N. M. LA PORTE.

CAPPING MACHINE.

APPLICATION FILED MAY 18, 1914.

1,226,778.

Patented May 22, 1917

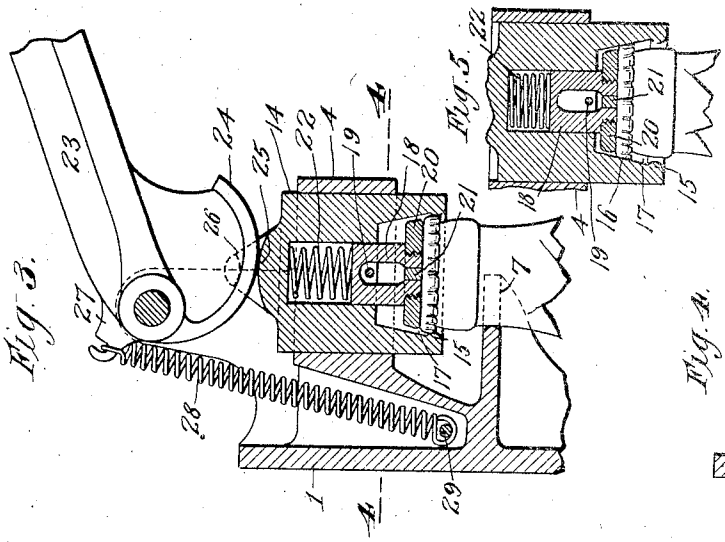


Fig. 3.

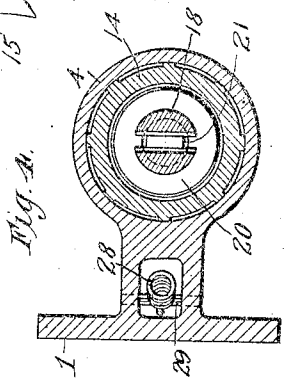


Fig. 4.

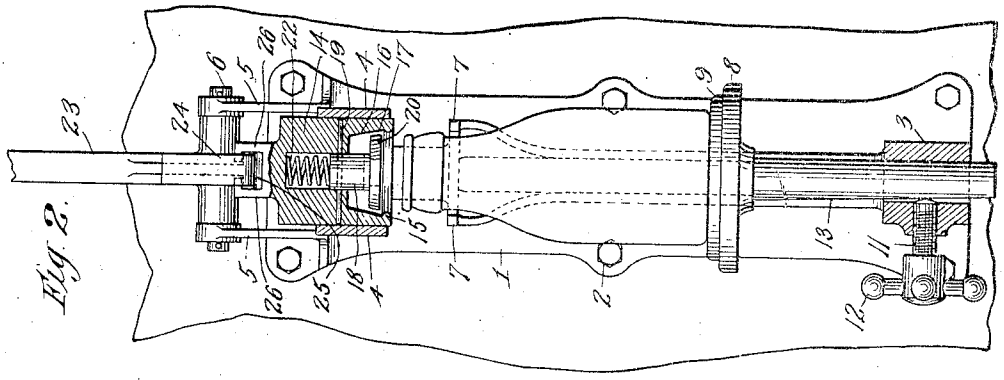


Fig. 2.

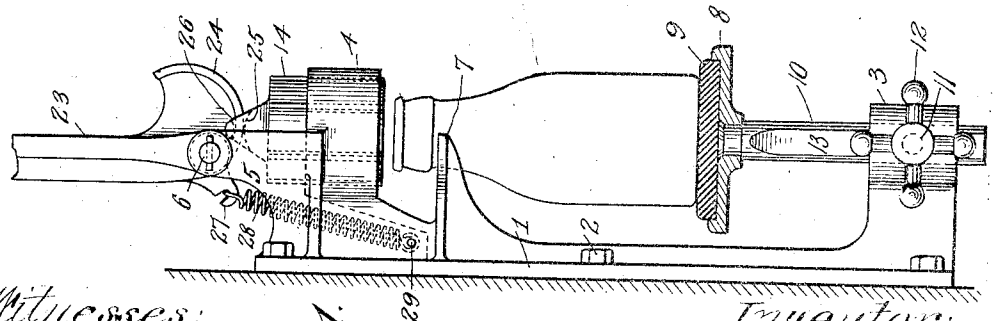


Fig. 1.

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UNITED STATES PATENT OFFICE.

NORBERT M. LA PORTE, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY OF BALTIMORE CITY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

CAPPING-MACHINE.

1,226,778. Specification of Letters Patent. Patented May 22, 1917.

Application filed May 18, 1914. Serial No. 839,290.

To all whom it may concern:

Be it known that I, NORBERT M. LA PORTE, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Capping-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improvement in capping machines, and particularly to a hand-operated machine for applying crown corks to bottles and the like.

The object of the invention is to provide a simple and durable machine which will be economical to manufacture and easily transported and which will quickly apply the well-known type of crown cork to bottles and similar vessels.

