

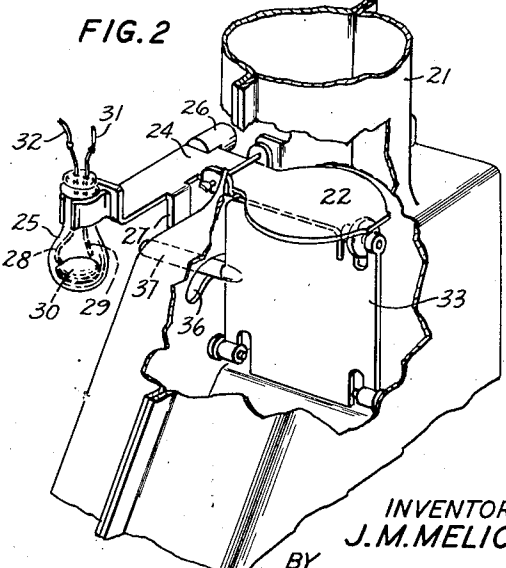
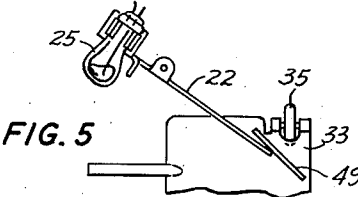
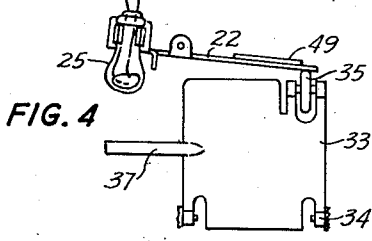
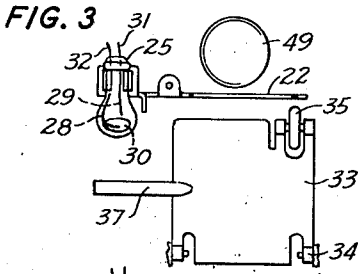
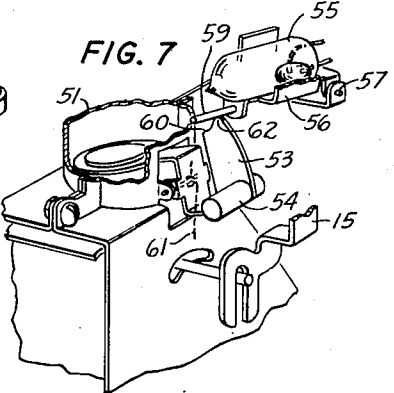
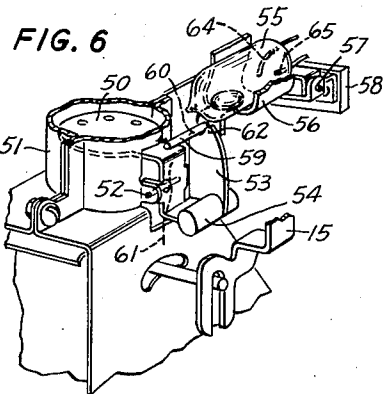
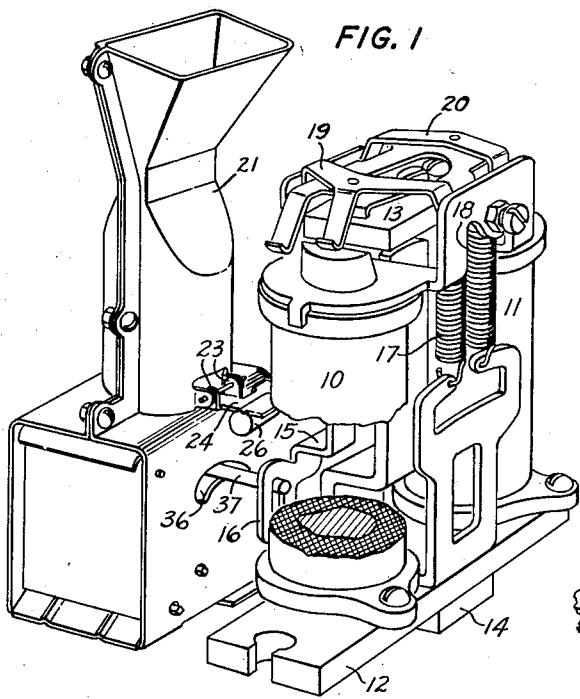
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1,984,536

COIN CONTROLLED APPARATUS

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1,984,536

COIN CONTROLLED APPARATUS

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4 Claims. (Cl. 194-16)

This invention relates to coin controlled apparatus and more particularly to a coin handling and switching mechanism for use in telephone pay stations.

