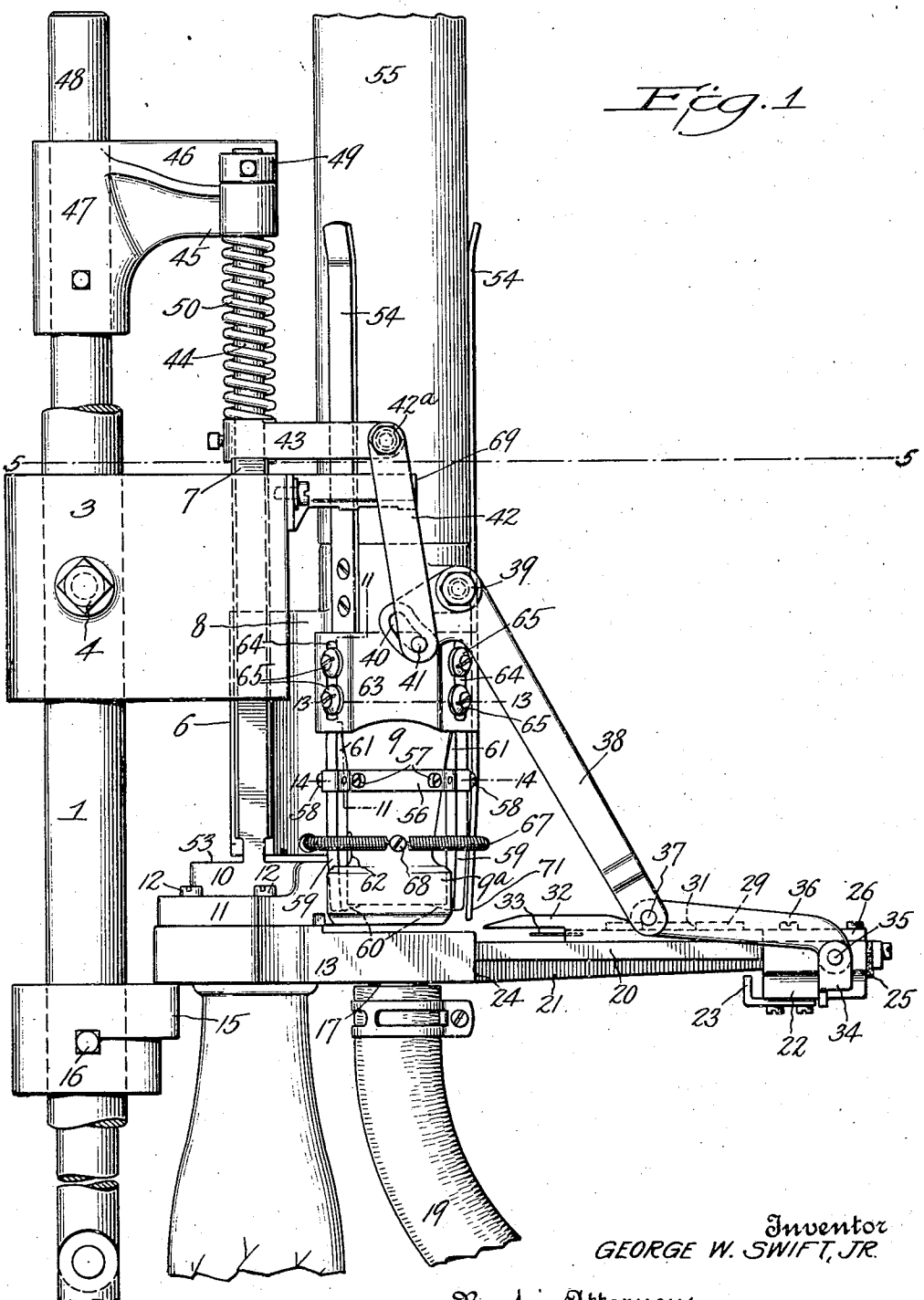
Nov. 11, 1930. G. W. SWIFT, JR 1,781,036

BOTTLE CAPPING MACHINE

Filed Nov. 16, 1928 6 Sheets-Sheet 1

Fig. 1



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BOTTLE CAPPING MACHINE

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Fig. 2.

