R. E. TAYLOR.

BOTTLE CAPPING MACHINE.

APPLICATION FILED JAN. 9, 1911.

1,041,527.

Patented Oct. 15, 1912.

3 SHEETS—SHEET 1.

Fig. 1

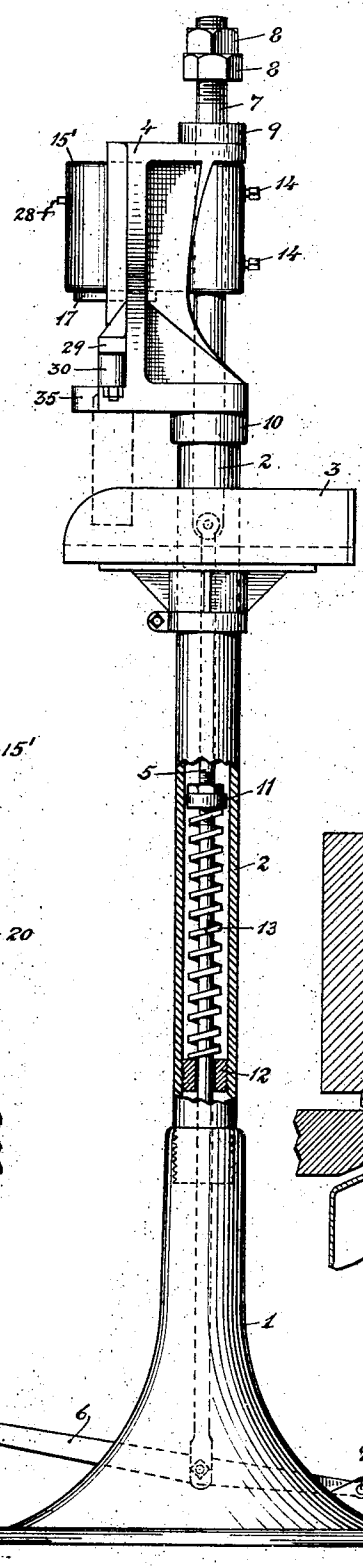


Fig. 5.

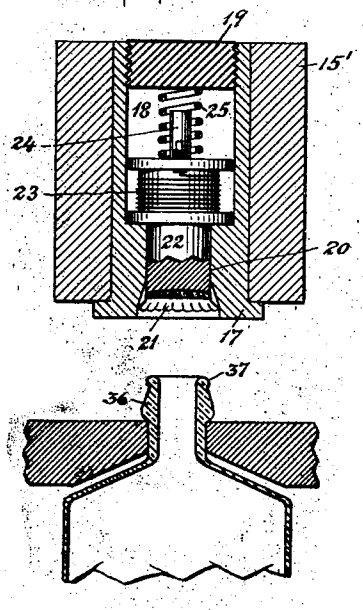
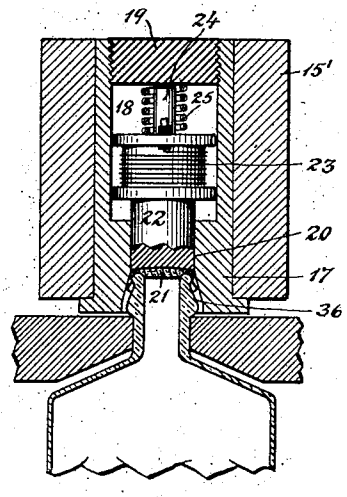


Fig. 6.



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3 SHEETS—SHEET 2.

Fig. 2.

