(No Model.) 4 Sheets—Sheet 1.

A. L. BERNARDIN.

BOTTLE CAPPING MACHINE.

No. 527,193. Patented Oct. 9, 1894.

FIG. 1.

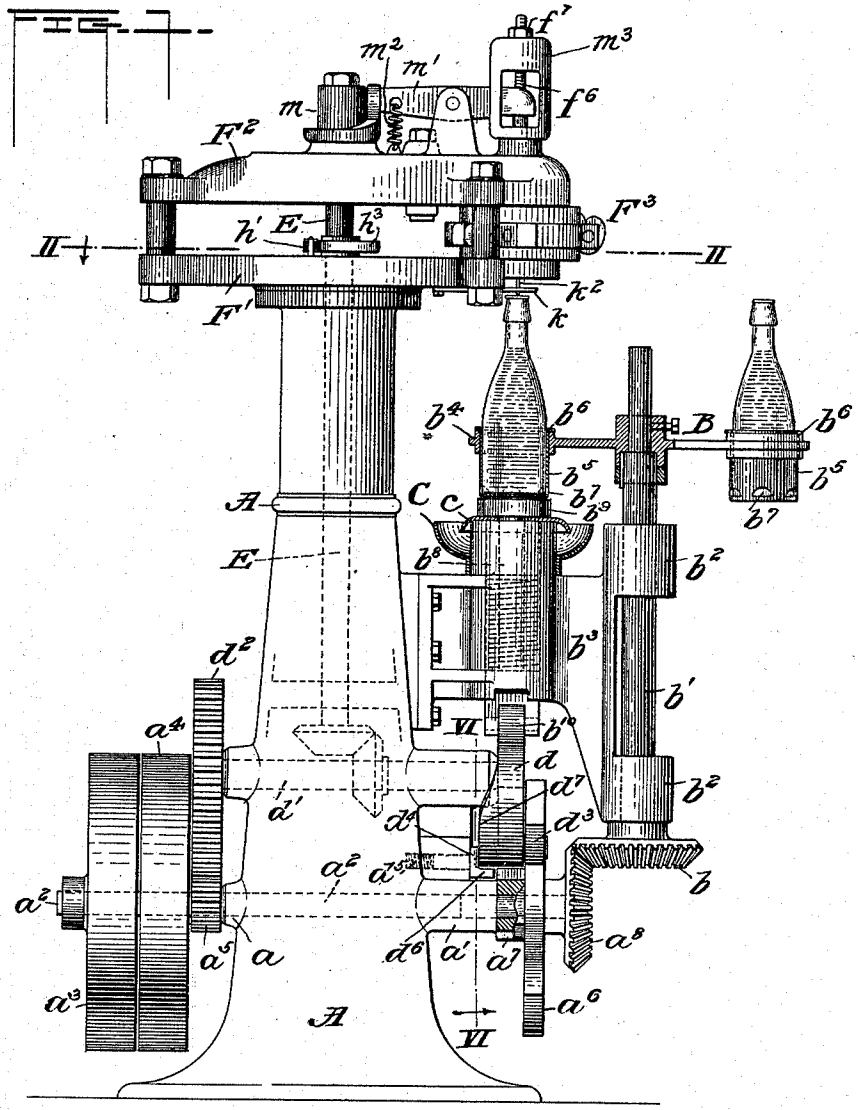
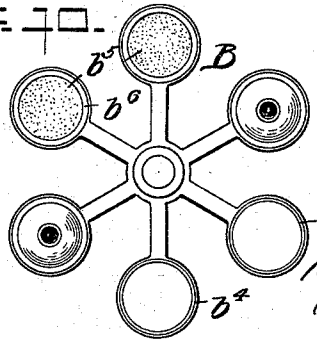


FIG. 10.



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(No Model.) 4 Sheets—Sheet 2.

A. L. BERNARDIN.

BOTTLE CAPPING MACHINE.

No. 527,193. Patented Oct. 9, 1894.

FIG. 2.

