

(No Model.)

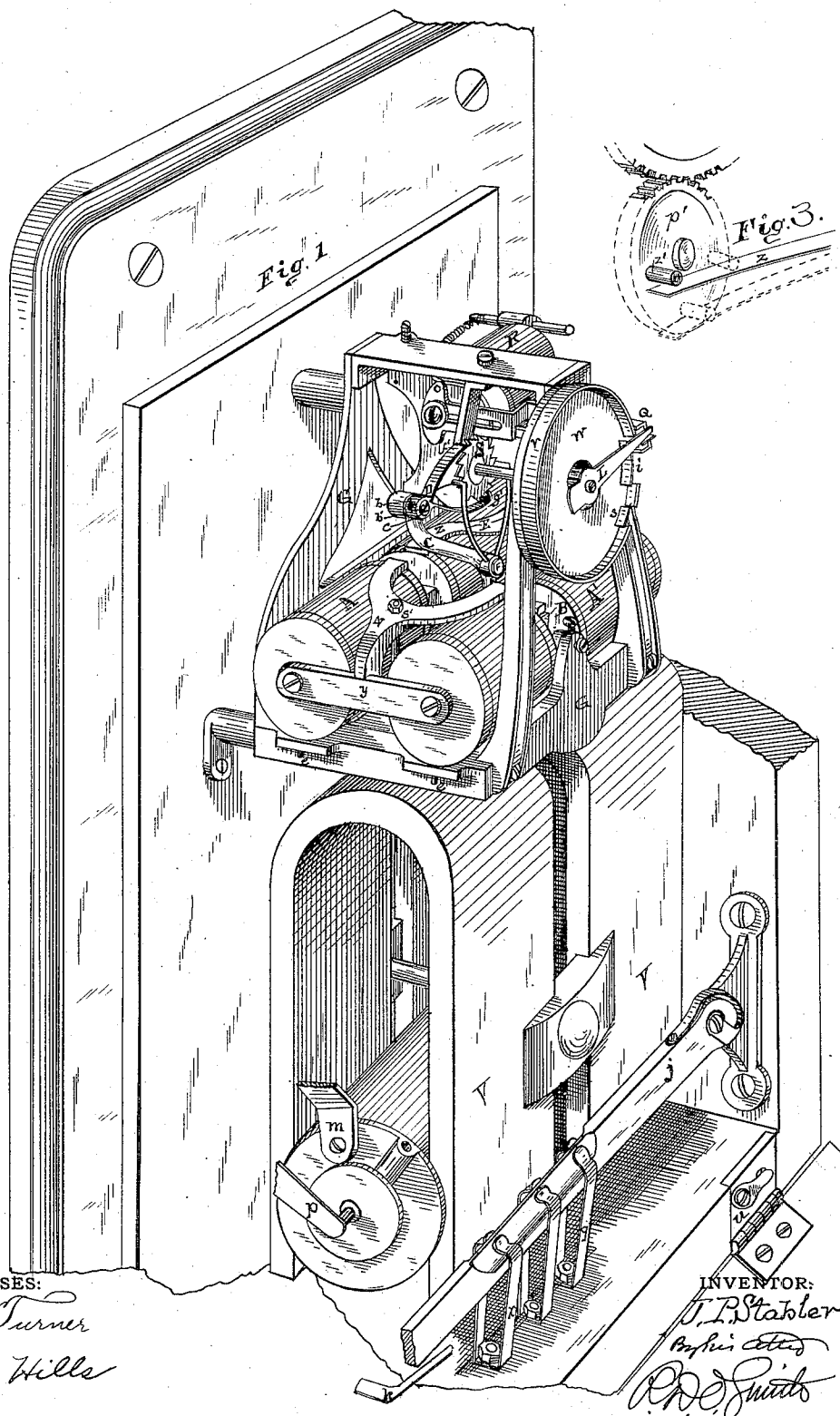
2 Sheets—Sheet 1.

J. P. STABLER.

INDIVIDUAL CALL INSTRUMENT FOR TELEPHONES.

No. 306,361.

Patented Oct. 7, 1884.



WITNESSES:

J. C. Turner
L. C. Hills

INVENTOR:

J. P. Stabler
By *Wm. C. Smith*
R. D. Smith

(No Model.)

