J. SCHLAGEL.

BOTTLE CAPPING HEAD.

APPLICATION FILED JULY 20, 1910.

1,033,955. Patented July 30, 1912.

2 SHEETS—SHEET 1.

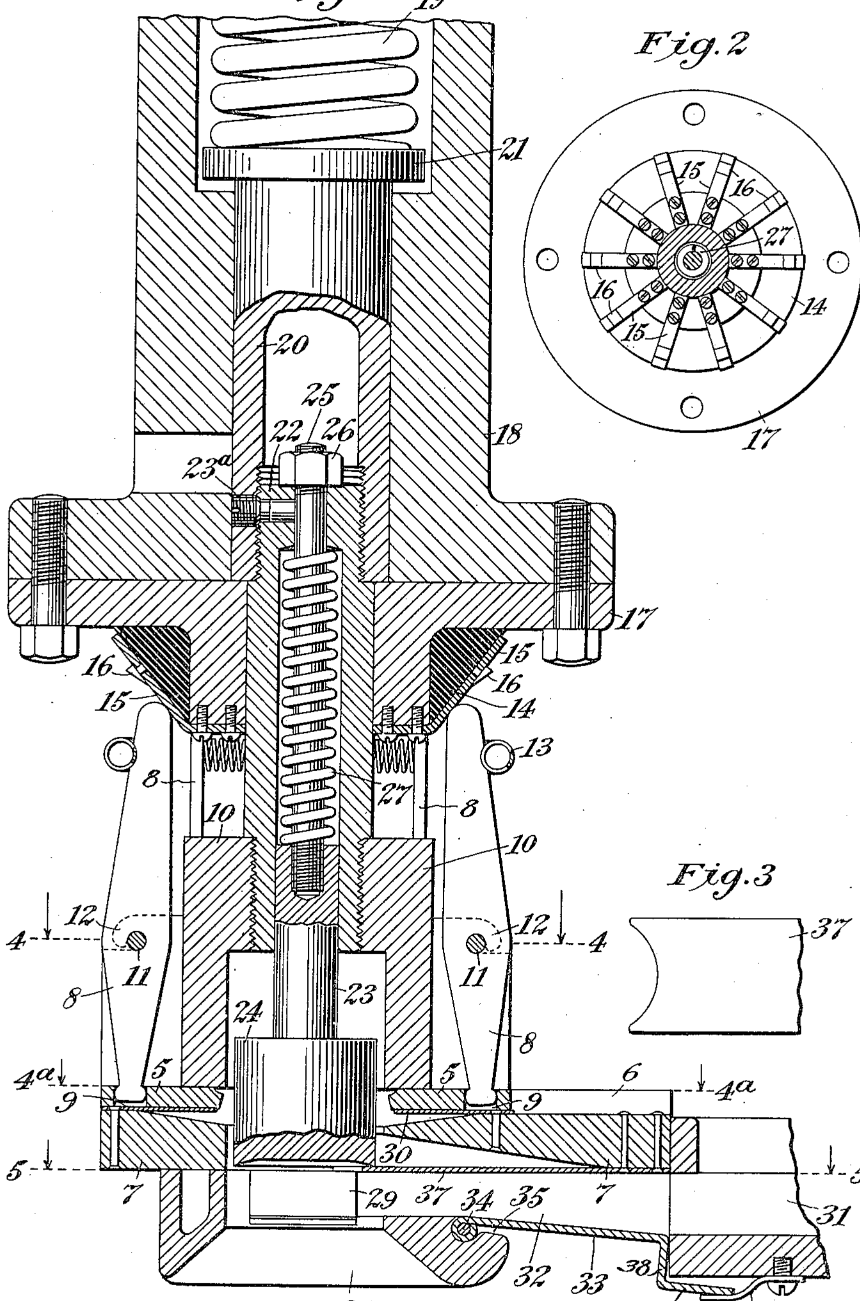

Fig.1 *Fig.2* *Fig.3*

Witnesses:

Victor D. Borst

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By his Attorney

Henry D. Williams

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2 SHEETS—SHEET 2.

