

Jan. 29, 1957

B. W. FRY

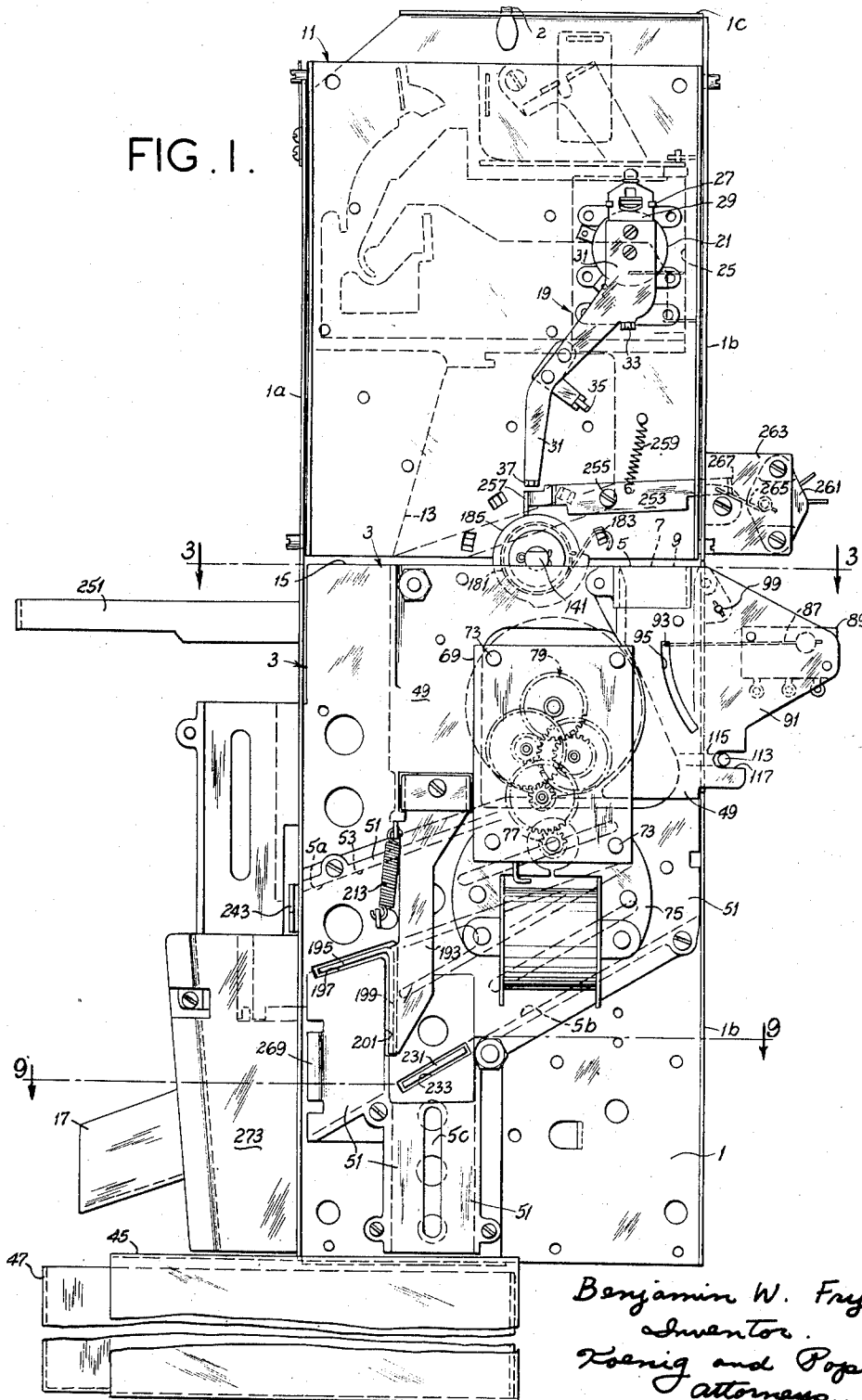
2,779,449

COIN MECHANISM

Filed June 1, 1954

5 Sheets-Sheet 1

FIG. 1.



Benjamin W. Fry,
Inventor.
Koenig and Pope,
Attorneys.

Jan. 29, 1957

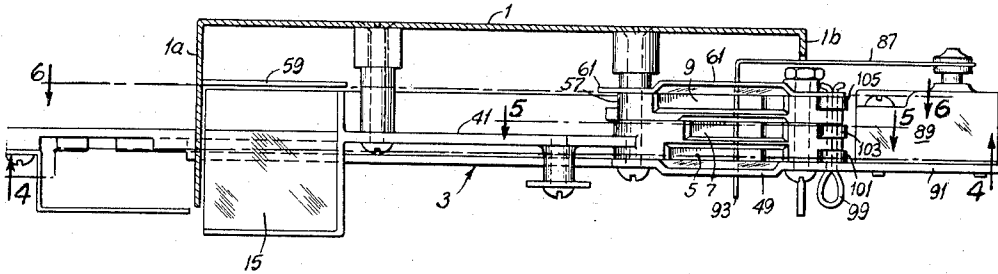
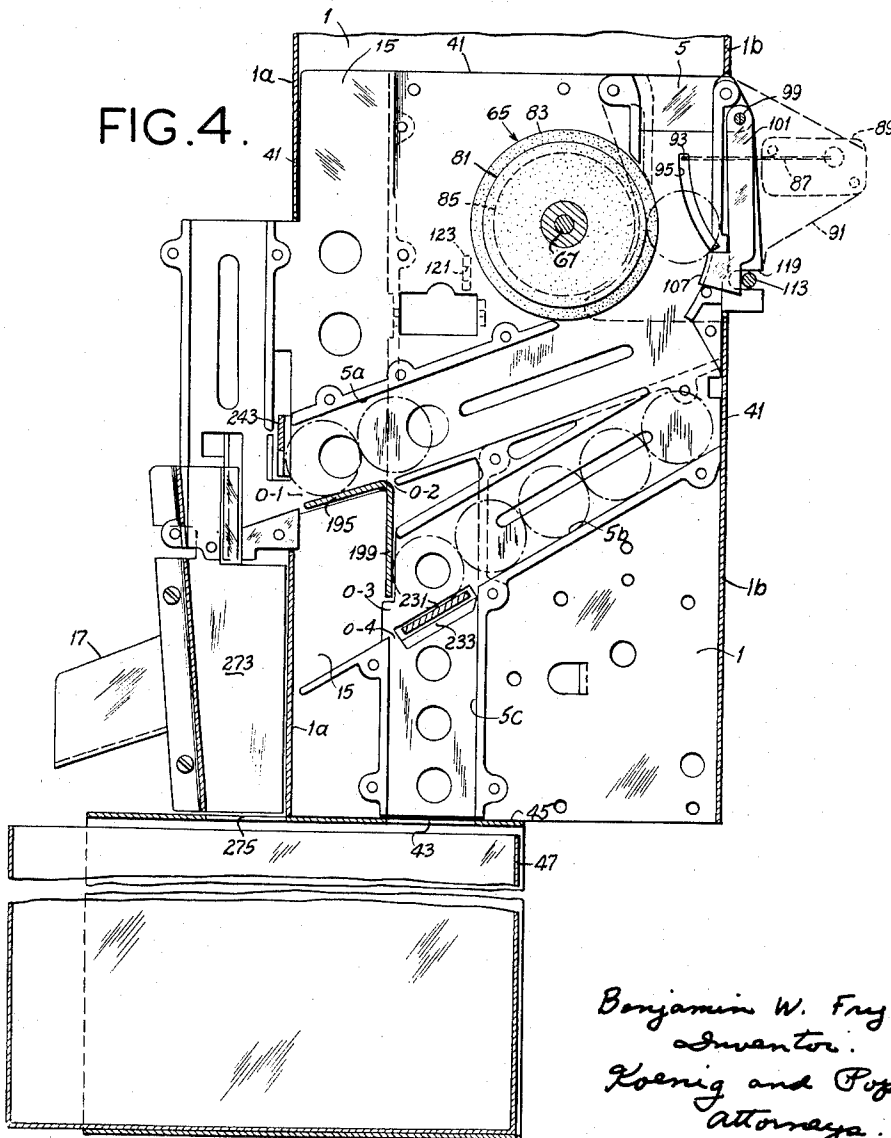
B. W. FRY
COIN MECHANISM

2,779,449

Filed June 1, 1954

5 Sheets-Sheet 2

FIG. 3.



