

Dec. 8, 1942.

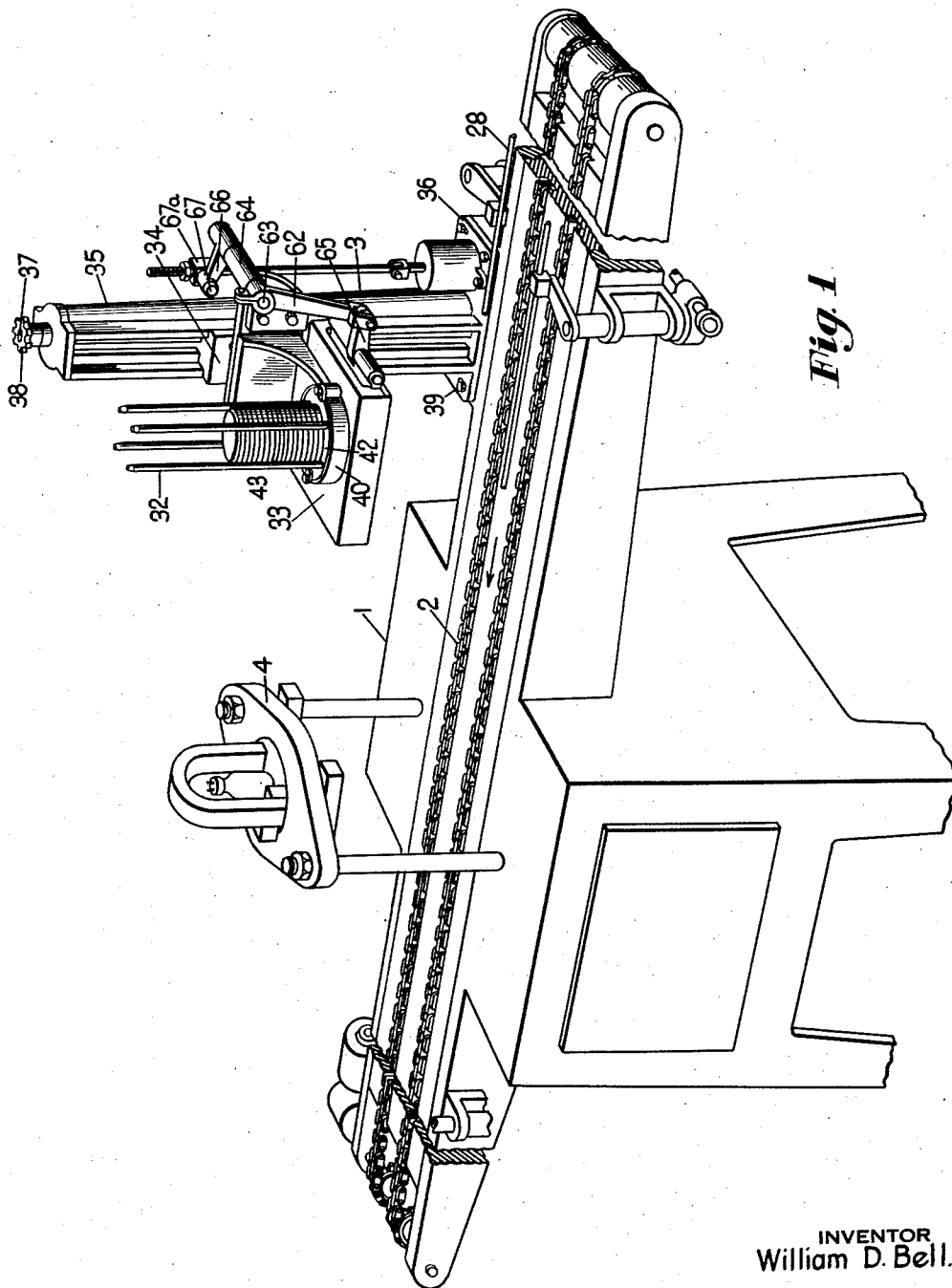
W. D. BELL

2,304,437

CAP FEEDING APPARATUS

Original Filed April 8, 1939

4 Sheets-Sheet 1



INVENTOR
William D. Bell.

