No. 698,972. Patented Apr. 29, 1902.

T. R. LAING.

APPARATUS FOR TELEPHONE TOLL LINES.

(Application filed June 10, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

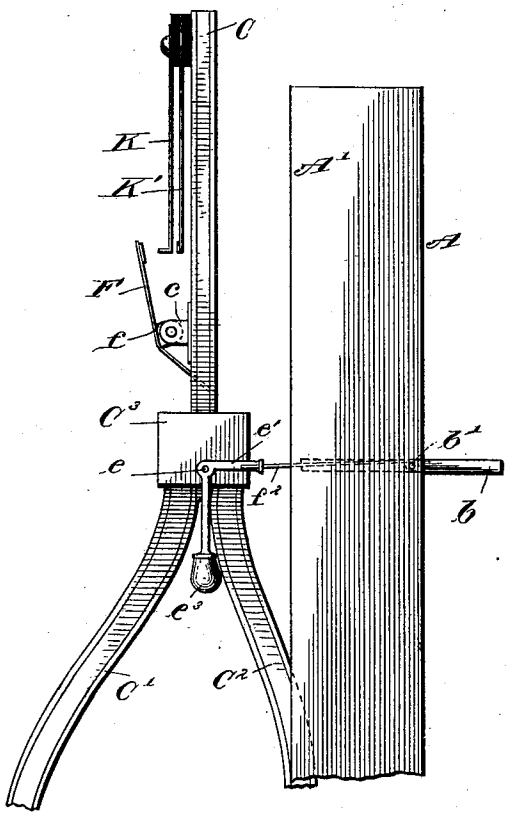
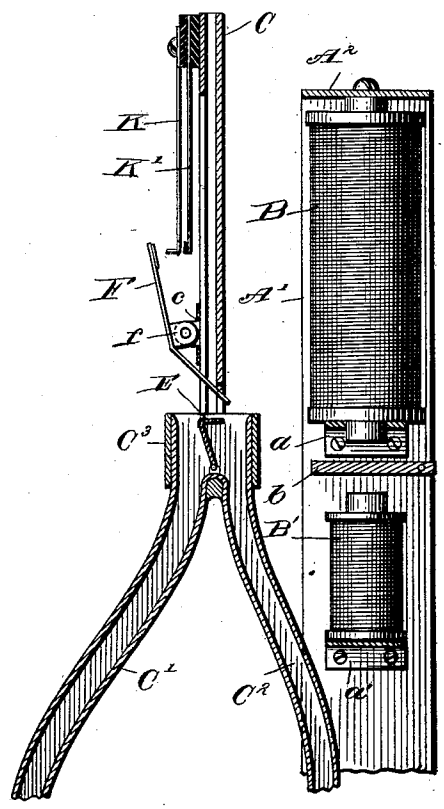
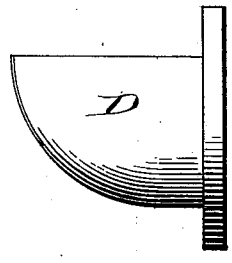


Fig. 2.





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Fig. 3.

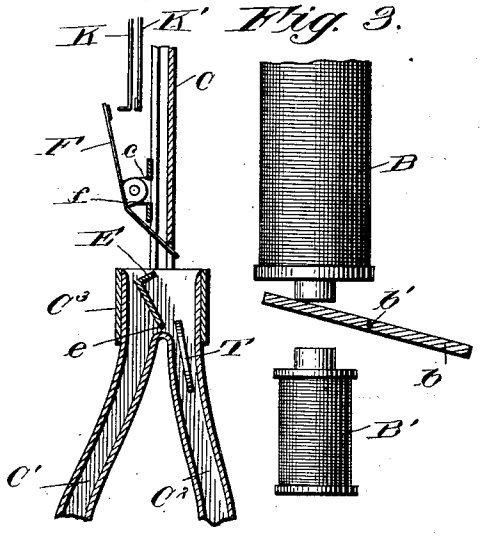


Fig. 4.

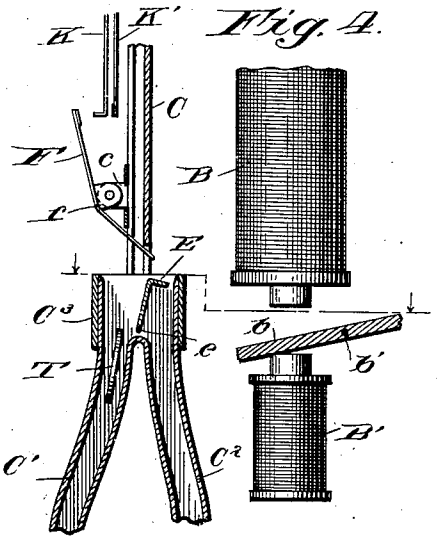


Fig. 5.

