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J. T. SCHULLER

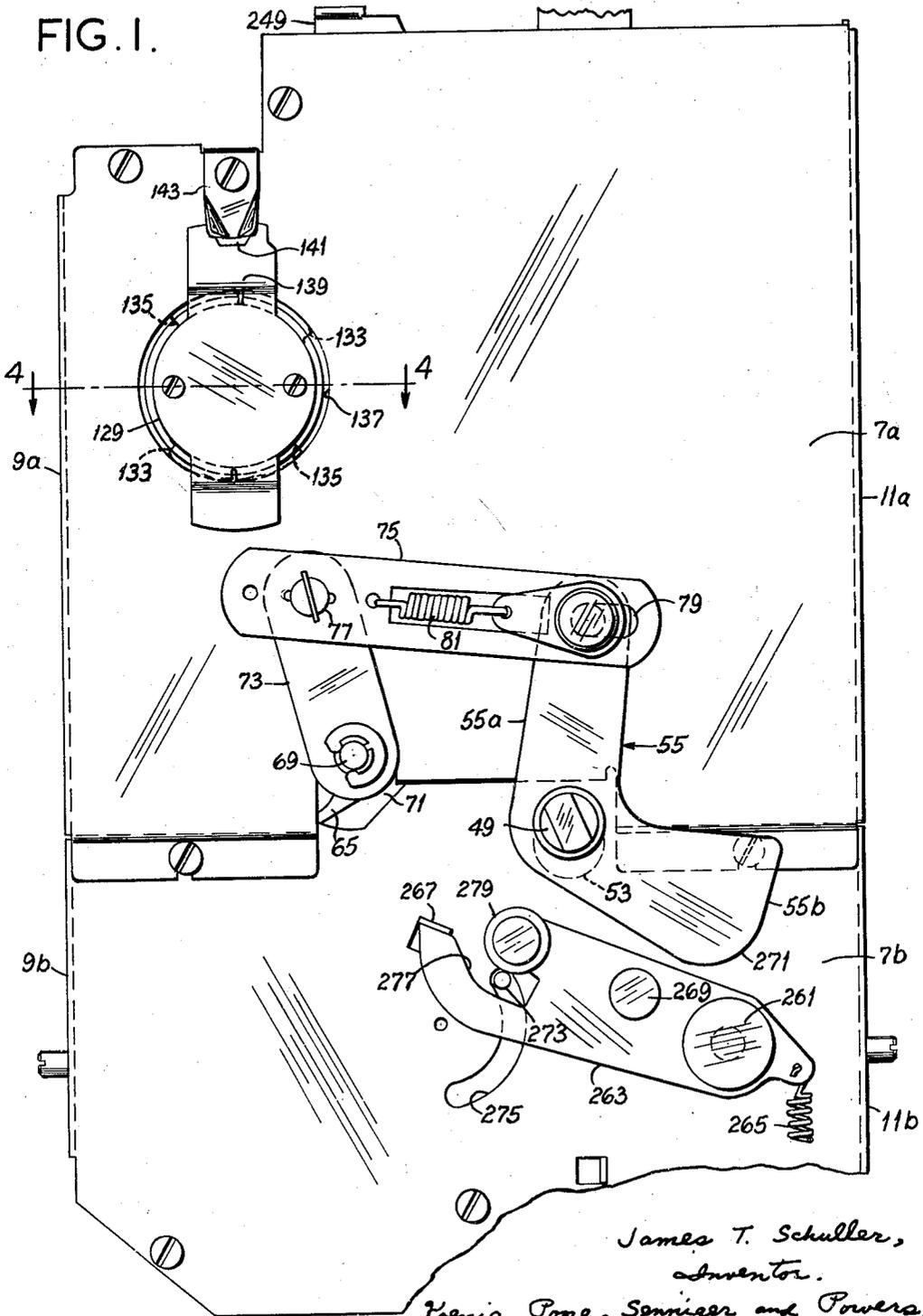
3,149,709

COIN APPARATUS

Filed Feb. 1, 1962

6 Sheets-Sheet 1

FIG. 1.



James T. Schuller,
Inventor.
Koenig, Pope, Senniger and Powers,
Attorneys.

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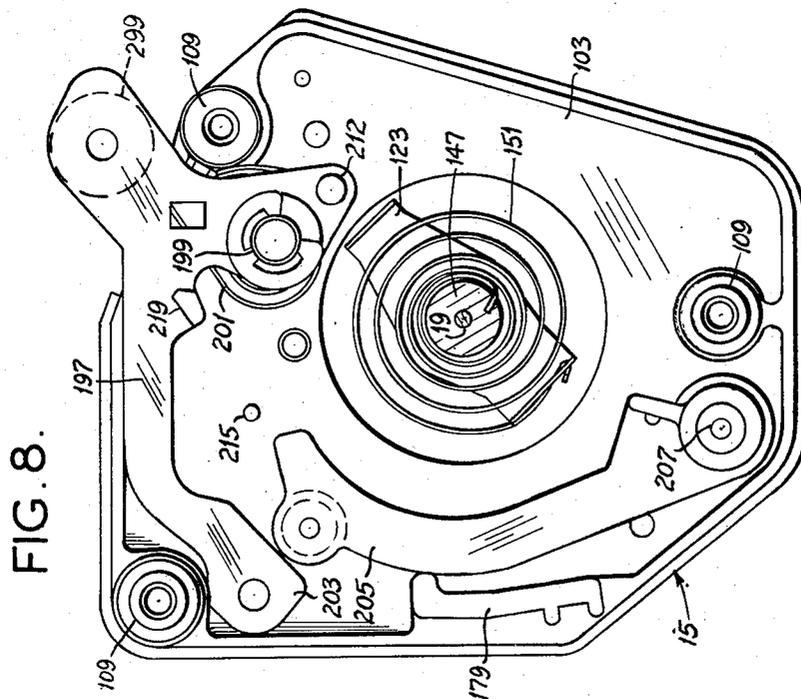
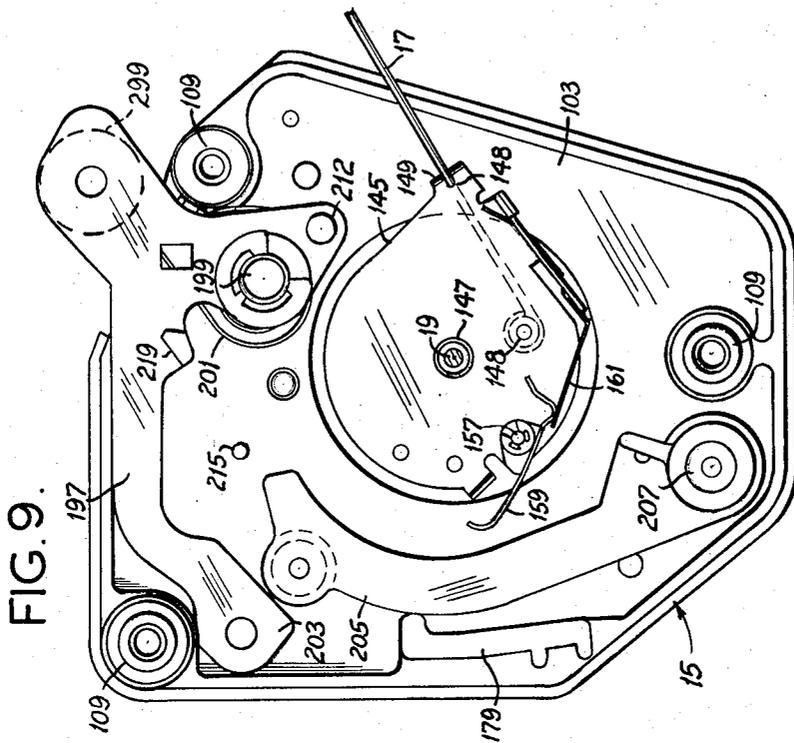
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COIN APPARATUS

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3,149,709

COIN APPARATUS

James T. Schuller, St. Ann's, Mo., assignor, by mesne assignments, to Universal Match Corporation, Ferguson, Mo., a corporation of Delaware
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This invention relates to coin apparatus, and more particularly to such apparatus for controlling the operation of a vending machine or the like.

