

No. 651,817.

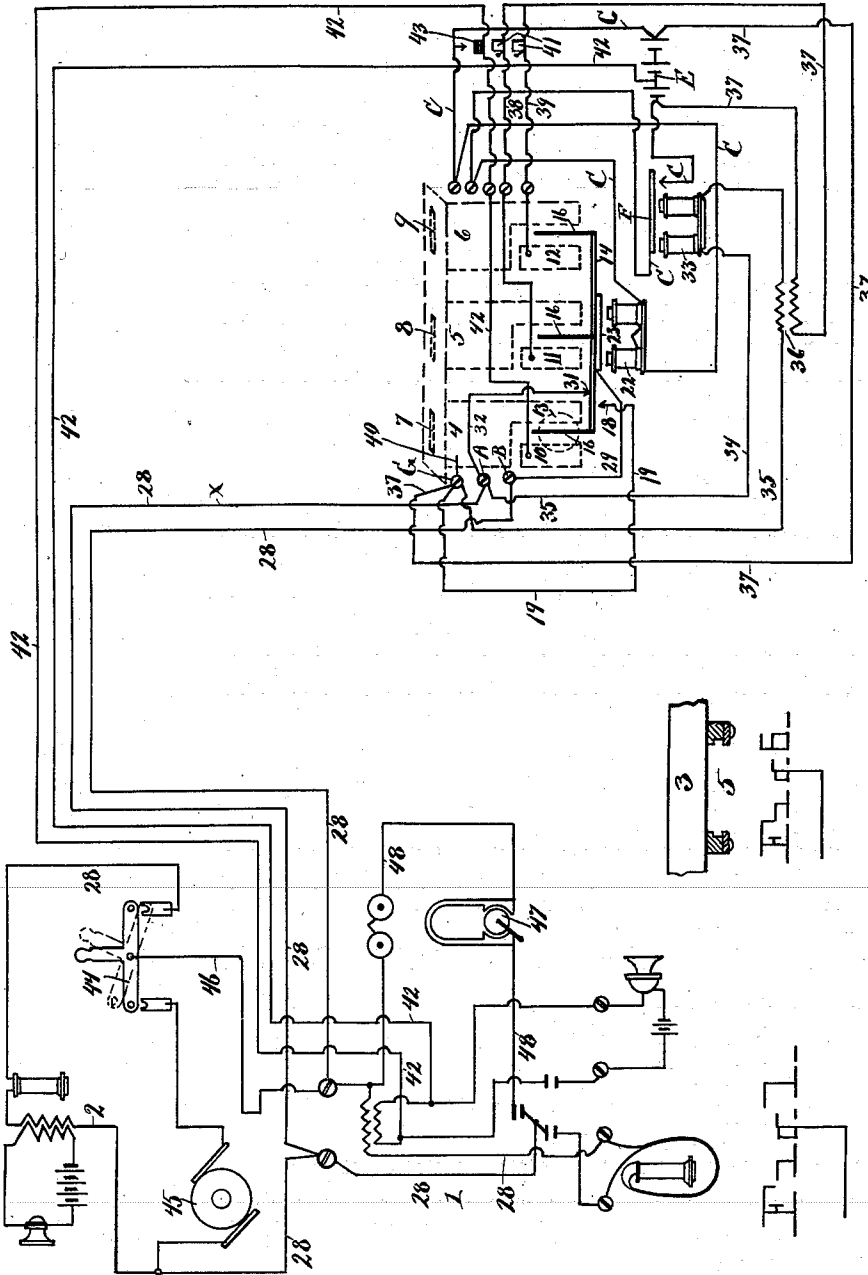
Patented June 19, 1900.

