

No. 789,210.

PATENTED MAY 9, 1905.

W. W. DEAN.

TOLL BOX FOR TELEPHONE PAY STATIONS.

APPLICATION FILED JAN. 14, 1902.

4 SHEETS—SHEET 1.

Fig. 1.

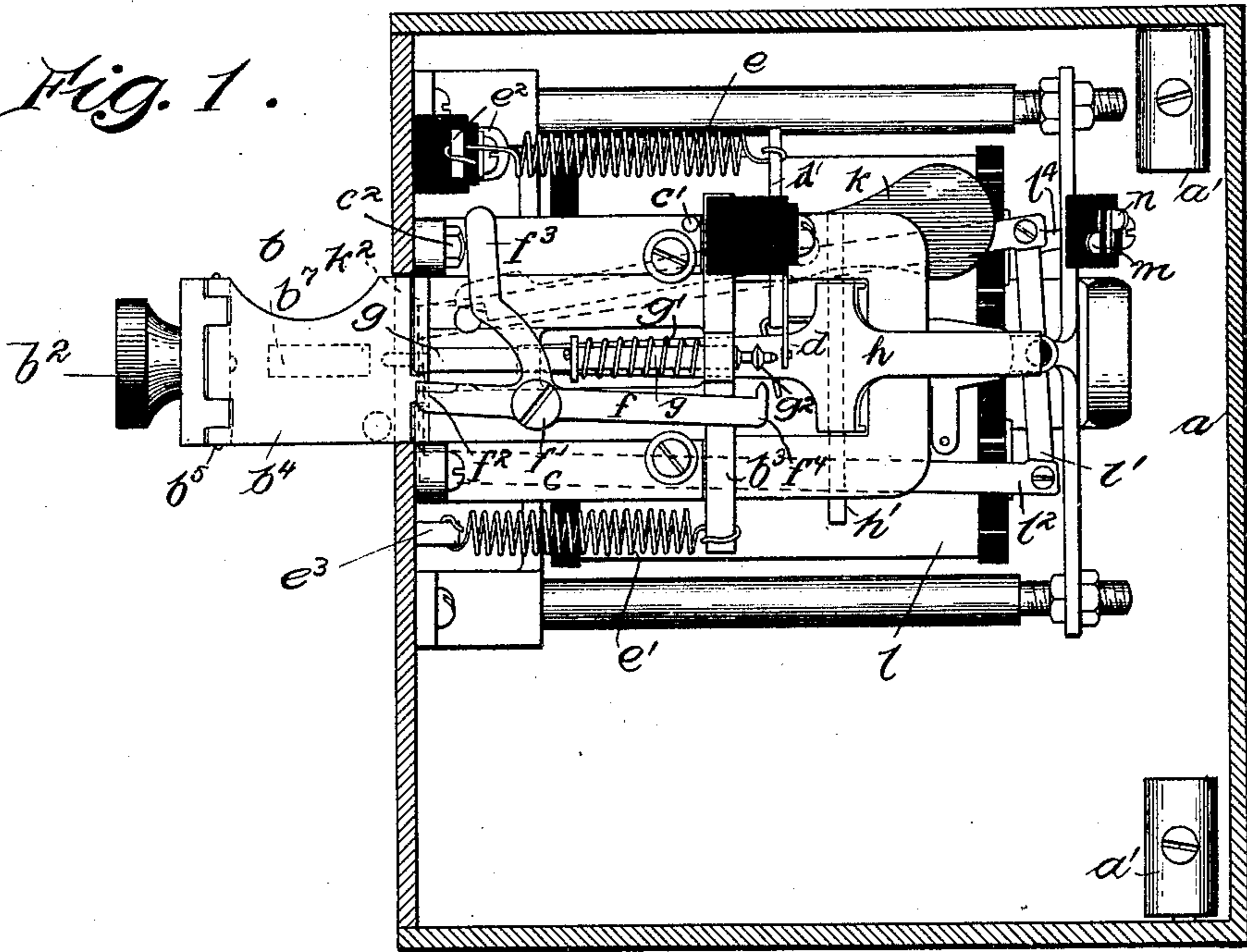
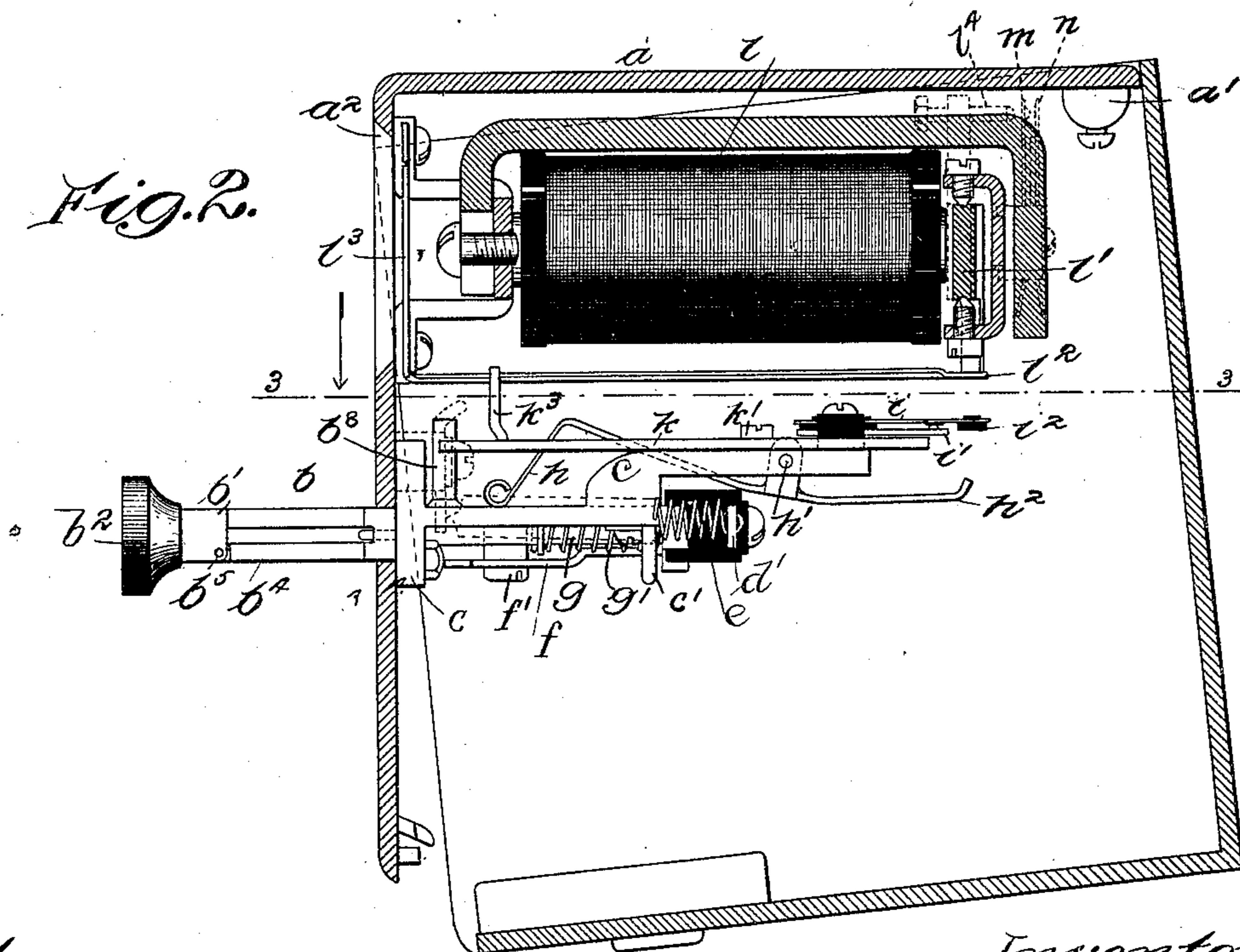