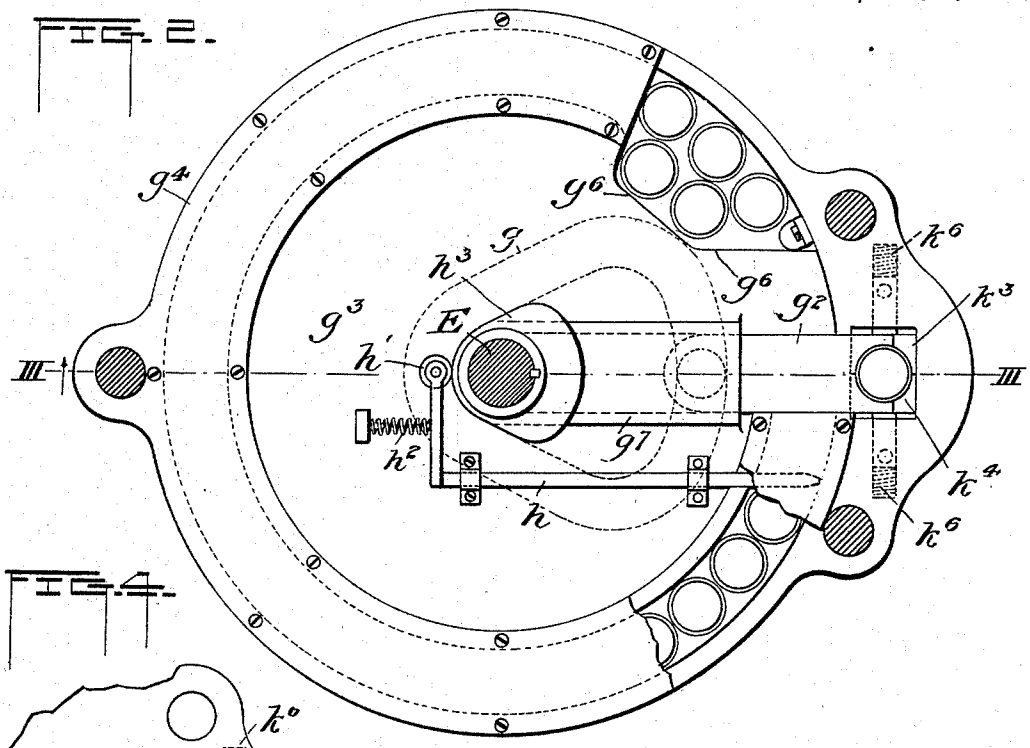


FIG. 4.

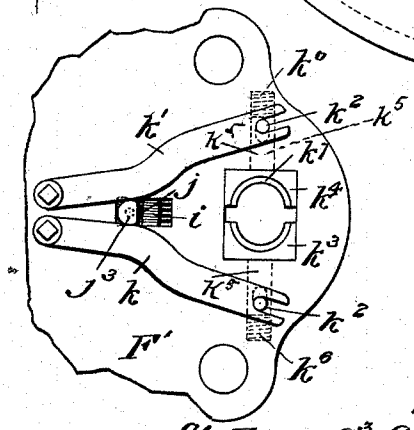


FIG. 3.

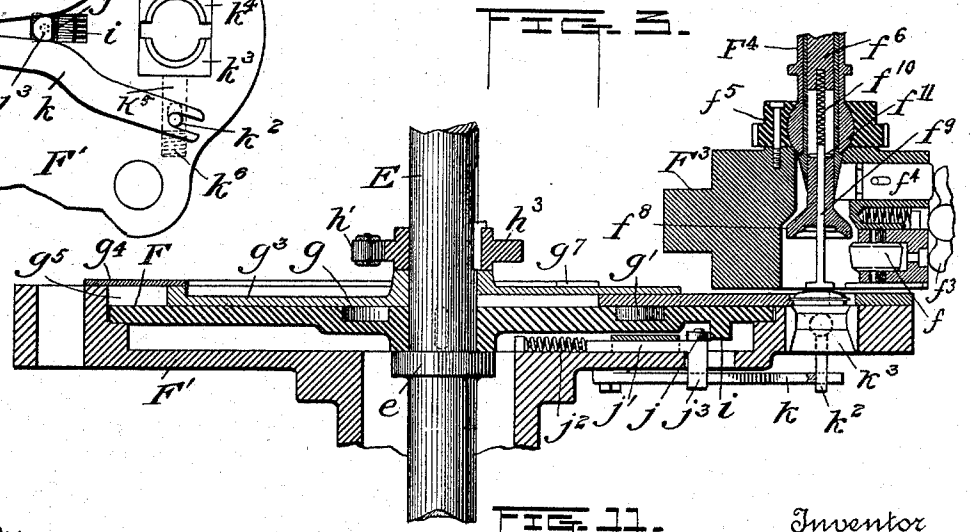
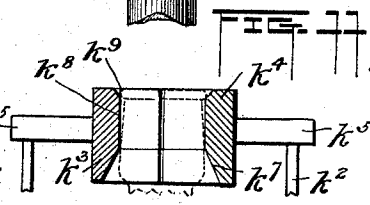


FIG. 11.



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(No Model.) 4 Sheets—Sheet 3.

A. L. BERNARDIN.

BOTTLE CAPPING MACHINE.

No. 527,193. Patented Oct. 9, 1894.

FIG. 5.

