T. L. VALERIUS & O. LARSEN.

BOTTLE CAPPING MEANS.

APPLICATION FILED JULY 10, 1914.

1,289,972.

Patented Dec. 31, 1918.

5 SHEETS—SHEET 1.

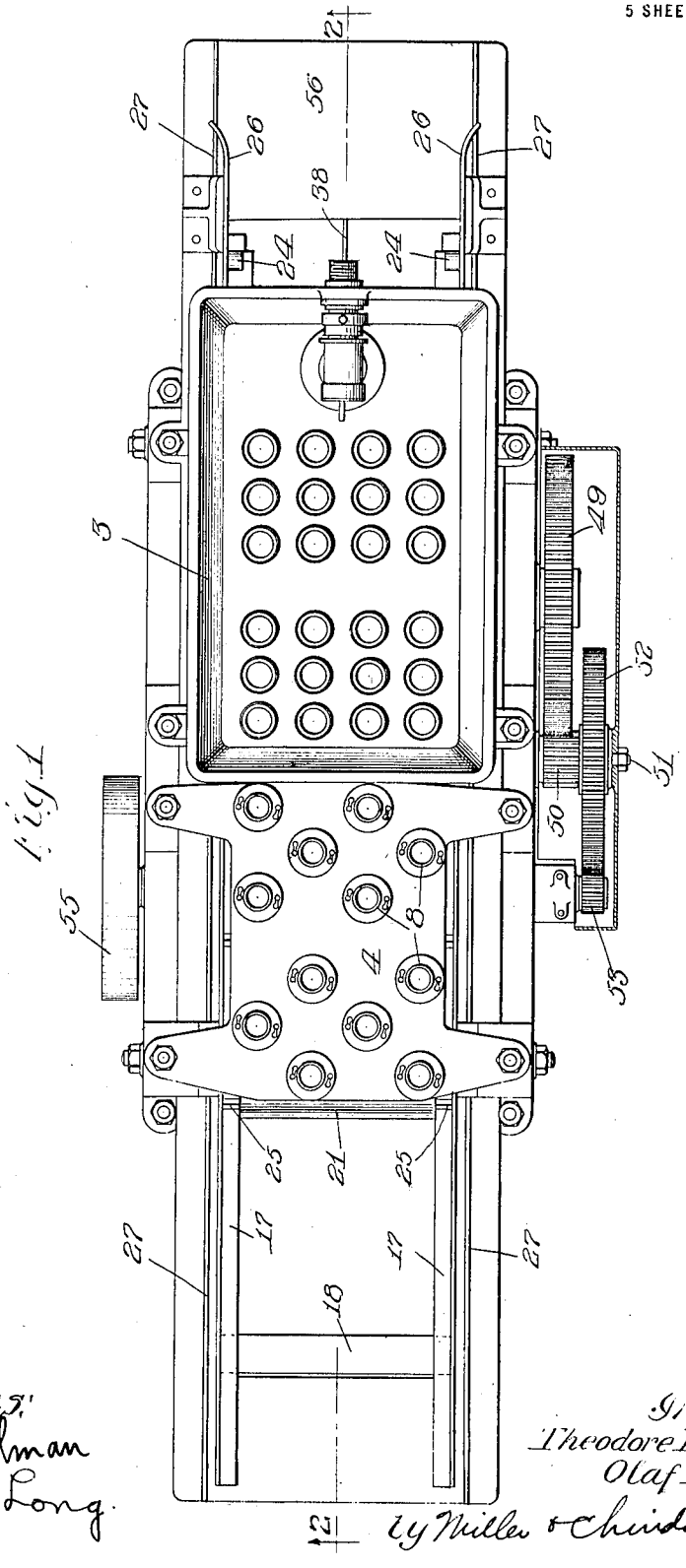


Fig. 1.

