No. 859,912. PATENTED JULY 16, 1907.

H. S. BREWINGTON.

BOTTLE CAPPING MACHINE.

APPLICATION FILED APR. 21, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

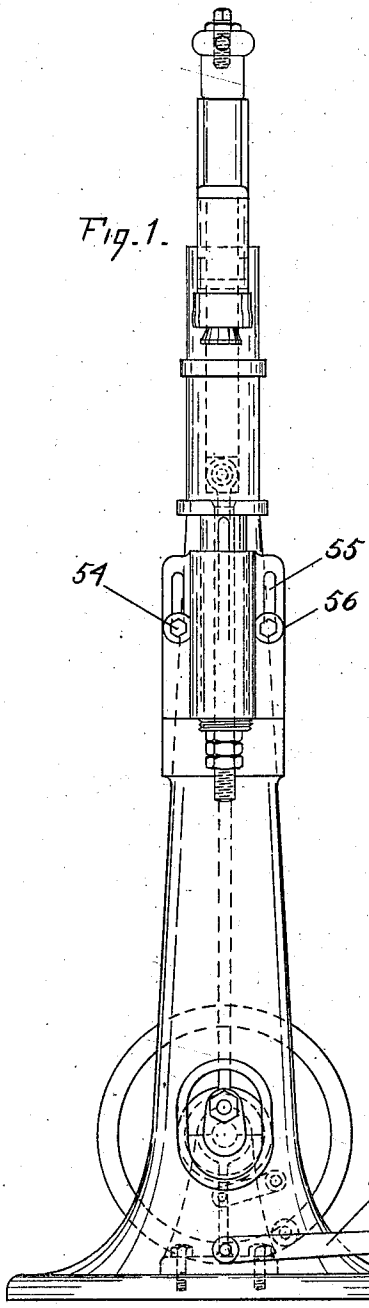


Fig. 2.

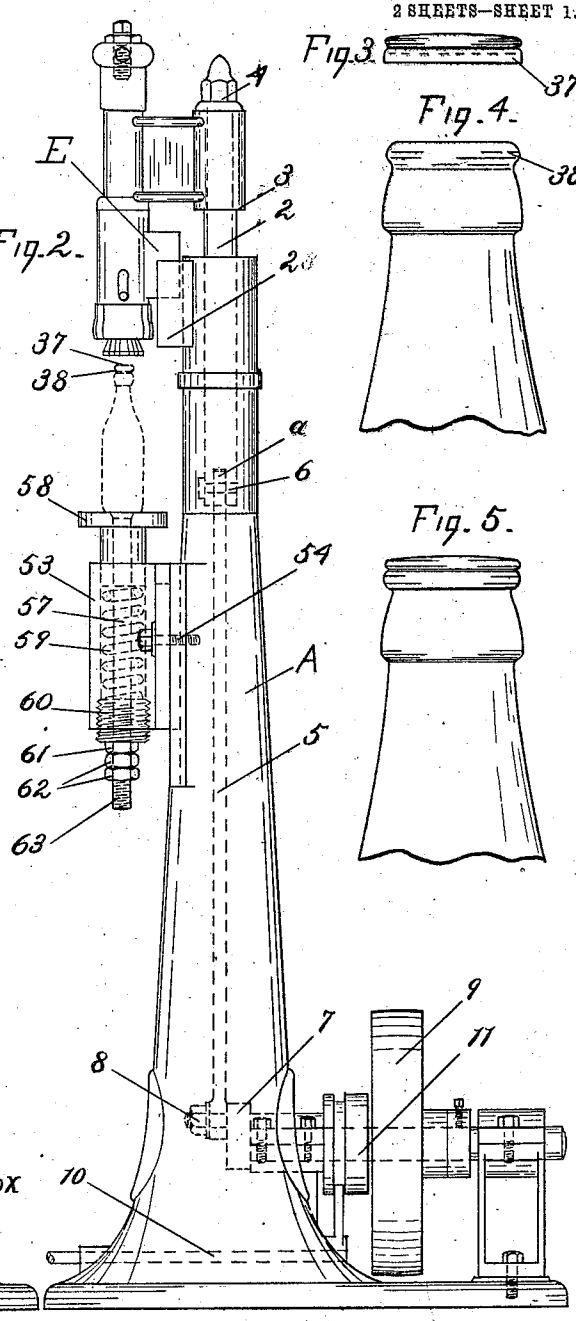


Fig. 3.