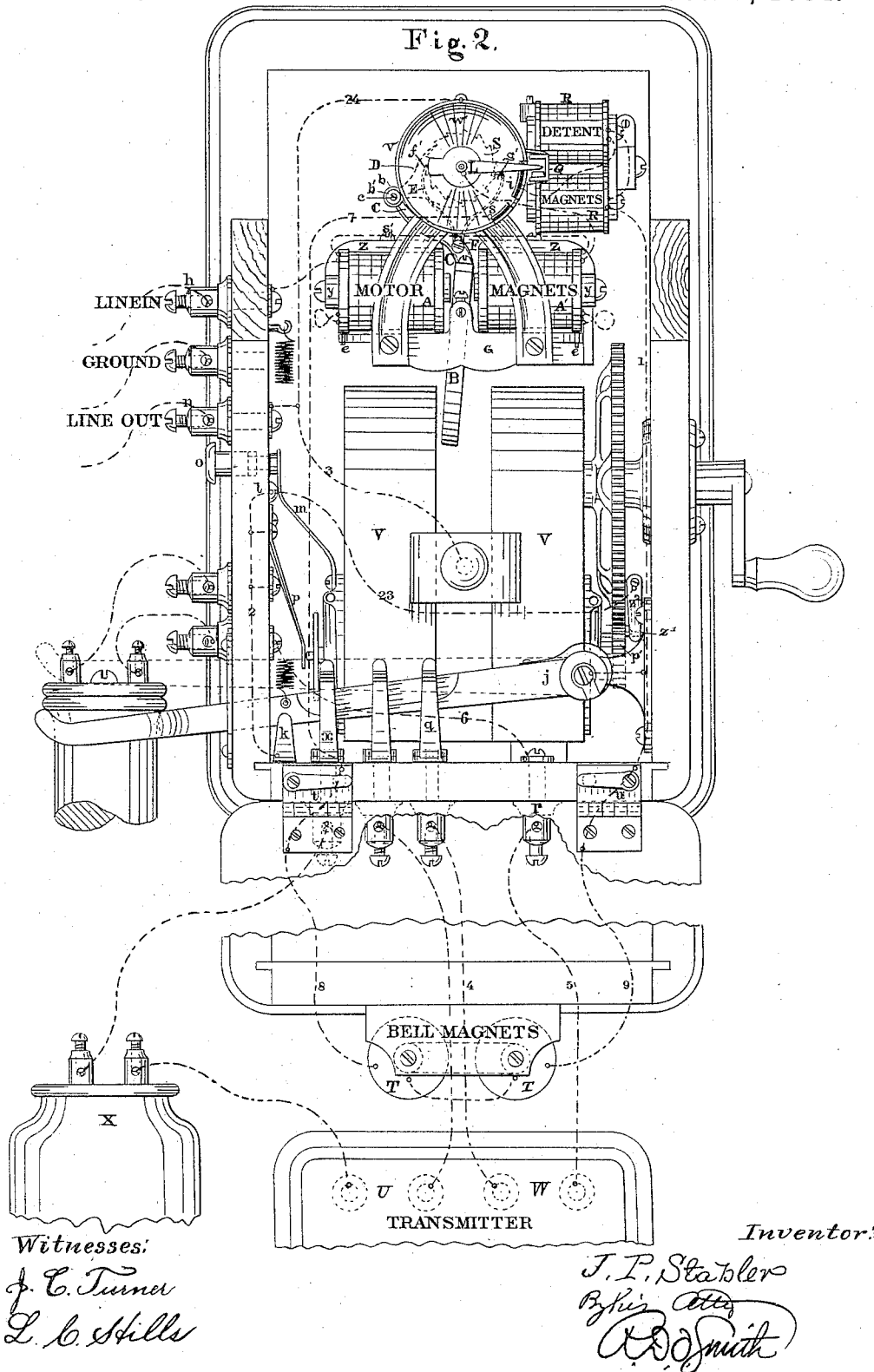
2 Sheets—Sheet 2.

J. P. STABLER.

INDIVIDUAL CALL INSTRUMENT FOR TELEPHONES.

No. 306,361.

Patented Oct. 7, 1884.



UNITED STATES PATENT OFFICE.

JAMES P. STABLER, OF SANDY SPRING, MARYLAND.

INDIVIDUAL-CALL INSTRUMENT FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 306,361, dated October 7, 1884.

Application filed January 26, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES PLEASANTS STABLER, of Sandy Spring, Montgomery county, in the State of Maryland, have invented new and useful Improvements in Individual-Call Apparatus for Telephone-Lines; and I do hereby declare that the following is a full and accurate description of the same.

This improvement relates more particularly to the invention for which Letters Patent No. 265,454 were granted to me October 3, A. D. 1882; and it consists in the improvement in the push-and-pull pawl, in the escapement or detent for the ratchet-wheel actuated by said pawl, in the electrical connections in the box, in the single-current commutator on the axis of the generator, whereby the current which drops the annunciator at the exchange is always in the same direction as the office-bell current of the central-office instrument, and in the mode of holding magnets on the frame.

The general structure and operation of the instrument shown herein being fully described in my said patent, and now well known, it will only be necessary herein to describe in detail those portions which form the subject of the present improvement.

Figure 1 is a perspective view, my call-box open, the electrical connecting-wires being omitted. Fig. 2 is a plan of the same with all the electrical connections. Fig. 3 is a perspective view of the armature-pinion and single-current contact-spring.

