



INTRODUCTION

This new and revised edition of the A.T.M. Catalogue presents in a convenient and readily accessible form a detailed description of the products of Automatic Telephone & Electric Co., Ltd.

Convenient form of presentation.

The Catalogue is divided into fourteen sections, each dealing with a major product group, for issue as separate publications if required. Some of these sections are further sub-divided into sub-sections describing individual components, assemblies and accessories. The Catalogue does not refer to systems and methods since a comprehensive range of Engineering Bulletins exists to fulfil this need and copies of these will be supplied on request. The Catalogue is assembled on the loose-leaf principle thus permitting additions or alterations to be made. New sheets incorporating any necessary amendments will be issued from time to time thus enabling the volume to retain its value to users as a compendium of telecommunication equipment.

Finish of equipment.

The finishes render all items listed suitable for use under most climatic conditions but special finish may be provided on request.

Modifications of equipment.

As the Company's policy has been, and is, to strive continuously to improve products, the right is reserved to change the design of, or withdraw at any time without notice, any item listed.

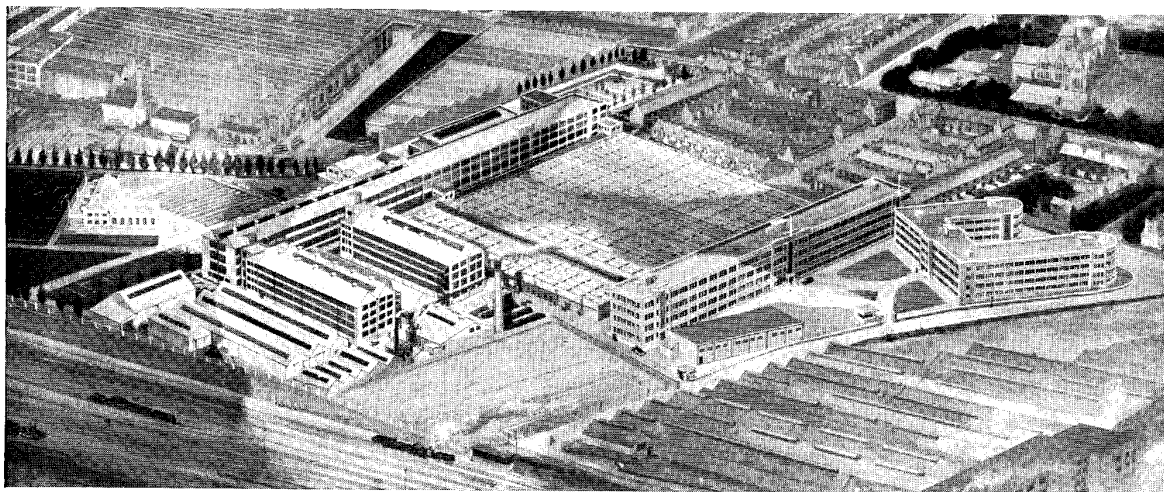
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AUTOMATIC TELEPHONE & ELECTRIC CO. LTD

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AN IMPRESSION OF STROWGER WORKS, LIVERPOOL, WITH EXTENSIONS COMPLETED

THE COMPANY

Automatic Telephone & Electric Co. Ltd. was originally known as Automatic Telephone Manufacturing Co. Ltd., hence the Company's trade mark incorporating the letters "A.T.M."

The Company was formed in 1912 to manufacture and exploit in Great Britain and certain world territories, automatic telephone equipment which operated on the Strowger system of "step by step" decimal selection.

The premises and staff of Telegraph Manufacturing Company Limited, a small subsidiary Company of the then British Insulated Cables Limited, Edge Lane, Liverpool, were taken over by the newly formed company as a nucleus production unit. For many years, excluding the war years of 1914-18, production of telegraph instruments and telephone exchange equipment—both manual and Strowger automatic—proceeded side by side. Eventually, with the adoption of the Strowger system by the British Post Office and other large public and private telephone administrations in various parts of the world coupled with the decline in the demand for telegraph apparatus, the capacity of "Strowger Works"—as the factory had been termed—was devoted to the manufacture of an ever increasing quantity of Strowger equipment for telephony and a number of special signalling systems which had been developed to serve other purposes.

Over the period of from 1912 to the present time, the Company has increased its personnel and manufacturing floor space by more than ten times; has built and equipped a number of research laboratories; has established branch offices and service depots throughout Great Britain, and has promoted a sales organisation of associated companies, agents and representatives throughout the world. Concurrently, the Company acquired additional manufacturing premises in Fazakerley and Speke, Liverpool, and control of companies in various parts of the country producing electronic devices and the like which enter into one phase or another of telephone practice.

In 1946 the Company, in co-partnership with its associated company, British Insulated Callender's Cables Ltd., formed British Telecommunications Research Limited, Taplow Court, near Maidenhead, to undertake special research in open wire, cable and radio transmission.

With this augmentation of its own research facilities—noted for such developments as the Director system, the type 32A selector (B.P.O. Type 2000) the all-electric totalisator, calling line identification, etc., etc.—the Company on account of its numerous patents held, its specialist engineering technique and its vast manufacturing resources, is in an immensely powerful position to offer consultative services to any authority, and to undertake the planning, engineering and production of equipment for telecommunications or special signalling schemes of any magnitude.

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LIST OF "A.T.M." PRODUCTS

TELEPHONE SYSTEMS FOR NETWORKS OF ANY SIZE

Automatic telephone equipment for main and satellite exchanges.	Calling line identification equipment.
Director systems for metropolitan areas.	Manual exchanges.
Type 2027 automatic telephone equipment.	Private automatic and manual branch exchanges.
Time metering equipment.	Private automatic exchanges.
Rural automatic exchanges.	Press-button telephone systems.
Semi-automatic exchanges.	Telephones and accessories.
Automatic and automanual trunk exchanges.	Switchboard lamps (Hivac Ltd.).

SIGNALLING EQUIPMENT FOR TELEPHONE SYSTEMS.

V.F. systems of signalling and dialling using C.C.I.F. codes.
 500/20 c/s signalling equipment.
 50 c/s dialling equipment.

RADIO AND TRANSMISSION EQUIPMENT.

V.H.F. Multichannel Radio Telephone Equipment.
 V.H.F. Fixed and Mobile, single and multiple channel equipment.
 Radio Telegraph Equipment: Frequency Shift Keying Units and Receiving Terminals, Dual Diversity V.F./D.C. Converters for on/off keying, Wide Band Aerial Matching Units.
 Telegraph Transmission Equipment: Electronic Teleprinter Regenerative Repeaters, Electronic Teleprinter Transmitter Distributors, Teleprinter Tape Readers.
 Single, 3-, 4- and 12-channel carrier telephone systems for overhead wires or underground cables. 4-, 6- and 8- channel carrier telegraph systems and 6-, 12-, 18- and 24-channel V.F. telegraph systems.
 Speech Inverter and Secraphone Equipment.
 Transmission Testing Equipment.
 Loading coils.
 Electronic valves including military types (Hivac Ltd.).
 Carrier and Audio Repeaters.
 Cold Cathode Tubes.

REMOTE CONTROL SYSTEMS.

Systems of remote selection and control with indication and telemetering equipment for the following:—
 Electricity distribution networks.
 Gas distribution networks.
 Oil distribution networks.
 Electric railway, tram and trolley bus transport undertakings.
 "Rythmatic" ripple control systems for street lighting, selective load control and other operations.

SPECIAL SIGNALLING SYSTEMS.

Mine telephones and signalling equipment.	Vehicle-actuated street traffic signals for simple and complex intersections; interlinked systems.
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INTRODUCTION AND INDEX

	Section		Section
A ccumulator batteries	F	Boxes, distribution	B, BA
Accumulator charging panels, direct current	C	Boxes, fuse and arrester (for pole mounting)	BA
Adapter for capsule transmitter	EB	Branch exchanges, private, automatic	CA
Adjusting tools	AE	Breastplate telephones	EA
Agglomerate block cells (Leclanche)	FA	Buried sleeve-type loading coil cases	GA
Alarm fuses and mountings	BB	Bus bars	BB, BC
Alternating-current relays	AA	Bus bar terminal strip	BC
Ampere meter	AE	Buzzers	H
Anti-sidetone transformer	ED		
Armature replacing tool	AE		
Arrester carbons	BB		
Arrester mica separators	BB		
Arresters, lightning	BA, BB		
Automatic exchanges, private	C, CA		
Automatic switches	A		
Automatic telephones	E		
Auto-repeater unit	J		
	Section		Section
B ackboards for local battery telephones	FA	C able terminals	B, BA
Bands, rubber, for batteries	FA	Call counters or meters and mountings	AB
Bank contact cleaner	AE	Call indicator, visual	EE, H
Banks, selector contact	A	Canister-type loading coil cases	GA
Barretters	DC	Capacitor mountings	AC
Base, relay mounting	AA	Capacitors	AC
Batteries, primary, wet and dry	FA	Caps, ear	EB
Battery boxes	FA	Capsule transmitter	EB
Battery carbons	FA	Capsule transmitter adapter	EB
Battery charging panels (direct current)	CC	Carbons, battery	FA
Battery charging resistors	CC	Carbons, lightning arrester	BB
Battery eliminators	CC	Cells, dry	FA
Battery hydrometer	F	Cells, Leclanche	FA
Battery zincs	FA	Cells, primary	FA
Bell pattern receiver	EB	Cells, wet	FA
Bell sets, telephone	EE	Central battery telephones	E
Bell sets, telephone, insect proof	EE	Certified mining equipment	J
Bells (alternating current)	EE, H	Chargeable time indicator	AB
Bells (direct current), trembler	H	Charging panels, battery (direct current)	CC
Bells, fire	H	Charging resistors	CC
Bells, certified, for mines	J, H	Choke coils	DF
Bells, magneto	J, H	Cleaning tools	AE
Bells, single stroke	H	Clips, test	AE
Bells, telephone	EE	Clock, B.P.O. No. 44	AB
Bells, weatherproof	H	Coils, anti-sidetone	ED
Bending tools	AE	Coils, drainage	GB
Block, test terminal, for meters	AE, BC	Coils, heat	BB
Blocks, tag	BC	Coils, impedance	DF
Boxes, battery	FA	Coils, induction	ED
Boxes, bell	EE	Coils, repeating	GB
Boxes, cable terminal and protector	BA	Coils, resistance	AD
Boxes, cable terminal, indoor	B, BA	Coils, retardation	DF
Boxes, cable terminal, outdoor	BA	Colliery signalling equipment	J
		Comparative sizes of selectors	A
		Connection strips or tag blocks	BC
		Contact adjusters	AE
		Contact banks, Strowger selector	A
		Contact capsule	N
		Contact cleaners	AE
		Contact insulator	AE
		Contact pressure gauge	AE
		Contact for extension bells	H

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INTRODUCTION AND INDEX



	Section		Section
Cords, test	AE	G alvanometer	AE
Cord terminal strip	EB, BC, E	Gauges, contact pressure or spring tension	AE
Counters, telephone call or unit	AB	Gauges, feeler	AE
Coupling unit... ..	J	Generator magneto	J
Covers, relay	AA	Glass jars for Leclanche cells	FA
Cutting pliers, cutters	AE	Glass tube fuses	BB
Controllers, vehicle actuated	N	Gongs	H
	Section	Graphite	AE
D esignation strips	DC	Grease	AE
Desk telephones	E	Gredag	AE
Detector (B.P.O. No. 4)	AE		Section
Detectors, traffic signals	N	H and telephone, portable in case	E
Dial speed tester	AE	Hand telephones	EA, AE
Dials and dial mountings	EC	Headgear receivers	EA
Diaphragms, receiver	EB	Heat coil extractors	AE
Digit key strip	DE	Heat coils	BB
Distribution cases and boxes	B, BA	Heat coil strips	BA, BB
Distribution frames and racks	B	High-voltage relays	AA
Distribution rings	B	Hook-switch	EB
Double line fuse	BB	Horn, electric	H
Driver, jack-fastener	AE	Hygrometers, hair, recording, sling	AE
Driver, screw... ..	AE		Section
Dry cells... ..	FA	I mpedance coils	DF
Duck-bill pliers	AE	Impulse regenerator	A
	Section	Impulse speed tester	AE
E ar caps or earpieces, receiver	EB	India-rubber bands for agglomerate cells	FA
Electric horn	H	Indicator, chargeable time	AB
Eliminators, battery	C	Indicators and mountings	DD
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Explosive fuses	BB	Insect-proof telephones	E
Extension bells	H, EE	Inset receivers	EB
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Extension switch key	DE	Inset transmitters, adapter for	EB
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	Section	Insulating cover for bus-bar	BB
F eelers gauges	AE	Insulator, relay contact	AE
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Fire bells	H	Ironclad telephones	E
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Fuse panels	BA, BB	Jack fastener	DB
Fuses, alarm, explosive, etc.	BB	Jacks and plugs	DB
Fuse assembly, "Rythmatic" control	M	Jack-fastener driver	AE
Fuses, mountings	M, BB	Jack strips	DB
Fuses, strips	BB		
Fuses, high voltage	N		

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INTRODUCTION AND INDEX

	Section		Section
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Junction box for traffic signals	N	Mica separators	BB
		Mine telephones	J
		Mineral oil	AE
	Section	Minor switch, Strowger	A
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Keys, digit	DE	Mountings, fuse	BB
Keys, extension switching	DE	Mountings, heat coil	BA, BB
Keys, lever type, and mountings	DE	Mountings, indicator	DD
Keys, meter	DE	Mountings, key	DE
Keys, mountings for	DE	Mountings, relay	AA
Keys, order wire	DE	Mountings, resistor	AD
Keys, plunger, and mountings	DE	Mouthpieces, transmitter	EB
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Lamps, switchboard	DC	Oil	AE
Lamp and lamp cap extractors	AE	Oildag	AE
Lamp Jacks	DC	Operators' telephones... ..	EA
Leclanche cells	FA	Order wire keys, plunger type and mountings	DE
Lever switch	DE		
Lever type keys and mountings	DE		Section
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Lightning arresters and fuse panels... ..	BA	Panels, fuse and arrester	BA, BB
Lightning arresters and protectors	BA, BB	Pedestrian control units	N
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Line switch	A	Phantom units	GA
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		Plates, mounting, relay	AA
	Section	Plates, mounting, resistor	AD
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Magneto switchboards... ..	J	Plugs, test	AE
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Mains transformers	GB	Plug, 6-way	DB
Maintenance tools... ..	AE	Plug, 8-way	DB
Manual switchboards	D	Plug, 12-way	DB
Marginal relays	AA	Plug, for operator's instruments	DB
Master timers	N	Plug, 4-way for testing auto-exchange equipment	DB
Mercury contact relays	AA	Plunger type keys and mountings	DE
Meter cover tongs	AE	Polarised relays	AA
Meter keys and mountings plunger type	DE	Pole, mounting box	BA
Meter test plug	AE	Porcelain tube fuses	BB
Meter test terminal block	AE, BC	Porous pots	FA
Meter test terminal strip	AE, BC	Pre-selectors... ..	A
		Pressure gauges for relay contacts	AE

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INTRODUCTION AND INDEX



	Section		Section
Primary batteries	FA	"Rythmatic" mechanical locking relay	M
Private automatic exchange equipment (P.A.X.)	C	"Rythmatic" Control switch housing	M
Private automatic branch exchange equipment (P.A.B.X.)	CA	"Rythmatic" alternator set	M
Protectors	BA, BB	"Rythmatic" 4-pole contactor	M
Psychrometer, sling	AE	"Rythmatic" E.H.T. injection transformer	M
Push switch	H	"Rythmatic" control desk, 16 signals	M

	Section		Section
R acks, distribution	B	S alammoniac... ..	FA
Receiver diaphragms	EB	Screwdrivers... ..	AE
Receiver earpieces or caps	EB	Screwdrivers, offset	AE
Receiver hook-switch	EB	Secretarial cabinet	C
Receiver inset	EB	Selectors, Strowger	A
Receivers, telephone	EB	Selectors, Strowger, contact banks	A
Receivers, metal cased	EB	Selector plug	DB
Recording hygrometer	AE	Selector wipers	A
Rectifiers... ..	C	Semi-automatic exchanges	R
Relay covers	AA	Separators, mica	BB
Relay mounting plates and covers	AA	Sets, relay	A
Relay sets and groups... ..	A, AA	Shelf jack	DB
Relay tools	AE	Shoe horn, relay armature	AE
Relays	AA	Signals, traffic	N
Relays, alternating current... ..	AA	Shunt-field relays	AA
Relays, high voltage, isolating	N, AA	Single jacks gauge B	DB
Relays, line and cut-off	AA	Single-stroke gong	H
Relays, magnetic lock and reverse current release	AA	Sling psychrometer (hygrometer)	AE
Relays, marginal	AA	Slow-operating relays... ..	AA
Relays, mercury contact	AA	Spacing strips for jack... ..	DB
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Relays, shunt-field	AA	Speed tester, dial impulse	AE
Relays, slow-operating	AA	Spools, resistor	AD
Relays, slow-releasing	AA	Spring benders	AE
Relays, thermal	AA	Spring contact cleaner... ..	AE
Relays, time check and alarm	AB	Spring tension gauge	AE
Relays, two-step	AA	Stand, test, for Strowger selectors	AE
Relays, type 3000	AA	Strip, test terminal for meters	AE, BC
Relays, type 600	AA	Strips, connection... ..	BC
Relays, T6000 type	AA	Strips, connecting terminal... ..	BC
Repeater, dial impulse	A	Strips, digit key	DE
Repeaters	GB	Strips, terminal	BC
Repeating coils	GB	Strowger selectors	A
Resistance box, adjustable	AE	Strowger selector test set	AE
Resistors, porcelain, non-inductive and inductive types	AD	Strowger selector test stand	AE
Resistor mountings	AD	Strowger selector wipers	A
Retardation coils	DF	Subscribers' instrument protectors	BB
Ringers, telephone	EE, H	Subscribers' meters	AB
Ringling transformer	GB	Switchboard lamp extractor	AE
Rings, jumper distribution	B	Switchboard jacks and plugs	DB
Ripple frequency motor alternator	M	Switchboard plug gauge B	DB
Rubber bands for agglomerate cells	FA	Switchboards, private automatic	C, CA
Rural automatic exchanges... ..	R	Switchboards, manual	D
"Rythmatic" control switch	M	Switch, extension	DE

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“STROWGER” SELECTORS

Fig. 2. Comparative sizes of Type 32A Selector and its predecessor.

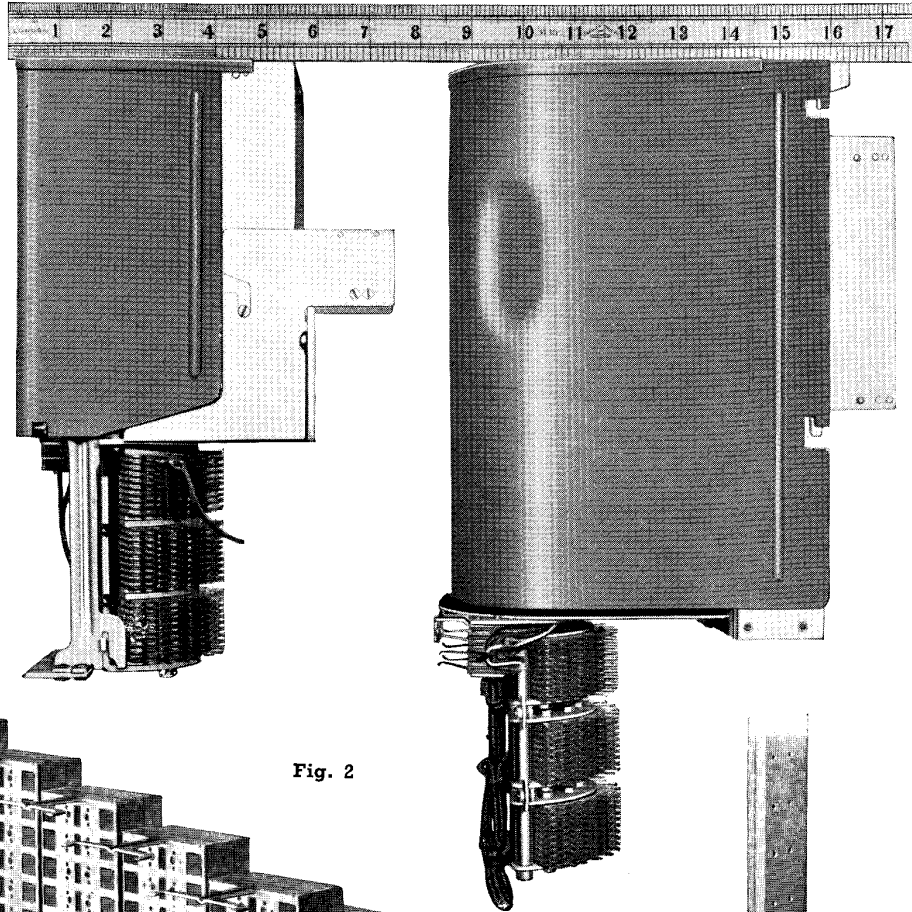


Fig. 2

Fig. 3. 32A Selector shelf with banks and typical relay bases.

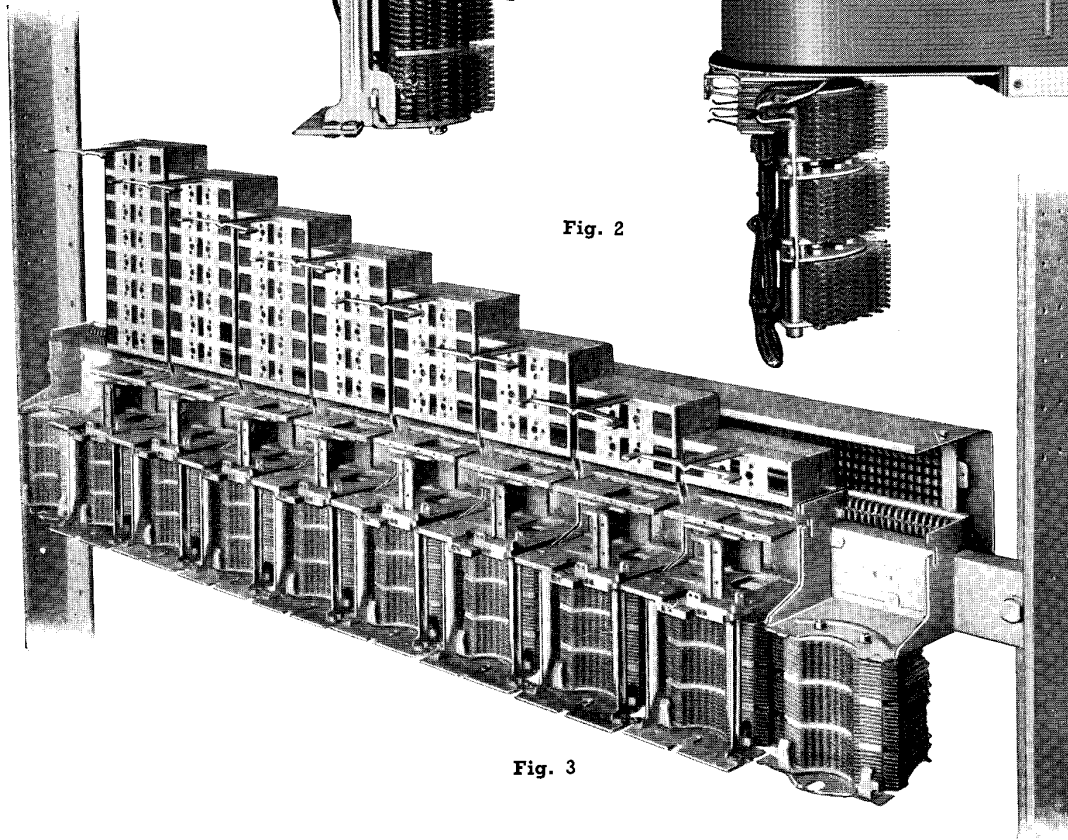


Fig. 3

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“STROWGER” SELECTORS



The finders operate in the normal way to connect repeaters to cord circuits. The amount of gain obtainable from these repeaters is set at two values, 6 db. and 10 db., either of which may be selected by the operator as required.

A full description of the mechanical and electrical features of the Type 32A Selector is given in Engineering Bulletin No. 400, which will be sent on request.

The 32A Selector has so many advantages that its use is indicated for all new exchanges, also for extensions of existing exchanges.

The smaller overall size (which permits a larger amount of equipment to be installed in the same floor space), the three-fold increase of bank capacity (ten banks of 220 points each), the simplicity and permanence of adjustments (with consequent reduction of maintenance costs), all offer advantages which no operating administration can afford to ignore.

Fig. 2 shows the comparative sizes of the new and old selectors, from which the reduction in cubic capacity will be obvious.

Fig. 3 shows the method of mounting the cradles carrying contact banks on the shelf. The selector cradles are shown without mechanisms for the sake of clarity. The rigidity of the bank fixing is such that selectors may be jacked in position without the necessity for wiper adjustment to the bank, after the initial setting in that position. Type 3000 relays are fitted as standard.

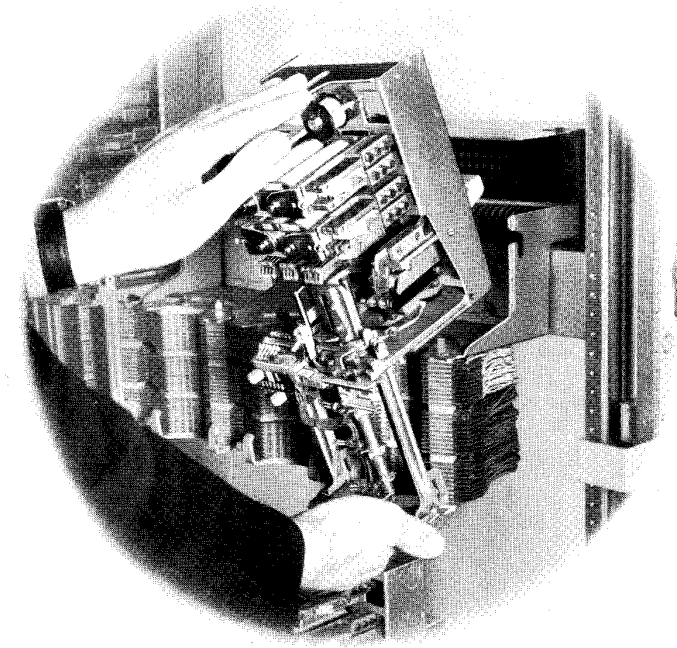


Fig. 4

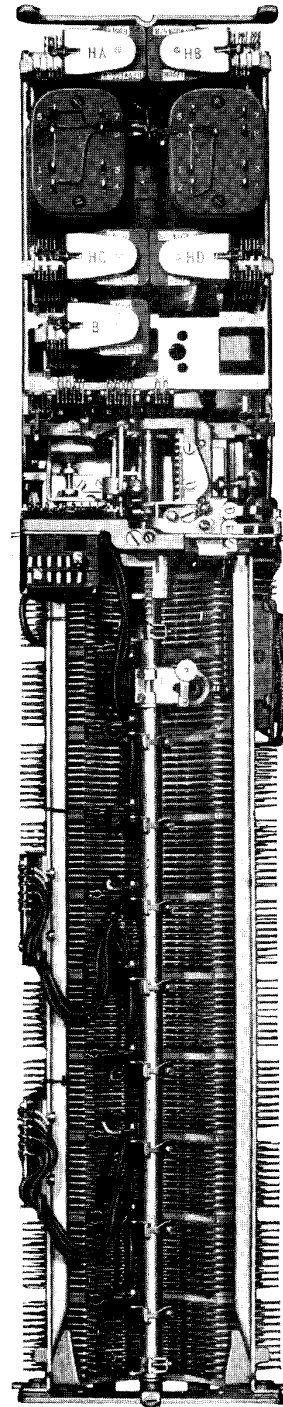


Fig. 5

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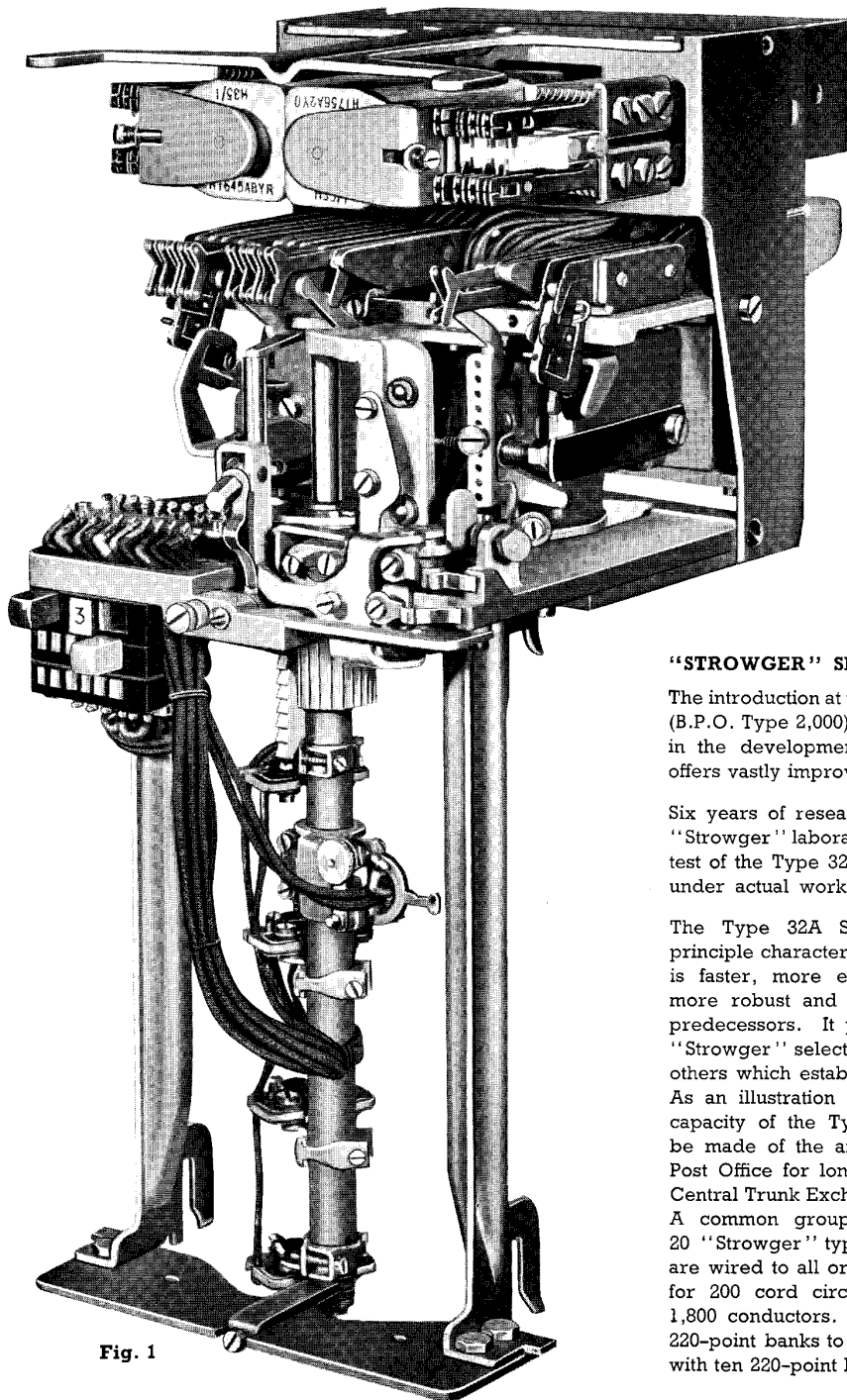


Fig. 1

“STROWGER” SELECTORS. Fig. 1

The introduction at the end of 1935 of the “Strowger” Type 32A (B.P.O. Type 2,000) Selector marked a very important advance in the development of automatic telephone practice which offers vastly improved service and facilities.

Six years of research and experimental work in “A.T.M.” “Strowger” laboratories culminated in a two years’ exhaustive test of the Type 32A Selector in British Post Office Exchanges under actual working conditions.

The Type 32A Selector retains the two-motion operation principle characteristic of former “Strowger” selectors, but it is faster, more efficient, more compact, more capacious, more robust and more economical in all respects than its predecessors. It performs all the functions associated with “Strowger” selectors, and in addition is capable of furnishing others which establish new standards in telephone operation. As an illustration of a new facility afforded by the greater capacity of the Type 32A Selector, particular mention may be made of the arrangement adopted by the South African Post Office for long-distance working. In the Johannesburg Central Trunk Exchange, cord circuit repeaters are employed. A common group of 20 of these repeaters is wired to 20 “Strowger” type 32A finder selectors, the banks of which are wired to all ordinary cord circuits. Capacity is required for 200 cord circuits of nine conductors each, a total of 1,800 conductors. This is achieved by fitting nine standard 220-point banks to each finder. Fig. 5 shows a selector fitted with ten 220-point banks.

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“STROWGER” SELECTORS

The range of relay mountings shown is from 2 to 16, but mountings can be provided for up to 26 relays. The end position shows the shelf jack which engages with the selector jack to establish connection between the selector and shelf wiring without soldered connections.

Fig. 4 shows the simple method of placing a selector in position.

Fig. 6 shows the capacitor box hinged to the back of the selector relay plate, which also acts as a cover for the relay wiring.

The Type 32A Selector will, in future, be supplied as standard for new exchanges, also for extensions to existing exchanges (where practicable), with consequent advantages to purchasers.

The British Post Office has adopted the new “Strowger” Selector as standard, assigning to it the Type No. 2000.

To those who may not be acquainted with “Strowger” automatic telephone exchange equipment, the following description of the general characteristics and functions of “Strowger” selectors will be of interest.

The “Strowger” Selector is the fundamental component of the “Strowger” automatic telephone system, and has numerous applications, apart from telephony. It can be applied to particular problems wherever step-by-step selective switching principles are involved. It is a two-motion automatic selector functioning on a decimal basis, capable of making ten steps vertically, and eleven horizontally for each level—110 in all.

Multiples of 110 selections are obtained by increasing the number of banks of fixed contacts traversed by the selector wipers.

Each selector comprises a rust-proof die-cast frame, upon which is mounted the mechanism, comprising magnets, shaft, vertical and rotary armatures, pawls and ratchets, also mechanically-operated springs.

The frame is conveniently mounted on a back-plate, with accommodation for from two to twenty-six relays on the upper portion, according to type of selector and operating requirements.

Provision is also made for the accommodation of capacitors and repeating coils where necessary.

The mechanism and relays are protected by a slip-on dust-excluding metal cover.

The connections terminate in a plug, enabling the selector to be “jacked in” on its supporting shelf without disturbance of the permanent wiring or the need to make wired connections.

The plugs and jacks have silver plated springs to ensure satisfactory contacts between them.

Banks are fitted to cradles on the selector shelf so that selectors may be fitted or removed without disturbing the bank adjustment, thus rendering wiper to bank adjustment unnecessary after the initial setting.

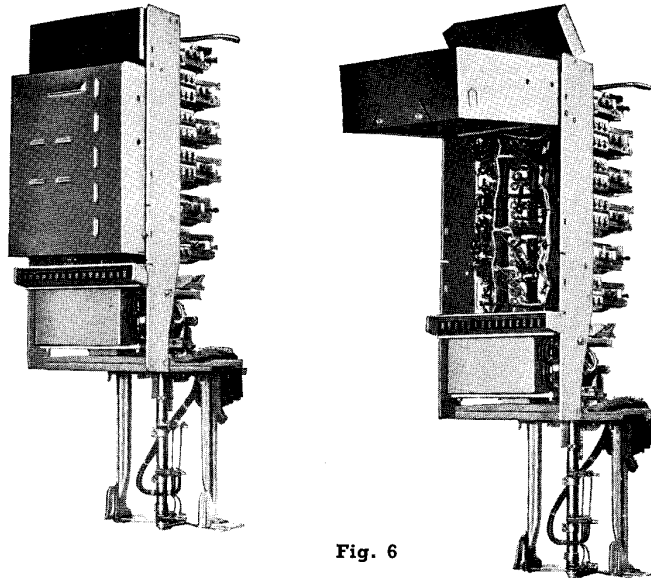


Fig. 6

Considered from an operating standpoint, selectors may be divided into four main groups:—

- (1) Those in which both vertical and rotary motions are entirely self-driven and independent of dialled impulses. Examples: (a) The 200-point line finder switch employed in the Strowger partial secondary line finder system. (b) The 1,800-point cord circuit repeater finder mentioned above.
- (2) Those in which the vertical motion is controlled by a train of dialled impulses, the rotary motion being self-driven. Examples: 10-10 and 10-20 group selectors.
- (3) Those in which both vertical and rotary motions are controlled by successive trains of dialled impulses. Examples: 100 and 200-point regular final selectors; 100 and 200-point test final selectors; 100 and 200-point trunk offering final selectors; 100 and 200-point combined regular and toll final selectors.
- (4) Those in which the vertical and rotary motions are controlled alternatively as described in 1, 2 or 3, with or without an intermediate release action during an inter-digital period. Examples: The B.C. selector of re-routing directors; digit absorbing selectors; switching selector repeaters; discriminating selector repeaters; P.B.X. final selectors, etc.

An extensive and increasing range of “Strowger” selectors is manufactured to suit all purposes. Various examples are illustrated, and it should be noted that the relay groups, contact banks, circuits, etc., can be varied to suit requirements. Selectors can be supplied for any combination of functions or circuit conditions. For example, in the type 2027 system they are used in Europe to rebuild and extend exchanges whose apparatus was originally of another type employing quite different circuit principles. Full particulars on request, accompanied by detailed requirements.

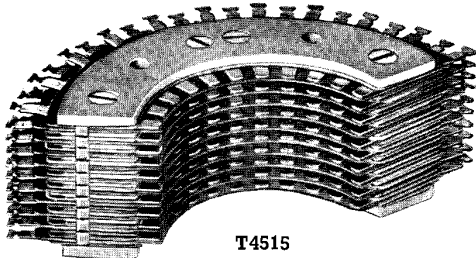
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T4515

T4515 Contact Bank.

For “Strowger” selectors 220 point. Comprising 10 levels, each of 11 pairs of brass contacts. Phenol fibre insulation; aluminium separators. As fitted to line finders, group and final selectors.

T4516.

As T4515, but nickel-silver contacts. As fitted to heavy-duty selectors, e.g., “A” digit selectors, “BC” selectors, etc.

T4517.

110 point. Comprising 10 levels, each of 11 brass contacts. Used as private bank on group and final selectors.

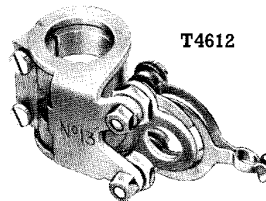
Length : Width : Depth : Weight :
 $4\frac{1}{2}$ " (114 mm.) $1\frac{1}{2}$ " (40 mm.) $2\frac{3}{8}$ " (60 mm.) $8\frac{1}{2}$ -ozs. (241 gm.)

T4612 Wiper Assembly.

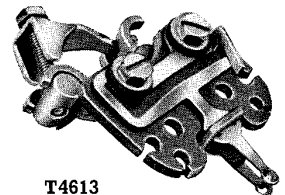
For vertical bank of type 32A selector.

T4613 Wiper Assembly.

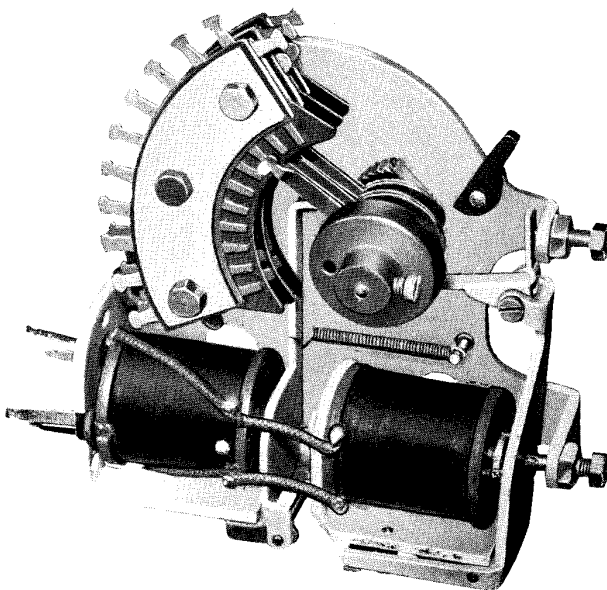
For line and private banks of type 32A selectors.



T4612



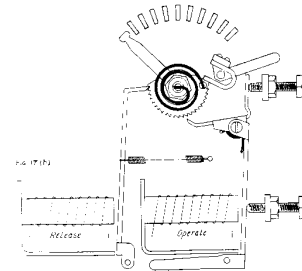
T4613



T4469 “Strowger” Single Motion Selector (Minor Switch).

Comprising selector movement actuated by electro-magnet through ratchet and pawl, release being effected by a release magnet and volute spring on wiper shaft. Fitted with 10-point contact bank having a maximum of three double-contact levels for a three-wire circuit.

T4469



The movement, magnets and bank are mounted on a zinc-plated steel frame.

Various combinations of bank contacts and common plates can be provided on the levels to meet requirements. Each pair of wipers connects the contacts to the common plate on their respective levels, thus eliminating wiper cords and wiper contact springs.

Magnets can be wound to suit any voltage. Adjustment is provided for wipers to rest normally on or off first contact. A typical example, T4469, is a 3-level, 50-volt minor switch with wipers normally off the first contact.

Contacts per level: 1st level—10 contacts and 1 common plate. 2nd level—2 contacts, 8 common and 1 common plate. 3rd level—1 contact, 9 common and 1 common plate.

Length : Width : Depth : Weight :
 $4\frac{1}{2}$ " (114 mm.) $4\frac{1}{2}$ " (114 mm.) $1\frac{1}{8}$ " (48 mm.) 14-ozs. (397 gm.)

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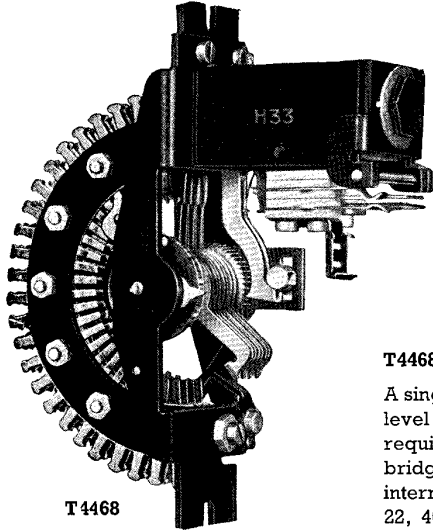
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“STROWGER” SELECTORS

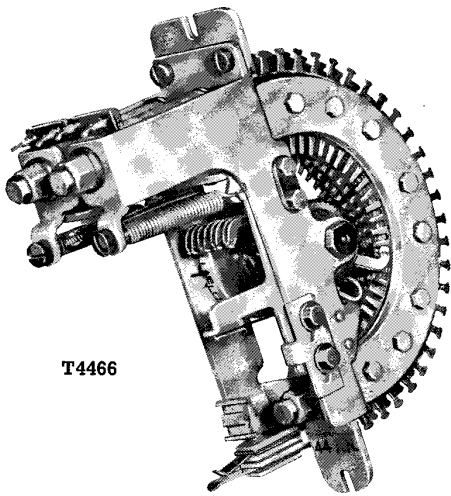
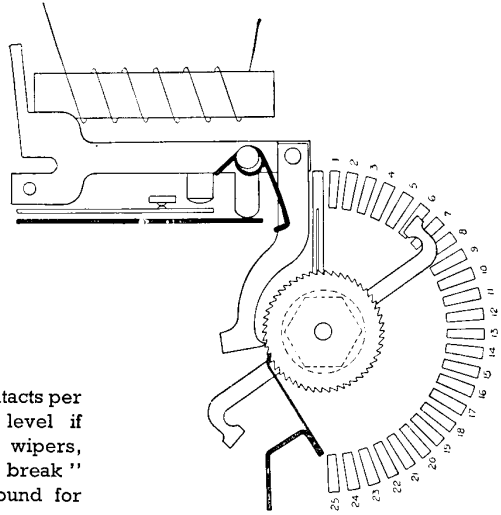


T4468

Length : $5\frac{1}{16}$ " (144 mm.)
 Width : $2\frac{1}{8}$ " (52 mm.)
 Depth : 5" (126 mm.)
 Weight : $1\frac{5}{8}$ -lbs. (737 gm.)

T4468 Uniselector.

A single-motion selector. Twenty-five contacts per level; 1-8 levels, including homing level if required. Single or double-ended wipers, bridging or non-bridging. Fitted with "break" interruption springs and test jack. Wound for 22, 40, 50 or 60 volts operation.

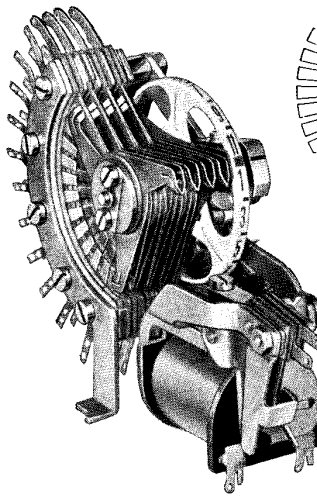


T4466

T4466 Uniselector.

A single-motion selector, as T4468, but with two-coil driving magnet.

Length : $5\frac{3}{8}$ " (146 mm.) Width : $2\frac{1}{8}$ " (54 mm.) Depth : $5\frac{5}{8}$ " (143 mm.) Weight : $1\frac{1}{2}$ -lbs. (681 gm.)

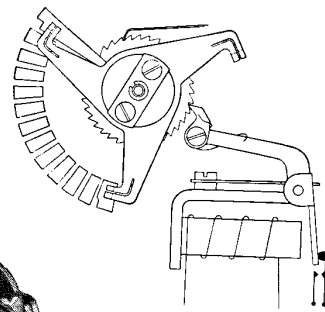


T4467

T4467 Uniselector.

A single-motion selector. Twelve contacts per level; 1-6 levels, including homing level if required. Bridging or non-bridging wipers. Fitted with "break" or "make" interrupter springs according to requirements. Wound for 24, 50 or 60 volts operation.

Length : $3\frac{3}{8}$ " (85 mm.) Width : $4\frac{3}{8}$ " (111 mm.) Depth : $1\frac{5}{8}$ " (41 mm.) Weight : 10-ozs. (283 gm.)



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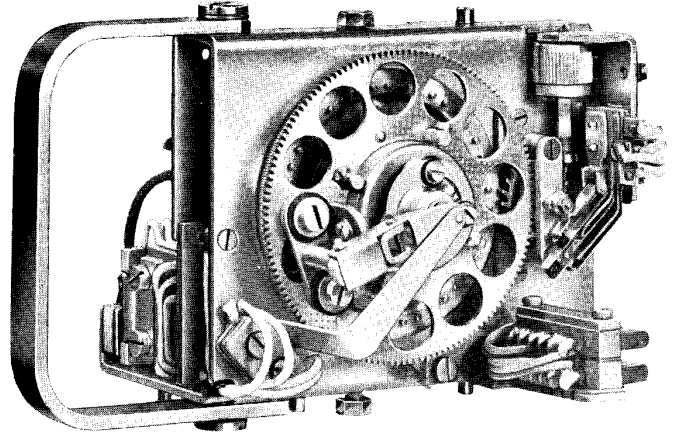
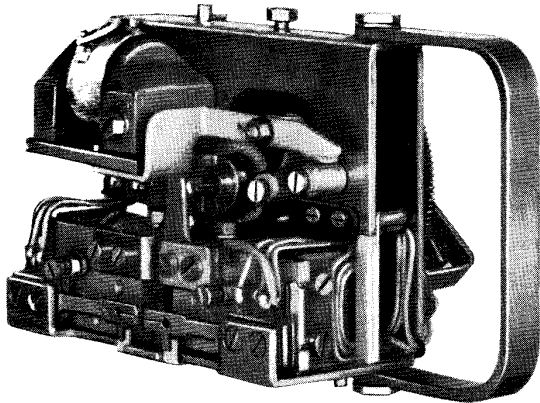
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T3584 Dial Repeater Mechanism.

Consisting of a dial repeater mechanism only, as briefly described above.

Height : 3½" (89 mm.) Width : 3½" (89 mm.) Depth : 4¼" (108 mm.) Weight : 3¼-lbs. (1.47 kg.)

The Dial Repeater

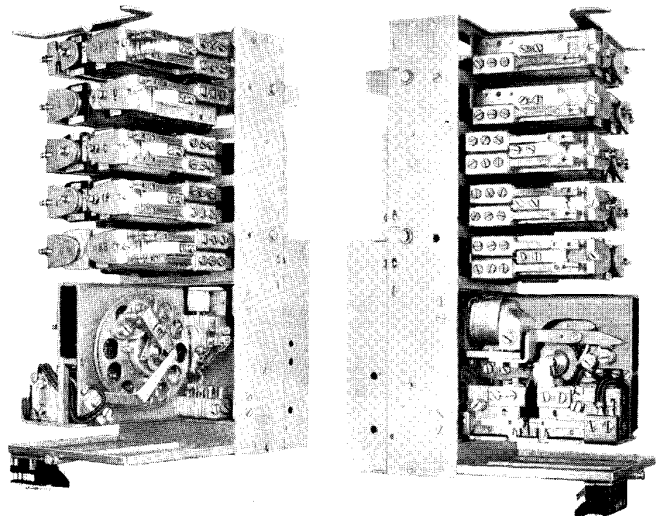
(Impulse Regenerator B.P.O. No. 1)

The primary function of a dial repeater is to repeat trains of impulses over a two-wire junction to establish an inter-exchange call. It also transmits supervisory signals to the calling exchange. A dial repeater is particularly suitable for use in exchange areas where the impulsing conditions are extreme, or in which impulse repetition at more than two exchanges in tandem is involved.

The dial repeater is virtually a mechanical storing and transmitting device which first stores each train of impulses (all of which may be distorted) and then transmits perfect impulses at standard speed and ratio, thus eliminating the effects of impulse distortion.

The mechanism, which is controlled by three electromagnets, comprises a fixed plate having a ring of 42 close-fit sliding pins, a pin-setting lever on a ratchet wheel, and a pin-restoring plunger, the latter being mounted on a spring-driven wheel suitably geared to the impulsing springs and governor. A detailed explanation of the operation and full description will be furnished on request.

The dial repeater is also used for effecting economies in junctions of automatic networks, for providing multi-fee metering facilities, for converting impulses from D.C. to A.C., for assisting P.A.B.X. operators, and for other cases where storage and translation or plain repetition of impulses is required, notably in V.F. signalling systems.



T3585 Dial Repeater.

Consisting of one dial repeater mechanism and controlling relays assembled in the form of a self-contained jack-in unit with test jack and single-piece cover.

Height : 11½" (292 mm.) Width : 4⅝" (118 mm.) Depth : 6¾" (172 mm.) Weight : 14¾-lbs. (6.68 kg.)

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RELAYS.

Although designed primarily for telephone service, there are many other fields of application for the relays illustrated and described herein, and there is ample choice in the standard ranges to meet any reasonable specification.

Designed for mounting on plates with coil horizontal, the general construction comprises a single or multiple winding of enamelled wire with core, armature and heel-piece of soft iron. Nickel-silver springs are mounted on the heel-piece, the contacts being of platinum, silver, gold-silver, gold-silver-platinum, or "platit," according to requirements.

Spring combinations can be varied in number and relation of "make" and/or "break" contacts as required, the maximum number of springs which can be accommodated depending on the type of relay.

In addition to the relays for direct current operation, a range of relays has been designed specifically for alternating current operation.

Mounting plates and covers can be supplied either singly or in combination for any desired grouping or arrangement of relays.

Broadly, relays fall into two main classes, determined by their original purpose, i.e., manual relays (as used in the line and supervisory circuits of manual telephone switchboards) and automatic relays (which constitute a considerable proportion of "Strowger" automatic exchange equipment).

With the evolution of auto-manual working there is a tendency, in practice, for the two groups to merge, the automatic class being better adapted in many instances to meet the more exacting requirements of modern manual working. Thus no hard and fast line can be drawn in the above classification, which has been adopted for convenience.

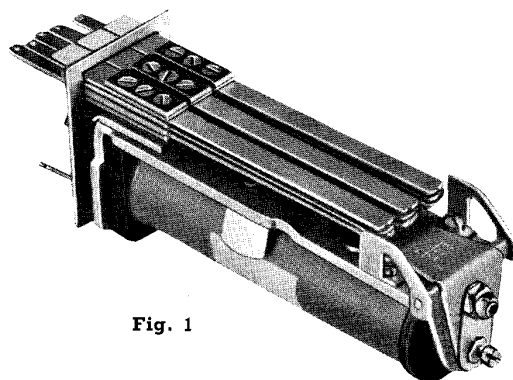


Fig. 1

The Type 8000 series, illustrated in Fig. 1, is an example of the former class, the springs being mounted above the coil, and limited to a maximum of nine, in three groups of three springs to each relay.

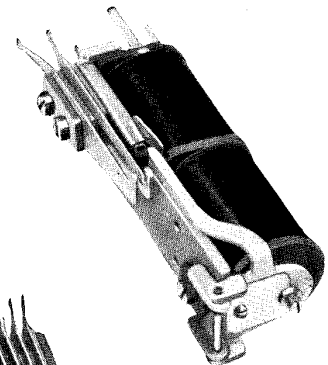


Fig. 2

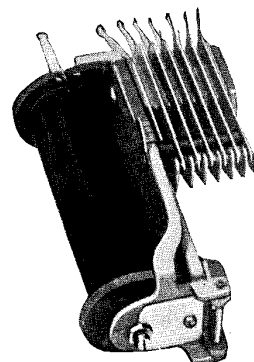


Fig. 3

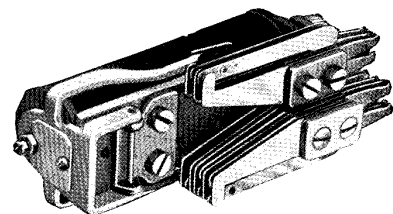


Fig. 4

Automatic relays, on the other hand, cover a far more extensive field, both in general construction, spring arrangement, and operating characteristics.

The disposition of the springs of automatic relays may be either on the left, right, or both sides of the coil, viewed from the armature end, as illustrated in the HL, HR and HLR series, Figs. 2, 3 and 4 respectively, the armature being provided with an extension arm or arms for actuating the springs.

This alternative disposition makes for compact grouping, increased spring accommodation, and ease of access to springs and contacts for inspection and adjustment.

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Where circumstances call for slow-operating or slow-releasing characteristics, the relay is fitted with a copper slug (the equivalent of a short-circuited winding) in addition to the ordinary single or multiple winding, its size and position on the core being determined by operating requirements. For slow-operating relays the slug is fitted at the armature end of the core, and for slow-releasing relays at the heel end of the core, as illustrated in Figs. 5 and 6 respectively.

Operating characteristics also affect the choice of armature. Quick-acting relays are equipped with armatures which have a ratio of movement as between the extremity of the spring-actuating arm and the armature proper, of approximately $2\frac{1}{2}$ to 1, whereas slow-releasing relays are usually fitted with an armature giving a corresponding ratio of $1\frac{1}{2}$ to 1.

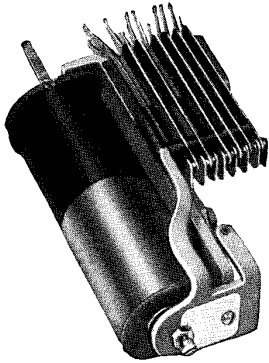


Fig. 5

The winding specification of relay coils can be varied to suit operating voltage and circuit requirements, the resistance ranging from a fraction of an ohm to thousands of ohms in extreme cases, without materially affecting the power required to operate the relay.

As prices of relays vary with the equipment of springs and other characteristics, it is impracticable to list all the possible combinations, therefore prices will be quoted in accordance with the types of relays and mountings specified in enquiries.

Some representative types of relay, taken from the standard ranges only, are illustrated. Relays will be designed and manufactured to any practicable specification, and enquiries for special relays are invited. The experience of skilled designers will be applied to all such enquiries.

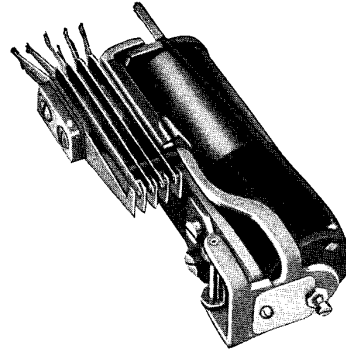


Fig. 6

Particulars of existing conditions and desired results should be given, and if practicable, all the following information should accompany enquiries :—

Operating voltage (D.C. or A.C., frequency, etc.).

Circuit conditions ; also operating, non-operating and/or releasing currents.

Maximum current and voltage that the relay contacts will have to carry. Frequency of operation.

Timing characteristics, that is, if to be normal or slow-operating, and/or slow-releasing.

Contact combination, e.g., "make," "break," "break and make," "make before break," etc.

Approximate resistance of winding.

Whether relays are to be supplied mounted or unmounted.

Following are particulars to indicate the main characteristics of the principal ranges of relays and types of standard mountings :—

T6000.

As used on colliery winding signal indicator, etc.

T8000.

As used in balanced pairs, with retardation coils of similar construction, for cord circuits on manual telephone switchboards. (Fig. 1).

T2711 Type HL.

Springs mounted on left of coil. (Fig. 2).

T2712 Type HR.

Springs mounted on right of coil. (Fig. 3).

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T2713 Type HLR.

Springs mounted on both sides of coil. (Fig. 4).

Slow-operating.

Copper slug at armature end of core. (Fig. 5).

Slow-releasing.

Copper slug at heel end of core. (Fig. 6).

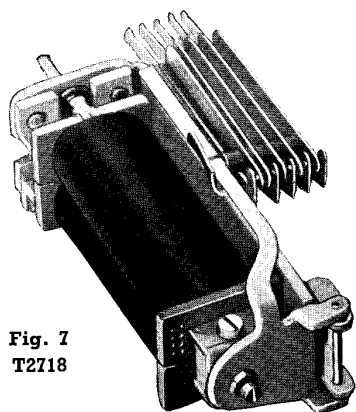


Fig. 7
T2718

T2718 Shunt Field Relay.

Fitted with two independent coils, current through the main coil operating in one direction only. (Fig. 7).

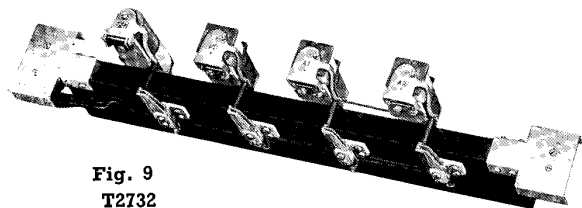


Fig. 9
T2732

T2732 High Voltage or Isolating Relay.

As used on remote supervisory control circuits for isolating the signalling circuits from high-voltage transmission lines. (Fig. 9).

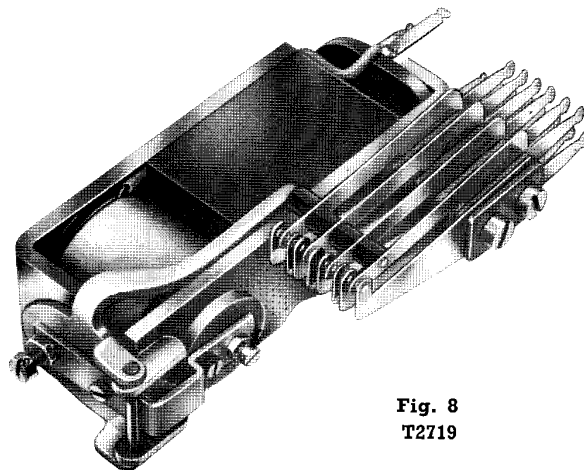


Fig. 8
T2719

T2719 Magnetic Locking and Reverse-Current Release Relay.

The operated armature is held in magnetic contact with the core, and released by reversal of current. (Fig. 8).

T2628 Two-step Relay.

Used as a combined line and cut-off relay. The armature movement takes place in two stages, the operating current being augmented during the second stage to overcome the increased spring reaction. (Fig. 8A).

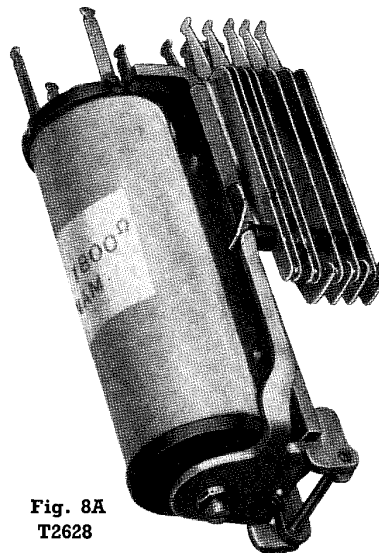


Fig. 8A
T2628

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T1182 Polarized Relay.

D.C.; 4 coils each 300 ohms; single make; twin silver contacts. A specially sensitive and powerful relay. Used for long-distance dialling and signalling (Fig. 10).

Also supplied with four 0.5 ohms or 100 ohms coils or two 300 ohms coils.

Length	...	...	4 $\frac{7}{8}$ " (124 mm.)
Breadth	...	...	4 $\frac{3}{8}$ " (111 mm.)
Depth	...	...	1 $\frac{1}{4}$ " (32 mm.)
Weight	...	...	1-lb. 14-ozs. (851 gms.)

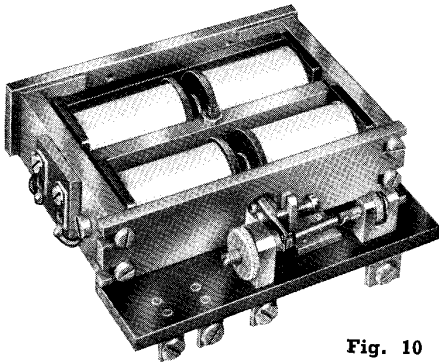


Fig. 10
T1182

T2736 Relay.

A.C. or D.C. A robust relay particularly designed for A.C. or D.C. track signalling circuits. Used for "Electro-matic" street traffic signals and "ATM" railway signals. (Fig. 11).

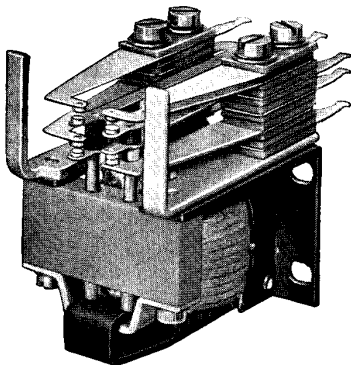


Fig. 11
T2736

T2734 Alternating Current Relay.

Fitted with copper-oxide rectifier. As used on the 16.66-cycle ringing current of telephone exchanges. Will accommodate a 4-spring combination, and functions without any tendency to armature vibration. (Fig. 12).

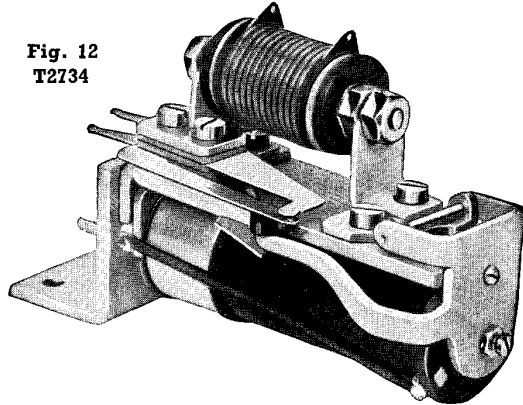


Fig. 12
T2734

T2679 Mercury Contact Relay.

Fitted with either one or two glass tubes filled with inert gas, and containing mercury arranged to bridge sealed-in contacts when tilted by armature. Contact rating, 5 amperes at 250 volts (A.C. or D.C.). (Fig. 13).

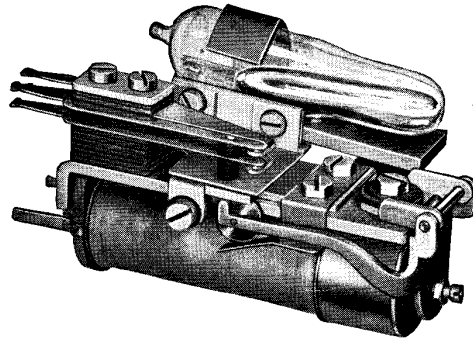


Fig. 13
T2679

"STROWGER" RELAY-SET MOUNTING BASES AND COVERS.

For mounting groups of automatic relays (as Figs. 2 to 8), repeating coils, capacitors, etc., on steel shelves in conformity with standard practice in "Strowger" automatic telephone exchanges. Comprising zinc-plated back-plate pierced for the accommodation of relays and arranged for bayonet type attachment to steel shelves, each plate fitted with dust-excluding grey enamelled cover.

Following is a list of typical relay mounting bases:—

T4705.

Accommodates 8 single and 2 double-armature relays, and 1 jack.

T4706.

Accommodates 10 single and 2 double-armature relays, and 1 jack.

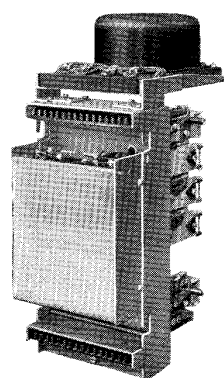
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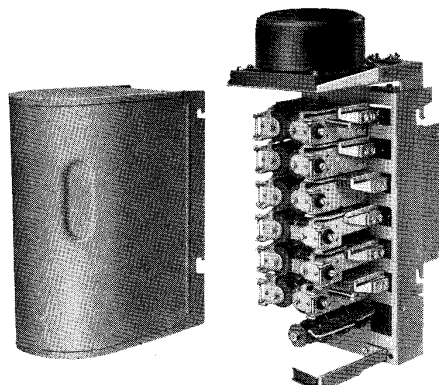
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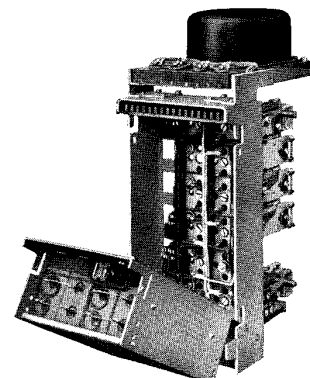
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(a) Capacitor box in normal position.



(b) Front cover off.



(c) Capacitor box tilted to show wiring.

Fig. 14. T4708

T4707.

As T4706, but with 2 jack positions.

T4708.

Accommodates 12 single and 2 double-armature relays, and 2 jacks (Fig. 14 shows resistors in place of double-armature relays and extra fittings for 1 repeating coil and 4 capacitors $2\mu\text{F}$).

T4709.

Accommodates 8 single and 4 double-armature relays, and 2 jacks.

T4710.

Accommodates 14 single and 2 double-armature relays, and 2 jacks.

T4711.

Accommodates 10 single and 4 double-armature relays, and 2 jacks.

T4712.

Accommodates 16 single and 2 double-armature relays, and 1 jack.

T4713.

Accommodates 12 single and 4 double-armature relays, and 2 jacks.

T4714.

Accommodates 18 single and 2 double-armature relays, and 2 jacks.

T4715.

Accommodates 20 single and 2 double-armature relays, and 2 jacks.

T4716.

Accommodates 22 single and 2 double-armature relays, and 1 jack.

T4717.

Accommodates 24 single and 2 double-armature relays, and 2 jacks.

T4718.

Accommodates 16 double-armature relays, and 2 jacks.

T4719.

Accommodates 26 single and 2 double-armature relays, and 1 jack.

T4720.

Accommodates 28 single and 2 double-armature relays, and 1 jack.

Additional equipment for the accommodation of capacitors and repeating coils can be included with any of the above mounting plates, and comprises capacitor boxes, with covers and clamping rods, and base for repeating coils, etc.

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Section AA  RELAYS AND MOUNTINGS

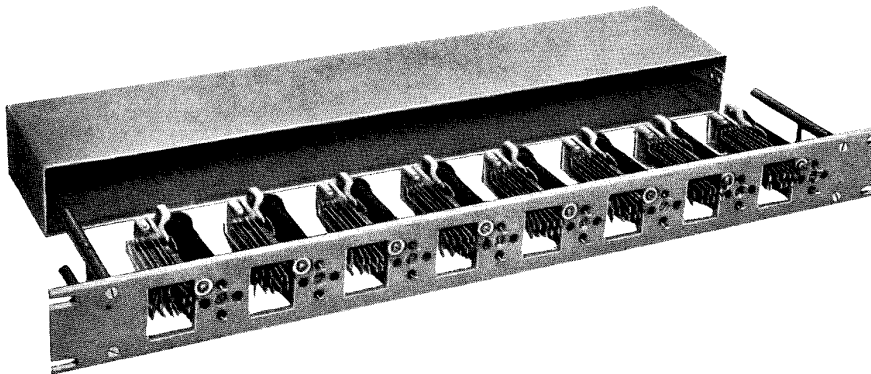


Fig. 15

Mounting Plates.

An extensive range of mounting plates is available for both manual and automatic relays. The plates are drilled and slotted for the reception of the relays, and have end slots for fixing screws (see Fig. 15). The finish is zinc plate, covers

being grey enamelled. Either individual or common covers can be supplied, the former being usual in the case of manual relays, except in the case of line and cut-off relays.

Automatic relays are usually fitted with common covers, but individual covers can be supplied in certain instances.

T No.	Number of Relays.	Type of Relay.	Type of Cover.	Length.		Width.		Depth.	
				ins.	mm.	ins.	mm.	ins.	mm.
4233	10	manual	individual	19	483	1.968	50	$\frac{7}{32}$	5.55
4234	17	"	"	$22\frac{1}{8}$	561	1.968	50	$\frac{7}{32}$	5.55
4235	10 pairs	"	in pairs	19	483	2.718	69	$\frac{7}{32}$	5.55
4236	17 "	"	"	$22\frac{1}{8}$	561	2.718	69	$\frac{7}{32}$	5.55
4237	3	HLR	common	8	203	1.968	50	$\frac{1}{8}$	3.2
4238	5	HR	"	$15\frac{1}{2}$	394	1.968	50	$\frac{7}{32}$	5.55
4242	7	"	"	19	483	1.968	50	$\frac{7}{32}$	5.55
4243	10	HL	"	$22\frac{1}{8}$	561	1.968	50	$\frac{7}{32}$	5.55

Prices and particulars of other mounting plates will be given on request, stating requirements.

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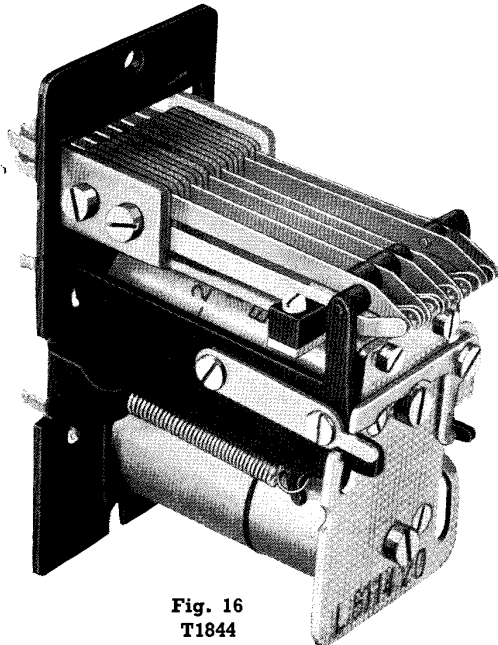


Fig. 16
T1844

T1844 Line and Cut-off Relay.

For 50-volt working on "Strowger" automatic telephone exchanges. Line coil 630 ohms, cut-off coil 1,300 ohms; mounted on cosletted steel back-plate; nickel-plated brass front-plate. Nickel-silver springs; gold-silver-platinum contacts. Line springs, single "break and make"; single "make". Cut-off springs, triple "break and make"; single "make". Other spring combinations can be supplied to meet requirements. Metal cover. Grey enamel finish. (Fig. 16).

Length: 4" (101 mm.) Width: 3½" (88 mm.) Depth: 2" (50 mm.) Weight: 1½-lbs. (680 gm.)

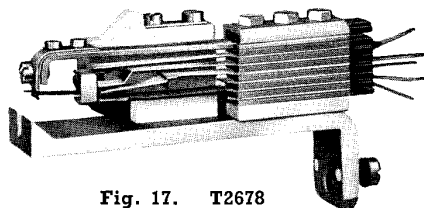


Fig. 17. T2678

T2678 Thermal Time-lag Relay.

For operating a "break" or "make" contact within a period determined by the heating effect of a current traversing a coil wound on a bi-metallic contact spring. Comprising bi-metal and nickel-silver springs, mica insulation, 100 ohms heating coil, single screw fixing. (Fig. 17). Can be adjusted to the following limits:—

To break contact: from 10 to approximately 15 seconds.
To make contact: from .55 to approximately .65 seconds.
These times can be extended by the addition of suitable resistances in series with the heating coil.

Length: 3¾" (96 mm.) Width: 7/8" (23 mm.) Depth: 1 1/16" (50 mm.) Weight: 3½-ozs. (100 gm.)

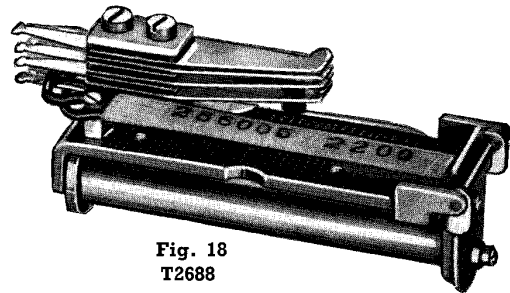


Fig. 18
T2688

T2688 Thermal Relay.

400 ohms coil, and 6 contact springs. With this type of relay, the coil may be wound, or different contact springs can be fitted (up to a maximum of 14 springs) to suit circuit conditions. Quotations for variations will be furnished on request. If required for use on a circuit with over 100 volts, an external resistance must be provided. Operating time, from 1 minute with 2½ watts, to 10 seconds with 15 watts. Maximum safe continuous load, 4 watts. (Fig. 18)

Length: 4" (102 mm.) Width: 1¼" (32 mm.) Depth: 1 9/16" (40 mm.) Weight: 5-ozs. (0.142 kg.)

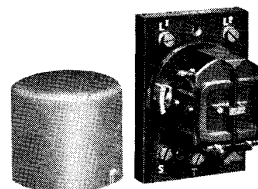


Fig. 19. T3540

T3540 Polarised Relay.

Single coil, 1,000 ohms, and magnet; supporting brass top-plate with bridge piece for balanced armature. Polished walnut base; circular aluminium cover secured by bayonet slots. (Fig. 19). Nickel-plated brass terminals on base.

T3541. Polarised Relay. As T3540, but 4,500 ohms.

T3542. Polarised Relay. As T3540, but 500 ohms.

Length: 4¾" (120 mm.) Width: 3¼" (82 mm.) Depth: 3 5/16" (84 mm.) Weight: 1¾-lbs. (794 gm.)

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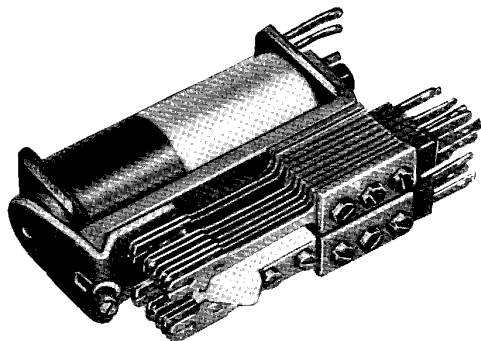


Fig. 20

Type 3000 Relay (T2Z14).

This is the standard telephone relay for automatic exchanges of the British Post office. It is of the knife-edge type, and the core is enlarged at the armature end. Each component part is of the highest grade material and is manufactured and tested to within very close limits; consequently, the operating characteristics of completed relays are uniform. Fig 20 shows a typical relay with a copper slug on the core and a fixed residual stud in the armature.

The contact springs are of nickel-silver, the end of each spring being slotted longitudinally to give the essential flexibility to each of the twin contacts, which are a special feature of this relay. Each relay has capacity for a total of 18 contact springs, these being mounted in two sets, each of which is readily detachable as a single assembly. Springs of two thicknesses, 12 mils and 14 mils, are normally used but thicker springs of up to 40 mils are also available for special purposes.

Whilst the contacts are generally of pure silver, platinum contacts are also available, and are used in all impulsing circuits.

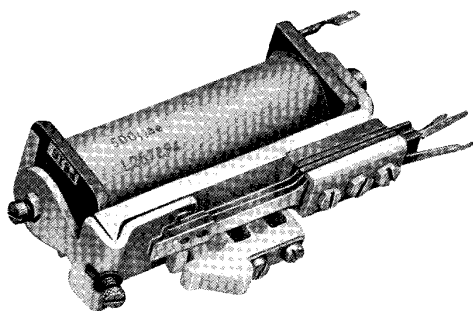


Fig. 22

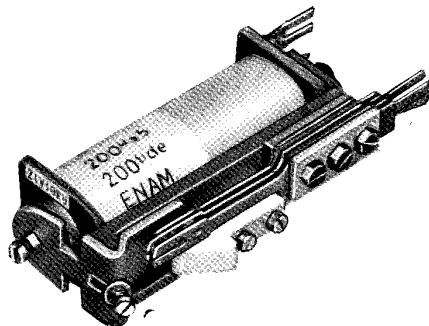


Fig. 21

A maximum of 5 tags can be accommodated on the cheek of the coil, thus making provision for various winding requirements. In order to provide delayed operating and releasing times, copper slugs of various lengths can be fitted at the heel or armature end of the core, as required. (See Fig. 20). For high impedance purposes, the core can be fitted with one or more nickel-iron sleeves, the latter extending the full length of the core, under the windings. A nickel-iron core is sometimes used.

A wide range of control of operating characteristics is also possible because of the variety of armatures available, which include the "isthmus" armature, "pear-shaped" armature, "residual screw" armature, and "fixed residual" armatures. A standard "fixed residual" armature has a stud of 4, 12 or 20 mils, as required, permanently fixed to the armature face. The "residual screw" armature provides adjustable control of the air-gap by means of a setscrew projecting through the armature face. The "isthmus" armature is of a special design, two slots being cut in the sides thus leaving a narrow neck which effectually limits the extent to which the working face of the armature can be saturated magnetically. The "isthmus" and "pear-shaped" armatures are used on impulsing relays. Fig. 21 shows a typical relay with "isthmus" armature with adjustable residual screw and Fig. 22 a relay with "pear-shaped" armature.

The armature is retained on its knife-edge seating by means of a compressed spiral spring and screw, the latter projecting through a slot in the armature and screwing into the heel-piece. A special tool is employed for adjusting the "stroke" of the armature. This tool is included in the catalogue section for tools and testing equipment as are the other maintenance tools required for this relay.

Length : $3\frac{7}{8}$ " (98 mm.) Width : $2\frac{3}{16}$ " (66 mm.) Depth : 1" (25 mm.) Weight : 12-ozs. (340 gm.)

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Mountings for Type 3000 Relays.

The type 3000 relay can be mounted either on steel relay-set bases fitted with switch jacks to engage the shelf jacks on channel type or 2000 type shelves, or on steel relay strips. In all cases, the relays are individually insulated from the mountings and from one another.

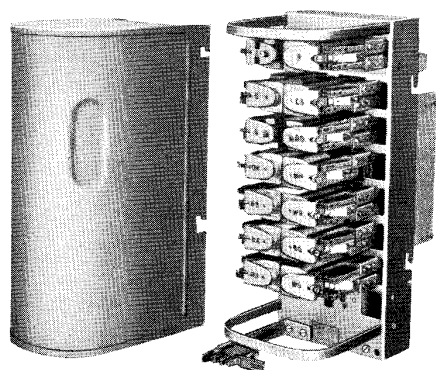


Fig. 23

Relay-Set Bases for mounting on Pressed Channel type shelves.

A wide range of standardised relay-set bases and strips is available—a typical base is shown in Fig. 23. These bases are designed to ensure convenience in handling and maximum

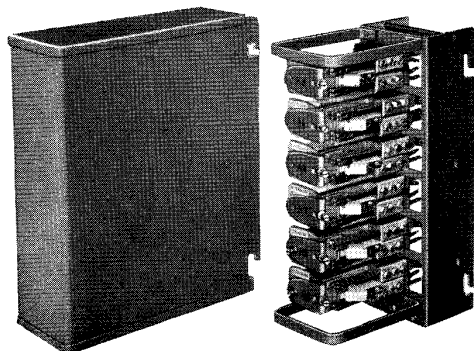


Fig. 24

utilisation of rack space. Standard bases are available in two widths, $4\frac{1}{2}$ " (113.5 mm.) (Fig. 23) and $2\frac{3}{8}$ " (60.3 mm.) (Fig. 24). The former are for mounting on $4\frac{3}{4}$ " (120.7 mm.) centres in positions 1 to 10 on channel type shelves, whilst the latter mount in the narrow end position, and usually carry supervisory and alarm relays.

The wider bases are available in 12 sizes and provide accommodation for from 10 to 32 relays, the length of the shortest being $7\frac{7}{8}$ " (200 mm.), and the longest $21\frac{1}{2}$ " (546 mm.). A repeating coil can also be accommodated at the top of each of these bases. Brackets are fitted at the top and bottom to provide convenient handles for withdrawing and replacing the relay groups, and effectively protect the relays from damage during replacement of the slip-on cover.

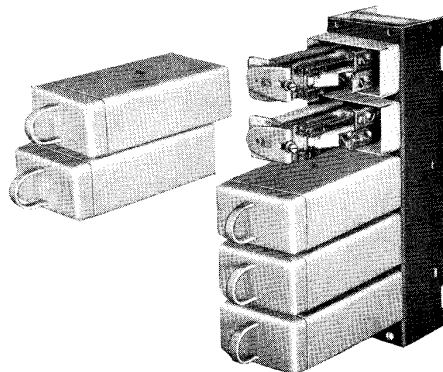


Fig. 25

The narrow bases accommodate up to a maximum of 8 relays, which may be provided with individual covers (Fig. 25), or a common cover for each group (Fig. 24).

Four standardised mounting strips, for horizontal mounting, and having capacities for 8, 16, 18 and 20 relays, are available, the width being $2\frac{9}{16}$ " (65 mm.), the length of the shortest being $13\frac{3}{8}$ " (349 mm.), and the longest $27\frac{3}{8}$ " (704.9 mm.). These strips of relays may have common clip-on covers, or the relays may be covered in pairs. Two sizes of mounting strip for vertical mounting are also available, having capacities for 5 and 10 relays, the lengths being $9\frac{1}{2}$ " (241.3 mm.) and $14\frac{1}{2}$ " (368.3 mm.) respectively, and the width $2\frac{9}{16}$ " (65 mm.). The shorter strip can be provided with either individual covers or an overall clip-on cover.

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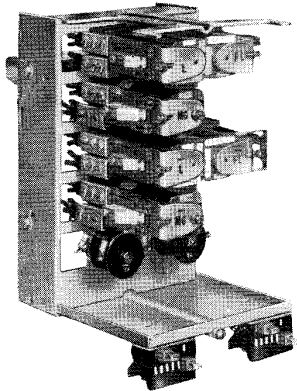


Fig. 26

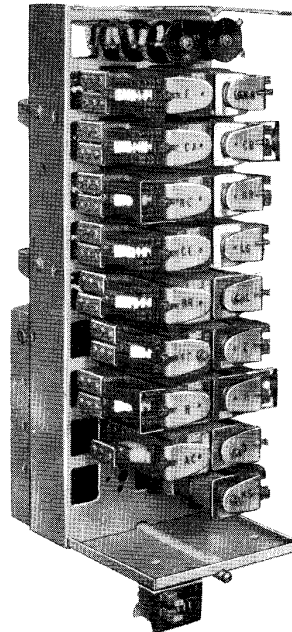


Fig. 28

Relay-Set Bases for Type 3000 relays on Type 2000 Equipment.

Relay-Set bases are also available for mounting on Type 2000 shelves. Typical examples are shown in Figs. 26, 27, 28 and 29. Bases are $4\frac{1}{2}$ " (113.5 mm.) wide and in various lengths from $5\frac{7}{8}$ " (149 mm.) to $20\frac{1}{8}$ " (511 mm.) to accommodate from 8 to 32 Type 3000 relays. Uniselectors and repeating coils can be fitted by reducing the relay capacity. Cover guides are provided to protect the relays from damage when covers are being removed or replaced.

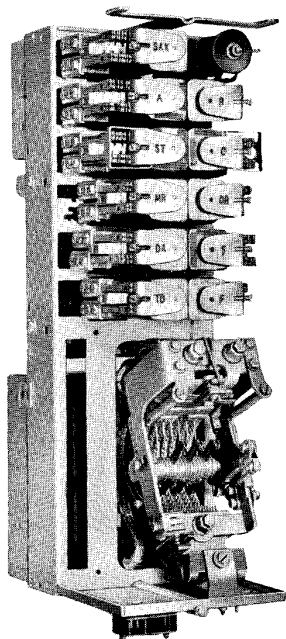


Fig. 27

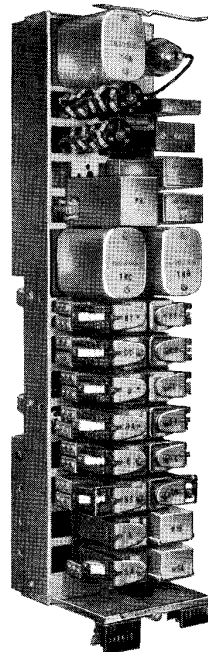


Fig. 29

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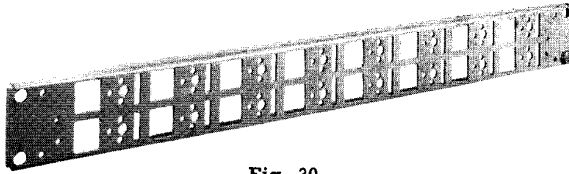


Fig. 30.

