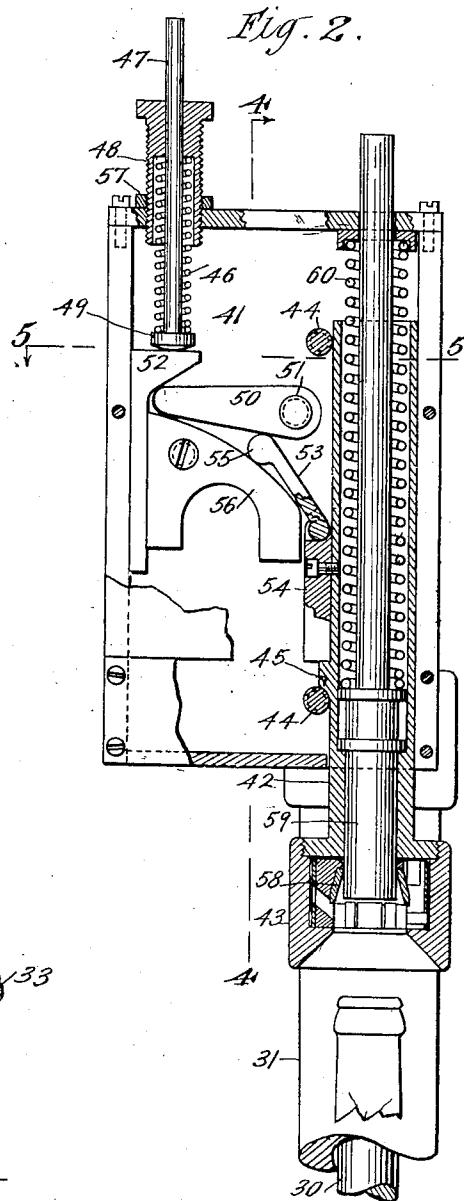
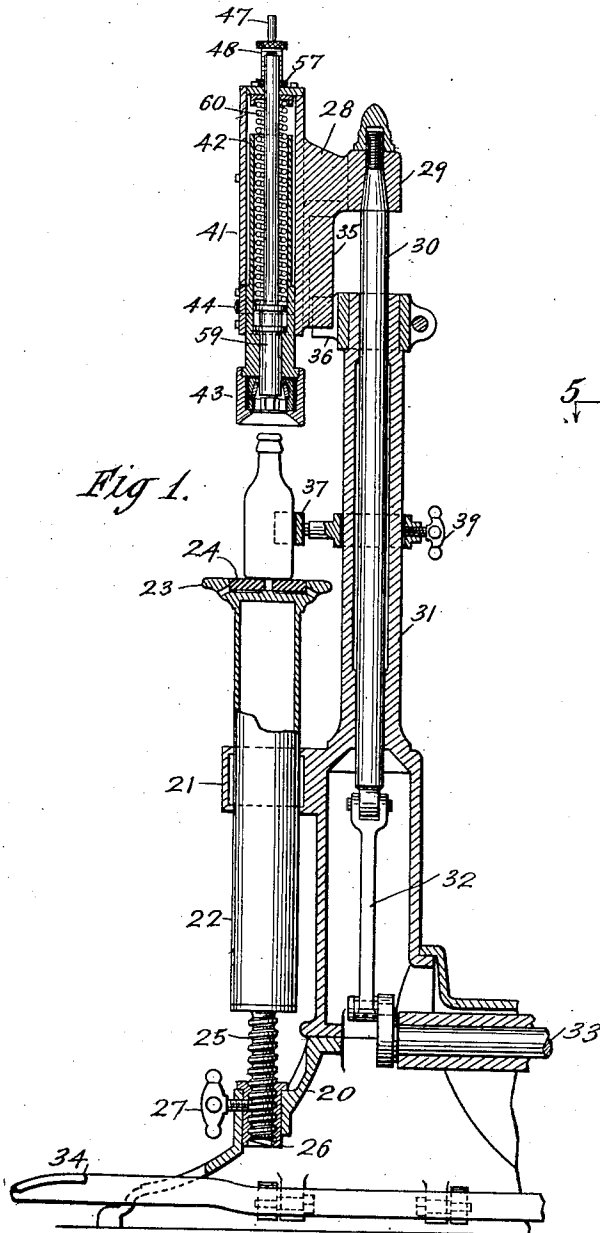


S. W. TAYLOR.
BOTTLE CAPPING APPARATUS.
APPLICATION FILED JULY 31, 1917.

1,348,908.

