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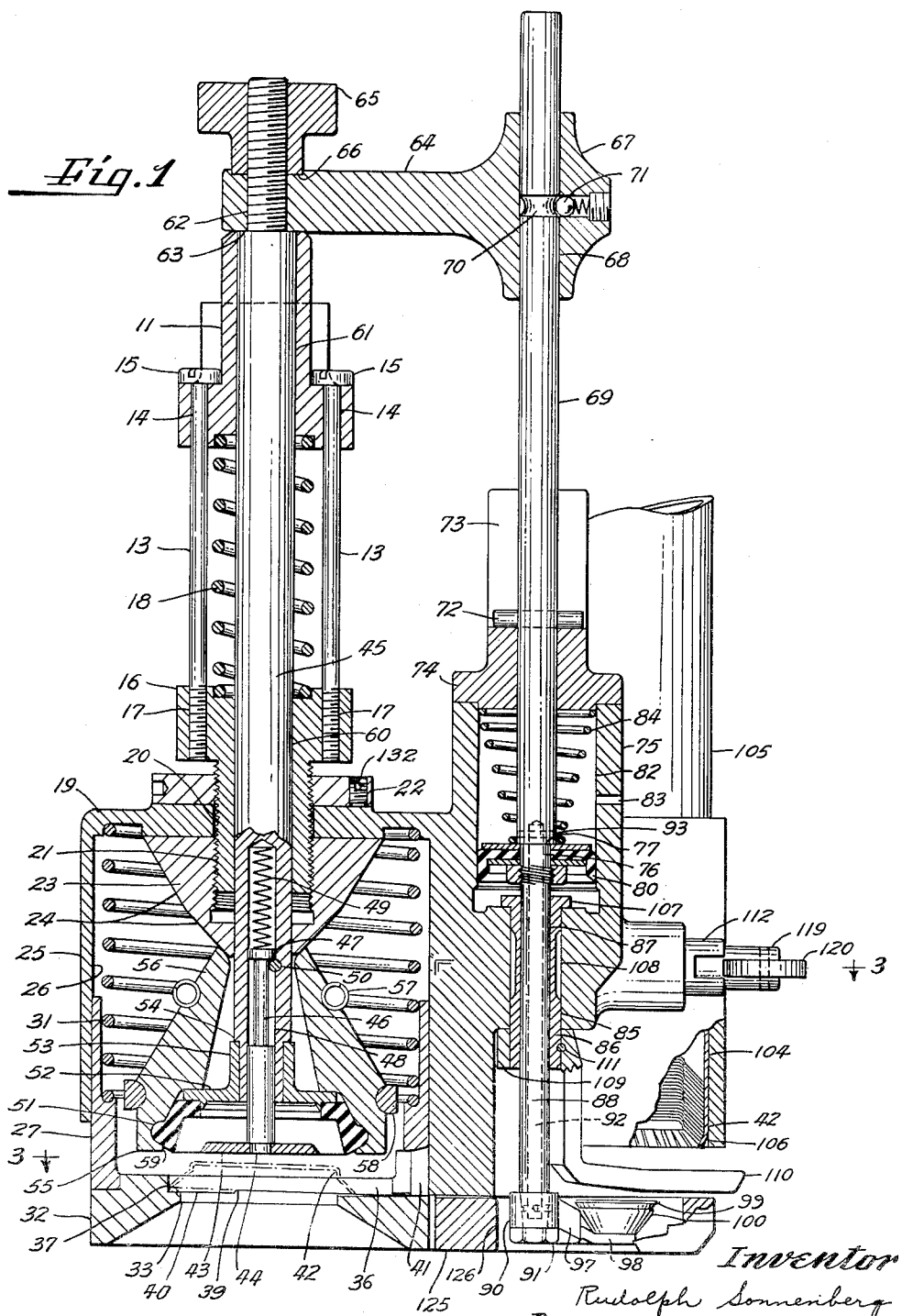
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BOTTLE HOODING AND CAPPING MECHANISM