J. T. BELANGER.
TELEPHONE TOLL APPARATUS.

(Application filed Nov. 20, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

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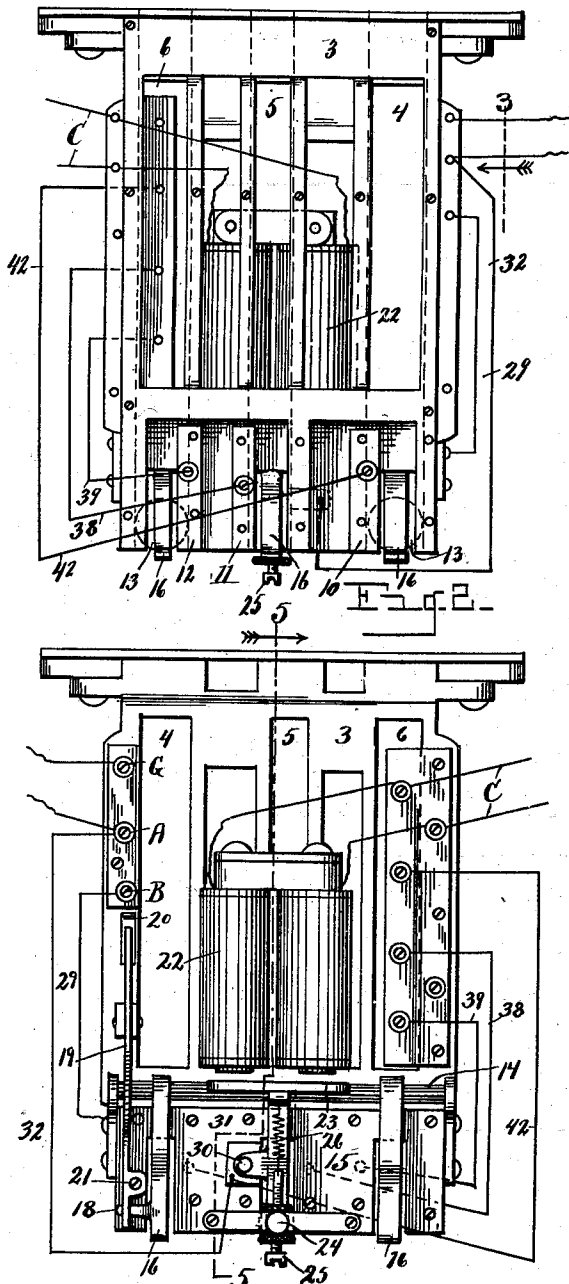
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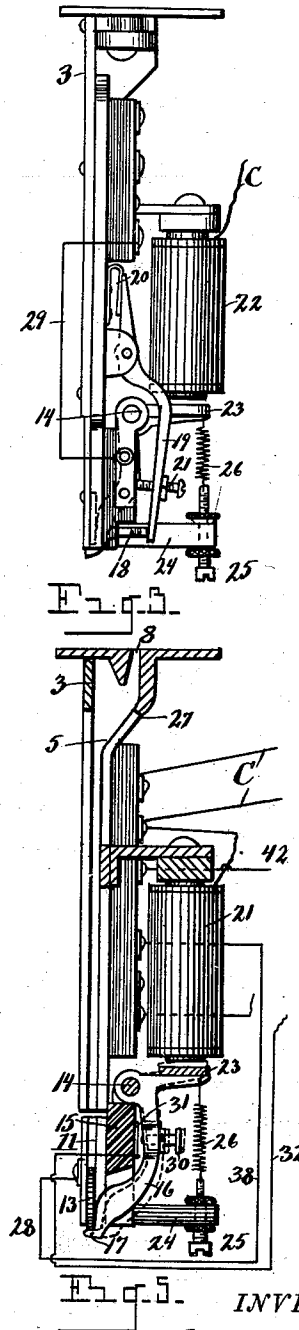
2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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TELEPHONE TOLL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 651,817, dated June 19, 1900.

Application filed November 20, 1899. Serial No. 737,559. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. BELANGER, a citizen of the United States of America, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Telephone Toll Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to telephone toll apparatus; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The objects of the invention are to produce a device of the character described in which the arrangement is such as to insure a perfect contact and a positive closing of the signal-circuit when a coin is placed in the machine, to provide for indicating to the operator the denomination of the coin which closes the signal-circuit, and to provide means under the control of the operator for discharging the coin from the device after the closing of the signal-circuit.