Patented Aug. 10, 1920

2 SHEETS—SHEET 1.



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Fig. 3.

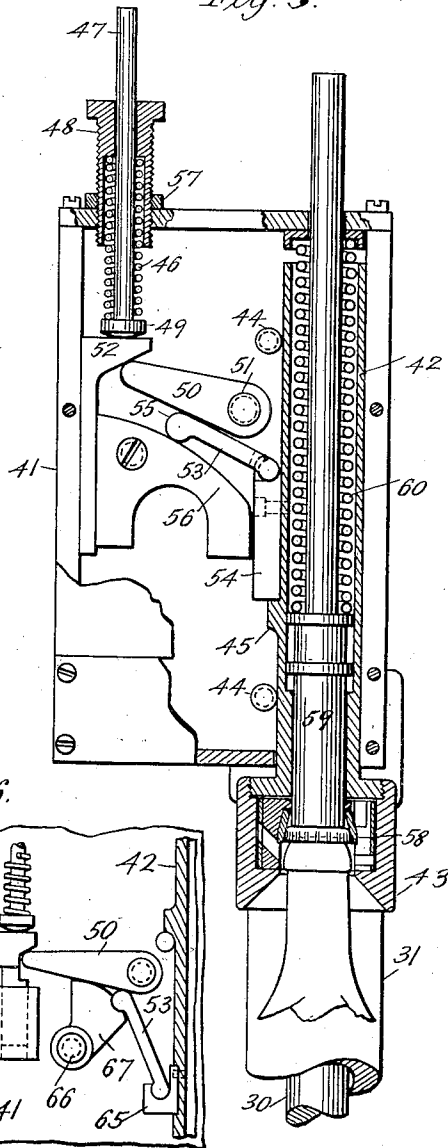


Fig. 4.

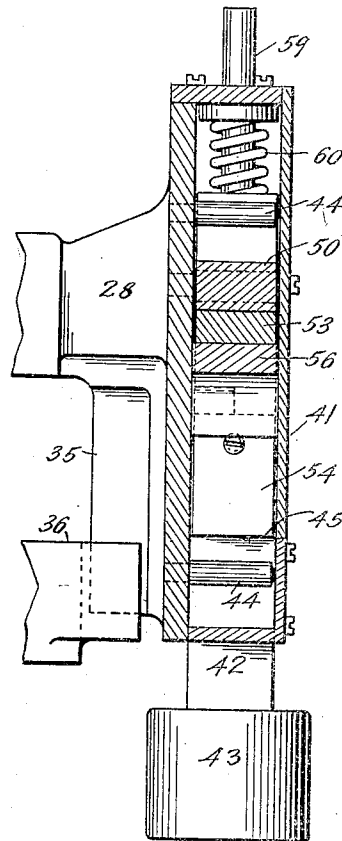


Fig. 6.

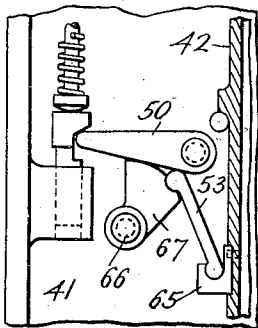
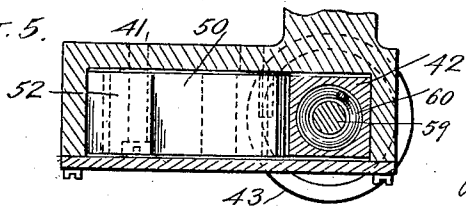


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BOTTLE-CAPPING APPARATUS.

1,348,908.

Specification of Letters Patent.

Patented Aug. 10, 1920.

Application filed July 31, 1917. Serial No. 183,682.

To all whom it may concern:

Be it known that I, SAMUEL W. TAYLOR, a citizen of the United States, residing at Baltimore city, State of Maryland, have invented certain new and useful Improvements in Bottle-Capping Apparatus, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to bottle capping apparatus.