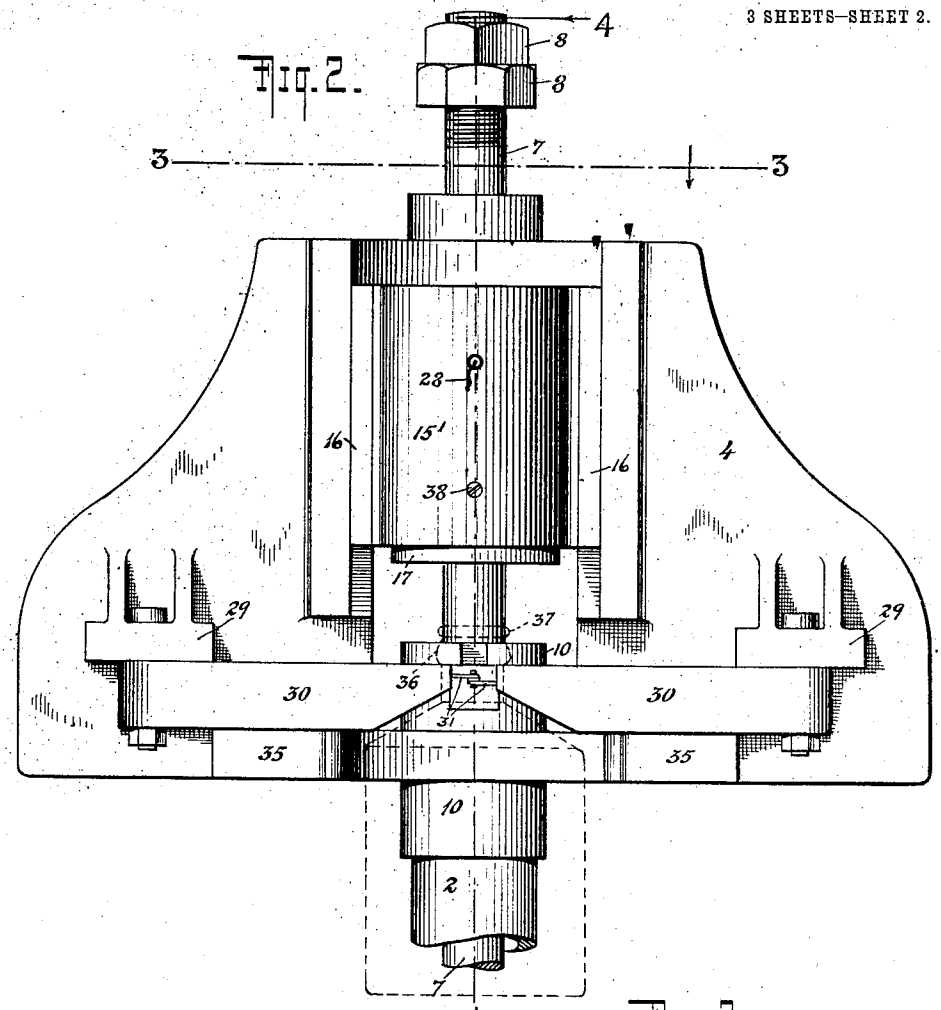
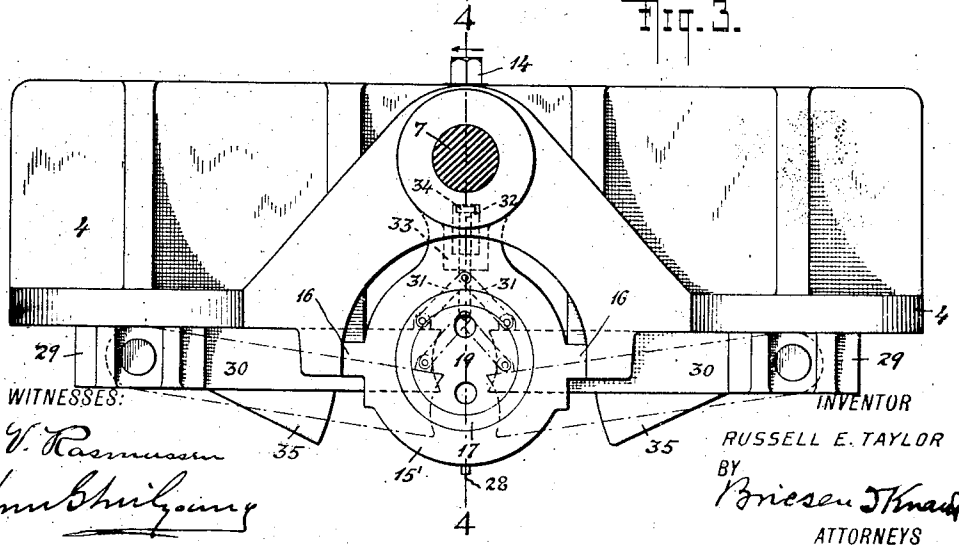