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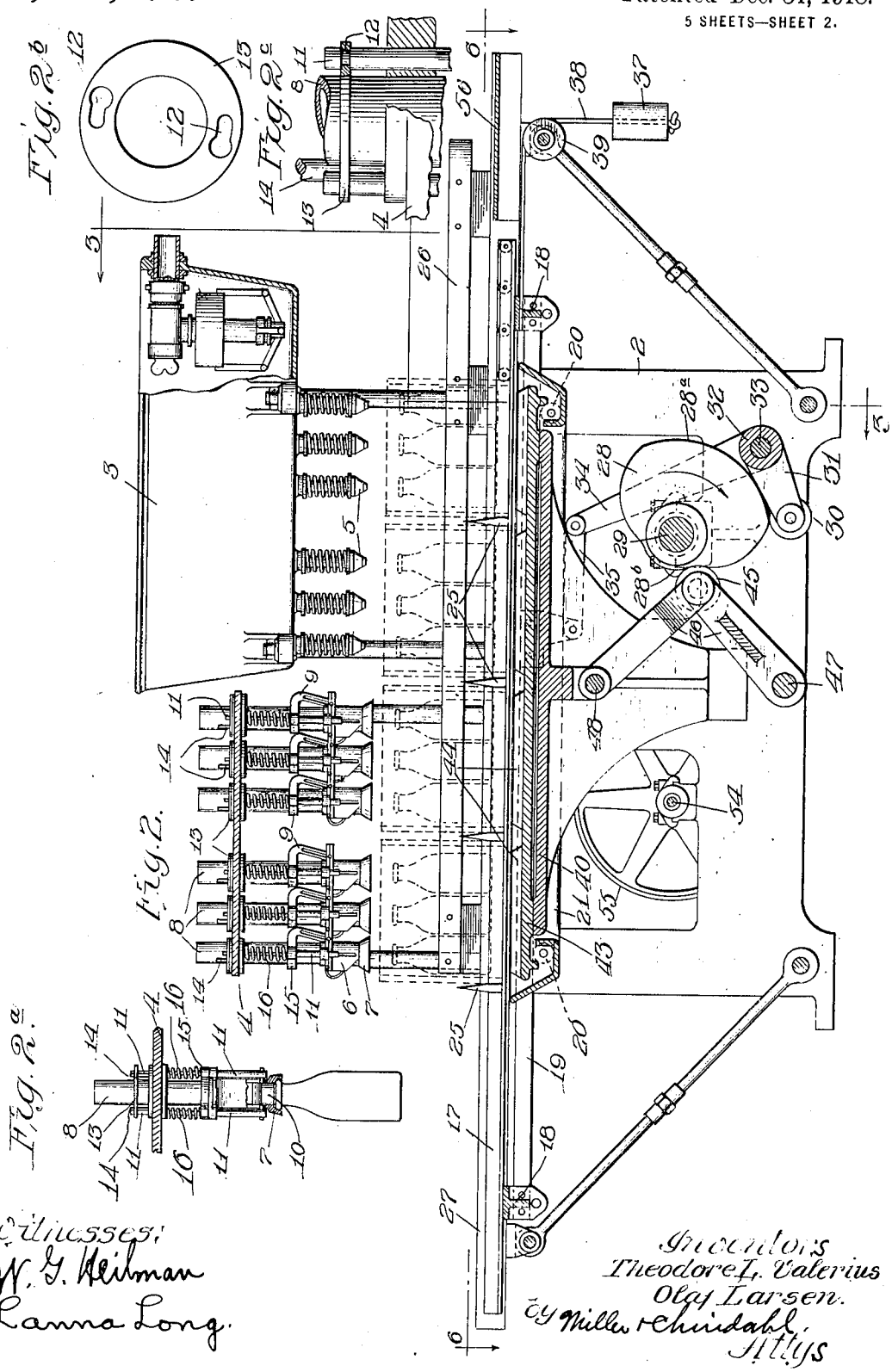
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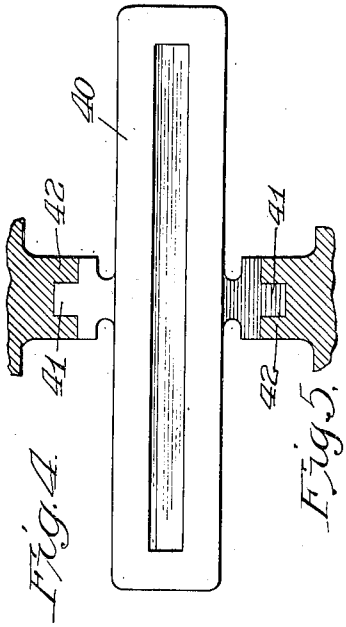


Fig. 4.

