May 23, 1933. M. G. ALLISON 1,910,978

COIN COLLECTION APPARATUS

Filed July 11, 1928

FIG. 1.

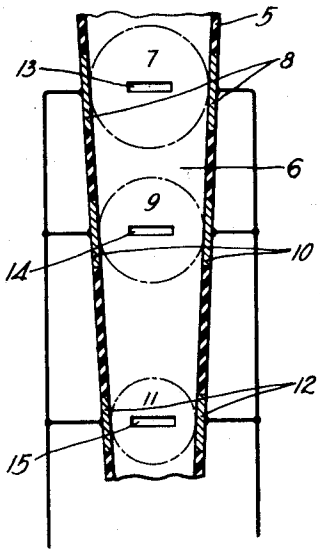


FIG. 2.

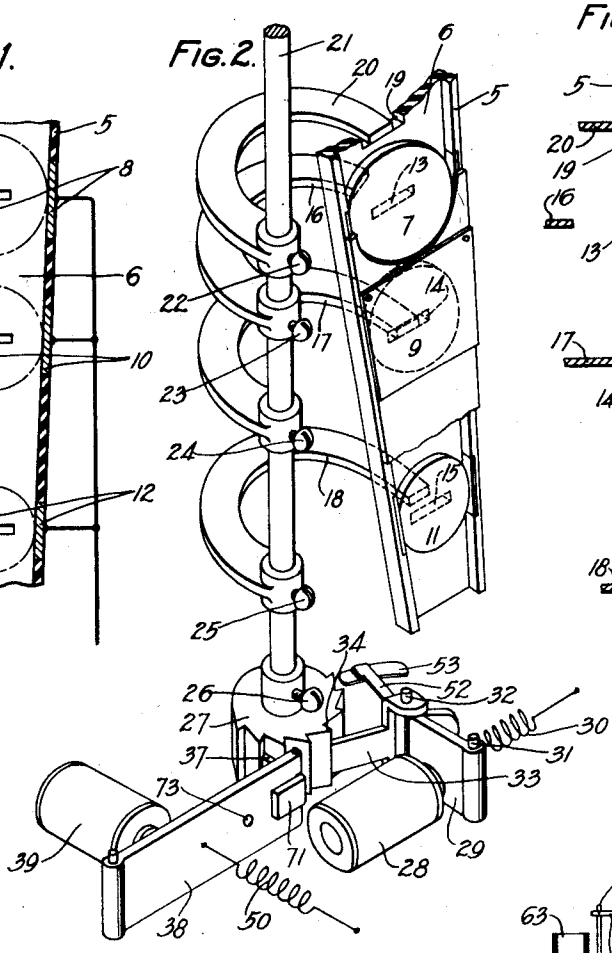


FIG. 3.

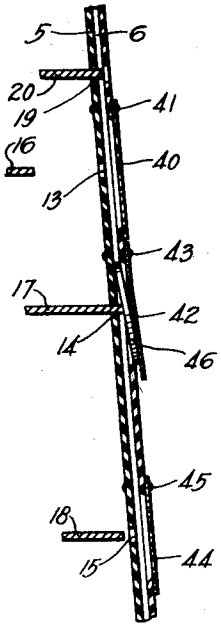
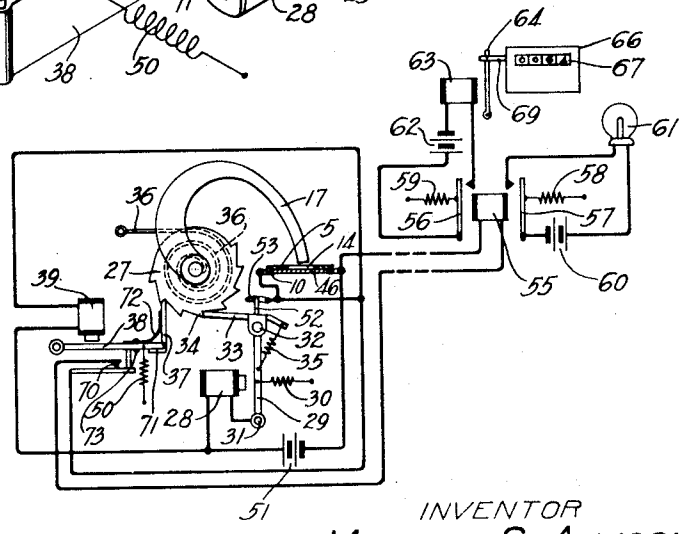


FIG. 4.



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UNITED STATES PATENT OFFICE

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COIN COLLECTION APPARATUS

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This invention relates to coin collection apparatus of the type in which coins are deposited, for the use of an instrument, for the purchase of services or supplies from a vending machine, for the purpose of being counted or for the purpose of obtaining correct change.