Fig. 4.

Fig. 5.

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2 SHEETS—SHEET 2.

Fig. 6.

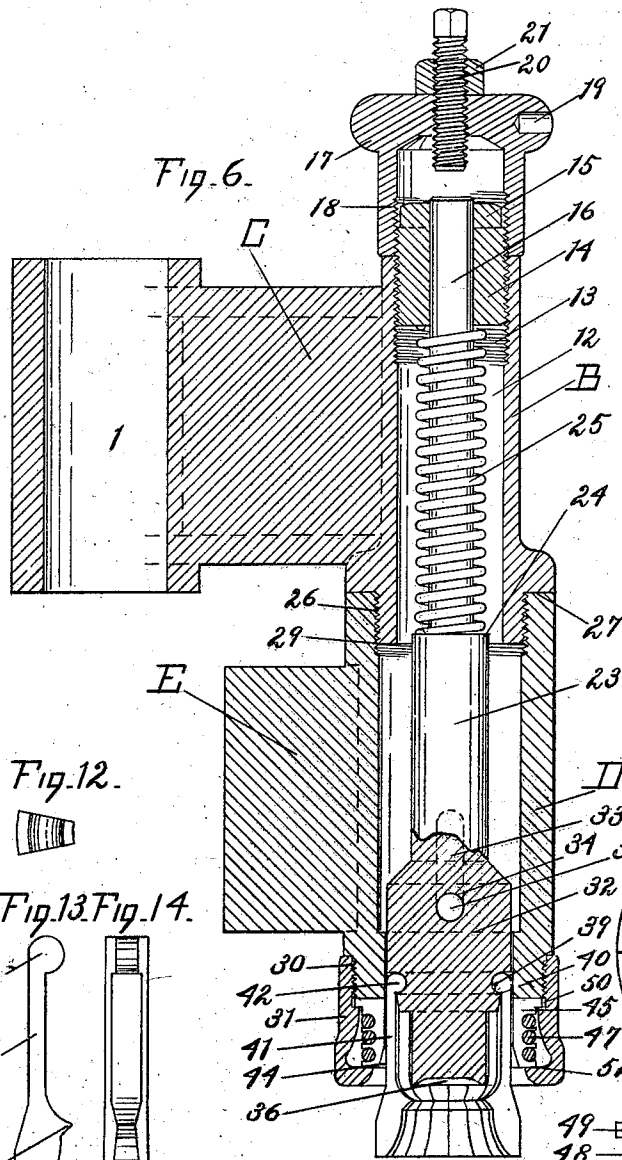


Fig. 7.

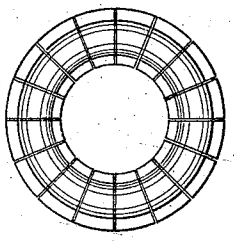


Fig. 8.

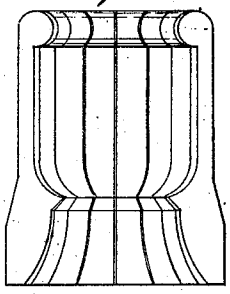
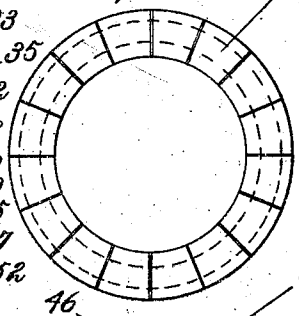


Fig. 12.

Fig. 13. Fig. 14.

Fig. 9.



