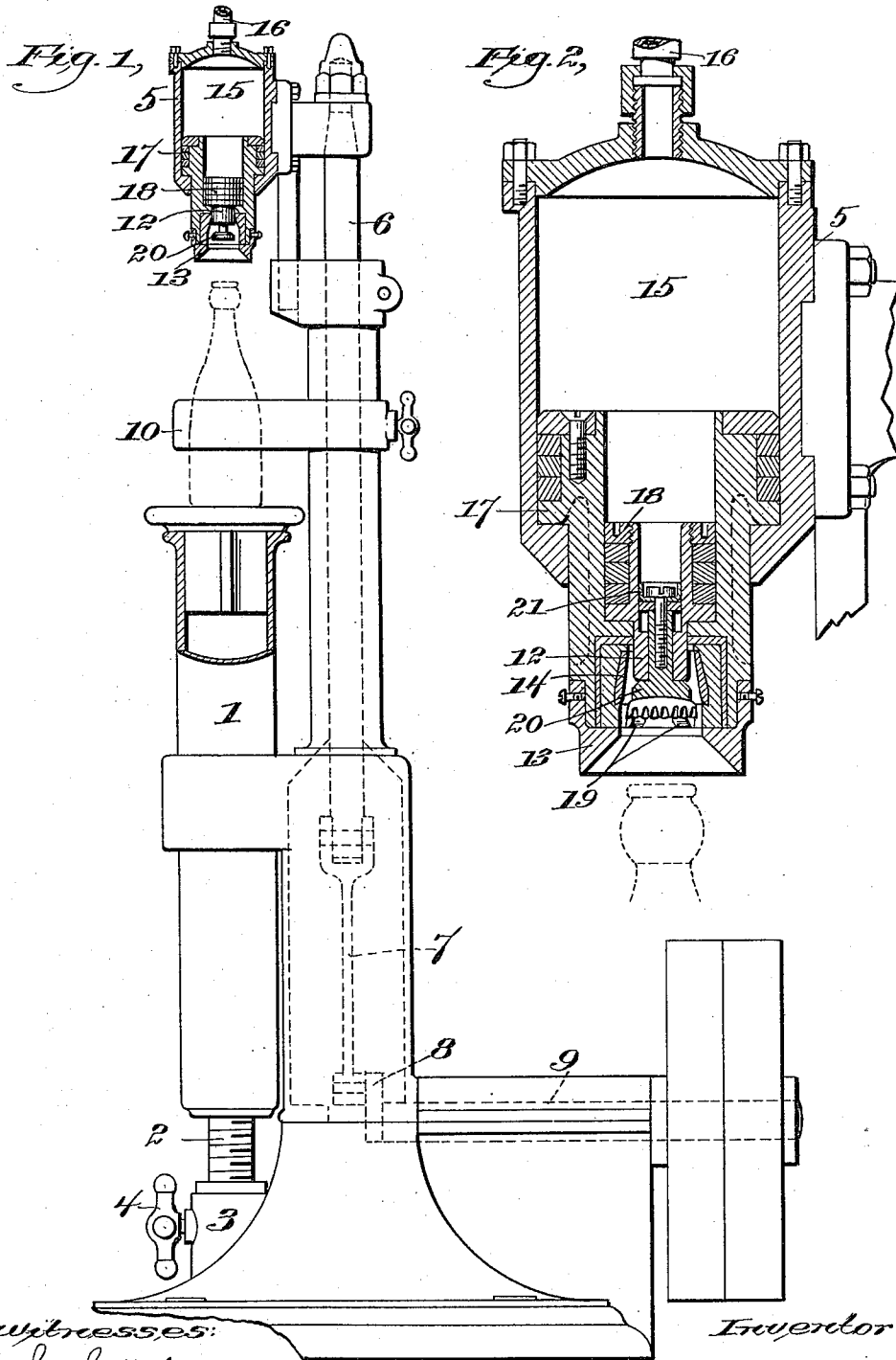


W. E. LINDSAY.
MACHINE FOR APPLYING CROWN STOPPERS.
APPLICATION FILED APR. 1, 1912.

1,162,702.