The invention is an improvement upon coin apparatus of the class shown in the coassigned U. S. Patent 3,028,940 and U.S. Patent 2,991,867 comprises a coin-actuated totalizer unit adapted to totalize the amount of coins deposited in the vending machine in which the coin apparatus is used, the unit including three so-called indexing stops (indicated at 125, 127 and 129 in U.S. Patent 3,028,940 and at S1, S2 and S3 in U.S. Patent 2,991,867). These stops are rotatable away from a zero position in response to deposit of coins. Associated with each stop is a feeler (the feelers being indicated at 171, 183 and 195 in U.S. Patent 3,028,940 and at F1, F2 and F3 in U.S. Patent 2,991,867). The vending machine includes a plurality of purchaser-operable pull-out rods and mechanism for moving the feelers toward the stops when any rod is pulled out. Each feeler is then engageable with its respective stop to block it against full working movement unless the respective stop has rotated to a position clearing the feeler for full working movement. Each feeler controls a latch release member, the arrangement being such that on full working movement of a feeler, the respective latch release member is actuated to release an associated latch in the machine.

Since, in the operation of coin apparatus such as shown in U.S. Patent 3,028,940 and U.S. Patent 2,991,867, there occur conditions when one feeler must be permitted to operate its associated latch release member while the other two feelers are blocked out by the respective stops, or when two feelers must be permitted to operate the associated latch release members while the third feeler is blocked out by the respective stop, tension springs (such as indicated at 219, 222 and 223 in U.S. Patent 3,028,940 and at 67, 69 and 71 in U.S. Patent 2,991,867) are interposed in the mechanism between the pull-out rods and the feelers to enable full working movement of the one feeler while the other two are blocked out or of two feelers while the third is blocked out. It has been found that, in some circumstances, interposition of these springs increases to an undesirable extent the force which must be exerted by a purchaser to pull out a pull-out rod, since the purchaser is required to exert force to stretch certain of the springs. Also, on a fast pull of a pull-out rod, interposition of the springs may in some instances cause a failure of the latch-releasing operation.

Accordingly, among the several objects of the invention may be noted the provision of an improved coin apparatus of the class described wherein the latch-release members are in effect directly actuated from the pull-out rods without the interposition of springs, thereby minimizing the force which a purchaser must apply to pull out a pull-out rod, and minimizing the possibility of failure to release the latches on a fast pull; and the provision of improved coin apparatus such as described which is economical to construct and reliable in operation. The improved apparatus is featured by a construction in which, instead of having feelers each blocked by a respective stop for values below a predetermined value assigned to

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that stop and cleared for full working movement for values above the assigned value, each feeler is cleared for full movement but nonworking movement for values below the assigned value, and blocked for values above the assigned value, the desired latch release being obtained by blocking instead of clearing of the feeler, as will be made clear. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

FIG. 1 is a front elevation of a coin apparatus of this invention;

FIG. 2 is a rear elevation of the coin apparatus;

FIG. 3 is a view corresponding to FIG. 1 with certain front cover plates removed, and certain parts broken away;

FIG. 4 is an enlarged horizontal cross section taken on line 4-4 of FIG. 1, showing the totalizer unit of the apparatus;

FIG. 5 is a generally horizontal cross section taken on line 5-5 of FIG. 3;

FIG. 6 is a vertical cross section taken on line 6-6 of FIG. 3;

FIG. 7 is a vertical cross section taken on line 7-7 of FIG. 3;

FIGS. 8, 9, 10 and 11 are vertical cross sections taken on lines 8-8, 9-9, 10-10 and 11-11, respectively, of FIG. 4, of the totalizer unit per se;

FIG. 12 is a fragmentary vertical section showing the rearward side of the ratchet member shown in FIG. 10;

FIG. 13 is a fragment of FIG. 11 with parts broken away; and

FIG. 14 (sheet 4) is a horizontal cross section taken on line 14-14 of FIG. 3.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, a coin apparatus of this invention is shown to comprise a main mechanism plate 1 (see particularly FIGS. 2 and 4) having left and right side flanges 3 and 5, and upper and lower front cover plates 7a and 7b (see particularly FIG. 1) which close off the space between side flanges 3 and 5. The upper cover plate 7a has left and right side flanges 9a and 11a and the lower cover plate 7b has left and right side flanges 9b and 11b which fit on the outside of flanges 3 and 5.

Mounted on the main mechanism plate 1 are three latch release levers R1, R2, R3 (see FIGS. 2, 3 and 6) which correspond to the latch release levers R1, R2, R3 shown in U.S. Patent 2,991,867. These normally occupy the retracted position in which they appear in FIGS. 3 and 6, and are movable away from their retracted position for releasing three latches (not shown) of the vending machine in which the coin apparatus is used. This machine may be of the type shown in U.S. Patent 3,028,940 and U.S. Patent 2,993,581, for example, and the stated latches may be similar to the latches L1, L2, L3 shown in said application and said patent.

The latch release levers R1, R2, R3 are adapted for actuation by members D1, D2, D3, respectively (see FIGS. 3 and 5). Each of these is constituted by a drag link mounted for sliding movement toward the left away from the retracted position in which they appear in FIG. 3, and back toward retracted position. They are biased toward retracted position (i.e., toward the right as viewed in FIG. 3) as will appear. Drag links D1, D2, D3 are adapted for actuation by feeders F1, F2, F3, respectively. Each of these is constituted by a lever

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pivoted intermediate its ends at the left end of the respective drag link. As will appear, each feeler F1, F2, F3 is capable of free movement relative to the respective drag link D1, D2, D3 without moving it, and is adapted for working movement to move it.