The machines heretofore constructed for the purpose of applying crown corks to bottles have usually been either power or treadle operated machines of heavy construction and intended for use in large plants where great quantities of bottles were to be capped.

It has been found that these machines are entirely too complex and too expensive to install and operate where only a limited number of bottles are to be capped. It is the object of the present invention to provide a machine which can be conveniently and economically operated by unskilled labor under conditions where only a small number of bottles are to be capped at a time. The machine is particularly adapted for applying thin sheet metal crowns to milk bottles, where said bottles and contents after having been sealed are to be subjected to a pasteurizing process.

With the above general objects in view, the invention consists in the features, details of construction and combination of parts which will now be described in connection with the accompanying drawings:

Figure 1 is a side elevation of an apparatus embodying the best form of this invention, the bottle-supporting table being shown in section;

Fig. 2 is a front elevation of the same, with the plunger in section;

Fig. 3 is a detailed sectional view taken in a plane at right angles to the sectional portions of Fig. 2;

Fig. 4 is a horizontal section on the line 4—4, Fig. 3; and

Fig. 5 is a detailed sectional view of the capping head, showing it in position for finally setting a cap.

Referring to the drawings,—1 is a wall plate adapted to be secured to a wall or post in any suitable way, as, for example, by means of lag screws indicated at 2. The wall plate 1 is provided with extensions in the nature of brackets, the lower extension indicated at 3 being arranged to carry a bottle support, while the upper extension serves to carry a plunger guideway 4 and two upward-extending arms indicated at 5, which support a fulcrum pin 6. Between the extension 3 and the plunger guideway 4, the wall plate is provided with an intermediate extension indicated at 7, which is forked at its front end and arranged to receive the neck of the bottle to be capped, the fork being of such a shape that when the bottle is placed with its neck in said fork, the axis of the bottle will be in alinement with the axis of the plunger. The bottle support comprises a table 8 having its upper surface recessed to receive a cushion 9, of suitable elastic material, the table 8 being mounted on the upper end of a standard 10, which passes through a vertical opening in the extension 3. The standard 10 is arranged to be engaged by a screw 11 threaded through the extension 3 and provided on its exterior with a suitable operating handle 12. For the purpose of more certainly preventing the standard 10 from slipping downward and also to permit quick adjustment vertically of the standard in the extension 3, it has one side flattened and sloped, the slope being upward and outward, this sloping surface being arranged to be engaged by the inner end of the screw 11. This sloping or wedge surface is shown at 13, Figs. 1 and 2. In the plunger guideway 4 is mounted a plunger 14 having its lower end arranged to serve as a capping head, said lower end being centrally recessed from below to form a chamber whose walls are substantially conoidal,—that is to say, inclined upward and inward—the lower portion of the walls of the chamber extending inward toward the axis of the plunger. This inward-extending portion indicated at 15 serves as a cap-bending portion

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and the diameter of opening at this place is larger than the diameter of the chamber near the upper end thereof. The chamber of the capping head may be considered as having three portions, namely, the lower cap-bending portion 15 hereinbefore referred to, a portion near the upper end of lesser diameter than that of the opening in the cap-bending portion indicated at 16, Fig. 5; this portion serving as a cap-setting portion. Between the cap-setting and cap-bending portions, the chamber has an enlarged diameter as indicated generally at 17. Furthermore, the slope of the walls of the chamber at 16 is such that any pressure against said walls due to the resiliency of the cap after being set will produce a downward resultant tending to force the cap out of the chamber. The plunger is provided with a central opening, in which is mounted a permanent magnet 18, substantially cylindrical exteriorly and having a central slot, through which passes a transverse rod 19, Fig. 3, secured in the walls of the plunger, this rod serving to restrict the movement of the permanent magnet. The lower end of the permanent magnet 18 is screwed into a presser foot 20 of magnetic material, such, for example, as a soft iron. The space between the two legs of the permanent magnet, at the point where it is threaded into the presser foot, is closed by a suitable filler block 21, which may also be of magnetic material. The permanent magnet, and with it the presser foot, is yieldingly forced downward by suitable means, such as a spring 22 located in the recess in the plunger. Suitable means is provided for reciprocating the plunger, that shown in the present example comprising a lever 23 fulcrumed on the fulcrum pin 6, the axis of this fulcrum being back of the transverse plane through the vertical axis of the plunger. This lever is provided with a double-acting cam device, consisting, in the present instance, of two lateral flanges 24, whose upper and lower faces have the desired curvature, the lower faces of the flanges bearing against a rounded top 25 of the plunger. The plunger 14 is provided with ears 26, Fig. 2, having ends extending toward each other and arranged to engage the upper surfaces of the cam flanges 24. The lever is also provided with a hook 27 extending in a general radial direction from the axis of the fulcrum, to which hook is attached one end of a spring 28, whose other end is suitably secured to the machine frame. For convenience in assembling, the spring is provided with eyes at each end, one of which is engaged by the hook 27, and the other by a pin 29, in the frame.

