Dec. 12, 1944. H. S. BENJAMIN 2,364,939

FREE SERVICE COIN CONTROLLED MACHINE

Original Filed Dec. 26, 1940 2 Sheets-Sheet 1

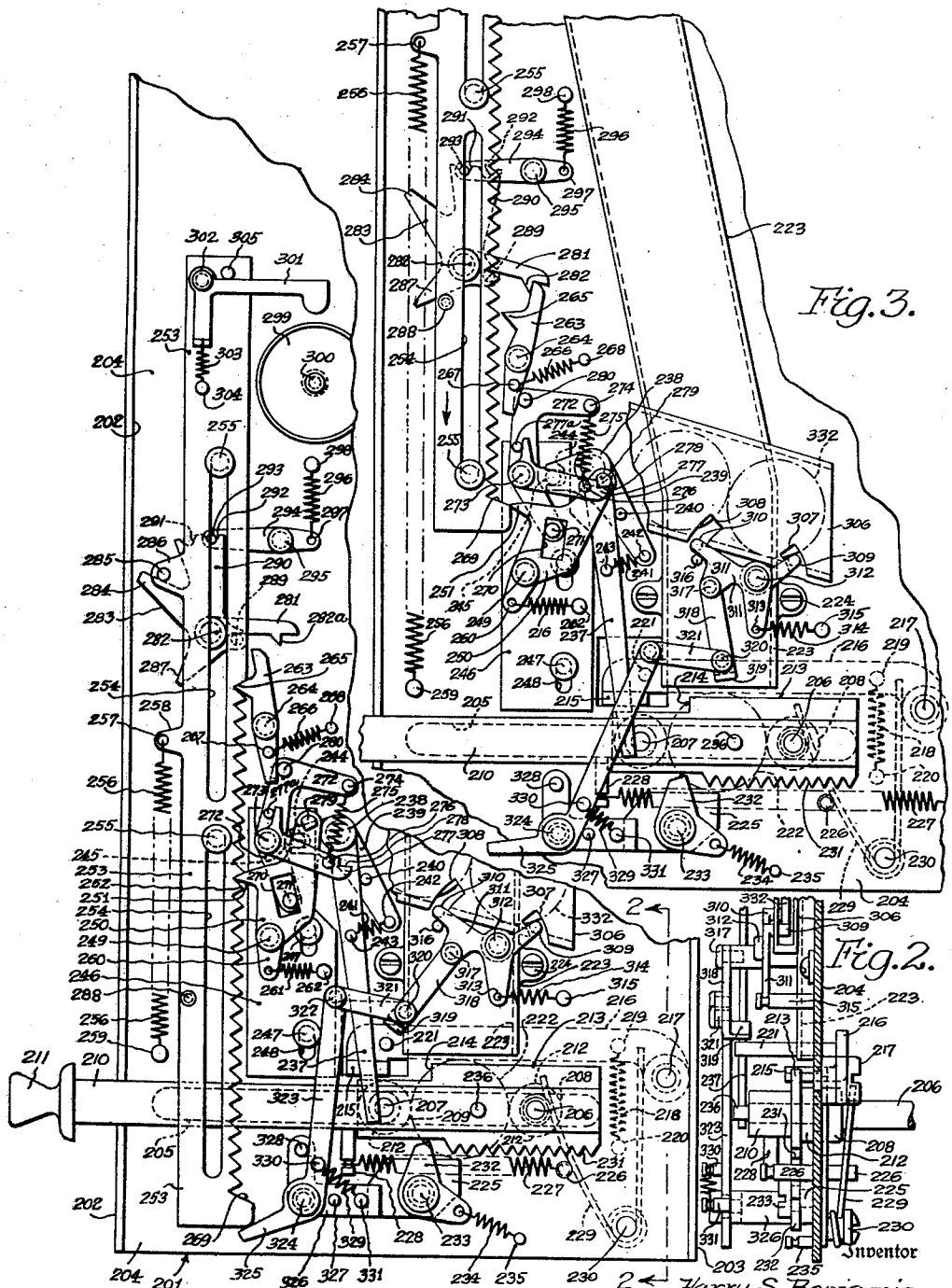


Fig. 1.

Fig. 3.

Fig. 2.

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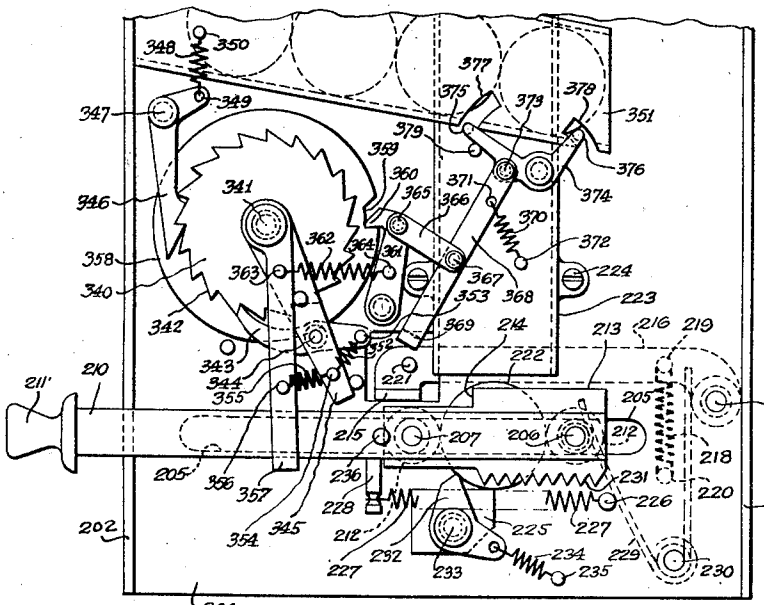


Fig. 4.

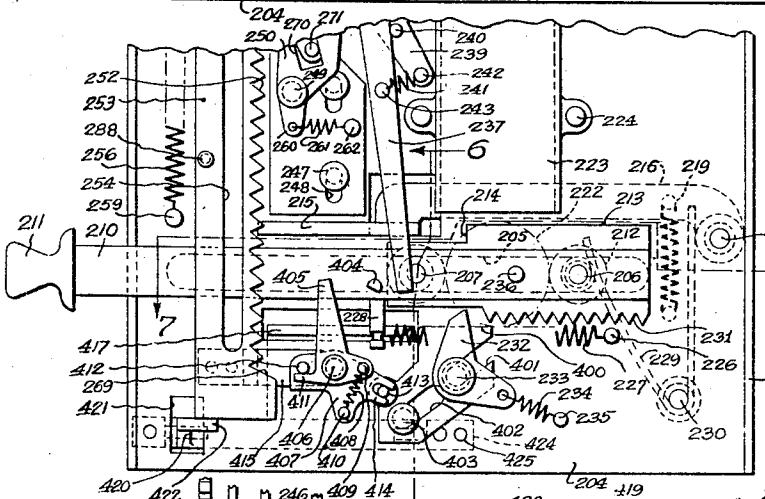


Fig. 5.