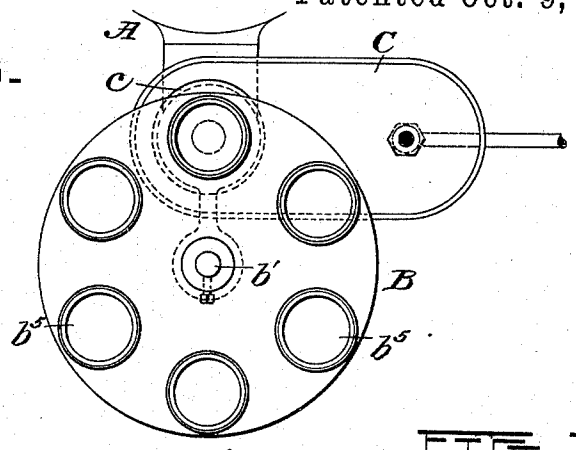


FIG. 6.

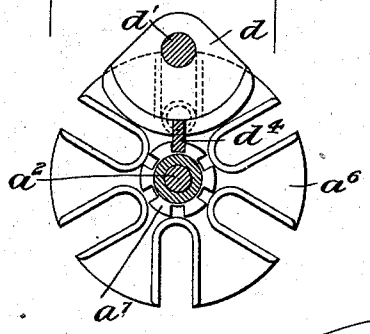


FIG. 9.

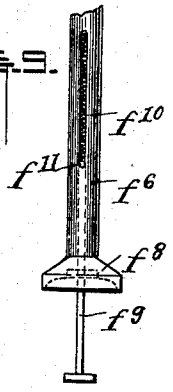


FIG. 7.

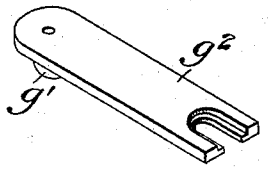
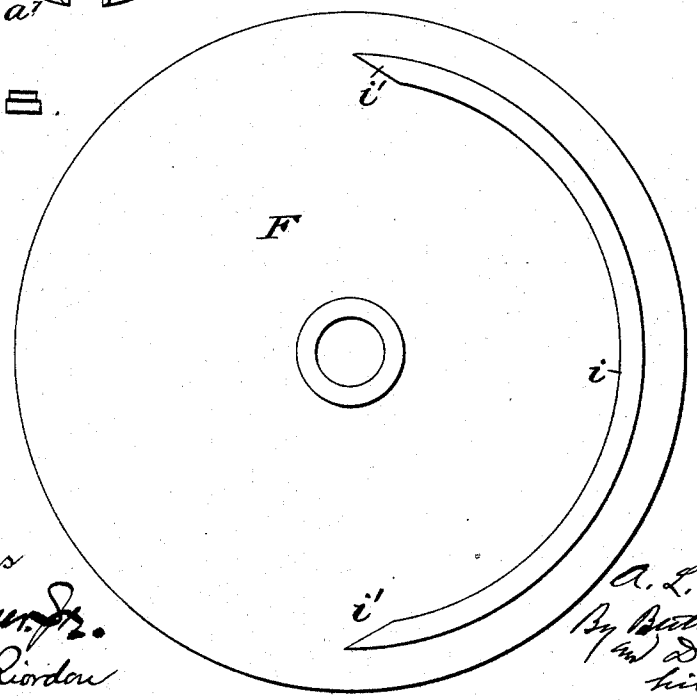


FIG. 8.



