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2,329,283

CONTACT SPRING PILE-UP FOR COIN COLLECTOR TELEPHONES

Filed Dec. 20, 1940

2 Sheets-Sheet 1

FIG. 1

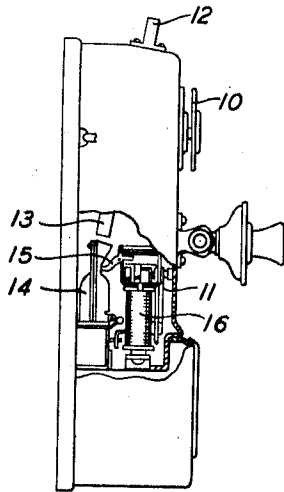


FIG. 2

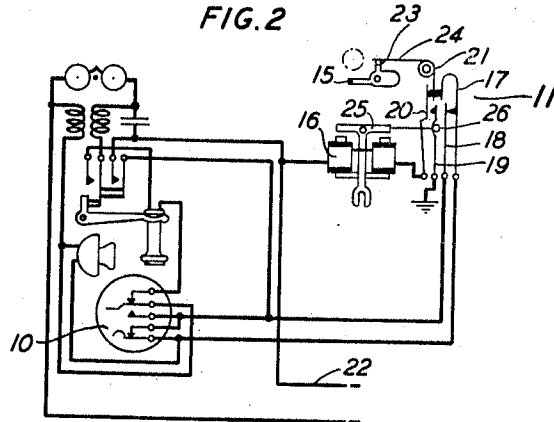


FIG. 3C

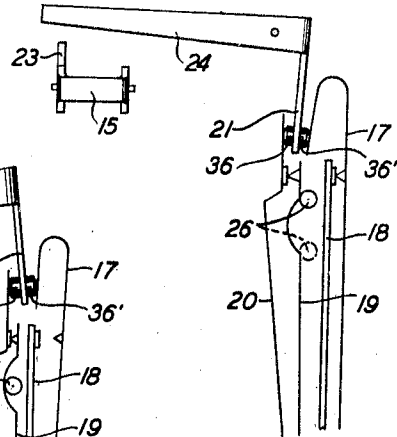


FIG. 3B

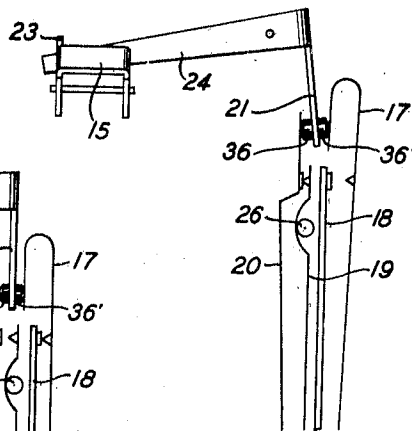
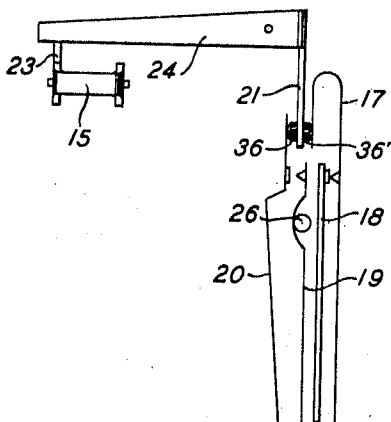


