

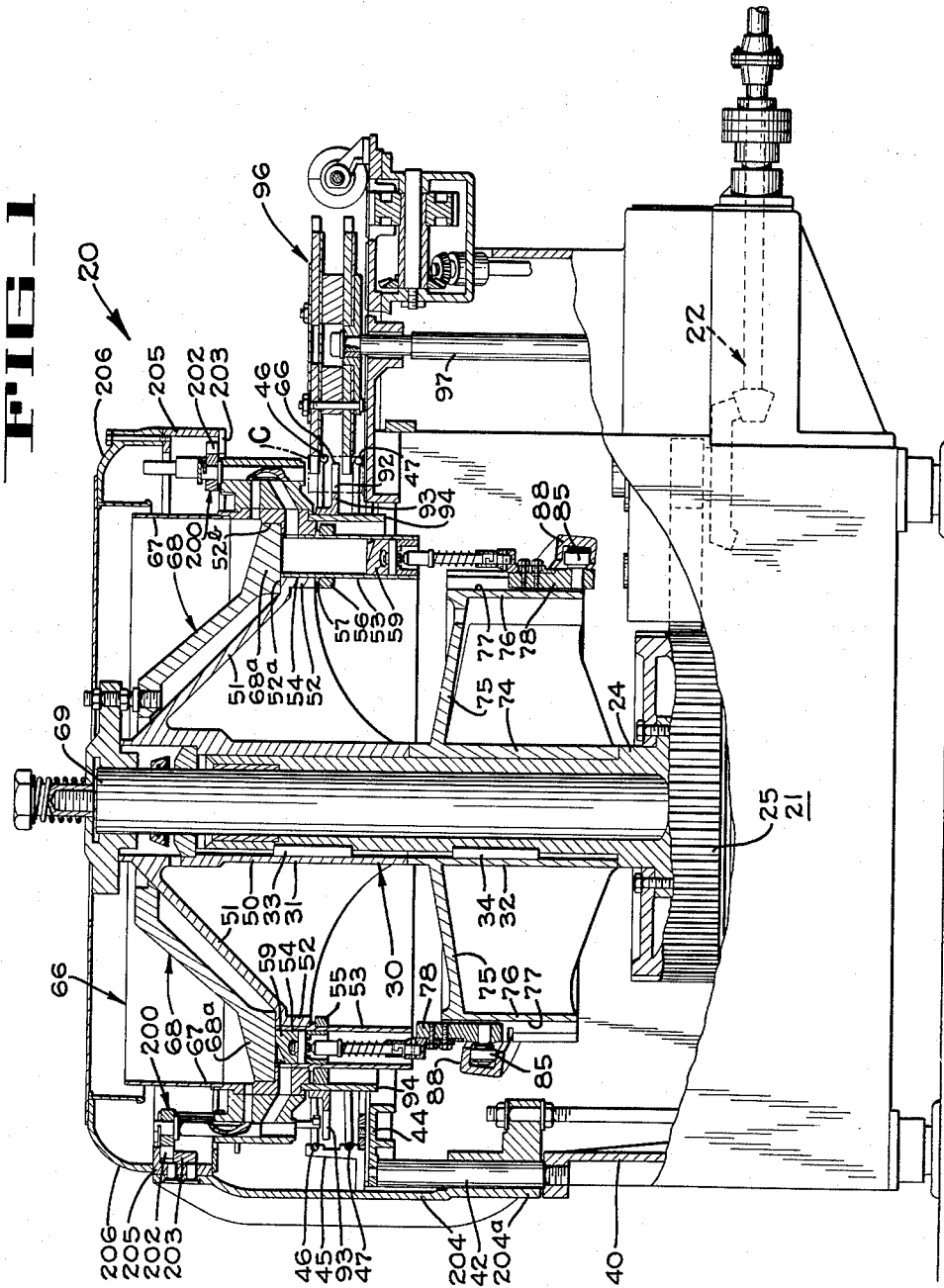
Nov. 1, 1960

C. E. KERR
FILLING MACHINE

2,958,346

Filed Jan. 28, 1958

6 Sheets-Sheet 1



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ATTORNEY

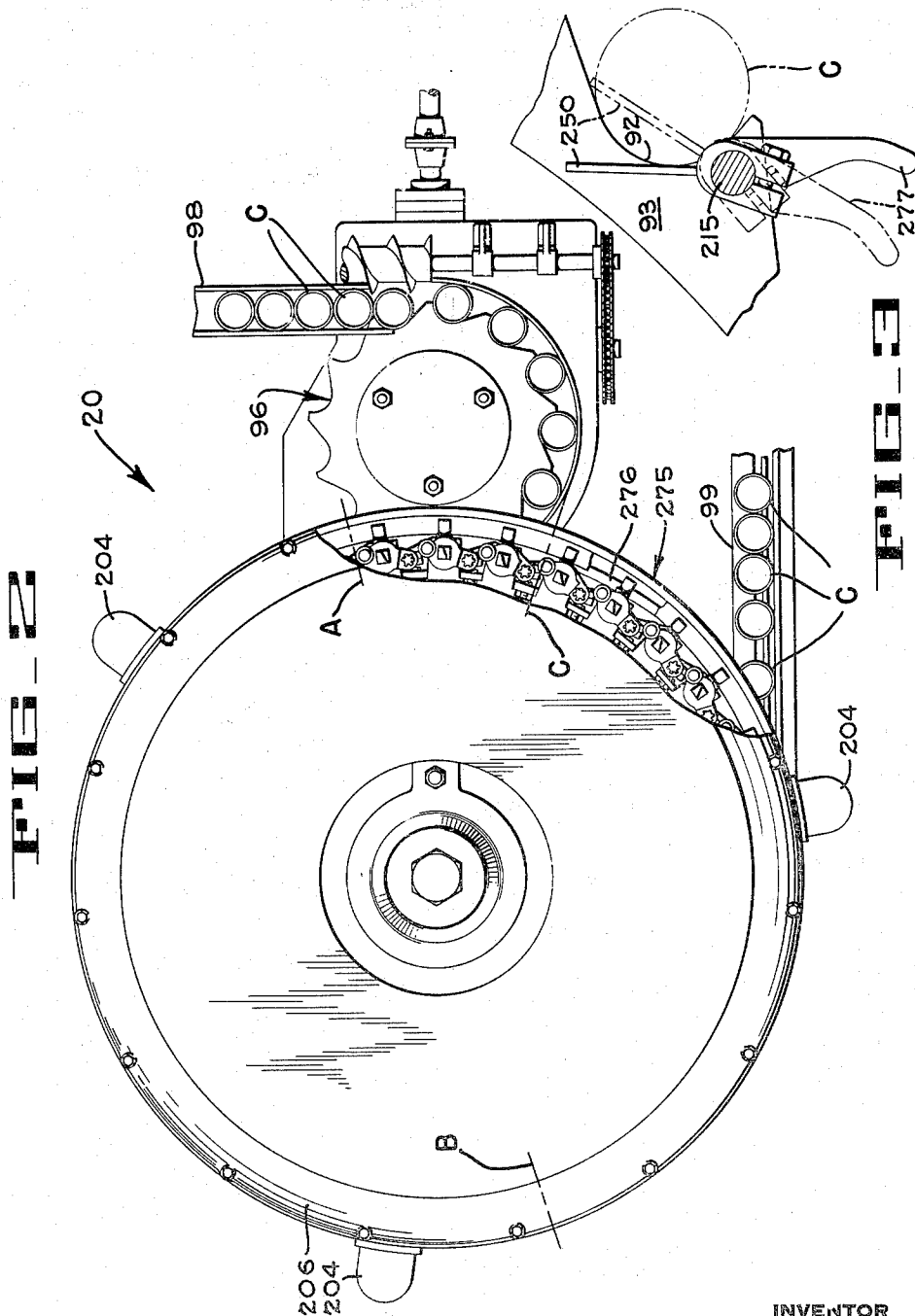
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6 Sheets-Sheet 2



