Nov. 7, 1939. F. A. HOYT ET AL 2,179,091

COIN COLLECTOR

Filed March 24, 1938 6 Sheets-Sheet 1

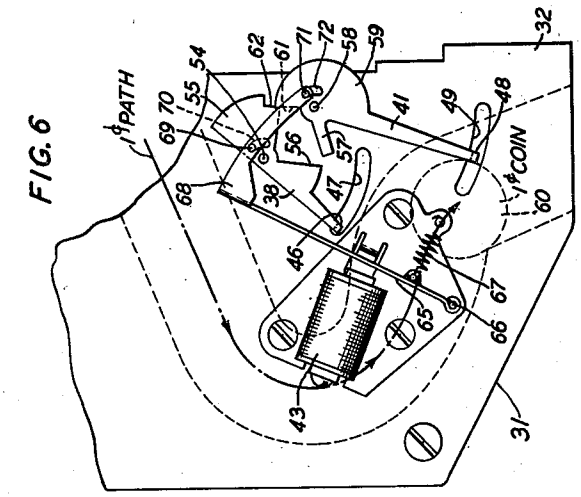

FIG. 6

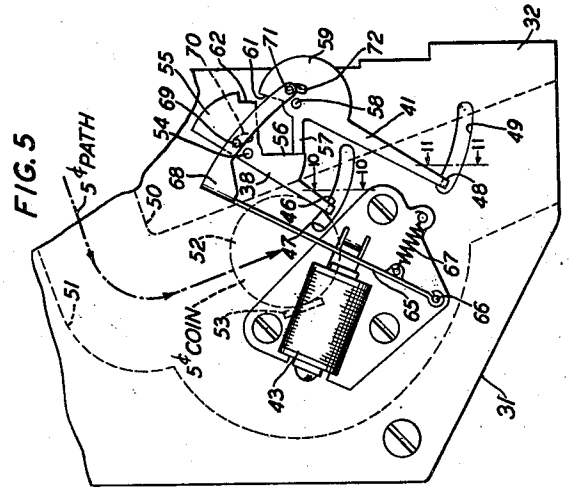

FIG. 5

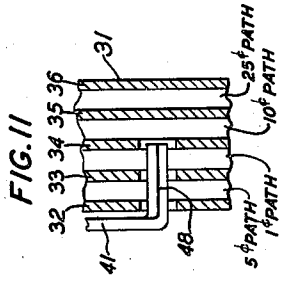

FIG. 11

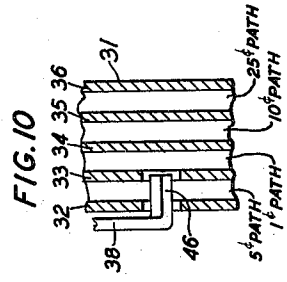

FIG. 10

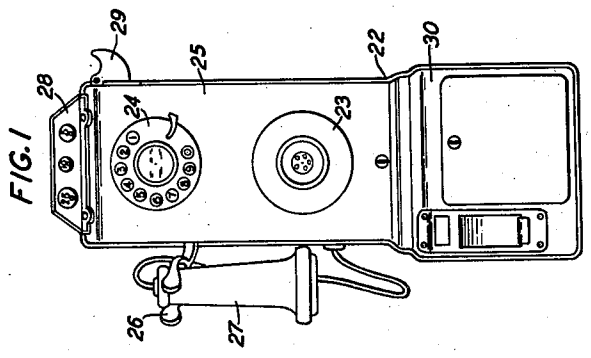

FIG. 1

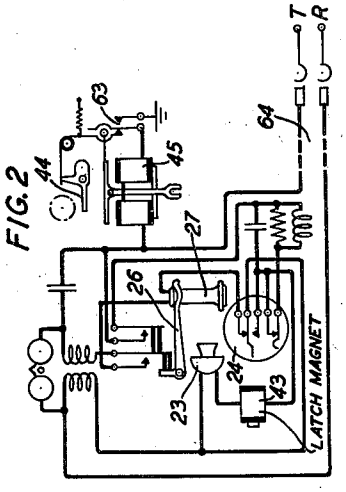

FIG. 2

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Nov. 7, 1939. F. A. HOYT ET AL 2,179,091