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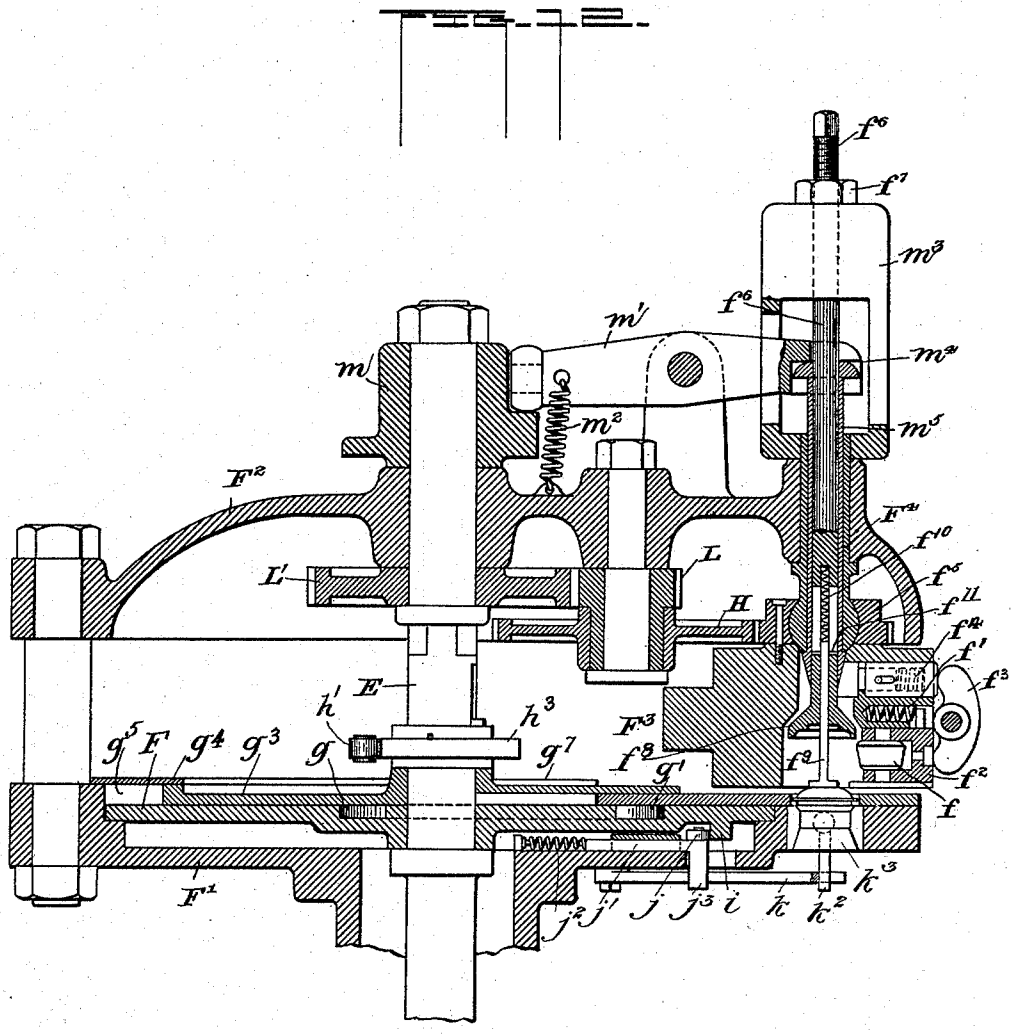
(No Model.) 4 Sheets—Sheet 4.

A. L. BERNARDIN.

BOTTLE CAPPING MACHINE.

No. 527,193. Patented Oct. 9, 1894.



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his attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALFRED L. BERNARDIN, OF EVANSVILLE, INDIANA, ASSIGNOR TO THE BERNARDIN METALLIC CORK COMPANY, OF SAME PLACE.

BOTTLE-CAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,193, dated October 9, 1894.

Application filed May 4, 1894. Serial No. 510,052. (No model.)

To all whom it may concern:

Be it known that I, ALFRED L. BERNARDIN, a citizen of the United States, residing at Evansville, county of Vanderburg and State of Indiana, have invented certain new and useful Improvements in Bottle-Capping Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in bottle capping machines, and more particularly to a machine for applying a metallic cap provided with a depending flange to the head of a bottle having an annular shoulder against which the flange of the cap is pressed in locking contact.

The primary object of the invention is to provide a simple, compact machine, adapted to be automatically operated from a single source of power.

Further objects of the invention are to provide effective means for keeping the bottle in proper alignment when the same is forced upward in position to receive the cap; to provide automatic means for feeding the caps, in combination with means for preventing the caps from crowding or interfering with the cap-feeding mechanism; to provide means for holding the caps and head of the bottles in their proper relative positions for the compression of the caps so as to prevent the breaking of the bottles; and to provide means for conveying away the liquid from the machine should a bottle break while compressing a cap around the head thereof.

With these several objects in view the invention consists in the features of construction and combinations of parts hereinafter fully described and pointed out in the appended claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a machine embodying my improvements, some of the parts being shown in section. Fig. 2 is a sectional plan view on the line II—II of Fig. 1, illustrating the cap-feeding mechanism. Fig. 3 is a fragmentary vertical section on the line III—III of Fig. 2. Fig. 4 is an inverted plan of the bottle and cap aligning devices. Fig. 5 is a plan view of the bottle holder with the liquid conveying trough arranged below said holder. Fig. 6 is a sectional view on the line VI—VI of Fig. 1, illustrating the cam and means for placing the bottle holder in proper alignment. Fig. 7 is a perspective view of the cap feeding finger. Fig. 8 is an inverted plan view of the revolving feed table with the cam for releasing the bottle head and cap aligning devices. Fig. 9 is an elevation of the cap releasing and aligning plunger removed from the machine. Fig. 10 is a slightly modified form of bottle holder. Fig. 11 is a view illustrating the action of the aligning jaws on the bottle head; and Fig. 12 is a fragmentary vertical sectional view illustrating the cap compressing mechanism and means for operating the same.

