Feb. 24, 1942. E. G. BAUM 2,274,583

FEEDING MECHANISM FOR BOTTLE CAPPING MACHINES

Original Filed Feb. 5, 1936 4 Sheets-Sheet 1

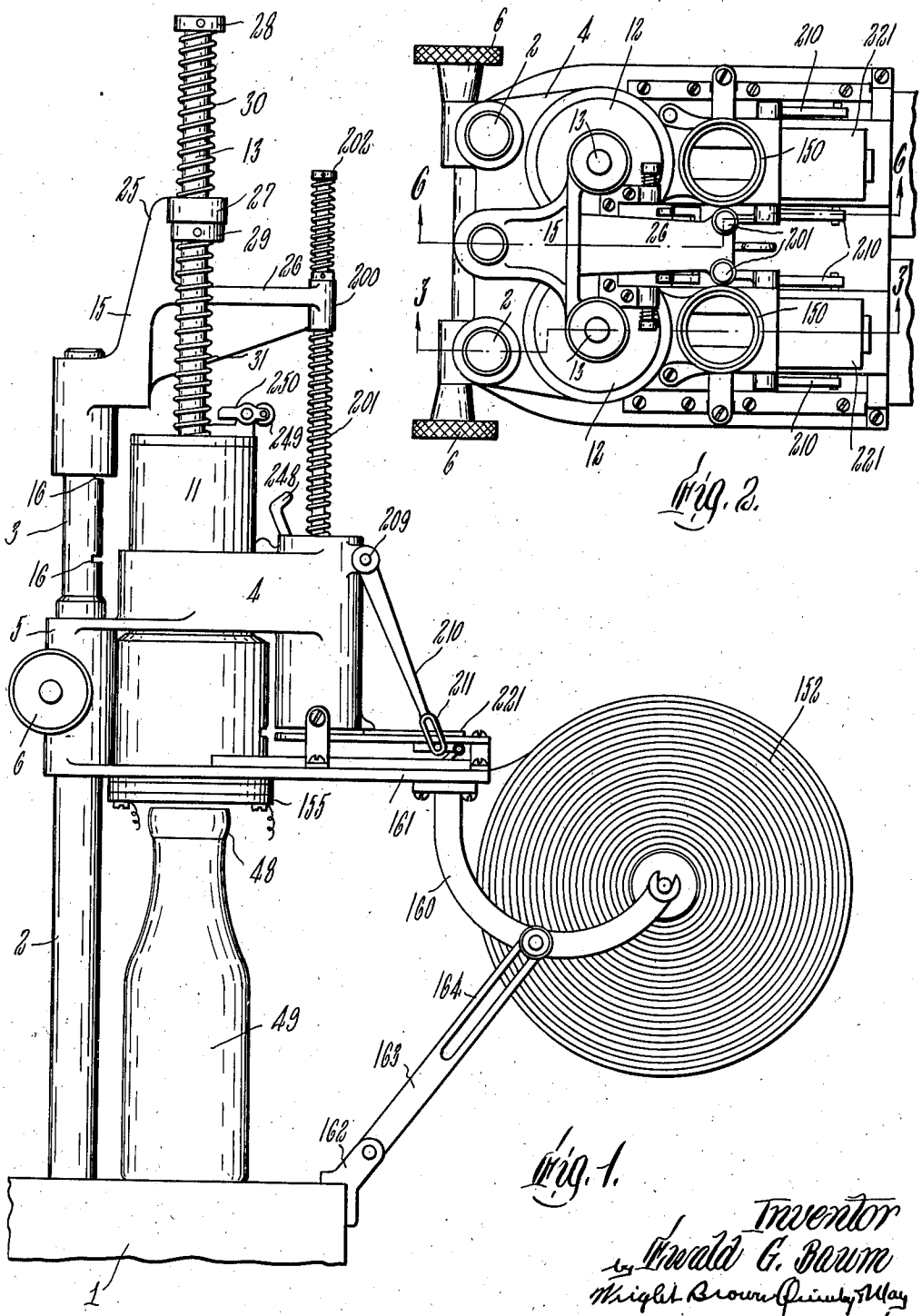

Fig. 1.

Fig. 2.

