

Jan. 15, 1957

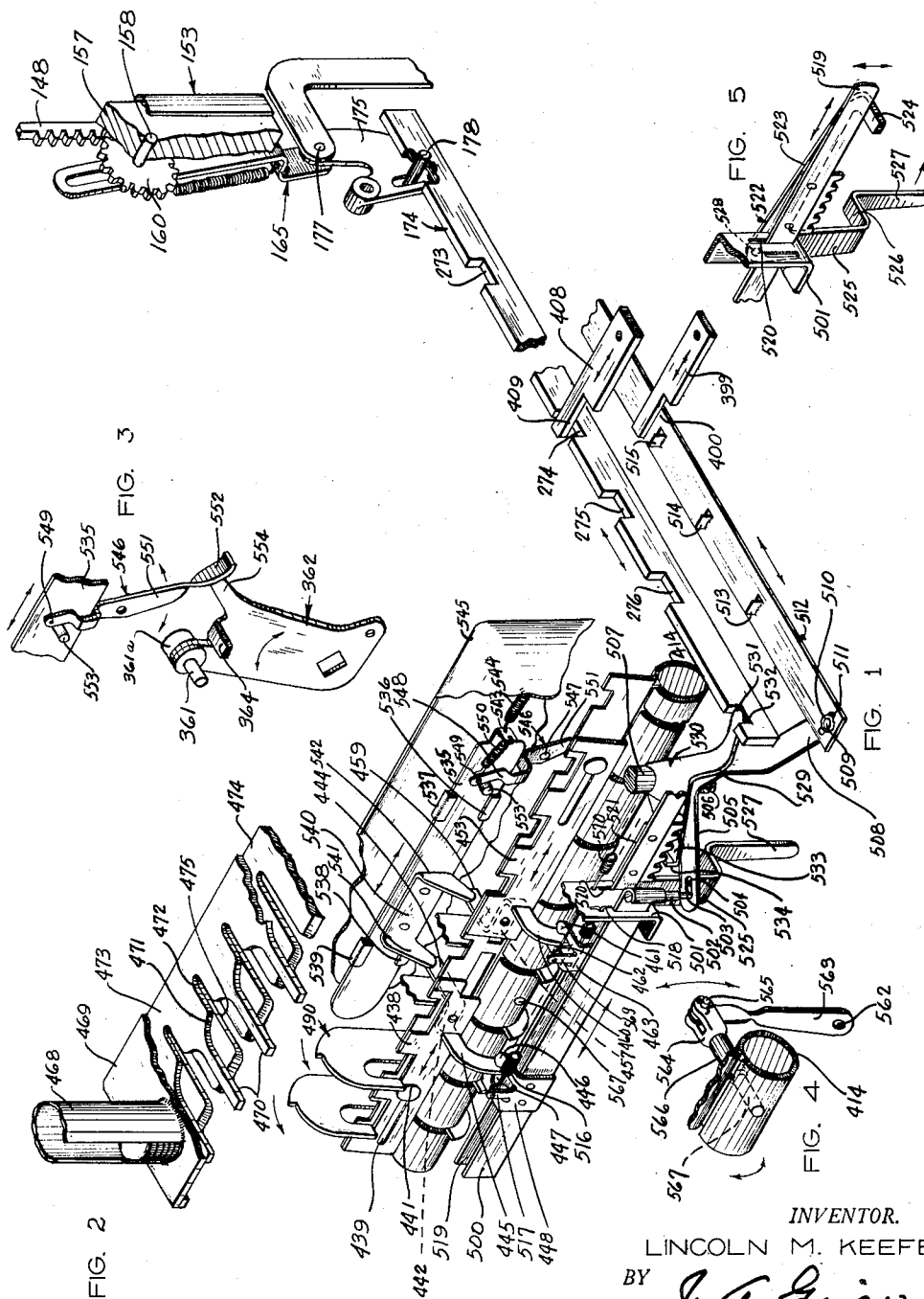
L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 1



Jan. 15, 1957

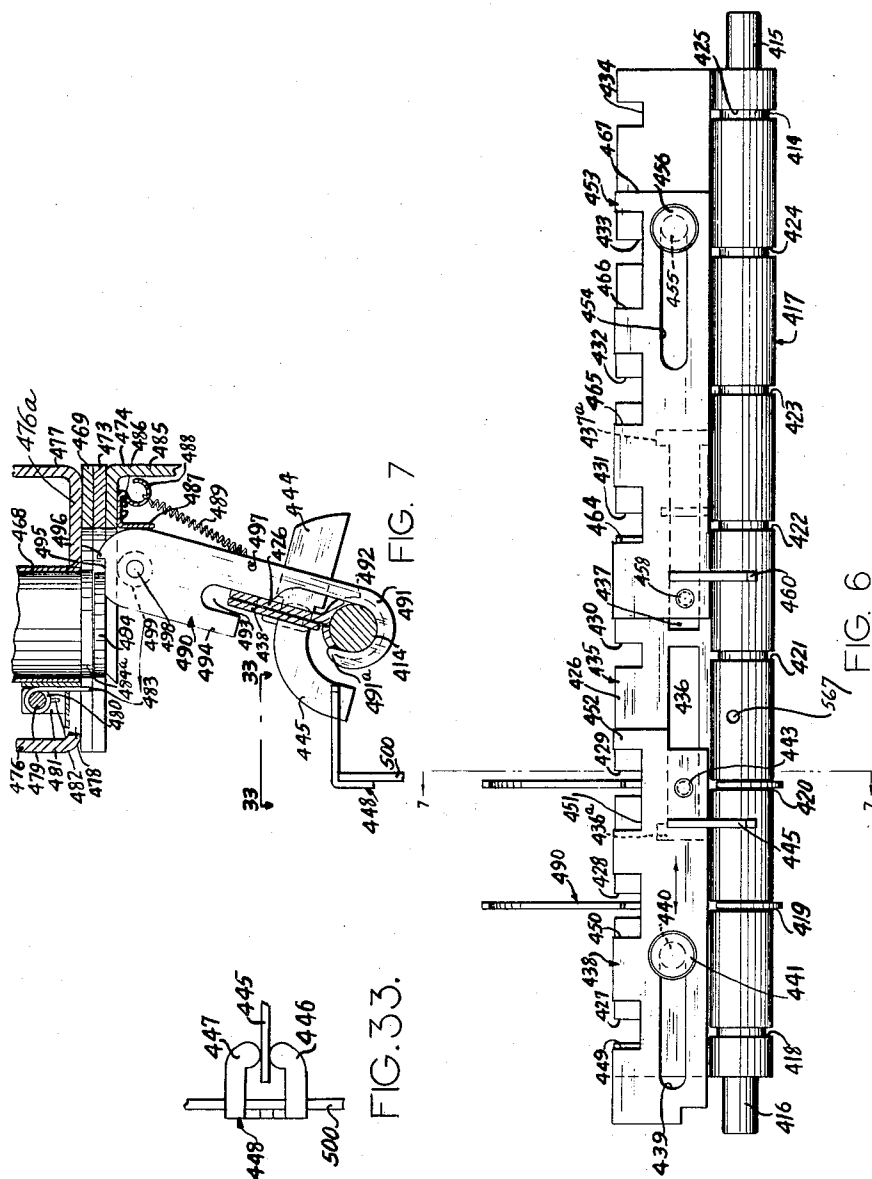
L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 2



INVENTOR.
LINCOLN M. KEEFE
BY *J. A. Grier*
ATTORNEY

Jan. 15, 1957

L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 3

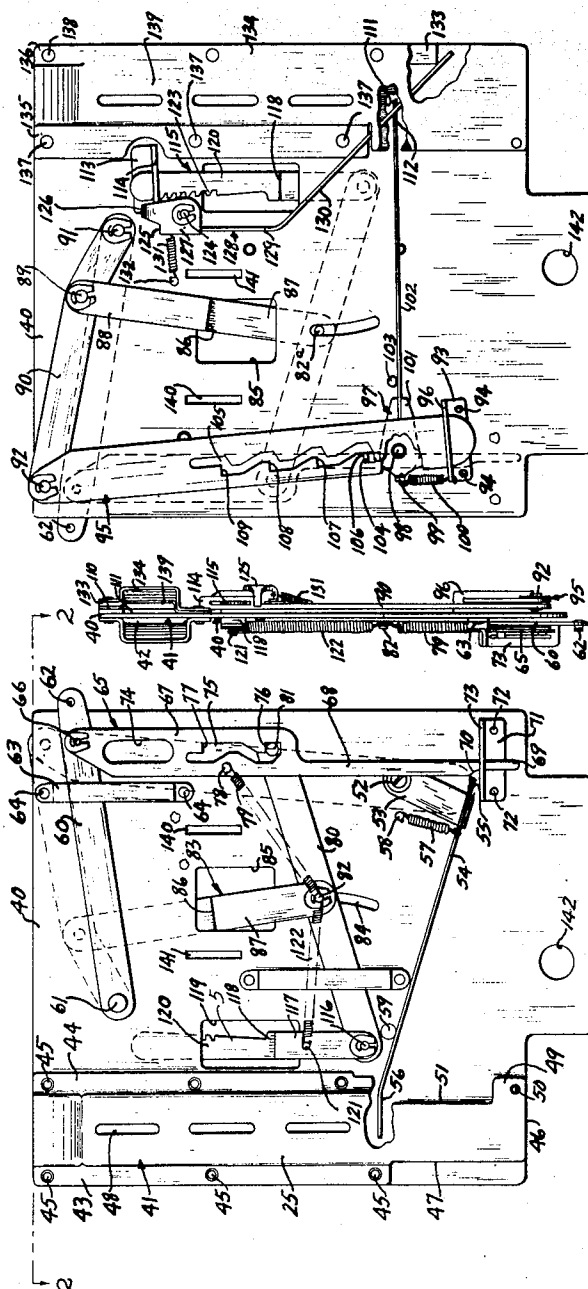


FIG. 10.

FIG. 9.

FIG. 8.

INVENTOR.
LINCOLN M. KEEFE
BY *J. A. Guen*
ATTORNEY.