The invention is particularly suitable for use in telephone pay station apparatus of the class shown in United States Patent 1,043,219 to O. F. Forsberg, issued November 5, 1912, in which the deposit of a coin or token is necessary in order that the substation may be able to signal a central office and in which other coins are deposited for the use of a toll connection, said coins being subsequently cashed by the operator if the connection is successfully completed, or returned to the depositor if the said connection is not obtained. In apparatus of this type the deposit of the coin before dropping through a trap door is usually caused to operate a trigger to close contacts forming a line switch to allow an associated electromagnet to be controlled when desired by the distant telephone operator for the purpose of collecting or refunding the coins. Since such a trigger must of necessity be capable of being operated by an exceedingly light coin it follows that the line switch contacts have heretofore been delicate in nature and hence have required careful supervision and maintenance. It is also customary that the operation of this relay automatically opens the line contacts and prevents the operator from having subsequent control over the deposited coin. It sometimes happens that the operator does not keep the circuit closed for a time sufficient to allow the coins to be removed from the trap. However, even a momentary closing of this circuit operates the relay and breaks the line connection so that the operator may at times have no means of knowing whether any coins or tokens remain in the trap.

An object of this invention is to provide a coin collector with coin control and switching means which are under the control of a distant operator until the deposited coins have been cashed or returned.

Another object of this invention is to provide an improved circuit closing means for coin controlled apparatus, more particularly to provide a telephone coin collector with a coin operated switching mechanism of high efficiency and long life and yet quite sensitive in its response to light weight coins.

Another object of this invention is to provide a coin collector device having electrical contacts closed by a deposited coin to enable a distant

operator to control the collection or refunding of the deposited coin, the subsequent opening of said contacts being solely under the control of said coin and opened only after the coin has been actually refunded or collected.

In accordance with the preferred embodiment of this invention the coin chute of the substation equipment is provided with a pivoted trap door and the deposit of a coin on the door causes its downward movement to actuate means for closing a contact to place the coin collection or refunding under the control of the distant operator, the said means being such that the said contact will remain closed until the weight of the coin has been removed from the trap door, for example due to the distant operator energizing means to permit the coin to slide off the trap into a coin box or refund tray. The preferred contact device operated by the trap door or its equivalent comprises a mercury switch which may be mounted on an external arm of the trap door, the door and the mercury switch being so balanced that in the absence of a coin on the trap the contacts within the mercury switch will be open. The deposit of a coin, however, will create an unbalance which will lower the trap, thereby tilting the mercury switch until the resulting flow of the mercury makes the desired electrical connection, which connection will be positively maintained independent of the remote telephone operator until the weight of the coin on the trap has been removed.

This invention will be better understood by reference to the following detailed description taken in connection with the accompanying drawing in which

Fig. 1 is a perspective view partly in section of an electromagnetically operated coin handling mechanism embodying the invention;

Fig. 2 is a fragmentary view of the device of Fig. 1 viewed from a different position;

Fig. 3 shows a coin trap and a mercury switch for a coin chute in their normal positions.

Fig. 4 shows the position of the coin trap and the mercury switch after a coin has been deposited and before it has been released by the electromagnet;

Fig. 5 shows the position of the apparatus of Fig. 4 after the electromagnet has been operated to release the deposited coin or coins;

Fig. 6 is a perspective view partly in section of an alternative form of the invention; and

Fig. 7 shows the device of Fig. 6 in an operated position.

The electromagnetic coin control device of Figs. 1 and 2 is similar in many respects to that described in United States Patent No. 1,117,485 of November 17, 1914 to O. F. Forsberg or that described in the United States Patent No. 1,938,698 to F. A. Hoyt, issued December 12, 1933 to which reference is made for a more detailed description. The electromagnetic device consists in general of a polarized electromagnet having two coils 10 and 11, each supported at one end on a yoke 12, an armature 13 pivotally supported at its center between the poles of the opposite ends of the coils 10 and 11, and a permanent magnet 14 supported on the yoke 12 for polarizing the armature and the electromagnet. Associated for movement with the armature 13 is a lever 15 having a forked end 16. Springs 17 and 18 cooperate respectively with the members 19 and 20 to separately act upon the armature 13 to return it to its normal position as shown in Fig. 1 depending upon the direction of the previous displacement of the armature.