COIN COLLECTOR

Filed March 24, 1938 6 Sheets-Sheet 2

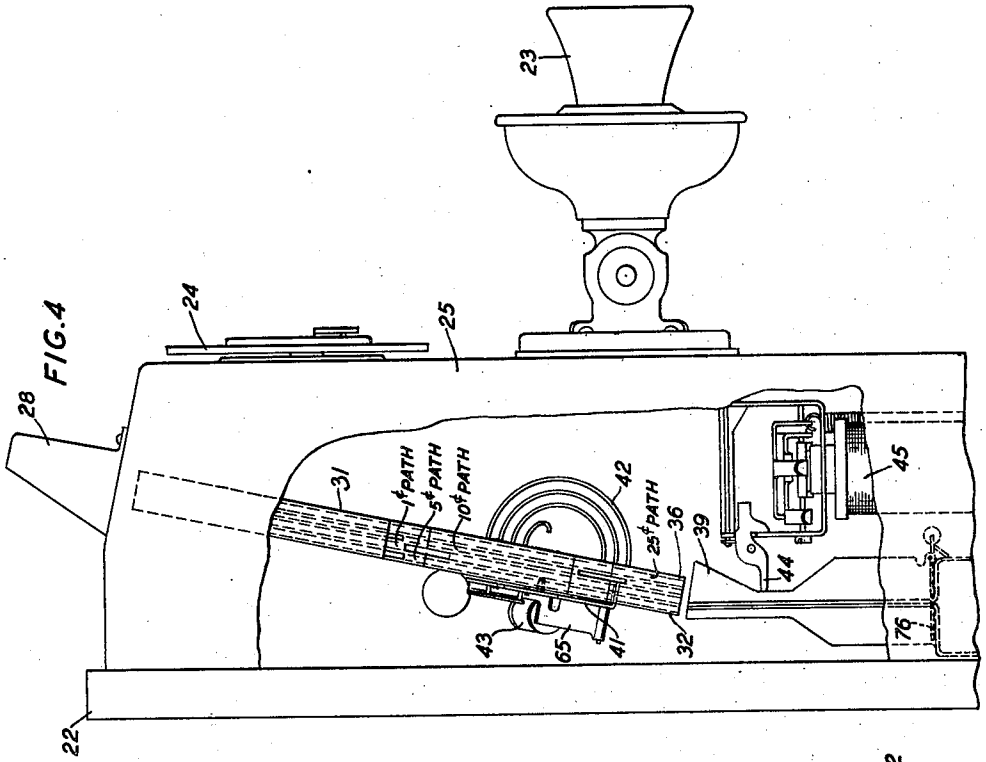

FIG. 4

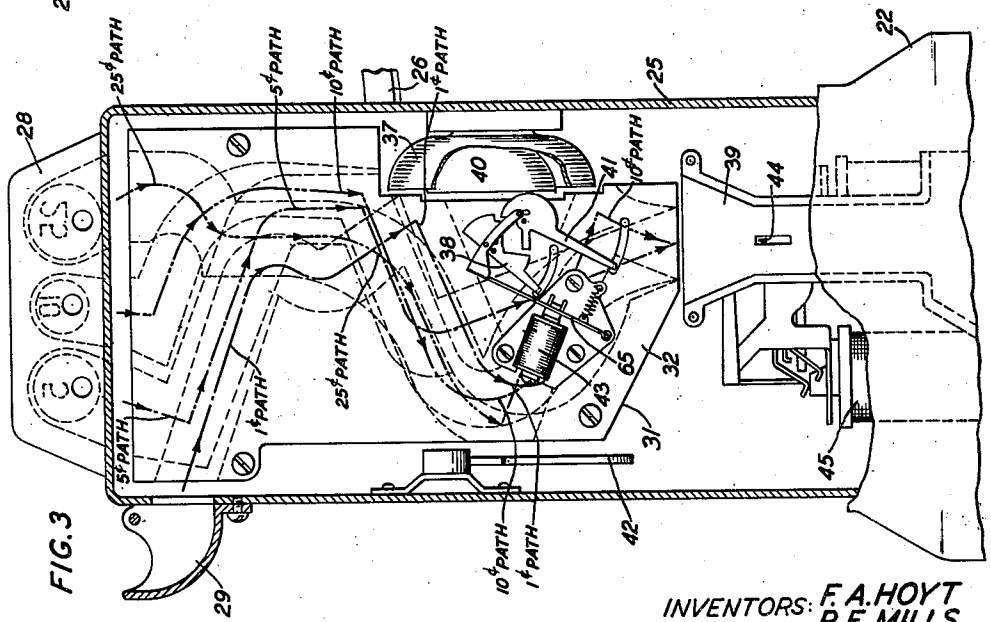

FIG. 3

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Nov. 7, 1939. F. A. HOYT ET AL 2,179,091

COIN COLLECTOR

Filed March 24, 1938 6 Sheets-Sheet 3

FIG. 9

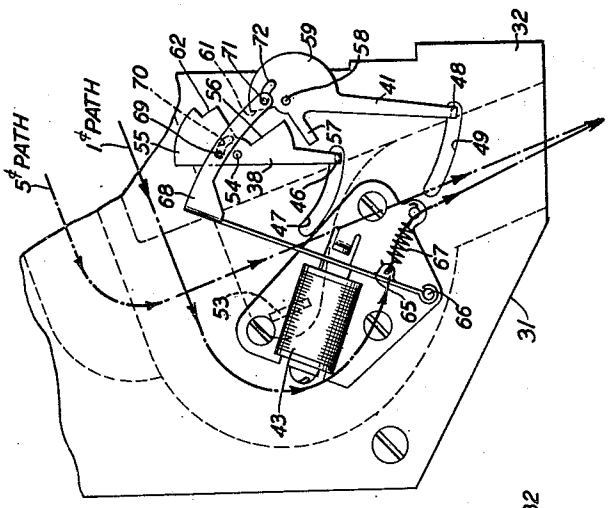


FIG. 8

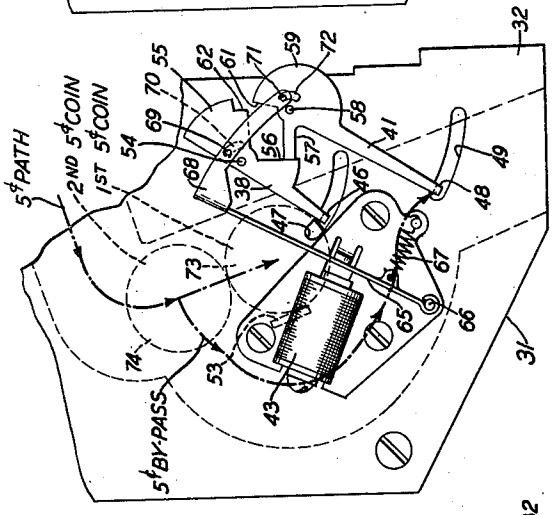
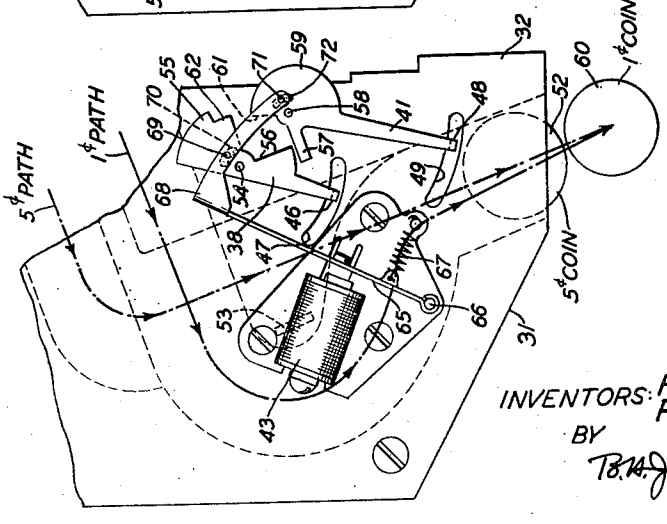