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Original Filed Feb. 5, 1936 4 Sheets-Sheet 2

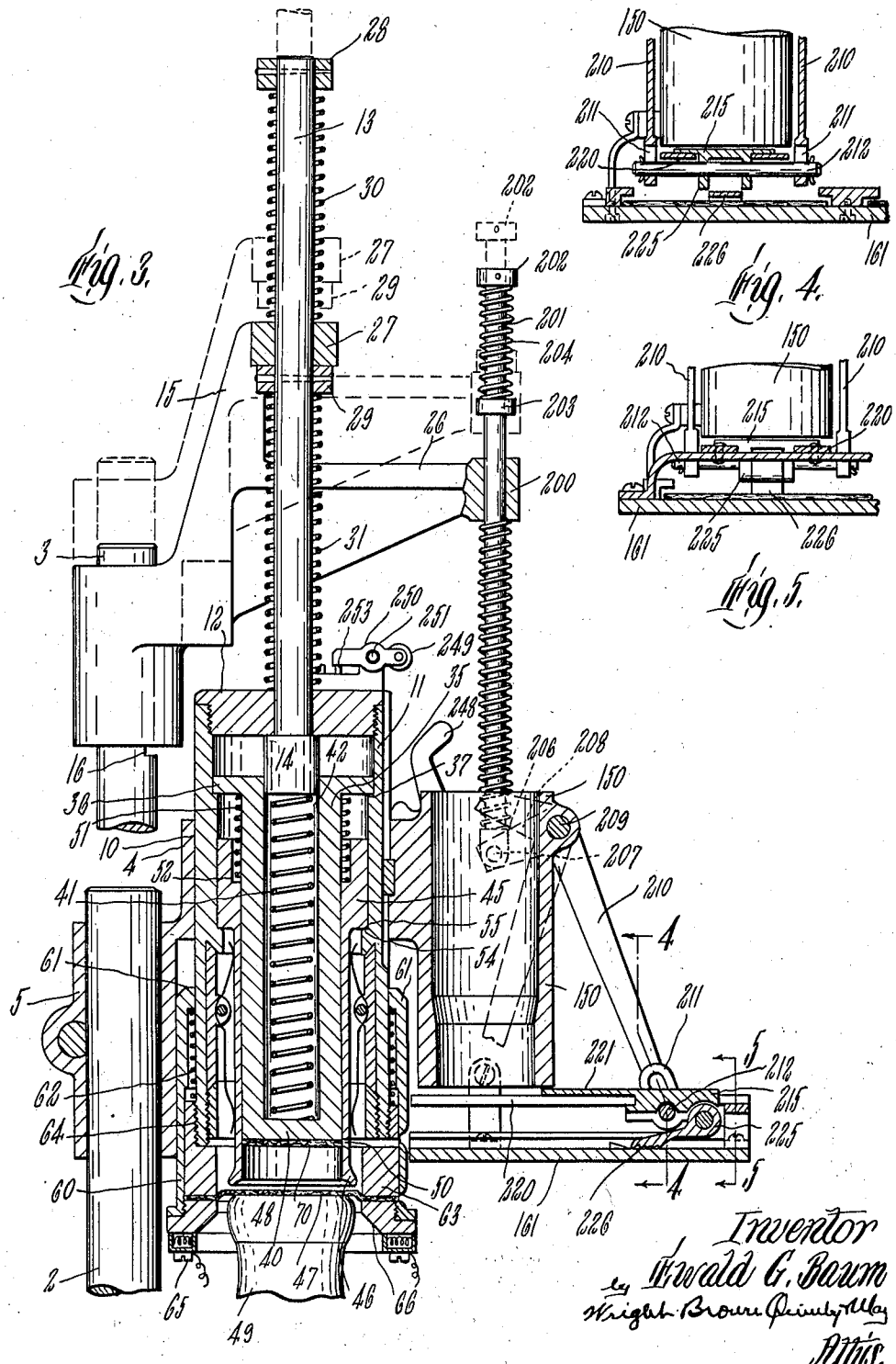

Fig. 3.

Fig. 4.

Fig. 5.