BY
Carbeth, Mahony & Miller
ATTORNEYS

Dec. 8, 1942.

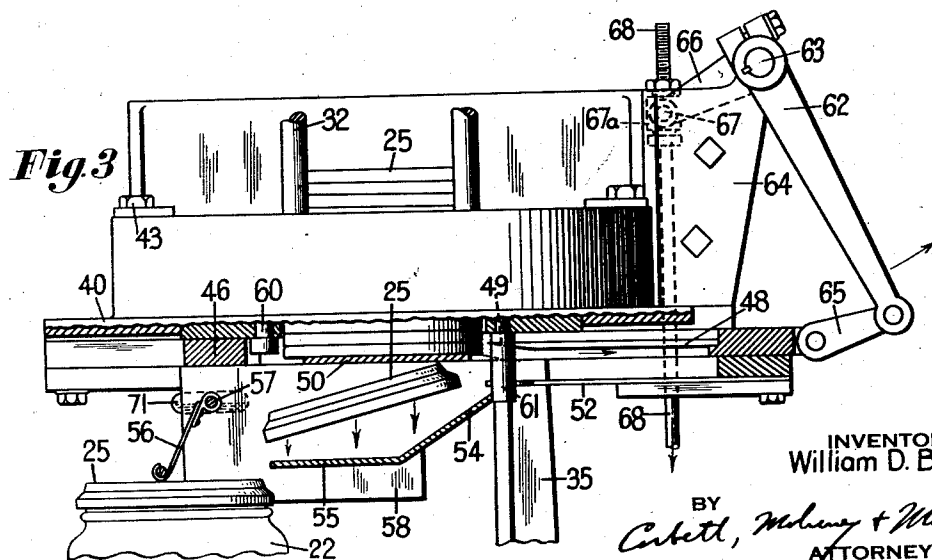
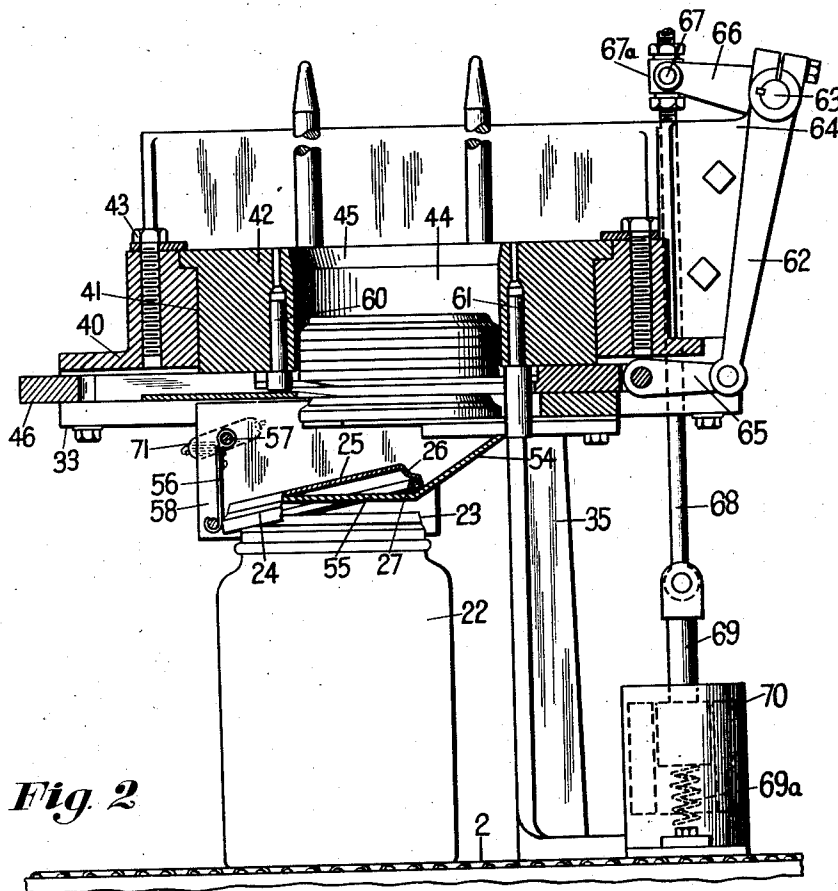
W. D. BELL