For convenience I will describe the parts improved in the order named above. In my said patent the push-and-pull pawls to actuate the ratchet S and index L are constituted of two arms coincidently jointed to the end of the arm C, carried by the armature B, and drawn together by a spring, the ends of which are attached to the pawls, respectively. This mode of construction requires the making and handling of five separate pieces, and considerable labor, &c. I now dispense with the separate pivoted arms and substitute a pair of pawls made from a single strip or ribbon of steel, as at D, bent at the middle to form an eye, *b*, capable of embracing the body of the screw *c*, or, preferably, the perforated bushing *b'*, to which the eye *b* may be fastened by

solder or otherwise, if required. The screw *c* then passes through the perforation in the bushing, and thereby pivots the pawls upon the arm C. The end *f'* is finished plain to push upon the teeth of the ratchet, while the end *g'* is turned around inward to form a hook and pull upon the teeth of the ratchet. The elasticity of the ribbon D affords all the attention required to keep both pawls in their duty. In my said patent I have described the necessity of an escapement to positively arrest the ratchet and index switch when the pawl movement ceases. The ratchet, &c., shown in the patent has reference to the local-station instrument wherein in each instrument there are but two points where such arrest is required; but in the central-office instrument the same arrest is required for each pawl movement; otherwise the index-switch of the central-office instrument may by momentum move too far and make contact with the key-stops too soon, thus cutting out the line before the local switch has reached its bell-shunt. Under these circumstances the proper bell would not be rung; but at the central office there would not be any indication of that fact. It was contemplated to employ with the central office a ratchet-wheel having an escapement-pin for each local station on the line, so that my escapement would arrest at each movement. This involves a great deal of trouble in adjustment, and I have substituted for the escapement arms and pins a pair of rigid arms E E, carried by the arm C, and having their ends located near the edges of the ratchet in close proximity thereto on opposite sides and about midway between the points of contact of the pawls measuring around the circumference of the ratchet-wheel. These arms vibrate with the arm C and upon the same center. At the close of each reciprocation of the pawls and advance of the ratchet one or the other of said arms E is in close contiguity to the inclined face of the ratchet-tooth and ready to arrest the same if momentum shall cause any continuance of motion. Thus a perfect escapement arrest is provided without any of the delicate adjustments required where a series of pins shall be used, because the ratchet-teeth are closely dupli-

cates, and when the arms E are adjusted to one pair of said teeth the adjustment will be sufficient for all.

The change in electrical connection from that shown in Patent No. 265,454 may be indicated as follows: In said patent, when the index is on the bell-shunt and the lever down, the current is through said shunt, but does not enter the lever at all. It goes to a switch-spring controlled by said lever, and on one side said spring makes connection with the telephone and line, and on the other side it makes connection with the bell and line, and one or the other of these connections is made according as the lever is up or down. In the present improvement I dispense with the side contacts and arrange the switch-spring to break contact with the lever when down and make contact therewith when it is up, and connect the bell on one side with said spring and on the other with the lever, whereby when the lever is down the bell will be in circuit, and when the lever is up the bell will be cut out by short-circuiting the current direct through the lever.

In tracing out the electrical connections it will be convenient to remember that the "line out" is "to ground," and the "line in" is from the central office. For convenience also, the electrical connections will be separately traced under the several conditions in which they may be in the use of the instrument. When the station is "called" by the operator at the central office, the telephone being on the hooks at the station. When the index-switch L is traveling to the local shunt of the station (S) to be called, supposing it starts from the unison-shunt *i*, the current will first pass over the following line, to wit: line in post *h*, to motor-magnets A A', to index-switch L, to detent-shunt *i*, to detent Q, detent-magnets R, wire 1, to hook-lever *j*, to spring *k*, wire 2, to button *l* by spring *m*, to frame of station-generator V, wire 3, to line-out post *n*. When the index-switch L passes from the detent-shunt *i* to the dial-rim *u*, the current goes by way of said rim and wire 24 to the line-out post *n* direct. When the index-switch L passes on to the local station or bell-shunt *s*, the current then passes by means of said shunt and wire 7 to hinge *t*, wire *s*, to bell-magnet T, wire 9, to hinge *u*, and to hook-lever *j*, to contact-spring *k*, wire 2, to button *l*, by push-button spring *m*, to frame of local generator V and wire 3, to line-out post *n*. The bell-magnet T, then being in circuit, the bell is caused to ring by a current of adequate strength. The call being heard, the telephone is taken down and the circuit will then be as follows: Post *h* to motor-magnets A A', to index-switch L, to station-shunt *s*, wire 7, to contact-spring *x*, along lever *j*, to spring *q* by wire 4, to the secondary coil W of the transmitter by wire 5, to post *r*, wire 6, to telephone-wire 2, to button *l*, spring *m*, frame of generator V, and wire 3, to line-out post *n*. This