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FEEDING MECHANISM FOR BOTTLE CAPPING MACHINES

Original Filed Feb. 5, 1936 4 Sheets-Sheet 3

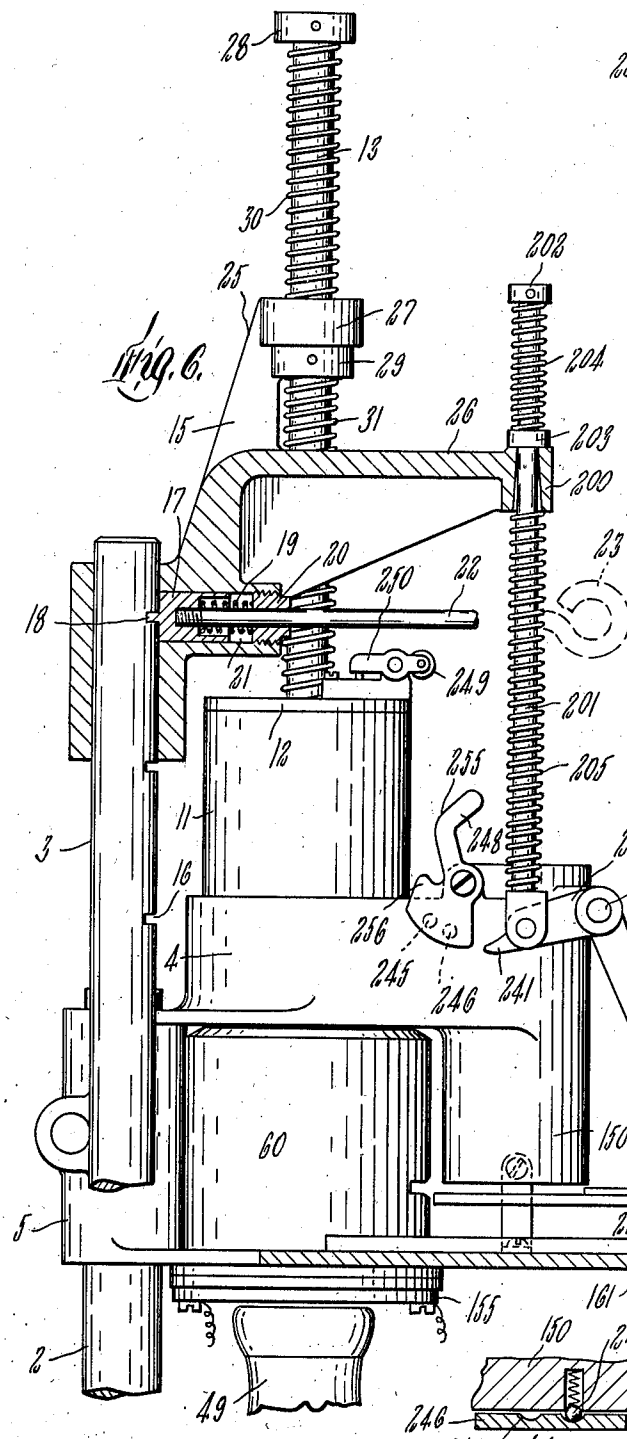

Fig. 6.

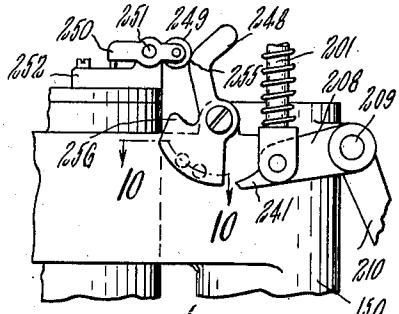

Fig. 7.

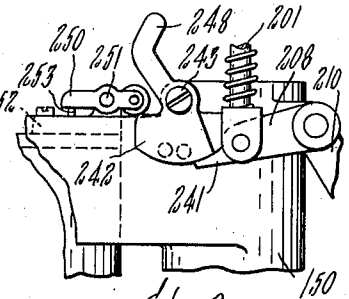

Fig. 8.

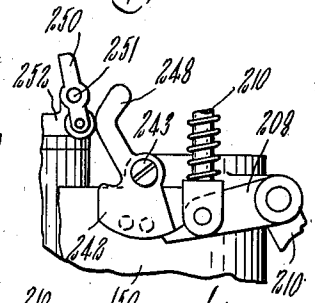

Fig. 9.

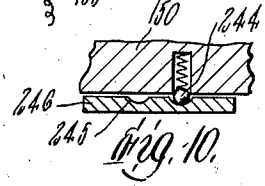

Fig. 10.

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FEEDING MECHANISM FOR BOTTLE CAPPING MACHINES

Original Filed Feb. 5, 1936 4 Sheets-Sheet 4

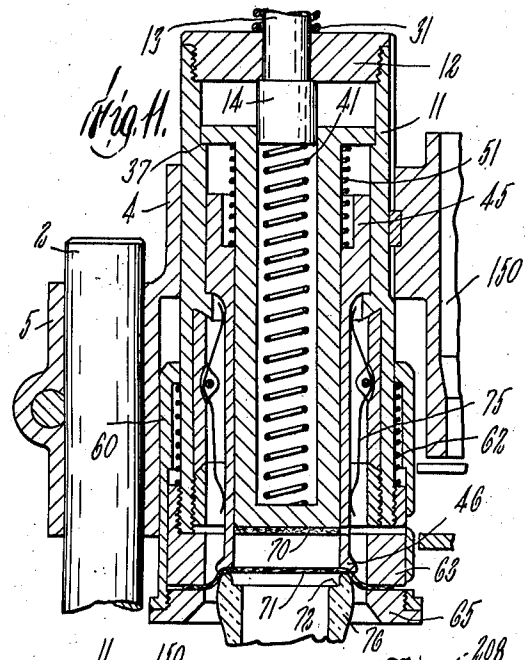

Fig. 11.

