June 18, 1940. D. G. BLATTNER 2,204,747

COIN COLLECTOR APPARATUS

Filed Aug. 6, 1938 2 Sheets-Sheet 1

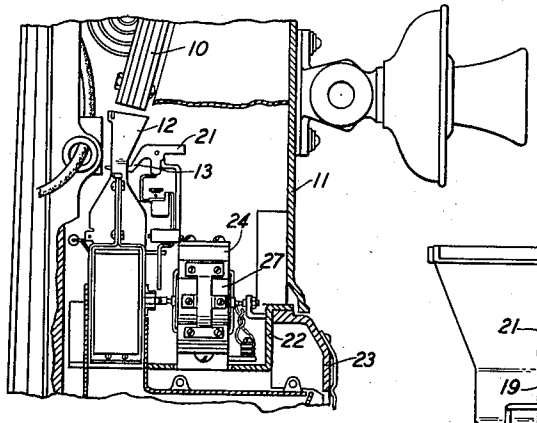


FIG. 1

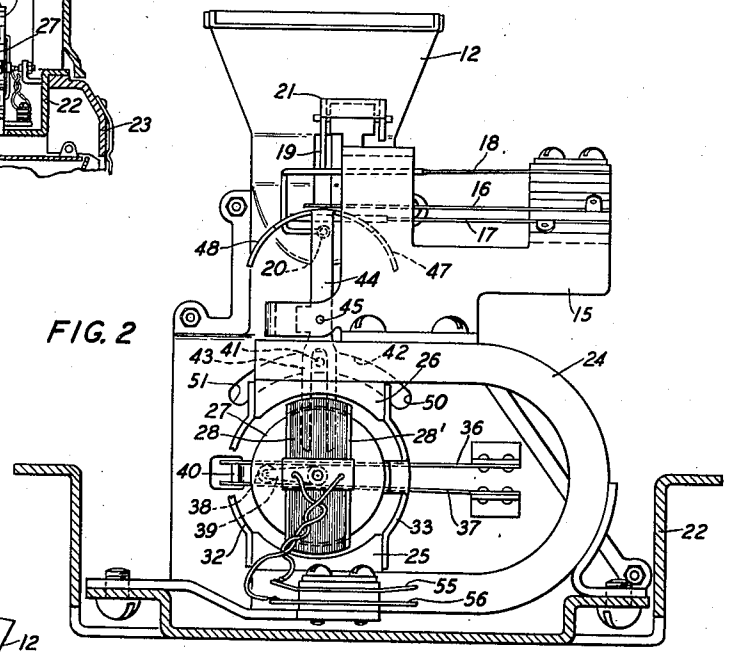


FIG. 2

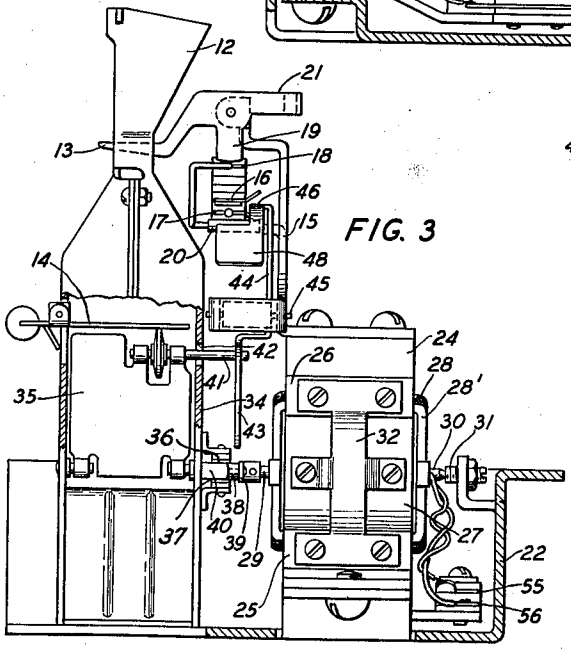


FIG. 3

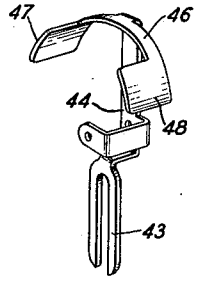


FIG. 4

INVENTOR
D. G. BLATTNER
BY
B. H. Jackson
ATTORNEY

June 18, 1940. D. G. BLATTNER 2,204,747

COIN COLLECTOR APPARATUS

Filed Aug. 6, 1938 2 Sheets-Sheet 2

FIG. 5

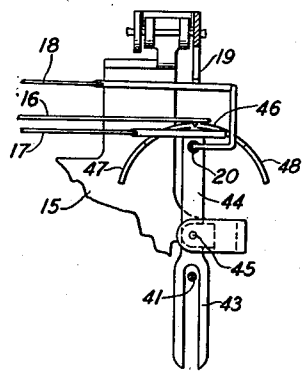


FIG. 6

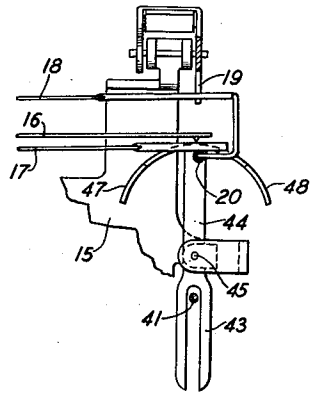


FIG. 7

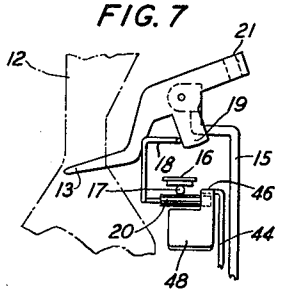


