July 27, 1943. C. W. GOODWIN 2,325,164

PICKER MECHANISM

Original Filed June 23, 1941 2 Sheets-Sheet 1

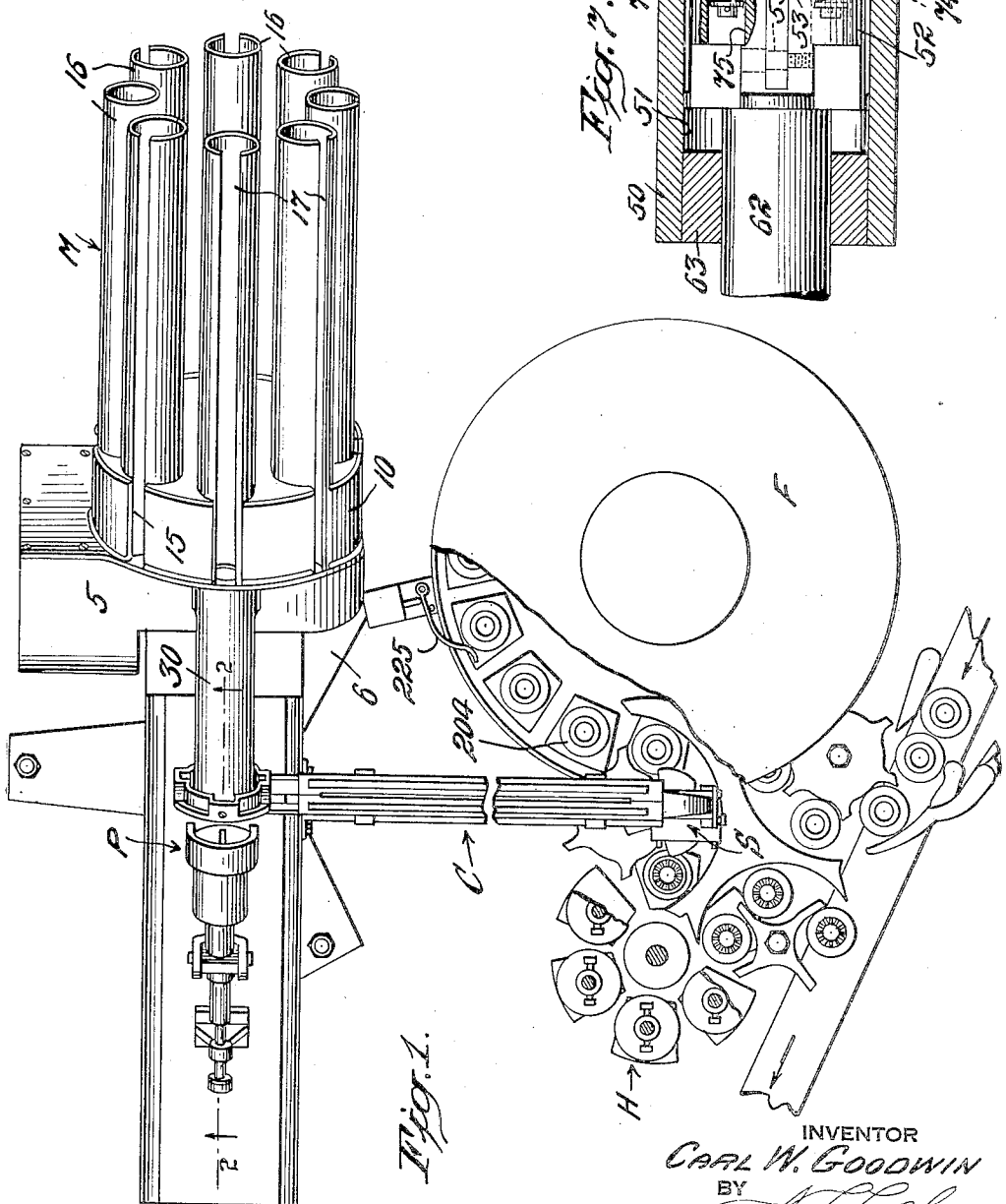


Fig. 1.