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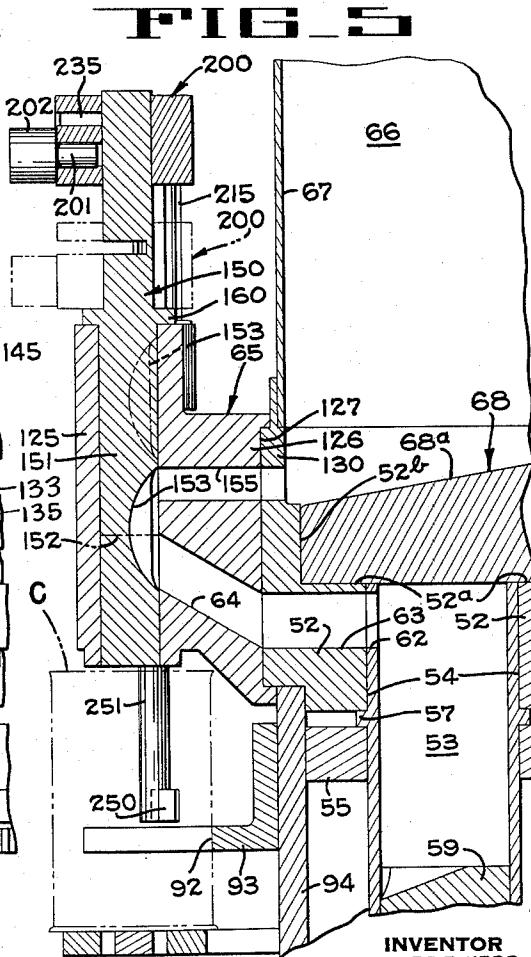
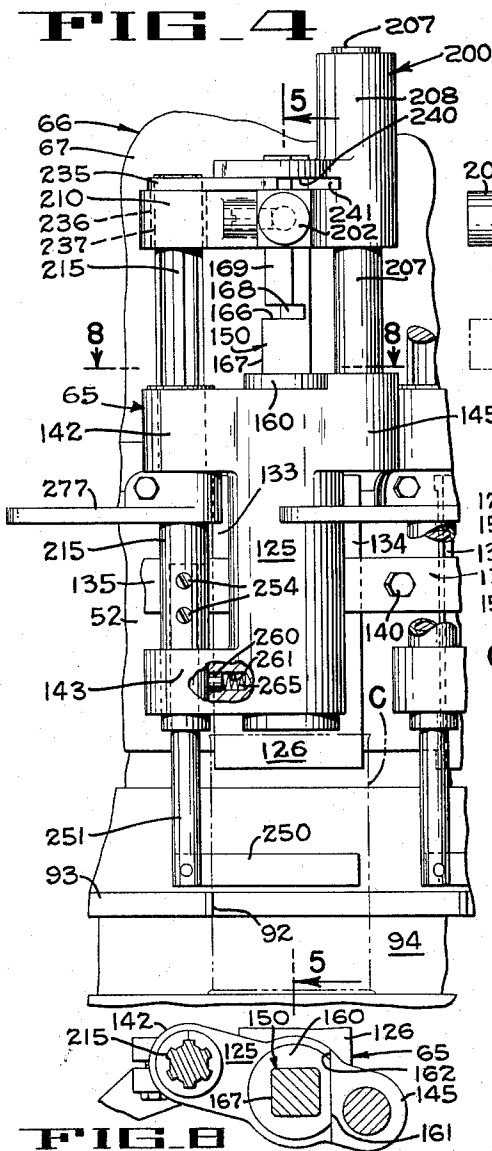
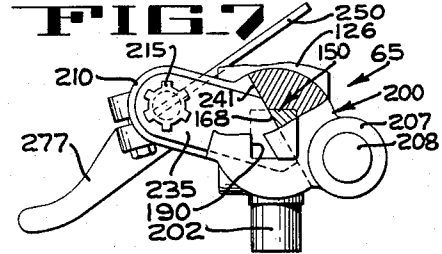
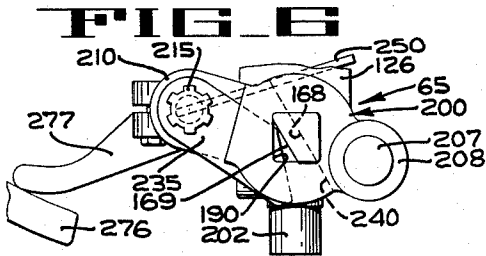
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6 Sheets-Sheet 3



