No. 873,022. PATENTED DEC. 10, 1907.

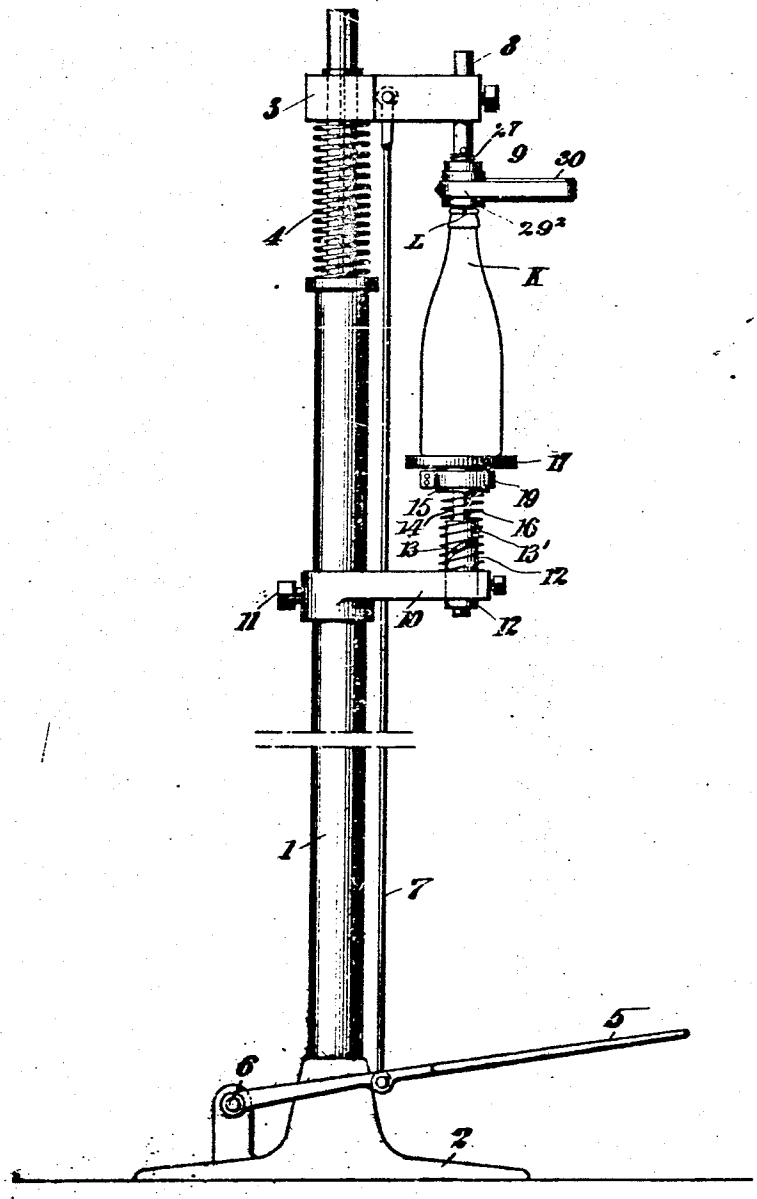
A. W. CORDES.

BOTTLE CAPPING MACHINE.

APPLICATION FILED SEPT. 21, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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4 SHEETS—SHEET 2.

Fig. 2.

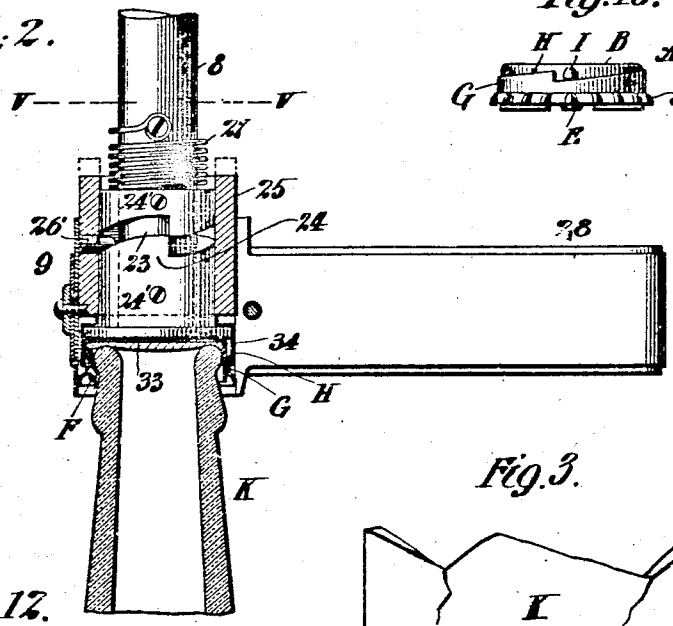


Fig. 10.