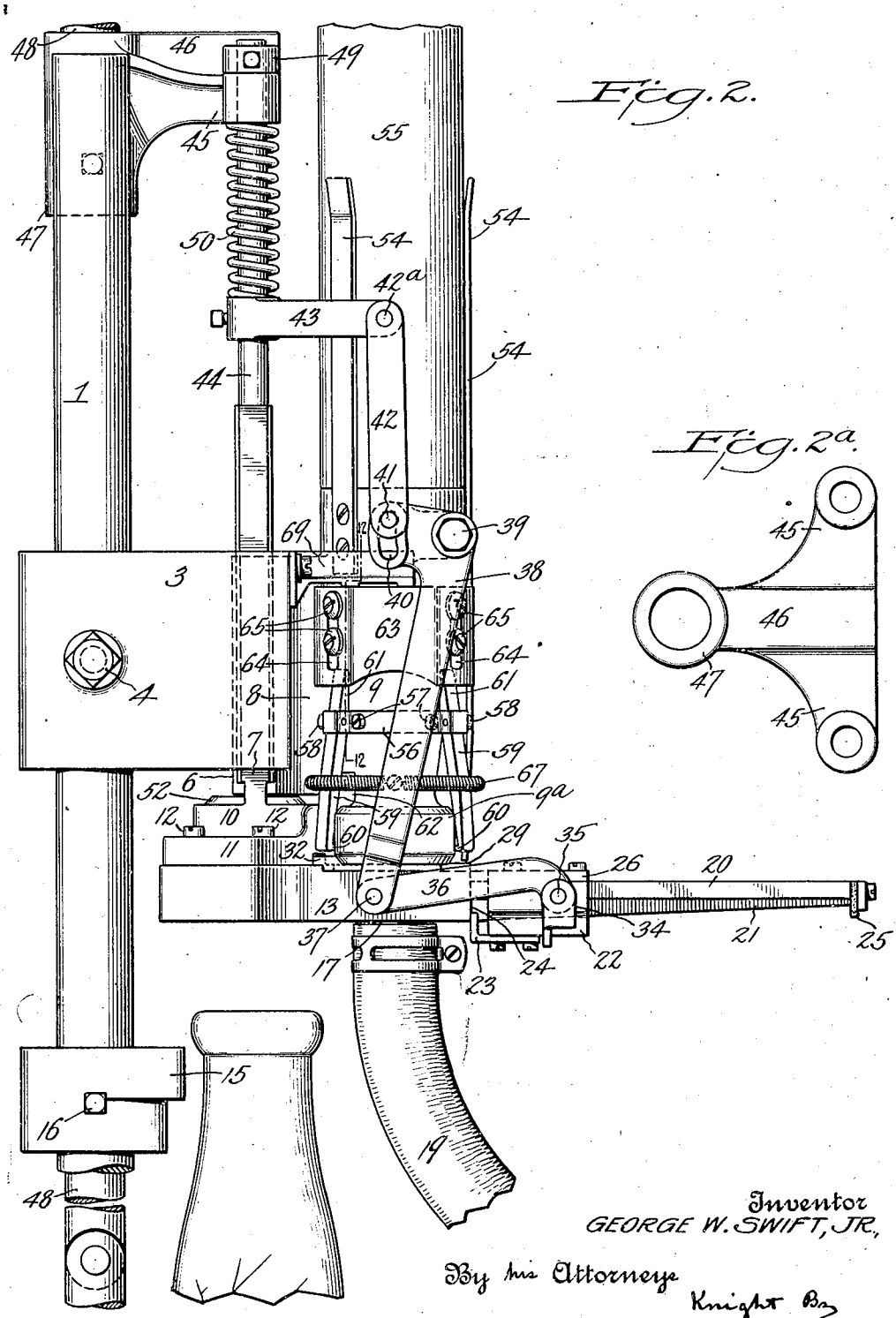


Fig. 2a.

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BOTTLE CAPPING MACHINE

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Fig. 3.

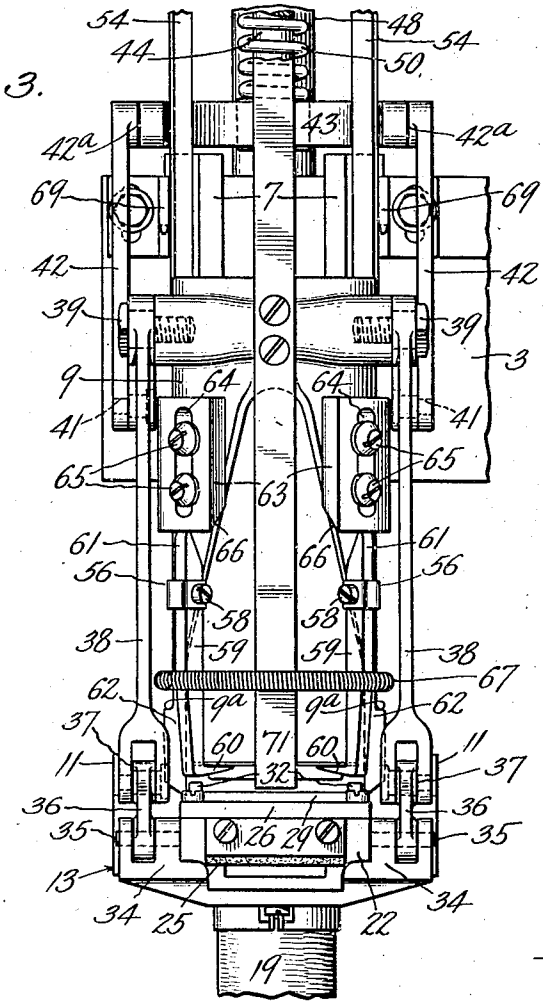
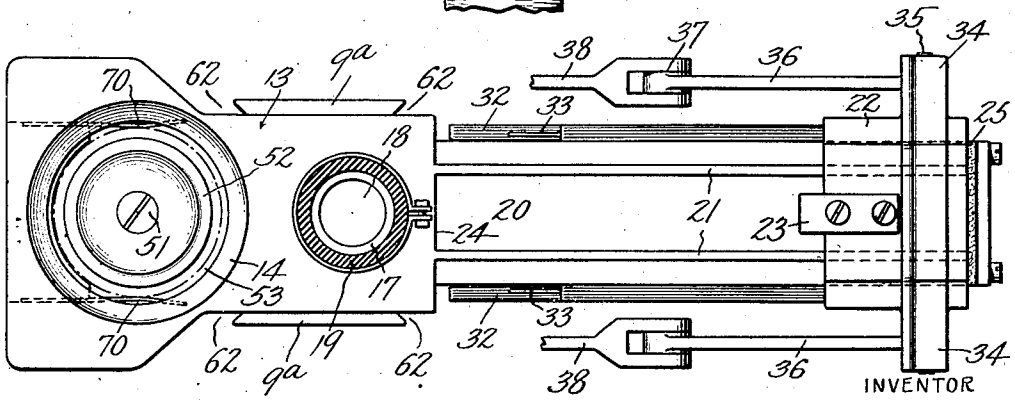


Fig. 4.



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BOTTLE CAPPING MACHINE

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Fig. 5.