2,304,437

CAP FEEDING APPARATUS

Original Filed April 8, 1939

4 Sheets-Sheet 2



INVENTOR
William D. Bell.

BY
Corbett, Mahoney & Miller
ATTORNEYS

Dec. 8, 1942.

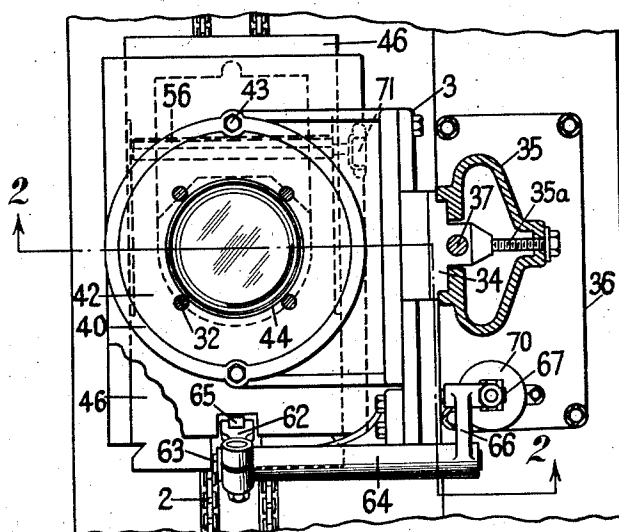
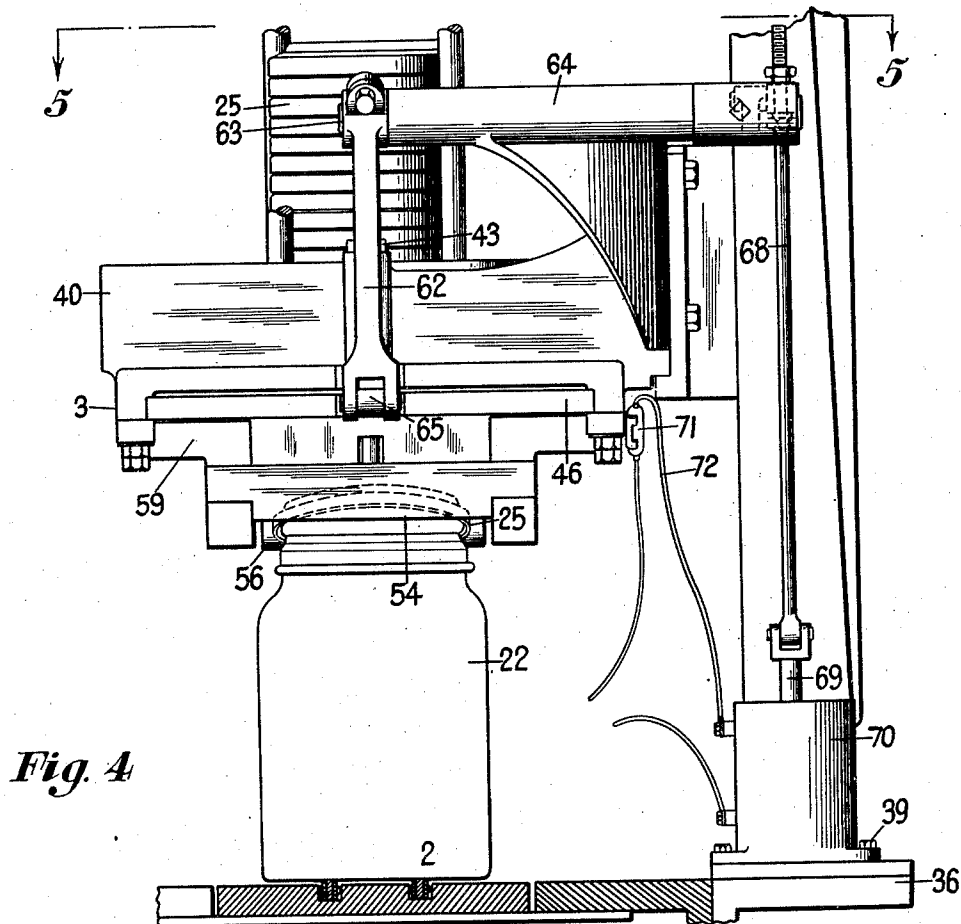
W. D. BELL

