July 11, 1944. C. HOBBS 2,353,156

CAPPING MACHINE

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Fig. 3

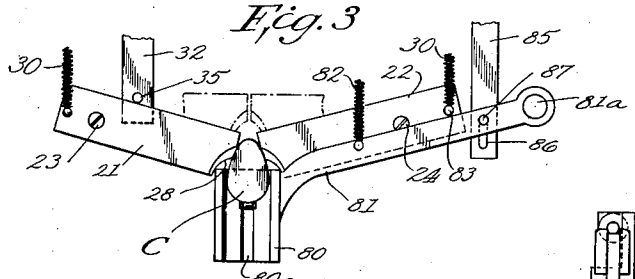


Fig. 4.

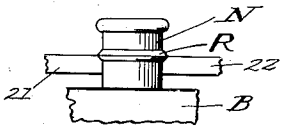


Fig. 2.

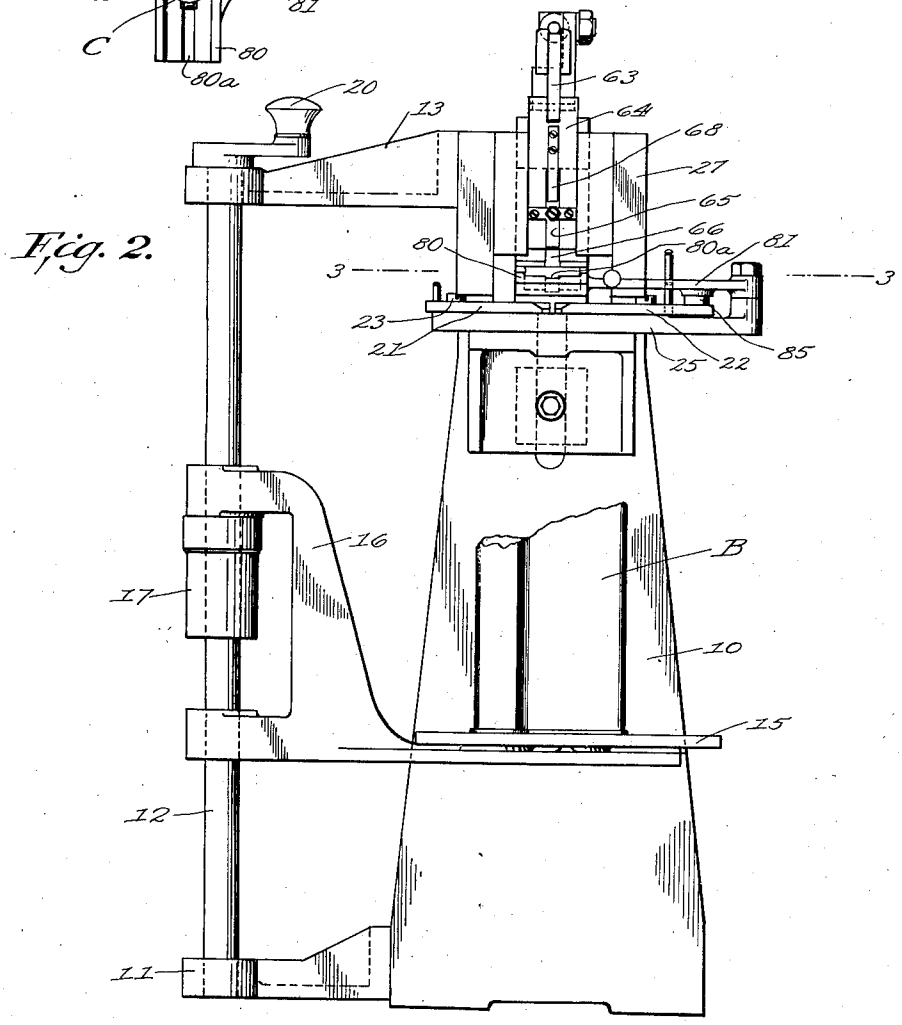


Fig. 5.

