G. KIRKEGAARD.

BOTTLE CAPPING MACHINE.

APPLICATION FILED DEC. 16, 1908.

939,141.

Patented Nov. 2, 1909.

Fig. 1.

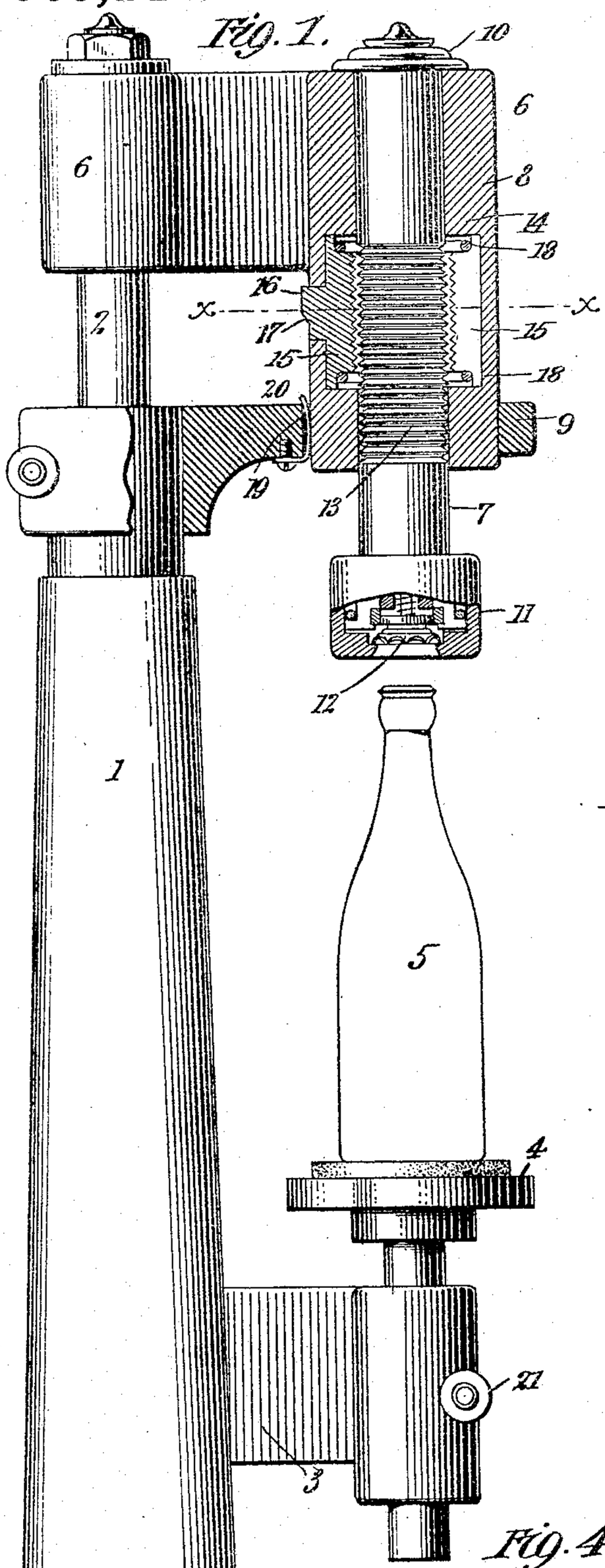


Fig. 2.