Jan. 15, 1957

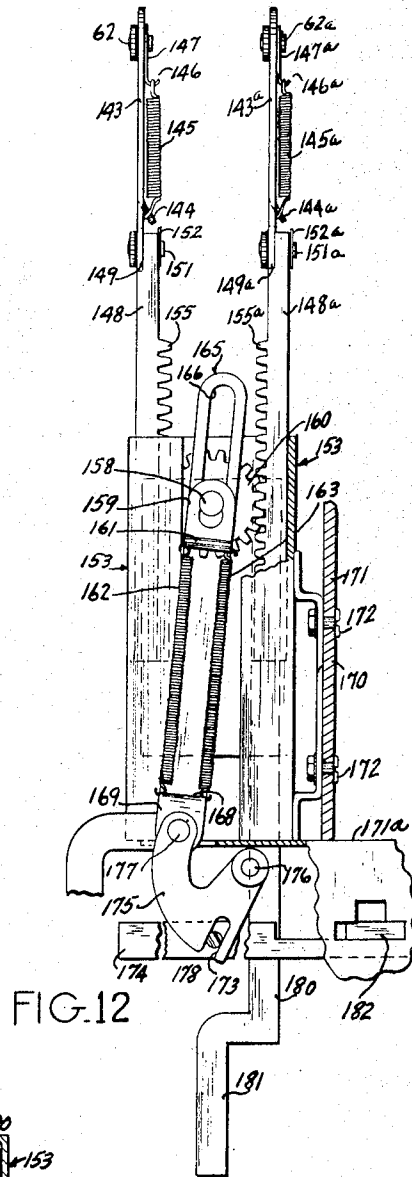
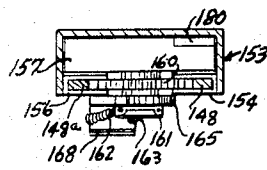
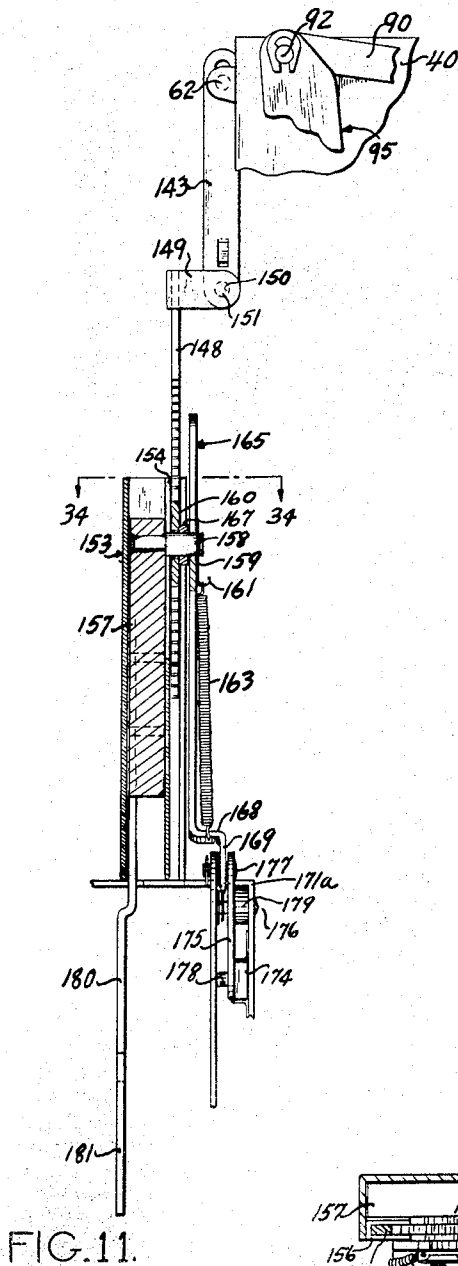
L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 4



INVENTOR.
LINCOLN M. KEEFE
BY *J. A. Grier*
ATTORNEY.

Jan. 15, 1957

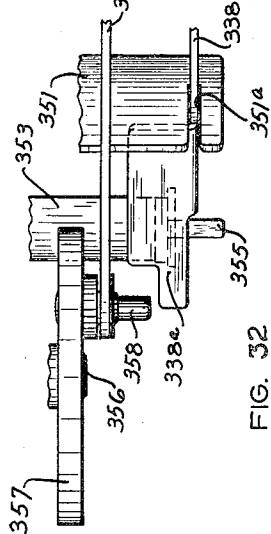
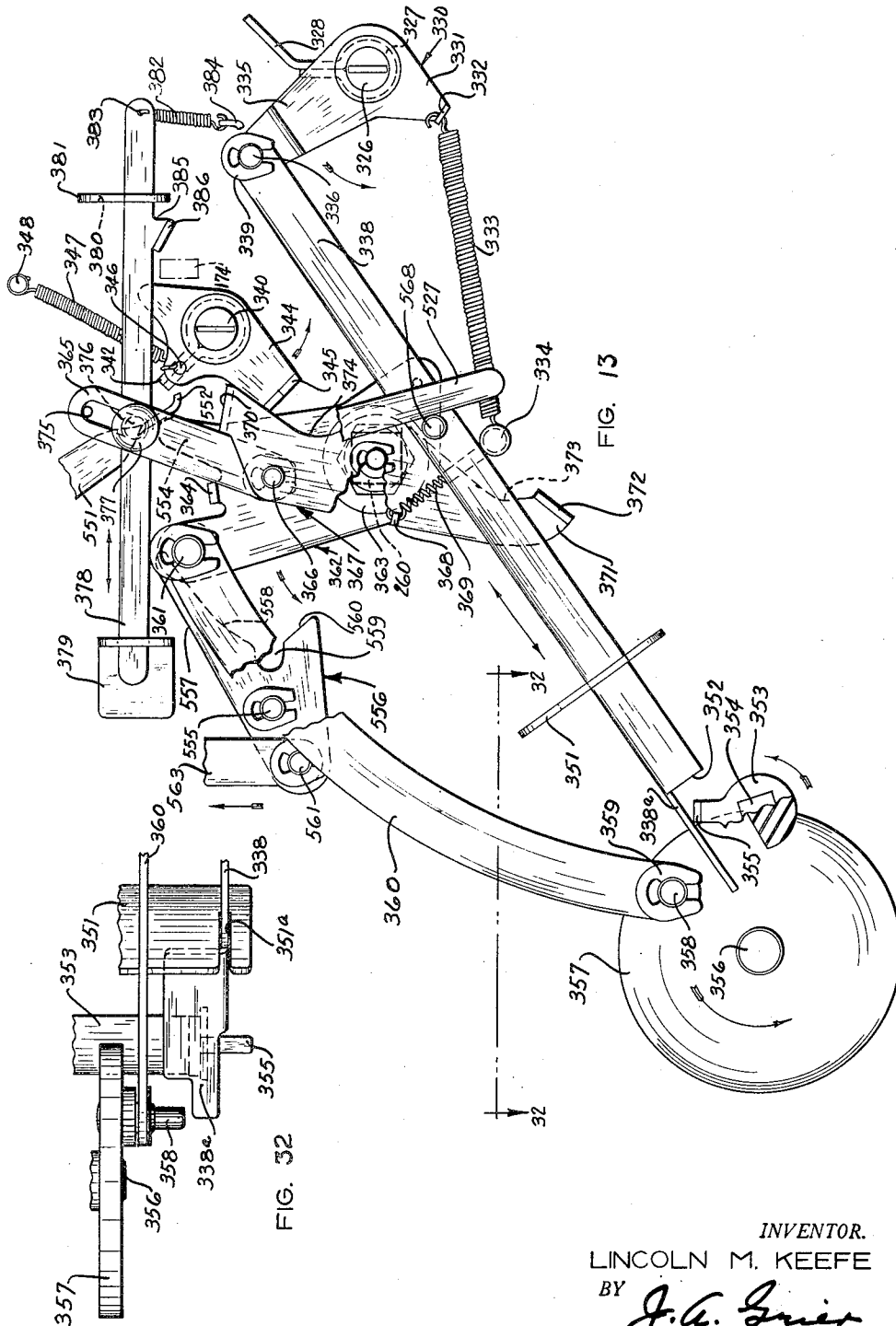
L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 5



INVENTOR.
LINCOLN M. KEEFE
BY *J. A. Guier*
ATTORNEY

Jan. 15, 1957

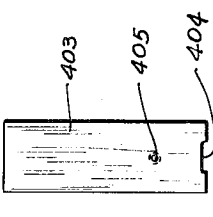
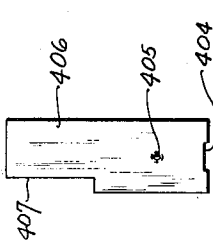
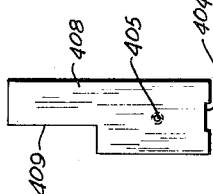
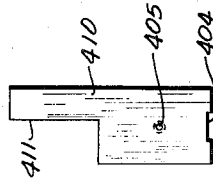
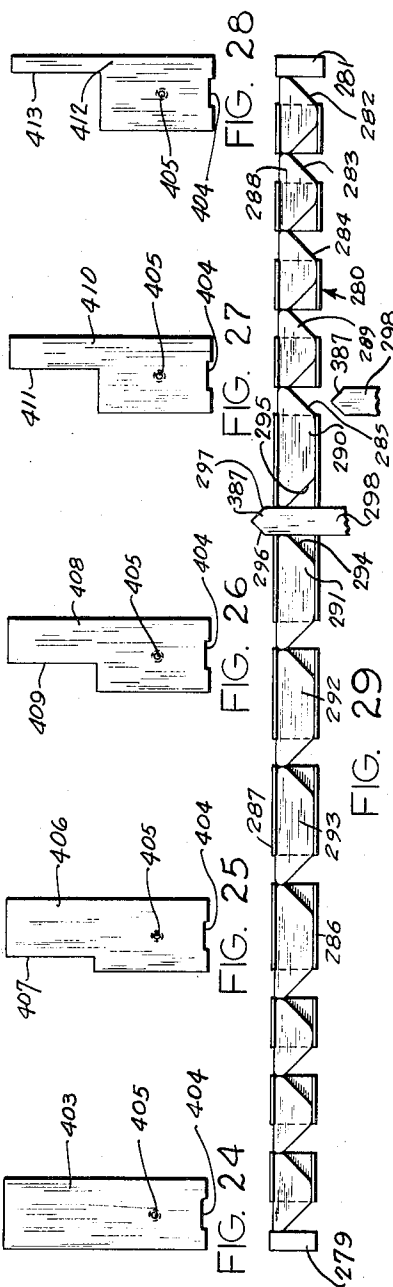
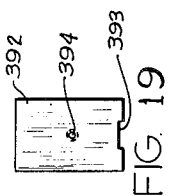
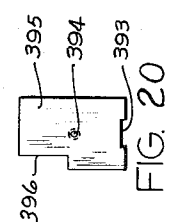
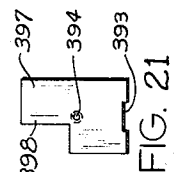
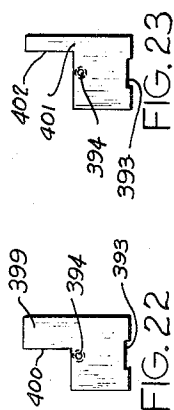
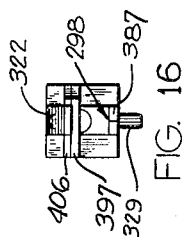
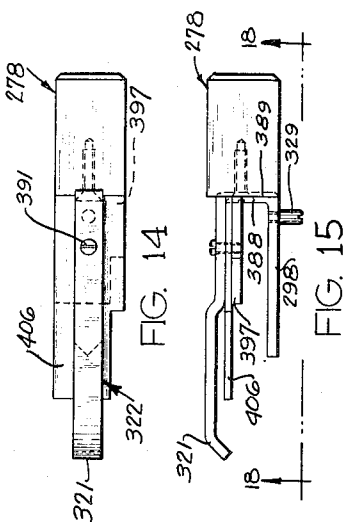
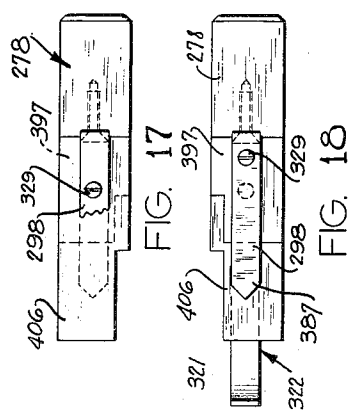
L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 6



INVENTOR.
LINCOLN M KEEFE
BY *J. A. Guier*
ATTORNEY

Jan. 15, 1957

L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 7

F1G.31.