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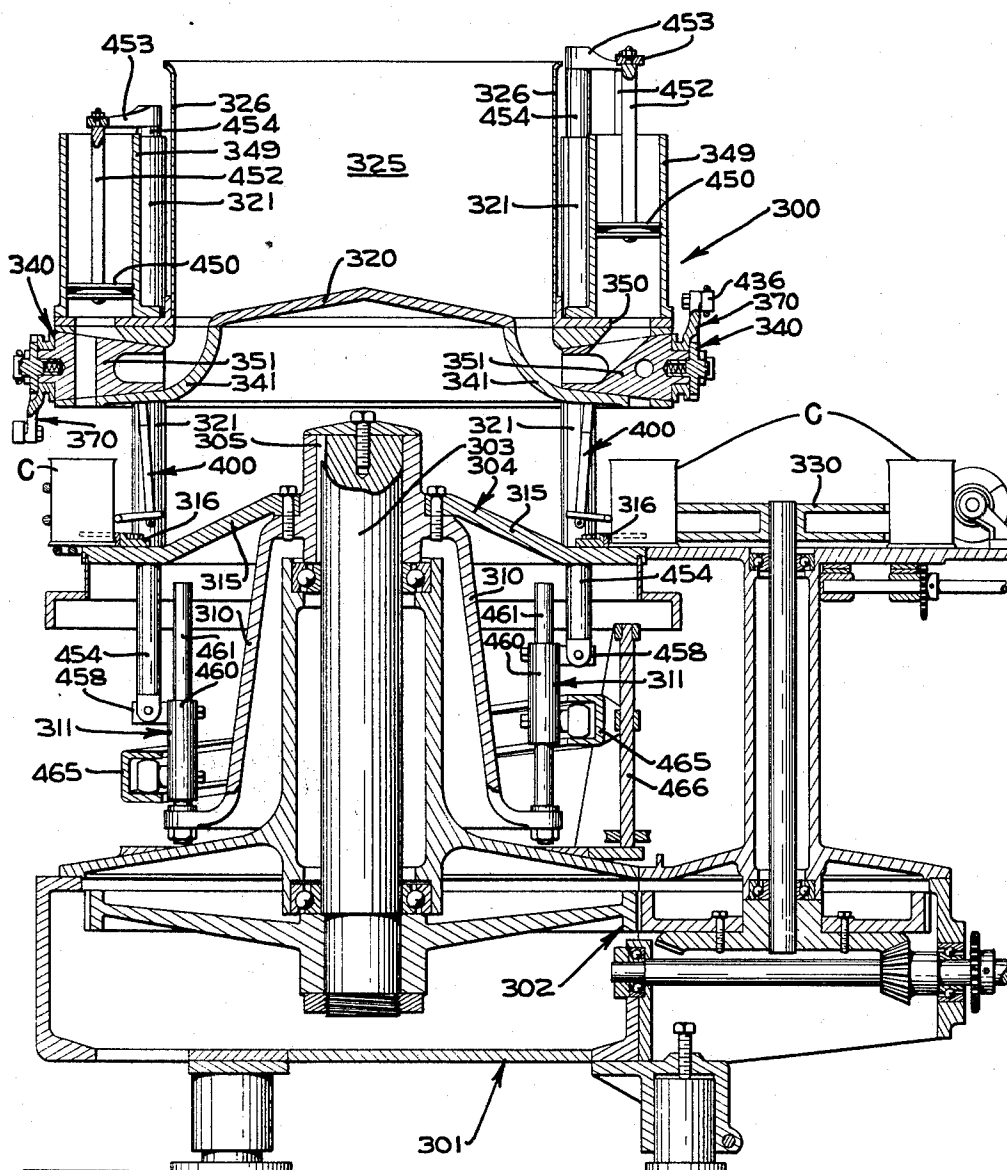
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FIG. 11



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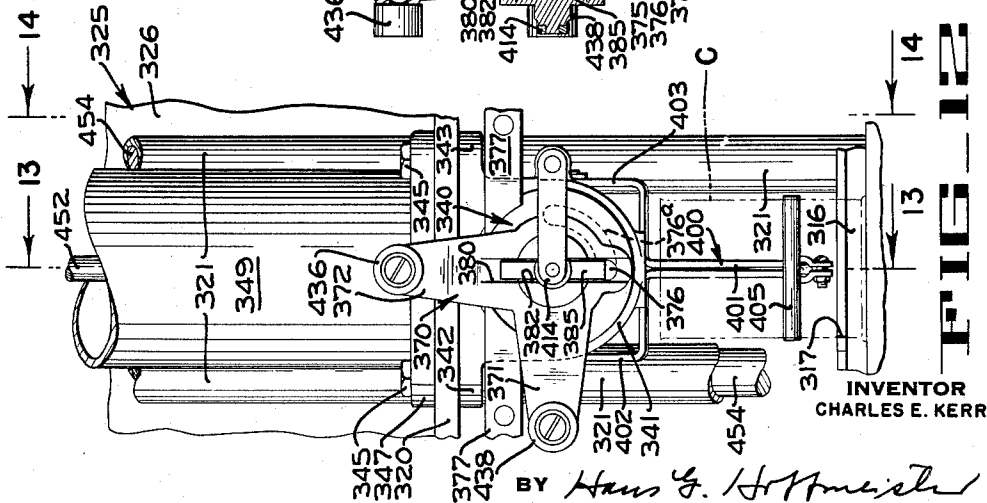
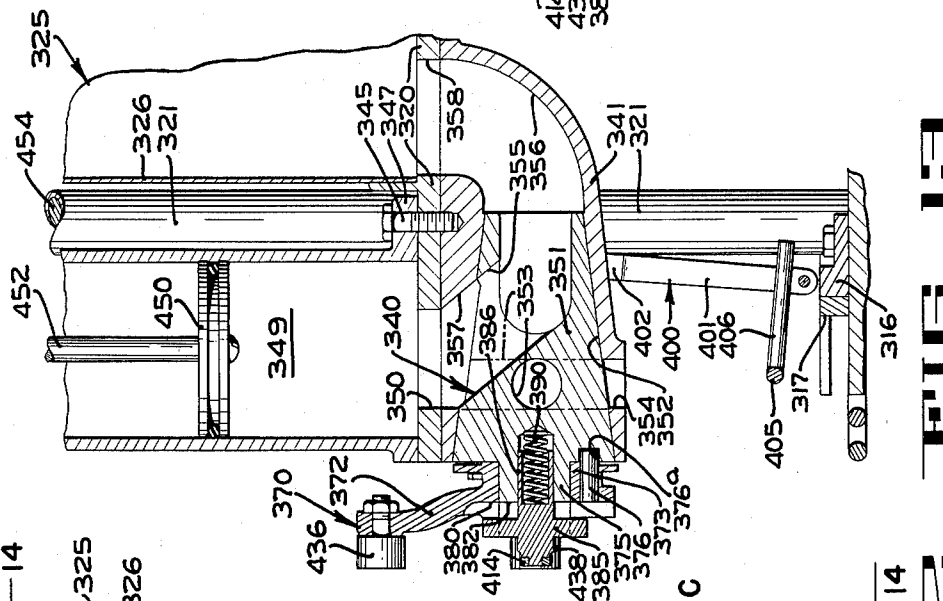
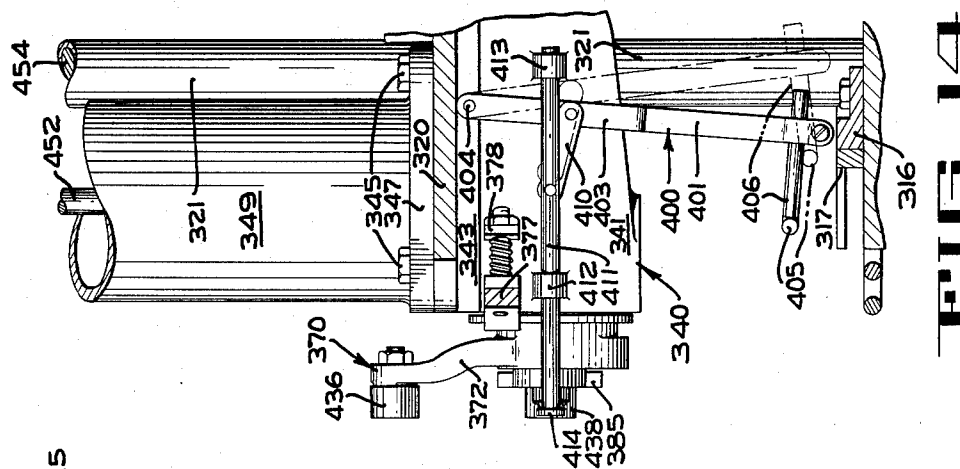
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FILLING MACHINE