In the associated coin chute 21 (Fig. 2), is a trap door 22 pivotally supported on externally projecting lugs 23. Supported on an outwardly extending arm 24 of the trap 22 and on the opposite side of the pivots from the chute 21 is a mercury switch 25 and a counter-weight 26. Under normal conditions, that is in the absence of a deposited coin, the counter-weight 26 and bulb 25 are sufficient to overbalance the trap 22 slightly, causing a stop 27 to rest against the wall of the coin chute. Under these normal conditions the trap door 22 should preferably be in practically a horizontal position instead of being tilted upwardly as in former devices. This counteracts the tendency of a deposited coin to come to rest on that part of the trap 22 adjacent its pivoted point.

The bulb 25 contains two separated terminals 28 and 29, terminal 28 being designed to contact with the mercury 30 for all positions of bulb 25, while terminal 29 is immersed in the mercury only when the bulb 25 is tilted. Therefore under the conditions assumed for Fig. 2 there is no electrical connection between terminals 28, 29. Wires 31, 32 when joined by the connection made within bulb 25 are intended for connection to a circuit for signaling the distant operator of the deposit of a coin and for placing the electromagnet 10, 11 under the control of the said operator.

In the coin chute 21 below the trap 22 is a vertical vane 33 pivoted near its lower edge 34, the line of its pivots being at right angles to the line of the pivots 23 of the trap. In the absence of a deposited coin and with trap 22 in a horizontal position the trap lies above the upper edge of vane 33 and its roller 35 and out of contact therewith. Projecting through an arcuate opening 36 in the wall of coin chute 21 and attached to the vane 33 is a stud 37 engaging the forked end 16 of the lever 11.

The operation of the invention in connection with the electromagnetic device is as follows:

When a suitable coin 49 is dropped in chute 21 and falls on trap 22, the weight of the coin is sufficient as shown in Fig. 4 to tilt the trap downwardly to cause it to ride the roller 35, the distance the trap is dropped by the coin being designed to be sufficient to cause the resulting tilting of the bulb 25 to shift the mercury to make contact between terminals 28, 29 to cause the distant operator to be signaled in an appropriate manner and also to place the electro-

magnet 10, 11 under the control of the central office by suitable connections over the telephone line, not shown. After conversation with the depositor the operator may then press the usual control key to energize the electromagnet 10, 11 and cause the armature 13 to move either clockwise or counter-clockwise to operate the lever 15 to move vane 33 either to the right or left depending on whether the coin is to be returned or collected. This deflection of vane 33 will swing its upper end far enough over in one direction or the other to release trap 22 and allow it to tilt still farther downwardly under the weight of the coin as shown in Fig. 5, whereupon the coin will readily slide off the trap and be collected or refunded. Attention is called to the important feature that the arrangement of the mercury switch 25 is such that the contact between terminals 28, 29 is still maintained while the trap door 22 is in the position shown in Fig. 5 and the said contact will remain closed until the trap door has lost its coin load and has been returned to its normal position as in Fig. 3. This retention of the contact in the mercury switch insures that the distant operator retains control over the electromagnet 10, 11 until the trap door has returned to the position of Fig. 3. If the coin fails to slip off the trap 22, the first time the operator energizes electromagnet 10, 11, the operator will be able to energize the electromagnet a second time or until the desired collection or refund has been achieved. The mercury switch 25 is solely under the control of the deposited coin both for opening the contacts and for closing the contacts 28, 29. Prior suggestions have involved the feature of having the line contacts opened by the cessation of the line current used to energize the electromagnet such as 10, 11.

While a mercury switch has been disclosed in Figs. 1 to 5 other forms of switches under the control of a deposited coin both for opening and closing operations may be employed if desired. It is also to be understood that the bulb 25 may contain a conducting liquid other than mercury such as a suitable chemical solution. The mercury switch, however, is preferred because of the ease with which a positive opening or closing of the circuit is obtained. When contact springs actuated by mechanical pressure are employed, some difficulty has been experienced in securing sufficient pressure from the fall of a deposited coin to make a satisfactory contact.

Another advantage in the use of a mercury switch instead of contact springs is in less rigid operating requirements for the electromagnet such as magnet 10, 11. In prior designs employing contact springs to place the electromagnet under the control of the central office operator, a specific release requirement is necessary which is not required when this invention is employed.

