Feb. 2, 1954 H. W. MARTIN 2,668,203

BOTTLE CAPPING MACHINE CONTROL MECHANISM

Filed Dec. 12, 1951

3 Sheets-Sheet 1

Fig. 1

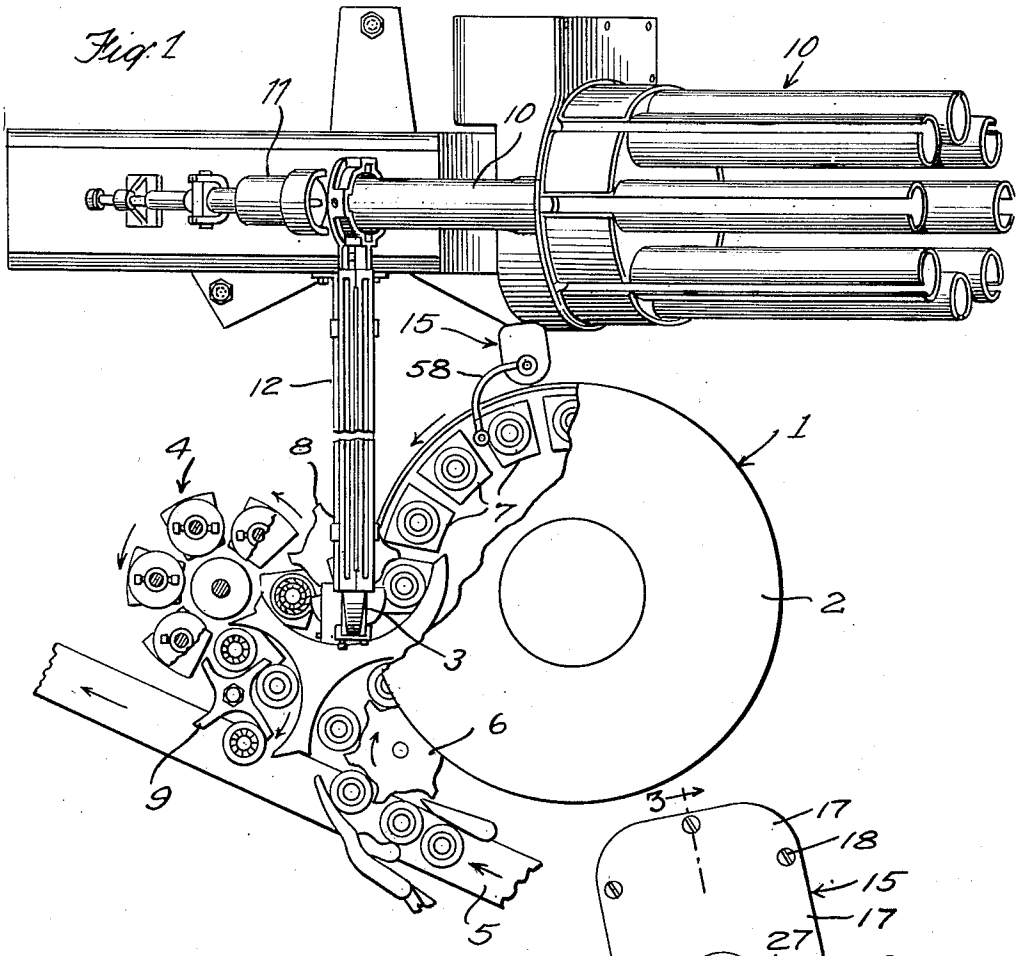
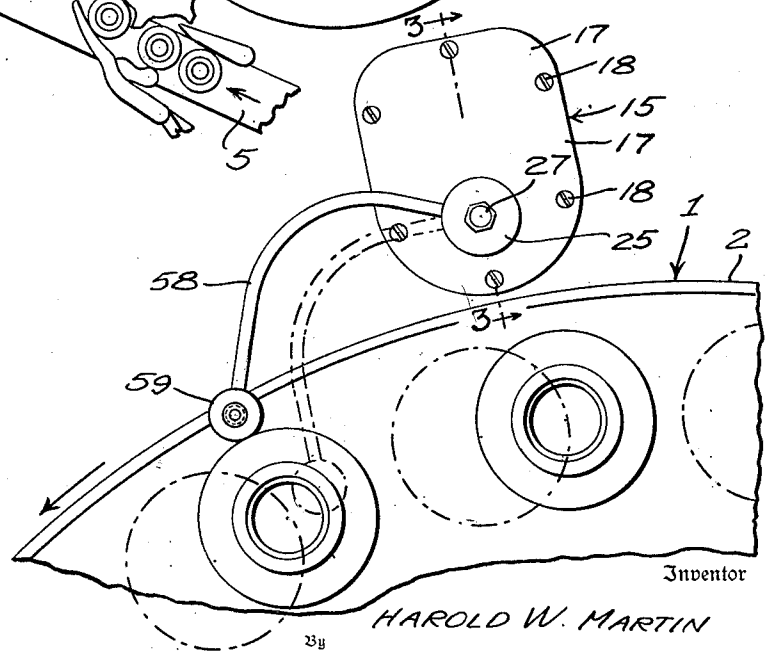