Jan. 29, 1957

B. W. FRY

2,779,449

COIN MECHANISM

Filed June 1, 1954

5 Sheets-Sheet 3

FIG. 5.

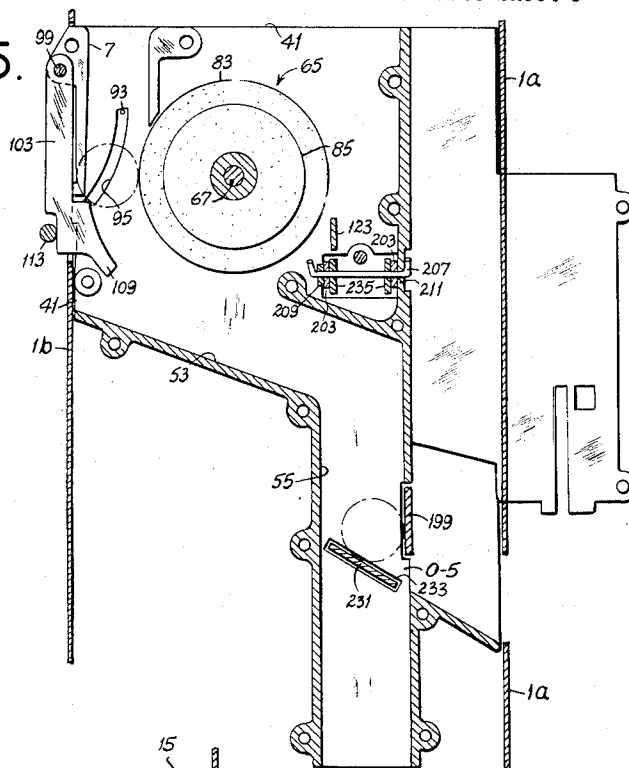
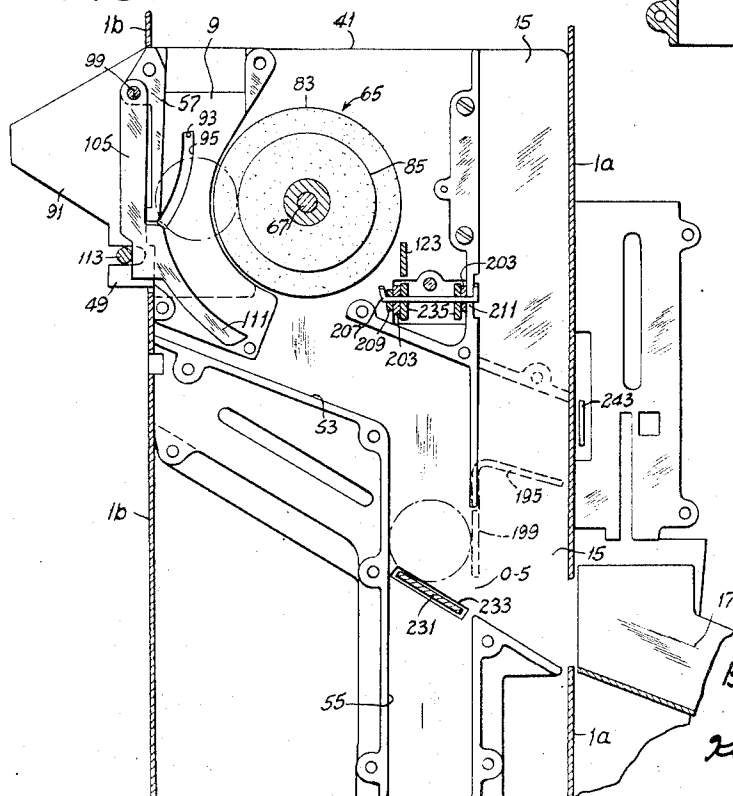


FIG. 6.



Benjamin W. Fry,
inventor.
Koenig and Pope,
attorneys.

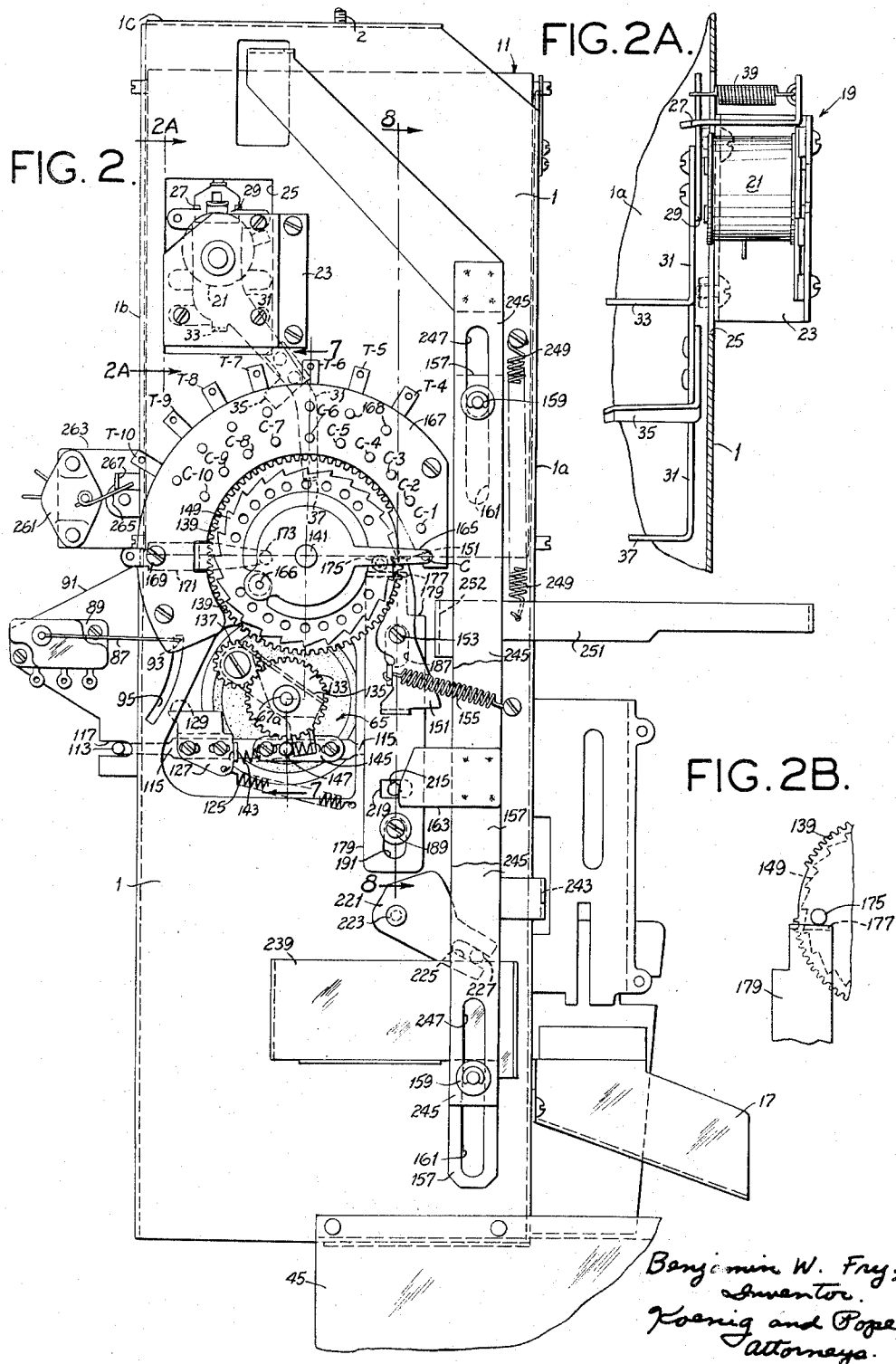
Jan. 29, 1957

B. W. FRY
COIN MECHANISM

2,779,449

Filed June 1, 1954

5 Sheets-Sheet 4



Jan. 29, 1957

B. W. FRY
COIN MECHANISM

2,779,449

Filed June 1, 1954

5 Sheets-Sheet 5

FIG. 8.