A further object is to provide an induction-coil in the signal-circuit to reduce the intensity of the vibration of the signal and to provide for cutting out all resistance from the line when in its normal position.

The above objects are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view showing a subscriber's station connected with my improved toll apparatus and an operator's instrument connected with said apparatus and said station. Fig. 2 is a rear elevation of the frame of the device containing the coin-receiving chutes, the contacts for closing the signal-circuit, and the electromagnet for discharging the coin. Fig. 3 is a side elevation of said frame, looking in the direction indicated by the arrow and dotted line 3 of Fig. 2. Fig. 4 is a front elevation of said frame; and Fig. 5 is a vertical section therethrough

as on line 5 5 of Fig. 4. Fig. 6 is a detail in cross-section of one of the ways or chutes which receive the coin.

Referring to the characters of reference, 1 designates a public station or a subscriber's station, as the case may be, with which the coin-receiving apparatus is connected, and the operator's station 2 is also in circuit.

It is the purpose in the application of this invention to enable the subscriber to call the operator and state the station with which the subscriber wishes connection, when the operator will request the subscriber to place in one of the several slots of the machine a coin of a denomination sufficient to pay the toll-service between the subscriber and the station called. The signals are so arranged that upon the insertion of the coin by a subscriber the operator may know definitely that the proper coin has been inserted, when the operator may discharge the coin from the device and connect the subscriber with the station called.

The coin-receiving apparatus, as illustrated in Figs. 2, 3, 4, and 5, comprises a metallic frame 3, in which are formed three independent ways 4, 5, and 6, respectively, having slots 7, 8, and 9 in the top of the frame communicating therewith. The sides of said slots, as shown in Fig. 6, are channeled to receive the edges of the coin and direct it properly to the bottom of the chute. The portion of the frame forming one side of the coin-chutes at the bottom of each of said chutes and indicated at 10, 11, and 12 is detached from the main frame and electrically insulated therefrom, so that while the main frame is common to one side of all the signaling-circuits the other side of said circuits leads to the insulated frame-sections 10, 11, and 12, so that the closing of the signal-circuits when the coin is inserted into the device is only effected when the coin reaches the bottom of the chute in which it is placed and bridges between the main portion of the frame connected with one side of the line and the insulated section connected with the opposite side of the said line, such position of the coin being shown by dotted lines 13 in Figs. 1 and 2.

To provide additional means for closing the signal-circuits and to insure a perfect contact with the inserted coin of the opposite

side of the line, a transverse shaft 14 is journaled on the frame and insulated therefrom by the insulating-block 15, which carries the bearings of said shaft. Mounted upon and common to the shaft 14 are the contact-arms 16, which curve inwardly and project into the coin-chutes, so as to stand in the path of a coin descending said chutes, the lower ends of said arms having a projecting shoulder 17 (see Fig. 5) to arrest the coin when it reaches the bottom of said chute, the inner faces of said contact-arms being slightly inclined, so as to cause the coin to wedge between its inclined face and the guideway of said chutes.