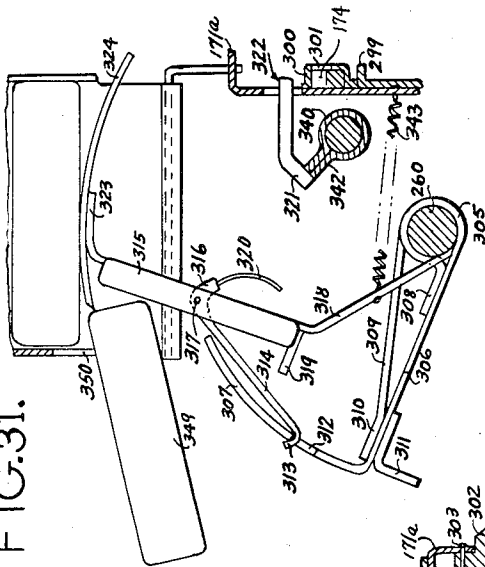
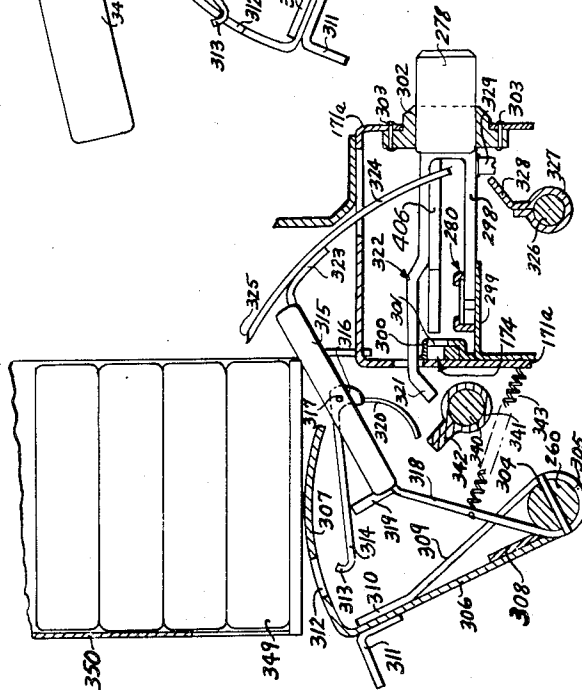


FIG. 30.



INVENTOR.
LINCOLN M. KEEFE
BY *J. A. Guier*
ATTORNEY.

Jan. 15, 1957

L. M. KEEFE

2,777,553

DEVICES FOR MAKING CHANGE

Filed Dec. 14, 1948

8 Sheets-Sheet 8

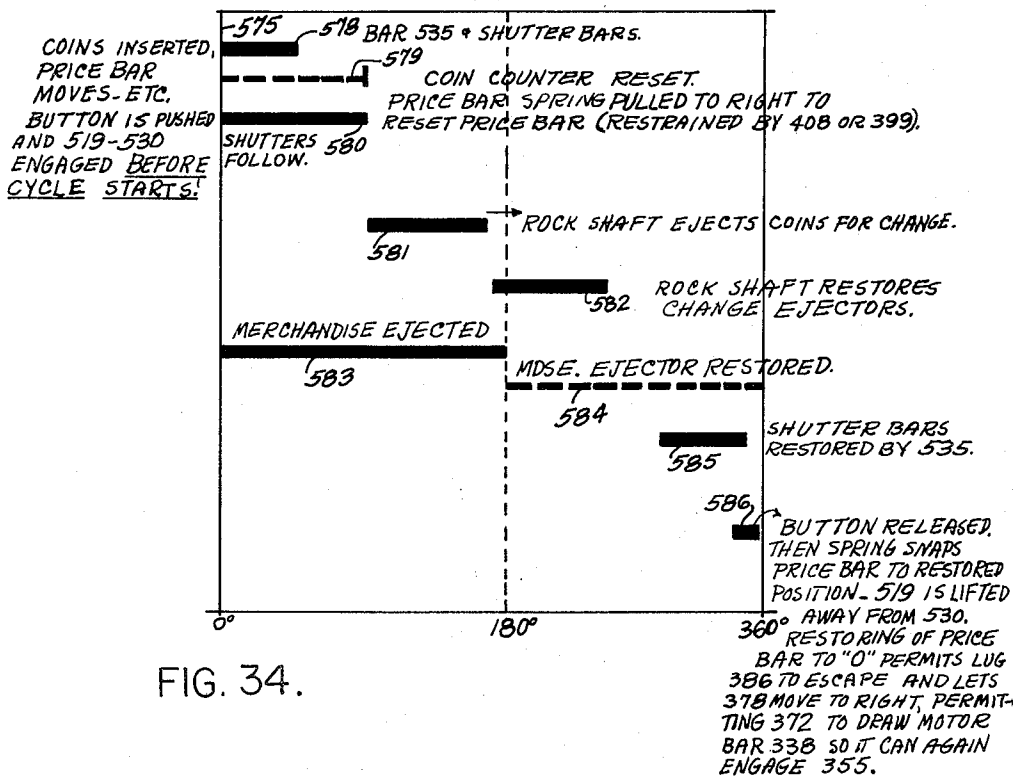


FIG. 34.

INVENTOR.
LINCOLN M. KEEFE
BY *J. A. Greer*
ATTORNEY.

1

2,777,553

DEVICES FOR MAKING CHANGE

Lincoln M. Keefe, Woodside, N. Y., assignor to Stewart Products Corporation, a corporation of Delaware

Application December 14, 1948, Serial No. 65,259

6 Claims. (Cl. 194—2)

The invention relates to improvements in devices for making change and has for a principal object the provision, in a vending machine or the like, of a change maker having a plurality of columns or holders for stacks of coins of different values therein, and shutter means for ejecting coins from the bottoms of said columns, said shutter means being operative after a credit is set up in the vending machine and after the purchaser has selected an article for delivery from the machine, said shutter means operating to deliver to the purchaser, change representing the difference between the credit which was set up and the cost of the article delivered.

Another object of the invention is the provision, in a change maker, of at least one holder for a stack of coins, shutter means for ejecting coins therefrom, means for setting up a credit in a vending machine in which said change maker is incorporated, and article delivery means adapted to subtract from said credit the cost of the article, said shutter means being adapted to eject the difference between said credit and said cost.

A further object of the invention is the provision in a vending machine or the like of a change maker including a plurality of columns for containing stacks of coins of one value, a second plurality of columns for containing stacks of coins of a different value, shutter means for ejecting coins from said stacks of one value, separate shutter means for ejecting coins from the stacks of said different value, means for setting up a credit in said machine, key means operated by a purchaser, in selecting an article, for determining how many coins of said first value shall be ejected by said shutter means, and separate key means also operated by the purchaser, in selecting the article, for determining how many coins of said different value shall be ejected by said separate shutter means.

Yet another object of the invention is the provision, in a vending machine or the like, of a change maker having a plurality of columns to contain stacks of coins of one value, a second plurality of columns to contain stacks of coins of a different value which is a multiple of the value of said first coins, individual ejector means for ejecting the bottom coins from said stacks, and push button means for setting said machine into operation and comprised of; a plurality of push buttons, one for each merchandise column in the machine, the costs of which may vary, said push button means being adapted to start the machine in operation to effect delivery of an article selected, said push button also including a first template means and a second template means for determining respectively how many coins of said first value and how many coins of said second value shall be ejected during that operative cycle of said machine.

A further object of the invention is the provision in a change maker of a plurality of columns to contain stacks of coins of one value, a second plurality of columns to contain stacks of coins of another value, individual ejector means at the bottom of each of said columns for ejecting the bottom coin therefrom, shutter means com-

2

prised of a slotted plate carried on a rock shaft having notches formed therein and a cooperative plate also having notches therein and movable parallel to the axis of said shaft for actuating the ejectors for the coins of said first value, and a second notched plate also movable parallel to the axis of said rock shaft for actuating the ejectors of the coins of said another value.

Another object of the invention is the provision of individual ejector elements for columns containing coins, and a rock shaft for causing said elements to swing radially and yet have their upper ends traverse a substantially horizontal path in ejecting the bottom coin from any of said columns.

Other objects and advantages of the invention will be apparent to those skilled in the art upon a study of the specification and the accompanying drawings.

Referring to the drawings which are given by way of example:

Figure 1 is a perspective view of one form of my new and improved change maker which, by way of example, shows the use of pennies in some of the columns and nickels in others of the columns, and showing the change maker operatively connected to a price bar which is controlled by positionable members on coin controlled mechanisms which are interconnected to the price bar through a differential;

Figure 2 is a perspective view, partly broken away, showing depressions at the bottoms of the columns, said depressions forming sockets for the bottom coin in each column and also showing elongated slots which define the paths of the coin ejector elements;

Figure 3 is a view showing an actuating shaft member for the vending mechanism and its correlation to the change maker;

Figure 4 is a fragmentary view, showing how the rock shaft is actuated;

Figure 5 is an enlarged view of the end of the bar which controls the delivery of nickels;

Figure 6 is a side elevation of the rock shaft and its slides;

Figure 7 is a sectional elevation taken along the lines 7—7 of Figure 6;

Figure 8 is a side elevation of my new and improved coin controlled mechanism;

Figure 9 is a plan view of the mechanism taken along the lines 9—9 of Figure 8;

Figure 10 is an elevation of the mechanism shown in Figure 8, as seen from the opposite side thereof;

Figure 11 is a fragmentary view of the coin controlled mechanism, such as that shown in Figure 10, operatively connected to a differential mechanism, said differential mechanism being shown partly in section;

Figure 12 is an end elevation of said differential mechanism operatively connected to the positionable members of two coin controlled devices, such as the one shown in Figures 8, 9 and 10;

Figure 13 is an elevation showing the linkages between the ejector means of Figure 30, a one revolution clutch and motor control means set by one of the push buttons, such as that shown in Figure 30;

Figure 14 is a plan view of a push button carrying key plates, one of which determines whether or not any nickels are to be given in change, and the other of which determines whether or not any pennies are to be given in change;

Figure 15 is a side elevation of the push button shown in Figure 10;

Figure 16 is an end elevation of the push button as seen from the left end of Figure 11;

Figure 17 is a plan view similar to Figure 14, except that some parts are broken away;

Figure 18 is a view of the push button taken along the lines 18—18 of Figure 11;

Figure 19 is a plan view of a key plate for effecting non-delivery of pennies;

Figure 20 is a plan view of a key plate for effecting the delivery of a single penny in change;

Figure 21 is a plan view of a key plate for effecting the delivery of two pennies in change;

Figure 22 is a plan view of a key plate for effecting the delivery of three pennies in change;

Figure 23 is a plan view of a key plate for effecting the delivery of four pennies in change;

Figure 24 is a plan view of a key plate representing a price of twenty-five cents.

Figure 25 is a plan view of a key plate representing a price of twenty cents;

Figure 26 is a plan view of a key plate representing a price of fifteen cents;

Figure 27 is a plan view of a key plate representing a price of ten cents;

Figure 28 is a plan view of a key plate representing a price of five cents;

Figure 29 is a plan view of a lockout chain in which a second key is prevented from being depressed after one key has already been depressed;

Figure 30 is a sectional view, showing the relation of a push button, such as that shown in Figures 14 and 15, to other controls in the machine, and also the relation of article ejector means to a column of articles in the machine;

Figure 31 is a view similar to Figure 30, except that the article ejector means is shown ejecting an article from its article column;

Figure 32 is a plan view of a portion of the mechanism taken along the lines 32—32 of Figure 13;

Figure 33 is a plan view of the shutter linkage taken along the lines 33—33 of Figure 7; and

Figure 34 is a timing chart showing the movements and resettings of certain elements of the change making mechanism, the price bar, etc.

Referring first to Figures 8, 9, 10, 11 and 12, I show, by way of example, coin controlled mechanisms for setting up a credit in the machine, from which credit the price of the article purchased is to be deducted. The difference between said credit and the price of the article is to be returned to the purchaser by the change maker, the subject of the present application.

