(No Model.) 2 Sheets—Sheet 1.

H. C. ROOT.

AUTOMATIC TOLL BOX FOR TELEPHONES.

No. 536,100. Patented Mar. 19, 1895.

FIG. 1.

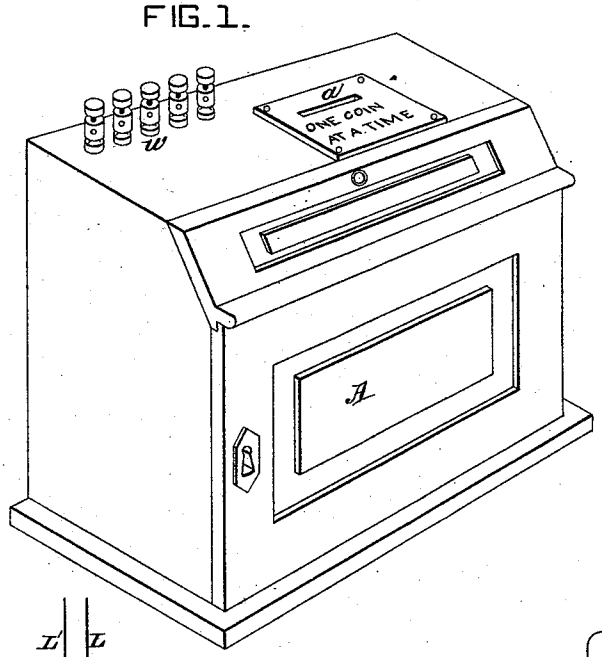
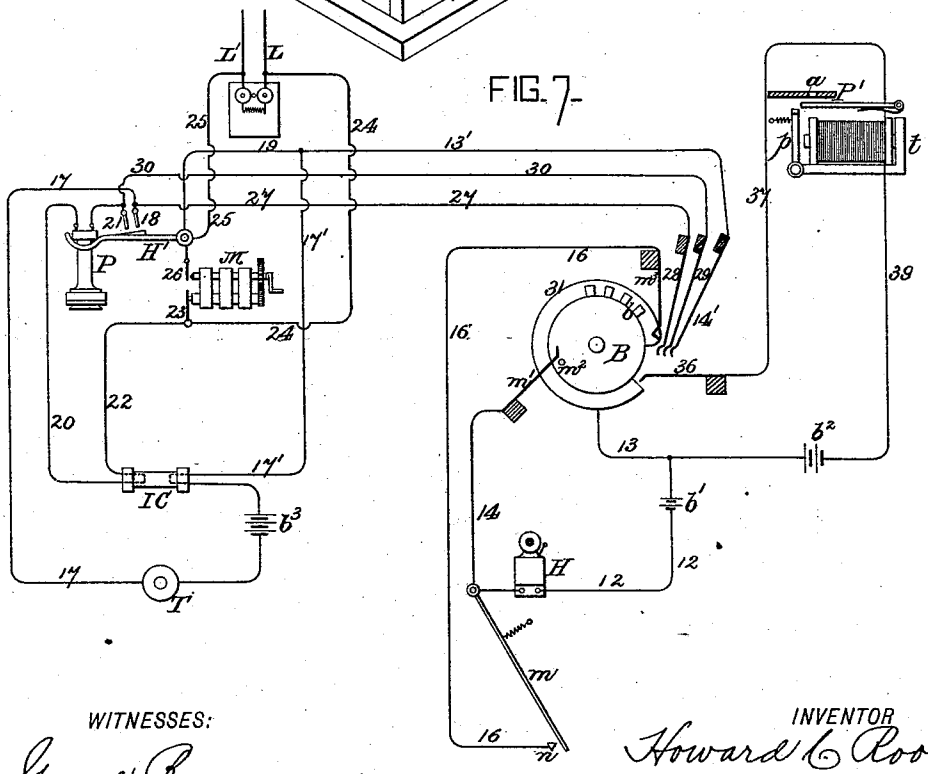


FIG. 7.