A modification of this invention is disclosed in Figs. 6 and 7 where a mercury switch is also employed, but in these two figures the switch is actuated by a cam under the control of the trap door. The trap door 50 in the coin chute 51 is pivoted at the point 52 and is continued external to the chute in the form of an upwardly extending cam 53 and a balancing weight 54. A mercury switch 55 is mounted on a carriage 56 pivoted at or near one end at the point 57 to a rigid support 58 suitably attached to the coin chute wall. In the absence of a deposited coin, a pin or roller 59 extending from the carriage 56

rests on the surface 60 of the cam 53. The pin 59 is preferably located directly above the trap door pivot, both being in approximately the same vertical plane. The weight of the carriage 56 and bulb 55 therefore has little effect on the trap door balance. The balancing weight 54 is preferably designed so that, in the absence of a deposited coin and neglecting for the moment the spring 61, the trap door is in a balanced state, that is, not biased either for clockwise or counter-clockwise movement. The proper clockwise bias for the trap may be supplied by the spring 61 coiled around the pivot pin and pressing on the trap tending to operate it in a clockwise direction. A suitable stop may be provided to hold the trap in a substantially horizontal position in the absence of a deposited coin, as shown in Fig. 6. When a coin has been deposited the coin will move the trap downwardly causing cam 53 to move in a counter-clockwise direction and therefore causing pin 59 to ride the shoulder 62 of cam 53, at which time the downward movement of the trap 50 is temporarily halted by a vane such as vane 33 of Fig. 2. When the arm 15 (Fig. 7) is actuated by the electromagnet to deflect the vane, as in Fig. 1, the downward tilting of the trap is continued under the weight of the coin and the continued counter-clockwise movement of cam 53 still keeps pin 59 in the same elevated position as shown in Fig. 7.

The shape of the bulb 55 and the location of the terminals 64, 65 therein are such that in the position of the bulb 55, shown in Fig. 6, the mercury does not connect the two terminals, but when the bulb is tilted due to pin 59 being lifted by cam 53, as in Fig. 7, both terminals 64, 65 become immersed in the mercury thereby signaling the central office operator of the deposit of a coin and placing its collection or refund under her control. When the coin slides off the trap 50, the spring 61 supplies the restoring force to bring trap 50 back to its normal position and bulb 55 to a horizontal position for open contacts, as shown in Fig. 6. Except for the details given above, the apparatus of Figs. 6 and 7 is intended to operate in a similar fashion to that of Fig. 1. The arrangement of Figs. 6 and 7 is also one in which the opening of the line switch and the closing of the line switch are under the control of the deposited coin.

While in the above described forms of the invention the coin control of the line switch is obtained through a pivoted trap door, it is to be understood that it is within the scope of this invention to provide other means within the coin chute responsive to a deposited coin for opening or closing the line switch such as the mercury switch. The manner of connecting the mercury switch and the electromagnet with the central office has not been disclosed as it will be obvious to those skilled in the art and can be readily as-

certained by reference, for example, to the U. S. patents to O. F. Forsberg previously mentioned.

While this invention has been specifically described as a coin collector for a manual telephone system, it will be apparent that it is equally applicable, for example, to dial switching telephone systems or to other types of equipment other than telephony employing coin controlled apparatus.

What is claimed is:

1. Coin controlled apparatus comprising a coin chute, a coin trap in said chute, a member in said chute for arresting the movement of said trap upon receipt of a deposited coin, a mercury switch responsive to the movement of said trap due to a deposited coin for closing the switch contacts, an electromagnet energized after the closure of said contacts for actuating said member to allow said trap to drop, said contacts being broken upon return of said trap to its normal position.

2. Coin controlled apparatus comprising a coin chute, a coin trap in said chute, a vane in said chute for arresting the movement of said trap upon receipt of a deposited coin, a mercury switch tilted by the movement of said trap to close its electrical contacts, an electromagnet energized after the closure of said contacts for deflecting said member to allow a further downward movement of said trap whereby the deposited coin is removed from said trap by gravity, said contacts of said switch being reopened independently of said electromagnet and only when said trap has resumed its normal position.

3. Coin controlled apparatus comprising a coin chute, a coin trap in said chute, means for arresting the movement of said trap upon the receipt of a deposited coin, a vessel containing spaced electrical terminals and electrical conducting liquid out of contact at times with at least one of said terminals, said vessel being responsive to the movement of said trap due to the deposited coin for causing said liquid to connect said terminals, and means energized after the connection of said terminals for actuating said first means to allow a further movement of said trap, the connection between said terminals being broken upon return of said trap to its normal position.

4. Coin controlled apparatus comprising a coin chute, a pivoted member having an arm extending into said chute, means for arresting the movement of said arm upon receipt of a deposited coin on said arm, a mercury switch responsive to the said movement of said arm to close its electrical contacts, and means energized only during the closure of said contacts for rendering said first means ineffective to prevent a further movement of said arm.

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