Fig. 3.

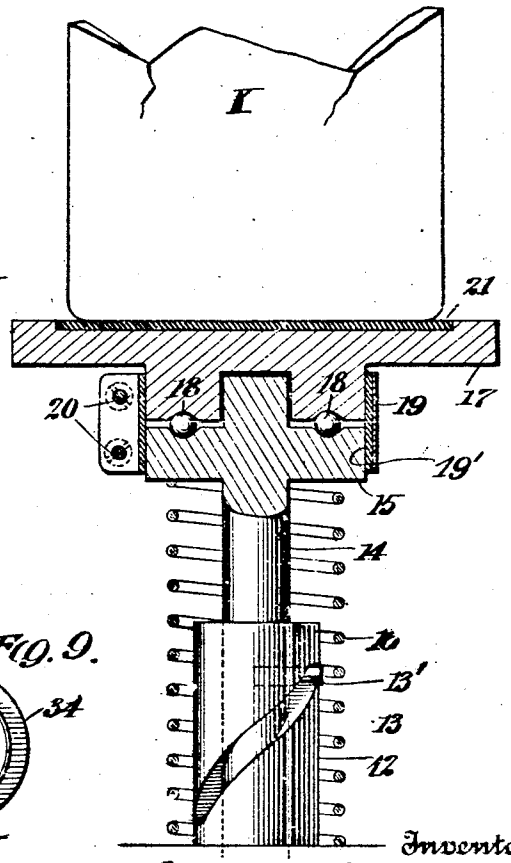


Fig. 12.

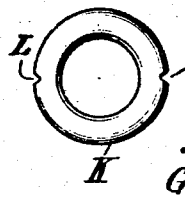


Fig. 11.

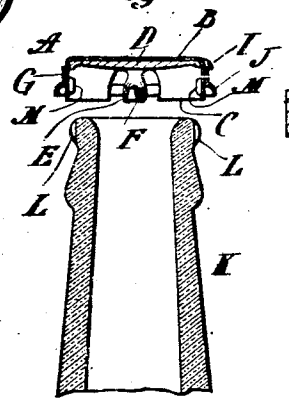


Fig. 8.

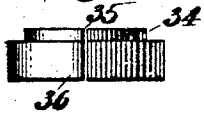
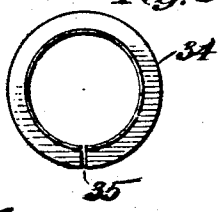


Fig. 9.



Witnesses

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4 SHEETS—SHEET 3.

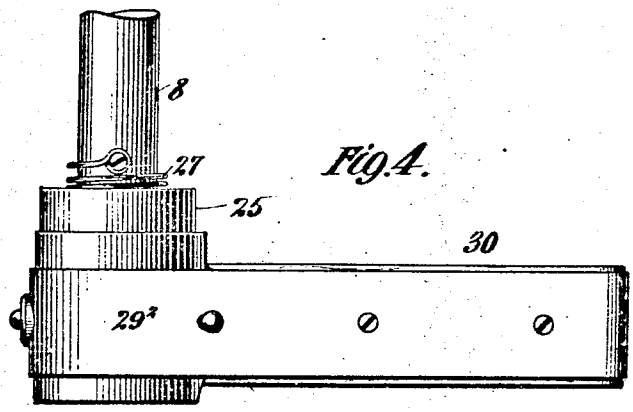
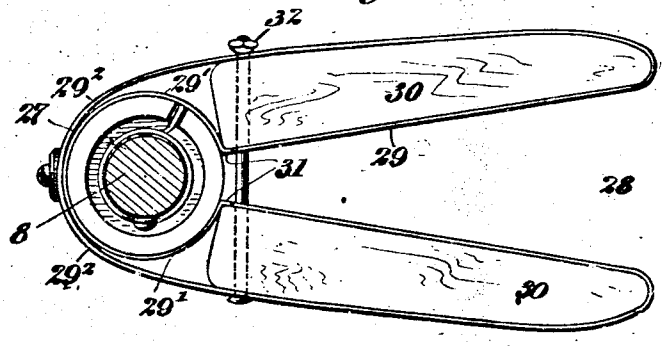


Fig. 4.