A main plate 40 forms a support for the elements, some of them being positioned on one side of the plate, some of them on the other side of the plate, and some of them extending from one side of the plate to the other through the other openings formed therein, as will hereinafter be explained. Secured to the plate 40 on one side thereof is a U-shaped channel 41 having a passage 42 therein for quarters. This channel has flanges 43 and 44 formed on the opposite edges thereof and these flanges are spot welded to the plate 40 as at 45. The flange 43 terminates a substantial distance from the lower edge 46 of the plate 40, leaving an edge opening 47 communicating with the interior of the channel. The channel 41 has several elongated perforations, such as the perforation 48, formed therein, and on the lower end the channel has an ear 49 which is secured to the plate 40 at the point 50 with a suitable spacer therebetween. The flange 44 terminates a substantial distance from the lower edge 46 of the plate and an opening or slot 51 communicates with the interior of the channel in the same manner.

A shouldered screw 52 has journaled thereon a lug 53 and on the outer end of this lug is secured a rod 54 which has an upturned portion 55 on its right end. This rod, as may be seen in Figure 1, is inclined to the horizontal and has a horizontal portion 56 which extends through the slot 51 into the interior of the channel 41 so as to be engaged by twenty-five cent coins passing down the channel 41. A spring 57 has its lower end secured to the rod

54 and has its upper end engaging a stud 58. A stud 59 mounted in the plate 40 serves as a stop to limit the upward movement of the rod 54 and the rod is urged against said stop by means of the spring 57. An arm 60 has its left end, as seen in Figure 8, journaled on a stud 61 mounted in the plate 40, and has its right end extending beyond the right edge of the plate 40 and carrying a stud 62. This stud constitutes what is termed "a positionable member." A bracket member 63 has offset lugs on each end which are secured to the plate 40 by means of spot welds 64, or in any other suitable manner, and the portion between the offset lugs is parallel to and spaced apart from the plate 40 and forms a guide for the arm 60.

A lever member 65 has its upper end journaled on a stud 66 which is mounted in the arm 60. The lever member has an upper portion 67 of substantial width and a lower portion 68 which is substantially narrower than the portion 67, and a lower end portion 69 which is narrower than the portion 68, the left edges of the portions 68 and 69 having a curved surface 70 therebetween. A right angled bracket 71 has a vertical portion which is secured to the plate 40 by means of spot welds 72 and has a horizontal portion 73 which has an elongated slot formed therein through which the lower end 69 of the lever member 65 extends. The upper portion 67 of the lever member has an elongated hole 74 formed therein to lighten it, and below this hole is formed a ratchet slot 75 which is in effect a follow cam having lands 76 and 77 formed therein. The lever member 65 has a stud 78 mounted thereon to which one end of a spring 79 is secured.

A lever 80 carries on its right end, as seen in Figure 8, a stud 81 which extends into the ratchet slot 75 and which normally engages the land 76. The lever 80 intermediate the ends thereof has a stud 82 upon which is journaled the lower end of a lever 83. The spring 79 described above has its other end connected to the stud 82 and thus the lever member 65 is urged in a clockwise direction about its pivot 66 and thereby the land 76 is normally maintained in engagement with the stud 81. The stud 82, in addition to having an upstanding portion upon which the lever 83 is journaled, has an extension 82a which extends through an arcuate slot 84 formed in the plate 40. The plate 40 has a rectangular hole 85 formed therein through which the lever 83 extends. The lever 83 has an offset portion 86 which extends through the hole 85, and it has a vertical portion 87 on the side of the plate 40, as seen in Figure 8, and a second vertical portion 88 on the side of the plate, as seen in Figure 10. The upper end of the portion 88 is journaled on a stud 89 carried by a lever 90 on the opposite face of the plate 40. The lever 90 has one end journaled on a stud 91 mounted in the plate 40. A stud 92 is carried by the other end of the lever 90 and has journaled thereon the upper end of a lever member 95.

The lever member 95 extends generally downwardly on the face of the plate, as seen in Figure 10. Secured to the plate 40 is a bracket having a vertical portion 93 which is secured to the plate in any suitable manner, for example, by spot welds 94, and this bracket has a horizontal portion 96 which has a slot formed therein in which the lower end of the lever member 95 forms a working fit.

A plate member 97 is journaled on a stud 98 on the plate 40 and it has an upturned ear 99 to which one end of a spring 100 is secured. The other end of this spring is secured to the horizontal portion 96 of the bracket. The plate member 97 has a lug portion 101 to which is secured a rod 102. A stud 103 mounted in the plate 40 forms a stop against which the rod 102 is normally held under the urge of the spring 100. The plate member 97 also has an upturned lug 104 which is positioned in a ratchet groove 105 formed in the lever member 95. This ratchet groove has lands 106, 107, 108 and 109 formed therein with which the lug 104 cooperates. Normally the

Lug 104 is in engagement with the land 106. A plate 110 is supported in spaced relation to the plate 40 and this plate and its supports form a coin passage 111 to receive dimes. The end 112 of the rod 102 extends into the passage 111 so as to be actuated by the impact of coins moving downwardly in the passage 111. A bracket has a vertical portion 113 which is spot welded or otherwise secured to the plate 40. This bracket has a horizontal portion 114 which has formed therein a guide slot. A lever member 115 has its lower end journaled on a stud 116 carried on the left end of the lever 80 (as seen in Figure 8).

The lever member 115 has a portion 117 which is on the side of the plate shown in Figure 8, an angular portion 118 which extends through a hole 119 formed in the plate 40, and a vertical portion 120 which extends upwardly on the face of the plate 40, as seen in Figure 10. The upper end of the lever member 115 extends through the slot above described, as formed in the horizontal portion 114 of the bracket. Thereby the upper end of the lever member 115 is guided by this bracket. The portion 117 of this lever has a stud 121 mounted thereon and a spring 122 has one end connected to the stud 121, and the other end is connected to the stud 82 on the lever 80 so that this spring urges the lever member 115 in a clockwise direction, as viewed in Fig. 8, which is a counterclockwise direction, as viewed in Figure 10. A series of notches 123 is formed in the lever member 115 and these notches are urged by the spring 122 into engagement with the left edge of the slot formed in the bracket, as viewed in Figure 10.

A stud 124 has journaled thereon a plate member 125 which has an upstanding lug 126, which is adapted to engage the upper end of the lever member 115 and move the same in a clockwise direction, as viewed in Figure 10, so as to disengage one of the notches 123 from the bracket portion 114. The plate member 125 has a downwardly projecting portion 127 to which a rod 128 is secured. The rod 128 has a portion 129 which extends vertically downwardly and formed integral with this portion is an angular portion 130.

A spring 131 has one end secured to the plate member 125 and the other end secured to a stud 132 mounted on the plate 40. The spring 131 connects to the plate member above its pivot, and consequently the rod 128 is urged in a counterclockwise direction and the lower end rests against a spacer member 133.

A channel 134 has flanges 135 and 136. The flange 135 is secured to the plate 40 by spot welds 137, for example, and the flange 136 is secured to the plate 40 by means of screws 138 extending through the spacer 133, plate 110 and its spacer, thereby providing between the channel 134 and the plate 110 a passage 139 for nickels. Since the angular portion of the rod 128 extends into the passage 139, it is actuated by the impact of nickels passing through the passage 139.

A plate 40 has spaced mounting holes 140 and 141 adapted to engage supports in a machine in which the coin controlled mechanism is to be mounted. Spaced apart from the holes 140 and 141 is a hole 142 adapted to engage a shouldered stud in a machine in which the plate 40 is to be mounted so that the plate may be secured thereto by means of a screw and washer (not shown).

Referring to Figures 1, 11 and 12, two coin controlled mechanisms, such as those shown in Figures 8, 9 and 10, are employed, and the positionable member 62 of one of them is pivotally connected to a link 143. The link 143 has a struck out tongue 144 to which the lower end of a spring 145 is connected. The upper end of the spring is connected to a hook 146 formed on a lug 147 which engages a groove formed in the stud 62. A bar 148 has a lug 149 secured to the upper end thereof which has a hole 150 formed therein, and a boss 151 carried by the link 143 forms a working fit in the hole 150 and is retained therein by a clip member 152. The bar 148 has a

rack 155 formed therein and this rack is reciprocally carried in a channel 154, which is in turn mounted in a U-shaped channel 153.

The positionable member 62a on a second coin controlled mechanism, like the one shown in Figures 8, 9 and 10, has a link 143a, the upper end of which has a hole therein journaled on the stud 62a and retained thereon by means of a clip 147a having its lower end in the form of a hook 146a. The link 143a has an ear 144a, and the spring 145a has its upper end connected to the hook 146a and its lower end connected to the ear 144a. Thus, the clip 147a is maintained in engagement with a groove formed in the stud 62a.

A bar 148a has a lug 149a secured to the upper end thereof, which has a hole like the hole 150 formed therein and a boss 151a carried by the link 143a forms a working fit with said hole 155a formed therein and this rack is reciprocally carried in a channel 156 which is in turn mounted in a U-shaped channel 153 so that the channels 154 and 156 have their open ends facing each other.

A metallic block member 157, which due to its mass constitutes a weight, is reciprocally carried in the channel 153 and it carries a stud 158 upon which a pinion 160 is journaled. This pinion meshes with both the rack 155 and the rack 155a. The stud 158 has a groove formed therein which is engaged by a clip 159. The clip 159 has its lower end in the form of a wide hook 161 to which the upper ends of springs 162 and 163 are secured.

A connecting rod generally designated by the numeral 165 has an elongated slot 166 formed in the upper end thereof which slidably engages the stud 158 and which is located fore-and-aft between the clip 159 and a hub 167 on the pinion 160. The connecting rod 165 has near the other end a horizontal portion 168 which joins an end portion 169 which is parallel to the main body of the connecting rod 165. The horizontal portion 168 has holes in opposite edges which are engaged by the lower ends of the springs 162 and 163 so that the connecting rod 165 is urged upwardly by the springs 162 and 163, and thereby the lower end of the elongated slot 166 is maintained in engagement with the stud 158. The channel member 153 has secured thereto, for example, by spot welding, a bracket member 170 which may be secured by a supporting part 171 of the machine in which it is mounted by means of screws 172.

A crank member 175 is journaled on a stud 176 and carries a stud 177 upon which a hole formed in the lower end 169 of the connecting rod 165 is journaled. The crank member has a radial slot 173 formed therein, and a bar 174 reciprocally mounted in the frame of the machine and constituting what might be termed a price bar, extends across all of the columns of the machine. This bar is moved in steps and its position (with reference to its normal position) represents a credit set up in the machines as a result of all of the coins entered into either one or both of the coin controlled mechanisms, as will hereinafter be more fully explained.

The bar 174 carries a stud 178 which engages and forms a working fit with the radial slot 173. The crank member 175 has a hub 179, and the stud 176 is secured to an extension 171a of the frame 171.

The block member 157 has secured thereto a depending arm 180 which has an offset portion 181 formed integral therewith, the purpose of which will be presently described. The frame member has a plurality of stepped rectangular perforations 182 formed therein, and there form clearance holes for the push buttons for the several columns of the machine which are disposed in a row adjacent to the price bar 174.

Referring now to Figures 1 and 29, the differential mechanism is shown partly broken away in Figure 1, and the connections to the price bar 174 are shown. The price bar 174 has a series of notches 273, 274, 275 and 276 formed therein. These notches are engaged by key plates such as the key plate 406 carried on the selector push

buttons such as push button 278 shown in Figures 14-18, inclusive, 30 and 31. Paralleling the price bar 174 is a lock-out chain generally designated by the numeral 230. This chain has a confined space between two end barriers 279 and 281 with which aligned slots 282, 283, 284, 285 communicate. These slots are formed in side walls 286 and 287, which also form guides for a series of slidable members 288, 289, 290, 291, 292 and 293. Each of these slidable members has a bevel 294 formed at one end thereof and a bevel 295 formed at the other end, so that when they are placed in an area within the space between the side walls 286 and 287 and the end barriers 279 and 281, the beveled surfaces 294 and 295 match beveled surfaces 296 and 297 on a plunger 298 which is also mounted on the push button 278 and which is movable therewith.