Filed Jan. 28, 1958

6 Sheets-Sheet 6



1

2,958,346

FILLING MACHINE

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13 Claims. (Cl. 141-141)

This invention appertains to machines for filling containers with fluid and more particularly relates to an improved filling valve and a mechanism for operating the valve.

In one commercial automatic filling machine, each container to be filled is moved from a feed turret to a filling turret and positioned in a pocket in the filling turret directly under one of a plurality of valves that are carried by the filling turret. As the container and its associated valve move along together on the filling turret, the valve is opened at a predetermined station to discharge a measured quantity of liquid into the container. A valve actuating mechanism is positioned immediately ahead of the valve opening station. This valve actuating mechanism is arranged to be held in valve opening position by each container in a line of containers entering the turret. However, if an opening appears in the line of containers, the valve actuating mechanism is allowed to move to valve closing position and, accordingly, no liquid will be discharged into the empty pocket in which the missing container would have been positioned. Such a mechanism is effective when the turret is operated relatively slowly. However, if the turret is operated rapidly, the actuating mechanism can not return quickly enough to valve opening position and, accordingly, a container in the pocket next behind the empty pocket will not be filled.

It is therefore an object of the present invention to provide a mechanism for quickly and reliably actuating the valve of a filling machine.

Another object is to provide an improved filling machine.

Another object is to provide an improved filling valve for a filling machine.

Other and further objects and advantages of the present invention will become apparent from the following detailed description taken in connection with the attached drawings, in which:

Fig. 1 is a front elevation, with parts broken away, of the filling machine of the present invention.

Fig. 2 is a plan, with parts broken away, of the machine of Fig. 1.

Fig. 3 is an enlarged fragmentary plan of a container pusher mechanism and a portion of the valve actuating mechanism used in the machine of Fig. 1.

Fig. 4 is an enlarged front elevation of one of the several identical valve assemblies used in the filling machine, said valve assembly being shown mounted on the turret of the machine.

Fig. 5 is a vertical section taken on line 5-5 of Fig. 4.

Fig. 6 is a plan of the valve assembly of Fig. 4.

Fig. 7 is another plan of the valve assembly with parts broken away and parts shown in different operating positions from the positions of Fig. 6.

Fig. 8 is a fragmentary horizontal section taken on line 8-8 of Fig. 4.

Fig. 9 is a plan, with parts broken away, of a second embodiment of the rotary filling machine of the present invention.

2

Fig. 10 is a schematic, developed view of the cam mechanism used in the machine of Fig. 9.

Fig. 11 is a vertical section taken along line 11-11 of Fig. 9.

Fig. 12 is a front elevation of one of a plurality of identical valve assemblies used in the machine of Fig. 9, said valve assembly being illustrated as mounted on the turret of the machine.

Fig. 13 is a vertical section taken along line 13-13 of Fig. 12.

Fig. 14 is a vertical section taken along line 14-14 of Fig. 12.

In Figures 1 and 2 the reference number 20 indicates a rotary filling machine in which the valve actuating mechanism of the present invention is mounted. The machine 20 comprises a stationary base 21 in which is mounted a drive mechanism 22 adapted to be connected to a source of power (not shown). A tubular shaft 24, which is secured to a gear 25 of the drive mechanism, projects upwardly through the center of the machine, and a turret 30, which comprises an upper turret member 31 and a lower turret member 32, is keyed to the tubular shaft 24 by keys 33 and 34.

Three brackets 40 (one only being shown) project vertically upwardly from the base 21, and each of the brackets has a post 42 projecting upwardly from its upper end. An annular, container support table 44 is supported in fixed position on the upper end of the three posts 42, and a pair of guide rails 46 and 47 are supported by brackets 45 which are secured to the table.

The upper turret member 31 includes a central tubular portion 50, a slanted web 51, and an outer support ring 52. A plurality of equally spaced cylinders 53 (two only being shown in Fig. 1) are secured in openings 54 (Fig. 5) in the outer support ring 52 by clamp rings 55 and 56, each of which engages an annular flange 57 on one of the cylinders and is secured by machine screws (not shown) to the ring 52. Each cylinder 53 has a piston 59 slidably disposed therein and has a discharge port 62 communicating with a passage 63 in the support ring 52 which, in turn, communicates with a passage 64 in a valve assembly 65, to be described presently. A reservoir 66 (Fig. 1) for liquid is provided above the turret, said reservoir being defined by a cylindrical wall 67, the web 51 and the outer support ring 52. Each cylinder 53 is in direct communication with the reservoir approximately from the time it passes a position indicated by reference letter B in Fig. 2 to a position indicated by letter C. Approximately at position C, each cylinder moves under a cutoff plate 68 (Fig. 1) which is supported in fixed position above the turret on the upper end of a center post 69 that is mounted at its lower end in non-rotating relation in the fixed base 21. The cutoff plate 68 has a lower flange 68a disposed in close, sliding contact with an upper surface 52a of the support ring 52 and with a vertical, cylindrical inner surface 52b of the ring. It will be evident that, when each cylinder moves under the cutoff plate a predetermined charge of liquid is trapped in the cylinder, and that the cutoff plate acts as an upper wall for the cylinder when the piston therein moves upwardly to discharge the liquid from the cylinder.