In the usual form of bottle capping machine there is a bottle support and a capping head having relative movement and the stroke of the moving part is fixed. The capping throat which is associated with the capping head is forced against the bottle with a predetermined pressure designed to cause the cap to be attached to the bottle. Since bottles are not uniform in height, the pressure necessary for capping a given bottle will be too great on a longer bottle, and in order to prevent breakage, some provision is necessary for releasing any excess pressure.

Bottle capping machines have been devised which include a bottle support having associated therewith pressure-releasing mechanism usually contained within the supporting column. Such a construction is open to the objection that any spilled liquid or any liquid from occasional broken bottles runs and drips down the bottle support and associated parts with the result that the pressure-releasing mechanism eventually becomes so rusty that its proper operation is interfered with.

It is an object of the present invention to provide bottle capping apparatus having pressure-releasing means independent of and apart from the bottle support and located so as to be removed from the reach of any liquid which may be spilled from the bottles.

It is a further object of the invention to provide bottle capping apparatus having means for releasing all the excess pressure substantially immediately upon the predetermined amount being exceeded, applicable to machines already in use, and generally efficient in operation.

The following specification describes and the accompanying drawings illustrate bottle capping apparatus constructed in accordance with the invention, it being understood

that changes may be made in the form, construction and arrangement of the parts without departing from the invention, the forms herein disclosed being preferred embodiments thereof.

In the drawings—

Figure 1 is a vertical sectional view of a bottle capping machine constructed in accordance with the invention.

Fig. 2 is a view of the same in front elevation with parts broken away and parts in section;

Fig. 3 is a view similar to Fig. 2 showing the parts in a different position;

Figs. 4 and 5 are cross-sectional views taken on the lines 4—4 and 5—5, respectively, of Fig. 2, looking in the direction of the arrows; and

Fig. 6 is a view similar to Fig. 3, showing a modification of a portion of the device shown therein.

The invention includes a bottle support and a capping head capable of relative movement. In the embodiment here illustrated as an example, this relative movement is obtained by a capping head having a reciprocating movement with respect to a stationary bottle support. Although capable of various constructions, in the form shown, supported by the base 20 and having a bearing in a bracket 21, is a bottle support in the form of a cylindrical casing 22 provided at its top with a table portion 23 having a resilient pad or seat 24 for the bottle which is to be capped. In order to accommodate the support to bottles of different sizes, *i. e.*, quarts, pints, and the like, the cylindrical casing 22 is movable up or down in its bearing and to this end it is provided at the bottom with a screw 25 in threaded relation with a sleeve 26 carried by the base 20. By turning this screw in its sleeve the bottle support may be raised or lowered and a set screw 27 is provided for locking the parts in any desired position.

The capping head 28 has an arm 29 secured to the top of a reciprocating rod or plunger 30 which is inclosed within a hollow standard 31 extending upwardly from the base. The plunger is connected by means of a link 32 with a shaft 33 connected in turn with a power shaft by a suitable clutch (not shown), this clutch being operated to cause reciprocation of the parts by a treadle 34.

To guide the reciprocating capping head the latter is provided with a web 35 which slides in a forked bracket 36 extending out from the standard 31. To position the bottle on its support an arcuate guide 37 is provided which, for adjustment, is slidable on the standard 31 and is held in place by a set screw 39. It will be seen that the structure described comprises a bottle support which (for a given adjustment) is stationary and a capping head which reciprocates with a fixed stroke.

The invention includes means for exerting capping pressure on the bottle and for preventing excess pressure by means of pressure releasing mechanism which is independent of and apart from the bottle support. Although such means may vary within a wide range, in structures embodying the invention to the best advantage, the capping throat is movable relatively to the capping head to relieve the pressure on the bottle. In such case these two parts are arranged to act as a unit, as, for example, by moving together, within the limit of capping pressure but the capping throat is allowed to give way as soon as the point of capping pressure is passed, as hereinafter described, thus preventing any excess pressure on the bottle. Although capable of various constructions, in the present embodiment, carried by the capping head is a housing 41 in which is slidably mounted a square sleeve 42 having secured to the flange at its foot, a capping throat 43. Associated with the latter is the usual throat ring 53 for crimping the caps onto the bottle neck and inclosed within the square sleeve 42 is a presser-foot and knock-out plunger 59 pressed downward by a coil spring 60, these elements being known in the art and requiring no further description. In order to guide and aid the square sleeve 42 in such movements as it may make, it is arranged to slide over upper and lower rollers 44 carried by the housing, and to limit the downward movement of the sleeve the lower roller serves as a stop for a shoulder 45 formed on the sleeve.