FIG. 3A



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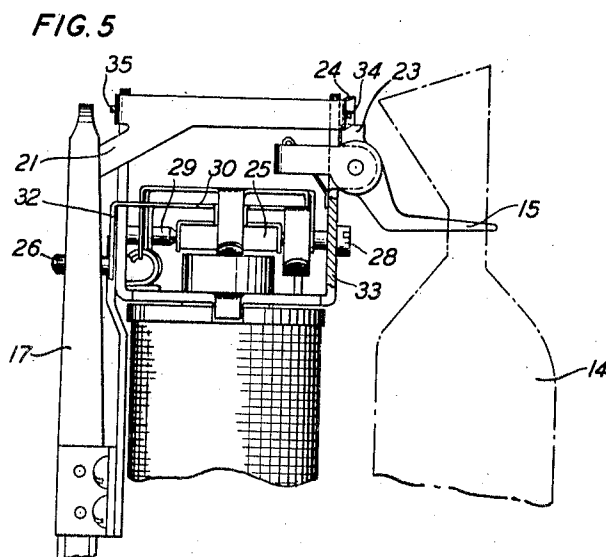
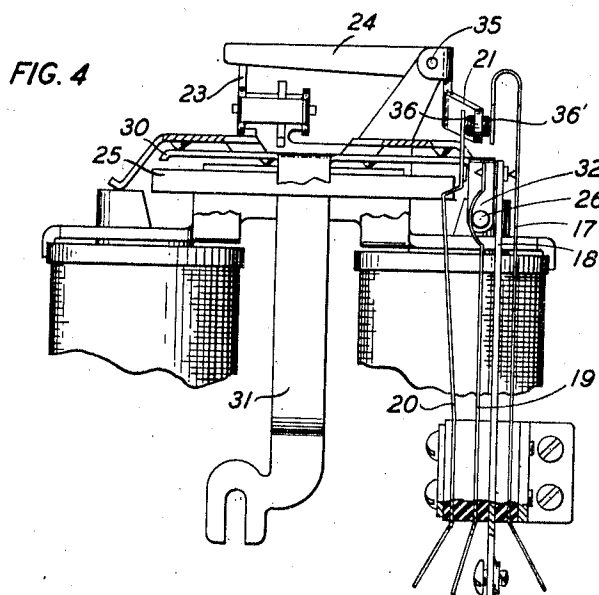
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2 Sheets-Sheet 2



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CONTACT SPRING PILE-UP FOR COIN
COLLECTOR TELEPHONES

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Application December 20, 1940, Serial No. 370,973

3 Claims. (Cl. 179—6.3)

This invention relates to coin collector telephones which are equipped with dial apparatus and more particularly to a switch arrangement therefor whereby fraudulent calls are prevented and legitimate calls are expedited.

In prepay coin collector telephones equipped with dials it has been found that under certain circumstances fraudulent attempts are occasionally made to dial a desired number without the deposit of a coin to pay for the call. To prevent such operation switch arrangements have been incorporated in the sets to maintain a short circuit across the dial pulsing contacts, which short circuit is opened upon the deposit of a proper coin.

Upon the completion of a call it is necessary to reestablish the short circuit and this function is performed by the coin collect relay. It is well known to those skilled in the art that the margin of operation of the usual coin relay is not large, that is, a diminution of operating voltage by a small amount or too great an amount of work to be done by the relay armature will prevent the armature from properly operating. When the relay armature is not operated the deposited coins are not properly disposed of, the connection to the central office remains connected to ground and the short circuit across the dial pulsing contacts is not reestablished. The addition of extra contacts for dial shorting puts an extra load on the relay and thereby tends to reduce its operating margin.

This invention has as an object a reduction of the work required by the coin collect relay.

A closely related object is a contact spring pile-up operable in one direction by the coin collect relay in which the contact springs are so tensioned as to be readily operated.

Another object is a contact spring pile-up comprising two pairs of contact springs, and which requires no extra spring members for tensioning or restraining purposes.

The invention and the manner in which the various objects are attained will be understood from the following description together with the attached drawings forming a part thereof and in which,

Fig. 1 is a side elevation of a partially cut-away coin collect telephone equipped with dialing apparatus;

Fig. 2 is a circuit schematic illustrating the function of the contact springs;

Figs. 3A, 3B and 3C show three positions of the contact springs illustrating different phases of operation;

Fig. 4 is a front view of the upper part of the coin collect relay showing the relation between the relay armature and associated mechanism and the new contact spring pile-up; and

Fig. 5 is a side view of the upper part of the coin collect relay and apparatus showing the relation between the coin trigger, trigger arm and new contact spring pile-up.

There is shown in Fig. 1 a telephone coin collector of the general type disclosed in the O. F. Forsberg United States Patent 1,043,219, issued November 5, 1912, to which reference may be had for a detailed description of its manner of operation. The collector of the present invention may be assumed to be essentially the same as that disclosed by Forsberg except that the present collector is equipped with a dialing device 10 and a contact spring pile-up 11 arranged to control two circuits instead of only one as in the Forsberg patent.