Fig. 2.



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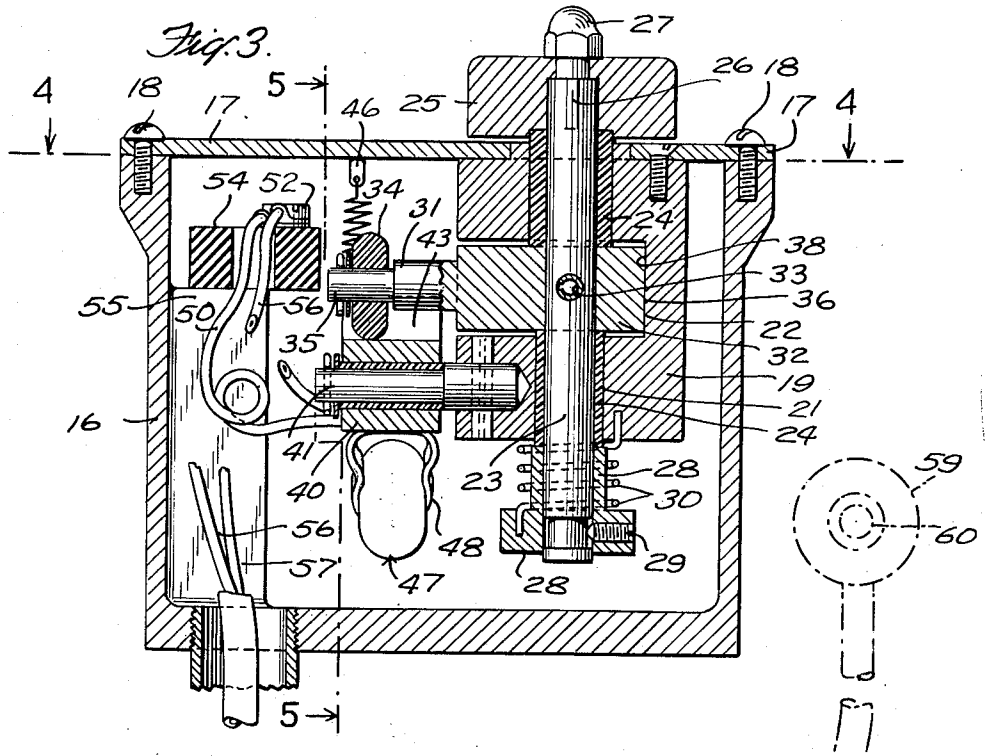
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BOTTLE CAPPING MACHINE CONTROL MECHANISM

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Fig. 3.