circuit remains until the communication or conversation is terminated, when the central office is notified of that fact by "ringing off," the telephone being first replaced upon the hook and the push-button *o* being pushed in to break contact with the button *l*. The frame of the local generator V being normally in connection with the "out" post *n*, a pin, *z*, on the armature-pinion *p'* makes contact at each revolution with the spring *z*, which is in connection by wire 23 with the button *l*, and thence by way of contact-spring *p* with the opposite terminal of the armature-coil, so that during each revolution of the armature one current will be short-circuited through the generator by way of pin *z*, button *l*, and spring *p*, and the other current will go to the line. The pin *z* is so located that the current which goes to the line will be in the same direction as the re-enforce current from the central office. While "ringing off," the currents to the line will be, generator-frame V to out post *n*, and from spring *p* by wire 2 to contact-spring *k*, to lever *j* by wire 9, to hinge *u*, and to bell-magnets T, wire 8, to hinge *t*, wire 7, to local shunt *s*, index-switch L, motor-magnets A A', post *h*, line to central office.

When it is desired to "call up" the central office, the telephone is upon the hook, and the switch upon the detent or unison shunt *i*. The push-button *o* is pushed in to break contact with button *l*. When the crank is turned, the current will then be, generator-frame to out post *n*, and from springs *p* by wire 2 to contact-spring *k*, lever *j*, and wire 1, to detent-magnet R, index-switch L, motor-magnets A A', and post *h*, to line. When "call" is answered, take the telephone from the hook and the currents will be, generator-frame by wire 3, to post *n* and spring *p*, and wire 2 to telephone-wires 6 and 5, to secondary coil W of the transmitter-wire 4, to contact-spring *q*, lever *j*, wire 1, detent-magnets R, index-switch L, motor-magnets A A', and post *h* to line. This completes the several connections under the various conditions of use. The primary coil U of the inductorium is in the short local circuit of the battery X, as is usual.

It has been found necessary to fix the motor-magnets very firmly in position with reference to the polarized armature, so as to secure the exact movement of the latter necessary to operate the push-and-pull pawl and ratchet of the index-switch. I therefore provide the three-armed clamp-plate Z, two arms of which engage the spool ends, and the other engages the yoke *y*. A screw, *s'*, passes through said clamp, between the magnets and into the frame G, so as to bind the spools firmly against said frame, which is also provided with seats prepared to receive and engage the spool ends.

As an additional precaution against the shifting of the magnets from rough handling, shipment, or other accidental concussion, a pin, *e*, is passed through a hole in the frame into the spool end.

Having described my invention, I claim—

1. The push-and-pull pawl made from a single strip or ribbon of spring tempered steel or equivalent metal, bent at its middle to form an eye, *b*, and the ends *f'g'*, finished as described, and for the purpose set forth.
2. The push-and-pull pawl made from a single strip or ribbon, *D*, of spring tempered steel or equivalent metal, bent at its middle to form an eye, *b*, combined with the perforated bushing *b'*, permanently fastened therein, the arm *C* of the vibrating armature *B*, and the ratchet *S* of the index-switch *L*.
3. The push-and-pull pawl *D*, the revolving ratchet *S*, and vibrating arm *C*, whereby said pawl is actuated, combined with the escapement-arms *E E*, permanently attached to and carried by said arm *C*, and adjusted to approach and stop close to but not in engagement with the edge of the ratchet, as and for the purpose set forth.
4. A rotating ratchet, *S*, and vibrating arm *C*, combined with a push-and-pull pawl, *D*, both attached to said arm at the same distance from its center of motion, and escapement-arms *E E*, both pawl and escapement being carried by said arm, but arranged to approach and engage the edge of the ratchet from directions respectively perpendicular to each other.
5. A rotating ratchet and a vibrating arm, *C*,

combined with escapement-arms *E E*, rigidly attached to and vibrating with said arm upon its center of motion, and an elastic push-and-pull pawl, *D*, carried by said arm and pivoted thereto at a point ninety degrees with reference to the axis of the ratchet from the escapement-arms' axis of motion.

6. In an individual call-instrument for telephone-lines, the telephone hook-lever *j*, contact-springs *x q*, and their electrical connections, in combination with the contact-spring *k*, whereby when said lever is down contact is made with said lever, and the currents short-circuited to cut out the transmitter and telephone, as described.

7. The spring *z*, arranged to make single-current contacts with the pin *z'* on the revolving spindle of the armature, for convenience, say, on one side of the generator, and placed in electrical connection with the armature on the other side of the generator, whereby the alternate currents are short-circuited through the generator and currents in the same direction as central-office bell-current are sent to the line only.

JAMES P. STABLER.

Witnesses:

R. D. O. SMITH,
J. C. TURNER.