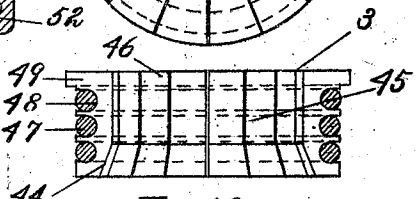
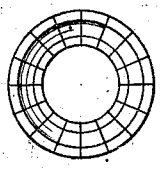


Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE.

HENRY S. BREWINGTON, OF BALTIMORE, MARYLAND.

BOTTLE-CAPPING MACHINE.

No. 859,912. Specification of Letters Patent. Patented July 16, 1907.

Application filed April 21, 1906. Serial No. 312,961.

To all whom it may concern:

Be it known that I, HENRY S. BREWINGTON, a citizen of the United States, residing at Baltimore city, State of Maryland, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a specification.

My invention relates to an improvement in bottle capping machines, the object of which is to automatically secure a cap on the head of a bottle.

The particular kind of bottle which I employ is that which has exterior locking shoulders or a bead on the head thereof, and the cap which is more particularly desired to be used and for which the machine is particularly designed is the metal cap which I have heretofore invented and for which Letters Patent have been issued to me, said Letters Patent bearing date of January 14, 1902, No. 691,107.

Having in mind the status of my invention relative to the state of the prior art I will state that I am the first to apply a cap having a plain depending flange to a bottle by forcing the lower portion of the flange under the shoulder or bead on the head of a bottle, where no intermediary is used between the flange of the cap and the bead on the bottle head. The state of the art does not disclose this feature of securing a metallic cap to the head of a bottle mouth by the method I employ which is effective and novel. The machine is so constructed that it is composed of but few parts, is durable, effective in operation and not likely to get out of order.

With the foregoing object in view my invention consists of certain novel features of construction and combination of parts, which will be hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view and Fig. 2 is a side view in elevation of the machine with the parts assembled showing a bottle in the machine in the position to be capped. Fig. 3 is a view of the sealing cap. Fig. 4 is a view of a bottle head. Fig. 5 is a view of the sealing cap as applied to a bottle. Fig. 6 is a sectional view of the crowning head with the parts assembled in position. Fig. 7 is a top view of the closing fingers assembled. Fig. 8 is a vertical view of the closing fingers showing the front half removed. Fig. 9 is a top plan view of the cam ring. Fig. 10 is a vertical view of the cam ring with the front half removed. Fig. 11 is a bottom plan view of the fingers in position in the head. Fig. 12 is a top plan view of an individual closing finger. Fig. 13, is a vertical side view and Fig. 14, is a vertical inside edge view of the same.

A is the body casting and is preferably made of cast iron, cylindrical in form, and it has a flaring base, through which a horizontal hole is drilled for the reception of a treadle lever which is fulcrumed or pivoted in a suitable socket in the base of the body casting.

B is a reciprocating head which carries the crowning mechanism, said head being provided with an arm C, which is bored at 1 and adapted to fit on the reciprocating rod 2 which rod is fitted within the upper part of the cast body part A. The diameter of the said reciprocating rod 2, is reduced near its projecting end so as to form a shoulder 3 thereon, and the arm C is secured on the reduced end of the rod 2 by means of the cap nut 4 which is inwardly threaded and which is adapted to be screwed on the end of the said rod 2 which is also threaded to receive it (neither of the threaded portions, however, are shown).