In the drawings A indicates the hollow standard of the machine preferably provided with a flared base. The standard has formed thereon bearings a and a' in which is journaled a drive or main shaft a^2 having on one end thereof a fast pulley a^3, an idler a^4, and a gear wheel a^5; and on the other end of said shaft a slotted wheel a^6 loosely mounted on the shaft and having secured thereto or formed integrally therewith a sleeve a^7 and a bevel gear a^8. The bevel gear a^8 is in mesh with the bevel gear b of the vertical shaft or spindle b'; the said spindle being journaled in bearings b^2 of the bracket b^3, which bearing is secured to the standard, A. Upon the upper end of the spindle b' is adjustably held a bottle holding frame B; said frame having apertures b^4 for the reception of the bottles. Within these apertures are preferably arranged bottle holding cups or thimbles b^5, having an annular flange b^6 at the top thereof, and provided with perforations b^7 at their lower portion which serve for the egress of any material which might otherwise collect in said cups. The bottle holding frame is adjustably held upon the shaft b' to adapt the machine for bottles of different heights and is retained in the desired position by a set screw, or other means, and is further provided with a spline for preventing said holder from any movement except with the spindle.

The apertures b^4 of the bottle holder are

adapted to register with a spring-pressed vertically movable plunger b^8, arranged in the bracket b^3; the upper end of said plunger having a head or collar b^9, preferably somewhat larger than the diameter of the bottle holding cups. The lower surface of the collar rests upon a shield or deflector c through which the stem of the plunger passes. This deflector is arranged over a trough or receptacle C into which any liquid would be deflected by the shield c should a bottle break while in the frame B, thus preventing the liquid from passing into the bracket b^3, around the bottle raising mechanism. The plunger b^8 has a friction roller b^{10} at its lower end adapted to be engaged by the periphery of a cam d when the same is rotated. This cam is held upon a shaft d' having its bearing in the standard A and receiving rotary motion through the gear wheel d^2 secured to the opposite end of the shaft and in mesh with the gear a^5 of the main shaft. The cam carries on its outer surface a roller d^3 mounted upon a stud projecting from the cam, and adapted to successively enter the slots of the wheel a^6 for the purpose of intermittently rotating said slotted wheel.

To prevent any movement of the wheel a^6 beyond the desired point I preferably provide a sliding block d^4 arranged in the standard and normally pressed outwardly by a spring d^5; the said block having a projecting end d^6 which engages slots or indentations in the sleeve a^7 of the wheel a^6 and serves to adjust and lock same against movement. The block or locking device d^4 is arranged in the path of movement of the cam d which cam has an inner cam surface d^7 which contacts with said locking device and releases the block from the indentations of the sleeve as the roller d^3 enters the slots of the wheel a^6 to rotate same.

Within the standard and on the countershaft d' is a miter gear in mesh with a similar gear secured to the end of a vertical shaft E supported in suitable bearings in said standard. Upon the vertical shaft near the top of the standard is a collar e, shown in Fig. 3, above which is the revolving feed table F rigidly secured to said shaft for the purpose of feeding the caps to the compressing mechanism as will presently appear. The standard has the head plate F′ and the cap plate F^2 secured to said head plate; the latter serving to support the cap compressing mechanism.

The cap compressing mechanism and means for operating the same may be of any suitable construction, but I preferably use a revolving chuck F^3 supported upon a sleeve F^4 depending from the cap plate F^2 on which the chuck is adapted to revolve. This chuck is provided within the lower portion with crimping or compressing rollers f, usually three, normally pressed outwardly and yieldingly held therein by springs f' which are located in sockets and which abut against a projection on the block f^2 in which said rolls are journaled. Arranged to press the blocks inwardly are rocking levers f^3 pivotally secured to the chuck, the lower ends of which rest against the crimping roller blocks, while the upper ends are adapted to press against cam blocks f^4 located in the chuck, and by which the said lever is rocked on its pivot as will presently appear. Secured to the upper end of the chuck is a gear f^5 rotatably held on the sleeve F^4, and which is in mesh with the gear H journaled on a stud secured to the cap plate F^2; the said gear H carrying a smaller gear L which in turn meshes with the gear L′ secured to the vertical shaft E, and by which the train of gearing is revolved.

Above the cap plate F^2 and secured to the vertical shaft E is a cam wheel m. As the cam wheel revolves, its cam surface contacts with the end of a lever m' pivotally secured to the cap plate and having its end normally retained against the cam surface by a spring m^2. The other or outer end of this lever passes into a boxing m^3 and has its end forked and recessed to form a striking head m^4 adapted to strike the flanged upper end of a hollow sleeve m^5 slidingly held in the sleeve F^4; the said sleeve m^5 having its lower end beveled to operate the cam blocks f^4 when the lever m' is rocked on its pivot. The outer end m^4 of the lever by striking the sleeve m^5 forces the same downwardly causing the beveled end to force the blocks f^4 against the rocking levers f^3, thereby forcing the compressing rolls inwardly to crimp the cap around the bottle head after the same has been placed in position. The sleeve m^5 surrounds a centering bar f^6 which passes through said sleeve and the chuck and is adjustably held in the boxing m^3 by a nut f^7, and has an enlarged recessed lower end f^8 to receive the cap when the bottle is in position to have the cap compressed.