More particularly the invention relates to telephone toll apparatus where one or more coins are deposited for the use of a telephone instrument, the deposited coins indicating to a telephone operator the fact that they have been deposited. This type of apparatus is incorporated in what are known as telephone pay stations.

An object of this invention is to collect and register the deposited coins.

Another object of this invention is to record the number and denomination of the deposited coins.

In one embodiment of this invention a coin chute with a single slot for collecting coins of all denominations is provided. The slot is tapered in width so that a coin of each denomination will stop at a location in the slot depending upon its diameter. A pair of contacts for each size of coin which may be deposited is arranged within the slot at the location at which each size of coin would stop. These contacts are arranged on opposite sides of the slot so that each coin will bridge one pair of contacts when it comes to rest in the slot. The bridging of the contacts closes a circuit through the coin and through a stepping magnet which operates to send pulses to a recording mechanism, the number of pulses sent depending upon the denomination of the coin bridging the contact, and after the pulses have been sent to remove the coin from the chute. On removal of the coin from the chute a release mechanism returns the stepping magnet apparatus to its original position where it remains at rest until another coin is deposited.

Referring now to the drawing, Fig. 1 is a schematic view of a tapered chute which may be used in a coin collector according to this invention, showing how the deposited coins of different denominations come to rest in the chute to bridge the contacts.

Fig. 2 is a partial perspective view of the chute with the stepping magnet and the apparatus for removing the coins from the chute.

Fig. 3 is a view in section of the chute and of a portion of the coin removal apparatus.

Fig. 4 is a circuit arrangement showing how the stepping magnet operates to send the coin registering pulses and after the pulses have been sent to remove the coin from the chute.

Referring now to Fig. 1, the chute 5 is arranged so that a deposited coin enters its upper edge and travels by force of gravity along slot 6 towards its lower edge. The slot 6 is tapered in width and is arranged so that a coin of one size, for example, twenty-five cent piece 7, indicated by dotted lines, will come to rest in the slot 6 and bridge the contacts 8. In the same way, a coin of another size, for example, a five cent piece 9, indicated by dotted lines, will bridge contacts 10 and a coin of still another size, for example, a ten cent piece 11, indicated by dotted lines, will bridge the contacts 12. Openings 13, 14 and 15 in the chute 5 are provided in order that the punch-out arms or levers 16, 17, 18 (shown by Figs. 2 and 3) of the coin removal apparatus may remove the twenty-five cent, the five cent and the ten cent coins respectively from the slot 6 when the counting pulses have been sent to the central office operator. Opening 19, shown in Figs. 2 and 3, is arranged in the chute 6 above the twenty-five cent coin contacts 8 and cooperates with stop-arm or lever 20 which serves to block the chute 6 and prevent more than one coin at a time from entering the chute. The arms 20, 16, 17 and 18 are attached to shaft 21 by means of screws 22, 23, 24 and 25 respectively. Secured to the lower portion of the shaft 21 by means of screw 26 is the toothed wheel 27. The wheel 27 and the shaft 21 are rotated through the agency of the magnet 28 which when energized attracts its armature 29 against the pull of the spring 30. The armature 29 is pivoted at 31 and has pivotally

attached at 32 the escapement pawl 33 which when the armature 29 is attracted to the magnet 28, engages with one of the teeth 34 of the wheel 27 causing it to rotate from its starting position. The pawl 33 is held against the wheel 27 by means of the spring 35 as shown in Fig. 4. The wheel 27 is rotated in a clockwise direction by the pawl 33 against the pressure of the spring 36, shown in Fig. 4. The magnet 28 during the operation of the device may be energized several times in succession to cause the pawl 33 to advance the wheel 27 the width of several teeth. To prevent the wheel 27 from returning in a counter clockwise direction under the influence of the spring 36 between strokes of the pawl 33, the holding pawl 37 is held against the teeth of the wheel 27 under the influence of the magnet 39, to the armature 38 of which it is pivotally attached. The holding pawl 37 has a portion 71 at its pivoted end turned at right angles which contacts with the armature 38 when the holding pawl is held against a tooth of the wheel 27. This portion 71 of the pawl 37 prevents the pivoted pawl 37 from turning in a clockwise direction when the wheel 27 tends to rotate towards its starting position under the influence of the spring 36 between the strokes of the escapement pawl 33. The spring 72, shown in Fig. 4, which is attached at one end to the armature 38 by the rivet 73 and bears at its other end against the holding pawl 37, serves to keep the pawl 37 against the teeth of the wheel 27. When the wheel 27 is rotating in a clockwise direction the pawl 37 rides over the advancing teeth of the wheel 27 but prevents the return movement of the wheel as long as the magnet 39 is energized. The magnet 39 is energized during the pulsing operation of the device and holds the holding pawl 37 through the armature 38 against the teeth of the wheel 27 permitting the wheel to rotate in a clockwise direction under the action of the pawl 33 but preventing the return of the wheel 27 in a counter clockwise direction under the influence of the spring 36. When the magnet 39 is deenergized the spring 50 removes the holding pawl 37 from contact with the teeth of the wheel 27 thus permitting the spring 36 to return the wheel 27 to its starting position.