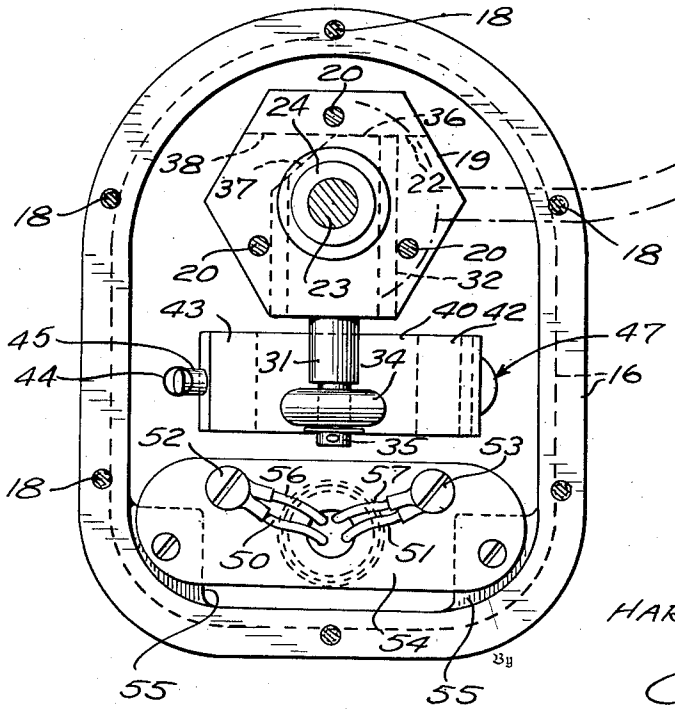


Fig. 4.

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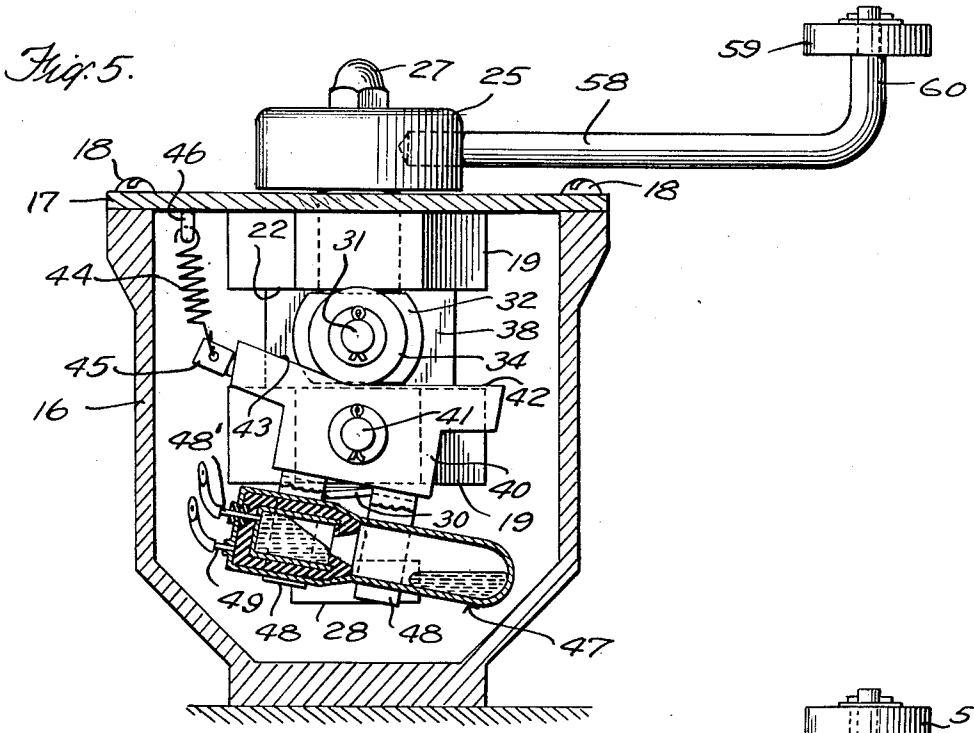
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BOTTLE CAPPING MACHINE CONTROL MECHANISM

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Fig. 5.