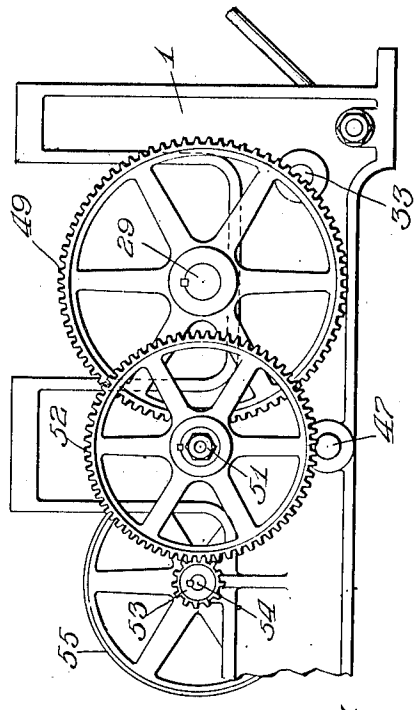


Fig. 5.

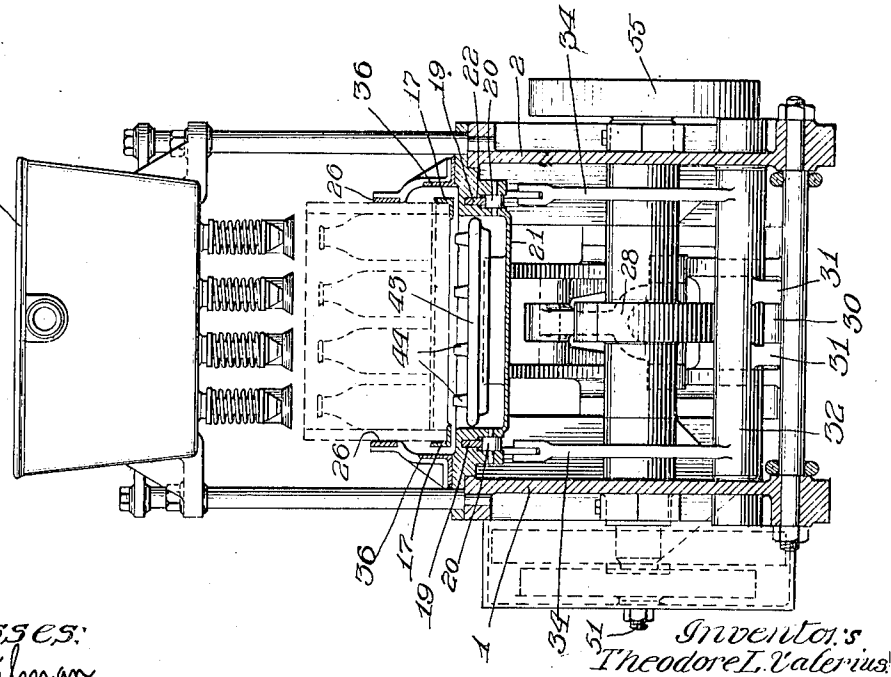


Fig. 3.

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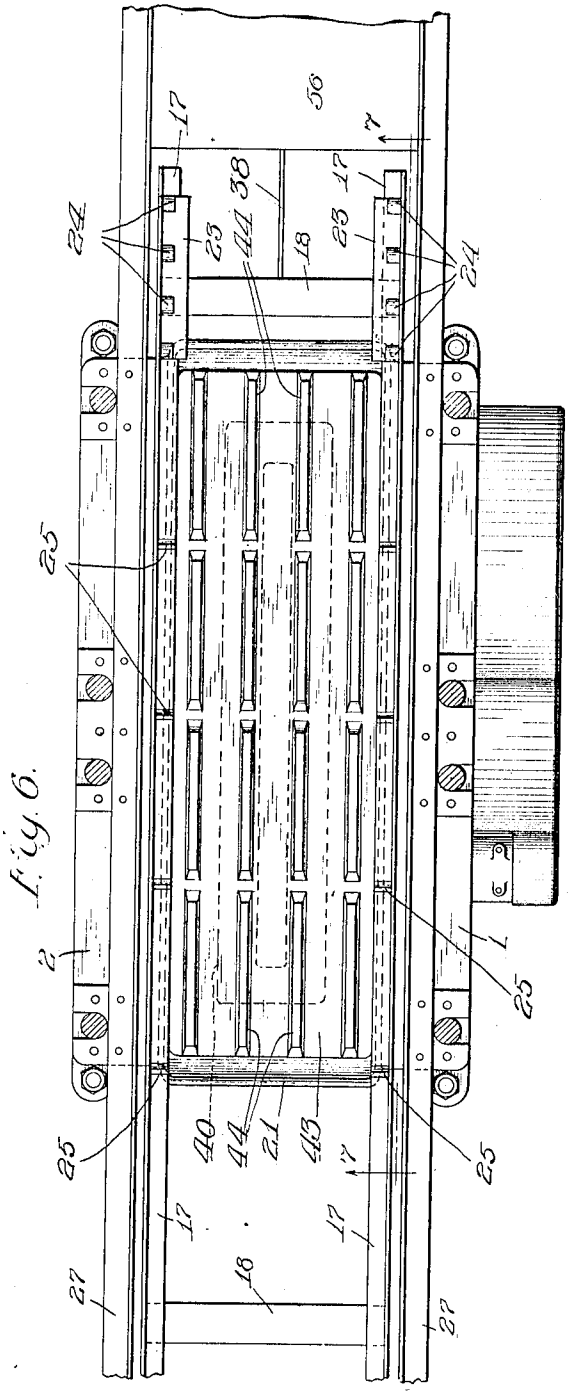