The telephone device shown is provided with the usual apparatus such as coin gauge 12, coin chute 13 and coin hopper 14 in which the deposited coin is held until final disposition thereof is made. There is also the usual trigger 15 one end of which extends into hopper 14 and which controls the contacts of the contact spring pile-up 11 as explained in the Forsberg patent noted.

Coin collect relay indicated generally at 16 in Figs. 1 and 2 is completely disclosed in the O. F. Forsberg United States Patent 1,117,485 issued November 17, 1914 and reference may be had to that patent for details of construction which are not of particular interest in the present invention. Figs. 4 and 5 show only those parts of relay 16 which are necessary to an understanding of the present invention.

As indicated in Figs. 4 and 5, relay 16 comprises two windings which are connected in series as indicated in Fig. 2. Armature 25 is centrally pivoted by means of trunnion screws 28 and 29 so that it may move either clockwise or counterclockwise about the pivots depending upon the direction of current flow through the windings.

Plate 30, also pivoted in trunnion screws 28 and 29, is adapted to be moved by the armature 25 when it is operated. Plate 30 has a downward extending arm 31 adapted to move other mechanism upon the movement of armature 25 as described in Forsberg Patent 1,117,485. At one end of plate 30 (right end as viewed in Fig. 4) is a forwardly and downwardly extending arm 32 to which roller 26 is attached. Roller 26 is in contact with but exerts no pressure on contact spring 19 of contact spring pile-up 11.

Rear support 33 of the supporting members of trunnion screws 28 and 29 also supports trigger 15. Trigger 15 is provided with a cam portion 23 upon which trigger lever extension 24 normally rests. Trigger lever 21 is a downwardly extending arm of trigger lever extension 24 which latter is pivoted at 34 and 35. Trigger lever 21 is provided with insulating pieces 36, 36' which contact springs 20 and 17 respectively of the pile-up 11.

The contact spring pile-up comprises four contact springs as shown in Figs. 2, 3A, 3B, 3C, 4 and 5. Contact spring 17 is tensioned to press against trigger lever 21 and contact spring 20 is also tensioned to press against trigger lever 21 in a direction opposite to that of spring 17. In the normal unoperated condition of the contact springs, contact is made between springs 17 and 18 and no contact is made between springs 19 and 20. Contact spring 18 is heavier than the other springs and is maintained fixed or rigid. Contact springs 17, 19 and 20 are flexible. Contact spring 17 is reduced in width at its upper loop end to permit most of its tension to be available for contact pressure when in the position shown in Fig. 3A.

As will be seen from Fig. 2, when contact is made between springs 17 and 18 a short circuit is established across the dial pulsing contacts of dial apparatus 10. Spring 19 is connected to ground but since there is no contact between springs 19 and 20 there normally is no ground on line conductor 22 which is connected to spring 20 through the windings of relay 16.

As stated above, contact spring 19 is adjusted to touch roller 25 but to exert substantially no pressure on it.

As described in the previously mentioned Forsberg Patent 1,043,219, a coin deposited in coin gauge 12 traverses certain passages and is discharged from coin chute 13 into hopper 14 at the bottom of which the coin is held temporarily. The coin in passing down hopper 14 strikes trigger 15 moving the end that extends into the hopper downwardly thereby removing cam portion 23 from trigger lever extension 24 permitting trigger lever 21 to take the position indicated in Fig. 3B. In this condition spring 20 moves over to contact with spring 19 thereby connecting line conductor 22 to ground through the winding of relay 16, spring 20 and spring 19. The current flow through the winding of the relay is not sufficient at this time to cause it to operate. Also, trigger lever 21 forces spring 17 out of contact with spring 18, thereby removing the short circuit across the dial pulsing contacts as indicated in Fig. 2. The number desired may then be dialed.