Fig. 5.



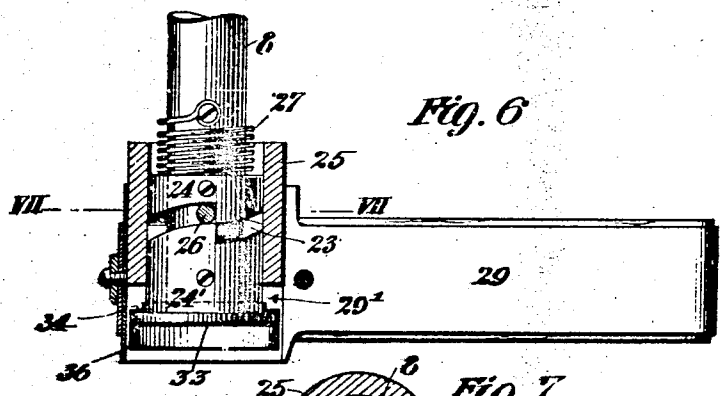


Fig. 6.

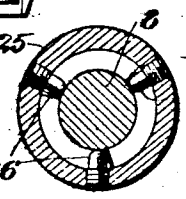


Fig. 7.

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BOTTLE CAPPING MACHINE.

APPLICATION FILED SEPT. 21, 1906.

4 SHEETS—SHEET 4.

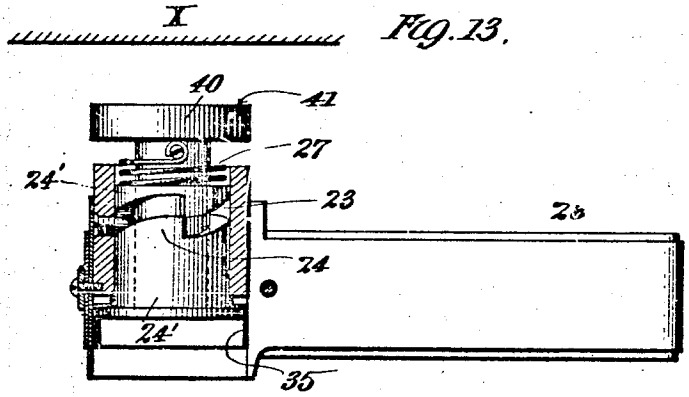


Fig. 13.

Fig. 14.

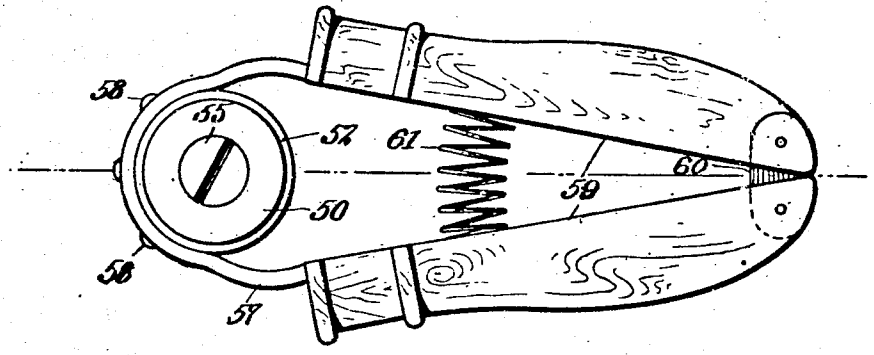
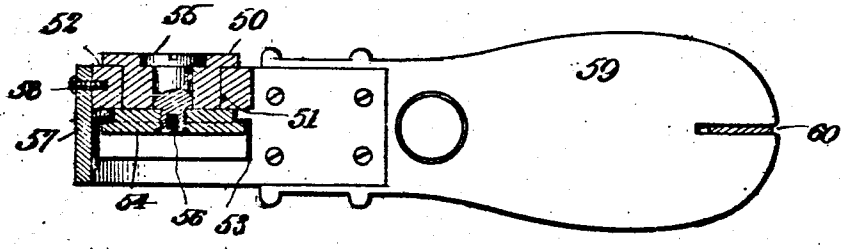


Fig. 15.