Fig. 6.

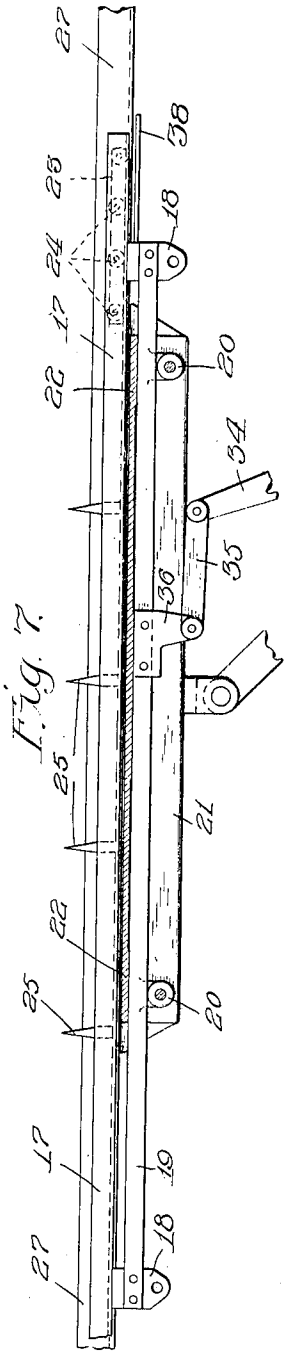


Fig. 7.

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5 SHEETS—SHEET 5.

FIG. 11.

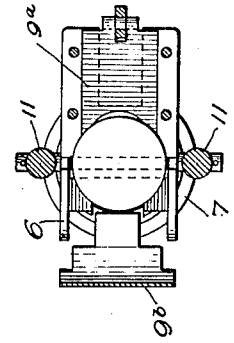


FIG. 12.

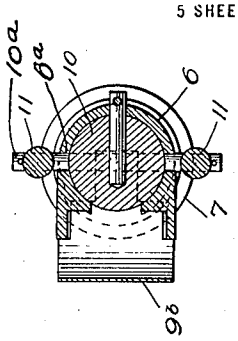


FIG. 9.