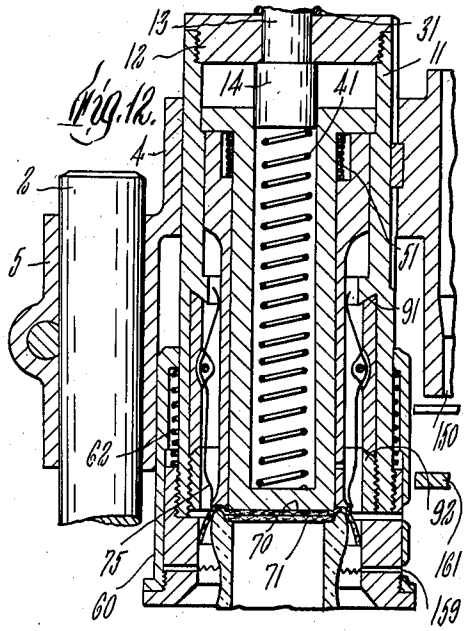

Fig. 12.

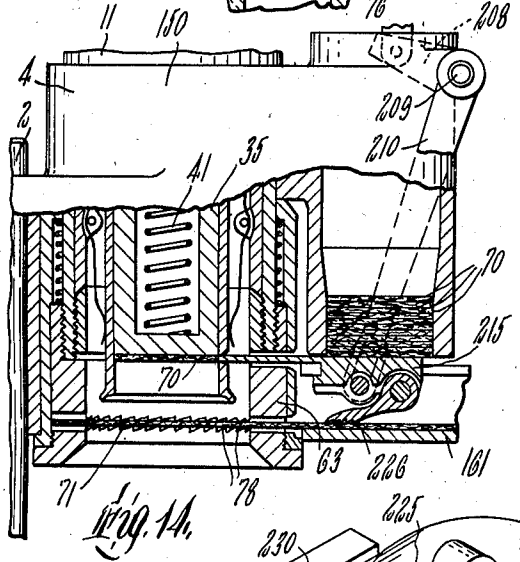

Fig. 14.

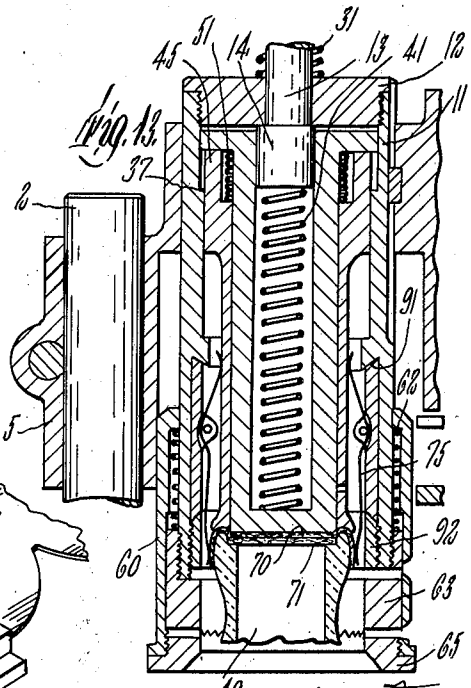

Fig. 13.

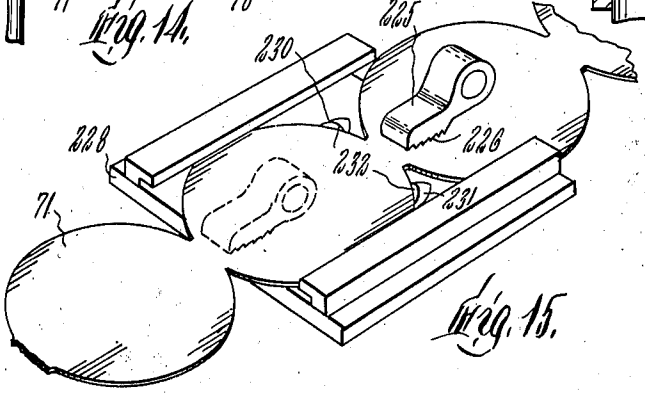

Fig. 15.

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UNITED STATES PATENT OFFICE

2,274,583

FEEDING MECHANISM FOR BOTTLE CAPPING MACHINES

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Original application February 5, 1936, Serial No. 62,469. Divided and this application December 2, 1939, Serial No. 307,293

7 Claims. (Cl. 226—92)

This invention relates to the capping of bottles, and more particularly to those in which milk and cream are commonly sold. One object of the invention is to form the cap directly on the bottle from materials which can be packed for shipment in convenient and compact form so that they may be shipped with great economy, one feature of the invention relating to the feeding of these materials into proper relation to each other and to the bottle for the cap-forming and applying operations.

A further object is to provide such a machine which will be responsive to the presence of a bottle in order to be actuated.

To the accomplishment of these and other objects, as may later appear each cap as delivered to the capping machine comprises a piece, preferably a disk of suitable material such as waterproof paper having a margin so treated that it may be applied about and conformed to the outside wall of the bottle below its mouth and after having been so conformed will retain its shape, sealing off the contents of the bottle and protecting the pouring lip against the possibility of being contaminated in any way as long as the cap remains sealed thereto. If desired, also, and preferably, a smaller disk such as is commonly used to close a milk bottle, may be superposed on the central portion of the larger disk to reinforce it and the two forced down together against the internal annular ledge with which milk bottles are ordinarily provided.