FIG. 8

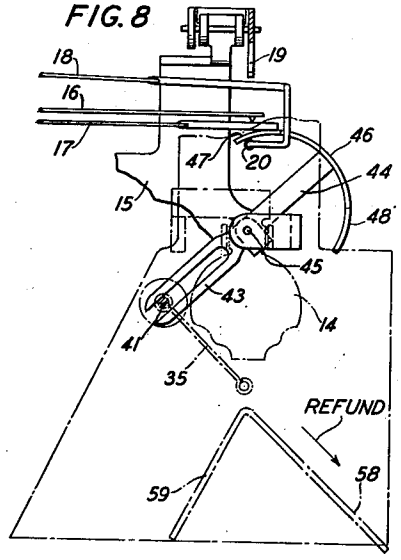


FIG. 9

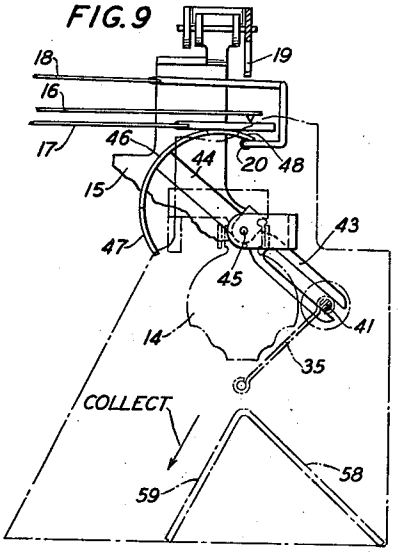
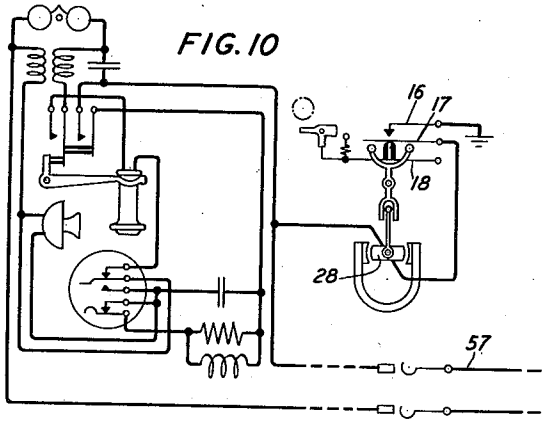


FIG. 10



INVENTOR
D. G. BLATTNER
BY
P. W. Jackson
ATTORNEY

Patented June 18, 1940

2,204,747

UNITED STATES PATENT OFFICE

2,204,747

COIN COLLECTOR APPARATUS

David G. Blattner, Mountain Lakes, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application August 6, 1938, Serial No. 223,401

5 Claims. (Cl. 232—57.5)

This invention relates to coin collector apparatus and more particularly to a moving coil operated coin collector system for telephone pay stations.