The invention includes means for causing the capping head and capping throat to act as a unit within the limit of the predetermined pressure and to permit the capping throat to move relatively to the capping head as soon as this capping pressure is exceeded. In apparatus of the type herein described as an example, in which the capping head reciprocates, this is accomplished by causing the two elements to move together within the limits of capping pressure and permitting the throat to give way as soon as such pressure is exceeded. Although variable within a wide range, in structures embodying the invention to the best advantage, a spring is provided together with mechanism

for transmitting its force to the capping throat. Although capable of various constructions, in the present embodiment a coil spring 46 embraces a plunger 47 sliding in a guide member 48 which is carried by the housing 41, and which has a socket which forms a seat for one end of the spring. The other end of the spring seats against the shoulder of a knob or foot 49 formed on the plunger 47. Between this spring-pressed plunger 47 and the throat-carrying sleeve is the mechanism for transferring the spring pressure to the capping throat to normally cause the latter to move with the capping head. Although variable within a wide range, in structures embodying the invention to the best advantage, this mechanism includes a lever acted on by the spring and mechanism associated with the capping throat for transferring the force of the spring to the capping throat and so designed that the leverage exerted rapidly diminishes upon application of excess pressure. Although capable of various constructions, in that illustrated, there is provided a lever 50 having a rounded end and pivoted to the housing as at 51. In the particular construction shown as an example, the lever does not engage the plunger 47 directly, but, instead, the end of the lever bears against the oblique bottom of a sliding member 52, the horizontal top of which engages the plunger, this member serving to strengthen the spring. In operative association with the lever is a link 53 the end of which is pivoted in a socket formed in a plate 54 secured to the sleeve 42. This link has a knobbed or rounded end 55 which is engaged by the lever.

Means is provided for holding the link 53 in contact with the lever 50 and in structures embodying the invention to the best advantage, this is accomplished by an abutment device such as a cam member designed to act as a stop to prevent the link from falling away from contact with the lever as the device operates and this cam may be, for example, a stationary member. Although capable of various constructions, Figs. 2-6 illustrate a stationary cam 56 carried by the housing 41 and having a curved face over which the rounded end 55 of the link rides during the movement of the parts as hereinafter described, the curve of the cam being so designed that as the lever moves on its pivot the link is always held in contact with the lever with a shifting point of application.

Fig. 2 illustrates the position of the parts preparatory to the descent of the capping head to a bottle. The capping throat and its supporting sleeve are in their lowermost position and the throat is pressed downward by the spring 46 through the intermediation of the mechanism described. Upon descent of the head, contact is made by the throat

ring with a bottle and the continued relative movement of the capping head and bottle support causes pressure to be exerted between the bottle and capping head. While the cap is being pressed into the throat ring 58, plunger 59, resting on the cap, is now forced upward and is building up pressure through the compression of spring 60. The corrugated flange of the cap is compressed around the bottle mouth by the ring of the capping throat, the latter being held against relative movement by the force of the spring 46 which is designed to hold the parts in this position as long as the predetermined capping pressure is not exceeded. It will be seen that, due to the construction described, the leverage exerted by lever 50 on link 53 is, in the position of the parts illustrated in Fig. 2, very great so that only a comparatively small spring is required to exert sufficient pressure on the capping throat to properly seal a bottle. When the predetermined capping pressure is exceeded, as in the case of an extra long bottle, the pressure on the capping throat overcomes the force of spring 46 and causes the same to be depressed, thus allowing the throat ring to give way and relieve the pressure on the bottle. During such operation the throat carrying sleeve 42 under the pressure exerted thereon moves upward relatively to the capping head, thereby moving the link 53 upwardly against the lever which is thus caused to swing on its pivot, the end wiping against the sliding member 52 to raise plunger 57 and depress the spring. During this movement the cam 56 holds the link in contact with the lever, as appears in Fig. 3 and it is noted that the relative position of the parts change in such manner that the leverage exerted by lever 50 through the link to the capping throat rapidly decreases. Due to this construction, the spring pressure is rapidly overcome once this opposing excess pressure is started and the release of the pressure on the capping throat is consequently substantially immediate.