When the push button 278 is depressed or pushed in the beveled end 296, 297 engages one or the other or both of the beveled surfaces 294 and 295, forms an entering wedge and enters between the adjacent ends of any two of the movable members 289 to 293. In Figure 29, this plunger is shown positioned between the slidable members 290 and 291, and when the plunger is so positioned all of the space between the barriers 279 and 281 is occupied by the several slidable members and the plunger, and therefore no other plunger on any other push button in the machine can enter between the other movable members of the chain after a first one has entered.

The lock-out chain 230 is shown in Figure 30, as positioned on a bracket 299 secured to the frame member 171a. The price bar 174 is slidably mounted in a bracket 300 which is also secured to the frame member 171a. The bracket 300 has perforations or openings 301 formed therein in alignment with the key plates 406 carried by the push buttons 278, so that said plates may pass through the same and engage one of the notches formed in the price bar 174. The plates 277 may have several forms, as are illustrated by way of example in Figures 19-28, inclusive, which will presently be described.

The push button is slidably mounted in a socket 302 which extends through an opening formed in the frame 171a and which is secured thereto by means of escutcheon pins 303. The main shaft 260 has secured thereto by means of a rivet 304 a metallic stamping having a portion 305 which partially embraces the shaft 260, having an extension 306 the front portion 307 of which is in the form of a curved plate. Coextensive with the portion of the extension 306 is a bracing plate 308. A second bracing member 309 formed integral with the portion 305 has its extremity 310 in contact with the extension 306 in the area spaced apart from the bracing means 308. Opposite the extremity 310 is a bracket member 311 and this bracket member and the extremity 310 may be spot welded to the extension 306. The curved portion 307 has a rectangular opening 312 formed therein which is adapted to be engaged, during a delivery operation, by a hook 313 formed on the end of an arm 314.

A rectangular plate member 315 has upturned edges and channels parallel to the edges (not shown) between which the arm 314 is pivoted. Secured to the arm 314 is a hub member 316 which is journaled on a shaft 317 carried in the rectangular member 315. The rectangular member has secured to its lower end a pair of spaced arms one of which is designated by the numeral 318 and these arms have their extremities embracing and journaled on the main shaft 260 so that they are freely movable thereon. The member 315 also carries a tab 319 which forms a stop against which the arm 314 may normally rest. Extending downwardly from the hub 316 is a curved tail 320 which is actuated by the angular tip 321 of a bar 322 which forms an integral part of the push button 278. Extending from the upper end of the plate 315 is a pair of curved brackets one of which is designated by the numeral 323 and secured to these brackets is a curved plate 324 which preferably has its engaging end 325 serrated.

Extending all the way across the machine beneath the push buttons is a rock shaft 326 which has an embracing member 327 thereon. This embracing member has an extension 328 which is angular with respect to the vertical when the shaft 326 is in its normal position and which is moved from its normal position by means of a screw head 329 carried on the bottom edge of the push button assembly.

Secured on the outer end of the shaft 326, as may be seen in Figure 13, is a bell crank 330 which has an arm 331 with an upturned tab 332 formed thereon to which one end of a spring 333 is secured. The other end of the spring 333 is connected to a stationary post 334. The bell crank 330 has an arm 335 which carries a stud 336. Journaled on this stud is a bearing hole formed in one end of a bar 338 and this bar is retained on the stud 336 by means of a spring clip 339.

Returning to Figure 30, the machine has a second shaft 340 which is embraced by member 341 having its extremities abutting each other to form a continuous radial arm 342. The arms 318 shown in their normal positions in Figure 30 are urged to this normal position by means of springs 343 secured to the arms and to the frame member 171a. Carried on the outer end of the shaft 340, as may be seen in Figure 13, is a crank 344 which has an end 345 bent at right angles to the main body of the crank and this comes to rest against a member to be presently described. The crank 344 has an ear 346 with a hole through which is engaged one end of a spring 347. The other end of this spring is connected to a fixed post 348 so that the spring continuously urges the crank 344 and consequently the shaft 340 and the radial arm 342 thereon to their normal positions.

Referring again to Figure 30, since the crank just described maintains the shaft 340 and the radial arm carried thereby to the position shown in Figure 30, it can be seen that when the push button 278 is depressed the end 321 of the member 322 which forms an integral part of the push button engages the curved tail 320 and swings the arm 314 upwardly so that the hook end 313 thereof enters the opening 312 and engages the curved member 307, so that when the shaft 260 is rocked in a counterclockwise direction, as seen in Figure 30, to deliver an article, and rocked in a clockwise direction to again assume its normal position, the article ejector 324 moves therewith and ejects the article.

Figure 31 shows the shaft 260 swung almost its entire stroke in the counterclockwise direction, thereby ejecting an article 349 from the article column 350. As the article delivery stroke is completed and the mechanism is returned to its normal position, the crank 344 is moved through an arc in a counterclockwise direction with the result that the end 321 which, during the delivery and return operation, was engaged by the ends of the arm 342, is released from these ends due to said arcuate movement of the shaft 340. As soon as the end 321 is released, the push button returns to its normal position, which is the position shown in Figure 30.

Referring again to Figure 13, the bar 338 reciprocates in a suitable slot 351a formed in a plate 351. The bar 338 near the lower end thereof has preferably formed integral therewith a lateral tab 338a which extends beyond the end 352 of the bar 338 so that the end 352 constitutes an engaging member.

The crank member 353 which is mounted on a shaft 354 has an ear 355 extending across the path of the bar 338 and adapted to be engaged by the engaging end 352 of the bar 338. Carried on the shaft 354, not shown, is a mercury switch such as that shown in copending application Serial No. 65,590, filed on December 16, 1948, which when rocked connects an electric motor such as that shown in said copending application and thereby effects, through the medium of a one revolution clutch, the rotation of a shaft 356 upon which is secured a disc 357 carrying a stud 358. The stud 358 is

parallel to the shaft 356 and has journaled thereon a bearing hole which is formed in one end of a curved connecting rod 360. The end of this connecting rod is retained on the stud 358 by means of a spring clip 359. The other end of the connecting rod 360 has a bearing hole formed in it which is journaled on a stud 361 which is carried on a dog 362. The dog 362 has a hub 363 which is keyed on the shaft 260. Formed integral with the dog 362 is a tab 364 which extends forwardly, as seen in Figure 13, and normally in contact with this tab is a lever 365 which has one end journaled on a stud 366, which is carried on a member 367, which is journaled on and freely movable on the shaft 260. The member 367 has a tab 368 thereon to which one end of a spring 369 is connected. The other end of the spring is connected to the stud 334 and thus the member 367 is urged by this spring in a counterclockwise direction, as seen in Figure 13. The member 367 has a downwardly projecting ear 370 which bears against the right hand edge of the lever 365 and, due to the urge of the spring 369, urges the left edge of the lever 365 against the tab 364.

The member 367 has a depending arm 371 which carries a forwardly projecting ear 372. The right edge of the arm 371, as seen in Figure 13, has a curved depression 373 formed therein which cooperates with the post 334 in a manner to be presently described.

The angular end 345 of the crank 344 is normally in contact with the surface 374 of the member 367.

The lever 365 has an elongated slot formed therein adjacent to the upper end thereof and forming a working fit in this slot is a stud 376 having an enlarged head 377. The stud 376 is secured to a bar 378 the left end of which forms a working fit in a slot formed in an annular bracket 379. The other end of the bar 378 is reciprocally carried in an elongated slot 380 formed in a lug 381 supported on the frame of the mechanism. The slot 380 is substantially longer than the width of the bar 378 so that it not only reciprocates therein but also moves laterally (up and down, as seen in Figure 13). A spring 382 has one end extending through a small hole 383 formed in the right end of the bar 378 and the other end of this spring is connected to a lug 384 which is fixed on the frame of the machine. The bar 378 has a depending extension 385 with a laterally extending tab 386 formed integral therewith.

When a push button, such as the push button 278, for example, is depressed, the screw 329, as pointed out before herein, engages the extension 328 of the member 327 which embraces the shaft 326 and thereby causes the shaft to rotate through an arc in a counterclockwise direction. The bell crank 330 moves therewith, since it is keyed to the shaft 326 and the bar 338 is moved lengthwise and it causes the shaft 354 carrying a mercury switch (not shown) to rock to a position where the mercury switch is closed, thereby supplying power to the electric motor. The shaft 356 is rotated, through suitable gearing and a one revolution clutch, a single revolution in a counterclockwise direction, as viewed in Figure 13, thereby through the medium of the connecting rod 360 causing the dog 362 to move counterclockwise through an arc and return to its normal position, and thus the shaft 260 is rocked to effect the delivery of an article in the manner described in connection with Figures 30 and 31.

As the dog 362 starts moving in a counterclockwise direction, the member 367 and the lever 365 move therewith until the depressed surface 373 on the member 367 comes in contact with the post 334 and from there on the member 367 is arrested. During this movement the bar 378 is moved to the left, and since the tab 386 is angularly disposed on the bar it cams over the price bar 174, and after it passes over the price bar, the right end of the bar 378 is pulled downwardly by the spring 382 so that the tab 386 and its extension 385 remain on the left side of and in contact with the price bar 174.

When the push button is depressed and released before the cycle has been completed the member 367 and the lever 365 move with the dog 362 as the latter is moving in a clockwise direction to return to its normal position. The tab 364 acting against the lever 365 and the lever in turn acting against the lug 370 causes the member 367 to move positively and against the urge of the spring 369. The surface 374 of the member 367 engages the portion 345 of the crank 344, thereby rotating the shaft 340 in a counterclockwise direction and releasing the end 321 of the push button member 322 from the radial arm 342 on the shaft 340, thereby releasing the push button 278 and withdrawing the plunger 298 from the lock out chain and the key plate 277 from one of the slots in the price bar 174. This allows the push button to return to its normal position and consequently its screw stud 329 is disengaged from the extension 328 and allows the bell crank 330 and its shaft 326 to return to its normal position under the urge of the spring 333. Since by this time the price bar 174 has returned to its normal position, the tab 386 is free to return to its normal position under the urge imparted to it by the lever 365. Thus everything is reset for a subsequent operation.

Assuming that the push button is depressed and is held in by the operator, the cycle starts as described above and continues to the point where the radial arm 342 releases the portion 321 of the push button member 322, but the key plate 277 is still engaged with one of the notches in the price bar 174, and also the lock out plunger 298 is in engagement with the lock out chain. In addition to this, the extension 328 on the shaft 326 is held in advanced position by the screw 329 on the push button assembly. Therefore, the bar 338 cannot return to its normal position, so that as the member 367 is moving in a clockwise direction, due to the clockwise motion of the dog 362, the tab 364 acting against the left side of the lever 365, therefore, acts as a fulcrum, and since the bar 378 cannot move due to the fact that the price bar 174 has not withdrawn, the result is that the member 367 is moved a greater distance than it normally is, so that the end 372 engages and lifts the bar 338 to the upper end of its slot in the member 351 and thereby its engaging end 352 is held out of the range of the tab 355 and the mercury switch on the other end of the shaft 354 cannot be actuated.