Mounting Plate L78390 (T2728) for 16 Type 3000 Relays.

Mounting Plates for Type 3000 relays (T2714).

Some typical mounting plates are listed below; others are available to suit individual circuit and mounting requirements; specific enquiries are invited. Fig. 30 shows a horizontally mounted plate for 16 relays, T2728.

Code No.	Relay Capacity	Length	Breadth	Depth	
T2716	5	9½" 241 mm.	2-7/8" 62 mm.	13 mm.	V
T2727	10	14½" 428 mm.	2-7/8" 62 mm.	13 mm.	V
T2728	16	23" 584 mm.	2-13/32" 66 mm.	19 mm.	H
T2729	20	27¾" 705 mm.	2-13/32" 66 mm.	19 mm.	H
T2730	18	25½" 648 mm.	2-13/32" 66 mm.	19 mm.	H
T2731	20	30½" 775 mm.	2-13/32" 66 mm.	19 mm.	H

H - Horizontally mounted. V - Vertically mounted.

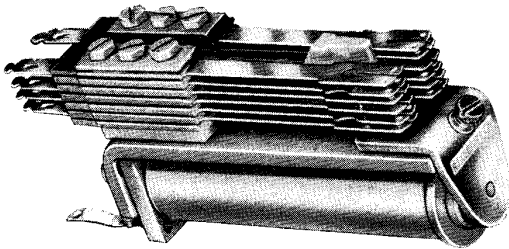


Fig. 31. T2549 Type 600 Relay.

Type 600 Relay.

This is the small type relay standardised by the British Post Office principally for use as a line and cut-off relay. Generally of similar construction to the type 3000 relay, but of smaller overall dimensions and without the knife-edge armature fulcrum. This relay has capacity for a total of 12 contact springs, which are fitted with twin contacts. The armature has a fixed residual of 4, 8, or 12 mils. The coil cheek can accommodate a total of 4 tags, for terminating 2 separate windings.

T2549 Type 600 Relay. Fig. 31.

Fig. 31 shows a single type 600 relay. Individual clip-on pressed-steel covers can be fitted as required.

Length: 3 7/16" (88 mm.) Width: 1 3/8" (35 mm.) Depth: 3/4" (19 mm.) Weight: 4 1/4-ozs. (12 kg.)

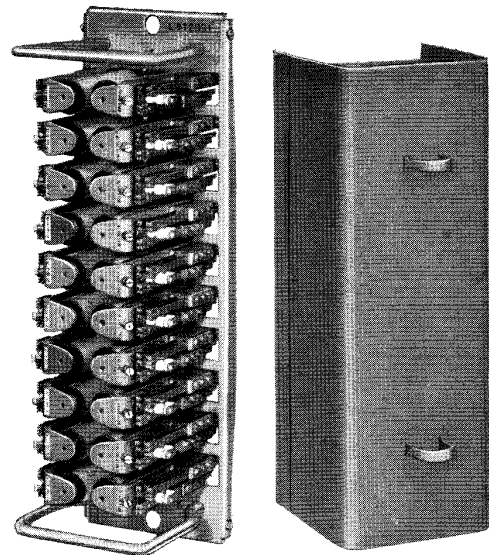


Fig. 32. Type 600 Relay Set.

Mountings for Type 600 Relays.

Designed primarily for strip mounting, 10 pairs per strip, with an overall slip-on cover, as shown in Fig. 32, the type 600 relay can also be provided with individual covers.

T2547 Strip of 10 Pairs Line and Cut-off Relays—Type 600.

See Fig. 32. Consisting of 10 pairs line and cut-off relays, type 600, mounted on steel mounting plate, and provided with overall slip-on cover. Completely wired and provided with battery and earth tags.

Length: 11" (279 mm.) Width: 3 1/2" (89 mm.) Depth: 5" (125 mm.) Weight: 7 1/4-lbs. (3.3 kg.)

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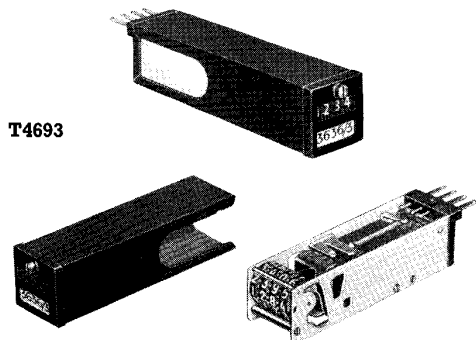
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Counters or Meters for Telephone Calls.

Primarily designed for recording the number of calls and switch operations in telephone exchanges, these meters may be used for recording the number of operations of anything which can be adapted to close a pair of electrical contacts. The meters are electrically operated, and the standard range provides for a wide variety of circuit conditions. Zinc plated finish. Dull black detachable brass cover with window in front of number discs. Range, 0000 to 9,999. White figures on black ground. Silver contacts to springs, if fitted. Each meter is tested for 10,000 operations at a rate of five operations per second.



T4693

T4693 Counter or Meter.

Resistance, 500 ohms. Operates on return stroke of armature. Fitted with full-length cover.

Length :	Width :	Depth :	Weight :
4 $\frac{3}{8}$ " (111 mm.)	1" (25 mm.)	1" (25 mm.)	4 $\frac{1}{2}$ -ozs. (127 gm.)

T4695 Counter or Meter.

As T4693, but wound with 9,000 turns to 2,300 ohms resistance.

T4696 Counter or Meter.

As T4695, but wound with 21,000 turns to 2,300 ohms resistance.

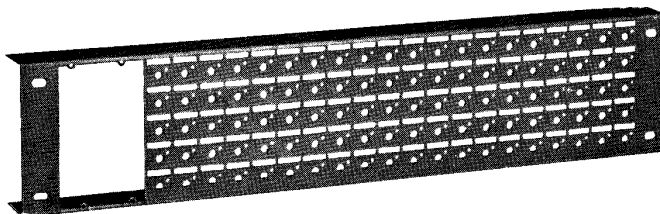
T4697 Counter or Meter.

As T4696, but with "make" contacts.

T4694 Mounting Plate.

Pressed steel. For 100 small type telephone meters. Slotted for test terminal block T4519 (200 point) or T4520 (100 point). See Section DB. Apparatus not included.

Length :	Width :	Depth :	Weight :
29 $\frac{1}{2}$ " (740 mm.)	6 $\frac{1}{8}$ " (156 mm.)	2 $\frac{3}{8}$ " (60 mm.)	8 $\frac{3}{4}$ -lbs. (4 kg.)



T4694. Meter Mounting Plate for 100 Meters.

T4699 Mounting Plate

As T4694 but for 40 meters and test terminal block T4504.

Length :	Width :	Depth :	Weight :
30 $\frac{1}{2}$ " (774.7 mm.)	2 $\frac{1}{2}$ " (65 mm.)	$\frac{3}{4}$ " (19 mm.)	17-lbs. 9-ozs. (8.2 kg.)



T4699 Meter Mounting Plate with 40 Meters.

T4151 Counter or Meter, Non-Electric.

A finger-operated counter on the "Veeder" principle, for recording telephone calls or other units. Registers from 0 to 99,999. Arranged for plug and socket mounting, enabling it to be removed from the switchboard when not in use.



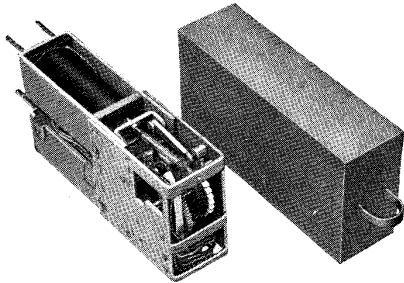
T4151

Length :	Width :	Depth :	Weight :
1 $\frac{3}{8}$ " (35 mm.)	1 $\frac{3}{8}$ " (35 mm.)	1 $\frac{1}{8}$ " (29 mm.)	1 $\frac{3}{4}$ -ozs. (49.7 gm.)

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T1846

T1846 Time Check and Alarm Relays.

As used on telephone trunk circuits to warn the operator of the approaching expiration of the time period, or to disconnect at the end of that period.

Length: $7\frac{3}{8}$ " (187 mm.) Width: $1\frac{9}{16}$ " (40 mm.) Depth: $2\frac{7}{8}$ " (73 mm.) Weight: $2\frac{1}{16}$ -lbs. (1.22 kg.)

key of the rotary type and a "Reset" key of the plunger type it accommodates, if required, the standard cord circuit speaking and ringing key or a time check lamp. The "Start" and "Reset" keys are interlocked so that the "Reset" key cannot be operated whilst the "Start" key is operated. Calls from both ordinary and call office subscribers can be dealt with by the "Start-Stop" key, which is turned to the left for ordinary subscribers or to the right for call offices. Driving magnet is 170 ohms, for 22 volts or 800 ohms for 40 to 60 volts.

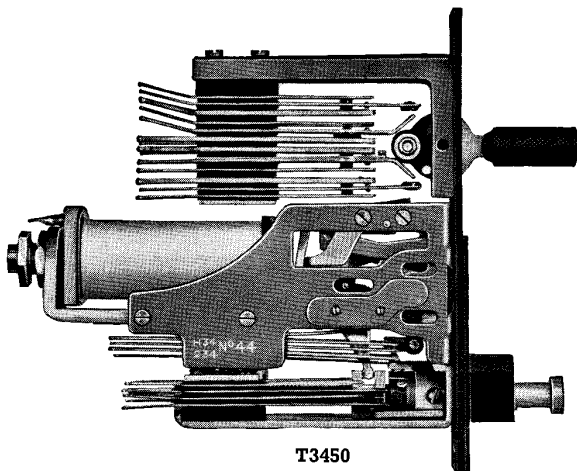
To time a call from an ordinary subscriber, the "Start" key is set to the left "Ord" position, which causes the indicator to commence recording. After the expiry of 2.8 minutes, a tone is momentarily applied to the line to advise the subscriber that the fee period has almost expired. A check lamp on the switchboard also glows and remains alight until the 3-minute period is completed. This sequence is repeated at 5.8 and 8.8 minutes, whilst at the 9th minute, the check lamp flickers to announce the completion of three 3-minute call periods. If necessary, the operator may again reset the indicator for an extension of the call. The indicator ceases to operate immediately the calling subscriber replaces the telephone receiver, and the time shown should then be recorded by the operator, who finally restores the indicator to zero by depressing the "Reset" key.

A call office call is timed similarly, but the key is turned to the right-hand "CCB" position and the check lamp flickers at 3.0 minutes to indicate to the operator that an additional fee should be collected.

The indicator is suitable for use on sleeve-controlled circuits for the "on demand" method of operating trunk calls.

A panel-mounted mechanism can be provided with a multi-conductor cord and plug to engage with a jack on the switchboard, this enables the mechanism to be moved from one position to another without unsoldering any connections. This type is not suitable for keyboard mounting.

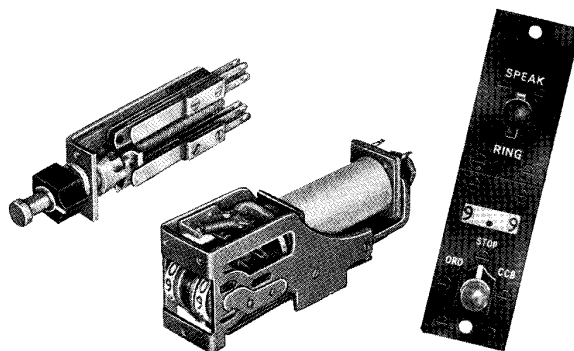
Height: $4\frac{1}{4}$ " (108 mm.) Width: $1\frac{1}{8}$ " (29 mm.) Depth: $5\frac{3}{8}$ " (137 mm.) Weight: 1-lb. 6-ozs. (510 gms.)



T3450

T3451 Chargeable Time Indicator (B.P.O. Clock No. 44).

A compact electro-magnetic mechanism operated from a master clock at 6-second intervals, controlling cyclometer drums which display the duration of a telephone call in minutes and tenths, up to 9.9 minutes. The indicator is fitted on a metal plate, suitable for mounting vertically in a panel or horizontally in a keyboard and in addition to a combined "Start-Stop"



T3451 Components

T3450 as above but without facility for timing calls from telephones with coin boxes.

A descriptive Engineering Bulletin will be supplied on request.

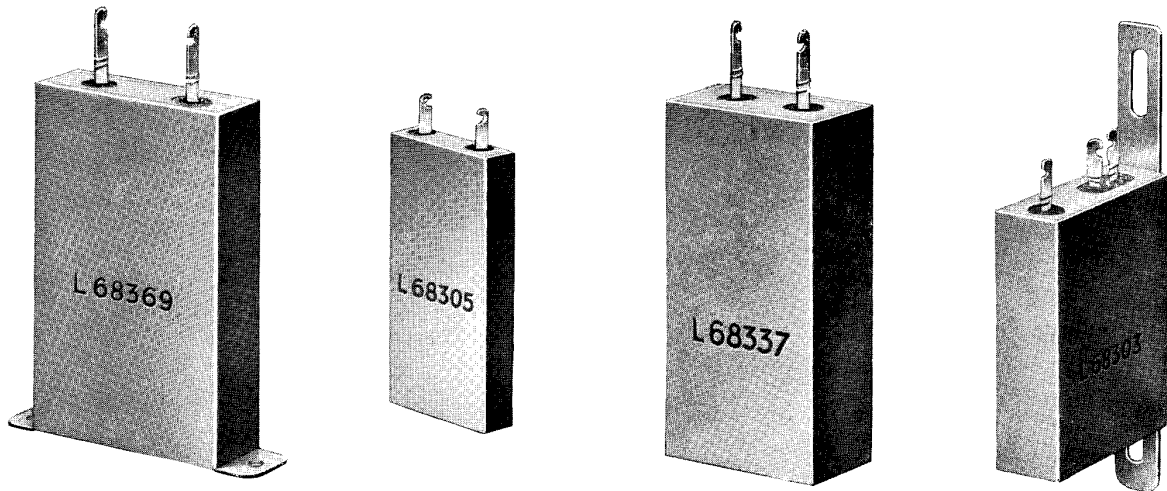
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CAPACITORS



"A.T.M." Capacitors are of the aluminium foil type enclosed in tinned sheet iron cases having a grey enamelled finish.

The tropical type capacitors have hermetically sealed cases filled with mineral wax with a melting point of 80° centigrade. These capacitors are fitted with ceramic or glass sealed terminals and are in every way suitable for use under extreme tropical conditions. Manufacture is carried out under expert supervision and only carefully selected materials are used. Exhaustive final tests ensure the highest standard of efficiency.

Tests applied:—

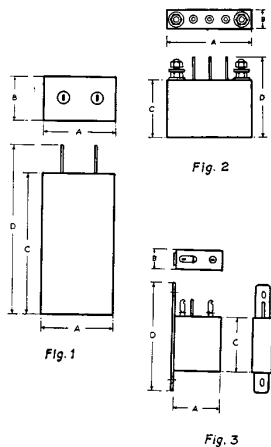
Capacitance Test. Standard capacitance limits are $\pm 10\%$. Special types have limits $\pm 3\%$ to $\pm 15\%$ as specified in the tables.

Insulation Resistance Test. Insulation is guaranteed to exceed 1,000 megohms per microfarad when measured at 60°F. (15.5°C.) with 300 volts after electrification for one minute in the case of capacitors exceeding $1\mu\text{F}$ or 1,000 megohms for capacitors under $1\mu\text{F}$.

Insulation Breakdown Test. 500 volts D.C. for general purpose capacitors and up to 1,650 volts D.C. for special types.

ALUMINIUM FOIL CAPACITORS. NON-TROPICAL TYPE.

Capacitance limits $\pm 10\%$

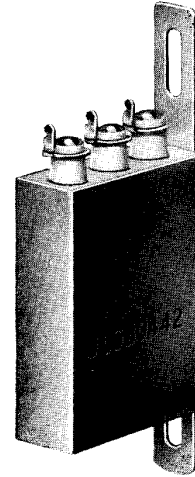
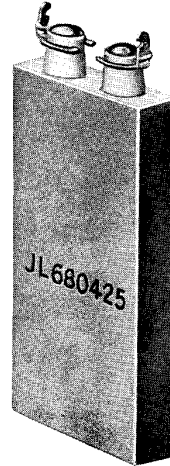
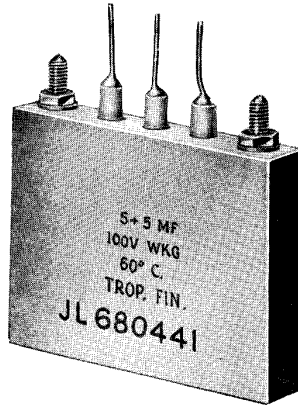
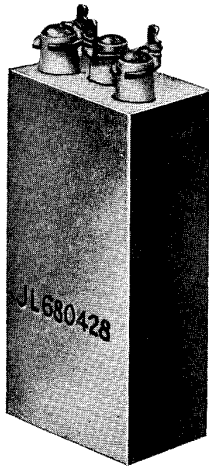


Code No.	μF .	A		B		C		D		Weight.		Ter- minals	Fig. No.
		ins.	mm.	ins.	mm.	ins.	mm.	ins.	mm.	ozs.	gm.		
L68305	0.001	1 1/4	32	1 1/4	9.5	2 7/16	62	2 15/16	74.9	1 1/16	30	2	1
L68308	0.02	1 1/4	32	1 1/4	9.5	2 7/16	62	2 15/16	74.9	1 1/8	32	2	1
L68339	0.02	1 1/2	41	1 1/2	12.7	3 3/16	81	3 7/8	98	2 1/2	64	2	1
L68304	0.04	1 1/2	32	1 1/2	9.5	2 7/16	62	2 15/16	74.9	1 3/8	32	2	1
L68350	0.05	1 1/2	41	1 1/2	12.7	3 3/16	81	3 7/8	98	1 3/8	50	2	1
L68336	0.5	1 1/2	41	1 1/2	12.7	3 3/16	81	3 7/8	98	2 1/2	71	2	1
L68337	2	1 1/2	41	1 1/2	25	3 3/16	81	3 7/8	98	4 1/2	128	2	1
L68338	4	1 1/2	41	2	51	3 3/16	81	3 7/8	98	9	255	2	1
L68068	1	1 1/2	41	1 1/2	12.7	3 3/16	81	3 7/8	98	2 3/4	78	2	1
L68072	1+1	1 1/2	41	1	25	3 3/16	81	3 7/8	98	4 3/4	135	3	1
L68366	0.5+0.5	1 1/2	41	1	25	3 3/16	81	3 7/8	98	4 1/4	120	3	1
L68303	0.2+0.2	2	51	2	18	2 1/2	63	4 1/2	118	3 3/4	106	3	3
L68368	1	2	51	2	12.7	3 3/16	81	3 7/8	98	3	85	2	1
L68369	2	2	51	2	19	3 3/16	81	3 7/8	98	4 1/2	128	2	2
L68423	0.5	2	51	2	12.7	3 3/16	81	3 7/8	98	3	85	2	2
L68390	10	2	51	3	76	3 3/16	81	3 7/8	98	16 1/4	461	2	2

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ALUMINIUM FOIL CAPACITORS. EXTREME TROPICAL TYPE.
In hermetically sealed cases with ceramic mounted terminals.

Code No.	µF.	A		B		C		D		Weight		Ter- minals	Fig. No.
		ins.	mm.	ins.	mm.	ins.	mm.	ins.	mm.	ozs.	gm.		
JL680423	0.5	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/8	60	2	1
JL680424	1	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680425	2	1	41	1	25	3 3/16	81	3 13/16	97	4 1/2	128	2	1
JL680426	4	1	41	2	51	3 3/16	81	3 13/16	81	8 1/2	241	2	1
JL680427	0.02	1	41	1	12.7	3 3/16	81	3 13/16	97	2 3/4	64	2	1
*JL680428	1+1	1	41	1	25	3 3/16	81	3 13/16	97	4 1/4	121	3	2
JL680429	0.05	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680430	0.005	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680431	0.25	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680432	0.1	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680433	0.5+0.5	1	41	1	25	3 3/16	81	3 13/16	81	4 1/4	120	3	2
JL680434	2	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680435	0.01	1	41	1	12.7	3 3/16	81	3 13/16	97	2 1/4	64	2	1
JL680436	0.75	1	41	1	25	3 3/16	81	3 13/16	97	4 1/2	128	2	1
JL680437	4	1	41	1	25	3 3/16	81	3 13/16	97	4 3/4	135	2	1
*JL680441	0.5+0.5	3	76	1	12.7	2 5/8	54	3 5/8	79	3 3/8	106	3	4
JL680442	0.2+0.2	2	51	3 3/8	18	2 1/2	63	4 5/8	118	3 1/2	99	3	3

NOTES.

- * This capacitor has no internal resistance. For spark quench circuits external resistors of suitable value must be used.
- All capacitors are finished with cellulose grey enamel.
- Capacitance limits $\pm 10\%$.

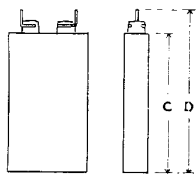


Fig. 1.

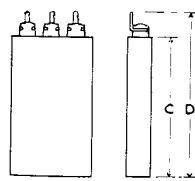


Fig. 2.

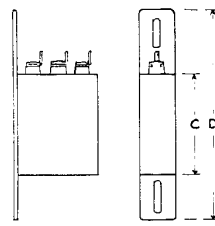


Fig. 3.

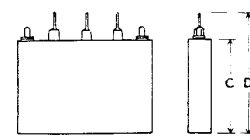


Fig. 4.

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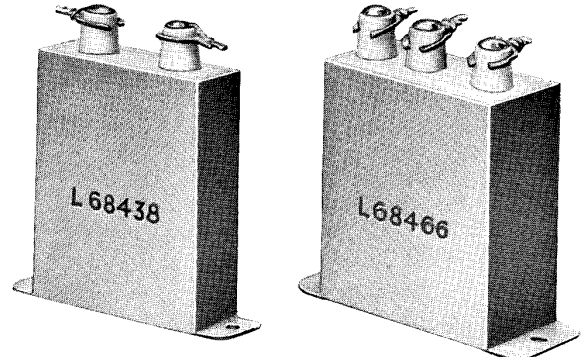
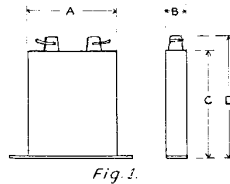
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CAPACITORS



NOTES.

1. Base plates $2\frac{3}{4}$ " (70 mm.)
Mounting centres $2\frac{3}{8}$ " (60 mm.)
2. All capacitors are finished with cellulose grey enamel.
3. Capacitance limits $\pm 15\%$.



ALUMINIUM FOIL CAPACITORS. EXTREME TROPICAL TYPE. BASE MOUNTING.
In hermetically sealed cases with ceramic mounted terminals.

Code No.	μF	A		B		C		D		Weight		Ter- minals.	Fig. No.	Working Volts	Testing Volts			
		ins.	mm.	ins.	mm.	ins.	mm.	ins.	mm.	ozs.	gm.							
L68438	1	2	51	$\frac{5}{8}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{4}$	78	2	1	250V.D.C.	500V.D.C.			
L68439	2	2	51	1	25	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$4\frac{1}{4}$	120	2						
L68440	3	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68441	4	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68442	0.5	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68443	0.1	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68444	0.01	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68445	0.25	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68446	0.02	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68447	0.001	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68448	0.2+0.2	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	73	$2\frac{1}{4}$	64	3						
L68449	0.5+0.5	2	51	$1\frac{1}{2}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	73	$3\frac{3}{4}$	106	3						
L68450	1	2	51	$\frac{5}{8}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{4}$	78	2				1	350V.D.C.	750V.D.C.
L68451	2	2	51	1	25	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$4\frac{1}{4}$	120	2						
L68452	3	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68453	4	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68454	0.5	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68455	0.1	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68456	0.01	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68457	0.25	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68458	1	2	51	$\frac{5}{8}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{4}$	78	2	1	500V.D.C.	1000V.D.C.			
L68459	2	2	51	1	25	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$4\frac{1}{4}$	120	2						
L68460	3	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68461	4	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68462	0.5	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68463	0.1	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68464	0.01	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68465	0.25	2	51	$1\frac{1}{2}$	12.7	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{1}{8}$	60	2						
L68466	1+1	2	51	1	25	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	5	142	3	1	600V.D.C.	1650V.D.C.			
L68467	4+4	$3\frac{1}{2}$	89	$2\frac{1}{4}$	57	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$19\frac{1}{2}$	553	3						
L68468	1	2	51	$\frac{5}{8}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{4}$	78	2	1	600V.D.C.	1650V.D.C.			
L68469	2	2	51	1	25	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$4\frac{1}{4}$	120	2						
L68470	3	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68471	4	2	51	2	51	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$8\frac{1}{2}$	240	2						
L68472	0.5	2	51	$1\frac{1}{2}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{8}$	78	2						
L68473	0.1	2	51	$1\frac{1}{2}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{8}$	78	2						
L68474	0.01	2	51	$1\frac{1}{2}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{8}$	78	2						
L68475	0.25	2	51	$1\frac{1}{2}$	16	$2\frac{1}{4}$	57	$2\frac{1}{2}$	67	$2\frac{3}{8}$	78	2						

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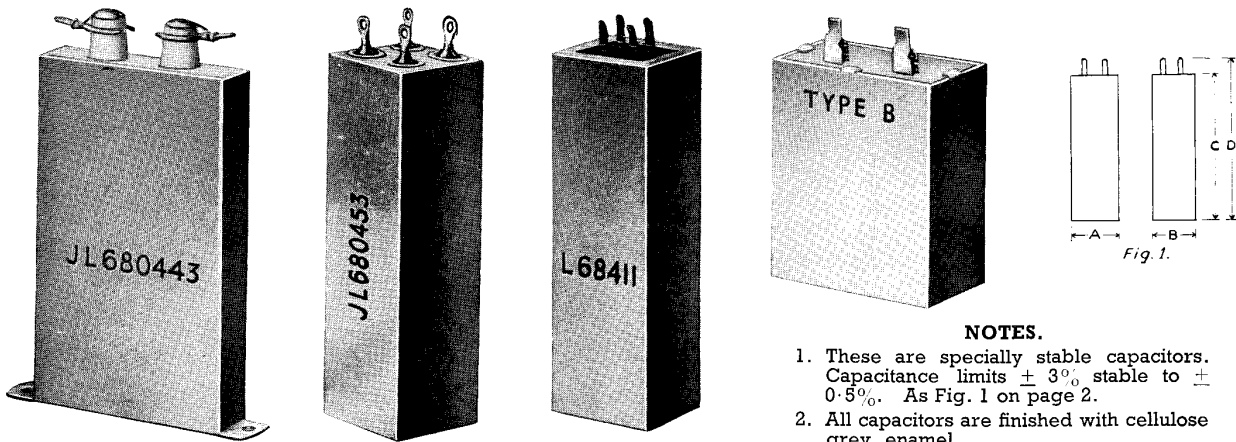
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CAPACITORS



NOTES.

1. These are specially stable capacitors. Capacitance limits $\pm 3\%$ stable to $\pm 0.5\%$. As Fig. 1 on page 2.
2. All capacitors are finished with cellulose grey enamel.

ALUMINIUM FOIL CAPACITORS. EXTREME TROPICAL TYPE. BASE MOUNTING. Capacitance $\pm 10\%$.
In hermetically sealed cases with ceramic mounted terminals.

Code No.	$\mu F.$	A		B		C		D		Weight.		Ter- minals.	Fig. No.	Working Volts.	Remarks
		ins.	mm.	ins.	mm.	ins.	mm.	ins.	mm.	ozs.	gm.				
JL680443	1	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2	As Fig. 1 on page 3	350 D.C.	Base Plates 2 $\frac{3}{8}$ " (70 mm.)
JL680444	2	2	51	1	19	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{3}{8}$	135	2		350 D.C.	
JL680458	0.5	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2		350 D.C.	
JL680459	2	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2		200 D.C.	
JL680460	0.75	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2		350 D.C.	
JL680461	10	2	51	3	76	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	18 $\frac{3}{8}$	521	2		200 D.C.	Mounting Centres 2 $\frac{3}{8}$ " (60 mm.)
JL680462	0.1	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2		350 D.C.	
JL680463	0.75	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2		200 D.C.	
JL680464	4	2	51	1	41	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	10	283	2		350 D.C.	
JL680465	3	2	51	1	19	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	4 $\frac{3}{8}$	135	2		200 D.C.	
JL680466	0.5	2	51	1	12.7	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	3 $\frac{1}{8}$	89	2		200 D.C.	
JL680467	4	2	51	1	19	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	4 $\frac{3}{8}$	135	2		200 D.C.	
JL680468	1	2	51	1	19	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	91	4 $\frac{3}{8}$	135	2		200 D.C.	

MISCELLANEOUS AND CONTINENTAL TYPE CAPACITORS.

Capacitance—Miscellaneous Capacitors $\pm 10\%$ except special type, see Note 1. Continental type capacitors $\pm 15\%$

Code No.	$\mu F.$	A		B		C		D		Weight		Ter- minals.	Fig. No.	Remarks.
		ins.	mm.	ins.	mm.	ins.	mm.	ins.	mm.	ozs.	gm.			
L68411	2+0.1	1	25	1	25	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	89	3	85	4	1	For P.O. Telephones 332.
L680252	2	1	25	1	25	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	89	3	85	2	1	For P.O. Bell Box.
JL680453	2+0.1	1	25	1	25	3 $\frac{3}{16}$	81	3 $\frac{1}{2}$	89	3	85	4	1	Tropical. For Telephones.
JL680409	50	4	102	3	76	4 $\frac{1}{2}$	114	4 $\frac{7}{8}$	124	36	1020	2	1	Tropical. For smoothing circuits. As Fig. 1 on p.3.
JL68894	5	4	102	1 $\frac{1}{4}$	32	4 $\frac{1}{2}$	114	4 $\frac{7}{8}$	124	15	425	2	As	Tropical. See Note 1.
JL68897	5+5	4	102	2	51	4 $\frac{1}{2}$	114	4 $\frac{7}{8}$	124	24	680	4	Fig. 4	Tropical. See Note 1.
L68066	0.5+0.5	3	76	1 $\frac{1}{2}$	12.7	2 $\frac{1}{8}$	54.2	2 $\frac{1}{8}$	74.9			3	on page 2	Incorporates resistor internally.
Type A	Up to 1	1 $\frac{1}{8}$	45	1 $\frac{3}{32}$	15	2	50	2 $\frac{3}{8}$	60	2	57	2	See	Continental type capi- tators. Available tested to 500 V.D.C. 1000 V.D.C. or 1500 V.D.C. Sup- plied with lugs if re- quired.
Type B	1 to 2	1 $\frac{1}{8}$	45	1	25	2	50	2 $\frac{3}{8}$	60	3 $\frac{1}{4}$	92	2	Fig. 1	
Type C	2 to 4	1 $\frac{1}{8}$	45	1 $\frac{3}{8}$	35	2	50	2 $\frac{3}{8}$	60	4	114	2	on page 1	

Electrolytic Capacitors—Enquiries are invited for electrolytic capacitors of which a full range is also offered.

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RESISTORS AND MOUNTINGS

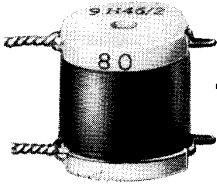


T3665 Resistors.

Wound on white porcelain spool. Resistance wire welded to terminals and coated with black enamel.

Rating: Up to 500 ohms - 10 watts
Over 500 ohms - 8 watts

Tolerance $\pm 1\%$
Ohms. 15-75



T3665

Tolerance $\pm 1\%$			
Ohms.	Ohms.	Ohms.	Ohms.
18.9	35	100	300
20	40	200	338.5
33	61.73	225	450

Length: 1" (25 mm.)
Diameter: 1" (25 mm.)
Weight: 1 oz. (28 gm.)

Tolerance $\pm 2\%$
Ohms. 4-7

Tolerance $\pm 2\frac{1}{2}\%$							
Ohms.	Ohms.	Ohms.	Ohms.	Ohms.	Ohms.	Ohms.	Ohms.
5	40	105	160	225	520	1600	
11	50	110	165	240	600	2000	
12	60	115	170	250	700	2500	
14	70	120	175	300	750	3000	
16	75	123	180	330	800		
17	80	135	195	350	850		
20	85	140	200	380	1000		
25	90	145	210	400	1200		
28	97	150	215	450	1300		
30	100	155	220	500	1500		

Tolerance $\pm 5\%$			
Ohms.	Ohms.	Ohms.	Ohms.
2	5	7	10
4	6	8	

Tolerance $\pm 10\%$	
Ohms.	Ohms.
0.02	1

T3667 and T3669 Resistors.

Wound on moulded bakelite spools. Axial hole for fixing screw. Soldering tag terminals.

Rating 2 watts.

Length: $\frac{5}{8}$ " (16 mm.) Diameter: 1" (25 mm.) Weight: $\frac{1}{2}$ -oz. (14 gm.)

T3667 Resistors—Inductive

Tolerance $\pm 2\frac{1}{2}\%$			
Ohms.	Ohms.	Ohms.	Ohms.
1	150	1000	4500
1.5	175	1100	5000
2	200	1150	6000
4	218.5	1200	6500
8	240	1250	7000
10	250	1300	7500
11	300	1400	8000
15	350	1480	8500
20	380	1500	9500
25	400	1600	10000
30	450	1700	12000
35	500	1800	12500
40	600	2000	15000
46	630	2400	16000
50	700	2500	20000
80	750	2600	25000
85	800	2700	32000
100	830	2800	35000
110	850	3000	40000
120	900	3500	50000
125	950	4000	

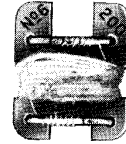
T3667



T3669 Resistors—Non-inductive.

Tolerance $\pm 2\frac{1}{2}\%$		
Ohms.	Ohms.	Ohms.
0.3	200	1000
45	210	1487
50	225	1600
58.25	240	2000
90	300	2500
100	400	5000
110	600	10000
180	800	20000

Tolerance $\pm 0.5\%$ Special		
Ohms.	Ohms.	Ohms.
650	7500	13000
1780	11000	



T3666

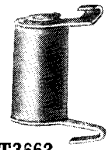
T3666 Resistors.			
Length:	Width:	Depth:	Weight:
$\frac{3}{4}$ " (19 mm.)	$\frac{5}{8}$ " (16 mm.)	$\frac{1}{4}$ " (6 mm.)	$\frac{1}{2}$ -oz. (14 gm.)
Ohms.	Ohms.	Ohms.	Ohms.
1	7	600	2000
3	20		
5	30		

T3666 Resistors.

Used with capacitors for spark quenching. For soldering direct to capacitor terminals. Wound on pressed fibre shuttle. Asbestos covered winding.

T3662 Resistors.

Used on capacitors for spark quenching. Wound on ceramic spool fitted with connection tags arranged for soldering direct to capacitor terminals. Surface of resistance wire is covered with stoved vitreous enamel.



T3662

Length:	Width:	Depth:	Weight:
.65" (16.5 mm.)	.365" (9.3 mm.)	.552" (14 mm.)	.084-oz. (2.4 gm.)
Tolerance $\pm 10\%$		Ohms.	Colour.
		10	Yellow
		40	Orange
		50	Black
		100	Blue
		200	Grey

ALTERNATIVE RESISTANCE VALUES.

To meet new requirements the lists of resistance values are frequently augmented. Most spools can be wound to any resistance but customers should specify their requirements fully so that a quotation can be given for a properly designed and suitable resistor.

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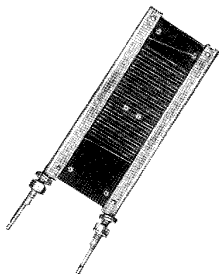
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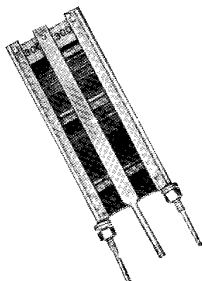
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RESISTORS AND MOUNTINGS



T3663



T3664

T3663 and T3664 Resistors.

Wound on rectangular insulating plates, fitted with brass side frames, ending in soldering tag terminals. Complete with nuts and washers for plate mounting. In the three-terminal series the central brass strip is common to both windings. Resistances correct within $\pm 2\frac{1}{2}$ per cent. Rating, 30 watts.

Length : $4\frac{1}{4}$ " (119 mm.) Width : $1\frac{1}{4}$ " (43 mm.) Depth : $\frac{3}{8}$ " (9.5 mm.) Weight : $1\frac{1}{2}$ -ozs. (42 gm.)

T3663				T3664	
Ohms.	Ohms.	Ohms.	Ohms.	Ohms.	Ohms.
1	75	300	1200	5 + 10	83 + 83
2	80	320	1250	15 + 20	100 + —
2.7	83	350	1300	20 + 20	100 + 100
3	100	360	1400	20 + 40	100 + 200
4	110	400	1500	20 + 100	100 + 250
5	120	500	1666	20 + 200	100 + 1000
6	125	560	2000	25 + 30	120 + —
8	140	600	2200	25 + 50	120 + 120
10	150	650	2300	25 + 140	200 + —
12	160	700	2500	30 + 30	200 + 200
20	175	750	2600	37 + 37	200 + 350
25	180	780	2800	40 + —	210 + 210
30	200	800	3000	40 + 40	240 + 240
35	210	830	4000	40 + 50	250 + 250
40	235	850	5000	40 + 83	250 + 500
45	240	925	6000	40 + 120	300 + 300
50	250	1000	6500	40 + 240	350 + 350
60	270	1100	7150	40 + 850	360 + 360
Tolerance $\pm 1\%$				50 + 50	400 + 400
				50 + 210	500 + 500
				50 + 300	800 + 800
				60 + —	1000 + 1000
				60 + 200	1500 + 1500
				80 + 80	
				80 + 160	

T2624.

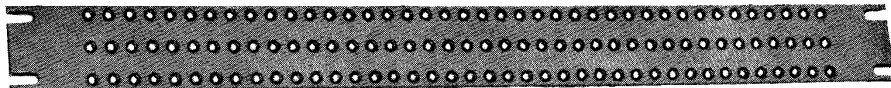
Mounting plate with insulating bushes to drillings for 20 T3663 resistor spools. Steel, zinc plated.

Length : $15\frac{1}{2}$ " (394 mm.) Width : $1\frac{3}{4}$ " (50 mm.) Depth : $\frac{7}{32}$ " (6 mm.)

T2626.

Similar to T2624, but for 40 spools.

Length ... $22\frac{1}{8}$ " (563 mm.)
 Width ... $1\frac{3}{4}$ " (50 mm.)
 Depth ... $\frac{7}{32}$ " (6 mm.)

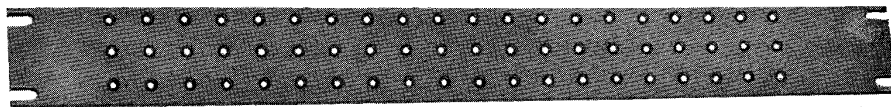


T2627

T2625.

Mounting plate with insulating bushes to drillings for 20 T3664 resistor spools. Steel, zinc plated.

Length ... 19" (483 mm.)
 Width ... $1\frac{3}{4}$ " (50 mm.)
 Depth ... $\frac{7}{32}$ " (6 mm.)
 Weight ... $2\frac{9}{16}$ -lbs. (1.16 kg.)



T2625

T2627.

As T2625, but for 40 spools.

Length ... 19" (483 mm.)
 Width ... $1\frac{3}{4}$ " (44 mm.)
 Depth ... $\frac{7}{32}$ " (6 mm.)
 Weight ... $2\frac{1}{16}$ -lbs. (.94 kg.)

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Notes : (1) All overall dimensions and weights are approximate.
 (2) 32A type selectors are B.P.O. type 2000.
 (3) AF Across flats of a hexagon.



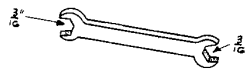
Double-ended steel spanners. Hardened and tempered. Finished blue and lacquered or D.N.P. For telephone exchange maintenance.

Code No.	Dim. A. AF	Dim. B. AF	Length.	Width.	Depth.	Weight.	
L14381	ins. 3.96	.156 5.00	2 3/8 69.85	1 1/8 14.29	1 1/8 1.59	.18 oz. 5 gm.	
L14382	ins. mm.	.224 5.68	.252 6.4	3 3/8 85.73	7/8 22.23	3/8 2.38	.64 oz. 18 gm.
L14383	ins. mm.	.287 7.22	.328 8.37	3 3/8 84.14	7/8 22.23	3/8 2.38	.56 oz. 16 gm.
L14384	ins. mm.	.224 5.59	.286 7.21	3 3/8 85.73	7/8 22.23	3/8 2.38	.64 oz. 18 gm.
L14386	ins. mm.	.316 8.07	.380 9.65	3 7/8 98.43	1 1/8 26.99	3/8 2.38	.99 oz. 28 gm.
L14387	ins. mm.	.452 11.46	.530 13.46	4 3/8 120.65	1 1/8 34.93	3/8 3.18	1.98 oz. 56 gm.
L14393	ins. mm.	.135 3.43	.176 4.47	2 1/8 68.26	1 1/8 14.29	1 1/8 1.59	.35 oz. 10 gm.
L14396	ins. mm.	.228 5.79	.260 6.60	2 3/8 69.06	1 1/8 15.08	3/8 2.38	.28 oz. 8 gm.
L14413	ins. mm.	.356 9.04	.388 9.85	3 1/8 84.14	7/8 22.23	3/8 2.38	.6 oz. 17 gm.
L14584	ins. mm.	.163 4.14	.195 4.96	2 1/8 68.26	1 1/8 14.29	1 1/8 1.59	.18 oz. 5 gm.
L14585	ins. mm.	.228 5.79	.260 6.60	3 3/8 98.43	1 1/8 13.49	1 1/8 1.59	.35 oz. 10 gm.
L14586	ins. mm.	.291 7.40	.323 8.21	3 3/8 80.96	1 5/8 15.88	3/8 3.18	.53 oz. 15 gm.
L14587	ins. mm.	.350 8.89	.388 9.85	3 3/8 92.08	1 1/8 20.64	3/8 3.18	.78 oz. 22 gm.
L14588	ins. mm.	.419 10.63	.450 11.43	4 101.60	1 1/8 23.81	1 1/8 4.76	1.24 oz. 35 gm.
L14589	ins. mm.	.515 13.08	.546 13.87	4 1/2 114.30	1 25.4	3/8 3.96	1.41 oz. 40 gm.

L14503A Spanner.

For 32A (B.P.O. 2000) type selector detent locknuts. .196" (4.98 mm.) across flats. Steel.

Length : 1 1/8" (49.21 mm.) Width : 1 1/8" (8.73 mm.) Depth : .092" (2.34 mm.)

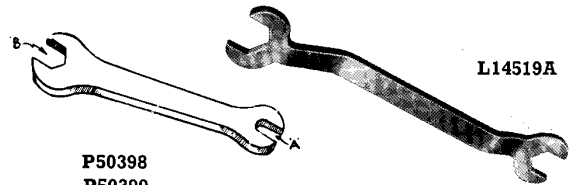


L14602 Spanner. Single-ended, for B.P.O. 332 and 232 telephones and general use. 10 B.A. .121" (3.07 mm.)

Length : 2 3/8" (69.85 mm.) Width : 9/16" (14.28 mm.) Depth : .077" (2.03 mm.) Weight : .18 oz. (5 gm.)

L14519A Spanner. Flat, hexagon, cranked, .370" and .473" (9.4 and 12.02 mm.) AF, for mechanism fixing screw, idler spindle nut and wiper fixing nut of motor unselector.

Length : 4 5/8" (117.5 mm.) Width : 1 5/8" (24.8 mm.) Depth : 1 1/8" (26.99 mm.)



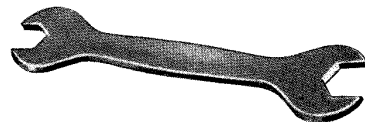
P50398 Spanner. For telegraph equipment. Steel.

Dimension across flats. A—1 1/4" (4.3 mm.) B—1 5/8" (5.9 mm.)

P50399 Spanner. For telegraph equipment. Steel.

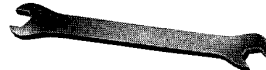
Dimension across flats. A—258" (6.55 mm.) B—148" (3.76 mm.)

Length : 2 1/2" (63.5 mm.) Width : 9/16" (14.29 mm.) Depth : .08" (2.03 mm.)



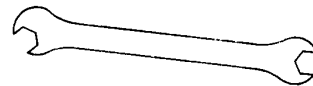
L14630 Spanner. Flat, double-ended, 3/2" and 3/8" (7.14 and 9.53 mm.) AF for general use.

Length : 3 5/8" (84.2 mm.) Width : 7/8" (22.2 mm.) Depth : 3/32" (2.4 mm.)



L14524A Spanner. Flat, hexagon, 4 B.A. .253" (6.43 mm.) double-ended for motor unselector.

Length : 3 1/2" (88.9 mm.) Width : 9/16" (14.29 mm.) Depth : 1/8" (3.2 mm.)



L14651A Spanner. Flat, 5 B.A., hexagon, and adjuster for wiper assembly of unselector B.P.O. No. 3.

Length : 2 5/8" (68.74 mm.) Width : 7/8" (11.11 mm.) Depth : 3/16" (4.76 mm.)

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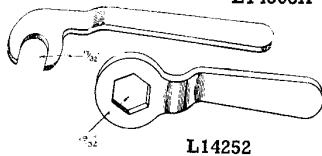
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L14288A Spanner. For traffic signals and fire alarm equipment .195" (4.95 mm.) across flats. Steel, double ended, cranked.

Length: $4\frac{1}{2}"$ (102.4 mm.) Width: $\frac{7}{16}"$ (11.11 mm.) Depth: .08" (2.03 mm.) Weight: 0.35 oz. (10 gm.)

L14252 Spanner. For A.T. & E. Co. uniselector armature adjusting screw; $\frac{1}{32}"$ (15.0 mm.) across flats. Cranked shaft nickel-plated finish.



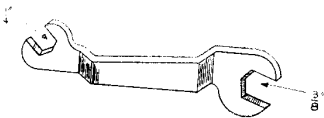
L14363A

L14363 Spanner. For clamping A.T. & E. Co. uniselector wipers; $\frac{17}{32}"$ (13.4 mm.) across flats. Nickel-plated finish.

L14252 **L14363**
 Length $3\frac{1}{16}"$ (94 mm.) $4\frac{1}{2}"$ (114 mm.)
 Width $1\frac{1}{16}"$ (27 mm.) $1\frac{1}{4}"$ (32 mm.)
 Depth $\frac{7}{16}"$ (11 mm.) $\frac{1}{4}"$ (6.3 mm.)
 Weight 1 oz. (28 gm.) 1 oz. (28 gm.)

L14261 Spanner cranked

For 32A (B.P.O. 2000) type Selectors, minor switch, uniselector and dial repeater and general use. Dimensions: A— $\frac{1}{4}"$ (6.3 mm.) B— $\frac{3}{8}"$ (9.5 mm.)



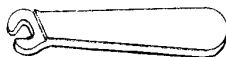
L14261

Length: $3\frac{5}{8}"$ (84.14 mm.) Width: $\frac{3}{8}"$ (19.05 mm.) Depth: $\frac{1}{4}"$ (6.35 mm.) Weight: 0.529 oz. (15 gm.)

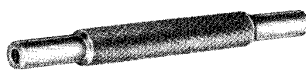
L14511A Spanner.

For dial repeater cam.

Length: $2\frac{1}{2}"$ (63.5 mm.) Width: $\frac{1}{2}"$ (12.7 mm.)
 Depth: $\frac{1}{8}"$ (1.59 mm.) Weight: 0.21 oz. (6 gm.)



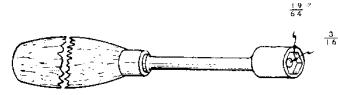
L14511A



L14525

L14525 Box Spanner, double-ended.

For use on the impulse cam nut T4219 (type 24C) T4215 (type 24B) and T4216 (type 24) dials. .156" (3.96 mm.) .135" (3.43 mm.) across flats (8 B.A. and 9 B.A.)
 Length ... $3\frac{1}{2}"$ (88.90 mm.) Diameter ... $\frac{5}{16}"$ (7.94 mm.)
 Weight ... 1 oz. (28.35 gm.)



L14304A

Box Spanners.

Varnished hardwood handle, nickel-plated steel stem.

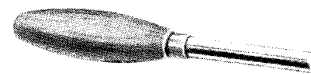
		Width across flats.	Length.	Diameter.	Weight.
L14304	ins. mm.	$\frac{1}{4}"$ 7.25	7 180.98	$\frac{1}{2}"$ 25	2.82 oz. 80 gm.
P37556	ins. mm.	$\frac{3}{16}"$ 8.33	7 177.8	1 25.4	2.82 oz. 80 gm.
L14502A	ins. mm.	$\frac{3}{8}"$ 9.52	7 177.8	$\frac{1}{2}"$ 28.58	4.06 oz. 115 gm.
L14390A	ins. mm.	.195 4.96	$5\frac{1}{2}"$ 149.22	$\frac{5}{16}"$ 14.29	0.8 oz. 23 gm.

L14304 For B.P.O. No. 162 telephones, moulded type and B.P.O. uniselector coil fixing screws.

P37556 For B.P.O. 100 type meters.

L14502A For 32A B.P.O. 2000 type selector bank nuts, 1 B.A. Hex. small.

L14390A For Strowger selector wiper, assembly locking screw (Poland).



L140070

L140070 Box spanners, polished hardwood handle, brass ferrule, steel.

		Width across flats.	Length.	Diameter.	Weight.
L140070A	ins. mm.	.258 6.55	6 171.45	$\frac{3}{8}"$ 19.05	2.57 oz. 72 gm.
L14482A	ins. mm.	.156 3.76	$3\frac{3}{8}"$ 92.08	$\frac{3}{8}"$ 19.05	1.25 oz. 35 gm.
L14474A	ins. mm.	$\frac{27}{64}"$ 10.71	13 330.2	$\frac{1}{2}"$ 38.1	12 oz. 340.18 gm.
L14389A	ins. mm.	$\frac{1}{4}"$ 4.36	$6\frac{3}{8}"$ 168.28	1 25.4	1.76 oz. 50 gm.

L140070A (B.P.O. No. 14) for telephones, uniselectors and 32A type selectors.

L14482A (B.P.O. No. 8) for 32A type selector wiper clamp screws.

L14474A For manual relay plates.

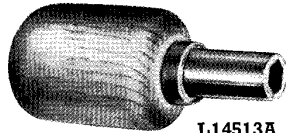
L14389A (B.P.O. No. 7) for Strowger selector (3 magnet type) wiper fixing.

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 Telegraphic Address: Strowger, Liverpool



L14513A

L14513A Box spanners, hardwood handle, brass ferrule, steel stem.

		Width across flats.	Length.	Diameter.	Weight.
L14513A	ins. mm.	.261 6.73	2 1/8 63.5	1 1/8 28.6	1 1/2 oz. 35 gm.
P37544	ins. mm.	7/32 7.14	2 3/8 73.03	1 1/8 28.58	1.27 oz. 36 gm.

L14513A (B.P.O. No. 12) for protector and other 4 B.A. nuts.
P37544 For Protector nuts ; early type only.



L14397

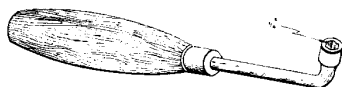
L14397 Box Spanner. Steel, cranked, .22" (5.59 mm.) across flats. B.P.O. No. 1 for 3000 type relay and uniselector.



L14333

L14333. Box Spanner. Steel, cranked, 1/4" (6.35 mm.) across flats. B.P.O. No. 3 for polarised horizontal relay.

	L14397	L14333
Length	3 3/8" (86 mm.)	3 3/8" (98.43 mm.)
Diameter	1/32" (9 mm.)	1/16" (22.23 mm.)
Width :	1 1/8" (20.64 mm.)	1 1/8" (29.53 mm.)
Weight :	3/4 oz. (18 gm.)	0.35 oz. (10 gm.)



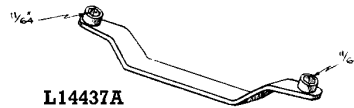
L14338

L14338 Box Spanner.
For A.T. & E. Co. uniselector spring assembly fixing. 1/4" (6.35 mm.) across flats, steel. Polished hardwood handle.
Length : 6" (152.4 mm.)
Diameter : 1 1/8" (28.58 mm.)
Weight : 1.69 oz. (48 gm.)



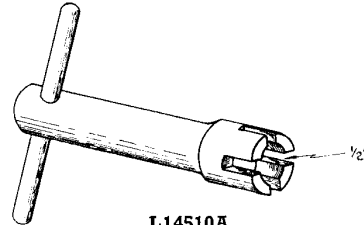
L14325

L14325 Box Spanner, cranked.
For two-motion (3 magnet type) selectors. Steel 2 5/8" (9.92 mm.) across flats, top 1 9/16" (7.54 mm.) bottom.
Length : 3 3/8" (85.73 mm.) Width : 5/8" (15.88 mm.) Depth : 1/2" (12.7 mm.) Weight : 1.48 oz. (42 gm.)



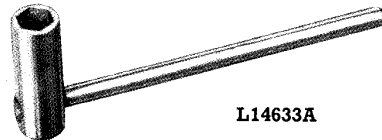
L14437A

L14437A Box Spanner, cranked.
For B.P.O. Type 600 relays spring set screws. 1/16" (4.36 mm.) across flats. Steel.
Length : 3 1/8" (96.84 mm.) Width : 3/8" (9.53 mm.) Depth : 7/16" (11.11 mm.) Weight : 0.53 oz. (15 gm.)



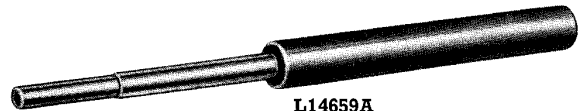
L14510A

"T" Form Box Spanners
L14510A Spanner. For "Electro-matic" traffic signals, high voltage relay. Hole 1/2" (12.7 mm.) dia.; 1/2" (12.7 mm.) deep. Steel.
Length : 3 1/2" (83 mm.) Width : 4" (102 mm.) Diameter : 1 3/8" (20.6 mm.) Weight : 4.94 oz. (140 gm.)



L14633A

L14633A Spanner. Box, offset, hexagon, .288 AF, for locking-nut on knife edge adjustment of uniselector A.P.O. No. 3 and B.P.O. No. 2.
Length : 3 5/16" (84.14 mm.) Width : .406" (10.31 mm.) Depth : 1 1/8" (28.58 mm.) Weight : 3/4 oz. (21 gm.)



L14659A

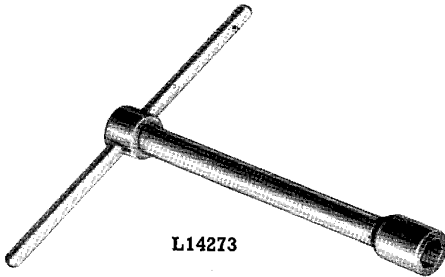
L14659A Spanner. Box, square, .095 AF, for B.P.O. No. 2 uniselector wiper assembly.
Length : 5 1/4" (133.4 mm.) Diameter : 3/8" (9.52 mm.) Weight : 1/2 oz. (14.18 gm.)

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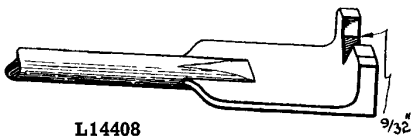
L14273

L14273 Spanner. For "Strowger" selector (3 magnet type), rotary magnet $\frac{1}{4}$ " (7.54 mm.) across flats hex. Steel.
 Length: 4" (102 mm.) Width: $4\frac{1}{4}$ " (126 mm.) Diameter: $\frac{1}{2}$ " (12.6 mm.) Weight: 2.12 oz. (60 gm.)

L14268 Spanner. Similar to L14273 but for Keith equipment and "Strowger" selector, (3 magnet type) rotary magnet bush $\frac{2}{8}$ " (9.9 mm.) across hex. flats. Steel.
 Length: $4\frac{5}{8}$ " (11.85 mm.) Width: 4" (101.6 mm.) Diameter: $\frac{5}{8}$ " (15.8 mm.) Weight: 3.4 oz. (95 gm.)

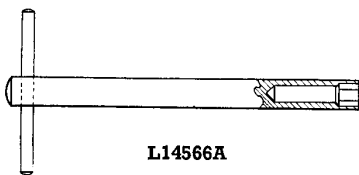
L14255 Spanner. Similar to T14273 but for Keith equipment shaft clamping screws. $\frac{1}{4}$ " (6.35 mm.) A.F. square. Steel.
 Length: $3\frac{1}{2}$ " (83 mm.) Width: 3" (77 mm.) Diameter: $\frac{1}{2}$ " (12.7 mm.)

P37572 Spanner, box, T form, similar to L14273 for Keith switch gates $\frac{3}{8}$ " (18.26 mm.) across hexagon flats.
 Length: $5\frac{1}{2}$ " (139.7 mm.) Width: 4" (101.6 mm.) Depth: 1" (25.4 mm.)



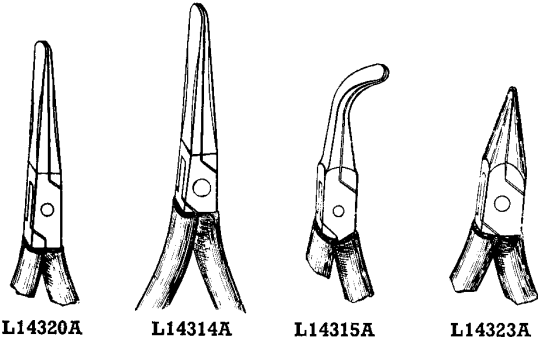
L14408

L14408 Spanner, T form, for "Electro-matic" traffic signals solenoid fixing screw.
 Length: $5\frac{1}{4}$ " (133.4 mm.) Width: $2\frac{1}{2}$ " (63.5 mm.) Depth: $\frac{5}{8}$ " (15.88 mm.) Weight: 1.6 oz. (45 gm.)



L14566A

L14566A Spanner, box, T form, 0 B.A., for meter plate. .421" (10.67 mm.) across hexagon flats.
 Length: $8\frac{1}{2}$ " (215.9 mm.) Width: 4" (101.66 mm.) Depth: $\frac{5}{8}$ " (15.88 mm.)

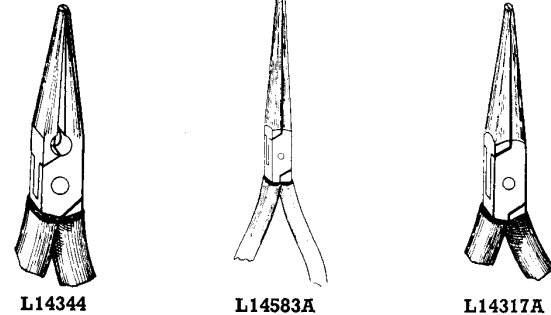


L14320A

L14314A

L14315A

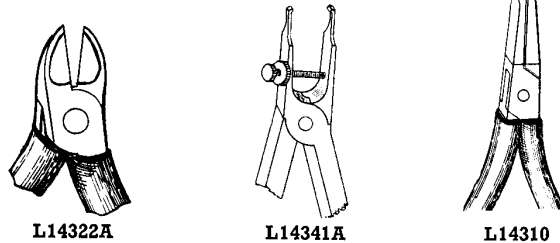
L14323A



L14344

L14583A

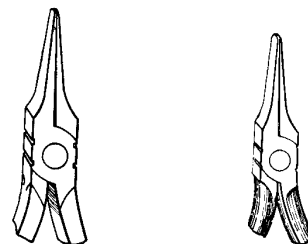
L14317A



L14322A

L14341A

L14310



L14388A

L14507A

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L14320A Duck-bill Pliers. For general adjusting. Short. Polished steel jaws. Insulated handles.

Length: $5\frac{1}{2}$ " (140 mm.) Width: $2\frac{1}{16}$ " (52 mm.) Depth: $\frac{3}{8}$ " (9.5 mm.) Weight: 3 oz. (85 gm.)

L14314A Duck-bill Pliers. As L14320A but long.

Length: $6\frac{1}{2}$ " (159 mm.) Width: $1\frac{7}{8}$ " (48 mm.) Depth: $\frac{3}{8}$ " (9.5 mm.) Weight: $4\frac{1}{2}$ oz. (120 gm.)

L14315A Duck-bill Pliers. As L14320A but with curved jaws.

Length: $5\frac{1}{2}$ " (140 mm.) Width: 2" (51 mm.) Depth: $\frac{7}{8}$ " (22 mm.) Weight: 3 oz. (85 gm.)

L14323A Wiring Pliers. Polished jaws ; insulated handles.

Length: $5\frac{5}{8}$ " (130 mm.) Width: $2\frac{1}{8}$ " (54 mm.) Depth: $\frac{1}{16}$ " (7.5 mm.) Weight: $2\frac{1}{4}$ oz. (60 gm.)

L14583A Wiring Pliers. As L14323A but with long tapered jaws for "Strowger" switch bank wiring.

Length: $7\frac{1}{2}$ " (190.5 mm.) Width: $2\frac{1}{8}$ " (54 mm.) Depth: $\frac{9}{32}$ " (7.1 mm.) Weight: 3 oz. (85 gm.)

L14344 Wiring and Cutting Pliers. For general use. Polished steel jaws ; insulated handles.

Length: $5\frac{3}{8}$ " (149.19 mm.) Width: 2" (50.8 mm.) Depth: $\frac{1}{16}$ " (7.925 mm.)

L14322A Wire-cutting Pliers. For general use. Polished steel jaws ; insulated handles.

Length: $5\frac{5}{8}$ " (130 mm.) Width: $2\frac{1}{8}$ " (54 mm.) Depth: $\frac{1}{16}$ " (11 mm.) Weight: $3\frac{1}{2}$ oz. (99 gm.)

L14317A Tapered Nose Pliers. For general use. Polished steel jaws ; insulated handles.

Length: 6" (152.4 mm.) Width: 2" (50.8 mm.) Depth: $\frac{9}{32}$ " (7.8 mm.)

L14341A Extractor. For lamp caps, labels and label holders. Forged steel tongs with adjusting screw ; handles not insulated.

Length: $5\frac{1}{8}$ " (130 mm.) Width: $1\frac{1}{2}$ " (38.1 mm.) Depth: $\frac{3}{8}$ " (9.5 mm.) Weight: 2.22 oz. (62 gm.)

L14310 Extractor. For heat coils. Polished steel jaws ; insulated handles.

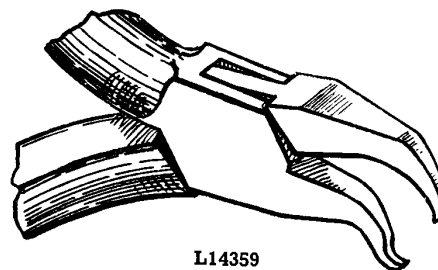
Length: $5\frac{1}{4}$ " (133.65 mm.) Width: 2" (50.8 mm.) Depth: $\frac{1}{16}$ " (7.5 mm.)

L14388A Duck-bill Pliers. For 10 and 12 point uniselector wipers, also B.P.O. types 600 and 3000 relay spring tension adjustment, and general use. Polished steel jaws ; not insulated.

Length: $5\frac{5}{8}$ " (134.92 mm.) Width: $1\frac{5}{8}$ " (47.59 mm.) Depth: $\frac{3}{8}$ " (9.51 mm.)

L14507A Duck-bill Pliers. Narrow tipped. For vertical wipers type 32A (B.P.O. 2000 type) and general adjustment. Steel, not insulated.

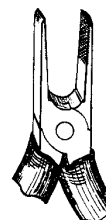
Length: $5\frac{1}{2}$ " (139.7 mm.) Width: $1\frac{7}{8}$ " (47.59 mm.) Depth: $\frac{5}{16}$ " (7.925 mm.) Weight: 2.7 oz. (75 gm.)



L14359

L14359 Pliers, buffer removing.

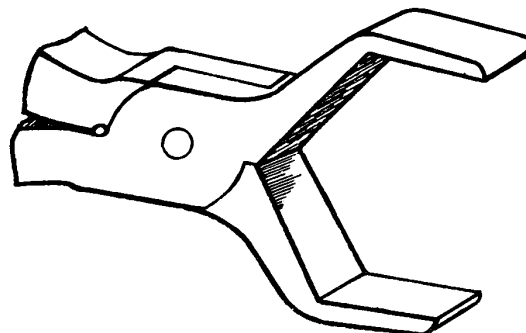
Length: $5\frac{1}{2}$ " (139.7 mm.) Width: $1\frac{7}{8}$ " (47.63 mm.) Depth: $\frac{3}{8}$ " (9.53 mm.) Weight: 3.18 oz. (90 gm.)



L14460

L14460 Pliers, for removing protector carbons.

Length: $5\frac{5}{8}$ " (130.175 mm.) Width: $1\frac{1}{2}$ " (38.1 mm.) Depth: $\frac{3}{8}$ " (9.53 mm.) Weight: 1.95 oz. (55 gm.)



L14347

L14347 Pliers, for removing covers of B.P.O. No. 9 meters. Not insulated.

Length: $6\frac{5}{8}$ " (160 mm.) Width: $2\frac{1}{16}$ " (52 mm.) Depth: 1" (25 mm.) Weight: 6 oz. (170 gm.)

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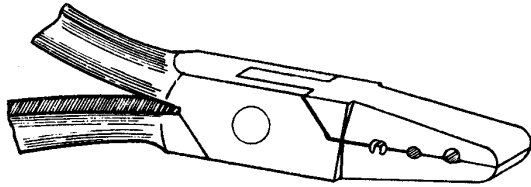
Telegraphic Address: Strowger, Liverpool



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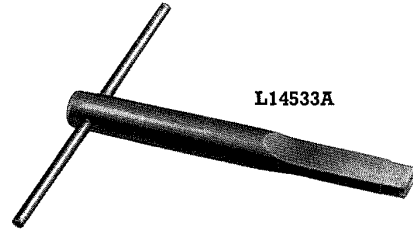
Export Sales: STROWGER HOUSE, ARUNDEL STREET, STRAND, LONDON, W.C.2
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L14582

L14582 Pliers, for clinching cord tags.

Length: 6 1/4" (156.5 mm.) Width: 2 1/8" (53.1 mm.) Weight: 5.35 oz. (150 gm.)

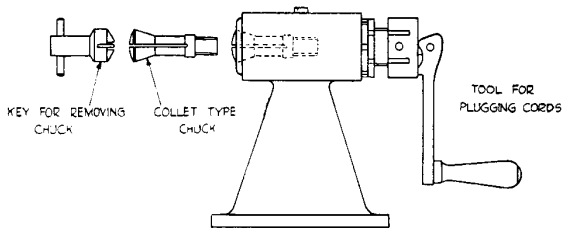


L14533A

L14533A Adjuster.

For interrupter springs (if fitted) on A.T. & E. Co. uniselector. Slot .050" / .052".

Length: 3 5/8" (92.08 mm.) Width: 3 1/4" (82.55 mm.) Depth: 3/8" (9.53 mm.) Weight: 1 1/2 oz. (42.53 gm.)

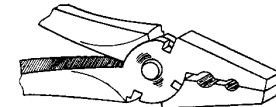


KEY FOR REMOVING CHUCK

COLLET TYPE CHUCK

TOOL FOR PLUGGING CORDS

PLIERS FOR HOLDING CORD



L14590

L14590 Cord Repair Tool, including bench headstock with hand-driven mandrel, chuck for plugs, key for changing chuck and special pliers.

Length: 7 3/4" (196.85 mm.) Width: 4 1/2" (114.3 mm.) Depth: 6 1/2" (165 mm.) Weight: 5 1/2 lb. (2.5 kg.)



L14675A

L14675A Adjuster.

For rotary interrupter and N.P. bracket of 32A Mk. II (B.P.O. Type 2000) selectors. Slot .084".

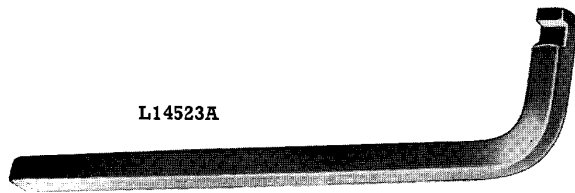
Length: 4 1/4" (107.95 mm.) Width: 1/4" (6.35 mm.) Depth: 3/4" (19.05 mm.) Weight: 1 oz. (28.35 gm.)



L760006A

L760006A Screw, for adjusting rotary armature stroke type 32A selector (B.P.O. type 2000).

Length: 1 1/2" (38.1 mm.) Diameter: 3/8" (9.53 mm.) Weight: 0.18 oz. (5 gm.)



L14523A

L14523A Adjuster.

For motor uniselector latch contact spring support.

Length: 5 1/2" (133.35 mm.) Width: 1 5/16" (33.34 mm.) Depth: 1/4" (6.35 mm.) Weight: 1 3/4 oz. (49.62 gm.)

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L14332

L14332 Adjusting Tool.

Double-ended, for adjusting armature stops and interlocking levers on "Strowger" interlocking line and cut-off relays.

Length: $3\frac{1}{8}$ " (100 mm.) Width: $\frac{7}{16}$ " (11 mm.) Depth: $\frac{1}{4}$ " (6.35 mm.) Weight: 1 oz. (28 gm.)



L14632

L14632 Adjuster.

For A.P.O. No. 3 uniselector springs. Slot .040".

Length: 4" (101.66 mm.) Width: $\frac{1}{4}$ " (6.35 mm.) Depth: $\frac{9}{16}$ " (14.29 mm.) Weight: 1 oz. (28 gm.)

L14631A Adjuster.

For A.P.O. No. 3 uniselector interrupter. Similar to L14632 but slot .072"/.074". (1.83/1.88 mm.)

Length: $3\frac{3}{8}$ " (85.72 mm.) Width: $\frac{7}{8}$ " (22.23 mm.) Depth: $\frac{1}{4}$ " (6.35 mm.) Weight: 1 oz. (28.35 gm.)

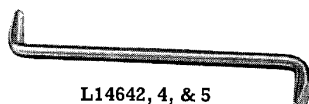


L14267

L14267 Adjusting Tool.

For adjusting double-dogs on "Strowger" selectors (3 magnet type) and "Rythmatic" street lighting relay front pawl stop.

Length: $2\frac{3}{4}$ " (70 mm.) Width: $\frac{9}{16}$ " (14.288 mm.) Depth: $\frac{1}{8}$ " (3.75 mm.) Weight: .7 oz. (20 gm.)



L14642, 4, & 5

L14642 Adjuster.

For "Electro-matic" controller springs. Slots .031" and .022".

Length: $5\frac{1}{2}$ " (139.7 mm.) Width: $\frac{7}{32}$ " (5.55 mm.) Depth: $\frac{25}{32}$ " (19.8 mm.) Weight: $1\frac{1}{8}$ oz. (31.9 gm.)

L14644 Adjuster.

For "Electro-matic" controller springs. Slots .015" and .025".

Length: $4\frac{1}{2}$ " (114.3 mm.) Width: $\frac{7}{32}$ " (5.55 mm.) Depth: $\frac{27}{32}$ " (21.43 mm.) Weight: 1 oz. (28.35 gm.)

L14645 Adjuster.

For "Electro-matic" controller springs. Both slots .033"/.034".

Length: 5" (127.0 mm.) Width: $\frac{7}{32}$ " (5.55 mm.) Depth: $1\frac{3}{32}$ " (27.78 mm.) Weight: $1\frac{1}{8}$ oz. (31.9 gm.)



L14336

L14336 Adjusting Tool.

For adjusting armature stops on horizontal relays.

Length: $4\frac{1}{2}$ " (114 mm.) Width: $\frac{3}{16}$ " (4.7 mm.) Depth: $\frac{3}{16}$ " (1.2 mm.) Weight: 1 oz. (28 gm.)



L14643A

L14643A Adjuster.

For "Electro-matic" controller cam springs.

Length: $5\frac{3}{8}$ " (146.05 mm.) Width: $\frac{1}{2}$ " (12.7 mm.) Depth: $\frac{1}{8}$ " (3.18 mm.) Weight: $\frac{3}{4}$ oz. (21.26 gm.)



L14647A

L14647A Adjuster.

For "Electro-matic" A.C. relay armature. Slots .08" and $\frac{5}{16}$ ".

Length: 6" (152.4 mm.) Width: 1" (25.4 mm.) Depth: $\frac{3}{8}$ " (9.53 mm.) Weight: 9 oz. (255 gm.)

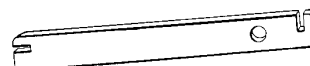


L14648A

L14648A Adjuster.

For "Electro-matic" road relay springs.

Length: $4\frac{1}{2}$ " (114.3 mm.) Width: $\frac{1}{2}$ " (12.7 mm.) Depth: $\frac{3}{16}$ " (4.76 mm.) Weight: $\frac{1}{2}$ oz. (7.09 gm.)



L14426A

L14426A Adjusting Tool.

For adjusting rotary and vertical armatures of type 32A selectors (B.P.O. 2000). The hole is for a "tommy bar."

Length: $5\frac{1}{4}$ " (133.35 mm.) Width: $\frac{5}{8}$ " (15.85 mm.) Depth: $\frac{1}{4}$ " (6.35 mm.) Weight: $3\frac{1}{2}$ oz. (99.23 gm.)



L14646A

L14646A Adjuster.

For "Electro-matic" controller impulse mechanism back stop. Slot .187".

Length: 6" (152.4 mm.) Width: $\frac{1}{2}$ " (12.7 mm.) Depth: $\frac{1}{2}$ " (12.7 mm.) Weight: $6\frac{1}{2}$ oz. (184.27 gm.)

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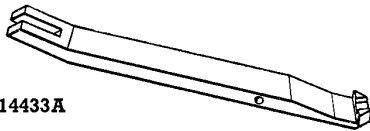
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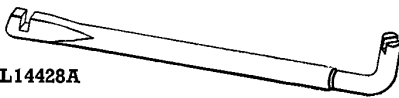


L14433A

L14433A Adjusting Tool.

Vertical interrupter striker adjuster and holder for L14675A for type 32A (B.P.O. 2000) selector.

Length: $4\frac{3}{8}$ " (111.12 mm.) Width: $\frac{7}{16}$ " (11.12 mm.) Depth: $\frac{3}{8}$ " (9.525 mm.) Weight: 1.6 oz. (45 gm.)



L14428A

L14428A Adjusting Tool.

For adjusting vertical detent and vertical pawl guide of type 32A (B.P.O. 2000) selector.

Length: $4\frac{3}{8}$ " (106.36 mm.) Width: $\frac{7}{8}$ " (22.225 mm.) Depth: $\frac{1}{4}$ " (6.35 mm.) Weight: 1 oz. (28 gm.)

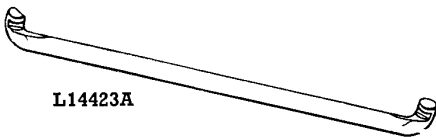


L14520A

L14520A Adjuster.

For motor unselector wipers. Slot .017".

Length: $5\frac{1}{2}$ " (139.7 mm.) Width: $1\frac{1}{2}$ " (38.1 mm.) Depth: $\frac{5}{32}$ " (3.97 mm.) Weight: $\frac{5}{8}$ oz. (17.72 gm.)



L14423A

L14423A Adjusting Tool.

For adjusting rotary interrupter striker of type 32A selector (B.P.O. 2000).

Length: $5\frac{1}{2}$ " (133.35 mm.) Width: $\frac{7}{8}$ " (11.113 mm.) Depth: $\frac{1}{4}$ " (6.35 mm.) Weight: 1.14 oz. (32 gm.)



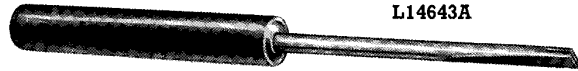
L14575

L14575 Adjusting Tool.

For adjusting rotary detent of type 32A selector. (B.P.O. 2000).

Length: $4\frac{1}{2}$ " (114 mm.) Width: $1\frac{5}{8}$ " (41.25 mm.) Depth: $\frac{1}{2}$ " (12.7 mm.) Weight: 1.57 oz. (44 gm.)

L14429 Adjusting Tool. As L14575 but for B.P.O. exchanges.

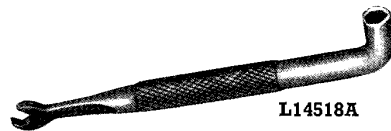


L14634A

L14634A Adjuster.

For A.P.O. No. 3 unselector wipers. Slot .013"/.015".

Length: 6" (152.4 mm.) Diameter: $\frac{1}{2}$ " (12.7 mm.) Weight: 1 oz. (28.35 gm.)

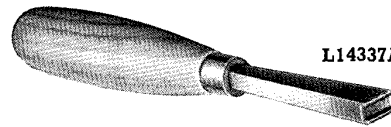


L14518A

L14518A Spanner.

For latch and cam fixing, also gauge for motor unselector feeder spring gap.

Length: $3\frac{1}{2}$ " (88.9 mm.) Width: $\frac{5}{8}$ " (15.88 mm.) Depth: $\frac{17}{64}$ " (6.75 mm.) Weight: $\frac{3}{4}$ oz. (21.3 gm.)



L14337A

L14337A Adjuster.

With hardwood handle for interlocking lever on line and cut-off relays.

Length: $6\frac{1}{8}$ " (153.99 mm.) Diameter: $1\frac{9}{16}$ " (39.69 mm.) Weight: 2 oz. (56.7 gm.)

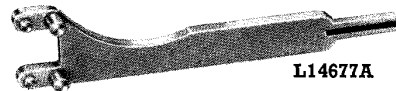


L14676A

L14676A Adjuster.

For rotary interrupter toggle operating bracket and N.P. lever of 32A Mk. II (B.P.O. Type 2000) selectors. Both slots .084".

Length: $4\frac{1}{2}$ " (114.3 mm.) Width: $\frac{1}{4}$ " (6.35 mm.) Depth: $\frac{9}{32}$ " (7.14 mm.) Weight: 1 oz. (28.35 gm.)



L14677A

L14677A Adjuster.

For cranked lever arms and vertical alignment "S" lever of 32A Mk. II (B.P.O. Type 2000) selectors. Slot .072" and 4 pins.

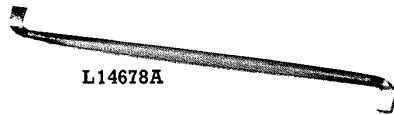
Length: $4\frac{3}{4}$ " (120.65 mm.) Width: 1" (25.4 mm.) Depth: $\frac{1}{2}$ " (12.7 mm.) Weight: 2 oz. (56.7 gm.)

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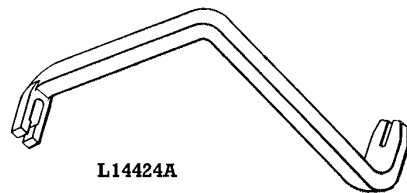


L14678A

L14678A Adjuster.

For mechanical spring set of 32A Mk. II (B.P.O. Type 2000) Selector. Both slots .0165"/.0195".

Length : Width : Depth : Weight :
 4" (101.6 mm.) $\frac{7}{16}$ " (11.11 mm.) $\frac{1}{2}$ " (12.7 mm.) $\frac{1}{8}$ oz. (3.54 gm.)

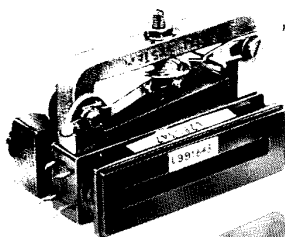


L14424A

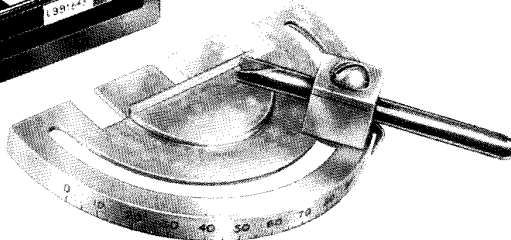
L14424A Adjusting Tool.

For adjusting level springs auxiliary cam of type 32A (B.P.O. 2000) selector

Length : Width : Depth : Weight :
 $2\frac{1}{8}$ " (74.6 mm.) $2\frac{5}{8}$ " (74.6 mm.) $1\frac{1}{2}$ " (38.1 mm.) 1.64 oz. (46 gm.)



L14687



L14687 Angle Gauge and Adjuster.

For contacts of Rythmatic relays.

Length : Breadth : Depth : Weight :
 $4\frac{1}{2}$ " (114.3 mm.) $2\frac{1}{4}$ " (57.15 mm.) $1\frac{1}{16}$ " (26.99 mm.) 4.5 oz. (127.57 gm.)

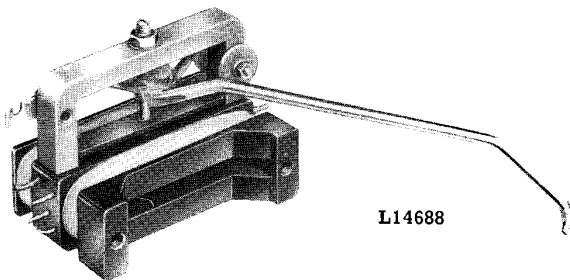


L14576A

L14576A Adjusting Tool.

For adjusting detent spring on B.P.O. clock 44, B.P.O. 100 type meter and B.P.O. No. 2 Uniselector.

Length : Width : Depth : Weight :
 $4\frac{1}{16}$ " (103.187 mm.) $\frac{3}{16}$ " (4.7 mm.) $\frac{3}{32}$ " (2.35 mm.) .35 oz. (10 gm.)

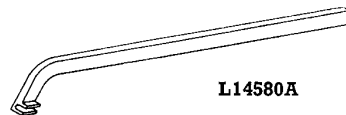


L14688

L14688 Adjuster.

For Rythmatic relay spiral springs.

Length : Weight :
 $4\frac{1}{8}$ " (104.78 mm.) 0.5 ozs. (14.18 gm.)



L14580A

L14580A Adjusting Tool.

For adjusting forward pawl stop, B.P.O. clock 44.

Length : Width : Depth :
 $4\frac{5}{8}$ " (111.475 mm.) .6" (15.24 mm.) .193" (4.82 mm.)



L14399A

L14399A Adjusting Tool.

For adjusting contact spring tension of B.P.O. 3000 type relays.

Length : Width : Depth : Weight :
 $5\frac{1}{2}$ " (140 mm.) $\frac{1}{4}$ " (6.35 mm.) $\frac{9}{32}$ " (7 mm.) $\frac{1}{8}$ oz. (5 gm.)

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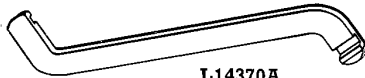


L14360A

L14360A Adjusting Tool.

For adjusting contact spring tips of B.P.O. 600 and 3000 type relays, so that the twin contacts operate simultaneously.

Length :	Width :	Depth :	Weight :
$3\frac{1}{2}$ "	$\frac{1}{4}$ "	$\frac{1}{8}$ "	$\frac{1}{4}$ oz.
(100 mm.)	(6 mm.)	(3 mm.)	(4 gm.)



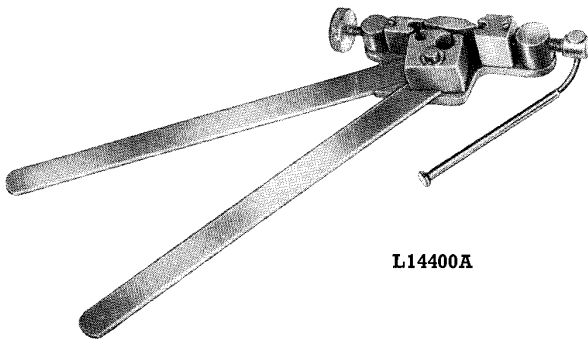
L14370A

L14370A Adjusting Tool.

For adjusting horizontal relay armatures.

Length :	Width :	Depth :	Weight :
$4\frac{1}{4}$ "	$\frac{11}{16}$ "	$\frac{3}{32}$ "	.53 oz.
(108 mm.)	(17.16 mm.)	(2.34 mm.)	(15 gm.)

L14431 Adjusting Tool. As L14370A but for Australian exchanges only.



L14400A

L14400A Adjusting Tool.

Bench tool for bending armatures for B.P.O. 600 and 3000 type relays. (B.P.O. Adjuster, armature, No. 2).

Length :	Width :	Depth :	Weight :
$11\frac{3}{8}$ "	$6\frac{3}{8}$ "	$1\frac{3}{8}$ "	1 lb. 9 $\frac{3}{8}$ oz.
(298.45 mm.)	(161.93 mm.)	(34.93 mm.)	(730.4 gm.)



L14334A



L14307A



L14334A Spring Adjuster.

For adjusting short interrupter spring on A. T. and E. Co. uniselectors, slot .051" (1.295 mm.). Insulated handle.

Length :	Width :	Depth :	Weight :
$2\frac{5}{8}$ "	$\frac{9}{16}$ "	$\frac{3}{16}$ "	2 oz.
(67 mm.)	(14.2 mm.)	(4.8 mm.)	(57 gm.)

L14307A Spring Adjuster.

For adjusting horizontal relay springs. Slots .031" (.787 mm.). Ends cranked. Insulated handle.