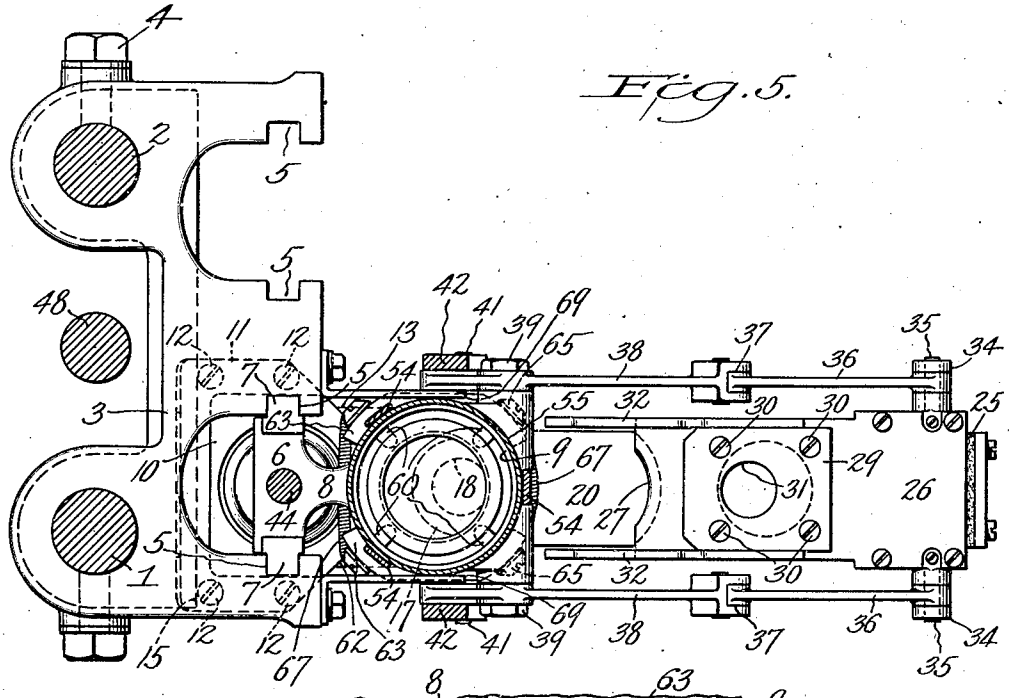
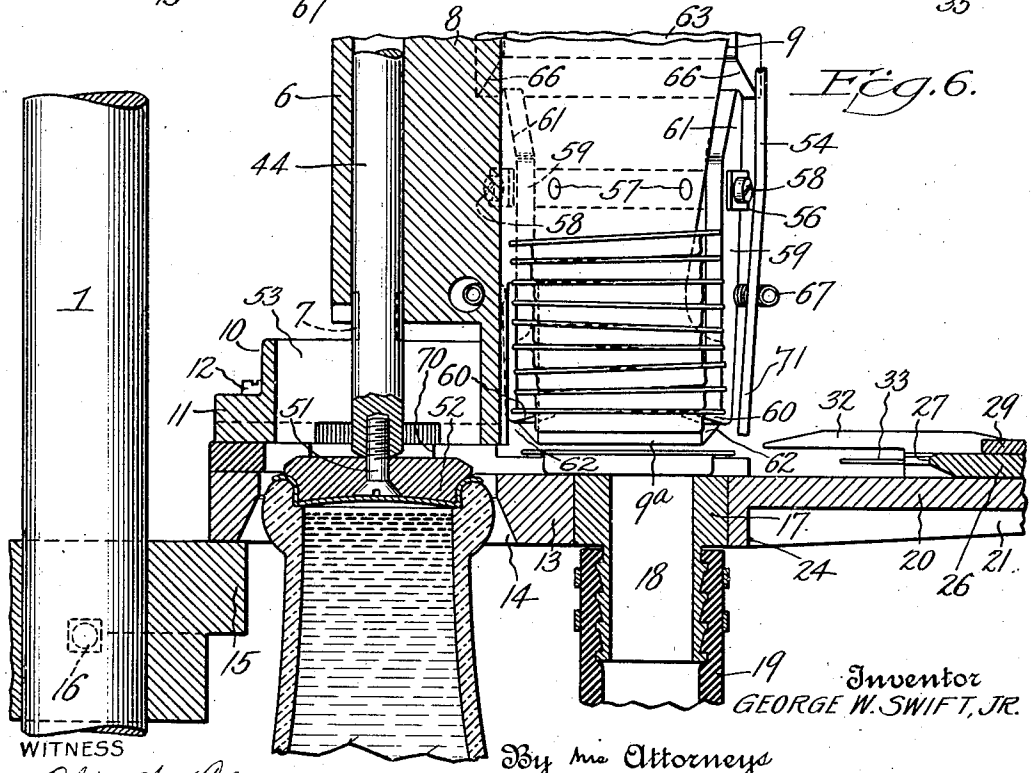


Fig. 6.



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BOTTLE CAPPING MACHINE

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Fig. 7.

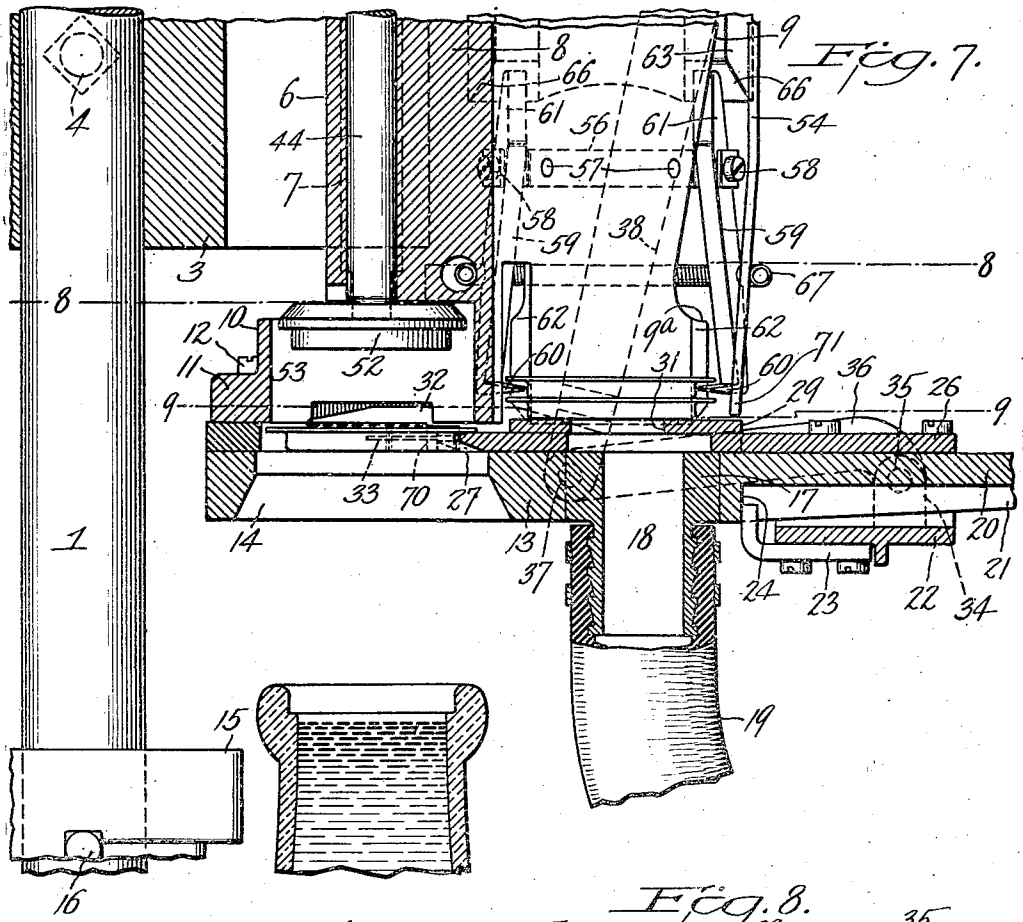
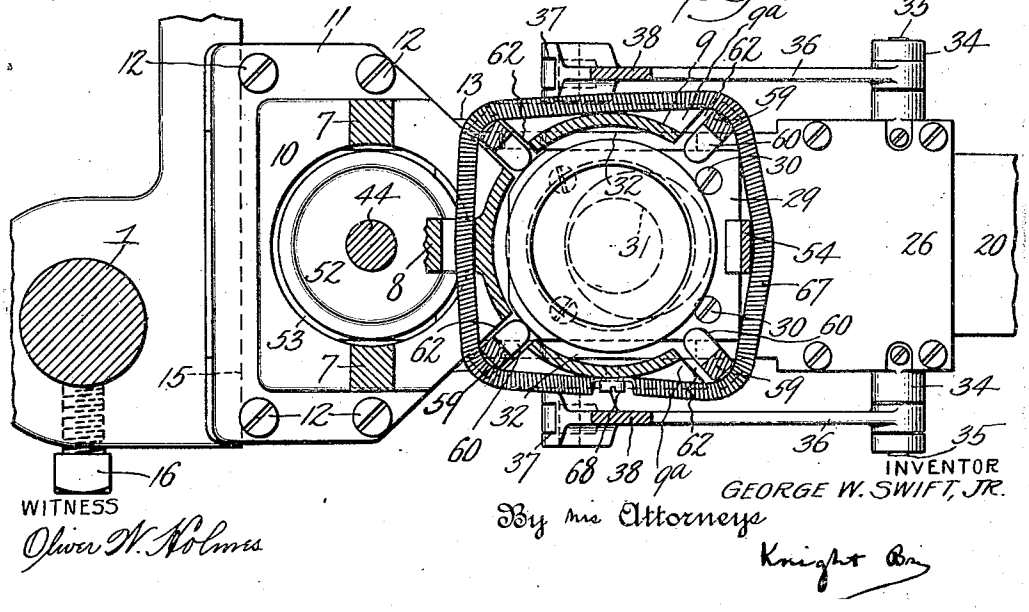