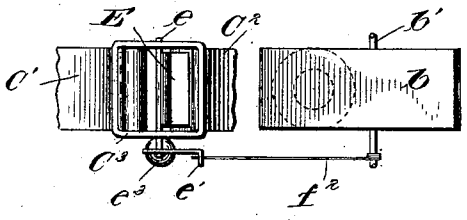
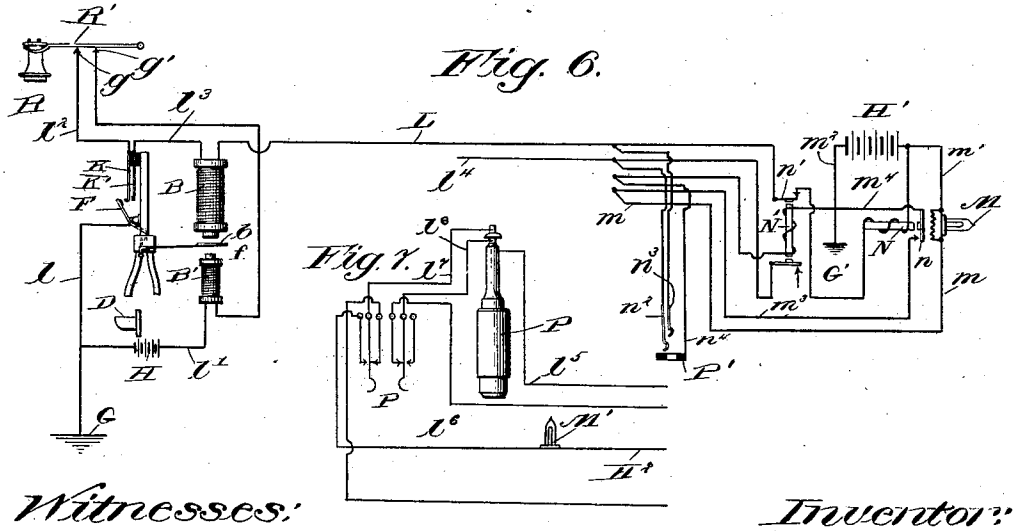


Fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TELEPHONE TOLL-LINES.

SPECIFICATION forming part of Letters Patent No. 698,972, dated April 29, 1902.

Application filed June 10, 1901. Serial No. 63,913. (No model.)

To all whom it may concern:

Be it known that I, THADDEUS R. LAING, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Apparatus for Telephone Toll-Lines; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to telephones, and more particularly to telephone instruments which are designed to receive a coin or other toll-piece in payment for the use of the telephone and to effect a signal at the central station when a coin or toll-piece of the proper character has been deposited.

It is customary in telephones of the type mentioned for the user to call up the operator at a central station in the usual manner by removing the receiver from its supporting-hook and to deposit the necessary coin or toll-piece only when informed by the operator at central that conversation may be had with the desired subscriber. This procedure has proved objectionable for several reasons, among which may be mentioned the unnecessary loss of time to the operator at central due to the delay frequently occasioned by the user not having a coin of the proper denomination to deposit when notified to do so, and consequently having to secure the requisite coin. Another objection often results from persons inexperienced in the use of such telephones depositing the coin or toll-piece before removing the receiver from its support, and hence the deposit of the coin is not indicated to the operator at central, which occasions annoyance both to the user and to the operator. It has been sought to obviate these objections by so arranging the apparatus that the coin must first be deposited in order to signal the operator at central, the coin being either returned to the exterior of the instrument, where it may be regained by the user, or transferred to a cash-box by means actuated by a circuit controlled by the operator at central.

The object of my invention is to construct an apparatus which will avoid the objections above mentioned by being so arranged that the coin or toll-piece of the proper character must be deposited in order that the operator at central may be signaled and also so arranged that the coin or toll-piece may be either transferred to a receptacle within the instrument in case the subscriber desired is connected with or in case such connection shall not be secured to return the coin to the exterior of the casing of the instrument, where it may be regained by the user, such result being obtained by an electrically-controlled switch operatively located in part in a local circuit and in part in a circuit controlled by the operator at central.