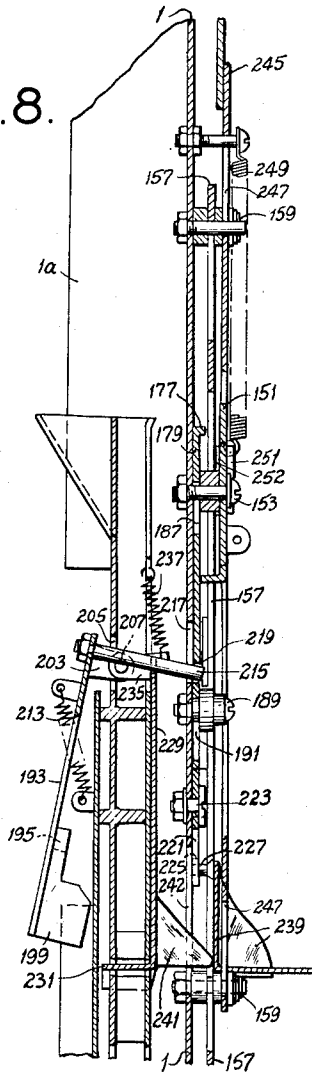


FIG. 7.

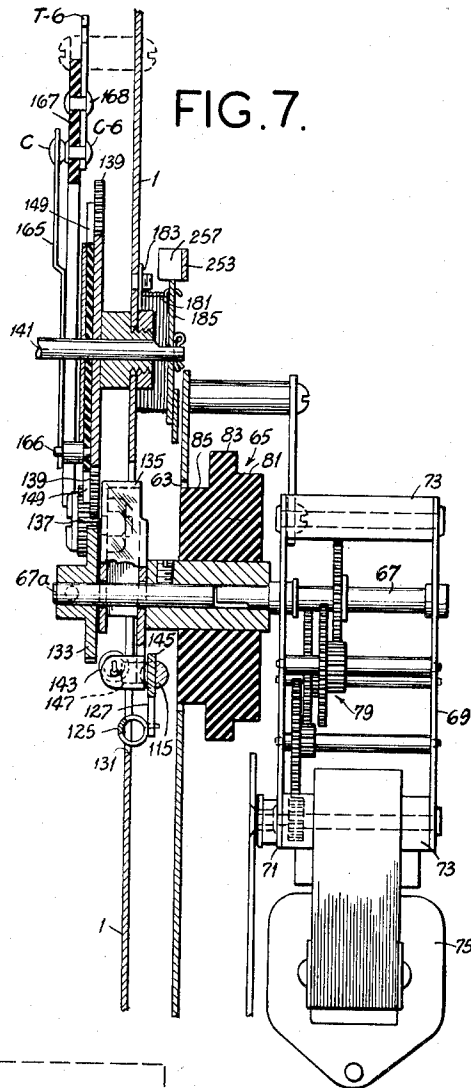
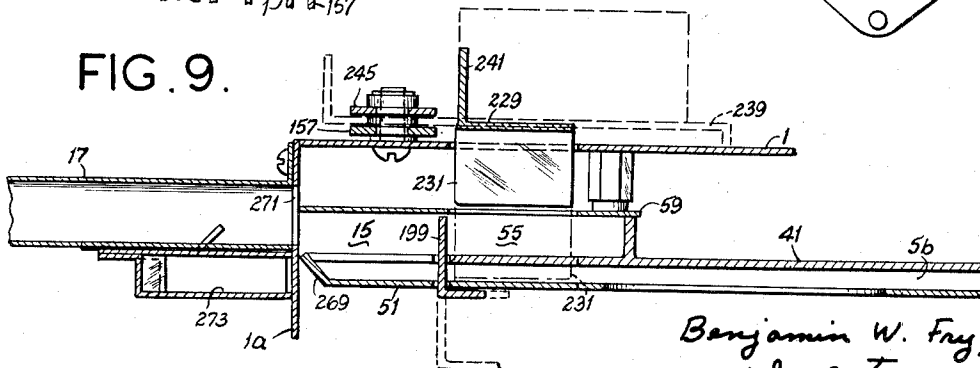


FIG. 9.



Benjamin W. Fry,
Inventor.
Koenig and Pope,
Attorneys.

1

2,779,449

COIN MECHANISM

Benjamin W. Fry, Ladue, Mo., assignor, by mesne assignments, to National Vendors, Inc., a corporation of Missouri

Application June 1, 1954, Serial No. 433,400

14 Claims. (Cl. 194—9)

This invention relates to coin mechanisms, and more particularly to coin-operated control apparatus for use in connection with vending machines.

The invention is an improvement upon coin mechanisms such as shown in my United States Patent 2,433,689, issued December 30, 1947, and among its several objects may be noted the provision of a simplified and more compact mechanism which is adapted to accept coins of different denominations, for example, nickels, dimes and quarters, to record the total amount inserted, and to control vending operations in accordance with the total amount inserted; the provision of coin mechanism of this class which is adapted for controlling the operation of a vending machine which stocks items having a wide range in price; and the provision of a coin mechanism of this class which is relatively economical to manufacture and reliable in operation. 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 view in elevation of the outside of a coin mechanism of this invention;

Fig. 2 is a view in elevation of the inside of the coin mechanism;

Fig. 2A is an enlarged vertical section taken on line 2A—2A of Fig. 2;

Fig. 2B is a fragmentary detail;

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 1, parts being omitted;

Figs. 4, 5 and 6 are reduced vertical cross sections taken on lines 4—4, 5—5 and 6—6, respectively, of Fig. 3;

Fig. 7 is an enlarged vertical cross-section taken on line 7—7 of Fig. 2;

Fig. 8 is an enlarged vertical cross section taken on line 8—8 of Fig. 2; and,

Fig. 9 is an enlarged cross section taken on line 9—9 of Fig. 1.

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

Referring to the drawings, which illustrate a coin mechanism of this invention adapted to accept nickels, dimes and quarters, and to control the operation of a vending machine (not shown) which may stock items ranging in price from five cents up to fifty cents in five-cent increments, there is indicated at 1 a main plate for supporting the various elements of the coin mechanism. This plate has vertical front and rear flanges 1a and 1b, and a top flange 1c. It is mounted in the vending machine at one side of the machine with these flanges extending outward. The side of the plate from which the flanges extend outward is hence referred to as the outside of the plate, and its other side is referred to as its

2

inside. A mounting screw is shown at 2 in the top flange. Mounted between the flanges 1a and 1b on the outside of the plate, and spaced outward from the outside of the plate, is a multiple coin chute assembly 3. This has three upper rear vertical coin chutes 5, 7 and 9 side-by-side. The planes of these chutes are parallel to the plate 1. The outermost chute 5 is for nickels, the next chute 7 for dimes, and the inner chute 9 for quarters.