Filed June 22, 1950

3 Sheets-Sheet 1



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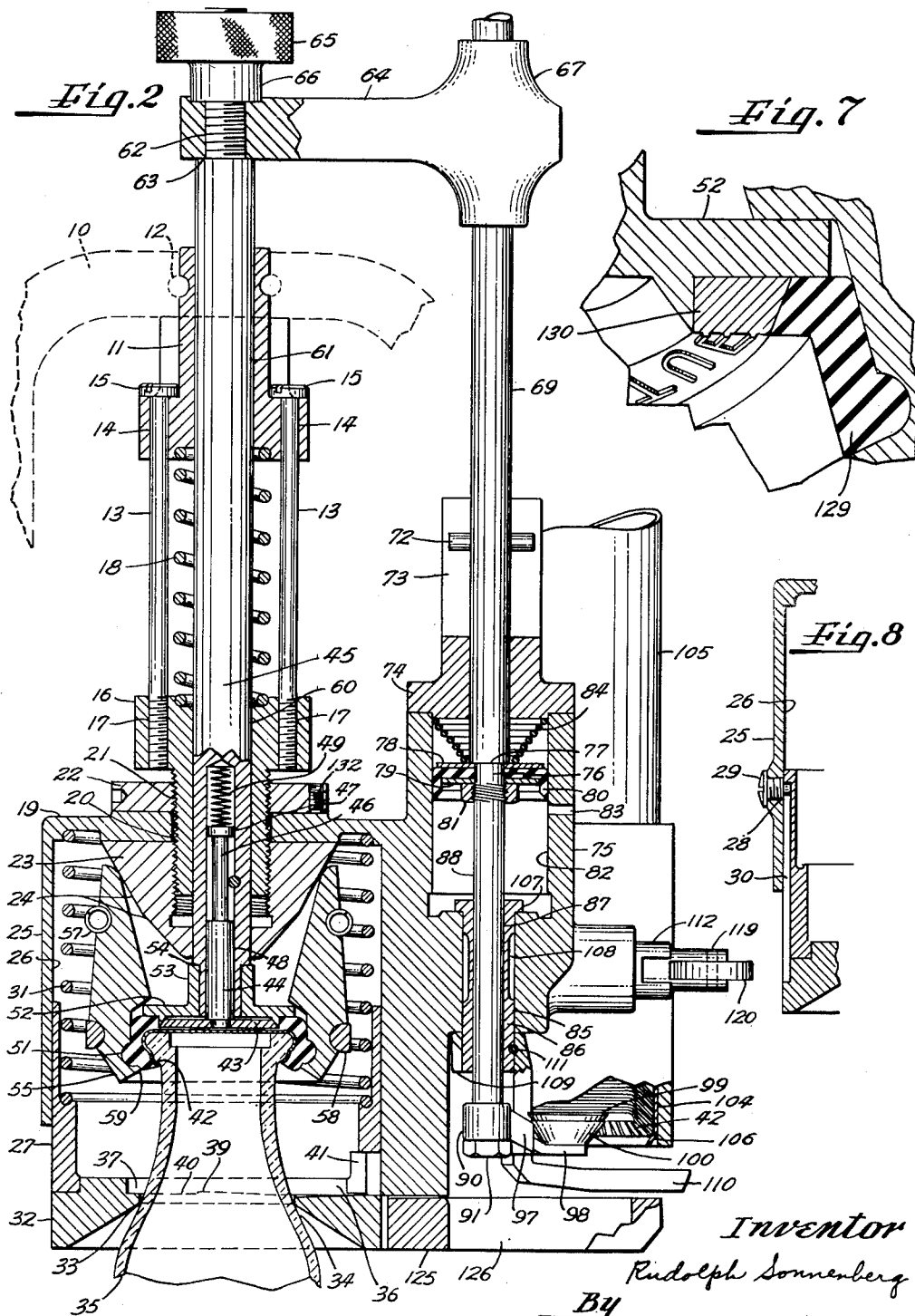
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3 Sheets-Sheet 2



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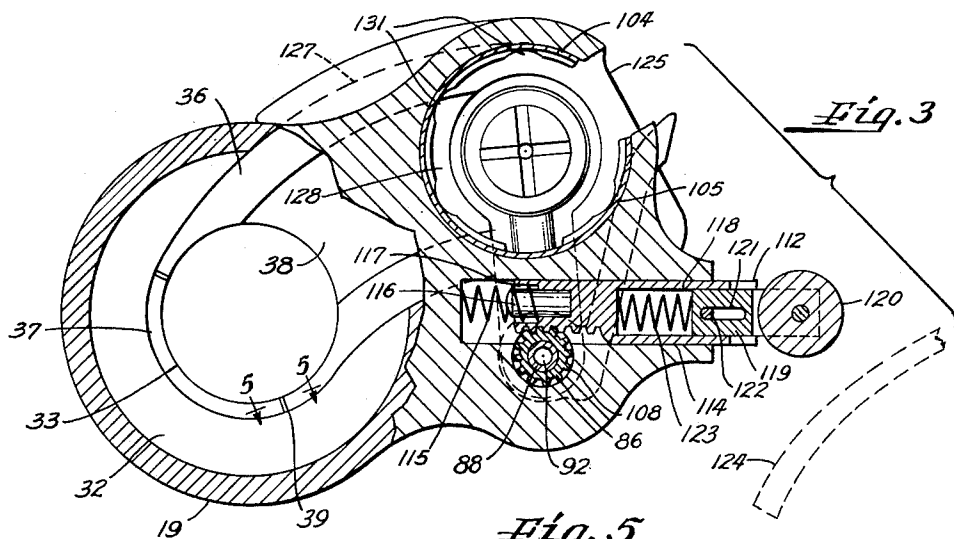
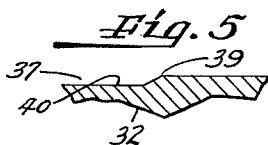
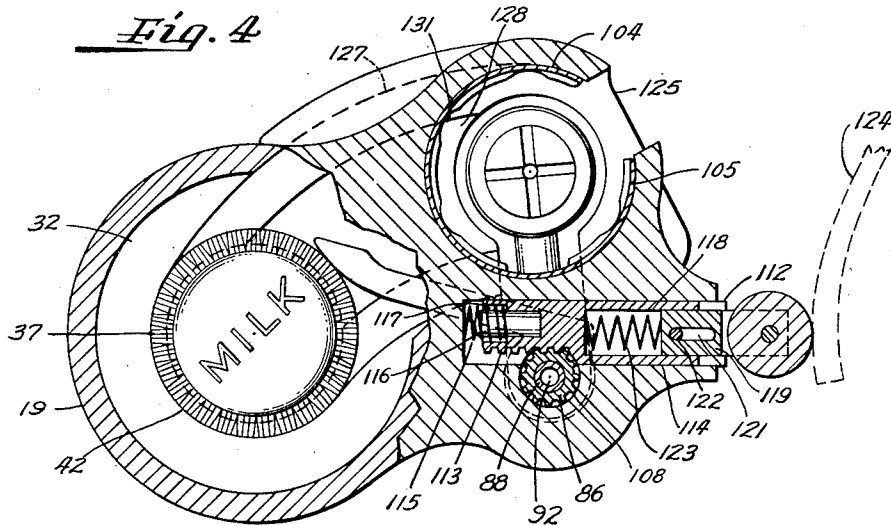
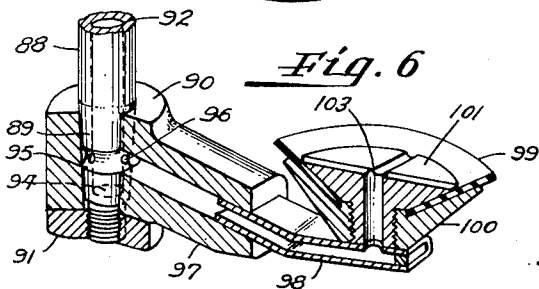
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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BOTTLE HOODING AND CAPPING
MECHANISM