WITNESSES:

George Baumann

S. C. Connor

INVENTOR

Howard C. Root

BY

Howson and Howson

his ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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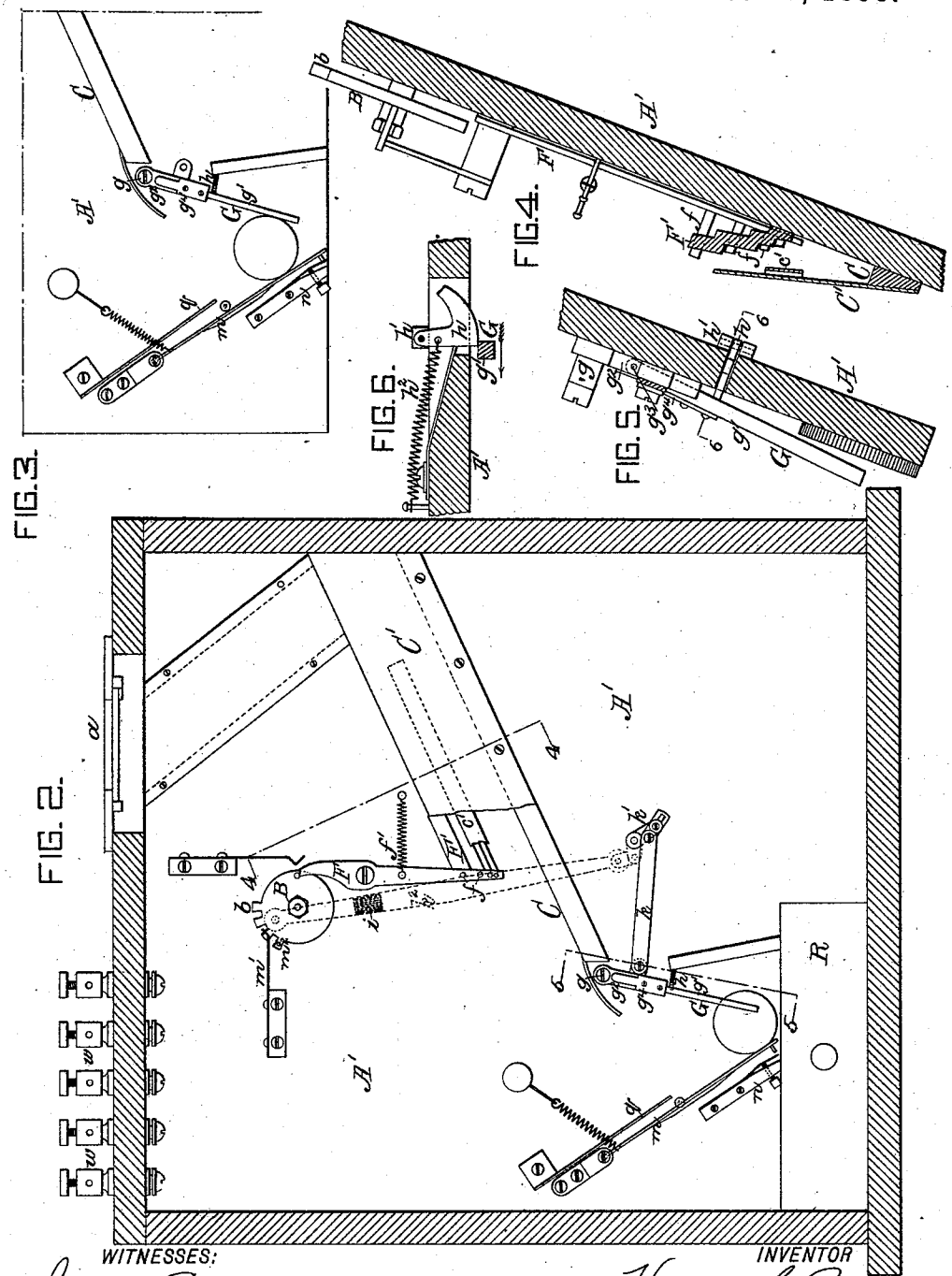

FIG. 3.