The invention is particularly suitable for use in a telephone pay station of the type illustrated in the O. F. Forsberg U. S. Patent 1,043,219, issued November 5, 1912, wherein a deposited coin is temporarily held upon a pivoted coin trap after the coin has actuated a trigger to close electrical contacts for the purpose of signaling the central office and for the additional purpose of establishing an energizing circuit for a coin relay. At the termination of the conversation battery at the central office may be applied to energize the coin relay whereby the actuation of its armature serves to collect the coin if the applied voltage is of one polarity and to refund the coin if the applied voltage is of the opposite polarity. The coin trap upon which the coin is temporarily held may be supported by a pivoted coin vane controlled by the relay to release the trap and direct the coin into the desired collect or refund channel. The operation of the relay also serves to restore the coin trigger to normal thereby reopening the electrical contacts controlled thereby.

An object of this invention is to simplify the construction and cost of manufacture of the coin relay and associated switching mechanism while providing for efficient operation over a wide variation in energizing current and load.

In accordance with the preferred form of this invention the coin relay comprises a coil rotatable in the field of a permanent magnet. A coin trigger when actuated by a deposited coin serves to establish a circuit through this coil whereby the coil is rotated in one direction for an applied voltage of one polarity and rotated in the opposite direction for voltage of the opposite polarity. This coil may be mechanically coupled to the coin vane in the hopper whereby the rotation of the coil serves to deflect the vane and release the coins resting upon the coin trap. The actuation of the coin vane may serve to restore the coin trigger to normal so that the energizing circuit for the rotatable coil will be broken when the rotatable coil is subsequently restored to normal due to the disconnection of the source of voltage from the coil. Certain features of the present invention are described and claimed in my divisional application Serial No. 307,742, filed December 6, 1939, entitled Coin collector apparatus.

Referring to the drawings,

Fig. 1 is a view partly in section of the central portion of a telephone coin collector embodying this invention;

Fig. 2 is an enlarged front view of the coin controlling apparatus of this invention involving a coin relay of the moving coil type;

Fig. 3 is a side view of the apparatus of Fig. 2;

Fig. 4 is a view in perspective of the contact controlling lever employed in the apparatus of Figs. 2 and 3;

Figs. 5 to 9 illustrate how certain electrical contacts of the collector are jointly controlled by coin deposit and by the actuation of the coin relay; and

Fig. 10 is a circuit diagram of a telephone coin collector substation embodying this invention.

Fig. 1 shows only a portion of a telephone coin collector of the general type disclosed in the above-mentioned Forsberg patent to which reference is made for further details as to its general construction and method of operation. A coin deposited by a subscriber after passage through a coin chute 10 within housing 11 drops into a coin hopper 12, actuates a coin trigger 13 and is temporarily retained upon a pivoted coin trap 14. The present invention is concerned with the manner in which the coin actuation of the coin trigger 13 serves to signal the central office that a coin has been deposited, and the invention is also concerned with the apparatus within the coin collector whereby the deposited coin may be collected or refunded depending upon whether the desired connection has been obtained.

Suitably mounted upon a bracket 15 adjacent the coin hopper 12 are a pair of electrical contact springs 16, 17 and an upwardly tensioned biasing spring member 18. The normal position of the three springs 16, 17 and 18 and coin trigger 13 is illustrated in Fig. 5. Contact springs 16, 17 are normally open and the biasing spring 18 is normally restrained from closing these contacts by reason of the fact that spring 18 normally rests against the downwardly extending shoulder 19 of the coin trigger. However, as soon as trigger 13 is coin actuated, causing a counterclockwise movement of the trigger as viewed in Figs. 1 and 3, shoulder 19 is removed from its restraining position and spring 18 is then free to move upwardly causing an insulating roller 20 mounted upon an extension of spring 18 to close the contact springs 16 and 17. In Figs. 6 and 7 the contacts 16 and 17 are shown in closed position due to coin deposit with the coin trigger in its actuated position. Also spring 18 after its upward movement has been completed

occupies a position (Figs. 6 and 7) lying in the path of shoulder 19 and blocking the return of shoulder 19 to its normal position, so that counterweight 21 will be unable to restore coin trigger 13 to normal until spring 18 has again been depressed. As in the Forsberg patent the closing of contacts 16, 17 serves to signal the central office that a connection is desired.