FIG. 7



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Nov. 7, 1939. F. A. HOYT ET AL 2,179,091

COIN COLLECTOR

Filed March 24, 1938 6 Sheets-Sheet 4

FIG. 13

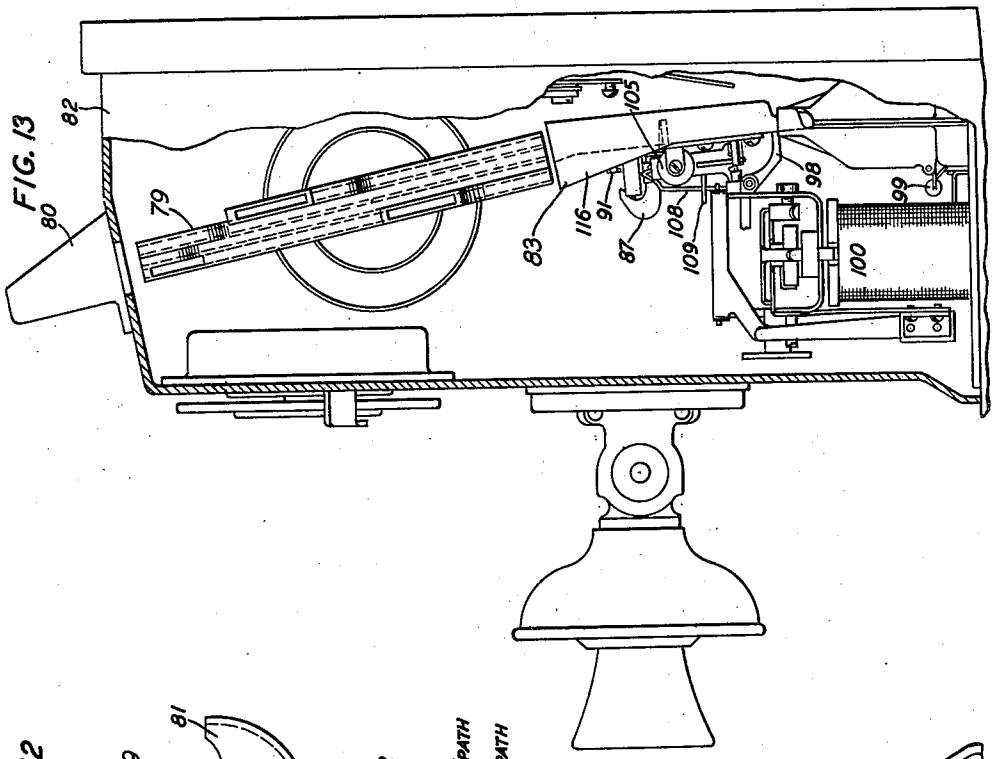
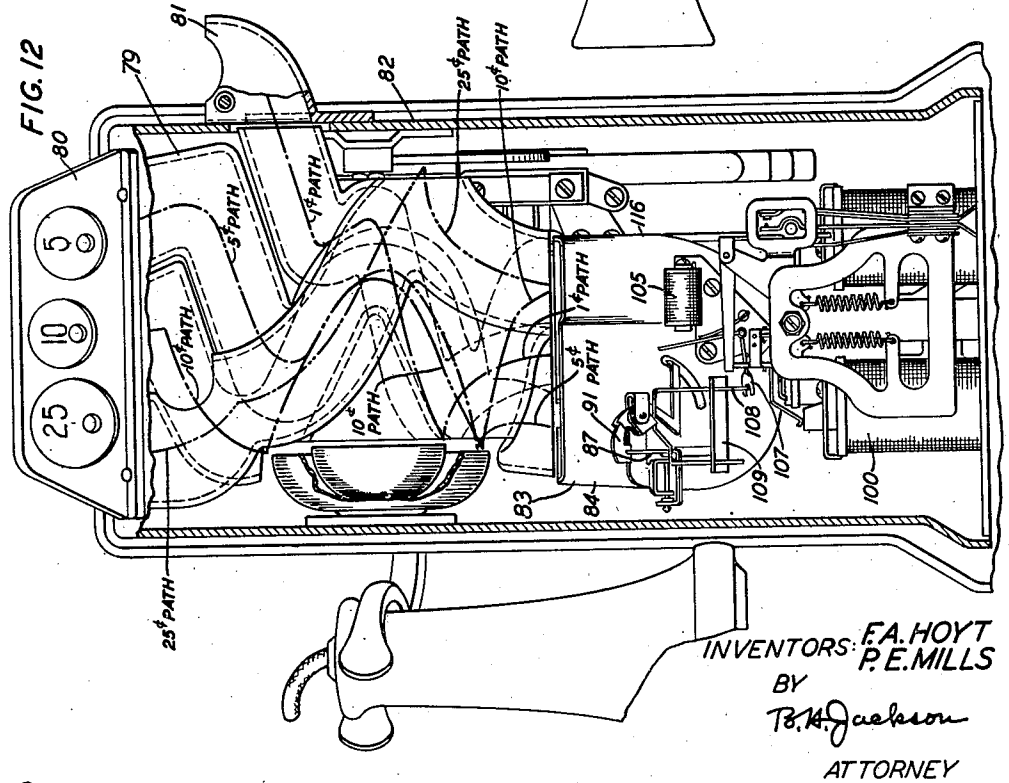