In order that the material for the caps may be packaged economically the large pieces or disks may be partly cut from a strip which may be wound into a coil or roll. This coil may be unwound as needed by the capping machine and the partially severed pieces completely severed successively as they are required. The smaller disks are commonly completely cut and arranged in stacks from one end of which they are removed as required and they may be supplied so packaged for use with the machine of this invention.

In order that the margins of the larger disks shall remain in close engagement with the bottle necks after having been conformed thereto by the capping machine, they may be suitably treated, and if desired, by material which may be temporarily softened in the capping machine in order to facilitate their conformation to the bottle. The machine may therefore be provided with suitable cap-softening means.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figures 1 and 2 are side elevation and top plan views, respectively, of the capping portion of a bottle filling and capping machine.

Figure 3 is a section on line 3—3 of Figure 1.

Figures 4 and 5 are detail sections on lines 4—4 and 5—5, respectively, of Figure 3.

Figure 6 is a section to a larger scale of the machine on line 6—6 of Figure 2 and showing "no bottle" mechanism.

Figures 7, 8 and 9 are fragmentary elevations of parts shown in Figure 6, Figures 7 and 8 showing the lower limit of motion of the capping mechanism with and without a bottle present, respectively, and Figure 9 showing the mechanism on the up stroke.

Figure 10 is a detail section on line 10—10 of Figure 7 but to a larger scale.

Figures 11, 12 and 13 are sections similar to a portion of Figure 3, but showing successive stages in the capping of a bottle.

Figure 14 is a view partly in section and partly in side elevation showing the cap feeding mechanism in its inner position.

Figure 15 is a fragmentary perspective showing the disk strip and its manner of feeding.

Cap forming and applying mechanism

Referring first to Figure 1, at 1 is indicated a platform for supporting bottles to be capped. This may be the bottle-supporting platform of a well known form of a bottle filling and capping machine known commercially as the Milwaukee filler. These machines are provided with a pair of stationary posts or rods 2 upstanding therefrom in spaced relation to which may be adjustably clamped stationary portions of a bottle capping machine and between these posts 2 is positioned an axially movable upright bar or rod 3 which is reciprocated to effect capping and bottle-releasing operations. Applied to these rods 2 and 3 are the stationary and actuating portions of the capping mechanism of this invention. The stationary parts comprise a pair of bracket arms 4 each having an integral sleeve portion 5 which may be secured at the desired elevation rigidly to the bars 2, as by means of the clamp nuts 6 secured to suitable clamp screws in a manner well known in the art. The bracket arm 4, as shown, supports a pair of capping mechanisms so that two bottles may be capped simultaneously as is usual practice with such machines, although of course any other number desired might be employed. Each

bracket arm 4, therefore, is provided adjacent to its sleeve portion 5 with a circular opening 10 within which is vertically slidable a sleeve 11. Each of these sleeves 11 is shown as closed off at its upper end, as by means of a threaded plug 12 through which extends slidably a rod 13 having a head 14 at its lower end of a size sufficient to prevent complete withdrawal of the rod 13 upwardly through the plug 12.

A bracket 15 is secured in any suitable way to the upper portion of the actuating rod 3, this rod being provided with slots 16 at suitable intervals to selectively receive securing means by which the bracket 15 may be fixed in the desired position with respect to the rod 3. As shown in Figure 6, this securing means may comprise a plug 17 having a fin 18 which may be projected into any selected slot by means of a spring 19 reacting between the plug 17 and a stationary plug 20 secured in the outer end of a socket 21 in which the plug 17 is slidable. A rod 22 having an eye 23 at its outer end to form a handle may be passed through a central opening in the plug 20 and be secured as by threading into the plug 17, so that by pulling outwardly on the eye portion 23 the plug 17 may be released from the notch 16 to permit the bracket 15 to be moved axially of the rod 3.

The bracket 15 has a pair of arms 25 and 26 projecting therefrom. The arm 25 is provided with a sleeve portion 27 through which the rod 13 extends. The upper end of this rod 13 has fixed thereto a collar 28, and a collar 29 is secured to the rod 13 below the sleeve 27. Surrounding the rod 13 between the sleeve 27 and the collar 28 is a coil spring 30, and surrounding the rod 13 between the collar 29 and the top of the plug 12 is a spring 31. Descent of the bracket 15, therefore, from the position shown in Figure 1, acts to depress the rod 13 positively and through the spring 31 to depress the sleeve 11 yieldingly. Slidable within the sleeve 11 is a hollow plunger 35 having a flange 36 at its upper end which may ride between the plug 12 and an annular shoulder 37 on the inner wall of the sleeve 11 spaced somewhat below the plug 12. The lower end of the plunger 35 is closed off as by a head portion 40, and seated on the upper end of this head portion is a coil spring 41 which is contained within the hollow central portion 42 of the plunger 35 and which bears against the lower end of the head 14, which is slidably guided in the portion 42.