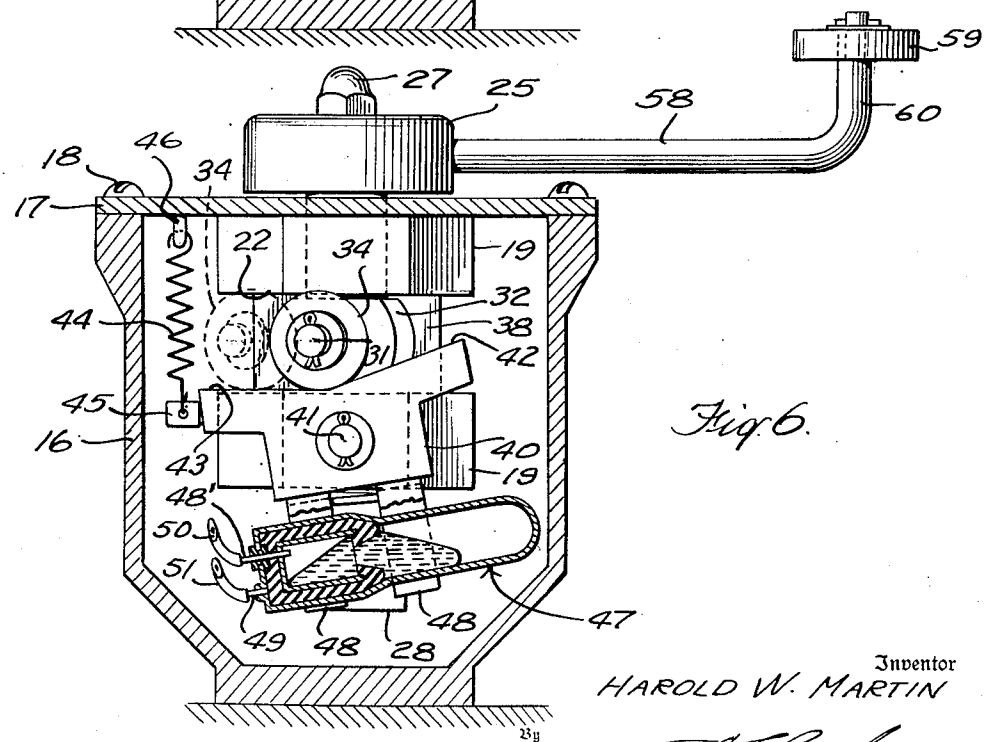


Fig. 6.

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Patented Feb. 2, 1954

2,668,203

UNITED STATES PATENT OFFICE

2,668,203

BOTTLE CAPPING MACHINE CONTROL MECHANISM

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Application October 12, 1951, Serial No. 250,987

3 Claims. (Cl. 200—61.41)

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This invention relates to a bottle-actuated control mechanism which is capable of being successively actuated at a rapid rate for extended periods of time. It is especially designed and adapted for use with a machine for applying hood caps to milk bottles of the same general type as the capping machine shown in the patent to Goodwin et al. No. 2,325,163.

In machines of this type the hood caps are contained in a magazine from which they are successively withdrawn and the milk bottles are fed in a continuous stream through a bottle filling and capping machine which fills and caps from 150 to 200 bottles per minute. The filled bottles as they approach the capping mechanism successively actuate a switch as they are conveyed past it. Each time the switch is actuated it effects the actuation of mechanism which withdraws a cap from the magazine, which cap is eventually placed on the bottle which actuated the switch and effected the release of that particular cap.