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Application June 22, 1950, Serial No. 169,596

20 Claims. (Cl. 226-86)

1

This invention relates to bottle capping machines and more particularly to machines for capping dairy bottles and the like.

It has for an object to provide an improved machine for removing a thin metallic hood cap from a magazine and delivering it directly to a capping mechanism for application to the bottle.

A further object of this invention is to provide a capping head having a self-contained vacuum pump arranged and operated to remove a hood cap from a magazine and deliver said cap to a station from which it is moved directly into capping position beneath the plunger of a capping mechanism.

A still further object is to provide a machine for removing a thin metallic hood cap from a magazine by a vacuum cup and delivering it to a station, for sweeping this removed cap to a second station and for crimping the edges of this cap about the bead on the neck of a bottle as the bottle is raised with respect to the mechanism.

Another object is to provide a novel machine for capping breakable bottles or jars through successive operations in which a hood cap is removed from a magazine and placed in a first station, the cap is then swept to a following station where it is positioned in the capping mechanism to receive the rim of a bottle intended to be sealed by it, and the cap is then crimped in place on a bottle wherein compensating mechanisms are provided to prevent breakage of bottles having slight deviations from established standards.

Another object is to provide a capping machine of compact design with the axes of its three major parts vertically disposed and compactly arranged to permit an external force to perform the several operations required therein.

Further objects will be apparent from the following specification, appended claims and drawings thereof, in which—

Figure 1 is a vertical sectional view through the capping mechanism and associated parts in one position;

Fig. 2 is a view similar to Figure 1, with the parts in moved position;

Fig. 3 is a transverse section as on line 3—3 of Figure 1;

Fig. 4 is a view similar to Fig. 3 with the parts moved to another position;

Fig. 5 is a fragmentary detail on line 5—5 of Fig. 3;

Fig. 6 is a perspective view of the suction cup, partly in section;

Fig. 7 is a perspective view of a modified construction of capper head, and

2

Fig. 8 is a detail in vertical section.

In capping machines of this type, it is necessary that a mechanism must be of a design to permit it being more or less universal in its application to present structures of bottle filling machines. That is, in smaller machines where the filling process is relatively slow, this capping machine may be mounted to receive a vertically movable bottle, or the capping mechanism itself may be moved vertically with respect to the bottle, but in the larger more rapidly moving filling machines, it may be necessary to mount the capping machine on a rotatable supporting member and to provide a plurality of capping units so that as the filled bottles are moved along a conveyor, successive capping machines are moved into operative position as the filled bottles progress along the conveyor system.

In the following description, it is assumed that the capping mechanism is stationarily supported and that the filled bottles are moved with respect to it. From the above, it is obvious that the capping machine may be raised and lowered, or it may also be thus moved while being carried by a rotating supporting member.

Therefore, referring to Fig. 2 of the drawings, there is a bracket 10, shown in dotted lines, to support the capping machine. This inverted U-shaped bracket is part of a supporting mechanism and may be a single unit or one of a number of similar brackets as the case may demand.

A sleeve 11 is mounted in this bracket and secured therein as by a U-bolt 12 shown in dotted lines. Guide rods 13 are slidable in parallel vertical passages 14 formed in this sleeve and may be provided with heads 15 to limit the free travel in a downward direction.

These guide rods support a bushing 16 at their lower ends as by threaded engagement in the tapped holes 17. A compression spring 18 is impounded between the sleeve 11 and bushing 16 to resist upward movement of the bushing 16, but to yield when enough upward pressure is exerted on this bushing.

A head 19 for the capping mechanism is carried by the bushing 16 and has a clearance hole 20 to slide on the threaded stem 21 of the bushing 16. A lock nut 22 provides for locking the head 19 on the threaded stem 21 in the correct position with respect to associated parts of the complete machine. This lock nut may be further provided with a threaded hole and set screw 132 as shown to hold this lock nut securely in place. By this mounting, the lock nut may be loosened and the head may be swung to the right or left hand position about a ram 45 as desired for use on

3

either right or left hand capping machines or for adjustment of the head with respect to the capping machines.

There is a tapered cam 23 threaded on the end of threaded stem 21, which serves as a nut, to engage the head 19 and coact with the lock nut 22 to hold the head in secure position. This cam 23 has its external surface tapered to present cam faces 24 to be hereinafter described.