Fig. 8.



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BOTTLE CAPPING MACHINE

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Fig. 9.

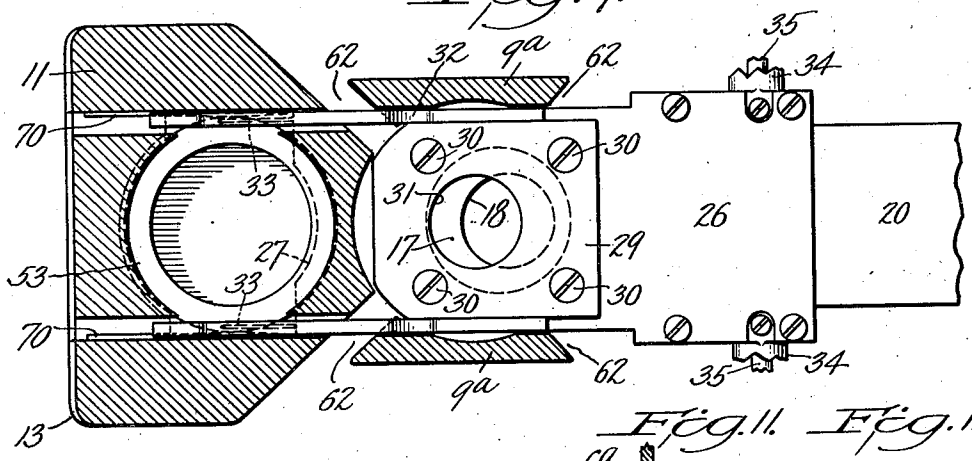


Fig. 10.

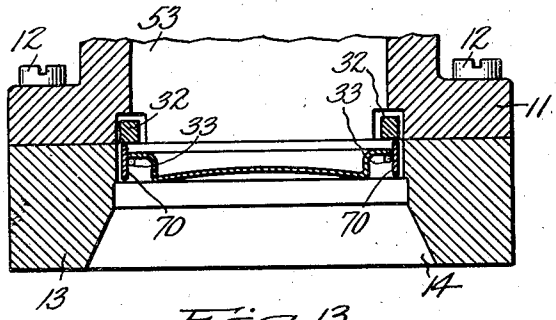


Fig. 11.

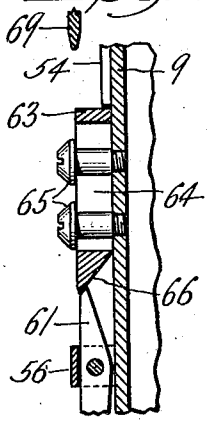


Fig. 12.

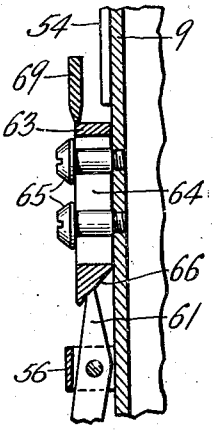


Fig. 13.

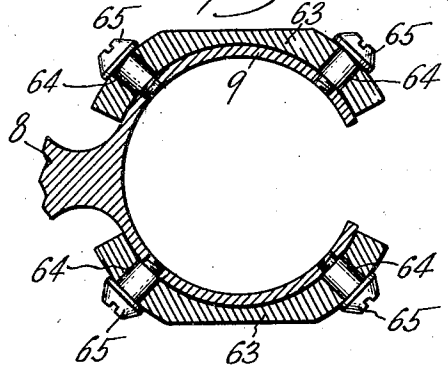
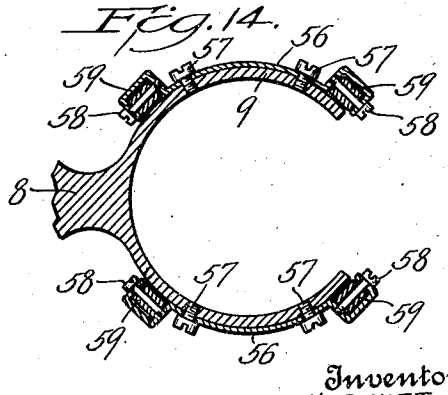


Fig. 14.