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UNITED STATES PATENT OFFICE.

AUGUST W. CORDES, OF NEW YORK, N. Y.

BOTTLE-CAPPING MACHINE.

No. 873,022. Specification of Letters Patent. Patented Dec. 10, 1907.

Application filed September 21, 1906. Serial No. 335,538.

To all whom it may concern:

Be it known that I, AUGUST W. CORDES, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a full, clear, and exact description.

My invention relates to bottle capping machines or tools, and pertains particularly to the provision of a machine or tool for applying caps of the character set forth in my Patent No. 824,341, and my application 312,772, filed April 20, 1906, although the invention is applicable to many other forms of cap having a movable clamping ring by which they are tightened.

The principal object of the invention is to provide a machine or tool of the above character, which applies the caps quickly and perfectly to the bottles under all circumstances, regardless of slight variations or irregularities therein, and without necessitating any particular care or skill on the part of the operator.

With these and other objects in view, the invention consists in the features of construction hereinafter set forth and claimed.

In the drawings: Figure 1 is a side elevation of a bottle capping machine embodying the principles of my invention; Fig. 2 is a vertical sectional view of the cap applying head; Fig. 3 is a sectional view showing the support or rest for the bottle; Fig. 4 is a side view of the cap applying head; Fig. 5 is a horizontal sectional view on the line V—V of Fig. 2; Fig. 6 is a view similar to Fig. 2 showing the cap applying head in a position to receive a cap; Fig. 7 is a partial sectional view on the line VII—VII of Fig. 6; Fig. 8 is a detail side view of one of the parts; Fig. 9 is a top view of the same; Fig. 10 is a side elevation showing the construction of a cap adapted to be applied in accordance with my invention; Fig. 11 is a sectional view of the same in position to be applied to a bottle; Fig. 12 is a view of the top of a form of bottle which may be used; Fig. 13 is a sectional view similar to Fig. 2, but showing a slightly modified construction of gripping lever adapted to be used as a separate tool. Fig. 14 is a plan view of another modified form of gripping lever; Fig. 15 is a sectional view of the same.

In the practical operation of a bottle capping machine or tool the most essential requisite is to have the appliance work quickly and perfectly in spite of rather careless handling, which is unavoidable under the ordinary conditions of a bottling establishment. The operator cannot be depended on to position the caps at any particular angular relation in the cap applying device, nor can he be called upon to apply any exact predetermined amount of pressure to the foot levers and operating devices. Moreover since the operator frequently pushes the caps into the cap receiving device rather carelessly, such device should be constructed to avoid injury to the caps in such case. In carrying out my invention I secure all these requisites, and in addition I obtain a machine which is durable and rapid in its operation.

Referring to the drawings in which like parts are designated by the same reference sign, 1 indicates the frame or standard of the machine supported from a base 2, and having a vertically depressible cross head 3, normally spring impelled into its upward position by a compression spring 4.

5 indicates a foot pedal pivoted at 6 on the base and having a link connection 7 with the cross head 3. The cross head carries the main operating spindle 8, having a cap applying head 9, at its lower extremity.

10 denotes a bracket adjustable vertically on the standard 1, by means of a set screw 11. I provide upon this bracket a vertically projecting sleeve 12 in alinement with the main operating spindle 8, and having a spiral aperture 13 in its wall, as shown in Fig. 3. This spirally apertured sleeve contains a vertically sliding plunger 14, with an enlargement 15 thereon to limit its downward movement against the sleeve 12. This plunger also carries a pin 13′ which is guided in the spiral aperture 13, so that the plunger has a definite rotative movement when depressed.

16 denotes a spring surrounding the sleeve and plunger and serving to normally maintain the latter in an elevated position. The bottle support 17 is rotatably supported by the plunger 14, and in order to minimize the uncertain friction of the rotative movement, I have shown ball bearings 18 interposed between the bottle support and the plunger.