2,304,437

CAP FEEDING APPARATUS

Original Filed April 8, 1939

4 Sheets-Sheet 3



INVENTOR
William D. Bell.

BY
Corbett, Mahoney & Miller
ATTORNEYS

Dec. 8, 1942.

W. D. BELL

2,304,437

CAP FEEDING APPARATUS

Original Filed April 8, 1939

4 Sheets-Sheet 4

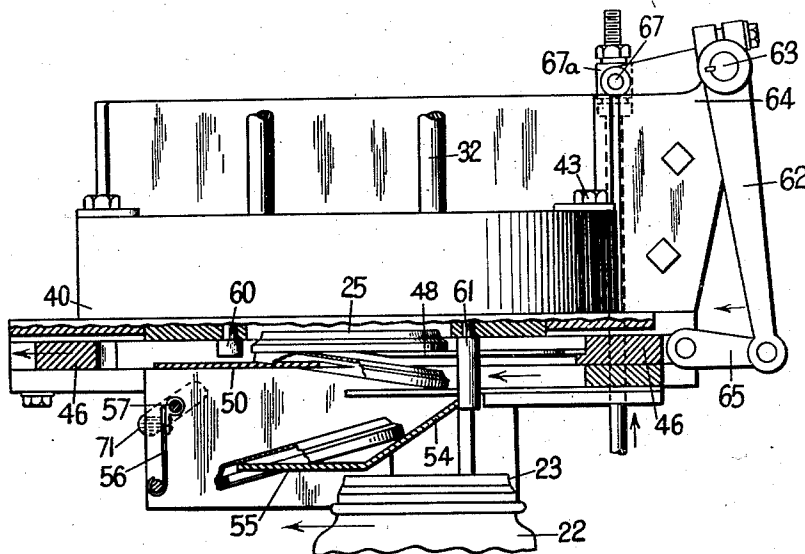


Fig. 6

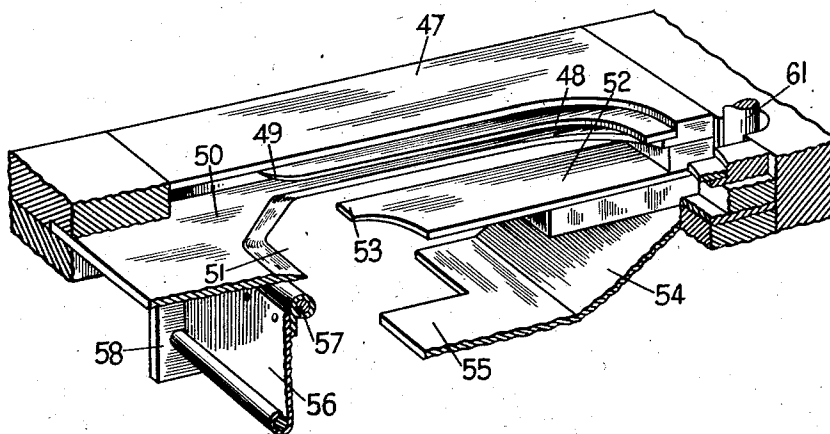


Fig. 7

INVENTOR
William D. Bell.