FIG. 4.

FIG. 6.

FIG. 5.

FIG. 2.

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UNITED STATES PATENT OFFICE.

HOWARD C. ROOT, OF BROOKLYN, NEW YORK.

AUTOMATIC TOLL-BOX FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 536,100, dated March 19, 1895.

Application filed November 30, 1894. Serial No. 530,343. (No model.)

To all whom it may concern:

Be it known that I, HOWARD C. ROOT, a citizen of the United States, and a resident of Brooklyn, Kings county, New York, have invented Improvements in Automatic Toll-Boxes for Telephones, of which the following is a specification.

My invention consists of certain improvements in the construction of automatic toll boxes for telephone pay stations, more particularly those embodying the inventions for which I have obtained Letters Patent of the United States No. 440,118, dated November 4, 1890, and No. 525,623, dated September 4, 1894.

In the accompanying drawings, Figure 1 is a perspective view of the toll box. Fig. 2 is a vertical section drawn to a somewhat larger scale. Fig. 3 is a view of part of Fig. 2,—showing the gate retaining a coin temporarily. Fig. 4 is a sectional view on the line line 4—4, Fig. 2, drawn to a larger scale. Fig. 5 is a section on line 5—5, Fig. 2, drawn to the same scale as Fig. 4. Fig. 6 is a sectional view on line 6—6, Fig. 5. Fig. 7 is a diagram of an arrangement of circuits which may be used in carrying my invention into effect.

My telephone toll box is more particularly designed for use in connection with, and to be electrically connected up to telephonic instruments as ordinarily constructed, and in the drawings I have therefore shown my invention, more particularly in Fig. 1, as embodied in a separate self-contained box structurally independent of the usual telephone sets. This box has a slit *a* at the top for the introduction of the various sizes of coins and is provided with a suitable number of binding posts *w* for electrically connecting up the various circuits. A hinged door A may be provided in front of the box with a lock and key for access of authorized persons to the interior and particularly to the coin drawer or receptacle. It should be understood, however, that my invention may be embodied in and constructed as part of the telephonic apparatus, as for instance in the box containing the battery for the primary circuit in a manner similar to that illustrated in my Patent No. 440,118.

Referring more particularly to Figs. 2, 3 and 4, C is the inclined chute or run-way along which the coins dropped through the slot pass in a somewhat inclined position, as by properly inclining the backboard A′, upon which the chute is mounted. This chute is as usual provided with a front guard C′ to prevent the coins from falling off.

As in the box of my Patent No. 525,623, I provide in connection with the chute for the passage of different sizes of coins a single signal-producing mechanism to be automatically operated by the weight or impetus of the coins to give different signals by the passage of different sizes of coins through one and the same chute. I provide as before contact fingers at different heights from the bottom of the chute, these fingers being mounted upon one lever F but instead of being pendent fingers, as illustrated in my former patent, I mount the several fingers *f* to project laterally from the lever F, as shown more clearly in Figs. 2 and 4, there being as many fingers on the lever as there are to be different toll signals in the apparatus.

With the several contact fingers *f* I combine guards F′ projecting to different heights from the backboard A′ and arranged at different heights from the bottom of the inclined chute, so that the larger coins will ride over these guards and be thereby prevented, as in my other apparatus, from coming into contact with the fingers intended to be struck by the smaller coins, but the ends of the several fingers *f* project laterally beyond the faces of the several corresponding guards, as will be readily understood on reference to Fig. 4. In order to aid in keeping the larger coins over against these guards as they pass through the chute or run-way, I provide on the front guard C′ a light flat spring *c′* indicated in Fig. 4, and in part by dotted and full lines in Fig. 2.