These elements remain in this relation as long as the push button is held in. Now, if the absent-minded purchaser happens to think that he is holding the button in and releases it, the plunger 298 is withdrawn from the lock out chain and at the same time the key plate 277 is withdrawn from its notch formed in the price bar 174 and, therefore, the price bar can return to its normal position and in doing so its end clears the tab 386, allowing the bar 378 to move to the right to its normal position, and in so doing the member 367 through the medium of the lever 365, its slot, and the stud 376 therein allows the member 367 to return to its normal position, allowing the bar 338 to return to its normal position within the slot in the member 351. Since the release of the push button allows the screw 329 to become disengaged with the extension 328, it and its shaft 326 together with the bell crank 330 are allowed to return to their normal position and therefore the engaging member of the bar 338 is withdrawn to its normal position with the engaging end 352 spaced apart from the tab 355 on the crank member 353 and thereafter the machine may be operated by inserting coins therein in the usual manner.

It will be evident that if the push button had been held in and anybody attempted to push in any other buttons, they would be prevented from doing so because the lock out chain is filled by the plunger 298 and therefore no other plunger can enter it. It would also be prevented from operating because the bell crank 330 had not returned to its normal position to reengage the tab 355 on the crank 353, and due to the additional fact that the

left end of the bar 338 is raised so that its engaging end 352 is out of the range of the tab 355 on the crank 353 and therefore it is impossible to operate the machine by holding one of the push buttons depressed and attempting to operate another while so holding the first one.

All of the elements described above in connection with Figure 13, control the operation of the machine in the manner described. However, Figure 13 shows other elements which cooperate with the change maker, the subject of the present application, and these elements will hereinafter be described, together with the linkages to the elements of the change maker which they control.

As described above, the coin controlled mechanisms, through the medium of the differential mechanism which integrates the movements of the positionable members of the two coin controlled mechanisms, effects the movement of the price bar 174 in increments corresponding to the value of the money inserted in either one or both of the coin controlled mechanisms, thereby in effect setting up a credit in the machine.

The push buttons which are utilized to select the column in which the article desired appears may be very easily arranged to represent the price of the article and in the embodiment shown herein, any push button may be arranged for any price regardless of whether it is as low as one cent or as high as twenty-five cents.

Referring now to Figures 14-18, inclusive, a push button is shown and is designated generally by the numeral 278. Each push button in the machine is provided with a plunger 298 which has a point 387 which forms an entering wedge adapted to cam against one or the other or both of the edges 294 and 295 of the elements 290, 291, for example, of the lock out chain 280. Depending from the plunger 298 is a screw 329 which, as described above, actuates the extension 328. The member 322, already described above, has a downwardly bent end 321, the purpose of which has been described above. The plunger 298 has an angular portion 388, and the member 322 has an angular portion 389. These angular portions overlap and are set into the end of the push button 278 and secured thereto in any suitable manner, for example, by means of a screw 390. The member 322 has a clearance hole therethrough to accommodate a screw 391, and by means of this screw, key plates, such as those shown in Figures 19-28, are secured onto the push button. In securing the key plates onto the push button, one of those shown in Figures 19-23, and one of those shown in Figures 24-28 are secured to the member 322 by means of the screw 391, the one taken from the group, Figures 19-23 being in contact with and below the first mentioned key plate.

In Figure 19, a key plate 392 is shown and this plate is completely rectangular in form, except that it has a notch 393 formed therein to engage the angular portion 388 on the lock out plunger. A threaded hole 394 is formed in the plate 392 to be engaged by the screw 391. This key plate is used where there are no pennies in change to be delivered. In other words, if the push button represented a price of fifteen cents, the change from a twenty-cent or twenty-five cent credit would be delivered as one nickel or two nickels, respectively. Of course, a key plate of the form shown in Figures 24-28 would also be secured to this push button, as will hereinafter be described in connection with said figures.

Figure 20 shows a key plate 395 which is generally rectangular in form, except that a notch is formed therein, leaving an engageable edge 396 spaced from the left edge of the plate to effect the delivery of a single penny in change. This plate has a notch 393 formed therein and is provided with a tapped hole 394. A key plate 397, shown in Figure 21, is generally rectangular in form, except that a notch is formed therein leaving an engageable edge 398 spaced from the left edge of the plate a distance to effect the delivery of two pennies in change. The plate 397 is also provided with a notch 393 and a tapped hole 394. A key plate 399 is shown in Figure 22, and

this plate is likewise generally rectangular in form, except that a notch is formed therein, leaving an engageable edge 400 spaced apart from the left edge of the plate to effect the delivery of three pennies in change. The plate 399 is also provided with a notch 393 and a tapped hole 394.

A key plate 401, shown in Figure 23, is also generally rectangular in form, except that a notch is formed therein, leaving an engageable edge 402 spaced apart from the left edge of the plate to effect the delivery of four pennies in change. The plate 401 is also provided with a notch 393 and a tapped hole 394. In all of these key plates, the notches 393 and the tapped holes 394 are so formed therein that the key plates are interchangeable.

A key plate 403 is shown in Figure 24, and this plate is generally rectangular in form and somewhat longer than the key plates 392, 396, 398, 400 and 402. The key plate 403 is provided with a notch 404 and a hole 405. This plate represents a price of twenty-five cents.

A key plate 406, as shown in Figure 25, is provided to effect the delivery of one nickel in change. This plate is generally rectangular in form and is notched to form an engageable edge 407 spaced apart from the left edge of the plate. This plate represents a price of twenty cents. This plate is also provided with a notch 404 and a hole 405.

A key plate 408 is shown in Figure 26, and this plate is likewise generally rectangular in form, except that the notch formed therein presents an engageable edge 409 which is spaced apart from the left edge of the plate to represent a price of fifteen cents.

A key plate 410 is shown in Figure 27. This plate is generally rectangular in form and is notched more deeply to present an engageable edge 411 which is spaced apart from the left edge thereof a distance to represent a price of ten cents.

A key plate 412, shown in Figure 28, is generally rectangular in form and is deeply notched to present an engageable edge 413 which is spaced apart from the left edge of the key plate a distance to represent a price of five cents.

The key plates 408, 410 and 412 are also provided with notches 404 and holes 405.

In the push button assembly shown in Figures 14-18 inclusive, the key plate 406, representing twenty cents, is shown, and the key plate 397 is shown. These key plates are mounted, as may be seen in Figure 15, by means of a screw 391 which passes through the hole in the key plate 406 and engages the threaded hole 394 in the key plate 397. A push button assembly made up in this manner represents a price of eighteen cents and if twenty-five cents is inserted in the machine and this push button is depressed, it will cause the change maker to deliver one nickel and two pennies in change. A credit of twenty-five cents having been set up in the machine and the price of the article being eighteen cents, the result is: twenty-five cents, minus eighteen cents, equals seven cents in change.

If the price of the article is to be fifteen cents, for example, a key plate 408 would be secured to the push button together with a key plate 392, in place of the key plates 406 and 397 described above. By this arrangement, if fifteen cents were inserted in the machine, the depressing of this push button would effect the delivery of a fifteen cent article without any change; if twenty cents were placed in the machine, it would deliver the article and a nickel in change; or if twenty-five cents were placed in the machine, it would deliver the fifteen-cent article and two nickels in change.

As a third example, suppose the push button were made up for selecting an article, the price of which is six cents. Key plates 410 and 401 would be secured on the push button and when this button is depressed to select an article (the price of which is six cents) the change maker would deliver four cents in change, if ten cents were inserted in the coin control. If twenty cents were inserted, the

change maker would deliver fourteen cents in change; or if a quarter were inserted, the change maker would deliver nineteen cents in change.

From the above, it will be seen that the push button assembly may be made up for any article price from one cent to twenty-five cents.

In the embodiment of the change maker to be described herein, only nickels and pennies are given in change. The reason for this is that the coin control device will not accept less than five cents nor more than twenty-five cents, so all of the set-ups will result in giving change to the nearest larger nickel (if nickels are involved in the change) and the key plates shown in Figures 19-23 will give change which is the difference in price between the article and the next highest nickel, and this change would, of course, be in pennies.

Change maker

Referring now to Figures 1-7, the change maker includes a shaft 414 which has portions 415 and 416 on the ends thereof of reduced diameter and adapted to be journaled in suitable bearings, so that this shaft may be rocked during a certain portion of each operating cycle of the vending machine. Embracing the shaft is a sleeve 417 which has spaced slots 418, 419, 420, 421, 422, 423, 424, and 425. The sleeve 417 has an extension 426 which is in the form of a flat elongated plate extending substantially radially from the shaft 414. This plate has a series of slots 427, 428, 429, 430, 431, 432, 433 and 434 extending therein downwardly from the upper edge 435 thereof. The slots 427-430, inclusive, are to accommodate the ejectors for ejecting pennies, as will be hereinafter described, and the slots 431-434, inclusive, are for the ejectors of nickels. The extension 426 has an elongated slot 436 formed therein and having its longitudinal axis extending parallel to the axis of the shaft. Spaced apart from the slot 436 is a similar slot 437. The slot 436 has a widened extension 436a at one end thereof, and likewise, the slot 437 has a widened extension 437a at one end thereof. A shutter plate 438 has an elongated slot 439 formed therein adjacent to one end thereof and extending through this slot is a shouldered stud 440 having a head 441 which overlies the edge of the slot 439 in the shutter. Secured to the shutter 438 is a Z-shaped strip having a portion 442 in contact with the rear face of the shutter plate 438 within the slot 436, and secured to the plate by means of a screw 443. The Z-shaped member also has a portion 444 extending rearwardly, the function of which will be presently described. The Z-shaped member has a leg 445 which extends forwardly through a slot in the shutter, curves downwardly, and forms a dog by means of which the shutter is moved. This shutter dog extends between engaging lobes 446 and 447 of a dog shifter plate 448. By this arrangement, the shutter plate 438 may be shifted and the shaft 414 may be rocked without the dog 445 becoming disengaged from these lobes.

The shutter plate has slots 449, 450, 451 formed therein and beyond the slot 451 is a web 452 and these slots and the web cooperate, respectively, with the slots 427-430, inclusive. A second shutter plate 453 has an elongated slot 454 formed therein and extending through this slot is a shouldered screw 455 having a head 456 overlying the edges of the slot 454.

A second Z-shaped strip has a portion 457 positioned within the slot 437 and in contact with the rear face of the shutter plate 453 and is secured thereto by means of a screw 458. Extending rearwardly from the portion 457 of the strip is an extension 459 and extending forwardly through a slot in the plate 453 is a curved portion 460 which constitutes a shutter dog for the shutter plate 453. This dog is oppositely engaged by lobes 461 and 462 of a dog shifter plate 463. The shutter plate 453 has slots 464, 465 and 466 formed therein to cooperate with the slots 432-434 formed in the extension 426 and the end edge 467 of this shutter cooperates with the slot 434 in the extension 426.

The coins which are to be used with change are to be carried in a plurality of stacks, one of which is held in an open tubular section 468, as shown in Figure 2, shown positioned on a plate 469. Actually the tubular section 468 is mounted on a separate plate which is superimposed on the plate 469 in the manner shown in Figure 7, which will be presently described. The other stacks are omitted from Figure 2 for the sake of clarity. However, in the change maker, there are four such stacks of pennies and there are four such stacks of nickels.

Beneath the plate 469 is a plate 473 having a series of slots formed therein, one for each stack of change, and since these slots are similar, a description of one of them is believed to be sufficient. The slot 470 is of a width equal to the diameter of the coin plus clearance and its inner end 471 is semi-circular. Cutting the semi-circular wall 471 is a narrow extension slot 472. Beneath the plate 473 is a plate 474 which has lateral slots 475 formed therein and the plates 473 and 474 are so oriented on each other that the slot 475 coincides with the slot 472. The bottom coin in each stack rests upon the upper surface of the plate 474 within the slot 470 and the curved wall 471 backs the coin up. Now, the purpose is to move the coin outwardly from the slot 470 and this is done by means moving in the slot 475 and extending part way into the slot 472.