The lower turret member 32 (Fig. 1) comprises an inner tubular portion 74, a web 75, and an outer support ring 76. A plurality of vertical slots 77 are formed in the support ring 76, each slot being arranged to guide a slide 78 which is connected to the piston 59 disposed in one of the cylinders 53. A follower roller 85, which is rotatably mounted on each slide 78, is disposed in engagement with the camming surface of a stationary cam ring 88 that is secured by brackets, not shown, to the three support brackets 40. It will be evident that, as the turret rotates, the slides are moved up and down

causing the pistons to reciprocate in the cylinders in timed relation to the movement of the turret.

The liquid stored in each cylinder 53 is discharged into a container C (Fig. 1) that is fed into one of a plurality of pockets 92 (Fig. 5) provided on the turret by spaced fingers of a container pusher ring 93. The ring 93 is a two piece member that is clamped around a cylinder support ring 94 depending from the turret ring 52. A container is fed into each pocket 92 by means of a feed wheel 96 (Fig. 1) which is driven by a shaft 97 from the drive mechanism 22. As seen in Fig. 2, a conveyor 98 delivers empty containers to the feed wheel, and a conveyor 99 removes the containers from the machine after they are filled.

Each valve assembly 65 (Figs. 4 and 5) comprises a generally cylindrical or tubular housing 125 having a rear projection 126 (Fig. 5) with a recess 127 adapted to receive a peripheral projection 130 formed on the outer support ring 52 of the turret. Each rear projection 126 of the valve housing has two side flanges 133 and 134 (Fig. 4) and each valve housing is mounted on the support ring 52 by straps 135, that straddle the flanges 133 and 134 of adjacent valve bodies, and are secured by tap bolts 140 to the support ring 52. The valve housing has two integrally formed bosses 142 and 143 with aligned vertical openings, and a third boss 145 disposed approximately diametrically opposite the boss 142.

A valve core 150 (Fig. 5), which has a cylindrical portion 151 slidably disposed in the tubular housing 125, is provided with a lower edge 152 and a slot 153, and this slot 153 is arranged to establish communication between passage 64 and a by-pass passage 155 in the valve housing projection 126, when the slide element 150 is in its lowermost position. As will be explained presently, the by-pass passage 155 is used only when the feed wheel fails to put a container in the pocket below the associated valve and, when in use, the passage directs the fluid discharged from the cylinder 53 back to the reservoir. A flange 160, disposed at the upper end of the cylindrical portion 151 of the slide element 150, abuts the upper surface of the valve housing to define the lowermost position of the slide element. A flattened surface 161 (Fig. 8) on the flange 160 abuts a mating flattened surface 162 on the boss 145 of the valve housing to prevent rotation of the slide element. Above the flange 160, the valve core 150 has a square cross section with a horizontal slot 166 formed in this portion of the core. As seen in Figs. 4 and 7, the slot 166 extends inwardly from one side wall 167 of the core, and the innermost end of the slot is defined by a slanted wall 168. Above the slot 166, the side wall 167 of the core is cut back to provide a relieved portion with a slanted side wall 169. Thus, the upper portion of the core 150 is not square in cross section but has three walls in squared relation adapted to slidably engage three walls of a square socket 190 (Fig. 6) formed in a valve actuator 200.

A cam follower roller 202 is mounted on a pin 201 projecting from one side of the valve actuator 200. As will be explained presently, during operation of the machine the valve actuator is continuously reciprocated vertically between the upper full line position of Fig. 5 and the lower phantom line of Fig. 5 by means of a fixed cam track 203 (Fig. 1) on which the roller 202 of each valve actuator 200 rides. Three posts 204 (Figs. 1 and 2), each of which is anchored to the base 21 and has a hub portion 204a disposed around one of the posts 42, support an annular bracket 205 on which the cam track 203 is secured. A tank cover 206 is also mounted on the annular bracket 205.

The valve actuator 200 is guided during its vertical movement by means of a post 207 (Figs. 4 and 6) which is fixed in the valve housing boss 145 and projects upwardly therefrom into an aperture in a boss 208 integrally formed on the actuator 200, and by a spline shaft 215 which projects through a second boss 210 on the actuator

200 and through the bosses 142 and 143 of the valve housing.

In Fig. 5 the slidable valve core 150 is shown in the lowered position it assumes before it reaches the station at which a container is to be positioned thereunder by the feed wheel 96.

At this time the associated cylinder 53 is full. If a container is delivered to the turret, the valve core will be locked to the actuator 200 in a manner to be explained presently. Then, when the actuator is raised by the cam track 203, the valve core is raised, raising the slot 153 and the lower end surface 152 of the slide valve to the dotted line positions shown in Fig. 5. In this raised position of the slide valve, the by-pass passage 155 to the reservoir 66 is closed, and the cylinder 53 is in communication with the lower open end of the tubular valve housing, so that upward movement of the piston 59 in the cylinder will cause a charge of liquid to be discharged into a container C disposed below the valve. In accordance with the present invention, means is provided for latching or locking the valve actuator 200 to the valve slide 150 of a valve assembly each time a container is moved into a turret pocket 92 below that particular valve assembly. It will be evident that if the valve actuator 200 is not latched to the valve core 150, the valve core will not be lifted, and the piston will pump the liquid back into the reservoir through the by-pass passage 155.

The mechanism for latching the actuator 200 to the core 150 comprises an arm 235 (Figs. 4 and 6) which lies on the upper surface of the actuator 200. The arm 235 has a depending sleeve portion 236 which has a cylindrical external surface rotatably mounting the sleeve in an opening 237 in the actuator 200, and a splined inner surface that slidably engages the outer surface of the spline shaft 215. With this arrangement, the arm is arranged to be pivoted relative to the actuator 200 when the spline shaft 215 is oscillated.

The latch arm 235 is moved from the position of Fig. 6, wherein its free end is disposed part way in a slot 240 (Fig. 4) formed in the actuator 200, to the inner position of Fig. 7 wherein the outer slanted end of the arm abuts the slanted back wall 241 of the slot 240. It will be noted that the slanted back wall 241 of slot 240 is in substantially vertical alignment with the rear wall 168 of the slot 166 in the valve core 150. Accordingly, if the latch arm 235 is moved to its inner position when the valve actuator 200 is in its lower position, indicated in phantom lines in Fig. 5, the latch arm will move into the slot 166 and latch the actuator to the slidable valve core 150.