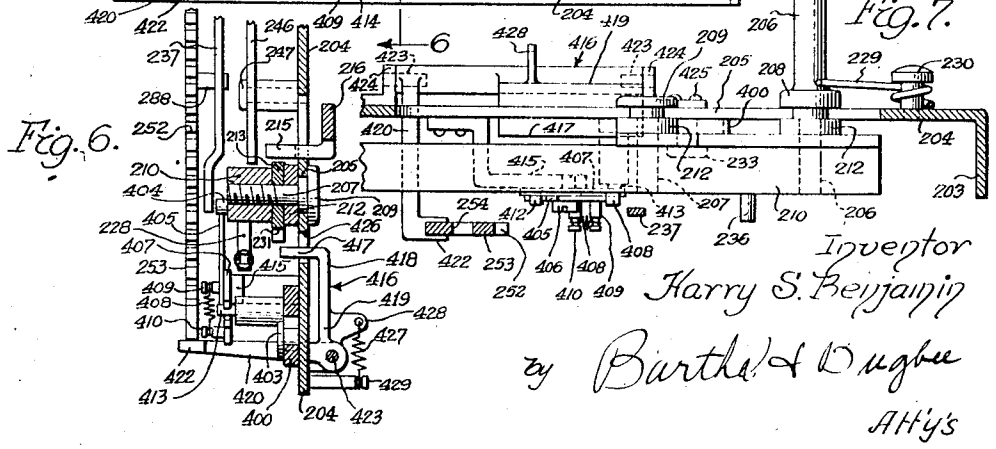


Fig. 7.

Fig. 6.

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Patented Dec. 12, 1944 2,364,939

UNITED STATES PATENT OFFICE

2,364,939

FREE SERVICE COIN-CONTROLLED MACHINE

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Original application December 26, 1940, Serial No. 371,700. Divided and this application July 24, 1942, Serial No. 452,159

20 Claims. (Cl. 194—55)

This invention relates to coin-controlled machines, and particularly to machines wherein the operator is permitted to obtain intermittent free service from the machine.

This application is a divisional application of my pending case Serial No. 371,700, filed December 26, 1940, upon Free service coin-controlled machine.

The primary object of the invention is to provide a coin-controlled machine where means is provided for enabling the operator of the machine to operate the same for a free operating cycle after a predetermined number of paid operating cycles have been carried out by the machine.

Another object of the invention is to provide a coin-controlled machine having means for retaining the coin of the operator but permitting the carrying out of an additional free operating cycle after a predetermined number of paid operating cycles have been performed thereby permitting the operator to obtain free merchandise on a free cycle of the operation of the machine or the return of another coin equal to the merchandise.

Another object of the invention is to provide a coin-controlled machine wherein means is provided for enabling the operator to carry out a complete working cycle without using a coin after a predetermined number of paid working cycles has been effected, thereby enabling the operator to obtain free merchandise or an additional coin as the result of obtaining a "free" working cycle after a predetermined number of working cycles have been paid in.

Another object of the invention is to provide a coin-controlled machine as above set forth wherein signalling means is provided for notifying the operator when a "free" working cycle has arrived.

Another object of the invention is to provide a coin-controlled machine having means for enabling the operator to receive a coin in addition to the coin inserted in the machine after a predetermined number of paid working cycles has been effected to condition the machine for a free benefit or premium surface.

Another object of the invention is to provide a coin-controlled machine wherein means is provided for enabling the operator to carry out a complete working cycle of the machine after a predetermined number of paid working cycles thereof so that at the end of the predetermined number of paid cycles, the operator will receive an article of merchandise as well as the coin inserted by the operator.

Another object of the invention is to provide a coin-controlled machine as set forth in the preceding objects wherein means is provided for enabling the operator to carry out a complete working cycle of the machine after a predetermined number of paid operations whereby said operator will receive an article of merchandise and a coin other than the one deposited before the free cycle operation.

Other objects and advantages of the invention will become apparent during the course of the following description of the drawings wherein

Fig. 1 is a side elevational view of a preferred embodiment of the invention illustrating portions thereof broken away for illustrating the details and arrangement of the various parts.

Fig. 2 is a vertical cross sectional view taken on line 2—2 of Fig. 1, looking in the direction of the arrows, further illustrating details of construction and the arrangement of the coin operating lever.

Fig. 3 is a view similar to Fig. 1 showing a coin in position and illustrating the manner in which the coin is moved by the operating plunger.

Fig. 4 is a side elevational view of a modified form of the invention showing a ratchet coin release mechanism in lieu of the rack bar structure shown in the form of the invention in Figs. 1 to 3 inclusive.

Fig. 5 is a fragmentary side elevational view of another modified form of the invention in which a rack bar is employed to determine the length of the free service cycle between paid cycles so that a coin will be returned to the operator in addition to an article of merchandise.

Fig. 6 is a vertical cross sectional view on the vertical line 6—6 of Fig. 5 looking in the direction of the arrows illustrating the coin release mechanism operable after a predetermined number of paid operating cycles, and

Fig. 7 is a horizontal cross sectional view taken on lines 7—7 of Fig. 5 looking in the direction of the arrows illustrating in detail the relative position of the operating lever and its associated parts.

In the drawings, wherein for the purpose of illustrating the invention and wherein like reference characters will be employed to designate like parts throughout the several views, the reference character 201 in Figures 1 to 3 inclusive will generally be employed to designate a support with a front wall 202 and rear wall 203, joined by a side wall 204. Formed in the side wall 204 is an

elongated slot 205 serving as a slide for a pair of pins 206 and 207 having heads 208 and 209 on the rear side of the side wall 204. The pins 206 and 207 extend through the slot 205 and are seated in the operating plunger 210 having a knob 211 by which it is reciprocated by the operator. The pins 206 and 207 are also provided with spacing washers 212 (Figure 2) interposed between the side wall 204 and a stop plate 213 mounted adjacent the plunger 210 and secured thereto by the pins 206 and 207. The plate 213 is provided with a stepped portion 214 which serves as a stop for preventing more than a limited withdrawal of the plunger 210 when it is engaged by the projection 215 on the swinging latch 216 which is pivoted on the screw 217 and urged downwardly into a normally latching position by the coil spring 218 secured as at 219 to the latch 216 and at 220 to the side wall 204. The latch 216 carries a pin 221 by which it may actuate coin releasing mechanism in the free service arrangement subsequently to be described.