The head 19 has a side wall or skirt 25 which is provided with a machined bore 26 in which a follower 27 is free to slide. In order that the follower 27 may slide in a limited movement in a vertically guided path the skirt 25 is drilled and tapped on each side as at 28 (see Fig. 8) to receive a slotted head machine screw 29 which has a reduced end engage in guide ways 30 milled in the side wall of the follower. This allows the follower 27, when free, to slide downwardly until the reduced ends of the screws engage the upper ends of the milled slots 30 and to assure this extended position of the follower 27 with respect to the head 19 when the follower is free, a compression spring 31 is provided having its ends seated in recessed portions of the head and follower as shown.

A flange 32 is secured to the bottom of the follower 27 and this flange is provided with an opening 33 to engage the shoulder 34 of a milk bottle or jar 35. This flange may be interchangeable so that substitutions may be made to suit the particular bottle to be capped. The upper face of this flange has a recessed guide way 36 formed therein (see Figs. 1, 3 and 4) leading from the periphery of the flange to a central seat portion 37 so that caps slid along this way may be centrally disposed over the opening 33. As some of the caps to be handled may be frail in structure and may be easily bent, the guide way 36 is recessed as at 38 (Fig. 3) to relieve any contact with the transverse portions of the skirt of the cap as it moves along the guide way. To prevent the forward edge of the cap from contacting the far edge of the central opening 33 as the cap is moved into position in the central seat 37, the reduced side portions of the guide way are provided with slightly inclined shoulders 39 as shown in Fig. 5, to raise the skirt of the cap above the far edge and over the depressed area 40. It will be seen that as the cap approaches its final position the shoulders 39 tip the forward edge of the cap upwardly away from the edge of the opening so that the skirt of the advancing cap will pass freely thereover to the position shown in Fig. 1. An opening 41 in the follower 27 shown in Figs. 1 and 2 registers with the guide way 36 to admit a cap into the central seat 37.

The bottle 35 is brought to the capping machine in the usual method of handling quantity operations and in one of the stations of the processing, the bottle is raised vertically to engage the rim of the opening 33 and to lift the follower in its further upward movement. This engagement with the follower holds the bottle securely on its support and it centers it for the capping operation.

From a preceding operation, a cap 42 has been slid into position in the flange 32. In this instance, a thin metallic disked hood cap is handled and it is delivered to its position on the central seat 37 with the skirt portion downwardly disposed as shown in Figure 1. As the bottle 35 is raised, the rim about the mouth of the bottle engages the cap, at rest in the central seat 37, and lifts it to impinge it against a follower disk

4

43 which is carried by a stem 44 slidable in a ram 45. The stem 44 has a reduced shank 46 and a head 47 formed thereon and this stem is slidable in a bore 48 drilled in the ram 45. The depth of this drilled bore accommodates a spring 49 in compression between the head of the stem 44 and the blind end of the bore 48. A pin 50 anchored in the ram 45 allows longitudinal movement of the stem 44 within the limits of the reduced diameter forming the shank 46.

Further upward travel of the bottle continues to raise the cap 42 and follower disk 43 until the cap engages a resilient crimping ring 51 carried by a flange 52 and hub 53 secured to the lower end of the ram 45. The hub 53 is secured in place on the reduced end of the ram and it presses against the shoulder 54.

As the crimping ring 51 is raised with respect to the nut 23, a plurality of levers 55 arranged about the lower end of the ram and the crimping ring have the lever arms 56 engage and ride upon the cam faces 24 formed on the cam 23 to swing these lever arms outwardly against the resistance of a coiled tension spring 57 which encircles these levers. These levers are held in place on the crimping ring 51 by a fulcrum ring 58 which also encircles all of the levers, so that when the lever arms are moved outwardly, the jaws 59 squeeze the crimping ring about the bead formed on the bottle to shape the cap to the bottle. The first angle of the tapered cam 23 is quick acting on the levers 55, and the second angle of the tapered cam is slower acting on the lever motion, but exerts greater pressure on the lever arms to effect the first crimping action of the cap on the bead about the bottle.

After the bottle has been raised to accomplish the application of the cap and the crimping action in sealing the cap in place on the bottle, the bottle is lowered from contact with the parts so they return to a normal position ready for a succeeding operation.

The ram 45 slides freely through the passages 60 in the bushing 16 and 61 in the sleeve 11, and has its upper end reduced in diameter and threaded as at 62 to provide a shoulder 63.

An arm 64 is connected to the ram by having a slotted end straddle the threaded stem 62 and by a thumb nut 65 engaging a recessed socket 66 formed in the arm, to clamp the arm to the ram 45. The other end of this arm terminates in a head 67 which has a bore 68 (Figure 1) formed therein to receive and support a pump rod 69. As an overload protection against damage to the parts in case something is out of order, the pump rod is provided with an annular groove 70 into which one or more spring pressed detents 71 may engage.

This pump rod 69 has a pin 72 secured therein and this pin operates in a slot 73 formed in the head 74 of a pump body 75, which is preferably formed integral with the head 19. The pump rod is machined to different diameters through sections of its length. In this construction, the hub portion 76 of somewhat smaller diameter than the upper portion of the pump rod presents a shoulder 77 against which the piston is secured. This piston comprises the washers 78 and 79, with a cupped piston 80 clamped between them. A nut 81 (Fig. 2) screwed on the threaded end of this hub holds the piston in place.