Projecting from the side of one of said arms (see Fig. 4) is a finger 18, which normally stands slightly away from the lower end of a pivoted lever 19, mounted upon and having electrical contact with the main frame and provided with a light spring 20 to maintain said pivoted lever properly in position. An adjusting-screw 21 passes through said lever and, bearing upon the insulating-block 15, regulates the distance between the lower end of said lever and the finger on the contact-arm 16. The point between said finger and said pivoted lever is normally open upon an insertion of a coin in any of the chutes, however. The arm 16 engaged by said coin is swung slightly outward, carrying the finger 18 against the lever 19, thereby closing the signal-circuit through the lever 19, as well as between the main part of the frame and one of the insulated sections at the lower end of the chute, through said coin which bridges between said parts, thereby insuring a positive closing of the signal-circuit. Supported in the frame is an electromagnet 22, located in a local circuit, hereinafter explained, whose poles stand adjacent to an armature 23, mounted upon the central contact-finger 16 of the shaft 14, whereby upon energizing said electromagnet the shaft 14 is actuated to swing outwardly the contact-finger 16, against which the coin is resting, and thereby discharge the coin from the chute, as clearly shown by dotted lines in Fig. 5. Mounted upon the insulating-block 15 is a post 24, through which passes an adjusting-screw 25, having one end of a coil-spring 26 attached thereto whose opposite end is attached to the armature of the magnet 22. The object of said spring is to withdraw the armature from said magnet when said magnet is out of circuit and to place a slight tension upon the contact-arms 16 so as to hold them positively against the coin when inserted in the chute.

It will be seen upon referring to Fig. 5 that the slot 8 in the top of the device is not in vertical alinement with the main portion of the chute, but overhangs, so that the coin first strikes an inclined portion 27 before being directed into the straight portion of the chute. The purpose of said arrangement is to prevent the device being actuated by other than a coin of the proper size, for should a coin too small be inserted in the slot 8 in-

stead of being directed into the chute 5 it will fall through the opening at the inclined portion 27 and fail to operate the device.

This device is arranged to receive coin of three denominations and is provided with three distinct signal-circuits, said circuits being arranged to indicate the introduction of coin of the value of five, ten, and twenty-five cents into the device. Any number of signal-circuits may be arranged, however, to indicate the introduction into the device of coins of any denomination without departing from the spirit of the invention.

The wiring of the several circuits and the connection of the device with the operator's instrument are shown in the diagram of Fig. 1, in which the main line is indicated at 28 leading to the binding-posts A and B, mounted upon the frame of the device, but insulated therefrom. The main-line circuit is normally closed through a short line 29, leading from the binding-post B to the shaft 14 and to the contact-screw 30, passing through a projection on the central finger 16, mounted on said shaft, as clearly shown in Figs. 4 and 5, and which normally bears upon a contact-plate 31, seated in the insulating-block 15, and from which a line 32 leads to binding-post A, so that as long as the circuit is closed at point 31 the main line is completed through said point and the lines 29 and 32. Upon the insertion of a coin the finger 16 engaged thereby is actuated sufficiently to turn shaft 14 and raise the screw 30 from contact with the plate 31, thereby opening the main-line circuit at that point. The electromagnet 22 is comprised in a local circuit C, including a battery E and the armature F of a relay-magnet 33, included in a relay-circuit 34 and 35, connected with the binding-posts A and G, the line 35 of said relay-circuit including the secondary side of the induction-coil 36. The primary side of the induction-coil 36 includes the line 37, connected with battery E and through the branches 38 and 39 with the insulated sections 11 and 12, respectively, of the frame, the opposite end of the line 37 terminating at the point 40, electrically connected with the main portion of the frame. Included in the branches 38 and 39 of the line 37 are the buzzers or other signal devices 41.

The signal-circuit 42, leading from the insulated section 10 of the frame, includes a resistance-coil 43, said circuit passing to the operator's instrument and returning to battery E, thence on line 37 to the point 40 on the main frame.

It will be observed that relay-magnet 33 is on the secondary side of the induction-coil 36 and is connected with the main line 28 through the binding-posts A and G.

The lever 19, connecting the contact-arm 16 with the main frame, is illustrated in diagram Fig. 1 by the line 19, the engagement between said lever and the finger of the contact-arm being indicated at point 18 and the union between said lever and the frame be-

ing indicated at point 40. It will be understood that point 18 is normally opened and is only closed upon the insertion of a coin, and the point 31 is normally closed and is only broken upon the insertion of a coin.

In the operator's set is a switch 44, through the medium of which the operator may be placed in communication with the subscriber and may throw the current from the generator 45 on the main line through the connecting-line 46.