BY
Cisbett, Winkley & Miller
ATTORNEYS

UNITED STATES PATENT OFFICE

2,304,437

CAP-FEEDING APPARATUS

William D. Bell, Columbus, Ohio, assignor to
Anchor Hocking Glass Corporation, Lancaster,
Ohio, a corporation of Delaware

Original application April 8, 1939, Serial No.
266,914. Divided and this application February
24, 1941, Serial No. 380,162

10 Claims. (Cl. 226—88.1)

My invention relates to cap-feeding apparatus. It has to do, more particularly, with apparatus for feeding caps from a source of supply into position to be engaged by the upper ends of containers which are moved along by a conveyer.

One of the objects of my invention is to provide cap-feeding apparatus of the type indicated which is very simple but very effective.

Another object of my invention is to provide a machine which will automatically release caps from the reservoir and feed them onto the top of the containers without any manual intervention by the operator.

Another object of my invention is to provide cap-feeding apparatus of the type indicated which will feed the cap into position to be engaged by the container, but there will be no danger of the cap leaving the device until it is engaged by the upper end of the container, and a second cap will not be fed into such position unless the first cap is engaged by a container.

Another object of my invention is to provide a cap-feeding device of the type indicated in the preceding paragraph which will be automatically operated merely by moving a container into association therewith.

Another object of my invention is to provide a cap feeding and applying unit of such a nature that the cap can be withdrawn therefrom by a container on a moving conveyer without danger of upsetting the container.

Another object of my invention is to provide a cap-feeding device of the type indicated which is of such a nature that the cap will be evenly positioned on the top of the receptacle.

This application is a division of my co-pending application, S. N. 286,914 filed April 8, 1939.

Various other objects and advantages will be apparent from the following description.

The preferred embodiment of my invention is illustrated in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a perspective view illustrating a machine having a cap feeding and applying unit associated therewith which is constructed in accordance with my invention.

Figure 2 is a transverse sectional view taken substantially along line 2—2 of Figure 5.

Figure 3 is a view somewhat similar to Figure 2 showing a cap which has been positioned on a container by my unit and also showing a cap dropping to a position where it can be engaged by the succeeding container.

Figure 4 is an end view of the cap delivery mechanism.

Figure 5 is a horizontal sectional view taken substantially along line 5—5 of Figure 4.

Figure 6 is a view, partly in side elevation and partly in section, showing the mechanism for separating the lowermost cap and delivering it to position where it is to be withdrawn by the container.

Figure 7 is a view partly in perspective and partly in section of the lower portion of the structure shown in Figure 6.

With reference to the drawings, I have illustrated a machine of the type disclosed in my co-pending application, Serial No. 266,914. This machine comprises generally a table 1 which supports a horizontal conveyer unit 2 on its upper end, a cap-feeding and applying unit 3, and a sealing head unit 4.

The conveyer unit 2 is described in detail in said co-pending application. As disclosed in said application, the conveyer unit 2 is driven continuously.

As described in said application, the containers 22 are placed indiscriminately on the conveyer and are moved in the direction of the arrow (Figure 1) by the conveyer. My invention is not limited to any particular type of container and cooperating cap but for illustrative purposes I have shown a container which has at its upper end a reduced portion 23, adapted to receive a cap 24, as clearly shown in Figure 2. This cap preferably embodies a substantially disk-like portion 25, which has a depending annular skirt 26 that carries an annular gasket 27 therewithin. When the cap is forced downwardly onto the reduced portion 23, the frictional contact of the gasket with the reduced portion of the container will aid in maintaining the cap in position and will seal the cap on the container.

In order to center the containers transversely of the conveyer and to maintain them centered, I provide a pair of longitudinally extending guide rails 28 as described in said co-pending application.