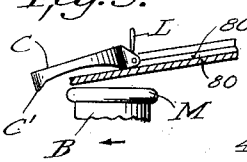
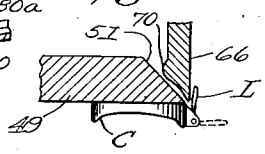


Fig. 6.



Inventor
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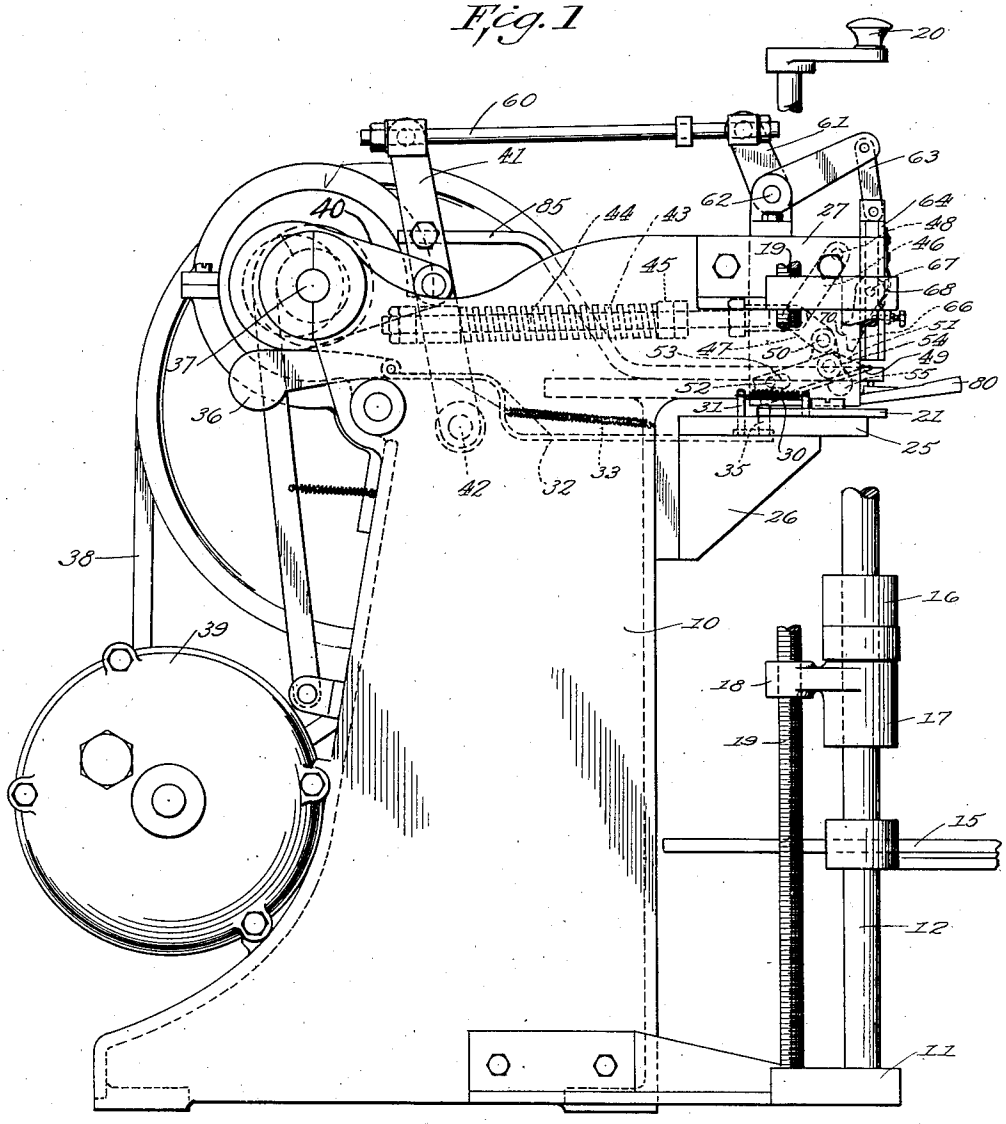
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July 11, 1944. C. HOBBS 2,353,156