Fig. 7.

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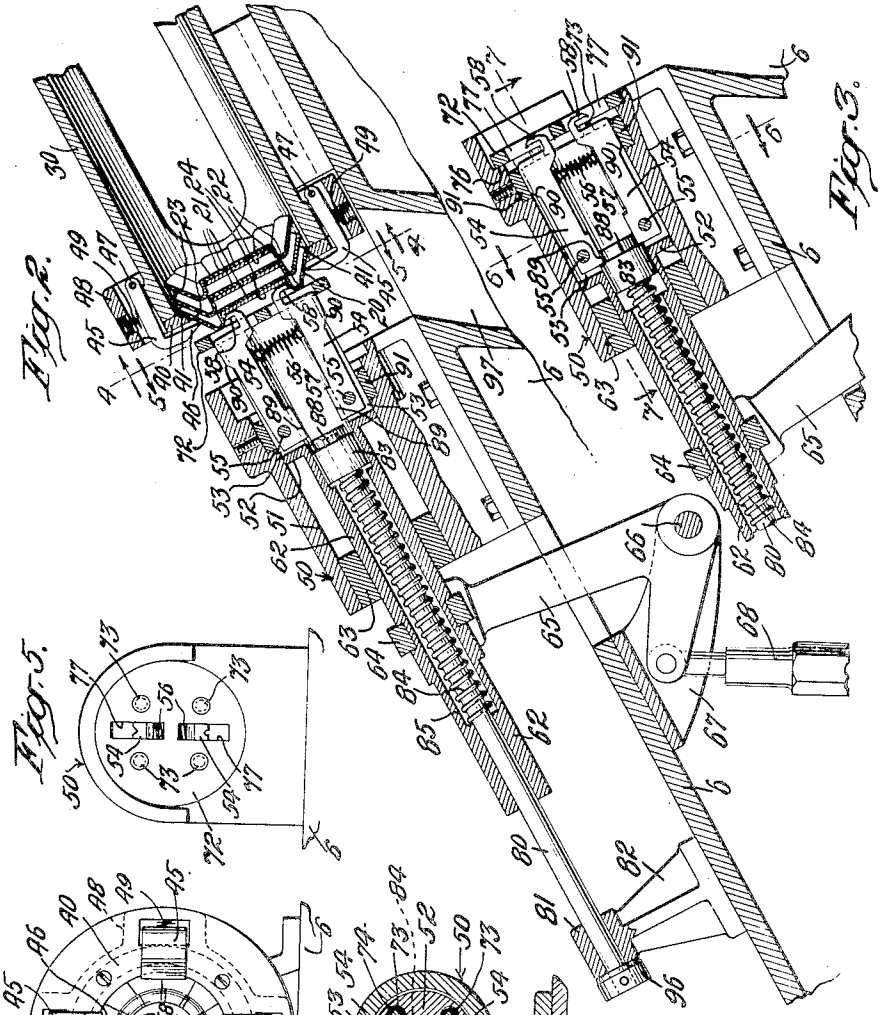


Fig. 3.

Fig. 2.

Fig. 5.

Fig. 4.

Fig. 6.

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PICKER MECHANISM

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Original application June 23, 1941, Serial No. 399,280. Divided and this application August 19, 1941, Serial No. 407,401

4 Claims. (Cl. 226—88.1)

This invention relates to a machine for applying flexible skirted hood caps to milk bottles or the like and more particularly to a machine for applying and sealing caps of the above type having a pleated skirt coated in whole or in part with a thermoplastic adhesive which requires heat and pressure for sealing.

This application is a division of the copending application of Goodwin and Martin, Ser. 399,280, filed June 23, 1941, for Capping machine.

An object of the invention is to provide a mechanism of the above type having novel and improved details of construction and features of operation.

Another object is to provide a novel and improved mechanism of the above type having characteristics suited for commercial operation.