FIG. 12



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Nov. 7, 1939. F. A. HOYT ET AL 2,179,091

COIN COLLECTOR

Filed March 24, 1938 6 Sheets-Sheet 5

FIG. 21

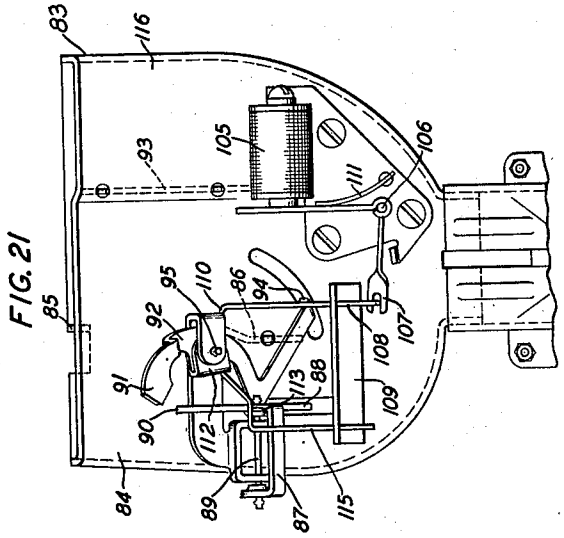


FIG. 15

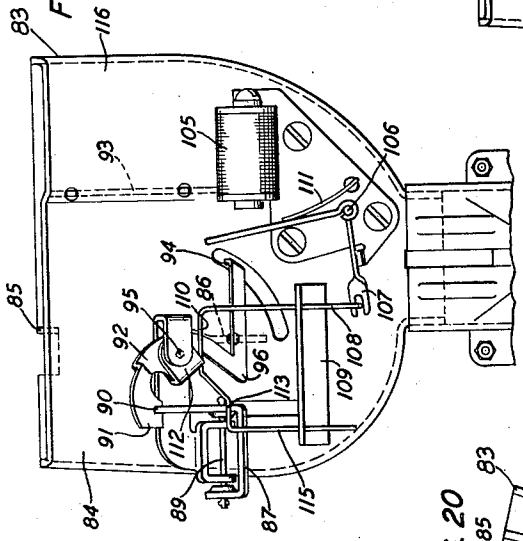


FIG. 20

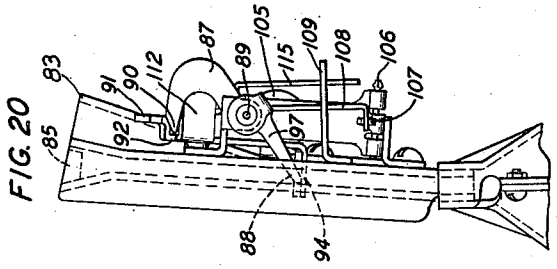
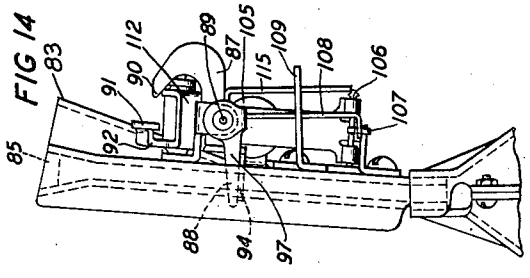


FIG 14



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Nov. 7, 1939. F. A. HOYT ET AL 2,179,091