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UNITED STATES PATENT OFFICE

GEORGE W. SWIFT, JR., OF BORDENTOWN, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BOTTLE CAP PATENTS COMPANY, OF BORDENTOWN, NEW JERSEY, A CORPORATION OF NEW JERSEY

BOTTLE-CAPPING MACHINE

Application filed November 16, 1928. Serial No. 319,837.

This invention relates more especially to bottle-capping machines of the type shown and described in my copending application Serial Number 256,890 which was filed in the United States Patent Office under date of February 25, 1928.

The primary object of my invention is to provide an improved construction and arrangement of parts in a machine of this character whereby caps may be rapidly separated from the bottom of a cap-holding hopper, positively controlled during their movements into cap-applying position with respect to successively-presented bottles and accurately applied to said bottles.

Another object of my invention is to provide a cap-feeding slide of improved construction wherein a suction gripper is employed for effectively controlling a cap while it is being separated from bulk preparatory to its movement into cap-applying position under the positive control of said slide.

Other objects of my invention will appear in the specification, the particular features of construction appertaining thereto being recited in the claims in reference to the accompanying drawings which show a preferred embodiment of my invention.

In the drawings:

Figure 1 is a side elevation of a bottle-capping machine constructed in accordance with the principles of my invention, the cap feeding slide being shown in retracted position and with the table in lowered position while a cap is being applied to a bottle.

Figure 2 is a similar side elevation of the machine showing the slide in its advanced position and with the table in elevated position.

Figure 2ª is a top plan view of the plunger operating bracket detached.

Figure 3 is a front elevation of the machine.

Figure 4 is a bottom plan view of the machine with the parts arranged as shown in Figure 1.

Figure 5 is a section on the line 5—5 of Figure 1.

Figure 6 is a vertical section of the lower portion of the machine with the parts in their positions shown in Figure 1.

Figure 7 is a similar vertical section of the machine with the parts shown in their positions corresponding to that shown in Figure 2.

Figure 8 is a section on the line 8—8 of Figure 7.

Figure 9 is a section on the line 9—9 of Figure 7.

Figure 10 is a vertical medial section through the left hand portion of Figure 9.

Figure 11 is an enlarged section on the line 11—11 of Figure 1.

Figure 12 is a section similar to Figure 11 with the parts shown in changed positions.

Figure 13 is an enlarged horizontal section corresponding to the line 13—13 of Figure 1.

Figure 14 is an enlarged horizontal section corresponding to the line 14—14 of Figure 1.

Referring more particularly to the drawings, laterally spaced uprights 1 and 2 serve to mount a cross frame or bracket 3 which is secured to said uprights by means of set screws 4. As shown in Figure 5, the cross frame 3 is provided with two sets of oppositely arranged guideways or grooves 5 within which are reciprocably mounted crosshead slides 6 which are provided with oppositely presented track bars 7 which reciprocate in the grooves 5. Each of the cross-heads is connected by a web or neck 8 to a tubular hopper 9 which is provided with an enlarged block or foot 10, as shown in Figures 6 and 8. Said block or foot is secured to a feed table 13 by means of screws 12 which pass through a base flange 11 of said block or foot and are threaded into said feed table. Each feed table is movable vertically in the manner to be hereinafter pointed out and is provided with an opening 14 for accommodating the neck of a bottle presented to receive a cap.

The lower limit of movement of the table 13 is determined by a transverse bracket 15 which is secured to the uprights 1 and 2 by means of set screws 16. As shown in Figure 6, the table 13 is provided with a tubular connection 17 through which extends a port-opening 18, the connection 17 being connected to a vacuum tube 19 to adapt the table to yieldably retain a cap above the port-opening 18. The table 13 is provided with a rear-

wardly presented extension 20 which is reinforced by longitudinal ribs 21, as shown in Figures 4 and 6. Reciprocably mounted upon the table 13 is a slide 22 which, as shown best in Figures 1, 4 and 7, is provided with a forwardly presented abutment 23 adapted to limit the forward movement of said slide when it is brought into engagement with a shoulder or abutment 24 which is presented downwardly from the extension 20. Suitable means for limiting the rearward movement of the slide 20 may be provided by a fixed stop or flange 25. The cap feeding slide is provided with a top plate 26 which, as shown in Figure 5, is provided with an arcuate recess 27. Secured to the top plate 26 is a suction plate 29 which is held in position by screws 30 and provided with a suction port-opening 31 which is adapted during the forward movement of the slide to be brought into communication with the port-opening 18 leading to suction pipe 19. Presented forwardly from the slide 22 are laterally spaced cap controlling fingers 32 which during the forward movement of the slide are adapted to project over the circular flange of a cap which is being moved forwardly into cap-applying position. Arranged below the fingers 32 and projecting from the forward end of slide 22 are laterally spaced cap supporting pins 33 which, as shown in Figure 10, are adapted to pass beneath the circular flange of the forwardly displaced cap.