Referring now to Figure 7, a top plate 476a has an upturned front edge 476, an upturned rear edge 477, and a slot 478 formed therein in line with the center of the tubular member 468. The plate 476a is superimposed on the plate 469. These were omitted from Figure 2 for the sake of clarity.

Spanning all of the columns is a shaft 479 with a spring 480 in front of each tubular column and spacer members 481 are provided between each spring so that the tail 482 of a spring may engage a notch formed in the spacer member. The other end 483 of the spring extends downwardly in the path of the coin 484a which rests on the lowest coin 484.

The plate 474 has a downward extension 485. Secured to the lower surface of the plate 474 is a bracket 486 having a downwardly extending tab 487 and an elongated tab 488.

A coin ejector, generally designated by the numeral 490, has formed on its lower end, a semi-circular web 491 which forms a working fit in the groove 419 and which embraces the shaft 414. The semi-circular web 491 has an elongated extension 491a which still engages the shaft, together with the straight web portion 492 on the opposite side thereof when the ejector 490 is moved downwardly, as will presently be explained in connection with Fig. 7.

The coin ejector 490 has an elongated slot 493 formed therein, the left edge of which blends into the web 492 and the right edge of which is foreshortened to form a tab 494 which is engaged in a manner to be presently described.

The upper end of the coin ejector is generally rounded and has a flat surface 495 formed therein which terminates in a vertical notch 496, which forms a coin engaging member, for example, as seen in Figure 7. If the ejector 490 is swung in a counter-clockwise direction, as seen in Figure 7, the vertical edge of the notch 496 engages the rear edge of the coin 484, for example, and as the ejector moves to the left, the coin moves with it. Now, since the radial distance between the coin 484 and the center of the shaft 414 shortens, as the ejector moves to the left, the portion 491 embracing the shaft 414 is moved downwardly away from the shaft a slight distance, and to take up the slack and urge the coin ejector upwardly, so that its flat surface 495 is against the bottom coin, a spring 489 is provided. One end of this spring is connected to a hole 497 formed in the ejector member and the other end is connected to arcuate tab 488,

15

and thus the coin ejector 490 is urged upwardly at all times by this spring.

As the bottom coin 434 is being ejected, the next coin above is in contact with it and is restrained by the end 483 of the spring 430. The coin being ejected rests on the plate 474 and as the coin is advanced to a point where the trailing edge is near the beveled edge of the plate 474, the coin falls downwardly into a chute (not shown) for the purpose of conveying it to a desired point.

Near the upper end of the coin ejector is a stud 498 which has an enlarged boss 499 on the opposite face thereof and the function of this boss is to limit the extreme upward movement of the coin ejector. In other words, the boss 499 bears against the lower surface of the plate 474 and thereby limits the upward movement of the coin ejector.

The dog shifter 443 is mounted on a bar 500 which is slidable endwise in the device. One end of the bar 500 passes through a slot formed in the angle bracket 501. The other end is supported in a slot in a similar bracket (not shown). The extreme right end of the bar 500, as seen in Figure 1, embraces a stud 502 and this stud has an end portion 503 of reduced diameter which extends through a slot 504 formed in one arm 505 of a bell crank 506, which is journaled on a shaft 507. The other arm 508 of this bell crank is offset downwardly and carries on the end thereof a stud 509 having an enlarged head 510. This stud extends through a slot 511 formed in a bar 512. Since the head 510 of the stud is larger than the width of the slot 511, the shank of the stud is maintained in the slot 511 and forms a working fit therein.

The bar 512 has a series of upstanding tabs 513, 514 and 515, formed therein, the purpose of which will be presently described. The dog shifter 443 carried on the bar 500, since it engages the dog 445, effects movement of the shutter plate 438 to the right in time with the movement of the bar 512, and one of the tabs on the bar 512, for example the tab 515, is arrested.

In connection with Figure 1, it is assumed that the price of an article is twelve cents and therefore the push button is assumed to carry a key plate 403 representing fifteen cents and a key plate 399 which will effect the delivery of three cents in change.

The bar 500 is urged forwardly (in the direction of the bell crank 506) by means of a spring 516 which has one end secured to a leg 517 on the shifter 443 and which has the other end secured to a cotter pin 518 which extends through a hole in the bracket 501. This spring urges the bar 500 to the right, as seen in Figure 1, and this motion is imparted by the bell crank 506 to the bar 512, causing this bar to move to the right until it is arrested by the engagement of the tab 515 with the engageable surface 400 on the key plate 399.

In the example given, the key plate 399 causes the delivery of three pennies in change. Now, since the dog shifter on the bar 500 is in engagement with the dog 445 at all times, the dog moves with the bar 500 since the dog is part of the shutter plate 438, this shutter plate is also moved, with the result that the slots 427, 428 and 429 are closed by solid portions of the shutter plate 438 so that (referring to Figure 7) when the shaft 414 is rocked in a counter-clockwise direction, the three coin ejectors associated with the slots 427, 428 and 429 rock with the shaft, and due to the closure of these slots by the shutter plate 443, the depending tabs 494 on said last mentioned coin ejectors are engaged by the shutter as the shaft 414 is rocked, and consequently the bottom coins from the three stacks of coins on the extreme left (stacks of pennies) are ejected and delivered as the change.

A bar 519, paralleling the bar 500, has the dog shifter 463 secured thereto and this dog shifter straddles the

16

dog 460 which effects the movement of the shutter plate 453 and thereby controls the coin ejectors for ejecting nickels. This bar is reciprocally mounted in the machine and the bracket 501 has a vertical slot 520 formed therein, the length of which is substantially greater than the width of the bar 519, so that in addition to being slidable endwise, the bar 519 may have its right end moved upwardly and downwardly.

Secured to the bar 519 is a plate 521 which has five notches formed therein. The nearest notch to the bracket represents twenty-five cents; the next notch, twenty cents; the next notch, fifteen cents; the next one, ten cents; and the last one (the one on the right) represents five cents. The bracket 501 also has pivotally secured thereon by means of a pivot pin 528, a bell crank 522 which has one arm 523 extending to the right, as seen in Fig. 5, and the extreme end thereof is in the form of a lug 524, which extends laterally under the bar 519.

The bell crank also has a depending arm 525 which has a horizontal offset portion 526 and a second depending portion 527.

Journalled on the shaft 507 is a dog member 530 which has an offset arm 529 which carries on its extremity a rounded head 531. This head forms a working fit in a slot 532 formed in the price bar 174 near the left end thereof, as seen in Figure 1. The dog also has an extension 533 which carries on its extremity an upturned rigid pawl 534. As the price bar moves to the left, as seen in Figure 1, due to the depositing of coins in the coin controlled mechanism, the dog member 530, through the medium of the arm engaging the slot 532, rotates in a clockwise direction about the axis 507 and therefore the rigid pawl 534 which is normally positioned below the right end of the plate 521, is advanced to the left one notch for each nickel value inserted in the coin controlled mechanism.

As coins are inserted in the coin control the price bar 174 moves to the left as seen in Figure 1 and the bell crank 530 is thereby rotated clockwise about its axis 507 as seen from above.

After sufficient coins are inserted the vendee pushes one of the selector buttons 278 which immediately carries the motor bar 338 and the pin 568 carried thereby to the left and downwardly, as seen in Figure 13, allowing the elements 519 to 523, 524 and 527 (Figure 5) to move downwardly under the force of gravity, and thereby a notch on the plate carried by the plate 521 engages the upturned lug 534 on the bell crank 530 and this is effected in the position that 530 was moved to by the price bar 174 under the control of the coins inserted.

Now as the machine cycle starts due to the movement of the motor bar 338, the bar 535 is permitted by the element 546 to travel to the right under the urge of spring 544 (Figures 1 and 3). As the bar 535 is urged to the right by the spring 544 the shutter plates 438-453 are permitted to move to the right under the urge of their respective springs 516, 570. The shutter bar 453 is restrained by a lug on the bell crank 530 to cause the shutter bar 453 to move to the right only under control of the price bar 174, and thereby the change in nickels is controlled.

The shutter bar 438, which is the cents bar, moves to the right under control of the cents change bar 512, and the amount of change in cents is in accordance with the arrest of the bar 512 due to the engagement of one of the tabs 513, 514, 515 etc. with the key plates which are notched as at 392, 396, 398, 400, and 401 (shown in Figures 19 to 23 inclusive).

In Figure 1, it is assumed that twenty cents has been inserted in the coin controlled mechanism in order to make the twelve cents purchase, by way of example, therefore rigid pawl 534 is moved to a position under the 4th notch from the right. During this time, the right end of the bar 519 is raised up so that the rigid pawl 534 clears the notches on the plate 521 and consequently moves

freely. During the delivery cycle of the machine, the right end of the bar 519 is lowered under the force of gravity and the rigid pawl 534 engages the notch which it was positioned beneath so that the bar 519, the dog member 530, and the price bar all move along together.

Prior to the initiation of the first half of the actual operating cycle, the machine accepts the money which was inserted. The price bar 174 is moved to the right, as seen in Figure 1, during the resetting of the coin controlled mechanism, and this bar moves until the left edge of the slot 274 in the price bar engages the engageable edge 409 of the key plate 408. While the price bar is moved, as just described, the bar 519 is moving therewith and the dog shifter moving therewith causes the shutter plate 453 to move to the right, and this movement is such that the shutter plate 453 covers the slot 431 which will cause the first nickel coin ejector 494 to be moved therewith when the shaft 414 is subsequently rocked, and will therefore effect the ejection of a single nickel, and this nickel, together with the three cents ejected by the pushing of the penny shutter 438, as controlled by the edge 400 of the key plate 399, makes a total of eight cents in change, together with a twelve-cent article which is delivered by the machine as the result of the insertion of two dimes in the coin controlled mechanism.

Toward the end of a machine cycle, referring to Figure 13, the member 367 picks up the crank 344, rotates the shaft 340 and releases the push button that had previously been actuated.

The spring 333, Figure 13, is under tension so that as the push button is released, the shaft 326, upon which the bell crank 330, tensioned by the spring 333, is mounted, is rotated clockwise (as seen in Figure 13) to restore the push button assembly (Figure 30) to its normal position. In time with this movement, the arm 335 is moved and it pulls up the motor bar 338 (Figure 13). A pin 568 on this bar engages the depending portion 527 of the bell crank 522 (Figure 5). This causes the bar 519 to be lifted upwardly in the elongated slot 520. The rack notches are carried by a plate which is secured on the bar 519. The raising of the notches as aforesaid brings the notches out of the range of the pawl 534.

Now, if fifteen cents had been inserted in the coin controlled mechanism, instead of twenty cents, the rigid pawl 534 would have come to rest under the third notch from the right in the plate 521 and during the resetting of the coin control, the price bar movement would be so slight that the nickel shutter 453 would not be moved sufficiently to cover any of the slots 431-434 and therefore the change would be no nickels and three pennies.

A bar 535 is reciprocally mounted in slides 536, 537, 538 and 539, and secured to this bar is a plate 540 having an extension 541 which engages the right face of the extension 444 of the Z-shaped member 442. The plate 540 also has a second extension 542 which is in contact with the right face of the extension 459 of the Z-shaped member 457, so that when the bar 535 is moved rearwardly (to the left, as seen in Figure 1) the shutter plates 438 and 453 are reset and since the dogs of these shutters are engaged with the shifters on the bars 500 and 519, they also are moved to the left.