A further object of my invention is to provide an apparatus which will be simple in construction and efficient in operation.

The invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 represents a side elevation of my invention; Fig. 2, a vertical longitudinal section through the center of Fig. 1; Fig. 3, a fragmentary view showing a portion of my invention in vertical section, the switch being in a position to permit the coin to fall into the chute leading to the cash-box; Fig. 4, a view similar to Fig. 3, in which the switch is shown in a position to permit the coin to pass through the chute leading to the cup which is accessible to the user; Fig. 5, a plan view of the upper end of the chutes, the switch, and armature for actuating the same. Fig. 6 illustrates diagrammatically my invention in its relation with so much of the telephone apparatus at central as is necessary to show the operation thereof, and Fig. 7 shows a jack-plug and the leads connected thereto.

Similar reference characters indicate the same parts in the several figures of the drawings.

Reference-letter A designates so much of the casing or cabinet of the instrument as is necessary to illustrate the connection therewith of my invention.

A′ indicates vertical supports forming part of or secured to the casing, to which are fastened brackets *a* and *a′*. The bracket *a* supports the lower end of a high-resistance magnet B, the upper end of which is secured to the under side of a portion A^2 of the casing by means of a screw or other suitable attaching device. The bracket *a′* serves as a support for the lower end of a small low resistance magnet B′. Pivotally supported between the vertical sides A′ is an armature *b*, located between the adjacent poles of the magnets B and B′. A rod *b′*, rigidly secured to the armature *b*, has its ends journaled in the sides A′, whereby an oscillatory movement of the armature *b* is permitted. A spring-rod f^2 is fixed to the pivotally-supported rod *b′*, so that when the rod *b′* turns in its bearings upon either of the magnets B and B′ being energized the spring-finger f^2 will swing upwardly or downwardly, according to which of the magnets is energized.

C designates a chute, the upper end of which is designed to receive a coin or other toll-piece. This chute is provided with projecting lugs *c*, between which is located a lug *f*, projecting from a circuit-controller F. A pivot-pin passes through the lugs *c* and *f*, thereby permitting the controller F to have a pivotal connection with the chute C. At the lower end of the chute C the upper ends of two other chutes C′ and C^2 unite in a common opening or mouthpiece C^3. Within the mouthpiece C^3 is pivotally supported a switch E, consisting of a vertical portion and an upper portion extending substantially horizontally therefrom. The switch E is secured at its lower end to a spindle *e*, journaled in bearings formed in the sides of the mouthpiece C^3. One end of the spindle *e* has rigidly secured thereto a bell-crank lever *e′*, to the lower end of which is secured a means for maintaining the bell-crank in normal position, such means being shown as consisting of a weight e^3. The other arm of the bell-crank lever extends normally in a horizontal direction in alinement with the armature *b*. The spring-rod f^2 is loosely secured to the horizontal arm of the bell-crank lever *e′*, so that the upward or downward movement of the spring-rod f^2 will cause a corresponding upward or downward movement of the bell-crank lever and through it effect the oscillation of the rod *e*.

D indicates a receptacle into which the coin may be delivered from the chute C′. The lower end of the chute C^2 communicates with the cash-box or other receptacle.

Secured to the upper end of the chute C are spring contact-fingers K K′, extending downwardly, so that their lower ends are adjacent to and in the path of movement of the upper end of the controller F. The upper ends of the spring contact-fingers are suitably insulated from the chute C.

At the right of Fig. 6 I have illustrated diagrammatically so much of the apparatus at a central station as is necessary to illustrate the operation of my invention.

M indicates the usual visual signal at central; H′, the battery.

N and N′ are magnetic circuit-closers.

N^2 and N^3 are the spring-contacts, adapted to be engaged by the jack-plug.

n′, n^3, n^4, *m*, *m′*, m^2, m^3, and m^4 are leads forming the circuits, which will be hereinafter traced out.

P in Fig. 7 indicates a jack-plug adapted to be inserted in the collar P′ to form the desired circuits in a well-known manner.