For each feeler lever F1, F2, F3, there is an auxiliary feeler lever, the three auxiliary feeler levers being designated F1A, F2A, F3A (see FIGS. 4 and 13). These are located in proximity to a cluster of totalizer member or stops S1, S2, S3 (see FIGS. 3, 4 and 11), one for each feeler lever, constituting part of a coin totalizer unit generally designated 15. Each totalizer member or stop S1, S2, S3 is movable from a position such as shown in FIGS. 3 and 11 which may be referred to as the zero position clearing the respective auxiliary feeler lever F1A, F2A and F3A and main feeler lever F1, F2, F3 to a position blocking the respective auxiliary feeler lever and main feeler lever in response to deposit in the apparatus of a predetermined amount in coin, as will appear. When any totalizer member or stop S1, S2, S3 is in its zero feeler-clearing position, it allows free movement of respective feeler lever F1, F2, F3 without moving the respective drag link D1, D2, D3, and consequently without effect on the respective latch release lever R1, R2, R3. However, when any totalizer member or stop S1, S2, S3 is in feeler-blocking position, it reacts on the respective feeler lever F1, F2, F3 through the respective auxiliary feeler F1A, F2A, F3A to effect working movement of the respective feeler lever F1, F2, F3 to move the respective drag link D1, D2, D3 and consequently to actuate the respective latch release lever R1, R2, R3.

The coin totalizer unit 15 includes an arm constituted by a trip wire 17 pivoted to swing on the axis of a shaft 19 and having a finger 21 at its free end which extends across three coin chutes NC, DC and QC (see FIG. 5) of a coin chute assembly 23 mounted on the inside of plate 1. Chute NC is for nickels, chute DC is for dimes and chute QC is for quarters. The arrangement is such that a coin dropping in any one of the coin chutes swings the trip wire 17 down from its raised retracted position of FIG. 3 through an angle corresponding to the value of the coin. The coin then escapes from the trip wire, the wire swings back up to its raised retracted position, and on its upward swing it acts to index the cluster S1, S2, S3 forward (rotate it counterclockwise as viewed in FIGS. 3 and 11) a number of steps corresponding to the value of the coin. A nickel indexes the cluster forward one step, a dime indexes it forward two steps, and a quarter indexes it forward five steps, as will be made clear.

The cluster S1, S2, S3 normally occupies the so-called zero position (see FIGS. 3 and 11) in which feeler levers F1, F2 and F3 are unblocked for full inward swing in the direction toward the center of the cluster. Any such position of any one of stops S1, S2, S3 may be referred to as a feeler-clearing position thereof, since the respective feeler lever F1, F2, F3 is then allowed free pivotal movement relative to the respective control member or drag link D1, D2, D3 without moving the latter. If a sufficient amount in coin is deposited, the cluster S1, S2, S3 is indexed or advanced (rotated counterclockwise) a sufficient number of steps to bring it into position blocking one or more of the feeler levers from full inward swing. Such position of any one of stops S1, S2, S3 may be referred to as its feeler-blocking position, since the upper end of respective feeler lever F1, R2 or F3 is then blocked from swinging by engagement with the respective auxiliary lever F1A, F2A, F3A, which is in turn blocked by the respective stop, and operating movement of the respective feeler lever F1, F2, F3 is effected to move the respective drag link D1, D2, D3, thereby to actuate the respective latch release lever R1, R2, R3.

The three latch release levers R1, R2 and R3 are pivotally mounted one above another on a vertical rod 25

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located between the coin chute assembly 23 and the right side flange 5 of plate 1. This rod is mounted in upper and lower ears 27 struck from plate 1. Levers R1, R2, R3 have latch-actuating arms R1a, R2a, R3a which are bent to extend through slots 29, 31 and 33 in plate 1, and crank arms R1b, R2b and R3b which extend forward (see FIG. 6). Drag links D1, D2 and D3 are pin-connected at one end as indicated at 35 to the respective crank arms R1b, R2b and R3b, and extend from the crank arms in front of coin chute assembly 23. Each feeler lever F1, F2, F3 is pivoted for swinging movement on a horizontal pin 37 at the left end of the respective link D1, D2, D3, the pins 37 extending transversely to the length of the links. Each link has a horizontal slot 39 (see FIG. 3) adjacent its left end, and a stud 41 extends forward from plate 1 through these slots to support the links for longitudinal sliding movement. Springs indicated at 43, 45 and 47 bias levers R1, R2, R3 to their retracted FIG. 3 position, and act through these levers to bias links D1, D2, D3 to move toward the right to their retracted FIG. 3 position.

Mechanism for actuating feeler levers F1, F2 and F3 (and for actuating links D1, D2, D3 if the respective totalizer members or stops S1, S2, S3 are in blocking position with regard to the upper ends of the feeler levers) is shown to comprise a shaft 49 extending through registering openings 51 and 53 in main plate 1 and cover plate 7b. This shaft constitutes part of the vending machine in the which the coin apparatus of this invention is used (and corresponds to shaft 77 shown in U.S. Patent 2,991,867 and shaft 253 shown in U.S. application Serial No. 629,749). Secured on the forward end of shaft 49 in front of cover plate 7a is a lever 55 (see FIG. 1) having an upwardly extending arm 55a and an arm 55b extending toward the right. A lever 57 (see FIGS. 3 and 7) is pivoted on stud 41. This lever extends down from stud 41 and, at its lower end, carries on its forward side a stud 61 having a roller 62 thereon engageable with the right edges of feeler levers F1, F2, F3 adjacent the lower ends of the latter (see FIGS. 3 and 7). Lever 57 also carries on its rear side a cam follower roll 63. This is engageable by edge 65e of a cam 65 on the inner end of a hub 67 journalled on a pin 69 extending forward from plate 1 through an opening 71 provided in cover plates 7a and 7b. Hub 67 has a crank arm 73 on its outer end in front of cover plate 7a. A link 75 is pin-connected at 77 to arm 73 and has a pin and slot connection 79 with the upper end of arm 55a of lever 55. A tension spring 81 is interconnected between arm 55a and link 75 to provide a yielding connection in the linkage from shaft 49 to arm 73.

It will be understood that shaft 49 and lever 55 are rotated clockwise as viewed in FIG. 1 away from the retracted position in which lever 55 appears in FIG. 1, and then returned counterclockwise back to this retracted position when a purchaser pulls out a knob of the vending machine and then returns the knob. Upon clockwise swing of lever 55, link 75 is pulled to the right through spring 81, and arm 73 and the associated cam 65 swing clockwise. As cam 65 swings clockwise (upward as viewed in FIG. 3), its edge 65e engages follower roll 63 on lever 57 and swings lever 57 clockwise (toward the left as viewed in FIG. 3). Roller 62 on lever 57 then swings the lower ends of feeler levers F1, F2, F3 to the left. As cam 65 completes its clockwise swing, its edge 65e rides off the follower roll 63. Then, on the return counterclockwise stroke of lever 55, the parts return to their initial positions.

The coin chute assembly 23 is substantially identical to the coin chute assembly shown in U.S. Patent 2,991,867. It extends down from the top of the main plate 1 adjacent the right side flange 5 of plate 1, leaving space between the left side of the coin chute assembly 23 and the left side flange 3 of plate 1 for the totalizer unit 15. The dime chute DC of assembly 23 is located between

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the nickel chute NC and the quarter chute QC, the quarter chute being on the inside of the dime chute toward plate 1, the nickel chute being on the outside of the dime chute away from plate 1 (see FIG. 5). The coin chute assembly 23 comprises a casting 85 formed with a groove on one side thereof forming the quarter chute QC and a casting 87 formed with grooves on opposite sides thereof forming the dime and nickel chutes. A plate 89 is provided between castings 85 and 87 serving as a partition between the quarter and dime chutes, and a cover plate 91 is provided overlying the outside of casting 87 serving as the outside wall of the nickel chute. Each of the castings 85 and 87 and the plates 89 and 91 is made with an arcuate slot so as to provide an arcuate slot 93 through the entire assembly 23. As fully disclosed in U.S. Patent 2,991,867, slot 93 registers with the nickel chute NC from the upper end of the slot through a portion of the slot having a length approximately one-fifth the entire length of the slot. Slot 93 registers with the dime chute DC from the upper end of the slot for approximately two-fifths the length of the slot. Slot 93 registers with the quarter chute QC substantially throughout the entire length of the slot. The coin chute assembly 23 is held together and secured to plate 1 by means of bolts such as indicated at 95, with a space between plate 1 and assembly 23 to accommodate the trip wire 17. The upper end of the assembly 23 is positioned in a gap 99 in a top flange 101 on plate 1, and the upper ends of the coin chutes are open.