As will hereinafter appear, it is desirable to have a certain predetermined friction in the rotative movement of the bottle support 17 and the plunger 14. For this purpose I employ what I shall term the safety friction

device comprising a strap 19 bearing on both the bottle support 17 and the enlargement 15 of the plunger through an intermediate packing strip 19′, so that a frictional engagement of definite value is exerted against both members. The amount of this friction can be adjusted by the screws 20. This safety friction device may, of course, be made so as to be placed on any desired base or support in connection with a capping machine. The bottle support is conveniently provided with a mat 21 of rubber, or suitable material, to cushion the bottle, and also to give a strong frictional engagement between the bottle and its support 17.

In Figs. 2 and 6 I have shown a construction of cap applying tool or head attached to and forming part of the spindle 8. For this purpose the spindle 8 is enlarged at its lower end to form a cylindrical block 24 with spiral grooves 23 therein. This is best accomplished by fastening suitably shaped collars 24′, thereto. These collars serve to loosely guide a sleeve 25, having a plurality of inwardly projecting pins 26, which coöperate with the spiral grooves 23, to give the sleeve a predetermined longitudinal movement when it is rotated.

27 denotes a spiral spring, fastened at its respective ends to the spindle 8, and to the sleeve 25, so as to normally impel the latter in one direction, left handed or anti-clockwise, looking from above in the construction shown. The normal position of the parts under the impulse of this spring is illustrated in Fig. 2.

Secured to the sleeve 25 and laterally projecting therefrom into a position convenient to be grasped by the operator, is a gripping lever 28. This lever is conveniently constructed of a metallic strap 29, which encircles the sleeve at 29′, and then extends radially outward therefrom to inclose stiffening blocks 30, the metal of the strap finally returning toward the sleeve, and again encircling the same at 29². By this construction a pair of biting shoulders are produced at 31, the metal at this point being supported by the blocks 30. When the two blocks 30 are impelled toward one another, the biting shoulders 31 become effective for the purpose of clamping the bottle cap, as will hereinafter appear. The blocks 30 are normally impelled apart by the resiliency of the metallic strap 29, their separation being limited by a bolt 32. While I have shown this particular construction of gripping lever 28, I do not desire to be limited or restricted thereto, since other forms of gripping lever adapted to clasp the cap when grasped in the hand, may be used in lieu thereof if desired.

The spindle 8 terminates at its lower end in a flat face 33, and is conveniently enlarged at this point to substantially the diameter of the bottle cap.

34 indicates a resilient spring ring, conveniently split at 35, which loosely surrounds the spindle, and has a depending rim 36. This spring ring may be fastened to the spindle, if desired.

Before considering the use and operation of the machine, I will describe briefly the essential features of a bottle cap which may be applied thereby. A designates broadly such a bottle cap, having a main portion B, with a circumferential depending rim C, and an interior lining of packing material D. E indicate depending spring fingers, which are beaded at F, so as to present a rounded surface exteriorly and interiorly. G indicates a clamping ring surrounding the cap and arranged to cam the fingers E inward when it is moved downward thereon. The ring is moved downward in this way by turning circumferentially, the top edge having cam inclines H, which coöperate with lugs or projections I on the cap. The lower edge of the clamping ring is conveniently milled or roughened, as shown at J, so as to be conveniently grasped by the fingers in turning it. This cap is applicable to an ordinary bottle, or it may be used with a special bottle, as shown in Figs. 11 and 12. In these figures the neck of the bottle K has recesses L at one or more points, and the interior of the cap has lugs M adapted to fall in such recesses.

The use and operation is as follows: It being desired to apply caps of the form above described to an ordinary bottle, the operator pushes a cap upwardly into the cap applying head 9. The cap passes upward and is guided into a central position by the engagement of the prongs I thereon, with the spring ring 34. It is evident that while this engagement holds the cap firmly in place, it does not prevent rotative movement of the clamping ring G, since the cap is held only by the protuberances I. A further advantage follows from this arrangement, since the protuberances I prevent any portion of the clamping ring being caught when a cap is carelessly inserted into the head, the cap being centered as it is inserted by the engagement of the prongs with the spring ring. The cap being thus pushed into place within the cap applying head, a bottle is placed on the bottle support 17, and the foot pedal 5 operated to depress the main operating spindle toward the bottle and position the cap thereon. It is to be noted that the resiliency of the cap is sufficiently great to permit its being initially placed on the bottle regardless of the relative position of the prongs M and the notches L. When the cap engages the bottle, the latter is depressed and rotates as it moves downwardly by reason of the spiral incline 13. The cap B does not partake of this rotary movement, however, on account of the friction of the knurled or roughened surface 33, which is sufficiently great for this pur-