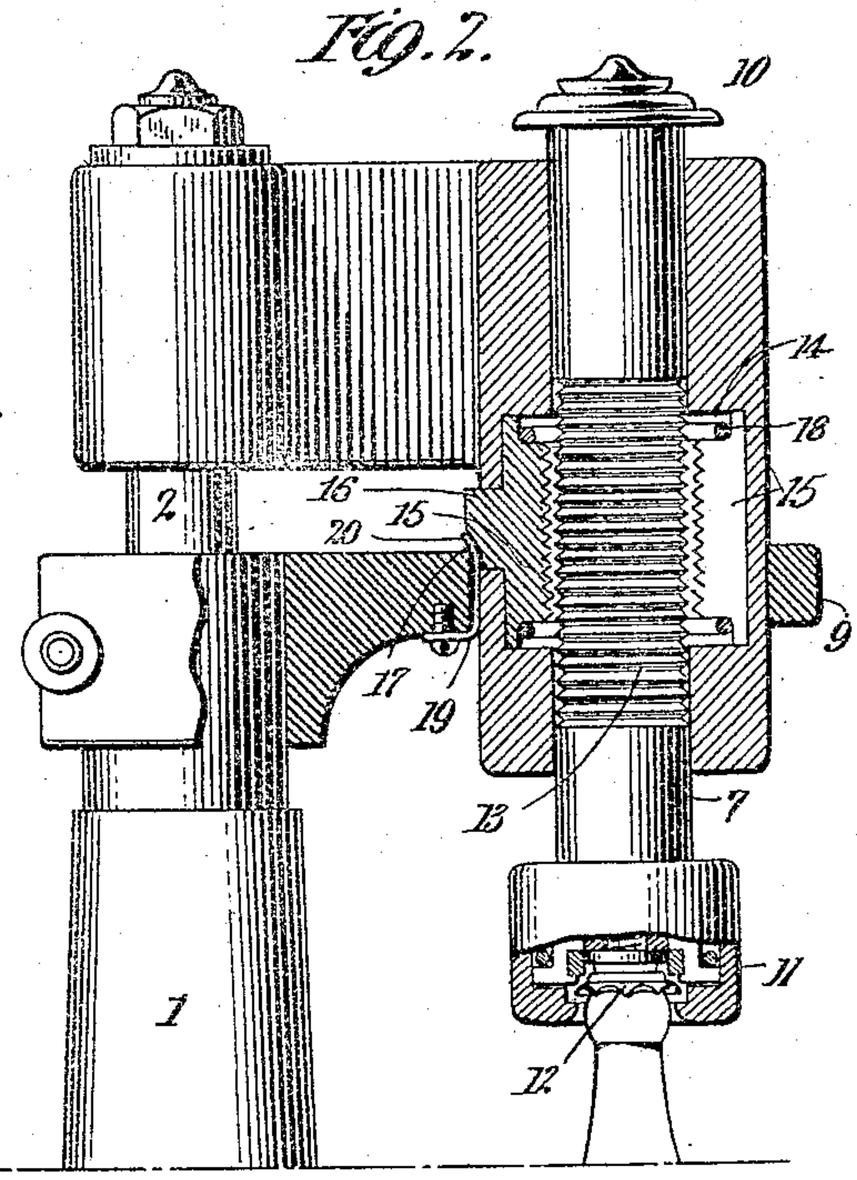


Fig. 3.