A coin selector 11 of known type, such as disclosed in my U. S. Patent 2,292,628, is mounted between the flanges 1a and 1b on the outside of the plate 1 above the multiple coin chute assembly 3, with its coin outlets above the upper ends of the three coin chutes. Details of the coin selector are indicated in phantom in Fig. 1. It will be understood that coins deposited in the vending machine in which the coin mechanism is used enter the coin selector, which functions to feed nickels into the nickel chute 5, dimes into the dime chute 7, quarters into the quarter chute 9. The coin selector also functions to eject any slugs through a slug outlet 13, so that they are not fed into the coin chutes. Slugs ejected through the slug outlet 13 drop through a vertical chute 15 in assembly 3 into an inclined coin return chute 17, which slopes downward toward the front of the vending machine. Any pennies which may be deposited are similarly ejected by the coin selector.

Coins travelling through the coin selector are subject to interception by an off-current coin deflector generally designated 19. This comprises an electromagnet coil 21 mounted on a bracket 23 fastened to the plate 1 on the inside. The coil reaches through an opening 25 in the plate 1 to the outside. Pivoted on the bracket at 27 is an armature 29 to which is fastened an arm 31 having coin-deflecting fingers 33, 35 and 37. A spring 39 biases the armature and arm to hold the fingers in coin-deflecting position when the coil is deenergized. Under these circumstances, any coin deposited in the machine is returned. As long as the coil is energized, the fingers are held out of coin-deflecting position (see Fig. 2A).

The coin chute assembly 3 comprises a main casting 41 having ribs on its outside face which define the upper nickel chute 5 and a pair of lower nickel chutes 5a and 5b which slope forward and downward from the lower end of chute 5 (see Fig. 4). Chute 5a is open at its forward end as indicated at O-1 and also has a bottom coin outlet O-2 at its forward end. Chute 5b (which is below 5a) is open at its forward end as indicated at O-3 and has a bottom coin outlet O-4 at its forward end. Below outlet O-4, ribs on the outside face of casting 41 define a vertical nickel outlet chute 5c. Nickels are adapted to drop out of chute 5c through an opening 43 in the top of a coin box housing 45 into a coin box 47. The latter is slidable into and out of the housing 45. Upper and lower cover plates for the outside of the main casting are indicated at 49 and 51 (see Fig. 1). These provide outside walls for the stated nickel chutes.

The main casting 41 has ribs on its inside face which define the upper dime chute 7, a chute 53 for both dimes and quarters which slopes forward and downward from the lower end of chute 7 (see Figs. 5 and 6), and a vertical chute 55 leading downward from the forward end of chute 53. Chute 53 is located directly in the back of chute 5a and chute 55 is located directly in back of chute 5c. Dimes and quarters are adapted to drop out of chute 55 through the opening 43 into the coin box. The main casting 41 also has ribs on its inside face which define the previously mentioned chute 15. Secured to the upper part of the main casting 41 on the inside thereof is a casting 57 having ribs which define the upper quarter chute 9 (see Figs. 3 and 6). A quarter exiting from chute 9 enters chute 53. A cover plate for the inside of the main casting is indicated at

3

59, and a cover plate for the casting 57 is indicated at 61. The chute 55 has a forward outlet O-5 inward of outlet O-3.

The coin chute assembly 3 has an opening 63 in which is located a coin-driving means in the form of a stepped resilient coin-driving roller or wheel 65 for driving nickels, dimes and quarters downward in the respective chutes 5, 7 and 9. This wheel is fixed on a horizontal shaft 67 journaled in spaced bearing plates 69 and 71 held in spaced-apart relation by spacers 73. The plates 69 and 71 in conjunction with the spacers form a cage, the cage being carried by the assembly 3. The cage carries an electric motor 75 having a shaft 77. This shaft is geared to drive the wheel 65 via a speed-reducing gear train generally designated 79, the gears of the train being carried by shafts journaled in the bearing plates 69 and 71. The wheel is driven clockwise as viewed in Fig. 1.

The coin-driving wheel 65 is formed of rubber or like suitable resilient material with three side-by-side steps 81, 83 and 85 on three different diameters. The step 81, hereinafter referred to as the nickel step, is located in the plane of the nickel chute 5 and is adapted to engage a nickel and drive it downward in the chute 5. The step 83, hereinafter referred to as the dime step, is located in the plane of the dime chute 7 and is adapted to engage a dime and drive it downward in the chute 7. The step 85, hereinafter referred to as the quarter step, is located in the plane of the quarter chute 9 and is adapted to engage a quarter and drive it downward in the chute 9.

A nickel, dime or quarter entering the respective chute 5, 7 or 9 actuates an operating lever 87 of a motor control switch 89 mounted on an extension 91 of cover plate 49. The lever 87 extends from the switch into the space between the main plate 1 and the assembly 3 and has a finger 93 at its free end which extends into an arcuate slot 95 in the assembly 3. The finger extends completely across all three chutes 5, 7 and 9. The lever 87 is adapted to close the contacts of switch 89 when swung downward from its generally horizontal retracted circuit-breaking position shown in Fig. 1 by a nickel, dime or quarter dropping downward in the respective chute 5, 7 or 9. Lever 87 is normally biased to its retracted position (which is determined by engagement of finger 93 with the upper end of slot 95) by spring means incorporated in the switch. The bias of the switch spring means is light enough to be readily overcome by the weight of a dime (the lightest coin) bearing on the finger 93. The switch and the pivotal axis of the lever are so located that the lever may swing downward to a circuit-making position wherein the finger 93 is at the lower end of the slot 95, and occupies a retracted chute-clearing position allowing a coin to travel on by the finger. The arrangement is such that whenever a coin, whether a nickel, dime or quarter, is inserted in the machine, the lever is swung down to close switch 89 thereby energizing the motor to drive the coin-driving wheel.

At 99 is shown a cotter pin which extends through the assembly 3 and constitutes a pivot for a nickel arm 101 located in the nickel chute 5 (see Fig. 4), a dime arm 103 located in the dime chute 7 (see Fig. 5), and a quarter arm 105 located in the quarter chute 9 (see Fig. 6). The arms hang down from the pin 99 and have fingers 107, 109 and 111, respectively, at their lower ends. The fingers are of different lengths along the length of the respective chutes corresponding to the different coin values and have curved inside edges facing the respective steps of the coin-driving wheel 65, for engagement by coins being driven by the wheel. A nickel being driven by the wheel engages the nickel finger 107 and swings the nickel arm 101 away from the wheel for the length of time that the nickel remains in engagement with the finger 107. A dime being driven by the wheel engages the dime finger 109 and swings the dime

4

arm 103 away from the wheel approximately twice as long. A quarter being driven by the wheel engages the quarter finger 111 and swings the quarter arm 105 away from the wheel approximately five times as long.

The lower ends of the arms 101, 103 and 105 are engageable with a finger 113 at the end of a shift rod 115 in such manner that when any one of the three arms is swung outward by a coin, rod 115 is moved rearward (to the left as viewed in Fig. 2). The rod 115 is movable in the space between assembly 3 and plate 1, being guided for horizontal reciprocation by sliding reception of finger 113 in aligned slots 117 and 119 in cover plates 49 and 61, and by sliding reception of its other end in a hole 121 in an ear 123 formed on the main casting 41. The rod is biased in forward direction to a retracted position by a spring 125. Fixed on the rod is a latch member 127 having a nose 129 adapted to engage over the switch lever finger 93 when the latter is moved to the lower end of the arcuate slot 95 by a coin, and to hold the lever 87 down in circuit-making position as long as rod 115 is held in outward position by one of the arms 101, 103 or 105.