COIN COLLECTOR

Filed March 24, 1938 6 Sheets-Sheet 6

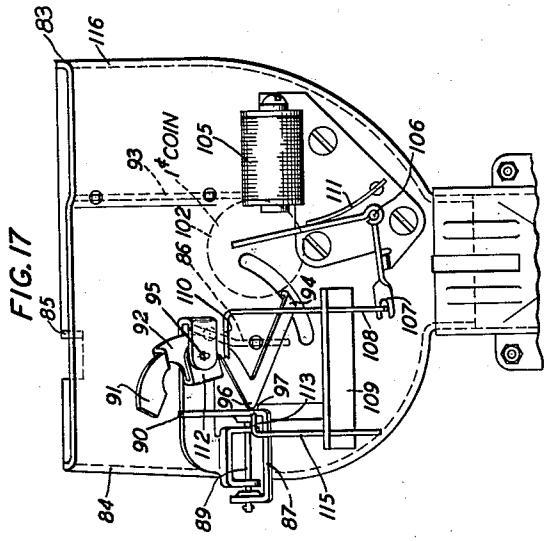

FIG. 17

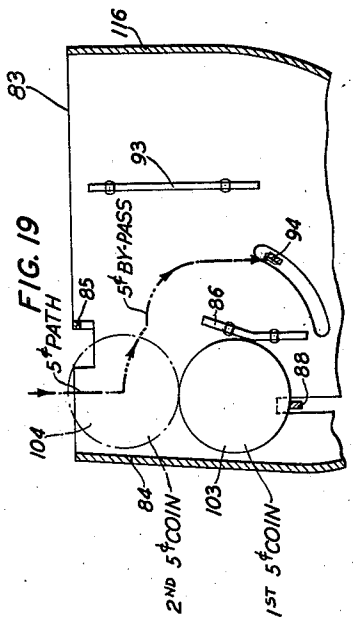

FIG. 19

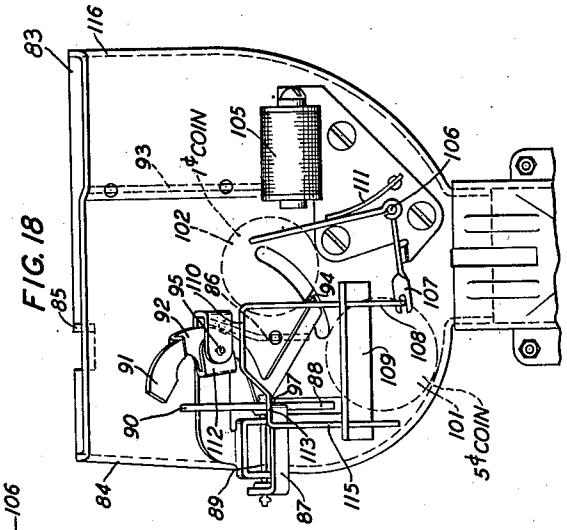

FIG. 18

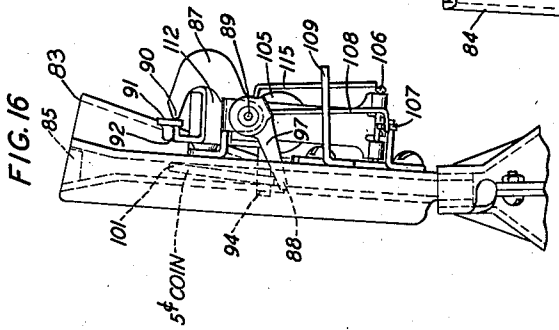

FIG. 16

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B. H. Jackson

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Patented Nov. 7, 1939 2,179,091

UNITED STATES PATENT OFFICE

2,179,091

COIN COLLECTOR

Frederick A. Hoyt, East Orange, and Percy E. Mills, Towaco, N. J., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application March 24, 1938, Serial No. 197,756

5 Claims. (Cl. 194—16)

This invention relates to coin collectors and particularly to those collectors where the deposit of more than one coin is required for obtaincertain services from the instrument. As applied to telephone coin collectors, one object of the invention is to provide a collector arranged to require the deposit of two or more coins of the same or different denomination before the collector may be utilized.

In the usual type of telephone coin collector a deposited nickel passes down a coin chute into a coin hopper where it strikes a coin trigger and temporarily comes to rest upon a coin trap as shown, for example, in the O. F. Forsberg U. S. Patent 1,043,219. The actuation of the coin trigger serves to close certain contacts which for a manual system signal the operator and which for a machine switching system prepare apparatus at the central office to permit the dialing of a local call.

In the preferred form of this invention the arrangement is such that a nickel and a penny must be deposited before the operator will be signaled or before a local call may be dialed. Mounted upon the coin chute or upon the coin hopper are interlocking latches projecting into the nickel runway and the penny runway to hold either coin in the runway until the other coin has been deposited, whereupon both coins will be released to actuate the usual coin trigger to cause the collector to be available for service in the usual manner. A relay is provided in the talking circuit portion of the substation to be energized when talking current is applied over the line to the substation to actuate means for holding the latches in coin freeing position but when the talking battery at the central office is disconnected from the substation the relay is deenergized to restore the latches to their normal interlocking engagement. Thus, the interlocking latches are arranged to require the deposit of two coins for obtaining a connnection to the central office but once the connection is established, placing talking battery on the line, the latches are disengaged to permit the subsequent passsage of another coin which, for example, may be deposited in payment for an overtime period of conversation.

Referring to the drawings,

Fig. 1 is a front view of a telephone coin collector;

Fig. 2 is a circuit schematic of a coin collector substation;

Fig. 3 is a rear view of the upper housing of the collector of Fig. 1 showing the various coin runways;

Fig. 4 is a side view of the upper housing of Fig. 1;

Fig. 5 shows the interlocking latches of this invention mounted on the coin chute and illustrates their relation to the nickel runway;

Fig. 6 shows the relation of the interlocking latches to the penny runway;

Fig. 7 is similar to Fig. 5 except that the interlocking latches are shown in coin releasing position;

Fig. 8 illustrates how the interlocking latches of Fig. 5 may be released by the deposit of two nickels;

Fig. 9 illustrates the position of the interlocking latches due to the operation of the associated electromagnet;

Figs. 10 and 11 are sectional views of Fig. 5 of the coin chute adjacent the interlocking latches;

Fig. 12 is a modification of the invention in which the interlocking latches are mounted on the coin hopper;

Fig. 13 is a side view of the apparatus of Fig. 12;

Fig. 14 is a side view of the coin hopper of Fig. 12 shown with the interlocking latches in their normal positions;

Fig. 15 is a front view of the apparatus of Fig. 14;

Fig. 16 shows a nickel being held in the nickel runway of the coin hopper;

Fig. 17 shows a penny held in the penny runway of the coin hopper;

Fig. 18 shows how the nickel and the penny are released after both coins are deposited;

Fig. 19 shows how the interlocking latches of Fig. 16 may be released by the deposit of two nickels; and

Figs. 20 and 21 show the latches of Fig. 15 in coin releasing position due to the energization of the associated electromagnet by the application of talking battery current.