It will be understood that the vending machine has a slot for nickels, dimes and quarters. Coins deposited in this slot enter a coin selector and slug rejector device (not shown) located above the coin chute assembly 23 to deliver nickels to the nickel chute NC, dimes to the dime chute DC and quarters to the quarter chute QC. The coin selector and slug rejector device also acts to reject coins of improper denominations (pennies) and spurious coins. Coin selector and slug rejector devices suitable for the purpose are well known: see, for example, U.S. Patent 2,292,628.

Totalizer unit 15 (see FIGS. 3, 4 and 8-11) is similar to totalizer unit 15 shown in U.S. Patent 2,991,867, with certain modifications as will appear. It comprises a rear or base plate 103, an intermediate or center plate 105, and a front cover plate 107. The base plate 103 is a die casting formed with three forwardly extending tubular spacer posts 109 (see FIGS. 8-10 and 12). The center plate 105 is a sheet metal plate having three holes 113 registering with posts 109. The front cover plate 107 is a die casting formed with three rearwardly extending tubular spacer posts such as indicated at 115 in FIG. 14, the ends of which engage center plate 105. Plates 103, 105 and 107 are held in assembly by screws 117 received in the posts.

The base plate 103 is formed with a rearwardly extending circular cup portion 119 (see FIG. 4). This fits in an opening 120 in main plate 1. A bearing 121 (which may be made of brass, for example), is riveted in a hole at the center of the circular base of cup portion 119. Bearing 121 secures a trip wire spring anchor 123 (see FIGS. 4 and 8) within the cup portion. The totalizer shaft 19 has one end received in bearing 121, and extends outward from base plate 103 through a hole in the center plate 105. The outer end of shaft 19 is received in a hole 127 in a cap 129 (which may be made of plastic such as nylon). The front cover plate 107 has an opening 131 receiving the cap, the latter having bayonet lugs 133 engaging the inside face of plate 107 to hold it in assembly therewith and allowing for its removal by turning to align the lugs 133 with notches 135 in plate 107. The cover plate 7a has an opening 137 accommodating the cap. A retaining plate 139 is secured to the outside of the cap 129 and has a notch 141 (see FIG. 1) for receiving a locking member 143 for holding the cap against turning.

A pawl carrier 145 (see FIGS. 4 and 9) constituted

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by a sheet metal stamping has a hub 147 rotatably mounted on the totalizer shaft 19 immediately in front of bearing 121. Trip wire 17 is secured to the pawl carrier 145 as indicated at 148 and extends through a slot in an ear 149 on the pawl carrier and thence in the space between the main plate 1 and the coin chute assembly 23 to the slot 93, where it has the finger 21 at its free end extending forward through the slot 93 across all three chutes NC, DC, QC. A clock spring 151 (see FIGS. 4 and 8) has one end fixed to the hub 147 of the pawl carrier and its other end secured to spring anchor 123 for biasing the pawl carrier 145 and the wire 17 to rotate counterclockwise as viewed in FIGS. 3 and 9 to a raised retracted position determined by engagement of the wire with a stop 155. Spring anchor 123 may be turned for adjustment of the spring bias on the pawl carrier 145.

Clock spring 151 is located on the side of the disk 145 toward the bearing 121 and within the cup 119. Pivoted at 157 on the other side of the pawl carrier 145 is a driving pawl 159 (see FIG. 9). Pawl carrier 145 also carries a leaf spring 161 biasing the pawl 159 toward engagement with a series of ratchet teeth 163 on a ratchet member 165 (see FIGS. 4, 10 and 12). This ratchet member 165 has a hub 167 mounted on the totalizer shaft 19 independently of pawl carrier 145, and is free to rotate relative to the pawl carrier. Member 165 is so formed as to have a disk portion 171 peripherally formed with holding ratchet teeth 173. Teeth 163 are driving teeth, being formed on an annular flange 175 of smaller diameter than disk 171 projecting rearward from disk 171. Ratchet member 165 is biased to rotate clockwise as viewed in FIG. 10 by a clock spring 177 having one end secured to the hub 167 of the ratchet member and its other end secured to a spring anchor 178 mounted on a lug 179 formed on base plate 103. Spring 177 is lighter and weaker than spring 151 (see FIG. 4). Plate 105 has an arcuate slot 183 (see FIG. 11) centered in and partially surrounding the hole in plate 105 for shaft 19, and an opening 185 extending radially outward from this arcuate slot at the top. Ratchet disk 171 has a finger 187 extending forward through arcuate slot 183.

At 189 (see FIG. 10) is indicated a holding pawl engageable with the holding teeth 173 on ratchet member 165. This holding pawl is pivoted on a pin 191 extending between the base plate 103 and the center plate 105. It is biased toward engagement with teeth 173 by a spring 193 attached to a spring post 195 on center plate 105. A reset lever 197 is pivoted at 199 on a pin extending from the base plate 103. The reset lever is biased by a torsion spring 201 to swing clockwise on pivot pin 199 to the retracted position in which it appears in FIG. 10. It has a downwardly extending tail 203 for actuating a reset arm 205. The latter is pivoted at its lower end as indicated at 207 on a stud extending from base plate 103 and is biased toward the retracted position in which it appears in FIG. 10 by a spring 211. This retracted position of the reset arm is determined by its engagement with lug 179. Arm 205, on swinging away from its retracted position, is engageable with the driving pawl 159 to release the latter. Reset lever 197 also carries a pin 212 engageable with the holding pawl 189. The arrangement is such that when the reset lever 197 swings away from its FIG. 10 retracted position, pin 212 moves up and releases holding pawl 189 and tail 203 on the reset lever swings reset arm 205 away from its retracted position to release the driving pawl 159. When the pawls are released, clock spring 177 is adapted to rotate the ratchet member 165 clockwise to zero position which is determined by engagement of finger 187 with the end 183a of slot 183.

At 213 (see FIG. 10) is indicated a latch adapted to latch the reset lever 197 in pawl-releasing position. This latch 213 comprises a lever pivoted as indicated at 215 on a pin extending between the base plate 103 and the center plate 105 and having a finger 217 at its free end adapted for latching engagement with a stud 219 on the

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 reset lever to latch the latter in pawl-releasing position. Latch lever 213 also has an arm 221 having a finger 223 at its free end engageable by a projection 225 on ratchet member 165 when the latter returns to zero position. The latch lever 213 is gravity biased in the direction toward latching engagement with stud 219 on the reset lever. Each time the reset lever 197 is moved to release the pawls, latch lever 213 tends to move into position to latch the reset lever 197 in pawl-releasing position. Assuming the ratchet member returns to zero position following release of the pawls, projection 225 on the ratchet member strikes finger 223 on latch arm 221 before latch lever 213 has had time to drop into latching engagement with reset lever 197, thereby allowing reset lever 197 to return to retracted position. If, however, the ratchet member should fail to return to zero position, the latch lever 213 drops into latching engagement with reset lever 197 and holds it in pawl-releasing position.