The operation of my invention is as follows: When it is desired to use the subscriber's instrument, a coin or other toll-piece T—for instance, a check or device of a character to coöperate with the apparatus—is deposited in the upper end of the chute C. The coin engages the lower end of the controller F, which projects through slots in the chute C into the path of the coin. The controller F is caused to swing about its pivot by the lower end being forced outward by the coin, so that the upper end of the controller will engage the spring-contact fingers K and K′ and cause them to contact with each other, thereby closing the following circuit local to the subscriber's instrument: battery H, lead *l′*, through the magnet B′ to contact-point *g′*, through the receiver-hook R′ or switch controlled thereby to contact *g*, to lead l^2, to spring-contact K, to controller F, to lead *l*, back to the other pole of the battery H. This circuit energizes the magnet B′, causing it to attract the end of the armature *b*, whereby the armature is rocked and through the spindle *b′*, spring-finger f^2, bell-crank lever *e′*, rod *e*, and the switch E is moved from its central position (shown in Fig. 2) to the position shown in Fig. 4, thereby permitting the coin to pass into the chute C′ and thence to the receptacle D, from which it may be taken by the user. It is therefore evident that if the coin is deposited by the user in the chute C prior to removing the receiver from its supporting-hook the coin will pass through the instrument and out again into the cup D. If, however, the receiver R is removed from its hook, the local circuit above described will be broken by the arm R′ rising out of engagement with the contacts *g g′*. The passage of the coin in the chute C will therefore be obstructed by the switch E assuming the position shown in Fig. 2, in which it extends across the opening in the chute C, the switch E being held in such position, when neither of the magnets B B′ is energized, by means of the gravity or other device e^3 and its fixed connection with the rod *e*, to which is rigidly connected the lower end of the switch E.

The coin when held in the lower end of the chute by the switch E maintains the control-

ler F in a position in which its upper end causes the spring-contacts K K′ to be in engagement with each other, and thereby closes the following signal-circuit to the central station: from ground G to lead l, to controller F, to spring-contact K, to spring-contact K′, to lead l^3, through high-resistance magnet B to the line L, through the armature n' of the magnetic circuit-controller N′, through the magnetic circuit-controller N, through the battery at central H′, to lead m^2, and thence to ground G′. The circuit just described causes the armature n of the circuit-controller N to be attracted, thereby closing the following circuit: lead m^3, to lead m, to signal M, which in this instance is an incandescent light, to lead m', to battery H′, to lead m^2, to lead m^4, back to armature n. The signal M is consequently operated and the attention of the operator at central directed to the fact that someone desires to use the subscriber's instrument corresponding to the signal.

If after the operator has communicated with the prospective user it is ascertained that conversation may be had with the desired subscriber, the operator at central closes the following circuit through the magnet B: lead H^2, connecting with a source of high potential, through a switch p and lead l^7, to the end of the jack-plug, thence to the spring contact-finger n^3, (the jack-plug having been inserted in its supporting-collar P′,) thence to line L, through magnet B, through lead L^3, to spring-contacts K K′, thence to controller F, to lead l, to ground G. This circuit energizes the high-resistance magnet B and causes it to attract the magnet b, thereby moving, through the connections described, the switch E to the position shown in Fig. 3, which permits the coin or other toll-piece to pass through the chute C^2 to the cash box or receptacle therefor.

l^6 and l^7 indicate the subscriber's line and l^5 a testing-line.

M′ indicates an incandescent lamp in the high-potential lead H^2.

It should be noted that while the signal-circuit, which is closed by the coin when it rests upon the switch E, includes the magnet B, such magnet is not energized sufficiently to attract the armature b, owing to the low potential of the battery H′ at central.

The term "toll-piece" as used in the claims forming part of this specification is intended to designate a coin, a check, or any suitable device which may be used to control the operation of the mechanism.

While I have described my invention as being embodied in a telephone system, I do not wish to limit myself thereto, as I contemplate using my invention in other systems, nor do I wish to limit myself to the particular circuits I have described for energizing the magnets B B′, as it would be practicable to provide other circuits therefor, especially for controlling the magnet B′, although I preferably would use a local circuit controlled by the receiver-hook, as such an arrangement automatically returns the coin to the cup D upon hanging up the receiver in case the operator at central has notified the user that the desired person cannot be conversed with.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in the form, proportion of the parts, and substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit of my invention.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a system of communication, the combination with a signal-circuit, of means operated by a toll-piece controlling said circuit, a local circuit, means in said local circuit controlling the transfer of the toll-piece from its operative engagement with said means, and means for making and breaking said local circuit, substantially as described.

2. In a telephone system, the combination with a telephone instrument, of means operated by a toll-piece for controlling a signal at a central station, a local circuit, means in said local circuit controlling the transfer of the toll-piece from its operative engagement with said means, and means for making and breaking said local circuit, substantially as described.