To retain the cap on the head of the bottle after receiving the same by the cap feeding mechanism I have provided an auxiliary plunger f^9 (see Figs. 3, 9 and 12) which is slidingly held within the centering rod f^6, and preferably provided with a spring f^{10} which tends to normally press said plunger downwardly. The small plunger f^9 has a pin f^{11} working in a slot in the centering rod f^6; the said pin f^{11} serving to limit the throw of the plunger and to prevent any rotary movement thereof.

The cap feeding mechanism consists of a revolving table F, secured to the vertical shaft E and formed with a cam groove g which receives a roller g' depending from a feed-finger g^2. Above the revolving table F is supported a stationary feed-plate g^3 having a removable plate g^4 secured thereto in such manner as to form a passage for the caps as the feed table revolves; the said passage preventing the crowding of said caps by providing a single passage therefor. The feed-plate g^3 is recessed at g^6 to permit the caps to be placed

upon the revolving table and is provided with an off-set g^7 which serves to guide the feed-finger g^2 as said finger reciprocates back and forth by the action of the cam groove of the revolving table. The end of the finger is recessed at its outer end to receive the caps and is adapted to feed one cap at each forward movement of said finger. To prevent the caps crowding against the feed finger I preferably provide a retaining rod h (Fig. 2) which is slidingly held upon the stationary feed-plate g^3. This bar is preferably angular and is provided on the outer end of the angular portion with a roller h' which is normally pressed forward by a spring h^2 against a cam h^3. This cam is rigidly secured to the vertical shaft E so that as said shaft revolves the cam will force the retaining bar h against the tension of the spring h^2 permitting a cap to be fed by the revolving table to the feed-finger g^2.

The revolving table F is provided on its under surface with a cam-actuating rib i having the cam faces i'. The cam i acts upon a roller j mounted upon a projecting stud of a sliding block j'. This block is slidingly held in a recess in the head plate F' and is normally pressed against the cam i by the spring j^2; the said block having a depending end j^3 passing through a slot in the head plate. On each side of the depending end j^3 of the sliding block and pivotally secured to the under side of the head plate are two arms k and k'. These arms are arranged to be separated or moved on their pivots by the block j' as said block is actuated by the cam i of the revolving feed table. The outer end of the arms k and k' engage depending lugs or pins k^2 of the jaws k^3 and k^4. The jaws k^3 and k^4 are slidingly held in the head plate by the stems k^5 fitting in apertures in the head plate and are normally pressed together by springs k^6 arranged in the apertures in the rear of the stems k^5 of said jaws. These jaws have a beveled lower surface k^7, and a straight face k^8, preferably beveled at the upper edge at k^9. The straight edge or face k^8 of the jaws serve to place the bottles in proper alignment to receive the caps by said edge abutting against the shoulder and head of the bottle, as best shown in Fig. 11. This is an important feature for the reason that the bottle holding cups are generally somewhat larger than the bottle to accommodate variations in the diameters of the bottle. Without such a device the bottles are liable to shift sidewise and consequently will not be in proper position to receive the caps, resulting either in the breaking of the bottle while compressing the cap into engagement with the shoulder or compressing the caps irregularly around the bottle head.

The operation of the machine is as follows: The bottle holder being supplied with bottles and the machinery started, one of the bottle cups or thimbles will rest upon the head b^8 of the plunger and be raised by the contact of the cam d with the roller of said plunger. The jaws k^3 and k^4 at this time are in position to place the bottle in proper alignment to receive its cap which has simultaneously been fed forward by the feed-finger g^2. The cam i of the revolving table acting upon the sliding block j' forces open the arms k and k' which open the jaws k^3 and k^4; the said jaws being held open by said cam during the crimping of the cap around the head of the bottle and while said bottles are lowered by the plunger. At the same time that the jaws k^3 and k^4 are released from the bottle head, and as the bottle continues to ascend the cap is caught and retained in its proper position on the head by the auxiliary plunger f^9 till it reaches the centering rod f^6. The compression rollers of the chuck now act upon the cap and compress the same around the shoulder of the bottle head. The cam d, as soon as the cap is compressed, permits the bottle and plunger to be lowered. At the same time the cam releases the locking device d^4 from engagement with the slotted wheel a^6 which is then revolved by the roller d^3 entering the slots of said wheel. The rotation of the slotted wheel imparts a like movement to the bottle-holder by means of the miter gears a^8 and b, thereby placing another bottle in position to be raised to receive its cap. This is accomplished by the cam d acting upon the spring-pressed plunger b^8; the said cam receiving rotary motion through the counter-shaft d', gear d^2 and gear a^5, the latter being secured to the driving shaft.