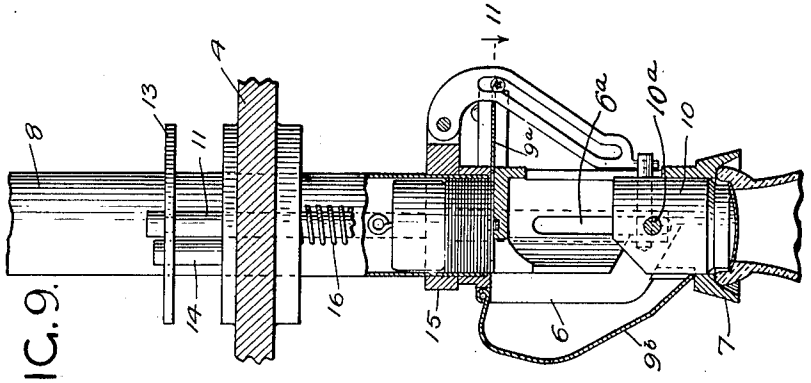


FIG. 8

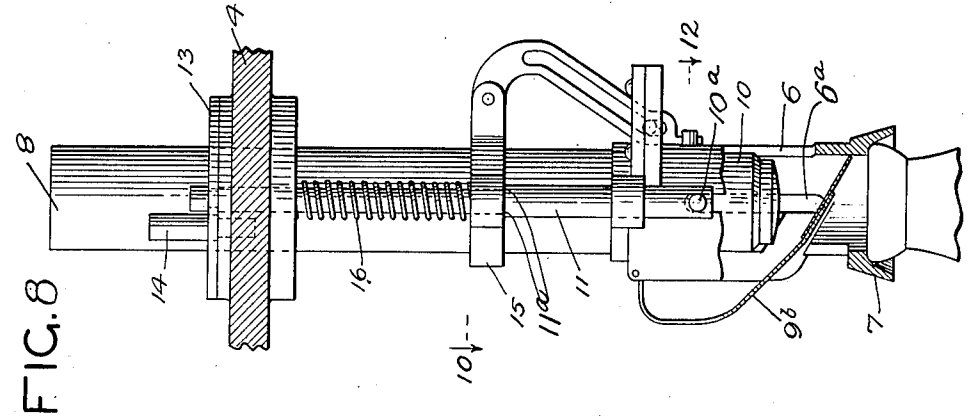
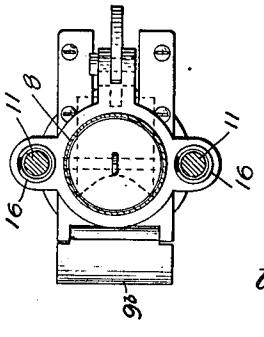


FIG. 10.



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UNITED STATES PATENT OFFICE.

THEODORE L. VALERIUS AND OLAF LARSEN, OF FORT ATKINSON, WISCONSIN, ASSIGNORS TO THE CREAMERY PACKAGE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BOTTLE-CAPPING MEANS.

1,289,972. Specification of Letters Patent. **Patented Dec. 31, 1918.**

Application filed July 10, 1914. Serial No. 850,123.

To all whom it may concern:

Be it known that we, THEODORE L. VALERIUS and OLAF LARSEN, citizens of the United States, residing at Fort Atkinson, in the county of Jefferson and State of Wisconsin, have invented certain new and useful Improvements in Bottle-Capping Means, of which the following is a specification.

This invention relates to machines for capping bottles, particularly such bottles as are used for milk and cream, the invention being particularly applicable to machines for filling and capping cased bottles.

Generally stated, the object of the invention is to simplify the construction of machines of this class. This object is attained in part by using capping devices which have no operative connection with the driving mechanism and which are actuated simply by the operation of pressing the bottles against the capping devices.

Herein the invention is illustrated and described in connection with a combined filling and capping machine in which filling means of suitable construction and operation are employed together with suitable means for forwarding the bottle cases into and out of operative position.

In the drawings, Figure 1 is a top plan view of a machine embodying the features of our invention. Fig. 2 is a view taken approximately in the plane of dotted line 2—2 of Fig. 1. Fig. 2^a is a view of one of the cappers, showing a bottle in operative relation thereto. Fig. 2^b illustrates a means for detachably securing each capper in place. Fig. 2^c is a fragmental view illustrating the means for supporting the cappers. Fig. 3 is a view of the front end of the machine, the lower portion being sectioned in the plane of dotted line 3—3 of Fig. 2. Fig. 4 is a top plan view of the elevator and its guiding means. Fig. 5 is a fragmental side elevation showing the driving means. Fig. 6 is a horizontal sectional view taken in the plane of dotted line 6—6 of Fig. 2. Fig. 7 is a fragmental view showing the forwarding mechanism, the view being taken in the plane of dotted line 7—7 of Fig. 6. Fig. 8 is an elevation partly in section illustrating one of the cappers. Fig. 9 is a longitudinal section of the capper in association with a bottle. Fig. 10 is a transverse section on line 10 of Fig. 8, and Figs. 11 and 12 are transverse sections on line 11 of Fig. 9 and line 12 of Fig. 8, respectively.