CAPPING MACHINE

Filed Aug. 3, 1940 2 Sheets-Sheet 1

Fig. 1



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UNITED STATES PATENT OFFICE

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CAPPING MACHINE

Charles Hobbs, Decatur, Ill., assignor to Crown Cork Specialty Corporation, a corporation of Illinois

Application August 3, 1940, Serial No. 350,808

13 Claims. (Cl. 226—81)

The present invention relates to capping machines and, more particularly, to capping machines for applying caps of the type provided with locking levers, such as shown in Patent No. 2,126,651 for Pouring spout and closure, issued to Carl McQuinn on August 8, 1938.

An important object of the invention is to provide a machine of the above type which is of minimum size and cost for use in small plants, and which is widely adjustable for handling numerous types and sizes of containers.

Capping machines such as are intended to handle caps of the type provided with locking levers must include means to both move the cap to proper position upon the container mouth and also move the locking lever of the cap to locked position with respect to the container. It is also usual to so support the container during the capping operation that the capping force cannot act upon the top wall of the container.

Another object of the present invention is to provide an apparatus which will positively seal the cap and actuate the locking lever all without transmitting any of the capping force to the top wall of the container.

Another object of the invention is to provide means to support a cap in the path of incoming movement of a container so that the cap will readily be placed upon the container for subsequent sealing.

A further object of the invention is to provide a capping head of simple construction which will move both downwardly and laterally so as to insure that a cap tilted upon the container mouth will be given a corresponding movement to sealed position.

Other objects and advantages of the invention will be apparent from the following drawings wherein:

Figure 1 is a side elevation of the machine with portions broken away;

Figure 2 is a front view of the machine;

Figure 3 is a detail horizontal sectional view on the line 3—3 of Figure 2;

Figure 4 shows a container supported in position for capping;

Figure 5 is a detail view showing the manner of supporting a cap, and

Figure 6 is a detail view of the capping head and locking lever operating mechanism.

The machine comprises a base or pedestal 10 including a lateral extension 11 at its lower end which supports an upstanding post 12. The upper end of the pedestal also includes a lateral extension 13 to which the upper end of the post is secured.

A container supporting platform 15 is provided with a yoke 16 which is mounted for swinging movement upon the post 12 with respect to the front wall of the pedestal 10. Container supporting platform 15 is supported in a vertically adjusted position upon post 12 by means of a sleeve 17 positioned beneath the upper yoke on post 16 and including a rearward extension 18 which is threaded upon a screw shaft 19 rotatably mounted in the extensions 11 and 13 and provided at its upper end with a handle 20. Obviously, rotation of screw shaft 19 will cause the sleeve 17 to varify the vertical position of the container supporting platform 15.

A pair of container gripping arms 21 and 22 are respectively pivoted at 23 and 24 upon a forwardly extended plate 25 carried by an angle bracket 26 secured to the pedestal 10 beneath an overhanging and forwardly extending housing 27 provided in the upper end of the pedestal.

It will be noted from Figure 1 that the forward edge of the container gripping arms 21 and 22 extend past the forward edge of the plate 25. The adjacent ends of the arms 21 and 22 are also recessed on their forward edges as at 28 to receive the neck of a container and the arms 21 and 22 extend sufficiently far forward past plate 25 that even when the arms are in their rearward and container gripping position indicated in dotted lines in Figure 3 the container neck will not contact with the forward edge of plate 25. It will also be noted from Figure 2 that the upper edges of the recesses 28 of the arms 21 and 22 are beveled so as to engage beneath a rim R about the neck N of an container as shown in Figure 4 to support the container and prevent capping pressure from being applied to the container top wall.