As is indicated by the dotted lines and connecting with the reciprocating rod 2 on the lower end thereof is a connecting rod 5. This rod is connected with the rod 2 by means of the rod 2 being slotted at (*a*) in the end thereof, a hole being drilled through the end of the said rod 2 and passing through the slotted end, a similar hole drilled through the upper end of the connecting rod 5, and a pin 6, inserted through the hole in the rod 2 and passing through the hole in the end of the connecting rod 5, it having been previously inserted in the slot (*a*) of the rod 2. The lower end of the connecting rod 5 is connected with the crank shaft 7 by means of a pin 8. On the outer extended part of the shaft is secured the fly wheel 9, which is driven by a belt (not shown), 10 is a shaft carrying on the free end thereof the treadle lever 10× as shown in Fig. 1, and 11 is a clutch on the shaft which is operated by the treadle lever and which in turn controls the operation of the machine. The head B is bored at 12 and is inwardly threaded at 13, into which is screwed the threaded plug 14. The plug is exteriorly threaded throughout its entire length and is provided with a nut head 15 on the top part thereof for the purpose of being readily engaged by a wrench or other suitable tool that it may be screwed within or withdrawn from the bore of the head B, as may be desired. This plug 14 is centrally bored throughout its entire length to allow the plunger 16 to reciprocate therethrough. The head B is provided with a hollow cap 17 which is inwardly threaded at 18, that it may be screwed on the extended threaded portion of the plug 14 which has been screwed partially within the head B. This cap is exteriorly provided with a spanner hole 19, that it may be easily put on and taken off the head B by the insertion of a suitable tool within the spanner hole for the purpose. This cap is bored through the center of the top part thereof and is inwardly threaded in the bored portion into which is screwed the set screw 20, and which is provided with the lock nut 21 for the purpose to be hereinafter explained. Into the bored portion of the head B, is fitted the reciprocating plunger 16 which is enlarged at a point from about the center thereof toward the lower end portion of said enlargement as is indicated at 23, thereby forming a shoulder thereon and designated 24,

around the upper end part of the plunger 16 and within the head B and interposing between the shoulder 24 on the plunger and the plug 14 is placed a spiral spring 25, the purpose of which will be hereinafter explained. The lower end portion of the head B, is outwardly threaded at 26 and provided with a shoulder 27.

D is a sleeve provided with a reciprocating arm E which reciprocates within a slot guide 28 within the upper side of the body casting A as shown in Fig. 2. The said sleeve D is inwardly threaded in the upper end part 29 for the purpose of being screwed on the exterior threaded end 26 of the head B, being exteriorly threaded on the lower end portion at 30 on to which is screwed the holder or follower 31. The sleeve D is bored of a larger diameter than the bore within the head for the purpose of allowing the enlarged end 32 of the plunger 16 to reciprocate therein. The sleeve D is slotted through the side walls thereof as indicated by the dotted lines 33, and through the plunger 16 is drilled a hole 34, through which is fitted a pin 35 which reciprocates in the slot 33 in the sleeve D, and which prevents the mechanism within the head B and the sleeve D from falling out thereof.

The face of the lower end portion of the plunger 16 is slightly concave at 36 for the purpose of centering the cap 37 and to force the outer edges of the cap in a rounding position that a better sealing contact may be had with the head of the bottle 38. In the exterior walls on the lower end of the plunger 16 at a point a suitable distance above the lower end of the same is constructed a circumferential groove 39 and just below said groove a shoulder 40. Into the groove is fitted a series of closing fingers 41. These fingers are constructed with a rounded head or top portion 42, said rounded head portion being of slightly less diameter than that of the groove 39 of the plunger, into which they are loosely fitted or suspended by the rounded head 42 being inserted within the groove 39 of the plunger 16, and the shoulder 40 on the plunger causes the fingers suspended to hang at an angle suitable for the function required in holding the cap 37 within the fingers prior to being forced on the bottle head 38, which is placed below for the purpose of being sealed. These fingers are tapered toward the inner center making the inner circle of less diameter than that of the outside thereof, in other words, the back of each finger is wider than the portion forming the V-shaped tooth, as shown in Fig. 14, each finger being tapered to a degree that when assembled an inner circle of the V shaped teeth of the required dimensions is formed. These fingers are each provided with a V-shaped tooth 43 and the lower end portion 44 is inwardly flared outwardly for the purpose of receiving the bottle head, around the series of suspended fingers after being suspended in the grooves as hereinbefore explained is fitted the yielding cam ring 45, which is made of a series of segments 46, these segments being held together and made yielding by the spring bands 47, which are fitted around the exterior parts of the several segments which compose the ring and the springs held in position by means of the grooves 48 into which they are sprung. The said cam ring is inwardly flared at its lower end portion at 44 for the purpose of avoiding a sudden contact with the fingers and to cause them to gradually close and is exteriorly provided at the top part with a shoulder 49, which is adapted to fit into the groove 50 of the holder or follower 31. This follower or holder is hollow and provided on its lower end with an inwardly projecting shoulder 52 on which the lower edge of the cam ring 45 may rest. The shoulder 49 should be but loosely fitted to the lower edge of the cam ring so as to avoid any great frictional contact. The inner diameter of the holder or follower should be of such dimensions as to allow a suitable space between the inner walls thereof and the cam ring to interpose, that the expansion of the cam ring may be freely permitted.