The latch 216 is adapted to be raised by engagement with the edge of a coin 222 which falls into the space between the washers 212 from the coin chute 223. The latter is secured as at 224 to the side wall 204 and extends downwardly from a suitable entrance slot (not shown) in the upper part of the machine.

The lower edge of the coin 222 is adapted to rest upon a shelf 225 while it is being moved forward during the withdrawal of the operating plunger 210 by the operator. The shelf 225 is in the form of a small plate secured to the side wall 204. The plunger 210 normally occupies the position shown in Figure 1 and may be pushed inward or pulled outward from this position. When the plunger 210 is pushed inward, the coin 222 may fall over the rearward edge of the shelf 225 through the space between it and the pin 226.

Secured to the pin 226 is one end of a coil spring 227. The pin 226 is mounted in the side wall 204. The other end of the spring 227 is secured to a pin 228 mounted in and extending downwardly from the plunger 210. The spring 227 normally urges the plunger 210 inward, but is restricted in this by an opposing spring 229 coiled around the screw 230 mounted in the side wall 204 and having its arms respectively engaging the screw 217 and the pin 206. The spring 229 is limited in its thrusting motion by the pin 226 (Figure 2) and thus urges the plunger 210 into an intermediate position from which it may be pushed either inward or outward. When it is pushed inward, the coin 222 falls over the rear edge of the shelf 225 and is returned to the operator, whereas when it is pulled forward, the coin 222 falls over the front edge of the shelf 225 and into the coin box of the machine.

Formed in the lower edge of the stop plate 213 are ratchet teeth 231 adapted to be engaged by a bell crank pawl 232 pivoted on the pin 233 and urged toward engagement with the ratchet teeth 231 by the coil spring 234 anchored to the pin 235. The pins 233 and 235 are mounted in the side wall 204. The first or left-hand tooth of the ratchet teeth 231 is so positioned that the pawl 232 slips over it and prevents return motion of the plunger 210 just before the free service and merchandise-delivering mechanism starts functioning.

The free service mechanism is actuated by a pin 236 mounted on the plunger 210 and engageable with the lower end of an arm 237 loosely mounted upon a pivot pin 238 secured to the side wall 204. Also loosely mounted upon the pin 238 is a bell crank lever 239 having a pin 240 engageable with the arm 237, to which it is yieldably connected by a coil spring 241 attached as at 242 and 243 to the bell crank lever 239 and arm 237 respectively. The spring 241 is of sufficient tension to hold the pin 240 of the bell crank lever 239 in engagement with the arm 237, yet permits the latter to be pulled further to the left at the end of the stroke of the plunger 210. The purpose of this is to allow for the longer stroke of the plunger 210 than is necessary to actuate the free-service mechanism.

The free end of the bell crank lever 239 is provided with a notch 244 which engages a pin 245 mounted in a slide 246 which is guided for vertical reciprocation by pins 247 engaging vertical slots 248 in the slide 246. The pins 247 are mounted in the side wall 204 and have enlarged heads for the purpose of retaining the slide 246 on the pins 247.

The slide 246 carries a pin 249 upon which an irregularly shaped pawl 250 is pivotally mounted. The pawl 250 is provided with a point 251 engageable with the teeth 252 of a ratchet bar 253 which controls the free service. The ratchet bar 253 is provided with slots 254 engageable by pins 255 mounted in the side wall 204 for the purpose of guiding the vertical reciprocation of the ratchet bar 253. The ratchet bar 253 is urged downwardly by means of a coil spring 256 secured as at 257 to the end 258 projecting from the ratchet bar 253. The spring 256 is anchored at its opposite end to the pin 259 mounted in the side wall 204.

The pawl 250 is provided with an integral lever arm 260 to which is attached a coil spring 261 anchored to a pin 262 mounted on the slide 246. The spring 261 urges the point 251 of the pawl 250 into engagement with the ratchet teeth 252. As a consequence, when the plunger 210 is pulled forward a sufficient distance, the pin 236 swings the arm 237 and with it the bell crank lever 239, raising the slide 246 by the engagement of the notch 244 with the pin 245. When the slide 246 is thus raised, the pawl point 251 engages the teeth 252 and lifts the ratchet bar 253 by a distance of one tooth. When this occurs, the ratchet bar 253 is temporarily locked in the attained position by a holding pawl 263 pivoted on the pin 264 mounted in the side wall 204 and having its point 265 urged into engagement with the teeth 252 by the coil spring 266 attached as at 267 to the pawl 263 and at 268 to the side wall 204.

The ratchet bar 253 is provided with a number of teeth 252 corresponding to the number of coins 222 which it is desired to collect before the machine executes a free service stroke and delivers merchandise while either returning the buyer's coin or giving him another coin of the same denomination. The ratchet bar 253 is moved upward one tooth at a time corresponding to each stroke of the plunger 210. The final or lowest tooth 269 extends farther outward than the remaining teeth and serves to control the free service mechanism.

In order to permit the ratchet bar 253 to drop just before the free service stroke, it is necessary to hold the points 251 and 265 of the pawls 250 and 263 away from the teeth 252 of the rack bar 253. To accomplish this, the pawl 250 is provided with a rectangular aperture 270 which is sufficiently large to permit the pawl 250 to move

back and forth over each tooth 252 without actuating the remaining mechanism but insufficient to prevent this when the final tooth 269 is reached.

Entering the rectangular aperture 270 is a pin 271 mounted on one end of a bent lever 272 which pivots loosely upon a pivot pin 273 mounted on the side wall 204. The bent lever 272 is provided at its end with a pin 274 to which one end of a coil spring 275 is attached, the other end being secured to a pin 276 mounted upon the outer end of a bell crank latching lever 277 likewise loosely pivoted upon the pin 273. The end of the latching lever 277 is provided with a notch 278 which is adapted under certain circumstances to engage the pin 279 in the upper end of the pawl 250 (Figure 3). The swinging of the bell crank latching lever 277 is limited by a pin 277*a* mounted on the bent lever 272. The bent lever 272 carries a pin 280 adapted to engage the lower end of the pawl 263 and swing the tip 265 thereof out of engagement with the teeth 252 on the ratchet bar 253.