Referring to Fig. 1 the front view of a telephone coin collector **22** is disclosed having the usual transmitter **23** and calling dial **24** mounted on the front wall of the upper housing **25**, and extending from one side of the upper housing is the usual switchhook **26** for receiver **27**. Mounted on top of the upper housing is a coin gauge **28** for receiving quarters, dimes and nickels while on the right side of the upper housing is a separate coin gauge **29** for receiving pennies. Below the upper housing **25** is the usual lower

housing 30 containing a cash compartment and a refund chute opening.

Referring more particularly to Figs. 3 and 4 it will be seen that the upper housing contains a multiple coin chute 31 which in general is similar to the multiple coin chute disclosd in Forsberg Patent 1,043,219. The coin chute as disclosed more clearly in the sectional view of Fig. 10 comprises five spaced plates 32 to 36, inclusive, between which lie the suitably formed coin runways. A coin channel for nickels is provided between rear plate 32 and intermediate plate 33 whereby a nickel deposited in gauge 28 follows the line marked 5¢ path, strikes the upper edge of bell 37 and after being temporarily restrained by finger 38 falls into coin hopper 39. A penny deposited in gauge 29 follows a coin channel between intermediate plates 33 and 34 indicated by line marked 1¢ path, strikes the upper edge of bell 40 and after being temporarily restrained by a pivoted finger 41 drops into coin hopper 39. A dime deposited in the dime opening of coin gauge 28 follows a coin channel between intermediate plates 34 and 35 indicated by line marked 10¢ path, strikes both the upper and the lower edges of bell 37 and then drops into the coin hopper. A quarter deposited in the quarter opening of coin gauge 28 follows a coin channel between intermediate plate 35 and front plate 36 indicated by the line marked 25¢ path, strikes gong 42 and drops into coin hopper 39. Also mounted upon the rear wall 32 of the coin chute is an electromagnet 43 for controlling the pivoted fingers 38 and 41 in a manner to be described later. Any coin reaching coin hopper 39 strikes a coin trigger 44 and in the manner described in the Forsberg patent closes contacts 63, thereby establishing circuit to ground through the windings of the coin relay 45, whereby apparatus at the central office will be suitably conditioned and the deposited money subsequently collected or refunded by the operation of relay 45.

The pivoted coin operated fingers 38 and 41 are shown in various stages of their operation in Figs. 5 to 9, inclusive. It will be noted from Fig. 10 that the nickel finger 38 has a projection 46 which extends through slot 47 in chute wall 32 and into a slot in chute wall 33 so that projection 46 normally obstructs the passage of coins in the nickel runway. It will also be noted from Fig. 11 that the penny finger 41 has a projection 48 passing through slot 49 in chute wall 32 through a slot in chute wall 33 and into a slot in chute wall 34 whereby projection 48 normally obstructs the passage of coins in both the nickel runway and the penny runway.

Referring particularly to Fig. 5 a portion of the coin chute is shown with the end walls of the nickel runway indicated by the dotted lines 50 and 51. The path of a first deposited nickel is shown by line marked 5¢ path where the nickel 52 drops between partition 53 and end wall 50 and strikes projection 46 of finger 38 where it is temporarily prevented from proceeding down the chute. Finger 38 is pivoted at the point 54 and is normally biased by counterweight 55 to have projection 46 lie adjacent the upper end of slot 47 as shown in Fig. 6. The force of nickel 52 in striking projection 46 causes finger 38 to move counterclockwise a short distance until its shoulder 56 strikes extension 57 of finger 41 whereupon the nickel 52 is held in the runway above projection 46 until the penny finger 41 has been moved about its pivoting axis 58 to an extent sufficient to free shoulder 56 of extension 57.

If it is assumed that a penny only has been deposited without a nickel, the penny path adjacent the pivoted finger 41 is shown in Fig. 6. Finger 41 due to counterweight 59 is biased to have its projection 48 normally lying adjacent the upper end of slot 49 as shown in Fig. 5 but when the penny 60 is deposited and strikes projection 48 of finger 41, finger 41 is moved slightly counter-clockwise until shoulder 61 on finger 41 strikes shoulder 62 on finger 38, whereby the penny is held in the runway above projection 48 until the nickel finger 38 has been moved counter-clockwise to an extent sufficient to free shoulder 61 of shoulder 62. It will be seen from Fig. 5 that the deposit of a nickel causes finger 38 to move sufficiently to free shoulder 61 of shoulder 62 and it will be seen from Fig. 6 that the deposit of a penny is sufficient to move extension 57 out of the path of shoulder 56. Hence, when both a nickel and a penny are deposited in their respective runways the interlocking latches 38 and 41 are freed from each other and operate fully as shown in Fig. 7 to permit the passage of both coins down the chute into hopper 39.