Referring more especially to Figure 3, the slide 22 has laterally presented portions 34 which are provided with upwardly presented slots, the slotted portions carrying pivot pins 35. Laterally spaced connecting links 36 are pivotally mounted at one end upon the pins 35, the other ends of said links being connected by pins 37 to the lower ends of laterally spaced bell crank levers 38 which are pivotally mounted at 39 and provided with arcuate slots 40 in their shorter arms for receiving laterally presented pins 41 carried by connecting links 42. Said links 42 are pivotally mounted at their upper ends upon pivots 42^a carried by the deflected bracket arms 43. The bracket arms 43 are rigidly secured to vertically reciprocable rods or plungers 44 which have their lower ends embedded in the cross heads 6. The upper ends of the rods 44 are slidably mounted in the laterally presented arms 45 of a triangular bracket 46, said triangular bracket being provided with a boss 47 which is rigidly secured to the upper end of a power driven plunger 48 which reciprocates vertically. Secured to the upper end of each of the rods 44 and limiting the downward displacement of said rod with respect to the bracket arm 45, is a collar 49. A helical spring 50 which is interposed between each bracket arm 45 and the bracket 43, tends to retain the collar 49 in abutment with the bracket arm 45. Secured to the lower end of each of the plungers 44 by means of a screw 51, is a cap-applying disk 52 which operates within a cylindrical chamber 53 formed within the bottom block or foot 10 of the hopper. Each of the tubular hoppers is provided with upwardly presented spring clips 54 for the reception of suitable stacking receptacles 55. As shown in Figures 1, 3, 6 and 14, a pair of oppositely arranged arcuate straps 56 are secured to the outer wall of the hopper 9 by means of screws 57. A series of screws 58, mounted in outwardly bent portions of the straps 56, serve as pivots for cap-holding levers 59 which are provided at their lower ends with cap engaging claws 60. Said levers, as shown best in Figures 11 and 12, are provided at their upper ends with cam arms 61 by means of which said cap holding levers are adapted to be moved radially inwardly and outwardly within diagonal slots 62 (see Figures 3 and 9) for successively releasing one cap and engaging another. Movable axially on the outer wall of each of the cap hoppers are cam segments 63 which are provided with axial slots 64, through which extend screws 65 for connecting said segments to the hopper 9. The lower ends of spring clips 54 constitute fixed abutments for limiting the upward movement of the cam segments 63 with respect to the hoppers 9. Each of the cam segments 63 is provided with an inwardly presented bevelled cam surface 66 which is adapted to impart an inward displacement to the cam arms 61 of the cap holding levers 4, moving the claws 60 out of stack supporting position at such times as the cam segments are displaced downwardly upon the hopper walls 9. A normal tendency to retain the cap holding arms in stack supporting position is imparted by a coil spring 67 which, as shown in Figure 8, extends around the lower end of the hopper and embraces the lower arms of the levers 59. The ends of coil spring 67 are secured by a screw 68 to the hopper wall. Suitable means for effecting a downward displacement of the cam segments 63 at times when the cap feeding slide is in its forward position to receive a cap released from the lower end of the column, may be provided in the form of stops or bracket arms 69 which are secured to the cross frame or bracket 3. A cap thus deposited upon the slide in its forward position is yieldably held thereto by suction and during the retraction of said slide from its position shown in Figure 7, the cap is intercepted by a depending rod or guard 71 which sweeps the released cap from the slide and permits it to drop into position over port opening 18, as shown in Figure 6, as the slide moves outwardly. During this outward movement of the slide, the laterally-spaced fingers 32 which are presented forwardly therefrom

prevent an undue lateral displacement of the cap while permitting said cap to drop little by little into position over the suction opening 18. As shown in Figures 9 and 10, a pair of laterally spaced spring arms 70 are arranged to yieldably grip the circular periphery of a cap presented thereto by the forwardly moving slide, said cap being thereby retained in position to be applied to a bottle on the next downward movement of the cap-applying disk 52.

Operation

As shown in Figures 1 and 6 of the drawings, the cap-feeding table is in lowered position with the neck of a bottle presented within the opening 14. The cap-applying plunger 44 has just completed its downward or cap-applying movement. During this movement, the cap-conveying slide has been retracted and the next cap in order to be released from the stack has been swept from the slide by the depending rod 71. This cap is held by suction in the path of the slide on its next inward movement. As the cross-head 6 moves upwardly for this purpose, the cap-applying plunger is lifted while the pins at the lower ends of the connecting links are moving upwardly in the arcuate slots 40 with which the short arms of the bell-crank levers 38 are provided. An inward movement of the slide follows, the detached bottom cap which is held in position by suction being picked up by said slide and presented above the mouth of the next vessel which has in the meantime reached a suitable position to receive the cap on the next downward movement of the cap-applying plunger. During the progress of this movement of the cap-feeding slide, however, the movable cam segments are brought into engagement with the fixed bracket arms 69 which produce an actuation of the cam-actuated cap-retaining levers, moving them to release position and permitting the column of caps to rest upon the table. At the commencement of the downward movement of the main driving cross-head and cap-applying plunger, the cam-segments are moved away from the fixed bracket arm and thus permit the cap-retaining levers to be drawn inwardly by the helical spring 67 into position to support all but the lowermost cap in the column. With the several parts in their relative positions shown in Figure 7, the main driving cross-head moves downwardly, the cap-feeding table being eventually arrested in its downward movement by the fixed bracket 15. The pins 41 at the lower ends of the connecting links now move downwardly in their respective arcuate slots while the cap-applying plunger begins its cap-applying movement. As soon as the lost motion between the connecting links and bell crank levers has been taken up the cap-feeding slide moves to its outermost position in readiness for another cycle of operations.

I claim:—

1. In a bottle-capping machine, the combination of a vertically-movable table provided with a cap-stacking hopper mounted thereon, said hopper being provided with an outlet at its lower end arranged to discharge caps onto said table, cap-retaining levers mounted on said hopper, means yieldably holding said levers in cap-retaining position, cams operated by the upward movement of said hopper for moving said levers to release position, and a reciprocable slide on said table for moving the caps from the lower end of said hopper to cap-applying position.

2. In a bottle-capping machine, the combination of a vertically-movable table provided with a cap-stacking hopper mounted thereon, said hopper being provided with a discharge outlet at its lower end spaced above said table, cap-retaining levers pivotally mounted on the outer wall of said hopper, means yieldably holding said levers in cap-retaining position, cam-segments slidably mounted on the outer wall of said hopper, said cam-segments being movable into and out of engagement with said levers for moving said levers to release position, and a slide reciprocable on said table for moving released caps from the lower end of said hopper to cap-applying position.

3. In cap-applying mechanism, the combination with a hopper for caps, said hopper being provided with a downwardly-discharging outlet, of a cap-feeding table arranged below said hopper and provided with a suction-opening, and a reciprocatory slide operating on said table between said table and the lower end of said hopper, said slide being provided with means for controlling the delivery of caps one at a time, from said hopper to said suction-opening and for moving said caps from said suction-opening into position to be applied to bottles.

4. In cap-applying mechanism, the combination with a hopper for caps, said hopper being provided with a downwardly-discharging outlet, of a cap-feeding table arranged below said hopper and provided with a suction-opening, a reciprocatory slide provided with a port-opening movable into and out of position between said suction-opening and the outlet opening of said hopper, said reciprocatory slide being provided with means for moving said caps one at a time from the bottom of said hopper and into position to be applied to bottles.