Patented Nov. 30, 1915.



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UNITED STATES PATENT OFFICE.

WILLIAM EDWARD LINDSAY, OF NEEDHAM, MASSACHUSETTS.

MACHINE FOR APPLYING CROWN-STOPPERS.

1,162,702.

Specification of Letters Patent.

Patented Nov. 30, 1915.

Application filed April 1, 1912. Serial No. 687,658.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD LINDSAY, a citizen of the United States, residing at Needham, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Machines for Applying Crown-Stoppers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a machine for applying crown stoppers to bottles, the purpose of the invention being to simplify the mechanism and to dispense entirely with the use of springs, the machine being so arranged that all the yielding parts are controlled by fluid pressure. Crowning machines of the kind to which this invention appertains consist of a support for the bottle and a compressing plunger and crowning throat which perform the operations of compressing the cork washer and closing in the sides of the crown so that the latter engage with the groove around the bottle neck; the support and the throat having relative movements whereby the crowning operation is performed.

In carrying out the operation, the compressing plunger acts before the throat moves to its operative position, the function of the plunger being to press the crown against the top of the bottle so as to force the cork washer in the crown firmly into contact with the top of the bottle before the sides of the crown are closed in. This necessitates the yielding of one part or the other after sufficient pressure has been exerted, so as to admit of the further relative movement which carries the throat to its final operative position. Furthermore, it is necessary that provision should be made for the yielding of one entire part relative to the other so as to compensate for the difference in the lengths of the bottles.

In carrying out this invention, I have provided the machine with a stationary support for the bottle, the yielding parts being contained entirely in a movable head, the said parts being provided with pressure receiving abutments differing in area, which

are subjected to fluid pressure, so that the parts will yield after the force necessary has been exerted.

Figure 1 is a side elevation, partly in section, of a power driven machine embodying the invention; and Fig. 2 is an enlarged section, through the crowning head of the machine.

Referring to Fig. 1, the machine is provided with an adjustable standard 1 which is herein shown as mounted on a screw threaded stem 2 which enters a socket 3 in the frame of the machine, so that the height of the standard 1 can be adjusted by turning said standard, there being a locking screw 4 to hold it after the proper adjustment has been made.

Above the standard 1 is a reciprocating crowning head 5 which is shown as connected with a vertical rod 6 which is arranged to be moved up and down through the action of a pitman 7 and crank 8 of a main driving shaft 9. The bottle, as shown in Fig. 1, is arranged to be supported on the standard 1 and positioned by means of a guide or gage 10. The crowning head 5 is provided with the yielding plunger 12 and the crowning throat 13. The plunger 12 is adapted to exert sufficient pressure on the crown to compress the washer and make a tight fit between said washer and the mouth of the bottle, this plunger being adapted to yield after sufficient pressure has been exerted for this purpose, so as to admit of a further independent movement of the throat 13. In this further movement, the inclined inner surface 14 of the throat presses against the corrugated side of the stopper, forcing the corrugations into the groove around the neck of the bottle and locking the crown in place. For the purpose of obtaining the necessary pressures acting on the different parts, I have provided the operating parts with abutments which are subjected to fluid pressure, the crowning head being herein shown as consisting of a closed chamber 15 adapted to receive fluid pressure, such as that of compressed air, through a pipe 16, the movable abutments, aforesaid together constituting the lower wall of the chamber. The initial pressure in the chamber is maintained sub-

stantially constant in order to secure uniformity in the crowning operations, and such constant pressure may be provided for by supplying the chamber from a reservoir or reservoir tank having a capacity relatively large, as compared with the capacity of the chamber 15, and in which reservoir the pressure is maintained practically constant by means of any of the usual governing devices, such as relief valves or pressure regulators. The movement of the abutments with relation to the crowning head are relatively slight, and the change in actual pressure in the chamber 15 which is due to said movements may be disregarded so far as relates to any effect it may have upon the uniformity of operation.