Nickel finger 38 due to counterweight 55 and penny finger 41 due to counterweight 59 after the passage of the coins as shown in Fig. 7 will tend to restore to their normal position of interlocking engagement to prevent a subsequently deposited penny or nickel from reaching the coin hopper 39. However, as previously stated, the coins 52 and 60 after reaching coin hopper 39 actuate a coin trigger 44 to close contact 63 whereby in a well-known manner apparatus at the remote central office connected to line 64 will be conditioned to permit the extension of the line to the called party desired and among other things talking battery will be applied to line 64 to energize the transmitter 23 and receiver 27. It will be noted from Fig. 2 that electromagnet 43 is connected in series with transmitter 23 and that the electromagnet 43 will be energized as soon as talking battery is connected to line 64 and will remain energized until the connections at the central office are broken to disconnect talking battery from the local substation. As shown in Figs. 5 to 9, inclusive, electromagnet 43 has an armature 65 pivoted at the point 66 and biased by spring 67. Armature 65 at its upper end has an arcuately formed arm 68 bearing on its under side a pin 69 projecting into a slot 70 in finger 38 and also has on its under side a pin 71 projecting into a slot 72 in finger 41. With electromagnet 43 deenergized and with fingers 38 and 41 in the normal positions as shown in Fig. 3, pin 69 is adjacent the upper end of slot 70 and pin 71 is adjacent the upper end of slot 72. These pins 69 and 71 do not interfere in any manner with the full actuation of fingers 38 and 41 when operated by a deposited nickel and penny as in Figs. 5, 6 and 7 since their counter-clockwise movement due to coin operation is completed before pins 69 and 71 contact with the lower ends of their respective slots 70 and 72. However, as soon as electromagnet 43 is energized its armature 65 is attracted upwardly and pins 69 and 71 contacting with the upper ends of slots 70 and 72 will move fingers 38 and 41 counter-clockwise to the positions shown in Fig. 9 where the fingers are disengaged from each other and occupy non-obstructing positions for coin travel whereby a nickel alone or a penny alone may be deposited and freely passed by the fingers 38 and 41 to drop into hopper 39. When electromagnet 43 is deenergized by the removal of

talking battery from the substation, spring 67 will restore armature 65 to its normal position of Fig. 5 whereupon fingers 38 and 41 will be restored to their normal interlocking engagement by their respective counterweights.

The purpose of electromagnet 43 in controlling fingers 38 and 41 in the above manner is to enable a single coin deposited, for example, in payment of an overtime charge to reach the coin trap 76 in hopper 39 without being held by finger 38 or 41. It is also obvious that if a toll call is desired from the substation shown, the deposit of both a nickel and a penny would first be needed to call the operator, which nickel and penny would then be refunded, whereupon the subscriber would deposit the proper amount for the toll call, which amount may include, for example, a nickel, a dime and a quarter. Without the control by electromagnet 43 this nickel would be blocked in the coin chute by finger 38 and could not be collected at the completion of the call.

Figs. 5, 6 and 7 show how the pivoted fingers 38 and 49 are released by the deposit of a nickel and a penny. Fig. 8 shows how the same result can be obtained by the deposit of two nickels. In Fig. 8 the first deposited nickel 73 is held in the chute between partition 53 and end wall 50 against projection 46 of nickel finger 38 since finger 38 is not free to rotate to coin freeing position due to extension 57 being in the path of shoulder 56. When a second nickel 74 is deposited, the second nickel after striking the top of the first nickel rolls off the first nickel over the top of partition 53 into a portion of the nickel runway between partition 53 and end wall 51, thereby by-passing the nickel finger 38 but striking the penny finger 41 which as shown in Fig. 11 projects into both the nickel and the penny runways. The second nickel in operating finger 41 performs the same function as described above for a deposited penny whereby fingers 38 and 41 are released from each other to allow both nickels to drop onto the coin trap 76 in coin hopper 39 after actuating the coin trigger 44.

As described above with respect to Figs. 10 and 11 pivoted fingers 38 and 41 do not project into the dime runway or the quarter runway. Hence, a deposited dime or quarter is not restrained in the coin chute but freely passes into hopper 39 to reach coin trap 76.

The form of the invention shown in Figs. 12 to 21, inclusive, is quite similar to that above described except that the interlocking fingers and associated electromagnet are mounted on the coin hopper instead of the coin chute.

Coins deposited in the quarter, dime and nickel coin gauge 80 or in the penny gauge 81 traverse coin channels in the upper housing 82 similar to those above described except, as shown in Fig. 12, the outlet for the nickel channel is at the left portion of the chute assembly 79, the outlet for the penny channel is in the central portion of the chute assembly, and the dime and quarter outlets are at the right of the chute assembly. Therefore, as shown in Fig. 15 deposited nickels will fall into coin hopper 83 between side wall 84 and partition 85 and will be held in the coin channel between side wall 84 and partition 86 due to pivoted finger 87 which has a projection 88 normally occupying a coin obstructing position in the described channel. Finger 87 is suitably pivoted on a rod 89 and when projection 88 is struck by a deposited nickel the finger 87 as shown in Fig. 14 will move counter-clockwise a small amount until its arm 90 contacts with extension 91 of the penny finger 92 whereby the deposited nickel is held in the channel above projection 88 until the penny finger has been actuated to move its extension 91 out of the path of arm 90.

A deposited penny will enter the hopper in the coin channel between partition 85 and partition 93 to strike projection 94 of the penny finger which is suitably pivoted on pin 95. A penny in striking projection 94 will move the finger 92 clockwise until shoulder 96 strikes portion 97 of the nickel finger, assuming that the nickel finger is in normal position. However, the deposit of a nickel moves arm 97 downwardly far enough to free shoulder 96 of portion 97, thereby allowing the penny finger 92 to complete its movement to penny releasing position; and the initial movement of penny finger 92 due to a deposited penny is sufficient to move arm 91 out of the path of projection 90, thereby allowing the nickel finger 87 to complete its movement to nickel releasing condition. Hence, when both a penny and a nickel are received in the coin hopper both coins will be released to actuate coin trigger 98 and come to rest on coin trap 99 where they may be subsequently collected or refunded under the control of coin relay 100 in the usual manner.

The pivoted fingers 87 and 92 have been described somewhat briefly since they are quite similar in their operation to the penny and nickel interlocking latches described and claimed in the copending application of F. A. Hoyt Serial No. 187,640, filed January 29, 1938, to which reference may be made for a more detailed description.