The embodiment herein shown of our invention comprises two standards or side frames 1 and 2 rigidly secured together in any suitable manner. Upon these standards are supported suitable mechanism for filling the bottles preliminary to the capping operation, which may comprise a stationary tank 3 for the liquid with which the bottles are to be filled. A stationary plate 4 is also mounted upon the standards to support the cappers. The tank 3 is provided with filling valves 5 of any suitable or well-known character, said valves being arranged in position to register with the bottles contained within a bottle case. Herein the valves 5 are shown as arranged to fill a case of twelve quart bottles, but it will be understood that the valves might be arranged to fill pint bottles, of which there are usually twenty in a case. The valves 5 are preferably arranged in two groups, there being one dozen valves in each group. The groups of filling valves are arranged along the machine in position to operate successively. The first group of filling valves fills the bottles in a given case partially full. The second group of valves completes the filling of the bottles. An advantage of thus filling the bottles in two steps is that the foam caused by the initial part of the filling is allowed to subside before the filling is completed.

The cappers are so constructed that they are operable simply by engagement of the bottle therewith. In order to provide the space required for the cappers, they are divided into two groups of six cappers each, the cappers of each group in the present instance being arranged in staggered relation to each other. The first group is positioned so as to cap half of the bottles in a case, some in each row, while the second group caps the remaining bottles in the case.

The bottle cases are moved along beneath the groups of filling valves and cappers, and are periodically raised to place the bottles in operative relation to the valves and cappers. The end of the machine at which the bottle cases are introduced (*i. e.*, the right

hand end in Fig. 2) will be hereinafter termed the front end of the machine.

The cappers, which are of the type disclosed in our prior Patent No. 1,139,931 dated May 18, 1915, are unitary in their character, being structurally independent of each other, and are detachably mounted upon the supporting plate 4 so as to be individually removable. The cappers are arranged to be operated solely by engagement of the bottles therewith. The construction and mounting of the cappers may be described as follows:

Each capper comprises a tubular body 6 having a bell-mouth 7 and a cap magazine 8, the magazine being alined with and rigidly secured to the body in any suitable way. The magazine extends slidably through an opening in the capper-supporting plate 4. 9 is a cam fixed to a collar 15 and arranged to actuate a cap-ejecting slide 9^a which is reciprocable transversely in the body and is arranged to singly and successively eject the lowermost cap in the magazine. The ejected cap falls onto an exteriorly-positioned curved guide 9^b which is pivoted at its upper end and by which the cap is directed into position to be depressed into the bottle by a cap-seating punch 10 slidable in the body 6, the guide 9^b being swung to one side by the plunger as the latter descends. The punch 10 is supported from the plate 4 by means of two rods 11, the upper ends of which extend slidably through openings in the plate 4. Above said plate the rods are provided with an annular groove to fit the narrow portion of a key-hole slot 12 in a washer 13. Said washer lies upon the plate 4 and is held against rotation by means of a lock pin 14 fixed in the plate 4 and passing freely through the wide portion of one of the slots 12. The cam 9 is supported by a ring 15 in which the magazine 8 is freely slidable. The ring 15 bears against shoulders 11^a formed on the rods 11 by enlarging the diameter of the same. Coiled springs 16 are interposed between the plate 4 and the ring 15, said springs normally holding the cap-seating punch 10 and the ring 15 in the position shown in Figs. 2 and 8. The lower ends of the rods 11 are connected to a cross rod 10^a entered through the punch 10 (Fig. 12) with its opposite ends protruding through vertical slots 6^a in the body 6, which slots permit relative longitudinal movement of the punch and body. When the parts are in their normal or inoperative position, the body 6 and magazine 8 thereon are supported by the ends of the rod 10^a bearing in the upper ends of the slots 6^a. When a bottle is pressed against the bell-mouth 7, the body 6 and the magazine 8 rise until the bottle strikes the cap-seating punch 10, a cap having previously been fed into position between the bottle and the punch. When the cap is fully seated, the upper end of the body 6 strikes the ring 15. Continuing upward movement of the bottle causes the ring 15 to rise, thus relieving the punch 10 of pressure of the springs 16 and permitting the punch to rise with the bottle. When the bottle is lowered, the body 6 and the magazine 8 descend by gravity to their normal position.