A shaft 67a extends from the coin-driving wheel 65 through an opening 131 in the main plate 1 to the inside of the plate. Fixed on the end of the shaft 67a is a spur gear 133 (see Figs. 2 and 7). A rocker arm 135 is pivoted on the shaft 67a between gear 133 and the wheel 65. A pinion 137 is mounted on the rocker arm 135 in mesh with the gear 133. Pinion 137 is shiftable into and out of mesh with a gear 139 by rocking the arm 135, while remaining in mesh with gear 133. Gear 139 is fixed on a shaft 141 journaled in the main plate 1 above shaft 67a. Arm 135 is biased to swing toward gear 139 by a spring 143 connected between the latch member 127 on rod 115 and the arm 135. Rod 115 has fixed thereon a plate 145 carrying a stud 147 engageable with the arm 135 to hold pinion 137 out of mesh with gear 139 when the rod 115 is retracted. When the rod 115 is shifted rearward by one of arms 101, 103 or 105 (to the left as viewed in Fig. 2), the arm 135 is released for being swung by spring 143 to shift the pinion 137 into mesh with gear 139.

A ratchet 149 is fixed on shaft 141 on the outside of gear 139 to be rotary with the gear 139. A holding pawl 151 for the ratchet is pivoted on a stud 153 secured to the main plate 1 on the inside (see Fig. 2). The pawl is biased toward engagement with the ratchet by a pawl spring 155. At 157 is shown a vertically shiftable reset bar. This bar is guided by upper and lower studs 159 secured to the main plate 1 and received in elongate upper and lower vertical slots 161 in the bar. The bar has a lower retracted position determined by the engagement of the upper ends of the slots with the studs. It carries a cam 163 engageable with the pawl 151 upon upward movement of the bar from its retracted position to swing the pawl out of engagement with the ratchet.

The shaft 141, gear 139 and ratchet 149 are parts of a rotary selector switch which further comprises a contact blade 165 mounted on the end of shaft 141 outward of the ratchet 149, being pinned to the ratchet as indicated at 166. At the free end of the blade 165 is a contact C successively engageable, upon rotation of the gear 139 and ratchet 149 in counterclockwise direction as viewed in Fig. 2, with a series of contacts C-1 to C-10 arranged in an arc centered in the axis of shaft 141 on an insulation ring segment plate 167. Contacts C-1 to C-10 are angularly spaced at equal intervals corresponding to the tooth intervals of the ratchet. Plate 167 is mounted on the inside of main plate 1. Terminals T-4 to T-19 lead radially outward from contacts C-4 to C-10 on the inside of plate 167, being fastened thereto by rivets 168 in addition to being fastened by contacts C-4 to C-10. Contacts C-1 to C-10 are hereinafter referred to as price contacts, representing prices ranging from 5¢ to 50¢ in five-cent increments. Terminals are omitted for contacts C-1 to C-3 as herein illustrated, since the coin mecha-

nism is used in a machine stocking items ranging in price upward from 20¢. A main terminal on the insulation plate 167 is indicated at 169. A conductive spring blade 171 is fixed at one end to this terminal and has a contact 173 at its other end wiping the blade 165.

The contact blade 165 normally occupies the retracted zero position shown in Fig. 2 in which it extends generally horizontally to the right, with contact C thereon below the first contact C-1 a distance corresponding to one ratchet tooth interval. This zero position of the blade is determined by engagement of a stud 175 on the back of gear 139 with a finger 177 at the upper end of a vertically shiftable stop bar 179 (see Fig. 2B). The gear 139, ratchet and blade are biased toward the zero position by a coil return spring 181 (see Figs. 1 and 7) having one end secured to the plate 1 at 183 and its other end secured to a cam 185 on the inner end of shaft 141. Stop bar 179 is guided for vertical movement by the stud 153 for pawl 151, the stud being received in an elongate slot 187 in the upper end of the bar, and by a lower stud 189 received in an elongate slot 191 at the lower end of the bar. Bar 179 is biased to a lower retracted position, determined by engagement of the upper ends of slots 187 and 191 with studs 153 and 189, by the force of the return spring 181 acting through shaft 141, gear 139 and the stud 175. When the gear 139 rotates counterclockwise from the position shown in Fig. 2, stud 175 moves away from finger 177 to free bar 179 for upward movement.

At 193 is indicated a coin gate which is pivoted at its upper end for swinging movement on a horizontal axis parallel to the planes of the coin chutes (see Figs. 1 and 8). The gate extends down on the outside of assembly 3 from its pivot, and toward its lower end has a narrow finger 195 adapted to enter a slot 197 in cover plate 51 for blocking the nickel outlet O-2. The gate also has a wide finger 199 adapted to enter a slot 201 in assembly 3 for blocking the outlets O-3 and O-5. The gate has inwardly extending hinge ears 203 at its upper end which reach from the outside of the main casting 41 to the inside through an opening 205. Ears 203 receive a hinge pin 207 which is received at one end in a hinge eye 209 formed on the inside of the main casting 41 and at its other end in an opening 211 in a rib on the inside of the main casting. The gate is biased to swing toward the assembly 3 by a spring 213. It is maintained in a retracted position, wherein finger 195 is clear of outlet O-2 and finger 199 is clear of outlets O-3 and O-5, by means of a pin 215 which extends from the upper end of the gate through opening 205 and through an opening 217 in main plate 1 into an opening 219 in the stop bar 179. The arrangement is such that bar 179, when held down in its lower retracted position by the stud 175, acts through the pin 215 to hold the gate in the swung-out retracted position shown in Fig. 8. When stud 175 moves away from the finger 177 at the upper end of bar 179, the bar is freed for upward movement, whereupon the gate swings closed (under the bias of spring 213) so that finger 195 blocks outlet O-2 and finger 199 blocks outlets O-3 and O-5, and pin 215 raises the bar 179. At 221 is shown a cam for holding the stop bar 179 in raised position in response to lifting of the reset bar 157. The cam 221 is pivoted at 223 on plate 1, and has a slot at 225 receiving a pin 227 on the reset bar 157.

At 229 (see Fig. 8) is indicated a coin rest which is pivoted at its upper end on the hinge pin 207 and which extends down on the inside of assembly 3. At its lower end, the coin rest 229 has a wide finger 231 adapted to enter a slot 233 in assembly 3 for blocking the outlet O-4 and also for blocking the chute 55. The coin rest has hinge ears 235 at its upper end receiving the hinge pin 207. The coin rest is biased by a spring 237 to swing away from assembly 3 to a retracted position wherein finger 231 is clear of outlet O-4 and chute 55. It is

shown in this position in solid lines in Fig. 9. It is normally held against the spring bias in an operative position wherein finger 231 blocks outlet O-4 and chute 55 by engagement of a plate 239 carried by the reset bar 157 with a cam 241 on the coin rest when the reset bar is down. The cam extends through an opening 242 in main plate 1. When the reset bar is raised, the coin rest is freed to be moved outward to retracted position by the spring 237. The reset bar carries a finger 243 for blocking outlet O-1 when the reset bar is retracted (down). When the reset bar is raised, finger 243 is moved upward clear of O-1.

At 245 is shown a vertically shiftable coin return bar. This is located directly over the reset bar 157, being guided by the studs 159, which are received in elongate upper and lower slots 247 in the return bar. The return bar is biased upward by a spring 249 to a retracted position determined by the engagement of the lower ends of slots 247 with the studs 159. It has an operating arm 251, the inner end 252 of which is engageable with the holding pawl 151 on downward movement of the return bar to release the pawl from the ratchet 149 to allow the return spring 181 to drive the ratchet back to its zero position. Upon such release of the pawl and return of the ratchet, the stop bar 179 is driven downward to open the gate 193.

The cam 185 on the inner end of the shaft 141 is part of an overinsertion mechanism for returning to a customer any inserted coins which raise the total amount inserted to more than the highest priced item stocked in the vending machine with which the coin mechanism is used. This overinsertion mechanism comprises a cam follower lever 253 (see Fig. 1) pivoted at 255 on the main plate 1 and biased for engagement of its inner end 257 with the cam by a spring 259. At 261 is shown an overinsertion control switch. This is mounted on a bracket 263 carried by the plate 1. It has a control arm 265 engageable by a finger 267 at the end of the lever 253. The arrangement is such that when the gear 139 and ratchet 149 rotate to move blade 165 past that price contact representing the highest price, the cam actuates the lever to open the switch 261. The switch 261 is connected in series with the off-current coin deflector coil 21 so that, when switch 261 is opened, the coil is deenergized, fingers 33, 35 and 37 are moved to coin-deflecting position, and any coin deposited in the vending machine will be returned.