Another object is to provide novel and improved picker means for removing successive caps from a stack.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

Although the novel features which are believed to be characteristic of this invention are pointed out more particularly in the claims appended hereto, the invention itself may be better understood by referring to the following description, taken in connection with the accompanying drawings forming a part thereof in which a specific embodiment of the invention has been set forth for purposes of illustration.

In the drawings,

Fig. 1 is a top plan view of a cap applying and sealing mechanism embodying the present invention;

Fig. 2 is an enlarged section taken on the line 2—2 of Fig. 1 showing the details of the picker mechanism;

Fig. 3 is a longitudinal section similar to Fig. 2 showing the picker mechanism in retracted position;

Figs. 4 and 5 are transverse sections taken on the lines 4—4 and 5—5 respectively of Fig. 2;

Fig. 6 is a transverse section taken on the line 6—6 of Fig. 3; and

Fig. 7 is a section taken on the line 7—7 of Fig. 3 showing details of the picker mechanism.

In the following description and in the claims certain specific terms have been used for convenience in referring to various details of the invention. These terms, however, are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawings more in detail, the invention is shown in Fig. 1 as applied to a capping and sealing mechanism comprising magazine M having a plurality of tubes adapted to contain a plurality of stacks of nested caps for successive application to milk bottles, a picker mechanism P, which is adapted to pick successive caps from said stacks and supply them to a chute C along which the caps roll on the lower edges of their flared skirts in the path of radiant heat rays which are focused onto the adhesive carried by the skirt. From the chute C the caps pass to a cap applying station S where they meet and are picked off by the advancing necks of milk bottles and are carried to a bank of rotating capping heads H which contract the skirts around the necks of the bottles and hold the same under sealing pressure.

The milk bottles are received by a suitable conveyor, passed through a filling device F of standard construction wherein they are filled with milk, thence past the cap applying station S and to the capping heads H above mentioned, after which they are redelivered to the conveyor. The filling station F and the capping heads H form a part of the standard filling and capping apparatus, the details of which form no part of the present invention. The capping heads H may, for example, be of the form disclosed in a co-pending application, Goodwin and Martin, Ser. 383,752 for Capping head. The capping head is particularly designed to fold and seal caps of the type referred to herein. It is to be understood, however, that other types of capping heads and other types of caps may be used if desired.

The magazine M, picker P and chute C, in accordance with the present invention, are formed as a unit mounted on a suitable pedestal which may be positioned to supply caps with heat softened adhesive to the milk bottle heads as they advance from the filler F to the capping heads H on a standard filling and capping machine as above mentioned.

The cap magazine is shown as comprising a stationary housing 5 attached by a bracket 6 to a pedestal adapted to rest upon the floor in a convenient position with respect to the filling machine. A rotatable turret 10 is mounted for rotation in the housing 5. The turret 10 is provided with a plurality of openings 15 adapted to receive tubes 16 which carry the various stacks of caps. The tubes 16 and the corresponding portions of the turret 10 are provided with longitudinal openings 17, which facilitate the

manual filling of the tubes with the stacks of caps.

In practice the stacks of caps are usually wrapped in paper to form units corresponding in size and length generally to the tubes 16. The units are inserted as such in said tubes and the stack is unwrapped in situ by unrolling and removing the paper through the longitudinal slots 17. This procedure not only facilitates the loading of the magazine, but prevents the caps from being touched by the hand during the loading operation.

The caps 20 may be of the general type disclosed in the copending application of Herbert G. Vore, Ser. No. 391,125, which comprises a central diaphragm or closure portion 21, (Fig. 2) an annular pouring lip housing 22 and a fluted skirt 23 carrying a band of thermoplastic adhesive on the outer surface thereof. A disc 24 may be positioned within the recess formed by the diaphragm 21 and the pouring lip housing 22 for increasing the holding power of the cap when seated on the internal ledge of a milk bottle.

The caps 20 are inserted in the tubes 16 with their fluted skirts 23 extending rearwardly and with their diaphragms 21 and pouring lip housings 22 extending forwardly. The magazine M is arranged at an inclination to the horizontal such that the caps feed forwardly by gravity.