Fig. 2.



Witnesses:
J. M. Skinkle,
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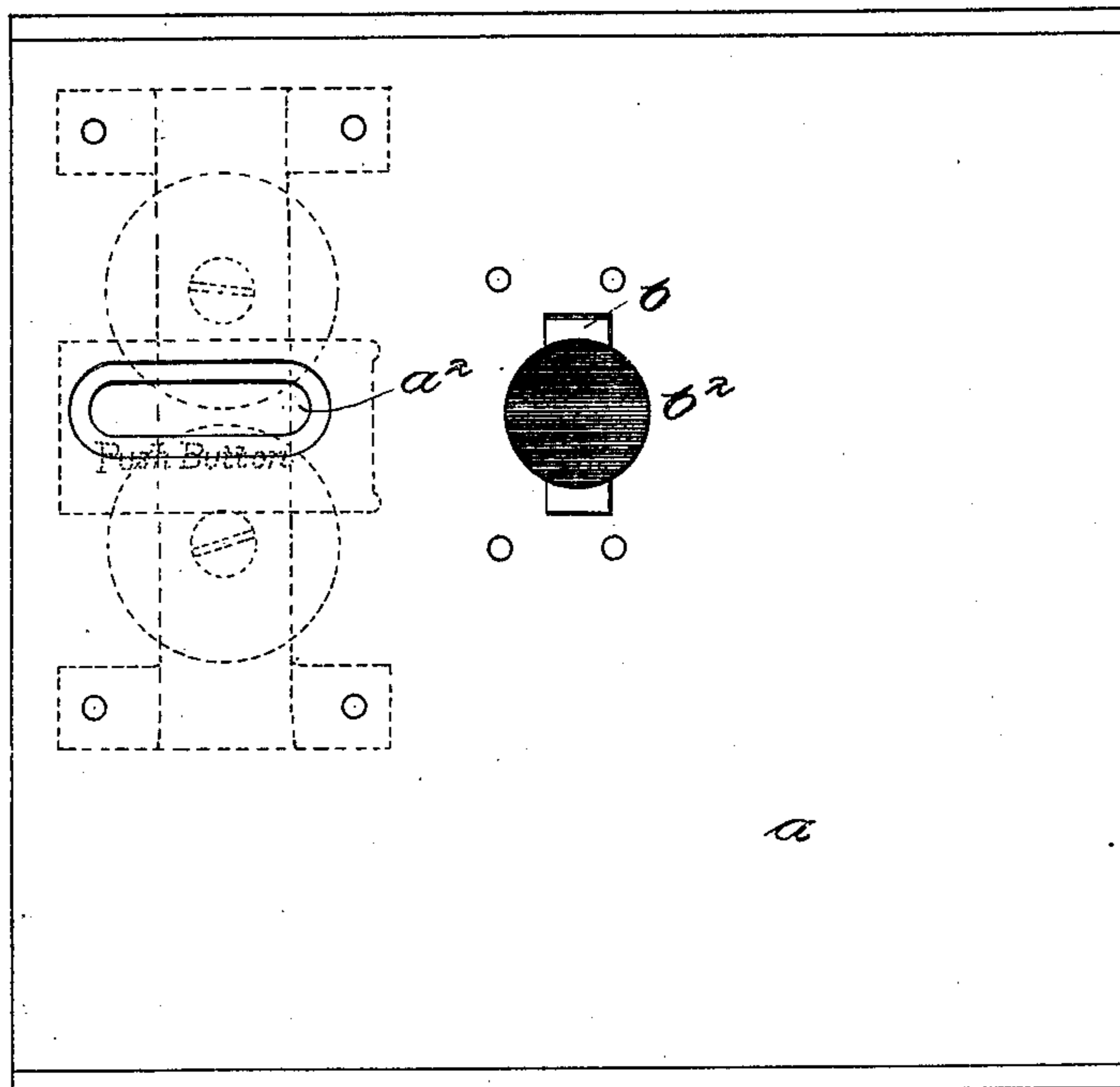
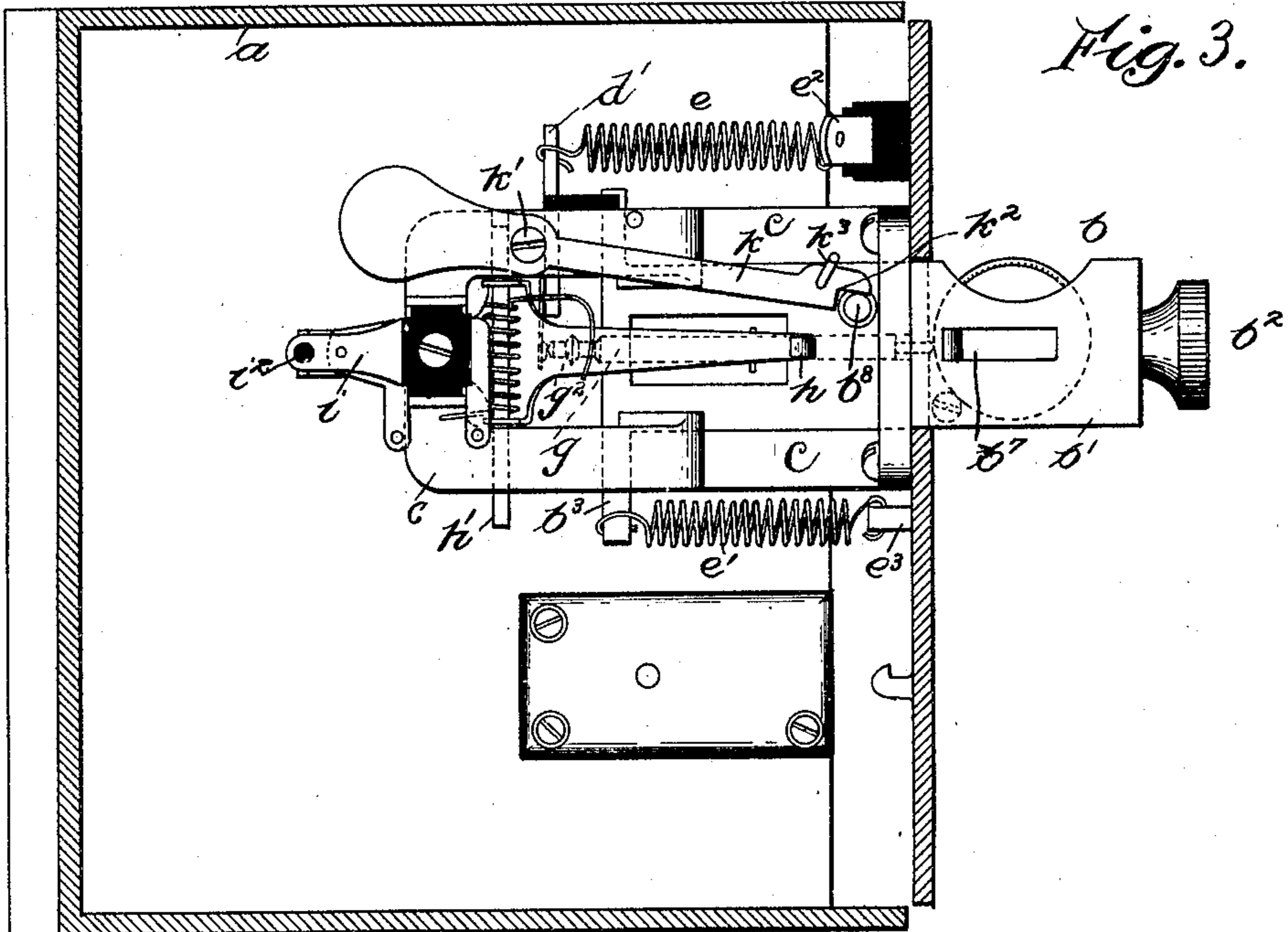
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 5.