When the free service stroke is reached, the upper end of the pawl 263 is similarly latched in a retracted position by a detent 281 having a point 282*a* engageable with the upper end of the pawl 263 (Figure 3). The pawl 281 is loosely pivoted upon the pin 282 mounted in the side wall 204. Also loosely and pivotally mounted upon the pin is a detent actuating lever 283 having arms 284 engageable with a pin 285 on an ear 286 projecting from the ratchet bar 253. The detent actuating lever 283 is also provided with an arm 287 which is engageable with a lower pin 288 mounted upon the ratchet bar 253. The detent actuating lever 283 is provided with a pin 289 engageable with the detent 281 to lift the latter when the lever 283 is swung in a counterclockwise direction. In order to hold the detent actuating lever 283 in a fixed position, the remaining arm 290 thereof is provided with a pair of notches 291 and 292 which are adapted to be engaged by a pin 293 in the end of a holding lever 294. The latter is pivotally mounted upon the pin 295 and the pin 293 is urged into the notches 291 or 292 by a coil spring 296 attached as at 297 to the lever 294 and at 298 to the side wall 204.

In order to warn the operator of the approach of a free service stroke, the machine is provided with a bell 299 mounted upon the pin 300 secured to the side wall 204. The bell 299 is struck by the end of a bell crank 301 which is loosely and pivotally mounted upon the pin 302 secured to the upper end of the ratchet bar 253. The other arm of the bell crank 301 is engaged by one end of a coil spring 303, the opposite end of which is secured to the pin 304 mounted on the ratchet bar 253. The upward motion of the bell crank 301 is limited by a pin 305 mounted on the upper end of the ratchet bar 253. Thus the bell crank 301 is free to swing downward under its own momentum to strike the bell 299 when the ratchet bar 253 is halted after dropping from its upper position (Figure 3) to its lower position (Figure 1).

In the free service operation, the operator does not get back the coin which he deposited, but receives a substitute coin of the same denomination held in a supply chute 306 having spaced arcuate notches 307 and 308 respectively. The notches 307 and 308 are entered by stop pins 309 and 310 on two of the arms of an approximately Y-shaped lever 311 pivotally mounted upon the pin 312 secured to the chute 223. Connected as at 313 to the remaining arm of the lever 311 is a coil spring 314, the opposite end of which is anchored as at 315 to the side wall 204. The Y-shaped lever 311 is limited in its swinging by a pin 316 mounted upon the coin chute 223.

Pivotally connected as at 317 to the Y-shaped lever 311 is a link 318 having a bent end 319 engageable with the pin 221 when the pin 221 with the latch 216 is raised by the top edge of a coin 214 as the latter is drawn forwardly by the operation of the plunger 210. Pivotally attached as at 320 to the linke 318 is a link 321 which is pivotally attached as at 322 to the upper end of a lever 323. The lever 323 is pivoted upon a pin 324 and is provided with an arm 325 engageable with the lower end of the ratchet bar 253, when the latter drops at the time of a profit-sharing stroke. The pivot pin 324 is mounted in a bracket 326 offset from and secured to the coin shelf 225. The bracket 326 is provided with stop pins 327 and 328 for limiting the swinging motion of the lever 323. The latter is urged in a clockwise direction by the coil spring 329 secured as at 330 to the lever 323 and at 331 to the bracket 326.

In the operation of the modification of Figures 1 to 3 inclusive, the operator inserts a coin 214 in the coin chute 223. The coin drops downward into the space between the spacing washers 212, as shown in Figure 1. During its descent the coin is, of course, subjected to the usual tests for fraud and proper denomination.

The operator now grasps the knob 211 and pulls the plunger 210 outward (Figure 1). As he does so, the upper edge of the coin 222 engages the portion 215 of the latch 216 and lifts it. Otherwise, when no coin is in the machine, the abutment 214 engages the latch portion 215 after the plunger 210 has been withdrawn but a short distance. Except when free service takes place, the upward motion of the latch 216 does not affect the operation of the remainder of the mechanism because the end 319 of the link 318 is swung out of the way of the pin 221 (Figure 3). Meanwhile, the pawl 232 has engaged the ratchet teeth 231 to prevent the pushing in of the plunger 210 until the operation has been completed.

Up to the time the pawl 232 engages the first tooth 231, however, the operator may change his mind and have his coin returned to him. To do so, he merely pushes back the plunger 210, whereupon the bottom edge of the coin 214 rolls over the right-hand end of the coin shelf 225 and drops downward into the coin return chute, and thence is returned to the operator.

Assuming, however, that the operator's choice remains unchanged and that he continues to pull the plunger 210 outward, the pin 236 thereon soon engages the lower end of the arm 237 and swings it and the bell crank lever 239 through an arcuate path, due to the yielding connection 241 therebetween. When this occurs, the notched end 244 of the bell crank 239 swings the pin 245 and slide 246 upward, carrying with the latter the ratchet bar 253, due to the engagement of the pawl tip 251 with the ratchet teeth 252. The motion of the plunger 210 is just sufficient to move the ratchet bar 253 upward one tooth.

While this raising is being completed, the tip 265 of the pawl 263 rides over the tooth 252 immediately beneath it and comes to rest in the notch between the next two teeth, holding the ratchet bar 253 in its raised position. When the plunger 210 is pulled to the end of its outer stroke, the coin 214 rides over the front edge of the coin shelf 225 and drops downward through the space

behind the bracket 326 into the coin box of the machine. At the same time, the vending mechanism operated from the rod 206 mounted on the plunger 210 (Figure 2) releases and delivers an article of merchandise to the operator or performs some other service for which the operator has paid. The operator then releases the plunger 210, which is returned to its original position (Figure 1) by the coil spring 227.

Upon the return stroke of the plunger 210, the arm 237 is released from engagement with the pin 236, permitting the bell crank 239 and slide 246 to drop downward. When this occurs, the point 251 of the pawl 250 rides over the tooth 252 immediately below it while the pawl 263 prevents the ratchet bar 253 from falling. The ratchet 250 is permitted by the aperture 270 to move to and fro over each tooth without interfering with or actuating the pin 271 and bent lever 272.