The arms 21 and 22 are normally urged to the forward position shown in solid lines in Figure 3 by coil springs 30 extending from the outer ends of the arms to fixed posts 31 on the bracket 26. A trip bar 32 normally urged forwardly by a coil spring 33 carries an upstanding pin 35 arranged in the path of movement of the container gripping arm 21. The rearward end of trip bar 32 is connected to a clutch operating mechanism 36 upon a shaft structure 37. The purpose of the clutch mechanism 36 is to operatively connect the driving portion of the shaft structure 37, rotated through a chain 38 from a motor 39, to the driven portion of the shaft structure for one complete revolution and then release the clutch.

The driven portion of the shaft structure 37 carries an eccentric strap 40 which is pivotally conected to a vertical lever 41 pivoted in pedestal 10 at 42. Adjacent its lower end the lever 41 is connected to a coil spring 43 surrounding a rod 44 in such manner that the rearward end of spring 43 will receive a forward impulse from lever 41 and will transmit the same to a collar 45 fixed adjacent the forward end of rod 44. The extreme forward end of rod 44 is pivotally connected to a toggle device comprising an upper link 46 and a lower link 47, rod 44 being connected at the pivot point of the two links so that forward movement of the rod will cause the toggle to move toward a vertically extended position.

The upper link 46 is pivoted to the housing 27 at 48, and the lower link 47 is pivotally connected to the upper portion of a capping head 49, as indicated at 50. Capping head 49 has its lower surface of a plate-like form to engage the top wall of a cap but it includes a rearwardly inclined upper cam surface for a purpose hereinafter set forth.

Capping head 49 is pivotally supported at its inner end on a horizontal pin 52 fixed in housing 27, the pin extending through a forwardly enlarged slot 53 in the capping head. Adjacent its forward end and at each side capping head 49 is provided with rollers 54 adapted to move in short substantially vertical slots 55 in the housing 27. Thus, when a forward thrust is imparted to spring 43 by lever 41, rod 44 will urge the toggle device toward a vertical position with the result that the forward end of the capping head 49 will be moved downwardly, while the entire head moves slightly forwardly, such movement of the head being permitted by reason of the fact that the slot 53 in which the pin 52 moves has its lower wall slightly downwardly inclined.

It will be noted that when the downward movement of the capping head 49 is stopped, as by engagement with the top wall of the cap, lever 41 will simply compress spring 43, the spring thereby acting as a compensation mechanism in the capping structure.

The extreme upper end of lever 41 is pivotally connected to a link 60 having its forward end pivoted to the vertically extending arm of a bell crank 61 pivotally mounted on the housing 27. The other arm of bell crank 61 is pivotally connected through a link 63 to a vertical slide 64 provided with a vertically extending slot 65 (Figure 2) in which a locking lever operating arm 66 is pivotally mounted on a horizontal pin 67. As best shown in Figure 1, the trip arm 66 is urged to the position shown in that figure by means of a leaf spring 68 fixed to slide 64 with its lower and free end bearing on the forward surface of arm 66 just beneath the pivot. The lower and rearward surface of arm 66 is provided with an integral shoulder 70 which, when the slide 64 is moved downwardly, will ride upon the cam surface 51 of capping head 49, with the result that as the trip arm 66 moves downwardly its lower end will be swung forwardly and down past the lower surface of the capping head 49.

A cap support 80 is provided at the front of the machine, this element being of generally tray-like form and being downwardly inclined as best shown in Figure 5. Element 80 is carried by an arm 81 pivoted on the plate 25 as indicated at 81a, both element 80 and its supporting arm 81 being positioned in a plane above the container gripping arms 21 and 22. Cap support 80 is urged to the inward position indicated in Figures 1 and 3 by a coil spring 82. So long as the container gripping arms 21 and 22 are in the forward position illustrated in Figure 3, however, the inward swinging of cap support 80 is limited by the upwardly extending pin 83 to which the spring 30 of container gripping arm 22 is connected.