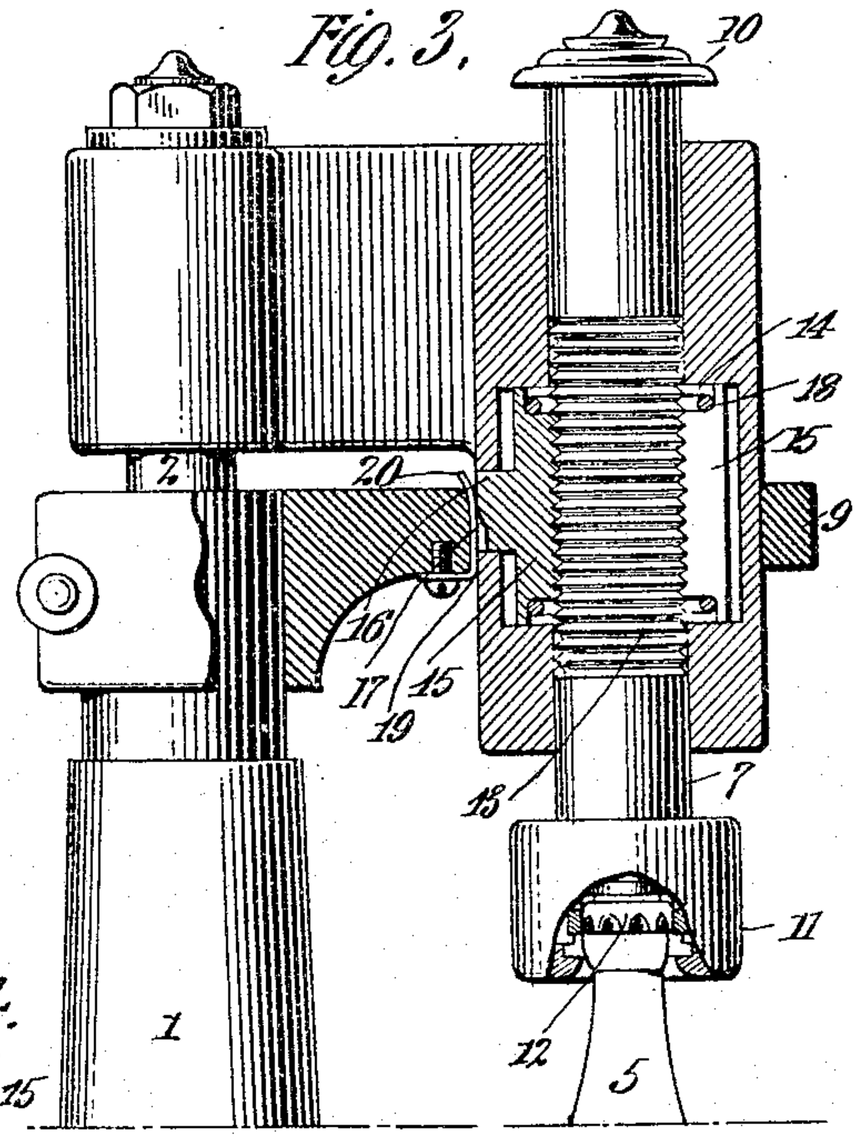
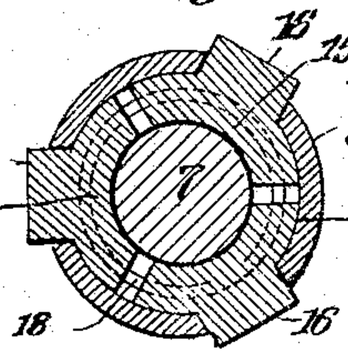


Fig. 4.



Witnesses:

James S. Obar

Waldo M Chapin

Inventor

Georg Kirkegaard

By his Attorneys

Rosenbaum & Stockbridge

UNITED STATES PATENT OFFICE.

GEORG KIRKEGAARD, OF NEW YORK, N. Y., ASSIGNOR TO IMPERIAL STOPPER COMPANY, A CORPORATION OF MAINE.

BOTTLE-CAPPING MACHINE.

939,141. Specification of Letters Patent. **Patented Nov. 2, 1909.**

Application filed December 16, 1908. Serial No. 467,818.

To all whom it may concern:

Be it known that I, GEORG KIRKEGAARD, a citizen of the United States, residing at the city of New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a full, clear, and exact description.

This invention is a machine for applying metal caps or stoppers to bottles, the caps being of that class containing a packing disk which is to be compressed upon the mouth of the bottle and held under compression by the engagement of the flange of the cap with a bead on the exterior of the bottle. In applying these caps to bottles, difficulty has been experienced by reason of the fact that the bottles, on account of crudity in manufacture, or for other reasons, vary considerably in length. Accordingly when the bottle is placed upon the table and a reciprocating capping head lowered to make a fixed downward descent or stroke, the bottle is likely to be broken if of undue length, or the cap is not properly applied if the bottle is unduly short. Therefore some compensating arrangement is desirable which will efficiently and properly apply the cap to bottles of various sizes. This desideratum is the object of the present invention, which consists in providing the reciprocating capping member of the machine with two parts, movable with respect to each other, but adapted to be locked or engaged so as to move together through a part of the stroke. One of these parts, which carries the capping head, is adapted to be moved to a position determined by the size of the bottle and this part thereafter remains stationary until the other part has reached a point in the stroke where the capping motion begins, at which time the first member is locked to the second and the two parts travel together through the remainder of the stroke to accomplish the application of the cap to the bottle. These motions and the details of the machine forming other features of the invention will now be described more fully in connection with the accompanying drawing, in which:

Figure 1 is a side elevation, with parts in section, of that portion of a capping machine with which my invention is concerned, and shows the capping head in its elevated position; Fig. 2 is a similar view of the capping member shown at a succeeding stage of the capping operation; Fig. 3 is a view similar to Fig. 2, showing the capping member in the final stage of the capping operation, and Fig. 4 is a section on the line *x*—*x* of Fig. 1.

Referring to the drawings by figures of reference, 1 indicates a hollow standard through which passes a vertical reciprocating rod 2 supposed to be driven by power applied in any suitable manner.

3 is a bracket supported by the standard and itself carrying a table 4 upon which the bottle 5 rests while undergoing the capping operation.

The capping member comprises two main portions 6 and 7 respectively. The member 6 is positively fixed to the upper end of the reciprocating rod 2 and it has a cylindrical portion 8 which is arranged concentrically above the table 4, projects downward and slides in a guiding bracket 9 in which it accurately fits. The cylindrical member 8 is provided with an axial passage in which is placed the member 7 which is in the form of a plunger loosely fitting therein. The upper end of this plunger is provided with a cross-head 10 which rests upon the upper end of the cylinder 8 to prevent the plunger from falling through the cylinder and to limit its lowest position. The lower end of the plunger carries a capping head 11 of any suitable construction for receiving the top or mouth of a bottle and applying thereto the metal cap, one of which caps is shown at 12 adjusted to the head and ready to be applied to the bottle. The middle portion of the plunger 7 is provided with screw-threads or corrugations 13, or is otherwise formed to constitute one surface or part of a clutch, and surrounding this portion of the plunger is a chamber 14 formed in the cylinder 8 and containing three segmental jaws 15, 15, 15, which are provided on their inner faces with screw-threads, corrugations or other irregular surfaces corresponding to the surface 13 on the plunger and adapted to interlock therewith. Each of these jaws is provided with a lug 16 which projects through an opening in the wall of the cylinder 8, the lugs having a bevel edge 17 at about midway of their vertical length adapted to be engaged by the edge of the

opening in the bracket 9 as the cylinder 8 passes downward therethrough. The jaws 15 are normally held out of contact with the plunger 7 by the circular springs 18 and they are adapted to be forced into engagement with the plunger to lock the cylinder and plunger together when the cylinder 8 in moving downward carries the lugs 16 beyond the edge of the opening in the bracket 9. The three points around this opening where the lugs 16 strike are cut out or notched slightly as shown at 19 to fit the faces of the lugs and to receive hard steel tongues 20 against which the lugs impinge while passing through the bracket. These tongues are specially made to receive and withstand the stroke of the lugs.