Referring to FIG. 4, there is shown a bushing 225 which is mounted on shaft 19, being rotatable relative to the shaft. This bushing has a flange 227 at its rearward end. The flange 227 has a notch 229 (see FIG. 11) receiving the finger 187 for keying the bushing 225 to the ratchet member 165 so that the bushing rotates with the ratchet member. The front face of flange 227 has markings spaced at intervals corresponding to the spacing of the ratchet teeth and representing prices from five cents to sixty cents in five cent increments (see FIG. 11). On the forward face of the flange surrounding the bushing are crown coupling teeth 231. The stops S1, S2 and S3 fit rotatably on the bushing. The stops are identical, each comprising a disk having crown coupling teeth 233 on both faces thereof, and having a lobe 235 extending for about 53° of arc around the periphery of the disk. The leading ends of the lobes 235 of stops S1, S2 and S3 are respectively designated S1A, S2A and S3A. Stop S1 is the rear stop of the three, stop S2 is the middle stop, and stop S3 is the front stop. The stops are biased axially rearward on the bushing 225 by a spring 237. With the crown coupling teeth of stop S2 in mesh with the teeth on stops S1 and S3 and with the teeth on stop S1 in mesh with the crown coupling teeth 231 on the flange 227, and with finger 187 of ratchet member 165 in the notch 229 of flange 227, all three stops are locked to the ratchet member 165 for rotation therewith. The stops are independently rotatably adjustable on the bushing 225 by moving them outward on the bushing against the bias of the spring 237 to disengage the teeth, and then rotating them to a desired angular position. The stops S1, S2 and S3 have projections such as indicated at 239 which serve as pointers in conjunction with the markings on flange 227 for facilitating the adjustment of the stops.

Coins drop out of the chutes NC, DC and QC into a hopper indicated at 241 in the lower part of the apparatus (see FIG. 3). This hopper is defined by plates 1 and 7b and left and right lower pivoted gates 243 and 245. The gates have a common pivot at 247. A spring-biased coin return bar 249 (see FIG. 2) vertically slidable on the outside of the plate 1 has a finger 251 reaching through a slot 253 in the plate 1 under the left-hand gate 243 for holding this gate in an upper closed position. Springs for biasing the bar 249 upward are indicated at 255 in FIG. 2. Upon downward movement of the bar 249 against the bias of the springs 255, finger 251 engages a hook 257 on the bottom of gate 243, and swings this gate down to spill out any coins in the hopper into a chute 259 for return to a customer.

Pivoted at 261 on the outside of the lower front cover plate 7b is a lever 263 (see FIG. 1). This lever is biased by a spring 265 to swing clockwise (upward) to the raised retracted position in which it appears in FIG. 1. This retracted position is determined by engagement of the end of the lever with an ear 267 struck out from plate 7b. Lever 263 has a cam follower roller 269 engageable

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 by a cam edge 271 on arm 55b of lever 55, the arrangement being such that lever 263 is swung downward when lever 55 turns clockwise, and returns upward when lever 55 returns counterclockwise. The right-hand gate 245 has a finger 273 extending through an arcuate slot 275 in the lower front cover plate 7b. Lever 263 has a slot 277 receiving finger 273 and a roller 279 at the top of the slot engageable with the finger, the arrangement being such that, on downward swing of lever 263, gate 245 is swung down to spill out any coins in the hopper into a chute 281 which leads to a money box, and, on return upward swing of lever 263, gate 245 returns to closed position. A torsion spring 283 is provided on pivot 247.

Means is provided for damping or braking the trip wire 17 on its upward (return) swing to slow down its movement and the movement of the pawl carrier 145 to preclude overrunning or overriding of the ratchet member 165, bushing 225 and members S1-S3 which are keyed to the ratchet member. As shown in FIG. 3, this damping means comprises a damping wire 285 pivoted as indicated at 287 on plate 1 hanging down from the pivot in position for brushing against the trip wire 17 and having a weight 289 at its lower end. The arrangement is such that as the trip wire 17 swings upward, it brushes against the wire 285, thereby retarding its movement to prevent override of the ratchet member 165, bushing 225 and members S1-S3.

A stud 291 (see FIG. 3) extends forward from plate 1 at the left of the coin chute assembly 23 adjacent the top of plate 1. Pivoted on this stud is a cam 293 for actuating the reset lever 197. Cam 293 normally occupies the retracted position in which it appears in FIG. 3 determined by its engagement with an ear 295 struck from plate 1. It has a cam edge 297 engageable on clockwise swing of the cam with a follower roll 299 on the reset lever to swing the reset lever away from its retracted position to its pawl-releasing position. Roll 299 extends through a slot 301 in plate 1 for actuation by coin return bar 249, the latter having a notch 303 (see FIG. 2) formed to provide a cam edge for this purpose. Cam 293 is actuated by a link 305 from cam 65, this link being pin-connected at its lower end as indicated at 307 to cam 65 and having a pin and slot connection at its upper end as indicated at 309 to cam 293.

A lever 311, which may be referred to as a nonreset lock lever, is pivoted on stud 291 along with cam 293, overlying the link 305. Lever 311 has an arm 313 extending toward the left with a finger 315 on the arm engageable with the reset lever 197. A spring 317 biases lever 311 to swing clockwise, and thereby holds finger 315 in engagement with the reset lever. Lever 311 also has a downwardly extending arm 319 having a serrated lower end 321. Link 305 carries a forwardly projecting pin 323. The arrangement is such that when reset lever 197 is in retracted position, it holds nonreset lock lever 311 in its FIG. 3 retracted position wherein the lower end 321 of arm 319 of lever 311 is clear of pin 323 on link 305. This permits upward movement of the link on actuation of cam 65 to actuate the reset cam 293, and hence to actuate the reset lever 197. If reset lever 197 should be latched in its pawl-releasing position by latch 213 due to failure of ratchet member 165 to return to zero position, then, after link 305 has moved downward, lever 311 swings to the left to the point where finger 315 engages the reset lever, which brings the lower end 321 of arm 319 of lever 311 directly above the pin 323 on link 305. Then, on the next attempted actuation, link 305 is blocked from moving upward, thereby precluding actuation of cam 65, and hence precluding operation of latch release levers R1, R2, R3.