Since pin 83 is outwardly of the pivot 24 of arm 22 and hence will be in an inward position when the container gripping arms are in their normal outward position shown in Figure 3, the cap support 80 may be at this time in the inward position shown in the same figure. Cap support 80 will be moved from the inward position shown in Figure 3 by means of a rod 85 pivotally connected to lever 41 just above the connection of crank 40 to the latter, arm 85 being provided with a longitudinal slot 86 adjacent its forward end which is adapted, on forward movement of the rod, to contact with a pin 87 extending downwardly from the cap support 80 inwardly of the pivot 81a of the latter. On rearward movement of the rod 85 slot 86 will simply move along the pin 87.

In the operation the machine a filled container B is placed upon the platform 15 by the operator. As indicated in Figure 2, if the container is rectangular in cross section, it is usual to have the pouring spout of the type disclosed in the McQuinn patent positioned near one corner of the top wall of the can with the pouring spout extending diagonally toward that corner. Therefore, when such a can is positioned upon such a platform it must be properly alined so that the major axis of the pouring spout will substantially coincide with the direction of movement of the can when the latter is engaged and moves with the gripping or container supporting arms 21 and 22.

A cap C of the type shown in the McQuinn patent has already been placed in the inclined cap support 80, so that the forward lip C' of the cap will hang downwardly over the forward edge of the cap support so as to be engaged by the leading portion of the container mouth M when the container is moving inwardly as indicated in Figure 5.

It will be understood that at the above time the driving portion of shaft structure 37 will be continuously rotating and that the container supporting arms 21 and 22 will be in the forward position shown in solid lines in Figure 3 with the cap support 80 in the rearward and inward position shown in the same figure.

When the operator moves the container B forwardly to cause the rib R on the neck of the container to engage the beveled surfaces of the recesses 28 of the container supporting arms 21 and 22, the engagement of the neck N of the container with the outwardly facing portions of these recesses will cause the container supporting arms to swing inwardly against the action of the springs 30. This movement of the arm 21 will cause the clutch operating slide 32 to move rearwardly to engage the driven portion of shaft structure 37 with the continuously operated driving portion of the shaft structure, this clutch connection continuing until the shaft structure has made one full revolution, when it will be automatically disengaged in well known manner.

With the clutch engaged, lever 41 will be swung forwardly and during the initial portion of this movement, it will slide the rod 85 sufficiently forwardly to swing the cap support 80 forwardly

from the position illustrated in Figure 3, so that support 80 will be clear of downward movement of locking lever operating trip arm 66.

Substantially simultaneously, lever 41 will compress the spring 43 sufficiently to move rod 44 forwardly to substantially straighten the toggle links 46 and 47, forcing the capping head 49 to swing downwardly and move slightly forwardly and contact with the top wall of the cap C. If, compensation is required, the spring 43 will permit the same. The forward movement of the capping head is desirable in order to insure that a lip extending inwardly from the skirt of a cap of the type disclosed in the McQuinn patent will engage beneath the mouth of the container. The movement also serves to properly level a slightly tilted cap.

As the capping head 49 swings and moves forwardly to move the cap to sealed position on the container the slide 64 will be moved downwardly, bringing the shoulder 70 upon trip arm 66 into contact with the cam 51 on the capping head 49. Thus the trip arm will swing forwardly against the action of spring 68 as it moves downwardly. As shown in Figure 6 this will move the locking lever L from the solid line position of Figure 6 to the dotted line position of the same figure so that the cap will be locked upon the container.

The operator will then withdraw the can from beneath the supporting arms 21 and 22 so that the latter will be moved forwardly by the springs 30. Such forward movement of the inner ends of these gripping arms will cause the pin 83 carried by gripping arm 22 to move rearwardly so that the cap support 80, which already has another cap placed thereon, will swing to the position of Figure 3 by the action of spring 82. This will complete the cycle of operation.

A longitudinally extending and central groove 80a is provided in the upper surface of the cap support 80 in which the downwardly projecting portions of the cap skirt, comprising the locking lip and locking lever shoulders, may rest. Thus, the cap will be leveled in the capping support along a transverse line. The element 80 also is provided with upstanding side flanges as shown in Figure 5.