Length :	Width :	Depth :	Weight :
$6\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{5}{16}$ "	1 oz. (28 gm.)
(162 mm.)	(7.9 mm.)	(7.9 mm.)	



L14391A

L14391A Adjusting Tool.

For adjusting Strowger selector (3 magnet type), rotary release magnet armature.

Length :	Width :	Depth :	Weight :
$4\frac{3}{8}$ "	$\frac{6}{8}$ "	$\frac{1}{8}$ "	.64 oz.
(111.12 mm.)	(15.85 mm.)	(3.195 mm.)	(18 gm.)

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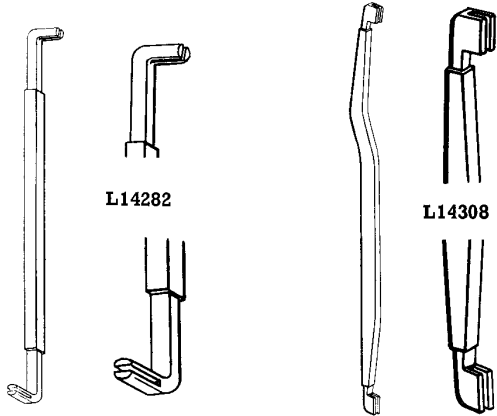
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L14282

L14308

L14282 Spring Adjuster.

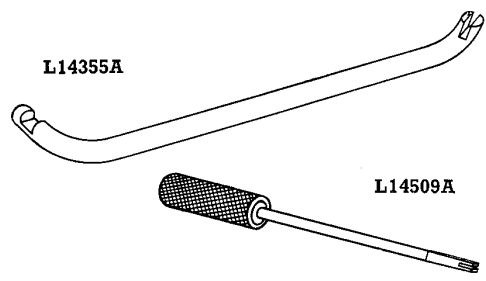
For adjusting "Strowger" interlocking type line and cut-off relays, cam springs, keys, slots .031" (.787 mm.). Insulated handle.

Length : 5 1/2" (140 mm.) Width : 1/2" (12.7 mm.) Depth : 1/2" (12.7 mm.) Weight : 1 oz. (28 gm.)

L14308 Spring Adjuster.

For adjusting horizontal type relays on small centres, cranked handle, slots .031" (.787 mm.)

Length : 6 1/2" (165 mm.) Width : 3/4" (19 mm.) Depth : 7/32" (5.6 mm.) Weight : 1 1/4 oz. (35 gm.)



L14355A

L14509A

L14355A Adjusting Tool.

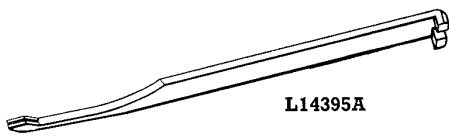
For adjusting B.P.O. uniselector No. 1 interrupter and Strowger (3 magnet type) selector rotary interrupter. Slots .075" and .200" / .231" (1.9 and 5.08/5.87 mm.) (B.P.O. No. 2.)

Length : 5 1/2" (140 mm.) Width : 1 5/8" (11.9 mm.) Depth : 7/8" (22.225 mm.)

L14509A Adjusting Tool.

For adjusting wipers and general adjustments. Slot .016" (.406 mm.)

Length : 3 5/8" (92.075 mm.) Width : 7/16" (11.12 mm.) Depth : 7/16" (11.12 mm.) Weight : .7 oz. (20 gm.)

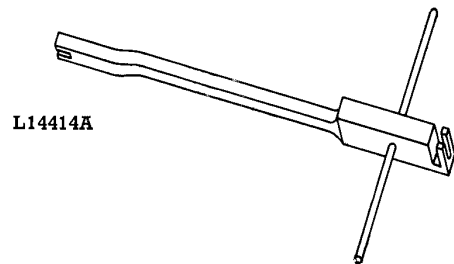


L14395A

L14395A Spring Adjuster.

For adjusting 31H type relay springs and armature backstop.

Length : 5 5/8" (130.175 mm.) Width : 3/8" (9.5 mm.) Depth : 1 1/8" (3.195 mm.) Weight : .8 oz. (22 gm.)



L14414A

L14414A Adjusting Tool.

For adjusting B.P.O. 100 type meter armature restoring spring and removing cover.

Length : 4 1/8" (119.06 mm.) Width : 3 1/8" (79.375 mm.) Depth : 5/16" (7.94 mm.) Weight : 1.07 oz. (30 gm.)



L14280 Spring Adjuster.

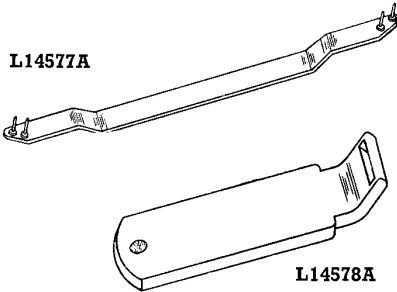
For Keith lineswitch bank contacts.

Length : 11 1/2" (285.7 mm.) Diam : 1/4" (6.3 mm.) Weight : .35 oz. (10 gm.)

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L14577A Adjusting Tool.

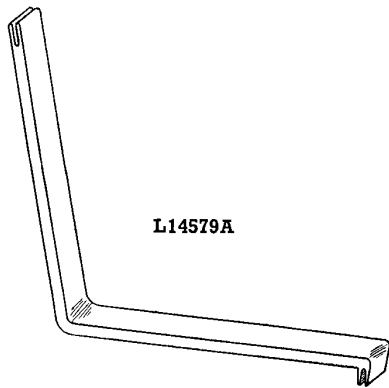
For adjusting B.P.O. 600 type relay springs. B.P.O. No. 12.

Length :	Width :	Depth :
$4\frac{3}{8}$ "	$\frac{1}{4}$ "	$\frac{1}{8}$ "
(120.65 mm.)	(6.35 mm.)	(6.35 mm.)

L14578A Adjusting Tool.

For adjusting M.D.F. protector springs.

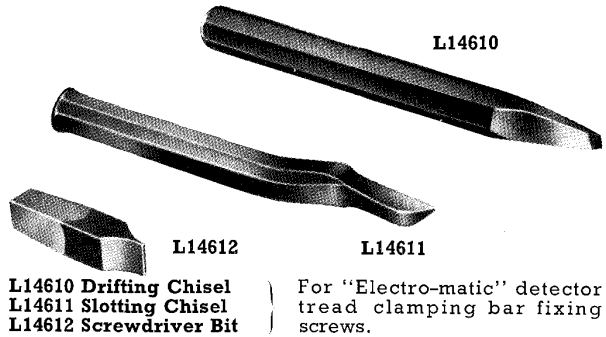
Length :	Width :	Depth :
$3\frac{1}{4}$ "	$\frac{3}{4}$ "	$\frac{1}{2}$ "
(82.55 mm.)	(19.05 mm.)	(10.32 mm.)



L14579A Adjusting Tool.

For adjusting A.K. Key Springs.

Length :	Width :	Depth :	Weight :
$5\frac{3}{8}$ "	$2\frac{1}{8}$ "	$\frac{1}{4}$ "	1.07 oz.
(146.05 mm.)	(53.975 mm.)	(6.35 mm.)	(30 gm.)



L14610 Drifting Chisel
L14611 Slotting Chisel
L14612 Screwdriver Bit

For "Electro-matic" detector tread clamping bar fixing screws.

	L14610	L14611	L14612
Length ...	$8\frac{1}{2}$ " (216 mm.)	8" (203 mm.)	$3\frac{1}{2}$ " (89 mm.)
Breadth ...	$\frac{7}{8}$ " (22 mm.)	$\frac{7}{8}$ " (22 mm.)	$\frac{3}{8}$ " (19 mm.)
Depth ...	$\frac{7}{8}$ " (22 mm.)	$1\frac{1}{2}$ " (38 mm.)	$\frac{3}{8}$ " (19 mm.)
Weight ...	{ 1 lb. 6 oz. (624 gm.)	1 lb. 3 oz. (538 gm.)	8 oz. (227 gm.)



L14613 Turncrew Brace
L14614 Extension Bit

For "Electro-matic" detector tread clamping bar fixing screws.

	L14613	L14614
Length ...	$1' 0\frac{1}{8}$ " (306.38 mm.)	$1' 1\frac{3}{8}$ " (336.54 mm.)
Breadth ...	$7\frac{7}{8}$ " (188.9 mm.)	$1\frac{1}{2}$ " (38.1 mm.)
Depth ...	$2\frac{5}{8}$ " (66.65 mm.)	
Weight ...	2 lb. 10 oz. (1.19 Kg.)	2 lb. 1 oz. (935 gm.)

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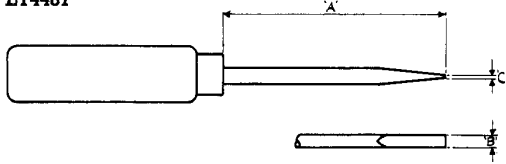
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L14487

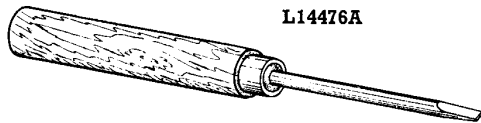


L14487 to L14493 Screwdrivers.

For general maintenance and adjustment.

Code	B.P.O. No.	Approximate Overall		Dimensions A, B and C			Approx. Weight
		Length	Width	Blade length	Blade width	Edge thickness	
L14487	1	ins. 5½ mm. 139.7	½ 12.7	2½ 63.5	¾ 19.0	.013 .33	.7 oz. 20 gm.
L14488	2	ins. 6 mm. 152.4	⅝ 15.85	2½ 63.5	1⅞ 47.6	.018 .457	.78 oz. 22 gm.
L14489	3	ins. 6 mm. 152.4	⅝ 19.05	2½ 63.5	¾ 19.05	.025 .635	.88 oz. 25 gm.
L14490	4	ins. 9 mm. 241.3	⅝ 15.85	6 152.4	3⅝ 91.4	.013 .33	1.06 oz. 30 gm.
L14491	5	ins. 11 mm. 279.4	⅝ 19.05	7 177.8	3⅞ 98.4	.022 .559	1.76 oz. 50 gm.
L14492	6	ins. 12 mm. 304.8	⅞ 22.19	8 203.2	4⅞ 122.2	.025 .635	3.25 oz. 92 gm.
L14526	7	ins. 9⅝ mm. 244.48	1⅞ 20.63	5 127.0	¾ 19.05	.016 .406	1.25 oz. 35.4 gm.
L14527	8	ins. 9⅝ mm. 244.48	1⅞ 20.63	5 127.0	¾ 19.05	.022 .559	1.5 oz. 42.5 gm.

L14493 Screwdriver. As L14491 but blade sheathed in insulating material (B.P.O. No. 5A).

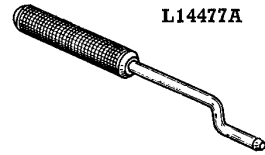


L14476A

L14476A Screwdriver.

Non-magnetic for telegraph relay. ⅛" (3.17 mm.) blade.

Length: 5½" (127 mm.) Width: ½" (12.7 mm.) Weight: ½ oz. (14 gm.)

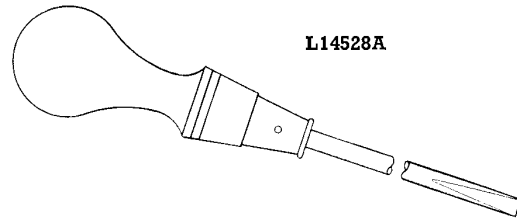


L14477A

L14477A Tommy Bar.

Non-magnetic for telegraph relay. Diam. .092" (2.34 mm.)

Length: 2½" (65.86 mm.) Width: ¼" (6.35 mm.) Depth: .342" (8.46 mm.) Weight: 7 oz. (20 gm.)



L14528A

L14528A Screwdriver.

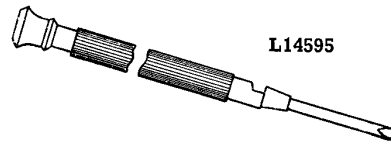
Blade 5" × ¼" (127 × 6.35 mm.) for general use.

Length: 7¼" (184.15 mm.) Diameter: 1½" (38.1 mm.) Weight: 2¾ oz. (77.97 gm.)

L14529A Screwdriver.

As L14528A but blade 5" × ⅝" (127 × 7.94 mm.) for general use.

Length: 7¼" (184.15 mm.) Diameter: 1½" (38.1 mm.) Weight: 3 oz. (85.05 gm.)



L14595

L14595 Boley Screwdriver.

For adjusting P.O. Clock No. 44 and general use on small instrument screws. Blade ⅜" (2.38 mm.) wide.

Length: 4¾" (120.65 mm.) Diameter: ⅞" (11.109 mm.) Weight: .7 oz. (20 gm.)

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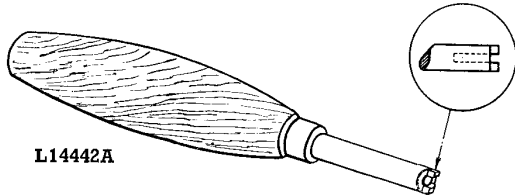
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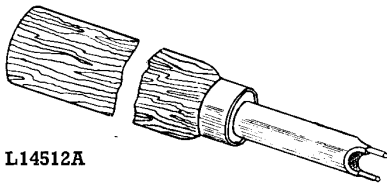


L14442A

L14442A Ringdriver.

Forked. B.P.O. No. 4 for slotted nuts on 32A (B.P.O. 2000) type selector.

Length: $8\frac{1}{2}$ " (215.9 mm.) Width: 1" (25.4 mm.) Depth: 1" (25.4 mm.) Weight: 2.14 oz. (60 gm.)

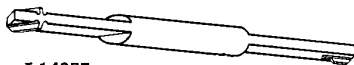


L14512A

L14512A Ringdriver.

Forked. For removing oscillator covers.

Length: $5\frac{1}{2}$ " (139.7 mm.) Width: $\frac{3}{4}$ " (19.05 mm.) Weight: 2.32 oz. (65 gm.)

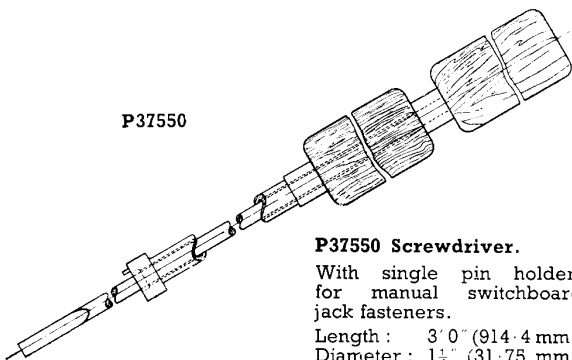


L14357

L14357 Screwdriver.

Off-set. For screws on Keith lineswitch, horizontal relays, "Strowger" selectors (3 magnet type) and general use. Blades $\frac{1}{32}$ " \times $\frac{3}{16}$ " (.794 \times 4.76 mm.)

Length: $3\frac{3}{4}$ " (95.25 mm.) Width: $\frac{5}{16}$ " (7.90 mm.) Depth: $\frac{1}{16}$ " (1.57 mm.) Weight: .93 oz. (26 gm.)

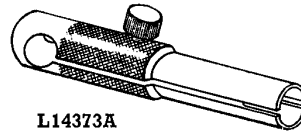


P37550

P37550 Screwdriver.

With single pin holder, for manual switchboard jack fasteners.

Length: 3'0" (914.4 mm.) Diameter: $1\frac{1}{2}$ " (31.75 mm.) Weight: 1 lb. 2 oz. (504 gm.)

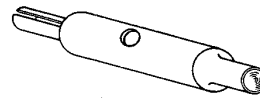


L14373A

L14373A Lamp Extractor.

For signal lamps, two pin type, on Fire Alarm, Remote Control and Automaster P.A.X. equipment.

Length: 3" (76.2 mm.) Width: $\frac{7}{8}$ " (22.19 mm.) Depth: $\frac{5}{8}$ " (15.85 mm.) Weight: 2.85 oz. (80 gm.)



L14581

L14581 Lamp Extractor.

For signal lamps on manual switchboards.

Length: 3" (76.2 mm.) Diameter: $\frac{1}{2}$ " (12.7 mm.) Weight: .357 oz. (10 gm.)



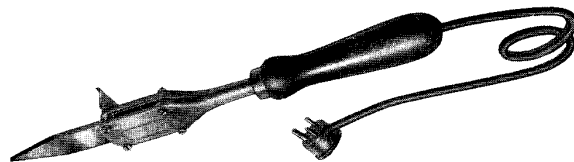
L14594A

L14594A Soldering Iron.

50 volt 65 watt complete with 14' 6" cord and plug.

L14624. As L14594A but with 6' cord.

Length: 1'0" (304.8 mm.) Width: $1\frac{1}{8}$ " (34.9 mm.) Diameter: $1\frac{3}{8}$ " (34.9 mm.) Weight including cord: 1 lb. 6 oz. (618 gm.)



L14625 Soldering Iron.

220/230V. 175W. with 15' 3-core cable and 3-pin plug.

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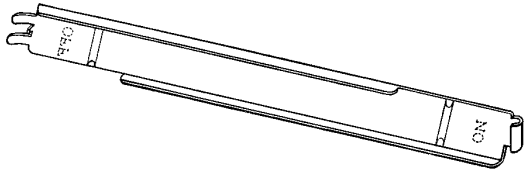
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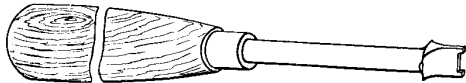
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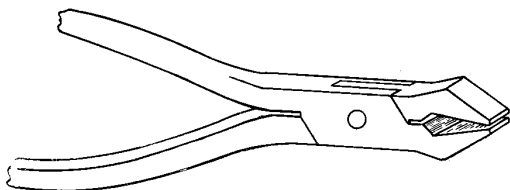
L14371A Extractor, for spiral spring of type 24 dial.
 Length: $5\frac{7}{8}$ " (149.23 mm.) Width: $1\frac{7}{16}$ " (11.11 mm.) Depth: $1\frac{7}{16}$ " (11.11 mm.) Weight: 0.35 oz. (10 gm.)



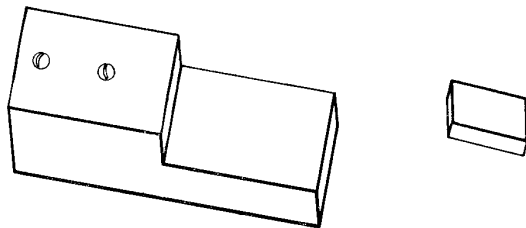
L14406 Tool, for removing and replacing type 31H relay armatures.
 Length: $6\frac{5}{8}$ " (168.28 mm.) Width: $1\frac{3}{8}$ " (14.05 mm.) Depth: $1\frac{1}{8}$ " (3.18 mm.) Weight: 0.78 oz. (22 gm.)



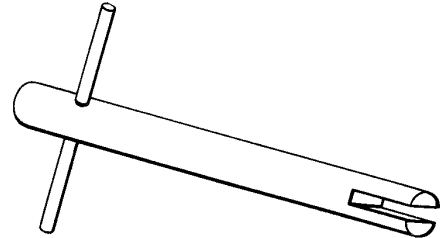
P37561 Driver, for manual board order wire key caps.
 Length: $7\frac{1}{8}$ " (180.98 mm.) Width: 1" (25.4 mm.) Depth: 1" (25.4 mm.) Weight: 2.47 oz. (70 gm.)



L14550A Spanner, quick grip for nuts up to $\frac{5}{16}$ " (7.94 mm.) across flats.
 Length: $5\frac{7}{8}$ " (149.23 mm.) Width: $1\frac{3}{8}$ " (34.93 mm.) Depth: $1\frac{7}{16}$ " (14.29 mm.) Weight: 4.2 oz. (118 gm.)



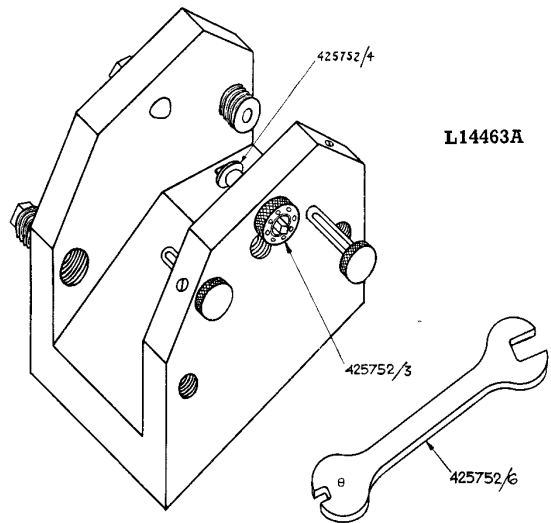
L14278 Gauge, for adjustment of Keith lineswitch plunger.
 Length: $5\frac{1}{8}$ " (150.81 mm.) Width: 2" (50.8 mm.) Depth: $1\frac{1}{4}$ " (31.7 mm.)



L14275 Adjuster, for Keith lineswitch plunger arm.
 Length: 4" (101.6 mm.) Width: $3\frac{1}{2}$ " (88.9 mm.) Diameter: $1\frac{1}{2}$ " (12.7 mm.)

L14516 Adjuster, for Keith lineswitch restoring spring.

Length: $8\frac{1}{2}$ " (215.9 mm.) Diameter: $1\frac{3}{8}$ " (19.05 mm.) Weight: $1\frac{3}{8}$ oz. (49.62 gm.)



L14463A Bank Repair Tool.

For extracting screws from banks of 32A (B.P.O. 2000) type selectors. Complete with spanner and spare bits.

For method of using refer to operating Bulletin No. 463.

Length: $3\frac{3}{8}$ " (85.71 mm.) Width: $2\frac{7}{8}$ " (72.99 mm.) Depth: $2\frac{9}{16}$ " (63.5 mm.) Weight: 3 lb. 2 oz. (1.4 kg.)

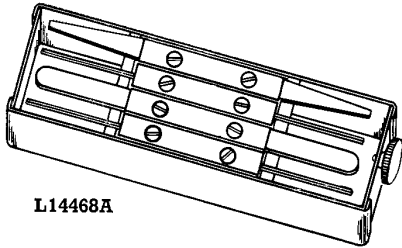
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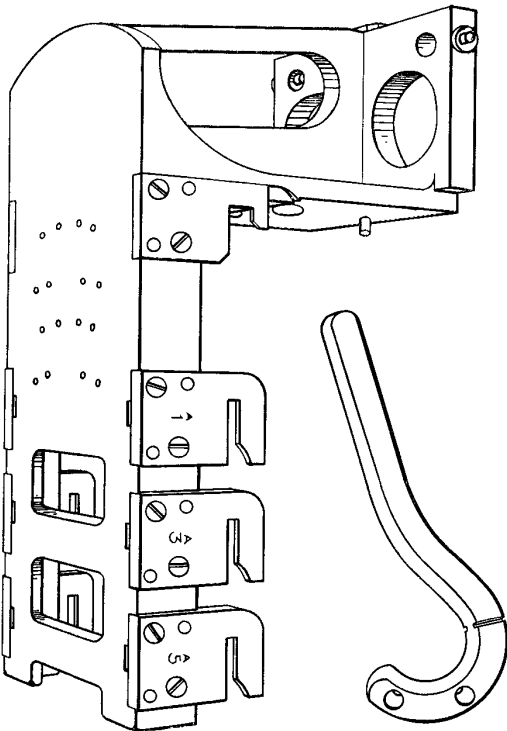
L14468A

L14468A Gauge Feelers.

Box of special feeler gauges for adjustment of wipers, spring sets and mechanism of 32A (B.P.O. 2000) type selector.

The set of gauges comprises :-

- For mechanism .005" & .010" (.127 & .254 mm.) Flat gauge
- .012" & .018" (.305 & .457 mm.) " "
- For wipers .012" & .020" (.305 & .508 mm.) Wire gauge
- For spring sets .010" & .030" (.254 & .762 mm.) " "
- Length : Width : Depth : Weight :
- 4" (101.6 mm.) 1 1/4" (31.75 mm.) 1/32" (12.3 mm.) 3.5 oz. (100 gm.)



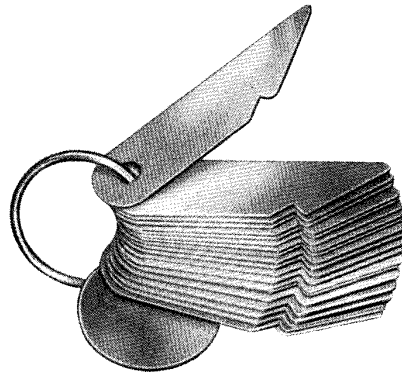
L14499A

L14500A

Bank Aligning Gauge.

Comprising : L14499A gauge and L14500A wrench.
Used with : P37586 box spanner and L14383 flat spanner.
For method of using the gauge refer to operating Bulletin No. 391.

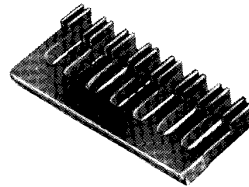
- L14499A. 10" x 4 1/2" x 4 1/2" (254 x 114.3 x 114.3 mm.)
5 lb. 3 oz. (2.353 kg.)
- L14500A. 9 3/8" x 3 1/4" x 1 1/8" (247.7 x 82.6 x 7.62 mm.)
11 1/2 oz. (326 gm.)



L14305 Gauges, Feeler (B.P.O. No. 4).

19 gauges on ring .008" to .047" (.203 to 1.194 mm.) for fire alarm boxes, interlocking L. & CO. relays and 31H relays.

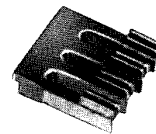
- Length : Width : Depth : Weight :
- 1 1/16" (49 mm.) 5/8" (15.88 mm.) 1" (25.4 mm.) 1 oz. (28 gm.)



L660460 Comb.

For fitting A.P.O. No. 3 and B.P.O. No. 2 uniselector mechanisms to bank, 8 level.

- Length : Width : Depth : Weight :
- 1 5/8" (41.28 mm.) 7/8" (22.23 mm.) 7/32" (5.96 mm.) 1/8 oz. (3.54 gm.)



L660461 Comb.

For fitting A.P.O. No. 3 and B.P.O. No. 2 uniselector mechanisms to bank, 4 level.

- Length : Width : Depth : Weight :
- 3/4" (19.05 mm.) 7/8" (22.23 mm.) 9/32" (7.14 mm.) 1/16 oz. (1.77 gm.)

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L660468 Comb.

For fitting A.P.O. No. 3 and B.P.O. No. 2 uniselector mechanisms to bank, 5 level.

Length : $1''$ (25.4 mm.) Width : $\frac{7}{8}''$ (22.23 mm.) Depth : $\frac{9}{32}''$ (7.14 mm.) Weight : .085 oz. (2.4 gm.)

L660469 Comb.

For fitting A.P.O. No. 3 and B.P.O. No. 2 uniselector mechanisms to bank, 10 level (5 on and 5 off).

Length : $\frac{5}{8}''$ (15.88 mm.) Width : $\frac{7}{8}''$ (22.23 mm.) Depth : $\frac{9}{32}''$ (7.14 mm.) Weight : .052 oz. (1.47 gm.)



L14635A Gauge.

.068" (1.727 mm.) non-magnetic, for A.P.O. No. 3 uniselector armature gap.

L14636A Gauge.

As L14635A but .070" (1.778 mm.)

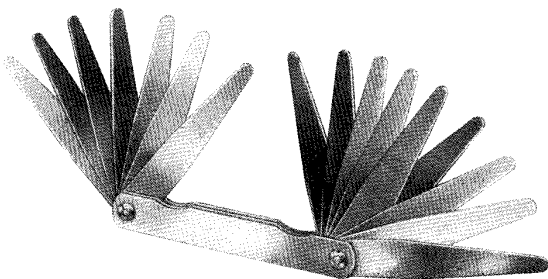
Length : $3''$ (76.2 mm.) Width : $\frac{1}{2}''$ (12.7 mm.) Weight : $\frac{1}{2}$ oz. (14.18 gm.)



L14517A Gauge.

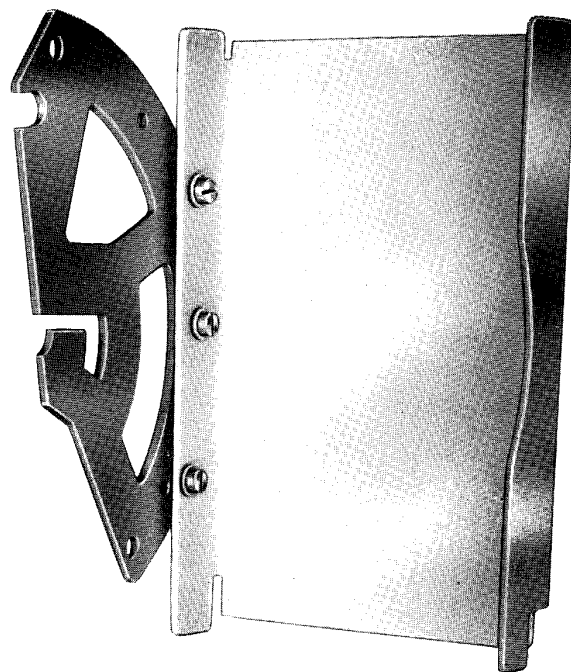
For assembling stator coils on motor uniselector.

Length : $1.215''$ (30.857 mm.) Diameter : $.810''$ (20.57 mm.) Weight : $\frac{3}{4}$ oz. (21.27 gm.)



L14532A Gauges, Feeler.

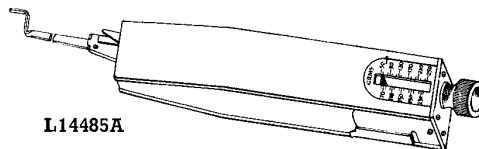
19 blades $\frac{1}{2}''$ (12.7 mm.) wide, $3''$ (76.2 mm.) long tapered and hinged .002" to .020" by .001" (.051 to .508 by .025 mm.) for motor uniselector.



**L14521 } Outriggers.
L14522 }**

For 16 and 8 level motor uniselectors respectively to hold mechanism away from bank and so facilitate adjustment.

Length : $5\frac{1}{16}''$ (144.46 mm.)
Width : $4\frac{1}{15}''$ (106.36 mm.) or $2\frac{3}{4}''$ (62.31 mm.)
Depth : $3\frac{3}{8}''$ (85.73 mm.)
Weight : 13 oz. (368.5 gm.)



L14484A Tension Gauge.

For measuring contact pressures and spring tensions. Range 10 to 80 grammes. Other gauges available are :—

L14483A, 4 to 24 grammes.

L14485A, 50 to 250 grammes and **L14486A**, 100 to 500 grammes.

L14483A Length : $7\frac{3}{16}''$ (182.56 mm.) Width : $1''$ (25.4 mm.) Depth : $\frac{2}{16}''$ (14.26 mm.) Weight : 3.4 oz. (95 gm.)

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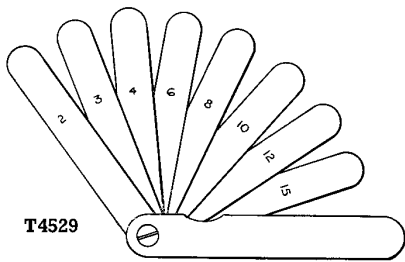


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	Length:	Width:	Depth:	Weight:
L14484A	$7\frac{3}{16}$ " (182.56 mm.)	1" (25.4 mm.)	$\frac{5}{8}$ " (15.87 mm.)	3.57 oz. (100 gm.)
L14485A	$7\frac{5}{16}$ " (185.74 mm.)	$\frac{7}{8}$ " (22.2 mm.)	$\frac{9}{16}$ " (14.26 mm.)	3.57 oz. (100 gm.)
L14486A	$5\frac{1}{2}$ " (108.85 mm.)	$\frac{7}{8}$ " (22.2 mm.)	$\frac{9}{16}$ " (14.26 mm.)	3.2 oz. (90 gm.)



T4529

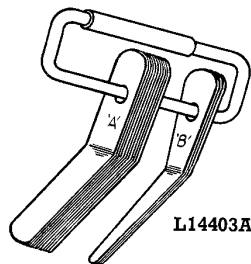
T4529 Feeler Gauges.

For gauging the adjustments of Strowger relays, uniselectors and selectors. Set of 8 tempered steel gauges, 2 to 15 mils. (.0508 to .381 mm.), individually marked and mounted in steel protector sheath.

Length:	Width:	Depth:	Weight:
$3\frac{1}{2}$ " (84 mm.)	$\frac{1}{2}$ " (13 mm.)	$\frac{1}{4}$ " (6 mm.)	$\frac{7}{8}$ oz. (24 gm.)

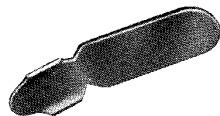
L14403A Feeler Gauges.

Set of 20 gauges with keeper ring, for gauging residual settings and general use. Each gauge has a hole and is bent to facilitate the gauging operation. 17 of "A" .002" to .018" by .001" (.051 to .457 by .025 mm.) 3 of "B" .010", .012" and .016" (.254, .305 and .406 mm.)



L14403A

Length:	Width:	Depth:	Weight:
$3\frac{5}{8}$ " (92 mm.)	$\frac{1}{2}$ " (12 mm.)	$\frac{3}{4}$ " (19 mm.)	1 oz. (28 gm.)



L14401A

L14401A Contact Insulator.

Black fibre. For insulating relay contacts for testing purposes.

Length:	Width:	Depth:	Weight:
$2\frac{3}{8}$ " (70 mm.)	$\frac{9}{16}$ " (13 mm.)	$\frac{1}{8}$ " (3 mm.)	$\frac{1}{30}$ oz. (1 gm.)



L14398A

L14398A Armature Guide.

For replacing 3000 type armatures. White, opaque celastoid.

Length:	Width:	Depth:	Weight:
$2\frac{5}{8}$ " (60 mm.)	$\frac{1}{16}$ " (17 mm.)	$\frac{3}{64}$ " (1 mm.)	$\frac{1}{15}$ oz. (2 gm.)

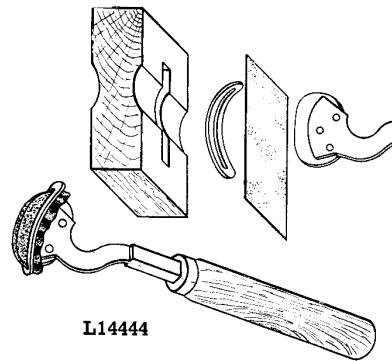


L14454A

L14454A Spring Contact Cleaning Tool.

Consists of shaped and finely sandblasted steel blade for cleaning the contacts of relay and selector springs.

Length:	Width:	Depth:	Weight:
$2\frac{5}{8}$ " (66 mm.)	$\frac{3}{8}$ " (9.5 mm.)	$\frac{1}{32}$ " (.8 mm.)	$\frac{1}{8}$ oz. (3 gm.)



L14444

L14444 Bank Contacts Cleaning and Oiling Tool.

Consists of circular shaped steel blade mounted on wooden handle. Designed to be used with strip velvet, chamois leather or other approved material for cleaning the contacts of 2-motion selector banks.

Length:	Width:	Depth:	Weight:
7" (178 mm.)	$2\frac{5}{8}$ " (67 mm.)	$1\frac{1}{2}$ " (38 mm.)	$2\frac{1}{2}$ oz. (70 gm.)



L14257 Relay Contact Cleaner.

"Electro-matic" controller.

Length:	Diameter:	Weight:
$4\frac{1}{2}$ " (114.3 mm.)	$\frac{3}{8}$ " (9.53 mm.)	$\frac{1}{2}$ oz. (14.18 gm.)

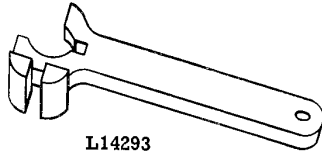
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L14293

L14293 Holding Tool.

For holding Strowger selector (3 magnet type) wiper, when tightening or loosening the nut securing wiper springs.

Length :	Width :	Depth :	Weight :
$3\frac{3}{8}$ "	$1\frac{3}{16}$ "	$\frac{5}{16}$ "	2.32 oz.
(95.25 mm.)	(30.161 mm.)	(15.85 mm.)	(65 gm.)

L14481 Holding Tool.

As L14293 but for Australian exchanges.

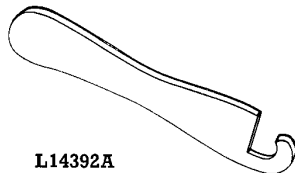


L14473A

L14473A Lock.

For locking 3000 type relay armature during testing operations in either normal or operated position. Fibre.

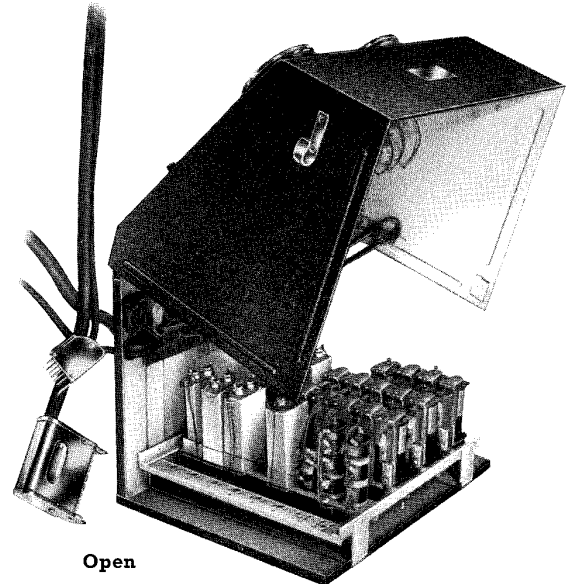
Length :	Width :	Depth :	Weight :
$2\frac{3}{8}$ "	$\frac{1}{8}$ "	$\frac{9}{32}$ "	.07 oz.
(60.31 mm.)	(6.35 mm.)	(7.18 mm.)	(2 gm.)



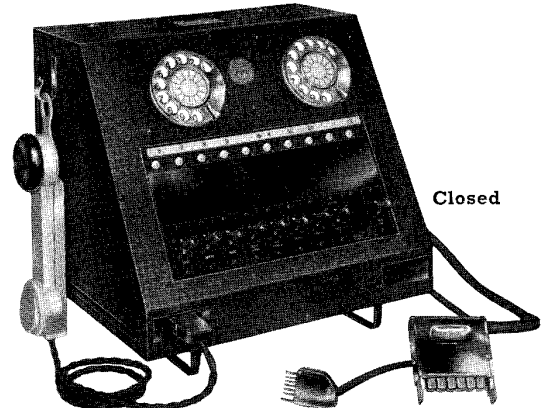
L14392A

L14392A Lock.

For locking pawl and stop on A.T. & E. Co. uniselectors when wiper and bank adjustments are being made.

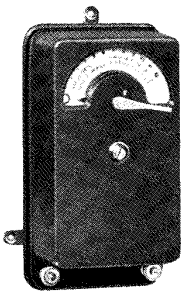


Open



Closed

TEST SETS AND APPARATUS



L55280 Dial Speed Tester (P.O. No. 43).

For measuring the speed and continuity of impulses of Strowger dials. Black moulded bakelite base and cover, fitted with clockwork winding mechanism. Electro-magnetic impulse control. For 50-volt working.

Length	$8\frac{1}{2}$ " (206 mm.)
Width	$5\frac{1}{4}$ " (133 mm.)
Depth	$3\frac{9}{16}$ " (90 mm.)
Weight	$2\frac{1}{2}$ lb. (1 kg.)

Test Sets.

Various test sets are available to perform the routine testing operations required in telephone exchanges.

The illustrations of a typical test set (Type JC350090) show its compactness and convenience. This set (which is used for the routine testing of final selectors), may be placed either on a table or a bench or, if mounted on the wheeled stand (L300579) may be readily moved about the exchange.

The approximate overall dimensions and weight of this test set are, height 13" (330 mm.), width 15" (381 mm.), depth 11" (279 mm.), weight $33\frac{1}{2}$ lbs. (16.33 kg.).

As each type of circuit has its own particular functions the circuit number or code number of the selector for which a test set is required should always be given when making enquiries or ordering so that the correct type of set can be supplied.

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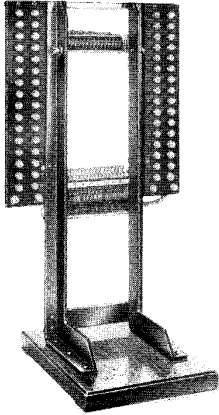
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L300585

L300585 Test Stand.

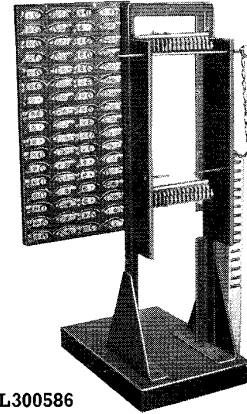
Bench pattern; B.P.O. Type No. 7 for testing pre-32A type "Strowger" selectors and relay groups. Comprising iron framework on polished oak base. Ebonite terminal block with nickel-plated brass terminals, wired to two 32-point shelf jacks. Upper bayonet pins adjustable.

L300586 Test Stand.

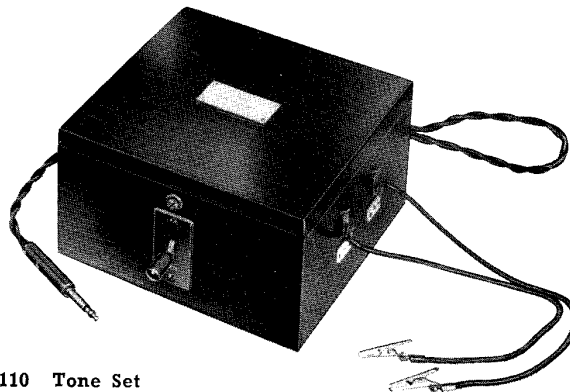
As L300585 but without wiring and with both terminal blocks on left and a feeler-gauge rack on right.

For works use only.

Length ... 21½" (546 mm.)
 Width ... 11½" (292 mm.)
 Depth ... 12" (305 mm.)
 Weight ... 13 lb. (5.9 kg.)



L300586



JC348110 Tone Set

JC348110 Tone Set, in Wood Case.

Includes headphones, cords, contact rods, and "crocodile" clips: Used for locating short circuits in bank multiples. The tone is applied to the two conductors of the multiple that are in contact; the fault is located by comparing the intensity of the tone in various parts of the multiple by means of the low resistance headphones and contact rods.

Case : Length : Breadth : Height :
 7" (177.8 mm.) 7" (177.8 mm.) 4" (101.6 mm.)

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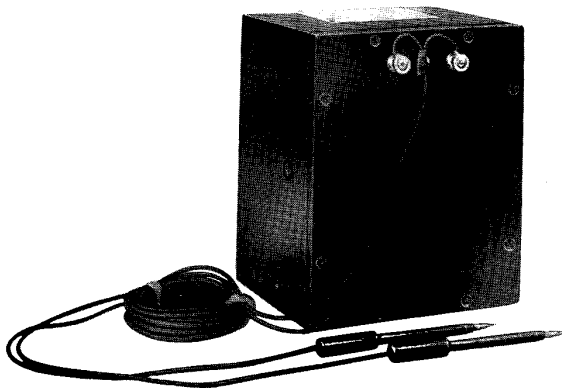


JC348100

JC348100 Buzzer, in Case.

For testing exchange cabling etc., also for signalling between intercommunication telephones. Supplied in sets of two.

Length : 7" (177.8 mm.) Breadth : 5 7/8" (149.23 mm.) Height : 8 1/2" (215.9 mm.)

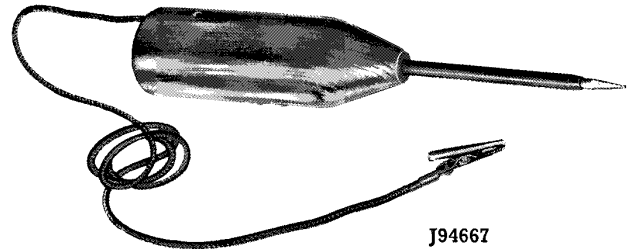


J43716

J43716 Buzzer.

3.5 ohms, in wood case; includes two dry cells, two insulated cords each 10' long with contact rods for continuity tests.

Length : 7" (177.8 mm.) Breadth : 6 3/8" (161.93 mm.) Height : 8 1/2" (215.9 mm.) Weight : 9 lb. (4.08 kg.)



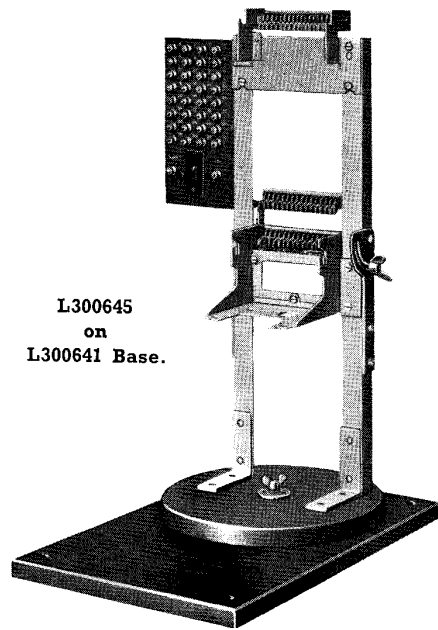
J94667

J94667 Test Relay-Buzzer.

For routine testing for short circuits and frame contacts in bank multiples; includes 12' single conductor cord with crocodile clip.

Length : 10" (254 mm.) Diameter : 2" (50.8 mm.) Weight : 9 oz. (255.1 gm.)

TEST STANDS FOR 32A SELECTORS



L300645
on
L300641 Base.

L300645 Selector Test Stand.

For 32A (B.P.O. 2000) type selectors. Comprising angle-iron frame fitted with cradle, 3 shelf jacks 32-point, panel assembly with 34 terminals and 1 key. The stand is fitted with trunnions for mounting on base L300641. A thumbscrew working on a quadrant enables the stand to be inclined to and locked in any convenient position.

Height : 13 1/2" (343 mm.) Width : 12" (305 mm.) Depth : 8" (203 mm.) Weight : 5 1/2 lb. (2.61 kg.)

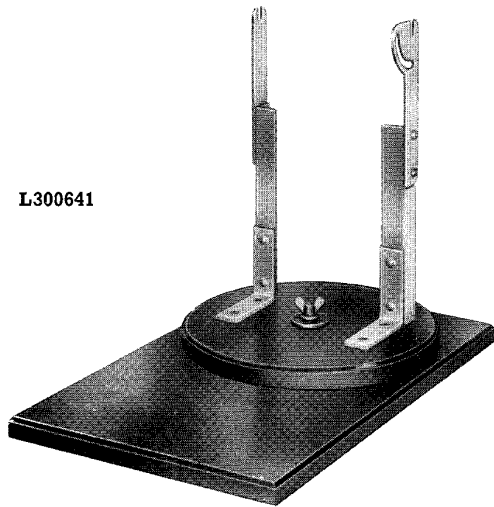
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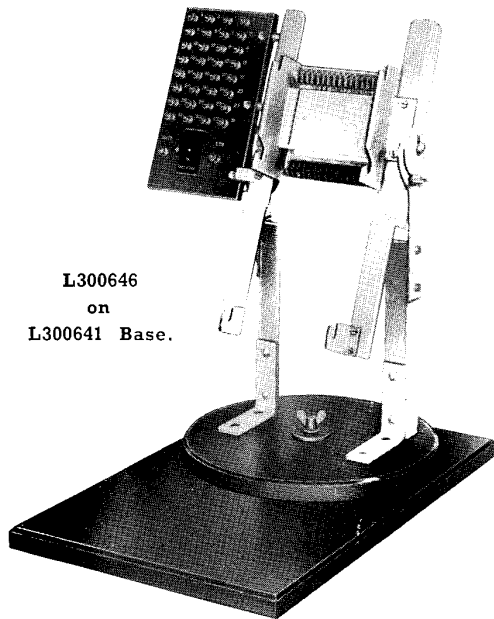


L300641

L300641 Test Stand Base.

Base comprising angle-iron frame mounted on wood turntable with thumbscrew to lock in position. Suitable for relay and selector test stands L300645 and L300646.

Height: $13\frac{1}{4}$ " (336 mm.) Width: 11" (280 mm.) Depth: 17" (432 mm.) Weight: $7\frac{1}{2}$ lb. (3.6 kg.)



L300646
on
L300641 Base.

L300646 Relay Group Test Stand.

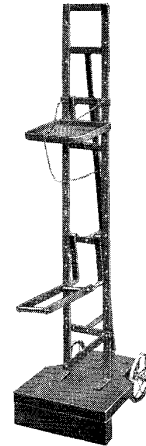
For 32A (B.P.O. 2000) type mountings. Similar to L300645, but less cradle, top bracket, and 1 shelf jack.

Height: $8\frac{1}{2}$ " (216 mm.) Width: 12" (305 mm.) Depth: $2\frac{3}{4}$ " (70 mm.) Weight: $4\frac{1}{4}$ lb. (1.93 kg.)

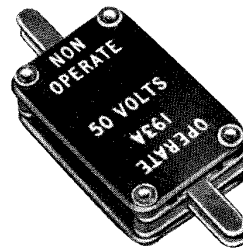
L300579 Test Set Stand.

Mobile floor pattern (B.P.O. No. 1), for telephone exchange test sets. Comprising iron framework on wood chassis, with 6" rubber-tyred wheels, crossbar handle and detachable tray. Accommodation is provided for the test set at the top of the framework, and its height can be varied to suit requirements by means of captive pegs. Black enamel finish. Will accommodate two test sets if required.

Length 60" (1523 mm.)
Width 14" (355 mm.)
Depth 20" (508 mm.)
Weight 42 lb. (19.1 kg.)



L300579

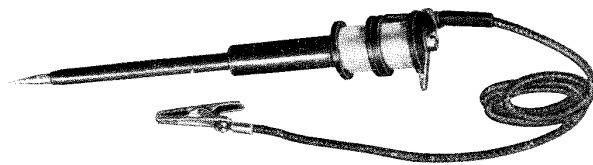


L14530

L14530 Test Pencil.

22 - 25 ohms, 50 volts, for adjusting latch restoring spring pressure on motor uniselector.

Length: $2\frac{9}{16}$ " (65.09 mm.) Width: $1\frac{3}{32}$ " (27.78 mm.) Depth: $\frac{5}{16}$ " (15.88 mm.)



L94661

L94661. Test Pencil.

100 ohms with 12' single conductor cord and crocodile type clip; for release test on 32A Mk. II (B.P.O. Type 2000) selectors. Supplied in sets of two.

Length: 8" (203.2 mm.) Breadth: $1\frac{1}{2}$ " (38.1 mm.) Depth: $1\frac{1}{4}$ " (31.75 mm.) Weight: 4 oz. (113.39 gm.)

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L94604 Test Pencil.

For loop testing on Strowger uniselectors. Nickel-silver springs connected to 750 ohms coil. Ebonite insulation and cover.



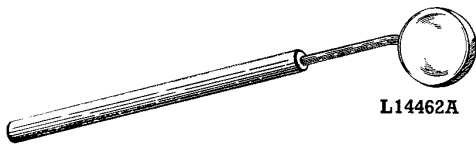
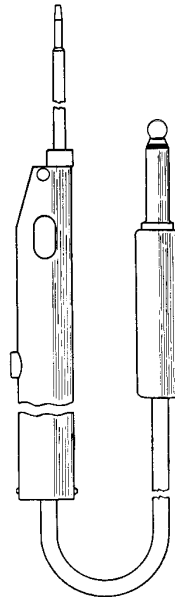
L94604

Length : $3\frac{1}{2}$ " (89 mm.) Diameter : $\frac{1}{2}$ " (13 mm.) Weight : $\frac{1}{2}$ oz. (14 gm.)

L94658 Test Pencil. As L94604 but 1750 ohms resistance.

L14592A Test Lamp.

For general testing complete with 6' 6" (1981 mm.) twin cord and plug No. 316. Has push-button to enable test for either battery or earth potential. B.P.O. No. 23A. $8\frac{9}{16}$ " \times $\frac{1}{8}$ " \times $\frac{9}{16}$ ". (217.5 \times 17.46 \times 14.29 mm.)

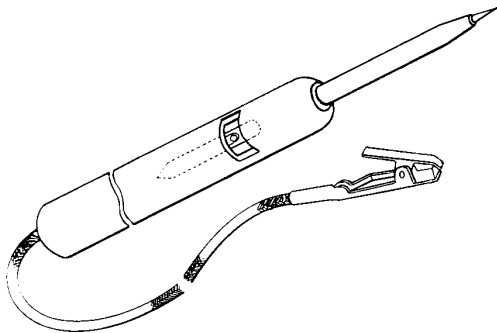


L14462A

L14462A Inspection Mirror.

For inspecting adjustments of spring contacts where direct vision is not possible.

Length : 7" (177.8 mm.) Width : $\frac{1}{8}$ " (23.8 mm.) Depth : $\frac{1}{8}$ " (20.631 mm.) Weight : .89 oz. (25 gm.)



Test Lamps. For general testing. Complete with test clip and 11' 6" (3505 mm.) flexible cord. Length 8" (203 mm.) Diam. $\frac{1}{16}$ " (17.46 mm.)

L94601 50 volt. Suitable bulb **L94005.**

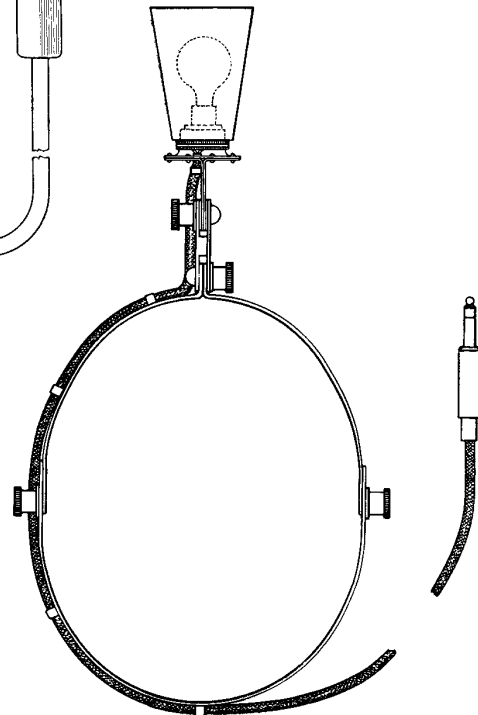
L94613 24 volt " " **L94002.**



L94623 Inspection Lamp.

For general inspection of apparatus, complete with 58" (1473 mm.) cord and plug. Jack suits standard switchboard lamp.

Length : 5 6 (1736 mm.) Diameter : $\frac{5}{8}$ " (12.7 mm.) Weight : 2.5 oz. (70 gm.)



L14457A Headgear Inspection Lamp.

For general inspection of apparatus. Complete with headgear, 9' cord and plug. Suitable bulb L94622A.

Length : 1' 1" (330.2 mm.) Breadth : $7\frac{1}{2}$ " (190.5 mm.) Depth : $2\frac{3}{4}$ " (57.15 mm.)

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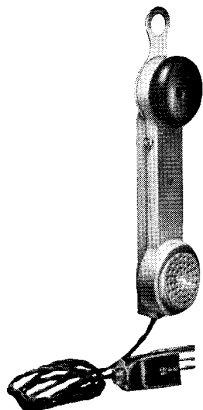
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L14543A Headgear Inspection Lamp.

For P.A.X. Switchboards. As L14457A but fitted with two clips in place of plug.

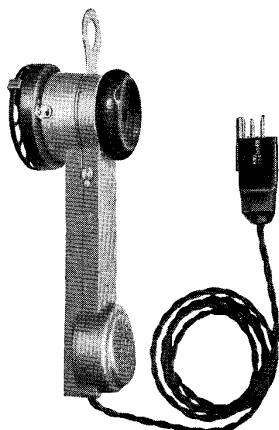


L11311

L11280 Testing Hand-Telephone (B.P.O. No. 80 Mk. 236).

For testing automatic telephone exchange equipment. Comprising cast aluminium case fitted with receiver, inset transmitter, 0.3 microfarad capacitor, and press key for closing the circuit. Includes two-way cord for connecting to test plug.

L11311 Testing Hand-Telephone.
Similar to L11280 but including two-way plug L57239A for 32A (B.P.O. 2000 type) equipment.



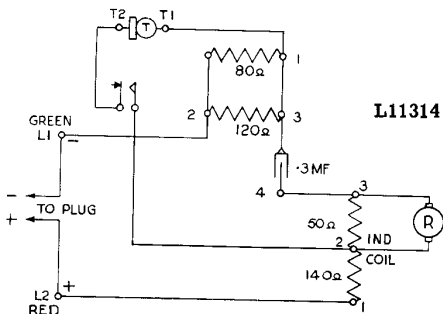
L11310

L11310 Testing Hand-Telephone.

Similar to L11311 but case suitable for and fitted with 24C dial.

L11289 Testing Hand-Telephone.

As L11310, but fitted with extra key for introducing a self-contained resistance of 1,200 ohms into the dialling circuit.

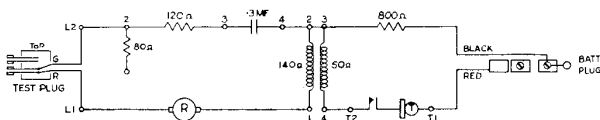


L11314

L11314 (B.P.O. No. 80 Mk. 5) Testing Hand-Telephone.
With twin cord and test plug to circuit Fig. 1.

L11333 (B.P.O. No. 80A).

Similar to L11314 but arranged for use on "dry" loop with twin cord and pre 2000 type test plug also twin cord and battery plug to circuit Fig. 2.



L11333

L11340. Similar to L11333 but with 2000 type test plug.

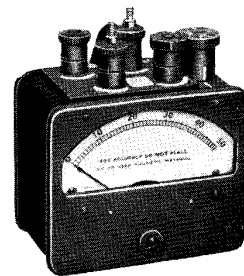
	Length :	Width :	Depth :	Weight :
L11340	10" (254 mm.)	2 3/4" (70 mm.)	4 1/4" (108 mm.)	1 lb. 8 oz. (681 gm.)
L11310	11" (279 mm.)	3 1/4" (83 mm.)	3 1/4" (83 mm.)	1 lb. 9 3/4 oz. (730 gm.)

L11286 (B.P.O. No. 140 Mk. 235).

Similar to L11280 but with coil and plug No. 1 1-way cord and 3-way cord and plug No. 310.

R145 Detector No. 4 (British Post Office) or Galvanometer.

Matt black finish, brass case ; dead-beat moving coil combination ; jewelled bearings ; clear scale, 2 3/4" (69.85 mm.); accuracy ± 1%. Self-contained ranges of 0.1, 5 and 50 volts, and 10, 50 and 500 milliamperes are selected by means of a switch which inserts appropriate shunts and resistances. External resistances may be screwed to the special terminals provided to give ranges up to 500 volts. External shunts may also be applied to give current ranges up to 50 amperes or more. Tropical finish extra. Leather carrying-case with shoulder strap can be supplied as an extra.



Height :	Width :	Depth :	Weight :
4" (102 mm.)	3 1/2" (69 mm.)	2" (51 mm.)	1 1/2 lb. (.68 kg.)

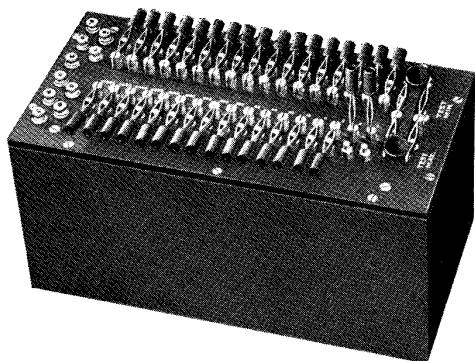
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L48132 Resistance Box.

Adjustable. Comprises two sets each of 17 resistances wound on flat mica insulators. A switch per resistance enables each set to be adjusted in steps of 1 ohm from 1 to 21,110 ohms. Terminals are provided for connection of test leads and fuses, also for connecting the two sets of resistance in series. A double-pole two-way switch enables the test leads to be connected to either set of resistances. The whole is mounted on an insulating panel fitted with a robust wooden case. Used for marginal testing of relays and general testing purposes.

Height : 13" (330 mm.) Width : 6½" (165 mm.) Depth : 7" (178 mm.) Weight : 11 lb. (4.98 kg.)

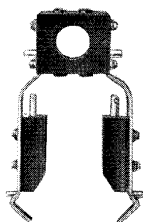


T3621

L57508 Test Clip.

For use on protector mounting T2845, without removing heat coils. Comprising two pairs of nickel-silver contact springs mounted on ebonite block, with vulcanised fibre covers over terminals. (P.O. No. 12 Mk. 235).

Length : 3½" (89 mm.) Width : 3¾" (95 mm.) Depth : ½" (12.7 mm.) Weight : 1¾ oz. (49 gm.)



T1681

L57500 Test Clips.

For use on protector mounting T2844, after removal of heat coils. Comprising phosphor-bronze springs, with brass terminal blocks, mounted on lacquered brass holder. Ebonite insulation. (P.O. No. 5).

Length ... 3½" (89 mm.)
Width ... 2½" (63 mm.)
Depth ... 9 mm.
Weight ... 2¾ oz. (77 gm.)

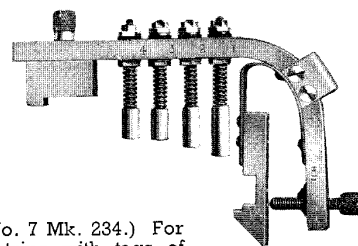


T3619

L57511A Test Clips.

In pairs, for use on fuse mounting T2767. Each clip comprises a phenol fibre block, mounting two brass studs, with terminals for cord attachment. Clips engraved "A" and "B" respectively.

Length : 2½" (54 mm.) Width : 5/8" (15.8 mm.) Depth : 7/16" (8 mm.) Weight : 1 oz. (28 gm.)



T1680

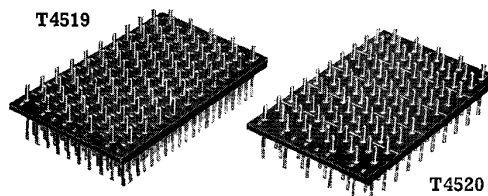
T1679A Test Clip.

Four-way. (B.P.O. No. 7 Mk. 234.) For use on connection strips with tags of equal length. Comprising dull nickel-plated steel frame, mounting four tubular pattern spring loaded terminals, and screwed block attachments.

T1680A Test Clip.

As T1679A but for use on connection strips with stepped tags. (B.P.O. No. 8 Mk. 235.)

Length : 4¾" (111 mm.) Width : 3¾" (96 mm.) Depth : 3/8" (9.6 mm.) Weight : 4 oz. (113 gm.)



T4519

T4520

L151469A Test Terminal Block.

For meter testing. (B.P.O. No. 16). Comprises ebonite panel with 100-pin terminals and 100 terminals for terminating wiring from rectifier. Engraved "0"—"9," "0"—"9," and arranged for mounting on meter plate T4694. Use test clip L57509A.

L151470A Test Terminal Block.

As above, but fitted with 100-pin terminals only (B.P.O. No. 17). For meters not equipped with rectifiers.

Height : 6" (152 mm.) Width : 3½" (91 mm.) Depth : 1½" (40 mm.)

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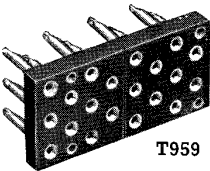
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L57509A Test Clip.

For meter testing. (B.P.O. No. 24.) Used with test panels L151469A and L151470A.



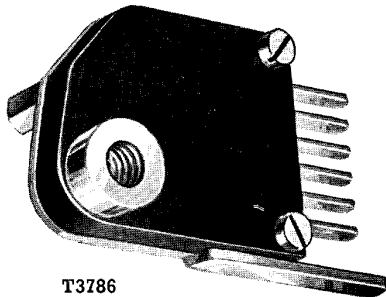
T959

Height : $2\frac{7}{16}$ " (62 mm.) Width : $1\frac{3}{32}$ " (33 mm.) Depth : 1" (25 mm.)

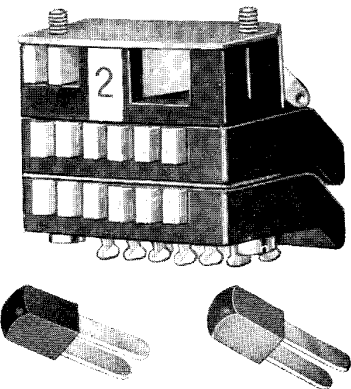
L57233A Test Plug.

For meter testing ; one-way. (B.P.O. No. 112.) Suitable for use with test terminal strip L42571. Length $1\frac{1}{4}$ " (32 mm.), diameter $\frac{1}{32}$ " (9 mm.).

Strowger 32A Selector Test Jack.



T3786



L57240

Length : $2\frac{7}{16}$ " (62 mm.)
Width : $1\frac{1}{2}$ " (39 mm.)
Depth : $1\frac{7}{16}$ " (37 mm.)
Weight : $2\frac{1}{2}$ oz. (64 gm.)

L57240 Test Plug.

(B.P.O. 1205 Mk. 1.) For use with test jacks on type 32A "Strowger" selectors, 12-point.

L57234 Test Plug.

As L57240 but 6-point. (B.P.O. No. 611 Mk. 1.)

L57239 Test Plug.

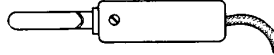
As L57240, but 2-point. (B.P.O. No. 226 Mk. 1.)

L61468A Test Link.

For use with test jacks on 32A Strowger selectors ; red bakelite cap.

L61468B Test Link.

As L61468A, but green bakelite cap.



T1197 Cord and Plugs.

For use with "U"-link sockets. Comprises 30" (762 mm.) single conductor cord, with fibre-covered brass plug T1828 at each end.



T1197

Length : 36" (912 mm.) Diameter : $\frac{5}{8}$ " (16 mm.) Weight : $7\frac{1}{2}$ oz. (212 gm.)

T1828 Test Plug.

B.P.O. No. 103. One-way ; brass, with slit stem. Red fibre or ebonite cover. Used on telegraph testboards, and with "U"-link sockets.

Length : $3\frac{1}{16}$ " (77 mm.) Diameter : $\frac{9}{16}$ " (14 mm.) Weight : 1 oz. (28 gm.)

T4277 Hygrometer.

Hair type. Range, 10 to 100 per cent. relative humidity. 4" (102 mm.) dial ; two scales, one indicating relative percentage humidity, and the other the dew-point. Hairs mounted in slotted tube with adjustment screw at lower end. Fitted with maximum and minimum electrical contacts. External terminals. For use in manual and automatic telephone exchanges, etc., where a direct-reading instrument is required.



Length 15" (380 mm.)
Width 4" (102 mm.)
Depth 4" (102 mm.)
Weight $2\frac{3}{8}$ lb. (1.1 kg.)

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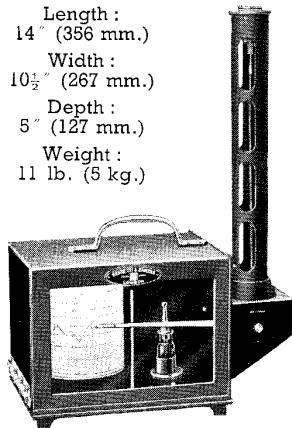
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Length :
14" (356 mm.)
Width :
10½" (267 mm.)
Depth :
5" (127 mm.)
Weight :
11 lb. (5 kg.)



T4278 Hygrometer.

Hair recording type. For continuously recording humidity in manual and automatic telephone exchanges, etc. Comprises a bundle of individually loaded hairs, mounted in a well-ventilated cylindrical brass tube with adjustment screw at the top. The movement and clock-drum are mounted on a cast-iron base, with hinged glass-panelled cover and handle. The size of the charts is 3·6" by 11·8", (91 × 300 mm.) and the drum makes one complete revolution

per 24 hours. Range, 10 to 100 per cent. relative humidity. Complete with 100 charts, ink, and daily clock.

T4279 Hygrometer.

Hair recording type. As T4278, but with weekly clock, causing drum to make one complete revolution per week.



T4280 Hygrometer.

Whirling type. For testing humidity in manual and automatic telephone exchanges, etc. Comprising two thermometer tubes accurately graduated, mounted in nickel-plated cylindrical brass case, slotted for free circulation of air. Fitted with wood handle for whirling. A screw-on guard protects the bulbs when the instrument is out of use. Mounted in velvet-lined polished wood case, complete with glass bottle containing distilled water, spare muslins, and a table giving

relative humidity. National Physical Laboratory certificates can be supplied at an extra charge.

	T4280	T4281
Range	10° F.—110° F.	20° F.—130° F.
	T4282	T4283
Range	10° C.—45° C.	5° C.—55° C.

T4627 Spindle Oil.

This is a highly refined neutral petroleum oil, and is used for lubricating the various bearings of "Strowger" selectors, etc. Supplied in 1-oz. bottles. A.T. & E. Co. Spec. S.335.



T4628 Selector Lubricant.

Concentrated "Oildag" is used for lubricating the ratchet teeth of "Strowger" selectors and uniselectors. Supplied in original containers.

T4629 Lubricating Oil.

This is a pure mineral oil, and is used for lubricating uniselectors, dial switches regenerators and clocks. Supplied in 1 oz. bottles. A.T. & E. Co. Spec. 2497. (B.P.O. No. 16.)

T.4616 Non-Fluid Oil.

For B.P.O. Clock 44, Spec. S.373.



L14681A Brush, Lubricating.
(P.O. No. 1), stiff bristle.



L14682A Brush, Lubricating.
(P.O. No. 2), medium sable.



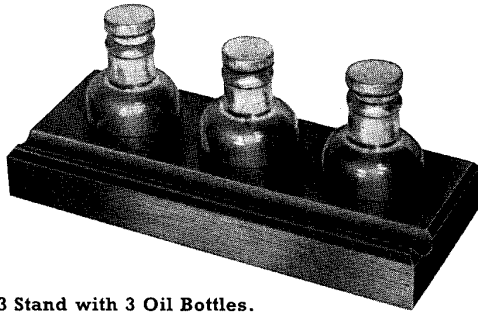
L14683A Brush, Lubricating.
(P.O. No. 3), fine sable.

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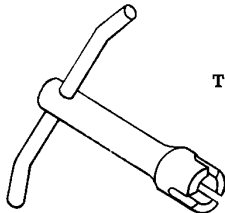
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L14593 Stand with 3 Oil Bottles.

(P.O. No. 36) without oil; to hold the lubricants required for selector mechanisms.

Length :	Breadth :	Height :
8" (203.2 mm.)	3½" (88.9 mm.)	2⅞" (73.02 mm.)

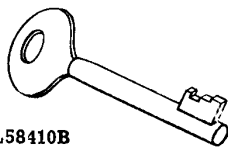


TG3749

TG3749 Key.

For Fire Alarm and Police Telephone Box.

Length :	Width :	Depth :
2¼" (57.15 mm.)	3" (76.2 mm.)	.552" (14.02 mm.)

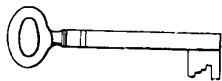


L58410B

L58410B Key.

For lock L58404 on outer cases of fire alarms and "Electro-matic" controllers.

Length :	Breadth :	Depth :	Weight :
2⅝" (66.68 mm.)	1⅞" (26.99 mm.)	.245" (6.23 mm.)	(21.27 gm.)



L58405/2

L58405/2 Key.

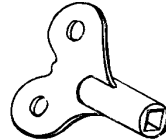
For "Electro-matic" Traffic Signal outer case.

Length :	Width :	Depth :	Weight :
2⅞" (68.26 mm.)	22.23 mm.	(6.35 mm.)	(10.63 gm.)

L58416/2 Key.

For "Electro-matic" Traffic Signal outer case. Replacing L58405/2 for new work.

Length :	Width :	Depth :	Weight :
3" (76.2 mm.)	22.23 mm.	(5.56 mm.)	(10.63 gm.)

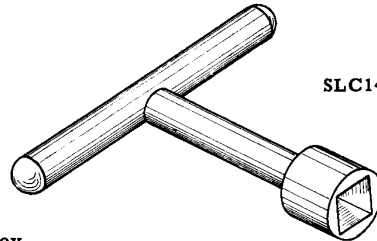


SLC184

SLC184 Key.

For "Rythmatic" Street Lighting Control Switch Box.

Length :	Width :	Depth :
1½" (38.1 mm.)	1½" (38.1 mm.)	⅜" (9.53 mm.)

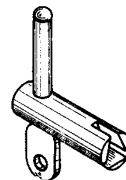


SLC149

SLC149 Key.

For "Rythmatic" Street Lighting Transmitter Cabinet (Rural).

Length :	Width :	Depth :
3" (76.2 mm.)	3½" (82.55 mm.)	⅜" (9.53 mm.)

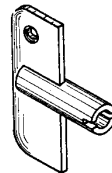


50023/14

50023/14 Key.

For "Electro-matic" Traffic Signal Facility switch.

Length :	Width :	Depth :	Weight :
1½" (31.75 mm.)	1⅞" (47.62 mm.)	(9.53 mm.)	.705 oz. (20 gm.)



425336/64

425336/64 Key.

"Strowger" Private Automatic Exchange cabinet key.

Length :	Width :	Depth :	Weight :
2" (50.8 mm.)	1⅜" (34.92 mm.)	⅜" (8.73 mm.)	⅜ oz. (21.26 gm.)

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SECTIONS B — BC



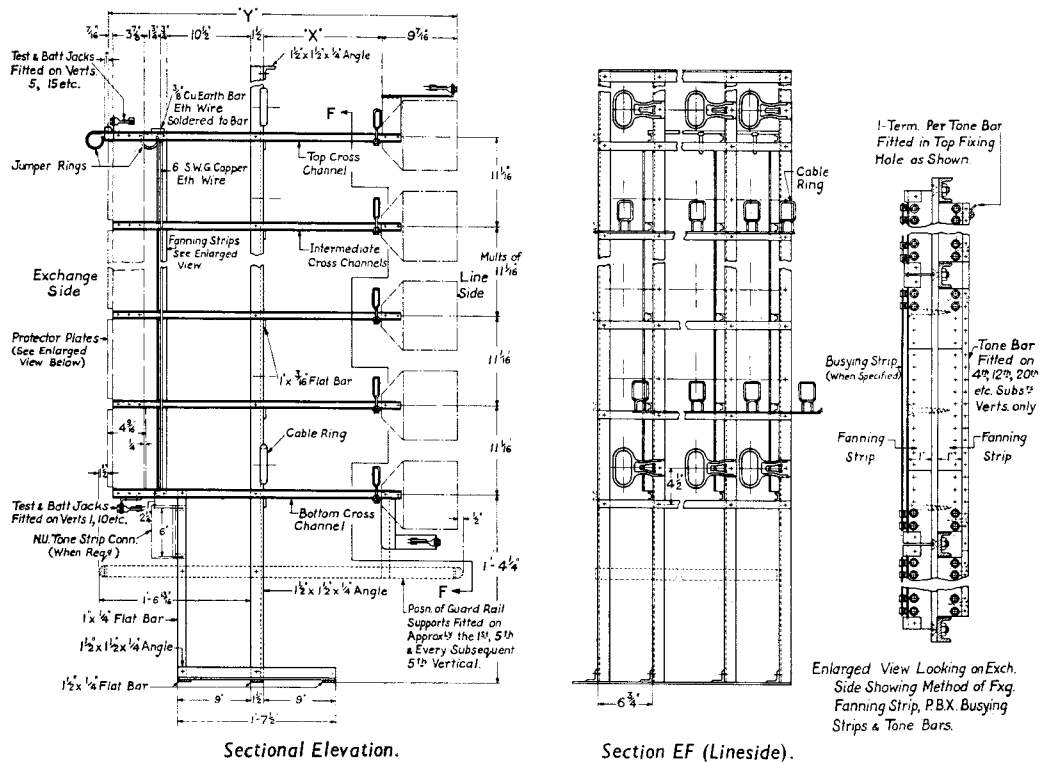
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M.D.F. Fig. 1.

Group No.	Ult. of Verts.	Dim " X "	Dim " Y "
1	Up to 40	1' 2 3/4" 375 mm.	3' 7" 1092 mm.
2	41 & Over	1' 8 3/4" 527 mm.	4' 1" 1245 mm.

Main Distribution Frames.

For terminating and interconnecting the internal and external wires of manual and automatic exchanges. The external wires are usually disposed in cable numerical order, and the internal wires in the order of subscribers' numbers.

Comprising angle, channel and strip iron construction bolted together, mounting the requisite number of connection strips or fuse mountings and protectors, also jumper rings for cross-connecting wires. The construction and dimensions of the frame are similar whether fuses or connection strips are fitted on the external side except that, with connection strips, dimension Y is 4" less. Grey enamel finish. The size varies in accordance with the capacity of the exchange. (See Fig. 1.).

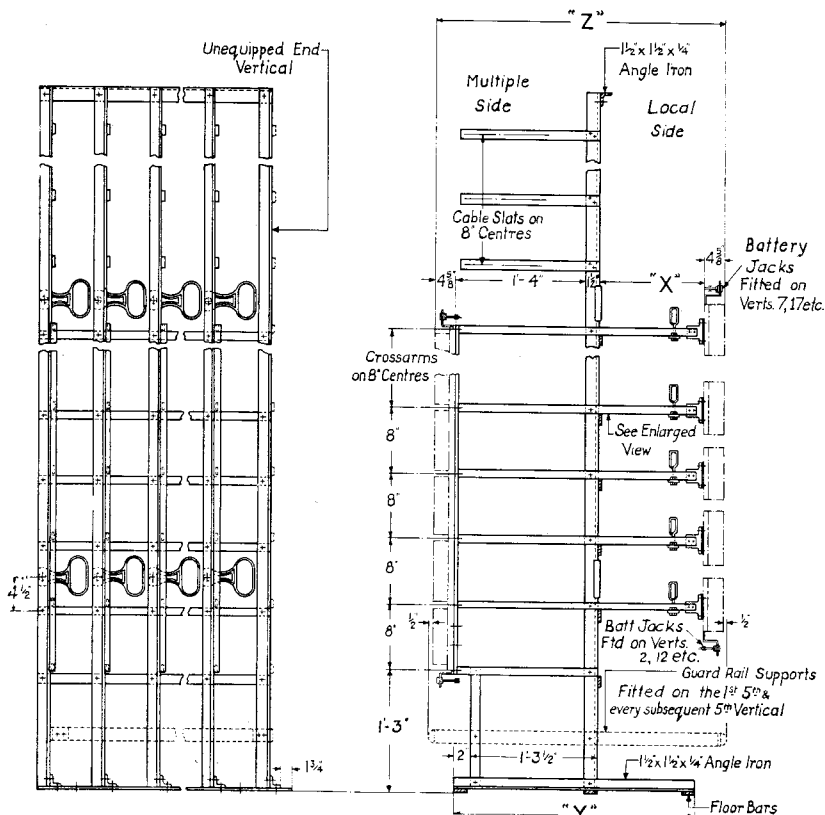
Prices quoted on receipt of enquiry giving particulars of requirements.

Clear Height of Room	Capacity per Vert.	Height of Frame above Floor
12' 0" 3658 mm.	200/220	11' 3 3/4" 3448 mm.
13' 0" 3962 mm.		10' 3 1/2" 3137 mm.
11' 0" 3353 mm.	180/200	

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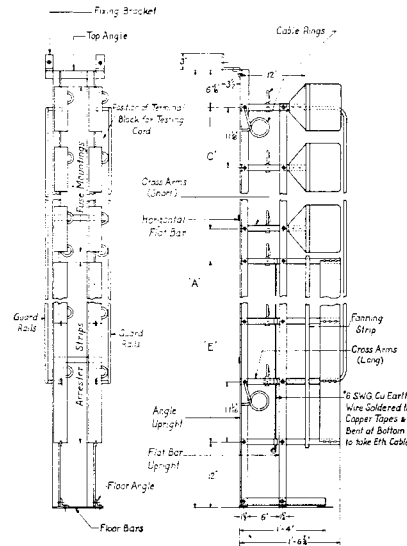


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Elevation of Multiple Side.

Sectional Elevation.



Lines per Vert.	60	80	100
Dim "A"	6' 8 1/2" 2038 mm.	8' 6 1/2" 2604 mm.	10' 4 1/2" 3162 mm.
No. Short Cross Arms	3	4	5
Dim "C"	1' 10 3/8" 562 mm.	2' 9 3/8" 843 mm.	3' 8 3/8" 1124 mm.
No. Long Cross Arms	4	5	6
Dim "E"	2' 9 3/8" 843 mm.	3' 8 1/2" 1124 mm.	4' 7 3/8" 1405 mm.

Wall Distribution Frame.
Fig. 3.

Ass. No.	Type	Ultimate No. Verts.	Dim "X"	Dim "Y"	Dim "Z"
1	Bolted Frame	Up to 40 Verts.	1' 3" 381 mm.	2' 8" 813 mm.	3' 5 3/4" 1060 mm.
2	Bolted Frame	41 Verts. & Over	1' 8" 508 mm.	3' 1" 940 mm.	3' 10 3/4" 1187 mm.

Height of Frame depends on Number of Circuits per Vertical.

I.D.F. Fig. 2.

Intermediate Distribution Frames.

For terminating and interconnecting the wires between the main distribution frame and the apparatus in manual and automatic exchanges where a centralised line I.D.F. is required.

On the multiple side the sets of terminals are for subscribers' and junction lines in their respective numerical orders, and on the answering side for the calling and answering equipments. In automatic exchanges, sets of terminals are also required for miscellaneous apparatus.

Similar construction and finish to main distribution frames, but fitted with connection strips and jumper rings only.

The size varies in accordance with the capacity of the exchange. (See Fig. 2).

Prices quoted on receipt of enquiry giving particulars of requirements.

Combined M.D.F. and I.D.F.

For use where floor space is restricted and ceiling height adequate. The upper portion of each vertical is equipped with connection strips as an I.D.F. and the lower portion with protectors and fuses as an M.D.F. Similar construction and finish to frames previously described but one side only is equipped with protectors and fuses.

Distribution Frame, single sided, wall mounting.

Main, Intermediate or combined M.D.F. and I.D.F.

For mounting against a wall in exchanges where floor space and the number of circuits are limited. It is of similar construction and finish to frames previously described but one side only is equipped with protectors and fuses.

If required, connection strips can be fitted to enable the frame to be used either as an I.D.F., or combined M.D.F. and I.D.F. Fig. 3 indicates how size varies with capacity and equipment of frame.

Prices quoted on receipt of enquiry giving particulars of requirements.

Fuller information regarding distribution frames, travelling ladders, mezzanine platforms and special lighting arrangements are given in the M.D.F. Engineering Bulletin, available on request.

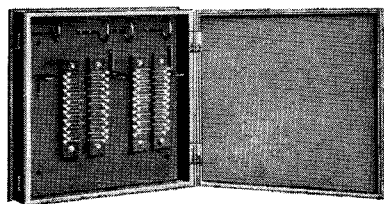
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Distribution Cases.

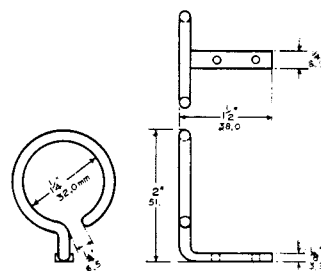
For terminating cables and providing facilities for re-distributing or cross-connecting the lines.

Comprising walnut-finished case, with hinged front, arranged for wall mounting. Terminals mounted on ebonite and furnished with soldering tag at one end, and screw connection at the other.

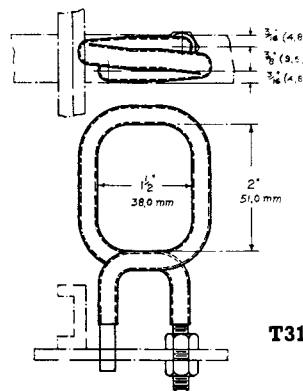
T. No.	...	T3710	T3711	T3712	T3713	T3714	T3715
Capacity	... pairs	20	40	80	160	240	480
Length	... ins.	13½	14½	20	33	33	33
	... mm.	343	369	508	838	838	838
Width	... ins.	8¾	14½	15	16	28	40
	... mm.	222	369	381	406	711	1016
Depth	... ins.	4	4	4	6	6	6
	... mm.	102	102	102	152	152	152
Weight	... lbs.	6	8	14	29	50	84
	... kg.	2.7	3.6	6.4	13	23	38

T3178 Jumper Ring.

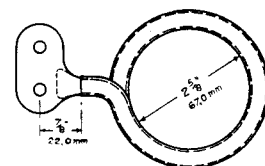
For use in distribution cases T3710-T3715. Comprising steel rod construction with two coats of insulating enamel.



T3178



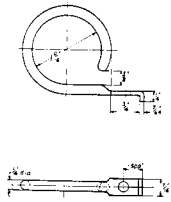
T3175



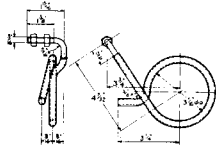
T3177

T. No.	...	T3175	T3177	T3178
Length	... ins.	4½	5 5/32	2
	... mm.	114	134	51
Width	... ins.	2 1/16	3 5/16	1 5/8
	... mm.	52	79	41
Depth	... ins.	¾	7/8	1½
	... mm.	19	22	38
Weight	... ozs.	3½	4	1½
	... gm.	99	113	44

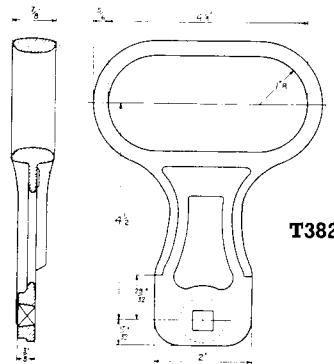




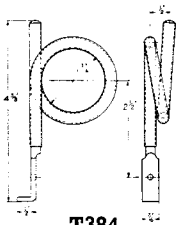
T381



T383



T382



T384

T381-3 and 4 Jumper Rings.