After the containers are positioned on the conveyer, they are first carried to the cap feeding and applying unit 3. This cap feeding and applying unit is illustrated in the accompanying drawings. The cap feeding and applying unit comprises a cap receiving magazine for receiving a stack of nested caps which is formed by four upstanding posts 32 supported on a horizontally disposed cap feeding device 33. This device 33 is carried by a vertically disposed slide 34 oper-

ating in a vertically disposed guide member 35. The guide member 35 is carried by a horizontal support 36 at one side of the conveyer. A vertically disposed screw member 37 is supported by the member 35 and is threaded through the slide 34. By operating hand wheel 38 keyed on the upper end of screw member 37, the slide 34 may be raised or lowered so that the device 33 can be adjusted to different heights depending upon the height of the containers to be operated upon by the machine. The slide 34 also carries a bolt 35a which extends into a vertical slot formed in member 35. This bolt may be tightened to hold member 34 in any adjusted position. The vertical supporting member 35 is bolted to the horizontal support 36 by means of bolts 39 which extend into slots formed in the member 36 and which are disposed transversely of the conveyer. This permits the member 35 to be adjusted laterally relative to the conveyer. Thus, the device 33 may be adjusted both vertically and laterally relative to the conveyer to properly position it relative to the containers on the conveyer.

The construction of the device 33 may best be seen from an observation of Figure 2. It consists of a member 40 which has an annular socket 41 that receives and retains an annular collar 42. The collar 42 forms the lower part of the cap magazine and is retained in position by means of bolts 43. The collar member 42 may be removed and replaced with a different member having a central opening 44 of a different size depending upon the size of the caps to be applied to the containers. The upper end of the opening or central socket 44 is flared, as indicated at 45, to facilitate dropping of the caps therinto. The posts 32 are carried by the collar member 42. These posts and collar form the cap magazine. The member 40 carries a longitudinally reciprocable slide 46 which is disposed in a suitable guide formed therein.

The slide 46 is illustrated best in Figures 2 to 7, inclusive. This slide includes a number of superimposed plates having openings therethrough and through which the caps will drop from the magazine. These plates can be removed and replaced with plates having openings of a different size to permit caps of a different size to pass therethrough. Thus, the slide is provided with a top plate 47 having an opening therein through which the caps in the magazine will drop. Within the slide in the position indicated in Figure 2, the lowermost cap of the magazine will rest on inwardly projecting cap separator 48 which is disposed directly below the plate 47. This separator 48 has a sharp forward edge 49 (Figure 7). Spaced a distance slightly greater than the distance of the cap below the separator 48 is a plate 50. This plate has an opening 51 through which the caps will drop after being removed from the separator 48 in the manner to be described. Spaced a similar distance below the plate 50 is a shelf 52 which terminates at the point 53 spaced from one edge of the opening 51 in plate 50. Extending from the lower side of the slide is the bottom member 54 of the cap chute which may be supported in a suitable manner (not shown) from stationary member 40. This member extends downwardly and then horizontally. It is provided with a narrow tongue 55 at its forward edge. A pivoted gate 56 hangs freely adjacent the forward edge of the tongue 55. This gate has its upper end pivoted at 57 to vertically disposed side plates 58 which form the

sides of the cap chute. These side plates 58 are attached to horizontal members 59 (Figure 4) which are bolted to the member 40. The member 42 (Figure 2) carries the pin 60 which extends downwardly almost into contact with the plate 50. The member 42 also carries a similar pin 61 at a point on the opposite side of the opening 44. This pin projects downwardly through aligning slots formed in the plates 47, 50 and 52.