The pump body is provided with a bore 82 in which the piston operates and this bore has a lateral port 83 formed in the wall thereof to

communicate with the atmosphere. A compression spring 84 is included in the pump bore between the head 74 and the piston on the pump rod to assist in returning the parts to a normal position.

The pump body is further provided with a bore 85 to rotatably support a bushing 86. This bushing also has a bore 87 centrally therethrough to receive the extension portion 88 of the pump rod which is of lesser diameter than the hub portion 76. The lower end of this extension of the pump rod terminates in a frusto-conical seat 89 (Fig. 6) against which the bore of a hub 90 seats. A nut 91 threaded on the extreme end of the pump rod clamps this hub in place with an air-tight joint.

A small diameter hole 92 is drilled axially into the pump rod from its bottom end to a distance slightly above the piston and a transverse bore 93 through the pump rod above the piston communicates with this axial hole and the interior of the pump bore above the piston. The bottom end of this axial hole or passage is closed by a plug 94 in Fig. 6 in dotted lines screwed into the hole at its bottom end, and an annular groove 95 in the tapered seat 89 communicates with the axial hole through transverse holes 96 in the pump rod.

The hub 90 has a lateral nipple 97 which supports a flattened tube 98 to which a suction cup 99 is attached. This section cup comprises a body 100 attached to the flattened tube 98 and a screw 101 having the side wall of its head tapered to fit the tapered recess of the head so that the resilient cup member 99 may be clamped in place between this body and the head of this screw. The screw 101 has a central vertical passage 103 therein, and radial grooves formed in its upper face for better evacuation of air from the interior of the suction cup in operation.

The head 19 is further provided with a cavity 104 in which a magazine 105 and a stack of bottle caps, indicated at 42, may be placed. The cavity and magazine 105 preferably has a slot formed along one side thereof for convenience in reloading the magazine, or in correcting the position of the caps, should they become disarranged while in loading or withdrawal from the magazine. This magazine has its lower end tapered inwardly as at 106 to form a choke for the free movement of the caps downwardly. To permit an individual cap to be extracted from the bottom of the pile in the magazine, the inner face of the inwardly tapered bottom end is provided with a number of recesses 131 axially disposed, of fairly large radius. These recesses have the faces of their roots coincident with the inside wall of the magazine so that the inwardly directed nubs act as the choke to restrict free passage of the caps through the bottom of the magazine, but when the suction cup grabs the bottom disked hood cap and pulls it down through the bottom opening, the nubs resulting from the recesses cause the skirt of the cap to become fluted to pass through the opening.

The rotatable bushing 86 has a flange 107 formed on the upper end thereof, the intermediate portion thereof is milled with longitudinal teeth 108 to form a gear and the lower end is adapted to receive the hub 109 of a transfer arm 110 (Figs. 1 and 2). The hub 109 is held in place on the bushing by a pin 111 driven in place after the parts are assembled. As shown in Figs. 3 and 4, a plunger 112 has a rack 113 formed thereon which meshes with the gear teeth 108

on the bushing. This plunger is slidable in a bore 114 formed in the head 19 and the plunger is normally extended by the compression spring 115 which is guided by a plug 116 inserted in the plunger 112. A recess 117 provides operating space for the compression spring 115. The plunger 112 has a recess 118 formed in the outer end thereof to receive a yoke 119 on which a roller 120 is mounted. The yoke is slotted as at 121 to receive a pin 122 carried by the plunger 112, and this allows movement of the yoke without movement of the plunger in case something restricts the free movement of the transfer arm and bushing. A spring 123 in compression is placed between the yoke 119 and blind end of the recess. This spring ordinarily is strong enough to operate the plunger without further compression, but if a condition arises in which some of the parts become jammed, the overload spring can yield to prevent change to the equipment.

After a cap has been applied and crimped, the bottle is removed and another bottle is moved into place preparatory to another capping operation. During this transition of bottles, the mechanism which handles them has relative movement to the capping mechanism. This may be by vertical movement of the bottle, or vertical movement of the capping mechanism, or by a compound rotary and vertical of either or both, the bottle and capping mechanism. In either of these cases, the cam roller 120 will engage a cam face 124 shown in dotted lines in Figs. 3 and 4, and will impart movement to the plunger 112 to swing the transfer arm 110 through its operative stroke. If the relative movement is vertical, the axis of the cam roller 120 will be horizontal and if this relative movement is horizontal, the axis of this cam roller will be vertical.

A base plate 125 is attached to the head 19 and is placed under the pump and cap magazine. It has a key hole slot 126 formed therein and a guide way 127 formed in its upper face forming a continuation of the guide way 36 formed in the flange 32. This guide way is recessed as at 128 to freely pass a cap. When the pump rod is in its normal position, the extension rod 88, the hub 90 and the suction cup 99 come to rest in the key hole slot 126, as shown in Figure 1, and a cap 42 which has been extracted from the magazine 105 is laid on the upper face of the base plate 125 over the larger opening of the key hole slot.