For jumper wire distribution on main and intermediate distribution frames. Comprising steel rod construction, coated with vulcanised rubber.

T382 Jumper Ring.

Used on large M.D.F.s and I.D.F.s ; robust construction and large capacity. Enamelled finish.

T. No. ...		T381	T382	T383	T384
Length ...	ins.	3 $\frac{11}{16}$	6 $\frac{11}{32}$	6 $\frac{1}{2}$	4 $\frac{5}{8}$
	mm.	81	163	159	118
Width ...	ins.	$\frac{7}{16}$	4 $\frac{3}{4}$	4 $\frac{15}{16}$	2 $\frac{3}{4}$
	mm.	11	122	126	70
Depth ...	ins.	2 $\frac{29}{64}$	$\frac{7}{8}$	2 $\frac{1}{8}$	$\frac{7}{8}$
	mm.	64	22	54	22
Weight ...	ozs.	2	21	7 $\frac{3}{4}$	3
	gm.	57	595	219	86

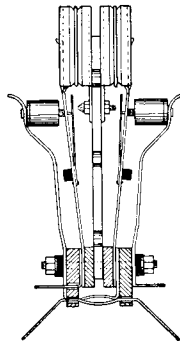
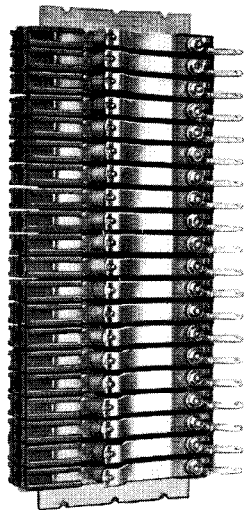
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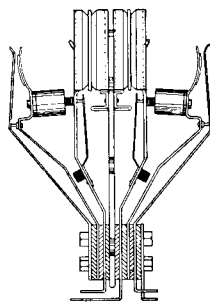


T2844

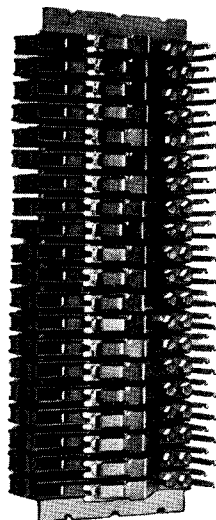
T2844 Protectors.

Strip mounting: as used on main distribution frames for guarding exchange apparatus against lightning and sneak currents. Comprises zinc-plated steel plate, mounting 20 sets of nickel-silver springs on each side, 40 heat coils T3582, and 40 sets of carbons T884. Type of carbon required to be specified in order (see Section BB).

Length: 11" (279 mm.) Width: 2⁹/₁₆" (65 mm.) Height: 4¹/₂" (114 mm.) Weight: 3⁵/₁₆-lbs. (1.5 kg.)



T2845



T2845 Protectors.

Strip mounting as T2844, but fitted with additional nickel-silver springs to facilitate testing without removal of heat coils.

Length: 11" (279 mm.) Width: 3" (76 mm.) Depth: 4¹/₂" (114 mm.) Weight: 4-lbs. (1.8 kg.)

Alarm springs can be provided on this type of protector, if required.

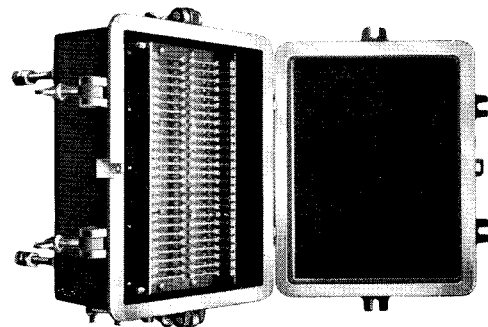
T2842 Lightning Arrester and Fuse Panel.

For mounting in pole-box. Comprising 26 pairs of nickel-silver fuse clips and T4296 fuses, together with carbon block arresters on ebonite base.

T2843 Lightning Arrester and Fuse Panel.

As T2842, but fitted with 50 pairs of fuses and arresters.

	T2842	T2843
Length	16 ¹ / ₁₆ " (408 mm.)	30 ¹ / ₁₆ " (781 mm.)
Width	8 ³ / ₄ " (222 mm.)	8 ³ / ₄ " (222 mm.)
Depth	2 ¹ / ₈ " (54 mm.)	2 ¹ / ₈ " (54 mm.)
Weight (approx.)	2 ¹ / ₂ -lbs. (1.13 kg.)	6-lbs. (2.72 kg.)



T2842 Arrester in T4446 Box.

T4446-7 Pole Mounting Box.

Iron, waterproof, suitable for arrester and fuse panels T2842-3.

	T4446	T4447
Capacity	26 pairs	50 pairs
Length	20 ¹ / ₄ " (515 mm.)	34 ³ / ₄ " (882 mm.)
Breadth	15 ³ / ₄ " (400 mm.)	15 ³ / ₄ " (400 mm.)
Depth	8 ¹ / ₄ " (210 mm.)	8 ³ / ₄ " (222 mm.)
Weight	109 ¹ / ₂ -lbs. (49.7 kg.)	176-lbs. (79.8 kg.)

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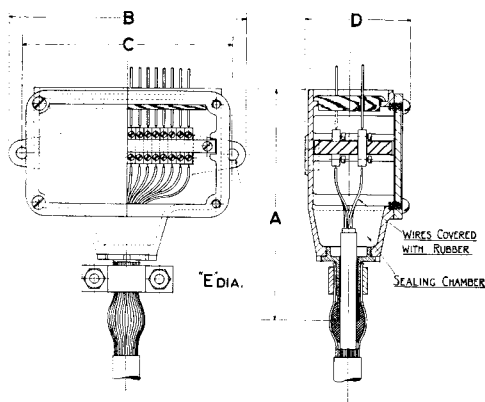
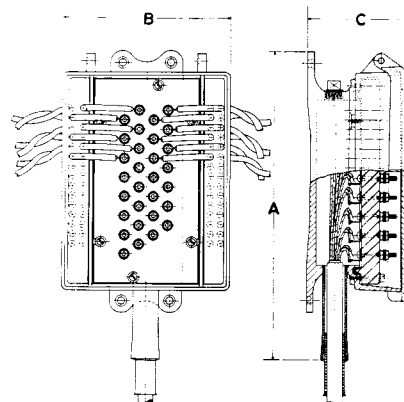
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Cable Terminal—Outdoor.

Cast iron, for wall or pole mounting; with hinged lid; sealing chamber; brass terminals in porcelain panel. A 6-ft. length of 10-lb. cable is usually fitted.

With Cable.	Without Cable.	No. of Pairs.	DIMENSIONS.			Weight without Cable.
			A.	B.	C.	
T2539	T2540	5	10 $\frac{1}{4}$ " (260 mm.)	7 $\frac{1}{2}$ " (191 mm.)	4 $\frac{3}{8}$ " (111 mm.)	13-lbs. (5.9 kg.)
T2541	T2542	10	10 $\frac{1}{4}$ " (260 mm.)	7 $\frac{1}{2}$ " (191 mm.)	4 $\frac{3}{8}$ " (111 mm.)	13 $\frac{1}{4}$ -lbs. (6 kg.)
T2543	T2544	15	13" (330 mm.)	7 $\frac{1}{2}$ " (191 mm.)	4 $\frac{3}{8}$ " (111 mm.)	18 $\frac{1}{2}$ -lbs. (8.4 kg.)
T2545	T2546	25	17 $\frac{1}{2}$ " (444 mm.)	7 $\frac{1}{2}$ " (191 mm.)	4 $\frac{3}{8}$ " (111 mm.)	29-lbs. (13.2 kg.)



T. No.	No. of Pairs.	DIMENSIONS.					Weight.
		A.	B.	C.	D.	E.	
T2528.X.	3	7 $\frac{1}{2}$ " (191 mm.)	5 $\frac{3}{8}$ " (137 mm.)	4 $\frac{1}{2}$ " (114 mm.)	3 $\frac{1}{4}$ " (82 mm.)	10 $\frac{3}{8}$ " (10 mm.)	8-lbs. (3.6 kg.)
T2529.Y.	3	8 $\frac{1}{4}$ " (210 mm.)	5 $\frac{3}{8}$ " (137 mm.)	4 $\frac{1}{2}$ " (114 mm.)	3 $\frac{1}{4}$ " (82 mm.)	10 $\frac{3}{8}$ " (10 mm.)	8-lbs. (3.6 kg.)
T2530.X.	5	8" (204 mm.)	7 $\frac{1}{4}$ " (184 mm.)	6 $\frac{1}{4}$ " (159 mm.)	3 $\frac{1}{4}$ " (82 mm.)	11 $\frac{7}{8}$ " (11 mm.)	11-lbs. (5 kg.)
T2531.Y.	5	8 $\frac{3}{4}$ " (223 mm.)	7 $\frac{1}{4}$ " (184 mm.)	6 $\frac{1}{4}$ " (159 mm.)	3 $\frac{1}{4}$ " (82 mm.)	11 $\frac{7}{8}$ " (11 mm.)	11-lbs. (5 kg.)
T2532.X.	10	8" (204 mm.)	9" (229 mm.)	8" (204 mm.)	4" (102 mm.)	11 $\frac{7}{8}$ " (11 mm.)	14-lbs. (6.36 kg.)
T2533.Y.	10	8 $\frac{3}{4}$ " (223 mm.)	9" (229 mm.)	8" (204 mm.)	4" (102 mm.)	11 $\frac{7}{8}$ " (11 mm.)	14-lbs. (6.36 kg.)
T2534.X.	15	8 $\frac{3}{4}$ " (223 mm.)	12 $\frac{7}{8}$ " (327 mm.)	11 $\frac{7}{8}$ " (302 mm.)	4" (102 mm.)	11 $\frac{7}{8}$ " (11 mm.)	18-lbs. (8.2 kg.)
T2535.Y.	15	9 $\frac{1}{2}$ " (242 mm.)	12 $\frac{7}{8}$ " (327 mm.)	11 $\frac{7}{8}$ " (302 mm.)	4" (102 mm.)	11 $\frac{7}{8}$ " (11 mm.)	18-lbs. (8.2 kg.)
T2536.X.	20	8 $\frac{3}{4}$ " (223 mm.)	16" (406 mm.)	15" (380 mm.)	4" (102 mm.)	11 $\frac{7}{8}$ " (11 mm.)	23-lbs. (10.4 kg.)
T2537.Y.	20	9 $\frac{1}{2}$ " (242 mm.)	16" (406 mm.)	15" (380 mm.)	4" (102 mm.)	11 $\frac{7}{8}$ " (11 mm.)	23-lbs. (10.4 kg.)

Telephone Instrument Protectors are listed in Section BB.

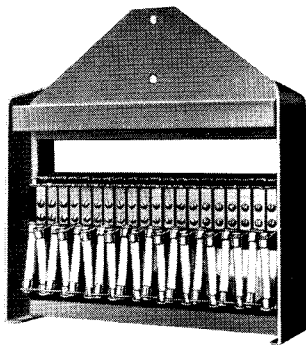
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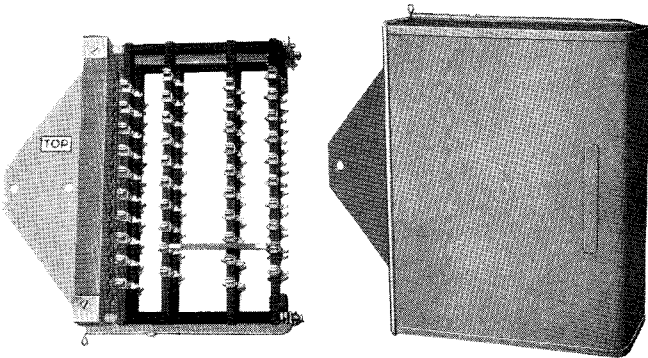


Length : $8\frac{1}{2}$ " (215 mm.)
 Width : $2\frac{3}{4}$ " (66 mm.)
 Depth : $9\frac{3}{8}$ " (241 mm.)
 Weight : $3\frac{1}{2}$ -lbs. (1.57 kg.)

T2767

T2767 Fuse Mounting.

Used on main distribution frames. Comprises zinc-plated steel frame carrying 40 ebonite insulated nickel-silver fuse clips. Varnished hardwood fanning strip drilled for jumpering. For mounting 40 porcelain tube fuses T4285.



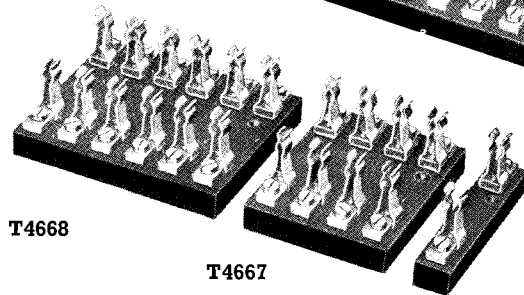
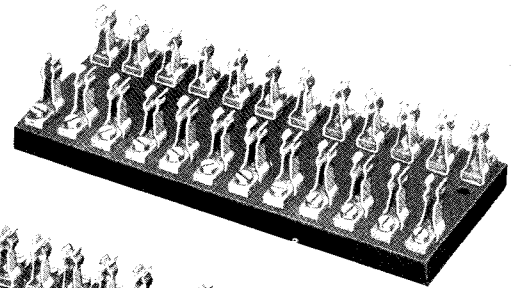
Length : 10" (254 mm.)
 Width : $3\frac{1}{2}$ " (89 mm.)
 Depth : $9\frac{1}{2}$ " (241 mm.)
 Weight : $6\frac{1}{2}$ -lbs. (2.9 kg.)

T2775

T2775 Fuse Mounting.

Used on main distribution frames. Comprises zinc-plated sheet-iron frame carrying 40 nickel-silver fuse clips mounted on ebonite. The frame has two hinged sides, each fitted with varnished hardwood fanning strip drilled for jumpering. For mounting 40 fuses T2766. Complete with sheet-iron cover, finished grey enamel.

T4671



T4668

T4665

T4667

Fuse Mountings.

Comprising nickel-silver fuse clips and nickel-plated brass screw terminals mounted on black composition base. Accommodates fuses T4294, T4295, and T4285.

T4665.	For 1 fuse.	T4669.	For 8 fuses.
T4666.	" 2 fuses.	T4670.	" 10 "
T4667.	" 4 "	T4671.	" 12 "
T4668.	" 6 "	T4672.	" 14 "

	T4665	T4667	T4668	T4671
Length ...	$3\frac{1}{4}$ "	$3\frac{1}{4}$ "	$3\frac{1}{4}$ "	$3\frac{1}{4}$ "
	(83 mm.)	(83 mm.)	(83 mm.)	(83 mm.)
Width ...	$\frac{5}{8}$ "	$2\frac{1}{2}$ "	$3\frac{3}{8}$ "	$7\frac{1}{2}$ "
	(15 mm.)	(64 mm.)	(95 mm.)	(191 mm.)
Height ...	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	$1\frac{1}{2}$ "
	(41 mm.)	(41 mm.)	(41 mm.)	(41 mm.)
Weight ...	2-ozs.	7-ozs.	10-ozs.	21-ozs.
	(56 gm.)	(199 gm.)	(283 gm.)	(595 gm.)

T4285 Fuse.

Porcelain tube, with dull nickel-plated brass end-caps. Fusing current 3 amperes.



T4285

Carrying capacity 1.5 ampere. Used on fuse mountings T2767, T4665, etc.

T4286 Fuse. As T4285 but fusing current, 5 amperes, carrying capacity 2.5 amperes.

Length :	Diameter :	Weight :
$2\frac{1}{8}$ " (53 mm.)	$\frac{9}{32}$ " (7 mm.)	$\frac{1}{4}$ -oz. (7 gm.)

T2766 Fuse.

Flat bakelite, with copper end-caps. Carrying capacity 1.5 ampere indefinitely.



T2766

Fusing current 3 amperes in 30 seconds. As fitted to fuse mounting T2775.

Length :	Diameter :	Weight :
$3\frac{1}{2}$ " (39 mm.)	$\frac{1}{2}$ " (13 mm.)	$\frac{1}{8}$ -oz. (4.6 gm.)

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T4294 Fuse.

Glass tube ; fitted nickel-plated brass end-caps. Fusing current 1 ampere.

T4295 Fuse.

Glass tube. As T4294, but fusing current 0.4 ampere.

T4293 Fuse.

Glass tube (clear). As T4294, but fusing current 7 amperes, instantaneously. Carrying capacity 3.5 amperes indefinitely. As fitted to T4448 cable terminal and protector box.

Length :	Diameter :	Weight :
2 1/8" (53 mm.)	3/8" (7 mm.)	1/4-oz. (7 gm.)



T4296

T4296 Fuse.

Glass tube (blue), with nickel-plated brass end-caps. Fusing current 7.5 amperes within

10 seconds. Carrying capacity 5 amperes for 15 minutes. As fitted to T2842 lightning arrester and fuse panel.

T4297 Fuse.

Similar to T4296, but glass tube clear, fusing current 0.75 ampere within 10 seconds, carrying capacity 0.5 ampere for 15 minutes.

T4298 Fuse.

Similar to T4296, but glass tube green, fusing current 4.5 amperes within 10 seconds, and carrying capacity 3 amperes 15 minutes.

T4296, T4297, T4298—

Length :	Diameter :	Weight :
2 3/4" (69 mm.)	1/4" (6 mm.)	1/4-oz. (7 gm.)

T2773

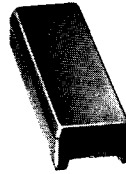
Length ... 2 1/2" (60 mm.)
Diameter ... 3/4" (6 mm.)
Weight ... 1/4-oz. (7 gm.)



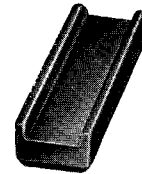
T2773

T2773 Fuse.

Clear glass tube, with nickel-plated end-caps. Fusing current 1 ampere within 10 seconds. Carrying capacity 0.66 ampere for 15 minutes. As fitted to line fuses T891 and T892.



T888
T889
T893
T894



T888, T889, T893, T894—

Length :	Width :	Depth :	Weight :
1 1/4" (32 mm.)	3/8" (9.6 mm.)	7/16" (11.1 mm.)	0.16-oz. (4.5 gm.)

T894 Arrester Block.

Carbon, single ; working surface and bevels coated with anti-dust varnish and then with insulating varnish approximately 0.0015" (0.0375 mm.) thick ; separators not required.

T893 Arrester Blocks.

Similar to T894 but without insulating varnish ; in pairs with separator.

T889 Arrester Block.

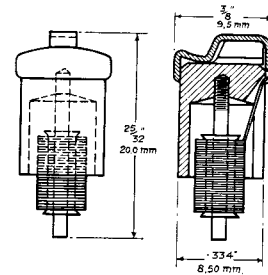
Single, moulded from loaded phenol-formaldehyde powder containing graphite and copper to give necessary conductivity ; working surface and bevels coated with anti-dust varnish and then with insulating varnish approximately 0.0015" (0.0375 mm.) thick ; separators not required.

T888 Arrester Blocks.

Similar to T889 but without insulating varnish ; in pairs with separator.

T3582 Heat Coil.

Used on protectors T2844, etc. ; earths the circuit on operation. Resistance 3.5—4.1 ohms. Operating current 0.5 ampere in 210 seconds. Carrying capacity 0.3 ampere.



Length :	Width :	Depth :	Weight :
2 5/8" (20 mm.)	3/8" (9.5 mm.)	5/8" (16 mm.)	0.06-oz. (1.7 gm.)



T3578

T3578 Heat Coil.

Disconnects the circuit on operation. Operating current 1.5 ampere in 15—60 seconds. Carrying capacity 0.9 ampere for 3 hours.

Length :	Diameter :	Weight :
2 1/2" (17 mm.)	5/16" (8 mm.)	.07-oz. (1.96 gm.)

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T3579 Heat Coil.

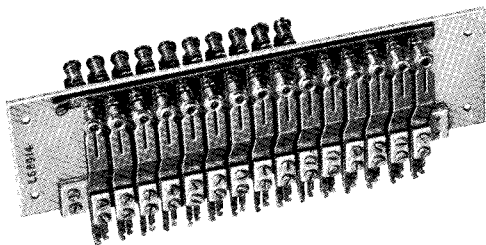
Disconnects the circuit on operation. Operating current 2 amperes in 15-60 seconds. Carrying capacity 1.33 ampere for 3 hours.

T3580 Heat Coil.

As T3579, but operating current 500 milliamperes in 15-60 seconds. Carrying capacity 350 milliamperes for 3 hours.

T3581 Heat Coil.

As T3579, but operating current 250 milliamperes in 15-60 seconds. Carrying capacity 150 milliamperes for 3 hours.



T3575

T3575 Heat Coils, Strip Mounted.

Comprising zinc-plated steel plate mounting, 15 sets of nickel-silver springs on each side, and 30 heat coils T3578. Ebonite insulation. Gold-silver-platinum alarm contacts, which close when heat coil operates.

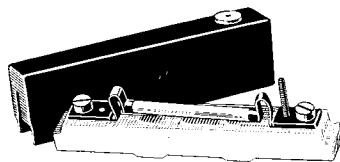
T3576 Heat Coils, Strip Mounted.

As T3575, but with 10 sets of springs each side, to accommodate 20 heat coils.

T3577 Heat Coils, Strip Mounted.

As T3575, but with 5 sets of springs each side, accommodating 10 heat coils.

	T3575	T3576	T3577
Length ...	10 $\frac{1}{4}$ " (260 mm.)	7 $\frac{1}{4}$ " (184 mm.)	5 $\frac{1}{4}$ " (134 mm.)
Width ...	2 $\frac{3}{8}$ " (60 mm.)	2 $\frac{3}{8}$ " (60 mm.)	2 $\frac{3}{8}$ " (60 mm.)
Depth ...	3 $\frac{1}{16}$ " (94 mm.)	3 $\frac{1}{16}$ " (94 mm.)	3 $\frac{1}{16}$ " (94 mm.)
Weight ...	4 $\frac{1}{2}$ -lbs. (2 kg.)	3-lbs. (1.4 kg.)	1 $\frac{1}{2}$ -lbs. (700 gm.)



T891 Single Line Fuse.

Porcelain base; 1 ampere glass tube fuse T2773 detachably mounted in spring clips. Papier mâché cover secured by milled nut.

Length:	Width:	Depth:	Weight:
4 $\frac{3}{8}$ " (120 mm.)	$\frac{7}{8}$ " (22 mm.)	1 $\frac{1}{8}$ " (35 mm.)	4-ozs. (114 gm.)

T892 Double Line Fuse.

As T891, but fitted two 1-ampere fuses T2773.

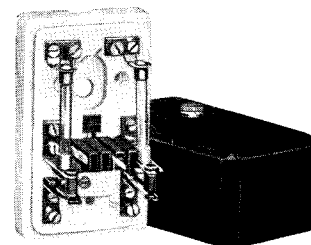
Length:	Width:	Depth:	Weight:
4 $\frac{3}{8}$ " (120 mm.)	2 $\frac{1}{4}$ " (22 mm.)	1 $\frac{1}{2}$ " (35 mm.)	8-ozs. (228 gm.)

T890 Protector.

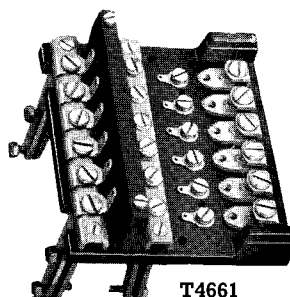
Single unit for one metallic circuit. Comprising two heat coils T3580, two fuses T4285, and two pairs of carbons with mica separators T884; mounted in nickel-silver and phosphor-bronze springs, on porcelain base. Black insulating cover secured by captive nut.

Affords protection against lightning, abnormal currents and sneak currents.

Length:	Width:	Depth:	Weight:
4 $\frac{5}{8}$ " (117 mm.)	2 $\frac{3}{4}$ " (69 mm.)	3 $\frac{1}{16}$ " (77 mm.)	1 $\frac{1}{8}$ -lbs. (510 gm.)



T890



T4661

Alarm Fuse Mountings.

Black moulded bakelite panel. Fitted with individual alarm terminals. Arranged for clamping to bus-bars at rear by four brackets, which also constitute battery and earth connections. Suitable fuses T4349 to T4351 and T3101.

	T4661	T4659	T4662	T4664
No. of fuses ...	6	4	1	6
Length ...	3 $\frac{3}{4}$ " (95 mm.)	2 $\frac{1}{4}$ " (57 mm.)	1" (25 mm.)	3 $\frac{3}{8}$ " (95 mm.)
Width ...	3 $\frac{1}{4}$ " (83 mm.)	3 $\frac{1}{4}$ " (83 mm.)	3 $\frac{1}{2}$ " (83 mm.)	3 $\frac{1}{2}$ " (83 mm.)
Depth ...	3 $\frac{1}{8}$ " (79 mm.)	3 $\frac{1}{8}$ " (79 mm.)	3 $\frac{1}{8}$ " (79 mm.)	3 $\frac{1}{8}$ " (79 mm.)
Weight ...	8 $\frac{1}{2}$ -ozs. (241 kg.)	5-ozs. (142 kg.)	2-ozs. (58 kg.)	9-ozs. (255 kg.)

Alarm Fuse Mountings.

Construction and dimensions as T4661 and T4659, but fitted with common alarm bar.

T4660. For six fuses.

T4658. For four fuses.

T4664

Alarm Fuse Mounting.

Similar to T4660, but fitted with six "U" links and sockets, and earth bus-bar connection only. Used for earth fusing.

T4663 Alarm Fuse Mounting.

For single fuse. As T4662, but brackets do not constitute battery and earth connections. Suitable alarm fuses are T4349 to T4351 and T3101.

Length:	Width:	Depth:	Weight:
1" (25 mm.)	3 $\frac{1}{4}$ " (83 mm.)	3 $\frac{1}{8}$ " (79 mm.)	2-ozs. (57 gm.)

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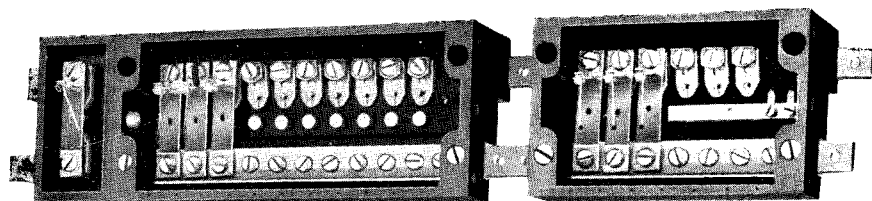
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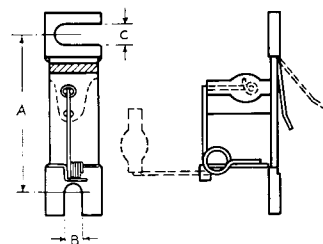
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T3150

T3154

T3151



Fuse Panels for Bus-Bar Mounting (32A Selector Racks).

Designed to mount on bus-bars T2853, as shown above. Comprise moulded bakelite box panels fitted with D.N.P. brass fuse terminals, and stainless-steel alarm contact bar or D.N.P. brass individual alarm contact studs.

Suitable for bead type alarm fuses T4349, T4350 and T4351. Each panel includes four fixing screws and set of fuse mounting screws for bus-bar.

	With Common Alarm Bar.	With Individual Alarm Studs.
1 Point ($1\frac{1}{2}'' \times 2\frac{7}{8}'' \times 1\frac{3}{4}''$) ...	—	T3150
6 Point ($4\frac{1}{2}'' \times 2\frac{7}{8}'' \times 1\frac{3}{4}''$) ...	T3151	T3152
10 Point ($6\frac{1}{2}'' \times 2\frac{7}{8}'' \times 1\frac{3}{4}''$) ...	T3153	T3154

T2853 Bus-Bar.

Standardised. For positive and negative battery on 32A selector racks. Tinned copper, $\frac{1}{2}''$ (12.7 mm.) \times $\frac{1}{4}''$ (6.3 mm.) section; drilled and tapped 2.BA at $\frac{1}{2}''$ (12.7 mm.) centres throughout the length. Supplied in lengths as specified in order.



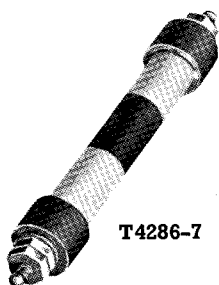
T2853

T2855 Insulating Cover.

For bus-bar T2853. Rectangular tube of paper to slip over negative bus-bar. Within fuse panels, cover is cut away from top of bus-bar to enable fuse and panel fixing screws to be inserted. Supplied in 1' 4" lengths.

T4286-7 Explosive Fuses.

Used in conjunction with "A.T.M." High Voltage Protective Equipment for exposed telephone lines, and designed to sever the connection when operated, allowing the wires to fall free and out of reach from the ground.



T4286-7

Length: $4\frac{1}{8}''$ (125 mm.)
 Diameter: $\frac{3}{8}''$ (19 mm.)
 Weight: 2-ozs. (57 gm.)

T4286. Rating 7 amperes.
 T4287. Rating 1 ampere.

Alarm Fuses (B.P.O.).

Bakelite moulding fitted with slotted copper end terminal plates. Nickel-silver fuse wire and springs. When blown, an alarm contact is released and a coloured flag is displayed.

List No.	DIMENSIONS			P.O. Fuse No.	Carrying Capacity Amp.	Fusing Currents Amp.	Colour of Plastic Slewing
	A Ins.	B Ins.	C Ins.				
T4343	$1\frac{1}{2}$	.195	.195	4/1A	0.5	0.8	Blue
T4344	$1\frac{1}{2}$	.195	.195	4/2	1.5	2.4	Red
T4345	$1\frac{1}{2}$	.152	.152	5/2	1.5	2.4	Red
T4346	$1\frac{1}{2}$	.152	.152	5/3A	3.0	4.8	Black
T4347	$1\frac{1}{2}$	.195	.152	13/2	1.5	2.4	Red
T4348	$1\frac{1}{2}$	.195	.152	13/3A	3.0	4.8	Black
T4349	$1\frac{1}{2}$	.152	.195	31/1	0.5	0.8	Blue
T4350	$1\frac{1}{2}$	.152	.195	31/2	1.5	2.4	Red
T4351	$1\frac{1}{2}$	.152	.195	31/3	3.0	4.8	Black
T4352	2	.152	.152	27/1	0.5	0.8	Blue
T3101	$1\frac{1}{2}$	.152	.195	31/1A	1.0	1.6	Yellow

Length: 2" (50 mm.) Width: $\frac{3}{8}''$ (9 mm.) Depth: 1" (25 mm.) Weight: $\frac{1}{4}$ -oz. (7 gm.)

Alarm Fuses (Non B.P.O.).

As above, except "Dullray" fuse wire is used in place of nickel-silver.

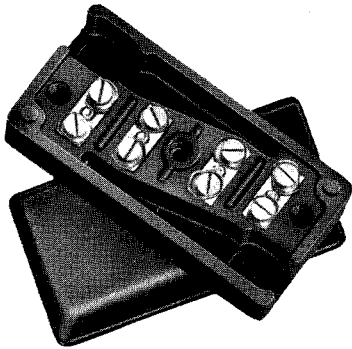
List No.	DIMENSIONS			Carrying Capacity Amp.	Fusing Currents Amp.	Colour of Plastic Slewing
	A Ins.	B Ins.	C Ins.			
T3102	$1\frac{1}{2}$	.152	.195	3.56	5.7	Yellow
T3103	$1\frac{1}{2}$	.152	.195	2.75	4.4	Black
T3104	$1\frac{1}{2}$	.152	.195	1.44	2.3	Red
T3105	$1\frac{1}{2}$.152	.195	0.5	0.8	Blue
T3106	$1\frac{1}{2}$.152	.152	3.56	5.7	Brown
T3107	$1\frac{1}{2}$.152	.152	1.3	2.1	Yellow

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T979. Interior view.

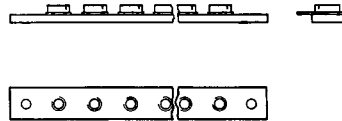
T979 Cord Terminal Strip.

Four-way; for desk telephone. Black moulded bakelite, with inset brass screw terminals. Used with telephone T4070, etc. Includes two fixing screws.

Cord terminal strips can be supplied in the following colours at an extra charge :-Walnut, mahogany, ivory, red or green.

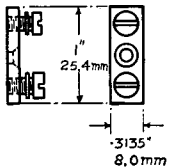
Bus-Bar Terminal Strip.

For conveniently concentrating a number of common connections, e.g., "Earth"; "Night Alarm"; "Battery Feed," etc.



Comprising brass strip, drilled at ends for fixing screws, and fitted with terminal screws.

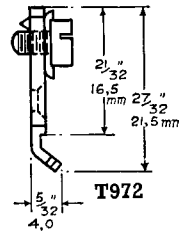
T. No. ...	T970	T3509	T3510	T3511	T3512
Number of Terminals...	3	5	8	11	14
Length ... ins. mm.	2 5/8 67	3 3/4 95	5 7/8 138	7 1/8 181	8 1/4 224
Width ... ins. mm.	3/4 19	3/4 19	3/4 19	3/4 19	3/4 19
Depth ... ins. mm.	3/2 7	3/2 7	3/2 7	3/2 7	3/2 7
Weight ... ozs. gm.	1 28	1 1/2 42	2 1/4 64	3 85	4 1/2 127



Length ... 1" (25 mm.)
Width ... 5/16" (8 mm.)
Depth ... 5/16" (8 mm.)
Weight ... 0.04-oz. (1.13 gm.)

T971 Terminal Plate.

Brass, dull nickel plated, with two terminal screws and washers.



T972 Terminal Plate.

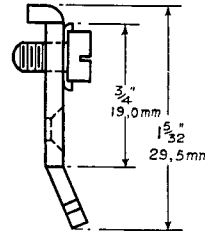
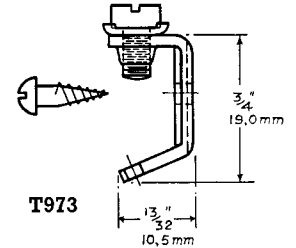
Brass, dull nickel plated, with one terminal screw and washer, and soldering tag extension. Used as telephone or general apparatus terminal.

Length ... 27/32" (21 mm.)
Width ... 5/16" (8 mm.)
Depth ... 1/4" (6.3 mm.)
Weight ... 0.5-oz. (14 gm.)

T973 Terminal Plate.

Brass, with turned-up ends; dull nickel plated. Fitted one terminal screw and washer, and with soldering tag extension.

Length ... 7/8" (22 mm.)
Width ... 5/16" (8 mm.)
Depth ... 7/16" (11 mm.)
Weight ... 0.14-oz. (3.9 gm.)



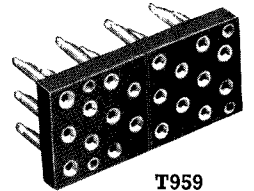
T974 Terminal Plate.

Brass, dull nickel plated, with one terminal screw and washer, and soldering tag extension.

Length ... 1 5/32" (29.5 mm.)
Width ... 3/8" (9.5 mm.)
Depth ... 3/8" (9.5 mm.)
Weight ... 0.15-oz. (4.2 gm.)

T959 Test Terminal Strip.

For meter testing. Comprises phenol fibre panel with 20 plug socket terminals; engraved "0"-"9," "0"-"9," and arranged for mounting on meter plate T2921. Use test plug T978.

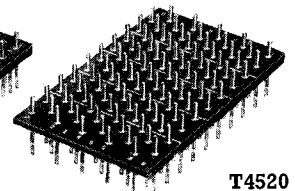
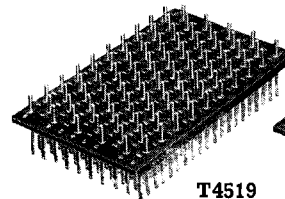


T4519 Test Terminal Block.

For meter testing. Comprises ebonite panel with 100 pin terminals and 100 terminals for terminating wiring from rectifier. Engraved "0"-"9," "0"-"9," and arranged for mounting on meter plate T4694. Use test clip T4522.

T4520 Test Terminal Block.

As above but fitted with 100 pin terminals only. For meters not equipped with rectifiers.



T4504 Test Terminal Block. As T4519 but for 40 meters.

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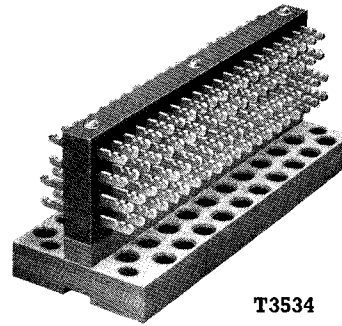
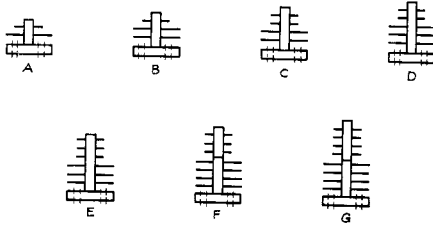
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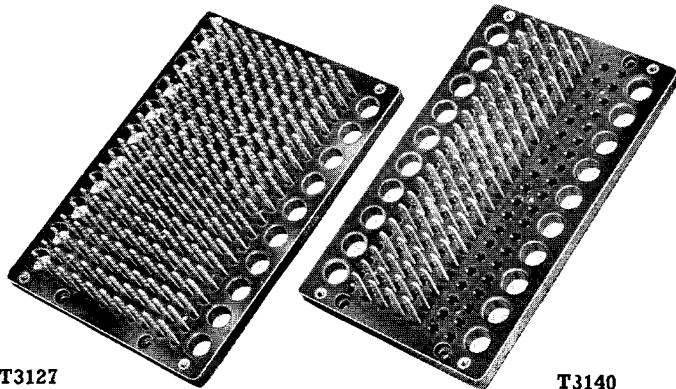
Connection Strips or Tag Blocks.

For use on distribution frames or for general cross-connections on telephone equipment. They comprise groups of soldering tags mounted in ebonite on varnished hardwood bases, drilled to serve as fanning strips. For tropical use, teak bases can be supplied at extra cost.



T3534

T No.	Capacity in Tags.	Figure.	Length.		Width.		Depth.		Weight.	
			ins.	mm.	ins.	mm.	ins.	mm.	ozs.	gm.
T3531	3 × 10	B.	6 1/2	165	2 1/2	64	2 3/8	61	11	311
T3532	2 × 20	A.	6 1/2	165	2 1/2	64	2 3/8	61	11	311
T3850	2 × 25	A.	6 1/2	165	2 1/2	64	2 3/8	61	11	311
T3533	3 × 20	B.	6 1/2	165	2 1/2	64	2 3/8	61	11	311
T3851	3 × 25	B.	6 1/2	165	2 1/2	64	2 3/8	61	11	311
T3534	4 × 20	C.	6 1/2	165	2 1/2	64	2 3/8	70	12	340
T3852	4 × 25	C.	6 1/2	165	2 1/2	64	2 3/8	70	12	340
T3535	5 × 20	D.	6 1/2	165	2 1/2	64	3 3/16	81	12	340
T3853	5 × 25	D.	6 1/2	165	2 1/2	64	3 3/16	81	13	368
T3536	6 × 20	E.	6 1/2	165	2 1/2	64	3 1/2	89	13	368
T3854	6 × 25	E.	6 1/2	165	2 1/2	64	3 1/2	89	14	396
T3537	7 × 20	F.	6 1/2	165	2 1/2	64	4 1/4	108	15	425
T3855	7 × 25	F.	6 1/2	165	2 1/2	64	4 1/4	108	16	453
T3538	8 × 20	G.	6 1/2	165	2 1/2	64	4 3/4	121	17	481
T3856	8 × 25	G.	6 1/2	165	2 1/2	64	4 3/4	121	17	481
T3857	2 × 20	A.	8	203	2 1/2	64	2 3/8	61	12	340
T3858	3 × 20	B.	8	203	2 1/2	64	2 3/8	61	13	368
T3863	3 × 25	B.	8	203	2 1/2	64	2 3/8	61	13	368
T3859	4 × 20	C.	8	203	2 1/2	64	2 3/4	70	14	396
T3864	4 × 25	C.	8	203	2 1/2	64	2 3/4	70	14	396
T3860	5 × 20	D.	8	203	2 1/2	64	3 1/8	79	15	425
T3865	5 × 25	D.	8	203	2 1/2	64	3 1/8	79	15	425
T3861	6 × 20	E.	8	203	2 1/2	64	3 1/2	89	16	453
T3866	6 × 25	E.	8	203	2 1/2	64	3 1/2	89	16	453
T3862	8 × 20	G.	8	203	2 1/2	64	4 3/4	121	18	510
T3867	8 × 25	G.	8	203	2 1/2	64	4 3/4	121	18	510



T3127

T3140

Tag Blocks for 32A Selector Shelves.

Consist of moulded bakelite blocks, in two sizes, fitted with connecting tags in the following combinations:—

Tag Equipment.	Cat. No.	
	on base size 7" × 5"	on base size 7" × 4"
2 × 20	T3119	T3138
3 × 20	T3120	T3139
4 × 20	T3121	T3140
5 × 20	T3122	T3141
6 × 20	T3123	T3142
7 × 20	T3124	T3143
8 × 20	T3125	—
9 × 20	T3126	—
10 × 20	T3127	—

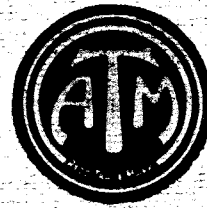
Approximate Weights: 1-lb. (454 gm.) 11-ozs. (312 gm.)

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**MANUAL TELEPHONE
EXCHANGE
APPARATUS**

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The "A.T.M." standardised unit type manual switchboard has been designed to meet all requirements for manual operation with flexibility and economy.

The switchboard sections are built to suit any type of position, C.B. No. 10, toll, trunk, test, enquiry, etc. from the following standardised units:—

- (1) Base from floor to key shelf for 1 position section.
- (2) Base from floor to key shelf for 3 position section.
- (3) Top unit details including rear doors for 1 or 3 position section.
- (4) Keyshelf including plug shelf and cord rail.
- (5) Detachable apparatus unit at rear.

Sections may be either 4' 8½" or 6' 4½" high according to panel space required.

The design incorporates improved plug seating, cord terminal fasteners Fig. 1, cord suspension Figs. 2 and 3, cord length adjusters Fig. 4, and connection strips Fig. 5.

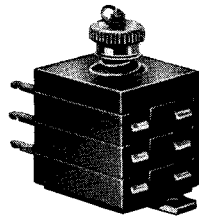


Fig. 1
Cord terminal fastener

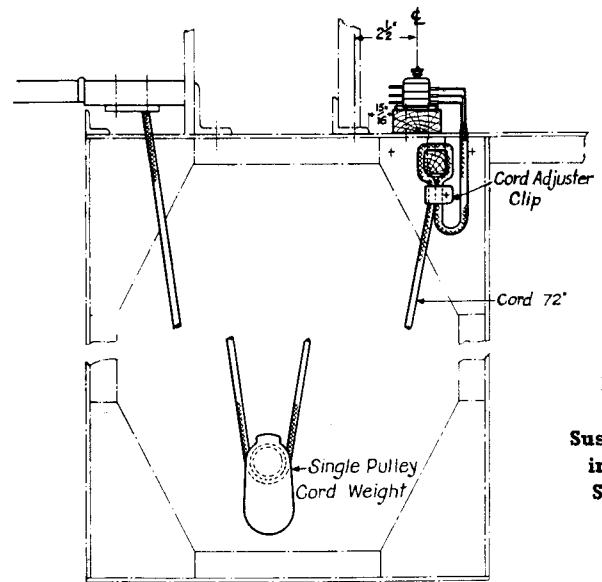


Fig. 3
Cord Suspension in 4' 8½" Section

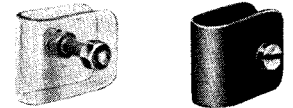


Fig. 4. Cord length adjuster used with Fig. 3

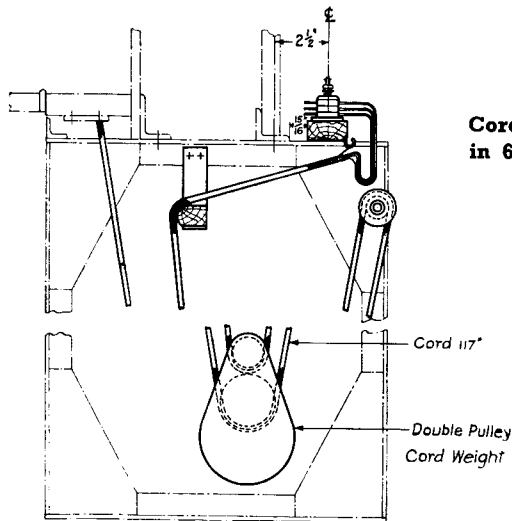


Fig. 2
Cord Suspension in 6' 4½" Section

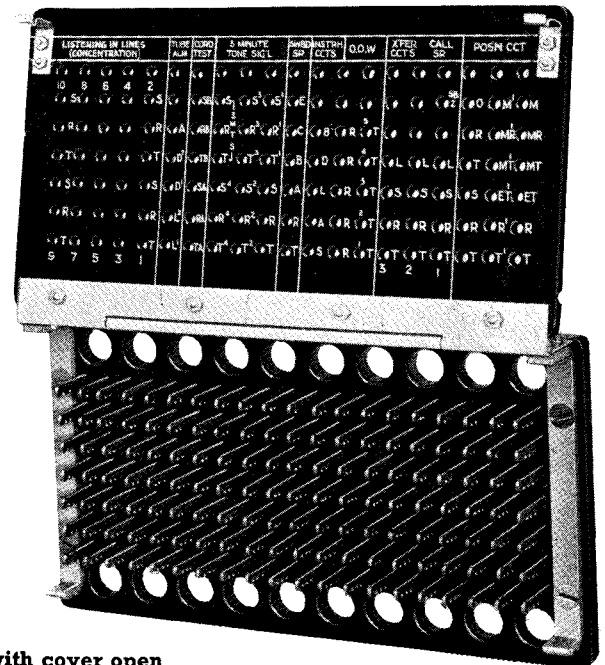


Fig. 5. Connection Strip with cover open

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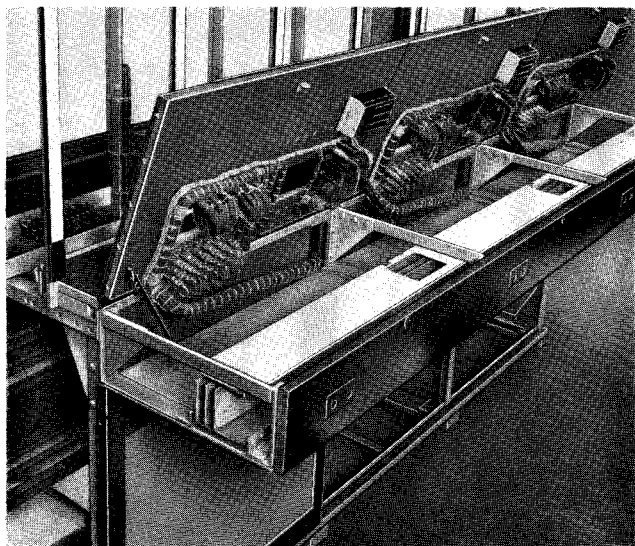


Fig. 6. Keyshelf showing conveyor belt space

Space is provided in the keyshelf for ticket conveyor belts as shown in Fig. 6 or pneumatic tubes, also card troughs, timing devices, etc. Space for cabling up to 70 trunk switchboard positions through one duct is provided in the base as will be clear from Figs. 7, 8 and 9.

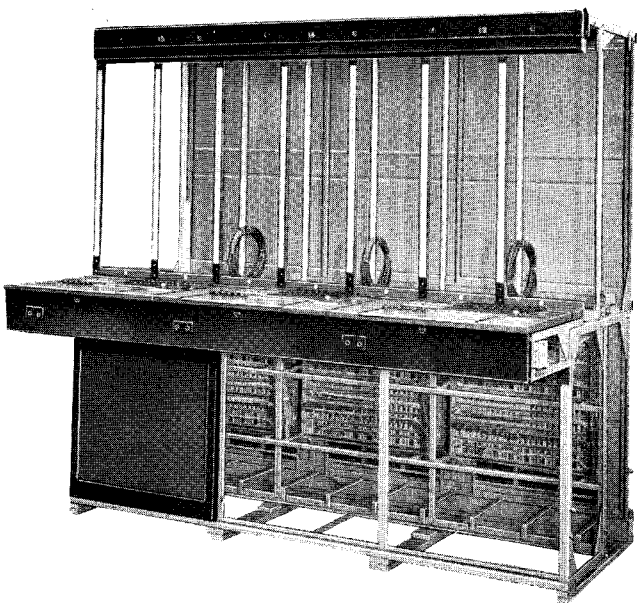


Fig. 7. Front view, 3 position section 6' 4½" high

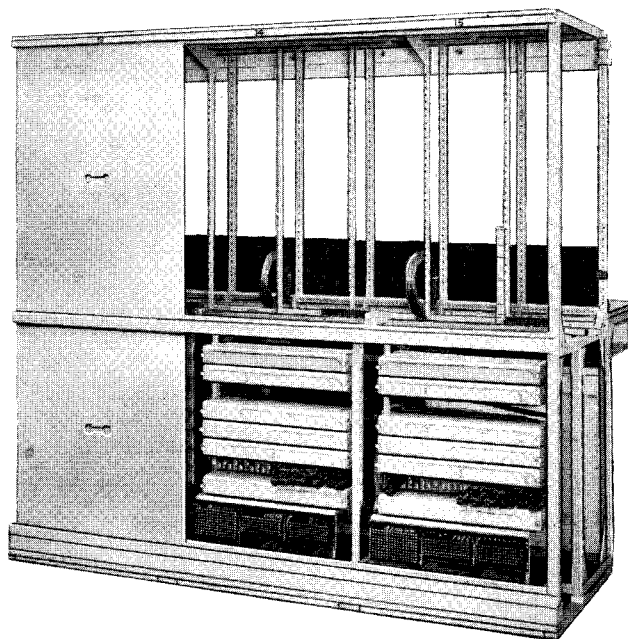


Fig. 8. Rear view, 3 position section 6' 4½" high

The framework is of angle-iron and gives greater rigidity and strength with much less weight than earlier designs. All front kicking panels are interchangeable, so also are the lift-out rear doors on 4' 8½" high sections. Sheet-iron sliding doors are fitted to 6' 4½" sections.

Only two standardised base assemblies are used, for 1 and 3 position type sections respectively. Front and rear views of a 3 position section 6' 4½" high are shown in Figs. 7 and 8 and of 4' 8½" sections in Figs. 10 and 11.

The switchboards can be supplied 4' 8½" high initially and later be converted on site if and when required to 6' 4½" high. This is effected by unbolting the vertical details above the keyshelf level and substituting the longer components, also sheet-iron rear doors and rollers.

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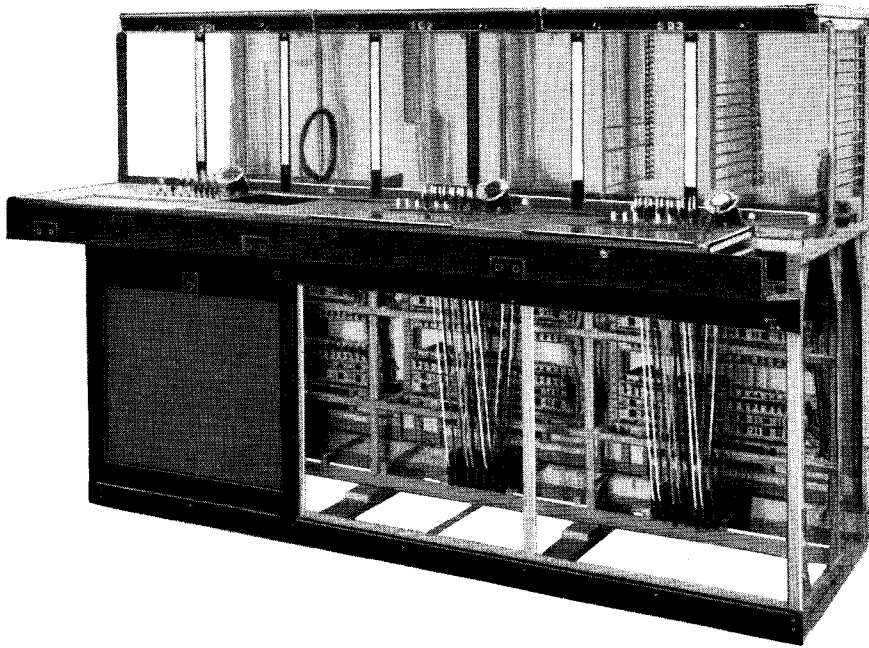


Fig. 10
Front view of 3 position section
4' 8 1/2" high

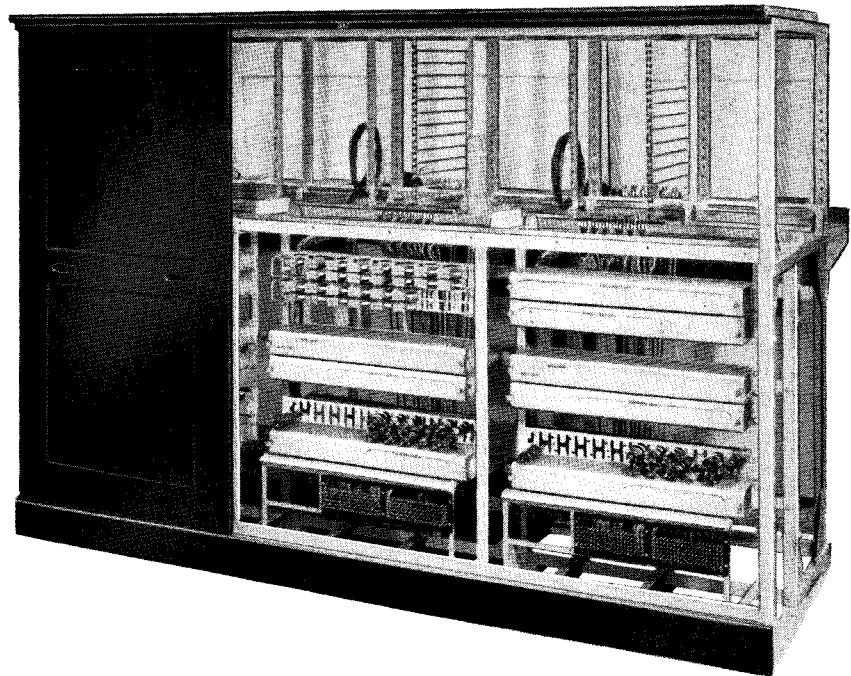


Fig. 11
Rear view of 3 position section
4' 8 1/2" high

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All components are designed for bolting together to facilitate erection and replacements or conversions on site if required. The apparatus unit at the rear is standardised and may be readily replaced in event of a major conversion on site. Complete rear units with apparatus wired can be shipped apart from the switchboard sections as shown in Fig. 12. The position cable form is of standardised shape and may be wired on the bench.

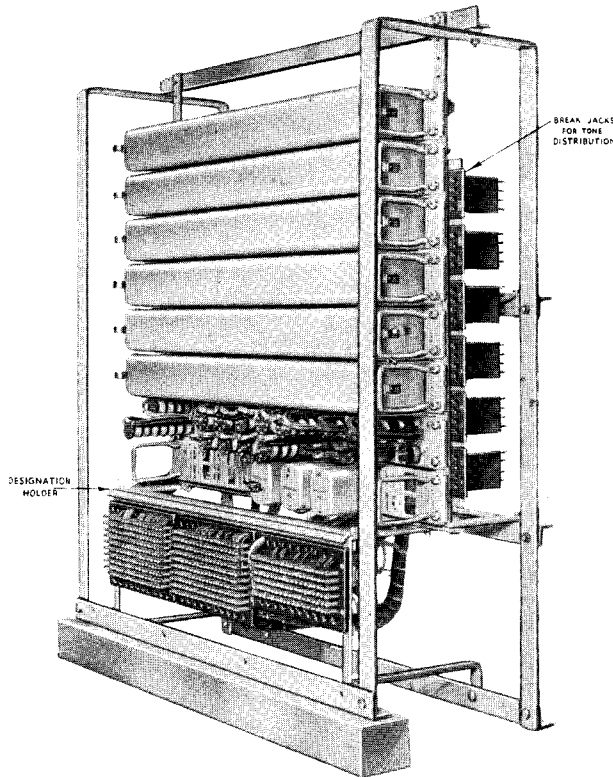


Fig. 12
Detachable Apparatus Unit

Further particulars of the "A.T.M." Standardised Unit Type Manual Switchboard are given in separate publications which deal also with particular applications. Copies of these publications will be supplied on request, full particulars of service requirements should be given.

A single position 4' 8½" high section and a 30-degree angle section are shown in Figs. 13 and 14 respectively.

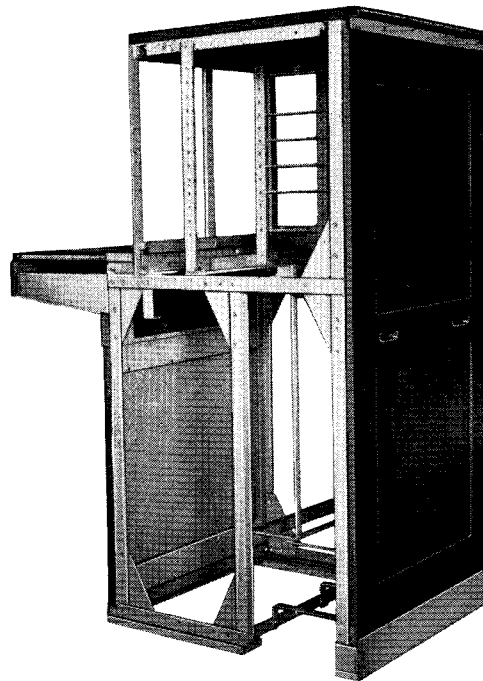


Fig. 13
Single position
4' 8½" high
section

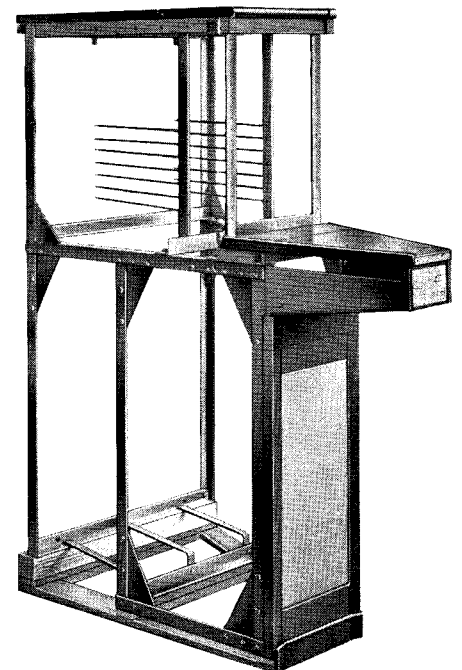


Fig. 14
30-degree
angle section

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"A.T.M." UNIT TYPE P.M.B.X.

Introduction and General Description

Increasing demand for "A.T.M." P.M.B.X. (private manual branch exchange) switchboards has led to concentration on the development of the floor-pattern cord-type board. The "A.T.M." unit type P.M.B.X. incorporates the improvements which long experience in manufacturing and operating this type of equipment has shown to be advantageous. Figs. 15 and 16 show one and two position switchboards respectively.

This P.M.B.X. equipment is variable within maximum capacity limits as follows :—

	1 position	2 position
Exchange lines (bothway junctions with public exchange) and/or private wires	10	20
Extension lines	60	120
Cord circuits	15	30

It should, however, be noted that, to derive the full benefit of standardised production, three equipments which meet the majority of requirements, have been standardised. Special quotations are necessary for equipment which differs from these three standards :—

	5 - 20		10 - 50		10 - 100	
	60 1 position		60 1 position		110 2 positions	
Position cord test, power leads, ringing and night alarm circuits	wired eqpt.		wired eqpt.		wired eqpt.	
	1	1	1	1	2	2
Cord circuits	15	8	15	15	30	30
Night service circuits ...	10	5	10	10	20	10
Extension line circuits ...	50	20	50	50	100	100
Exchange line circuits ...	10	5	10	10	20	10
Dial circuits	1	1	1	1	2	2

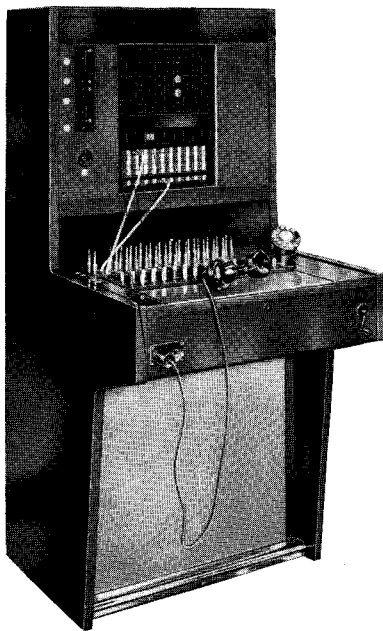


Fig. 15. P.M.B.X. 1 position, front view

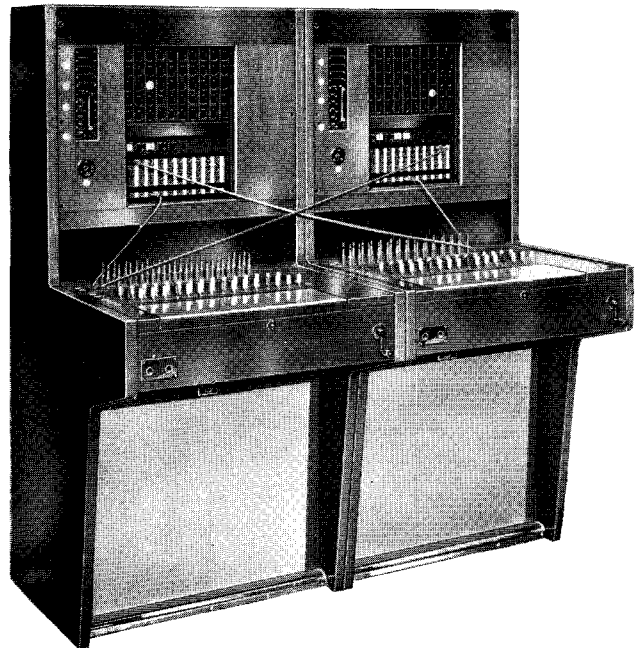


Fig. 16. P.M.B.X. 2 position, front view

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Ring current operates drop-flap indicators on exchange lines. Eyeball indicators on extension lines operate from common battery loop. Keys provided for cord circuits are "ring call + speak" and "ring answer + dial". There is through clearing on extension-exchange calls. Double supervision is provided on cord circuits by "disc signal" indicators.

As on main exchanges, relays are standard B.P.O. (British Post Office) 3000 type. Keys, plugs, capacitors and resistors are B.P.O. standard types.

Each fully equipped position requires 0.5 amperes at between 16 and 24 volts. Supply may be by power leads from the parent exchange or, where A.C. mains are available, by a "battery eliminator" (a rectifier with smoothed output), or by a 16-volt battery with suitable charging means. The "battery eliminator" incorporates automatic change-over to an emergency battery in case of mains failure.

Ring supply may be from the parent exchange, from a 16-volt vibrator or the hand generator. Hand generators are always provided for emergency use.

Exchange line circuits can work to common battery signalling, common battery or automatic exchanges. Extension lines work to normal common battery instruments.

Maximum resistance of exchange and extension lines.

The maximum permissible resistances depend on the voltage and source of power supply and are approximately as follows:—

Source of Supply	Maximum Exchange line	resistances Extension line
22 or 24 volt exchange with 50 + 50 ohms feed over a power lead ...	150	100
40 volt exchange with 200 + 200 ohms feed over a power lead	200	150
50 volt exchange with 200 + 200 ohms feed over a power lead	400	150
18 to 22 volt eliminator or local battery at P.M.B.X.	400	150

There is the usual night alarm, also night service on a maximum of 10 extension lines. Position coupling is provided for, and there is a cord test circuit.

The "A.T.M." P.M.B.X. is designed to facilitate operators' work by a convenient arrangement of apparatus on the panel and key-shelf also to simplify maintenance by various novel features.

STANDARD CONSTRUCTIONAL FEATURES.

The following particulars will serve to indicate important advances over earlier standard P.M.B.X. designs. Most of the improvements have already been introduced in the Company's main exchange manual switchboards.

Width of Switchboard.

Increased from 24" to 27". Operators have more space and 3000-type relay mountings are accommodated. The indicators are more accessible.

Depth of Key-shelf.

Increased from 11" to 14". Operator has writing-space at front and side, and more leg-room below. The increased depth also provides space for a transparent plastic covered panel for list of telephone numbers, special information, notes, etc.

Kicking Panel.

Simplified vertical construction replaces sloping panel. Cord-weight space is increased, and the necessity for anti-noise felt and rawhide padding inside panel is eliminated. Complete linoleum covering outside prevents damage by operator's shoes. Flush metal catch, instead of handholes, improves appearance. Panels are easily removed and replaced.

Plug-shelf and Lower Half of Front Panel.

Covered with quarter-inch black-lacquered ebonite (replacing red fibre) for better appearance, durability and resistance to humid conditions.

Generator Handle.

In lock-rail instead of panel, handle does not interfere with cords in use and so facilitates operation between two positions.

Connection Strips.

Single-sided bakelite type replaces double-sided wooden type. Wiring, installation and maintenance are easier. Bakelite is more suitable for tropics. Local cable form is smaller and there is more space inside switchboards. See Figs. 17 and 18.

Fuse Panel.

Is of smaller type and improved appearance, has double bus-bars and is located immediately below the connection strip for easier wiring, installation and maintenance. Stronger, more durable yet takes less space in switchboard.

Cord Terminals (Fig. 1).

Plug-in, moulded type cord terminal blocks replace individual screw-fitting type terminals and facilitate cord replacements. There is less risk of contacts between adjacent terminals and more space between adjacent pairs of cords since one terminal block takes ANS. CORD T.R.S. and CALL CORD T.R.S. Tags of both cords are clamped by single knurled nut.

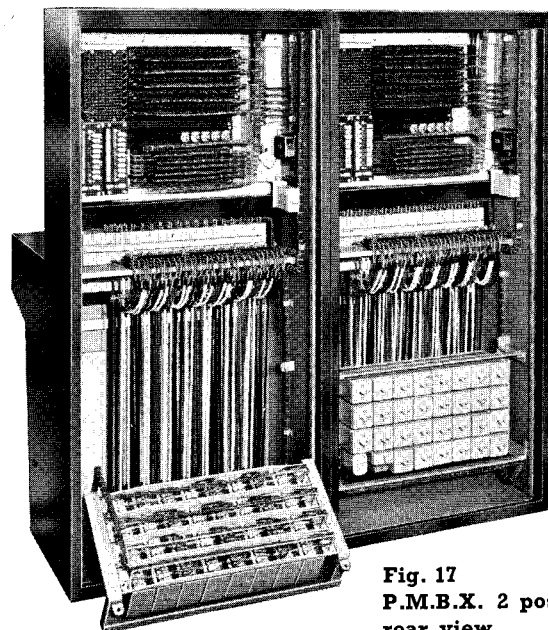


Fig. 17
P.M.B.X. 2 position,
rear view

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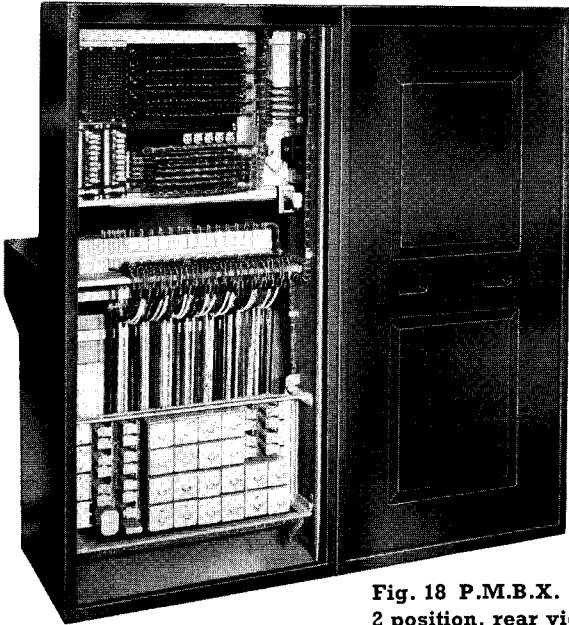


Fig. 18 P.M.B.X.
2 position, rear view

Cord-length Adjuster Grip and Suspension Rail (Fig. 3). Transparent plastic adjuster permanently on cord. Adjuster may be of fibre if desired. Adjusted by sliding grip on cord without disconnecting. Ensures longer cord life and easier maintenance. Avoids knotting of cords to take up slack and the need for cord strain tags and hooks.

Plug Seats.

Continuous phenol fibre strip below plug-shelf, drilled to register with plug holes. Holes are smooth and flared to reduce wear and ensure easy passage of cords. Construction is simple and fully tropical. Replaces leather washers and individual metal plug seats.

Capacitors.

Mounted on cord terminal shelf to reduce wiring, facilitate maintenance and access to indicators.

Relays and Retardation Coils, Hinged Mounting Frame (Fig. 17).

Each standard mounting plate accommodates relays and retardation coils for four cord circuits. The five plates are mounted on a hinged and detachable frame which provides for easy access to the wiring side and for any major alterations to equipments which might be required on site at some future time. This method of mounting concentrates the cord circuit apparatus and reduces the amount of wiring. More space is made available to enable full length of cords to be utilised for maximum reach.

Detachable Front Indicator Panel.

Facilitates manufacture and assembly also any major modifications of equipment in the future.

Colouring of Cords and Key-handles.

Tops of all ringing keys are red. The new colour scheme for speaking keys and cords replaces black and red alternate pairs. Colours of cords and associated speaking keys are now in sequence black, yellow, green, neutral.

P.V.C. Cord Insulation.

Fully tropical, and more flexible for easier cord movements. The usual braided cotton covering is used.

Operator's Instrument Jacks.

Double-type jack for headsets or handsets with concentric plugs.

CONSTRUCTIONAL FEATURES TO SPECIAL ORDER.

Fluorescent Lighting.

Available if A.C. supply exists. "Daylight" 15-watt tube on each switchboard cornice gives same illumination as 40-watt filament lamp. Adjustable reflector controls light-distribution.

Special Tropical Features.

Standard assembly and components are generally "tropicalised", but for extreme conditions woodwork is teak, oiled and wax-finished, instead of polished mahogany, capacitors are of special tropical pattern and the wire is enamelled. The relay coils can be impregnated if specially desired, but this feature is not recommended.

Filing Cabinet (Fig. 19).

Has drawer at top, directory shelf below and locked cupboard at bottom. Supplied for right- or left-hand location by hinging cupboard on right or left of cabinet. For two-position P.M.B.X., one of each is recommended. Top is at keyshelf height and is linoleum covered for supplementary telephone, ash-trays, cups, etc. Woodwork and finish is supplied to suit the switchboard.

Miscellaneous Circuit Features.

Normally the unit type P.M.B.X.'s are wired to circuit S.349080. If specially ordered, the wiring could be to circuit S.351180, which provides the following special features:—

Transmitter cut-out key for monitoring; private line feature barring access to main exchange; a battery eliminator and ringing vibrator.



Left-hand

Fig. 19. Filing Cabinet

Right-hand

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SWITCHBOARD JACKS AND PLUGS.

Three gauges for jacks and plugs have been standardised: the largest of these three, gauge "A," is used mainly for individually mounted jacks; gauge "B" is used for toll and trunk switchboards, manual switchboards of the No. 10 type, etc., where the multiple does not exceed 2,800 lines; gauge "C" is used for large manual switchboards of the No. 1 type, where the multiple may extend to 10,000 lines. In interpreting the following items it should be noted that only plugs and jacks of the same gauge are suited to each other.

Various jack spring combinations are available, of which some typical arrangements are schematically illustrated in Fig. 1, (a) to (g). This figure is referred to in catalogue descriptions of jacks.

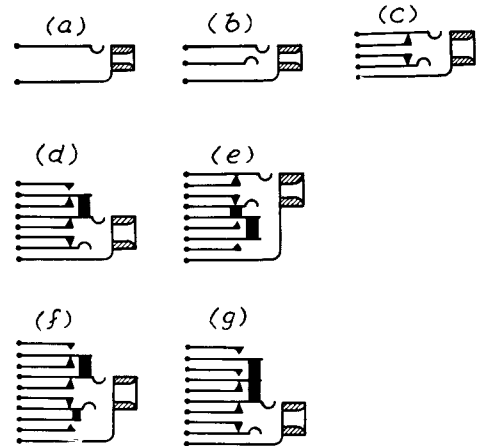
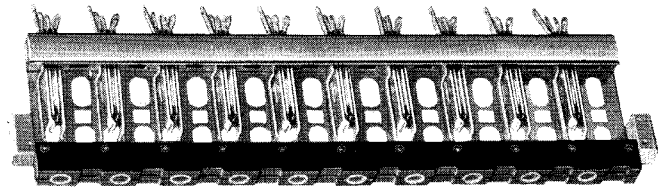


Fig. 1
Schematic diagrams of Spring Combinations.

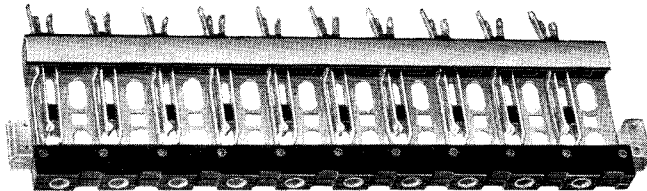
JACK STRIPS, SWITCHBOARD, GAUGE "B."

Comprising jacks with nickel-silver springs, silver contacts and ebonite insulators mounted on a metal frame with end blocks for panel mounting. The ebonite front strip is $10\frac{5}{16}'' \times \frac{1}{2}''$ (258 mm. \times 13 mm.), and if for 10 jacks is recessed and drilled for removable label holders T2135, but if for 20 jacks, the front strip is spotted and numbered 0 to 9—0 to 9, and has the lower edge grooved for filling.

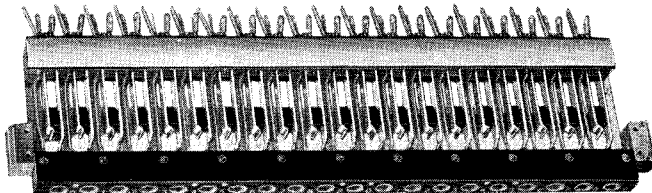
Suitable for T1832 or T1842 plugs.



T2484



T2482



T2483

Cat. No.	Jacks per Strip	Jack Points	Spring Combination Fig.	Overall Dimensions	Approx. Weight
T2482	10	3	(b)	$11\frac{1}{8}'' \times 3\frac{1}{2}'' \times \frac{1}{2}''$ (282 \times 89 \times 13 mm.)	12 $\frac{3}{4}$ -ozs. (363 gm.)
T2484	10	5	(c)	"	13 $\frac{3}{4}$ -ozs. (391 gm.)
T2486	10	8	(d)	"	15 $\frac{1}{2}$ -ozs. (433 gm.)
T2483	20	3	(b)	"	16-ozs. (455 gm.)
T2485	20	5	(c)	"	18-ozs. (512 gm.)

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Spacing Strips for Jacks.

For filling spaces between jack strips in the jack panels of No. 10 central battery switchboards.

Other variations of dimensions "A" and "B" (Fig. 2) can be supplied to meet requirements.

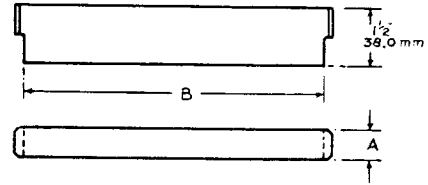


Fig. 2

Cat. No.	A		B		Weight		Front
T3702	$\frac{3}{4}$ "	19 mm.	$10\frac{5}{16}$ "	261 mm.	1.8-ozs.	51 gm.	Polished mahogany-finish
T3704	$1\frac{1}{2}$ "	38 mm.	$10\frac{5}{16}$ "	261 mm.	3.5-ozs.	99 gm.	
T3706	$\frac{3}{4}$ "	19 mm.	$10\frac{5}{16}$ "	261 mm.	1.8-ozs.	51 gm.	Matt ebonised
T3708	$1\frac{1}{2}$ "	38 mm.	$10\frac{5}{16}$ "	261 mm.	3.5-ozs.	99 gm.	

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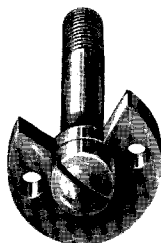


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T3784 Fastener, Jack.

Brass, with clamping plate. For securing jack strips in switchboards.



T3784

Stem.	Length	Dia. of Clamping Plate	Weight
1BA	1 ³ / ₈ " (35 mm.)	³ / ₄ " (19 mm.)	¹ / ₂ oz. (14 gm.)

Jacks, Single, Gauge "B."

For panel mounting; nickel-plated brass frame; nickel-silver springs; gold-silver contacts; bush tapped for screw fixing to escutcheon plate T1688. Suitable for plugs T1832, T2207 and T1842.

T4198



Cat. No.	Jack Points	Spring Combination Fig.	Approximate Dimensions and Weight
T4196	3	(b)	3 ¹ / ₆ " × ³ / ₄ " (78 × 19 mm.) 1 ¹ / ₂ -ozs. (43 gm.)
T4197	5	(c)	
T4198	8	(d)	

Jacks, Single, Gauge "B."

For panel mounting. Pressed brass frame with fixing lugs; nickel-silver springs; gold-silver contacts. Suitable for plugs T1832 and T1842.

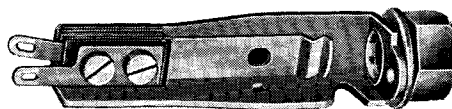


T3395

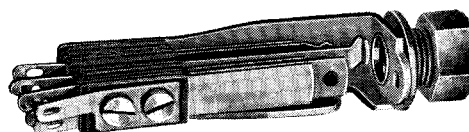
Cat. No.	Jack Points	Spring Combination Fig.	Approximate Dimensions and Weight
T3395	5	(c)	3 ¹ / ₂ " × 1 ¹ / ₈ " × ³ / ₈ " (89 × 29 × 16 mm.) 1 ¹ / ₂ -ozs. (43 gm.)
T3398	9	(e)	

Jacks, Single, Gauge "B."

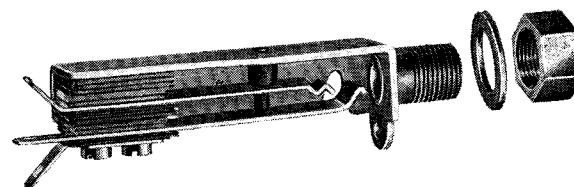
For panel mounting with clamping nut and washer on threaded brass bush; zinc-plated pressed-steel frame; nickel-silver springs; silver contacts. Suitable for plugs T1832 or T1842.



T2487



T2493



T2488

Cat. No.	Jack Points	Spring Combination Fig.	Approximate Dimensions and Weight
T2487	2	(a)	3 ³ / ₈ " × ⁷ / ₈ " (86 × 22 mm.) 1 ¹ / ₂ -ozs. (43 gm.)
T2488	3	(b)	3 ³ / ₈ " × ⁷ / ₈ " (86 × 22 mm.) 1 ⁵ / ₈ -ozs. (46 gm.)
T2489	5	(c)	3 ³ / ₈ " × ⁷ / ₈ " (86 × 22 mm.) 1 ³ / ₂ -ozs. (50 gm.)
T2493	8	(d)	3 ³ / ₈ " × 1" (86 × 25 mm.) 2-ozs. (57 gm.)

NOTE.—These jacks are also supplied as above but without nut and washer, the bush being tapped for screw fixing to escutcheon plate T1688.

Cat. No.	Jack Points
T2494	3
T2495	5
T2496	8

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T1832 Switchboard Plug, Gauge "B."

3-way; red fibre cover. Used with switchboard jacks T1891-4, T1409, T4196-8, T3395 and T3398.



T1832

T1842 Switchboard Plug, Gauge "B."

3-way. As T1832, but with black fibre cover. Grey or cerise covers can be supplied alternatively on demand.

Length 3 1/4" (82 mm.)
 Diameter 7/16" (11 mm.)
 Weight 1-oz. (28 gm.)

T2207 Plug, Gauge "B."

3-way, for use on switchboards operating at 40 volts or over. Long fibre sleeve to prevent operator's fingers touching rear end of barrel. Red, black, cerise or grey sleeves supplied as specified in order.

NOTE.—Thin cords required for narrow orifice.



T2207

T1843 Plug, Gauge "B."

3-way, for testing and trunk-offering on manual switchboards, private branch exchanges, etc. Incorporates spring plunger "tip" and "ring" connections, enabling contact to be established with the corresponding jack springs without breaking an existing connection. For use with jacks T1409, T1891, T1892, and T1894.



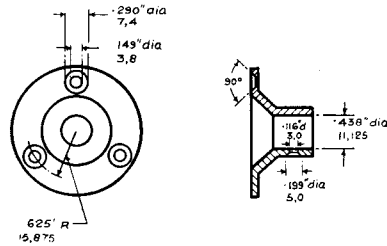
T1843

Length 3 1/4" (82 mm.)
 Diameter 7/16" (11 mm.)
 Weight 1 1/2-oz. (35 gm.)

T1688 Escutcheon Plate for Jack.

Black moulded plastic, countersunk front, drilled for 3-hole fixing to panel. Includes No. 6 BA. screw for fixing to jack. Used with jacks T3390-1-2, T3401-2, and T4196-7-8, for panel mounting.

Diameter 1 11/16" (43 mm.)
 Depth 2 3/32" (20 mm.)
 Weight 1/4-oz. (7 gm.)



T1688

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T1832 Switchboard Plug, Gauge "B."

3-way; red fibre cover. Used with switchboard jacks T1891-4, T1409, T4196-8, T3395 and T3398.



T1832

T1842 Switchboard Plug, Gauge "B."

3-way. As T1832, but with black fibre cover. Grey or cerise covers can be supplied alternatively on demand.

Length	3 1/4" (82 mm.)
Diameter	7/16" (11 mm.)
Weight	1-oz. (28 gm.)

T2207 Plug, Gauge "B."

3-way, for use on switchboards operating at 40 volts or over. Long fibre sleeve to prevent operator's fingers touching rear end of barrel. Red, black, cerise or grey sleeves supplied as specified in order.

NOTE.—Thin cords required for narrow orifice.



T2207

T1843 Plug, Gauge "B."

3-way, for testing and trunk-offering on manual switchboards, private branch exchanges, etc. Incorporates spring plunger "tip" and "ring" connections, enabling contact to be established with the corresponding jack springs without breaking an existing connection. For use with jacks T1409, T1891, T1892, and T1894.



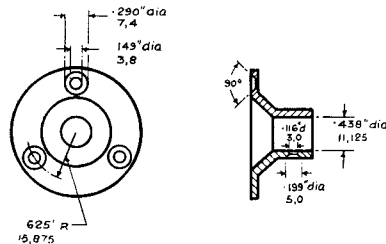
T1843

Length	3 1/4" (82 mm.)
Diameter	7/16" (11 mm.)
Weight	1 1/2-oz. (35 gm.)

T1688 Escutcheon Plate for Jack.

Black moulded plastic, countersunk front, drilled for 3-hole fixing to panel. Includes No. 6 B.A. screw for fixing to jack. Used with jacks T3390-1-2, T3401-2, and T4196-7-8, for panel mounting.

Diameter	1 11/16" (43 mm.)
Depth	2 5/8" (20 mm.)
Weight	1/4-oz. (7 gm.)



T1688

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LIVERPOOL 7
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 Telegraphic Address : Strowger, Liverpool



T3453 Test Plug.

For use with test jacks on Type 32A Strowger selectors, 12-point.

$2\frac{3}{8}'' \times 1\frac{7}{16}'' \times 1\frac{7}{16}''$ (60 × 36 × 36 mm.). $1\frac{7}{8}$ -ozs. (53 gm.).

T3454 Test Plug.

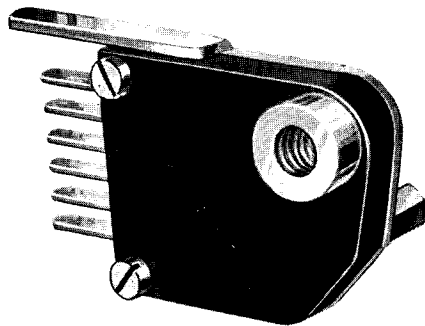
As T3453, but 6-point.

$2\frac{3}{8}'' \times 1\frac{7}{16}'' \times 1\frac{1}{8}''$ (60 × 36 × 29 mm.). $1\frac{5}{8}$ -ozs. (46 gm.).

T3459 Test Plug.

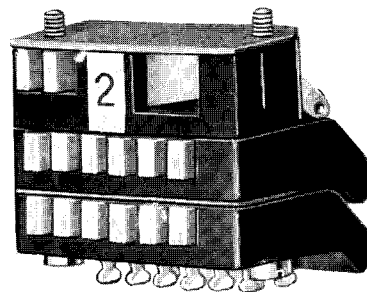
As T3453, but 2-point. This plug is also suitable for uniselector test jack.