Fig. 14 is an end view of the coin hopper showing both fingers 87 and 92 in their normal positions obstructing the passage of either a nickel or a penny until the other coin has also been deposited. Fig. 15 is a front view of the coin hopper showing both fingers 87 and 92 in their normal positions. Fig. 16 shows the position of the nickel finger 87 when only a nickel 101 has been deposited without a penny. Fig. 17 shows the position of the penny finger 92 when only a penny 102 and not a nickel has been deposited. Fig. 18 shows the operation of both fingers 87 and 92 to coin freeing position when both the nickel 101 and the penny 102 have been deposited.

Fig. 19 shows how both fingers 87 and 92 may be freed of their interlocking engagement by the deposit of two nickels where the first nickel 103 is temporarily held by projection 88 of the nickel finger and the second nickel 104 after reaching the coin hopper will roll off the first nickel through the opening between partitions 85 and 86 to enter the penny channel and cause the actuation of the penny finger projection 94 whereby both coins will be released to proceed on down the coin chute to operate the coin trigger 98 and come to rest on coin trap 99.

However, the coin hopper arrangement of these figures differs from that in the above-mentioned Hoyt application in that there is mounted on the coin hopper 83 an electromagnet 105 which performs the same function as electromagnet 43 in the earlier figures, it being assumed that the winding of electromagnet 105 is in series with the transmitter as shown for electromagnet 43 in the circuit diagram of Fig. 2. The armature of relay 105 is pivoted at the point 106 and has a forked extension 107 between the prongs of which lies an angular projection of a wire or rod 108. Wire 108 extends upwardly through a slot in the mount-

ing bracket 109 and as shown in Fig. 15 its horizontal portion 110 due to armature biasing spring 111 normally lies just below portion 112 of the penny finger 92 while portion 113 of wire 108 normally lies just below portion 87 of the nickel finger as shown in Fig. 14. Wire 108 also has an extension 115 freely passing through a slot in bracket 109. As soon as talking current is applied to the substation from the central office electromagnet 105 is energized to attract its armature, thereby lifting wire 108 from the position in Fig. 15 to the position shown in Figs. 20 and 21, whereby the two pivoted fingers 87 and 92 are moved sufficiently to free each other from their interlocking engagement. Therefore, as long as talking battery is applied to the substation a nickel will freely pass by the nickel finger 87 and a penny will freely pass by the penny finger 92. Hence, any coin or coins deposited after the initial deposit will not be held up by the pivoted fingers 87 or 92 but will reach the coin trap 99 without delay to be subsequently collected or refunded depending upon the current applied to the coin relay 100. It will be noted that dimes or quarters will enter the coin hopper between partition 93 and end wall 116 and without any interference will proceed down the hopper and come to rest on coin trap 99.

In the above arrangements it has been convenient to describe them as applicable to United States coins of certain denominations but it will be readily understood that the invention may be applied to the control of coins or tokens of any denomination or size.

What is claimed is:

1. A telephone substation comprising a transmitter, a coin collector housing, said housing comprising a coin runway for receiving coins of one denomination, a second coin runway for receiving coins of a second denomination, a coin trap adapted to receive coins from both of said runways, means in said first runway for temporarily restraining a first coin deposited in said first runway from reaching said coin trap, means operated by a second coin deposited in one of said runways for freeing said first coin from said restraining means to permit both coins to reach said trap, a relay, means for supplying talking battery current to said transmitter and to said relay, and means controlled by said relay for rendering said first means ineffective to restrain another coin deposited in said first runway after the deposit of said first coin and said second coin.

2. A telephone substation comprising a transmitter, a coin collector housing, said housing comprising a coin runway for receiving coins of one denomination, a coin runway for receiving coins of a second denomination, electrical contacts which in their normal non-operated condition prevent a local call from being initiated at said substation, a pivoted member occupying a coin interfering position in said first runway, a second pivoted member occupying a coin interfering position in said second runway, means contingent upon the operation of both of said members by coins received in said channels for operating said contacts, an electromagnet, means for supplying talking battery current to said transmitter and to said electromagnet, and means controlled by said electromagnet for controlling said members.

3. A telephone substation comprising a transmitter, a coin collector housing, said housing comprising a coin runway for receiving coins of one denomination, a coin runway for receiving coins of a second denomination, electrical contacts which in their normal non-operated condition prevent a local call from being initiated at said substation, means in said first runway for temporarily restraining a first coin deposited in one of said runways, means operated by a second coin deposited in one of said runways for freeing said first coin from said restraining means, means controlled by the released coin for operating said contacts, a relay in series with said transmitter, means for supplying talking battery current to said relay and to said transmitter, and means controlled by said relay for moving said restraining means to coin freeing position.

4. A telephone coin collector substation comprising a transmitter, a calling dial, a housing including a coin channel for receiving coins of one denomination, a second coin channel for receiving coins of a second denomination, electrical contacts which in their normal non-operated condition render said dial ineffective for dialing a local call from said substation, a pivoted member occupying a coin obstructing position in said first channel, a second pivoted member occupying a coin obstructing position in said second channel, means contingent upon the operation of both of said members for operating said contacts, a relay, means for supplying talking battery current to said relay and to said transmitter, and means controlled by said relay for holding said members in coin freeing position.

5. A telephone substation comprising a transmitter, a coin collector housing, said housing comprising a coin runway for receiving coins of one denomination, a second coin runway for receiving coins of a second denomination, electrical contacts which in their normal non-operated condition prevent a local call from being initiated at said substation, a pivoted member occupying a coin obstructing position in said first runway, means comprising a second pivoted member operated by a coin received in said second runway for releasing a coin held by said first pivoted member, means controlled by the released coin for operating said contacts, a relay, means for supplying talking battery current to said relay and to said transmitter, and means controlled by the energization of said relay for moving said first pivoted member to coin freeing position.

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