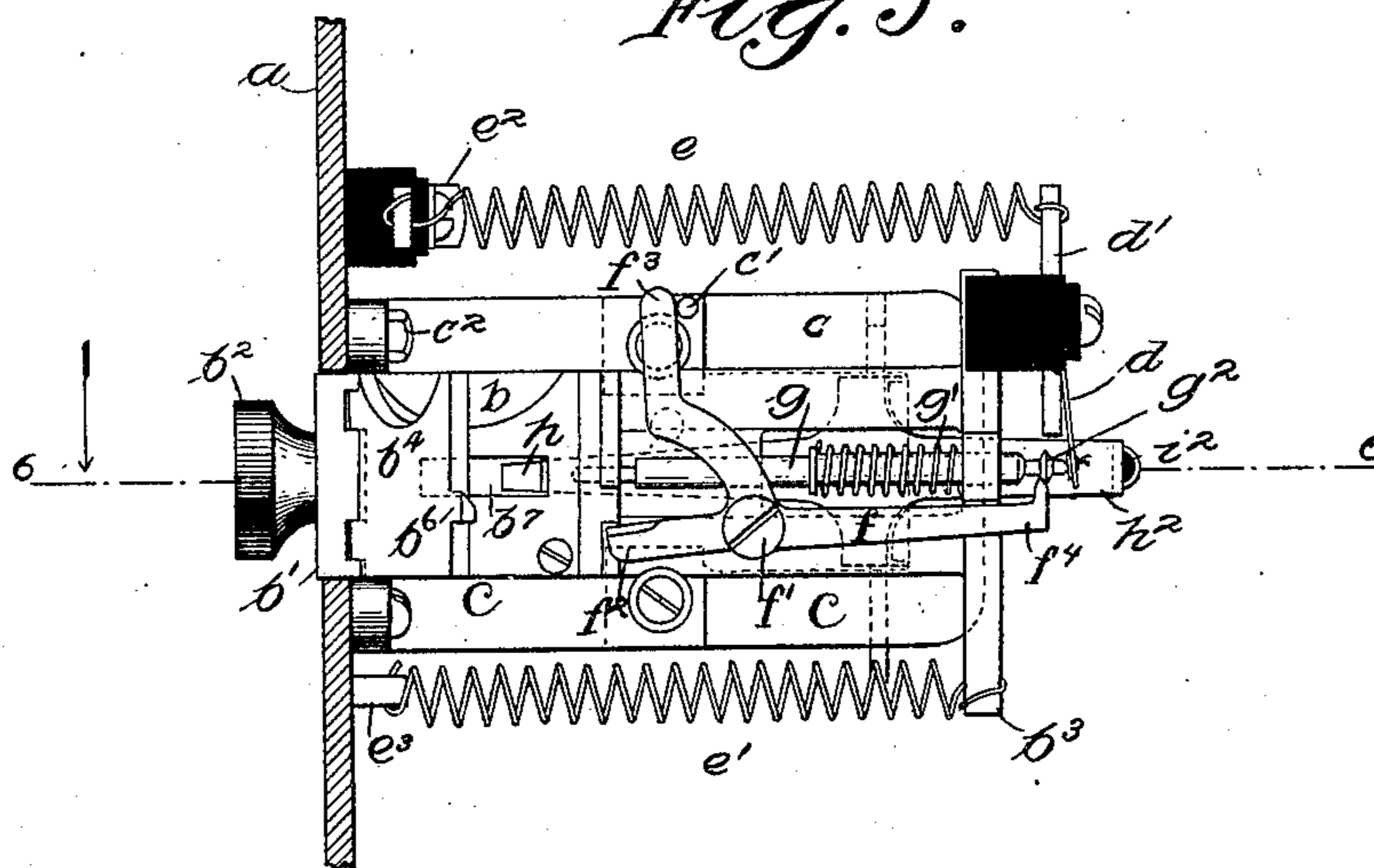
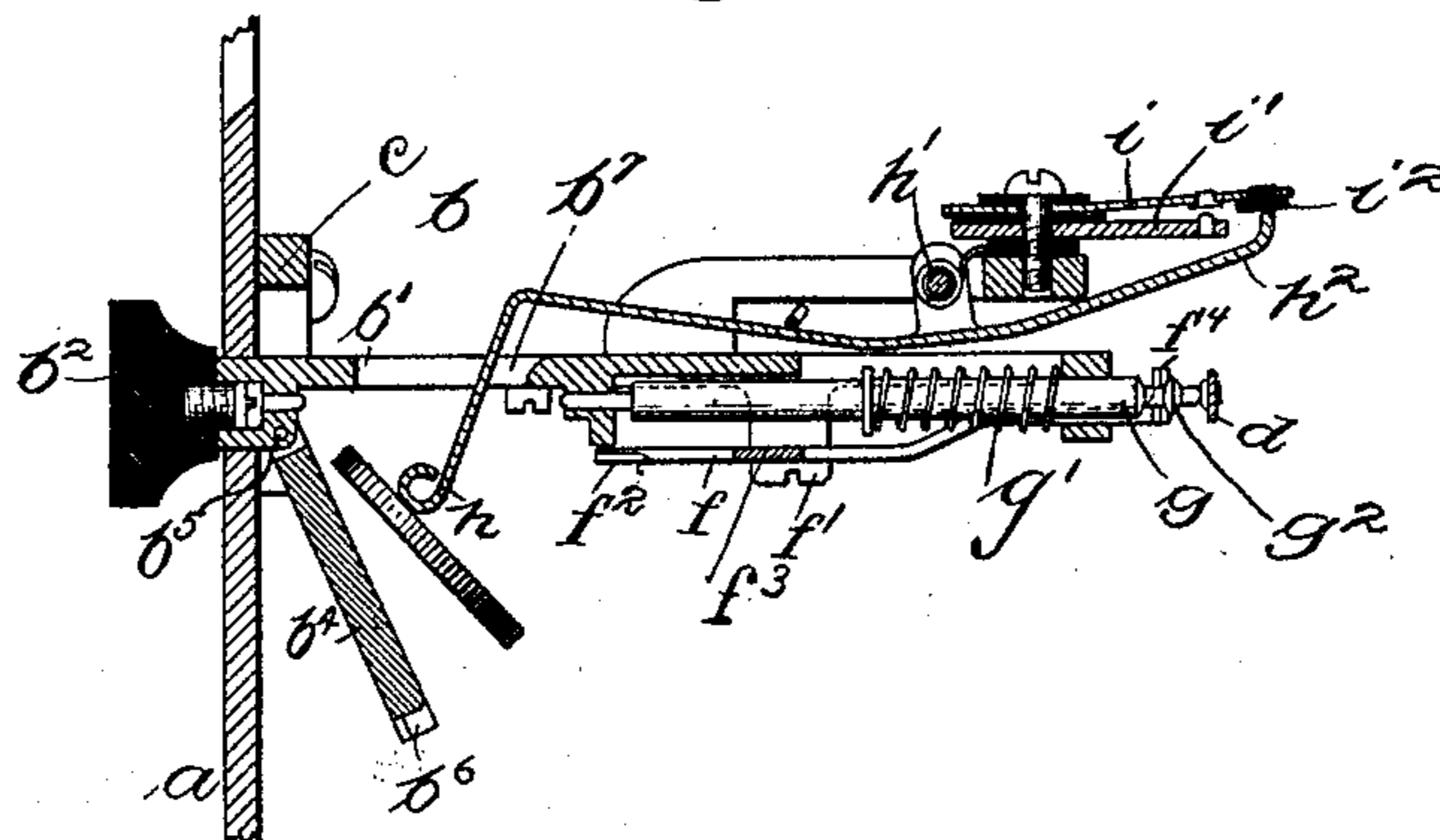


Fig. 6.