3. In an apparatus of the character described, the combination with a plurality of chutes, of means for controlling the passage of an article into a predetermined one of said chutes, an arm rigidly secured to said means, a pivoted armature normally in alinement with said arm, a resilient connection between said armature and said arm, and a plurality of magnets for actuating said armature, and an independent circuit for energizing each of said magnets.

4. In an apparatus of the character described, the combination with a plurality of chutes, of a main chute communicating therewith, a switch for connecting one of said communicating chutes with the main chute, an arm rigidly secured to said switch, an armature for operating said switch, a spring-rod interposed between and operatively connecting said armature and said arm, magnets located on opposite sides of said armature, and an independent circuit for each of said magnets.

5. In a telephone instrument, the combination with a plurality of chutes, of means for controlling the passage of a toll-piece into a predetermined one of said chutes, a plurality of magnets for actuating said means, a local circuit at the instrument for energizing one of said magnets, a circuit for energizing the other of said magnets, and means for controlling each of said circuits, substantially as described.

6. In a telephone instrument, the combina-

tion with a plurality of chutes, of means for controlling the passage of a toll-piece into a predetermined one of said chutes, a plurality of magnets for actuating said means, a local circuit at the instrument for energizing one of said magnets, a controller for said circuit operated by the telephone-receiver support, an independent circuit for energizing the other of said magnets, and means for controlling said independent circuit, substantially as described.

7. In a telephone instrument, the combination with a plurality of chutes, of means for controlling the passage of a toll-piece into a predetermined one of said chutes, a plurality of magnets for actuating said means, a local circuit at the instrument for energizing one of said magnets, a controller for said circuit operated by the telephone-receiver support, a second controller for said circuit operated by the toll-piece, an independent circuit for energizing the other of said magnets, and means for controlling said independent circuit, substantially as described.

8. In a telephone instrument, the combination with a plurality of chutes, of means for controlling the passage of a toll-piece into a predetermined one of said chutes, a plurality of magnets for actuating said means, a local circuit at the instrument for energizing one of said magnets, contacts in said circuit adapted to be closed by the telephone-receiver when engaging its support, other contacts in said circuit adapted to be closed by the toll-piece, and means for energizing the other of said magnets, substantially as described.

9. In combination with an apparatus of the character described having an opening adapted to receive a toll-piece, of electrically-actuated means for transferring the toll-piece to a freely-accessible position, and means local to the apparatus for energizing the said electrically-actuated means.

10. In combination with an apparatus having an opening adapted to receive a toll-piece, of electrically-actuated means for transferring the toll-piece to a freely-accessible position, means located at the apparatus for controlling the said electrically-actuated means, and other means for transferring the toll-piece to a position inaccessible to the public, substantially as described.

11. In combination with a telephone instrument adapted to receive a toll-piece, of electrically-actuated means for transferring the toll-piece to a freely-accessible position, a circuit actuating said electrical means, and contacts for closing said circuit operated by the telephone-receiver support, substantially as described.

12. In combination with a telephone instrument adapted to receive a toll-piece, of electrically-actuated means for transferring the toll-piece to a freely-accessible position, a circuit including said electrical means normally closed by the telephone-receiver engaging its support, and a controller in said circuit adapted to be operated by the toll-piece to completely close said circuit and thereby actuate said electrical means, substantially as described.

13. In combination with a telephone instrument adapted to receive a toll-piece, of electrically-actuated means for transferring the toll-piece to a freely-accessible position, a circuit including said electrical means, a circuit-controller operated by the toll-piece to close said circuit and thereby actuate the electrical means, and means for making and breaking said circuit, substantially as described.

14. In combination with a telephone instrument adapted to receive a toll-piece, of electrically-actuated means for transferring the toll-piece to a freely-accessible position, a circuit including said electrical means, a plurality of circuit-controllers located at said instrument for closing said circuit through both of which the current passes to actuate said electrical means, substantially as described.

15. In a telephone system, the combination with a telephone instrument adapted to receive a toll-piece, of a switch controlling the transfer of the toll-piece to a freely-accessible position or to a position inaccessible to the public, a plurality of magnets for actuating said switch, an independent circuit for energizing each of said magnets, means whereby the user of the telephone may control the circuit energizing the magnet for transferring the toll-piece to a freely-accessible position, and means whereby the operator at central may control the circuit for energizing the magnet to transfer the toll-piece to a position inaccessible to the public, substantially as described.

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

THADDEUS R. LAING.

Witnesses:

CHAS. T. FRANTZ,

J. MERCKENS.