Referring back to Figs. 1 and 2, 53 is a bracket cylinder which is secured to the body part A in line with the plunger in the head by the means of the bolts 54, the cylinder is made adjustable by reason of the slots 55, whereby it may be raised and lowered as desired and secured in position by tightening up on the bolts 54; interposed between the head of the bolts and slots are washers 56. Within the cylinder is a supported rod 57 provided at its upper end with a disk 58, a spring 59 surrounds the rod within the bracket cylinder 53 and serves to normally raise the rod which is intermittently forced downward by the pressure brought down on the bottle placed on the disk while being sealed. In the lower end of the cylinder is screwed the threaded plug 60 provided with a nut head 61 whereby the tension of the spring within the cylinder is regulated. Below the plug 60 and on the lower extended end of the rod 57 are secured the lock nuts 62, the lower end of the rod being threaded at 63 to secure them thereon, the object of the lock nuts being to prevent the slipping of the adjustment after being once secured as desired, also to prevent the rod 57, when released from the pressure brought to bear upon it from rebounding from the bracket cylinder 53, and that it may be retained in position with the same spring tension as previously adjusted, and be so maintained throughout the time of operation of the machine or until other new adjustment be required as hereinafter explained.

My invention is operative as follows: A bottle with a cap mounted thereon is placed on the disk 58 and the treadle lever is then depressed, the head B is then forced downward, the top of the cap is forced against the plunger and is centered on the bottle head, by reason of the face 36 of the plunger being concave. The cap is centered into proper position on the bottle head by the pressure brought to bear on it by the descent of the plunger, as the head B is forced down over the cap which is held in position on the bottle head by the plunger which engages the cap. The movement is such that the head of the bottle which is forced thereinto carries the plunger upward until it is brought into contact with the set screw 20 which is fitted within the top of the cap 17 and which has been previously adjusted so that the plunger 16 is prevented from rising beyond this fixed point. The adjustment is such that while the plunger 16 is being forced upward the flexible cam ring 45, which is placed around the fingers will cause the flared ends of the fingers to close in on the cap, and the V-shaped teeth of the fingers will engage the lower edge of the flange of the cap forcing it under the bead on the head on the bottle neck. The fingers being loosely fitted to the head as hereinbefore described will conform to and overcome any variation of the bottle head and the cam ring being composed of

segments will force the fingers into closing contact in such a manner that they will in turn conform to the variations caused by the bottle neck not being uniform. The flexible cam ring 45 therefore equalizes and distributes the pressure brought to bear on the bottle head while forcing the flange of the cap under the bead thereon, and being composed of segments and held together by the band springs which are fitted around it, it is made rigid enough to perform the functions of closing the fingers in on the flange of the cap, yet it is also flexible enough to prevent the crushing of the bottle head, and the spring 59 within the bracket cylinder which supports the disk supporting the bottle is of sufficient strength to secure the necessary pressure between the plunger and the bottle head interposed between which is the cap, to insure a perfect closure and sealing contact, yet, at the same time it has sufficient resiliency to overcome the different heights of various bottles. As the head rises the spring 25 around the plunger 16 in the head B causes the bottle head to be forced out from within the closing fingers without disturbing the bottle from its resting place on the disk, whence it can be readily removed and another bottle placed thereon and the capping operation repeated. The clutch 11 on the crank shaft 7 operating in such a manner that the machine will make but one revolution even though the pressure be retained on the treadle lever, it is necessary to release the treadle lever before the machine will again make the revolution. While I have described the operation by previously placing the cap loosely on the bottle head and permitting the head to descend upon the bottle, the cap can also be placed within the closing die formed by the series of fingers and is held within the die by the V-shaped teeth of the fingers in such a manner and position that it can be secured on the bottle head just as advantageously as by placing it first thereon, and it is just as practical to operate by this latter as by the former method. It will thus be seen that I have provided a closing means which also will perform the additional function of holding the cap within the die previous to securing it to the bottle head.