$2\frac{3}{16}'' \times 1\frac{1}{4}'' \times 1\frac{1}{8}''$ (56 × 32 × 29 mm.). $1\frac{1}{8}$ -ozs. (32 gm.).



T3454

Strowger 32A Selector Test Jack (Fig. 3)



T3786

T544	32a Selector Test Jack	8 point with lamp springs.
T545	" "	2 point " " "
T546	" "	6 point. " " "
T547	" "	12 point.

T3786 Test Link.

For use with test jacks on Type 32A "Strowger" selectors (Fig. 3); red moulded plastic cap.

$\frac{1}{8}'' \times \frac{9}{32}'' \times \frac{9}{32}''$ (24 × 7 × 7 mm.). $\frac{1}{16}$ -oz. (1.55 gm.).

T3787 Test Link.

As T3786, but green moulded plastic cap.

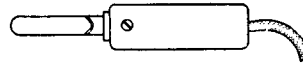
T1828 Test Plug.

1-way, brass, with slit stem; red fibre or ebonite cover. Used on telegraph test-boards and with "U" link sockets.

Length $3\frac{1}{16}''$ (77 mm.)

Diameter $\frac{7}{16}''$ (14 mm.)

Weight 1-oz. (28 gm.)



T1197 Cord and Plugs.

For use with "U" link sockets. Comprises 30-in. single conductor cord with fibre-covered brass plug T1828 at each end.

Length : 36" (912 mm.)

Diameter : $\frac{5}{8}''$ (16 mm.)

Weight : $7\frac{1}{2}$ -ozs. (212 gm.)



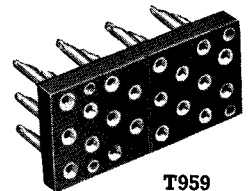
T1197

T1196 Cord and Plugs.

As T1197, but with ebonite-covered plugs for tropical use.

T959 Test Terminal Strip.

For meter testing. Comprises phenol fibre panel with 20 plug socket terminals; engraved "0-9," "0-9," and arranged for mounting on meter plate T2921. Use test plug T978.



T959

Height : $2\frac{7}{16}''$ (62 mm.)

Width : $1\frac{9}{32}''$ (33 mm.)

Depth : 1" (25 mm.)

T4519 Test Terminal Block.

For meter testing. Comprises ebonite panel with 100 pin terminals and 100 terminals for terminating wiring from rectifier. Engraved "0-9," "0-9," and arranged for mounting on meter plate T4694. Use test clip T4522.

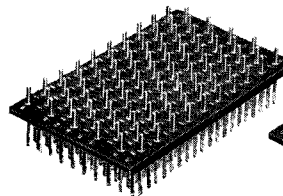
T4520 Test Terminal Block.

As above, but fitted with 100 pin terminals only. For meters not equipped with rectifiers.

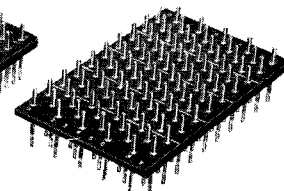
Height : 6" (152 mm.)

Width : $3\frac{1}{32}''$ (91 mm.)

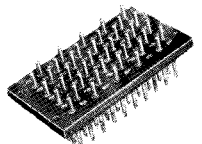
Depth : $1\frac{1}{32}''$ (40 mm.)



T4519



T4520



T4504

T4504 Test Terminal Block. As T4519 but for 40 meters. $4\frac{1}{8}'' \times 2\frac{1}{2}'' \times 1\frac{5}{8}''$ (105 × 64 × 41 mm.). 6 oz. (170 gm.).

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T978 Test Plug.

For meter testing; 1-way. Suitable for use with test terminal strip T959.

Length 1 1/4" (32 mm.)
 Diameter 1/32" (9 mm.)

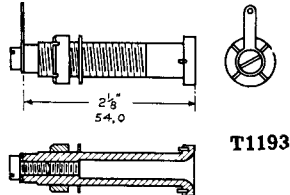
T4522 Test Clip.

For meter testing. Used with test panels T4519 and T4520

T1193 "U" Link Socket.

Brass, electro-tinned; long; with nut, washer and tag.

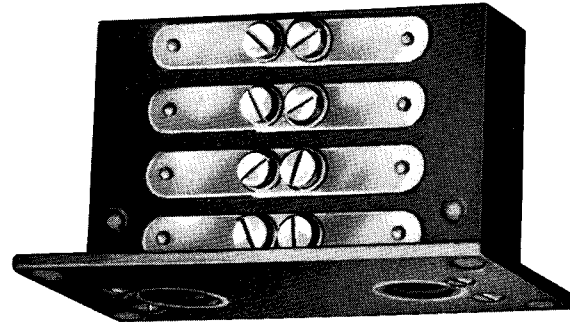
Length 2 1/8" (54 mm.)
 Width 5/8" (16 mm.)
 Depth 5/8" (16 mm.)
 Weight 1 1/4-ozs. (35 gm.)



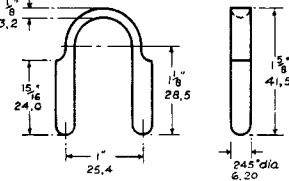
T1192 "U" Link Socket.

Brass, electro-tinned; short; with nut, washer and tag.

Length: 1 1/2" (38 mm.) Depth: 5/8" (16 mm.)
 Width: 5/8" (16 mm.) Weight: 1-oz. (28 gm.)



T4195



T1194 "U" Link.

Hard brass, electro-tinned.

Length 1 5/8" (41 mm.)
 Width 1 1/4" (32 mm.)
 Depth 1/4" (6.4 mm.)
 Weight 5/8-oz. (18 gm.)

T653 Instrument Jack.

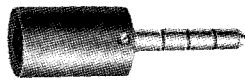
4-way single. For connecting operator's telephone set to switchboard with 4-way plug T656. Nickel-plated contact springs on ebonite.

T656 Plug.

For operator's instruments. Four nickel-plated brass pins; ebonite body and cord grip; screw terminals. Used with jack T653.

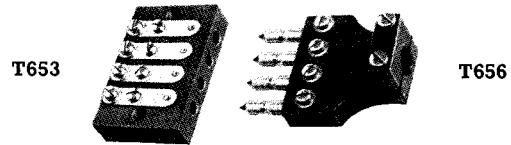
T678 Plug.

4-way cylindrical. As fitted to operator's telephone set. Ebonite cover.



T678

Length 3 7/8" (98 mm.)
 Diameter 1 1/8" (28 mm.)
 Weight 4-ozs. (113 gm.)



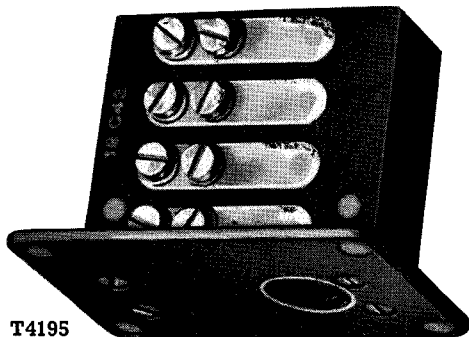
T653

T656

T4195 Instrument Jack.

Single. For connecting operator's telephone set to switchboard. Accommodates one 4-way cylindrical plug T678. Nickel-plated contact springs on ebonite; black phenol fibre front plate.

Length : 2 5/8" (66 mm.)
 Depth : 1 7/8" (47 mm.)
 Width : 1 3/4" (45 mm.)
 Weight : 3-ozs. (85 gm.)



T4195

	Length :	Width :	Depth :	Weight :
T653	2 2/16" (65 mm.)	1 3/4" (44 mm.)	1 5/16" (24 mm.)	1 1/2-ozs. (42 gm.)
T656	2 1/4" (57.14 mm.)	1 1/2" (12.7 mm.)	1 1/4" (31.7 mm.)	3-ozs. (85 gm.)

T3455 Plug.

4-way. For testing automatic telephone exchange equipment. Stainless steel springs; ebonite separators; metal case. Fitted with nickel-plated brass guide for location in test jack.

T3456 Plug. 6-way. As T3455.

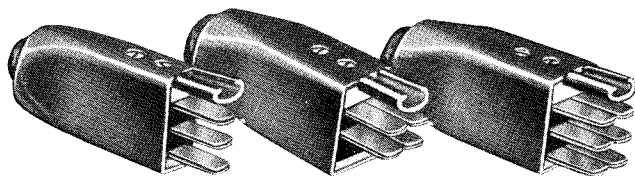
T3457 Plug. 8-way. As T3455.

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T3456

T3457

T3458

T3458 Plug. 12-way. As T3455.

Length	3 1/8" (79 mm.)
Width	1 3/8" (34 mm.)
Depth	1 1/8" (28 mm.)
Weight	6-ozs. (178 gm.)

Selector Plug and Shelf Jacks for "Strowger" Selectors.

A "selector plug" is a multi-blade male connector or plug fitted to a "Strowger" selector or relay group to terminate all wires from that selector or relay group. A "shelf jack" is a multi-blade female connector or jack fitted at each selector position on a "Strowger" selector shelf to terminate wires at that position.

The act of placing a selector or relay group in position on a shelf aligns the blades of selector and shelf jacks, and they slide into contact to establish at once all the connections required between the selector or relay group and its shelf position. The action is illustrated in Figs. 4 and 5.

Length	4 1/4" (108 mm.)
Width	5/8" (16 mm.)
Depth	1 1/4" (32 mm.)
Weight	2-ozs. (57 gm.)

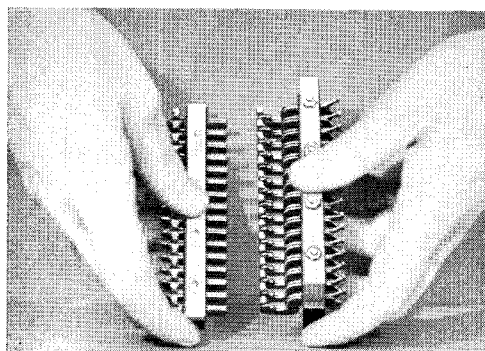


Fig. 4—Disconnected 32-point Plug and Jack.

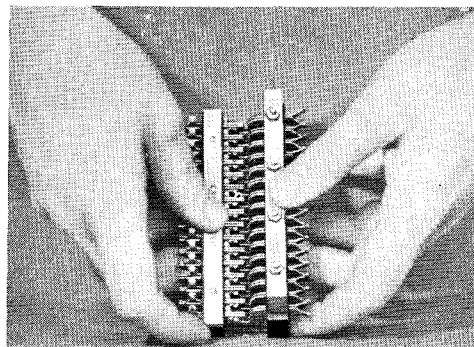


Fig. 5—Connected 32-point Plug and Jack.

T4183 Selector Plug.

16-point. Fitted to pre-32A type "Strowger" selectors and relay groups for establishing connections with a jack fitted to shelf and on which the permanent wiring terminates. Comprising silver plated nickel-silver contact springs mounted in slotted ebonite block. Zinc-plated clamp-plate; phenol-fibre insulations. Used with shelf jacks T4186-8.

T4184 Selector Plug.

24-point. As T4183.

T4185 Selector Plug.

32-point. As T4183.

T4186 Shelf Jack.

16-point. Fitted to pressed type shelves for establishing connection with a selector plug; fitted to the "Strowger" selectors and relay groups. The permanent wiring of the racks terminates on these jacks, enabling equipment to be removed for inspection, or interchanged with maximum facility.

T4187 Shelf Jack.

24-point. As T4186.

T4188 Shelf Jack.

32-point. As T4186.

	Length :	Width :	Depth :	Weight :
T4186	2 1/4" (57 mm.)	1 1/4" (32 mm.)	1 1/2" (38 mm.)	2-ozs. (57 gm.)
T4187	4 1/4" (108 mm.)	1 1/4" (32 mm.)	1 1/2" (38 mm.)	3 1/2-ozs. (92 gm.)
T4188	4 1/4" (108 mm.)	1 1/4" (32 mm.)	1 1/2" (38 mm.)	3 1/2-ozs. (92 gm.)

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Selector Plug for first position 32A Type "Strowger" Selector.

Used with shelf jacks T4507-21.

T3685. 16-point.

$4\frac{1}{2}" \times 1\frac{9}{16}" \times 1"$ (114 × 40 × 25 mm.). 4 $\frac{1}{8}$ -ozs. (117 gm.).

T3689. 32-point.

$4\frac{1}{2}" \times 1\frac{9}{16}" \times 1"$ (114 × 40 × 25 mm.). 4 $\frac{3}{4}$ -ozs. (135 gm.).

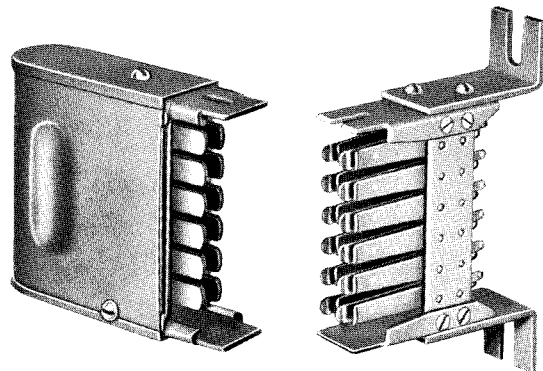
Shelf Jacks for 32A Type "Strowger" Selectors and Relay Group Shelves.

T4507. 16-point.

$2\frac{1}{4}" \times \frac{7}{8}" \times 1\frac{1}{2}"$ (57 × 21 × 38 mm.). 1 $\frac{1}{2}$ -ozs. (43 gm.).

T4521. 32-point.

$4\frac{3}{4}" \times \frac{7}{8}" \times 1\frac{1}{2}"$ (109 × 21 × 38 mm.). 2 $\frac{7}{8}$ -ozs. (82 gm.).



T3462

T3463

T3462 Test Plug.

24-point, nickel-plated cover. Used with test jacks T3463 and T4189.

$3\frac{1}{2}" \times 1\frac{1}{4}" \times 3\frac{1}{16}"$ (89 × 32 × 78 mm.). 7 $\frac{1}{2}$ -ozs. (212 gm.).

T3463 Test Jack.

24-point. 10 sets of 2 break springs, and 2 sets of 2 open circuit springs. Dull nickel-plated frame with zinc-plated brackets. Used with test plug T3462.

$2\frac{3}{4}" \times \frac{1}{8}" \times 4\frac{7}{16}"$ (70 × 24 × 113 mm.). 6-ozs. (170 gm.).

T4189 Test Jack.

As T3463 but with 12 sets of 2 break springs used with test plug T3462.

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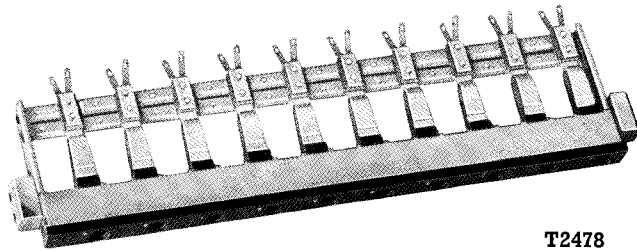


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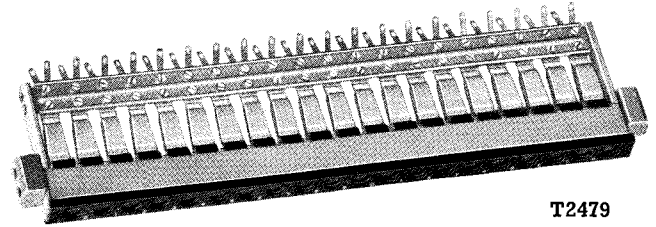


LAMP JACK STRIPS.

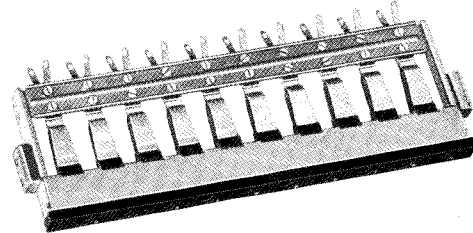
Nickel-silver springs with ebonite insulation; mounted on coslettized steel frame with end blocks for panel fixing, and white ceramic lamp shields, blacked outside. Front strip drilled and tapped for designation strip.



T2478



T2479



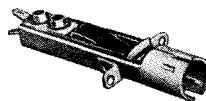
T2481

DIMENSIONS :

Catalogue No.	No. of Jacks per Strip	Front Strip Numbering	Front Strip	Suitable Label Holder	Overall	Approx. Weight
T2477	5	None	$10\frac{5}{16}'' \times \frac{1}{2}''$ (262 × 12.7 mm.)	T2499	$11\frac{1}{8}'' \times 3\frac{1}{8}'' \times \frac{1}{2}''$ (261 × 80 × 13 mm.)	$10\frac{1}{8}$ -ozs. (287 gm.)
T2478	10	0 to 9	$10\frac{5}{16}'' \times \frac{1}{2}''$ (262 × 12.7 mm.)	T2499	$11\frac{1}{8}'' \times 3\frac{1}{8}'' \times \frac{1}{2}''$ (261 × 80 × 13 mm.)	11-ozs. (313 gm.)
T2479	20	0 to 9, 0 to 9 and Spotted	$10\frac{5}{16}'' \times \frac{1}{2}''$ (262 × 12.7 mm.)	T2499	$11\frac{1}{8}'' \times 3\frac{1}{8}'' \times \frac{1}{2}''$ (261 × 80 × 13 mm.)	$12\frac{3}{4}$ -ozs. (362 gm.)
T2481	10	0 to 9	$7\frac{3}{4}'' \times \frac{7}{16}''$ (196 × 11 mm.)	T2504	$8\frac{1}{8}'' \times 3\frac{1}{8}'' \times \frac{7}{16}''$ (206 × 80 × 11 mm.)	8-ozs. (227 gm.)

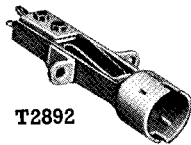
T1435 Lamp Jack, Keyboard.

Zinc-plated steel frame, with fixing lugs for mounting to $\frac{7}{8}''$ (22 mm.) thick panels; nickel-silver springs; grey fibre lamp protector. Accommodates lamps T1440 to T1442, T2861, T2858 and T2864, and lamp caps T1449, T3207, T3201, T1450, T3204 and T3205.



T1435

Length .. $2\frac{7}{8}''$ (73 mm.) Depth .. $\frac{1}{4}''$ (13 mm.)
Width .. $1\frac{1}{16}''$ (27 mm.) Weight .. $\frac{1}{4}$ -oz. (21 gm.)



T2892

T2892 Lamp Jack, Pilot.

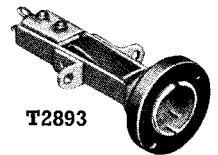
Zinc-plated steel frame; nickel-silver springs; grey fibre lamp protector. Fixing lugs are adjustable to three positions for different panel thicknesses: (a) $\frac{7}{8}''$ (22 mm.); (b) $1\frac{1}{4}''$ (32 mm.); (c) $1\frac{3}{4}''$ (45 mm.).

Suitable for lamps T2865, T2862 and T1443, and lamp caps T3200, T3206, T1467 and T3209 to T3211, etc.

Overall dimensions and weight } $2\frac{7}{8}'' \times 1\frac{1}{2}'' \times 1\frac{1}{8}''$
(73 × 32 × 17 mm.) $\frac{3}{4}$ -oz. (21 gm.)

T2893 Lamp Jack, Pilot.

Zinc-plated steel frame with fixing lugs at $1\frac{1}{4}''$ (32 mm.) from top of barrel, which is threaded and fitted with clamping ring for panel fixing. Nickel-silver springs; grey fibre lamp protector.



T2893

Suitable for lamps T2865, T2862 and T1443, and lamp caps T3200, T3206, T1467 and T3209 to T3211, etc.

Overall dimensions and weight } $2\frac{7}{8}'' \times 1\frac{3}{32}'' \times 1''$
(73 × 33 × 25 mm.) 2-ozs. (56 gm.)



T2874

T2874 Lamp Socket.

Porcelain base; brass screw socket. Accommodates lamps T2866 to T2870.

Diameter : $1\frac{3}{8}''$ (34 mm.) Depth : $\frac{7}{8}''$ (22 mm.) Weight : 1-oz. (28 gm.)

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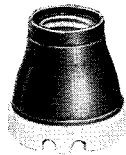


LAMPS, LAMP JACKS, SOCKETS and CAPS LABELS and HOLDERS, DESIGNATION STRIPS

T1445 Lamp Socket.

Porcelain base ; brass screw socket ; moulded bakelite cover. Accommodates T1444 resistance lamp.

Diameter ... 2" (50 mm.)
Depth ... 2" (50 mm.)
Weight ... 3-oz. (85 gm.)

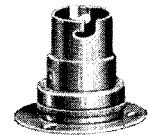


T1445

T2877 Lamp Holder.

Miniature bayonet type. For lamps, T3641, etc.

Diameter ... 1 1/32" (37 mm.)
Depth ... 1 1/8" (28 mm.)
Weight ... 1-oz. (28 gm.)



T2877

LAMP CAPS.

Brass body with opal or coloured lens which can be inscribed with black symbols on opal lenses, or white symbols on coloured lenses. Particulars and prices of standard symbols on request.

T1448



T3209

T1450



Catalogue No.	Lens Colour	Suitable for Jacks	Dimensions Length Diameter	Approx. Weight
T1448	Opal	Strips T2477, T2478, T2479 & T2481	1/2" x 3/8" (12 x 9.5 mm.)	.05-oz. (1.4 gm.)
T1453	Red			
T3202	Green			
T1449	Opal	Individual T1435 (Keyboard)	1/2" x 1 1/32" (12 x 10 mm.)	.075-oz. (2.1 gm.)
T3201	Red			
T3207	Green			
*T1450	Opal			
*T3205	Red	Individual T2892 (Pilot), T2893	1 1/32" x 1 1/32" (13 x 10 mm.)	.1-oz. (2.8 gm.)
*T3204	Green			
T1467	Opal			
T3200	Red	Individual T2892 (Pilot), T2893	3/4" x 9/16" (19 x 14 mm.)	.175-oz. (5 gm.)
T3206	Green			
*T3209	Opal			
*T3210	Red			
*T3211	Green		3/4" x 9/16" (19 x 14 mm.)	.23-oz. (6.6 gm.)

* These lamp caps are fitted with a metal guard over the lens as illustrated.

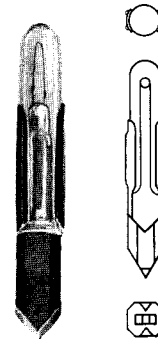
Lamps, Switchboard, Supervisory and Pilot.

Clear glass ; brass terminal plates. Terminal end coloured to indicate type. Conform to B.P.O. Spec. D1524 and D1624 for metal and carbon filaments respectively.

Supervisory	Length : 1 3/8" (45 mm.)	Diameter : 3/32" (7 mm.)	Weight approx. : .08 oz. (2.27 gm.)
Pilot	1 1/2" (49 mm.)	1/2" (13 mm.)	.16 oz. (4.34 gm.)

Cat. No.	Code No.	Filament	Volts.	Amps.	Terminal End Colour	Suitable Jacks	
Supervisory types							
T1441	L94000	Metal	4	.250	Green	Strips :— T2481 T2477 T2478 T2479 Individual : T1435	
T1440	L94001	Carbon	12	.117	Red		
T1442	L94002	Metal	24	.100	Yellow	Individual :— T2892, T2893	
T2861	L94003	Carbon	36	.075	Black		
T2858	L94004	Carbon	40	.068	Blue		
T2864	L94005	Carbon	50	.107	White		
T536	L94007	Metal	6	.040	Grey		
T538	L94012	Metal	17	.045	Orange		
T540	L94014	Metal	12	.100	Red-Yellow mottle		
Pilot Type							
T1443	L94021	Metal	24	.100	—		Individual :— T2892, T2893
B.P.O.	Spec. D1626						

T 1441



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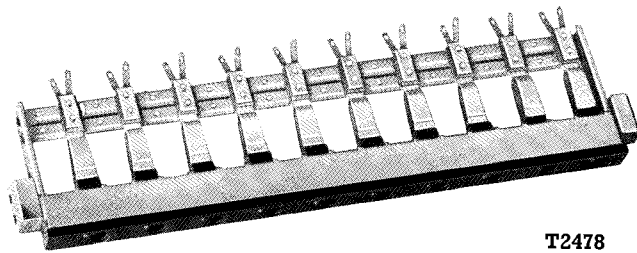


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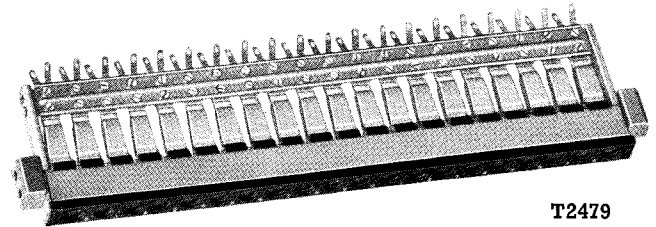


LAMP JACK STRIPS.

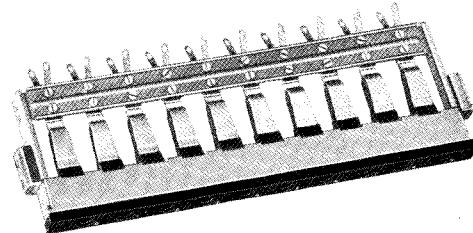
Nickel-silver springs with ebonite insulation; mounted on coslettized steel frame with end blocks for panel fixing, and white ceramic lamp shields, blacked outside. Front strip drilled and tapped for designation strip.



T2478



T2479



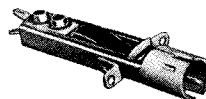
T2481

DIMENSIONS :

Catalogue No.	No. of Jacks per Strip	Front Strip Numbering	Front Strip	Suitable Label Holder	Overall	Approx. Weight
T2477	5	None	10 $\frac{5}{16}$ " \times $\frac{1}{2}$ " (262 \times 12.7 mm.)	T2499	11 $\frac{1}{8}$ " \times 3 $\frac{1}{8}$ " \times $\frac{1}{2}$ " (261 \times 80 \times 13 mm.)	10 $\frac{1}{8}$ -ozs. (287 gm.)
T2478	10	0 to 9	10 $\frac{5}{16}$ " \times $\frac{1}{2}$ " (262 \times 12.7 mm.)	T2499	11 $\frac{1}{8}$ " \times 3 $\frac{1}{8}$ " \times $\frac{1}{2}$ " (261 \times 80 \times 13 mm.)	11-ozs. (313 gm.)
T2479	20	0 to 9, 0 to 9 and Spotted	10 $\frac{5}{16}$ " \times $\frac{1}{2}$ " (262 \times 12.7 mm.)	T2499	11 $\frac{1}{8}$ " \times 3 $\frac{1}{8}$ " \times $\frac{1}{2}$ " (261 \times 80 \times 13 mm.)	12 $\frac{3}{8}$ -ozs. (362 gm.)
T2481	10	0 to 9	7 $\frac{3}{32}$ " \times $\frac{7}{16}$ " (196 \times 11 mm.)	T2504	8 $\frac{1}{8}$ " \times 3 $\frac{1}{8}$ " \times $\frac{7}{16}$ " (206 \times 80 \times 11 mm.)	8-ozs. (227 gm.)

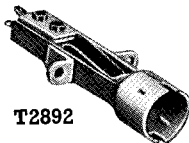
T1435 Lamp Jack, Keyboard.

Zinc-plated steel frame, with fixing lugs for mounting to $\frac{7}{8}$ " (22 mm.) thick panels; nickel-silver springs; grey fibre lamp protector. Accommodates lamps T1440 to T1442, T2861, T2858 and T2864, and lamp caps T1449, T3207, T3201, T1450, T3204 and T3205.



T1435

Length .. 2 $\frac{7}{8}$ " (73 mm.) Depth .. 1" (25 mm.)
Width .. 1 $\frac{1}{16}$ " (27 mm.) Weight .. $\frac{3}{4}$ -oz. (21 gm.)



T2892

T2892 Lamp Jack, Pilot.

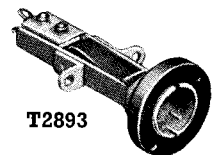
Zinc-plated steel frame; nickel-silver springs; grey fibre lamp protector. Fixing lugs are adjustable to three positions for different panel thicknesses: (a) $\frac{7}{8}$ " (22 mm.); (b) 1 $\frac{1}{4}$ " (32 mm.); (c) 1 $\frac{3}{4}$ " (45 mm.).

Suitable for lamps T2865, T2862 and T1443, and lamp caps T3200, T3206, T1467 and T3209 to T3211, etc.

Overall dimensions and weight } 2 $\frac{7}{8}$ " \times 1 $\frac{1}{4}$ " \times 1 $\frac{1}{8}$ "
(73 \times 32 \times 17 mm.) $\frac{3}{4}$ -oz. (21 gm.)

T2893 Lamp Jack, Pilot.

Zinc-plated steel frame with fixing lugs at 1 $\frac{1}{4}$ " (32 mm.) from top of barrel, which is threaded and fitted with clamping ring for panel fixing. Nickel-silver springs; grey fibre lamp protector.



T2893

Suitable for lamps T2865, T2862 and T1443, and lamp caps T3200, T3206, T1467 and T3209 to T3211, etc.

Overall dimensions and weight } 2 $\frac{7}{8}$ " \times 1 $\frac{9}{32}$ " \times 1"
(73 \times 33 \times 25 mm.) 2-ozs. (56 gm.)



T2874

T2874 Lamp Socket.

Porcelain base; brass screw socket. Accommodates lamps T2866 to T2870.

Overall dimensions and weight } 1 $\frac{3}{8}$ " (34 mm.) Diameter : Depth : Weight :
1 $\frac{3}{8}$ " (34 mm.) $\frac{7}{8}$ " (22 mm.) 1-oz. (28 gm.)

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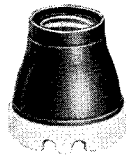


LAMPS, LAMP JACKS, SOCKETS and CAPS LABELS and HOLDERS, DESIGNATION STRIPS

T1445 Lamp Socket.

Porcelain base ; brass screw socket ; moulded bakelite cover. Accommodates T1444 resistance lamp.

Diameter ... 2" (50 mm.)
Depth ... 2" (50 mm.)
Weight ... 3-oz. (85 gm.)

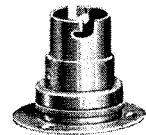


T1445

T2877 Lamp Holder.

Miniature bayonet type. For lamps, T3641, etc.

Diameter ... 1 1/32" (37 mm.)
Depth ... 1 1/8" (28 mm.)
Weight ... 1-oz. (28 gm.)



T2877

LAMP CAPS.

Brass body with opal or coloured lens which can be inscribed with black symbols on opal lenses, or white symbols on coloured lenses. Particulars and prices of standard symbols on request.

T1448



T3209

T1450



Catalogue No.	Lens Colour	Suitable for Jacks	Dimensions Length Diameter	Approx. Weight
T1448 T1453 T3202	Opal Red Green	Strips T2477, T2478, T2479 & T2481	1/2" x 3/8" (12 x 9.5 mm.)	.05-oz. (1.4 gm.)
T1449 T3201 T3207 *T1450 *T3205 *T3204	Opal Red Green Opal Red Green	Individual T1435 (Keyboard)	1/2" x 1/32" (12 x 10 mm.) 1 1/2" x 1 1/32" (13 x 10 mm.)	.075-oz. (2.1 gm.) .1-oz. (2.8 gm.)
T1467 T3200 T3206 *T3209 *T3210 *T3211	Opal Red Green Opal Red Green	Individual T2892 (Pilot), T2893	3/4" x 9/16" (19 x 14 mm.) 3/4" x 9/16" (19 x 14 mm.)	.175-oz. (5 gm.) .23-oz. (6.6 gm.)

* These lamp caps are fitted with a metal guard over the lens as illustrated.

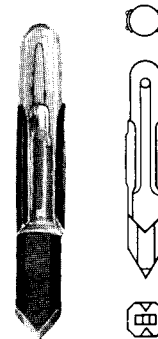
Lamps, Switchboard, Supervisory and Pilot.

Clear glass ; brass terminal plates. Terminal end coloured to indicate type. Conform to B.P.O. Spec. D1524 and D1624 for metal and carbon filaments respectively.

Supervisory Length : 1 3/4" (45 mm.) Diameter : 3/32" (7 mm.) Weight approx. : .08 oz. (2.27 gm.)
Pilot Length : 1 3/2" (49 mm.) Diameter : 1/2" (13 mm.) Weight approx. : .16 oz. (4.34 gm.)

Cat. No.	Code No.	Filament	Volts.	Amps.	Terminal End Colour	Suitable Jacks	
Supervisory types							
T1441	L94000	Metal	4	.250	Green	Strips :— T2481 T2477 T2478 T2479 Individual : T1435	
T1440	L94001	Carbon	12	.117	Red		
T1442	L94002	Metal	24	.100	Yellow	Individual :— T2892, T2893	
T2861	L94003	Carbon	36	.075	Black		
T2858	L94004	Carbon	40	.068	Blue		
T2864	L94005	Carbon	50	.107	White		
T536	L94007	Metal	6	.040	Grey		
T538	L94012	Metal	17	.045	Orange		
T540	L94014	Metal	12	.100	Red-Yellow mottle		
Pilot Type							
T1443	L94021	Metal	24	.100	—		
B.P.O.	Spec. D1626						

T 1441



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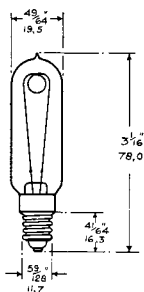
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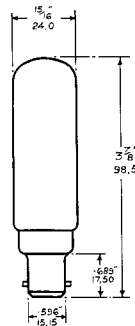
Supervisory Lamp.

Screw cap; rating 55 volts; 8 candle-power. Used with lamp socket T2874.

Cat. No.	Colour	Dimensions		Weight
		Length	Diam.	
T2867	White	3 ¹ / ₁₆ " × ¹ / ₈ " (78 × 19.5 mm.)		1-oz. (28 gm.)
T2868	Red			
T2869	Blue			
T2870	Green			



T2867



T3641

Supervisory Lamps.

Small bayonet cap type. Used with lamp-holder T2877.

Cat. No.	Volts	Watts	Colour	Weight
T3641	50	20	Red	1-oz. (28 gm.)
T3642	50	20	White	
T3643	50	20	Green	
T3644	50	20	Blue	
T3645	50	20	White lacqd.	
T3646	100	20	White	
T3647	100	20	Yellow	
T3648	100	20	Blue	
T3649	100	20	Green	
T3658	100	20	Red	
T3659	100	20	White lacqd.	

T3656.

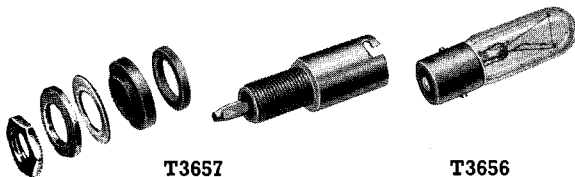
Lamp 32.50 volt; .1 amp.; single bayonet cap. Used with remote control equipment. Suitable socket T3657.

1 ¹¹/₃₂" × ¹³/₃₂" (34 mm.) × (10 mm.) 1/8-oz. (3.5 gm.)

T3657.

Socket single bayonet contact, complete with bush, terminal and fixing nut.

1 ¹³/₃₂" × ⁷/₁₆" (36 mm.) × (11 mm.) 3/8-oz. (10.7 gm.)



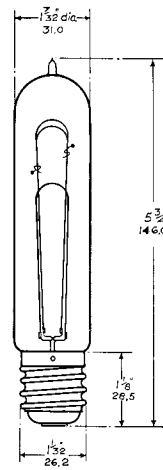
T3657

T3656

T1444 Resistance Lamp.

Clear bulb; carbon filament; 110 volts; 660 ohms; screw cap. Used with lamp socket T1445.

Length: 5 ³/₄" (146 mm.)
Diameter: 1 ⁷/₃₂" (31 mm.)
Weight: 1-oz. (28 gm.)

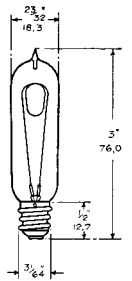


T1444

T2866 Resistance Lamp.

Clear bulb; carbon filament; 110 volts; 660 ohms; screw cap. Used with lamp socket T2874.

Length: 3" (76 mm.)
Diameter: ²³/₃₂" (18.3 mm.)
Weight: 1-oz. (28 gm.)



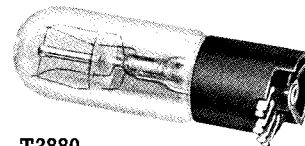
T2866

T2880 Resistor, Ballast (Barretter), 100 m.a. Type.

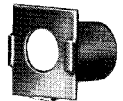
Used in transmitter battery feed circuits to regulate current automatically in accordance with loop resistance. An average resistance characteristic curve of the resistor rises steeply from 110 to 270 ohms with increase of current flow from 80 to 100 milliamperes. Fits in mounting place of one 3000 type relay.

Approx. dimensions and weight:

Length: 3 ³/₈" (85.7 mm.) Diameter: 1" (25 mm.) Weight: 7/8-oz. (24.8 gm.)



T2880



T3214 Lamp Cap and Label Holder.

T3214

T3215 Lamp Cap and Label Holder (with label).

Combined lamp cap and label holder for lamp jack strips. T2477, T2478, T2479, T2481, for use where space is restricted in multiple. Plain or with label marked to service requirements. Brass, black finish.

Length ... 1 ¹/₂" (12.7 mm.) Depth ... ¹³/₃₂" (10.32 mm.)
Width ... ³¹/₆₄" (12.3 mm.) Weight05-oz. (1.4 gm.)

T2135 Label Holder.

Brass, with riveted pin. Fits in front strip recesses of jack strips T2482, T2484 and T2486. Dull black finish. Accommodates label T3305.



T2135

Length ... 3/8" (9 mm.)
Depth ... 1/32" (8 mm.)
Width ... 1/2" (13 mm.)
Weight03-oz. (0.89 gm.)

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LAMPS, LAMP JACKS, SOCKETS and CAPS
LABELS and HOLDERS, DESIGNATION STRIPS

T2136 Label Holder.

As T2135, but for jack strip T1895. Accommodates label T3306.

Length : $\frac{1}{2}$ " (6 mm.) Width : $\frac{3}{8}$ " (9 mm.) Depth : $\frac{1}{32}$ " (8 mm.) Weight : .015-oz. (0.45 gm.)

T3633 Label Holder (Uniselector).

Steel black finish, for Bristol board label $\frac{1}{2}$ " \times $\frac{3}{4}$ " (12.7 \times 10.7 mm.)

Height : $\frac{3}{16}$ " (17 mm.) Width : $\frac{9}{16}$ " (14 mm.) Depth : $\frac{1}{16}$ " (21 mm.) Weight : .07-oz. (2 gm.)

T3634 Label Holder (Final Selector).

Nickel silver, for label T3297.

Height : $\frac{3}{16}$ " (17 mm.) Width : $\frac{9}{16}$ " (14 mm.) Depth : $\frac{7}{16}$ " (11 mm.) Weight : .055-oz. (1.5 gm.)

T3635 Label Holder (Selector).

Nickel silver, for label T3295.

Height : $\frac{3}{16}$ " (17 mm.) Width : $1\frac{1}{16}$ " (27 mm.) Depth : $\frac{1}{2}$ " (13 mm.) Weight : .095-oz. (2.6 gm.)

T3636 Label Holder (Uniselector).

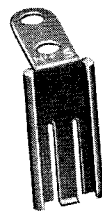
Nickel silver, for label T3297.

Height : $\frac{5}{16}$ " (8 mm.) Width : $\frac{1}{2}$ " (13 mm.) Depth : $\frac{1}{32}$ " (15 mm.) Weight : .05-oz. (1.4 gm.)

T3637 Label Holder (Relay Set).

Nickel silver, for label T3295.

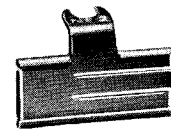
Height : $1\frac{1}{16}$ " (27 mm.) Width : $\frac{1}{2}$ " (13 mm.) Depth : $\frac{5}{8}$ " (16 mm.) Weight : .09-oz. (2.5 gm.)



T3638



T3637



T3635



T3295



T3636



T3633



T3624



T3297

T3638 Label Holder (Relay Set).

Nickel silver, for label T3295.

Height : $1\frac{1}{16}$ " (27 mm.) Width : $\frac{1}{2}$ " (13 mm.) Depth : $\frac{1}{16}$ " (21 mm.) Weight : 0.1-oz. (2.7 gm.)

LABELS. White cellastoid with machined edges, not engraved.

Catalogue No.	Fig.	For	Dimensions					
			Length		Width		Depth	
T3295	A	Designation Strip T1901	1"	25.4 mm.	$\frac{7}{16}$ "	11.1 mm.	$\frac{5}{64}$ "	2 mm.
T3296	B	" " T1901	1"	25.4 mm.	$\frac{7}{16}$ "	11.1 mm.	$\frac{5}{64}$ "	2 mm.
T3297	A	" " T1901	1"	12.7 mm.	$\frac{7}{16}$ "	11.1 mm.	$\frac{5}{64}$ "	2 mm.
T3298	B	" " T1901	$1\frac{1}{2}$ "	12.7 mm.	$\frac{7}{16}$ "	11.1 mm.	$\frac{5}{64}$ "	2 mm.
T3299	A	" " T1768	$1\frac{1}{2}$ "	7.5 mm.	$\frac{7}{16}$ "	18.2 mm.	$\frac{5}{64}$ "	2 mm.
T3300	B	" " T1768	$1\frac{1}{2}$ "	7.5 mm.	$\frac{7}{16}$ "	18.2 mm.	$\frac{5}{64}$ "	2 mm.
T3301	A	" " T1902	$1\frac{1}{2}$ "	7.5 mm.	$\frac{7}{16}$ "	9.5 mm.	$\frac{5}{64}$ "	2 mm.
T3302	B	" " T1902	$1\frac{1}{2}$ "	7.5 mm.	$\frac{7}{16}$ "	9.5 mm.	$\frac{5}{64}$ "	2 mm.
T3303	A	" Strips T1769/70	1"	25.4 mm.	$\frac{1}{16}$ "	12.7 mm.	$\frac{3}{64}$ "	1.2 mm.
T3304	A	" " T1769/70	$1\frac{1}{2}$ "	19.0 mm.	$\frac{1}{16}$ "	12.7 mm.	$\frac{3}{64}$ "	1.2 mm.
T3305	A	Label Holders T2135/6	$1\frac{1}{2}$ "	9.5 mm.	$\frac{1}{16}$ "	11.0 mm.	$\frac{1}{32}$ "	0.8 mm.
T3306	A	" " T2135/6	$1\frac{1}{2}$ "	6.3 mm.	$\frac{1}{16}$ "	8.0 mm.	$\frac{1}{32}$ "	0.8 mm.

Other lengths can be supplied to order.

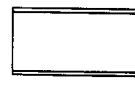
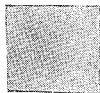


Fig. A

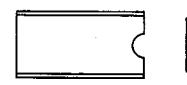


Fig. B

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T3515 Chart Holder.

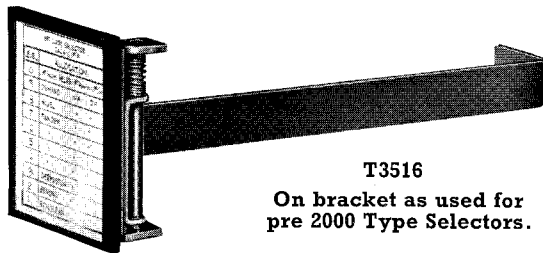
7" x 1 3/4" (178 x 44 mm.). Used for unselector bank outlets, junction hunters, secondary finders, etc.

T3515



T3516 Chart Holder.

3 1/2" x 2 3/4" (89 x 70 mm.). Used for group selectors, level allocations.



T3516

On bracket as used for pre 2000 Type Selectors.

T3517 Chart Holder.

13" x 8" (330 x 203 mm.). Used for bank gradings, group and final selectors, etc.

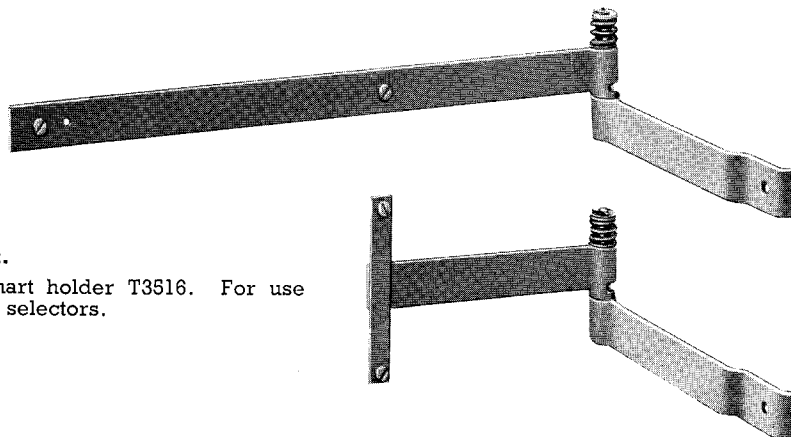
The above chart holders may be mounted direct on the end of the rack framework, but suitable brackets for mounting chart holders in front of the selectors are listed below. These brackets have hinged ends so that the chart holders may be turned through 90 deg. to give free access to selectors.

T3518 Bracket.

Suitable for chart holders T3515 and T3517. One required for T3515, and two required for T3517. For use with 2000 type selectors.

T3519 Bracket.

Suitable for chart holder T3516. For use with 2000 type selectors.

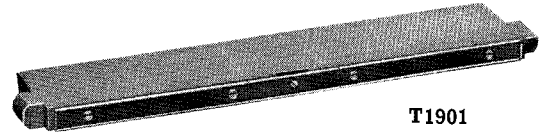


T3518

T3519

T1901 Designation Strip.

For No. 10 type switchboards. Comprising black finished metal label holder mounted on ebonised wood strip. Accommodates 8 labels T3295, 2 labels T3296, or 18 labels T3297 and 2 labels T3298. For jack field mounting to indicate jacks assigned to special services.

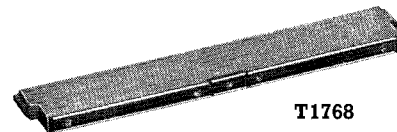


T1901

Length ... 10 5/8" (262 mm.) Depth ... 1/2" (12 mm.)
Width ... 1 1/8" (28 mm.) Weight ... 2 1/2-ozs. (70 gm.)

T1768 Designation Strip.

Similar to T1901, but for No. 1 type switchboards. Accommodates 8 labels T3299 and 2 labels T3300, or 18 labels T3301 and 2 labels T3302.



T1768

Length ... 7 3/4" (196 mm.) Depth ... 3/8" (9 mm.)
Width ... 1 3/8" (35 mm.) Weight ... 1 1/2-ozs. (42 gm.)

T1902 Designation Strip.

As T1768, but accommodates 18 labels T3301 and 2 labels T3302.

Length ... 7 3/4" (196 mm.) Depth ... 3/8" (9 mm.)
Width ... 1 3/8" (35 mm.) Weight ... 1 1/2-ozs. (42 gm.)

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T1769

T1769 Designation Strip.

Comprising black finished brass strip, grooved for labels T3303. For key-shelf mounting to indicate plugs assigned to special services.

Length ... $18\frac{11}{16}$ " (474 mm.) Depth ... $\frac{1}{8}$ " (3 mm.)
Width ... $\frac{5}{8}$ " (15 mm.) Weight ... 5-ozs. (140 gm.)

T1770 Designation Strip.

As T1769, but $19\frac{7}{8}$ " (494 mm.) long.
Other lengths can be supplied to meet requirements.

T2499 Designation Strip.

For "free line signal." Suitable for fitting to $10\frac{5}{16}$ " (26.2 mm.) lamp jack strips T2479 etc.

Used with labels T2497 and T2505 and cover T2506. Brass, dull black finish.

Length $10\cdot076$ " (256 mm.) Depth $\cdot125$ " (3.18 mm.)
Width $\cdot495$ " (12.6 mm.) Weight 1-oz. (28 gm.)

T2497 Label.

Perforated paper, for "free line signal." Suitable for designation strip T2499 with label T2505 and cover T2506.

Length 10" (254 mm.) Thickness $\cdot030$ " ($\cdot762$ mm.)
Width $\cdot425$ " (10.8 mm.)

T2505 Label.

Plain paper, for "free line signal." Suitable for service marking. Used with designation strip T2499, perforated label T2497 and cover T2506.

Length 10" (254 mm.) Thickness $\cdot010$ " ($\cdot254$ mm.)
Width $\cdot425$ " (10.8 mm.)

T2506 Label Cover.

Transparent celastoid strip for covering labels T2497 and T2505. Used with designation strip T2499.

Length 10" (254 mm.) Thickness $\cdot016$ " ($\cdot407$ mm.)
Width $\cdot425$ " (10.8 mm.)



T2499



T2497



T2505



T2506

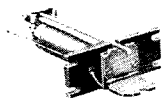
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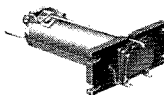
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T1797

T1797 Indicator.

Single coil, unmounted, 100 ohms. Used as line indicator on magneto switchboards. Complete with alarm contact, actuated by falling shutter, front plate, shutter and fixing screws. Front plate enamelled white. Suitable mounting plate T2608, for 10 indicators.



T1798

T1798 Indicator.

Tubular pattern ; as T1797, but 600 ohms. Coil enclosed in soft iron sheath. Front plate enamelled red. Used as clearing indicator on magneto switchboards. Suitable mounting plate T2609, for 10 indicators.

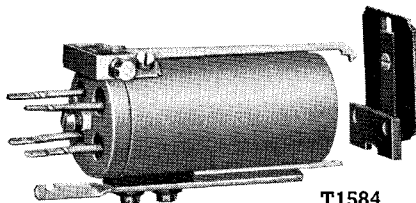
T1799 Indicator.

Tubular pattern ; as T1798, but 1,000 ohms.

	T1797	T1798 and T1799
Length	3 3/4" (95 mm.)	3 3/4" (95 mm.)
Width	1" (25 mm.)	1 1/8" (27 mm.)
Depth	1 5/8" (24 mm.)	1" (25 mm.)
Weight	4-ozs. (113 gm.)	6-ozs. (170 gm.)

T1584 Indicator.

Tubular pattern, with drop shutter. Used as line or clearing indicator on magneto switchboards. 500 - 500 ohms, series or parallel. Coils enclosed in soft iron sheath. Complete with alarm contact, actuated by falling shutter, front plate, shutter and fixing screws. Other resistances to order.



T1584

Length: 3" (76 mm.)	Width: 1 1/4" (31 mm.)
Depth: 1" (25 mm.)	Weight: 3 1/2-ozs. (99 gm.)



T4745

T4745 Indicator.

Eye-ball pattern, self restoring. Used as line or clearing indicator on central battery switchboards. 1,000 ohms. Complete with alarm contact.

Length: 4 1/2" (120 mm.)	Width: 1 1/2" (35 mm.)	Depth: 1 1/4" (31 mm.)	Weight: 6-ozs. (170 gm.)
--------------------------	------------------------	------------------------	--------------------------

T1582 Indicator.

Eye-ball pattern. As T4745, but 500 ohms.

T4750 Indicator.

As T4745, but 15 ohms.

T3789 Indicator.

Eye-ball pattern. As T4745, but 70 ohms.

T3790 Indicator.

Eye-ball pattern. As T4745, but 16,000 ohms.

T3791 Indicator.

Eye-ball pattern. As T4745, but 1,000 - 1,000 ohms.

T2608 Mounting Plate.

For ten drop indicators (line) T1797. Two fixing slots at each end ; black finish ; indicators mounted at 1 1/8" centres.

T2609 Mounting Plate.

For ten drop indicators (supervisory tubular), T1798 and T1799. As T2608, but indicators mounted at 1" centres. For panel mounting in wall and floor pattern magneto switchboards.

	T2608	T2609
Length	12 3/4" (324 mm.)	11 1/2" (292 mm.)
Width	1" (25 mm.)	1" (25 mm.)
Depth	3/16" (5 mm.)	3/16" (5 mm.)
Weight	10-ozs. (283 gm.)	8-ozs. (227 gm.)

T4725 Mounting.

For one tubular pattern indicator T1584, and three eye-ball pattern indicators T4745. Black finish.

T4726 Mounting.

As T4725, but for two T1584 and four T4745 indicators.

T4727 Mounting.

As T4725, but for three T1584 and nine T4745 indicators. NOTE.—The above plates and brackets are as fitted to cordless switchboards T3004, etc.

	T4725	T4726	T4727
Length: 6" (152 mm.)	8 3/8" (213 mm.)	15" (381 mm.)	
Width: 3 3/8" (81 mm.)	3 3/8" (81 mm.)	3 3/8" (81 mm.)	
Depth: 1 1/2" (38 mm.)	1 1/2" (38 mm.)	1 1/2" (38 mm.)	
Weight: 11-ozs. (312 gm.)	13-ozs. (369 gm.)	19-ozs. (540 gm.)	

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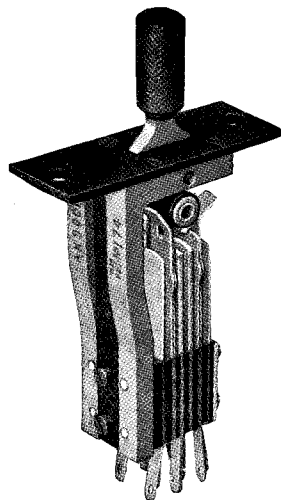


Fig. 1

Lever Type Keys.

Used as ringing and listening keys on manual telephone switchboards, and for many other purposes. The specification comprises frames made from extruded brass with lacquered finish; nickel-silver springs; ebonite insulation; ebonite roller-cam action, with anti-click feature on double-action keys to prevent momentary break of circuit by rebound of rollers against the opposing springs; silver contacts (other contact materials can be supplied to order); knurled detachable handles in black, white, red, yellow, blue, green, pink, orange, grey or brown.

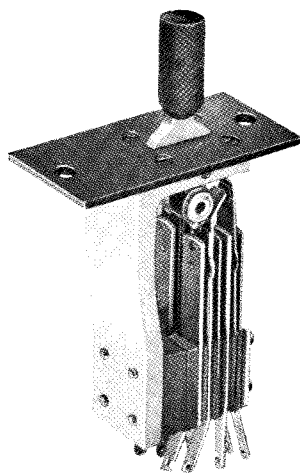


Fig. 2

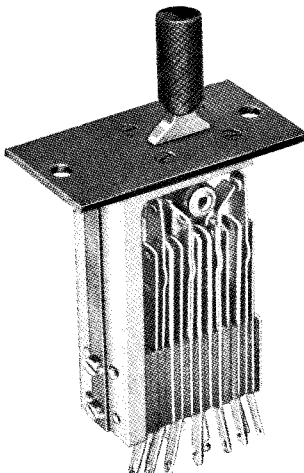


Fig. 3

Keys are classified in five major groups and typical spring combinations of each group are illustrated in Figs. 4 and 5, under the following catalogue numbers:—

- T3432. Single-throw, non-locking.
- T3433. Single-throw, locking.
- T3434. Double-throw, non-locking.
- T3435. Double-throw, locking.
- T3436. Double-throw, locking and non-locking.

Other spring combinations for single or double-throw, locking or non-locking keys can be supplied as required.

Figs. 1, 2 and 3 illustrate the three types of frame required in making up the various spring combinations illustrated in Figs. 4 and 5.

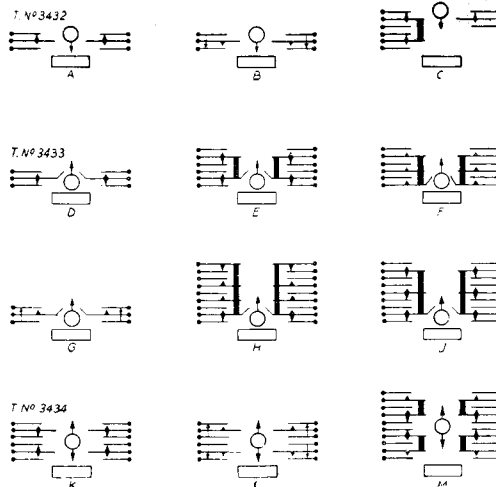


Fig. 4

Keys can be supplied mounted singly, or in groups, on steel plates. Copper-oxidised and black lacquer finish, arranged for either key-shelf or jack field mounting.

Specify requirements when ordering, and if possible, give sketch of spring combination with "make" and "break" requirements clearly indicated.

	Width :	Depth :	Weight :
Length :	(average)	(average)	(average)
4" (101 mm.)	1 3/8" (28 mm.)	3/4" (19 mm.)	3-ozs. (85 gm.)

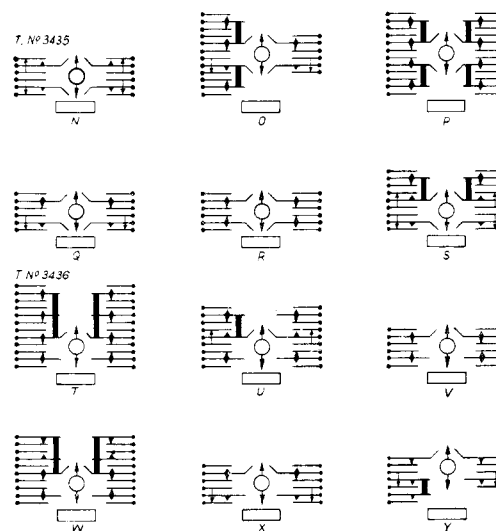


Fig. 5

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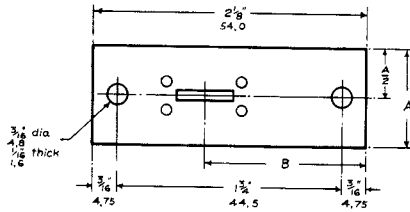
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KEYS AND KEY MOUNTINGS

Mounting Plate.

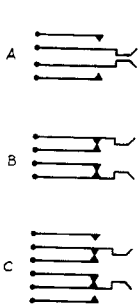
For lever type keys. Mild steel, black finish, drilled and slotted for key mounting; two fixing holes.



List No.	Dimension A.	Dimension B.	Weight :
T3836 ...	1" (25 mm.)	1 1/8" (27 mm.)	68-oz. (19.4 gm.)
T3837 ...	1 1/8" (28.5 mm.)	1 1/8" (27 mm.)	77-oz. (21.8 gm.)
T3838 ...	1 1/4" (31.8 mm.)	1 1/8" (27 mm.)	85-oz. (24.1 gm.)
T3839 ...	1 3/8" (35.1 mm.)	1 3/8" (32 mm.)	68-oz. (19.4 gm.)
T3840 ...	1" (25 mm.)	1 1/8" (30 mm.)	

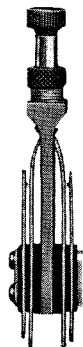
Keys, Plunger Type.

Locking and non-locking. Nickel-plated brass frame; nickel-silver springs; silver contacts; black knobs. For suitable mounting plates, see T4331 and T4332.



List No.	Spring Combination.
T3421	A
T3422	B
T3423	C
T3424	A
T3425	B
T3426	C

Locking: T3421, T3422, T3423
Non-locking: T3424, T3425, T3426



T3421

Length : 3 7/8" (98 mm.) Width : 1" (25 mm.) Depth : 1/2" (13 mm.) Weight (approx.): 1-oz. (28 gm.)



T3416

Order Wire Keys, Plunger Type.

Pressed steel frame, zinc plated finish. Nickel-silver springs, silver contacts. Polished nickel-plated knob with provision for circular inset label in white, green, grey, red or black, engraved as required. Supplied complete with plates for key-shelf or jack-field mounting in manual telephone switchboards.

- T3416.** Double "break" and "make" action.
- T3417.** Triple "make" action.
- T3418.** Double "make" action.

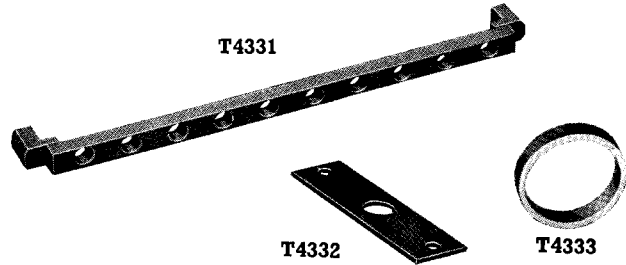
When ordering, specify type of key, mounting plate, and number to be fitted (1-5 or 1-10), etc.

Example : One T4327 mounting plate, fitted seven T3416 keys, in positions 1-7. Red labels, engraved 1-7.

Length : 3 1/2" (88 mm.) Width : 1 1/2" (12 mm.) Depth : 1 1/2" (13 mm.) Weight : 9-ozs. (26 gm.)

T4331 Mounting Plates.

For plunger type keys. Various mounting plates and frames can be supplied for mounting keys T3421-2-3 and T3424-5-6. For example: panel mounting plate for 10 keys, as T4331, and keyboard or panel mounting plate for single plunger key, as T4332 (with T4333 distance piece).



T4331

T4332

T4333

	T4331	T4332
Length ...	11 1/4" (286 mm.)	2 1/2" (63 mm.)
Width ...	1 1/2" (13 mm.)	3/4" (19 mm.)
Depth ...	1 1/8" (28 mm.)	.080" (2 mm.)
Weight ...	12-ozs. (340 gm.)	1-oz. (28 gm.)



T4330



T4329



T4327



T4328

Mounting Plates for Order Wire Keys.

Brass mounting plate with black-finished steel cover plate, drilled and tapped for full complement of keys.

- T4327.** For key-shelves—Maximum capacity, 10 keys.
- T4328.** For key-shelves—Maximum capacity, 5 keys.

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T4329.

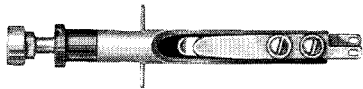
For jack-field—Maximum capacity, 10 keys.

T4330.

For jack-field—Maximum capacity, 10 keys.

	T4329	T4330
Length	8 ³ / ₈ " (212 mm.)	11 ¹ / ₈ " (283 mm.)
Width	1 ¹ / ₂ " (13 mm.)	1 ¹ / ₂ " (13 mm.)
Depth	1 ¹ / ₂ " (38 mm.)	1 ¹ / ₂ " (38 mm.)
Weight	6-ozs. (170 gm.)	8-ozs. (228 gm.)

	T4327	T4328
Length	7 ³ / ₈ " (188 mm.)	4 ¹ / ₄ " (108 mm.)
Width	1 ¹ / ₂ " (13 mm.)	1 ¹ / ₂ " (13 mm.)
Depth	5 ⁵ / ₁₆ " (8 mm.)	5 ⁵ / ₁₆ " (8 mm.)
Weight	4-ozs. (114 gm.)	2-ozs. (57 gm.)



T4327

T3427 Meter Keys, Plunger Type.

Tubular brass frame, dull nickel-plate finish. Two nickel-silver springs. Single "make" action. Platinum contacts. Polished nickel-plated knob with provision for circular inset label in black, green, red, grey or white; engraved as required. Fixing lugs for wood screws, and oxidised copper clamping nut securing plunger.

Length:	Width:	Weight:
4" (101 mm.)	1" (25 mm.)	1 ¹ / ₈ -ozs. (31 gm.)

T3441 Plunger Key.

Non-locking. Used in conjunction with "Strowger" key-sending equipment on auto-manual switchboards. Designed for light operation. Comprising zinc-plated pressed-steel frame; nickel-silver springs; silver contacts; cam and roller action. "Tri-make" and "single make."

T3442 Plunger Key.

As T3441, mounted on bevelled black bronzed mounting plate 2" (51 mm.) x 1³/₈" (35 mm.), arranged for undershelf screw fixing. Knob engraved "CNCL" (CANCEL).

T3443 Plunger Key.

As T3442, but knob engraved "RLSE" (RELEASE).

T3444 Plunger Key.

As T3442, but knob engraved "STRT" (START).

T3445 Plunger Key.

As T3441, but two "break" and "make."

T3446 Plunger Key.

As T3441, but "tri-make" and "two-make."

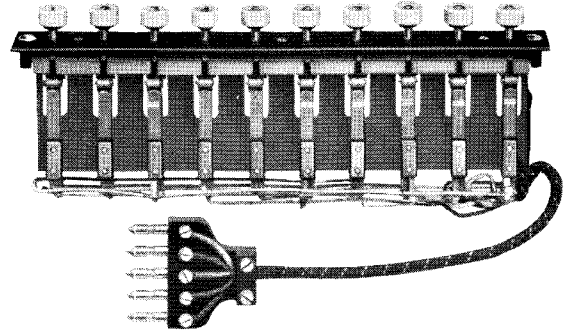
T3447 Plunger Key.

As T3442, but two "break" and "make."

T3448 Plunger Key.

As T3444, but "tri-make" and "two-make."

Length:	Width:	Depth:	Weight:
4" (102 mm.)	1 ¹ / ₈ " (29 mm.)	1" (25 mm.)	1/2-oz. (14.2 gm.)



T3438

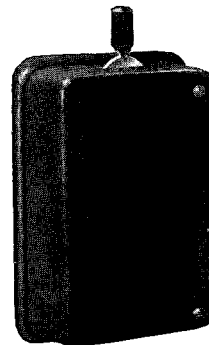
T3438 Digit Key Strip.

For use on key-sending auto-manual switchboards. Comprising ten keys as T3441, but arranged for "two-make," mounted on black bronzed strip designed for undershelf screw fixing. Key knobs engraved "1" to "0."

T3439 Digit Key Strip.

For use on key-sending auto-manual switchboards. Comprising ten keys, arranged for "two-make," and two keys "tri-make" and "two-make." Mounted in two rows of six on black bronzed plate designed for undershelf screw fixing. Key knobs engraved "1" to "0," with letter equivalents for Director working and ANS. and CALL.

	T3438	T3439
Length	10 ⁵ / ₈ " (270 mm.)	5 ⁷ / ₈ " (148 mm.)
Width	1 ³ / ₈ " (35 mm.)	2 ³ / ₄ " (70 mm.)
Depth	4" (102 mm.)	4" (102 mm.)
Weight	1 ³ / ₄ -lbs. (793 gm.)	2-lbs. (907 gm.)



T3694

T3694 Extension Switch.

For connecting an exchange line to any of three extension telephones. Comprising double-action lever key, mounted on pressed-steel base with detachable steel cover. Eight terminals. Black enamel finish.

T3695 Extension Switch.

For connecting an exchange line to either of two extension telephones.

As T3694, but single-action key.

Length ...	6" (152 mm.)	Width ...	3 ¹ / ₂ " (88 mm.)
Depth ...	1 ³ / ₄ " (44 mm.)	Weight ...	13 ¹ / ₄ -ozs. (375 gm.)

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T3697 Extension Switch Box.

For connecting an exchange line to any of three extension telephones. Comprising double action lever key mounted in moulded black plastic case with terminals for 24 wires. The case provides for cable entry at bottom, rear or either side, and easy access to key springs and terminals. See Figs. 1, 2 and 3.

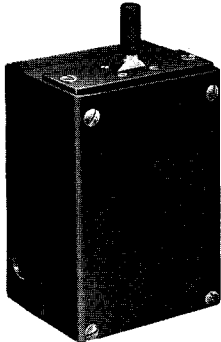


Fig. 1.
Key box assembly,
KB5 type, closed.

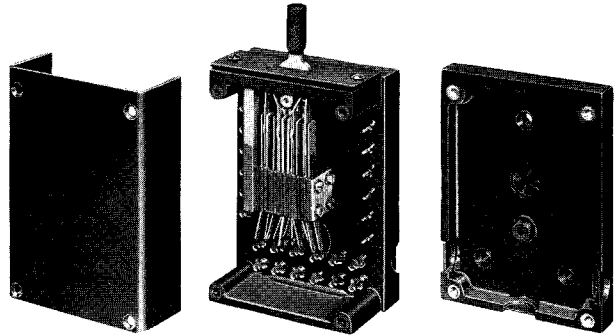


Fig. 2.

Key box assembly, KB5 type, opened. Front view.

T3698 Extension Switch Box.

For connecting an exchange line to either of two extension telephones similar to T3697 but with single action key. Note: The range of boxes provides for any spring combination possible on one key providing not more than 24 wires are required.

	Length:	Width:	Depth:	Av. Weight:
T3697	5 1/4"	2 7/8"	2 1/4"	20 ozs.
T3698	133 mm.	73 mm.	57 mm.	567 gm.

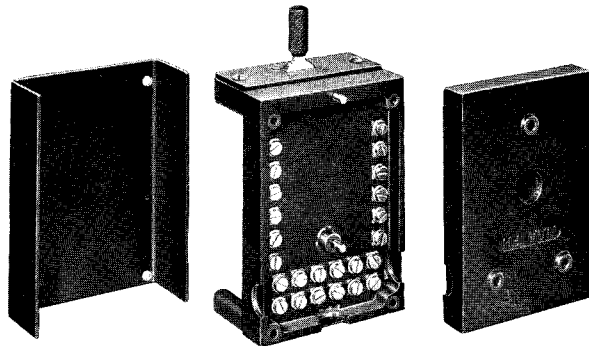


Fig. 3.

Key box assembly, KB5 type, opened. Rear view.

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T3653 Retardation Coils, Ironclad Tubular Type.

Comprising coil in dull nickel-plated iron sheath. Single or double winding on iron rod core. Soldering tags of channel section. For plate mounting with single fixing screw at terminal end. Fig. 1.

Length ... $3\frac{1}{2}$ " (88 mm.)
 Width ... 1" (25 mm.)
 Depth ... 1" (25 mm.)
 Weight ... 4-ozs. (113 gm.)

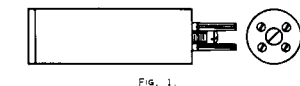


FIG. 1.

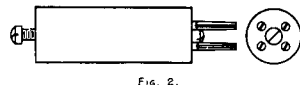


FIG. 2.

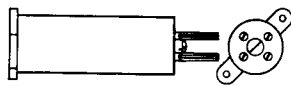


FIG. 3.



T3654

T3653.

T3654.

Resistance.	Figure.	Resistance.	Figure.
50	1	50	3
100	1	100	3
200	1	120	3
300	1	200	3
400	1	250	3
500	1	300	3
600	1	400	3
750	1	500	3
1000	1	600	3
5000	1	750	3
		1000	3
		1400	3
200 + 200	1	50 - 50	3
300 + 300	1	200 - 200	3
500 + 500	1	600 - 600	3
600 + 600	1		

T3654 Retardation Coils, Ironclad Tubular Type.

Comprising coil in dull nickel-plated iron sheath. Single or double winding on iron rod core. Fixing lugs for two screws at end remote from tags. Fig. 3.

Length : $3\frac{1}{2}$ " (88 mm.) Width : $1\frac{5}{8}$ " (41 mm.) Depth : 1" (25 mm.) Weight : 4-ozs. (113 gm.)

T3655 Retardation Coil, Ironclad Tubular Type.

Comprising coil in dull nickel-plated iron sheath. Double winding 200 - 200 ohms on iron rod core. For plate mounting, with single fixing screw at end remote from tags. Fig. 2.

Length : $3\frac{1}{2}$ " (88 mm.) Width : 1" (25 mm.) Depth : 1" (25 mm.) Weight : 4-ozs. (113 gm.)



T3828

T3826 Retardation Coil.

Comprising pressed-steel frame ; laminated core ; black moulded bakelite spool. Resistance 20 ohms. Complete with cover. Grey enamel finish.

T3827 Retardation Coil.

As T3826, but resistance 57 ohms.

T3828 Retardation Coil.

As T3826, but resistance 80 - 80 ohms.

Length : $4\frac{1}{2}$ " (102 mm.) Width : $2\frac{1}{8}$ " (52 mm.) Depth : $1\frac{5}{8}$ " (41 mm.) Weight : $17\frac{1}{2}$ -ozs. (496 gm.)

T1394 Retardation Coil.

165 ohms. Stalloy core. Varnished teak base. For 22-volt working.

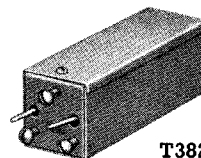


T1394

T2795 Retardation Coil.

As T1394, but 400 ohms. For 50-volt working.

Length : $6\frac{1}{2}$ " (155 mm.) Width : $1\frac{3}{4}$ " (45 mm.) Depth : 2" (51 mm.) Weight : $12\frac{3}{4}$ -ozs. (361 gm.)



T3822

T3822 Retardation Coil.

165 ohms. Iron wire core, brass frame ; metal cover ; grey enamel finish. Three screws at end for plate mounting.

T3823 Retardation Coil.—As T3822, but 325 ohms.

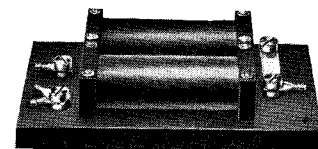
T3824 Retardation Coil.—As T3822, but 250 ohms.

T3825 Retardation Coil.—As T3822, but 400 ohms.

Length : $5\frac{3}{8}$ " (132 mm.) Width : $1\frac{5}{8}$ " (41 mm.) Depth : $1\frac{1}{2}$ " (38 mm.) Weight : 12-ozs. (390 gm.)

T3810 Impedance Coils.

Twin ; on polished hardwood base. Resistance, each coil, 1.21 ohms. Laminated cores. For use in battery supply circuits to telephone exchange ringing dynamotors. For 40-volt working.



T3810

T3811 Impedance Coils.

Twin ; as T3810, but resistance, each coil, .65 ohm. For 22-volt working.

Length : 10" (254 mm.) Width : $4\frac{7}{8}$ " (112 mm.) Depth : $2\frac{3}{4}$ " (70 mm.) Weight : $3\frac{1}{2}$ -lbs. (1.59 kg.)

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C A T A L O G U E

TELEPHONES

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TROWGER WORKS · LIVERPOOL 7.



T4078 Automatic Desk Telephone.

With black moulded body incorporating bell set, "ASTIC" induction coil T3799, and sliding tray for directory or memoranda. Complete with dial, hand microphone, cords and terminal strip. Can be supplied with dial-blank in place of dial.

Height : 6" (152 mm.) Width : 9" (229 mm.) Depth : 7 3/4" (197 mm.) Weight : 5 3/4-lbs. (2.61 kg.)



T4078

T4036 As T4078 but with push button for call transferring (P.A.B.X. working).

T4076 As T4078 but with dial blank in place of dial. Weight : 5 1/4-lbs. (2.38 kg.)

T4086 Automatic Desk Telephone.

As T4078, but without tray.

T4029 As T4086 but for use in tropical climates.

T4037 As T4086 but insect proof for use in tropical climates.

T4035 As T4086 but with lamp indicating instead of ringing.

T4085 Automatic Desk Telephone.

Fitted with induction coil T3799 and sliding tray in base for directory or memoranda. Complete with hand microphone, cords and dial, for use with separate bell set T4119. Can be supplied with dial-blank in place of dial.

Height : 6" (152 mm.) Width : 9" (229 mm.) Depth : 6 1/4" (159 mm.) Weight : 4-lbs. (1.81 kg.)



T4085

T4025 As T4085 but with dial blank in place of dial. Weight : 3 1/2-lbs. (1.59 kg.)

T4070 Automatic Desk Telephone.

As T4085 but without sliding tray for directory.



T4070

T4071 Automatic Desk Telephone.

As T4070, but fitted with T4213 dial.

T4072 Automatic Desk Telephone.

As T4070, but incorporating bell set T4119.



T4072

T4082 Automatic Desk Telephone.

As T4072, but fitted with T4123 dial.

T4080 Central Battery Desk Telephone.

As T4070, but with dial-blank in place of dial.

T4081 Central Battery Desk Telephone.

As T4072, but with dial-blank in place of dial.

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	T4070 & T4071	T4072 & T4082	T4080	T4081
Height ...	5 $\frac{7}{8}$ " (138 mm.)	7 $\frac{1}{4}$ " (184 mm.)	5 $\frac{7}{8}$ " (138 mm.)	7 $\frac{1}{4}$ " (184 mm.)
Width ...	9" (228 mm.)	9" (228 mm.)	9" (228 mm.)	9" (228 mm.)
Depth ...	5 $\frac{5}{8}$ " (142 mm.)	6 $\frac{1}{2}$ " (165 mm.)	5 $\frac{5}{8}$ " (142 mm.)	6 $\frac{1}{2}$ " (165 mm.)
Weight ...	4 $\frac{1}{2}$ -lbs. (2 kg.)	7 $\frac{1}{2}$ -lbs. (3.4 kg.)	4-lbs. (1.8 kg.)	7-lbs. (3.2 kg.)

T4077 Automatic L.B. Desk Telephone.

Similar to T4070 but less induction coil and modified for local battery transmission. Used with telephone bell set T4065.

T4083 Automatic L.B. Desk Telephone.

As T4070, but fitted with push-button for subscriber attended P.A.B.X. working.

T4084 Automatic Desk Telephone.

As T4072, but fitted with push-button for subscriber attended P.A.B.X. working.

T4127 Automatic Wall Telephone.

Comprising black moulded bakelite base and hinged case, T4219 dial, cradle switch, moulded hand microtelephone and cord. Base fitted with polarised ringer, condenser and "ASTIC" induction coil T3799.

T4128 Automatic Wall Telephone.

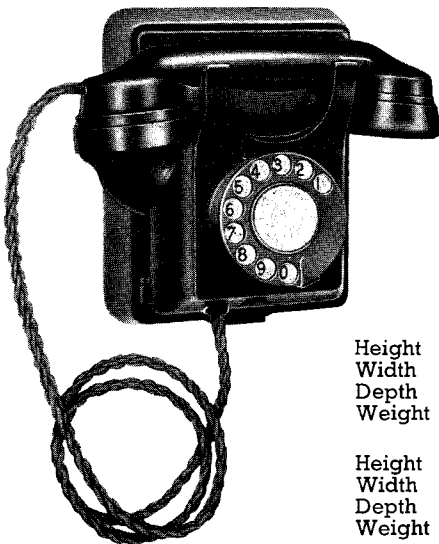
As T4127, but fitted with T4213 dial.

T4129 Central Battery Wall Telephone.

As T4127, but with dial-blank in place of dial.

T4143 Automatic Wall Telephone.

As T4127 but for use in tropical climates.



T4128

T4127 and T4128	
Height ...	8 $\frac{1}{2}$ " (210 mm.)
Width ...	9" (228 mm.)
Depth ...	5 $\frac{5}{8}$ " (142 mm.)
Weight ...	5 $\frac{7}{8}$ -lbs. (2.67 kg.)
T4129	
Height ...	8 $\frac{1}{2}$ " (210 mm.)
Width ...	9" (228 mm.)
Depth ...	5 $\frac{5}{8}$ " (142 mm.)
Weight ...	5 $\frac{3}{8}$ -lbs. (2.43 kg.)

Insect-proof Telephones.—The following telephones, T4074, T4075 and T4126, are similar to T4070, T4072 and T4127 respectively, but have all apertures covered with metal gauze or otherwise suitably protected against the ingress of insects. The telephones have a tropical finish.

T4074 Automatic Desk Telephone.

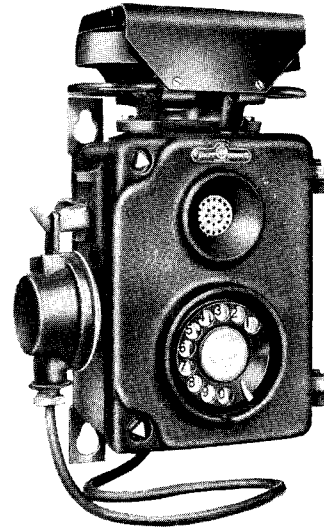
Insect-proof. With hand microtelephone and dial, for use with separate bell set T4066.

T4075 Automatic Desk Telephone.

Insect-proof. With hand microtelephone and dial; incorporating bell set T4066 in base.

T4126 Automatic Wall Telephone.

Insect-proof. With hand microtelephone and dial; incorporating bell set T4066 in back.



L11191.A2.

L11191.A2.**Weatherproof Automatic Telephone.**

Robustly constructed ironclad weatherproof automatic telephone, complete with bell and sealing glands for receiver cord and line cable. Designed to withstand rough usage in exposed situations. Can also be supplied without bell for use with separate bell set.

Height :
14 $\frac{1}{4}$ " (362 mm.)

Width :
10 $\frac{3}{4}$ " (274 mm.)

Depth :
6 $\frac{1}{2}$ " (167 mm.)

Weight :
34-lbs. (15.422 kg.)

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T4115

T4114

T4115 Carrying Case.

Leather, with 2-ft. shoulder strap; for hand telephone T4114

Length: Width: Depth: Weight:
 9 $\frac{3}{4}$ " (248 mm.) 3" (76 mm.) 4 $\frac{3}{8}$ " (122 mm.) 1-lb. 4-ozs. (567 gm.)

T4114 Hand Telephone.

Portable, with cord and plug. Suitable for testing fire alarm boxes, etc.

Length: Width: Depth: Weight:
 9" (229 mm.) 2 $\frac{3}{4}$ " (70 mm.) 4 $\frac{1}{8}$ " (105 mm.) 14 $\frac{3}{4}$ -ozs. (417 gm.)

Loud-speaking telephones for P.A.X. equipment will be quoted for on request.

Mining Telephones, refer to Section "J" of this catalogue.

Bell Sets.

See Section EE for separate bell sets.

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T392

T392 Hand Microtelephone.

Comprising black moulded bakelite handle, receiver ear cap, and transmitter mouthpiece. Fitted with T2205 receiver inset, 80 ohms, transmitter inset T2137, and cord T2473. As fitted to automatic and manual central battery desk telephones.

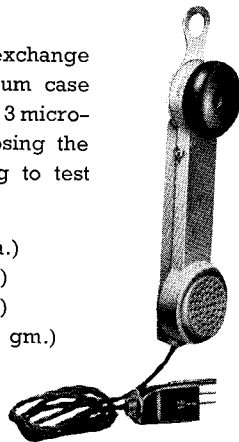
Length : Width : Depth : Weight :
 9" (228 mm.) 2 3/8" (70 mm.) 4 1/8" (105 mm.) 14 3/4-ozs. (417 gm.)

Coloured Telephones : Hand microtelephone T392 can be supplied in any of the following colours at an extra charge : Walnut, mahogany, ivory, red, green.

T395 Testing Hand Microtelephone.

For testing automatic telephone exchange equipment. Comprising cast aluminium case fitted with receiver, inset transmitter, 0.3 microfarad capacitor, and press key for closing the circuit. Includes cord for connecting to test plug.

Length ... 10 1/2" (266 mm.)
 Width ... 2 1/2" (63 mm.)
 Depth ... 3" (76 mm.)
 Weight ... 1 1/2-lbs. (670 gm.)



T395



T566

T566. Operator's Telephone Set.

Comprising head-gear receiver, 60 ohms, and breast-plate transmitter. Fitted with cord and 4-way cylindrical plug. Mouthpiece specially constructed to facilitate frequent removal for disinfecting purposes. When replaced, the mouthpiece is rigidly locked in position by metal clip.

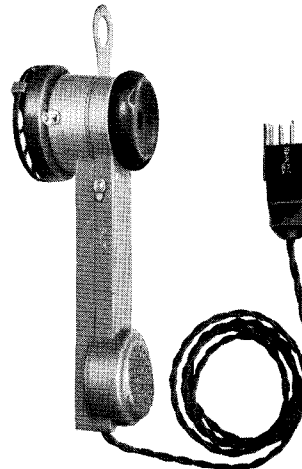
Length : Width : Depth : Weight :
 6" (152 mm.) 6" (152 mm.) 4" (101 mm.) 21-ozs. (595 gm.)

T396 Testing Hand Microtelephone.

As T395, but fitted with dial.

T397 Testing Hand Microtelephone.

As T396, but fitted with extra key for introducing a self-contained resistance of 1,200 ohms into the dialling circuit.



T396

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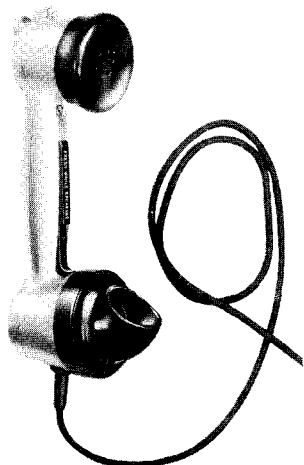
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HAND TELEPHONES AND OPERATORS' SETS

T398.

Testing hand microtelephone (B.P.O. type 80) with twin cord and test plug to circuit Fig. 1.