Assuming that the coin rest 229 is in its operative position wherein finger 231 blocks the outlet O-4 and chute 55 (see Fig. 8 and the dot-dash line position shown in Fig. 9 for finger 231), and that the reset bar 157 is down so that finger 243 blocks outlet O-1, when the coin gate 193 is swung open, thereby unblocking the outlets O-2, O-3 and O-5, any nickels that may be in the chute 5a will drop out through the outlet O-2 and down into the lower end of chute 15. Thence, the nickels will roll out through the coin return chute 17 for return to the customer. Any nickels that may be in the coin chute 5b will roll out into the lower end of the coin chute 15 through the outlet O-3, and be guided by a lip 269 (see Figs. 1 and 9) on cover plate 51 into the coin return chute 17 for return to the customer. Entry to the coin return chute 17 is through an opening 271 in the flange 1a of the main plate 1 (see Fig. 9). Any dimes or quarters in chute 55 will roll off finger 231 and through the outlet O-5 into the lower end of chute 15 and thence into the coin return chute 17.

Assuming that the coin gate 193 is closed, upon opening the coin rest 229 thereby to swing the finger 231 out of the slot 233, and upon raising of the reset bar 157, thereby moving the finger 243 clear of the outlet O-1, any nickels in chute 5b will drop through chute 5c into the coin box 47. Any dimes or quarters in chute 55 will drop out into the coin box. Any nickels in chute 5a will roll off finger 195 and fall into a chute 273, falling in chute 273 and through an opening 275 in the top of the housing 45 into the coin box.

Operation is as follows:

A nickel deposited in the vending machine is fed to the coin selector 11. Assuming that the off-current deflector coil 21 is energized, the nickel will travel completely through the selector and be delivered into the upper end of the nickel chute 5. As the nickel falls in chute 5, it engages the finger 93 on the end of the operating lever 87 for the motor control switch 89, and swings this lever downward to close the motor switch. This initiates operation of the motor 75 to rotate the coin-driving wheel 65 clockwise as viewed in Figs. 1 and 4 (counterclockwise as viewed in Figs. 5 and 6). The nickel is pinched edgewise between the nickel step 81 of the coin-driving wheel and the opposite edge of the chute 5 and is driven downward in the chute. As the nickel is driven downward, it engages the finger 107 at the lower end of the nickel arm 101, and swings the arm 101 rearward (to the right as viewed in Fig. 4). The arm 101, in swinging rearward, drives the shift rod 115 rearward against the bias of spring 125 to the point where the nose 129 on the latch member 127 is moved over the finger 93, which is initially held down at the lower end of the arcuate slot 95 by the nickel. The shift rod 115 remains in its moved position as long as the nickel engages the finger 107. Thus, while the nickel moves downward out of engagement with finger 93, the nose 129 on the latch member 127 holds the switch lever 87 down to keep the motor switch 89 closed until the nickel travels out of engagement with the finger 107.

The stated rearward movement of the shift rod 115 moves the stud 147 rearward away from the lower end of the rocker arm 135. The spring 143 thereupon rocks the arm 135 and shifts the pinion 137 into mesh with the gear 139. The motor 75 is now in operation (the nickel having operated lever 87 to close the motor control switch 89) and the pinion 137 hence is rotating, being driven from the motor shaft 67 by the gear 133 in clockwise direction as viewed in Fig. 2. The gear 139 is accordingly driven counterclockwise as viewed in Fig. 2. When the nickel rides off the finger 107, spring 125 returns the shift rod 115 to its retracted position. This moves the nose 129 on latch member 127 clear of the finger 93 on lever 87, to allow the lever 87 to swing up and open the motor control switch 89 to stop the motor. It also results in movement of the stud 147 into engagement with the lower end of the rocker arm 135 to rock the rocker arm counterclockwise as viewed in Fig. 2, thereby to shift the pinion 137 out of mesh with the gear 139.

The length of the curved edge of the finger 107 engaged by the nickel is such that the motor 75 is operated and pinion 137 is held in mesh with gear 139 for such a length of time as to effect rotation of the gear 139 through a fraction of a revolution corresponding to one tooth interval of the ratchet 149 and one interval between the price contacts. The result is that ratchet 149 is stepped forward one tooth and the free end of the contact blade 165 is rotated counterclockwise from the zero position shown in Fig. 2 upward one step and onto the first price contact C-1. The blade 165 is maintained in this position by the action of the holding pawl 151, which clicks in behind a tooth of the ratchet under the bias of spring 155. The pawl keeps the assembly of the gear 139, ratchet 149 and blade 165 from being returned to zero position by the bias of the coil return spring 181. Upon the stated rotation of the gear 139, the stud 175 moves upward away from the finger 177 at the upper end of the stop bar 179. This frees the stop bar for upward movement with the result that the restraint upon the coin gate 193 is removed. The coin gate thereupon swings to its closed position under the bias of the spring 213, pin 215 thereupon raising the stop bar 179.

The nickel riding off the finger 107 and out of the lower end of the chute 5 enters the chute 5b and rolls down this chute to a forward position resting on the finger

231, being kept from rolling out of the chute 5b by the finger 199 (see Fig. 4). Additional nickels inserted in the vending machine act to step the ratchet one tooth interval in the same manner as above described, and eventually are received in the chute 5b one behind the other in edge-to-edge relation. Each nickel, in effecting stepping of the ratchet one tooth interval, effects stepping of the free end of the blade 165 from whatever price contact it was on to the next higher price contact. Thus, the second nickel deposited will effect movement of the free end of the blade from contact C-1, to C-2, a third nickel from contact C-2 to C-3, a fourth nickel from contact C-3 to C-4 and so on. The chute 5b, as herein illustrated, is adapted to hold up to five nickels. When it is full, any additional nickels inserted in the machine and exiting from the lower end of chute 5 will enter the chute 5a. The first nickel entering the chute 5a rolls down this chute to a position of rest on the finger 195, being kept from rolling out of the forward end of the chute 5a by the finger 243. Additional nickels accumulate behind the first nickel in chute 5a.

A dime or a quarter deposited in the vending machine is fed to the coin selector 11. Again assuming that the off-current deflector coil 21 is energized, the dime will travel completely through the selector and be delivered into the upper end of the dime chute 7. The quarter will travel completely through the selector and be delivered into the upper end of the quarter chute 9. The dime or the quarter, falling in the respective chute 7 or 9, engages the finger 93 in the same manner as a nickel, and initiates operation of the motor 75 to rotate the coin-driving wheel 65. A dime is pinched edgewise between the dime step 83 of the wheel and the opposite edge of the chute 7 and is driven downward in the chute 7. Similarly, a quarter is pinched edgewise between the quarter step 85 of the wheel and the opposite edge of the chute 9, and is driven downward in the chute 9. As a dime is driven downward, it engages the finger 109 at the lower end of the dime arm 103, and swings the arm 103 rearward. As a quarter is driven downward, it engages the finger 111 at the lower end of the quarter arm 105, and swings the arm 105 rearward.