5. In cap-applying mechanism, the combination with a hopper for caps, said hopper being provided with a downwardly-discharging outlet, of a cap-feeding table arranged below said hopper and provided with a suction-opening presented toward the discharge outlet of said hopper, and means for delivering caps one at a time from said hopper to

said suction-opening in the table, said means including a reciprocatory slide which moves said caps from said suction-opening into position to be applied to bottles.

6. In a bottle-capping machine, the combination of a cap-feeding table provided with a vacuum-opening adapted to grip a cap by suction, a cap-stacking hopper provided with a discharge outlet at the bottom, a cap-feeding slide reciprocable on said table below said hopper, said slide being provided with means for controlling the delivery of a cap from the bottom of said hopper to the vacuum-port opening in said cap-feeding table and with other means for engaging a cap previously deposited over the vacuum-opening in said table and moving it into position to be applied to a bottle.

7. In a bottle-capping machine, the combination of a cap-feeding table provided with a vacuum-opening adapted to grip a cap by suction, a cap-stacking hopper provided with a discharge outlet at the bottom, a cap-feeding slide reciprocable on said table below said hopper, said slide being provided wih a port-opening movable into and out of position between the vacuum-port opening in said cap-feeding table and the discharge outlet of said hopper, and a depending finger interposed in the path of a cap covering the port-opening in said slide for sweeping a cap therefrom during the retreat of said slide, said slide being adapted at its forward end to engage a cap previously deposited over the vacuum-opening in said table for moving the last-mentioned cap to bottle-capping position.

8. In a bottle-capping machine, the combination of a cap-feeding table provided with a vacuum-opening adapted to grip a cap by suction, a cap-stacking hopper provided with a discharge outlet at the bottom arranged opposite to the vacuum-opening in said table, a cap-feeding slide reciprocable on said table below said hopper, said slide being provided with a port-opening movable into and out of position between the vacuum-port opening in said cap-feeding table and the discharge outlet of said hopper, and a depending finger interposed in the path of a cap covering the port-opening in said slide during its retracting movement for delivering said cap to the suction-opening in said table, said slide being adapted at its forward end to engage a cap previously deposited over the vacuum-opening in said table for moving it into cap-applying position.

9. In a bottle-capping machine, the combination of a vertical hopper discharging downwardly at its lower end, a table extending below said hopper and provided with a cap-gripping suction opening, a slide reciprocable on said table, and provided with a port adapted to form a connecting through-way between said suction-opening in the table and said hopper, means for sweeping a cap from said slide during the retraction thereof, said table being adapted by the suction-opening therein to grip the cap as it drops from the slide, and means carried by said slide for moving said cap into cap applying position.

10. In a bottle-capping machine, the combination of a vertical hopper discharging downwardly at its lower end, a table extending below said hopper and provided with a cap-gripping suction opening, a slide reciprocable on said table and provided with a port adapted when brought into communication with said suction opening to grip a cap at the outlet opening of said hopper, means for sweeping a cap from said slide during the retraction of said slide, said table being adapted by the suction-opening therein to grip the cap as it drops from the slide, means for raising and lowering said table for the admission and retraction of bottles before and after the cap-applying operation, and means operated by the upward movement of said table for releasing a cap from the bottom of said hopper.

11. In a bottle-capping machine, the combination of a vertical cap-hopper discharging downwardly at its lower end, a table extending below said hopper and provided with a cap-gripping suction opening, a slide reciprocable on said table and provided with a port adapted by communication with said suction-opening in the table to grip a cap at the bottom of said hopper, means for sweeping a cap from said slide during the retraction of said slide, said table being adapted by the suction-opening therein to grip the cap as it drops from the slide, means for raising and lowering said table for the admission and retraction of bottles before and after the cap-applying operation, and means operated by the upward movement of said table for releasing a cap from the bottom of said hopper.

12. In a cap-applying machine, the combination with a cap-holding hopper open at the bottom and provided with releasable cap-supporting means, of a cap-feeding table provided with a vacuum port-opening presented towards the open bottom end of said hopper, means for operating said cap-supporting means for releasing caps one at a time from the bottom of said cap-holding hopper, and a slide reciprocable on said table below said hopper, said slide being provided with a port-opening movable into and out of cap-gripping position between the lower end of said hopper and the vacuum port-opening in said table, and means for sweeping the cap from said slide during its retracting movement, said slide being adapted at its next forward movement to move the displaced cap into cap-applying position.

13. In a cap-applying machine, the combination with a cap-holding hopper open at the bottom and provided with cap-supporting cam-levers, of a cap-feeding table pro-

vided with a vacuum port-opening presented towards the open bottom end of said hopper, means for raising and lowering said cap-feeding table, a slide reciprocable by the rise and fall of said table, said slide being provided with a port-opening interposable between the lower end of said hopper and the vacuum port-opening in said table, means for sweeping the cap from said slide during its retracting movement, and cam-segments operated by the upward movement of said table for operating said cam levers.

14. In a bottle-capping machine, the combination of a feed-table provided with a suction orifice, a hopper for caps, said hopper being provided with a downwardly-presented discharge-opening spaced upwardly from said feed-table and above said suction orifice, a reciprocatory slide movable on said feed-table and between it and said hopper, said slide being provided with means for drawing a cap from the bottom of said hopper, during the retracting movement of said slide, and means for sweeping a cap from said slide during the retraction of said slide, said slide being provided with means for engaging said cap during its forward movement and moving it to bottle-capping position.

15. In a bottle-capping machine, the combination of a feed-table provided with a suction orifice, a hopper for caps, said hopper being provided with a downwardly-presented discharge-opening spaced upwardly from said feed-table, and in coaxial alinement with said suction orifice, a reciprocatory slide movable on said feed-table and between it and said hopper, said slide being provided with a port-opening movable into and out of registry with said discharge-opening and suction orifice, means for releasing caps one at a time from the bottom of said hopper, and means for sweeping a cap from said slide during its retracting movement, said slide being provided with means for engaging said cap and moving it to bottle-capping position on its forward movement.

16. In a bottle-capping machine, the combination with a fed-table provided with a suction orifice, of a hopper for caps, said hopper being provided with a downwardly-presented discharge-opening spaced upwardly from said feed-table, a reciprocatory slide movable on said feed-table and between it and said hopper, said slide being provided with means for displacing the bottom cap from said hopper, means for retaining said bottom cap above said suction orifice during the retraction of said slide, the retraction of said slide being adapted to permit the displaced bottom cap to be gripped by said suction orifice, and means carried by said slide for moving said cap from the suction orifice during the forward movement of said slide.