The latch arm is moved to the inner latching position by the engagement of a container with an actuating member in the form of a finger 250 which is secured to the lower end of a rod 251. The rod 251 is secured by setscrews 254 in a central bore in the lower end of the rotatable spline shaft 215. Rotation of the spline shaft is resisted by a button 260, which is slidably disposed in a recess 261 in the boss 143 and forced outwardly against the shaft by a compression spring 265. The button 260 therefore functions as a brake to hold the spline shaft in any turned position. As seen in Fig. 3, the finger 250 is moved to the solid line position by a container entering the pocket 92. The spring-loaded button maintains the finger in this withdrawn position until after the container is discharged onto conveyor 99. Approximately at the position indicated by arrows 275 (Fig. 2) a cam 276, that is mounted in fixed position below the cam support ring 205, engages a lever 277 (Fig. 3), that is clamped on the spline shaft, and cams that lever into the dotted line position of Fig. 3, moving the finger 250 to the phantom line position in the path of the next container to be fed into the pocket.

In Fig. 6, the cam 276 has just actuated the lever 277 and returned the finger 250 to a position disposed in the associated pocket 92. It will be noted that, at

5

this time, the latch arm 235 is withdrawn from the slot 166 of the slide valve 150 and accordingly, the actuator is not latched to the associated valve core 150. When a container is fed into the pocket by the feed wheel 96, the finger 250 is moved rearwardly to the position of Fig. 7 and the latch arm 235 is urged inwardly toward the base of the slot 240 of the actuator 200. In accordance with this invention, at the time a container is fed into a pocket 92, the fixed cam 203 (Fig. 1) has already permitted the valve actuator 200 to drop to its lowermost position, as shown by the valve assembly at the right side of Fig. 1. Accordingly, when a container enters a pocket and swings the latch arm 235 inwardly in the slot 240 of the actuator, the latch arm also moves into the slot 166 in the valve core 150, thus latching the valve core to the actuator. Accordingly, when the cam track 203 next moves the actuator upwardly, the valve core will be moved upwardly and liquid will be discharged into the container. It will be clear that, if no container is fed into a pocket, the finger 250 associated with that pocket will not be contacted and the actuator will not be latched to the slidable valve core of the valve assembly associated with that pocket. Accordingly, no liquid will be discharged from that particular valve assembly during the ensuing rotation of the turret.

Referring to Figure 2, during operation of the machine each valve core 150, that is latched to its actuator, is raised to valve open position approximately at station A and remains in the raised position until it reaches the vicinity of station B.

It is to be particularly noted that there is a detector finger and latch mechanism provided for each pocket and, therefore, each latch mechanism is independent and may be actuated regardless of whether or not the preceding pocket is filled. With each latch mechanism mounted for independent actuation, the turret may be rotated rapidly with no danger of any container in a pocket remaining unfilled with liquid.

In Figures 9 through 14, a second embodiment of the valve actuating mechanism of the present invention is illustrated as mounted in a dispensing machine 300 (Fig. 11) which includes a stationary support structure 301, a powered drive mechanism 302, a vertical drive shaft 303, and a turret 304 connected by a key 305 to the drive shaft. The turret 304 comprises a lower support member 310, on which a plurality of piston-actuating linkages 311 are mounted, and an upper support member 315 which carries a ring 316 having a plurality of pockets 317 (Figs. 12 and 13) each of which is arranged to receive a container C to be filled. A generally flat circular plate 320 (Fig. 11) is supported in spaced relation above the upper turret member 315 by means of a plurality of tubular posts 321 (Fig. 12) which are rigidly connected, as by welding, to the upper surface of the turret member 315 and to the lower surface of the plate 320. The plate 320 forms the bottom wall of a reservoir 325 (Fig. 11) which has a cylindrical side wall 326. A container is fed into each pocket 317 of the turret by means of a power driven feed wheel 330, and, after being filled, is discharged from the machine onto a conveyor 332 (Fig. 9).

A plurality of valve assemblies 340 (Fig. 11) are mounted below the outer peripheral portion of the plate 320. Each valve assembly comprises an elongated housing 341 (Figs. 12 and 13) which has upper marginal side flanges 342 and 343 secured to the plate 320 by capscrews 345. The capscrews 345 also pass through openings in a flange 347 of an open-bottom cylinder 349 to secure the cylinder to the upper surface of the plate 320 above a port 350 in the plate.

A valve core or body 351 of frusto-conical configuration is mounted for rotary movement about its axis in a suitable opening 352 formed in the valve housing 341. A passage 353 extends transversely across the

6

valve core and is adapted to be moved from the full line position of Fig. 13 to the phantom line position wherein it establishes communication between a discharge port 354, provided in the lower wall, and a passage 357, in the upper wall of the valve housing 341, and with the port 350 formed in the plate 320.

Each valve core 351 also includes an angled passage 355 communicating at one end with a passage 356 in the valve housing 341 which, in turn, communicates with the reservoir 325 through an opening 358 in the plate 320. At its other end, the angled passage 355 is connected in flow communication with the cylinder 349 through the passage 357 in the valve housing and through the port 350.

The valve core 351 is rotated 90 degrees about its axis, between the cylinder-filling position shown by the valve at the right side of Fig. 11, wherein the reservoir 325 is connected to the cylinder 349, and the liquid discharge position shown by the valve at the left side of Fig. 11, by means of a valve actuator 370. The valve actuator 370 (Figs. 12 and 13) is in the form of a bellcrank having arms 371 and 372 disposed at right angles to each other, and having a cylindrical hub 373 rotatably journaled on a stub shaft 375 projecting axially from the valve core 351. A locating pin 376 in the actuator projects into a groove 376a in the valve core 351. The valve core and the actuator are held in place by a bar 377 (Fig. 12) which straddles adjacent valve assemblies and has a stud locked in a tab 378 (Fig. 14) projecting from the valve housing of one of the assemblies.

The valve actuator 370 has a deep groove 380 in its face and this groove is arranged to be aligned with a similar groove 382 formed in the end face of the stub shaft 375. An elongated rectangular key or latch member 385 is adapted to be moved into the grooves 380 and 382 when they are disposed in aligned relation. The key 385 has a tubular extension 386 which is slidably disposed in a cylindrical opening in the valve core. A compression spring 390 is positioned in the bore of the extension 386 and is arranged to be compressed when the key is moved inwardly into the aligned grooves to connect the valve actuator in driving relation with the valve body.