As subsequent coins are deposited in the machine, the above described mechanism and operations of the plunger 210 cause the ratchet bar 253 to be raised tooth by tooth until it reaches its topmost position (Figure 3). The number of strokes through which the machine must be operated before free service occurs depends upon the number of teeth 252 upon the ratchet bar 253. When the lowest and largest tooth 269 engages the tip 251 of the pawl 250, it pushes the latter backward an abnormal amount (Figure 3) and causes the edge of the rectangular aperture 270 to engage the pin 271 and swing the bent lever 272 around its pivot 273. During this action, the pin 280 on the bent lever 272 engages the lower end of the pawl 263 and swings the tip 265 thereof out of the path of the ratchet teeth 252, whereupon the point 282a of the detent 281 slips over the upper end of the pawl 263 and latches it in its withdrawn position (Figure 3). Meanwhile, the pin 279 upon the upper end of the pawl 250 has slipped into the notch 278 in the outer end of the latching lever 277 (Figure 3), likewise latching the pawl 250 out of the path of the teeth 252 of the ratchet bar 253.

With both pawls 250 and 263 latched out of the path of the ratchet teeth 252, the ratchet bar 253 is released and moves rapidly downward under the influence of its coil spring 256, coming to a halt (Figure 1) when its lower end encounters the arm 325 of the lever 323. At the same time, the pin 285 encounters the arm 284 of the lever 283 and swings the latter so that the pin 289 lifts the detent 281 off the end of the pawl 263, releasing the latter. The pin 293 on the holding lever 294 meanwhile moves from the first notch 291 to the second notch 292 in the arm 290 of the lever 283.

When the ratchet bar 253 has reached the end of its descent, the momentum of the bell crank 301 mounted on the upper end thereof causes the latter to move onward, striking the bell 299 and announcing the arrival of a free service stroke. At the same time, the encounter of the lower end of the ratchet bar 253 with the arm 325 of the lever 323 swings the latter counter-clockwise, moving the bent portion 319 of the link 318 into position (Figure 1) immediately above the pin 221 upon the latch 216. The operator then inserts another coin and withdraws the plunger 210, the edge of the coin 222 lifting the latch 216 in the usual manner. Now, however, the pin 221 engages the bent portion 319 of the link 318 and swings the Y-shaped lever 311 in a clockwise direction, withdrawing the pin 309 from the arcuate slot 307 and at the same time inserting the pin 310 in the arcuate slot 308. This permits a coin 332 to fall from the reserve chute 306 into the coin return chute, from which it reaches the operator. The pin 310 prevents more than one coin from being delivered at any one stroke. The coin 222 inserted by the operator, however, rides over the forward end of the coin shelf 225 and drops into the coin box in the usual manner. At the same time, however, the motion of the plunger 210 and the rod 206 (Figure 2) has caused the actuation of the vending mechanism and the delivery of an article of merchandise. Thus the operator of the free service stroke has received a coin equal in denomination to the coin which he inserted and at the same time has also received an article of merchandise. As subsequent coins are inserted and the plunger 210 is operated, the action of the pawl 251 on the slide 246 pushes the ratchet bar 253 upward tooth by tooth until it again reaches the top of its stroke (Figure 3). When this occurs, the free service stroke takes place upon the next stroke of the plunger 210 in the manner previously described.

Reciprocating coin-controlled machine with rotary intermittent free service mechanism

The modified machine shown in Figure 4 is similar in principle to the machine shown in Figures 1 to 3 inclusive, except that a rotary ratchet 340 is employed in place of the linear ratchet bar 253. The lower portion of the mechanism including the plunger 210 and the parts immediately associated with it, are the same as in the previous form of the invention and are similarly designated. The parts are shown in their positions at the end of the last paid stroke, the next stroke being a free service stroke.

The rotary ratchet 340 is pivotally mounted upon a pivot pin 341 and is provided with teeth 342 engaged by the end of a pawl 343 pivoted as at 344 upon an arm 345, which in turn is loosely pivoted upon the pin 341. A holding pawl 346 likewise engages the ratchet teeth 342 and holds the ratchet 340 in its attained position. The holding pawl 346 is in the form of a bell crank lever pivoted upon a pin 347 and urged into engagement with the ratchet 340 by means of a coil spring 348 secured as at 349 to the bellcrank lever 346 and at 350 to the reserve coin chute 351.

The pawl 343 is urged into engagement with the ratchet teeth 342 by a coil spring 352 secured at its opposite ends to the pins 353 and 354 upon the pawl 343 and arm 345 respectively. Also secured at one end to the pin 354 is a coil spring 355 secured at its other end to a pin 356 mounted on a swinging arm 357. The latter is loosely and pivotally mounted upon the pivot pin 341 with its lower end in the path of the pin 236 upon the plunger 210. The coil spring 355 serves as a yielding connection between the arm 357 and the arm 345, to compensate for the stroke of the plunger 210 beyond the path of swing of the arm 345.

The free service strike is determined by a notched disk 358 secured to and rotatable with the ratchet 340 around their common axis 341. The disk 358 is provided with a notch 359 at one point in its periphery, this notch being engageable with the end 360 of a bent lever 361 which is urged therein by a coil spring 362 secured at its opposite ends to pins 363 and 364 mounted on the arms 357 and bent lever 361 respectively. The bent lever 361 also carries a pivot pin 365 upon which is mounted one end of a link 366, the other end of which is pivotally mounted upon

the pin 367 carried by the link 368. The lower end of the link 368 is provided with a bent portion 369 similar to the bent portion 319 on the link 318 of Figure 1. The link 368 is urged downward by a coil spring 370 secured thereto as at 371 and having its opposite end anchored to the pin 372 mounted on the coin chute 223. The upper end of the link 368 is pivotally mounted upon a pin 373 carried by a bell crank 374 having pins 375 and 376 adapted to enter arcuate slots 377 and 378 in the reserve coin chute 351. The motion of the bell crank lever 374 is limited by the stop pin 379.

In the operation of the modification of Figure 4, the operator, as before, inserts a coin in the coin chute 223. The coin drops into the space between the spacing washers 212 with its lower edge resting upon the coin shelf 225. The operator now pulls out the plunger 210, whereupon the pawl engages the ratchet teeth 231 and the coin 222 engages and lifts up the latch 216. As the plunger continues to move forward, the pin 236 thereon engages and swings the arm 357 to the left, likewise swinging the arm 345 through the spring connection 355. This action advances the pawl 343 and rotates the ratchet 340 through a single tooth 342. The vending mechanism connected to the shaft 206 releases an article of merchandise to the operator and the coin 214 drops over the front edge of the coin shelf 225 into the coin box. As in the case of the form of invention of Figures 1 to 3 inclusive, the operator can change his mind and get his coin back until he has withdrawn the plunger 210 a sufficient distance for a pawl 232 to engage the first ratchet tooth 231.