In the drawings I have illustrated as the preferred signal-producing movement, one in which a circuit-making and breaking device somewhat similar to those used in district messenger boxes is employed, and in the present instance I have illustrated it as normally on open circuit and producing the signal by closing of the circuit or circuits, but it will be understood that I do not wish to limit myself to the use of such a circuit making or breaking device. A suitable spring *f′* normally keeps the finger lever F in the position illus-

trated in Fig. 2, with its upper end in contact with a stop upon, and normally preventing, the break-wheel B from turning in the direction of the arrow. The break-wheel has a series of contacts b adapted to close the signaling circuit for the purpose of transmitting signals to the operator at the exchange, such signals differing with the different sizes of coins introduced into the box. The signals may be transmitted to the operator at the exchange in any of the well-known ways as by making and breaking the line circuit, as described in my earlier patent, or by having an audible signal at the pay station to make sounds which may be transmitted to the exchange like the talking through the telephonic instruments as described in my Patent No. 525,623. I prefer the latter arrangement and in the diagram, Fig. 7, is illustrated in the lower right hand part thereof, a system of circuits which may be employed.

At the bottom of the chute there is provided as before, a spring contact m which when a coin falls thereon makes contact with a back stop n connected up in the signaling circuit containing an audible signal H. This may be considered as located at the telephone pay station and is shown as connected up in a circuit 12, 13, containing a battery b', and leading to the break-wheel B. The back stop n is connected through a conductor 16 to a spring finger m^3 to co-operate with the contact b on the break-wheel. The spring contact m is connected through a conductor 14 with a finger m' acting in conjunction with a pin m^2 on the break-wheel to momentarily close the signaling circuit, when the break-wheel begins to move. Opposite this contact m is a gate G which may be pivoted at g, and is connected by suitable mechanical means with a break-wheel B, so that the gate will be moved upon its pivot as the break-wheel B revolves when released from the lever F. In the drawings I have shown the gate G as connected to the break-wheel through the medium of a link k, bell-crank lever k' and connecting rod k^2.

With the described arrangements of circuits the gate G will be normally arranged at such a distance from the contact m as to allow of the smallest toll coin passing directly into the receptacle R below, the one signal thus given being an indication that the smallest token has been put in. Each larger toll coin will similarly give a first signal through the closing of the circuit at m', m^2, and then the signaling circuit will be closed at m, m^2, while the coin is being held by the gate G, the number of times the circuit is closed being dependent, as described in my previous patent, on the size of the coin.

In my present invention I have improved the construction of the drop-out device controlled by the signal-producing movement, whereby improper coins, failing to operate the signal, will be dropped out. For this purpose I construct the gate G in such a manner that normally it will be in a position to allow a coin to pass by it into the receptacle R unless the coin has tripped the signal-producing movement on its way through the chute. For this purpose the gate G is made in two parts g' g^2, hinged at g^3 in such a way that the lower free end g' of the gate can be raised from the surface of the backboard A', as shown in Fig. 5, sufficiently to allow coins to pass back to it, as illustrated in Figs. 2 and 5. A spring g^4 however tends to push the free end of the gate G toward the backboard A', but a movable incline or cam h projecting in this case through a slot in the backboard and pivoted at h', Fig. 6, is normally held by a spring h^2 in such a position that when the gate G is in its normal position illustrated in Fig. 2, with the break-wheel B at rest, this incline or cam will hold the free end of the gate G away from the backboard, as illustrated in Figs. 5 and 6. The connection of the gate G with the break-wheel however, is such that when the break-wheel is first released by a passing coin it will have the effect of moving the gate G in the direction of the arrow, Fig. 6, sufficiently to permit the gate to pass beyond the cam or incline h and the free end g' of the gate to move up to the back-board and hold the coin on its way through the chute. The continued movement of the break-wheel, however, quickly reverses the direction of motion of the gate G to allow the coin in due time to pass to the receptacle G. The cam h yields to the backward motion of the gate G until the latter has passed the front edge of the cam, which then at once is drawn back by its spring h^2 to the position shown in Fig. 6. As the gate G returns to its normal position shown in Fig. 2, by the completion of the rotation of the break-wheel G the free end of the gate G rides upon the cam again to the position illustrated in Figs. 2, 5 and 6.