It will thus be seen that I have provided a novel, simple and effective machine for the purpose of securing a cap on a bottle head, and one that is durable and not likely to get out of order, and have lessened the possibility of breakage in bottles while in process of being sealed and have overcome the trouble in effectively sealing bottles varying in height and the heads of which are ofttimes irregular in shape.

Slight changes might be resorted to in the form and arrangement of the several parts herein described without departing from the spirit and scope of my invention, hence I do not desire to limit myself to the exact construction as herein set forth, but,

Having described my invention, what I claim as new and desire to secure by Letters Patent, is

1. In a bottle capping machine the combination substantially as hereinbefore described, comprising a movable head vertically bored throughout its entire length, a yielding plunger located within the bored portion provided with a groove in the lower end portion thereof, a series of closing fingers secured in and suspended from said groove and provided inwardly with V shaped teeth, the lower end portion of the fingers being outwardly flared forming a cone shaped guide for the bottle head, a yielding segmental cam ring held in position by a follower secured to a sleeve and adapted to act upon the lower end portion of the fingers, forcing them inwardly toward a common center by the downward movement of the head, thereby securing the cap on the bead of the bottle mouth.

2. In a bottle capping machine for applying crown caps to bottles comprising a crowning mechanism provided with an annularly arranged series of movable suspended closing fingers, a sectional ring surrounding said fingers, provided with a plurality of annular grooves in its outer surface, spring rings in said grooves yieldingly compressing said sectional ring and fingers and a plunger upon which said fingers are carried, having a cupped outer end, substantially as described.

3. In a bottle capping machine for applying crown caps to bottles comprising a crowning mechanism, provided with a plurality of independent movable suspended closing fingers loosely secured to a plunger, a flexible closing ring formed in sections provided with a plurality of annular grooves in its outer surface, spring rings in said grooves yieldingly compressing said closing ring, thereby compressing the said fingers about the cap whereby the cap is secured to the head of the bottle substantially as described.

4. In a bottle capping machine, the combination with a reciprocating rod carrying thereon a head which is vertically bored throughout its entire length, of a plunger located within the bored portion, a spiral spring fitted around the upper part of the plunger, a series of closing fingers inwardly provided with V-shaped teeth forming a closing die, carried on the lower end of said plunger, a sleeve secured to the lower end portion of the head, a follower secured to the sleeve, into which is fitted an elastic cam ring, said cam ring encircling the closing die and adapted to force the fingers toward a common center by the descent of the head on a bottle on which has been placed a sealing cap, the downward movement of the head causing relative upward movement of the plunger, thereby causing the V-shaped teeth of the closing die to engage with the lower portion of the flange of the sealing cap and force it into locking and sealing contact with the bead on the head of the bottle mouth.

5. In a bottle capping machine, the combination with a movable head vertically bored throughout its length, a hollow sleeve secured to the head, a plunger located within the bored portion and a plurality of individual closing fingers provided inwardly with V shaped teeth forming a closing die and carried thereby, a follower secured to the sleeve, an elastic independent cam ring fitted and held within the follower, and embracing the die formed by the series of closing fingers, the downward movement of the head acting upon the cam ring which in turn acts upon the fingers of the closing die, forcing them inwardly toward a common center, thereby securing the cap on the bead of the bottle mouth.