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

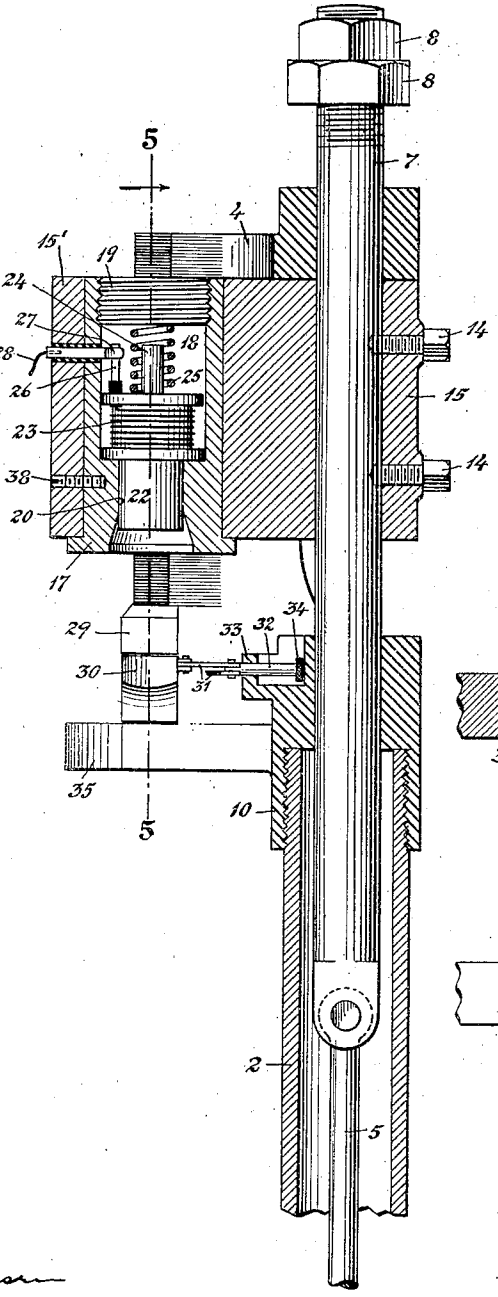

Fig. 7.

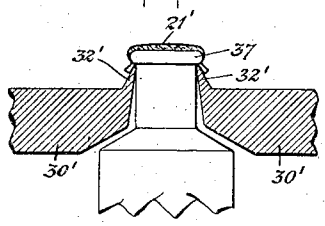

Fig. 8.

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UNITED STATES PATENT OFFICE.

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BOTTLE-CAPPING MACHINE.

1,041,527. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed January 9, 1911. Serial No. 601,524.

To all whom it may concern:

Be it known that I, RUSSELL E. TAYLOR, a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, have invented a new and useful Improvement in Bottle-Capping Machines, of which the following is a specification.

My invention relates to bottle-capping machines, sometimes spoken of as bottle sealing machines, and has for its object to provide a machine, operable by hand or automatically, in which the strains produced in the bottle structure incident to the capping operation are confined to the neck of the bottle instead of being distributed as heretofore throughout the entire structure; a further object of my invention is to provide a bottle capping machine applicable to bottles having short necks in contradistinction to machines requiring that the bottles to be capped should have relatively long necks; a still further object of my invention is to provide a bottle capping machine capable of capping thin walled bottles with as little risk of breakage as when capping thick walled bottles; other incidental objects will appear as the specification proceeds.