The key 385 is moved inwardly by means of an empty container, as the container enters the associated pocket of the turret, through a linkage 400 which includes a lever 401 (Fig. 14) whose forked upper end has arms 402 and 403 (Fig. 12) pivotally mounted by pins 404 (one only being shown in Fig. 14) on opposite sides of the valve housing 341. A container-contacting bar 405 has a shank 406 clamped in adjusted position in the lower end of the lever 401. Near its upper end, the fork arm 403 is pivotally connected to a link 410 which is pivoted to a push rod 411. The push rod is slidably journaled in apertured bosses 412 and 413 formed on the valve housing 341. A connecting bar 414 (Fig. 12) is secured, as by a press fit, to one end of the push rod and to a reduced diameter end portion of the key 385. It will be evident that, if the grooves 380 and 382 are in aligned position, when a container contacts the linkage 400 and pivots it counterclockwise (Fig. 14), the key will be moved into the aligned grooves against the resistance of the spring 390. When the container is discharged from the pocket, the spring 390 will swing the linkage clockwise into position overlying the pocket 317, and ready to be actuated by the next container fed into the turret.

During operation of the machine, each valve actuator 370 is rotated between cylinder-filling position and container-filling during its movements around the machine by a pair of cams 425 and 426 (Fig. 10) which are mounted adjacent the outer faces of the valve assemblies by means of posts 430 (Fig. 9). These posts 430, which are supported in fixed position from the base 301 in the same manner as the posts 204 of Fig. 1, also

7

support a reservoir cover 435. The cam track defined by the cams 425 and 426 is such that, as each valve assembly approaches station A (Fig. 9) a follower roller 436 (Fig. 10) on the arm 372 of the valve actuator 370, engages an inclined cam portion 425a of the cam 425 causing the valve actuator to be rotated 90 degrees. If the key 385 has been moved into the aligned grooves, the valve body will also be rotated 90 degrees from the cylinder filling position to the discharge position. When the valve assembly reaches station B (Fig. 9), an inclined cam portion 426b engages a follower roller 438 on the arm 371 of the actuator causing the valve actuator 370 to be rotated in the opposite direction bringing the conical valve body back to cylinder filling position. As the valve assembly moves from station B back to station A, the cams 425 and 426 hold the valve body in the cylinder filling position.

Simultaneously with the movement of the valve to discharge position at station A, a piston 450 (Fig. 11) in the associated cylinder 349 is moved downwardly to force the liquid through the valve and into the container. Each piston 450 is secured to the lower end of a rod 452 whose upper end is connected by a bar 453 to the upper end of a vertical shaft 454 that is slidably disposed in one of the support tubes 321. Aligned apertures, not shown, are provided in the plate 320 and in the turret member 315 to permit passage of the shaft 454 whose lower end is pivotally connected to an arm 458 carried by a sleeve 460. The sleeve 460 is slidably disposed on an upstanding post 461 that is secured to the lower turret member 310, and a roller, which is rotatably mounted on the sleeve 460, rides in a stationary cam track 465 supported from the base 301 by a bracket 466. With this arrangement, rotation of the turret member 310 causes reciprocation of the piston in each cylinder. The cam track 465 is so designed that the piston is moved downwardly while the associated valve assembly moves from station A to station B and is then moved upwardly as the valve is returned to cylinder charging position.

From the foregoing description it will be apparent that the present invention provides a valve latching mechanism that is simple in construction but is positive in its latching engagement. The provision of a separate container detector and latching mechanism for each pocket of the turret assures the filling of each container in the turret even when the turret is operated at high rotary speeds. In the following claims the term receptacle will be used to indicate the pocket of the turret and the space adjacent the pocket that is occupied by a container in the pocket.

What I claim as new and desire to protect by Letters Patent is:

1. In a filling machine, a valve housing, a valve core movable in said housing toward and away from a valve open position, a valve actuator mounted for movement through a predetermined range of movement adjacent said valve core, means for periodically moving said valve actuator through said predetermined range of movement, means defining a socket in said valve core, means defining a container receptacle beneath said valve housing, a container detector mounted on said housing for movement between a position withdrawn from said receptacle and a position projecting into said receptacle to be contacted and moved out of said receptacle by a container entering the receptacle, a locking member adjacent said valve actuator and arranged for movement relative to said actuator into the socket of said valve core to lock said actuator and said core for unitary movement, and means interconnecting said locking member and said detector whereby movement of said detector by an entering container is effective to move said locking member into the socket of said valve core.

2. In a filling machine, a valve housing, a valve core movable in said housing toward and away from a valve

8

open position and having an elongated socket therein, a valve actuator mounted for movement through a predetermined range of movement adjacent said valve core, means for periodically moving said valve actuator through said predetermined range of movement, means defining a socket in said valve actuator arranged to be aligned with the socket in said valve core, means defining a container receptacle beneath said valve housing, a container detector mounted on said housing for movement between a position withdrawn from said receptacle and a position projecting into said receptacle to be contacted and moved out of said receptacle by a container entering the receptacle, a locking member supported by said valve core and arranged to be moved into the sockets of said core and said actuator when said sockets are in aligned relation, and means interconnecting said detector and said locking member so that movement of said detector out of said receptacle in response to movement of a container into the receptacle effects movement of said locking member into said aligned sockets.

3. In a filling machine, a valve housing, a frusto-conical valve core rotatably mounted in said housing, said core having a cylindrical extension projecting externally of said housing, means defining an elongated slot transversely in the end surface of said extension, a valve actuator rotatably mounted on said valve core extension, said actuator having a pair of slots aligned with the slot in said extension, means defining a container receptacle beneath said valve housing, a container detector mounted on said housing for pivotal movement between a position withdrawn from said receptacle and a position projecting into said receptacle to be contacted and moved to said withdrawn position by a container entering the receptacle, an elongated key slidably mounted on the extension of said core and arranged to be moved into said slots when said slots are in aligned relation, and means interconnecting said detector and said key in such a manner that movement of said detector to said withdrawn position moves said key into said aligned slots.

4. In a filling machine, a valve housing, a cylindrical valve core slidably mounted in said housing, means defining a slot in said valve core, a valve actuator mounted for sliding movement on said housing and on said valve core and having a slot arranged to be aligned with the slot in said valve core, a shaft rotatably mounted in said valve housing, a key secured to said shaft, means for sliding said valve actuator to a position wherein said slots are in alignment, means defining a container receptacle below said valve housing, a container detector mounted for movement between a position projecting across said receptacle in the path of a container entering said receptacle to a position withdrawn from said receptacle, means for moving said detector into said receptacle, and means interconnecting said detector and said key whereby engagement and movement of said detector by a container entering said receptacle effects movement of said key into said aligned slots.

5. In a filling machine, a valve housing having a cylindrical bore, an elongated cylindrical valve core slidably mounted in said bore and having a portion of square cross-section with a transverse slot therein, a post carried by said housing, a spline shaft rotatably mounted in said housing and projecting parallel to said post, a valve actuator slidably journaled on said post and on said spline shaft and having a square opening adapted to receive the square portion of said valve core, means defining a slot in said actuator extending transversely over said square opening, a key splined on said shaft and disposed in transverse alignment with the slot in said actuator, means for sliding said actuator to a position wherein the slot in said actuator and the slot in said core are in alignment, and means for moving said key into said aligned slots to lock said core and said actuator for unitary movement relative to said housing.