Fig. 4

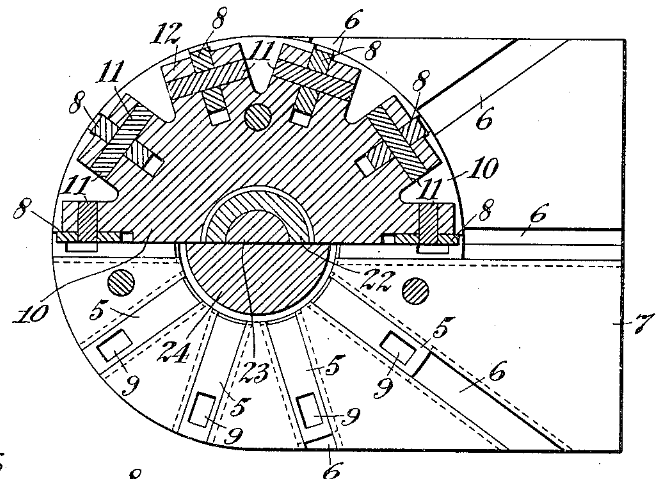


Fig. 6

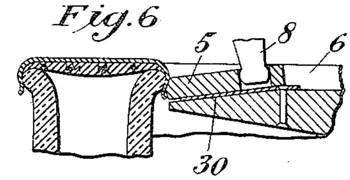
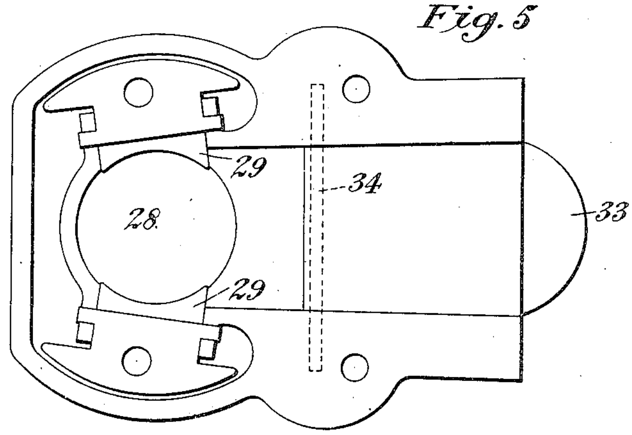


Fig. 5



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UNITED STATES PATENT OFFICE.

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BOTTLE-CAPPING HEAD.

1,033,955. Specification of Letters Patent. Patented July 30, 1912.

Application filed July 20, 1910. Serial No. 572,800.

To all whom it may concern:

Be it known that I, JACOB SCHLAGEL, a citizen of the United States of America, residing at the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Bottle-Capping Heads, of which the following is a specification, reference being had therein to the accompanying drawings forming part thereof.

My invention relates to machines for sealing vessels and particularly to machines for applying metal caps to bottles by turning or clenching the depending flange of the cap underneath a bead on the neck of the bottle.

This invention is an improvement upon that formerly made by Herbert E. Marshall and myself, which forms the subject matter of an application for United States Letters Patent, Serial Number 466,060.

One of the objects of my present invention is to provide simple and efficient means for producing a sealing pressure on the cap flange and bottle neck which will always be sufficient to firmly apply the cap and which will never be sufficient to break the bottle neck but will yield before the critical pressure is obtained; in other words, means which will compensate for variations in diameter of the bottle neck.

Another object of my invention is to provide cap-setting means which will effectively engage an outstanding flange on the cap and produce a downward pull on the cap, while applying it to the bottle.

Another object of my invention is to provide simple means for connecting a chute from an automatic cap feeder which will adapt itself to relative movement between the chute and the capping head; and to provide means for preventing any ill effects resulting from the caps overlapping as they are fed into register with the bottle.

Other objects and advantages of my invention will appear from the following description.

I shall now describe my invention with reference to the accompanying drawings and shall thereafter point out my invention in claims.

Figure 1 is a central vertical section of a capping head embodying my invention. Fig. 2 is a detail bottom view on a reduced scale of the cone and its support, showing the interiorly contained parts in section. Fig. 3 is a detail plan view of a broken portion of the spring top of the cap passage. Fig. 4 is a horizontal section, the upper half on the line 4—4 and the lower half on the line 4^a—4^a of Fig. 1, looking down. Fig. 5 is a horizontal section taken on line 5—5 of Fig. 1, looking down. Fig. 6 is a sectional detail of a cap-setting plunger and coöperating parts, illustrating the operating position of the plunger.

In its broad aspect my invention includes a resilient cone for actuating the cap-setting means, which is sufficiently inelastic to assure a sufficient cap-setting pressure, and which nevertheless will give way before breaking the bottle neck.

My invention also includes a cap-setting plunger having the lower edge of its engaging face beveled so that the face is inclined rearwardly or downwardly for engaging an outstanding edge of the cap and producing a downward sealing pull.