It will be seen that by the foregoing arrangement, the bottles, caps and compressing mechanism are retained in such relation to each other that the liability of breakage of the bottles is reduced to a minimum. The parts are so adjusted and arranged that the operation of the machine is automatic and continuous.

It is obvious that the number of slots in the wheel a^6, the number of slots or indentations in said wheel for the engagement of the locking device, and the number of bottle holding cups may be varied, provided the relative adjustment is maintained, and the required correspondence as to number is observed.

In Fig. 10 I have illustrated a bottle holding frame having simply radial arms extending from a central hub, instead of a disk, as shown in the preferred form.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a bottle capping machine, the combination with a supporting standard and a driving shaft, of mechanism for raising the bottle, devices for compressing the caps into engagement with the shoulder of the bottle, mechanism for automatically feeding the caps, and jaws arranged upon a stationary portion of the standard for aligning the bottle for the reception of the cap, substantially as described.

2. In a bottle capping machine, the combination with a supporting standard and a driving shaft, of mechanism for raising the bottle, devices for compressing the caps into engagement with the shoulder of the bottle, a revolving table and means for automatically feeding the caps, together with jaws yieldingly held upon a stationary portion of the standard for aligning the bottle for the reception of the caps, substantially as described.

3. In a bottle capping machine, the combination with a supporting standard and a driving shaft, of mechanism for raising the bottle, devices for compressing the cap into engagement with the shoulder of the bottle, mechanism for automatically feeding the caps, together with a reciprocating bar for preventing the caps from crowding the feeding mechanism, substantially as described.

4. In a bottle capping machine, the combination with a supporting standard and a driving shaft, of mechanism for raising the bottles, devices for compressing the cap into engagement with the shoulder of the bottle, mechanism for holding the bottle in proper alignment, mechanism for automatically feeding the caps, together with a cam-actuated reciprocating bar for preventing the caps from crowding the feeding mechanism, substantially as described.

5. In a bottle capping machine, the combination with a supporting standard and a driving shaft, of mechanism for raising the bottles, devices for compressing the cap into engagement with the shoulder of the bottle, mechanism for automatically feeding the caps, together with a yielding plunger for retaining and adjusting the caps upon the head of the bottle in its ascent, substantially as described.

6. The combination, in a bottle capping machine, of mechanism for raising the bottles, devices for compressing the caps into engagement with the shoulder of the bottle, mechanism for feeding the caps, devices for aligning the bottle for the reception of the caps, together with a yielding plunger for retaining and adjusting the cap during the ascent of the bottle, substantially as described.

7. In a bottle capping machine, the combination with a supporting standard and a driving shaft, of mechanism for raising the bottles, devices for compressing the caps into engagement with the shoulder of the bottle, mechanism for automatically feeding the caps, devices for preventing the caps from crowding the feeding mechanism, mechanism for aligning the bottle for the reception of the caps, together with a yielding plunger for retaining and adjusting the caps on the bottle head during its ascent, substantially as described.

8. In a bottle capping machine, the combination with the revolving feed table, of a reciprocating feed finger, a stationary plate supported above said table, and a reciprocating bar arranged above said stationary plate for preventing the caps from crowding against the feed-finger, substantially as described.

9. In a bottle capping machine, the combination with the main shaft and counter-shaft, of a vertical shaft rotated by said counter-shaft, a revolving feed-table mounted on said vertical shaft, a reciprocating feed-finger, and a reciprocating bar operated by the vertical shaft for preventing the caps from crowding against the feed-finger, substantially as described.

10. In a bottle capping machine, the combination with the revolving table and mechanism for feeding the caps, of a reciprocating retaining bar arranged above said table for preventing the caps from crowding the feeding mechanism, and means for operating said bar, substantially as described.

11. In a bottle capping machine, the combination with a rotary shaft and means for rotating said shaft, of a revolving feed-table secured to the shaft, means for feeding the caps a cap-retaining bar arranged above said table, and a cam secured to the shaft for operating the retaining bar, substantially as described.

12. In a bottle capping machine, the combination with a vertical shaft and means for rotating said shaft, of a revolving feed table secured to the shaft, a spring-pressed cap retaining bar arranged above said table, together with a cam for operating the retaining bar, substantially as described.