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4 SHEETS—SHEET 4.

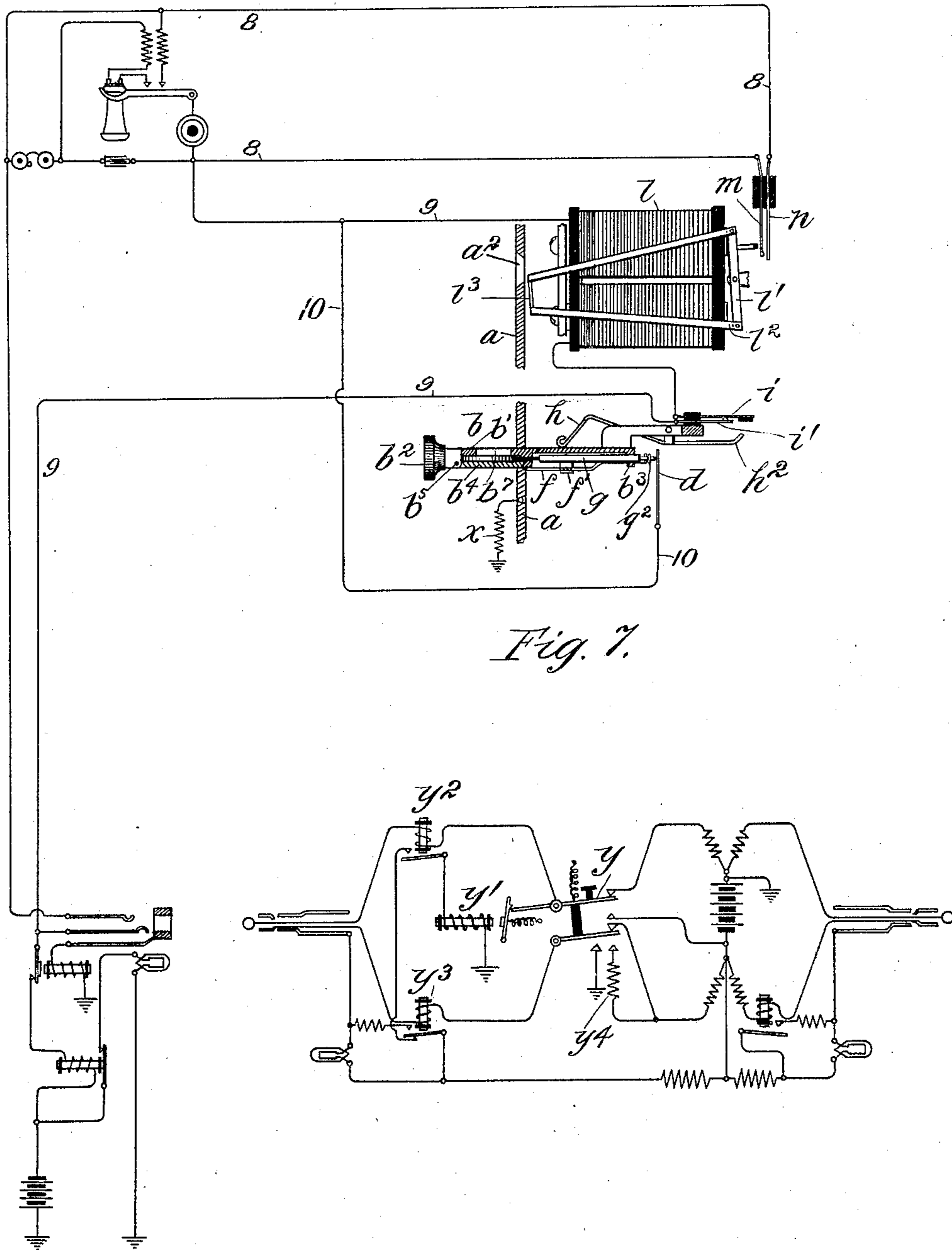


Fig. 7.

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UNITED STATES PATENT OFFICE.

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TOLL-BOX FOR TELEPHONE PAY-STATIONS.

SPECIFICATION forming part of Letters Patent No. 789,210, dated May 9, 1905.

Application filed January 14, 1902. Serial No. 89,664.

To all whom it may concern:

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Toll-Boxes for Telephone Pay-Stations, (Case No. 43,) of which the following is a full, clear, concise, and exact description.

My invention relates to a toll device or coin-collector; and its object is to provide an improved toll mechanism especially adapted for use at the substations of telephone-exchanges, so that a coin may be collected for each use of the telephone in which the subscriber is actually placed in communication with the party wanted.

My improved toll device is of the class in which a preliminary or tentative deposit of a coin is required in order to transmit a signal to the central office and obtain the attention of the operator, the coin, however, being held at first in a position accessible to the subscriber and only put beyond his control at a subsequent time, as when the connection has been completed. The telephone apparatus at the calling-station is then rendered inoperative, as by a blocking-switch controlled from the central office, so that the subscribers cannot talk with each other until the blocking-switch has been reversed or counteracted. This may be done only through the agency of mechanism which is actuated manually by the calling party in finally depositing the coin in the cash-box.