My invention also includes a passageway for the caps from an automatic feeder to the mouth of the capping head having a resilient top and a jointed bottom.

In the illustrated embodiment of my invention, I employ a plurality of ten arcuate cap-setting plungers 5, the face of each plunger forming an arc which is one-tenth of a circle, slidable longitudinally and arranged to close radially inward to form a complete circle about the neck of the bottle. These plungers slide in radial dovetail grooves 6 provided for them in the base 7. To actuate these plungers 5, levers 8 are provided, one for each plunger, the lower ends of which extend into recesses or sockets 9 in the top of the plungers 5. The levers 8 are pivoted in vertical slots provided for them around the periphery of a head 10, having a central longitudinal bore and preferably made of brass or other similar material. The head 10 and base 7 are secured together in any suitable way, as by vertical bolts, shown in section in Fig. 4. To provide bearings for the pivot pins 11, an annular horizontal slot is sawed or otherwise formed around the periphery of the head 10 at the desired height. The upper end of the head 10 is made of smaller diameter than the lower slotted portion and the annular slot is formed slightly below the shoulder thus formed, thereby leaving a thin ledge portion 12. To hold the pivots in their bearings, V-shaped portions are cut out of this ledge portion 12 between each pivot, as shown in Fig. 4, and thus a separate ledge portion 12 is provided for each pivot, which is bent down in front of the pivots to hold them in their bearings, as shown in Fig. 1. An annular coiled spring 13 encircles the upper end of the pivoted actuating levers 8 and holds the upper ends of these levers in toward the head, thereby normally holding their lower ends, and hence the plungers 5, in retracted position.

To actuate the levers 8, a cone 14 is provided arranged by relative movement between the levers and cone to press the upper ends of the levers outward and thus force the plungers 5 in around the bottle neck. To prevent this inward pressure of the plungers 5, produced by the relative movement between the cone 14 and the levers 8, from becoming sufficiently great to break the bottle neck in case the diameter of the bottle neck is so large that the plungers 5 close around it before they have reached the limit of their inward movement, the cone 14 is made of some yieldable or resilient material, preferably soft rubber as shown.

The resiliency of the cone permits it to yield just before the pressure of the plungers on the bottle neck reaches the breaking point of the bottle neck and by these means very simple provision is made for compensating for variation in diameter of the bottle necks. In order to facilitate the relative movement between the cone 14 and the actuating levers 8, tracks 15 of metal are provided on the cone, one for each lever. To give a final sealing impulse or pressure to the levers 8 just as the plungers 5 close about the cap on the bottle neck, the angle of the cone is increased at the limit of the movement of the levers 8 by the addition of a cam or wedge shaped piece 16 on each track.

The cone 14 is supported on a flanged sleeve member 17. The tracks 15, which are attached to the lower end of the flanged sleeve 17 by screws, as shown in the drawings, hold the cone in place. Attached to the flanged sleeve 17 and reversely arranged is an upper flanged sleeve 18. The sleeve 18 is secured to the sleeve 17 by bolts or screws passing through the two flanges, as shown. The sleeve 18 has a longitudinal bore in register with that of the flanged sleeve 17, but of a slightly larger diameter, the upper end of which bore is enlarged and serves for a spring box for a helical spring 19, which bears against the top of the enlarged spring box in the sleeve 18 in the usual way. The spring 19 bears at its lower end on the top of a hollow vertically sliding member 20 of the same diameter as the bore of the sleeve 18 and arranged to slide longitudinally therein. The sliding member 20 has an enlarged head 21 to serve as an abutment for the spring 19. The downward movement of the sliding member 20 is limited by its abutment against the shoulder formed at the beginning of the sleeve member 17.