In the operation of this device when a subscriber calls the current from generator 47 passes through line 48 to the main line 28, which is closed through the instrument by the lines 29 and 32, and the operator's set, which is connected with the main line. The operator receives the signal in the ordinary manner (not shown) and ascertains the station the subscriber desires to call, states the price of service to the station called, and requests the subscriber to insert a coin of the requisite denomination in one of the slots of the device. When the coin has been placed in the device, the operator receives a signal indicating the fact. The coin is then discharged and the subscriber connected with the station called.

In illustrating the operation, it will be supposed that a subscriber has called for a station requiring a toll-fee of five cents and upon instructions from the operator places a five-cent piece in the slot 7 of the device communicating with chute 4. As the coin drops to the bottom of the chute it closes the circuit of line 42 by bridging across the lower end of said chute between the insulated frame-section 10, to which the terminal of the line 42 is connected, and the main portion of the frame through line 37 from battery E to point 40 on said frame, causing a sound in the receiver of the operator indicating that the circuit has been closed and serving as a signal to indicate that the proper coin has been placed in the device. The weight of the coin falling against the curved contact-arm 16 forces said arm outward and carries the finger thereon into contact with the lever 19, thereby making a second contact with the frame through said coin-arm and lever and insuring a perfect closing of the signal-circuit. As the arm 16 moves outward by the coin falling against it the shaft 14 is turned, so as to carry the contact-screw 30 away from contact-plate 31, thereby opening the main-line circuit at said point, so that when the operator throws the generator-current onto the main line said current will pass from binding-post B through line 29 to the shaft 14, through the contact-arm 16, finger 18, and lever 19 to the main frame, from the main frame on line 35 through the relay-magnet 33 and back on line 34 to the main line through binding-post A, thereby energizing said relay-magnet 33, attracting its armature F, and closing the circuit C, which includes battery E and the electromagnet 22, whereby electromagnet 22 is energized

and its armature 23 attracted. Said armature 23 being mounted on the shaft 14 said shaft is rocked as said armature is attracted, swinging outward the arm 16, which retains the coin in the coin way or chute and discharges the coin therefrom, at the same time restoring the signal-circuit 42 to its normal condition. The passage of the coin from the device also opens the relay-circuit, thereby opening the local circuit of the electromagnet 22, when the spring 26 will withdraw the armature 23, rocking shaft 14, and restoring the parts to their normal position, leaving the talking or main-line circuit closed through the point 31 and the lines 29 and 32.

The operation of the device by the insertion of a ten-cent piece and a twenty-five-cent piece is the same as that upon the insertion of a five-cent piece, with the exception that the signal-circuits leading from the chutes adapted to receive a twenty-five-cent piece and a ten-cent piece, respectively, are provided with buzzers of different detonation, and to obviate the annoyance to the operator of the direct vibration of said buzzers in the receiver the signal from said buzzers is transmitted through the induction-coil 36, so that upon the closing of the signal-circuit 39 by the insertion of a twenty-five-cent piece in the chute or coinway 6 said coin will close the circuit from the insulated section 12 to the main portion of the frame and through line 37 to the battery E, the primary side of the induction-coil 36, and the line 39, connected to said insulated section 12, thereby inducing a current in line 34 and 35 and on main line 28 through the lines 19 and 29, connected with binding-posts B and G, whereby the operator receives the signal through an induced current, modifying the effect thereof.

The operation of the device through the insertion of a ten-cent piece is exactly like that caused upon the insertion of a twenty-five-cent piece, with the exception that the portion 38 of the signal-circuit, which includes the buzzer 41, leads from the insulated section 11, located at the bottom of the chute or way for the ten-cent coin, said portion 38 of said signal-circuit connecting with line 37 in the same manner as does line 39.

The difference in the tone of the buzzer 41 upon the signal-line branches 38 and 39 enables the operator to distinguish the denomination of the coin placed in the device.