In accordance with this invention a coin-carrier is arranged to slide in the wall of the toll-box to receive coins outside of the box and transfer them to the interior thereof. Said carrier is preferably provided with a door hinged at the outer end thereof, the door being automatically opened to permit the discharge of the coin when the carrier is moved inside the box. A spring-actuated ejecting-finger is arranged to throw the coin positively out of the carrier when the door is opened. As the carrier is returned to its outer position the door is automatically closed in pass-

ing through the wall of the toll-box. A contact is arranged to be actuated by a coin when placed in the carrier, and a further feature of my invention consists in means which I have provided for holding the contact device independent of the coin after the latter has been ejected.

My invention will be further explained and other features set forth by reference to the accompanying drawings, and the features or combinations which I regard as novel will be pointed out in the appended claims.

Figure 1 is a sectional elevation of the toll-box. Fig. 2 is a sectional plan view thereof, the box being shown partly open. Fig. 3 is a vertical sectional view on line 3 3 of Fig. 2. Fig. 4 is a front view of the exterior of the toll-box. Fig. 5 is a detail view of the traveling coin-carrier and its associated mechanism, the coin-carrier being shown as pushed in and the parts in the position which they would occupy immediately after the coin has been ejected. Fig. 6 is a sectional view on line 6 6 of Fig. 5; and Fig. 7 is a diagram illustrating a telephone toll-line extending from a substation to a central office, the substation being equipped with my improved coin-collecting appliance.

Similar characters of reference are used to designate the same parts wherever they are shown.

The toll-box *a* is made in two parts, which are hinged together at *a'*, and a lock is provided for keeping the box closed. The coin-carrier *b* is arranged to slide through the wall of the box, being mounted in a framework *c*, which is screwed upon the inner wall. This coin-carrier comprises a plate *b'*, mounted to slide in the framework *c*, said plate carrying upon its outer end a push-button *b²*, by which it may be manually operated. The plate has a vertical bar *b³* on its inner end, which forms a stop for engaging the stationary framework *c* and limiting the outward movement of the carrier. The upper end of the vertical bar *b³* carries an insulating-block upon which a contact-spring *d* is mounted, said spring being backed by a heavier metallic piece *d'*.

Two coiled springs e e' are provided for yieldingly maintaining the coin-carrier in its outward position, as shown in Figs. 1, 2, and 3. The spring e is attached to the metal piece d' and is anchored at its other end to a metallic connecting-terminal e^2 , which is mounted upon but insulated from the wall of the toll-box. The other spring, e' , is attached to the lower end of the bar b^3 and is anchored to a lug e^3 on the wall of the toll-box.

A door b^4 is hinged at b^5 to the outer end of the sliding plate b' and is normally held closed against a lug or jamb formed on the plate b' . The space between the inner face of the door b^4 when closed and the wall of the plate b' is just sufficient to accommodate a coin of the thickness intended to be used in the toll device. A latch-bar f is pivoted at f' to a lug upon the plate b' , and the end f^2 of said latch-bar normally engages a projection or lug b^6 upon the inner end of the door b^4 to hold the door closed. When the latch is withdrawn, the door may be opened if the coin-carrier is moved in sufficiently to bring the hinge of the door inside the wall of the box.

The pivoted latch-bar f is provided with a lever-arm f^3 , which extends upward beside the framework c , in which the coin-carrier slides. A pin c' is provided upon said framework, against which the upper end of the lever-arm f^3 is adapted to strike when the coin-carrier is pushed in, whereby the latch-bar f is rocked about its pivot f' to withdraw its end f^2 from engagement with the lug b^6 , carried by the door b^4 , and to permit said door to fly open. When the coin-carrier is returned to its outward position, the upper end f^3 of the lever-arm strikes against a stop c^2 , whereby the latch-bar is swung back again to latch the door, which has been automatically closed by the wall of the toll-box as the coin-carrier returned to its outer position.

A plunger g is mounted to slide to and fro in lugs carried by the sliding coin carrier or plate b' , the inner end of said plunger normally projecting into the chamber or space which is intended to receive the coin, so that when a coin is inserted in the carrier the end of said plunger g will be engaged by the coin and the plunger forced forward, sliding in its mountings. This forward movement of the plunger is made against the tension of a helical compression-spring g' , which encircles the plunger, bearing at one end upon the bar b^3 and at the other end upon an annular lug carried by said plunger. When advanced by a coin deposited in the carrier, the inner end of the plunger g is adapted to engage with the contact-spring d , thus completing the circuit between the metallic framework of the toll-box and the insulated terminal piece e^2 .

The latch-bar f has an extension f^4 , the end whereof serves as a stop or catch to engage an annular enlargement or bead g^2 upon the

inner end of the plunger g , said catch being engaged with said bead just before the latch is withdrawn.

When the coin-carrier is pushed in to discharge the coin, the latch-bar just before opening the door swings the stop f^4 into the path of the annular enlargement g^2 of the plunger, so that when the door is opened and the coin ejected the plunger, impelled by the spring, will move back until it strikes the projecting end f^4 of the latch-bar, but not far enough to break contact with the spring d . The latch-bar stays in this position until the carrier returns to its outer position, whereupon it is rocked by the lever-arm f^3 , as before described, thus latching the door and releasing the plunger, which then breaks contact with the spring d .