In the operation of this mechanism, the slide 46 is adapted to be reciprocated intermittently. The caps in the magazine are superimposed and the lowermost cap will rest on the separator 48 when the slide is in the position illustrated in Figure 2. As soon as the slide 46 is withdrawn to the right (Figure 2), the cap resting on the separator 48 will contact with the pin 61 and the separator 48 will be withdrawn from beneath the cap allowing it to drop on the forward portion of the plate 50. When the slide is moved back into its initial position, the separator 48 engages the next cap. The sharp edge 49 separates the stack from the cap to be dropped. At the same time, the cap which rests on the plate 50 will engage the pin 60 and will drop through the opening 51 onto the member 52. The next outward movement of the slide will cause the cap resting on member 52, in the manner illustrated in Figure 2, to engage pin 61 and the member 52 will be withdrawn from beneath the cap. This will cause the cap to drop down onto the member 54. It will slide down member 54 and will hang over the forward end of the tongue 55 but will be retained on the member 54 by the gate 56, as indicated in Figure 2. In the meantime, during the reciprocation of the slide, another cap will be moving into the position previously occupied by the first-mentioned cap. The container carried by the moving conveyer will engage the skirt of the cap causing it to be withdrawn from the chute and swinging the gate 56 about its pivot. Each time the slide is reciprocated a cap will be withdrawn from the magazine and the cap will be deposited in the cap chute, as shown in Figure 3.

I provide means for automatically reciprocating the slide 46. This means comprises the lever 62 which is keyed at its upper end to a horizontally disposed shaft 63 rotatably mounted in a bearing or sleeve 64 supported by the member 35. The lower end of this lever 62 is pivotally connected to a link 65 which is pivoted to the outer end of the slide 46. The second lever 66 is pivoted to the opposite end of the shaft 63. This lever is also pivoted at 67 to a member 67a which is adjustably threaded on the upper end on a rod 68. The lower end of this rod is pivotally connected to the core 69 of a solenoid 70. The solenoid 70 is supported on a horizontal support 36 which carries member 35. The solenoid is such that each time it is energized, the slide 46 will be withdrawn and then returned to its original position.

The solenoid is energized each time the container engages a cap and withdraws it from the chute which causes the gate 56 to be swung about its pivot. To accomplish this, the gate 56 carries a mercury switch 71 (Figures 2 and 4) which is connected by wires 72 to the solenoid. This switch is so arranged that when the gate 56 is swung outwardly and upwardly by withdrawing the cap from the chute, the switch makes contact and energizes the solenoid. When the solenoid is energized, the rod 68 is pulled downwardly, swinging lever 66 downwardly, rotating shaft 63, swinging lever 62 outwardly and drawing the slide 46 outwardly. When the gate 56 drops back

to its original position, the switch 71 breaks the circuit, and the solenoid is deenergized. A spring 69a may be provided in the solenoid for forcing the core 69 upwardly to cause the slide 46 to be returned to its original position. The effective length of the rod 68 is adjustable by adjusting member 67a therealong to permit vertical adjustment of member 34 on member 35.

After the containers pass the unit 3, where the caps are loosely applied thereto, they pass through the sealing unit 4. This unit is adapted to seal the caps on the containers and to vacuumize and sterilize the head space and sterilize the cap for the sealing operation. This particular sealing unit has been described in the parent application, Serial No. 266,914. However, it will be understood that this cap delivery apparatus may be used with various types of sealing units.

It will be apparent from the above description that my cap-feeding apparatus is simple but effective. The apparatus will be automatically actuated by movement of a container into association therewith. A cap will be fed into position to be withdrawn by a container but there is no danger of its falling from the cap-feeding apparatus until it is actually engaged by a container. A second cap will not be fed into position to be engaged by a container until the cap previously occupying such position has been removed.

Various other advantages will be readily apparent.

Having thus described my invention, what I claim is:

1. In a machine of the type described, a conveyor for supporting containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap chute disposed above the conveyor, said chute having a gate at its outlet end which permits the outermost cap to emerge sufficiently from the chute to be engaged by a container on the conveyor and to be withdrawn therefrom, said gate being moved by withdrawal of the cap from the chute, a magazine for holding a supply of caps and feeding them into the chute, a reciprocable member for controlling the feed of caps from the magazine, a solenoid for controlling said member, said solenoid being energized and deenergized by movement of said gate.