pose. The bottle accordingly turns with relation to the cap, by which means the interior prongs M fall into the recesses L of the bottle. When this occurs the bottle is prevented from further relative rotary movement with respect to the cap by such engagement, and thereafter the plunger 14 rotates independently of the bottle and its support by reason of the ball bearing 18, the friction strap 19 not imposing sufficient resistance to prevent this. Thus the safety friction device prevents the bottle being broken whether the prongs M fall into the notches L L at once or only after considerable rotative movement. The operation is finally arrested by the enlargement 15 bringing up against the upper face of the sleeve 12, and the pressure on the foot pedal is thereupon effective to bind the cap tightly upon the bottle while the clamping ring is being rotated.

In order to rotate the clamping ring, the operator grasps the gripping lever 28 and compresses the two blocks 30 toward one another. This causes the shoulders 31 to cooperate with the strap 29′ and firmly bite the clamping ring J of the cap. The gripping lever is then swung clockwise so that the clamping ring is tightened upon the fingers F, which thereafter hold the cap in its tightened or clamping position. In this action the gripping lever 28 is guided by the sleeve 25 which in turn is guided by the spiral grooves 23. The gripping lever, therefore, describes a spiral path, and the form of the cam grooves 23 is such that this path exactly corresponds to that required for the clamping ring J, which moves downward when turned by reason of the cam inclines on its upper edge. I regard this arrangement by which the gripping lever has an axial movement in applying the cap as a very important feature. It is important to have the cap firmly pressed on the bottle and the clamping ring then given the axial and rotary movement above described, particularly the axial movement which is the one effective to tighten the fingers E. This being accomplished, it is merely necessary to release the foot pedal and the gripping lever 28, whereupon the springs 4 and 27, and the resiliency of the strap 29 will restore all the parts to their initial or normal condition.

I regard as the most essential features of the invention, the gripping lever for turning the clamping ring of the cap and giving it an axial movement, and the safety friction device upon which the bottle rests. While I have illustrated these features in connection with an organized machine, this is not essential, since the gripping lever and the friction safety device are susceptible of use as separate tools. In Figs. 13, 14 and 15, I have illustrated forms of gripping levers adapted for use as separate tools. The construction in Fig. 13 is exactly like that already described in the machine except that in place of the spindle 8, there is substituted an enlargement 40, with a flat upper face 41. This tool is adapted to tighten the caps on a bottle without the use of any other machinery. It is best, however, to employ any ordinary press with a depressible flat surface X.

Any ordinary die press, arbor press, screw press, or foot press, may be employed as convenient. The procedure is to place the cap within the spring ring 35 exactly as has been already described in connection with Fig. 2, and then having positioned the cap and gripping lever upon a bottle, to place the whole under the press. After the pressure is applied, the gripping lever is grasped and turned clockwise as before, the friction of the members on the flat surface 41 serving to hold this part against rotation. The spring 27 returns the gripping lever to its normal position exactly as in the preceding case. This form of the invention is most applicable to use with ordinary bottles not provided with notches L, and the caps being also unprovided with the protuberances M.

In Figs. 14 and 15 there is shown a slight modification of gripping lever or tool. A cylindrical block 50 is circumferentially grooved at 51, and is swiveled within a ring 52, within such groove. 53 indicates a spring ring revolubly held with respect to the block 50 by means of a plate 54. 55 and 56 indicate screws for holding the parts together. A strap 57 of leather or flexible material surrounds the ring 52, and is secured thereto by screws 58. 59 indicate handles connected to the leather and flexibly connected to one another by a link 60 at their outer ends. The handles are normally spring impelled apart by the compression spring 61. The use of this tool is exactly similar to that of Fig. 13, the handles 59 serving to bind the strap 57 upon the clamping ring G when the handles are gripped. Thereafter the clamping ring may be turned while the cap is held stationary by its engagement with the bottle and with the plate 54.

What I claim, is:—

1. In a machine for applying a cap having a clamping ring to a bottle, means for initially rotating the bottle and the cap relatively to one another and finally rotating the clamping ring relatively to the cap.