13. In a bottle capping machine, the combination with a vertical shaft and means for rotating said shaft, of a revolving table mounted on said vertical shaft, a reciprocating finger, a stationary feed-plate arranged above said table, and a supplemental plate secured to the feed plate to form a covered single passage for the caps, substantially as described.

14. In a bottle capping machine, the combination with the supporting standard and the head plate arranged thereon, of a revolving table, sliding jaws arranged in said head plate, and connections between the jaws and the revolving table for actuating said jaws, substantially as described.

15. In a bottle capping machine, the combination with the supporting standard and the head plate arranged thereon, of a revolving table having a cam thereon, of spring-pressed jaws arranged in the head plate, and means connected with the sliding jaws and operated by the cam of the revolving table, substantially as described.

16. In a bottle capping machine the combination with the supporting standard and cap-compressing mechanism, of aligning jaws yieldingly arranged upon the standard below said cap-compressing mechanism, substantially as described.

17. In a bottle capping machine, the combination with the supporting standard and the head plate, of a revolving table having a cam on the under side thereof, a sliding block adapted to be moved by the cam of the revolving table, jaws arranged in the head plate,

and means connecting the jaws adapted to be operated by the sliding block, substantially as described.

18. In a bottle capping machine, the combination with the supporting standard and the head plate, of a revolving table having a cam on the under side thereof, a spring pressed sliding block arranged to contact with the cam of the revolving table, sliding jaws arranged in said head plate, and pivotal arms engaging the jaws and adapted to be operated by the sliding block, substantially as described.

19. The combination with feed and cap-compressing mechanisms, of a stationary centering bar, and a movable plunger arranged in said bar, substantially as described.

20. The combination with feed and cap-compressing mechanisms, of a cap-retaining plunger yieldingly arranged within the stationary portions of the cap-compressing mechanism, substantially as described.

21. The combination with the feed and cap-compressing mechanisms, of a stationary centering bar, and a spring-pressed cap-retaining plunger arranged in said bar, substantially as described.

22. In a bottle capping machine, the combination with the driving shaft, the cap feeding and compressing mechanism, and a plunger for raising the bottles, of a cam mounted upon a counter-shaft and arranged to operate the plunger, a radially slotted wheel mounted loosely upon the drive shaft, a gear wheel turning with said slotted wheel to revolve the bottle holder spindle when the slotted wheel is turned by said cam, together with a sliding block for locking the slotted wheel, substantially as described.

23. In a bottle capping machine, the combination with the standard, the drive shaft, and the bottle holder, of a slotted wheel mounted on said standard, a counter-shaft, a cam arranged on the counter-shaft to rotate the slotted wheel a locking device engaging the slotted wheel and arranged to be released by said cam, and connections between the slotted wheel and the bottle holder whereby both may rotate in unison, substantially as described.

24. In a bottle capping machine, the combination with the standard, the drive shaft, and the bottle holder, of a slotted wheel mounted on said standard, a counter-shaft, a cam arranged on the counter-shaft to rotate the slotted wheel a sleeve provided with slots secured to said slotted wheel, a spring-pressed locking device engaging the slots of the sleeve, the said locking device arranged to be released by the cam, and connections between the bottle holder and the slotted wheel, whereby both wheel and bottle holder may rotate in unison, substantially as described.

25. In a bottle capping machine, the combination with bottle lifting mechanism, of a bottle holder provided with apertures and bottle-holding cups or thimbles arranged in said apertures, substantially as described.

26. In a bottle capping machine, the combination with the bottle holder, the bottle raising plunger and mechanism therefor, of a deflector arranged above the plunger mechanism and having an aperture through which said plunger passes, substantially as described.

27. In a bottle capping machine, the combination with the bottle lifting mechanism, of a bottle holder provided with apertures therethrough, perforated bottle holding cups or thimbles arranged in said apertures, and means for revolving the bottle holder, substantially as described.

28. In a bottle capping machine, the combination with the bottle holder, the bottle raising plunger and mechanism therefor, of a deflector arranged above the plunger mechanism and having an aperture through which said plunger passes, and a trough arranged below said deflector, substantially as described.

29. In a bottle capping machine, the combination with the supporting standard and cap-compressing mechanism, of aligning jaws arranged upon the standard below said cap-compressing mechanism, together with means for opening and closing said jaws, substantially as described.

30. In a bottle capping machine, the combination with a standard, of a revolving table arranged upon said standard, a reciprocating feed-finger, a stationary feed-plate arranged above said table, together with a supplemental plate secured to the feed plate to form a covered passage for the caps, substantially as described.

31. In a bottle capping machine the combination with bottle lifting mechanism, of a bottle holder, and bottle-holding cups or thimbles provided with apertures arranged upon said bottle holder, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED L. BERNARDIN.

Witnesses:

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WM. R. CROWELL.