2. In a machine of the type described, a conveyor for supporting the containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap magazine, a movable member for feeding the caps from said magazine, electrically operated means for moving said member, and means adapted to be engaged by a cap being applied to a container moved into association with said cap-applying means for energizing and deenergizing said electrically operated means.

3. In a machine of the type described, a conveyor for supporting the containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap magazine, a movable member for feeding the caps from said magazine, electrically operated means for moving said member, and means adapted to be engaged by a cap being applied to a container on said conveyor for energizing and deenergizing said electrically operated means.

4. In a machine of the type described, a cap-applying unit, a container support associated with said cap-applying unit, said cap-applying

unit including a cap magazine, a movable member for feeding the caps from said magazine, electrically operated means for moving said member, a control member for controlling energizing and deenergizing of said electrically operated means, said control member being adapted to be engaged by a cap being applied to a container positioned on said support in association with said cap-applying unit.

5. In a machine of the type described, a conveyor for supporting containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap chute disposed above the conveyor, said chute having a gate at its outlet end which permits the outermost cap to emerge sufficiently from the chute to be engaged by a container on the conveyor and to be withdrawn therefrom, said gate being moved by withdrawal of the caps from the chute, a magazine for holding a supply of caps and feeding them into the chute, a movable member for controlling the feed of caps from the magazine, a solenoid for controlling said member, and a switch actuated by said gate for energizing and deenergizing said solenoid.

6. In a machine of the type described, a conveyor for supporting containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap chute disposed above the conveyor, said chute having a gate at its outlet end which permits the outermost cap to emerge sufficiently from the chute to be engaged by a container on the conveyor and to be withdrawn therefrom, said gate being moved by withdrawal of the cap from the chute, a magazine for holding a supply of caps and feeding them into the chute, a movable member for controlling the feed of caps from the magazine, and means for controlling movement of said movable member in response to movement of said gate.

7. In a machine of the type described, a conveyor for supporting containers, a cap-applying unit for applying caps to said containers as they are moved along by said conveyor, said unit having a gate at its outlet end and which permits the outermost cap to emerge sufficiently from said unit to be engaged by a container on the conveyor and to be withdrawn therefrom, said gate being moved by withdrawal of the caps from said unit, said unit including the magazine for holding a supply of caps, a movable member for controlling the feed of caps from the magazine, and means for controlling movement of said movable member in response to movement of said gate.

8. In a machine of the type described, a conveyor for supporting containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap chute disposed above the conveyor for supporting a cap in position to be engaged by a container moved along by the conveyor, a magazine for holding a supply of caps and feeding them into the chute, a movable member for feeding the caps from the magazine, and a control member associated with said chute for controlling movement of said movable member, said control member being engaged by the cap as it is withdrawn from the chute by said container.

9. In a machine of the type described, a conveyor for supporting containers, means for applying caps to said containers as they are moved along by said conveyor, said means comprising a cap chute disposed above the conveyor for sup-

porting a cap in position to be engaged by a container moved along by the conveyer, a magazine for holding a supply of caps and feeding them into the chute, a movable member for feeding the caps from the magazine, a solenoid for operating said member, and a control member associated with said chute for energizing and de-energizing said solenoid, said control member being engaged by a cap withdrawn from the chute by said container.

10. In a machine of the type described, a conveyer for supporting containers, means for applying caps to said containers as they are moved along by said conveyer, said means comprising

a cap chute disposed above the conveyer for supporting a cap in position to be engaged by the container moved along by the conveyer, a magazine for holding the supply of caps and feeding them into the chute, a reciprocating member for feeding the caps from the magazine, a solenoid for actuating said reciprocating member, a switch member associated with said cap chute, said solenoid being actuated by said switch, said switch being engaged by a cap as it is being withdrawn from the chute by said container

WILLIAM D. BELL.