Auxiliary feeler levers F1A, F2A and F3A are pivoted on a pin 325 received in a feeler guide assembly 327 which is mounted on the forward side of center plate 105 of totalizer unit 15. This feeler guide assembly

comprises a base plate 329 next to the center plate 105 and three feeler guide plates each designated 331 formed to provide spaces for the feeler levers. The feeler guide assembly is held together and secured to the center plate 105 by rivets 333, being located at the left of the totalizer unit. Pin 325 extends through holes in the base plate and the guide plates, being located toward the left of and above the axis of the totalizer shaft 19. The auxiliary feeler levers are identical, each having a finger 335 extending toward the right adjacent its lower end adapted to feel in toward a respective member S1, S2, S3 somewhat below the horizontal plane of shaft 19. Tension springs such as indicated at 337 connected between the upper ends of auxiliary feeler levers F1A, F2A and F3A and a stud 339 extending forward from the center plate 105 bias the auxiliary feeler levers to swing away from members S1, S2, S3 to the retracted position in which they appear in FIGS. 11 and 13. There are three such springs, one for each auxiliary feeler lever. Main feeler levers F1, F2 and F3 reach up into the spaces in the feeler guide assembly 327 behind the lower ends of auxiliary feeler levers F1A, F2A, F3A, respectively. With the auxiliary feeler levers biased by springs 337 to their stated retracted position, main feeler levers F1, F2, F3 are normally held in the retracted position in which they appear in FIG. 3. Springs 337 are light, weak springs.

Operation is as follows:

As herein illustrated, and by way of example, the apparatus may be set up for vending twenty-five cent, thirty cent and thirty-five cent items. Certain pullout rods of the vending machine will then be adapted for dispensing twenty-five cent items, others will be adapted for dispensing thirty cent items, and others will be adapted for dispensing thirty-five cent items. Actuation of latch release lever R1 is required to unlock any twenty-five cent rod; actuation of lever R2 in addition to R1 is required to unlock any thirty cent rod; and actuation of all three levers R1-R3 is required to unlock any thirty-five cent rod. Stops S1, S2, S3 are set in such angular positions relative to one another and to the bushing 225 that it takes five steps of the ratchet member 165 from zero position to rotate the cluster of stops to a position wherein lobe 235 of stop S1 is brought around to blocking position as regards finger 335 of auxiliary feeler F1A, six steps of the ratchet member to rotate the cluster to a position where lobe 235 of stop S2 is brought around to blocking position as regards finger 335 of auxiliary feeler F2A, and seven steps of the ratchet member to rotate the cluster to a position where lobe 235 of stop S3 is brought around to blocking position as regards finger 335 of auxiliary feeler lever F3A.

It will be understood that on deposit of a nickel, ratchet member 165 and the cluster of stops S1-S3 are indexed forward (rotated counterclockwise as viewed in FIGS. 3 and 11) through a one-tooth or one-step interval and held in their so advanced position against the bias of the ratchet return spring 177 by the pawls 159 and 189. On deposit of a dime, the ratchet member and cluster are indexed forward two steps, and on deposit of a quarter, the ratchet member and cluster are indexed forward five steps.

Assuming that a purchaser has deposited twenty-five cents in coin (either as a quarter, two dimes and a nickel, a dime and three nickels, or five nickels), the ratchet member 165 and stops S1-S3 will be indexed five steps from the zero position shown in FIGS. 3 and 11 to a twenty-five cent position and latched in the five-step advanced position by pawls 159 and 189. This brings stops S1, S2, S3 around from their zero position to a position with the lobe of stop S1 opposed to finger 335 of auxiliary feeler F1A, but with the lobes of stops S2 and S3 still clear of fingers 335 of auxiliary feelers F2A and F3A. Now, having deposited twenty-five cents, the purchaser pulls out a twenty-five cent rod of the vending machine, resulting in clockwise rotation of shaft 49 and lever 55.

The latter then pulls link 75 to the right and rotates arm 73 and cam 65 clockwise. Cam edge 65e on cam 65 engages cam follower roll 63 on lever 57 and swings the latter clockwise (toward the left as viewed in FIG. 3). Roller 62 on lever 57 engages the lower ends of main feeler levers F1, F2 and F3 and swings the lower end of each of these levers to the left. The upper end of main feeler lever F1 engages auxiliary feeler F1A, which is now blocked from swinging more than a small amount inward toward stop S1 by the lobe on this stop. Accordingly, the blocked auxiliary feeler F1A provides a fulcrum for clockwise swinging of main feeler lever F1 about the point of engagement of the upper end of main feeler lever F1 and auxiliary feeler F1A, and main feeler lever F1 swings clockwise about the fulcrum so provided. This effects translation of pivot 37 of lever F1 toward the left, thereby pulling drag link D1 toward the left to actuate the latch release lever R1. This permits the twenty-five cent rod of the vending machine to be completely pulled out and then returned to its retracted position to dispense a twenty-five cent item. Feeler levers F2 and F3 are not blocked from swinging inward toward stops S2 and S3, since the lobes on these stops are clear of fingers 335 on auxiliary feelers F2A and F3A. Accordingly, feeler levers F2 and F3 simply swing freely clockwise on their pivots 37 on links D2 and D3, and the latter remain in their retracted position so that latch release levers R2 and R3 are not actuated. This precludes operation of a thirty cent or thirty-five cent rod on deposit only of twenty-five cents.

As cam 65 continues through its stated clockwise swing, its cam edge 65e rides off the follower roll 63 on lever 57, and the latter is thereby allowed to swing back toward the right to release the feeler levers F1, F2, F3. Springs 337 then return the auxiliary feelers F1A, F2A and F3A, and particularly the auxiliary feeler F1A, to retracted position to remove feeler pressure on the cluster of stops S1-S3 to allow ratchet member 165 and the cluster to reset to the zero position. Link 305, being driven upward by cam 65, then swings reset cam 293 clockwise. Nonreset lock lever 311 at this time is in its retracted position, and its arm 319 is clear of pin 323 on link 305. The pin and slot connection at 309 provides for lost motion to delay actuation of reset cam 293 until after cam edge 65e of cam 65 has ridden off roll 63 to release the feelers. On the stated clockwise swing of reset cam 293, its edge 297 engages follower roll 299 on reset lever 197 to swing the latter counterclockwise from its retracted position. On such counterclockwise swing of the reset lever 197, its tail 203 swings reset arm 205 clockwise to release the driving pawl 159 and pin 212 on the reset lever releases the holding pawl 189. Ratchet member 165 and stops S1-S3 are thus freed for return to zero position under the bias of spring 177. As the reset lever 197 swings away from its retracted position to release the pawls, the nonreset lock lever 311 follows it, swinging clockwise away from the retracted position shown in FIG. 3.

When the pull-out rod of the vending machine is returned, shaft 49 and lever 55 are returned counterclockwise back to the initial position. Cam 65 is thereupon returned to its initial position, and pulls link 305 back down to its initial position. Cam 293 thereupon returns to initial position, releasing the reset lever 197 for return to retracted position provided the reset lever has not been latched in its pawl-releasing position by the latch 213. Assuming reset lever 197 has not been so latched, it swings clockwise back to retracted position and, in so doing, swings nonreset lock lever 311 back to retracted position. Whether or not the reset lever 197 becomes latched depends on whether or not ratchet member 165 is actually quickly returned to zero position. If the ratchet member quickly returns to zero position, projection 225 thereon strikes the finger 223 on arm 221 of latch 213 and keeps the latter from dropping into latch-

ing position. If, however, the ratchet member should fail quickly to return to zero position (as, for example, because of dirt in the mechanism), latch 213 drops into latching engagement with stud 219 on the reset lever and latches the latter in its pawl-releasing position. If the reset lever should be latched by latch 213 in its pawl-releasing position due to failure of the ratchet member to reset quickly to zero position, the nonreset lock lever 311 remains in active position toward the right of its FIG. 3 retracted position wherein the serrated lower end 321 of arm 319 lies in the path of pin 323 on link 305. This prevents further operation of the vending machine until the ratchet member 165 and stops S1-S3 are returned to the zero position. Sometimes it is possible to release the ratchet member 165 for return to zero position by actuating coin return bar 249, which actuates the reset lever 197, and then when the ratchet member returns to zero position, latch 213 is released to release the reset lever for return to retracted position, which returns the nonreset lock lever 311 to retracted position. Otherwise, it is necessary to service the machine.