6. In a filling machine, a valve housing having a frusto-conical bearing surface, a frusto-conical valve core rotatably journaled in said housing and having a cylindrical projection exteriorly of said housing, means defining a cylindrical recess and a slot in the end surface of said projection, a valve actuator having a tubular hub journaled for rotation on said core projection, said actuator having a slot adapted to be aligned with the slot in said core projection, a key having a shank portion slidably journaled in said cylindrical recess and an elongated locking portion adapted to be moved into the slot in said core projection and into the slot in said actuator when said slots are in aligned relation, and spring means connected between said key shank and said actuator for urging said key to a position withdrawn from said slots.

7. In a filling machine, a generally horizontal circular plate having a plurality of spaced circular openings disposed around the periphery thereof, an open bottomed cylinder mounted on said plate over each opening, a piston in each cylinder, a valve housing mounted below each cylinder and having an opening communicating with the cylinder through the associated opening in the plate, a valve core adjustably positioned in said housing, means defining a container receptacle beneath each valve housing, a container detector disposed in each receptacle and arranged to be contacted and moved out of the receptacle by an entering container, a valve actuator associated with each valve core, means for periodically reciprocating said actuator through a predetermined range of movement, means responsive to actuation of each detector by a container entering the associated receptacle for locking the associated valve actuator to the valve core, a linkage extending down into each cylinder through the open upper end thereof into operative engagement with the piston therein, cam means for periodically reciprocating said linkage to actuate the piston in the cylinder, and means coordinating the actuation of said piston and the movement of the associated valve core in its housing.

8. In a machine of the type in which each of a plurality of filling valves is mounted above a separate container pocket of a rotatable turret, the improvement which comprises a movable container detector disposed in each pocket and arranged to be moved out of said pocket by a container entering the pocket, a valve actuator adjacent each valve, means for periodically moving said actuator through a fixed range of movement in timed relation with the rotary movement of the turret, a locking member arranged for movement toward and away from a position connecting said actuator in driving engagement with said valve, means interconnecting said container detector and said locking member and arranged to move said member to the position connecting said actuator in driving engagement with said valve as said detector is moved out of said pocket by an entering container, and automatic brake means operatively connected between said valve and said locking member for holding said locking member in any adjusted position.

9. In a filling machine, a valve housing, a cylindrical valve core slidably mounted in said housing, means defining a slot in said valve core, a valve actuator mounted for sliding movement on said housing and having a slot arranged to be aligned with the slot in said valve core, a shaft rotatably mounted in said valve housing, a key secured to said shaft, means for sliding said valve actuator to a position wherein said slots are in alignment, means defining a container receptacle below said valve housing, a container detector mounted for movement between a position projecting across said receptacle in the path of a container entering said receptacle to a position withdrawn from said receptacle, cam means for moving said detector into said receptacle, means interconnecting said detector and said key whereby engagement and movement of said detector by a container entering said receptacle effects movement of said key into said aligned slots, a brake element slidably disposed in said valve

housing adjacent said detector, and spring means disposed between said housing and said brake element and arranged to urge said element into engagement with said detector to hold said detector in the position to which it is moved by said cam means or said entering container.

10. In a filling machine, a valve housing, a valve core rotatably mounted in said housing, said core having an extension projecting externally of said housing, means defining a shoulder transversely in the end surface of said extension, a valve actuator rotatably mounted on said valve core extension, said actuator having a pair of shoulders aligned with the shoulder in said extension, means defining a container receptacle beneath said valve housing, a container detector mounted on said housing for pivotal movement between a position withdrawn from said receptacle and a position projecting into said receptacle to be contacted and moved to said withdrawn position by a container entering the receptacle, a key slidably mounted on the extension of said core and arranged to be moved into engagement with said shoulders when said shoulders are in aligned relation, and means interconnecting said detector and said key in such a manner that movement of said detector to said withdrawn position moves said key into engagement with said aligned shoulders.

11. In a filling machine, a valve housing having a cylindrical bore, an elongated cylindrical valve core slidably mounted in said bore and having a portion of non-cylindrical cross-section with a transverse shoulder therein, a post carried by said housing, a splined shaft rotatably mounted in said housing and projecting in a direction parallel to said post, a valve actuator slidably journaled on said post and on said splined shaft and having an opening adapted to receive the non-cylindrical portion of said valve core, means defining a shoulder in said actuator extending transversely over said non-cylindrical opening, a key splined on said shaft and disposed in transverse alignment with the shoulder in said actuator, means for sliding said actuator to a position wherein the shoulder in said actuator and the shoulder in said core are in alignment, and means for moving said key into engagement with said aligned shoulders to lock said core and said actuator for unitary movement relative to said housing.

12. In a filling machine, a valve housing, a valve core mounted in said housing, means defining a driving surface on said core, a valve actuator mounted adjacent said valve core, said actuator having a driving surface adjacent the driving surface of said core, means for periodically moving said valve actuator, means defining a container receptacle beneath said valve housing, a container detector mounted on said housing for pivotal movement between a position withdrawn from said receptacle and a position projecting into said receptacle to be contacted and moved to said withdrawn position by a container entering the receptacle, a drive member mounted adjacent said core and said actuator and arranged to be moved into engagement with the driving surfaces of said actuator and of said core when said driving surfaces are in planar alignment, and means interconnecting said detector and said drive member in such a manner that movement of said detector to said withdrawn position moves said drive member into engagement with said driving surfaces.

13. In a filling machine, a generally horizontal circular plate having a plurality of spaced circular openings disposed around the periphery thereof, an open ended cylinder mounted on said plate in alignment and in communication with each opening, a piston in each cylinder, a valve housing mounted adjacent each cylinder and having an opening communicating with the cylinder, a valve core adjustably positioned in said housing, means defining a container receptacle beneath each valve housing, a container detector disposed in each receptacle and arranged to be contacted and moved out of the receptacle by an entering container, a valve actuator associated with each valve core, means for periodically reciprocating said actu-

11

ator through a predetermined range of movement, means responsive to actuation of each detector by a container entering the associated receptacle for locking the associated valve actuator to the valve core, a linkage extending into each cylinder through one of the open ends thereof into operative engagement with the piston therein, cam means for periodically reciprocating said linkage to actuate the piston in the cylinder, and means coordinating the actuation of said piston and the movement of the associated valve core in its housing.

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