2. In a machine for applying a cap having a clamping ring to a rotatable bottle, a bottle support cam guides for rotating said support when it is depressed, and a cap applying head adapted to depress a cap on the bottle without rotation of said head.

3. In a machine for applying a cap having a clamping ring to a bottle, a bottle support arranged to be simultaneously depressed and rotated, a cap applying head depressible in alinement with said support, and means

for independently rotating the clamping ring.

4. In a machine for applying a cap having a clamping ring to a bottle, a cap applying head having a spring ring to receive a bottle cap, means for depressing said cap upon a bottle, and means for gripping the clamping ring to rotate it.

5. In a machine for applying a cap having a clamping ring to a bottle, a cap applying head having a spring ring adapted to engage the cap independently of the clamping ring, means for depressing the cap applying head upon a bottle, and means for grasping the clamping ring to rotate it.

6. In a machine for applying a cap having a clamping ring to a bottle, means for frictionally engaging the cap and the bottle to rotate them relatively to one another, and means for finally frictionally engaging the clamping ring to rotate it relatively to the cap.

7. In a machine for applying a cap having a clamping ring to a bottle, means for frictionally engaging the cap and causing relative rotation thereof with respect to the bottle, and means for finally engaging the clamping ring whereby it may be rotated downwardly in a spiral path with respect to the cap.

8. In a machine for applying a cap having a clamping ring to a bottle, means for pressing the cap upon the bottle, and means for rotating the clamping ring in a spiral path with respect to the cap.

9. In a machine for applying a cap having a clamping ring to a bottle, means for grasping the cap and depressing it without rotation upon a bottle, and means for finally moving the clamping ring spirally with respect to the cap.

10. In a machine for applying a cap having a clamping ring to a bottle, a cap applying head having spring means to receive and hold the cap, and a gripping lever extending laterally from said cap applying head and guided to have a spiral movement with respect thereto.

11. In a machine for applying a cap having a clamping ring to a bottle, a depressible spindle having a lower face to frictionally engage the cap, means for gripping the clamping ring to rotate it independently of the cap, and means whereby the bottle is given an initial rotary movement with respect to the cap.

12. In a machine for applying a cap having a clamping ring to a bottle, a depressible spindle adapted to frictionally engage a cap, a bottle support arranged to have a rotative movement when depressed, and a gripping lever rotatably supported on said spindle to engage the clamping ring.

13. In a machine for applying a cap having a clamping ring to a bottle, a main operating spindle arranged to be depressed upon a bottle, a bottle support arranged to have a rotative movement when depressed, means whereby such rotative movement is arrested after the cap is properly engaged upon the bottle, and means for finally turning the clamping ring.

14. In a machine for applying a cap having a clamping ring to a bottle, a main operating spindle, a plunger in alinement therewith having a rotative movement when depressed, a bottle support rotatably mounted on said plunger, and means for imparting a predetermined friction to said bottle support when the plunger is turned.

15. In a machine for applying a cap having a clamping ring to a bottle, a main operating spindle arranged to depress a cap upon a bottle, and a gripping lever rotatably supported on said spindle and having a resilient strap adapted to surround the clamping ring and bite the same.

16. In a machine for applying a cap having a clamping ring to a bottle, a main operating spindle and a gripping lever extending laterally therefrom and adapted to be grasped by the hand of the operator and arranged to grip the clamping ring, and a spring for impelling said lever into normal position.

17. A means for tightening the clamping ring of a bottle cap, comprising a block having a spring ring thereon, and a gripping lever surrounding said block and spring impelled rotatably with relation thereto.

18. A means for tightening the clamping ring of a bottle cap, comprising a block adapted to be placed against the top of the cap, and a gripping lever having a strap of resilient material movable rotatably of said block and adapted to clamp the clamping ring.

19. A means for tightening the clamping ring of a bottle cap, comprising a block having spiral inclines thereon, and a gripping lever surrounding said block and guided by said inclines to have a combined rotary and axial movement.

20. In a bottle capping machine, a safety friction device, comprising a bottle support, and means for holding said support against rotation with a predetermined amount of frictional engagement.

21. In a bottle capping machine, a safety friction device comprising a bottle support, means for holding said support against rotation, and means for permitting relative movement between said support and means, with a predetermined amount of frictional resistance.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

AUGUST W. CORDES.

Witnesses:
FRANK S. OBER,
WM. A. ROSENBAUM.