Also, upon the above-noted clockwise rotation of lever 55, the cam edge 55b thereon engages follower roller 269 on lever 263, and swings the latter lever downward. Roller 279 on lever 263 engages finger 273 on the right-hand gate 245, and swings this gate down to spill out the coin or coins in hopper 241 into the chute 281 for delivery of the coin or coins to the money box. On counterclockwise return of lever 55, lever 263 swings back up and gate 245 is returned to closed position.

If less than twenty-five cents in coin should be deposited, stops S1-S3 are rotated through less than the five steps necessary to bring lobe 235 of stop S1 into feeler-blocking position in relation to main feeler lever F1. Accordingly, feeler lever F1, as well as feeler levers F2 and F3, is adapted for full-stroke inward swing, and on attempted operation of any pull-out rod of the vending machine, all three feeler levers F1-F3 simply pivot freely on their pivots 37 without actuating latch release levers R1-R3. Thus, buying is entirely precluded unless at least the minimum amount of twenty-five cents is deposited in coin or coins.

Assuming that a purchaser has deposited thirty cents in coin, the stops S1-S3 will be rotated six steps from the zero position. This brings stops S1 and S2 to a position with lobes 235 of these two stops opposed to the respective auxiliary feelers F1A and F2A. As previously stated, it is necessary to operate release levers R1 and R2 to obtain a thirty cent item. When the purchaser, having deposited thirty cents, pulls out a thirty cent rod of the vending machine, the action is similar to that above described except that auxiliary feeler F2A is blocked as well as auxiliary feeler F1A. Accordingly, auxiliary feeler F2A provides a fulcrum for clockwise swinging of main feeler lever F2 about the point of engagement of the upper end of main feeler lever F2 with auxiliary feeler F2A, and main feeler lever F2 swings clockwise about the fulcrum so provided to move drag link D2 toward the left to actuate the latch release lever R2. Latch release lever R1 is actuated in the same manner as above described for deposit of a quarter. Accordingly, the thirty cent pull-out rod of the vending machine may be completely pulled out and then returned to retracted position to dispense a thirty cent item. Feeler lever F3 is not blocked, and hence it simply swings freely on its pivot 37 on link D3, and the latter remains in retracted position so that latch release lever R3 is not actuated. This precludes operation of a thirty-five cent rod on deposit of thirty cents.

Assuming that a purchaser has deposited thirty-five cents in coin, the stops S1-S3 will be rotated seven steps from the zero position. This brings all three stops to a position with their lobes 235 opposed to auxiliary feelers F1A, F2A, F3A. As previously stated, it is necessary to operate all three release levers R1-R3 to obtain a thirty-five cent item. When the purchaser, having depo-

sited thirty cents, pulls out a thirty-five cent rod of the vending machine, the action is similar to that above described for thirty cent operation, except that auxiliary feeler F3A is blocked as well as auxiliary feelers F1A and F2A. Accordingly, auxiliary feeler F3A provides a fulcrum for clockwise swinging of main feeler lever F3 about the point of engagement of the upper end of main feeler lever F3 with auxiliary feeler F3A, and main feeler lever F3 swings clockwise about the fulcrum so provided to move drag link D3 toward the left to actuate the latch release lever R3. Latch release levers R1 and R2 are actuated in the same manner as above described for thirty cent operation. Accordingly, the thirty-five cent pull-out rod of the vending machine may be completely pulled out and then returned to retracted position for dispensing a thirty-five cent item.

It will be observed that, with any of stops S1-S3 in feeler-blocking position, there is in effect a direct mechanical connection from the pull-out rod to the respective latch release lever R1-R3 for positive actuation of the respective latch release lever. This minimizes the possibility of failure to actuate a latch release lever on a fast pull of the pull-out rod, as might occur if the linkage were to include a yielding spring link. In this regard, it is to be noted that spring 81 is a strong spring, provided simply to take care of the possibility of jamming of the coin apparatus, and for ordinary purposes may be regarded as a rigid link between lever 55 and crank arm 73. The direct mechanical connection is established via shaft 49, lever 55, spring 81 (which for ordinary purposes may be regarded as a rigid link), arm 73, cam 65, lever 57, the respective main feeler lever F1, F2, F3, and the respective drag link D1, D2, D3. Also, on pulling out any rod, there is no major spring force to be overcome, and pull-out of the rod is thereby made easy. Additionally, provision is made for lockout in case of failure of the totalizer unit quickly to reset to zero.

It will be understood that conversion of the apparatus to different three-price setups may be readily accomplished by changing the position of stops S1-S3 relative to the bushing 225 and/or relative to one another.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Coin apparatus comprising a totalizer for totalizing the value of coins deposited in the apparatus and including an indexing stop movable away from a retracted position to an operative position in steps corresponding to a unit coin value and biased to return to retracted position, coin-actuated means operable in response to deposit of coin in the apparatus for advancing said stop in amounts proportioned to coin values, means for holding the stop in advanced position against the return bias, a latch release member, a link connected to said latch release member, a feeler lever pivoted on said link, means operable on said lever to swing one end thereof in the direction toward the stop and then release said lever, and means for releasing the stop for return to retracted position upon release of the lever, said stop when in retracted position clearing said one end of the feeler lever for free swinging movement of the feeler lever on its pivot without moving said link and when in operative position blocking said one end of the feeler lever against movement to establish a fulcrum about which said feeler lever swings to effect translation of its pivot and consequent movement of said link to actuate said latch release member upon operation of said means.

2. Coin apparatus as set forth in claim 1 wherein said stop is a rotary stop having a lobe which blocks said

one end of the feeler lever when the stop is in operative position.

3. Coin apparatus as set forth in claim 2 further comprising an auxiliary feeler engageable by said one end of the feeler lever and engageable with said lobe when the stop is in operative position.

4. Coin apparatus comprising a totalizer for totalizing the value of coins deposited in the apparatus, said totalizer comprising an indexing stop means including a plurality of stops movable as a unit away from a retracted position in steps corresponding to a unit coin value to different operative positions and biased to return to retracted position, coin-actuated means operable in response to deposit of coin in the apparatus for advancing said stop means in amounts proportional to coin values, means for holding said stop means in advanced position against the return bias, a plurality of latch release members, one for each stop, a plurality of links, one for each latch release member, each connected to a respective latch release member, a plurality of feeler levers, one for each link, each pivoted intermediate its ends on a respective link, means operable on one end of the levers to swing the other ends thereof in the direction toward the respective stops and then release said levers, and means for releasing said stop means for return to retracted position upon release of said levers, each stop when in retracted position clearing said other end of the respective feeler lever for free swinging movement thereof on its pivot without moving the respective link and when in operative position blocking said other end of the respective feeler lever against movement to establish a fulcrum about which said feeler lever swings to effect translation of its pivot and consequent movement of the respective link to actuate the respective latch release member upon operation of said means.