Essentially my improved bottle capping machine comprises capping means in combination with jaws, or equivalent gripping or supporting means, adapted to seize or support the bottle to be capped by its neck. There is also provided as incidental to the main purpose of the machine, special means for holding the cap preparatory to placing it upon the bottle as well as special capping means especially adapted to the capping of short necked bottles.

Other minor details are also provided as will hereinafter appear.

Referring to the drawings, which are hereby made a part of the specification, Figure 1 represents a side elevation, partly in section, showing a preferred embodiment of a complete machine made according to my invention; Fig. 2 represents an enlarged front elevation showing the capping and supporting mechanism proper of my machine; Fig. 3 is a plan view taken along the line 3—3 of Fig. 2, Fig. 4 represents a similarly enlarged vertical section taken along the line 4—4 of Figs. 2 and 3; Fig. 5 represents a transverse diagrammatic section taken along the line 5—5 of Fig. 4 and shows the capping and supporting mechanism just before capping takes place; and Fig. 6 is a view, similar to Fig. 5, showing the position of the capping and supporting mechanism just as the capping is complete and before the bottle has been removed from the machine. Fig. 7, is a detail sectional view showing certain modified features, and Fig. 8, is a plan view of the same.

In the drawings (Figs. 1 to 6 inclusive) there is a main frame comprising a base casting 1 upon which is erected a tubular support 2 which carries a table 3 at convenient height and is surmounted by a head frame 4.

As illustrated, a connecting rod 5 is joined to a treadle 6, which in turn is pivoted to the base at 9, so that the connecting rod is depressed when the treadle is depressed. The connecting rod 5 is flexibly connected to an actuating rod 7 in line with the connecting rod and slidable in bearings 9 and 10 of the frame, see particularly Fig. 1. At the upper end of this rod are stop-nuts 8, which limit the downward movement of the rod.

The connecting rod 5 is provided, at a convenient distance from its upper end, with a screw thread upon which is fitted an adjustable abutment 11 and at some distance below this abutment is another adjustable abutment 12 screw threaded to the interior of the tubular support 2 and centrally bored to permit the connecting rod to easily slide within it. A suitable spring 13 surrounds the rod 5 between the two abutments 11 and 12.

Within the head frame 4 and fixed to the actuating rod by screws 14 is a capping head 15 comprising essentially a pair of short cylindrical portions joined by a web or neck, the rear cylinder being the smaller. The front and larger cylinder 15′ projects through an opening in the head frame and is provided with lateral guides 16 adapted to slide in corresponding grooves formed in said head frame. This front cylinder 15′ of the capping head is axially bored through

to receive a bushing 17 sweated or otherwise permanently fixed therein and in this bushing is a square bottomed cylindrical recess 18 closed above by a screw plug 19; at the bottom of this recess is a straight cylindrical hole 20 which is gradually enlarged as it nears the bottom of the bushing until it will receive a bottle cap 21; from this point downward the enlarged opening is preferably of uniform diameter.

Fitted slidably within the straight portion of hole 20 is a plunger 22 of magnetic material which has fixed to it, within the recess 18, a solenoid 23; a short spindle 24 is fixed to the top of the solenoid and extending upwardly toward the plug 19. A spring 25, surrounds this spindle and is supported upon the solenoid with its other end resting against the plug.

Fixed to the top of the solenoid is a staff 26 to which is joined one end of the solenoid winding, the other end of said winding being "grounded" to the plunger. A spring 27 fixed to the inner wall of recess 18 contacts with said staff and constitutes an end of a battery circuit 28, the other battery terminal being joined (not shown) to the main frame of the machine. Any usual electric light or power circuit may be used to energize the solenoid instead of a battery circuit if so desired.