In operation the magazine 105 is filled with caps 42 and the bottle capping machine of which this invention forms a part, is started in operation. As the bottles advance through the processing schedule, each one reaches the station under this capping machine, where whatever its advancing motion may be there is a relative vertical movement between the capping machine and a bottle being capped. In this vertical movement, the shoulder of the bottle 35 engages the rim of the opening 33 in the flange 32 and causes the bottle to be properly centered with respect to the capping machine. Continued movement causes the bottle to move the follower 27 so that the bottle is held securely on its support, and in this movement, the rim of the bottle picks up the cap 42 previously placed upon the central seat 37 and impinges this cap against the follower disk 43 to slide the stem 44 into the ram 45. Then, the cap has contacted the resilient crimping ring 51 where the initial forming operation begins as the disked cap is shaped

7

to fit this crimping ring. Continued movement causes the lever arms 56 to ride on the faces 24 of the cam 23 to complete the forming and crimping action of the cap 42 on the bottle 35. Meanwhile, as this crimping action is taking place within the head 19, the ram 45 has been raised against the resistance of the spring 18, and through the medium of the arm 64 the pump rod 69 is raised. The pin 72 restricts the movement of the pump rod to vertical travel only and prevents any turning.

As the pump rod 69 is raised, the piston 80 is moved above the breather ports 83 in the pump body, and the suction cup 99 has been raised to contact the bottom cap 42 in the magazine, and lift all of the caps in the magazine. This assures proper contact with the bottom cap and assures a short initial suction stroke for the pump. By this time, the upward motion of the several parts has reached its limits and the crimping action of the cap on the bottle has been completed in that portion of the machine. The capped bottle is then lowered and the several parts affected by the upward motion, tend to return to a normal position. However, as the pump rod 69 starts its downward movement, the piston 80 in the upper portion of the pump body 75, creates a sub-atmospheric pressure within the upper portion of this pump cavity and this negative pressure is communicated through the passageways 92, 93, 95, 96 and nipple 97 to the suction cup 99 where it causes the suction cup 99 to grip the lowermost cap 42 and extract it from the magazine 135. When the piston 80 has moved downwardly past the port 83, air at atmospheric pressure enters the upper portion of the pump body and restores atmospheric pressure within the suction cup through the several communicating passages so that the extracted cap is deposited upon the base plate 125. Meanwhile the bottle has been removed from the capping mechanism, and the parts have returned to normal. Thereafter the roller 120 carried by the plunger 112 engages the cam face 124 and as it depresses the plunger, the rack 113 rotates the gear 108 and causes the transfer arm 110 to contact the extracted cap 42 and move it through the complementary guide ways 36 and 127 to a position of rest upon the central seat 37 in the flange 32 preparatory to another crimping operation.

In some localities where the health regulations require dating of the packaged commodity, an easily changeable die may be provided as shown in Fig. 7. The resilient crimping ring 129, which is similar to the ring 51 except it may have a larger diameter central opening to fit on the flange 52, and in the space formed by this larger opening, a die ring 130 may be placed. This ring may have the day of the week or such other identification as may be needed formed thereon to act as a die to impress this information into the bottle cap as it is being applied.

From the foregoing, it is obvious that modifications in structures and operations may be made within the scope of the appended claims without departing from the spirit thereof and that restrictions are not implied by the limited showings, herein.

I claim:

1. A capping head for a bottle capping machine, comprising in combination, a capping mechanism operative in its capping stroke to apply a cap to a bottle intended to receive it, a magazine having a quantity of thin hood caps therein with said caps being in stacked relation,

8

said magazine at one end carrying means for retaining within the magazine the cap at said end of the stack, and a cap extractor operated by said capping mechanism to move into engagement with said end cap while said retaining means holds said end cap within the magazine during the capping stroke of said capping mechanism and operative thereafter to pull said end cap past said retaining means out said end of the magazine for delivery directly to said capping mechanism.

2. A capping head for a bottle capping machine comprising in combination, a reciprocatory capping mechanism operative in its capping stroke to apply a cap to a bottle intended to receive it, a magazine having a quantity of thin hood caps therein with said caps being in stacked relation, transfer mechanism for moving a cap directly to said capping mechanism after its removal from said magazine, a suction pump operatively connected to said capping mechanism to be operated thereby, and a suction cup actuated by said pump for extracting an individual cap from said magazine, said pump being operated by said capping mechanism during its capping stroke to move said suction cup into engagement with an individual cap in the magazine and thereafter being operated by said capping mechanism to actuate said suction cup to remove said cap from the magazine.

3. A capping head for a bottle capping machine comprising in combination, a capping mechanism operative in its capping stroke to seal to a bottle, a cap delivered thereto, a magazine having a quantity of thin hood caps therein, transfer mechanism for delivering a cap directly to said capping mechanism after its withdrawal from said magazine, a pump operable with and by said capping mechanism, and a suction cup operated by said pump to move into engagement with an individual cap at said magazine during the capping stroke of the capping mechanism and thereafter to withdraw said cap from the magazine for delivery to said capping mechanism.

4. A capping head for a bottle capping machine comprising in combination, a reciprocatory capping mechanism operative in its capping stroke to seal a bottle cap delivered thereto, a magazine having a quantity of thin metallic hood caps therein with said caps being stacked in upright position and having their skirt edges downwardly disposed, transfer mechanism for moving a cap directly to said capping mechanism after its withdrawal from said magazine, a suction cup for extracting an individual cap from said magazine, and a pump operable by said capping mechanism to move said suction cup into engagement with an individual cap at the magazine during the capping stroke of the capping mechanism and to actuate said suction cup to withdraw said cap from the magazine at the completion of the capping stroke of the capping mechanism.