Flexible covers 40, 42 and 44 which are attached in any suitable manner to the chute 5 at points 41, 43 and 45 respectively cover the face of the slot and prevent the coins from falling out of the chute. These covers may be made of leather, rubber or other suitable material and are adapted to hold a deposited coin within the slot 6 until the time that the proper punch-out arm pushes the coin from the slot at which time the cover is displaced sufficiently by the coin to permit the coin to be removed from the slot. In Fig. 3, the arm 17, a five cent coin 46 and the cover 42 are shown displaced from their normal positions.

The remainder of the apparatus shown by Fig. 4 will be described in the following explanation of the operation of the device. Referring to Fig. 4, suppose for example that a five cent coin 46 has been deposited in the proper manner and comes to rest in the chute 5 (shown in section) bridging the contacts 10. The bridging of the contacts 10 closes a circuit from the contacts 10, through battery 51, stepping magnet 28, armature 29, brush 52, which may be attached in any suitable manner to the unpivoted end of the armature 29 and travels with it, commutator 53 and thence to the contacts 10 causing the magnet 28 to become energized attracting the armature 29. The escapement pawl 33 carried by the armature 29 engages tooth 34 of the wheel 27 and rotates the wheel against the tension of the spring 36. The brush 52 slides over the commutator 53 and through their contact, energizing current is supplied to the magnet until the pawl 33 reaches the end of its stroke at which time the brush 52 slides off one end of the commutator 53 thus breaking the energizing circuit of the magnet 28. At this point the magnet 28 is deenergized and the spring 30 draws the armature 29 back to its original position with the brush 52 again on the commutator 53 and the pawl 33 is ready for another stroke. In the meantime however the movement of the wheel 27 has caused, through shaft 21, the punch-out arm 17 to travel through opening 14 in chute 5 forcing the coin 46 from the slot thus removing the coin from across the contacts 10 and breaking the energizing circuit of the magnet 28 so that the pawl 33 does not make another stroke. While the coin was in the chute 5 and bridging the contacts 10, another circuit was closed from the contacts 10, battery 51 and magnet 39 thus energizing magnet 39 causing it to attract its armature 38 to place the holding pawl 37 against the teeth of wheel 27 thus preventing the backward or counter clockwise motion of the wheel 27 under the influence of the spring 36. When the coin has been removed from the chute 5 by the action of the punch-out arm 17 the circuit of the magnet 39 is broken and the magnet 39 is deenergized permitting the spring 50 to withdraw the holding pawl 37 from contact with the wheel 27 thus permitting the spring 36 to return the wheel 27 and the punch-out arm 17 to its starting position. The length of the punch-out arm 17 with respect to its position with regard to the chute 5 is such that one stroke of the pawl 33 is sufficient to remove a five cent coin from the chute. The length of the arm 18 which is adapted to remove a ten cent coin

from the chute is such that two strokes of the pawl 33 are required to remove the coin. The length of the arm 16 which is adapted to remove a twenty-five cent coin from the chute is such that five strokes of the pawl 33 are required to remove the coin from the chute.

At another point or central station apparatus may be provided for registering the number of strokes made by the escapement pawl 33 since these strokes serve to indicate the denomination of a deposited coin. This apparatus consists of a relay 55 which is actuated in connection with the stepping magnet 28 so that for every stroke made by the pawl 33 the relay 55 is caused to operate. The relay 55 is provided with two armatures 56 and 57. Upon operation of the relay, the armature 57 closes a circuit through the battery 60 and the lamp 61 thus lighting the lamp which serves as a visual indicator to the operator. Upon deenergization of the relay the spring 58 retracts the armature 57 and the lamp 61 is extinguished. The armature 56 upon operation of the relay 55 also closes a circuit through battery 62 and the winding of a magnet 63 which is energized to attract its armature 64. Attached to the armature 64 is a connecting rod 69 which operates the register 66. The register 66 is provided with a scale 67 which serves to record the number of movements of the escapement pawl 33 and thereby the amount of money deposited. The energizing circuit of the relay 55 is interrupted at each stroke of the pawl 33 by the brush 52 leaving the commutator 53 on each stroke of the pawl. The contacts 70 are opened by the movement of the armature 38 when the magnet 39 is deenergized. These contacts 70 are in the circuit of the relay 55 and serve to prevent the relay from being energized when there is no coin in the chute 5. The circuit of the relay 55 may be traced from the relay 55, through the contacts 70, to commutator 53 and brush 52, armature 29 of the magnet 28, through magnet 28 and thence through battery 51 to the relay 55.