My improved mechanism includes a mercury switch of standard construction which is adapted to be quickly closed, to momentarily dwell in closed position, and then to be quickly opened. It comprises a cup-shaped casing which is closed by a removable cover. A block having a vertical bore therein and a transverse horizontal slot intersecting the vertical bore is rigidly secured to the under side of the cover within the casing. An oscillating arm which is disposed in and extends out from the horizontal slot is pinned to a shaft which is rotatably mounted in the vertical bore and extends out above the cover. A hub is keyed on and bolted to the outer end of the shaft and has secured thereto a lever which is adapted to be successively engaged and actuated by successive bottles as they are conveyed past the mechanism. The actuation of the lever rotates the shaft through 20° to 30° in one direction. After each actuation the shaft and lever are returned to their original positions by a helical spring disposed about the lower end of the shaft under the block. A roller, which is mounted on the outer end of the oscillating arm, is adapted to engage the top of a rocker arm which is rotatably mounted on a stud which is carried by and extends out from the block below the oscillating arm. The rocker arm is symmetrical about a medial transverse plane and the top thereof comprises two flat intersecting surfaces which are disposed at an obtuse angle of approximately 150° to each other. The rocker arm is yieldingly biased in one direction by a coiled spring which has one end thereof secured to one end of the

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rocker arm and the other end thereof secured to an eye carried by the cover. A mercury switch is removably secured to the bottom of the rocker arm. When the shaft and oscillating arm pinned thereto are in their normal at rest position, the rocker arm and mercury switch carried thereby are yieldingly held in such position by the coiled spring that the switch is open. As the shaft is turned by a bottle engaging the actuating lever the oscillating arm through the roller mounted on the free end thereof depresses one end of the rocker arm against the resistance of the coiled spring which changes the angular position of the mercury switch so that the mercury in the switch rolls from one end thereof to the opposite end thereof and closes the switch. In normal at rest position the mercury switch is inclined in one direction to the horizontal; and when the rocker arm is fully depressed the mercury switch is inclined in the opposite direction to the horizontal. The mercury switch closes as it passes the horizontal and remains closed during the time it moves on further past the horizontal and is returned to the horizontal. This provides a quick closing of the switch, a dwell in closed position and then a quick opening of the switch.

The principal object of the invention is to provide an improved mechanism of simple construction which is capable of being successively actuated at a rapid rate during extended periods of time.

Another object of the invention is to provide a mechanism of this character which is so constructed that when actuated it will quickly close a switch, then momentarily hold the switch in closed position and then quickly open the switch.

Other and more limited objects of the invention will be apparent from the following specification and the accompanying drawings forming a part thereof wherein:

Fig. 1 is a top plan view of a bottle filling and capping machine embodying the present invention;

Fig. 2 is an enlarged plan view of the control mechanism showing how successive bottles actuate the mechanism as they are conveyed past the mechanism;

Fig. 3 is an enlarged vertical section taken on the line 3—3 of Fig. 2;

Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 3;

Fig. 5 is a transverse vertical section taken on the line 5—5 of Fig. 3 showing the various parts of the mechanism in their normal at rest position; and

Fig. 6 is a view similar to Fig. 5 showing the

various parts of the mechanism at the limit of their movement away from normal at rest position.

Referring to the drawings by reference characters the numeral 1 indicates a bottle-filling and capping machine of standard construction, such as shown in the aforesaid Patent No. 2,325,163 to Goodwin et al., which comprises a bottle filling mechanism 2, a cap applying station 3 and a rotating bank of capping heads 4. Empty bottles are fed into the filling mechanism 2 from a conveyor 5 by a star wheel 6. The bottles are continuously conveyed around through the filling mechanism on stools 7 and are filled during their travel through the filling mechanism. After being filled the bottles are transferred by a star wheel 8 past the cap applying station 3 to the capping heads 4. As the bottles pass the cap applying station 3 caps are loosely placed over the mouths of the bottles. The capping heads then firmly clamp the caps in place over the mouths of the bottles and around the necks thereof. From the capping heads 4 the bottles are redelivered to the conveyor 5 by a star wheel 9. Caps are successively withdrawn from a magazine 10 by an intermittently operative picker mechanism 11 which deposits the caps in a chute 12 which delivers the caps to the capping station 3. As filled bottles approach the capping station they pass a control mechanism 15 which each bottle actuates in passing. Each actuation of the mechanism 15 effects one operation of the picker mechanism 11. The mechanism 15 is so positioned with respect to the capping station 3 that each bottle effects the release of its own cap.