The operation of the device is as follows: The bottle supporting table may be adjusted up or down and locked at the desired point by turning the screw 11. When it is desired to cap a bottle, the usual crown cork is placed by hand in contact with the presser foot 20 and being itself of magnetic material is there retained because the presser foot is magnetic by induction from the permanent magnet 18. A bottle may now be placed upon the cushion 9 of the bottle support, with its neck pushed back into the fork 7, whereby the axis of the bottle will be in line with the axis of the capping head. When the lever is pulled forward, its cam mechanism will push the plunger downward. The first effect of this is to bring the cap-bending portion 15 in contact with the outer edge of the skirt of the cap, thereby bending said skirt down, with its corrugations in contact with the lower edge of the bottle rim. A further downward movement of the capping head first permits the skirt of the cap to clear the cap-bending portion and enter the enlarged portion 17 of the conical chamber within the capping head. After still further downward movement of the capping head, the walls of the conical chamber come in contact with the skirt at about the portion 16 and finally exert pressure on the upper edge of the skirt, thereby tending firmly to set the skirt in close contact with the bottle rim, or, in other words, to roll the skirt somewhat under the rim. During the downward movement of the plunger, the presser foot 20 is maintained in close contact with the cap by means of the spring 22, which is gradually compressed as the permanent magnet 18 enters the recess in the plunger, thereby holding the cap in proper position on the bottle. The position of the apparatus at the time the cap-bending portion of the capping head has bent the skirt downward is shown in Fig. 3, whereas the termination of the downward movement of the plunger and the operation of setting the skirt firmly is shown in Fig. 5. In this figure, the cap is shown in contact with that portion of the wall of the chamber in the capping head constituting the cap-setting portion 16. It will be noted that the diameter of the chamber at this part is less than the diameter of any part of the chamber below said cap-setting portion. Further, the slope of the walls of the chamber at this point is such that if there is any outward spring of the cap, such as would tend to create a pressure against the chamber walls, such pressure would be resolved into two components, one of which would be perpendicular to the wall, while the other would be in a downward direction. Consequently, as soon as the lever is raised and the capping head lifted, there is no tendency of the cap to bind or stick in the chamber. In other words, the capped bottle readily frees

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itself from the capping head and has sufficient clearance so that, as the capping-head ascends, the bottle will not be lifted.

It will be seen that, by a simple proportioning and arrangement of the chamber in the capping head, a satisfactory device is provided for applying a cap to a bottle, while at the same time avoiding the complex mechanisms heretofore considered necessary for bending and setting the cap firmly in place and for thereafter positively freeing the bottle from the capping mechanism.

What is claimed is:—

1. In a capping machine, the combination, with a bottle support, of a capping head having a chamber to receive the upper end of the bottle, said chamber having a cap-bending surface of circular cross-section arranged to come into contact with the outer edge of the skirt of the cap and bend the same down into contact with the bottle, said chamber also having, above the cap-bending portion, a frusto-conical cap-setting portion, the maximum and minimum diameters of the frusto-conical portion being such that the upper edge of the skirt will contact with an intermediate diameter of the frusto-conical portion, whereby the cap is set, and means for producing a relative motion of the bottle support and capping head.

2. In a capping machine, the combination, with a bottle support, of a capping head having a chamber to receive the upper end of the article to be capped, said chamber comprising a cap-setting portion with downward-sloping working-faces, a cap-bending portion below the cap-setting portion and having its walls separated to a greater extent than are the working-faces of the cap-setting portion, and an enlarged portion between the cap-bending and the cap-setting portions of the chamber, and means for producing a relative motion of the bottle support and the capping head.

3. In a capping machine, the combination, with a bottle support, of a capping head having a chamber to receive the upper end of the bottle, said chamber having a cap-bending portion arranged to come into engagement with the outer edge of the skirt of the cap and bend the same down entirely around its circumference, said chamber also having above the cap-bending portion a cap-setting portion having a conical surface, an intermediate part of which is arranged to come in contact with the skirt near its upper edge only, and force the same downward, whereby the cap is set, and means for producing a relative motion of the bottle support and capping head.

4. In a capping machine, the combination with a bottle support, of a capping head having a chamber to receive the upper end of the bottle, said chamber having a cap-bending surface of circular cross-section arranged to come into contact with the outer edge of the skirt of the cap and bend the same down into contact with the bottle, said chamber also having, above the cap-bending portion, a frusto-conical cap-setting portion, the maximum and minimum diameters of the frusto-conical portion being such that the upper edge of the skirt will contact with an intermediate diameter of the frusto-conical portion, whereby the cap is set, a permanent magnet movable with relation to said capping head, a presser foot carried by said permanent magnet and located within the chamber of the capping head, a spring tending to move the permanent magnet in a direction toward the bottle head, and means for producing a relative motion of the bottle support and the capping head.

In testimony whereof, I have hereunto set my hand, in the presence of a witness.

NORBERT M. LA PORTE.

Witness:
A. WHITE.