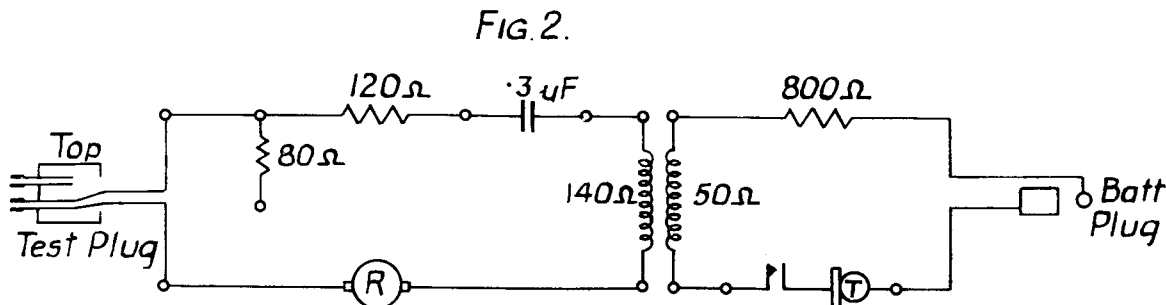
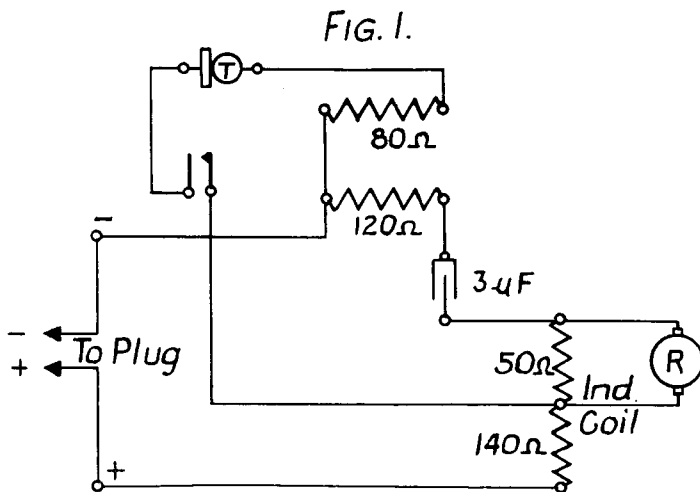
T399.

Similar to T398 but arranged for use on "dry" loops with twin cord and pre-2000 type test plug ; also twin cord and battery plug to circuit Fig. 2.

T400.

Similar to T399 but with 2000 type test plug.

Length :	Width :	Depth :	Weight :
10"	2 3/4"	4 1/4"	1-lb. 8-ozs.
(254 mm.)	(70 mm.)	(108 mm.)	(681 gm.)



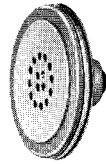
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T2137

T2137 Inset Transmitter.

Electrodes immersed in granular carbon ; for central battery working. As fitted to telephone hand-sets T392-4. Complete with spring disc.

T2137A, as T2137, but for tropical use.

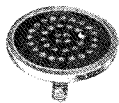
Length : $2\frac{5}{16}$ " (58 mm.) Width : $2\frac{5}{16}$ " (58 mm.) Depth : $1\frac{1}{8}$ " (28 mm.) Weight : $2\frac{1}{8}$ -ozs. (60 gm.)

T2131 Inset Transmitter.

Similar to T2137 but high resistance for use on low current battery feed circuits.

T3475 Inset Transmitter.

Similar to T2137 but for use in noisy situations.



T3474

T3474 Inset Transmitter.

Gold-plated electrodes immersed in granular carbon ; for central battery working. Inter-changeable with T2137 for use on telephone hand-sets T392-4. Fitted with helical contact spring.

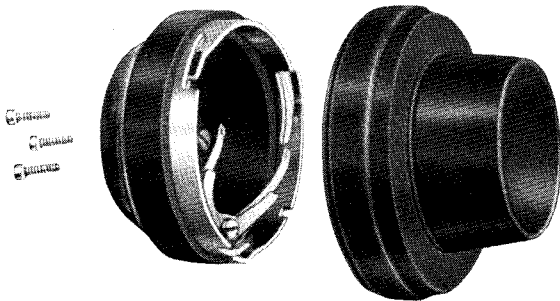
T2138 Inset Transmitter.

Granular carbon ; for central battery working. As fitted to testing hand microtelephone T395-7.

Diameter : $2\frac{3}{16}$ " (55 mm.) Depth : $1\frac{3}{16}$ " (21 mm.) Weight : $1\frac{1}{2}$ -ozs. (43 gm.)



T2138



T2476

T2476 Transmitter Case.

For inset T2137. Moulded black bakelite. Designed to enable inset (capsule) transmitter to replace solid back transmitter on pillar or wall telephone.

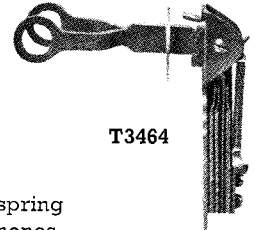
Diameter : $2\frac{3}{8}$ " (73 mm.) Depth : $2\frac{1}{4}$ " (57 mm.) Weight : 5-ozs. (14 kg.)

T3464 Switch Hook.

Nickel-plated brass frame, fitted with "Tri-make" nickel-silver spring combination. Gold-silver contacts. Detachable receiver hook, finished oxidised copper. Complete with escutcheon plate and fixing screws. As fitted to T3045 telephone.

T1733 Switch Hook.

As T3464, but "Break and Make" spring combination.

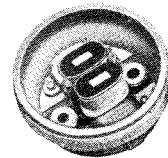


T3464

T1692 Switch Hook.

As T3464, but "Double-make" spring combination. As fitted to wall telephones.

Length : 4" (101 mm.) Width : $3\frac{3}{4}$ " (95 mm.) Depth : $1\frac{5}{8}$ " (41 mm.) Weight : 6-ozs. (170 gm.)



T2205

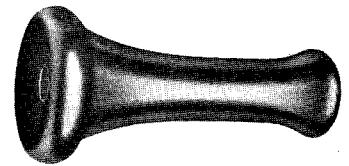
T2205 Inset Receiver.

Aluminium case, 80 ohms resistance, for use with hand microtelephones T392, T393 and T394.

Diameter : $2\frac{1}{8}$ " (54 mm.) Depth : 1" (25 mm.) Weight : $2\frac{3}{8}$ -ozs. (78 gm.)

T2067 Receiver.

Bell pattern. Permanent magnet type, with ebonite-covered case and moulded ear-cap. Resistance, 64 ohms. For central battery working.



T2067

Length : $5\frac{1}{2}$ " (139 mm.) Diameter : $2\frac{1}{2}$ " (63 mm.) Weight : 15-ozs. (425 gm.)

T2068 Receiver.

Bell pattern, as T2067, but 120 ohms. For local battery working.

T3034 Metal-cased Receiver.

Complete with braided steel armoured cords and gland nuts T1106. As fitted to magneto mine telephone. Resistance, 120 ohms.

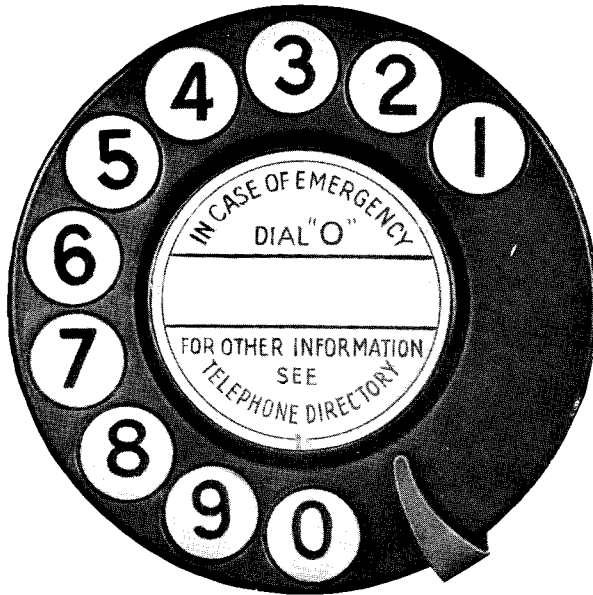
Length : 40" (1020 mm.) Width : $3\frac{3}{4}$ " (95 mm.) Depth : 3" (76 mm.) Weight : $1\frac{3}{4}$ -lbs. (800 gm.)

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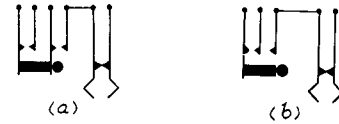
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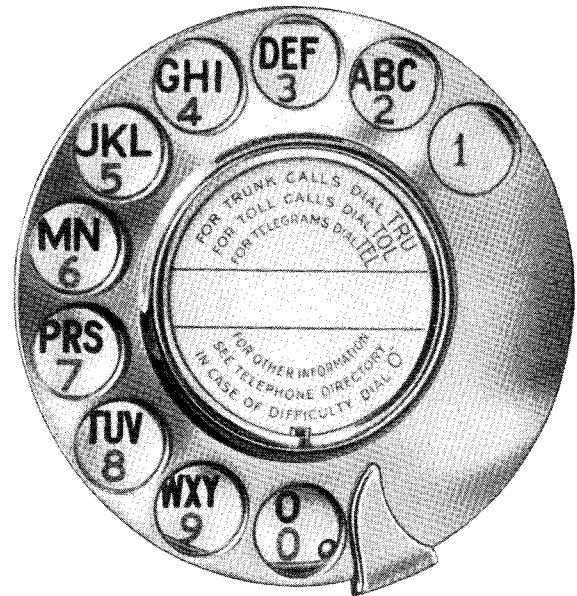
T4219

Diameter : $3\frac{1}{2}$ " (82 mm.) Depth : $1\frac{1}{8}$ " (42 mm.) Weight : $8\frac{1}{2}$ -ozs. (240 gm.)



T4219 Dial.

Type 24C. Interchangeable with T4213. Design ensures long life and economical maintenance. Double impulse delay feature. Brass base with two positioning and one tapped lug for mounting. Black finish, but stainless-steel fingerplate can be supplied if required. Impulsing contacts, platinum ; shunt contacts gold-silver. "Two-make" shunt spring combination (a) ; other spring combinations can be supplied if required. Can be supplied both numbered and lettered for use in Director areas or otherwise as required. For full description see E.B.405.

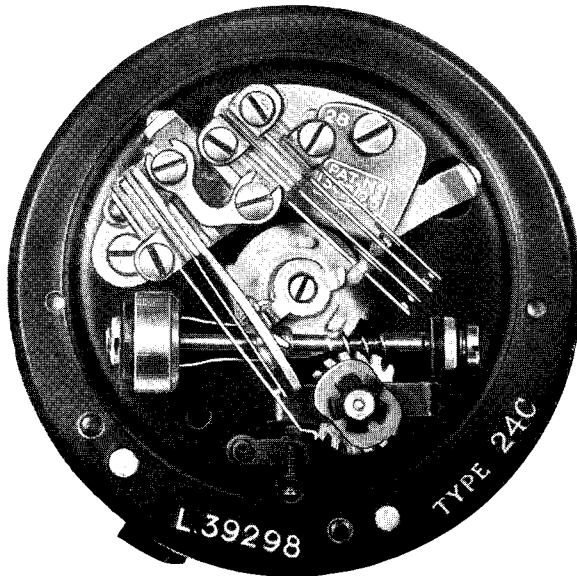


Lettered and numbered for use in Director areas.

T4213 Dial.

British Post Office standard. Brass base with two positioning and one tapped lug for mounting. Black finish. Black figures on white ground "1"—"0." Instruction card protected by transparent disc. "Two-make" shunt spring combination (a). Impulsing contacts, silver ; shunt contacts, silver. Can be supplied both numbered and lettered for use in Director areas (T4214).

Diameter : $3\frac{1}{2}$ " (82 mm.) Depth : $1\frac{5}{8}$ " (41 mm.) Weight : $9\frac{1}{4}$ -ozs. (262 gm.)



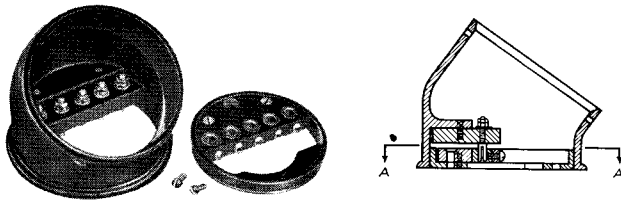
T4219

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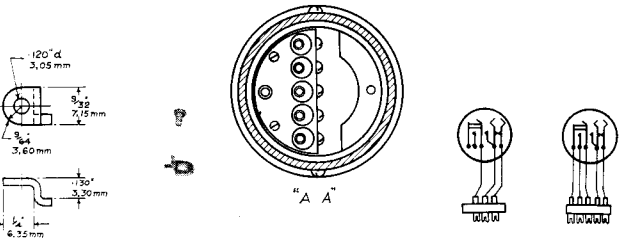


T4251 Dial Mounting.

For use on metal-cased telephones. As T4249, but four-hole fixing.

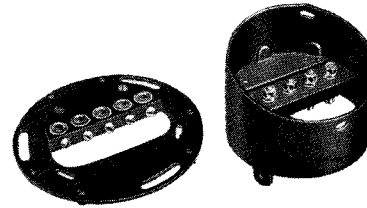
T4250 Dial Mounting.

As T4251, but with parallel faces.



T4199

T4193



T4248

T4191 Dial Mounting.

For keyshelf or panel fixing. Aluminium; black enamel finish. Ebonite terminal block. Three-point connection. Accommodates British Post Office standard and Type 24C Dials; also Type 24 Dial, by including Z Bracket, T4199.

Length: $2\frac{7}{8}$ " (73 mm.) Width: 3" (88 mm.) Depth: $2\frac{1}{4}$ " (57 mm.) Weight: $3\frac{1}{4}$ -ozs. (90 gm.)

T4193 Dial Mounting.

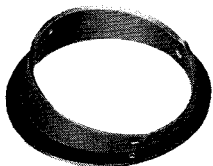
As T4191, but for five-point connection.

Length: $2\frac{7}{8}$ " (73 mm.) Width: 3" (88 mm.) Depth: $2\frac{1}{4}$ " (57 mm.) Weight: $3\frac{1}{2}$ -ozs. (92 gm.)

T4192 Dial Mounting.

Aluminium; black enamelled. For keyshelf or panel mounting; without terminal block. Other details as T4191.

Length: $2\frac{7}{8}$ " (73 mm.) Width: 3" (88 mm.) Depth: $2\frac{1}{4}$ " (57 mm.) Weight: 3-ozs. (85 gm.)



T4249 Dial Mounting.

For use on wood-cased telephones. Metal frame with sloping face. Three-hole fixing; black finish. Accommodates Dials T4213 and T4219.

T4248 Dial Mounting.

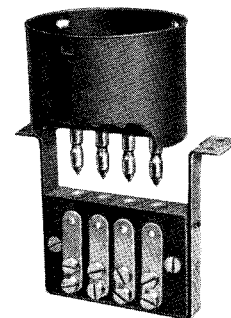
For keyshelf or panel mounting. Comprising five-point jack and plug combination, the jack including a metal fixing flange. The plug has a cylindrical metal frame with sloping face, for the reception of the dial, and is detachably mounted on the fixing flange. Ebonite insulation; black finish. Accommodates Dials T4213 and T4219.

	T4249 and T4251	T4250	T4248
Length ...	$2\frac{3}{4}$ " (72 mm.)	$2\frac{1}{8}$ " (75 mm.)	$3\frac{1}{8}$ " (79 mm.)
Width ...	$2\frac{3}{4}$ " (72 mm.)	$2\frac{1}{8}$ " (75 mm.)	$3\frac{1}{8}$ " (79 mm.)
Depth ...	$\frac{1}{8}$ " (24 mm.)	$\frac{1}{2}$ " (10 mm.)	2" (51 mm.)
Weight ...	$1\frac{1}{2}$ -ozs. (42 gm.)	$1\frac{1}{4}$ -ozs. (35 gm.)	$5\frac{1}{2}$ -ozs. (161 gm.)

T4247 Dial Mounting.

For keyshelf or panel fixing. Comprising four-point jack and plug combination, the jack including metal fixing bracket. The plug has a cylindrical metal frame for the reception of the dial. Ebonite insulation; black finish. Accommodates Dials T4213 and T4219.

Length ... $3\frac{3}{8}$ " (86 mm.)
 Width ... $3\frac{3}{8}$ " (86 mm.)
 Depth ... $2\frac{3}{8}$ " (60 mm.)
 Weight ... 7-6-ozs. (215 gm.)



T4247

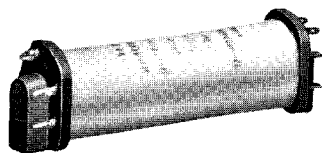
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T3799

T3799 "ASTIC" Induction Coil.

Five windings on black moulded spool fitted with terminal tags and tapped metal inserts for fixing. Used on telephones T4078, T4085, T4127 etc.

T3626 "ASTIC" Induction Coil.

As T3799 but has three windings—1, 17 and 33 ohms. As used on T4065 Bell-set.

Length ... $3\frac{5}{8}$ " (92 mm.)
 Width ... $\frac{15}{16}$ " (24 mm.)
 Depth ... $1\frac{3}{32}$ " (28 mm.)
 Weight ... $4\frac{1}{2}$ -ozs. (128 gm.)

T3610 Induction Coil.

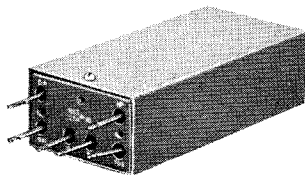
As T3609, but primary 250 ohms, secondary 1000 ohms, and non-inductive winding 360 ohms.

T3611 Induction Coil.

As T3609, but primary 250 ohms, secondary 200 ohms, and non-inductive winding 360 ohms.

T3609 ; T3610 ; T3611 :

Length :	Width :	Depth :	Weight :
$5\frac{3}{16}$ " (131 mm.)	$1\frac{1}{2}$ " (41 mm.)	$1\frac{1}{2}$ " (38 mm.)	$12\frac{1}{4}$ -ozs. (347 gm.)



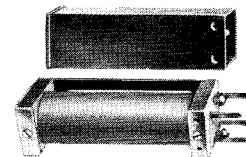
T3800

T3800 Induction Coil.

For operators' telephone circuits. Comprising three windings on laminated strip core. Primary 4 ohms, secondary 20 ohms, tertiary 440 ohms. Brass frame ; metal cover ; six terminals. Grey enamel finish. Three screws at end for plate mounting.

Length ... $6\frac{3}{4}$ " (171 mm.)
 Width ... $2\frac{5}{8}$ " (67 mm.)
 Depth ... $1\frac{5}{8}$ " (41 mm.)
 Weight ... $1\frac{7}{16}$ -lbs. (650 gm.)

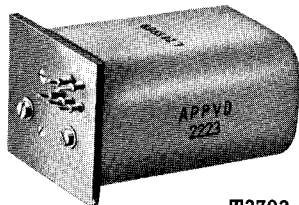
Length ... $5\frac{3}{16}$ " (131 mm.)
 Width ... $1\frac{1}{2}$ " (41 mm.)
 Depth ... $1\frac{1}{2}$ " (38 mm.)
 Weight ... $12\frac{1}{4}$ -ozs. (347 gm.)



T3807

T3807 Induction Coil.

Single ; for operators' telephone circuits. Primary 17 ohms, secondary 26 ohms. Brass frame ; metal cover. Grey enamel finish. Four terminals. Two screws at end for plate mounting.

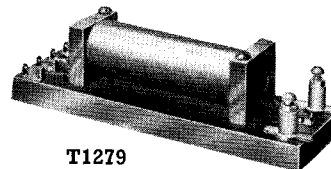


T3793

T3793 Induction Coil.

Similar to T3800 but for mounting on Type 3000 relay plates.

Length ... $3\frac{11}{16}$ " (94 mm.)
 Width ... $2\frac{5}{16}$ " (59 mm.)
 Depth ... $1\frac{1}{16}$ " (50 mm.)
 Weight ... $1\frac{1}{4}$ -lbs. (567 gm.)



T1279

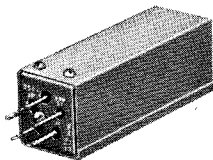
T1279 Induction Coil.

For operators' telephone circuits. Primary 11 ohms, secondaries 58 ohms and 240 ohms respectively. Seven terminals. Polished walnut base.

Length : $6\frac{1}{2}$ " (165 mm.)
 Width : 2" (51 mm.)
 Depth : 2" (51 mm.)
 Weight : $12\frac{3}{4}$ -ozs. (362 gm.)

T3609 Induction Coil.

Comprising primary 250 ohms, secondary 37 ohms, and non-inductive winding 360 ohms, on a common core. Brass frame, metal cover, five terminals. Grey enamel finish. Single screw at end for plate mounting. Used in operators' telephone circuits.



T3609

Note:—Repeating Coils, Transformers and Drainage coils are listed in Section GB.

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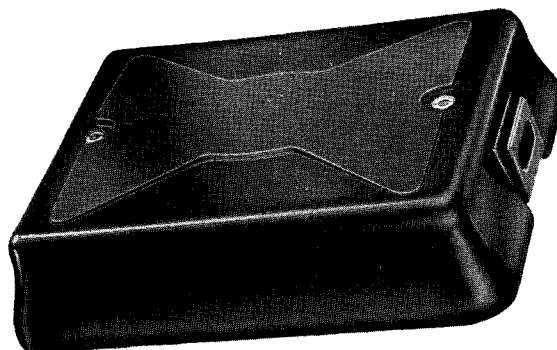


T4119 Telephone Bell Set.

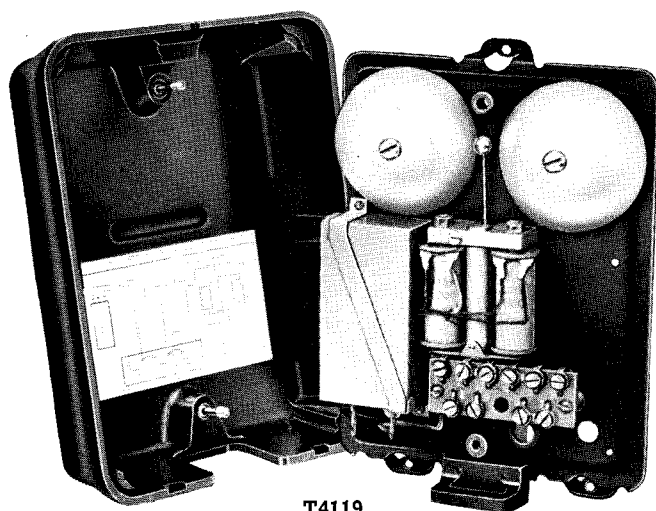
Comprising 1000 ohms ringer, two microfarad capacitor and terminal plate mounted on pressed steel base, having three fixing lugs for wall mounting. Moulded black bakelite cover secured by two captive screws. British Post Office Standard No. 26.

Interposed between baseplate and moulded body, this bell set converts telephones T4070 and T4080 into telephones T4072 and T4081.

Length :	Width :	Depth :	Weight :
$8\frac{1}{8}$ " (206 mm.)	$6\frac{1}{2}$ " (165 mm.)	$2\frac{1}{16}$ " (52 mm.)	2-lbs. 12-ozs. (1.25 kg.)



T4119



T4119

T4064.

As T4119, but less capacitor. Used as extension bell.

T4059 Bell Set.

Similar to T4119, but with earth terminals for P.A.B.X. exchange line answering telephone.

T4066 Insect-proof Telephone Bell Set.

Similar to T4119, but has all apertures metal gauze covered or otherwise suitably protected against the ingress of insects. The bell set has a tropical finish.

T4065 Telephone Bell Set.

British Post Office standard No. 31. As T4119, but has three-winding induction coil for local battery working on subscribers' loops which are too long for satisfactory common battery feeds. Used with telephone T4077.

T2857.

Visual call indicator to replace the customary telephone bell in places where an audible signal is undesirable. A special lamp, which flashes when the telephone is being rung, is mounted in a weighted rubber moulding coloured to represent grained walnut.

Includes 4'6" (1.37 m.) of twin flexible conductors.

No relay required.

Height $4\frac{1}{2}$ " (114 mm.)

Diam. at base $2\frac{3}{4}$ " (70 mm.)

Weight with flexible conductors
 $13\frac{1}{2}$ -ozs. (.383 kg.)



T2857

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C A T A L O G U E

BATTERIES

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.

**HOME SALES AND EXPORT DEPT.
STROWGER HOUSE, ARUNDEL ST. LONDON, WC2.**

TROWGER WORKS · LIVERPOOL 7.



ACCUMULATOR BATTERIES.

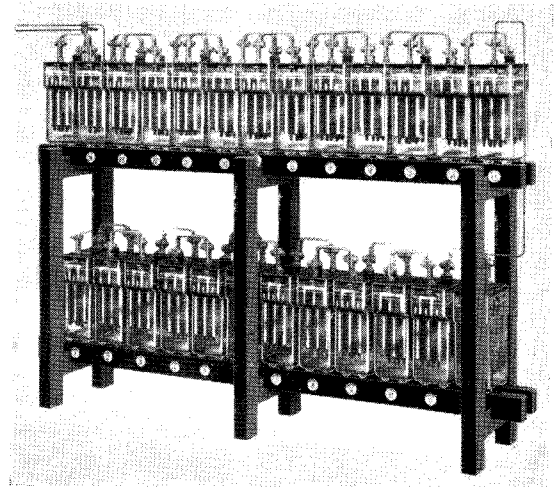
Only small capacity cells of standard sizes and obtainable from stock are listed; large accumulators for public telephone exchanges, etc., are manufactured to order; prices and particulars will be furnished on request. Enquiries should be accompanied by such information as will enable a quotation to be made for the most suitable size and type.

Cells having a capacity below 400 ampere-hours are supplied with glass boxes.

From 400 to 1,000 ampere-hours, cells can be supplied with either glass or lead-lined wood boxes.

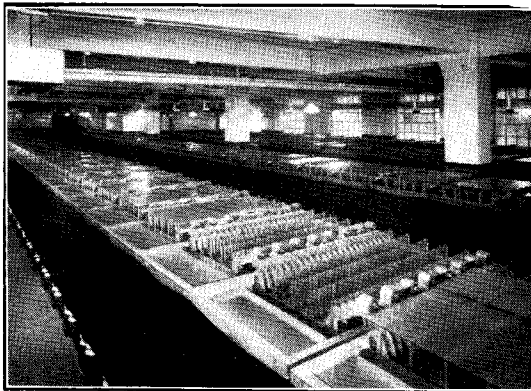
Above 1,000 ampere-hours, cells are supplied with lead-lined wood boxes.

Cells in glass boxes may be obtained with bolted inter-cell connections; this arrangement is of particular advantage where the services of a lead burner are not available.



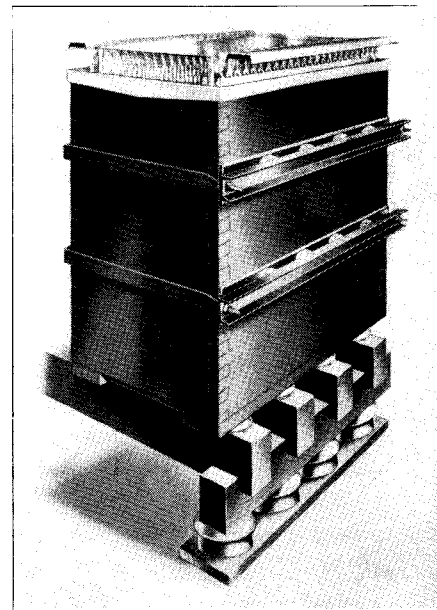
Automatic Telephone Exchange Battery in Glass Boxes.

Capacity, 50 ampere-hours.



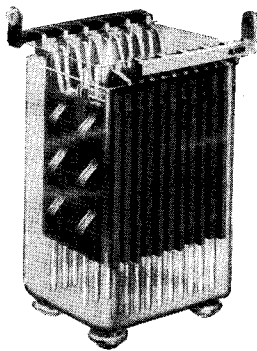
Automatic Telephone Exchange Battery in Lead-lined Wood Boxes.

Capacity, 13,000 ampere-hours.



Accumulator in Lead-lined Wood Box.

Capacity, 10,000 ampere-hours.



Accumulator in Glass Box.

Capacity, 300 ampere-hours.

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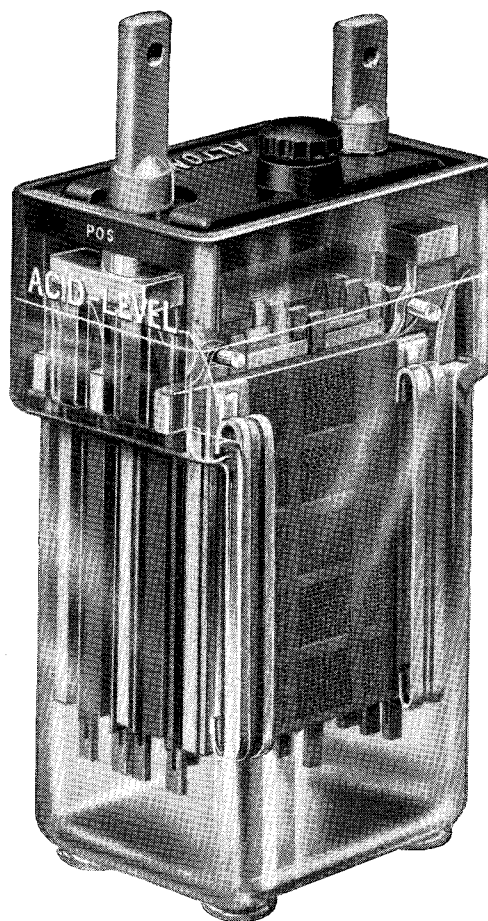


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**BATTERIES FOR SMALL TELEPHONE EXCHANGES.**

A range of cells has been specially designed for small telephone installations. All plates used in these cells comply with B.S.S. 440-1932. The positives, which are 12 mm. thick, are of the HEAVY PLANTE type, while the negatives are of the BOX type, thus ensuring that the maximum possible life is obtained from the battery. A substantial moulded glass box with insulating feet, and marked to indicate the correct acid level, is used. An ebonite lid is sealed in, and the vent plug is of ample size. Specially treated wood separators are employed, and the connecting bars are substantially constructed. The bolted inter-cell connections simplify the assembly of a battery. Ample space is provided below the plates for the accumulation of deposit. For use in the United Kingdom these cells are sent out fully charged, and may be put to work after receiving a short freshening charge. Full instructions are provided.

Stands, constructed of well-seasoned wood and without the use of metal fastenings, can be supplied to meet any special arrangement of cells which may be desired.



Cat. No.	Capacity at 10-hour Rate.	Normal Charging Rate.	Weight including Acid.		Dimensions.						Cell Centres.	
					Height Overall.		Width Overall.		Length Overall.			
	Ah	amp.	lbs.	kgs.	ins.	mm.	ins.	mm.	ins.	mm.	ins.	mm.
T2511	10	1.4	11.00	5.00	12	305	5 $\frac{3}{8}$	137	3 $\frac{3}{8}$	93	3 $\frac{3}{8}$	98
T2512	20	2.7	17.00	7.71	12	305	5 $\frac{3}{8}$	137	4 $\frac{7}{8}$	125	5 $\frac{3}{8}$	144
T2513	30	4.1	21.00	9.52	12	305	5 $\frac{3}{8}$	137	6 $\frac{3}{8}$	162	6 $\frac{7}{8}$	175
T2514	40	5.5	27.00	12.25	12	305	5 $\frac{3}{8}$	137	7 $\frac{7}{8}$	200	8 $\frac{3}{8}$	220
T2515	50	7.00	38.00	17.24	16 $\frac{5}{8}$	422	7 $\frac{7}{8}$	200	5 $\frac{1}{8}$	130	5 $\frac{1}{2}$	140
T2516	75	10.00	51.00	23.13	16 $\frac{5}{8}$	422	7 $\frac{7}{8}$	200	6 $\frac{5}{8}$	166	7	178
T2517	100	14.00	62.00	28.12	16 $\frac{5}{8}$	422	7 $\frac{7}{8}$	200	8 $\frac{1}{8}$	206	8 $\frac{1}{2}$	216
T2518	125	17.00	74.00	33.56	16 $\frac{5}{8}$	422	7 $\frac{7}{8}$	200	9 $\frac{5}{8}$	244	10	254

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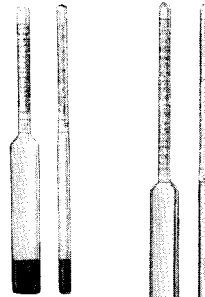
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T4289 Battery Hydrometer.

Flat type, 9" long (23 cms.). For use in open type storage cells. Range 1,120 to 1,280 in double degrees, with red index mark at 1,215.

Length 9" (229 mm.)
 Width $\frac{7}{8}$ " (22 mm.)
 Depth $\frac{1}{4}$ " (6.4 mm.)
 Weight 1-oz. (28 gm.)



T4289

T4290

T4290 Battery Hydrometer.

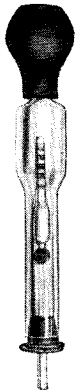
Flat type. As T4289 but 12" (305 mm.) long.

T4292 Battery Hydrometer.

Syringe type. For use with closed-top storage cells, small P.A.X. and signalling batteries, etc. The outer glass barrel is constricted at intervals to act as a guide to the hydrometer tube and ensures an upright position, thereby facilitating accurate reading. Friction is minimised and sticking prevented by a series of projections around the lower bulb.

Range: 1,100 to 1,300 in stages of 10 points.

Length 12" (305 mm.)
 Width $1\frac{1}{2}$ " (38 mm.)
 Depth $1\frac{1}{2}$ " (38 mm.)
 Weight $3\frac{1}{2}$ -ozs. (99 gm.)



T4292

T4291 Battery Hydrometer.

Luxmart type. For use in the presence of an oil-film on the surface of the electrolyte, or in the case of lead-lined wood tanks, or opaque containers, rendering it difficult to obtain a clear reading at electrolyte level. Embodying a celluloid float, which displays the specific gravity at approximately one inch above the level of the liquid.

Range: 1,120 to 1,220.

Length 9" (229 mm.)
 Width 3" (76 mm.)
 Depth 1" (25 mm.)
 Weight 4-ozs. (113 gm.)



T4291

T4656 Thermometer.

Vehicle battery type. Approx. $4\frac{1}{2}$ " (114 mm.) long \times $\frac{5}{16}$ " (8 mm.) diam. Scales 30°-130° F., and 0°-54° C.



T4656

T4655 Thermometer.

Stationary battery type. Approx. $11\frac{1}{2}$ " (293 mm.) long \times $\frac{3}{8}$ " (19 mm.) diam. Scales 30°-130° F., and 0°-54° C. Also specific gravity—temperature correction scale.



T4655

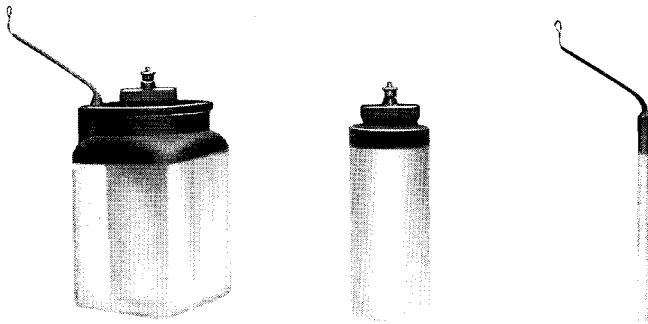
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Leclanché Cells—Porous Pot Type.

T4163. No. 1 Type. Three pints capacity. E.M.F., 1.6 volts. Internal resistance, .75 ohm. Complete cell, sealed, including sal-ammoniac.

T4164. No. 1 Type. Open and without sal-ammoniac.

T4165. Porous pot, charged.

T4166. Zinc rod.

T4167. Glass jar.

T No.	Length.		Width.		Depth.		Weight.	
	ins.	mm.	ins.	mm.	ins.	mm.	lbs. ozs.	kg.
T4163 ...	8 $\frac{3}{4}$	222	4 $\frac{5}{8}$	117	4 $\frac{5}{8}$	117	5 12	2.6
T4164 ...	8 $\frac{3}{4}$	222	4 $\frac{5}{8}$	117	4 $\frac{5}{8}$	117	4 4	2.2
T4165 ...	8 $\frac{1}{2}$	216	3	76	—	—	2 8	1.2
T4166 ...	7	178	dia.	dia.	—	—	0 6	.170
T4167 ...	7 $\frac{1}{4}$	184	4 $\frac{5}{8}$	117	4 $\frac{5}{8}$	117	2 0	.9

Leclanché Cells—Porous Pot Type.

T4168. No. 2 Type. Two pints capacity. E.M.F., 1.6 volts. Internal resistance, 1 ohm. Complete cell, sealed, including sal-ammoniac.

T4169. No. 2 Type. Open and without sal-ammoniac.

T4170. Porous pot, charged.

T4171. Zinc rod.

T4172. Glass jar.

T No.	Length.		Width.		Depth.		Weight.	
	ins.	mm.	ins.	mm.	ins.	mm.	lbs. ozs.	kg.
T4168 ...	7 $\frac{1}{4}$	184	3 $\frac{3}{4}$	95	3 $\frac{3}{4}$	95	4 0	1.8
T4169 ...	7 $\frac{1}{4}$	184	3 $\frac{3}{4}$	95	3 $\frac{3}{4}$	95	3 6	1.5
T4170 ...	7	178	2 $\frac{1}{2}$	63	—	—	1 10	.74
T4171 ...	6	153	dia.	dia.	—	—	0 4	.113
T4172 ...	6 $\frac{1}{2}$	165	3 $\frac{3}{4}$	95	3 $\frac{3}{4}$	95	1 8	.680

Leclanché Cells—Porous Pot Type.

T4173. No. 3 Type. One pint capacity. E.M.F., 1.6 volts. Internal resistance, 1.75 ohms. Complete cell, sealed, including sal-ammoniac.

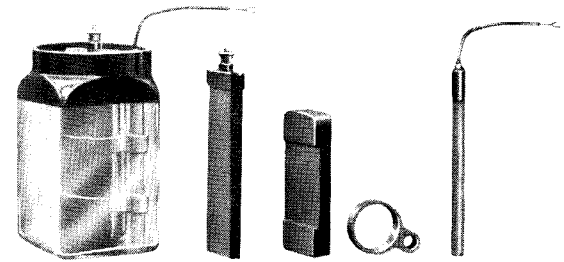
T4174. No. 3 Type. Open and without sal-ammoniac.

T4175. Porous pot, charged.

T4176. Zinc rod.

T4177. Glass jar.

T No.	Length.		Width.		Depth.		Weight.	
	ins.	mm.	ins.	mm.	ins.	mm.	lbs. ozs.	kg.
T4173 ...	6 $\frac{3}{4}$	171	3 $\frac{1}{4}$	83	3 $\frac{1}{4}$	83	2 8	1.2
T4174 ...	6 $\frac{3}{4}$	171	3 $\frac{1}{4}$	83	3 $\frac{1}{4}$	83	2 0	.9
T4175 ...	6 $\frac{1}{2}$	165	2	51	—	—	0 14	.396
T4176 ...	5	127	dia.	dia.	—	—	0 3	.085
T4177 ...	5	127	3 $\frac{1}{4}$	83	3 $\frac{1}{4}$	83	0 14	.396



Leclanché Cells—Agglomerate Type.

T4644. No. 3 Type. One pint capacity. E.M.F., 1.5 volts. Internal resistance, .8 ohm. Complete cell, sealed, including sal-ammoniac.

T4645. No. 3 Type. Open and without sal-ammoniac.

T4646. Agglomerate blocks (pairs).

T4647. Carbon plate with terminal.

T4648. Zinc rod.

T4649. Glass jar.

T4650. India-rubber band.

T No.	Length.		Width.		Depth.		Weight.	
	ins.	mm.	ins.	mm.	ins.	mm.	lbs. ozs.	gm.
T4644 ...	6 $\frac{1}{4}$	159	3 $\frac{1}{4}$	83	3 $\frac{1}{4}$	83	2 2	978
T4645 ...	6 $\frac{1}{4}$	159	3 $\frac{1}{4}$	83	3 $\frac{1}{4}$	83	1 12	794
T4646 each	3 $\frac{3}{4}$	95	1 $\frac{1}{4}$	32	—	—	0 3	85
T4647 ...	6	152	1 $\frac{1}{4}$	32	—	—	0 3	85
T4648 ...	5	127	dia.	dia.	—	—	0 3	85
T4649 ...	5	127	3 $\frac{1}{4}$	83	3 $\frac{1}{4}$	83	0 15	425
T4650 ...	—	13	1 $\frac{1}{4}$	32	—	—	0 0 $\frac{1}{2}$	14

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Leclanché Cells—Agglomerate Type.

- T4637. No. 2 Type. Two pints capacity. E.M.F., 1.5 volts. Internal resistance, .7 ohm. Complete cell, sealed, including sal-ammoniac.
- T4638. No. 2 Type. Open and without sal-ammoniac.
- T4639. Agglomerate blocks (pairs).
- T4640. Carbon plate with terminal.
- T4641. Zinc rod.
- T4642. Glass jar.
- T4643. India-rubber band.

T No.	Length.		Width.		Depth.		Weight.		
	ins.	mm.	ins.	mm.	ins.	mm.	lbs.	ozs.	gm.
T4637 ...	7	178	3 3/4	95	3 3/4	95	3	14	1756
T4638 ...	7	178	3 3/4	95	3 3/4	95	3	4	1474
T4639 each	4 1/2	114	1 5/8	41	1 5/8	41	0	9	255
T4640 ...	6 3/4	171	1 5/8	41	1 5/8	41	8	0 4 1/2	127
T4641 ...	6	152	7/16	11	—	—	—	0 4	113
			dia.	dia.					
T4642 ...	6 1/2	165	3 3/4	95	3 3/4	95	1	8	680
T4643 ...	1 1/2	13	1 1/4	32	1 1/8	3	0	0 1/2	14
			dia.	dia.					

Leclanché Cells—Agglomerate Type.

- T4630. No. 1 Type. Three pints capacity. E.M.F., 1.5 volts. Internal resistance, .6 ohm. Complete cell, sealed, including sal-ammoniac.
- T4631. No. 1 Type. Open and without sal-ammoniac.
- T4632. Agglomerate blocks (pairs).
- T4633. Carbon plate with terminal.
- T4634. Zinc rod.
- T4635. Glass jar.
- T4636. India-rubber band.

T No.	Length.		Width.		Depth.		Weight.		
	ins.	mm.	ins.	mm.	ins.	mm.	lbs.	ozs.	kg.
T4630 ...	8 1/2	210	4 5/8	117	4 5/8	117	5	7	2.466
T4631 ...	8 1/4	210	4 5/8	117	4 5/8	117	4	7	2.012
T4632 each	5	127	2 1/8	54	1	25	0	13	.369
T4633 ...	8	203	2	51	5/16	8	0	6 1/2	.184
T4634 ...	7	178	1 1/2	38	—	—	0	6	.170
			dia.	dia.					
T4635 ...	7 1/4	184	4 5/8	117	4 5/8	117	2	0	.907
T4636 ...	1 1/2	13	1 1/2	38	1 1/8	3	0	0 1/2	.014
			dia.	dia.					

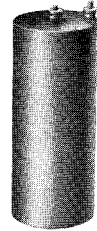
T4654 Sal-ammoniac.

For Leclanché cells. Price quoted on request.

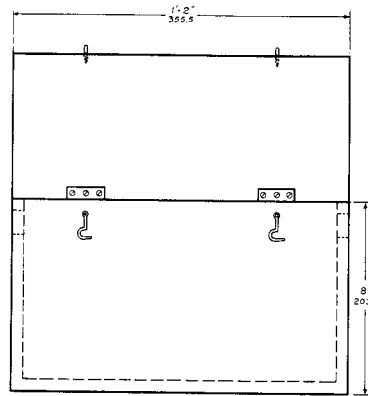
T2156 Dry Cell.

E.M.F., 1.5 volts. Internal resistance, .15 ohm.

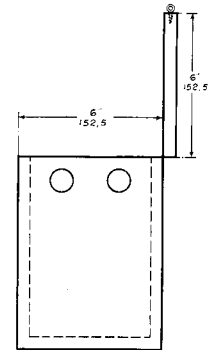
- Length 6 1/2" (165 mm.)
- Diameter 2 9/16" (65 mm.)
- Weight 2-lbs. (907 gm.)



T2156



T4652



T4652 Battery Box.

Oak finish, with hinged lid. Accommodates 9 T2156A dry cells. For use with intercommunication telephones, etc.

T4653 Battery Box.

As T4652, but for 5 cells.

	T4652	T4653
Length	14" (356 mm.)	9" (228 mm.)
Width	6" (152 mm.)	6" (152 mm.)
Depth	8 1/2" (216 mm.)	8 1/2" (216 mm.)
Weight	3 1/2-lbs. (1.785 kg.)	3-lbs. (1.361 kg.)

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C A T A L O G U E

**TELEPHONE
TRANSMISSION
APPARATUS**

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.

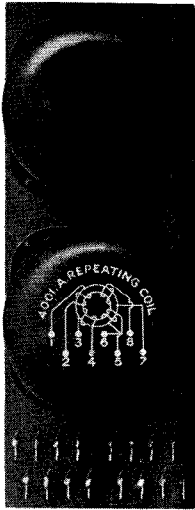
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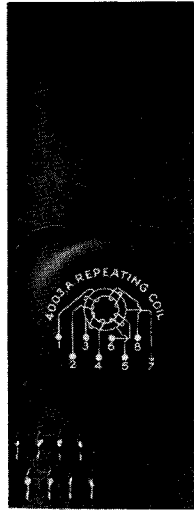
T R O W G E R W O R K S · L I V E R P O O L 7.



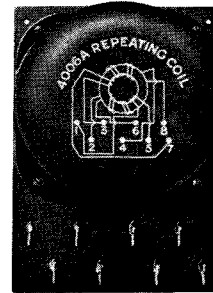
See also Section ED for induction coils and small transformers.



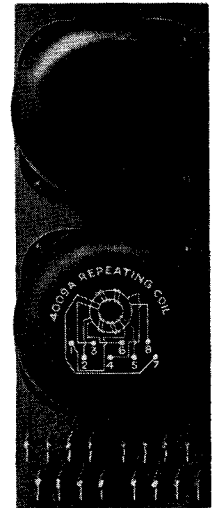
L28101 (T3603)



L28102 (T3604)



L28108 (T3607)



L28115 (T3606)

L28101 (T3603) Repeating Coils.

Toroidal type. For use in cord circuits of central battery exchanges. Comprising two coils, each separately enclosed in black enamelled pressed-steel shell, mounted on waxed teak base. Each coil has two primary and two secondary windings each of 21 ohms, the connections being led out to two sets of 8 terminal tags at one end of the base.

Length : 10 3/8" (273 mm.) Width : 4" (101 mm.) Depth : 2 9/16" (65 mm.) Weight : 6-lbs. (2.7 kg.)

L28102 (T3604) Repeating Coil. As L28101, but single coil only.

L28103 (T3605) Repeating Coil. As L28102, but on smaller base. Adapted for mounting on auxiliary apparatus panels, etc.

Length : 6" (152 mm.) Width : 4" (101 mm.) Depth : 2 9/16" (65 mm.) Weight : 3-lbs. (1.35 kg.)

L28115 (T3606) Repeating Coils.

Toroidal type. For use on duplex telephone circuits, for superimposing telegraph circuits on telephone lines, and for phantom working. Comprising two coils, each separately enclosed in black enamelled pressed-steel shell; mounted on oiled teak base.

Each coil has two primary windings, each of 31 ohms and two secondary windings each of 37 ohms, the connections being led out to two sets of 8 terminal tags at one end of the base. Windings accurately balanced for self capacity and impedance.

Length : 10 3/8" (273 mm.) Width : 4" (101 mm.) Depth : 2 9/16" (65 mm.) Weight : 5-lbs. (2.268 kg.)

L28108 (T3607) Repeating Coil.

As L28115, but single coil only, on smaller base. Adapted for panel mounting.

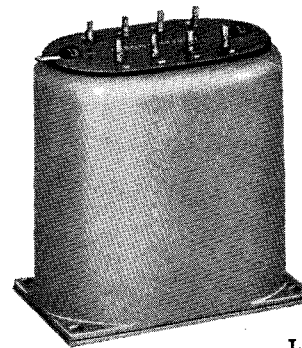
Toroidal Transformers.

For transforming line impedance to 600 ohms exchange impedance, see List A. The 1:1 ratio transformer may also be used as a repeating coil.

The frequency range is 17 to 5000 c/s. The overall loss in the speech range does not exceed 0.9 db.

Two primary and two secondary windings are provided, the connections being led out to eight terminals on top of a grey enamelled case. Both primary and secondary windings are balanced to better than 80 db with respect to the centre point of the windings. The transformers are therefore suitable for superposing purposes.

Power efficiency at 17 c/s is not less than 60%.



L95095 (T3612)

Length ... 4 1/4" (107 mm.)
Breadth ... 2 5/8" (66 mm.)
Height ... 4 3/4" (121 mm.)
Weight ... 4 1/2-lbs. (2.1 kg.)

List A.

Catalogue No.	Resistance ohms (max.)		Turns Ratio. Line to exch. winding
	Line winding	Exch. winding	
L95095 (T3612)	52	52	1:1
L95156 (T3616)	52	29	1:27:1
L95096 (T3613)	52	20	1:63:1
L95097 (T3614)	32	52	1:1:27
L95227 (T177)	16	52	1:1:87
L95228 (T178)	8	52	1:2:74
L95098 (T3615)	52	36	1:42:1

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This type of transformer can be supplied with an air gap in the core which has the effect of stabilizing the characteristics when large changes in current have to be dealt with ; see List B. At 17 c/s the current in the exchange winding does not exceed 50 milliamps with 60 volts.

With 1 milliwatt at 800 c/s applied to the exchange winding and the line winding closed with the appropriate resistance (shown in List B), the loss does not exceed 1 db.

The loss from 300 to 5000 c/s does not vary from the 800 c/s loss by more than ± 0.5 db.

The transformers can be supplied in matched pairs mounted side by side on a common base plate for phantom circuits.

List B

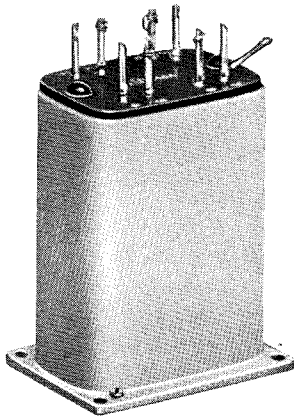
Catalogue No.	Resistance in Ohms (max.)		Turns Ratio Line to Exch. w'd'g	Line Impedance Ohms.
	Line winding	Exch. winding		
L95218 (T175)	72	72	1:1	600
L95219 (T176)	116	72	1:27:1	970
L95093 (T3617)	145	72	1:41:1	1200

Length : $4\frac{1}{4}$ " (107 mm.) Breadth : $2\frac{5}{8}$ " (66 mm.) Height : $4\frac{3}{4}$ " (121 mm.)

Small Transformers.

Used for transforming line impedance to 600 ohms exchange impedance ; see List C. Frequency range 300 to 5000 c/s with loss of less than 0.75 db. The line windings are electrically balanced to better than 80 db. The exchange winding is only approximately balanced and has a reactance of 19 ohms for all ratios. The transformer is not suitable for ringing frequencies (17-20 c/s) but will take up to 40 milliamperes D.C. without affecting the transmission loss.

Two primary and two secondary windings are provided, the connections being led out to eight terminals on top of a grey enamelled case.



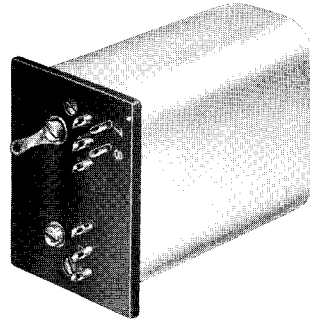
L95230 (T179)

List C

Catalogue No.	Resistance Ohms (max.)		Turns Ratio Line to Exch. winding
	Line winding	Exch. winding	
L95230 (T179)	19	19	1:1
L95376 (T183)	32	19	1:27:1
L95231 (T180)	7.3	19	1:1.63

Length : $3\frac{1}{8}$ " (100 mm.) Breadth : $2\frac{5}{8}$ " (66.7 mm.) Depth : 2" (50.8 mm.) Weight : 1 lb. 5 oz. (0.596 kg.)

These transformers can also be supplied with inverted mountings, to mount on selector or relay plates in the places normally occupied by two 3000 type relays ; see List D.



List D

Catalogue No.	Resistance Ohms (max.)		Turns Ratio Line to Exch. winding
	Line winding	Exch. winding	
L95258 (T181)	19	19	1:1
L95346 (T182)	6.7	19	1:1.87

Length : $3\frac{1}{16}$ " (84.1 mm.) Breadth : $2\frac{3}{8}$ " (60.3 mm.) Depth : 2" (50.8 mm.) Weight : 1 lb. 2 oz. (0.511 kg.)

Both types of these transformers are supplied with suitable ratios for use as input and output transformers for thermionic amplifiers, etc.

Mu-metal and permalloy cores are available for special requirements and the windings can be screened if desired.

Low Loss Toroidal Transformers.

Similar in construction to L95095 but with nickel-iron alloy core ; see List E. Frequency range 17 to 5000 c/s. Efficiency at 25 c/s 80% with 45 volts applied to exchange winding and line winding closed with appropriate resistance. Loss in the speech range does not exceed 0.5 db.

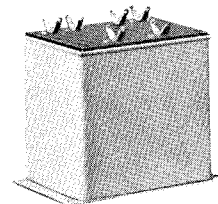
List E

Catalogue No.	Resistance Ohms. (Max.)		Turns Ratio Line to Exch. winding
	Line winding	Exch. winding	
L95277 (T3627)	30	30	1:1
L95278 (T3628)	30	33	1:1.13
L95279 (T3629)	40	65	1:1.63
L95381 (T184)	30	14	1:41:1

LD5023 (T4272)

Ringing Transformer

For use on "Strowger" P.A.X. equipment in connection with the ringing vibrator. Operates on various battery voltages, 12, 24 and 48 volts. Coil and laminations mounted in cast aluminium case filled with special insulating compound. Terminals on phenol fibre strip. Grey enamel finish. Arranged for plate mounting.



LD5023 (T4272)

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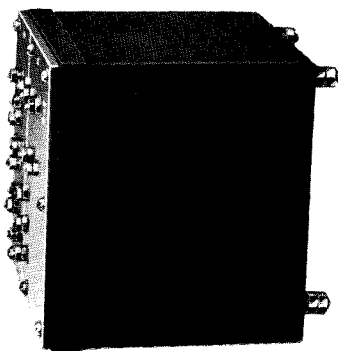


Length : Width : Depth : Weight :
 $4\frac{1}{4}$ " (108 mm.) 5" (127 mm.) 3" (76 mm.) $4\frac{3}{4}$ -lbs. (2.2 kg.)

L95055 (T4273) Universal Tone Transformer.

Used on main automatic exchanges for any of the usual tone frequencies, e.g., busy tone, N.U. tone, dial tone, and ring-back tone. One winding is suitable for supplying tone superimposed upon direct current where the permissible D.C. voltage drop is very small. Various combinations of the three windings may be used to meet different tone requirements. General construction and finish as LD5023 (T4272).

Length : Breadth : Depth : Weight :
 $4\frac{7}{8}$ " (123.8 mm.) $4\frac{1}{2}$ " (114.3 mm.) 3" (76.2 mm.) 4-lbs. 10-ozs. (2.097 kg.)



T3631

T3631 Compensated Mains Transformer.

As used with "Electro-matic" street traffic control signals. 55 volt-amperes. Tapped for input voltages of 200, 210, 220, 230, 240 and 250 at 50 cycles. Supplies filament and anode voltages for full-wave rectifier AZ31 or equivalent, together with 12 volts and 110 volts A.C. outputs. The rectified output from the valve is limited to 6 milliamperes at 412 volts, and this voltage is maintained automatically through special transformer construction to

within $\pm 2\%$ in spite of variations of input voltage up to 15%.

Sealed in a stout metallic case, having four fixing studs. Terminals mounted on a phenol fibre plate, suitably engraved.

A separate matched 0.5 μ F capacitor is included with these transformers.

T3632 Compensated Mains Transformer.

Similar to the above, but for input voltages of 95, 100, 105, 110, 115 and 120 volts.

Length : Width : Depth : Weight :
 $5\frac{1}{8}$ " (130 mm.) $4\frac{9}{16}$ " (116 mm.) $4\frac{1}{16}$ " (103 mm.) $8\frac{1}{2}$ -lbs. (3.74 kg.)

NOTE.—We can supply similar transformers for use with rotary converters on D.C. supply, 25 cycles, etc., or to customers' own specification.

Tropical Transformers.

All the above transformers can be supplied specially finished and impregnated so as to be suitable for tropical climates.

To order a transformer with tropical finish prefix the letter "J" to the code number listed above. Example :—J L95095 is the tropical version of L95095.

Non-standard Transformers.

Numerous other transformers, not listed in this Catalogue, are manufactured for various special applications. Enquiries are invited for transformers to meet customers' specific requirements.

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Loading Coils

The coils are specially designed for insertion in telephone cables at regular intervals for the purpose of reducing attenuation and distortion. The speaking range of a correctly-loaded cable is increased by approximately 400 per cent.

The construction of the coils ensures that losses due to eddy currents and hysteresis cause minimum overall change in effective resistance over the full frequency range.

Coils are assembled in wrought iron cases for installation in manholes or on poles, or in cast-iron cases for burying direct in the ground. Individual coils contained in tinned sheet steel cans, termed Unicoils, are also available for direct insertion in the sleeve joints of cables and for other purposes.

An essential requirement of loading coils is that the overall dimensions shall be as small as possible, provided of course that the electrical characteristics are preserved. This is to facilitate the accommodation of loading coil cases in manholes in which space is frequently very restricted. Recent improvements in the toroidal cores of the coils have effected substantial reductions in sizes and have resulted in a new Type A series of coils which are available in four grades as follows:—

Programme A Coils

These coils are intended for loading circuits of any type which are required to transmit music or other signals of frequencies up to 11,000 c/s. The hysteresis losses are extremely low and screening effectively reduces crosstalk to very low values.

Grade 1A Coils

These coils are for international main trunk or other circuits which are to be extended over very great distances. The stability and low hysteresis loss reduce non-linear distortion to a minimum.

Grade 2A Coils

These are for trunk circuits which are not to be extended to great distances, i.e., lines of 200 miles or less in length.

Grade 3A Coils

These are for short distance minor trunk circuits, i.e. lines of 50 miles or less, or junction circuits between telephone exchanges. They have the stability, low hysteresis loss and effective resistance adequate for this class of line.

N.B. Loading coils are supplied to British Post Office specifications and C.C.I.F. figures.

Types of Loading Coil Cases

The principal types of loading coil cases are:—

- (a) Manhole type case of sheet steel. See Fig. 1, and pages 2 to 6 inclusive.
- (b) Pole-mounting type, generally similar to (a). See page 2.
- (c) Cast-iron types for burial direct in the ground. See Figs. 2 to 7 on pages 7 and 8.
- (d) Cast-iron sleeve type for direct burial. See Fig. 8 on page 9.
- (e) Sleeve type for aerial lines see Fig. 9 on page 9.
- (f) Tunnel type for installation in jointing chambers. See Figs. 10 to 12 on page 10.
- (g) Unicoils—single coils in individual sheet steel cans. See Figs. 13 and 14 on page 11.

Up to four programme coils can be combined in the same case with any number of Grade 1A, 2A and 3A coils and four screened pairs can be incorporated in the stub cables.

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**MANHOLE TYPE LOADING COIL CASES**

Manhole and pole type cases are normally fitted with one 6-ft. (183 cm.) and one 8-ft. (244 cm.) star quad dry paper cable stubs. Cases containing phantom coils are fitted with multiple twin cable stubs. In either type any pairs not loaded are joined straight through the case.

Manhole type cases are protected with a bitumen impregnated

textile covering which will withstand corrosion almost indefinitely. Runners are provided to keep the bottom of the case off the floor.

The shipping brackets which protect the stub cable during transit are returnable.

POLE TYPE CASES

These are similar to Manhole types but are supplied without runners on base.

Finished with protective paint in place of textile covering.



Fig. 1. Loading Coil Cases, Manhole Type, with stub cable shipping brackets.

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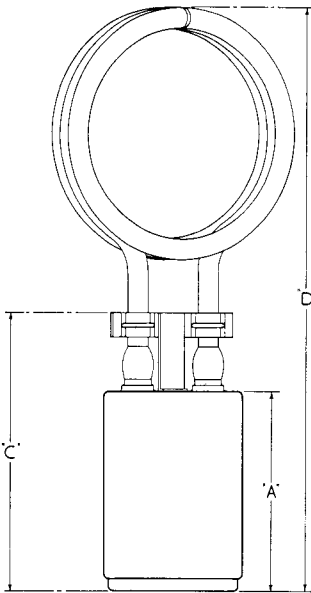
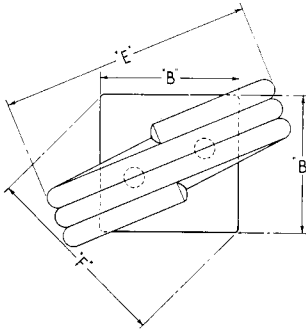


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MANHOLE TYPE LOADING COIL CASES



NOTE:—2 spare pairs are provided in the cables for pots above 160 coils. These spares are not loaded.

Overall Dimensions of Manhole Type Loading Coil Cases using Grades 2A & 3A Coils.

CASE PARTICULARS				GRADE 2A COILS							GRADE 3A COILS							
Stub Cable with Scrd. Pairs	Max. No. of Coils	Stub Cable without Scrd. Pairs	Max. No. of Coils	CASE DIMENSIONS							CASE DIMENSIONS							
				A	B	C	D	E	F	Approx. Wt. (lb)	A	B	C	D	E	F	Approx. Wt. (lb)	
4/40 + 34/20	2	14/40	2-14															
	34	28/20	16-28	8 1/2" (209.6 mm.)	8 3/4" (222.2 mm.)	13 1/2" (336.6 mm.)	32" (812.8 mm.)	16" (406.4 mm.)	12 1/2" (311.2 mm.)	100	7 1/2" (190.5 mm.)	8 1/2" (209.6 mm.)	12 1/2" (311.2 mm.)	31" (787.4 mm.)	16" (406.4 mm.)	11 1/2" (292.1 mm.)	86	
	36	38/20	30															
	36		36	10" (254.0 mm.)	"	15" (381.0 mm.)	34" (863.6 mm.)	"	"	110	8 1/2" (215.9 mm.)	"	13 1/2" (342.9 mm.)	33" (838.2 mm.)	"	"	96	
4/40 + 80/20	40	54/20	38															
	54		40	12 3/4" (370.7 mm.)	"	17 3/4" (447.7 mm.)	37" (939.8 mm.)	"	"	115	8 1/2" (215.9 mm.)	"	13 1/2" (342.9 mm.)	33" (838.2 mm.)	"	"	100	
	56	74/20	54															
	72		56	14 3/4" (365.1 mm.)	"	19 3/4" (492.1 mm.)	38" (965.2 mm.)	"	"	140	11" (279.4 mm.)	"	16" (406.4 mm.)	35" (889.0 mm.)	"	"	120	
	74	76-80	72															
	74		74	14 3/4" (365.1 mm.)	"	19 3/4" (492.1 mm.)	38" (965.2 mm.)	"	"	150	12 3/4" (327.0 mm.)	"	17 3/4" (454.0 mm.)	36" (914.4 mm.)	"	"	130	
	76-80	104/20	76															
	82		76	17 1/2" (438.2 mm.)	"	22 1/2" (565.2 mm.)	40" (1016 mm.)	"	"	157	12 3/4" (327.0 mm.)	"	17 3/4" (454.0 mm.)	36" (914.4 mm.)	"	"	137	
4/40 + 138/20	108	122/20	104															
	110		104	17 1/2" (438.2 mm.)	"	22 1/2" (565.2 mm.)	40" (1016 mm.)	"	"	175	15" (381.0 mm.)	"	20" (508.0 mm.)	37" (939.8 mm.)	"	"	165	
	126	160/20	106															
	128		106	21 3/4" (542.9 mm.)	"	27 3/4" (695.3 mm.)	49" (1245 mm.)	18" (457.2 mm.)	"	185	18 1/2" (460.4 mm.)	"	24 1/2" (612.8 mm.)	45" (1143 mm.)	18" (457.2 mm.)	"	175	
	138	210/20	122															
	138		122	21 3/4" (542.9 mm.)	"	27 3/4" (695.3 mm.)	49" (1245 mm.)	18" (457.2 mm.)	"	230	18 1/2" (460.4 mm.)	"	24 1/2" (612.8 mm.)	45" (1143 mm.)	18" (457.2 mm.)	"	190	
4/40 + 250/10	140	218/20	144															
	160		144	13 3/4" (339.7 mm.)	12 3/4" (320.7 mm.)	19 3/4" (492.1 mm.)	42" (1067 mm.)	"	17 3/4" (450.9 mm.)	320	11 3/4" (298.5 mm.)	10 3/4" (273.1 mm.)	17 3/4" (450.9 mm.)	41" (1041 mm.)	"	15" (381.0 mm.)	240	
	162	256/20	160															
	208		162	17 3/4" (450.9 mm.)	"	24 3/4" (628.7 mm.)	48" (1219 mm.)	20" (508.0 mm.)	"	340	15" (381.0 mm.)	"	22" (558.8 mm.)	46" (1168 mm.)	20" (508.0 mm.)	"	290	
4/40 + 292/10	210	310/10	216															
	240		216	17 3/4" (450.9 mm.)	"	24 3/4" (628.7 mm.)	48" (1219 mm.)	20" (508.0 mm.)	"	400	15" (381.0 mm.)	"	22" (558.8 mm.)	46" (1168 mm.)	20" (508.0 mm.)	"	320	
	242	386/10	218															
	248		218	22 3/4" (577.9 mm.)	"	29 3/4" (755.7 mm.)	54" (1372 mm.)	"	"	430	19 1/2" (485.8 mm.)	"	26 1/2" (663.6 mm.)	51" (1295 mm.)	"	"	350	
4/40 + 386/10	250	402/10	242															
	290		242	22 3/4" (577.9 mm.)	"	29 3/4" (755.7 mm.)	54" (1372 mm.)	"	"	460	19 1/2" (485.8 mm.)	"	26 1/2" (663.6 mm.)	51" (1295 mm.)	"	"	365	
	292	488/6 1/2	256															
	320		256	22 3/4" (577.9 mm.)	"	29 3/4" (755.7 mm.)	54" (1372 mm.)	58" (1473 mm.)	24" (609.6 mm.)	490	19 1/2" (485.8 mm.)	"	26 1/2" (663.6 mm.)	51" (1295 mm.)	55" (1397 mm.)	24" (609.6 mm.)	380	
4/40 + 492/6 1/2	322	544/6 1/2	320															
	384		320	22 3/4" (577.9 mm.)	15" (381.0 mm.)	29 3/4" (755.7 mm.)	54" (1372 mm.)	"	21" (533.4 mm.)	530	19 3/4" (485.8 mm.)	12 3/4" (320.7 mm.)	26 3/4" (663.6 mm.)	"	"	17 3/4" (450.9 mm.)	440	
	386	488/6 1/2	400															
	444		400	22 3/4" (577.9 mm.)	15" (381.0 mm.)	29 3/4" (755.7 mm.)	54" (1372 mm.)	"	21" (533.4 mm.)	560	19 3/4" (485.8 mm.)	12 3/4" (320.7 mm.)	26 3/4" (663.6 mm.)	"	"	17 3/4" (450.9 mm.)	480	
4/40 + 544/6 1/2	446	510	480															
	480		480	23 3/4" (603.3 mm.)	"	30 3/4" (781.1 mm.)	59" (1499 mm.)	"	"	580	21" (533.4 mm.)	"	28" (711.2 mm.)	56" (1422 mm.)	"	"	500	
	482	512	482															
	486		482	23 3/4" (603.3 mm.)	"	30 3/4" (781.1 mm.)	59" (1499 mm.)	"	"	600	22 3/4" (577.9 mm.)	"	29 3/4" (755.7 mm.)	58" (1473 mm.)	"	"	540	
	490	542	486															
	490		486	23 3/4" (603.3 mm.)	"	30 3/4" (781.1 mm.)	59" (1499 mm.)	"	"	600	22 3/4" (577.9 mm.)	"	29 3/4" (755.7 mm.)	58" (1473 mm.)	"	"	540	

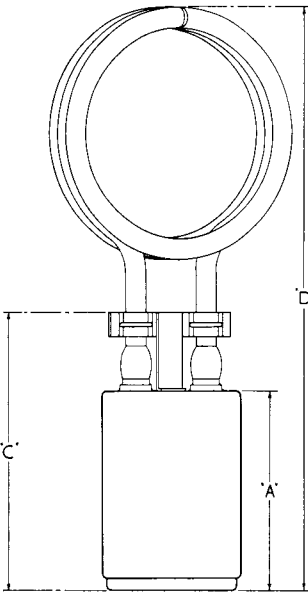
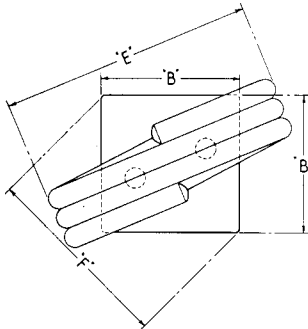
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MANHOLE TYPE LOADING COIL CASES



CASE PARTICULARS				GRADE 2A COILS + 4 GRADE 1A							GRADE 3A COILS + 4 GRADE 1A							
Stub Cable with Scrd. Pairs	Max. No. of Coils	Stub Cable without Scrd. Pairs	Max. No. of Coils	CASE DIMENSIONS							CASE DIMENSIONS							
				A	B	C	D	E	F	Approx. Wt. (lb)	A	B	C	D	E	F	Approx. Wt. (lb)	
4/40 34/20	2	14/40	2-10															
	30	28/20	12-24															
4/40 80/20	36	38/20	26-34	10"	8 3/4"	15"	34"	16"	12 1/2"									
	38	54/20	36	(254.0 mm.)	(222.2 mm.)	(381.0 mm.)	(863.6 mm.)	(406.4 mm.)	(311.2 mm.)									
4/40 138/20	72	74/20	52-70	14 3/8"	"	19 3/8"	38"	"	"									
	74-76	74	72	(365.1 mm.)		(492.1 mm.)	(965.2 mm.)											
4/40 160/20	78-80	104/20	80	16 5/8"	"	21 5/8"	40"	"	"									
	82	82-100	82-100	(422.3 mm.)		(549.3 mm.)	(1016 mm.)											
4/40 182/20	108	122/20	102-108	19"	"	25"	46"	18"	"									
	110	110-118	110-118	(482.6 mm.)		(635.0 mm.)	(1168 mm.)	(457.2 mm.)										
4/40 210/20	126	120-126	120-126	21 3/8"	"	27 3/8"	49"	"	"									
	128	128	128	(542.9 mm.)		(695.3 mm.)	(1245 mm.)											
4/40 250/10	134	160/20	144	23 3/8"	"	29 1/8"	51"	"	"									
	136	146-156	146-156	(587.4 mm.)		(739.8 mm.)	(1295 mm.)											
4/40 250/10	160	218/20	158-160	15 1/2"	12 5/8"	21 1/2"	45"	20"	17 3/8"									
	162-204	162-212	162-212	(384.2 mm.)	(320.7 mm.)	(536.6 mm.)	(1143 mm.)	(508.0 mm.)	(450.9 mm.)									
4/40 250/10	206-240	256/20	214-240	19 1/2"	"	25 1/2"	48 1/2"	"	"									
	242-244	242-250	242-250	(485.8 mm.)		(638.2 mm.)	(1232 mm.)											
4/40 292/10	246-260	252-260	252-260	21"	"	28"	51"	"	"									
	262-286	310/10	262-304	(533.4 mm.)		(711.2 mm.)	(1295 mm.)											
4/40 386/10	288-320	402/10	306-320	24 1/2"	"	31 1/2"	56"	"	"									
	322-380	322	322	(612.8 mm.)		(790.6 mm.)	(1422 mm.)											
4/40 446/6 1/2	382-396	396	396	21 3/8"	15"	28 3/8"	57"	"	21"									
	398-440	488/6 1/2	398-482	(542.9 mm.)	(381.0 mm.)	(720.7 mm.)	(1448 mm.)		(533.4 mm.)									
4/40 492/6 1/2	442-486	484-492	484-492	24 5/8"	"	31 5/8"	60"	"	"									
	494	544/6 1/2	494	(625.5 mm.)		(803.3 mm.)	(1524 mm.)											
4/40 544/6 1/2	538	538	538	26 1/2"	"	33 1/2"	62"	"	"									
				(673.1 mm.)		(850.9 mm.)	(1575 mm.)											

NOTE:—2 spare pairs are provided in the cables for pots above 160 coils. These spares are not loaded.

Overall Dimensions of Manhole Type Loading Coil Cases using Grade 2A & 3A Coils with 4 Grade 1A Coils.

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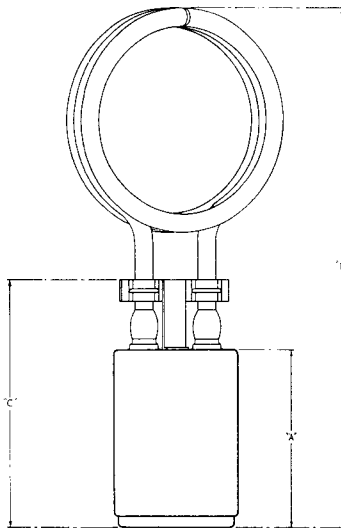
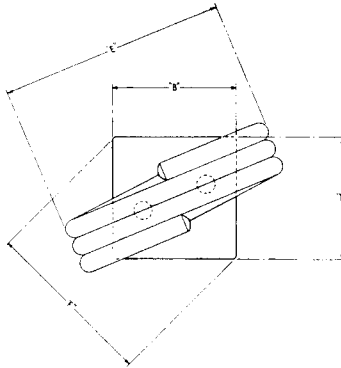
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MANHOLE TYPE LOADING COIL CASES



GRADE 2A COILS - 4 PROG. "A" COILS									GRADE 3A COILS - 4 PROG. "A" COILS						
CASE PARTICULARS		CASE DIMENSIONS							CASE DIMENSIONS						
No. of Side Coils	Stub Cable	A	B	C	D	E	F	Approx. Wt. (lb.)	A	B	C	D	E	F	Approx. Wt. (lb.)
2	4/40 + 34/20	10"	8 3/4"	15"	34"	16"	12 1/2"	123	9 1/2"	8 3/4"	14 1/2"	33"	16"	11 1/2"	103
34		(254.0 mm.)	(222.2 mm.)	(381.0 mm.)	(863.6 mm.)	(406.4 mm.)	(311.2 mm.)		(234.9 mm.)	(209.6 mm.)	(361.9 mm.)	(838.2 mm.)	(406.4 mm.)	(292.1 mm.)	
36	4/40 + 80/20							133							113
38	4/40 + 80/20	14 3/8"	..	19 3/8"	38"	..	..	158	12 7/8"	..	17 7/8"	36"	..	..	148
72		(365.1 mm.)		(492.1 mm.)	(965.2 mm.)				(327.0 mm.)		(454.0 mm.)	(914.4 mm.)			
74	4/40 + 80/20	16 3/8"	..	21 9/8"	40"	..	..	165	13 3/8"	..	18 3/8"	37"	..	..	155
80		(422.3 mm.)		(549.3 mm.)	(1016 mm.)				(349.3 mm.)		(476.3 mm.)	(939.8 mm.)			
82	4/40 + 138/20	19"	..	25"	46"	18"	..	210	16 3/8"	..	22 3/8"	44"	18"	..	180
108		(482.6 mm.)		(635.0 mm.)	(1168 mm.)	(457.2 mm.)			(577.9 mm.)		(577.9 mm.)	(1118 mm.)	(457.2 mm.)		
110	4/40 + 138/20	21 3/8"	..	27 3/8"	49"	..	..	225	18 1/8"	..	24 1/8"	45"	..	..	195
126		(542.9 mm.)		(695.3 mm.)	(1245 mm.)				(469.9 mm.)		(622.3 mm.)	(1143 mm.)			
128	4/40 + 138/20	23 1/8"	..	29 1/8"	51"	..	..	240	19 7/8"	..	25 7/8"	47"	..	..	210
138		(587.4 mm.)		(739.8 mm.)	(1295 mm.)				(657.2 mm.)		(657.2 mm.)	(1194 mm.)			
140	4/40 + 210/20	15 1/8"	12 5/8"	21 1/8"	45"	20"	17 3/8"	320	13 3/8"	10 3/8"	19 1/8"	43"	20"	15"	260
160		(384.2 mm.)	(320.7 mm.)	(536.6 mm.)	(1143 mm.)	(508.0 mm.)	(450.9 mm.)		(342.9 mm.)	(273.1 mm.)	(493.3 mm.)	(1092 mm.)	(508.0 mm.)	(381.0 mm.)	
162-208	4/40 + 210/20	19 1/2"	..	25 1/2"	48 1/2"	..	..	390	16 3/8"	..	22 3/8"	46"	..	..	300
210-240	4/40 + 250/10	(485.8 mm.)		(638.2 mm.)	(1232 mm.)			400	(425.5 mm.)		(577.9 mm.)	(1168 mm.)			320
242-248	4/40 + 250/10	21"	..	28"	51"	..	..	420	18"	..	25"	49"	..	..	340
250-260	4/40 + 292/10	(533.4 mm.)		(711.2 mm.)	(1295 mm.)			430	(457.2 mm.)		(635.0 mm.)	(1245 mm.)			350
262-290	4/40 + 292/10	24 1/8"	..	31 3/8"	56"	..	..	460	20 3/8"	..	27 3/8"	52"	..	..	380
292-320	4/40 + 386/10	(612.8 mm.)		(790.6 mm.)	(1422 mm.)			490	(530.2 mm.)		(708.0 mm.)	(1321 mm.)			400
					60"	24"						56"	24"		
					(1524 mm.)	(609.6 mm.)						(1422 mm.)	(609.6 mm.)		
322-384	4/40 + 386/10	21 3/8"	15"	28 3/8"	57"	..	21"	520	19 3/8"	12 3/8"	26 3/8"	55"	..	17 3/8"	440
386-396	4/40 + 446/6 1/2	(542.9 mm.)	(381.0 mm.)	(720.7 mm.)	(1448 mm.)		(533.4 mm.)	530	(485.8 mm.)	(320.7 mm.)	(663.6 mm.)	(1397 mm.)		(450.9 mm.)	460
398-444	4/40 + 446/6 1/2	24 3/8"	..	31 3/8"	60"	..	..	560	21"	..	28"	56"	..	..	480
446-490	4/40 + 492/6 1/2	(625.5 mm.)		(803.3 mm.)	(1524 mm.)			570	(711.2 mm.)		(1422 mm.)	(1422 mm.)			500

NOTE:—2 spare pairs are provided in the cables for pots above 160 coils. These spares are not loaded.

Overall Dimensions of Manhole Type Loading Coil Cases using Grade 2A & 3A Coils with 4 Prog. "A" Coils.

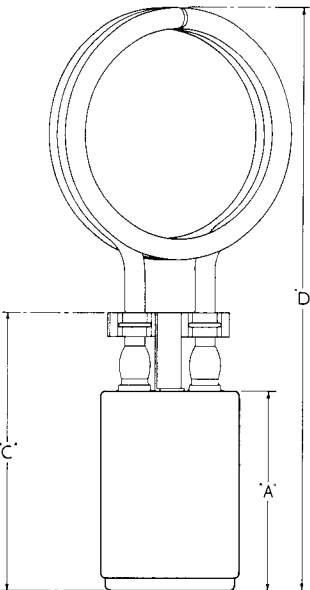
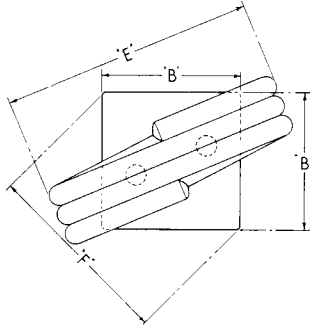
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MANHOLE TYPE LOADING COIL CASES



GRADE 2A COILS + 2 PROG."A" + 2 GRADE 1A									GRADE 3A COILS + 2 PROG."A" + 2 GRADE 1A						
CASE PARTICULARS		CASE DIMENSIONS							CASE DIMENSIONS						
No. of Side Coils	Stub Cable	A	B	C	D	E	F	Approx. Wt. (lb)	A	B	C	D	E	F	Approx. Wt. (lb)
2	4/40 - 34/20	10"	8 3/4"	15"	34"	16"	12 1/2"	123	9 1/4"	8 1/2"	14 1/2"	33"	16"	11 1/2"	103
32	4/40 - 34/20	(254.0 mm.)	(222.2 mm.)	(381.0 mm.)	(863.6 mm.)	(406.4 mm.)	(311.2 mm.)		(234.9 mm.)	(209.6 mm.)	(361.9 mm.)	(838.2 mm.)	(406.4 mm.)	(292.1 mm.)	
34-36	4/40 - 80/20							133							113
38	4/40 - 80/20	14 3/8"		19 3/8"	38"			158	12 7/8"		17 3/8"	36"			148
72	4/40 - 80/20	(365.1 mm.)		(492.1 mm.)	(965.2 mm.)				(327.0 mm.)		(454.0 mm.)	(914.4 mm.)			
74	4/40 - 80/20	16 5/8"		21 5/8"	40"			165	13 3/8"		18 3/8"	37"			155
78	4/40 - 80/20	(422.3 mm.)		(549.3 mm.)	(1016 mm.)				(349.3 mm.)		(476.3 mm.)	(939.8 mm.)			
80	4/40 - 138/20	19"		25"	46"	18"		210	16 3/8"		22 3/8"	44"	18"		180
108	4/40 - 138/20	(482.6 mm.)		(635.0 mm.)	(1168 mm.)	(457.2 mm.)			(425.5 mm.)		(577.9 mm.)	(1118 mm.)	(457.2 mm.)		
110	4/40 - 138/20	21 3/8"		27 3/8"	49"			225	18 3/8"		24 3/8"	45"			195
126	4/40 - 138/20	(542.9 mm.)		(695.3 mm.)	(1245 mm.)				(469.9 mm.)		(622.3 mm.)	(1143 mm.)			
128	4/40 - 138/20	23 1/8"		29 1/8"	51"			240	19 7/8"		25 7/8"	47"			210
136	4/40 - 138/20	(587.4 mm.)		(739.8 mm.)	(1295 mm.)				(504.8 mm.)		(657.2 mm.)	(1194 mm.)			
138	4/40 - 210/20	15 1/8"	12 3/8"	21 1/8"	45"	20"	17 3/8"	320	13 1/8"	10 3/8"	19 3/8"	43"	20"	15"	260
160	4/40 - 210/20	(384.2 mm.)	(320.7 mm.)	(536.6 mm.)	(1143 mm.)	(508.0 mm.)	(450.9 mm.)		(342.9 mm.)	(273.1 mm.)	(495.3 mm.)	(1092 mm.)	(508.0 mm.)	(381.0 mm.)	
162-206	4/40 - 210/20	19 1/8"		25 1/8"	48 1/2"			390	16 3/8"		22 3/8"	46"			300
208-240	4/40 - 250/10	(485.8 mm.)		(638.2 mm.)	(1232 mm.)			400	(425.5 mm.)		(577.9 mm.)	(1168 mm.)			320
242-246	4/40 - 250/10	21"		28"	51"			420	18"		25"	49"			340
248-260	4/40 - 292/10	(533.4 mm.)		(711.2 mm.)	(1295 mm.)			430	(457.2 mm.)		(635.0 mm.)	(1245 mm.)			350
262-288	4/40 + 292/10	24 1/8"		31 1/8"	56"			460	20 7/8"		27 7/8"	52"			380
290-320	4/40 + 386/10	(612.8 mm.)		(790.6 mm.)	(1422 mm.)			490	(530.2 mm.)		(708.0 mm.)	(1422 mm.)	24"		400
					60"	24"							(609.6 mm.)		
322-382	4/40 - 386/10	21 3/8"	15"	28 3/8"	57"	24"	21"	520	19 1/8"	12 3/8"	26 1/8"	55"	24"	17 3/8"	440
384-396	4/40 + 446/6 1/2	(542.9 mm.)	(381.0 mm.)	(720.7 mm.)	(1448 mm.)	(609.6 mm.)	(533.4 mm.)	530	(485.8 mm.)	(320.7 mm.)	(663.6 mm.)	(1397 mm.)	(609.6 mm.)	(450.9 mm.)	460
398-442	4/40 + 446/6 1/2	24 3/8"		31 3/8"	60"			560	21"		28"	56"			480
444-488	4/40 - 492/6 1/2	(625.5 mm.)		(803.3 mm.)	(1524 mm.)			570	(533.4 mm.)		(711.2 mm.)	(1422 mm.)			500

NOTE:—2 spare pairs are provided in the cables for pots above 160 coils. These spares are not loaded.

Overall Dimensions of Manhole Type Loading Coil Cases using Grade 2A & 3A Coils W/—2 Prog. "A" & 2 Grade 1A Coils.

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BURIED TYPE FOR SLEEVE TYPE JOINTS

Buried type cases are provided with a jointing chamber protected by a cast-iron cover, in which all joints between the

line cables and the short lead covered stub cables are made. The joints are kept moisture proof by a lead sleeve which is wiped to the brass elbows specially provided for that purpose.