The operation is as follows: The bottles, varying in size as they ordinarily do, are placed one after another upon the table 4 to be capped. A bottle having been adjusted in position, the capping member as a whole moves downward to apply the cap. The plunger 7 and the cylinder 8 move together, the former by gravity, during the first part of the stroke and continue to do so until the capping head 11 strikes the top of the bottle. This arrests the downward movement of the plunger and thereafter the cylinder 8 continues downward independently of the plunger until it reaches the position shown in Fig. 2, where the lugs 17 are striking the tongues 20 at the edges of the opening in the bracket 9 and are being forced inward. This eventually causes the segmental jaws to grip the plunger, and the continued movement of the cylinder 8 to the end of its stroke is therefore accompanied by the plunger. I will later show that the plunger is always gripped with certainty and positiveness under these circumstances. This final movement of the plunger with the cylinder is always uniform in length and is of the requisite extent to force the cap upon the bottle and fasten it thereto as shown in Fig. 3. It will be seen that after the capping head has touched, and been arrested by, the bottle, the further travel of the cylinder 8 independently of the plunger is variable, depending upon the length of the bottle. In the case illustrated in the drawing this distance is indicated by the elevation of the cross-head 10 above the top of the cylinder in Fig. 3, which is equal to the total distance traveled by the cylinder 8 from the time when the capping head strikes the bottle until the lugs have been forced inward by the bracket 9. On the upward movement of the capping member, the reverse movements of the two parts 7 and 8 take place; that is to say, they both rise together until the lugs 17 pass beyond the bracket 9, when the spring 18 acts to throw out the jaws and release the plunger. The plunger then remains on top of the bottle until the cylinder 8 strikes the cross-head 10; then the plunger and cylinder rise together to the starting position and the bottle is free to be removed and replaced by another. By working the screw 21, the table 4 can be raised or lowered to suit the average size or length of bottle; thereafter the compensating features of the head provide for the longer and shorter bottles.

I have referred to the fact that the spring tongues 20 have an effect in making the gripping of the plunger by the jaws 15, certain and positive under all circumstances. It might happen that a bottle of such height was capped that the jaws 15 moved inward with their most prominent edges impinged directly against the correspondingly prominent edges of the corrugated surface 13;—in other words out of proper meshing relation. Under these circumstances the inward movement of the jaws 15 would be prematurely arrested, and before the plunger was properly gripped. It is the purpose of the spring tongues 20 to yield at this time, the head moving downward meanwhile, and as the plunger 7 is arrested at this time by its contact with the bottle, the jaws are almost immediately brought into a relation where they mesh properly. A further depression of the head then occurs with the jaws bearing against the solidly backed portion of the tongues 20, making the gripping engagement continuous and positive.

From this description of the operation it will be seen that the cylinder 8 makes the same length of stroke at each operation, while the plunger or capping head makes a total variable length of stroke depending upon the length of the bottle, or in other words that lost motion is provided for between the two parts which varies with the length of the bottle to be acted upon.

Having described my invention, I claim:—

1. A bottle capping machine comprising a carrier, a capping head loosely slidable vertically therein and normally descending by gravity to its lower limit of movement therein, and means for gripping said head in said carrier when the latter has moved to within a predetermined distance of its lower limit of movement.

2. A bottle capping machine comprising a carrier, a capping head loosely slidable vertically therein and normally descending by gravity to its lower limit of movement therein, and means positively impelled inward to grip said head in said carrier when the latter has moved to within a predetermined distance of its lower limit of movement.

3. A bottle capping machine comprising a carrier, a capping head loosely slidable vertically therein and normally descending by gravity to its lower limit of movement therein, and jaws positively impelled in-

ward to grip said head in said carrier when the latter has moved to within a predetermined distance of its lower limit of movement.

4. A bottle capping machine comprising a carrier, a capping head loosely slidable vertically therein and normally descending by gravity to its lower limit of movement therein, a fixed bracket or frame part having an opening through which said carrier is closely guided, and means in the carrier and engaged by said frame part for gripping said head in said carrier.

5. A bottle capping machine comprising a carrier, a capping head loosely slidable vertically therein and normally descending by gravity to its lower limit of movement therein, a fixed bracket or frame part having an opening through which said carrier is closely guided, and jaws in the carrier and engaged by said frame part for gripping said head in said carrier.

6. In a bottle capping machine, a plunger having a corrugated surface, a head, means for depressing said head, corrugated jaws movable inwardly in said head, and resilient or yielding means in the path of said jaws when the head is depressed.

7. In a bottle capping machine, a plunger having a corrugated surface, a head, means for depressing said head, corrugated jaws movable inwardly in said head, and spring tongues in the path of said jaws when the head is depressed.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

GEORG KIRKEGAARD.

Witnesses:

WALDO M. CHAPIN,

JAMES D'ANTONIO.