It will be apparent that the apparatus is automatic in its workings and that it is self-restoring, the act of discharging the coin from any of the coin-chutes of the device serving to restore the apparatus to its normal condition in readiness for a succeeding operation.

Having thus fully set forth this invention, what is claimed is—

1. In a telephone toll apparatus, in combination with the main line, including the operator's set, of a toll apparatus having a way or chute for the reception of a coin, formed mainly integral with the frame but having a

section thereof electrically insulated from the remainder, a signal-circuit leading from the insulated section of said chute and connecting with the main line, a portion of said signal-circuit including the main portion of said chute so that said circuit is closed by a coin in said chute bridging between the insulated section and the main portion thereof.

2. In a telephone toll apparatus, the combination with the main line including the operator's set, of a toll apparatus comprising a frame having a coin-chute therein, the opposite sides of said chute being divided and a portion of one side electrically insulated from the remainder, a signal-circuit connected with the main line and having one terminal in the insulated section of said chute and the other terminal in the main frame, a movable contact-arm standing in the coin-chute between the opposite sides thereof, an auxiliary circuit leading from the main frame and adapted to be closed at said contact-arm, whereby the coin lying in said chute will bridge across between the sides thereof and close the signal-circuit and at the same time make an additional contact with the main frame through said auxiliary line.

3. In a telephone toll apparatus, the combination with the main line, of a toll apparatus comprising a frame having a coin-chute therein, whose opposite sides are separated and a portion of one side of which is electrically insulated from the remainder, a signal-circuit having one terminal at said insulated portion of the coin-chute and the other terminal in the main frame including the opposite side of said chute, a movable finger standing between the opposite sides of the coin-chute at its lower end and adapted to arrest the coin, an electromagnet included in a local circuit having an armature connected with said finger whereby upon the closing of the circuit of said magnet, said armature is attracted to retract said finger and discharge the coin from said chute.

4. In a telephone toll apparatus, the combination with the main line, of a toll apparatus comprising a main frame, having a coin-chute therein, the opposite sides of which at its lower end are separated and a portion of one side insulated from the remainder, a signal-circuit having one terminal in the insulated portion of the chute and the other in the main frame including the opposite portion of the chute, a movable finger standing between

the opposite sides of the coin-chute and adapted to arrest the coin at the bottom of said chute, said movable finger being permanently connected with one side of the main line and with the opposite side of the main line through a circuit-breaker normally closed, whereby upon the insertion of a coin the said finger is moved to break the main-line circuit, at its point of contact therewith and close the signal-circuit through said coin.

5. In a telephone toll apparatus, the combination with the main line, of a frame having a coin-chute therein, whose opposite sides are separated and a portion of one side of which is insulated from the remaining portion, a signal-circuit including a signal device terminating on opposite sides of said coin-chute, said circuit including the primary side of an induction-coil, the secondary side of said induction-coil being located in a local circuit connected with the sides of the main line, whereby upon the insertion of a coin into said chute the signal-circuit is closed and the signal transmitted to the main line through said induction-coil.

6. In a telephone toll apparatus, the combination with the main line of a metallic frame forming part of a signal-circuit, said frame having a coin-chute therein, whose opposite sides are separated and a portion of one side of which is insulated from the remaining portion of the chute, said chute adapted to receive a coin, which bridges across from side to side thereof, and closes said signal-circuit, a movable contact-finger standing between the opposite sides of said chute, and adapted to engage the coin when dropped therein, said contact-finger forming in connection with the main frame the complementary portion of a circuit, including the primary side of said induction-coil and connected with the main line, whereby upon the insertion of a coin into said chute, the main signal-circuit is closed by the bridging of the coin across the lower end thereof, and the circuit including the primary side of the induction-coil is closed through the contact of said coin with said finger and the main portion of the frame transmitting the signal by induction to the main line.

In testimony whereof I sign this specification in the presence of two witnesses.

JOHN T. BELANGER.

Witnesses:

FRANK H. CLARKE,
E. S. WHEELER.