The longitudinal bore of the sliding member 20 is internally screw-threaded and secured therein is the screw-threaded upper end of a lower vertically sliding member 22 which projects into the vertical bore of the sleeve member 17. The sliding member 22 is of the same diameter as the central bore of the sleeve member 17, and, being somewhat longer than the sleeve member 17, extends well down below and out of the sleeve member 17. The upper screw-threaded end of the sliding member 22 is of reduced diameter in order to enter the internal bore of the upper sliding member 20, and the lower sliding member 22 has a similar screw-threaded portion at its lower end which screws into the top of the central bore of the brass head 10. A screw 23ᵃ secures the sliding members 20 and 22 together and prevents any relative movement between the two. Thus the upper sliding member 20, the lower sliding member 22, and the head 10 are all secured together and move as one relative to the other parts of the head. The lower sliding member 22 also has a central longitudinal bore the upper end of which is of a reduced diameter. An upwardly extending stem 23 of a buffer head 24 enters the lower end of the bore in the sliding member 22, and a bolt or spindle 25, of the diameter of the upper reduced portion of the bore, is screwed into the top of the stem 23 and extends up through and out of the reduced portion of the bore in the sliding member 22. The upper end of the bolt 25 which extends above the sliding member 22, is screw-threaded and a nut 26 screws thereon and holds the bolt 25 and the buffer head 24 from falling out. A coiled thrust spring 26 encircles the bolt 25 and bears with its upper end against the shoulder formed at the beginning of the reduced portion of the bore in the sliding member 22, and with its lower end against the top of the stem 23, and holds the buffer head normally down as far as the nut 26 permits. The lower part of the central bore in the head 10 is enlarged, thus forming a shoulder to limit the upward relative movement of the buffer head 24.

In operation, either the bottle may be moved up relative to the capping head, or the capping head may be moved down and the bottle held stationary. Assuming the bottle to be located on a stationary rest in operation, and the capping head moved down, the neck of the bottle enters the mouth 28 of the capping head and picks up the cap which is in register therewith on the usual cap-supporting devices 29, and engages the buffer head 24. The head 24 is then held against further downward movement and the other parts continue downward relative to it against the tension of the spring 27, until the plunger head strikes the shoulder in the bore of the head 10, after which the head 10, and sliding members 22 and 20 are also held relatively stationary against the tension of the spring 19. Since the cone 14 now moves relatively to the levers 8, the further downward movement of the capping head is therefore utilized in actuating the levers 8 and pressing in the plungers 5 and closing them about the cap.

To cause the plungers 5 to exert a downward sealing pressure on the caps, the engaging edge of the plungers is beveled or rearwardly inclined downwardly of its face, as illustrated in Fig. 6. As the engaging edge closes in about the outstanding edge of the cap, therefore, the outstanding edge of the cap slides or is drawn down in under the beveled edge of the plunger, with the result that a downward pull is exerted on the whole cap and an effective seal made. The top of the engaging edge of the plungers 5 is also sharply beveled off, as shown in Fig. 6, to lower the point where the plunger engages the bead on the bottle neck, and assure that the plungers will slide underneath the bead and draw on the cap; in other words, the engaging edge of the plungers is substantially of convex V-shape.

To compensate for variation in width of the beads of the bottle necks, the inner ends of the dovetailed grooves 6 are beveled off, as shown, and a flat spring 30 under each of the plungers permits the engaging edges of the plungers to be carried down by the contour of the neck if the bead is wide, as shown in Fig. 6, and at the same time hold the plungers up to engaging position for beads not so wide.

Caps may be fed into my capping head from an automatic feeder (not shown) by a chute 31 through a passage 32 provided for this purpose and opening into the mouth 28 of the head. To facilitate the attachment of the chute 31 and to allow for relative movement between the head and the chute and always keep the opening from the chute and the passage 32 in alinement as the head moves up and down, the chute rests upon a jointed or hinged bottom piece 33 for the passage 32, the pivot pin 34 being provided for the bottom 33 at its inner end. A shoulder 35 is formed on the shell of the mouth 28 to limit the downward movement of the bottom 33.

The hopper or automatic feeder and the cap chute 31 are connected in the usual way with the upper part of the head of which the cone is a part, and move up and down therewith. The hinged bottom piece 33 is offset or dropped down near its outer end at the edge of the base 7, forming the shoulder 38 and the chute-supporting end 39 as shown. The shoulder 38 is of a height slightly greater than the thickness of the bottom of the chute 31, in practice about one thirty-second of an inch, so that when the chute 31 rests down upon the support 39 there is a slight offset between the bottom of the chute and of the passage 32. A pivoted latch 36 on the bottom of the chute is arranged to be turned underneath the support 39 and is bent so that when the support 39 rests on the latch 36, the bottom of the chute 31 and of the passage 32 are alined, as shown in Fig. 1. As previously stated at the beginning of the operation all the parts move down together, but when the buffer-head 24 engages the shoulder in the bore in the head 10, the base 7 and parts attached thereto are held against further downward movement, while the cone and connected parts, including the hopper and chute 31, are moved on down for a distance sufficient to force the plunger 5 in and seal the bottle. This distance differs with bottles of different length, and it is during this movement that the hinged bottom piece 33 comes into play. When the base 7 stops, the chute is carried on down and first strikes the supporting end 39 of the bottom piece 33, and then the bottom piece 33 is carried down with the chute the remaining distance. The slight offset of substantially one thirty-second of an inch between the bottom of the chute and of the passage 32 is sufficient to hold the caps in the chute, and the parts are so designed that just a pre-arranged number of caps can lie in the passage 32 from the mouth 28 to the edge of the base 7, and hence no cap can lie over the break between the passage 32 and the chute and get caught and bent by the top of the chute if the bottle happens to be very short and there is considerable relative movement between the chute and the passage 32.