It will be observed that the machine is extremely simple in operation and construction but, nevertheless, fulfills the objects set forth above as to the rapid and efficient sealing of caps upon containers. It is to be particularly noted that the movements imparted to the capping head and locking lever operating elements both insure that a cap will be properly sealed with the proper force and also that the locking lever L will be swung to proper locking position without possibility of breakage.

The terminology used in the specification is for the purpose of description and not of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a capping machine for applying to containers caps including locking levers, container supporting means, capping means, means to move the cap locking lever to locked position, said capping means being movable into the path of the locking lever moving means to control movement of the latter.

2. In a capping machine for applying to containers caps including locking levers, container supporting means, capping means, means to move the cap locking lever to locked position, said capping means being movable into the path of the locking lever moving means to control movement of the latter, said last two means being movable in substantially parallel paths.

3. In a capping machine for applying to containers caps including locking levers, container supporting means, capping means, means to move the cap locking lever to locked position, said capping means being movable into the path of the locking lever moving means to control movement of the latter, said last two means being movable in substantially parallel paths, and the locking lever moving means being mounted for swinging movement out of its path.

4. In a capping mechanism for applying to containers caps including locking levers, container supporting means, operating means actuated by contact of a container with said supporting means, a capping head, and a locking lever operating element, said head and element being movable downwardly and laterally with respect to the container.

5. In a capping machine for applying to containers caps including locking levers, container supporting means, capping means, means to move the cap locking lever to locked position, said last-named means and said capping means being movable along intersecting paths so that movement of the capping means will control movement of the locking lever moving means.

6. In a capping machine for applying to containers caps including locking levers, container supporting means, a movable capping head, means to move the cap locking lever to locked position, said head being movable into contact with said last named means to control the operation of the latter, and means to move said capping head.

7. In a capping machine for applying caps to containers, a container supporting element, a container capping element, means to move said capping element through cap applying and retracting strokes, cap supporting means, and means to hold said cap supporting means normally in the path of movement of said capping element and to move it from such path during the cap applying stroke of said capping element.

8. In a capping machine for applying caps to containers, a container supporting element, a container capping element, means to move said capping element through cap applying and retracting strokes, cap supporting means, means to hold said cap supporting means normally in the path of movement of said capping element, and means carried by said container supporting means to move said cap supporting means from such path during the cap applying stroke of said capping element.

9. In a capping machine, capping means reciprocable in a predetermined path, means to support a container for movement in a path transverse to the capping means path and to also support the container in the path of movement of said capping means, means to support a cap in said path of transverse movement of the container and in the path of said capping means, and means to move said cap support out of the path of movement of said capping means.

10. In a capping machine, capping means reciprocable in a predetermined path, means to support a container for movement in a path transverse to the capping means path and to also support the container in the path of movement of said capping means, means to support a cap in said path of transverse movement of the container and in the path of said capping means.

and means carried by said container supporting means to hold said cap support out of the path of movement of said capping means.

11. In a capping mechanism for applying to containers caps including locking levers, means to move a locking lever from raised to locked position comprising a vertically movable slide element, a locking lever engaging arm pivotally depending from said element and normally having its locking lever engaging portion at one side of the path of movement of said slide element, and means in the path of downward movement of said arm to move the locking lever engaging portion of the latter to the opposite side of the slide element path during such downward movement.

12. In a capping mechanism for applying to containers caps provided with inwardly extending ledges on their skirts, a base, a plate-like capping element pivotally mounted at one side edge thereof in said base for downward swinging movement with respect to the base and toward a container, said element being mounted to move translationally in a direction transversely of its downward movement, and means to swing said element on its pivot and simultaneously impart a translational movement thereto.

13. In a capping mechanism for applying to containers caps provided with inwardly extending ledges on their skirts, a base, a plate-like capping element pivotally mounted at one side edge thereof in said base for downward swinging movement with respect to the base and toward a container, said element being mounted to move translationally in a direction transversely of its downward movement, and means to swing said element on its pivot and simultaneously impart a translational movement thereto, including a reciprocable element and a toggle connection between said reciprocable element and said capping element.

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