Arranged symmetrically on each side of the capping head and pivoted to bosses 29 fixed to the head frame 4 in frontal alinement with the axis of plunger 22 are supporting or bottle holding jaws 30. The inner end of each jaw is concave centrally and is further provided with a pivotally attached link 31, the outer ends of which are joined by a common point to a centrally disposed rod 32 which is slidable forwardly or rearwardly in a lug 33 fixed to head frame 4; upon the rear end of rod 32 is an adjustable screw nut 34. By means of the two links 31 and the rod 32 the inner ends of jaws 30 may be moved in or out with respect to the head frame but must move together and so as to make at all times equal angles with said frame. The adjustable nut 34 limits the extent of such movement.

A second pair of bosses 35 is arranged below the jaws 30 and located nearer the position of the bottle during the capping action; they serve as reinforcing supports for said jaws to resist the downward pressure of the bottle capping operation to be shortly described. Both pairs of bosses as also the top and bottom of the jaws 30 are machined flat so as to permit the adjacent surfaces to fit closely and to engage over their entire areas.

A bottle, that it may be capped with a machine made according to my invention as shown in Figs. 1 to 6, must have its neck provided with a suitable bead or enlargement 36 the jaws 30 being so set and of such length as to just comfortably embrace the neck proper below said bead when said jaws are in bottle capping position against the head frame. The shape of this bead should be such as to afford ample strength for resisting the downward pressure of the bottle capping operation and it must join the neck proper sufficiently below the top thereof to give the capping head room to do its work as will hereafter appear. Above the bead 36 and preferably at the very top of the bottle neck is a capping bead 37 against and under which the edges of the cap 21 are to be forced.

The operation of my improved bottle capping machine is as follows:—The jaws 30 being drawn forward (dotted construction Fig. 3) a bottle is grasped in the hand and its neck thrust into the opening between the two jaw ends, the bead 36 being above the jaws; if the concaves of these jaw ends are suitably determined the bottle neck will enter the jaw opening when the jaws are thus in their outward position but will not pass through the same. The bottle is then pushed rearwardly which will cause the jaws to close against the head frame and bring the bottle neck immeditely under the plunger 22. Simultaneously with this operation a bottle cap (of soft iron or other magnetic material) 21 is thrust into the opening at the bottom of plunger 22 and will be held against said plunger by reason of the magnetization provided by solenoid 23. Foot treadle 6 is then depressed causing the actuating rod 7 with the attached capping head 15 to be drawn downwardly against the resistance of spring 13 by reason of the connecting rod 5. Plunger 22 and the bottle neck being in axial alinement, the bushing 17 will be drawn down over the bottle neck and plunger 22 pushed upwardly into the tapered opening of the bushing against the resistance of spring 25 until stopped by the check nuts 8 contacting with the head frame 4. As the plunger ascends the cap 21 will be pushed into a narrower region of the taper and will have its dependent edges crimped over the capping bead 37 of the bottle neck. The foot treadle 6 is then released when the capping head will rise by reason of the action of spring 13 and plunger 22 again descend in bushing 17 ready to receive a fresh cap. The capped bottle is then drawn forward and removed, the jaws 30 coming forward with the bottle until limited by the adjustable nut 34.

The arrangement of beads 36 and 37 shown in the several figures above described is the usual one provided for bottles which are to be capped with metallic caps or seals of the general type indicated at 21. Bottles intended to be corked merely, such as

patent medicine bottles, druggists prescription bottles, and small bottles generally, are usually made without the lower and larger bead 36. To cap such single beaded bottles with my improved machine I need only substitute for the form of neck supporting jaws 30 shown in Figs. 1 to 6 the modified jaws 30′ of Figs. 7 and 8 which have their inner ends each provided with an upwardly and centrally inclined bead supporting tongue 32′ of wedge shaped section; the tops of these tongues are adapted to snugly embrace the bottle neck proper just under bead 37 when the bottle is in capping position. Being very thin at their tops and lying close to the bottle neck throughout their entire height, as they preferably should, these tongues will not interfere with the descent of the capping head nor with perfect crimping of the edges of the bottle caps about the bead 37.