The closure of contacts 16 and 17 also serves to establish an energizing circuit for a coin relay to be utilized in disposing of the deposited coin. Mounted upon a tray 22 suitably supported by the lower housing 23 of the collector is a core 27 of magnetic material positioned between two pole-pieces 25, 26 to which a permanent magnet 24 is attached. In the air-gap between core 27 and the pole-pieces 25, 26 is a coil 28 comprising a plurality of turns of wire wound on a suitable form 28', one side of coil form 28' being rigidly attached to a rotatable shaft 29 while the other side of the coil form 28' has a pin 30 rotatable in a suitable bearing 31. The cylindrical core 27 is supported between the pole-pieces by suitably formed strips of insulating material 32, 33 joining the pole-pieces and the core in such a manner as to not interfere with the rotatable movement of coil 28.

Shaft 29 passes through side wall 34 of the coin hopper and is rigidly fastened to the lower end of the coin vane 35 which normally lies in a vertical position supporting the coin trap 14 (Fig. 3). Since vane 35 and coil 28 are rigidly attached to shaft 29 it will be obvious from Fig. 3 that the clockwise or counter-clockwise movement of coil 28 will cause a similar rotative movement of vane 35. In order to maintain coil 28 and vane 35 in their normal positions a pair of horizontally disposed spring members 36, 37 are mounted on the hopper side wall 34 and their free ends are tensioned against a stop 40. Spaced between the free ends of springs 36, 37 is a roller 38 carried on an arm 39 fastened to shaft 29. Spring members 36, 37 pressing against roller 38 serve to bias vane 35 and coil 28 to their normal positions and also serve to restore vane 35 and coil 28 to their normal positions after they have been subjected to a clockwise or counter-clockwise movement by the connection of a source of voltage to coil 28.

When current of a suitable voltage is applied to coil 28 it is obvious that the coil will rotate clockwise or counter-clockwise depending upon the polarity of the applied voltage and vane 35 in rotating with coil 28 will release coin trap 14 and direct the coins resting thereon either into a refund chute or a collect chute as determined by the direction in which coil 28 is moved.

Vane 35 near its upper free end has a pin 41 projecting through an arcuate slot 42 in the hopper side wall for engagement with the forked end 43 of a lever 44 pivoted about an axis 45. The upper end of lever 44 has an arcuate-shaped extension 46, the ends 47, 48 of which are considerably wider than the center portion thereof as shown in Fig. 4. The arcuate-shaped extension 46 preferably has a radius of curvature substantially less than the distance between portion 46 and axis 45 for a purpose to be explained later. The insulating roller 20 on the horizontal end portion of spring 18 lies directly above axis 45 and extends in a direction away from hopper 12 a distance sufficient that its free end lies beneath arcuate portion 46 but normally not in contact therewith. Contact springs 16 and 17 pass over arm 47 of member 46 and the lower spring 17 extends substantially beyond the center of the arcuate portion 46. Normally, however, springs 16 and 17 do not contact either with arm 47 or arcuate portion 46.

The normal position of lever 44 is shown in Fig. 5. When the coin trigger 13 is actuated by a deposited coin, biasing spring 18 is freed of shoulder 19 and moves upwardly until its roller 20 strikes the under surface of arcuate portion 46 as shown in Figs. 6 and 7; and as previously described, biasing member 18 in moving upwardly carries spring 17 with it to close the electrical contacts carried by springs 16 and 17.

In the movement of lever 44 from its position of Fig. 5 to its actuated position of Fig. 8 due to the application, say, of refund current to coil 28, roller 20 will remain in contact with the under surface of arcuate portion 46 and will consequently cause the lowering of spring member 18 since either end of arcuate portion 46 is closer to the pivoting axis 45 than its central portion. The depression of biasing member 18 caused by the rotating movement of lever 44 to its position of Fig. 8 is sufficient to bring biasing member 18 below the lower end of shoulder 19 and permit coin trigger 13 to be restored to normal due to its counterweight 21. Also, the movement of lever 44 from its position of Fig. 6 to its position of Fig. 8 will cause arm 47 to push against the lower surface of spring 17 and maintain contacts 16, 17 closed as long as lever 44 is in its position of Fig. 8 even though the coin trigger 13 is returned to its normal position. The arrangement described insures that after the actuation of trigger 13 to release biasing spring 18, contacts 16, 17 will remain closed until the removal of central office battery permits coil 28 and lever 44 to return to neutral position.