I prefer to provide over the spring contact m opposite the end of the run-way C a spring plate q, Fig. 2, to slightly retard the progress of the coin through the chute by causing the coin to rebound, and thus give a little more time for the gate to get into position for the coin.

In telephonic toll boxes as heretofore constructed with audible signaling movement at the telephone pay station the conveyance of the signals through the transmitter is dependent upon the closing of the primary or transmitter circuit, by the taking of the hand telephone off the hook. By my present invention I provide for the automatic closing of the transmitter or primary circuit independently of the hand telephone hook. For this purpose I prefer to provide means whereby the coin itself controls the closing of the primary or transmitter circuit and I avail myself of the movement of the break-wheel when released by the coin to effect the desired result. In Fig. 7 I have illustrated means whereby this part of my invention may be carried into effect. First however I will describe, with ref-

erence to Fig. 7, the arrangement of circuits in the telephone set as illustrated in that diagram.

The circuit containing the transmitter T and battery b^3 and passing through the primary of the induction coil IC includes a conductor 17′ on one side of the induction coil, while on the other is a conductor 17 leading to a contact 18 to make contact with the telephone hook H′ when the latter is raised. This hook is thus connected through a conductor 19 to a conductor 13′, to which the conductor 17′ is also connected, and which leads to a spring contact 14′ adjacent to the break-wheel B.

The secondary of the induction coil IC is connected through a conductor 20 with one terminal of the receiver P, whose other terminal leads to a contact 21 acting in conjunction with the hook H′ when the latter is raised. The secondary of the induction coil IC on the other side is connected through a conductor 22 to a contact 23, and through conductor 24 to line L. The hook H′ is on the other hand connected through the conductor 25 to line L′, the call-bell MC being connected across and between the conductors L and L′. When the handle of the magneto machine M is operated, it is thrown into circuit with the line through the contact 23 and conductor 24 on one side, and conductor 25 and contact finger 26 on the other side.

The circuits thus far described are such as may be used in ordinary telephone sets and as will be readily understood the transmitter circuit in such an arrangement will be closed only on raising the hook H′ by removal of the telephone P. The customer however cannot be relied on to do this and it would be a common difficulty that he would put his money into the box while the telephone P was on the hook and then the signal would not be transmitted to the central station. As a simple way of meeting this difficulty, I electrically connect to the conductors 17 and 20 or the contacts 18 and 21, two conductors 27 and 30 leading to spring fingers 28 and 29 adjacent to the break-wheel, which latter I provide with a projection 31, such that when the break-wheel has been released and begins to move it will bear against the fingers 28, 29 and 14, so as to close both the primary and secondary circuits through the conductors 27 and 30 on the one hand and the conductor 13′ on the other hand. Thus while the break-wheel is passing through that part of its rotary motion during which it may make and break signals, the primary circuit will be closed through the break-wheel, contact 28, conductors 27 and 17, transmitter T, battery b^3, primary of the induction coil, conductor 17′ and conductor 13′. At the same time the secondary circuit will be closed to line through the finger 29, conductors 30, 20, telephone P, secondary of the induction coil IC, conductors 22 and 24 to line L, back through the line L′ conductors 25, 19 and 13′.

It is desirable, if the gate G and contact m are of metal to provide some insulation, as at i (Fig. 2), in the mechanical connection between the gate and the break-wheel, as otherwise a short circuit might be formed by the coin while detained by the gate.

As described in my Patent No. 515,170, I provide in connection with the coin slot a, a door with electro-magnetic controlling means for locking the door.