6. In a bottle capping machine the combination with a bored supported head, the bored portion internally screw threaded at one end into which is fitted a hollow plug, securing thereon a hollow cap provided with a set screw adjustment in the top part thereof, the lower end of the head being exteriorly threaded on to which is screwed a sleeve, said sleeve being threaded at its outer end on to which is fitted a follower, carrying within it a flexible cam ring, of a spring actuated plunger carrying near the lower end thereof a closing die comprising a series of individual fingers, inwardly provided with V-shaped teeth, said fingers being flared outwardly and extending below the follower and in line with the cam ring, the said V-shaped teeth of the fingers affording an additional functional means for supporting the cap within the die prior to being secured on the bead of the bottle mouth.

7. In a bottle capping machine a closing die formed of a series of individual fingers, said fingers being provided with round top portions or heads, inwardly provided with V-shaped teeth, and being outwardly flared at the lower end portions, in combination with an elastic cam ring interposed between a follower secured to a sleeve and the said fingers substantially as described.

8. In a bottle capping machine, the combination substantially as hereinbefore described, comprising a head,

vertically bored throughout its length, and internally threaded within the top bored portion, a threaded hollow plug screwed partially within the top portion, a hollow cap screwed on the projecting portion of the plug, thereby securing the cap on the head, said cap being bored and threaded in the top part thereof into which is screwed a set screw provided with a nut interposing between the cap and the nut of the screw for the purpose of securing the adjustment thereof, a spring actuated plunger within the head carrying a closing die on the lower end portion thereof, a sleeve secured to the lower end of the head, a follower secured on the lower end of the sleeve, into which is fitted an independent elastic cam ring which is interposed between the closing die and the follower, and means for forcing the bottle and cap plunger into compressing contact, thereby causing the cam ring to engage the fingers forming the closing die and to force the lower edge of the flange of the sealing cap into locking contact with the head on bottle head.

9. In a bottle capping machine, the combination substantially as hereinbefore described comprising a head, a spring actuated plunger within the head, carrying a closing die on the lower end portion, a sleeve secured to the lower end of the head, a follower secured on the lower end of the sleeve, an elastic cam ring composed of a series of segments, exteriorly provided with a series of grooves into which are sprung a like number of spring bands for the purpose of elastically securing them together and which is secured within the follower whereby the die is closed in on the flange of the bottle cap thereby sealing and locking the cap on the head of the bottle mouth.

10. In a bottle capping machine the combination with a bored head of a sleeve secured to the head, a spring actuated plunger within the head, a groove within the lower end portion of the plunger into which is inserted the heads of the fingers composing the closing die, the diameter of the groove being larger than that of the heads on the fingers that they may fit loosely therein, said fingers being held in the groove of the plunger by the abutting walls of the sleeve, an elastic cam ring fitted around said fingers and held in position by a follower secured to the sleeve, means for supporting a sealing cap within the die and means whereby the cap is forced into sealing contact with the head on the head of a bottle mouth thereby overcoming the defects and imperfections which would ordinarily result from the bottle head not being perfect.

11. In a bottle capping machine, substantially as hereinbefore described comprising the combination of a plunger provided with a groove formed exteriorly in the lower body portion thereof, a plurality of individual fingers having a rounded top portion adapted to fit loosely within the groove of the plunger, the fingers each inwardly provided with a V-shape tooth, the lower inner portion being flared outwardly forming a guide when assembled for the bottle head, a yielding segmental cam ring held in position by a follower secured to a sleeve and means whereby the said cam ring is made to operate on the lower ends of said fingers for the purpose of securing a cap on the head of a bottle head.

12. The combination of a bottle capping machine comprising a head, a reciprocating plunger provided with movable fingers loosely secured on the lower end portion thereof, a yielding segmental cam ring adapted to engage the fingers and force them inwardly toward a common center, a spiral spring secured around the upper end portion of the plunger, a plug for controlling the tension of the spring and a cap provided with a set screw adjustment thereon for regulating the reciprocation of the plunger.

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

HENRY S. BREWINGTON.

Witnesses:
J. DUNCAN HARRISON,
MARY M. MAGRAW.