At each stroke of the pawl 33, the relay 55 is energized to actuate the indicating and recording apparatus at the distant point. When a coin enters the chute 5 and bridges the contacts, the magnet 39 is energized and pulls up its armature permitting the closing of the contacts 70. The magnet 28 is also energized and attracts its armature 29 thus starting the pawl 33 on its first stroke. Until the pawl completes its stroke, the relay 55 is energized causing its associated signaling and recording apparatus to function. At the end of each stroke of the pawl 33 the circuit of the relay 55 is broken due to the brush 52 leaving the commutator 53 and the signaling apparatus at the central station ceases to function until the relay circuit is again closed by the return stroke of the escapement pawl. When the coin is removed from the chute by the proper punch-out arm the magnet 39 is deenergized and the spring 50 causes the armature 38 to open the contacts 70 which control the circuit of the relay 55 which then does not again become energized until another coin bridges a set of contacts.

When a twenty-five cent coin, for example, enters the chute it remains there until the pawl 33 makes five strokes, the fifth stroke bringing the punch-out arm 16 in position so that it removes the coin from the chute. The punch-out arm moves towards the coin against the tension of spring 36 and is prevented from returning under the influence of this spring at the end of each stroke by the holding pawl 37 engaging the teeth of the wheel 27. When the coin is removed from the chute the energizing circuits of the magnets 39 and 28 are broken and the spring 36 returns the wheel 27 and the punch-out arms to their starting position. In the same way a deposited ten cent coin would require two strokes of the pawl to remove the coin from the chute.

The invention has been described in connection with the coin collection apparatus of a telephone system but it should be understood that the invention is not limited to such uses or it may be used in any apparatus requiring the handling of coins.

What is claimed is:

1. Coin apparatus comprising a coin chute, selective means in said coin chute to block the passage of deposited coins of different denominations, said selective means consisting of several pairs of electrical contacts rigidly mounted in said chute, said pairs of contacts adapted to be closed by said blocked coins, an impulse sending means operated by the closing of said contacts to send impulses denoting the denomination of the deposited coins, means for ejecting said coins from said chute, and means to return said ejecting means to normal position.

2. Coin collection apparatus comprising a coin chute for receiving coins of different denominations, a plurality of fixed electrical contacts to be closed by coins deposited in said chute, said contacts determining the length of travel of the deposited coin in said chute depending upon its denomination, electromagnetic means actuated by the closing of said contacts, a plurality of levers; means operated by said electromagnetic means to operate said levers to selectively remove the coins from said chute and means controlled by the removal of said coin to restore said levers to their starting position.

3. In combination, a coin chute, selective means in said coin chute to determine the

length of travel of a deposited coin therein, and means cooperating with said selective means to eject said deposited coin from said coin chute, said ejecting means comprising a shaft, movable arms and a toothed wheel mounted on said shaft, said arms being adapted to enter openings in said coin chute adjacent said selective means, means to rotate said shaft by steps, said means comprising a magnet, a pivoted armature in operative relation with said magnet, a pawl pivoted on said pivoted armature and associated with said toothed wheel, and means to return said ejecting means to normal position.

4. Coin collection apparatus comprising a coin chute, selective means in said coin chute to determine the length of travel of a deposited coin therein, remote means for indicating the denomination of the coin stopped by said selective means, means for ejecting said coin from said chute, said indicating means and said ejecting means being actuated in response to the engagement of a coin with said selective means, said ejecting means comprising a shaft, movable arms and a toothed wheel mounted on said shaft, said arms being adapted to enter openings in said coin chute adjacent said selective means, means to rotate said shaft by steps, said means comprising a magnet, a pivoted armature in operative relation therewith, a pawl pivoted on said pivoted armature and engaging said toothed wheel and means to return said ejecting means to normal position.

5. Coin apparatus comprising a coin chute, selective means in said coin chute comprising electrical contacts adapted to block the passage of deposited coins of different denominations, said blocked coin closing a circuit including a source of electrical energy and electro-magnetic means, impulse sending means operated by said electromagnetic means, means operated by said impulses to indicate the denomination of said coin, mechanical means controlled by said electro-magnetic means to selectively eject said coins from said chute and means to return said mechanical means to normal position.

In witness whereof, I hereunto subscribe my name this 9th day of July, 1928.

MALCOLM G. ALLISON.