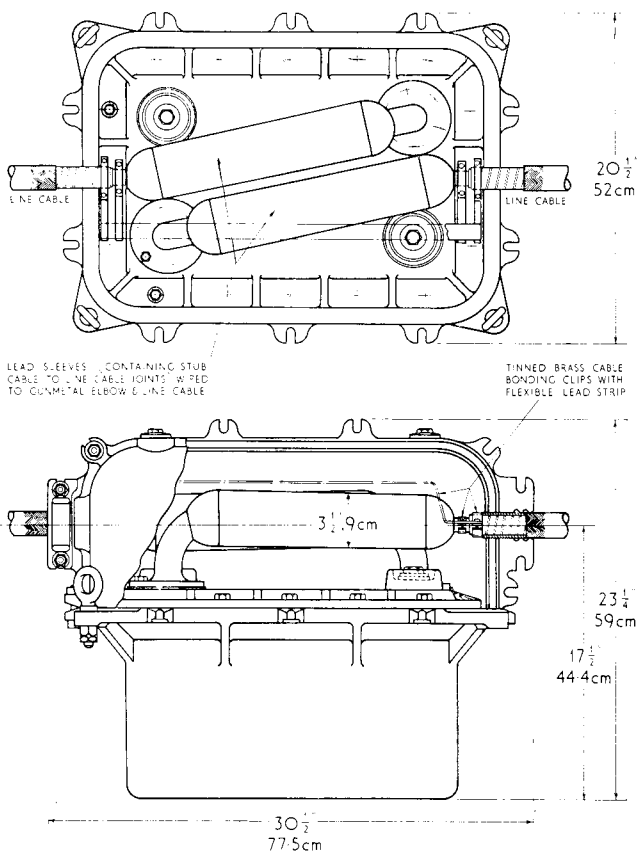


Fig. 2. Outline Dimensions and cable centres.

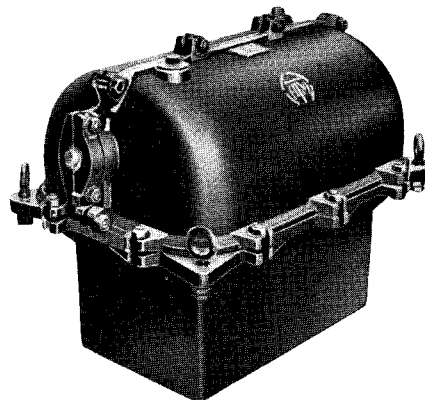


Fig. 3. Cable chamber covered.

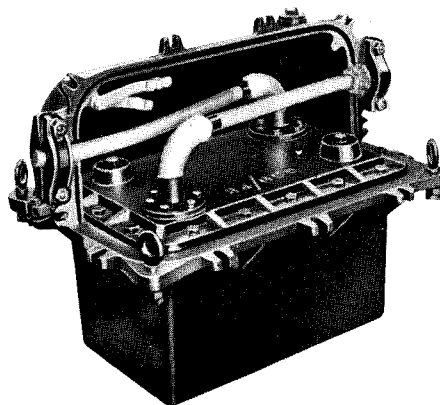


Fig. 4 Half cover removed.

Loading Coil Case. Buried Type with 2 Stud Cables for Lead Sheath Joints.

SIDE CIRCUITS			Armoured Line Cable	PHANTOM CIRCUITS		WEIGHT		
No. of Coils				No. of Units Grade 2A	Armoured Line Cable	Grade 1A	Grade 2A	Grade 3A
Grade 1A	Grade 2A	Grade 3A	up to 104 pr./20 lb. or 4 scrd. pr./40 lb. plus 80 pr./20 lb.	up to 28	up to 96 pr./20 lb. multiple twin.	580 lb. 262 kg.	565 lb. 255 kg.	555 lb. 250 kg.
up to 104	up to 104	up to 104						

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BURIED TYPE WITH FACILITY FOR PARTIAL STRAIGHT THROUGH JOINTING

This type provides for jointing to the line cables without unloaded pairs having to pass through the loading coil chamber, e.g., coaxial pairs. The jointing chamber is protected by a cast-iron cover, in which all joints between the line cables and the short lead covered stub cables are made.

The joints are kept moisture proof by a lead sleeve which is wiped to the brass end plates specially provided for that purpose. The line cables are wiped to split glands provided on the brass end plates.

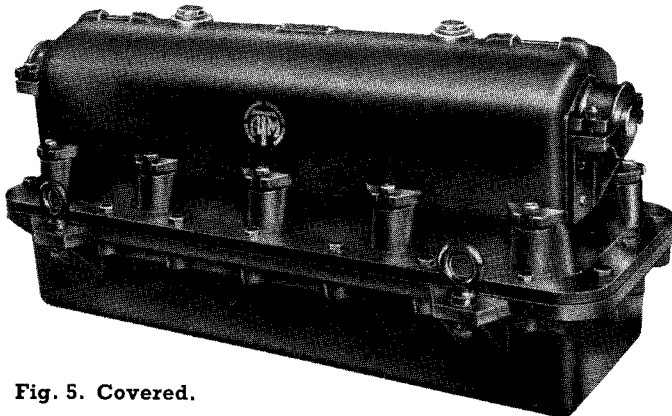


Fig. 5. Covered.

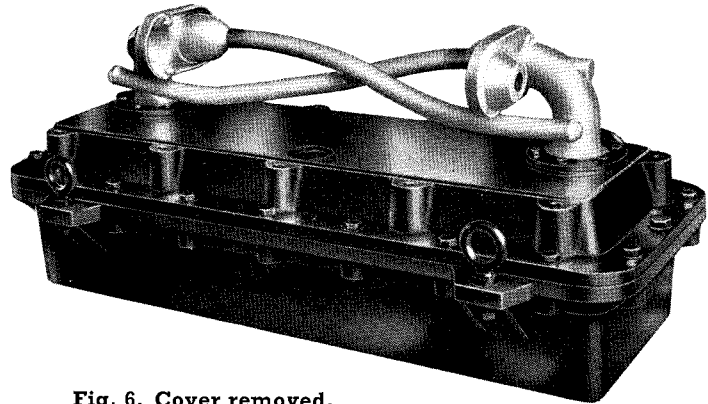


Fig. 6. Cover removed.

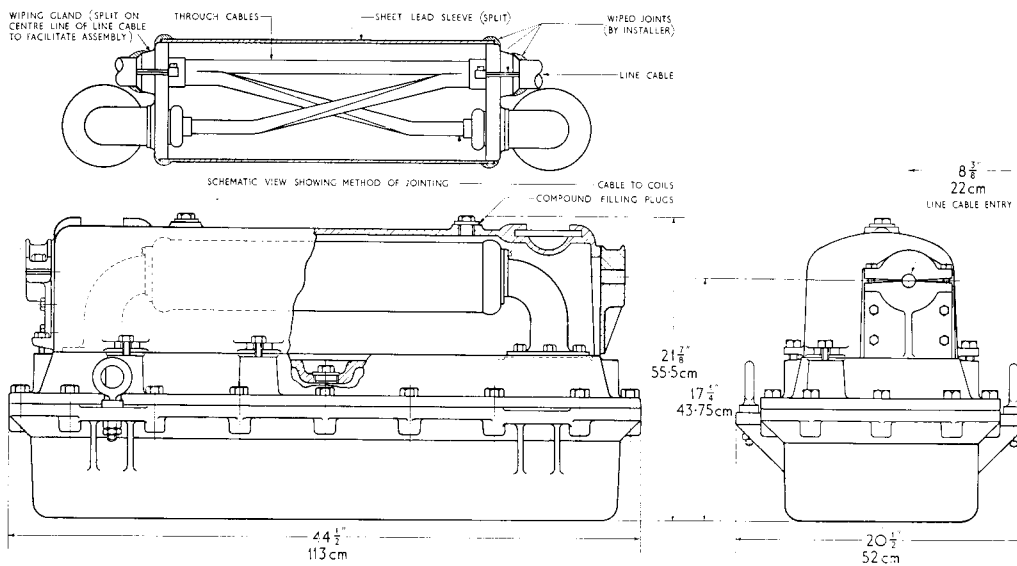


Fig. 7. Outline Dimensions and cable centres.

Loading Coil Case. Buried Type.

Suitable for jointing to Line Cable without unloaded pairs passing into the Coil Chamber, example coaxial pairs.

SIDE CIRCUITS			Armoured Line Cable	PHANTOM CIRCUITS		WEIGHT		
No. of Coils				No. of Units Grade 2A	Armoured Line Cable	Grade 1A	Grade 2A	Grade 3A
Grade 1A	Grade 2A	Grade 3A	up to 308 pr./20 lb. or 4 scrd.pr./40 lb. plus 254 pr./20 lb.	up to 68	up to 182 pr./20 lb. multiple twin.	1050 lb. 475 kg.	1030 lb. 465 kg.	1020 lb. 462 kg.
up to 156	up to 308	up to 308						

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CAST IRON SLEEVE BURIED TYPE

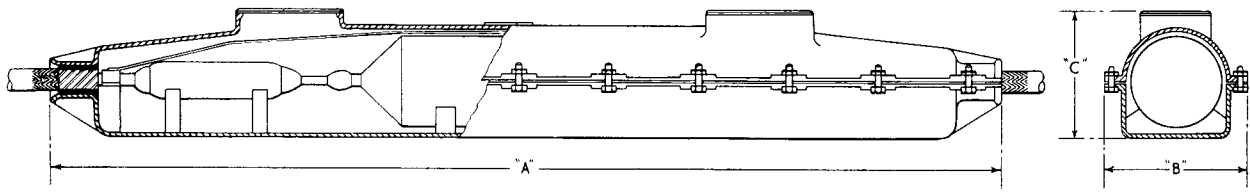


Fig. 8. Cast-iron sleeve type for direct burial.

Number of Coils	Dimensions			Stub cable
	A	B	C	
up to 64 Grade 2A or up to 74 Grade 3A	6'-5 ³ / ₄ " 197.5 cm.	12" 30.5 cm.	11 ¹ / ₂ " 29.2 cm.	up to 74 pr./20 lb. PCQT
Sizes of Cases for Grade 1A and Prog. "A" Coils Available upon application.				

SLEEVE TYPE CASES SUITABLE FOR AERIAL LOADING AND SPECIAL PURPOSES.

This sleeve type case is suitable for installation on aerial lines and can be provided for small quantities of any grade of coil. The cases are constructed of sheet steel, enclosed in a lead sleeve wiped to stub cables.

Overall dimensions and stub cables to suit customers requirements can be supplied upon receipt of specific enquiries.

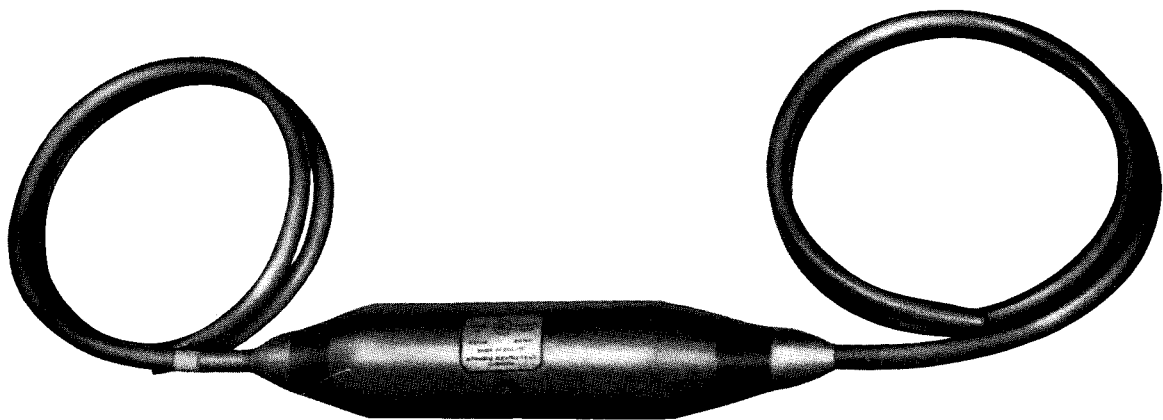


Fig. 9. Sleeve type for aerial lines.
 Sizes according to requirements.

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TUNNEL TYPE FOR INSTALLATION IN JOINTING CHAMBERS

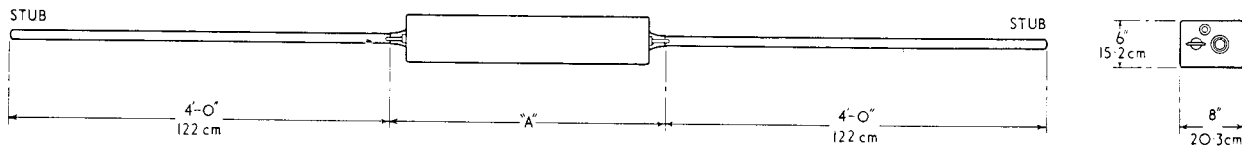


Fig. 10 Outline dimensions (see table)

Number of Coils Grade 3A	Stub cable	Dimension " A "		Number of Coils Grade 3A	Stub cable	Dimension " A "	
		in.	c.m.			in.	c.m.
54	54 pr./20 lb.	22 $\frac{1}{4}$	56.5	218-254	254 pr./20 lb.	46 $\frac{1}{2}$	118
56-74	74 pr./20 lb.	24	61.0	256-288	310 pr./10 lb.	50	127
76-104	104 pr./20 lb.	27 $\frac{1}{2}$	70.0	290-308	310 pr./10 lb.	54	137
106-122	122 pr./20 lb.	29 $\frac{1}{2}$	75.0	310-368	402 pr./10 lb.	59 $\frac{1}{2}$	151
124-160	160 pr./20 lb.	35	89.0	370-400	402 pr./10 lb.	62 $\frac{3}{4}$	159
162-192	216 pr./20 lb.	39 $\frac{1}{2}$	100	402-486	488 pr./6 $\frac{1}{2}$ lb.	75 $\frac{1}{4}$	191
194-216	216 pr./20 lb.	43	109	488-542	544 pr./6 $\frac{1}{2}$ lb.	80 $\frac{1}{2}$	205

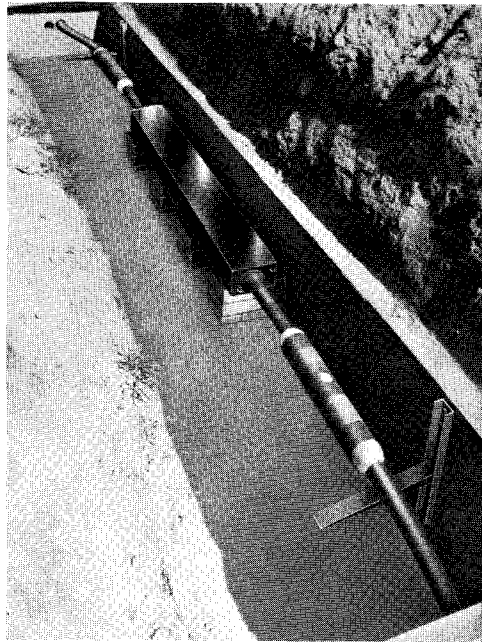
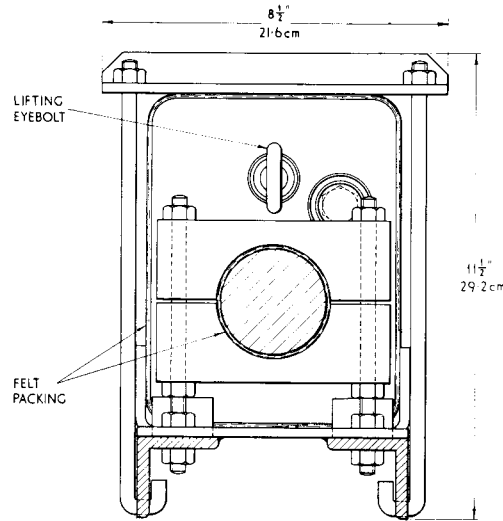


Fig. 11 Showing installation in jointing chamber.

542 coils. Grade 3A.
 Approx. weight of case = 400 lb. (181 kg.)
 Approx. weight of case complete with shipping cradle = 512 lb. (232 kg.)
 Cases can be supplied with a smaller number of coils if desired, sizes upon application.



SECTION THRO' 'BB'

Fig. 12A

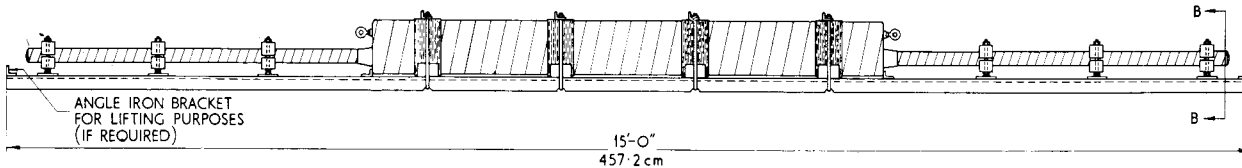


Fig. 12 Showing Shipping cradle for 542 coil tunnel type case.

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UNICOILS

These consist of single loading coils sealed in individual tinned sheet steel cans fitted with "in" and "out" flexible leads as shown in Figs. 13 and 14.

Grade of Coil	Can		Leads
	Diameter (Dim. "A")	Depth (Dim. "B")	
Programme "A"	2 ⁵ / ₈ " 6.6 cm.	1 ³ / ₁₆ " 3.02 cm.	Screened pairs
1A	2 ⁵ / ₈ " 6.6 cm.	1 ³ / ₁₆ " 3.02 cm.	Twisted pairs
2A	2 ⁵ / ₁₆ " 5.8 cm.	1" 2.54 cm.	Twisted pairs
3A	1 ³ / ₈ " 4.44 cm.	³ / ₈ " 1.9 cm.	Twisted pairs

Unicoils have been primarily designed to be inserted in the centre of cable joints. When so used, each uncoil is contained in a textile bag and the coils are disposed so as to reduce crosstalk to an extremely low value. After the uncoils have been inserted, the jointing procedure with the lead sleeve is completed in the usual manner.

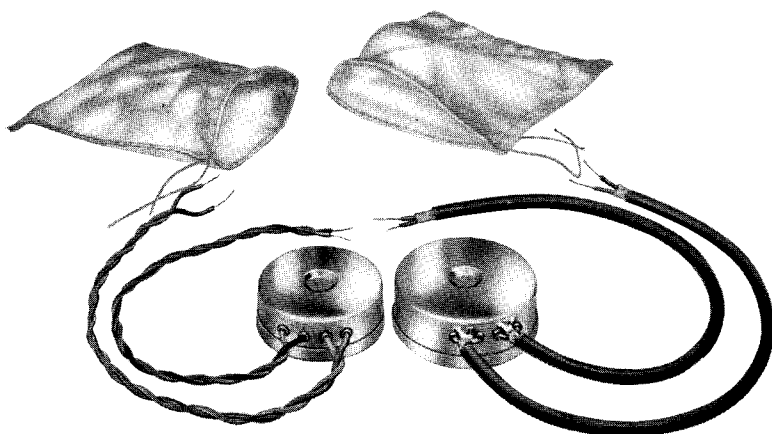


Fig. 13

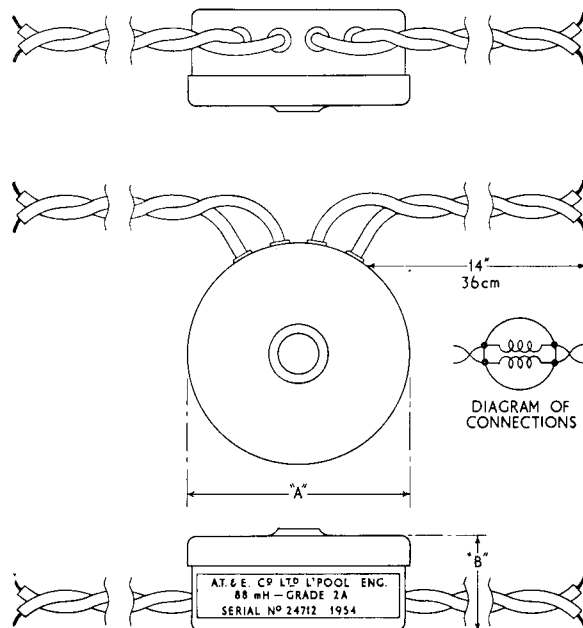


Fig. 14

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CHARACTERISTICS OF TYPICAL LOADING COILS

TABLE 1							
Characteristics of Programme "A" Loading Coils and Grades 1A, 2A and 3A							
Type of Coil	Windings connected series aiding						
	Inductance limits at 800 c/s.			Resistance—ohms.			
	Nominal mH	Minimum mH	Maximum mH	D.C. Maximum	At 800 c/s. Maximum	At 1800 c/s. Maximum	At 7000 c/s. Maximum
Programme "A"							
22	22	21.70	22.30	3.80	—	4.00	6.00
16	16	15.70	16.30	2.80	—	3.00	4.50
11	11	10.70	11.30	2.10	—	2.20	3.70
8	8	7.70	8.30	1.80	—	1.90	2.80
Grade 1A							
120	120	118.00	122.00	5.20	6.30	8.60	—
88	88	86.70	89.30	3.90	4.70	6.50	—
60	60	59.10	60.90	2.80	3.40	4.50	—
44	44	43.30	44.70	2.20	2.70	3.50	—
22	22	21.60	22.40	1.40	1.60	2.10	—
16	16	15.70	16.30	1.15	1.35	1.70	5.50
11	11	10.70	11.30	0.95	1.10	1.35	—
8	8	7.70	8.30	0.90	1.00	1.20	3.40
Grade 2A							
176	176	172.00	180.00	8.30	10.00	14.00	—
136	136	133.00	139.00	6.50	7.80	10.90	—
120	120	117.50	122.50	5.70	7.00	9.60	—
88	88	86.00	90.00	4.30	5.20	7.20	—
68	68	66.50	69.50	3.50	4.20	5.70	—
60	60	58.80	61.20	3.10	3.80	5.00	—
44	44	43.00	45.00	2.40	3.00	3.90	—
22	22	21.50	22.50	1.50	1.80	2.30	—
11	11	10.70	11.30	1.10	1.30	1.60	—
Grade 3A							
176	176	170.00	182.00	11.80	14.40	19.50	—
136	136	131.00	141.00	9.60	11.20	15.00	—
120	120	115.00	125.00	8.60	10.00	13.50	—
88	88	84.00	92.00	6.80	7.90	10.50	—
68	68	65.10	70.90	5.60	6.50	8.60	—
60	60	57.60	62.40	5.20	5.80	7.70	—
44	44	42.00	46.00	4.20	4.80	6.30	—
30	30	28.80	31.20	3.40	4.00	5.00	—
22	22	21.10	22.90	3.00	3.40	4.20	—

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LOADING COIL UNITS

For phantom working on multiple-twin type cables, loading coils units, each consisting of two side coils and one phantom coil, can still be supplied if specially ordered.

The demand for loading coil units is now greatly reduced due to the general adoption of star-quad cables, which are not suitable for phantom working.

<p align="center">Table 2 Crosstalk (in millionths) for Grades 1A, 2A and 3A Loading Coils</p>						
Loading in Side circuits only	Grade 1A Coils		Grade 2A Coils		Grade 3A Coils	
	Individual Values Max.	Mean of all Values	Individual Values Max.	Mean of all Values	Individual Values Max.	Mean of all Values
Between each side circuit and each *adjacent side circuit	20	10	30	15	40	20
Between each side circuit and each *non-adjacent side circuit	10	5	10	5	15	7
Between each phantom circuit and each *adjacent phantom circuit	20	10	40	20	—	—
Between each phantom circuit and each *non-adjacent phantom circuit	15	7½	20	10	—	—
Between each †“ Go ” circuit side or phantom and each †“ Return ” circuit side or phantom (4 wire circuits)	10	5	10	5	15	7

NOTE: * Adjacent circuits are those connected to adjacent coils on the same column or dowel, and to the same or adjacent quads in the leading out cables.

NOTE: †Coils allocated for four-wire “ Go ” and “ Return ” circuits, if any, should be indicated on the order.

Programme “A” Coils

The crosstalk between any two programme grade coils or any programme coil and any other coil shall not exceed 3 millionths.

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SECTION H



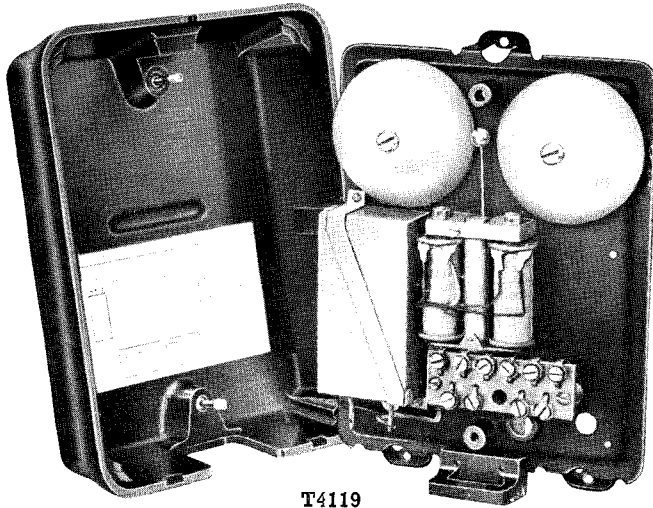
C A T A L O G U E

BELLS & BUZZERS

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T4119

T4119 Telephone Bell Set.

Comprising 1000 ohms ringer, two microfarad capacitor and terminal plate mounted on pressed steel base, having three fixing lugs for wall mounting. Moulded black bakelite cover secured by two captive screws.

Interposed between baseplate and moulded body, this bell set converts telephones T4070 and T4080 into telephones T4072 and T4081.

Length: 8 1/8" (206 mm.) Width: 6 1/2" (165 mm.) Depth: 2 1/16" (52 mm.) Weight: 2-lbs. 12-ozs. (1.25 kg.)

T4064 Telephone Extension Bell.

As T4119, but less capacitor, for use as extension bell.

T4059 Telephone Bell Set.

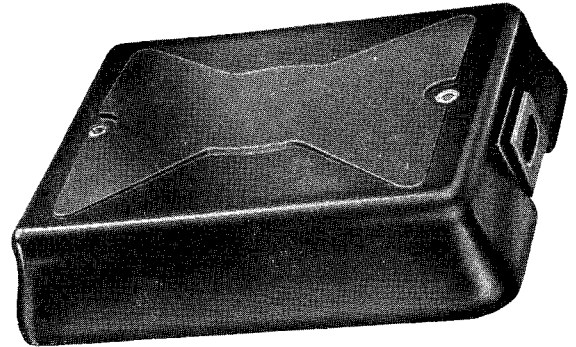
Similar to T4119, but with earth terminals for P.A.B.X. exchange line answering telephone.

T4066 Insect-proof Telephone Bell Set.

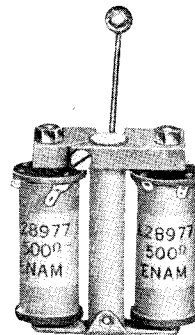
Similar to T4119, but has all apertures metal gauze covered or otherwise suitably protected against the ingress of insects. The bell set has a tropical finish.

T4065 Telephone Bell Set.

British Post Office standard No. 31. As T4119, but has three-winding induction coil, for local battery working on subscribers' loops which are too long for satisfactory common battery feeds. Used with telephone T4077.



T4119



T3931

T3931 Telephone Ringer.

500 - 500 ohms. As fitted to telephone bell set T4119, etc. Less gongs.

T3931

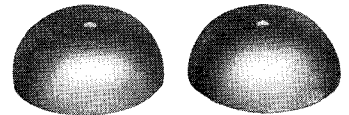
Length ... 3 3/4" (95 mm.)
 Width ... 2 1/2" (64 mm.)
 Depth ... 1 1/4" (32 mm.)
 Weight ... 6-ozs. (170 gm.)

T4067 Gong.

Dull nickel plated. High or low tone, for T3931 telephone ringer.

Length ... 2 1/2" (64 mm.)
 Diameter ... 7/8" (22 mm.)

High tone : Weight, 3-ozs. (84 gm.)
 Low tone : Weight, 2-ozs. (56 gm.)



T4067

T4227 Boxwood Gong.

Suitable for ringer T3931.

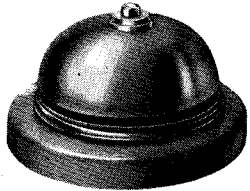
Length: 2 7/16" (62 mm.) Diameter: 7/8" (22 mm.) Weight: 1/4-oz. (7 gm.)

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T2117 Bell.

Circular pattern ; for 22-volt D.C. operation. Coils 500 - 500 ohms. Pressed-steel frame. 3" (76 mm.) oxidised copper gong. Polished wood base with recessed terminals and links for connecting coils in series or parallel.

Length : 4" (101 mm.) Diameter : 2 1/4" (57 mm.) Weight : 13 1/2-ozs. (383 gm.)

T2220 Bell.

As T2117, but without wood base.

T2147 Bell.

As T2117, but with nickel-plated gong.

T2146 Bell.

As T2220, but with nickel-plated gong.

NOTE.—These bells can be wound to other requirements or operating voltages.

T2140 Buzzer.

Circular pattern ; for 22-volt D.C. operation. Similar construction to T2117 bell, but hammer adjusted to vibrate without touching the gong, the oxidised copper gong serving as a cover only.

Length : 4" (101 mm.) Diameter : 2 1/4" (57 mm.) Weight : 13 1/2-ozs. (376 gm.)

T869 Code Call Buzzer.

Enamelled metal case. 8 to 230-volts A.C. ; 40 to 60 cycles. Please specify voltage and frequency when ordering.

Length : 4 7/8" (124 mm.) Width : 3 3/8" (86 mm.) Depth : 1 1/8" (40 mm.) Weight : 14 1/2-ozs. (411 gm.)

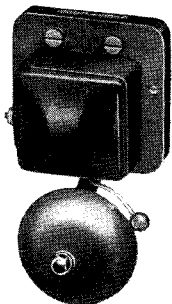
Bells.

For D.C. operation. Mechanism mounted on polished wood base. Black enamelled steel cover. Gong 2 1/2" (64 mm.) diameter. Coils arranged for series or parallel connection. Terminals recessed on underside of base. Adaptable to various voltages.

T2127. Resistance 50 - 50 ohms.

T2128. Resistance 250 ± 250 ohms.

T2125. Resistance 1000 - 1000 ohms.



Length : 6" (152 mm.) Width : 3 1/2" (83 mm.) Depth : 2 3/8" (60 mm.) Weight : 12-ozs. (340 gm.)

Buzzers.

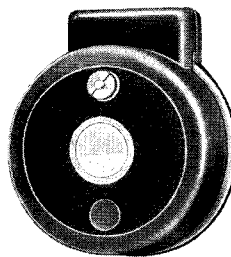
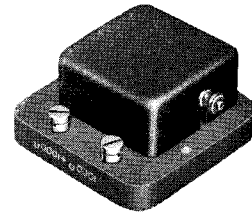
As T2127, but without gong, bracket and hammer.

T3742. Resistance 500 ohms. Series connection only.

T3745. Resistance 25 ohms. Series connection only.

T3743. Resistance 1000 ± 1000 ohms. Series or parallel connection.

Length : 3 1/4" (83 mm.) Width : 3 1/4" (83 mm.) Depth : 1 3/4" (44 mm.) Weight : 8 1/2-ozs. (240 gm.)



T2525 Buzzer.

Bakelite case. For code call signals. 6 or 12 volts D.C. Please specify voltage when ordering.

Length ... 3 1/4" (83 mm.)

Diameter ... 2 1/4" (57 mm.)

Weight ... 6-ozs. (170 gm.)

T2526 Buzzer.

As T2525, but for 12 to 250 volts D.C. or A.C. Please specify voltage and frequency when ordering.

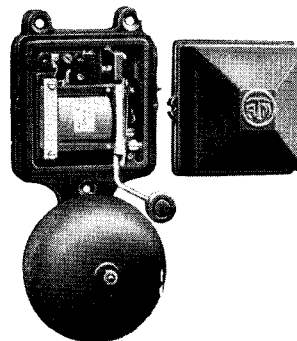
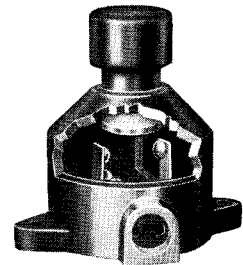
T2527 Push Switch.

For operating horns and bells ; capacity 10 amps. at 110 volts.

Length ... 4 1/8" (104 mm.)

Diameter ... 3 7/8" (99 mm.)

Weight ... 10-ozs. (280 gm.)



T343 Weatherproof Bell.

Cast-iron base and cover, dark green enamel finish. 6", 8" or 10" gong. Gold-silver contacts. Can be wound for D.C. voltages 2-230; A.C. voltages 20-230. (Please specify voltage and frequency, also gong diameter when ordering.)

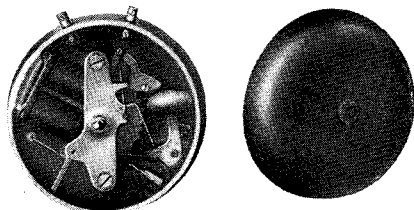
Length : 13 1/2" (343 mm.) Width : 6" (152 mm.) Depth : 4" (102 mm.) Weight : 12 7/8-lbs. (5.7 kg.)





T355 Firemen's Call Bell.

Weatherproof cast-iron base and cover. Similar to T343, but red enamel finish. 6", 8" or 10" gong. For use on 18-28 volts D.C. circuits.



T4549

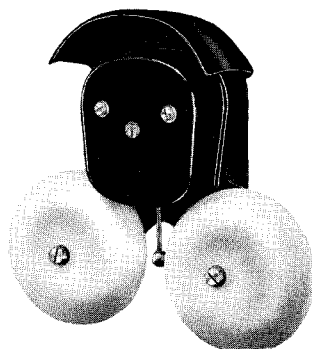
T4549 Single Stroke Electro Mechanical Gong (Turtle Back).

For repeating audibly in the fire station, the individual breaks representing the code message incoming on a closed circuit fire alarm system. 6" bell metal gong, covering robust mechanism. Winding key included. Positive single stroke action, clear tone. Specify in order whether for 50 or 100-milliampere circuit.

T2025 Weatherproof Magnet Extension Bell.

Metal cased loud ringing bell suitable for normal telephone ringing current. Resistance: 1000 Ohms. 6" gongs, zinc plated. Finish black enamel.

Length ... 12 1/2" (318 mm.)
Width ... 13" (330 mm.)
Depth ... 3 1/4" (83 mm.)
Weight 8 1/4-lbs. (3.75 kg.)



T2025



T2857

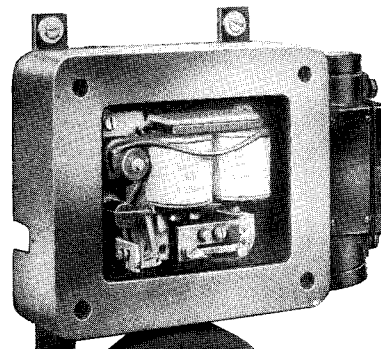
T2857 Visual Call Indicator.

Visual call indicator to replace the customary telephone bell in places where an audible signal is undesirable. A special lamp, which flashes when the telephone is being rung, is mounted in a weighted rubber moulding coloured to represent grained walnut. Includes 4' 6" (1.37 m.) of flex. No relay required.

Height : 4 1/2" (114 mm.)
Diameter at base : 2 3/4" (70 mm.)
Weight with flex : 13 1/2-ozs. (0.39 kg.)

T2017 Bell A.C. or D.C. for use in mines.

Machine-faced joint between cast-iron case and cover. 6" gong. Gold-silver contacts. Contact sparking is neutralized by rectifier. Resistance 106 ohms. Dark green enamel finish. Complete with key for removing cover bolts. For use on approved A.C. or D.C. 6-25-volt circuits in gaseous atmospheres. Type certified by Mines Department.



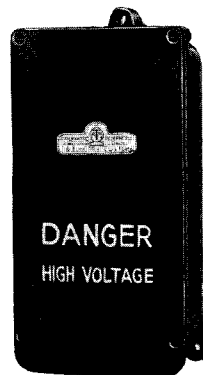
T2017

Length : 12" (305 mm.) Width : 8 3/4" (222 mm.) Depth : 3 1/2" (89 mm.) Weight : 15 1/2-lbs. (7 kg.)

T2018 Bell. As T2017, but with 8" gong.

Length : 14" (356 mm.) Width : 9 3/4" (247 mm.) Depth : 4 1/2" (114 mm.) Weight : 17 1/4-lbs. (7.84 kg.)

4" or 10" gongs can also be supplied on demand.



T375 Contactor.

For actuation by P.A.X. ringing current to close circuit to mains-operated or other bell. The contactor operates in series with the telephone bell.

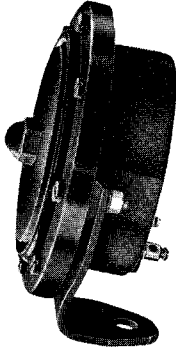
Length ... 8 11/16" (221 mm.)
Width ... 4 1/4" (108 mm.)
Depth ... 2 5/8" (67 mm.)
Weight 2 1/2-lbs. (1.134 kg.)

Registered Office :
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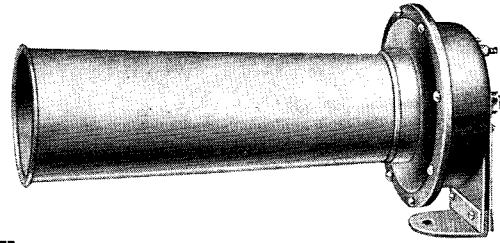
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M1245 Electric Hooter. (Formerly Cat. No. 500A.)

A distinctive audible signalling device for noisy situations such as engine-rooms, for code call or other signals. Finish: Black enamel. Voltage: 12 volts D.C.

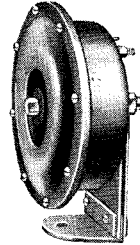
Length: 5½" (139.7 mm.). Width: 5" (127 mm.).
Depth: 2¾" (69.85 mm.). Weight: 2-lbs. 9-ozs. (1.191 kg.)



T2523 Horn.

Medium range, for code call or other signals. 6 to 250 volts D.C. or A.C. Please specify voltage and frequency when ordering.

Length :	Diameter :	Weight :
12¾" (324 mm.)	5⅝" (143 mm.)	3⅜-lbs. (1.53 kg.)



T2522 Horn.

Short range, for code call or other signals. 6 to 250 volts D.C. or A.C. Please specify voltage and frequency when ordering.

Length	3" (76 mm.)
Diameter	5⅝" (143 mm.)
Weight	3-lbs. (1.36 kg.)

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SECTION J



C A T A L O G U E

**MINE TELEPHONES
&
SIGNALLING EQUIPMENT**

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.

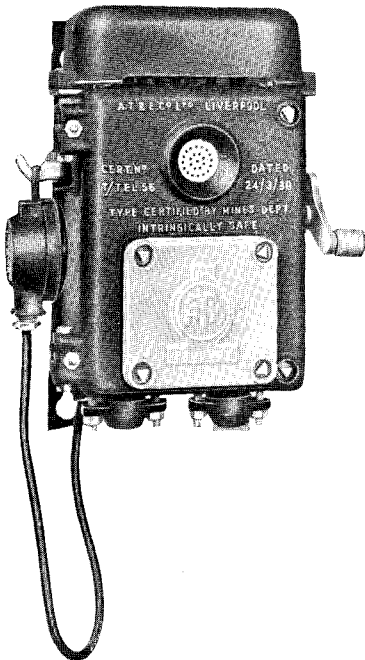
HOME SALES AND EXPORT DEPT.
STROWGER HOUSE, ARUNDEL ST., LONDON, WC2

TROWGER WORKS · LIVERPOOL 7.



M1074 Certified Magneto Mine Telephone.
(Formerly Types T3060 and T3070).

A robust ironclad weatherproof magneto telephone, complete with glands for receiver cord and line cable, for use either with bell attached or with separate extension bell. Specially constructed to withstand rough usage and designed for parallel working.



M1074—Front View.

Height:
15½" (394 mm.)

Width:
13" (330 mm.)

Depth:
6¾" (172 mm.)

Weights:
With 1 receiver—
44-lbs. (19.96 kg.)
With 2 receivers—
46-lbs. (20.87 kg.)

L11561 Surface Type Magneto Desk Telephone.
(Formerly Type T3903).

Certified by Ministry of Fuel and Power for surface use only.

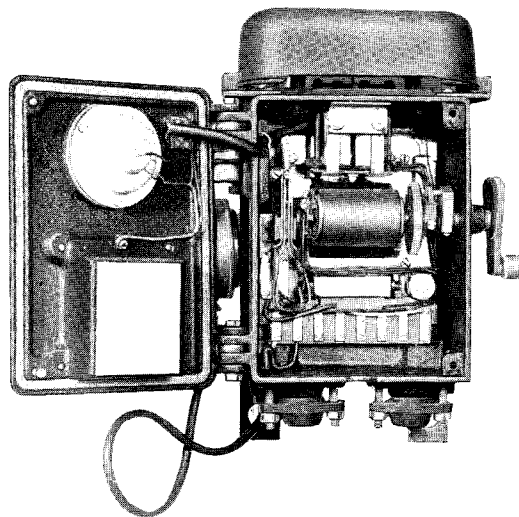
A magneto, hand combination telephone for desk use, comprising B.P.O. standard handset, cradle switch, dial blank, hand generator, ringer, induction coil, etc., the whole mounted on a substantial baseplate with rubber feet. The case is of moulded bakelite with black enamelled sheet metal sides. A separate battery box is required.



Height:
10½" (267 mm.)
Width:
10" (254 mm.)
Depth:
6½" (165 mm.)
Weight:
11½-lbs. (5.22 kg.)

L11561

Note : Where a wall-mounted telephone is required a bracket can be provided to carry L11561 for use as such.



M1074—Inside View.

- L11226 Telephone with 1 receiver and V.I.R. Cable Gland.
- L11227 Telephone with 1 receiver and armoured Cable Gland.
- L11228 Telephone with 2 receivers and V.I.R. Cable Gland.
- L11229 Telephone with 2 receivers and armoured Cable Gland.

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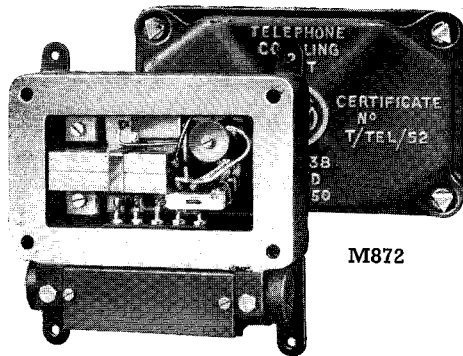
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**MINE TELEPHONES AND
SIGNALLING EQUIPMENT**



M872

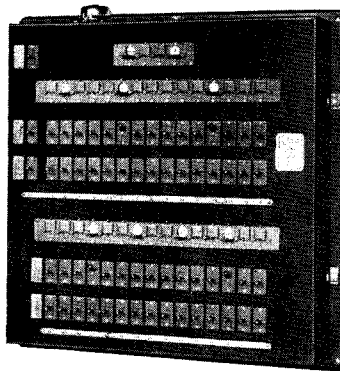
**M872 Magneto Telephone Coupling Unit.
(Formerly Type T3993).**

Certified by the Ministry of Fuel and Power as suitable for use in mines to provide safe coupling between surface magneto exchanges and certified magneto mine telephone systems. It permits through speech and ringing, has no moving mechanism, requires no maintenance and does not require manual switching. A conventional series-impedance network is employed, shunted on the "in-bye" or "safety" side by an "Atmite" disc, which limits the voltage across the "in-bye" connections to the "safe" circuit whilst permitting the application of any potential to the "unsafe" side. Cast-iron case. Finish: dark green enamel.

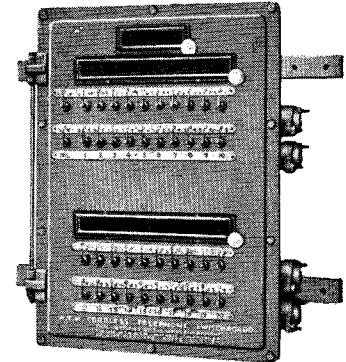
Length:	Height:	Depth:	Weight:
7½"	6½"	3"	13½-lbs.
(190 mm.)	(165 mm.)	(96 mm.)	(6.124 kg.)

**Wood-cased Cordless Magneto Telephone Switchboards.
(Formerly Types T293-T299).**

Certified by the Ministry of Fuel and Power for surface use only; under cover. Apparatus mounted on hinged front to facilitate inspection. Connections effected by means of keys. Hand-restored indicators. Provision for one, two or four simultaneous conversations according to capacity. Alarm contacts fitted on indicator shutters. Alarm bell and key mounted on the switchboard. Suitable for use in conjunction with certified magneto mine telephones.



Wood-cased
Type.



Iron-cased
Type.

WOOD-CASED TYPE SWITCHBOARDS

WOOD CASED TYPE.			Length :	Width :	Depth :	Weight (approx.) :
M1184/1	... 3 lines—1 through position fitted	...	14 ⁵ / ₈ " (371 mm.)	12" (305 mm.)	5½" (140 mm.)	15-lbs. (6.804 kg.)
M1184/2	... 4 " 2 " positions fitted	...	17 ³ / ₄ " (451 mm.)	12" (305 mm.)	5 ³ / ₈ " (137 mm.)	18-lbs. (8.164 kg.)
M1184/3	... 6 " 2 " " " " "	...	20" (508 mm.)	12" (305 mm.)	5 ³ / ₈ " (137 mm.)	20-lbs. (9.072 kg.)
M1184/4	... 10 " 4 " " " " "	...	24" (610 mm.)	18½" (470 mm.)	5½" (140 mm.)	30-lbs. (13.608 kg.)
M1184/5	... 12 " 4 " " " " "	...	26 ³ / ₄ " (679 mm.)	18½" (470 mm.)	5½" (140 mm.)	35-lbs. (15.876 kg.)
M1184/6	... 20 " 4 " " " " "	...	24 ⁵ / ₈ " (625 mm.)	31 ⁷ / ₈ " (810 mm.)	5 ⁷ / ₈ " (149 mm.)	50-lbs. (22.680 kg.)
M1184/7	... 30 " 4 " " " " "	...	31½" (800 mm.)	32" (813 mm.)	5 ⁷ / ₈ " (149 mm.)	70-lbs. (31.752 kg.)

IRON CASED TYPE.			Length :	Width :	Depth :	Weight (approx.) :
M1185/1	... 3 lines—1 through position fitted	...	10 ¹ / ₈ " (257 mm.)	9 ³ / ₄ " (248 mm.)	7" (178 mm.)	25-lbs. (11.34 kg.)
M1185/2	... 4 " 2 " positions fitted	...	13" (330 mm.)	9 ³ / ₄ " (248 mm.)	7" (178 mm.)	35-lbs. (15.876 kg.)
M1185/3	... 6 " 2 " " " " "	...	15½" (394 mm.)	10" (254 mm.)	7" (178 mm.)	60-lbs. (27.216 kg.)
M1185/4	... 10 " 4 " " " " "	...	21½" (546 mm.)	15 ³ / ₄ " (400 mm.)	7" (178 mm.)	116-lbs. (52.616 kg.)
M1185/5	... 12 " 4 " " " " "	...	24 ¹ / ₈ " (613 mm.)	15 ³ / ₄ " (400 mm.)	7" (178 mm.)	130-lbs. (58.968 kg.)
M1185/6	... 20 " 4 " " " " "	...	30½" (775 mm.)	22" (559 mm.)	7" (178 mm.)	200-lbs. (90.720 kg.)
M1185/7	... 30 " 4 " " " " "	...	30½" (775 mm.)	33¼" (845 mm.)	7" (178 mm.)	270-lbs. (122.472 kg.)

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COLLIERY WINDING SIGNAL INDICATOR.

The "A.T.M." colliery winding signal indicator is of the electrical (luminous screen) type, the signals being readily distinguishable. The apparatus conforms in every way with the regulations of the Ministry of Fuel and Power.

The equipment comprises a lamp indicator set for each level, and controlling mechanism which is housed in a separate metal cabinet, as illustrated.

The indicators consist of 12-volt lamps mounted in separate compartments, painted white internally, reflecting maximum light. The signal appears on the front glass panel as a luminous stencil. The working pressure is 12-volts.

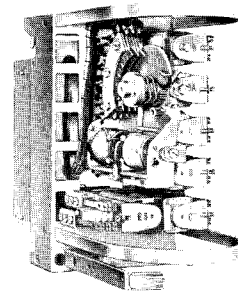
Cancellation of the signals is effected by an oil canceller M1212, driven from the winding engine. It responds readily to the slightest movements, as in "Decking."

The special operating features of the indicator are as follows:—

- (1) All signals are non-cumulative.
- (2) "Action Signals" are cancelled by the first movement of the winding engine.
- (3) "Cautionary Signals," e.g., MEN-3, remain displayed throughout the wind, and unless repeated during the wind are cancelled when the engine stops.
- (4) In the event of MEN-3 being sent during a wind and before the cage comes to rest—as is customary at some collieries—the cautionary signal will remain visible throughout the succeeding wind.

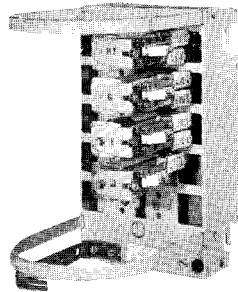
Emergency stop keys can be fitted and a signal sent on any one of these keys cancels all action signals and displays the order STOP.

The "A.T.M." colliery winding signal indicator can be made for any combination of levels, and additional levels can be added when required.



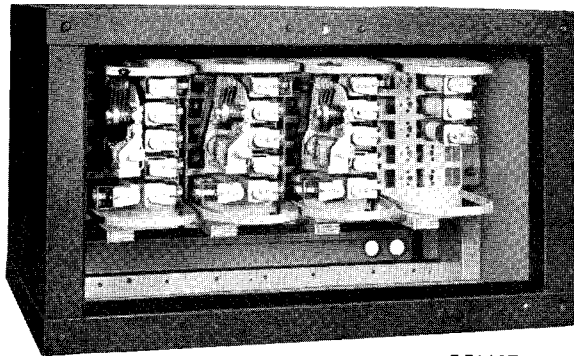
L813877

Cancel relay group as fitted in cabinet M1127, one per indicator.



L813878

Level control relay group as fitted in cabinet M1127, one per level.



M1127

M1127 Control Mechanism—Cabinet front removed.
(Formerly Type T3998).

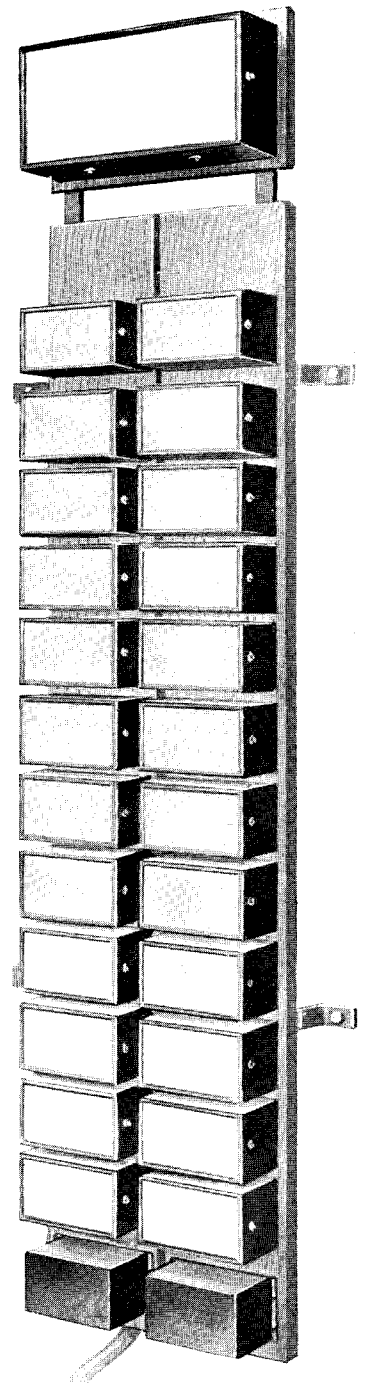
Length:	Height:	Depth:	Weight (less relay groups)
24"	14½"	16"	41-lbs.
(610 mm.)	(362 mm.)	(406 mm.)	(18·597 kg)
Weight of cancel group L813877			6¼-lbs. (2·830 kg.)
Weight of control group L813878			7¾-lbs. (3·520 kg.)

M1126 Typical Two-level Indicator.
(Formerly Type T3999).

Length:	
11 Units	6' 7" (2·007 m.)
"	6' 11½" (2·121 m.)
13 "	7' 4" (2·236 m.)

427018 Single Lamp Unit.
(Formerly Type T4228).

Length:	6⅓"	(156 mm.)
Height:	4½"	(105 mm.)
Depth:	3⅛"	(84 mm.)
Weight:	1½-lbs.	(670 gm.)



Typical Two-level Indicator

Registered Office :

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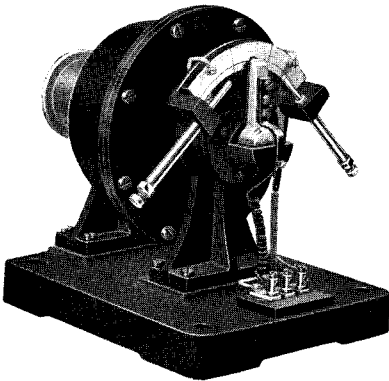
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**MINE TELEPHONES AND
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M1212 Signal Cancellor.
(Formerly Type T4264).

An oil-operated mechanical device for cancelling displayed signals on shaft-winding indicator.



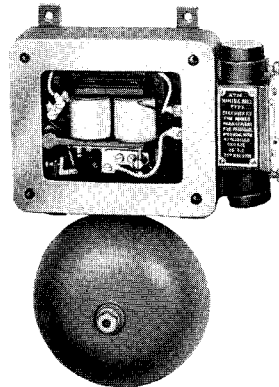
Length : 8" (203 mm.)
Width : 8" (203 mm.)
Depth : 7" (178 mm.)
Weight : 17½-lbs. (7.938 kg.)

M1212

M1233 Grp. 2, 6" A.C. or D.C. Bell.
(Formerly Types T2017 and T367).

Certified by Ministry of Fuel and Power for use in Mines. Certificate No. T/BR/122, dated 25/4/47. A bell for use on 6-25 volt A.C. or D.C. circuits in gaseous atmospheres. The case and cover are of cast-iron with machine-faced joints. A 6" (152 mm.) gong is fitted. Resistance, 106 ohms. Contacts, gold-silver, sparking is neutralised for safety. Finish: dark green enamel. A key is provided for cover bolts. The bell is safe for bare wire signalling when used with an approved transformer. M1187 is certified as suitable for the purpose. 4", 6", 8" or 10" gongs can be fitted.

Length: 12½" (318 mm.)
Width: 8¾" (222 mm.)
Depth: 3½" (89 mm.)
Weight: 18-lbs. (8.165 kg.)



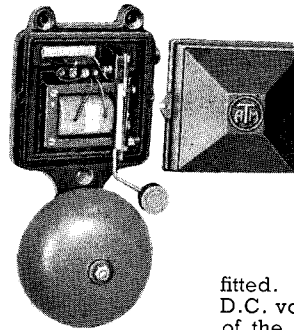
M1233/2

M1233/3, 8" A.C. or D.C. Bell
(Formerly Type T2018 and T368).

Similar to M1233/2, but fitted with 8" (203 mm.) gong.

Length: 14½" (368 mm.)
Width: 9¾" (248 mm.)
Depth: 3½" (89 mm.)
Weight: 20-lbs. (9.072 kg.)

4" or 10" gongs supplied, if required.



429025 D.C.

Length : 14½" (369 mm.) Width : 7" (178 mm.) Depth : 4" (102 mm.) Weight : 11¾-lbs. (5.331kg.)

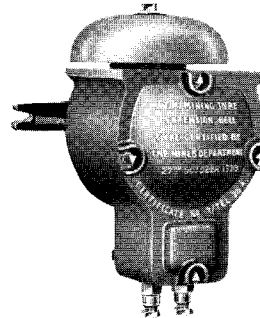
429025 D.C. Weatherproof Bell.

429086 A.C.
(Formerly Type T343).

These bells have a cast-iron case and are suitable for mounting in exposed positions in the open air. Bell coil wound for D.C. voltages from 2 to 230 volts or for A.C. voltages 20 to 230 volts. Contacts, gold-silver. 6", 8", or 10" gongs can be fitted. When ordering, please specify the D.C. voltage or A.C. voltage and frequency of the electric supply and also the size of gong. Finish: dark green enamel. Dimensions and weight with 6" (152 mm.) gong:—

M1186 Ironclad Telephone Extension Bell.
(Formerly Type T370).

Certified by Ministry of Fuel and Power for use in mines.



M1186

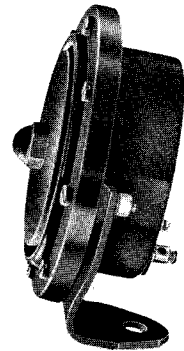
Length: 9½" (242 mm.) Width: 7 ⅜" (183 mm.) Depth: 6 ⅜" (162 mm.) Weight: 16-lbs. (7.257 kg.)

A certified extension bell suitable for use when the telephone user is situated at a distance from his instrument and an audible signal is necessary to attract attention. The bell which is mounted in a cast-iron case with wide machine-faced joints, is of special design, having an exceptionally strong magnetic field. A 5½" diameter bell-metal gong is fitted. Resistance: 1,800 ohms. Finish: green enamel.

M1245 Electric Hooter.
(Formerly Cat. No. 500A).

A distinctive audible signalling device suitable for use with the "A.T.M." Winding Signal Indicator as a discriminating signal clearly distinguishable from bells associated with the levels. The mechanism is totally enclosed in a strong metal case. Finish: black enamel. Voltage: 12 volts D.C.

Length: 5½" (139.7 mm.)
Width: 5" (127 mm.)
Depth: 2¾" (69.85 mm.)
Weight: 2-lbs. 9-ozs. (1.191 kg.)



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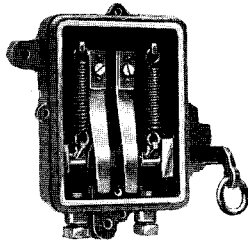


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TG2500-1 Side-pull Ringing Switch.
(Formerly Type T2031).

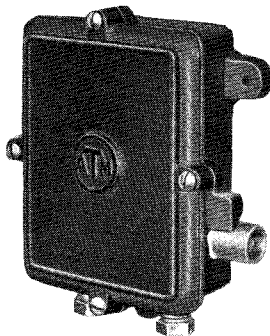
A "single-make" switch in a waterproof cast-iron case suitable for operation by rod, chain or detachable hook. Screwed packing gland are provided for leading-in wires. All current-carrying parts are well insulated. Finish: dark green enamel.



Height : 6½" (165 mm.) Width : 5½" (140 mm.) Depth : 3" (76 mm.) Weight : 5½-lbs. (2.385 kg.)

TG2500-3 Ringing Switch.
(Formerly Type T2032.)

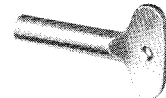
Similar to TG2500-1 except that operation is effected by means of a removable key as a precaution against unauthorised ringing.



TG2500-3

TG3758 Key.
(Formerly Type T2174).

Removable key for use with TG2500-3 Ringing Switch.

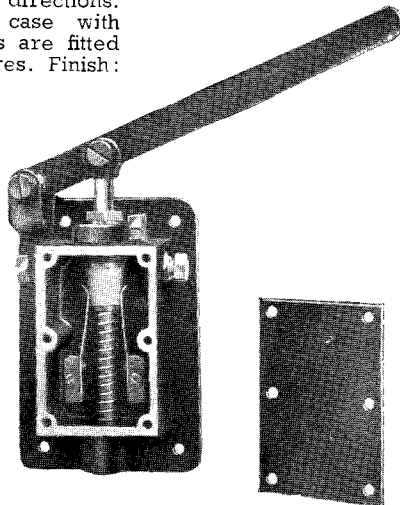


TG3758

TG462 Lever Pull Ringing Switch (Formerly Type T2037).

A "single-make" switch of the lever-operated type, suitable for adapting mechanical pull wires to electrical signalling. The lever is drilled for attachment to pull wires. A double lever can be fitted to enable the switch to be operated from two directions. Waterproof cast-iron case with removable lid. Glands are fitted for V.I.R. leading-in wires. Finish: dark green enamel.

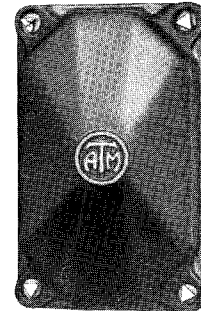
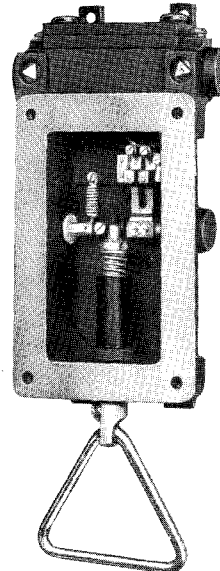
Height : 8½" (216 mm.)
Width : 5" (127 mm.)
Depth : 2¼" (57 mm.)
Lever : 12" (305 mm.)
Weight : 9-lbs. (4.082 kg.)



TG462

TG462-3 Lever Pull Ringing Switch.
(Formerly Type T2107).

Similar to TG462, but with special spindle-locking device to prevent unauthorised ringing. A special key, TG2577, to unlock the movement, is included. Extra keys supplied.



M800-3

M800-3 Non-flameproof Central Pull Ringing Switch with 25-50 lb. spring.

M800-4 Non-flameproof Central Pull Ringing Switch with 50-100 lb. spring.

(Formerly Type T2129).

These switches have a "make-and-break" action fitted in a cast-iron case with metal lid, secured by four bolts, removable only with a special key. Armoured cable glands are not fitted unless specified, but plain hardwood plugs, supplied in place of glands, may be drilled for leading-in wires. The terminals are housed in a separate compartment and are accessible without removing the main cover. The contacts are replaceable. Finish: dark green enamel. Either a 25 to 50 lb. or a 50 to 100 lb. spring can be fitted.

Height : 16½" (420 mm.) Width : 5" (127 mm.) Depth : 3" (76.2 mm.) Weight : 20-lbs. (9.072 kg.)

M800-1 Flameproof Central Pull Ringing Switch with 25-50 lb. spring.

M800-2 Flameproof Central Pull Ringing Switch with 50-100 lb. spring.

(Formerly Type T2175).

These switches are similar to M800-3 and 4, but are fitted with one armoured cable gland and one hardwood plug. They are certified flameproof by the Ministry of Fuel and Power.

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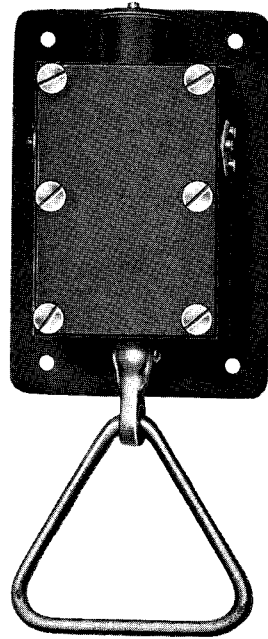


MINE TELEPHONES AND
SIGNALLING EQUIPMENT

M678-1 Central Pull Ringing Switch.
(Formerly Type T2036).

A "single-make" switch operated by central pull. Waterproof cast-iron case with removable iron cover. Glands for V.I.R. leading-in wires are fitted at the top of the case. Finish: dark green enamel.

Height: 11½" (292 mm.)
Width: 4¼" (114 mm.)
Depth: 2¼" (57 mm.)
Weight: 7¼" (3·288 kg.)



M678-1

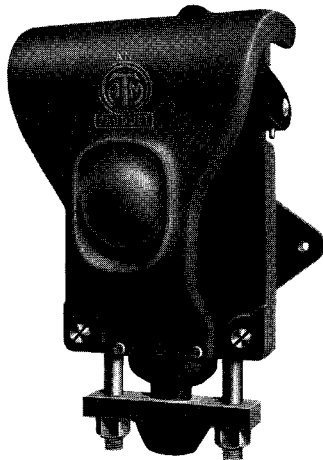
M678-2 Central Pull Ringing Switch.
(Formerly Type T2198).

Similar to switch M678-1, but with special spindle-locking device to prevent unauthorised ringing. A Special Key, TG2577, to unlock the movement is included. Extra keys can be supplied.

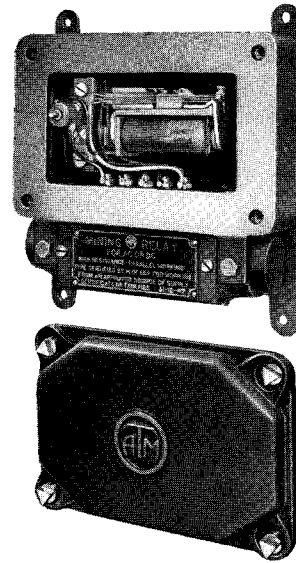
M881 Rapper Switch.
(Formerly Type T2027).

A switch with "make-and-break" action, mounted in strong cast-iron case. Knob shielded against accidental operation. Cable glands for either armoured cable or V.I.R. leading-in wires are provided, as required. Finish: dark green enamel.

Height: 7" (178 mm.)
Width: 4½" (114 mm.)
Depth: 4" (102 mm.)
Weight: 7½-lbs. (3·402 kg.)



M881



M1196/1

M1196/1 A.C./D.C. Relay Parallel Working.
(Formerly Types T3027, T3084-T3088).

This relay is of the standard pattern, in general use in telephone exchanges, fitted with a rectifier and is certified by the Ministry of Fuel and Power for parallel working with an approved battery. Certificate No. T/B.R./125, dated 31/12/47. Cast-iron case with cover secured by bolts removable only with a special spanner. Separate terminal compartment accessible without removing the main cover. Cable holes with wooden plugs for V.I.R. leading-in wires are standard, but armoured cable glands supplied, if required, at slightly extra cost. Finish: dark green enamel.

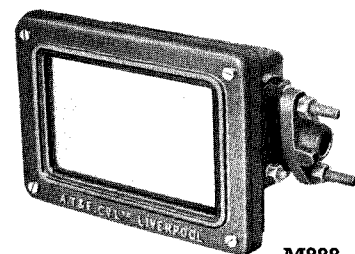
Length:	Width:	Depth:	Weight:
7½"	6½"	27⁄8"	13½-lbs.
(190 mm.)	(165 mm.)	(73 mm.)	(6·010 kg.)

M888 Luminous Indicator.
(Formerly Type T3996).

An Indicator, comprising a signal lamp, mounted in a strong cast-iron case with removable glazed front. Suitable for indicating levels or confirming audible signals. Lettered stencils supplied as required without extra charge. Cable glands for V.I.R. or armoured cable. Finish: dark green enamel.

Length: 9½" (242 mm.)
Height: 5½" (140 mm.)
Depth: 3½" (89 mm.)
Weight: 7-lbs. 15-oz.
(3·581 kg.)

Stencil area:
5½" (140 mm.) × 3½"
(89 mm.)



M888

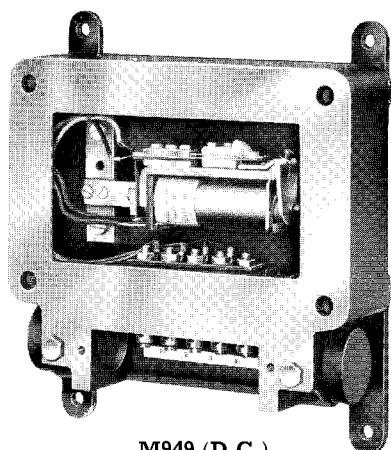
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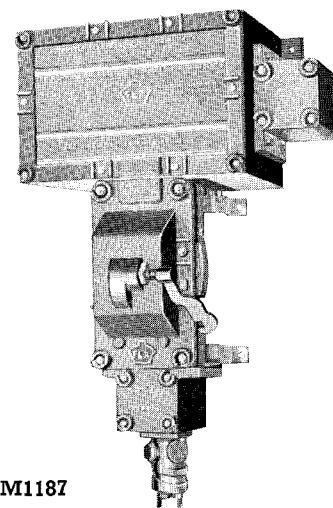


M949 (D.C.)

Length: 7½" (190 mm.)
 Width: 6½" (165 mm.)
 Depth: 2⅞" (73 mm.)
 Weight: 13¼-lbs. (6.010 kg.)

M949 (D.C.) Direct Current Relay. (Not certified). (Formerly Type T3026).

This is a standard telephone relay for operating on direct current. It is suitable for various circuit features, illuminating lamps, controlling signalling key circuits, operating bells, etc. A wide variety of spring combinations and coils can be provided to meet customers' requirements. The relay is mounted in a cast-iron case, the cover of which is secured by bolts removable only with a special spanner. The case has a separate terminal compartment accessible without removing the main cover. Cable glands for V.I.R. leading-in wires are normally fitted, but armoured cable glands can be supplied at a slightly extra cost. Finish: dark green enamel.

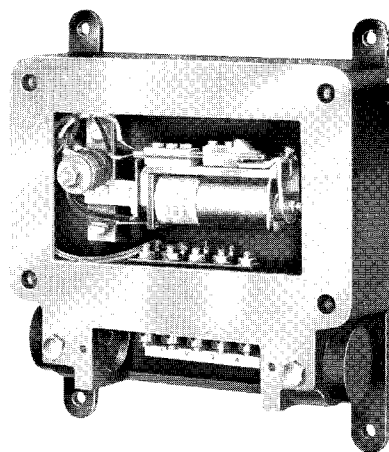


M1187

Length: 25½" (648 mm.)
 Width: 16⅞" (429 mm.)
 Depth: 10" (254 mm.)
 Weight: 96-lbs. (43.545 kg.)

M1187 Certified A.C. Mine Signalling Transformer. (Formerly Type T2553).

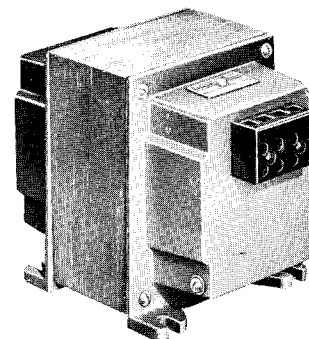
A transformer certified by the Ministry of Fuel and Power as intrinsically safe for reducing the local alternating current supply voltage to a voltage suitable for use with signalling equipment in the mine. Cast-iron case fitted with interlocking F.L.P. fuse-switch which ensures the transformer circuit is dead before the cover can be removed. Secondary voltage: 15 R.M.S. Output; 1.6 amperes R.M.S.



M949 (A.C.)

M949 (A.C.) Alternating Current Relay. (Not certified). (Formerly Type T3022).

A standard telephone relay, fitted with metal rectifier for operating on alternating current. Suitable for ringing direct-current extension bells from A.C. supply, as in the case of magneto telephones, i.e., 17 cycles, or from a 12.25 volt, 50-cycle supply. Similar to relay M949 D.C. in size and construction. A variety of spring combinations and coils can be provided to meet customers' requirements. Finish: dark green enamel.



M931

M931 Static Transformer. (Formerly Type T4269).

A highly efficient transformer designed for reducing the normal alternating current supply to 12 volts for lighting signal lamps, etc. Earthing shield fitted between windings. Suitable for use on single-phase, 50-cycle, alternating current supply. Primary wound for one particular voltage, as specified, between limits of 100 to 400 volts. Finish: black enamel.

Length:	Width:	Height:	Weight:
5½"	5"	4¼"	6-lbs.
(140 mm.)	(127 mm.)	(108 mm.)	(2.722 kg.)

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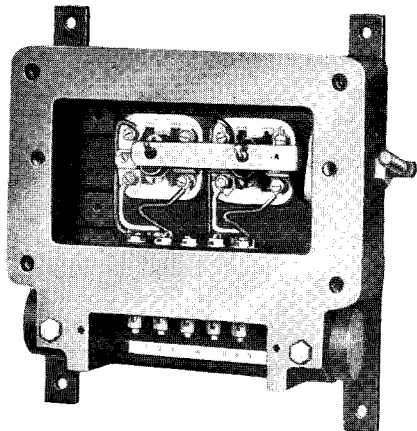
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MINE TELEPHONES AND
SIGNALLING EQUIPMENT



M1130

M1130 Iron-clad Change-over Switch.

A switch for single or double-pole change-over operated from outside of case by fixed key. Cast-iron case with removable cover, arranged for V.I.R. cable glands, but one or two armoured cable glands can be fitted if required. Suitable for changing over signalling lines between the surface and bank landings. Finish: dark green enamel.

- Width: $8\frac{3}{8}$ " (213 mm.)
- Height: $7\frac{3}{8}$ " (188 mm.)
- Depth: $3\frac{3}{8}$ " (86 mm.)
- Weight: With V.I.R. Connections—12½-lbs. (5.670 kg.)
- With 1 Armoured Cable Gland—13½-lbs. (6.124 kg.)
- With 2 Armoured Cable Glands—14¾-lbs. (6.691 kg.)

M1112 Iron-clad Change-over Switch.

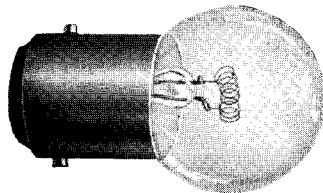
Similar to M1130, but a loose key is provided in place of the fixed key, as a precaution against unauthorised operation.

L94647/A Lamp.
(Formerly Type T2859).

A 12-volt, 6-watt, S.B.C. Lamp for "A.T.M." Luminous Indicator and Winding Indicators.

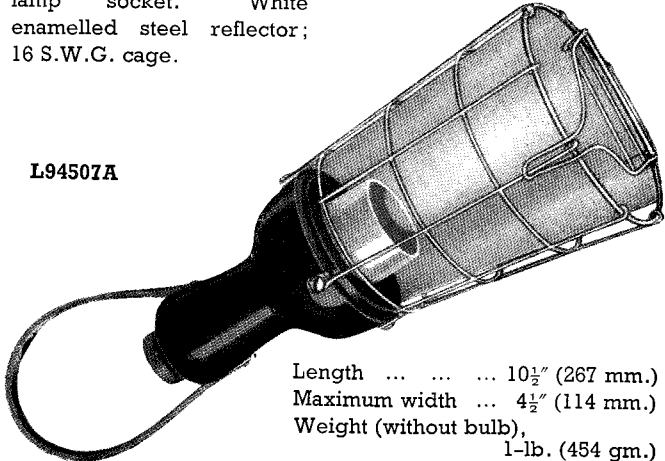
- Length: $1\frac{3}{8}$ " (44 mm.)
- Width: $1\frac{1}{8}$ " (12 mm.)
- Weight: $\frac{1}{4}$ -oz. (4 gm.)

L94647/A



L94507A Portable Hand Lamp.
(Formerly Type T2878).

A substantial lamp with polished hardwood handle and insulating shield screening lamp socket. White enamelled steel reflector; 16 S.W.G. cage.



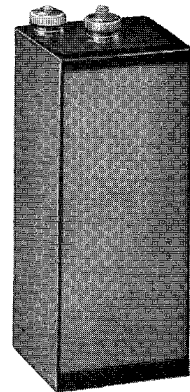
L94507A

- Length $10\frac{1}{2}$ " (267 mm.)
- Maximum width ... $4\frac{1}{2}$ " (114 mm.)
- Weight (without bulb),
1-lb. (454 gm.)

M1247 Dry Cell.
(Formerly Type T2190).

A cell for use with Mine Telephone M1074 and surface telephones L11561 and L11188.

- Approximate size and weight:
- Height $3\frac{3}{8}$ " (95 mm.)
 - Width $1\frac{1}{2}$ " (38 mm.)
 - Depth $1\frac{1}{2}$ " (38 mm.)
 - Weight 6-ozs. (170 gm.)

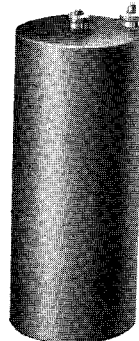


M1247

M1246 Dry Cell.
(Formerly Type T2156).

A general-purpose dry cell. E.M.F. 1.5 volts. Internal resistance, 15 ohms.

- Approximate size and weight:
- Height $6\frac{1}{2}$ " (165 mm.)
 - Diameter: $2\frac{9}{16}$ " (65 mm.)
 - Weight 2-lbs. (907 gm.)



M1246

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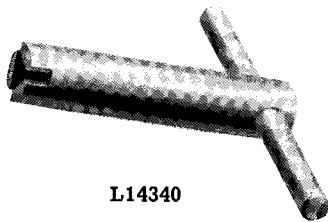
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**L14340 Key Spanner.
(Formerly Type T4523).**

A special key for gaining access to "A.T.M." mine telephones, bells, etc., which may be located in positions where unauthorised removal of covers would prove dangerous. Finish: dull nickel-plate.

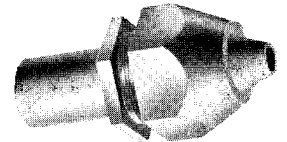
Length:	Width:	Weight:
4 ³ / ₁₆ " (106 mm.)	4" (102 mm.)	¹ / ₂ -lb. (227 gm.)



L14340

**TF 3026-1 and 2 Armoured
Cable Glands.
(Formerly Type T3900 and
T3901).**

Glands suitable for fitting to "A.T.M." mine bells, switches and other apparatus.



TF3026-1 to accommodate 2-core 3/·029 S.W.G. cable.

TF 3026-2 to accommodate 2-core 3/·036 S.W.G. cable. State size of cable when ordering.

Finish: galvanised.

Length:	Overall diameter:	Weight:
4" (102 mm.)	2" (51 mm.)	1-lb. (454 gm.)

T1212 Generator, Magneto.

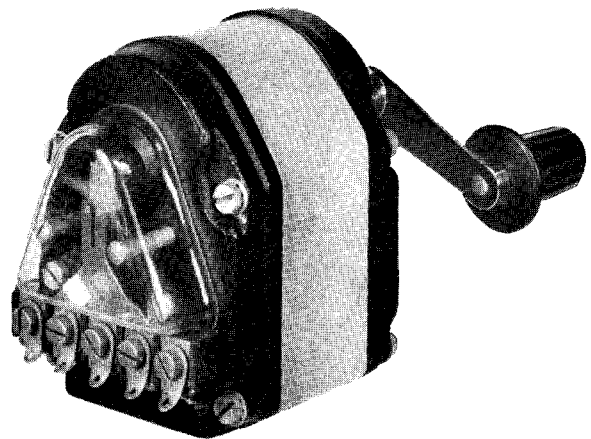
Rotating magnet type. D.C. resistance of armature coils 520 ohms ± 25 ohms. Designed to replace horseshoe-magnet type generators in magneto telephones or switchboards. Mounting bracket and handle supplied as extras to suit particular telephone or switchboard. Shaft projection 1 ³/₁₆" (30·2mm.) Output at 1,450 r.p.m.:—

Load resistance in ohms.	Volts approx.	Milliamps approx.
2000	86	43
1000	66	66
500	46	92

Height:	Width:	Depth:	Weight:
3 ³ / ₁₆ "	4 ⁵ / ₈ "	2 ¹ / ₂ "	2-lb 10-oz.
(81 mm.)	(118 mm.)	(64 mm.)	(1·19 kg.)

T1211 Generator, Magneto.

As T1212 but shaft projection ²/₁₆" (14·3 mm.).



T1212

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MINE TELEPHONES AND SIGNALLING EQUIPMENT

"A.T.M." Auto Exchange Coupling System.

Certified by the Ministry of Fuel and Power as an intrinsically safe system for use in mines. Designed to provide automatic telephone facilities with intrinsic safety, between surface automatic telephone exchanges and certified mine telephone systems, without any modification to existing standard telephone equipment.

The system employs:

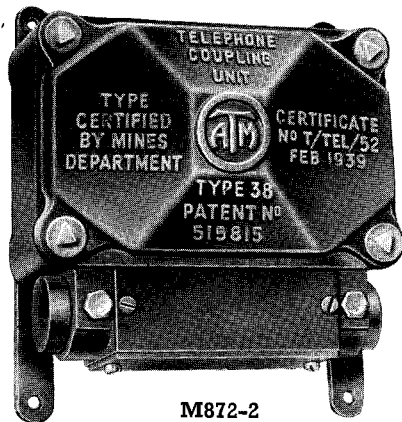
- M1190 Auto-Repeater Unit
- M872-2 Coupling Unit
- M1091-2 Auto-Magneto Switching Unit
- M1191 and M1177 Automatic Telephones

The auto-repeater and coupling units are located on the surface and the auto-magneto switching unit is installed in the mine.

The auto-magneto switching unit is not required when the exchange line terminates on a certified automatic telephone (M1177 or M1191). Provision is made for extension bells when required.

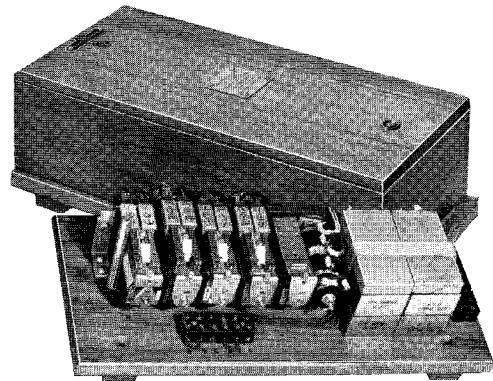
M872-2 Coupling Unit.

The purpose of this unit is to protect the "safe" side of the line from dangerous voltages without detriment to the through telephone service and ensures safe and efficient inter-communication between the surface exchange and the certified mine telephone equipment. The case is of cast-iron and the instrument is certified as intrinsically safe by the Ministry of Fuel and Power. Cast-iron case. Finish: dark green enamel.



M872-2

Length:	Height:	Depth:	Weight:
7½"	6½"	3"	13½-lbs.
(190 mm.)	(165 mm.)	(96 mm.)	(6·124 kg.)

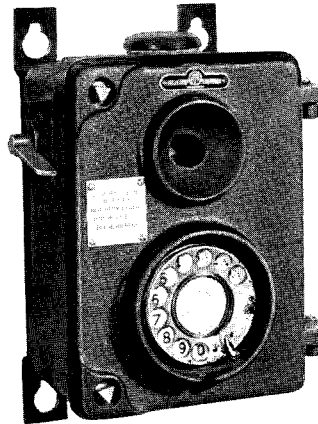


M1190
Auto-Repeater
Unit

M1190 Auto-Repeater Unit.

This unit, which comprises a number of standard relays, capacitors and resistances assembled in a hardwood case, performs the important function of isolating the auto. exchange circuits from the "safe" side of the telephone line without reducing the efficiency of the service. Standard supervision, dialling, signalling and speaking facilities are maintained.

Height:	Width:	Depth:	Weight:
13¼"	6½"	4½"	8½-lbs.
(337 mm.)	(165 mm.)	(115 mm.)	(3·856 kg.)



Height: 12" (305 mm.)
Width: 8¾" (223 mm.)
Depth: 6½" (165 mm.)
Weight: 24½-lbs. (11·113 kg.)

M1091-2 Auto-Magneto
Switching Unit.

An intrinsically safe equipment comprising dial switch, visual indicator, through switching key and associated apparatus, mounted in a strong cast-iron case. Cable glands are provided for armoured cable or V.I.R. cable. Levers for operating the through switching key and restoring visual indicator are conveniently located on outside of case. Indicator fitted with extension bell contacts. The unit is installed adjacent to the mine switchboard and provides facilities for the attendant to establish and supervise calls between the surface automatic exchange and the mine telephones.

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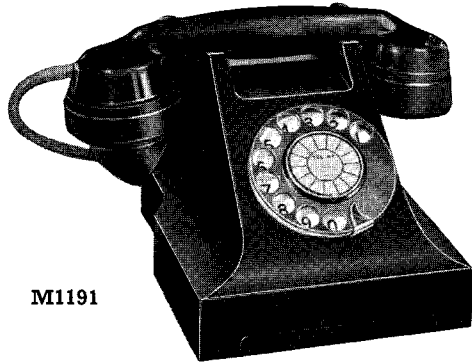


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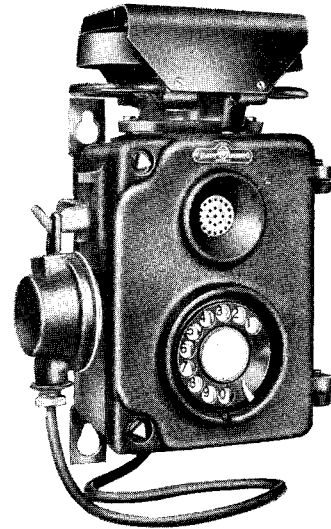


M1191 Desk Pattern Automatic Telephone.

A standard B.P.O. automatic telephone, specially modified for use with the "A.T.M." certified auto-exchange coupling system.



M1191



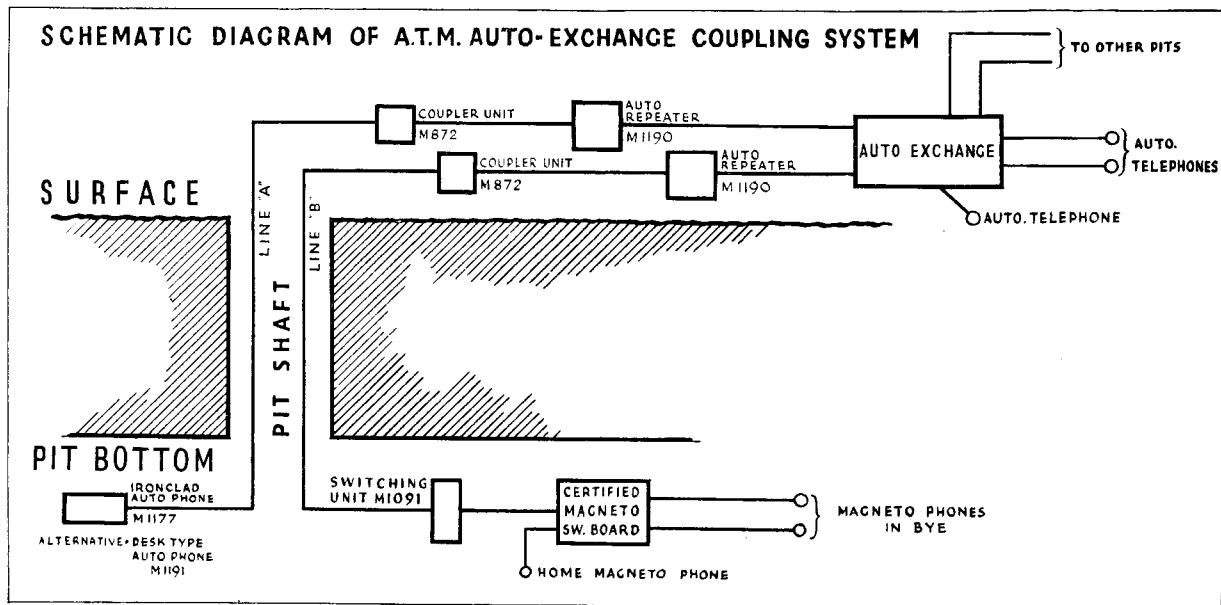
Wall Pattern Ironclad Automatic Telephone.