The housing 5 is formed with a cap supply chamber 30 with which the successive tubes 16 are adapted to register as the turret 10 is rotated, so that the caps from the corresponding tubes 16 slide downwardly by gravity into the supply chamber 30 when the tubes are properly positioned.

The supply chamber 30 is provided at its discharge end with a cap retaining ring 40 having a bevelled inner surface 41. The bevelled surface 41 is adapted to engage and retain the skirt 23 of the forward cap so as to hold the stack of caps in the supply chamber 30 until the individual caps are successively removed by the picker mechanism to be described. The retaining ring 40 is assisted in this holding operation by a plurality of spring pressed retaining fingers 45, which are mounted on the housing 5 and are provided with points 46 which extend inwardly beyond the inner edge of the ring 40. The fingers 45 are pivoted as at 47 to ears 48 formed on the housing 5. Springs 49 normally hold the fingers 40 in their innermost position but permit retraction thereof as the caps are successively withdrawn through the opening in the ring 40.

The picker mechanism is shown as comprising a housing 50 mounted on the bracket 6 and forming a cylinder 51 in which a head 52 is slidably mounted. The head 52 is provided with a diametrical slot 53 in which picker fingers 54 are pivotally mounted by means of pins 55. A spring 56, extending between opposite picker fingers 54 in said slot 53, tends to hold said fingers 54 outwardly. The fingers 54 are provided with curved points 58 which are adapted to enter the recess in the cap formed by the depressed diaphragm 21 and engage the inner surface of the pouring lip housing 22. The head 52 carries a sleeve 62, which extends outwardly through a bearing 63 in said cylinder 50 and carries a collar 64 which is engaged by a forked arm 65 pivoted at 66 to a bracket 67 by the housing 5. The arm 65 is attached to a link 68 by means of which the head 52 is reciprocated.

A stripper plate 72 is carried on pins 73 (Fig. 7) which are slidably mounted in the head 52 and are normally held in a retracted position by springs 74 seated in bores 75 in said head 52. The stripper plate 72 seats against a shoulder 76 formed in the housing 50 to limit the rearward movement thereof and to permit the fingers 54 to be retracted beyond the forward surface of said plate. The stripper plate 72 is provided with slots 77 through which the fingers 54 extend when they are in advanced position.

A rod 80 is seated within the sleeve 62 and is slidably held in a boss 81 carried in a bracket 82 attached to the housing 5. The rod 80 is provided with a head 83 sliding within the sleeve 62 and in a bore 57 in the head 52 and is normally held in advanced position by a spring 84 located in a bore 85 of said sleeve. The head 83 is provided with a shoulder 88 which is adapted to engage surfaces 89 formed on the fingers 54 for holding the fingers in retracted position as shown in Fig. 3. A collar 96 carried on the rod 80 engages the boss 81 to limit the forward movement of the rod.

The fingers 54 are provided with cam surfaces 90 adapted to engage the inner surface of a retracting ring 91 mounted within the cylinder 51 for retracting the fingers 54 on the rearward movement of the head 52. A discharge passage 97 is formed in the housing 5 to receive the caps from the picker mechanism.

The picker mechanism is normally held in its rearward position as shown in Fig. 3 with the fingers 54 retracted and withdrawn within the confines of the stripper plate 72, the fingers 54 being locked in retracted position by the shoulder 88 of the head 83 by engaging the surfaces 89 of said fingers. As the head 52 is advanced by the forked arm 65, the rod 80, head 83, head 52 and fingers 54 advance as a unit. The stripper plate 72, however, remains in the position shown in Fig. 7 until the head 52 has advanced sufficiently to engage the rear surface thereof, the pins 73 sliding in the head 52 during this portion of the movement. When the head 52 has advanced to engage the stripper plate 72, the points of the fingers 54 project through the slots 77 in the stripper plate a sufficient distance to engage within the depressed central diaphragm portion of the cap.