The withdrawal of the merchandise takes place as before after each coin has been deposited. The point 360 of the bent lever 361 meanwhile engages the periphery of the disk 358, and the link 366 holds the end 369 of the lever 368 out of the path of the pin 221 on the latch 216. Accordingly, no free service takes place as long as the bent lever 361 is held in this position by the periphery of the disk 358.

When the notch 359 in the disk 358 arrives opposite the end 360 of the bent lever 361, as shown in Figure 4, the lever 361 is permitted to swing to the left a sufficient distance to move the end 369 of the lever 368 into the path of the pin 221 on the latch 216, as shown in Figure 4. On the next stroke of the plunger 210, therefore, the latch 216 is raised by its engagement with the coin 222 as before, but the pin 221 now engages the end 369 of the lever 368 and swings the bell crank 374 in a clockwise direction, moving the pin 376 out of the arcuate slot 378 while moving the pin 375 into the arcuate slot 377. This action releases the first coin in the reserve coin chute 351, and the released coin drops into the coin return chute and is recovered by the operator. Meanwhile, an additional article of merchandise has been vended in the usual way. The operator thus receives a coin of the same denomination which he deposited in the machine, and also receives an article of merchandise when the profit sharing stroke arrives, as determined by the position of the notch 359 and the number of teeth 342 on the ratchet 340.

Reciprocating coin-controlled machine with intermittent free service coin-returning mechanism

The modified machine shown in Figures 5 to 7 inclusive is generally similar to that shown in Figures 1 to 3 inclusive, except that on the free service stroke of the machine, the operator gets back the same coin which he deposited in the machine, instead of receiving a substitute coin of the same denomination, as in the form of invention shown in Figures 1 to 3 inclusive. In the modification of Figure 5, the mechanism above the plunger 210 is substantially the same as that shown in Figures 1 to 3 inclusive, hence the same reference numerals are employed where such similarity exists. The reserve coin supply chute 306 and its associated mechanism are, however, omitted because the operator's coin is returned to him instead of a substitute coin. Instead, a movable coin shelf is provided which is interposed beneath the coin on the free service stroke and prevents the coin from dropping into the coin box. When the operator returns the plunger 210, therefore, his coin is returned to him in the usual way while he receives the free article of merchandise.

In the modification of Figure 5, the pawl 232 is provided as before but its pivot pin 233 is mounted directly upon the side wall 204 instead of upon the coin shelf which was designated 225 in Figures 1 to 3 inclusive. In Figure 5 the coin shelf 400 is movable and for this purpose is provided with a pair of oblique slots 401 and 402 which serve as guide slots for the downward oblique motion of the coin shelf 400. The guide slot 401 is engaged by the pivot pin 233 of the pawl 232, whereas the guide slot 402 is engaged by the pin 403 seated in the side wall 204. The coin shelf 400 retains its normal position during the forward stroke of the plunger 210 and is automatically retracted upon the return stroke thereof in order to permit the coin 214 to fall into the coin return chute upon the free service stroke of the machine.

The movable shelf 400 is actuated on the return stroke of the plunger 210 by a pin 404 mounted on the side of the plunger (Figure 5) and engageable with an arm 405 pivotally mounted upon the pin 406 which in turn pivotally supports the lever 407. The latter is resiliently connected to the arm 405 by means of the coil spring 408 and the pins 409 and 410, so that when the pin 404 engages the arm 405 on the forward stroke of the plunger 210, the pin 404 merely rides over the arm 405 and pushes it to one side without actuating the lever 407. On the return stroke of the plunger 210, however, the pin 404 engages the opposite side of the arm 405 and shifts the latter to the right. When this occurs, the projection 411 on the arm 405 engages the pin 412 on the lever 407 and causes the latter to be shifted clockwise around its pivot 406. This action causes the pin 413 on the movable coin shelf 400 to be swung downwardly in an oblique direction by its engagement with the slot 414 in the lever 407. The pivot pin 406 is mounted on the offset bracket 415 which is riveted to the side wall 204 (Figure 7).

In this manner the coin shelf 400 moves downwardly to the left in an oblique direction during the retraction stroke of the plunger 210. While the motion of the coin shelf 400 is only necessary during the return stroke of the plunger at the time of the free service stroke, in order to permit the coin to be returned to the operator. The occurrence of this motion upon every stroke is merely for the purpose of mechanical simplicity and has no effect on other strokes because the coin on an ordinary stroke has already dropped into the coin box at the front of the machine.

The free service mechanism includes a swinging coin shelf generally designated 416 (Figure 6)

which consists of a coin rest 417 constituting the bent end of an arm 418 on a bell crank lever 419, the other arm 420 of which projects through the aperture 421 in the side wall 204 (Figure 5) and terminates in a projection 422 extending into the path of the lower end of the rack bar 253. The bell crank lever 419 is pivotally mounted upon the horizontal pins 423 (Figure 7) at their opposite ends by the angular brackets 424 riveted to the side wall 204 as at 425. The coin shelf 417 can project through an aperture 426 in the side wall 204 but is normally urged outward by the coil spring 427 secured at one end to the projection 428 on the swinging coin rest 416 (Figure 6) and at its other end to the pin 429 mounted on the side wall 204.

In the operation of the modification shown in Figures 5 to 7 inclusive, the operator inserts a coin in the coin chute 223 as before. The coin drops down into the space between the washers 212 as before, with its lower edge resting upon the coin shelf 400. The operator now pulls the plunger 210 forward, and, as before, can change his mind and get his coin back by pushing the plunger inward as long as it has not reached the point where the pawl 232 has engaged the first ratchet tooth 231. Assuming that the operator does not change his mind but continues to withdraw the plunger 210, the coin 214, as before, lifts the latch 216 and slides along with its top edge in engagement with the projection 215 thereof, the projection 215 in Figure 5 being somewhat more elongated than the one in Figure 1.