5. A capping head for a bottle capping machine comprising in combination, a reciprocatory capping mechanism operative during its capping stroke to apply to a bottle and crimp thereon a cap delivered to said capping mechanism, a magazine having a quantity of thin metallic hood caps stacked therein in upright position and having the skirt edges downwardly disposed, transfer mechanism operative to deliver a cap directly to said capping mechanism immediately following its withdrawal from said magazine, a suction cup for extracting the lowermost cap from said magazine, and a pump movable with and

by said capping mechanism for moving said suction cup and for creating a sub-atmospheric pressure through a part of its stroke to energize said suction cup and an atmospheric pressure during the balance of its stroke to release said cap from said suction cup, said pump being operative to move said suction cup into engagement with the lowermost cap in the magazine during the capping stroke of the capping mechanism and at the completion of the capping stroke to create a sub-atmospheric pressure at said suction cup and move the suction cup away from the magazine to withdraw said cap from the magazine.

6. A capping head for a bottle capping machine comprising in combination, a reciprocatory capping mechanism operative in its capping stroke to apply to a bottle a cap delivered thereto, a magazine having a quantity of thin metallic hood caps stacked therein, said magazine at one end carrying means for retaining within the magazine the cap at said end of the stack, a cap extractor operated by said capping mechanism to move into engagement with said end cap while said retaining means holds said end cap within the magazine during the capping stroke of said capping mechanism and operative thereafter to pull said end cap past said retaining means out said end of the magazine for delivery directly to said capping mechanism, and a cap transfer device operated in timed relation with the operation of said capping mechanism to move the cap, following its removal from the magazine and prior to the next capping stroke of the capping mechanism, directly into capping position at the capping mechanism to be applied to the next bottle to be capped thereat.

7. A capping head for a bottle capping machine comprising in combination, a magazine tube having a quantity of thin metallic disked hood caps stacked therein in upright position with the skirt edges downwardly disposed, and a suction cup operable therewith to extract an individual cap from the bottom of said magazine tube, said magazine tube at its lower end having a plurality of circumferentially spaced inwardly extending nubs to restrict free discharge through the lower end of the magazine and to deform the skirt of a cap while the cap is being extracted through the lower end of said magazine.

8. A capping head for a bottle capping machine comprising in combination, a body member, a magazine having a quantity of thin metallic hood caps therein, a pump housing formed in said body, a pump rod reciprocable in said pump housing, a piston carried by said pump rod to reciprocate in said pump housing, said pump housing having a passage communicating with the atmosphere intermediate the ends of the path of reciprocatory movement of the piston, an extension of said pump rod extending through said pump housing, a suction cup carried by said extension rod for extracting an individual cap from said magazine, said suction cup communicating with the interior of said pump housing at one side of said piston, and said piston being operative to create sub-atmospheric pressure in said suction cup through a portion of its movement and being operative to restore atmospheric pressure through the balance of its movement by effecting communication between the suction cup and said passage in the pump housing.

9. A capping head for a bottle capping machine comprising in combination, a capping

mechanism operative in its capping stroke to apply a cap to a bottle intended to receive it, a magazine having a quantity of thin metallic hood caps in upright position therein and having the skirt edges downwardly disposed, support means defining a guideway extending from beneath said magazine to said capping mechanism, a suction cup operative during the capping stroke of the capping mechanism to move into engagement with an individual cap in said magazine and operative thereafter to withdraw said cap from the magazine and to release it onto said guideway under said magazine at the completion of said capping stroke, and a transferring mechanism comprising an arm movable in a sweeping motion from under said magazine across the top of said guideway after the release of said cap under the magazine and prior to the next capping stroke of the capping mechanism to transfer said cap along said guideway to position at the capping mechanism to be applied to the next bottle capped thereat.

10. In a capping head for a bottle capping machine, in combination, a frame, a head carried by said frame, a capping and crimping mechanism movably carried by said head, a flange attached to said head to receive a cap to be applied to a bottle, a magazine attached to said head and adapted to contain a quantity of thin metallic hood caps, an extractor operative to extract caps individually from said magazine, a transfer mechanism for transferring said extracted cap to said flange, and complemental guideways in said head and said flange for directing said extracted cap to capping position at said flange, said guide ways being recessed centrally therealong to avoid contact with the transverse edges of said disked caps and said guideways in said flange having upwardly inclined portions to elevate the leading edge of said extracted cap as it passes into capping position at said flange.

11. A capping head for a bottle capping machine, in combination, a frame, a head yieldably carried by said frame, said head having a plurality of vertical bores therein in closely spaced relation, a capping and crimping mechanism in one of said bores together with a ram and a follower, a flange carried by said follower, said flange having a central opening therein, and also having a central seat for a bottle cap formed in the upper face thereof, said body having a pump bore in another of said bores, a pump rod connected to said ram movably mounted in said pump bore, a suction cup carried by said pump rod, a magazine having a quantity of thin metallic disked hood caps therein being mounted in another of said bores in said head, a base plate carried by said head under said magazine, said flange and said base plate having complemental guide ways formed therein and a transfer arm rotatably mounted in said head to sweep an extracted cap from said magazine along said complemental guideways to the central seat in said flange.

12. A capping head for a bottle capping machine, in combination, a frame, a head yieldably carried by said frame, a follower slidably carried by said head, a flange carried by said follower, said flange having a central opening therein to receive and engage a bottle to be capped, said flange having a seat centrally therein in the upper face thereof, a magazine having a quantity of thin metallic disked hood caps therein, said magazine being detachably secured

11

in vertical position in said head, a suction pump and suction cup movably carried by said head, a base ring carried by said head, said flange and base ring having complemental guide ways formed therein and a transfer arm rotatably mounted in said head to sweep an extracted and released cup from said base ring under said magazine to said central seat in said flange.