Slidable between the outer face of the plunger 35 and the inner wall of the sleeve 11 is a sleeve 45, the lower end of which is formed as an annular clamp 46 which may be brought down to press sheet-capping material, as at 47, against the top of the bottle mouth 48 of the milk bottle 49 positioned therebeneath. Above the clamping portion 46 this sleeve 45 is provided on one side with a slot 50 through which disks, such as the usual cardboard disks commonly used for capping milk bottles, may be fed in to the interior of the sleeve 45 beneath the plunger head 40. A coil spring 51 reacts between the lower face of the plunger head 36 and the upper face of an annular socket 52 in the upper end of the sleeve 45 and yieldingly holds the sleeve 45 to its downward limit of motion provided by an internal annular shoulder 54 on the sleeve 11 with which engages a shoulder 55 of the sleeve 45. Outwardly of the sleeve 11 is vertically slidable thereon a sleeve 60. Its upper end is formed to closely and slidably embrace the sleeve 11 at 61, and below this point it is of larger internal diameter to house a coil spring 62 which reacts between the portion 61 and an upper annular clamping member 63 secured to the lower end of the sleeve 11, as by a threaded joint at 64. The lower end of the sleeve 60 carries a lower annular clamping element 65 which is depressed toward the clamping element 63 by the spring 62. This clamping element 65 is shown as provided with a flaring annular internal face 66 which may be projected over the bottle mouth during the capping operation, as shown in Figures 3 and 11, to guide the bottle mouth into proper position.

When the rod 3 is in its highest position the rod 13 is yieldingly held in its extreme upper position by the spring 30 and through the engagement of the head 14 on the lower face of the plug 12, the sleeve 11 with the parts carried thereby is also held in elevated position so that the bottle 49 may be moved beneath it as shown in Figures 1 and 6. In this position of the parts the disk 70 may be in position within the clamping sleeve 45 opposite to the slot 50 through which it was inserted, and in this position of the parts, also, the upper end of the sleeve 60 has impinged on the lower face of the bracket 4 and been stopped thereby, while the sleeve 11 carrying the upper clamp element 63 has been further raised to separate the clamping elements 63 and 65 so that a piece of sheet material 71 larger than the disk 70 may be placed therebetween as shown in Figure 14. This is the position of the parts when the bottle is placed in position for capping as in Figures 1 and 6. As the rod 3 is depressed for a capping operation, the sleeve 11 is moved downwardly under increasing pressure of the spring 31, bringing the upper clamping element 63 downwardly to clamp the sheet material 71 against the lower clamping element 65, as shown in Figure 3, and the sleeve 45 is brought down toward the bottle top until it engages the sheet material and presses it thereagainst as shown in Figure 11, whereupon further downward motion of the clamping sleeve 45 is stopped. Further downward motion of the rod 13 acts with the increasing pressure of the spring 41 to depress the plunger 35, forcing the disk 70 ahead of it and into contact with the uper face of the sheet material 71, and on further downward movement of this plunger, the disk 70 superposed on the piece 71, is forced into the mouth of the bottle and seated against its annular internal shoulder 72, the sheet material 71 being pulled inwardly beneath the clamping sleeve 45 and from between the clamps 63 and 65. The parts are then in the position shown in Figure 12, the plunger 35 in the lower portion of its stroke engaging on the shoulder 37 of the sleeve 11 and carrying this sleeve, together with the annular clamping members 63 and 65 with it, thus freeing the marginal portion of the sheet material 71.

Further depression of the rod 13 acts through the spring 31 to carry the sleeve 11 further downwardly and causes a series of wiping elements 75 carried thereby to wipe down the marginal portion of the sheet material 71 about the mouth of the bottle, completely covering the pouring lip at its top and engaging the sheet material beneath its flaring rim or top portion 76, thus to complete the application of the disk 70 and the sheet material 71 to the bottle mouth. The rod 3 is then moved upwardly, raising the bracket 15 and acting through the spring 30 to lift the sleeve 11 with the parts car-

ried thereby, and permitting these parts to return to the positions shown in Figure 14.

In order to facilitate the wiping of the sheet 71 about the top of the bottle, the clamping elements 63 and 65 may be provided with radially arranged serrations 78 which act to define fold lines for the sheet material. The first downward motion of the clamping elements 63 and 65 thereafter acts to bend the margins of the piece 71 downwardly. The disk 70 being superposed in the central portion of the sheet 71, which as shown is of disk form but of larger diameter than the disk 70, the two are pressed inwardly against the bottle ledge, while the action of the wiping elements 75 conforms to the margin of the piece 71 to the bottle top. The central portion of the element 71 within the area of the mouth, and reinforced by the disk 70, closes the bottle, while the remainder of the element 71 is conformed to and about the pouring lip and the outer face of the bottle adjacent to its mouth.