When the pin 236 on the plunger 210 engages the lower end of the arm 237 during the forward stroke of the plunger 210, the slide 246 and its pawl 250 are moved upward in the manner described in connection with Figures 1 to 3 inclusive, advancing the rack bar 253 upward by one tooth 252. As the swinging coin rest 417 is held out beyond the aperture 426 away from the path of the coin 222 during this operation, the coin 222 falls over the front edge of the coin rest 400 and drops into the coin box. Meanwhile, the vending mechanism of the machine has been set in operation by the motion of the rod 206 (Figure 7) in the manner described previously and an article of merchandise has reached the operator, or the service for which he has paid has been performed in the event that the mechanism is employed to perform a service rather than vend merchandise.

The rack bar 253 continues to be moved upward tooth by tooth at every paid operation of the plunger 210, each coin 222 falling into the coin box at the end of the forward stroke. When the rack bar 253 reaches the top of its stroke, in the same position as shown in Figure 3, the pawls 250 and 263 are latched out of the path of the teeth 252 by the mechanism set in operation by the elongated tooth 269 at the bottom of the rack bar 253, as discussed in connection with Figure 3. The rack bar 253 is then pulled rapidly downward by the coil spring 256 and the free service stroke is announced by the ringing of the bell 299 as in Figure 1.

When the rack bar 253 reaches the bottom of its stroke, it engages the projection 422 on the arm 420, which swings the coin rest 417 through the aperture 426 (Figure 6) into the path of the coin 222. Thus the swinging coin rest 417 is now interposed beneath the coin 222 so that it cannot fall into the coin box. The coin, accordingly, returns to the position shown in Figure 5, sliding along the top of the swinging coin rest 417. As the plunger 210 returns, however, the pin 404 swings the arm 405 and lever 407 in the manner previously described, shifting the movable coin rest 400 obliquely downward and permitting the coin 214 to drop into the coin rest chute, whence it is returned to the operator. Meanwhile, the vending mechanism attached to the rod 206 (Figure 7) has vended an article of merchandise so that on this free service stroke, the operator has received the identical coin which he deposited and at the same time has also received an article of merchandise or has received the service which the machine otherwise performs.

In Figure 6, the parts are shown in their positions at the end of the last paid stroke, the next stroke being free service stroke.

While I have shown and described my invention in detail, it is to be understood that the same is to be limited only by the appended claims for many changes may be made without departing from the spirit and scope of my invention.

What I claim is:

1. A coin operated machine, comprising an operating member normally free to move in one direction and locked against movement in the opposite direction, means operable by the insertion of a coin in the machine for releasing the operating member for movement in said opposite direction, coin retaining mechanism associated with the machine, a step by step free service device operable by a predetermined number of paid operating cycles of the operating member in said opposite direction to discharge a coin from said coin-retaining mechanism to the operator, said operating member being normally movable in said one direction to return the coin to the operator prior to its movement in said opposite direction.

2. A coin operated machine, comprising an operating plunger spring loaded against movement in two directions, means for normally holding the operating plunger latched against movement in one direction, means controlled by the insertion of a coin for releasing the operating plunger to operate the machine coin retaining mechanism associated with said machine and a free service mechanism operable upon a predetermined number of paid operating cycles of the machine for discharging a coin from the coin retaining mechanism to the operator said operating plunger being movable in the other direction to return the coin to the operator prior to manipulation of the operating plunger in its other direction.

3. A coin-controlled machine, comprising an operating member normally locked against movement in one of its two directions of movement and adapted to be released by the insertion of a coin in the machine to allow operation of the machine to dispense an article, coin retaining mechanism and a step by step mechanism controlled by the movement of said operating member in said one direction to release a coin from the coin retaining mechanism of said machine upon a predetermined number of paid operations of the machine whereby the operator will receive an article dispensed as well as a coin from said coin retaining mechanism of the same denomination inserted in the machine said operating member being operable in the other direction to return the coin initially inserted in the machine to the operator in the event the operator desires to change his selection of articles dispensed.

4. In a coin-controlled mechanism having an operating member normally locked against movement in one of its two directions of movement and a coin chute, coin retaining means associated with the mechanism, means for releasing the op-

erating member upon the insertion of a coin in said chute to allow movement of said operating member, a step by step mechanism adapted to be advanced by movement of the operating member, an escapement mechanism controlled by the advance of the step by step mechanism to a predetermined position and means controlled by a predetermined number of paid operations of said operating member wherein the step by step mechanism is advanced to a predetermined position to operate the escapement mechanism and release a coin from said coin retaining means.

5. In a coin-controlled machine, an operating plunger having coin receiving members, means for feeding a coin to the coin receiving members, coin retention means associated with said machine, a ratchet mechanism controlled by the operating plunger and detent means operable by the ratchet mechanism after said ratchet mechanism has been advanced to a predetermined position for returning a coin to the operator from said coin-retention means and upon the completion of a number of paid operations of the coin-controlled mechanism.

6. In a coin-controlled machine, an operating member adapted to be reciprocated having coin receiving means thereon, coin holding mechanism associated with said machine, a step by step mechanism controlled by the operating member, means interconnecting said operating member and step by step mechanism to advance said mechanism a step forward upon each reciprocation of said operating member and means for discharging a coin from the coin holding mechanism of the machine after the step by step mechanism has advanced a predetermined distance and said operating member has been reciprocated a predetermined number of times.

7. A coin-controlled machine, comprising a plunger normally locked against movement in one direction and releasable and operable by the insertion of a coin in the machine to perform a service when moved in the direction of locked movement, a free service mechanism operated by the plunger after a predetermined number of paid operating cycles thereof, coin holding mechanism associated with said machine, and means controlled by the free service mechanism for allowing the discharge of a coin from said coin holding mechanism at the end of the predetermined number of paid operating cycles of said machine.

8. A coin-controlled machine, comprising an operating plunger normally locked against movement in one direction and releasable and operable for rendering a service upon the insertion of a coin in the machine, coin holding mechanism associated with the machine, a step by step mechanism controlled by the operating plunger and pre-set after a predetermined number of paid operating cycles of the plunger to render a free service and means operable by the step by step mechanism to allow the discharge of a coin from the coin holding mechanism of said machine at the end of the predetermined number of paid operating cycles in addition to the service rendered upon the insertion of another coin in the machine.

9. A coin-controlled machine, comprising an operating plunger for rendering a service upon the insertion of a coin in the machine, coin holding mechanism associated with the machine, and a step by step mechanism operably connected to the plunger for discharging a coin from said holding mechanism simultaneously with the rendering of said service when the step by step mechanism has advanced a predetermined number of steps and the operating lever is again operated by the insertion of another coin in the machine.