13. A capping head for a bottle capping machine, in combination, a frame, a body yieldably carried by said frame, a ram yieldably mounted in said body, a capping and crimping mechanism carried by said ram, a suction pump rod and suction cup movably carried by said head and having connection with said ram, and an overload release carried by said ram for engagement with said suction pump rod.

14. A capping head for a bottle capping machine, in combination, a frame, a head yieldably carried by said frame, a magazine having a quantity of thin metallic disked hood caps therein, a suction pump and suction cup movably carried by said head to extract an individual cap from the bottom of said magazine and a transfer mechanism for transferring an extracted cap from said magazine, said transfer mechanism comprising a supporting bushing rotatably mounted in said head, said bushing having an operating pinion formed thereon, a plunger slidably mounted in said head and having a rack formed thereon to mesh with said pinion, a cam member to actuate said plunger and a spring pressed yoke carried by said plunger to yield under abnormal operating conditions to prevent breakage of the parts.

15. A capping head assembly for a bottle capping machine comprising, in combination, a frame, a head carried by said frame, a capping mechanism mounted for reciprocation at said head, a flange carried at the lower end of said head having a central vertical opening and a recessed seat at its upper face surrounding the opening, said seat serving to receive and center a cap to be applied to a bottle, a cap magazine mounted adjacent said head, means for releasing caps individually from the magazine, a transfer mechanism for transferring a released cap to said seat at the flange, and guideways in said head and said flange leading to said seat at the flange for directing said released cap to said seat at the flange, said guideways having upwardly inclined portions to elevate the leading edge of said cap immediately before said cap drops onto said seat at the flange as it passes thereto.

16. A capping head for a bottle capping machine comprising, in combination, a capping mechanism operative in its capping stroke to seal to a bottle a cap delivered thereto, a magazine having a quantity of thin hood caps therein, a pump operable with and by said capping mechanism, a suction cup operated by said pump to move into engagement with an individual cap at said magazine during the capping stroke of the capping mechanism and thereafter to withdraw said cap from the magazine for delivery to said capping mechanism, and means operative following the removal of the cap from the magazine and prior to the next capping stroke of the capping mechanism for moving said cap into capping position at the capping mechanism to be applied to the next bottle to be capped thereat.

17. A capping head for a bottle capping machine comprising, in combination, a reciprocating capping mechanism operative during its capping stroke to apply to a bottle and crimp thereon a

12

cap delivered to said capping mechanism, a magazine having a quantity of thin metallic hood caps stacked therein in upright position and having the skirt edges downwardly disposed, a suction cup for extracting the lowermost cap from said magazine, a pump movable with and by said capping mechanism for moving said suction cup and for creating a sub-atmospheric pressure through a part of its stroke to energize said suction cup and an atmospheric pressure during the balance of its stroke to release said cap from said suction cup, said pump being operative to move said suction cup into engagement with the lowermost cap in the magazine during the capping stroke of the capping mechanism and at the completion of the capping stroke to create a sub-atmospheric pressure at said suction cup and move the suction cup away from the magazine to withdraw said cap from the magazine, and a cap transfer device operative in timed relation with the operation of said capping mechanism to move the cap, following its removal from the magazine and prior to the next capping stroke of the capping mechanism, into capping position at the capping mechanism to be applied to the next bottle to be capped thereat.

18. In a capping head for a bottle capping machine, the combination of capping mechanism including a ram carrying a crimping ring for crimping a bottle cap onto the mouth of the bottle, a flange mounted at the lower end of said capping mechanism shaped to receive and locate the upper end of a bottle to be capped, and a mounting for said flange normally positioning the flange in spaced relation below said crimping ring and supporting said flange for limited movement with the bottle to be capped as the latter moves relatively upward toward said crimping ring after initially engaging said flange.

19. In a capping mechanism for a bottle capping machine, the combination of a capping head, a ram mounted for limited reciprocation vertically with respect to said capping head, a crimping ring supported by said ram, means yieldingly biasing the ram and the crimping ring downward to a predetermined position with respect to said capping head, a flange formed with a central opening shaped to receive and locate the upper end of a bottle to be capped, a mounting for said flange supported reciprocally on said capping head, and resilient means acting between said capping head and said mounting biasing the flange downward to a position spaced below the crimping ring to initially engage the bottle to be capped upon relative vertical approach movement between said bottle and the capping head, said flange moving with said bottle upward relative to said capping head and toward said crimping ring against the bias of said resilient means after initially engaging said bottle.

20. In a capping mechanism for a bottle capping machine, the combination of a capping head formed with a cavity open at the lower end of the capping head, a ram mounted for limited reciprocation vertically in said cavity in the capping head, a crimping ring supported by said ram, means yieldingly biasing the ram and the crimping ring downward to a predetermined position relative to the capping head, a flange formed with a central opening shaped to receive and locate the upper end of a bottle to be capped, a mounting for said flange supported reciprocally on said capping head and supporting the flange to extend across said cavity at the open lower end of the capping head, and resilient means acting

13

between said capping head and said mounting biasing the flange downward to a position spaced below the crimping ring for initial engagement with the bottle to be capped upon relative vertical approach movement between said bottle and said capping head, said flange moving with said bottle upward relative to said capping head and toward said crimping ring against the bias of said resilient means after initially engaging said bottle.

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