When the return relative movement of capping head and bottle support takes place, as by the raising of the head in the present embodiment, the parts return to their normal position on account of the built-up pressure in the two springs, plunger 59 during this return movement serving as a knock-out to prevent the bottle from sticking in the throat.

A construction such as that described provides an effective pressure release and one that acts to throw off all the excess pressure substantially immediately upon the passage of the predetermined point, so that there is no danger of broken bottles. The pressure releasing means is removed from the path of any spilled liquid; and, furthermore, by substituting the simple bottle

support and the capping head described for the corresponding parts in old machines, the invention is made applicable to capping apparatus already in use.

Means is provided for adjusting the normal or capping pressure. Although this may be done by various constructions, in the present embodiment the guide member 48, which serves as a seat for the spring 46, is in the form of a screw-threaded nut threaded through the top of the housing 41, and by movement of this nut the force of the spring is strengthened or weakened, as desired. A lock nut 57 serves to hold the parts in adjusted position.

In Fig. 6 is illustrated a modification of the means for holding the link against the lever. Instead of providing a stationary cam, as above described, having a face over which the link rides, a member is provided which supports the link in position and moves with it. Although capable of various constructions, in the form shown, the link 53 is pivoted in a bracket 65 which like the plate 54 is secured to the sleeve 42. Pivoted in the housing 41, as at 66, is a segmental cam member 67, the upper curved face of which is provided with a groove serving as a seat for the knobbled end of the link. The operation is the same as that of the embodiment first described, except that the link is held up against the lever by the cam 67 which swings on its pivot as the link moves upwardly and inwardly.

What is claimed is:

1. In a bottle-capping apparatus, the combination, with a capping head and a bottle support having relative movement, of a capping throat device carried by the capping head and movable relative thereto, and a yielding resistance device for retaining the capping throat device in fixed relation to the capping head within a predetermined limit of pressure and for giving a decreased resistance after the initial movement of the throat device relative to the capping head.

2. In a bottle-capping apparatus, the combination, with a capping head and a bottle support having relative movement, of an interiorly coned capping throat device carried by the capping head and movable relative thereto, a spring arranged to yieldingly retain the throat device in fixed relation to the capping head, and means for reducing the action of the spring on the throat device as said throat device moves relative to the capping head.

3. In a capping apparatus, the combination, with a capping head and a bottle support having relative movement, of a throat device carried by the capping head and movable relative thereto, a spring, and a variable pressure transmission device for transmitting the action of the spring to the throat device to yieldingly retain it in fixed rela-

tion to the capping head within a predetermined limit of pressure and for reducing the action of the spring on the throat device upon movement of the latter relative to the capping head.

4. In a capping apparatus, the combination, with a capping head and a bottle support having relative movement, of a throat device carried by the capping head and movable relative thereto, a spring, a lever acted upon by the force of said spring, an abutment device, and means movable relative to the lever and connected to the throat device, said means being pressed against the abutment device by the lever, whereby as the throat device moves relative to the capping head, the action of the spring on the throat device is reduced.

5. In a capping apparatus, the combination, with a capping head and a bottle support having relative movement, of a throat device carried by the capping head and movable relative thereto, a spring, a lever acted

upon by the force of the spring, an abutment device having a cam surface, and a link connected to the throat device and having a part arranged to be pressed against the cam surface by the lever and slidable along said lever.

6. In a capping apparatus, the combination, with a capping head and a bottle support having relative movement, of a throat device carried by the capping head and movable relative thereto, a spring, a lever, a connection between the lever and the spring, an abutment device, and means movable relative to the lever and connected to the throat device, said means being pressed against the abutment device by the lever, whereby as the throat device moves relative to the capping head, the action of the spring on the throat device is reduced.

In testimony whereof, I have hereunto set my hand.

SAMUEL W. TAYLOR.