The bar 535 has a tab 543 on the end thereof, a spring 544 having one end secured to this tab and having the other end secured to a frame member 545, and the bar 535 is constantly urged to the right. A lever 546 is pivotally mounted on a stud 547 on the frame member 545 and the upper end 548 thereof has a hole 549 there-through. A spring 550 has one end connected to the tab 543 and the other end connected to the hole 549 in the upper end of the lever 546, and thereby the lever 546 is constantly urged in a clockwise direction about the fulcrum 547. The lower portion 551 of the lever 546 has an engaging end 552 turned in a plane at right angles to the axis of the lever (which may best be seen in Figure 3). When the machine is at rest (in its normal

position which is its left-most position) a pin 553, which will next be described, is not in contact with the lever 546 because the sum of the reasonable tolerances of the cooperative elements provide a small clearance between the pin 553 and the lever 546. When the bar 535 moves to the right during an operating cycle the pin 553 contacts the end 549 of the lever 546. The reason for using the two springs, a strong spring 550 and a weaker spring 544 is that in manufacturing, such an arrangement eliminates the necessity for having close tolerances, because the spring 550 is strong and it takes up any variations in the tolerances.

A stud 553 mounted in the bar 535 adjacent to the upper end of the lever 546 is engaged by the latter when the lever is moved about the fulcrum 547 by the dog 362 hereinafter described.

Referring now to Figures 3 and 13, this lower end 551 and the engaging end 552 are seen in Figure 13 in relation to the elements with which it cooperates.

The dog 362 has an extension 554 which engages the portion 552 and moves the lever 546 about its pivot in a counter-clockwise direction after the dog 362, and the main shaft 260 of the machine, have made a swing in a counter-clockwise direction, as seen in Figure 13, and are returning in the opposite direction toward normal position.

A stud 555 (Figure 13) has journaled thereon a dog 556 having an arm 557, the inner surface 558 of which is curved, and this surface terminates in a generally semi-circular depression 559 which is joined by an angular flat surface 560. A rear extension 361a of the stud 361 cooperates with the curved surface 558 during the first part of an operating cycle, but since the curve of the surface is about a center, from the center of the shaft 260, the dog 556 is not moved about its axis on the stud 555. Thus, during the first half of the operating cycle, the stud 361 traverses the curved surface 558 as above stated, and then engages the lower half of the curved depression 559 and causes the dog 556 to move in a clockwise direction about the axis 555. The dog 556 carries a stud 561, upon which is journaled a bearing hole 562 in a connecting rod 563, which may best be seen in Figure 4. This connecting rod extends between the jaws of a bifurcated member 564 and is secured therein with a clevis pin 565. The bifurcated member has a shank 566 which has a stepped portion 567, which is secured in a hole in the shaft 414.

As the extension of the stud 361 engages the lower surface of the depression 559 and the dog 556 starts rotating in a clockwise direction about the axis 555, the connecting rod 563 is moved upwardly and since it is connected to the member 564 in the shaft 414, the shaft 414 is rocked in a counter-clockwise direction, as seen in Figure 1 or 4, and as described above, if either of the shutters 438 or 453 are positioned to close any slots in the extension 435, these shutters engage tabs 494 on coin ejectors and cause the coins to be ejected. Of course, those coin ejectors whose associated slots in the extension 435 are not closed, are unaffected by this rocking.

Referring to Figure 13, the bar 338 carries a stud 568 which at all times, when the motor is at rest, is in contact with and has displaced the depending portion 527 of the bell crank 522 to the right, as seen in Figure 13. This causes, referring now to Figures 1 and 5, the tab 524 on the arm 523 of the bell crank, to raise the right end of the bar 519, thereby moving it upwardly in the slot 520, and consequently, the notches in the plate 521 carried on the bar 519, are raised out of the range of the upturned lug 534 on the member 530. This leaves the member 530 free to move under the urge of the price bar 174 when coins, placed in the coin control, cause the price bar to move to the left, as seen in Figure 1. Therefore, the upturned lug 534 is freely positioned beneath one of the notches in the plate 521.

The dog shifter 463 on the bar 519 has a vertical lug 569, to which one end of a spring 570 is secured. The

other end of a spring 570 (not shown) is secured to a fixed frame member so that the spring 570 tends to urge the bar 519 to the right, as seen in Figure 1.

When a push button is depressed to select an article, and the bar 338 moves diagonally downward, as seen in Figure 13, to trip the mercury switch and start the motor going, the stud 568 carried on the bar 338 releases the depending portion 527 of the bell crank and allows the right end of the bar 519 to move downwardly under the force of gravity, thereby bringing the notch beneath which the upturned tab 534 is positioned, in contact therewith.

The only purpose for the bar 535 carrying the yokes 541 and 542 is to:

(a) When the device is at rest, to hold the bars 500 and 519 to their zero positions on the extreme left, as seen in Figure 1;

(b) Under the urge of the spring 544 to move (535) forward, (to the right as viewed in Figures 2 and 3) and permit the bars 500 and 519 to follow under the urge of their own respective springs 516 and 570 until each is arrested in accordance with a change set up;

(c) Near the end of an operative cycle, the bar 535 is pushed back (toward the left as viewed in Figures 2 and 3) and pick up the bars 500 and 519 along the way and thereafter carrying both back to the zero position on the extreme left.

The spring 550 has a dual function:

(1) It prevents the lever 551 from flapping around;

(2) It acts as a "yield" in case one of the pickers is not clear of the notches in the elements 426-438 to prevent damage to the mechanism. The spring 544 urges the bar 535 to the right as viewed in Figures 2 and 3.

The bar 519, which is more clearly shown in Figure 5, through the notches or teeth shown, selects coin pickers to give change in nickels.

The bar 500 selects the coin pickers to give change in pennies, namely, the element 445, the lobes 446 and 447 of the dog shifts plate 448, the shutter plate 438 and the ejector 490. These elements are controlled by and/or positioned by elements 502, 503, 505, 508, 512, 515 and the key plate 399.

It is understood that the above detailed description of the present invention is intended to disclose an embodiment thereof to those skilled in the art, but that the invention is not to be construed as limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of being practiced and carried out in various ways without departing from the spirit of the invention. The language used in the specification relating to the operation and function of the elements of the invention is employed for purposes of description and not of limitation, and it is not intended to limit the scope of the following claims beyond the requirements of the prior art.

What is claimed is:

1. In a change maker, supporting means for at least two stacks of coins, pivoted lever-like coin ejectors below said stacks, each for individually ejecting the bottom coin from its stack, a rockable member spanning all said ejectors and having a clearance slot therein for and aligned with each ejector, which normally straddles the latter without engaging the same when said member is rocked, a shutter comprising a plate reciprocably carried on said member, other slots formed in said shutter which normally uncover all said first slots, the solid portions of said shutter between said other slots being adapted to sequentially cover said first slots as said shutter is moved away from its normal position, urging means for urging said shutter in a direction away from normal to one of a plurality of selective positions, releasable resetting means for returning said shutter to its normal position, means connected to said shutter and moved therewith by said urging means, key means positioned to be engaged by and to thereby arrest said connected means thereby defining

one of said selective positions after said resetting means is released, and means to rock said member to effect the ejection of a coin from the selected stack.

2. In a change making system for vending machines operating cyclically, coin controlled means for moving a positionable member along a linear path in one direction during a set-up period prior to an operating cycle in increments corresponding to the value of coins inserted and thereby setting up a credit in said machine corresponding to the value of said coins, selector means and means to move the same into cooperative relation with said positionable member, said selector means forming an interposer representing an amount to be subtracted from said credit and defined by the linear movement of said positionable member from its set position in the opposite direction during a second half cycle of said machine to a point where it contacts and is arrested by said interposer, change delivery means actuated by pivoted lever coin ejectors, operating means for said ejectors including shutter means movable thereon for determining how many ejectors shall be operated, and linkages between said shutter means and said positionable member for moving said shutter means said linear movement, whereby said ejectors effect the ejection of the amount in coins defined by said last movement and means for resetting said positionable member, said selector means, said change delivery means and said operating means after the actuation thereof during each operating cycle.

3. In a change making system for vending machines operating cyclically, a positionable member movable along a linear path in one direction in increments prior to an operating cycle of said machine, said member having a plurality of engageable means thereon, each engageable means having a leading edge facing the normal direction of movement thereof and a trailing edge facing the opposite direction, coin controlled means for moving said member along said path and thereby setting up a credit representing the total value of the coins inserted therein, selector means each carrying key plates representing the price of an article in nickels and pennies to be subtracted from any credit set up by said positionable member, two key plates being carried by each selector means, one plate representing the price to the nearest nickel and the other representing the odd cents of the price, and change making means interconnected with said member and including movable shutter means moved in accordance with the key plates on the selector means for automatically controlling the quantity of change to be delivered.

4. In a change making system for vending machines operating cyclically, selector means for initiating a vending operation, said selector means including an interposer key plate representing the price of an article, a price bar movable along a path adjacent to and crossable by said key plate and including at least one slot having key engageable edges, one of which is termed a leading edge and comprising the edge facing in the direction in which said price bar moves when coins are placed in said machine, the opposite edge of said key plate being termed the trailing edge, spring means normally urging said price bar to its reset position, coin controlled means for moving said price bar along said path against the urge of said spring means a series of increments each representing the unit value of the smallest coin which said coin control will accept, thereby moving said slot relative to said key so that said selector may be actuated to move said key into said slot, the space if any, between said trailing edge and said key when the latter is positioned in said slot, representing the difference between the money inserted and said price, means to reset said coin controlled means immediately after a selector means has been actuated, and change making means operatively connected to said price bar upon the actuation of a selector means and including translating means set by the movement of said price bar in the opposite direction under the urge of said spring means after said coin control means is

reset to take up said space and to deliver change represented by said space.

5. The invention according to claim 4, in which said selector means includes a second key plate element which does not engage the slot in the price bar, in which said first key plate represents the nearest nickel above the price of an article and said second key plate representing the number of pennies less than said nearest nickel, and in which said change making system includes a movable shutter control element (500), a second bar alongside said price bar and operatively connected to and movable in definite relation with said movable shutter element, indexing means on said second bar in cooperative relation with and arrested by its engagement with said second key plate element.

6. In a change maker, a shaft journaled in bearings, means for rocking said shaft through a predetermined angle, a comparatively thin flat main plate extending radially from said shaft and movable therewith, a series of spaced open-ended slots formed in said plate, a pair of comparatively thin flat shutter plates mounted on and slidable axially along said main plate and each having a series of open-ended neighboring slots formed therein, each of said last slots being wider than its adjacent neighbor of the first series so that as either of said shutters is slid along said main plate away from its normal position, one or another of said first slots is covered by solid portions of the shutter between said last mentioned slots therein, a series of pivoted lever coin ejectors each being in alignment with and within the range of a different one of said first slots; each of said ejectors having a notched coin engaging upper end, a passage therethrough intermediate its ends communicating with one edge thereof,

and having a depending tab on said last edge partially overhanging said passage; said depending tabs being normally straddled by but not engaged by one of said first slots and adapted to be actuated by one or the other of said slidable portions when either is slid to a position covering one of said first slots, individual stacks of coins arranged in two groups, the coins in one group being greater in value than those in the other, each stack being positioned above a different one of said ejectors, whereby only the solid portions of either of said shutter plates covering said first slots engage said depending tabs and actuate said ejectors when said shaft is rocked as aforesaid, one of said shutter plates controlling the ejectors for coins of one value and the other for controlling them for coins of the other value, and other means for selectively controlling the positions of said shutters and consequently the number of coins of each value to be ejected conjointly each time said shaft is rocked.

References Cited in the file of this patent

UNITED STATES PATENTS

1,063,590	Potter	June 3, 1913
1,099,661	Menchen	June 9, 1914
2,288,870	Weber	July 7, 1942
2,289,002	Fleming	July 7, 1942
2,526,749	Hokanson	Oct. 24, 1950

FOREIGN PATENTS

459,852	Great Britain	Jan. 12, 1937
118,816	Australia	Aug. 31, 1944
135,907	Germany	Nov. 22, 1902