The mechanism 15 comprises a cup-shaped housing 16 which is closed by a cover plate 17 which is removably secured in place by bolts 18. A body 19 is rigidly secured to the underside of the cover plate 17 within the housing 16 by screws 20. The body 19 has a vertical bore 21 extending therethrough which is intersected by a transverse horizontal slot 22. A shaft 23, which is rotatably mounted in nylon bushing 24 in the bore 21, extends out from the housing 16 through the cover plate 17 and has a hub 25 removably secured to the upper end thereof by a key 26 and a nut 27. A collar 28 is secured to the lower end of the shaft 23 below the body 19 by a set screw 29. A helical spring 30 disposed about the collar 28 yieldingly biases the shaft 23 in one direction.

An arm 31 is formed integrally with and extends outwardly from a hub 32 which is disposed in the slot 22 and is pinned to the shaft 23 by a pin 33. A nylon roller 34 is rotatably mounted on the reduced outer end 35 of the arm 31. The inner end of the hub 32 has a flat vertical surface 36, which is perpendicular to the axis of the arm 31, and a flat vertical surface 37 which is disposed at an angle of approximately 45° to the surface 36. When the various parts of the mechanism 15 are in their normal at rest position the surface 36 of the hub 32 engages the vertical wall 38 of the slot 22 and thus limits the turning of the shaft 23 by the spring 30. The angularly disposed surface 37 permits the shaft 23 to be turned in the opposite direction against the action of the spring 30, as will be explained hereinafter.

A rocker arm 40 is rotatably mounted on a stud 41 which is secured to and extends outwardly from the body 19 below the slot 22. The rocker arm 40 is symmetrical about a transverse medial plane and the top thereof comprises two flat intersecting surfaces 42 and 43 which are disposed at an angle of approximately 150° to each other. The rocker arm 40 is mounted below the arm 31 in position for the roller 34 to roll over one of the surfaces 42 or 43 when the shaft 23 is turned from its normal at rest position. A spring 44, one end of which is secured to one end of the rocker arm 40 as indicated at 45 and the other end of which is secured to an eye 46 carried by the under side of the cover plate 17, yieldingly holds the surface 43 of the rocker arm 40 in contact with the roller 34.

A mercury switch 47 is removably mounted in a pair of spring clips 48 which are secured to the under side of the rocker arm 40. The switch 47 is of standard construction, so consequently it is not described in detail herein. There are many mercury switches of different manufacture available any one of which may be used herein. The switch 47 shown herein is sold under the trade name "Durakool." The terminals 48' and 49 of the switch 47 are connected by lead wires 50 and 51 to binding posts 52 and 53 carried by an insulating plate 54 which is secured to bosses 55 extending inwardly from the side walls of the casing 16. The binding posts 52 and 53 are also connected by the lead wires 56 and 57 to control a motor (not shown) which operates the picker mechanism 11.

The hub 25 which is secured to the upper end of the shaft 23 carries an actuating lever 58 which has a roller 59 rotatably mounted on the upturned free end 60 thereof. The casing 16 is suitably secured to the filling mechanism 2 with the free end of the actuating lever 58 disposed in the path of the bottles being carried along by the stools 7. As each bottle passes the mechanism 15 it engages and actuates the lever 58 which turns the shaft 23 through from 20° to 30° against the resistance of the spring 30. The turning of the shaft 23 swings the arm 31 pinned thereto which rolls the roller 34 over the surface 43 of the rocker arm 40 and shifts the rocker arm 40 and switch 47 carried thereby from the position shown in Fig. 5 to the position shown in Fig. 6, thus closing the switch 47. After a bottle has passed the lever 58 the spring 30 returns the shaft 23, lever 53 and roller 34 back to their original positions, and the spring 30 returns the rocker arm 40 and the switch 47 back to their original at rest positions as shown in Fig. 5, in which position the switch 47 is open. The movement of the roller 34 by the arm 31 and shaft 23 from the position shown in Fig. 5 to the position shown in full lines in Fig. 6 quickly closes the switch 47. The switch 47 is then held closed while the roller 34 travels from the full line position in Fig. 6 to the dotted line position therein and back slightly past the full line position, after which the switch quickly opens. From this it will be seen that the switch 47 is first quickly closed, then momentarily held closed, and then quickly opened. Each closing of the switch 47 causes one operation of the picker mechanism 11, so that every time a bottle passes the mechanism 15 a cap is withdrawn from the magazine 10 and deposited in the chute 12. The holding of the switch 47 closed during the greater portion of the time that the roller 34 is being moved back and forth over the surface 43 of the rocker arm 40 by the arm 31 affords the necessary time for the picker mechanism 11 to withdraw a cap from the magazine 10 and deposit it in the chute 12. The mechanism 15 is so positioned with respect to the cap applying station 3 that it takes a bottle the same length of time to travel from the mechanism 15 to the cap applying station 3 as it takes for a cap to be withdrawn from the