5. Coin apparatus as set forth in claim 4 wherein the stops are rotary stops all rotatable as a unit on a common axis, each stop having a lobe which blocks said other end of the respective feeler lever when the stop is in operative position, said lobes being angularly displaced around said axis.

6. Coin apparatus as set forth in claim 5 further comprising auxiliary feelers, one for each feeler lever and stop, each engageable by said other end of the respective feeler lever and engageable with the lobe of the respective stop when the stop is in operative position.

7. Coin apparatus comprising a totalizer for totalizing the value of coins deposited in the apparatus and including an indexing stop movable away from a retracted position in steps corresponding to a unit coin value and biased to return to retracted position, coin-actuated means operable in response to deposit of coin in the apparatus for advancing said stop in amounts proportional to coin values, means for holding the stop in advanced position against the return bias, a member movable away from and back to a retracted position, a feeler mounted on said member adapted for movement relative to said member without moving it and adapted for working movement to move it, means for moving the feeler toward the stop, then releasing the feeler, and then releasing said stop for return to retracted position, said stop when in retracted position allowing free movement of the feeler without moving said member and when in a predetermined advanced position constraining the feeler to effect working movement of the feeler to move said member upon operation of said feeler-moving means, and means for locking said feeler-moving means out of operation in response to release of the stop without return of the stop to retracted position, said locking means remaining inactive in response to release of the stop and return thereof to retracted position.

8. Coin apparatus comprising a totalizer for totalizing the value of coins deposited in the apparatus and including an indexing stop movable away from a retracted position and biased to return to retracted position, coin-

actuated means for advancing said stop in amounts proportional to coin values, means for holding the stop in advanced position against the return bias, a latch release member, a link connected to said latch release member, a feeler lever pivoted on said link, means operable on said feeler lever to swing one end thereof in the direction toward said stop and then to release said feeler lever, reset means operable from said lever-swinging means to release the stop for return to retracted position after release of the feeler lever, said stop when in retracted position clearing said one end of the feeler lever for free swinging movement of the feeler lever on its pivot without moving said link and when in a predetermined advanced position blocking said one end of the feeler lever against movement to establish a fulcrum about which said feeler lever swings to effect translation of its pivot and consequent movement of said link to actuate said latch release member upon operation of said lever-swinging means, and means for locking said lever-swinging means out of operation in response to release of the stop to retracted position, said locking means remaining inactive in response to release of the stop and return thereof to retracted position.

9. Coin apparatus as set forth in claim 8 wherein said reset means includes a reset member movable from a retracted position to a release position for releasing the stop, and said locking means comprises means for latching the reset member in release position in response to movement of the reset member to release position without return of the stop to retracted position, and means for locking said feeler-swinging means out of operation in response to latching of said reset member.

10. Coin apparatus comprising an indexing member rotatable in a forward direction away from a zero position and biased to return to zero position, coin-actuated means including a driving pawl and ratchet for rotating the indexing member forward in amounts proportional to coin value, a holding pawl for the ratchet, a reset member movable from a retracted position to release the pawls for return of the indexing member under the bias from an advanced to zero position, means for actuating the reset member, means for latching the reset member in pawl-releasing position in response to movement of the reset member to pawl-releasing position without return of the indexing member to zero position, and means for locking said reset member actuating means against movement in response to latching of said reset member in pawl-releasing position.

11. Coin apparatus as set forth in claim 10 wherein said reset member comprises a lever pivoted for swinging movement from retracted to pawl-releasing position and biased to retracted position, wherein said latching means is engageable by said indexing member on quick return thereof to zero position to keep it out of latching engagement with said reset lever, and wherein said locking means comprises a locking lever engaging the reset lever and biased to move toward a locking position on movement of the reset lever to pawl-releasing position and to be returned to an inactive position by the reset lever on return of the latter to retracted position.

12. Coin apparatus as set forth in claim 11 wherein the means for actuating said reset lever comprises a cam and a link for moving the cam, said locking lever when in locking position blocking said link.

13. Coin apparatus comprising a totalizer for totalizing the value of coins deposited in the apparatus and including an indexing stop movable away from a retracted position in steps corresponding to a unit coin value and biased to return to retracted position, coin-actuated means operable in response to deposit of coin in the apparatus for advancing said stop in amounts proportional to coin values, means for holding the stop in advanced position against the return bias, a member movable away from and back to a retracted position, a feeler mounted on said member adapted for movement relative to said member

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without moving it and adapted for working movement to move it, means for moving the feeler toward the stop, then releasing the feeler, and then releasing said stop for return to retracted position, said stop when in retracted position allowing free movement of the feeler without moving said member and when in a predetermined advanced position constraining the feeler to effect working movement of the feeler to move said member upon operation of said feeler-moving means.

14. Coin apparatus as set forth in claim 13 wherein said feeler comprises a lever pivoted on said member and wherein said indexing stop, when in its said predetermined advanced position, establishes a fulcrum for said feeler lever to effect swinging movement thereof about the fulcrum to move said member upon operation of said feeler-moving means.

15. Coin apparatus as set forth in claim 14 wherein said member comprises a slidable link, and wherein said feeler lever is pivoted intermediate its ends on said link, said feeler-moving means being operative on one end of said feeler lever and the other end of said feeler lever being movable toward and away from said stop.

16. Coin apparatus as set forth in claim 15 wherein an auxiliary lever is interposed between said other end of said feeler lever and said stop.

17. Coin apparatus comprising a totalizer for totalizing the value of coins deposited in the apparatus, said totalizer comprising an indexing stop means including a plurality of stops movable as a unit away from a retracted position in steps corresponding to a unit coin value to different operative positions and biased to return to retracted position, coin-actuated means operable in response to deposit of coin in the apparatus for advancing said stop means in amounts proportional to coin values, means for holding said stop means in advanced position against the return bias, a plurality of members, one for each stop, each movable away from and back to a retracted

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position, a plurality of feelers, one for each of said members, each mounted on a respective one of said members for free movement relative thereto without moving it and adapted for working movement to move it, means for moving the feelers toward the respective stops, then releasing the feelers, and then releasing said stop means for return to retracted position, each stop when out of its operative position allowing free movement of the respective feeler without moving the respective member and when in its operative position constraining the respective feeler to effect working movement thereof to move the respective member upon operation of said feeler-moving means.

18. Coin apparatus as set forth in claim 17 wherein each feeler comprises a lever pivoted on the respective member and wherein each stop, when in operative position, establishes a fulcrum for the respective feeler lever to effect swinging movement thereof about the fulcrum to move the respective member upon operation of said means.

19. Coin apparatus as set forth in claim 18 wherein each member comprises a slidable link, and wherein each feeler lever is pivoted intermediate its ends on the respective link, said means being operative on one end of each lever and the other end of each lever being movable toward and away from the respective stop.

20. Coin apparatus as set forth in claim 19 wherein auxiliary feelers are interposed between the said other ends of the levers and the respective stops.

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