In the diagram, Fig. 7, I have shown a construction of the device in which the door P which is hinged immediately below the coin slot, is normally free to be pushed open by introducing a coin, but after the coin has been introduced and the break-wheel B begins to move a contact finger 36 will come into contact with the projection 31 of the break-wheel and close a circuit through the break-wheel, conductors 13 and 29, battery b^2, electro-magnet t, conductor 37 and finger 36. The electro-magnet t being thus energized, the armature p is attracted against its retraction spring and latches the coin slot door P, thus preventing the introduction of a coin through the slot while the circuit is thus closed, or in other words, during the main part of the revolution of the break-wheel and so while the coin is on its way through the chute. When the break-wheel has completed its movement and comes to a position of rest, the circuit will have been broken again at 36 and the coin slot door will be then unlocked.

I claim as my invention—

1. An automatic toll box having a chute for the passage of different sized coins, a gate in the pathway of said coin normally open to allow improper coins to pass it, in combination with means whereby the said gate is closed by the introduction of a proper toll coin, a signaling circuit controlled by the said toll coin, and means for gradually opening the said gate to allow a detained toll coin to pass.

2. An automatic toll box having a chute for the passage of different sized coins, a break-wheel, contact fingers for coins controlling said break-wheel, a gate normally open to allow improper coins to pass, means for closing said gate on the introduction of a proper toll coin and a signaling circuit having a contact held closed by the toll coin while detained by the said gate.

3. An automatic toll box having a chute for the passage of different sized coins, a signal-producing movement controlled by the coins, a gate in the pathway of the coins normally open to allow improper coins to pass it, means whereby the signal-producing movement first closes and then gradually opens the said gate on the introduction of a proper toll coin, and a contact in the signaling circuit closed by the coin so long as it is detained by the said gate, substantially as set forth.

4. An automatic toll box having a backboard and a chute for the passage of the coin and provided with a coin-detaining gate, means for holding the said gate away from the backboard when the gate is in its normal

position of rest to allow improper coins to pass it and means for closing the said gate to the backboard on the introduction of a proper toll coin.

5. An automatic toll box having a chute for the passage of the coin and a signal-producing movement with a lever controlling the signal-producing movement and having several laterally projecting fingers of different lengths at different distances from the bottom of the chute and guards cooperating with the said fingers.

6. An automatic toll box having a signal-producing movement controlled by coins, an inclined chute for the passage of the coins and fingers and guards therefor, with a front guard provided on its inner face with a spring to hold the larger coins over against the finger guards.

7. An automatic toll box having a chute for the passage of the coins, a signal-producing movement controlled by the coins, a gate in the pathway of the coins to be gradually opened by the signal-producing movement, a contact in the signaling circuit to be closed by the coin so long as it is detained by the said gate, and a detention spring at the end of the chute over the gate.

8. In an automatic toll box, the combination of a coin slot and door therefor with an electro-magnetic locking device, a circuit for the electro-magnet and means for keeping the circuit closed during the passage of the coin through the toll box, as and for the purpose set forth.

9. A toll box for telephone pay stations having an audible signal to indicate the coin put in, in combination with a telephone set and means for closing the transmitter circuit independently of the telephone hook.

10. A toll box for telephone pay stations having an audible signal to indicate the coin put in, in combination with a telephone set and electric circuit connections controlled by the coin introduced into the toll box to close the transmitter circuit independently of the telephone hook.

11. A toll box for telephone pay stations having a signal to indicate the coin put in and an audible signal-producing movement controlled by the coins, in combination with a telephone set and circuits controlled by the said signal-producing movement to close the transmitter circuit independently of the telephone hook while the coin is passing through the toll box.

12. A toll box for telephone pay stations having an audible signal to indicate the coin put in, in combination with a telephone set and electric circuit connections controlled by the coin introduced into the toll box to close both the primary and secondary circuits of the telephone set independently of the telephone hook.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOWARD C. ROOT.

Witnesses:
EDITH J. GRISWOLD,
HUBERT HOWSON.