As caps with an outstanding edge are fed through the passage 32, it is apparent that the outstanding edges will overlap one over another. If the foremost cap which is in register with the bottle has its outstanding edge overlapping the one immediately behind no harm results as the cap in register with the bottle is moved relatively upward; but if, on the other hand, its edge is underneath that of the adjacent cap, it is held against the relative upward movement with the result that the edges are bent and the caps are damaged and rendered useless, which necessitates stopping the machine and taking out the damaged caps. To obviate this I make the top wall of the passage 32 yielding and resilient so that the second cap may move up with the first until the first cap slips by, and then the second will be returned to its original level. To effect this resiliency of the top wall, I bevel off the top wall at an angle toward the inner end, as shown in Fig. 1, and provide the flat spring 37 for the top wall, secured at the outer end by rivets, as shown. By these means, in case the second cap overlaps the first, it may be carried up with it against the tension of the spring 37, and as soon as the first cap slips past, the spring 37 returns the second cap to the level of those behind in the passage 32.

It is obvious that various modifications may be made in the construction shown and above particularly described within the principle and scope of my invention.

I claim:

1. In a bottle-capping head, a cone of resilient material, and a plurality of pivoted cap-setting levers arranged with their free ends in position to be directly engaged and simultaneously actuated by the cone.

2. In a bottle-capping head, in combination, a plurality of cap-setting plungers, actuating levers for the plungers, and a relatively movable resilient cone for operating the actuating levers.

3. In a bottle-capping head, in combination with a plurality of cap-setting plungers, actuating levers for the plungers, a relatively movable cone of resilient material for operating the actuating levers, and a track on the cone for each lever.

4. In a bottle-capping head, in combination with a plurality of cap-setting plungers adapted to close radially inward about the cap, actuating levers for the plungers, resilient means coöperating with the levers tending to hold the plungers in retracted position, and a relatively movable yieldable cone for operating the actuating levers.

5. In a bottle-capping head, in combination with a plurality of cap-setting plungers adapted to close radially inward about the cap, pivoted actuating levers for the plungers, annular resilient means encircling the plungers and tending to hold the plungers in retracted position, and a relatively movable resilient cone for operating the actuating levers to press the plungers yieldingly inward.

6. In a bottle-capping head, in combination, a plurality of cap-setting plungers having engaging edges rearwardly inclined downwardly of the edge, actuating levers for the plungers, and a relatively movable cone for operating the actuating levers.

7. In a bottle-capping head, in combination, a plurality of cap-setting plungers having substantially convex V-shaped engaging edges, actuating levers for the plungers, a relatively movable cone of resilient material for operating the actuating levers, and a track on the cone for each lever.

8. In a bottle-capping head, in combination, a plurality of cap-setting plungers, actuating levers for the plungers, a relatively movable cone for operating the actuating levers, and resilient means coöperating with the plungers for compensating for variations in width of the beads of the bottle necks.

9. In a bottle-capping head, in combination, a plurality of cap-setting plungers, actuating levers for the plungers, a relatively movable resilient cone for operating the actuating levers, and resilient means coöperating with the plungers for compensating for variations in width of the beads of the bottle neck.

10. In a bottle-capping apparatus, the combination of a capping head adapted to apply the caps when in register with the bottle, a cap-chute for the caps, a passageway arranged to lead the caps from the chute into the capping head in register with the bottle, and a resilient top for the passageway.

11. In a bottle-capping apparatus, the combination of a capping head adapted to apply the caps when in register with the bottle, a cap-chute for the caps, a passageway arranged to lead the caps from the chute into the capping head in register with the bottle, a resilient top for the passageway, and a jointed bottom for the passageway arranged to be connected to the cap-chute.

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

JACOB SCHLAGEL.

Witnesses:
VICTOR D. BORST,
JOHN W. WALLER.