When the energizing current for coil 28 is disconnected the deflected one of the restoring springs 36, 37 will exert sufficient pressure to bring coil 28 and vane 35 back to their normal positions, thereby restoring trap 14 to its horizontal position and restoring lever 44 to its vertical position whereby contacts 16 and 17 will reopen since arm 47 no longer exerts upward pressure on spring 17 and biasing member 18 is restrained from closing the contacts due to trigger shoulder 19.

The position of lever 44 shown in Fig. 8 is in its maximum clockwise position resulting from the movement of coil 28 and vane 35 until pin 41 strikes end 50 of slot 42, due to the application of refund current to coil 28. With vane 35 in its position shown in Fig. 8 it is obvious that any coins on trap 14 will be discharged into the refund chute 58 from which the coins may be recovered by the user of the instrument.

When collect current is applied to coil 28, coil 28 and vane 35 will rotate in the opposite direction until pin 41 strikes end 51 of slot 52 thereby causing lever 44 to assume a counter-clockwise position as shown in Fig. 9 where arm 48 instead of arm 47 serves to maintain contacts 16, 17 closed as long as lever 44 remains in its actuated position. With vane 35 in the position shown in Fig. 9 it is obvious that any coins lying on trap 14 will be discharged into collect chute 59.

The leads from coil 28 may be taken from points near the coil axis and connected to suitable terminals 55, 56 by means of which coil 28 may be connected into the substation circuit in the proper manner. Fig. 10 shows a standard coin collector

substation circuit modified to include the coin collecting apparatus of this invention. It is obvious from Fig. 10 that when contacts 16, 17 are closed by coin deposit the movable coil 28 will be connected between ground and one side 57 of the telephone line so that the relay will be actuated when apparatus at the central office is operated to apply collect current or refund current to conductor 57.

While in the above description of the relay, member 24 has been described as a permanent magnet, it is obvious that if desired core 27 may be a permanent magnet with members 24, 25 and 26 constituting the return path for the magnetic flux. It will also be obvious that permanent magnet 24 may be replaced if desired by an electromagnet.

What is claimed is:

1. A telephone coin collector comprising a coin hopper, means in said hopper for controlling the disposition of coins deposited in said hopper, means for producing a magnetic potential, a coil adapted to be traversed by an electrical current and mounted in the field of said means for rotative movement in a direction dependent upon the direction of applied current, means for biasing said coil to a normal position, and means coupled to said coil for actuating said controlling means.

2. A telephone coin collector comprising a coin hopper, a coin trap in said hopper for receiving deposited coins, means for producing a magnetic potential, a movable coil, a support for positioning said means within said coil, a support for rotatably supporting said coil on an axis passing through the coil, a return path of magnetic material external to said coil, and means controlled by said coil for controlling said trap.

3. A telephone coin collector comprising a coin hopper, a rotatable shaft, a coin vane in said hopper mounted on said shaft for rotative movement about said shaft as an axis, a coil adapted to be traversed by an electric current, a support for said coil mounted on said shaft, and means for producing a magnetic potential, said coil being positioned in the field of said means whereby said coil, said vane and said shaft are rotatable in a direction dependent upon the direction of the current traversing said coil.

4. A telephone coin collector comprising a coin hopper, a coin trap in said hopper normally held in position to receive deposited coins, a permanent magnet, a coil adapted to be traversed by an electrical current and mounted in the field of said magnet for movement about a fixed axis in a direction dependent upon the direction of the applied current, means for biasing said coil to a normal position, and means coupled to said coil for controlling said trap.

5. A telephone coin collector comprising a coin hopper, a coin trap in said hopper normally held in position to receive deposited coins, a permanent magnet, a coil adapted to be traversed by an electrical current, said coil being mounted in the field of said magnet for rotative movement about a fixed axis passing through said coil whereby said coil is rotated in a direction dependent upon the direction of the applied current, and means coupled to said coil for controlling said trap.

DAVID G. BLATTNER.