Thereafter, the head 52, fingers 54 and stripper plate 72 advance as a unit until the collar 96 of the rod 80 engages the boss 81 of the bracket 82 and prevents further forward movement of the rod 80. Further movement of the head 52 then causes the sleeve 64 to move with respect to the rod 80 compressing the spring 84 and releasing the surface 89 of the fingers 54 from the shoulder 88 of the head 83, thereby permitting the fingers 54 to snap open, in response to the pressure of the spring 56, into cap engaging position as shown in Fig. 3.

The arrangement is such that the stripper plate 72 engages the pouring lip housing of the forward cap 20 and slightly lifts the stack for straightening and centering the caps before the fingers 54 have been allowed to snap open, thereby assuring the proper positioning of the forward cap with respect to said fingers. When the fingers 54 are snapped open as above mentioned the points 58 thereof engage the inner surface of the pouring lip housing 22 and securely grip the same.

On the return stroke of the head 52 the cap 20 is pulled through the retaining ring 40 by the

points 58 of the fingers 54. The retaining fingers 45 are retracted by the skirt of the cap 20 as it is pulled through the retaining ring 40 but snap back against the skirt of the succeeding cap to strip the same from the forward cap and to prevent more than one cap from being pulled through the retaining ring. It is to be understood, of course, that the fingers 45 may be omitted if the desired stripping action is obtained by the retaining ring itself.

When the fingers 54 have reached a position such that the cam surfaces 90 thereof engage the retracting ring 91 the fingers are retracted and release the cap. At about this point the stripper plate 72 engages the shoulder 76 of the housing 50 and further rearward movement of the head 52 causes the fingers 54 to be withdrawn beyond the forward surface of the stripper plate, thereby leaving a smooth surface down which the released cap slides to the discharge passage 97. The withdrawal of the points 58 of the fingers 54 beyond the surface of the stripper plate 72 eliminates any projections or irrgularities which might interfere with the free movement of the released cap to the discharge passage 97.

With the fingers 54 retracted as above mentioned, the surfaces 89 thereof are again brought into alignment with the shoulder 88 of the head 83 and permit the head to snap outwardly in response to the action of the spring 84 to engage said surfaces and retain said fingers in retracted position, as shown in Fig. 3.

By the mechanism above described, at each stroke of the arm 65 the forward cap is removed from the supply chamber 30 and is deposited in the discharge passage 97. By utilizing a pair of spaced picker fingers 54 as shown, any distortion or elongation of the diaphragm portion 21 of the cap due to the action of the fingers on the pouring lip housing in one direction causes a contraction of said pouring lip housing in the opposite direction which pinches the disc 24 and retains the same securely in the cap. It is obvious, however, that any desired number of picker fingers may be employed. Four or more oppositely positioned fingers may be used, for example, if desired. In certain instances the action of the fingers may be reversed so as to grip the outer surface of the pouring lip housing instead of the inner surface thereof. A specific embodiment has been shown for purposes of illustration only.

The picker mechanism may be operated by any suitable means such as a one-revolution clutch and is adapted at each actuation to withdraw a cap from the chamber 30 and to drop the same into the discharge passage 97 which supplies the caps to the chute C which may have incorporated therewith suitable heating means for heating the thermoplastic adhesive coating on the skirts of the caps as they pass along said chute.

A contact arm 225 is positioned to be actuated by the advancing bottle before it reaches the capping station S. The contact arm 225 is adapted to close a circuit to actuate the picker mechanism above described so as to withdraw a cap from the stack and to supply the same to the feed chute C in a timed relation such that the cap reaches the capping station S with the bottle. If there is no bottle in any particular position on the filling apparatus, the arm 225 is not actuated and no cap is removed from the stack. The caps are thus removed only as required and are immediately applied to the bottle and pass under the sealing heads while the thermoplastic is soft and tacky for sealing.

The caps are fed from the chute C to the capping station S where they are picked off by the heads of the advancing bottles 204 and are passed under capping heads H wherein the skirts are folded against the necks of the bottles and pressure is applied for sealing the same, all as set forth more in detail in the co-pending application of Goodwin and Martin above mentioned.