The bottle cases are supported beneath the filling valves and the cappers upon two parallel slide rails 17, the forward and rear portions of said rails being rigidly secured together by means of two cross pieces 18. Secured to the ends of the cross pieces 18 below the rails 17 are two bars 19 (Fig. 7). It will be seen that the rails 17, cross pieces 18 and bars 19 form a rigid frame. Said frame is supported for reciprocation upon rollers 20, said rollers being carried by a drip pan or trough 21 which is rigidly secured to the standards 1 and 2. This drip-pan is of open rectangular shape through the central opening of which the elevating means to be later described operates. The bars 19 extend through guideways 22 (Figs. 3 and 7) formed in the side edges of the trough 21. To the forward end of each of the rails 17 is secured a support 23 in which rollers 24 are journaled. Fixed to the rails 17 are spacer blocks 25 for the purpose of spacing the bottle cases the proper distance apart so that the bottles therein shall register with the filling valves and the cappers. The rear ends of the roller supports 23 serve as stops to position the last case. 26 are stationary case guides (see Fig. 2) and 27 are stationary rail guards (see Figs. 1, 6 and 7).

The rails 17 are moved toward the rear end of the machine to advance the cases by means of a cam 28 (see Fig. 2) fixed upon a shaft 29, said shaft being rotatably mounted in the standards 1 and 2. The cam 28 operates upon a roller 30 carried by a fork 31 which is rigidly connected to a sleeve 32, said sleeve being mounted upon a shaft 33. Rigid with the sleeve 32 are two arms 34 which are connected by means of links 35 to brackets 36 fixed to the bars 19. The roller 30 is held against the periphery of the cam 28 by means of a weight 37 attached to a cable 38, said cable being secured to the forward bracket 18 and running over a guide sheave 39. It will be seen that as the shaft 29 is rotated, the rails 17 will be reciprocated.

After each rearward movement of the rails 17, the four bottle cases that are directly beneath the filling valves and the cappers are lifted off the rails to place the bottles in operative relation to the filling valves and the cappers, by means of an elevator 40 (see Figs. 2 and 6), said elevator

being provided at opposite sides with guides 41 which are mounted for vertical movement in guideways 42 formed upon the inner sides of the standards 1 and 2. Upon the top of the elevator 40 is a table 43 (see Figs. 3 and 6). On the upper side of the table 43 are four sets of ribs 44 (Fig. 6), each set of ribs being adapted to extend into a bottle case far enough to bear against and thus support the wires or other elements that constitute the bottom of the case, when the case is elevated. When the bottles are pressed against the filling valves and the cappers, the pressure of the bottles upon the wires is borne by the ribs 44, thus obviating injurious stress upon the wires.

The elevator 40 is raised by means of the cam 28 (see Fig. 2), said cam operating against a roller 45 which is located at the pivotal joint of the toggle arms 46. The lower toggle arm is pivoted at 47, the upper toggle arm being pivoted to the elevator 40 at 48.

To one end of the shaft 29 is fixed a spur gear wheel 49 (Fig. 1) that meshes with a pinion 50. The pinion 50 is rotatably mounted upon a stud shaft 51 on the standard 1. The pinion is rigidly fixed to a change gear wheel 52 that meshes with a pinion 53, the latter being rigidly mounted upon a shaft 54. One end of the shaft 54 carries a drive pulley 55.

A platform 56 is secured to and extends between the forward ends of the rail guards 27. Said platform is located just above the plane of the rails 17, so that the rails may extend beneath the platform when the rails move forward.

Assuming the parts to be in the position shown in Fig. 2, the operation is as follows: The cam 28 actuates the elevator 40 to raise the four bottle cases and hold them elevated for a time. The operator places a case of empty bottles on the rollers 24. As the roller 30 runs off the dwell 28^a the weight 37 draws the rails 17 forward (to the right). The case which the operator placed upon the rollers 24 is prevented from being carried to the right, as the rear edge of the platform 56 acts as a stop to detain the case; consequently as the rollers 24 pass under the platform 56 said bottle case is pushed off the rollers onto the rails 17 between the rear ends of the supports 23 and the adjacent pair of spacer blocks 25. As the roller 45 runs off the dwell 28^a, the elevator descends, depositing the bottle cases on the rails 17. As the roller 30 runs off the dwell 28^b, the rails 17 move rearwardly, thereby advancing the cases so that the bottle case last placed upon the rails is beneath the first group of filling valves. The elevator then lifts four of the cases leaving the fifth case containing filled and capped bottles standing on the rails. If the case containing filled and capped bottles is not lifted off the rails 17 by a workman before the rails again move toward the front, said case is carried against the case that is in operative relation to the second group of cappers, and is thereby detained as the rails move to the front.