Upon the completion of the call or if the connection to the called subscriber is not made, relay 16 is operated by the central office operator to make a final disposition of the coin. When the relay is operated roller 26, attached to the relay armature moves spring 19 against spring 20 releasing the force of spring 20 from trigger lever 21, thereby permitting the force of spring 17 to move trigger lever 21 causing trigger lever extension 24 to be raised as shown in Fig. 3C. When trigger lever extension 24 is raised, trigger 15 moves back to its unoperated position and cam portion 23 is put in position to support extension 24. When the relay armature returns to its normal unoperated condition roller 26 returns to the position of Fig. 3A as do the contact springs 17, 19 and 20. Spring 18 being rigid is

not moved. Also, trigger lever extension 24 comes to rest on trigger cam 23. It should be noted that armature 25 may move either clockwise or counter-clockwise and regardless of its direction of movement roller 26 actuates spring 19 as indicated in dotted lines in Fig. 3C.

The improved contact spring pile-up is readily seen from Figs. 3A, 3B and 3C. In prior art arrangements there has been a strong spring which performed no circuit function and acted only as a restraining member for certain of the springs. Other springs of the prior art arrangements were of comparatively heavy spring material and were tensioned to exert appreciable force which had to be overcome by the relay when it operated. With the arrangement of the present invention, all the springs in the pile-up perform circuit functions, and for controlling two circuits there are but four springs. As stated above, spring 18 is substantially rigid and is not moved by either the trigger lever or the armature roller. Spring 17 is tensioned to contact with spring 18 but the forces exerted by spring 17 on spring 18 is merely sufficient to assure good electrical contact. The force exerted by spring 17 against trigger lever 21 is sufficient to raise trigger lever extension 24 when the force of spring 20 is removed by the movement of roller 26. The tension of spring 20 is such that when its force is added to the weight of trigger lever extension 24 (upon actuation of trigger 15 by a coin) the force of spring 17 is overcome and the springs assume the positions illustrated in Fig. 3B. The force that must be exerted by the relay in resetting the springs to normal is only that required to overcome the tension of spring 20. This force is substantially smaller than that required in similar arrangements heretofore used in which stiff springs under appreciable tension were required. Hence, the margin of operation of the relay is increased and there is less chance of the relay not operating in the case of less than normal current flow. Further, because of the small forces involved, adjustment of the springs is facilitated and the adjustment is maintained stable.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention and the present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the depending claims are intended to be embraced therein.

What is claimed is:

1. A coin collector telephone comprising a coin collecting relay, a coin trigger adapted to be actuated by a deposited coin, a pivoted lever controlled by said trigger, said lever being unbalanced about its pivot, and a contact spring combination adapted to be operated in one direction by said trigger lever and in the opposite direction by said relay, said contact spring combination comprising four contact springs arranged in two pairs, one of said pairs comprising an inner rigid spring and an outer flexible spring, said outer flexible spring arranged to exert a force on said trigger lever sufficient to overcome its unbalance.

2. A coin collector telephone comprising a coin collecting relay, a projection on a movable part of said relay, a coin trigger adapted to be actuated by a deposited coin, a pivoted lever controlled by said trigger and a contact spring combination adapted to be operated to a first position by said pivoted trigger lever and to a second position by

said relay, said contact spring combination comprising four contact springs arranged in two pairs, one of said pairs comprising two flexible contact springs, the second of said pairs comprising an inside rigid spring and an outside flexible spring, said pivoted lever in both of said positions of said springs engaging only the two outside flexible springs of said pairs, said projection on the movable part of said relay engaging only the inside flexible spring of said one pair, the outside spring of said one pair contacting its associated inside flexible spring in said first position of said springs whereby said relay when operated moves only said flexible springs of said one pair of springs.

3. A coin collector telephone comprising a coin collecting relay, a coin trigger adapted to be actuated by a deposited coin, a pivoted lever normally restrained by said trigger but released from said restraint by the coin actuation of said trigger, and a contact spring combination adapted to be operated in one direction by said trigger lever and in the opposite direction by said relay, said contact spring combination comprising four electrical contact springs arranged in two pairs, the outside springs of said pairs arranged to exert opposing forces on said trigger lever, the outside spring of one pair being tensioned to aid said trigger lever in overcoming the tension of the outside spring of said other pair upon the release of said lever by the coin actuation of said trigger.

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