Rearward movement of arm 103 by a dime or rearward movement of arm 105 by a quarter drives the shift rod 115 rearward. This results in latching down of the motor switch control lever 87 and meshing of the pinion 137 with the gear 139 in the same manner as occurs upon deposit of a nickel, as previously described. A dime holds the shift rod 115 rearward and thus holds the motor 75 in operation and the pinion 137 in mesh with the gear 139 for the length of time during which the dime rides on the finger 109. This is twice as long as in the case of a nickel, and the gear 139 is thereby rotated through a fraction of a revolution corresponding to two tooth intervals of the ratchet and two price contact intervals. The result is that the ratchet is stepped forward two teeth and the free end of the contact blade 165 is rotated counterclockwise two price contact intervals. A quarter holds the shift rod 115 rearward and thus holds the motor 75 in operation and the pinion 137 in mesh with the gear 139 for the length of time during which the quarter rides on the finger 111. This is five times as long as in the case of a nickel, and the gear 139 is thereby rotated through a fraction of a revolution corresponding to five tooth intervals of the ratchet and five price contact intervals. The result is that the ratchet is stepped forward five teeth and the free end of the contact blade 165 is rotated counterclockwise five price contact intervals.

It will be understood that if a dime is the first coin deposited, the free end of the blade 165 will be rotated counterclockwise from the zero position shown in Fig. 2 upward two steps and onto the second price contact C-2. If a quarter is the first coin deposited, the free end of the contact blade 165 is rotated counterclockwise

from the zero position shown in Fig. 2 upward five steps and onto the fifth price contact C-5. If a nickel is inserted first and then a dime (a total of 15¢), insertion of the nickel will step the free end of the contact blade from the zero position to contact C-1 and the subsequent insertion of the dime will step the free end of the blade up to contact C-3 (the 15¢ price contact). If, for example, a quarter is inserted first, and then a dime (a total of 35¢), insertion of the quarter will step the free end of the contact blade from the zero position to the contact C-5 (the 25¢ contact) and the subsequent insertion of the dime will further step the free end of the blade to contact C-7 (the 35¢ contact). The operation for other combinations of coins, and other orders of deposit of the coins, will be apparent. In the case of any combination of coins, the ratchet is held by the holding pawl 151 to hold the free end of the blade 165 in contact with that one of the price contacts which corresponds to the total amount or value of coins which have been deposited.

It will be understood that deposit of a dime or quarter, with resultant rotation of the gear 139, will result in closing of the coin gate 193 in the same manner as occurs upon deposit of a nickel. A dime riding off the finger 109 and out of the lower end of the chute 7 enters the chute 53 and rolls down this chute into the chute 55, coming to rest on the finger 231, and being kept from rolling out of the chute 55 through the outlet O-5 by the finger 199 of the closed coin gate 193. Similarly, a quarter riding off the finger 111 and out of the lower end of the chute 9 enters the chute 53 and rolls down this chute into the chute 55, coming to rest on the finger 231, and being kept from rolling out of the chute 55 through the outlet O-5 by the finger 199 of the closed coin gate 193. The chute 55 is wide enough to accommodate a number of coins side-by-side resting on the finger 231.

The coin mechanism as herein disclosed may be used for controlling the operation of a vending machine for vending items ranging in price from twenty cents up to fifty cents in five-cent increments by appropriate use of the terminals T-4 to T-10. This range could be increased to take care of five-cent, ten-cent and fifteen-cent items by providing terminals for contacts C-1 to C-3. Assuming, for example, that the coin mechanism is to be used in a machine for vending twenty-five cent, thirty-cent, and thirty-five-cent items, terminals T-5, T-6 and T-7 will be utilized for providing twenty-five-cent, thirty-cent and thirty-five-cent vending circuits. The over-insertion mechanism cam 185 is made such as to provide for return to a purchaser any coin which raises the total amount inserted to more than thirty-five cents. Insertion of twenty-five cents in coins (whether as five nickels, a dime and three nickels, two dimes and a nickel, or a quarter) results in rotation of the contact blade 165 from its retracted position to the twenty-five-cent price contact C-5. It is held in this position by the action of the holding pawl 151 on ratchet 149. With the blade in the stated position, a circuit is completed from the main terminal 169 through the wiper 171, the blade 165 and the contact C-5 to terminal T-5. Under such conditions, operation by the purchaser of a vending machine push button for a twenty-five-cent item (not shown) results in completion of a vending machine circuit (not shown) to effect operation of the dispensing mechanism of the machine to dispense a twenty-five-cent item. Insertion of thirty cents in coins (whether as six nickels, a dime and four nickels, two dimes and two nickels, three dimes or a quarter and a nickel) results in rotation of the contact blade 165 to the thirty-cent price contact C-6. This completes a circuit from main terminal 169 to terminal T-6, and conditions the machine for dispensing a thirty-cent item upon pushing a thirty-cent push button. Insertion of thirty-five cents in coins (whether as seven nickels, a dime and five nickels, two dimes and three nickels,

three dimes and one nickel, a quarter and two nickels, or a quarter and a dime) results in rotation of the blade 165 to the thirty-five-cent price contact C-7. This completes a circuit from main terminal 169 to terminal T-7, and conditions the machine for dispensing a thirty-five cent item upon pushing a thirty-five cent push button.

The dispensing mechanism of the vending machine includes means (not shown) which functions at the close of the vending operation to raise the reset bar 157. Raising of the reset bar results in release of the holding pawl 151, to allow the return of the gear 139, the ratchet 149 and the contact blade 165 to the zero position under the return bias of the return spring 181. It also results in raising of the plate 239 out of contact with the cam 241 on the coin rest 229 to allow the coin rest to swing away from the coin chute assembly 3 under the bias of spring 237, with the result that finger 231 is withdrawn from the slot 233. Accordingly, any nickels in chute 5b, dimes in chute 55 or a quarter in chute 55 are released to fall into the coin box 47 as previously explained. Also, as the reset bar is raised, cam 221 becomes operative to hold up the stop bar 179. This holds the coin gate 193 from swinging out until the reset bar is returned to its lowered retracted position at the termination of the vending operation. As the reset bar is raised, finger 243 is raised, and any nickels in chute 5a will roll out into the chute 273 and drop into the coin box. Here it will be apparent that the coin gate 193 must be held closed while the reset bar is being raised to preclude any nickels in chute 5a and any nickels in chute 5b and dimes or a quarter in chute 55 from rolling out into the chute 15 and returning to the customer.

Return of deposited coins may be obtained, prior to pushing a vending machine button, by pushing down the coin return bar 245. Upon such downward movement of bar 245, the inner end 252 of the operating arm 251 for the bar engages and releases the holding pawl 151. This results in resetting of the selector switch to zero and the opening of the coin gate 193 as previously described. When gate 193 opens, thereby moving finger 195 clear of outlet O-2 and moving finger 199 clear of outlets O-3 and O-5, any nickels in chutes 5a and 5b and any dimes or a quarter in chute 55 thereupon fall into chute 15 and are returned to the customer via return chute 17.

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 drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. Coin mechanism comprising a plurality of coin chutes for respectively receiving coins of different denominations, one chute being for coins of a unit denomination, a wheel for engaging and positively driving any coin along a portion of its respective chute, an electric motor for driving the wheel, means for effecting operation of the motor in response to entry of a coin in any one of the chutes, a rotary selector switch having a series of fixed spaced price contacts and a blade rotatable from a retracted position spaced from the first price contact successively into engagement with the price contacts, a disconnectable drive for rotating the blade from the motor, and means for controlling operation of the motor and effecting connection of said drive comprising members engaged and actuated by coins being driven by said coin driving means, said members being of different length along the length of the respective chutes for effecting operation of the motor and connection of the drive for different periods of time corresponding to the different

11

coin values, a coin of unit denomination effecting operation of the motor and connection of the drive for such length of time as to effect rotation of the blade one price contact interval, coins of another denomination effecting operation of the motor and connection of the drive for such a length of time as to effect rotation of the blade a number of price contacts corresponding to the ratio of coin values, said blade being biased to its retracted position, and releasable means for holding the blade in any advanced position.