We claim as our invention:

1. In a cased-bottle capper, a group of cappers adapted to cap certain of the bottles in a case, another group of cappers adapted to cap the remaining bottles in the case, means for causing simultaneous relative movement between said groups of cappers and two cases of bottles, and means for forwarding the cases with relation to the groups of cappers.

2. A bottle capper having, in combination, a stationary supporting member, a capper carried by said member and comprising a cap magazine movable uprightly in said support, a plunger, and a horizontally reciprocatory cap ejector actuated by movement of the magazine to feed a cap beneath the plunger, and means for raising a bottle into engagement with said magazine and plunger to actuate the capper and for then lowering the bottle.

3. In a bottle capper, a stationary supporting member, a capper comprising a body providing a cap magazine, a cap-seating punch in said body, said punch being yieldingly supported by said member, said body being adapted to be engaged by a bottle and be lifted thereby, and means for lifting a bottle first into contact with said body and then into operative relation to the punch.

4. A bottle capping machine having, in combination, means for moving bottles horizontally step by step through the machine, capping mechanism located above the path of horizontal movement of the bottles and comprising a horizontally disposed support stationarily mounted in the machine and a plurality of independent unitary cappers carried by said support, each of said cappers comprising a tubular body, a vertically alined tubular cap magazine vertically slidable through said support, a plunger within said body yieldably suspended directly from said support, and means operable solely by engagement of a bottle with said body for delivering individual caps from said magazine into position beneath said plunger, the latter acting to apply the cap to the bottle, and means operating between the horizontal steps of movement of the bottles for raising the bottles into engagement with said cappers.

5. In a cased-bottle capper, two groups of cappers, each group containing half as many cappers as there are bottles in a case, the cappers of the first group being adapted to cap certain of the bottles in a given case, and the cappers of the second group being adapted to cap the remaining bottles in the given

case, and means for causing simultaneous relative movement between said groups of cappers and two cases of bottles.

6. In a machine for capping bottles, a horizontal support, and a capper supported in upright position by said support and comprising a body, a rod at one side of body and operatively associated therewith, said body and rod being vertically slidable through the support in the operation of the capper, and a member fixed against relative vertical movement upon the upper end of said rod and arranged to engage with the support to limit the downward movement of the rod and thereby the body in the support, said member being detachable from the rod to permit the removal of the capper from the support.

7. In a machine for capping bottles a horizontal support, and a capper supported in upright position by said support and comprising a body, a rod operatively associated therewith, said body and rod being vertically slidable through the support in the operation of the capper, a member fixed against relative vertical movement on the upper end of said rod and being movable laterally relative thereto for detachment therefrom, and means carried by the support normally locking said member against lateral movement relative to said rod, said member being movable vertically out of engagement with said locking means.

8. In a bottle capper, a stationary supporting member, a capper body, a cap magazine adapted to contain a stack of caps, said magazine being connected to said body and slidable through said supporting member, a cap-seating punch within said body, and punch-supporting means engaging said supporting member.

9. In a bottle capper, a stationary supporting member, a capper body, a cap magazine adapted to contain a stack of caps, said magazine being connected to said body and slidable through said supporting member, a cap-seating punch within said body, and two rods engaging said supporting member and said punch, said rods being located at opposite sides of said body.

10. In a bottle capper, a supporting member, a capper body, a cap magazine connected to the body and vertically slidable through said supporting member, a cap-seating punch within the body, two rods one at each side of said body, said rods extending slidably through the supporting member, means engaging said rods above said supporting member for supporting the rods, and springs bearing against said rods and yieldingly holding the rods and the punch in normal position.

11. In a bottle capper, a supporting member, a capper body, a cap magazine connected to the body and vertically slidable through said supporting member, a cap-seating punch within the body, two rods one at each side of said body, said rods extending slidably through the supporting member, a member detachably engaging said rods above said supporting member for supporting the rods, and springs bearing against said rods and yieldingly holding the rods and the punch in normal position.

In testimony whereof we hereunto set our hands in the presence of two witnesses.

THEODORE L. VALERIUS.
OLAF LARSEN.

In the presence of—
H. H. CURTIS,
HUBERT E. LEMKE.