The upper part of the member carrying the crowning throat forms one of the movable abutments, this upper part being herein shown as a piston 17 fitting the chamber 15, and being properly packed therein. The crowning throat, moreover, is provided with a bore through the middle in which fits a piston 18 which is connected with the plunger 12. The piston 17 which constitutes the abutment for the crowning throat and the piston 18 which constitutes the abutment for the plunger 12, are both subjected to fluid pressure, the piston 18, however, being somewhat smaller in area than the throat piston 17, so that it will yield after a certain predetermined fluid pressure has been balanced by the resistance, thus allowing an independent movement of the crowning throat to finish the operation, the pressure behind the throat piston 17 still preponderating over the resistance. After the crowning throat has done its work, it is obvious that the entire operating portion of the head can yield, so that no damage will be done if a bottle is somewhat longer than the standard.

In cases where the crowns are fed to the machine by hand, the crowning throat is provided with yielding dogs 19 which are in the form of latches to engage the under side of the crown and hold it in place. In connection with these dogs, the plunger 12 is provided with an independently yielding crown-positioning portion 20, the pressure of which is merely sufficient to hold the crown against the dogs in the position shown in Fig. 2. By constructing this yielding portion 20 as shown, it can be controlled by the same fluid pressure which controls the other parts, the said part 20 being herein shown as provided with a cup-leather packing 21 fitting in a cylindrical bore through the piston 18.

The operation of the machine is as follows: The crown and bottle being in position as shown in Fig. 2, the entire crowning head moves toward the bottle, the fluid pressure behind the piston 18 being sufficient to pre-

vent any independent movement of the plunger 12, before the cap washer has been forced firmly into contact with the mouth of the bottle. The resistance to the movement of the plunger is then sufficient to overcome the fluid pressure against the piston 18, but is not sufficient to overcome the fluid pressure against the throat piston 17. The throat, therefore, continues to move until the crown sides are closed in. Further movement of the plunger and throat is then impossible, since the bottle and stopper constitute a rigid abutment; but the fluid pressure exerted against the throat, while sufficient to close in the crown, is insufficient to crush the bottle, so that the operative parts will yield, if the movement of the reciprocating head continues after the crown is secured.

What I claim is:

1. The combination with a bottle support; of a head; a fluid pressure chamber in said head; a compressing plunger; a throat; abutments connected respectively with said plunger and throat, said abutments being subjected to the pressure in said fluid pressure chamber; and means for producing a relative movement of said bottle support and said head.

2. The combination with a bottle-support, of a reciprocating head; a fluid pressure chamber in said head; a compressing plunger; a crowning throat; and abutments connected, respectively, with said plunger and throat, said abutments being subjected to the pressure in the chamber.

3. The combination with a bottle-support, of a reciprocating head; a fluid pressure chamber in said head; a compressing plunger; a crowning throat; a crown positioning device located in the crowning throat; and abutments connected, respectively, with said plunger, said throat and said positioning device, said abutments all being subjected to the pressure in the chamber.

4. The combination with a bottle-support, of a reciprocating crowning head; a fluid-pressure chamber in said head; a crowning throat having an annular piston movable in said chamber; and a compressing plunger having a piston located in a bore through the annular throat piston.

5. The combination with a bottle-support; of a reciprocating crowning head; a fluid pressure chamber in said head; a crowning throat having an annular piston movable in said chamber; a compressing plunger having a piston located in a bore through the annular throat piston, said compressing plunger having a longitudinal bore; and a crown-positioning device having a piston fitting in said longitudinal bore.

6. The combination with an adjustable rigid support for a bottle; of a crowning head longitudinally movable toward and

from said support; a fluid pressure chamber
in said head; a compressing plunger; a
crowning throat; and concentric pistons,
differing in area, connected, respectively,
5 with said plunger and throat, and subjected
to the pressure in the chamber.

In testimony whereof, I have signed my

name to this specification in the presence of
two subscribing witnesses.

WILLIAM EDWARD LINDSAY.

Witnesses:

JAS. J. MALONEY,
W. E. COVENTRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."