M1155 Extension Bell Relay.

This unit consists of a standard telephone D.C. relay shunted by an "Atmite" safety resistance and in series with a metal rectifier. Designed for use in conjunction with an extension bell and certified battery to extend ringing from a certified automatic telephone to a remote point.

M1177 Wall Pattern Ironclad Automatic Telephone.

A cast-iron cased weatherproof automatic telephone specially modified for use with the "A.T.M." certified auto-exchange coupling system.



Schematic Diagram of "A.T.M." Auto-exchange Coupling System.

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**M1141 "A.T.M." Mine Haulage Signal Indicator.**

The "A.T.M." Mine Haulage Signal Indicator provides visual indication of the point of origin of the transmitted statutory audible signals "STOP" and "RESTART." The Indicator ensures greater safety for men on the haulage routes and guards against unnecessary stoppages and mischievous restarts. Designed for use on endless chain or rope haulage systems, but can be used on almost any type of haulage system. Operates in conjunction with existing haulage road bell signals, the only essential requirement being that no bells or relays be connected directly to the signalling wires. Comprises a certified flameproof lamp indicator panel and an intrinsically safe relay set. Entirely robust in construction conforming in every respect with the general design of approved mining equipment.

Lamp Indicator Panel.

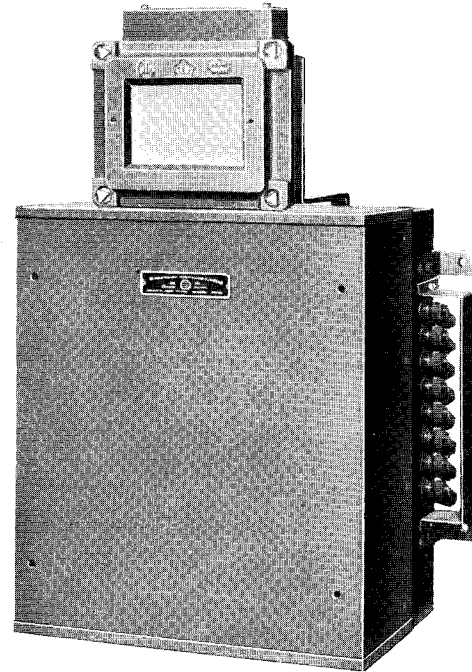
The Lamp Indicator Panel is of the luminous type, consisting of a panel of 10 "Section" lamps and 1 "Crossed Wire" lamp. The 10 "Section" lamps correspond to 10 short sections, each of 10 ohms resistance, of the signalling wire circuit. The "Crossed Wire" lamp glows when a short circuit fault has been detected and continues to glow until the fault is cleared.

Relay Set.

The relay set is an intrinsically safe equipment comprising standard telephone relays, resistors, etc., with a sheet-iron cover. The current consumption of the complete indicator, including the lamps, is so small that it can be operated by a certified Leclanché battery. It is preferable, however, to operate the indicator relays only from this source and to supply the lamp current from a certified transformer (See Sheet 1025), connected to the mains supply. With this arrangement the major load is removed from the battery; consequently, there is much less tendency for the battery to "polarize" and its useful life is very much increased.

Method of Operation.

Upon the statutory signal "STOP" being given on the signalling wire, the lamp governing the point of origin is illuminated. In response to this signal the engineman stops hauling and presses the "1st Cancel Key." This causes the lamp to change from a steady glow to a flicker until the second signal "RESTART" is received from the same line section. The second signal changes the flicker of the lamp to a steady glow again and the engineman restarts hauling and restores the indicator to normal by operating the Final Cancel Key. Should a false signal be given from a section other than that from which the "STOP" signal was received, another lamp will be illuminated. After noting the section the engineman cancels the second lamp by again operating the 1st Cancel Key.



M1141

Crossed Wire Feature.

If for any reason the signalling wires become short-circuited the indicating lamp associated with that section of the line will glow and as long as the fault persists, the signal cannot be cancelled in the normal manner. Under these conditions the engineman momentarily depresses the Crossed Wire Key which causes the Crossed Wire Lamp to glow and extinguishes the Section Lamp. The Crossed Wire Lamp continues to glow for the duration of the fault. The clearance of the fault will be indicated by the Crossed Wire Lamp being extinguished and the flashing of the Section Lamp and the equipment can then be restored to normal by operating the Final Cancel Key.

If during the period of the fault it is desired to ascertain the section of the line on which the short-circuit has occurred, it is only necessary to press the Crossed Wire Section Key, when the indicating lamp of the section affected will glow.

Overall dimensions and weight:

Height:	Width:	Depth:	Weight:
20½"	17"	9"	77·5-lbs.
(52 cms.)	(43·2 cms.)	(22·8 cms.)	(incl. cable)
			(35·2 kg.)

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RIPPLE CONTROL
EQUIPMENT**

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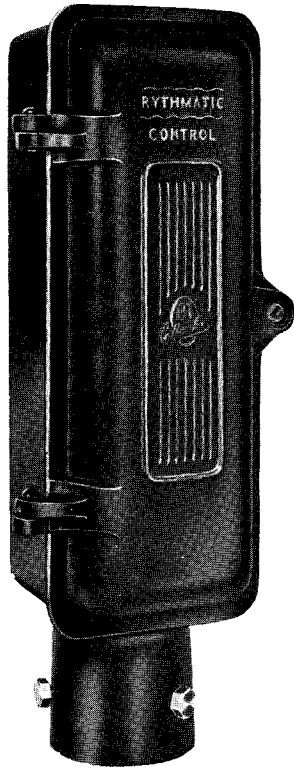


T1198 "Rythmatic" Control Switch Housing.

For use with street lamp standards.

Accommodates one "Rythmatic" control switch, and in addition, a fuse and disconnecting link for the "neutral" conductor. This housing is of cast iron and is weatherproof, the door being fitted with a waxed beading which seals the interior when closed.

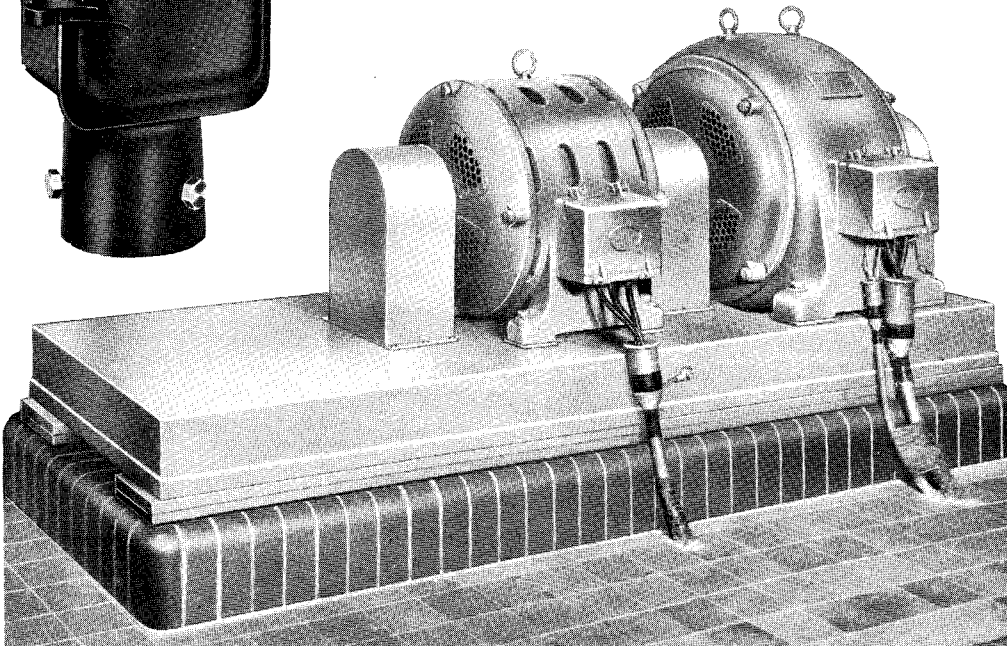
Height : Width : Depth : Weight :
 1'-8" (508 mm.) 7 $\frac{3}{4}$ " (197 mm.) 6" (153 mm.) 15-lbs. (6.8 kg.)



**T1198
Closed**



**T1198
Open**



Typical Motor Alternator Set
 showing bedplate to accommodate an additional alternator of different frequency.

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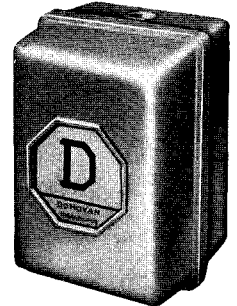
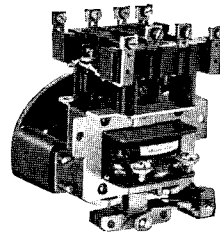


T1200 4-Pole Contactor.

Used on Rythmatic equipment for controlling the signal transmission cycle. Comprises operating and locking winding on laminated core, laminated armature and four silver-faced contacts. Normally the latter constitute four "make" contacts, but spares can be supplied for readily converting any "make" to "break" contacts. The non-inductive contact rating is 10 amperes and the operating windings are continuously rated at 240 volts 50 cycles.

Contained in cast-iron case.

Height : Width : Depth : Weight :
 6 $\frac{3}{4}$ " (173 mm.) 5" (127 mm.) 4 $\frac{3}{8}$ " (121 mm.) 6-lbs. (2.73 kg.)



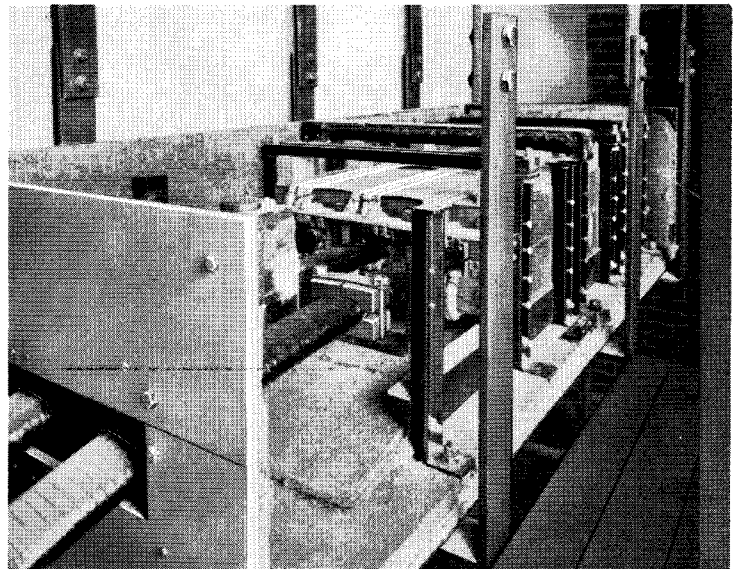
T1199 E.H.T. Injection Transformer.

Used for injecting ripple frequency currents into E.H.T. mains.

Comprises laminations and mounting brackets so arranged that the complete transformer can be built up around existing E.H.T. cables without interruption of the supply.

Typical Dimensions.

Length ... 6'-6" (1.981 m.)
 Width ... 1'-8" (508 mm.)
 Depth ... 2'-6" (762 mm.)
 Weight ... 11-cwts. 3-qrs. 4-lbs. (599 kgs.)

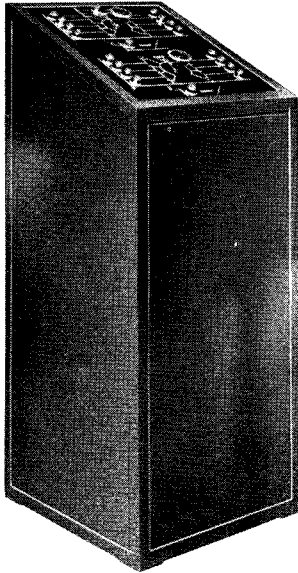


T 199

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T1204
Control Desk Assembly

T1204 Control Desk (16 Signals).

Equipped with two manually operated 8-way rotary switches with corresponding lamps for 16 signal selections, one lamp for each signal. A lamp and push button are associated with each manual switch to transmit the selected signals.

A signal lamp is also fitted to indicate when the motor-alternator is running. Desks can be placed side by side to give more selections as required. Framework is rigidly constructed of sheet-iron and is fitted with a hinged door at the rear and a removable panel at the front.

Finish: Crystalline enamel and chromium fittings.

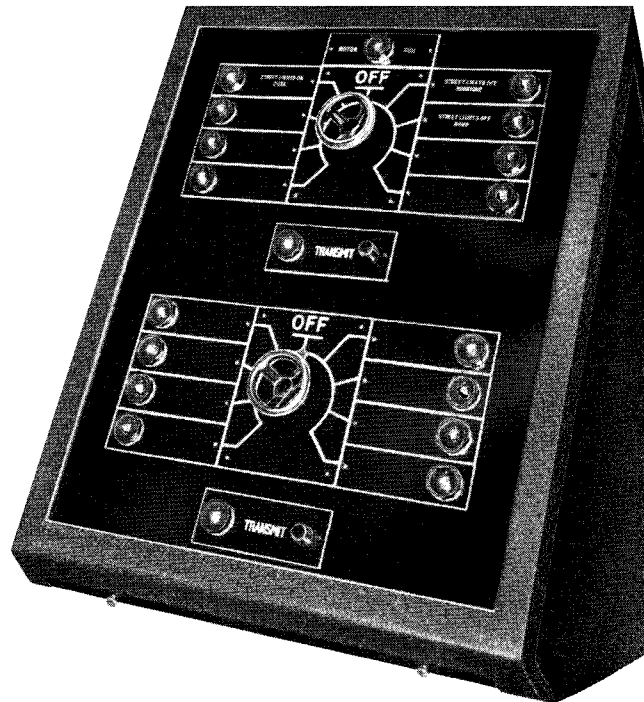
Depth: 1'-8½" (521 mm.)

Width: 1'-10½" (572 mm.)

Height: 4'-1½" (1.260 m.)

Weight: 2-cwts. 1-qr. (115 kg.)

T1204
Control Desk Panel



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T1202 Type 45 Rythmatic L.T. Injection and Control Unit.

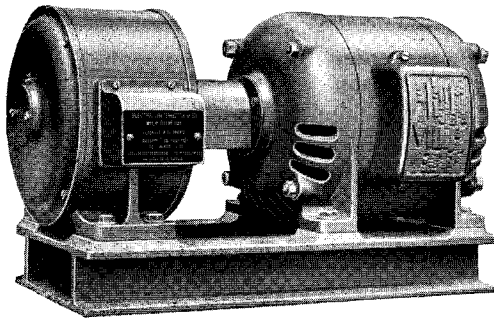
A completely self-contained L.T. injection and control unit for small electrical undertakings and large industrial plants, institutions etc., operating from their own "consumer's" sub-station or private sub-station. Provides for six distinctive signals, three of which are equipped for automatic transmission. Remote control by pilot wire is also provided for.

Comprises 100 watt injection motor alternator (ripple frequency), three coupling capacitors, signal controllers and contactors, rotary switch for signal selection, push button for signal transmission, three time switches for automatic street lighting control, suitable for 400 volts 3-phase 4-wire supply, and required 20 amp fused circuit. The whole of the apparatus is assembled in a steel cabinet for wall mounting, and fitted with a Yale lock.

Height : 2'-9" (839 mm.) Width : 2'-4" (712 mm.)
 Depth : 1'-4" (407 mm.) Weight : 1-cwt. 1-qr. 10-lbs. (68 kg.)
 (See Figs. 6 & 7. Engineering bulletin 2191).



**T1202
 L.T. Injection and Control Unit
 Front View**



**T1205
 Ripple Frequency Motor-Alternator**

**T1205
 Ripple Frequency Motor-Alternator.**

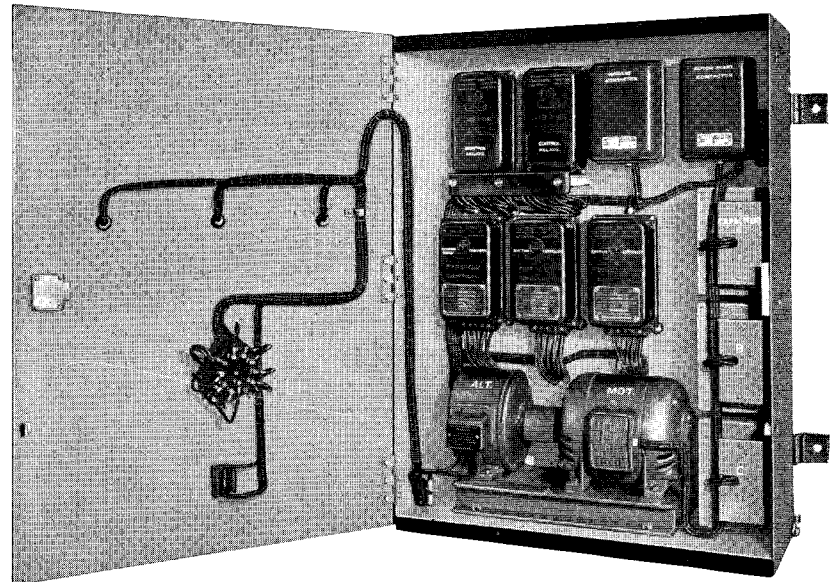
As incorporated in T1202 Type 45 Rythmatic injection and control unit.

Comprises ¼ H.P. 415v. 3-phase induction motor flexibly coupled to 100 watt ripple frequency single phase inductor type alternator having permanent magnet field.

Assembled on a common bed plate.

Length ... 1'-4" (407 mm.)
 Width ... 8½" (210 mm.)
 Depth ... 9½" (235 mm.)
 Weight ... 2-qrs. 15-lbs. (32.2 kg.)

(See Fig. 8. Engineering bulletin 2191).



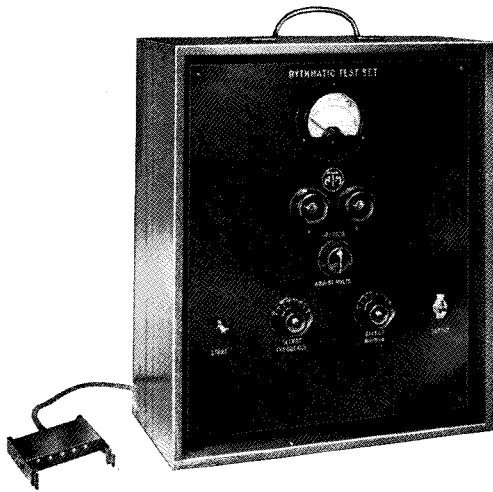
**T1202
 L.T. Injection and Control Unit. Open**

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T1201

T1201 Test Set for Rythmatic Control Switches.

Used for checking the operation of Rythmatic Control switches. Comprising valve oscillator, rhythm generator, supply lead and switch, frequency and rhythm radial selecting switches, ripple frequency voltage adjustment switch, ripple frequency voltmeter, "on" and "off" lamps, start switch, cord and 5-point-connecting plug. The apparatus is mounted on a panel and enclosed in a hardwood case, with handle.

Height : Width : Depth : Weight :
 1'-5½" (445 mm.) 1'-4" (407 mm.) 10½" (267 mm.) 26-lbs. (11·8 kg.)

Fuse Assembly.

Includes T1206 Fuse Mounting with mounting bracket and two T1207 Fuse Holders.

T1206 Fuse Mounting.

Length : Width : Depth : Weight :
 3" (76·2 mm.) 2" (50·2 mm.) 1" (25·4 mm.) 5¼-oz. (148·8 gm.)

T1207 Fuse Holder.

Length : Width : Depth : Weight :
 1 5⁄8" (41·3 mm.) 5⁄8" (15·9 mm.) 1 5⁄8" (41·3 mm.) 1¼ ozs. (35·4 gm.)



T1207

T1206

T1207



**T1206 Fuse Mounting Assembly
with T1207 Fuse Holders**

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C A T A L O G U E

**“ELECTRO-MATIC”
VEHICLE ACTUATED
TRAFFIC SIGNALS**

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HOME SALES AND EXPORT DEPT.
STROWGER HOUSE, ARUNDEL ST., LONDON, WC2.

T R O W G E R W O R K S · L I V E R P O O L 7.

ELECTRO-MATIC VEHICLE ACTUATED STREET TRAFFIC SIGNALS



The outstanding feature of the Electro-matic system of street traffic signals is control of the signal periods through detectors which are directly actuated by each unit of the passing traffic. The detection of traffic units makes it possible to arrange for automatic and continuous variation of the right-of-way periods in accordance with traffic requirements. It is possible, however, to superimpose any arbitrary timing of signals to meet the requirements of special traffic conditions.

Pedestrian signals are also provided for in the system. Right-of-way for pedestrians can be provided automatically as part of any traffic control scheme ; alternatively, pushbuttons or other types of detector can be used to enable pedestrians to call for right-of-way as required.

The Electro-matic system therefore offers a flexibility of control which is unique, and adequate for the needs of the busiest and most complicated street traffic.

It will be recognised that each intersection demands a study of the traffic to determine the type of controller and other apparatus required, therefore only typical items are listed in this catalogue. Full particulars of suitable complete equipments to meet specific conditions, or general descriptive literature, will be furnished on request.

The signal heads of the Electro-matic system incorporate the usual red, amber, and green light signals, with the word "STOP" embossed on the red glass roundel. Several patterns of signal head poles are available for use as required by local conditions. Further particulars of signal heads and poles are contained in Publication No. 880.

A controller which contains the cams, relays, switches, etc., necessary for operating the signals, may be of the 2, 3 or 4-phase type according to the characteristics of the particular traffic intersection for which it is required. "A.T.M." Controllers conform in all respects with the requirements of the British Ministry of Transport and British Standards Institution. They are designed and constructed so that any signal sequence which may be required can be given. Further particulars of controllers are given in Publication No. 881, together with illustrations of the pillars which house them.

Vehicle detectors are of types suitable for all road vehicles, including tramcars, and are made in sizes suitable for the various street widths encountered. Particulars and illustrations of detectors are given.

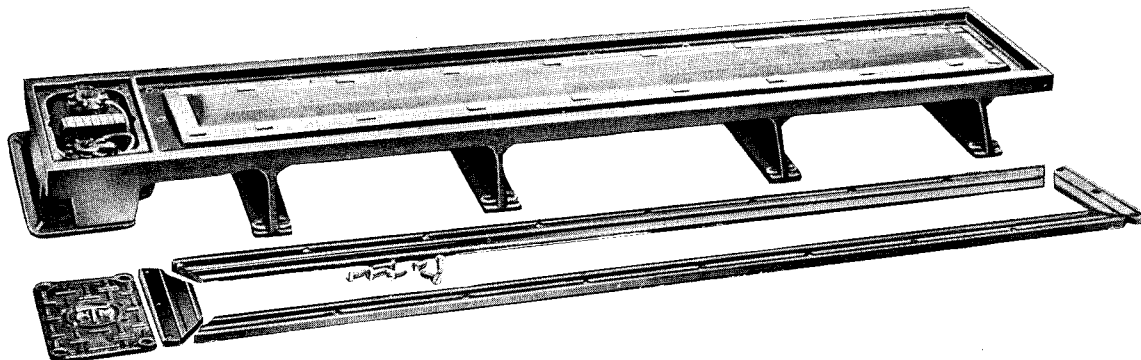


Fig. 1

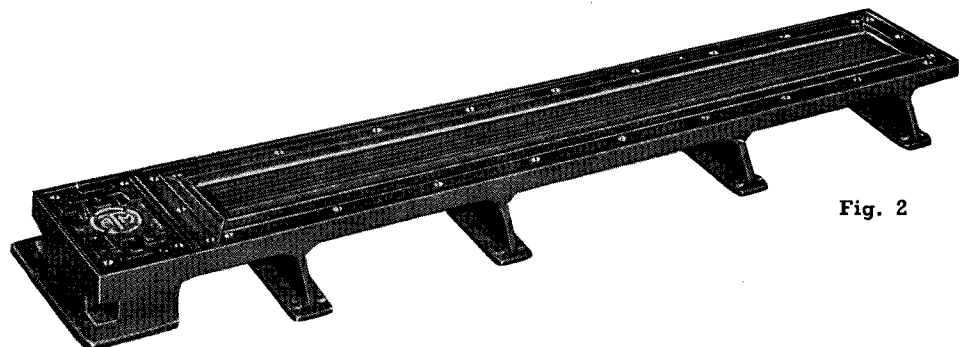


Fig. 2

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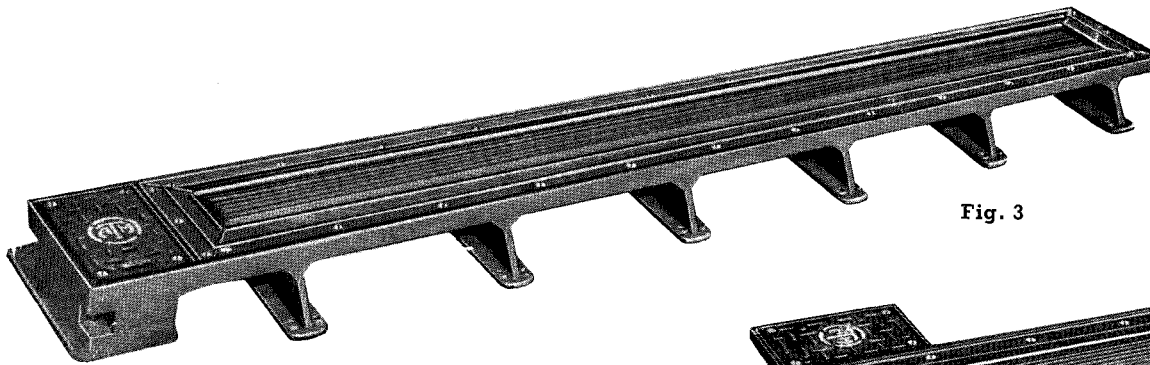


Fig. 3

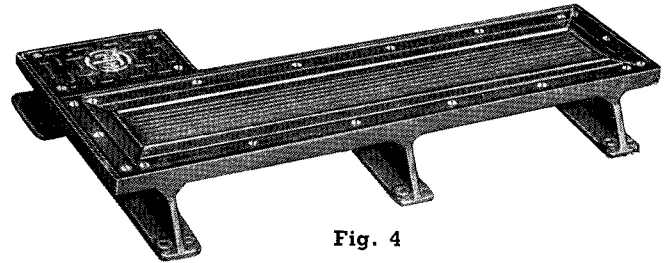


Fig. 4

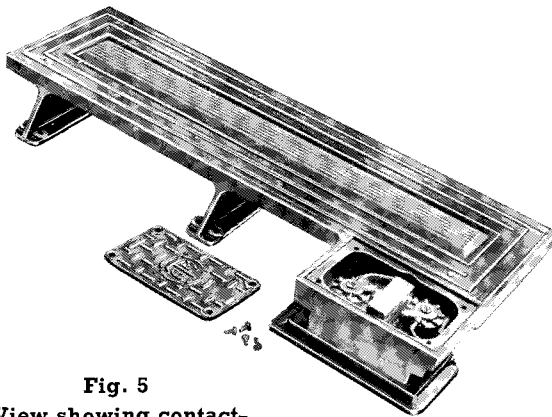


Fig. 5

View showing contact-making capsules fitted in position

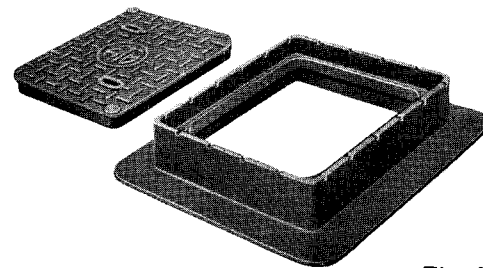


Fig. 6

DETECTORS:

T4604 Detector, Pneumatic, Standard.

T3317 Detector, Pneumatic, Unidirectional.

For Electro-matic street traffic signals; comprising rubber tread with air chambers connected to contact-making capsules. Specify in order whether required for standard or unidirectional working; the latter discriminates between traffic traversing it in opposite directions.

The whole is mounted in a cast-iron frame which is self-anchoring when fitted in the roadway.

Typical detectors are illustrated in Figs. 1, 2, 3, 4 and 5.

T3318 Kerbside Junction Box. Fig. 6.

For fixing in side walks to cover a brickwork well, containing the capsules of adjacent pneumatic vehicle detectors and air expansion chamber. The capsules are accommodated on a platform and are connected to the detectors by rubber and metallic tubing.

Length:	Breadth:	Depth:	Weight:
17 $\frac{3}{4}$ "	15"	3 $\frac{1}{4}$ "	47-lbs.
(45 cms.)	(38 cms.)	(8.2 cms.)	(21.4 kg.)

Standard:	Unidirectional:	Nominal Size:	Length:	Width:	Depth:	Weight:
T4604/8	T3317/8	8' 0"	8' 11 $\frac{11}{16}$ "	1' 5 $\frac{1}{4}$ "	6"	495-lbs.
		(244 cms.)	(272 cms.)	(44 cms.)	(15 cms.)	(224.5 kg.)
T4604/6	T3317/6	6' 0"	6' 10 $\frac{3}{16}$ "	1' 5 $\frac{1}{4}$ "	6"	398 $\frac{1}{2}$ -lbs.
		(183 cms.)	(208 cms.)	(44 cms.)	(15 cms.)	(180.5 kg.)
T4604/4	T3317/4	4' 0"	3' 11 $\frac{3}{4}$ "	1' 11 $\frac{1}{8}$ "	6"	273-lbs.
		(122 cms.)	(114 cms.)	(59 cms.)	(15 cms.)	(124 kg.)

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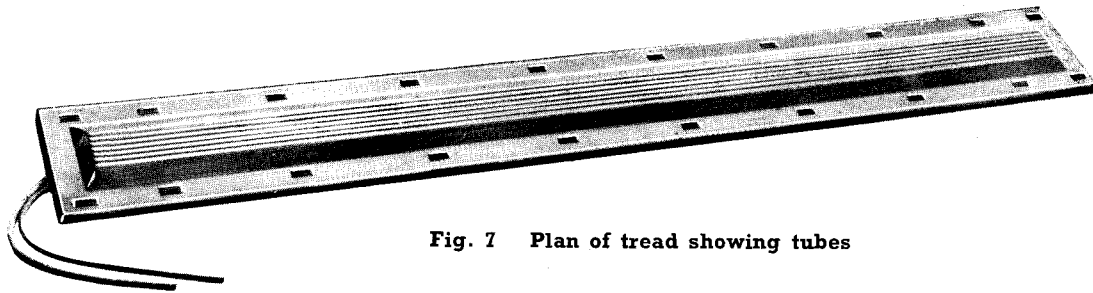


Fig. 7 Plan of tread showing tubes

**T4605 Tread for Pneumatic Detector,
Standard or Unidirectional.**

Comprises rubber tread with air chambers and tubes for connecting to contact capsule. See Figs. 7 and 8.

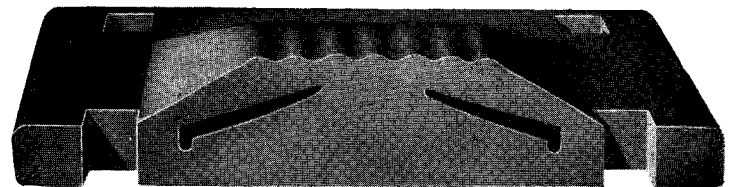


Fig. 8 Section showing air chambers

TREADS FOR PNEUMATIC DETECTORS.

Cat. No.	Nominal Size :	Length :	Width :	Depth :	Weight :
T4605/8	8' 0" (244 cms.)	7' 11 1/2" (242 cms.)	8" (21.5 cms.)	1 1/32" (3.6 cms.)	38-lbs. (17.2 kg.)
T4605/6	6' 0" (183 cms.)	5' 9 3/4" (177 cms.)	8" (21.5 cms.)	1 1/32" (3.6 cms.)	28-lbs. (12.7 kg.)
T4605/4	4' 0" (122 cms.)	3' 7 5/8" (110.8 cms.)	8" (21.5 cms.)	1 1/32" (3.6 cms.)	16-lbs. (7.26 kg.)

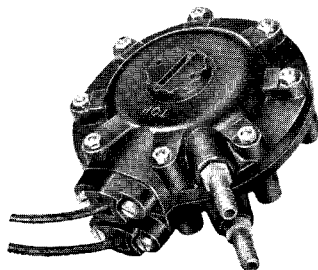


Fig. 9

**T4606/1 Contact Capsule, Left Hand.
T4606/2 Contact Capsule, Right Hand.**

Comprises diaphragm controlling a pair of "make" contacts. The capsule is completely sealed against the ingress of dirt and moisture. See Fig. 9.

3 3/4" (95 mm.) x 3 1/2" (89 mm.) x 1 1/4" (32 mm.) 9 1/4-ozs. (260 gms.)

Conversion from Contact to Pneumatic Tread.

Pneumatic treads are designed for use in detector castings originally fitted with contact treads. Complete sets of parts for conversion from contact to pneumatic working comprise pneumatic tread with clamping bars, contact capsule, etc.

When ordering conversion sets, particulars of existing detectors, with drawing numbers, should be given; also state whether detectors are standard or unidirectional and whether or not junction box is required.

Conversion Sets.

- (a) For existing self-anchoring castings.
- (b) For existing anchor-bolt type castings.

	Standard :		Unidirectional :	
	(a)	(b)	(a)	(b)
For 8-ft. detectors ...	T3313/8	T3315/8	T3314/8	T3316/8
" 6-ft. "	T3313/6	T3315/6	T3314/6	T3316/6
" 4-ft. "	T3313/4	T3315/4	T3314/4	

Unidirectional Working.

To convert a pneumatic detector of any size from standard to unidirectional working, an additional capsule with fittings is required (see Fig. 1). Additional relays in the controller, and wiring from detector to controller are also necessary. Full particulars of existing equipment should be given to enable a quotation to be made for the proper items.

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T4157 Pedestrian Push-button Control Unit.

Comprising cast aluminium mounting with push-button mechanism, vitreous enamelled instruction plate, and clamps for 4½" diameter pole.

The unit is illustrated in Fig. 10.



Length :
9¾" (248 mm.)

Width :
8" (203 mm.)

Depth :
3½" (89 mm.)

Weight :
6⅞-lbs. (3.12 kg.)

Fig. 10 T4157

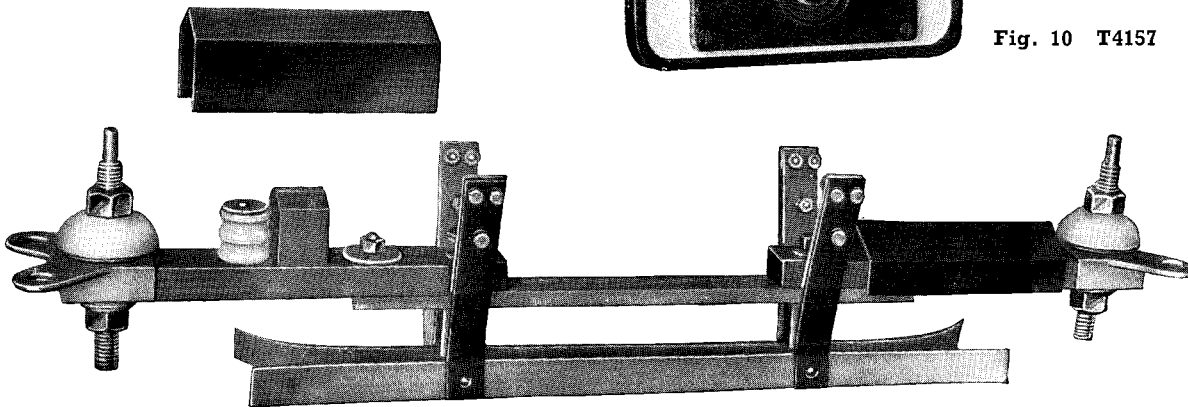


Fig. 11 T4335

T4335 Tramcar Detector.

For Electro-matic street traffic signals. For use with wheel trolley collectors. Comprising two spring-mounted conductor bars supported on insulating blocks ending in guy-wire attachments. The blocks are linked together by a zinc-plated channel-iron strip.

This type of detector is illustrated in Fig. 11.

Length : Width : Depth : Weight :
3' 4" (1.016 m.) 5¼" (133 mm.) 9" (229 mm.) 22½-lbs. (10.2 kg.)

T4336 Tramcar Detector.

For Electro-matic street traffic signals. Comprising movable slipper and contacting box for mounting above trolley wire. For use with bow or pantograph collectors.

The type of detector is illustrated in Fig. 12.

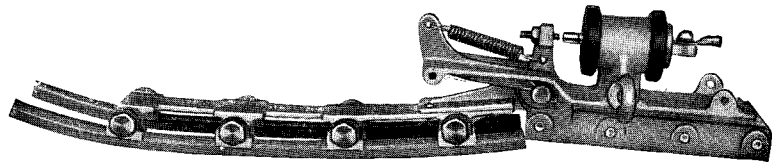
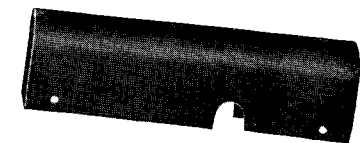


Fig. 12 T4336

Length: Width: Depth: Weight:
19½" 5¼" 4½" 7½-lbs.
(495 mm.) (133 mm.) (114 mm.) (4.54 kg.)

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Special Detectors.

Conduit and cable tramways require special detectors, particulars of which will be furnished on request.

A typical conduit tram detector of the magnetic type is illustrated in Fig. 13.

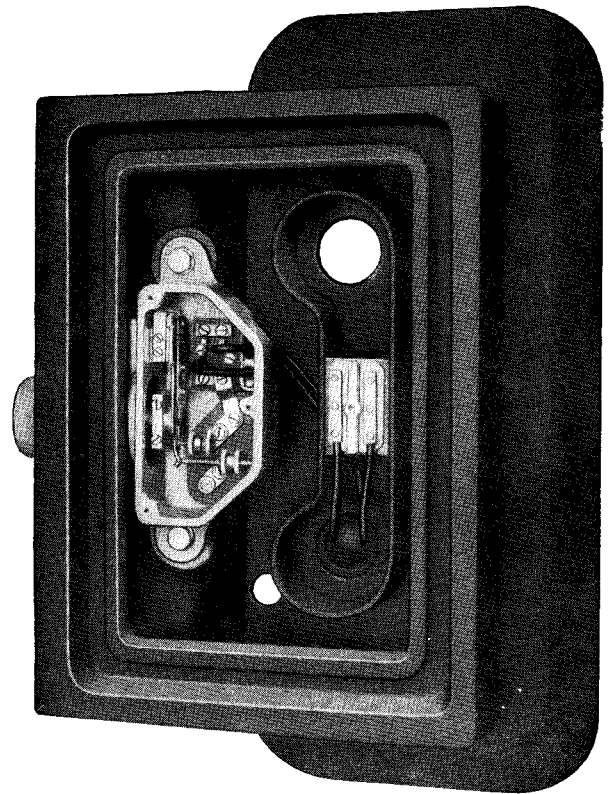
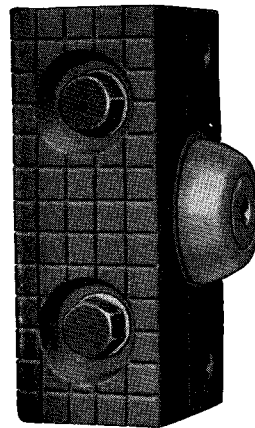


Fig. 13 Typical Conduit Tram Detector

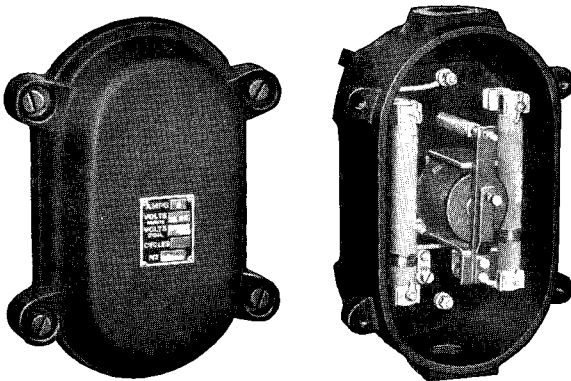


Fig. 14 T4441

T4441 Relay, High Voltage.

For use with tramcar detector, trolley type. Operating voltage 500-600 D.C. Contacts for 1.5 amperes at 12 volts A.C. Contained in cast-iron weatherproof box screwed each end for 1" conduit. Fixing bracket not included.

The relay is illustrated in Fig. 14.

Height : 9" (228 mm.) Width : 7" (178 mm.) Depth : 5 $\frac{3}{8}$ " (146 mm.) Weight : 14 $\frac{1}{4}$ -lbs. (6.46 kg.)

T4155 High-voltage Fuse.

Single-pole in cast-iron waterproof box with grey enamel finish. Shielded fuse. Spare fuses enclosed in box (Fig. 15). For use with tramcar detector.

Height : 8 $\frac{1}{2}$ " (216 mm.)
 Width : 2 $\frac{3}{8}$ " (70 mm.)
 Depth : 3 $\frac{1}{8}$ " (79 mm.)
 Weight : 4 $\frac{1}{4}$ -lbs. (1.93 kg.)

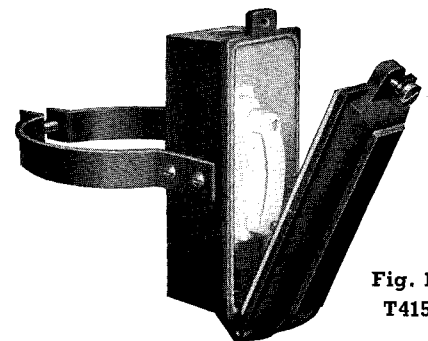


Fig. 15
T4155

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ELECTRO-MATIC VEHICLE ACTUATED STREET TRAFFIC SIGNALS



Fig. 16 T4154

T4154 Double-pole Watertight Switch.

For Electro-matic street traffic signals. Comprising double-pole switch, on porcelain base, mounted in circular cast-iron case screwed two-way through for 1" conduit. Operated by detachable key spanner. Black enamel finish. See Fig. 16.

Length : Width : Depth : Weight :
 $3\frac{1}{4}$ " (83 mm.) $3\frac{1}{8}$ " (79 mm.) $2\frac{3}{4}$ " (70 mm.) $1\frac{1}{2}$ -lbs. (.68 kg.)

CONTROLLERS.

Controllers, Vehicle Actuated.

For Electro-matic street traffic signals. Comprise a compact readily replaceable unit mounted in a pillar with front and rear doors. (See Figs. 17 and 18.) The pillar also contains the main switch, the fuses, the facility switch, a push-button, a radio interference suppressor, terminal blocks, and the permanent wiring. Space is available for such auxiliary apparatus as time switches, electricity meters, mains, sealing boxes, etc., if required.

The external dimensions of the pillar are, overall: Height 6' 0 $\frac{1}{2}$ " (183 cms.) (approximately 4' 11" (150 cms.) above ground level), width 1' 3" (38 cms.), and depth 1' 3" (38 cms.). Approximate average weight 690-lbs. (313 kg.).

In cases where additional apparatus is required for more complicated intersections, a larger pillar is available. The overall dimensions are: Height 6' 0 $\frac{3}{4}$ " (183 cms.) (approximately 4' 9" (145 cms.) above ground level), width 1' 4" (41 cms.), depth 1' 10" (56 cms.).

The control unit consists of a solenoid-driven camshaft with phenol-fibre cams, operating a series of phosphor-bronze contact springs; mounted with relays, capacitors and neon lamp in a cast aluminium case.

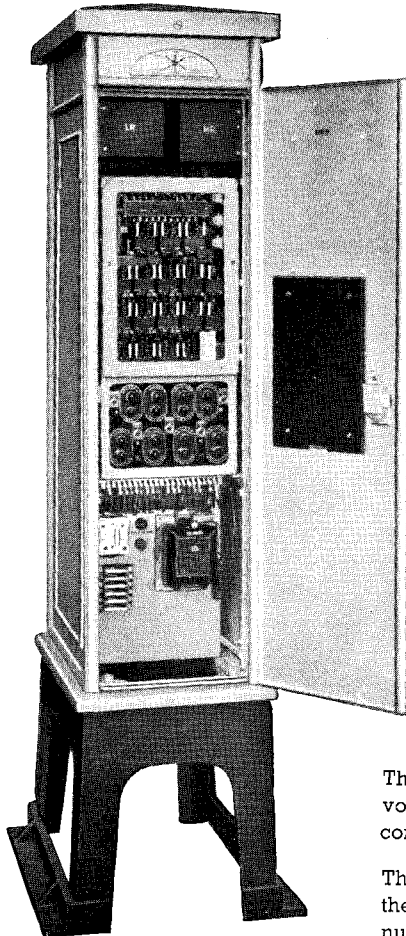


Fig. 17

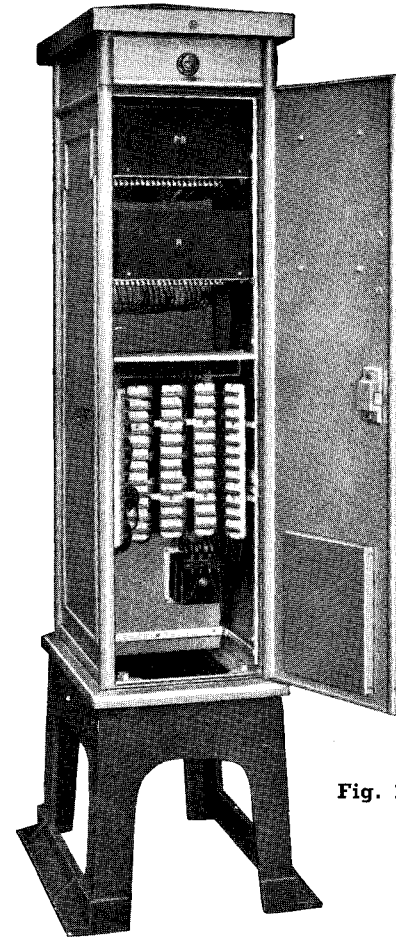


Fig. 18

The front panel carries the adjustable switches and "On" and "Off" switches associated with the several phases of operation, according to the type of control unit.

The front of the case is glazed to facilitate observation of the camshaft operation, and is finished in grey enamel.

The standard units operate with A.C. of any standard voltage. Where D.C. is to be used, apparatus to convert D.C. to A.C. is fitted in a separate pillar.

The following are three typical control units from the wide range which has been designed to meet numerous requirements.

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Control Units.

T4337

Two-phase control unit with variable maximum timing controlled by traffic density and arranged for flexible progressive working. Mounted in pillar.

T4341.

Three-phase control unit with variable maximum timing on phases A and C controlled by traffic density and arranged for flexible progressive working. Mounted in pillar.

T4342.

Four-phase control unit with variable maximum timing on two phases controlled by traffic density and arranged for flexible progressive working. Mounted in pillar.

T3319 Type 39 Electro-matic Controller with Bias Linking.

This controller is generally similar to those previously described, but the controlling apparatus consists of a number of "jack-in" units mounted on a rack, housed in a cast-iron pillar having watertight double doors at the front and a single door at one side.

Height: 5' 5" (1.625 m.) above ground. 1' 6" (.45 m.) below ground. 6' 11" total (2.1 m.).

Width: 2' 8" (81.28 cms.).

Depth: 1' 5" (45.75 cms.).

Weight 1,155-lbs. (525 kg.).

Approximate Average Weights and Dimensions.

Controller, 4-phase (mechanism):

67-lbs. (30.389 kg.) nett.

151-lbs. (68.489 kg.) gross.

Case :

3' 4" (1.016 m.) × 1' 8" (508 mm.) × 1' 6" (457 mm.) external.

3' 2" (965 mm.) × 1' 6" (457 mm.) × 1' 4" (406 mm.) internal.

Pillar (Cast Iron):

622-lbs. (282.122 kg.) nett.

826-lbs. (374.650 kg.) gross.

Case :

6' 10" (2.082 m.) × 2' 6" (762 mm.) × 2' 2" (660 mm.) external.

6' 8" (2.032 m.) × 2' 4" (711 mm.) × 2' 0" (609.6 mm.) internal.

Total weight, 689-lbs. (312.510 kg.).

T4464 Dual Master Timer.

Used to regulate (in accordance with a predetermined flexible progressive plan) the operation of interlinked traffic signal controllers at a succession of intersections. Consisting of cast-iron pillar finished in aluminium paint and fitted with two complete timers enabling alternative plans to be imposed as required.

Height :	Width :	Depth :	Weight :
6' 7 $\frac{1}{4}$ " (183 cms.)	1' 5 $\frac{1}{4}$ " (44 cms.)	2' 4 $\frac{3}{4}$ " (73 cms.)	1,071-lbs. (486 kg.)

Single Master Timer is available for use where dual facilities are not required.

SIGNALS

T4440 Three-light Traffic Signal Head.

Triangular sheet aluminium alloy body, with top and bottom castings of aluminium alloy. Hinged bezels with open or deep visors. Red, amber and green glass diffusing roundels, with lettering "STOP" moulded on red. Chromium-plated copper reflectors. Edison screw-cap lamp sockets. Complete with two stainless-steel anti-vibratory mounting straps and flexible metallic tubing for the protection of leading-in wires. Enamel finish.

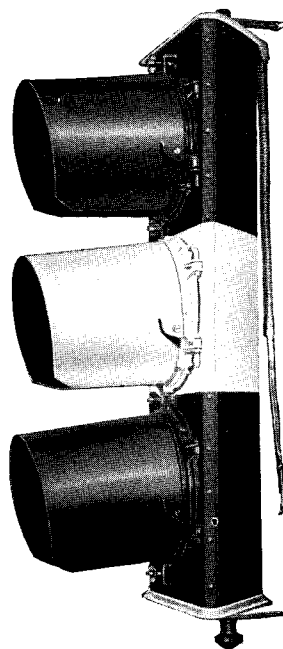


Fig. 19

Fig. 19 shows a typical signal head with deep visors. Fig. 20 shows an assembly with open type visors and indicates the possible inclinations of the signal faces. Figs. 23 and 24 show the flexibility in disposition of the signal heads, and give the principal dimensions of the housings. The illustrations also show respectively the alternatives of warning globe and finial for top of signal pole.

	Length :	Width :	Depth :	Weight :
T4440:	3' 6 $\frac{1}{4}$ " (1.072 m.)	11 $\frac{1}{2}$ " (292 mm.)	1' 2 $\frac{3}{4}$ " (375 mm.)	28-lbs. (12.7 kg.)

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**ELECTRO-MATIC VEHICLE ACTUATED
STREET TRAFFIC SIGNALS**

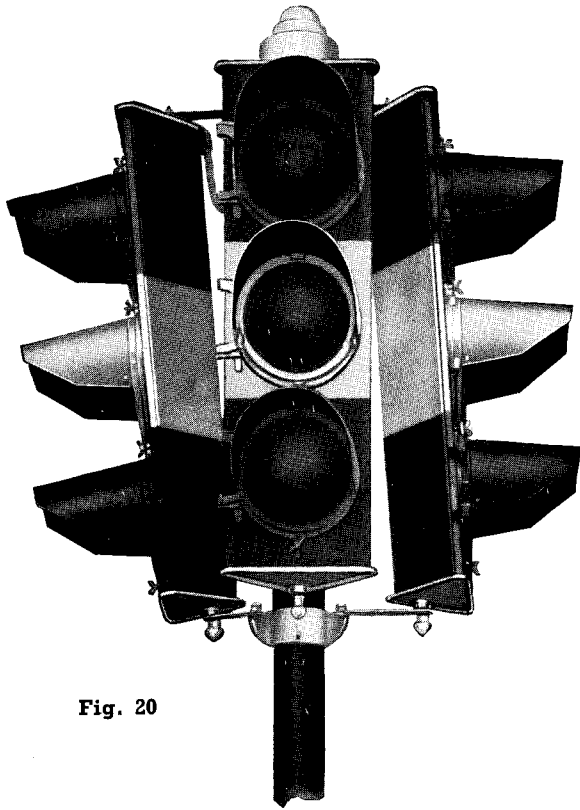


Fig. 20

Fig. 21

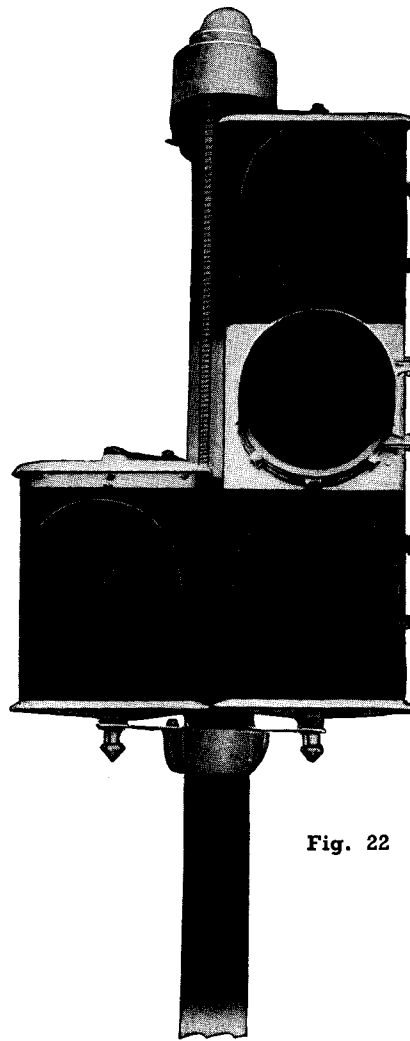
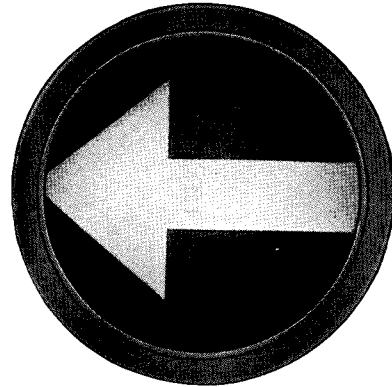


Fig. 22

T4156. Single Aspect Lantern—Green Arrow Left or Right.

As T4440, but for one aspect only. With E.S.C. lamp-holder, chromium-plated reflector, door, and diffusing glass roundel with moulded green arrow, displayed when illuminated, Fig. 21.

A typical single aspect lantern is illustrated in Fig. 22 associated with a 3-aspect lantern.

	Length :	Width :	Depth :	Weight :
T4156 :	18½"	11½"	1' 2¾"	12¾-lbs.
	(470 mm.)	(292 mm.)	(375 mm.)	(5.78 kg.)

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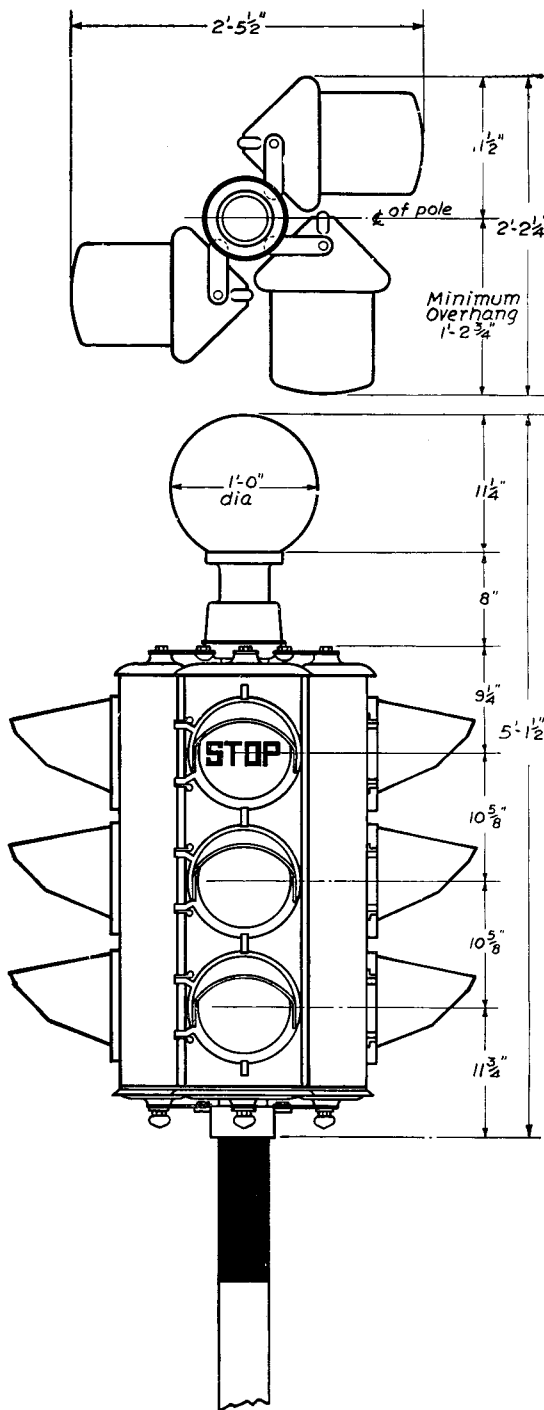


Fig. 23

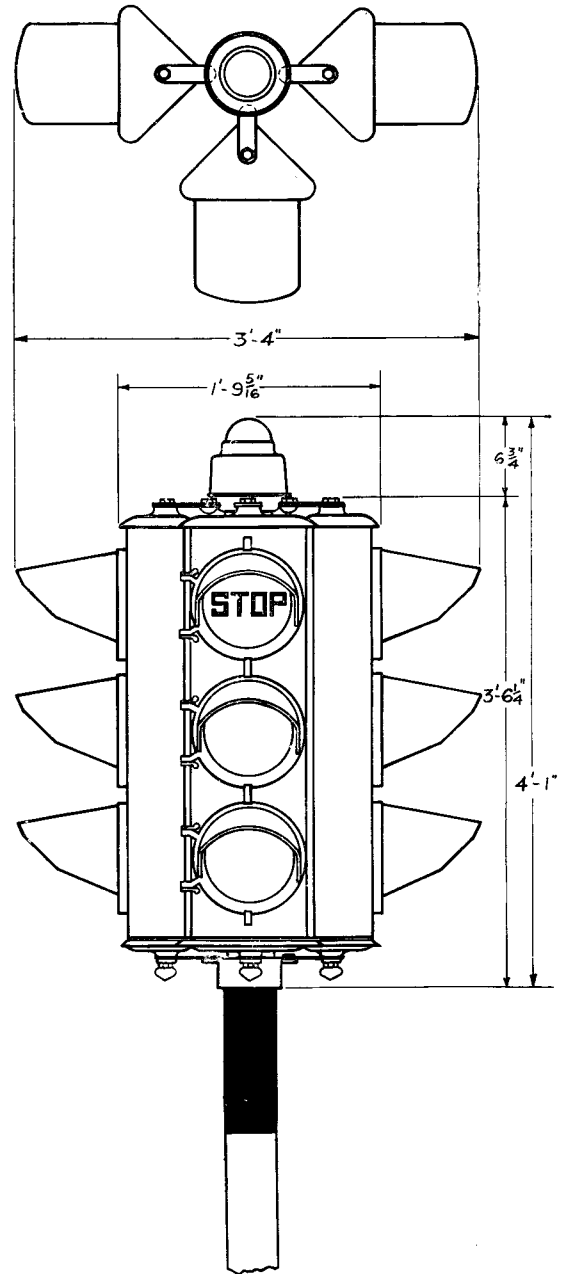


Fig. 24

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ELECTRO-MATIC VEHICLE ACTUATED STREET TRAFFIC SIGNALS

T4159 Single Aspect Lantern Pedestrian "Cross Now" Unit.

As T4440, but for one aspect only. With E.S.C. lamp-holder, chromium-plated reflector, door, and roundel of "Diffusalyte" glass which displays "Cross Now" when illuminated. (Fig. 25.)



Fig. 25 T4159

	Length :	Width :	Depth :	Weight :
T4159 :	18½"	11½"	14¾"	12¾-lbs.
	(470 mm.)	(292 mm.)	(375 mm.)	(5.78 kg.)

Two-aspect lanterns with plain red and "Cross Now" lenses are available, and will be quoted for on request.

T4339 Amber Warning Globe, Glass.

For use with street traffic control signals. To mount on top of pole. Conforms to B.S.I. Specification 566.

The globe (for internal illumination) is illustrated in Fig. 26.

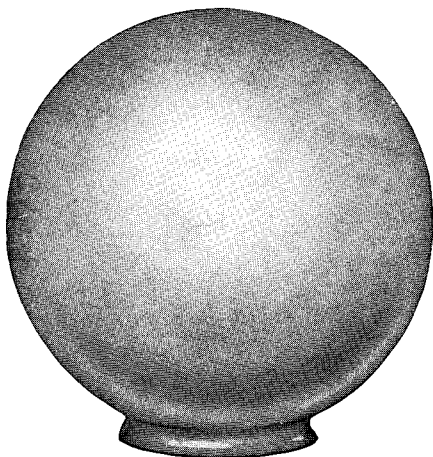
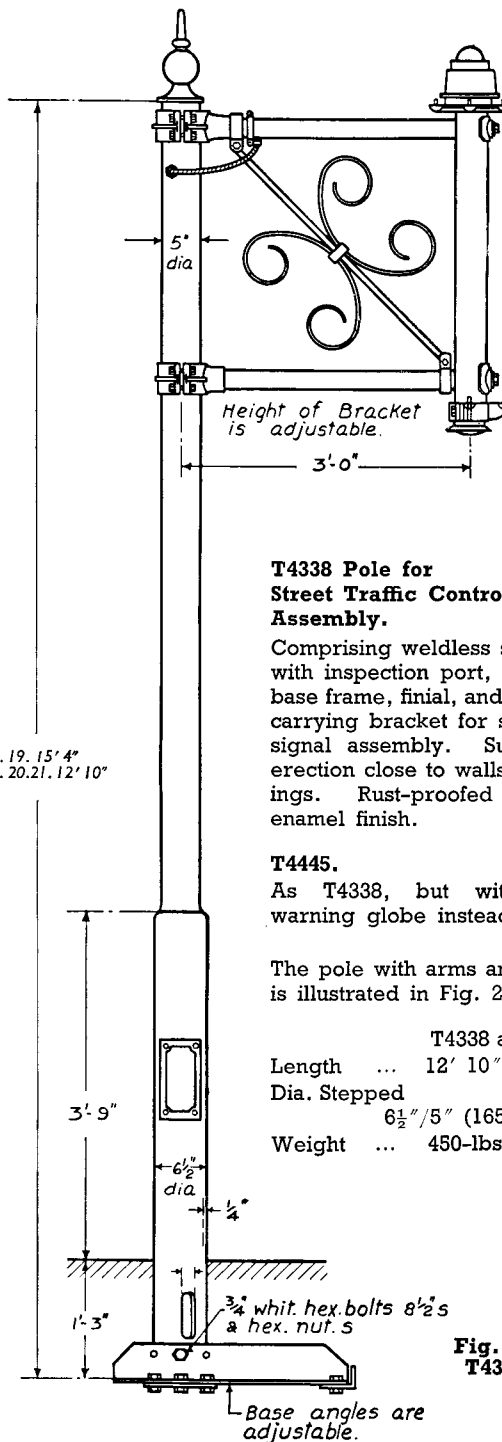


Fig. 26 T4339

Diameter :	Mounting Diameter :	Weight :
12" (305 mm.)	5" (127 mm.)	3¼-lbs. (1.47 kg.)



T4338 Pole for Street Traffic Control Signal Assembly.

Comprising weldless steel tube, with inspection port, angle-iron base frame, finial, and 3-ft. arms carrying bracket for supporting signal assembly. Suitable for erection close to walls or buildings. Rust-proofed and with enamel finish.

T4445.

As T4338, but with amber warning globe instead of finial.

The pole with arms and bracket is illustrated in Fig. 27.

	T4338 and T4445
Length ...	12' 10" (3.91 m.)
Dia. Stepped	6½"/5" (165/127 mm.)
Weight ...	450-lbs. (204 kg.)

Fig. 27 T4338

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**T4439 Ornamental Pole for
Street Traffic Control Signal Assembly.**

Comprising fluted steel tube, baseplate, signal mounting brackets, and finial with terminal block. Rust-proofed and with enamel finish.

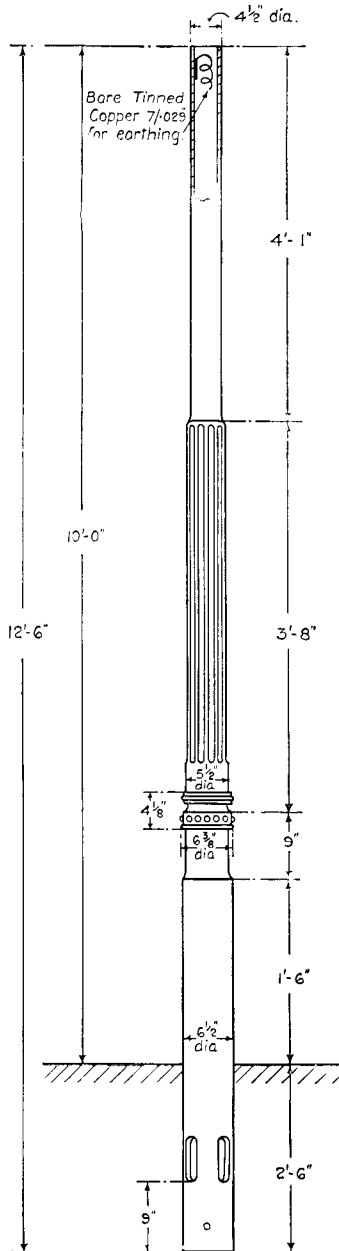


Fig. 28 T4439

T4456.

As T4439, but with amber warning globe and mounting instead of finial.

The fluted pole is illustrated in Fig. 28.

	T4439 and T4456
Length	12' 6" (3.81 m.)
Diam. Stepped	6 1/2"/4 1/2" (165/114 mm.)
Weight	234-lbs. (106 kg.)

**T4437 Pole for
Street Traffic Control Signal Assembly.**

Comprising plain weldless steel tube, complete with baseplate, signal mounting brackets, and finial with terminal block. Rust-proofed and with enamel finish.

T4438 Pole.

As T4437, but with amber warning globe and mounting in place of finial.

The plain pole is illustrated in Fig. 29.

	T4437 and T4438
Length	12' 0" (3.66 m.)
Diameter (A)	4 1/2" (114 mm.)
Weight	143-lbs. (64.8 kg.)

T4463 Mounting for Signal Assembly.

For fixing street traffic signal head to an existing standard. Comprising top and bottom assemblies for 1 or 2 lanterns, and pole terminal assembly.

T4465 Mounting for Signal Assembly.

As T4463, but for 3 or 4 lanterns.

DIMENSIONS :

Terminal.	
Height	11 1/2" (286 mm.)
Diameter	5" (127 mm.)
Weight	4 1/4-lbs. (1.93 kg.)
Clamps for 7 1/2" (190 mm.) diameter pole :	
Weight	16-lbs. (7.26 kg.)

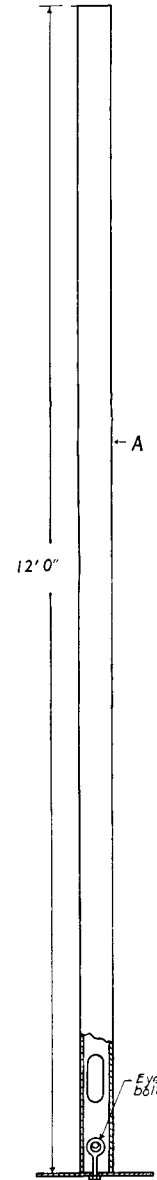
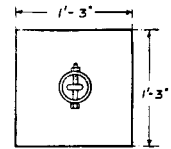


Fig. 29 T4437

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SECTION R



C A T A L O G U E

**R U R A L
A U T O M A T I C
E X C H A N G E S**

A U T O M A T I C T E L E P H O N E & E L E C T R I C C O . L T D .

**H O M E S A L E S A N D E X P O R T D E P T .
S T R O W G E R H O U S E , A R U N D E L S T . L O N D O N . W C 2 .**

S T R O W G E R W O R K S · L I V E R P O O L 7 .



Rural automatic telephone exchange equipment is of two main types (a) R.A.X. which is fully automatic and (b) S.A.X. which is semi-automatic.

All "A.T.M." rural exchanges are built up from the well proved apparatus used in "A.T.M." main exchanges but, since the services needed are not similar in all rural areas, the circuits and assemblies are modified to suit requirements for any particular rural automatic exchange area. Each rural exchange area must be considered individually to secure the most advantageous solutions of its particular problems.

The variety of services demanded from rural telephone equipment precludes complete standardisation economically and it is therefore impracticable to catalogue all the possible variations. Specifications and quotations will be furnished on receipt of enquiries with full particulars of service and other requirements.

R.A.X.

The R.A.X. is a complete, compact, fully automatic switching equipment for use in rural or isolated communities.

With R.A.X. equipment, the telephones are equipped with dials and all calls to subscribers on the same or on adjacent exchanges are effected automatically, either direct, or through another exchange in tandem. Toll and trunk calls are

obtained by dialling the respective exchanges in the manner usual with a network of automatic exchanges.

45 + 5 Unit Type R.A.X.

This equipment has a wide application. Front and rear views are shown in Figs. 1 and 2, and brief particulars are as follows;— The apparatus is built up in units of 45 lines to full capacity of 180 lines. Each unit is totally enclosed in a dust-proof metal cabinet, as illustrated in Fig. 3. The first unit is equipped with the complete automatic switching apparatus for 45 lines. In addition, it has the common apparatus for ringing and tone supply and supervision to serve up to 180 lines. Each extension unit is therefore equipped only with switching apparatus for 45 lines.

This R.A.X. utilises 50-point uniselectors as line finders and two motion "Strowger" first and final selectors with a 50-volt battery. Relays are B.P.O. Types 600 and 3000 and selectors are B.P.O. Type 2000. (A. T. & E. Co. Type 32A.)

In addition to ordinary subscribers, two and ten-party lines and one coin box line can be included to a total of 45 lines in each unit. Additional relays are required for a coin box line. The remaining 5 lines in the unit are allocated to bothway junctions. Two-party lines are on a terminal per station basis. Ten-party lines require one terminal per line.

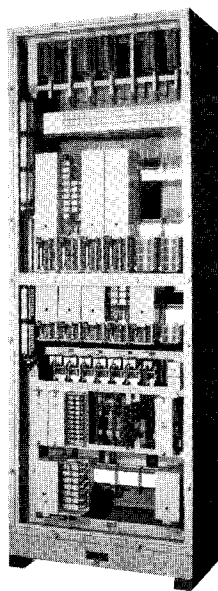


Fig. 1. 45 + 5 R.A.X.
front; covers removed

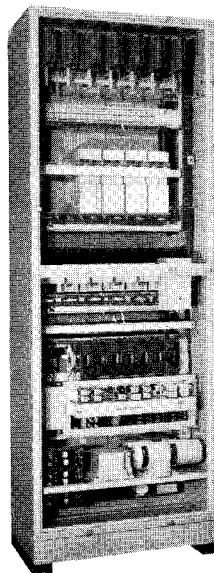


Fig. 2. 45 + 5 R.A.X.
rear; covers removed

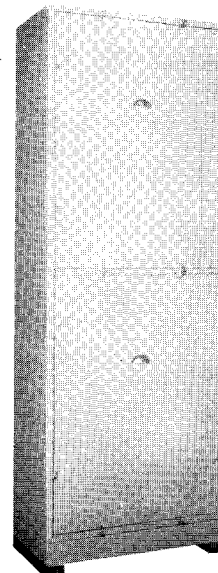


Fig. 3. 45 + 5 R.A.X.
front; covers fitted

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Facilities provided by this R.A.X. are:—

- (1) Bothway direct access to adjacent automatic or manual exchanges and via a "parent" to all other exchanges, automatic or manual.

NOTE.—For terminating junctions in a manual exchange, a complete and compact apparatus unit incorporating dial, keys and lamps can be supplied and fixed at the end of an existing manual switchboard. Power to operate the relays is supplied over the junctions, but a battery to supply 40 mA for each lamp is required in the manual exchange.

- (2) Metering, single or multi-fee for ordinary lines but not for individual party lines.
- (3) Alarm extension to parent exchange with fault indication by tones.
- (4) Line relay alone held by a line fault.
- (5) Ordinary and two-party subscribers ringing and tones and 10-party line codes by dynamotor driven from exchange battery. For two-party lines a revertive call relay set is required. Ten-party lines require special final selectors.

The M.D.F. may be either wall or floor pattern (see Sections B and CA). The power plant, where reliable A.C. supply is available, may comprise a 24-cell battery (see Section F) connected to "float" in parallel with an automatic, static, compensated battery charger (see Section CC).

A line test set and a set of maintenance tools are included with each exchange equipment.

Automatic telephones are not included with any R.A.X. but are listed in Section E. The B.P.O. standard pattern is recommended.

A brochure giving full particulars of the 45 - 5 unit Type R.A.X. is available and will be supplied on request.

50-8B R.A.X.

This is a similar R.A.X. equipment to the foregoing and is illustrated in Figs. 4 and 5. The capacity of this R.A.X. is limited to 50 lines but it is fully equipped for all the normal facilities required in a rural area with single or multi-exchange working.

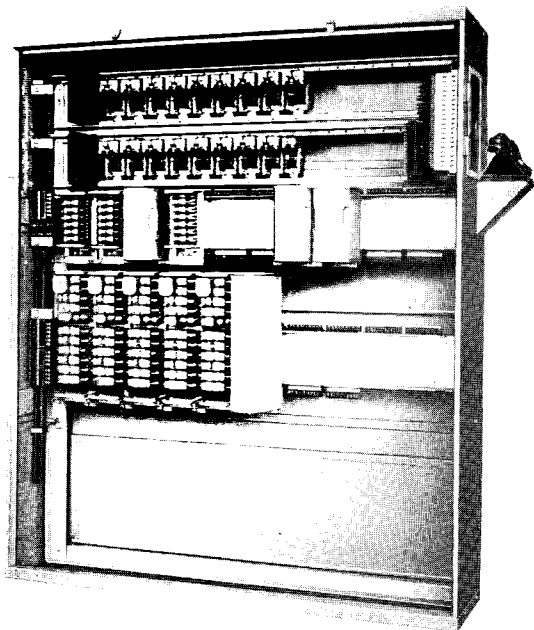


Fig. 4. 50-8B R.A.X.
front; covers removed

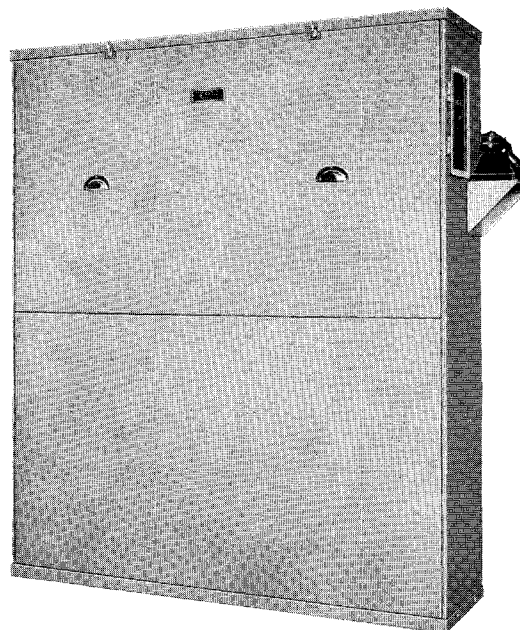


Fig. 5. 50-8B R.A.X.
front; covers fitted

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S.A.X.

The function of an S.A.X. is to concentrate automatically the traffic from isolated telephones and conduct it to the parent exchange. Traffic from several S.A.X. may be dealt with by one parent exchange and so justify the employment of adequate operating staff for 24 hours daily. Subscribers connected to an S.A.X. obtain all calls, local, toll and trunk, through the parent manual exchange. The telephones are of the magneto type without dials. Operating the hand generator of the telephone automatically causes establishment of connection with the operator. If a subscriber requires a local call, the operator dials the number demanded back over the same junction and so completes the connection, but toll and trunk calls are obtained by the operator through the respective exchanges in the normal manner.

Whilst there is no theoretical limit to the size of S.A.X. equipment, it has been ascertained that generally the economic application is in units of less than 50 lines. Above 50 lines, fully automatic equipment is always more economical on the basis of capital and operating costs. The range of S.A.X. equipment has therefore been designed with these facts in mind. It comprises equipment with capacities for:—

- (1) 10 lines and 1 junction with all-relay switching apparatus.
- (2) 23 lines and 2 or 3 junctions with relay and uniselector apparatus.
- (3) 45 lines and 3 junctions with relay and uniselector apparatus.

Fig. 6 shows a 10-line S.A.X. mounted on a rack with its power unit and M.D.F. The layout of equipment on a 45-line S.A.X. is shown in Fig. 7.

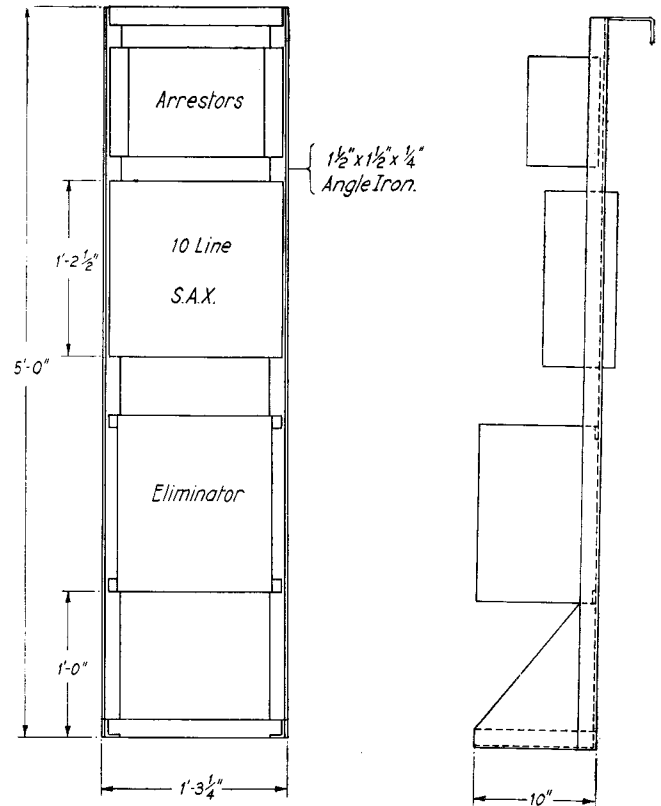


Fig. 6. 10-line S.A.X.

There is also a tandem unit which can be added to any of the above S.A.X. This unit, the equipment of which is shown in Fig. 8, has capacity for 5 bothway junctions with the parent exchange and 3 bothway junctions with each of 5 S.A.X.'s.

As a junction is held and the operator's attention required for each call, whether local or toll, the total number of simultaneous calls is limited by the number of junctions provided.

Magneto telephones of standard pattern are used for calling and speaking, but the bell circuit is modified by the addition of a capacitor in series to give conditions for C.B. supervision. Dials are not required.

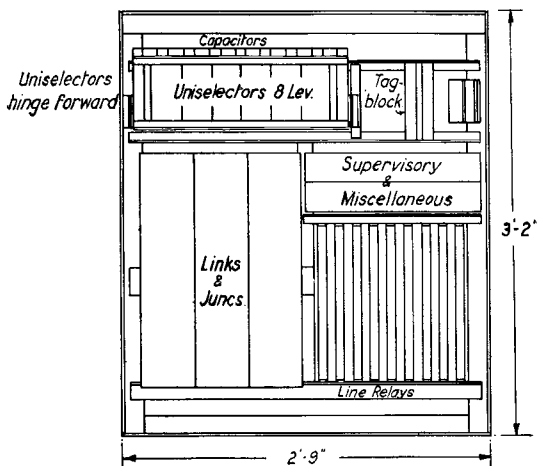


Fig. 7. 45-line S.A.X. unit

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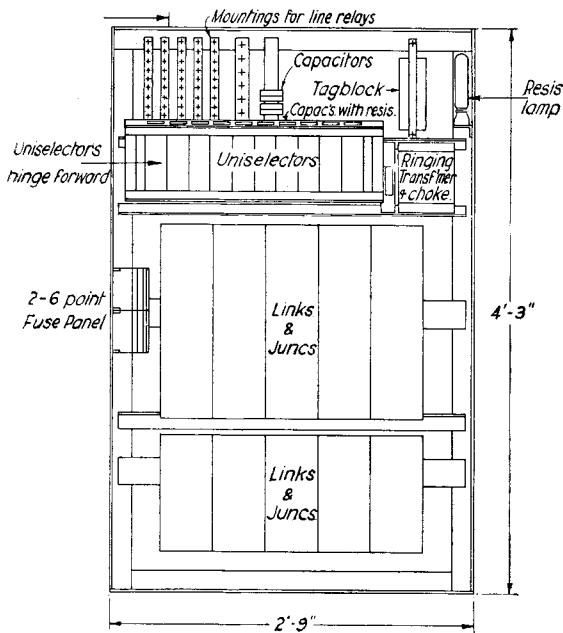


Fig. 8. Tandem Unit S.A.X.

Each S.A.X. requires a 50-volt D.C. supply which may be from secondary batteries or a rectifier with smoothed output operated from A.C. mains. Ringing supply is not required at each S.A.X. because the operator rings direct from the parent exchange. The tandem unit has a ringing supply to ensure adequate power for junction working.

Calls are stored when junctions are engaged and are put through to the operator when a junction becomes free.

In the event of power failure, emergency service is given by switching automatically a conveniently situated emergency telephone on to a predetermined junction to the parent exchange.

Tones are provided to identify public coin box telephones, also, by dialling a test number, to verify the absence of faulty conditions on the S.A.X. The latter facility is not provided on the 10-line S.A.X.

The relays and uniselectors are the same types as are used for fully automatic R.A.X. and M.A.X.

Each S.A.X. equipment is enclosed in a cabinet and may be mounted on a rack with its power unit and M.D.F. or elsewhere as convenient.

Further particulars of S.A.X. equipment will be furnished on request with full information regarding conditions to be met.

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD

Home Sales:
STROWGER HOUSE, ARUNDEL STREET, STRAND, LONDON, W.C.2
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Telegraphic Address : Strowger Estrand, London

Export Sales:
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Telegraphic Address : Strowgerex London



Registered Office:
STROWGER WORKS
LIVERPOOL 7
Telephone No. : STOneycroft 4830
Telegraphic Address : Strowger, Liverpool



INFORMATION REQUIRED FOR RURAL AUTOMATIC TELEPHONE PROJECTS.

The following indicates the type of information required in order that any R.A.X. project can be studied with a view to ensuring the most satisfactory and economic results in service. The information given should be as comprehensive and accurate as practicable; any curtailment should be avoided.

Information required for each proposed exchange.

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|---|--|
| <p>(1) Name of company or administration and postal address.</p> <p>(2) The place-name of the proposed exchange.</p> <p>(3) Name of the network or area in which the proposed exchange is to operate.</p> <p>(4) If an exchange already exists at the place named, the following particulars should be given:—</p> <p>(a) Type of exchange, magneto or common battery.</p> <p>(b) Number of lines capacity.</p> <p>(c) Number of working lines.</p> <p>(d) Is the condition of subscribers' instruments satisfactory for further service?</p> <p>(e) Number of junction groups and number of junctions in each group; also the type and capacity of each distant terminating exchange, including toll and trunk.</p> <p style="padding-left: 40px;">N.B.—If an exchange does not already exist in the place named, then similar information to the above should be given regarding the junction arrangements for the proposed exchange.</p> <p>(f) Is the condition of all the exchange equipment in (a) and (e) satisfactory for continued service?</p> <p>(g) Can the quantity of junctions and groups of junctions be readily increased if necessary?</p> <p>(5) A map showing the route distances between the several exchanges in the network or area, the existing under-</p> | <p>ground duct and cable routes, overhead cable and open wire lines, together with the material, weight per mile or gauge and number of conductors in each case.</p> <p>(6) The initial and ultimate number of subscribers' lines to be provided for on the proposed exchange, in the following categories:—</p> <p style="padding-left: 40px;">Ordinary lines.
P.B.X. lines.
2-party lines.
10-party lines.
Coin box lines.</p> <p>(7) How many subscribers' lines will have loop resistances of between 500 and 750 ohms, 750 and 1,000 ohms, and in excess of 1,000 ohms?</p> <p>(8) Are any earth return circuits used for subscribers or junctions?</p> <p>(9) The actual or estimated number and duration of busy-hour calls originated by subscribers and the proportion of purely local calls.</p> <p>(10) If subscribers' metering is required, state whether this is to be single-fee or multi-fee.</p> <p>(11) Voltage of electricity supply mains and whether D.C. or A.C. In the case of A.C. mains, the number of phases, line voltage and frequency should also be given. If there is any doubt about the reliability of the supply, this should be stated.</p> |
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