Cap strip feed

The elements 71 are fed into position between the clamps, the sleeve 60 having a slot at 158 for this purpose, and one or both of the clamp elements may have cutting edges as at 159 so that the closing of the clamp on the initial downward motion of the sleeve 11 will complete the severing of the element 71 in capping position from those outside of the sleeve 60. The coil 152 may be supported on a suitable holder 160 carried by a platform portion 161 which connects and spaces the brackets 4, and this may also be supported by a bracket 162 and a link 163 from the table 1, a slot 164 in the link 163 permitting vertical adjustment of the bracket 4 as desired, to suit the height of the bottles being capped.

Cap disk feeding mechanism

The actuating bracket 15 has on the outer end of its arm 26 a sleeve 200 slidably engaging a cap feeding actuating rod 201, there being one of these rods 201 for each capping device. A collar 202 is fixed to the upper end of each of the rods 201, and a collar 203 is slidable thereon and is normally held pressed against the upper end of the sleeve 200, as by means of a coil spring 204. The sleeve 200 rests on the upper end of a spring 205, the lower end of which is seated against a shoulder 206 formed on the lower bifurcated end 207 of the rod 201. This bifurcated portion 207 is pivoted to one end of an arm 208 fixed to a rock shaft 209 carried by the stack supply 150, and on opposite sides thereof arms 210 are carried by this rock shaft. The lower ends of the arms 210 are slotted as at 211 to take over a pin 212 which extends through a feed slide 215.

This feed slide, as shown best in Figure 3, is movable along a track 220 and is provided with a plate 221 which is slidable beneath the open lower end of the stack support 150, so that on the inward motion of the slide it takes the lowest disk in the stack and moves it from the stack and projects it into the sleeve 45 through the slot 50, while in its outward movement it slides beneath the disks in the stack to its extreme retracted position, shown in Figure 3, in which it permits the stack to descend to present the lowest disk thereon into position to be engaged on the next feeding movement of the slide. The slide 215 also carries a feed dog 225 having a serrated foot 226 which rests on the upper face of the strip of elements 71, and as the slide is moved to feed a disk from the reservoir 150, it also feeds the strip of elements 71 in the guideway 228. Retractive motion of the strip on reverse motion of the slide 215 is prevented by abutments 230 projecting upwardly from the guide 228 and presenting inclined or sloping faces 231 to the forward passage of an element 71 and abrupt shoulder portions 232 to the rear edge portions of an element 71. On each capping motion of the bracket 15 the sleeve 200 descends, and through its pressure on the spring 205, rocks the lever 208 and the arm 210 to retract the feed slide 215. On each upward motion of the member 25 the feed slide remains in its outer position until contact is made with the collar 203, whereupon further upward motion normally produces a feed stroke of the slide 215 when all the cap-applying parts are in proper position to receive the disks 70 and 71.

Means are provided, however, by which, should no bottle be in position beneath the clamping device on a capping stroke so that the disks would not be applied to a bottle and thus removed with it on the up-stroke, whereby on the next upward stroke of the cap-applying mechanism the feed slide is inoperative to feed other disks and elements 71 to the capping mechanism. To this end the upper arm 208 is provided with an extension 241, which, when no bottle has been present, is held beneath a locking dog 242 pivoted as at 243 to the portion 150. This locking dog 242 may be retained in either of two angular positions as by means of a spring ball detent or dog at 244 (see Figure 10) which may engage in either of a pair of depressions 245 and 246 in the dog 242. This dog is provided with an angular cam tail 248 against which may ride a roller 249 on a cam lever 250 pivoted as at 251 to a bracket support 252 secured to the upper face of the sleeve plug 12. A stop lug 253 limits the rocking movement of the lever 250 in one direction. When a bottle is in position to be acted on the descent of the sleeve 11 is limited by the clamp sleeve 45 striking on an element 71 over the bottle mouth, and by the engagement of the flange 37 of the plunger 35 against the upper end of the sleeve 45, and this plunger in turn, against the plug 12, as is shown substantially in Figure 13. At this lower limit of motion the roller 249 engages the shoulder portion 255 of the cam tail 248, thus holding the dog 242 out of the path of motion of the portion 241 of the lever 208, or, if the dog was not previously in this position, moving it thereto as shown in Figure 7. On the next upstroke of the capping mechanism, therefore, there is nothing to prevent the feeding motion of the cap slide so that the mechanism functions in its normal manner. If, however, no bottle has been in capping position, the sleeve 11 is permitted a downward motion further than its normal limit into the position shown in Figure 8, whereupon the roller 249 is brought down against the portion 256 of the stop dog, forcing it into the position shown in Figure 8 where it obstructs the motion of the arm 208, and thus prevents the cap-feeding motion on the succeeding retraction of the bracket 15, the final portion of this retraction being expended in compressing the spring 204. On the next downward motion of the capping mechanism, when this mechanism approaches the normal limit, as when a bottle is present, the roller 249 engaging on the tail 248, moves the dog out of engagement with the portion 241, but if this downward mo-