2. Coin mechanism comprising a plurality of coin chutes for respectively receiving coins of different denominations, one chute being for coins of a unit denomination, a wheel for engaging and positively driving any coin along a portion of its respective chute, means for driving the wheel comprising an electric motor, means for effecting operation of the motor in response to entry of a coin in any one of the chutes, a rotary selector switch having a series of fixed, spaced price contacts and a blade rotatable from a retracted position spaced from the first price contact successively into engagement with the price contacts, a gear rotary with the wheel, a gear rotary with the blade, a shiftable gear in mesh with one of said gears and shiftable around the axis of said one gear into and out of mesh with the other, means for shifting the shiftable gear into mesh with said other gear and holding it in mesh therewith comprising members engaged and actuated by coins being driven by the wheel, said members being of different length along the length of the respective chutes for holding the shiftable gear in mesh with said other gear for different periods of time corresponding to the different coin values, a coin of unit denomination holding it in mesh therewith for such a length of time as to effect rotation of the blade one price contact interval, coins of another denomination holding the shiftable gear in mesh with said other gear for such a length of time as to effect rotation of the blade a number of price contacts corresponding to the ratio of the coin values, said blade being biased to its retracted position, and releasable means for holding the blade in any advanced position.

3. Coin mechanism as set forth in claim 2 wherein said means for effecting operation of the motor is controlled by said members for effecting operation of the motor for different periods of time corresponding to the different coin values.

4. Coin mechanism as set forth in claim 2 wherein the releasable means for holding the blade in any advanced position comprises a ratchet rotary with the blade and a releasable holding pawl for the ratchet.

5. Coin mechanism comprising a plurality of coin chutes for respectively receiving coins of different denominations, one chute being for coins of a unit denomination, a wheel for engaging and positively driving any coin along a portion of its respective chute, means for driving the wheel comprising an electric motor, means for effecting operation of the motor in response to entry of a coin in any one of the chutes, a rotary selector switch having a series of fixed, spaced price contacts and a blade rotatable from a retracted position spaced from the first price contact successively into engagement with the price contacts, a gear rotary with the wheel, a gear rotary with the blade, a shiftable gear in mesh with one of said gears and shiftable around the axis of said one gear into and out of mesh with the other, a shift rod for shifting the shiftable gear into mesh with said other gear and holding it in mesh therewith, pivoted arms in the respective chutes having portions engaged and actuated by coins being driven by the wheel for shifting said rod, said portions being of different length along the length of the respective chutes for holding the shiftable gear in mesh with said other gear for different periods of time corresponding to the different coin values, a coin of unit denomination holding it in mesh therewith for such a length of time as to effect rotation of the blade one price con-

12

tact interval, coins of another denomination holding the shiftable gear in mesh with said other gear for such a length of time as to effect rotation of the blade a number of price contacts corresponding to the ratio of the coin values, said blade being biased to its retracted position, and releasable means for holding the blade in any advanced position.

6. Coin mechanism as set forth in claim 5 wherein said means for effecting operation of the motor comprises a switch having an operating member engageable by any coin entering its respective chute and movable by any coin from a circuit-breaking to a circuit-making position, and means carried by the shift rod for latching said switch operating member in circuit-making position when said rod is shifted to hold the shiftable gear in mesh with said other gear.

7. Coin mechanism as set forth in claim 6 wherein the releasable means for holding the blade in any advanced position comprises a ratchet having a tooth interval corresponding to the price contact spacing, said ratchet being rotary with the blade, and a releasable holding pawl for the ratchet.

8. Coin mechanism comprising a nickel chute, a dime chute and a quarter chute, means for engaging and positively driving any coin along a portion of its respective chute comprising a shaft, a wheel on the shaft, and an electric motor, means for effecting operation of the motor in response to entry of a coin in any one of the chutes, said wheel shaft having a first gear thereon, a rotary selector switch comprising a shaft having thereon a blade, a ratchet and a second gear, said switch further comprising a series of fixed, spaced price contacts successively engageable by the blade upon rotation thereof from a retracted position, a gear in mesh with said first gear and shiftable around the axis of said first gear into and out of mesh with said second gear, means for shifting the shiftable gear into mesh with the second gear and holding it in mesh therewith comprising members engaged and actuated by coins being driven by the wheel, said members being of different length along the length of the respective chutes for holding the shiftable gear in mesh with the second gear for different periods of time corresponding to the different coin values, a nickel holding the shiftable gear in mesh with the second gear for such a length of time as to effect rotation of the blade one price contact interval, a dime two price contact intervals, and a quarter five price contact intervals, means biasing the blade to its retracted position, and a releasable holding pawl engageable with the ratchet to hold the blade in any advanced position.

9. Coin mechanism as set forth in claim 8 wherein said means for effecting operation of the motor comprises a switch having an operating member engageable by any coin entering its respective chute and movable by any coin from a circuit-breaking to a circuit-making position, and means for latching said switch operating member in circuit-making position controlled by said coin-actuated members for effecting operation of the motor for different periods of time corresponding to the different coin values.

10. Coin mechanism comprising a nickel chute, a dime chute and a quarter chute, means for engaging and positively driving any coin along a portion of its respective chute comprising a shaft, a wheel on the shaft, and an electric motor, means for effecting operation of the motor in response to entry of a coin in any one of the chutes, said wheel shaft having a first gear thereon, a rotary selector switch comprising a shaft having thereon a blade, a ratchet and a second gear, said switch further comprising a series of fixed, spaced price contacts successively engageable by the blade upon rotation thereof from a retracted position, a gear in mesh with said first gear and shiftable around the axis of said first gear into and out of mesh with said second gear, a shift rod for shifting the shiftable gear into mesh with the second gear and holding it in mesh therewith, pivoted arms in the respective chutes

13

having portions engaged and actuated by coins being driven by the wheel for shifting said rod, said portions being of different length along the length of the respective chutes for holding the shiftable gear in mesh with the second gear for different periods of time corresponding to the different coin values, a nickel holding the shiftable gear in mesh with the second gear for such a length of time as to effect rotation of the blade one price contact interval, a dime two price contact intervals, and a quarter five price contact intervals, means biasing the blade to its retracted position, and a releasable holding pawl engageable with the ratchet to hold the blade in any advanced position.

11. Coin mechanism as set forth in claim 10 wherein said means for effecting operation of the motor comprises a switch having an operating member engageable by any coin entering its respective chute and movable by any coin from a circuit-breaking to a circuit-making position, and means carried by the shift rod for latching said switch operating member in circuit-making position when said rod is shifted to hold the shiftable gear in mesh with the second gear.

12. Coin mechanism as set forth in claim 10 further comprising an overinsertion switch, and means controlled by said selector switch for operating the overinsertion switch in response to movement of said blade past a predetermined price contact.

13. Coin mechanism as set forth in claim 12 wherein the means controlled by said selector switch for operating the overinsertion switch comprises a cam on the selector

14

switch shaft and a follower lever controlled by the cam and controlling the overinsertion switch.

14. Coin mechanism as set forth in claim 10 wherein the chutes, below the wheel, have outlets to a money box and outlets to a coin return chute, and wherein the mechanism further comprises a coin gate for holding coins in the chutes from passing to the coin return chute, a coin rest for holding coins in the chutes from passing to the money box, means responsive to movement of the blade away from its retracted position for moving the gate from a chute-clearing position to coin-holding position, a reset bar movable from a retracted position for releasing the holding pawl to reset the blade, means on the reset bar for holding the coin rest in coin-holding position when the reset bar is in retracted position and freeing the coin rest for movement to a chute-clearing position when the reset bar is moved from its retracted position to release coins for passage to the money box, and a coin return bar movable from a retracted position for releasing the holding pawl to reset the blade and thereby moving the gate to chute-clearing position to release coins for passage to the return chute.

References Cited in the file of this patent

UNITED STATES PATENTS

1,137,399	Goodrum	Apr. 27, 1915
1,635,451	Zsoldos	July 12, 1927
2,433,689	Fry	Dec. 30, 1947