Where a machine is to be used permanently for capping bottles of uniform size, or rather, bottles having necks of uniform size the bushing 17 may be made an integral part of the front cylinder 15′ of the capping head the necessary holes and openings to receive plunger 22 being formed directly in said cylinder. Obvious mechanical reasons, however, made the separate bushing construction preferable.

Where it is desired to adapt one of my improved machines to bottles having a neck of given size instead of some other size I need only to exchange the jaws 30 for others having appropriate sized inner ends and the bushing 17 with its plunger 22 and associated solenoid for another bushing provided with a plunger of appropriate size. Where the plunger is thus to be removed or exchanged at times it may preferably be held in place by a set-screw 38 rather than sweated or similarly fixed as previously described.

While I have described my invention as a manually operated machine it is clear that, by obvious mechanical adaptations, it may be readily converted into a continuously acting power operated or automatic machine.

My improved bottle capping machine enables me to cap thin walled bottles as readily as thick walled bottles and short necked bottles as readily as long necked bottles; bottles having necks joined to the body by reentrant portions and other bottles of odd shape not adapted to usual bottle capping machines may readily be capped with my machine.

Should breakage take place in the operation of my machine such breakage will be confined to the neck of the bottle and the contents thereof will not be spilt over the machine and operator as is necessarily the case with machines in which the bottle is supported upon its base.

While I have shown and described a specific form of my invention I do not confine myself to the detailed embodiments set forth many of which may be varied without departing from the spirit of my invention. Thus the character and mode of operation of the neck supporting jaws, the detailed means by which the cap is held against the plunger 22, the exact means by which the bottle neck is forced into the capping head and many other details may be and may require to be altered to suit special needs for which the machine is desired to be used without going beyond the essence of my invention which I have embodied in the following.

Claims:—

1. In a machine for commercially applying ordinary metal crowns in bottling to bottles having an integral glass head flange or bead, a pair of rigid anvil blocks adapted to receive the neck of a bottle between them, with its head flange or bead resting on the upper edges of the anvil blocks, means affording rigid lateral support for said anvil blocks on a line passing through the bottle in capping position, a rigid support beneath the anvil blocks near the bottle engaging portions thereof, and a capping die.

2. In a machine for commercially applying ordinary metal crowns in bottling to bottles having an integral glass head flange or bead, a pair of anvil blocks adapted to receive the neck of a bottle between them, with its head flange or bead resting on the upper edge of the anvil blocks, rigid lateral supports for said anvil blocks on a line passing through the bottle in capping position, rigid supports beneath the anvil blocks near the bottle engaging portions thereof, rigid supports above the anvil blocks at a point more remote from the bottle, and a capping die.

3. In a machine for commercially applying ordinary metal crowns in bottling to bottles having an integral glass head flange or bead, a pair of anvil blocks adapted to receive the neck of a bottle between them, with its head flange or bead resting on the upper edges of the anvil blocks, rigid lateral supports for said anvil blocks on a line passing through the bottle in capping position, means for permitting a simultaneous outward swinging movement of said anvil blocks to receive a bottle, rigid supports beneath the anvil blocks near the bottle engaging portions thereof, and a capping die.

4. In a machine for commercially applying ordinary metal crowns in bottling to bottles having an integral glass head flange or bead, a pair of rigid anvil blocks adapted to receive the neck of a bottle between them, with its head flange or bead resting on the upper edges of the anvil blocks, means affording rigid lateral support for said anvil blocks on a line passing through the bottle

in capping position, a rigid support beneath the anvil blocks near the bottle engaging portions thereof, and a capping die having a central plunger with a spring of great power to insure against the lifting of any bottle even in extreme cases, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

RUSSELL E. TAYLOR.

Witnesses:
ELMER G. WILLYOUNG,
JOHN A. KEHLENBECK.