That portion of the plate b' which forms one of the side walls of the chamber for receiving the coin has a slot or opening b^7 cut longitudinally therein. A spring-impelled ejecting-finger h is pivoted at h' to the framework c and bears with a comparatively strong lateral pressure upon the side of the plate b' on the line of said slot b^7 . When the coin-carrier is pushed in nearly as far as it will go, the end of the ejecting-finger h enters the slot b^7 and presses upon the side of the coin which may be contained in said carrier. Then when the latch f is withdrawn to release the door b^4 the ejecting-finger h will suddenly and forcibly throw the coin through the doorway and out of the carrier.

Two contact-springs i i' are mounted upon but insulated from the inner end of the framework c , said contact-pieces being normally closed together. The contact-spring i , however, is provided with an insulating button or stud i^2 upon its end, which is adapted to be engaged by the inner end h^2 of the ejecting-finger h when said finger snaps in to eject the coin from the coin-carrier, whereby said contact-springs are separated as the coin is ejected. When the coin-carrier is returned by the springs e e' to its outer position after depositing the coin within the toll-box, the ejecting-finger h rides up out of the slot b^7 and slides along the outer surface of the plate b' , so that the springs i i' are allowed to close together again.

The sliding carrier carries a pin b^8 upon its side, as shown most clearly in Figs. 2 and 3, and an arm k , pivoted at k' to the framework c , is formed at its end k^2 to serve as a stop, normally resting in the path of said pin to prevent the coin-carrier from being pushed in.

A polarized electromagnet l is mounted in the interior of the toll-box, as shown, and is provided with a tilting armature l' , which carries a light aluminium frame l^2 , extending forward alongside the framework c , which supports the coin-carrier. A target or indicator l^3 is mounted upon the end of said arm

l^2 , which target may bear a legend, such as "Push-button." An opening a^2 is provided in the wall of the toll-box, and when the polarized electromagnet l is excited and tilts its armature to raise the arm l^2 the signal or target l^3 is displayed in the opening a^2 of the toll-box.

A pin k^3 is carried by the stop-arm k , said pin k^3 projecting into the path of the target-supporting arm or frame l^2 , whereby when the frame is raised to display the target the stop-arm will also be raised, thus removing the stop k^2 from the path of the pin b^3 and permitting the coin-carrier to be pushed in.

A pair of contact-springs m n , normally separated from each other, is associated with the armature l' of the polarized electromagnet, and said armature carries a finger l^4 , which when the armature is tilted presses the contact-springs m n together.

The operation of the device may be best explained by referring first to Fig. 7. In this figure I have illustrated diagrammatically the manner in which the toll-box of my invention is associated with the circuits and apparatus of a telephone-substation. The telephone circuits and apparatus are of the usual character and need not be described in detail.

The electromagnet l is included in series in the telephone-line circuit, which circuit is controlled by the usual gravity telephone-switch and is further controlled by the pair of contacts i i' of the toll-box. A branch extends from the limb 9 between the telephone apparatus and the magnet l to the spring d and thence from the metallic framework of the toll-box to earth through a resistance x . The contacts m n control a short circuit about the telephone apparatus, so that when said contacts are closed together the subscriber's telephone apparatus is rendered inoperative. When the toll-line subscriber desires an exchange connection, he signals the central office by pressing a suitable coin into the sliding coin-carrier b , as shown in Figs. 3 and 7, whereby the plunger g is pushed into contact with the spring d . A circuit to ground from the limb 9 of the telephone-line is thus completed, and this serves to bring about the display of the line-signal at the central office, as will be understood by those skilled in the art. When the called subscriber responds, switching mechanism y at the central office is actuated to apply current to the electromagnet l , suitably directed to cause said magnet to tilt its armature, thus closing the contacts m n to short-circuit the subscriber's telephone apparatus and at the same time displaying the signal l^3 in the opening a^2 of the toll-box and removing the stop k^2 , which normally prevents the coin-carrier from being pushed in.

In the system shown the magnet l is operated through the agency of a reversing-switch

y at the central office, which may be operated by any desired means, automatically or manually, by the operator. When operated, the reversing-switch acts to connect both limbs of the plug-circuit in multiple with the free pole of the grounded central-office battery, the tip-strand being connected directly with the battery-pole and the sleeve-strand being connected therewith through a resistance y^4 and one of the windings of the repeating-coil. The reversing-switch also puts a ground on the ring-strand between the relay y^3 and the resistance y^4 . The effect of the operation of switch y is to reverse the flow of current through the magnet l at the substation, current flowing out over the tip-strand through the magnet and contacts i i' back to the longer line-spring of the jack, thence through the sleeve-strand of the plug-circuit to the ground connection, which is established by the reversing-switch. This reversal of current through the magnet l causes the same to tilt its armature, closing the contacts m n and at the same time displaying the signal l^3 and removing the stop k^2 , which normally prevents the coin-carrier from being pushed in. The reversing-switch once operated is held by a catch until released by a tripping-magnet y' . Said tripping-magnet is included in a local circuit controlled by relays y^2 y^3 , said circuit being completed only when relay y^2 is excited and relay y^3 inert. These relays are included one in each limb of the operator's cord-circuit. In order that the circuit of tripping-magnet y' may be completed, the limb of the cord-circuit which contains the relay y^2 must be grounded and the limb containing relay y^3 must be open. This condition can ordinarily be brought about only by pushing the coin-carrier, with a coin in it, into the toll-box at the substation. When the signal l^3 is displayed, therefore, the subscriber presses in on the push-button b^2 , whereupon the coin-carrier slides in against the tension of the springs e e' until, when it is clear in, the lever-arm f^3 of the latch-bar f strikes the pin e' , whereupon the latch-bar is rotated to unlatch the door and at the same time to interpose the stop f^4 in the path of the enlargement or bead g^2 on the plunger. When the door is unlatched, the pressure of the spring-impelled ejecting-finger h suddenly throws out the coin, as shown in Fig. 6, and at the same time the end h^2 is thrown against the insulating-button i^2 , carried by the spring i , thus separating said spring from its mate contact i' and breaking the line-circuit 9. The circuit of relay y^3 is thus broken, while relay y^2 still receives current which flows to earth by way of contact d , so that the local circuit containing the tripping-magnet y' at the central office is completed, whereby the reversing-switch y is released, reestablishing the operative condition of the system. Upon the removal of pressure from the push-button b^2