10. A coin-controlled machine, comprising an operating member movable in one direction for rendering a service upon the insertion of a coin in the machine, coin holding mechanism associated with said machine, means operable by the operating member for discharging a coin from the coin holding mechanism of the machine after the operating member has been operated a predetermined number of times in said one direction and means for allowing the return of the coin inserted in the machine upon movement of the operating member in the other direction and before the operating plunger has been moved a predetermined distance to complete a working cycle of the machine.

11. A coin-controlled machine, comprising an operating plunger operable in one direction for causing the machine to render a service, coin holding mechanism associated with the machine, a step by step mechanism operated by the plunger and adapted to be advanced a step at a time upon each reciprocation thereof and means controlled by the step by step mechanism after advancement thereof to a predetermined position for discharging a coin from the coin holding mechanism of the machine in addition to the service being rendered, said plunger being operable in the other direction to return the coin to the operator before the service has been rendered.

12. A coin-controlled machine, comprising a normally locked operating member adapted to be released by the insertion of a coin in the machine to render a service, coin holding mechanism associated with the machine, a step by step mechanism operably connected to the operating member adapted to be advanced a step at a time upon each reciprocation of said operating plunger and detent escapement means controlled by the step by step mechanism for discharging a coin from the coin holding mechanism of the machine when the operating member has been operated a predetermined number of paid operating cycles and when said plunger is again released and operated by the insertion of another coin in the machine.

13. A coin-controlled machine, comprising an operating plunger, a coin released detent for the plunger, a step by step mechanism associated with the operating plunger adapted to be advanced upon each operation of the plunger, means operable by the step by step mechanism to discharge a coin to the operator when the step by step mechanism has been advanced a predetermined distance, and means associated with the operating plunger for allowing the return of the coin inserted in the machine before a paid operating cycle of the machine has been completed.

14. In a coin-controlled machine, coin operated service rendering mechanism, a manually actuated, machine operating member, a coin magazine arranged to contain a plurality of coins, coin-releasing mechanism associated with said magazine and operable to release a single coin in response to a single stroke thereof, a coin receiver, means responsive to the insertion of a coin and actuation of said operating member for discharging the inserted coin into said coin receiver while actuating said service-rendering mechanism, a free service means responsive to the completion of a predetermined number of paid strokes of

said operating member for actuating said coin releasing mechanism whereby to exchange a coin for the coin inserted by the operator.

15. In a coin-controlled machine, coin operated service rendering mechanism, a manually actuated, machine operating member, a coin magazine arranged to contain a plurality of coins, coin releasing mechanism associated with said magazine and operable to release a single coin in response to a single stroke thereof, a coin receiver, means responsive to the insertion of a coin and actuation of said operating member for discharging the inserted coin into said coin receiver while actuating said service rendering mechanism and free service ratchet mechanism responsive to the completion of a predetermined number of paid strokes of said operating member for actuating said coin-releasing mechanism whereby to exchange a coin for the coin inserted by the operator.

16. In a coin-controlled machine, coin operated service rendering mechanism, a manually actuated machine operating member, a coin magazine arranged to contain a plurality of coins, coin releasing mechanism associated with said magazine and operable to release a single coin in response to a single stroke thereof, a coin receiver, means responsive to the insertion of a coin and actuation of said operating member for discharging the inserted coin into said coin receiver while actuating said service rendering mechanism, and free service mechanism including a reciprocable ratchet and responsive to the completion of a predetermined number of paid strokes of said operating member for actuating said coin-releasing mechanism whereby to exchange a coin for the coin inserted by the operator.

17. In a coin-controlled machine, coin operated service rendering mechanism, a manually actuated machine operating member, a coin magazine arranged to contain a plurality of coins, coin-releasing mechanism associated with said magazine and operable to release a single coin in response to a single stroke thereof, a coin receiver, means responsive to the insertion of a coin and actuation of said operating member for discharging the inserted coin into said coin receiver while actuating said service rendering mechanism, free service mechanism including a reciprocable ratchet and responsive to the completion of a predetermined number of paid strokes of said operating member for actuating said coin-releasing mechanism whereby to exchange a coin for the coin inserted by the operator, detent devices normally operative to limit the advancement of said ratchet to a single tooth in response to a single paid stroke of said operating member, means for retracting said ratchet at the time of a free service stroke, and means for holding said detent devices out of engagement with said ratchet in response to the attainment of a free service stroke whereby to permit the retraction of said ratchet.

18. In a coin-controlled machine, coin-operated service rendering mechanism, a manually actuated machine operating member, a coin magazine arranged to contain a plurality of coins, coin releasing mechanism associated with said magazine and operable to release a single coin in response to a single stroke thereof, a coin receiver, means responsive to the insertion of a coin and actuation of said operating member for discharging the inserted coin into said coin receiver while actuating said service-rendering mechanism, and free service mechanism including a rotary ratchet and responsive to the completion of a predetermined number of paid strokes of said operating member for actuating said coin releasing mechanism whereby to exchange a coin for the coin inserted by the operator.

19. In a coin-controlled machine, coin operated service rendering mechanism, a manually actuated machine operating member, means responsive to the insertion of a coin in the machine for permitting a full stroke of said operating member, means responsive to a full stroke of said operating member for actuating said service rendering mechanism, a coin return passageway, a coin receiver, means for discharging the inserted coin into said receiver concomitantly with a paid stroke of said operating member, free service means responsive to the completion of a predetermined number of paid strokes of said operating member for preventing the discharge of the inserted coin in said coin receiver during the operating stroke of said operating member, and means responsive to a reverse stroke of said operating member for discharging the inserted coin into said coin-return passageway whereby to return the coin to the operator while rendering the service.

20. In a coin-controlled machine, coin operated service rendering mechanism a manually actuated machine operating member, means responsive to the insertion of a coin in the machine for permitting a full stroke of said operating member, means responsive to a full stroke of said operating member for actuating said service rendering mechanism a coin return passageway, a coin receiver, means for discharging the inserted coin into said receiver concomitantly with a paid stroke of said operating member, an obstructor movable into and out of coin obstructing relationship with said coin receiver, free service means responsive to the completion of a predetermined number of paid strokes of said operating member for interposing said obstructor between said operating member and said coin receiver whereby to prevent the discharge of the inserted coin in said coin receiver during the operating stroke of said operating member, and means responsive to a reverse stroke of said operating member for discharging the inserted coin into said coin-return passageway whereby to return the coin to the operator while rendering the service.

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