magazine 11 and travel down the chute 12 to the cap applying station 3. A cap and the bottle which effects its withdrawal from the magazine 11 will meet at the cap applying station, from which it will be seen that each bottle effects the release of its own cap. If an empty stool 7 passes the mechanism 15 the mechanism will not be actuated and consequently no cap will be released.

From the foregoing it will be apparent to those skilled in this art that I have provided a very simple and efficient mechanism for accomplishing the objects of the invention.

It is to be understood that I am not limited to the specific construction shown and described herein as various modifications may be made thereto within the scope of the appended claims.

What is claimed is:

1. A bottle actuated control mechanism for a bottle capping machine, comprising a support, a vertical shaft rotatably mounted in said supoprt, a bottle actuated lever secured to said shaft and operative when actuated to turn said shaft, means restoring said shaft to its original pisition when said lever is released, an arm rigidly secured to said shaft to oscillate therewith and extending outwardly therefrom, a cam actuator mounted on the free end of said arm, a rocker arm mounted to rock about a horizontal axis and having a cam surface on which said cam actuator rides, spring means holding said cam surface against said cam actuator, a mercury switch mounted on said rocker arm and adapted to be opened or closed by the rocking of said rocker arm, said cam surface being shaped to hold said rocker arm in position to open said switch when said lever is in released position and being movable by said cam follower to tilt said rocker arm to switch closing position in response to actuation of said lever.

2. A bottle actuated control mechanism for a bottle capping machine, comprising a support, a vertical shaft rotatably mounted in said support, a bottle actuated lever secured to said shaft and operative when actuated to turn said shaft, means restoring said shaft to its original position when said lever is released, an arm rigidly secured to said shaft to oscillate therewith and extending outwardly therefrom, a cam actuator mounted on the free end of said arm, a rocker arm mounted to rock about a horizontal axis and having a cam surface on which said cam actuator rides, spring means holding said cam surface against said cam actuator, a mercury switch mounted on said rocker arm and adapted to be opened or closed by the rocking of said rocker arm, said cam surface engaging said cam actuator to hold said rocker arm in position to open said switch when said lever is in released position and to tilt said rocker arm quickly to switch closing position in response to actuation of said lever, and having an area engaging said cam actuator to hold said rocker arm in said last positions as the cam actuator rides thereover due to actuation of said lever.

3. A bottle actuated control mechanism for a bottle capping machine, comprising a support, a vertical shaft rotatably mounted in said support, a bottle actuated lever secured to said shaft and operative when actuated to turn said shaft, means restoring said shaft to its original position when said lever is released, an arm rigidly secured to said shaft to oscillate therewith and extending outwardly therefrom, a cam actuator mounted on the free end of said arm, a rocker arm mounted to rock about a horizontal axis, said rocker arm being symmetrical about the plane of said axis and having a pair of flat surfaces meeting in said plane, a mercury switch mounted on said rocker arm and adapted to be opened or closed by the rocking of said rocker arm, said cam actuator engaging said cam surfaces in said plane to hold said rocker arm in position to open said switch when said lever is in released position and riding over said surfaces to tilt said rocker arm quickly to switch closing position in response to actuation of said lever.

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