the coin-carrier will be returned by the springs $e e'$ to its normal outer position, as shown in Fig. 1, the door b^4 being automatically closed by its engagement with the wall of the toll-box. As the coin-carrier approaches its outer position the end of the lever-arm f^3 strikes the stud c^2 , so that the latch-bar is rotated and latches the door b^4 , at the same time releasing the plunger g . The plunger g being released is returned by the spring g' to its normal position, breaking contact with the spring d .

It will be seen that the toll-box of my invention is extremely effective in compelling the deposit of a coin before the use of the telephone apparatus is permitted, because when the magnet l is once actuated to permit the coin-carrier to be pushed in a short circuit of the telephone apparatus is established, and the contacts $i i'$, which control the circuit through the relay y^3 , are not separated until the coin-receiver is pushed clear in, said contacts preferably being separated by the same device which ejects the coin from the coin-receiver. It will be useless to push in the coin-receiver without a coin, since the path to ground established by the contact of plunger g with spring d —that is, the complete circuit for relay y^2 —must be maintained while the contact between springs $i i'$ is broken. For this reason I have provided the stop f^4 for holding the plunger g in contact with the spring d , so that the circuit of relay y^2 will be maintained even after the coin is ejected.

The coin-carrier fits the opening in the toll-box so closely that a string attached to the coin would be cut in, pushing in the coin-carrier, and any string or wire fine enough to be attached to the coin and still permit the carrier to be pushed in would be broken by the force and suddenness with which the coin is ejected from the coin-carrier by the finger h .

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. In a toll-box for telephone pay-stations, the combination with a movable coin-carrier for depositing coins within the box, of a contact device adapted to be actuated by a coin held in said coin-carrier, means for discharging the coin from the carrier when said carrier is moved inside the box, and mechanism, brought into action in moving the coin-carrier, for holding said contact device independent of the coin.
2. In a toll device, the combination with the toll-box and the sliding coin-carrier therefor adapted to receive a coin outside of the box and to be moved in to deposit said coin within the box, a movable plunger in said coin-carrier adapted to be actuated by a coin placed therein, an electrical contact actuated by said plunger, a movable catch f^4 , and mechanism, brought into action by the inward movement of the coin-carrier, for engaging said catch

with the plunger, whereby said plunger is held in engagement with the contact independent of the coin, substantially as set forth.

3. In a toll device, the combination with the toll-box and the sliding coin-carrier therefor adapted to receive a coin outside of the box and to be moved in to deposit said coin within the box, a movable plunger in said coin-carrier adapted to be actuated by a coin placed therein, an electrical contact with which said plunger is adapted to be held in engagement by the deposited coin, a pivoted bar f mounted upon the coin-carrier, mechanism controlled by the movement of said bar for ejecting the coin from the coin-carrier, a stop carried by said bar for holding the plunger in engagement with said electrical contact independent of the coin, and means, actuated by the coin-carrier in sliding inward, for rocking said bar upon its pivot, as set forth.

4. The combination with a substation telephone instrument, of a toll device associated therewith having a cash-box, a movable coin-carrier for depositing coins in the box, a blocking device, for rendering the telephone apparatus inoperative, a positively-acting ejector for throwing coins out of the carrier to deposit the coins in the box, and a restoring device, for re-establishing the operative condition of the telephone apparatus, said restoring device being actuated in the movement of the said ejector.

5. In a toll device, the combination with a cash-box, a movable coin-carrier for depositing coins within the box, a door normally holding the coin within the carrier, an ejecting-finger h arranged to press upon the coin within the carrier as the carrier is pushed in, and a latch for the door, actuated in the movement of the coin-carrier, said latch being withdrawn to permit the door to open and discharge the coin as the carrier is moved.

6. In a toll device, the combination with the toll-box and the sliding coin-carrier therefor adapted to receive a coin outside the box and to be moved in to deposit said coin within the box, a hinged door for the coin-carrier adapted normally to hold the coin in place, a latch for the door, actuated by the movement of the sliding coin-carrier, said latch being withdrawn to release the door when the coin-carrier is moved in, a spring-impelled ejecting-finger h bearing upon the coin held within the carrier and adapted to throw open the door and eject the coin when said door is unlatched, and an electrical switch-contact device, actuated by the movement of said ejecting-finger, substantially as set forth.

7. The combination with a toll-box, of a coin-carrier arranged to slide through the wall thereof, said carrier having a door for holding the coin in the carrier during its travel, a spring-actuated ejecting-finger adapted to forcibly throw the coin out of said carrier when the door is opened, detaining mech-

anism normally preventing the action of said ejecting-finger, and means actuated in the inward movement of the carrier for releasing said detaining mechanism; whereby the coin
5 is suddenly ejected, substantially as set forth.

8. The combination with a toll-box, of a coin-carrier arranged to slide through the wall thereof to deposit coins in the box, and a door for said carrier hinged to the outer end there-

of, and a latch for the door actuated as the coin-carrier is moved in to permit the door to open and discharge the coin within the box.

In witness whereof I hereunto subscribe my name this 18th day of December, A. D. 1901.

WILLIAM W. DEAN.

Witnesses:

DE WITT C. TANNER,

W. W. LEACH.