tion is prolonged, as when no bottle is present, it immediately returns the dog to obstructing position as shown in Figure 8. Upward motion of the capping mechanism is ineffective to move the dog since the roller **249** is permitted to be depressed, rocking the lever **250** away from the stop **252**, the ball detent holding the dog against the relatively small pressure necessary to effect the rocking of the lever **250** as shown in Figure 9.

From the foregoing description of certain embodiments of this invention, it should be evident to those skilled in the art that various changes and modifications might be made without departing from the spirit or scope of this invention as defined by the appended claims.

This application is a division of my application Serial No. 62,469, filed February 5, 1936, for Apparatus for capping bottles, which on February 13, 1940, eventuated into Patent No. 2,190,509.

I claim:

1. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap on the retraction of said mechanism, a member movable between a position preventing the actuation of said feeding means and a position permitting the actuation of said feeding means, an element movable with said mechanism for controlling the position of said member and operatively engaging said member, said element having a portion operatively engaging said member only when said mechanism moves beyond normal capping position as when no bottle is present to move said member into said preventing position, whereby on retraction of said mechanism from said position beyond normal capping position no cap is fed into capping position for a succeeding capping actuation of said mechanism.

2. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap into operative relation to said mechanism on the retraction of said mechanism, a cap supply support, a member mounted on said supply support for movement from and toward a position preventing the actuation of said feeding means, and an element carried by said mechanism in position to engage said member on motion of said mechanism beyond normal capping position as when no bottle is present and to move said member to said preventing position.

3. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap into operative relation to said mechanism on the retraction of said mechanism, a cap supply support, a member mounted on said supply support for movement from and toward a position preventing the actuation of said feeding means, and an element carried by said mechanism in position to engage said member on motion of said mechanism beyond normal capping position as when no bottle is present and to move said member to said prevailing position, said element and member having parts engaging, on descent of said mechanism toward normal capping position and moving said member out of preventing position.

4. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap into operative relation to said mechanism on the retraction of said mechanism, a cap supply support, a member mounted on said supply support for movement from and toward a position preventing the actuation of said feeding means, an element carried by said mechanism in position to engage said member on motion of said mechanism beyond normal capping position as when no bottle is present and to move said member to said preventing position, said element and member having parts engaging, on descent of said mechanism toward normal capping position, and moving said member out of preventing position, and latch means yieldingly holding said member in or out of preventing position.

5. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap on the retraction of said mechanism, said feeding means including a movable part, a member mounted for movement into and out of the path of motion of said part and when in said path of motion preventing actuation of said feeding means, said member having a pair of parts, and an element movable with said mechanism in position to engage one of said member parts when said member is in preventing position to move said member out of preventing position by movement of said mechanism in normal extent of capping motion of said mechanism and to engage the other of said member parts when said mechanism moves beyond said normal capping motion to move said member into preventing position as when no bottle to be capped is in capping relation to said mechanism.

6. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap on the retraction of said mechanism, said feeding means including a movable part, a member mounted for movement into and out of the path of motion of said part and when in said path of motion preventing actuation of said feeding means, said member having a pair of parts, an element movable with said mechanism in position to engage one of said member parts when said member is in preventing position to move said member out of preventing position by movement of said mechanism in normal extent of capping motion of said mechanism and to engage the other of said member parts when said mechanism moves beyond said normal capping motion to move said member into preventing position as when no bottle to be capped is in capping relation to said

mechanism, and means supporting said element to yield on retraction of said mechanism to inoperative position.

7. A machine of the class described, comprising a bottle support, a capping mechanism movable toward and from said support to cap a bottle thereon and to retract therefrom and be stopped in its capping motion by said bottle when in capping position, means including a yielding element actuable to feed a cap on the retraction of said mechanism, said feeding means including a movable part, a member mounted for movement into and out of the path of motion of said part and when in said path of motion preventing actuation of said feeding means, said member having a pair of parts, an element movable with said mechanism in position to engage one of said member parts when said member is in preventing position to move said member out of preventing position by movement of said mechanism in normal extent of capping motion of said mechanism and to engage the other of said member parts when said mechanism moves beyond said normal capping motion to move said member into preventing position as when no bottle to be capped is in capping relation to said mechanism, means supporting said element to yield on retraction of said mechanism to inoperative position, and latching means for yieldingly retaining said member in or out of preventing position.

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