Although a specific embodiment of the invention has been shown for purposes of illustration, it is to be understood that various changes and modifications may be made therein as will be readily apparent to a person skilled in the art. Furthermore, the various features set forth above may be applied individually to other types of capping machines and for other uses and are not restricted to the specific combination disclosed. The invention is only to be limited in accordance with the scope of the following claims.

What is claimed is:

1. In a machine for applying to containers and sealing thereon partially preformed hood caps having foldable pleated skirts, a supply chamber containing a supply of said caps nested with the skirts extending rearwardly, the discharge end of said supply chamber having means to release said caps one at a time for individual removal therefrom, a discharge chute beneath the discharge end of said supply chamber and picker means adapted to pick said caps successively from said chamber and to release the same over said discharge chute, said picker means comprising a reciprocating member, a plate carried by said member, said plate having a surface adapted to engage the end cap of said stack for positioning the same to receive the stripper fingers, a set of stripper fingers carried by said member and extending forwardly through said plate in a position to engage and grip said cap to pull the same from said chamber.

2. In a machine for applying to containers and sealing thereon partially preformed hood caps having foldable pleated skirts, a supply chamber containing a supply of said caps nested with the skirts extending rearwardly, the discharge end of said supply chamber having means to release said caps one at a time for individual removal therefrom, a discharge chute beneath the discharge end of said supply chamber and picker means adapted to pick said caps successively from said chamber and to release the same over said discharge chute, said picker means comprising a reciprocating member, a stripper plate carried by said member, said plate having a surface adapted to engage the end cap of said stack for positioning the same to receive the stripper fingers, a set of stripper fingers carried by said member and extending forwardly through said plate in a position to engage and grip said cap to pull the same from said chamber, said member during its return stroke carrying said stripper plate and said fingers to release position over said discharge chute, means at said release position to retract said fingers for releasing said cap and means responsive to further return movement of said member to withdraw said fingers beyond the surface of said stripper plate, whereby said cap is stripped by said plate from said fingers and a smooth surface devoid of projections is provided down which the caps may slide to said discharge chute.

3. In a machine for applying to containers and

sealing thereon partially preformed hood caps having foldable pleated skirts, a supply chamber containing a supply of said caps nested with the skirts extending rearwardly, the discharge end of said supply chamber having means to release said caps one at a time for individual removal therefrom, a discharge chute beneath the discharge end of said supply chamber and picker means adapted to pick said caps successively from said chamber and to release the same over said discharge chute, said picker means comprising a reciprocating head, a stripper plate carried by said head and slidably mounted for limited longitudinal movement with respect thereto, spring means normally holding said stripper plate in retracted position toward said head, a plurality of stripper fingers carried by said head and extending through said stripper plate to engage the foremost cap in said chamber, means limiting the return movement of said stripper plate when in released position over said discharge chute whereby further return movement of said head withdraws said fingers beyond the surface of said stripper plate to strip the cap from said fingers and to provide a smooth surface devoid of projections down which the cap slides to said discharge chute.

4. In a machine for applying to containers and sealing thereon partially preformed hood caps having foldable pleated skirts, a supply chamber containing a supply of said caps nested with the skirts extending rearwardly, the discharge end of said supply chamber having means to release said caps one at a time for individual removal therefrom, a discharge chute beneath the discharge end of said supply chamber and picker means adapted to pick said caps successively from said chamber and to release the same over said discharge chute, said picker means comprising a reciprocating head, a stripper plate carried by said head and slidably mounted for limited longitudinal movement with respect thereto, spring means normally holding said stripper plate in retracted position against said head, a plurality of stripper fingers carried by said head and extending through said stripper plate to engage the foremost cap in said chamber, means engaging said fingers to hold the same in retracted position, means withdrawing said last means from said fingers to release the same when said head has advanced to cap-engaging position, spring means causing said fingers to engage said caps when so released, cam means to retract said fingers when said head in its return movement has reached cap releasing position, and means to limit the return movement of said stripper plate when in said last position, the spring mounting of said stripper plate permitting limited further return movement of said head to thereby retract said fingers beyond the surface of said stripper plate, whereby the cap is released and a smooth surface devoid of projections is provided down which the cap may slide to said discharge opening.

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