17. In a bottle-capping machine, the combination with a feed-table, of a hopper for caps, said hopper being provided with a downwardly-presented discharge-opening spaced upwardly from said feed-table, a reciprocatory slide movable on said feed-table and between it and said hopper, said slide being provided with a suction orifice movable into and out of registry with said discharge-opening, means for releasing caps one at a time from the bottom of said hopper, means for timing the operations of the cap-releasing means with respect to the reciprocatory movements of said slide, and means for sweeping a cap from said slide during the retraction of said slide, said slide being provided with means for engaging said cap during its forward movement.

18. In a cap-feeding mechanism, the combination of a feed-table, a hopper for caps, said hopper being provided with a bottom opening spaced above said feed table, a slide reciprocable between said bottom opening of the hopper and said feed-table, said slide being provided with a suction gripper adapted to grip a cap during its retracting movement and to loosen said cap from the bottom of a column of caps in said hopper, means for limiting the retraction of said cap by said slide, the continuing retraction of said slide being adapted to permit the cap to drop to said feed-table and in the path of said slide on its next forward movement.

19. In a cap-feeding mechanism, the combination of a feed-table provided with a suction opening, a hopper for caps, said hopper being provided with an opening at the bottom disposed above said suction opening in the feed-table, a slide reciprocable between the opening at the bottom end of said hopper and said feed-table, said slide being provided with a port-opening movable into and out of registry with said openings, and means for displacing a cap from said slide during the retracting movement of the slide, said displacing means being adapted to locate the cap in position to be gripped by the suction opening in said feed-table, said slide being adapted to move said cap to bottle-capping position during its next forward movement.

20. In a cap-feeding mechanism, the combination of a feed-table provided with a suction opening, a hopper for caps, a slide reciprocable between the bottom end of said hopper and said feed-table, said slide being provided with means adapted to loosen caps one at a time from the bottom of a stack of caps in said hopper, and means cooperating with said slide during its retracting movement for depositing the loosened cap upon said suction opening in the feed-table, said slide being adapted to move said cap from the suction-opening during the next forward movement of said slide.

21. In a cap-feeding mechanism, the combination of a feed-table provided with a suction opening, a hopper for caps, said hopper

being open at the bottom and disposed above said feed-table, a slide reciprocable between said hopper and feed-table, said slide being provided with a port-opening movable into and out of registry with said suction openings in the table, said slide being thereby adapted to grip the bottom cap in said hopper, and means for moving a cap from said slide during the retracting movement of said slide, said slide being provided at its forward end with cap-engaging means for moving a cap forwardly from the suction opening in said feed-table.

22. In a cap-feeding mechanism, the combination of a feed-table provided with a suction opening, a hopper for caps, said hopper being open at the bottom and disposed above said suction opening in the feed-table, a slide reciprocable between the open bottom end of said hopper and said feed-table, said slide being provided with a port-opening movable into and out of registry with said suction opening in the table and the open bottom of said hopper, means for releasably retaining a column of caps in said hopper, said means being adapted to release said caps one by one at the bottom on to said slide, and a bar or finger arranged above said slide and in the path of a cap during the retracting movement of the slide, said slide being provided at its forward end with cap-engaging means whereby a cap which has been displaced from the slide to be gripped by the suction opening in said feed-table may be moved to bottle-capping position.

23. In a cap-feeding mechanism, the combination of a cap-holding hopper, said hopper being provided with means for releasing caps one at a time from the bottom of said hopper, a slide reciprocable below said hopper, said slide being provided with a suction gripper for retracting the released bottom cap and means for sweeping said released cap from the slide during the retracting movement of said slide and into the path of said slide on its forward movement.

24. In a cap-feeding mechanism, the combination of a cap-holding hopper provided with a discharge outlet at the bottom, a slide provided with a suction-gripper, said slide being reciprocable below said hopper and adapted to grip successive bottom caps during its retracting movements, means for sweeping said caps from said slide, means for reciprocating said slide, and means operated by said slide-reciprocating means for releasing caps one at a time from the bottom of said hopper.

25. In cap-feeding mechanism, the combination with a cap-stacking hopper provided with a downwardly-presented discharge outlet, a vacuum tube provided with an upwardly-presented opening arranged below and spaced from the discharge outlet of said cap-stacking hopper, and a reciprocatory slide arranged between said discharge outlet and the upwardly-presented opening of said vacuum tube, said slide being provided with a vacuum port-opening movable into and out of communication with the opening into said vacuum tube whereby said slide is adapted to grip and release the bottom cap in said hopper.

26. In cap-feeding mechanism, the combination with a cap-stacking hopper provided with a downwardly-presented discharge outlet, a slide reciprocable across said discharge outlet, said slide being provided with a vacuum port-opening whereby it is adapted to grip the bottom cap in said hopper, means for controlling the suction in said vacuum port-opening, and means timed with the movement of said slide for controlling the release of successive bottom caps from said hopper.

27. In a cap-applying machine, the combination of a cap-feeding table provided with an upwardly-presented vacuum port-opening, a cap-holding hopper provided with a downwardly-presented discharge outlet arranged above and spaced from said vacuum port-opening in the table, and a slide reciprocable on said table between said discharge outlet of the cap-holding hopper and the vacuum port-opening in said table, said slide being provided with a port-opening movable into and out of communication with said vacuum port-opening in the table whereby it is adapted to grip a cap discharged from the discharge outlet of said cap-holding hopper.

28. In a cap-applying machine, the combination of a cap-feeding table provided with an upwardly-presented vacuum port-opening, a cap-holding hopper provided with a downwardly-presented discharge outlet arranged above said vacuum port-opening in the table, a slide reciprocable on said table below said discharge outlet of the cap-holding hopper, said slide being provided with a port-opening movable into and out of communication with said vacuum port-opening in the table whereby it is adapted to grip a cap discharged from the discharge outlet of said cap-holding hopper, and means arranged in the path of said cap during the retraction of said slide for sweeping the cap from said slide in a position to be gripped by the vacuum port-opening in said table.

29. In a cap-applying machine, the combination of a cap-feeding table provided with an upwardly-presented vacuum port-opening, a cap-holding hopper provided with a downwardly-presented discharge outlet arranged above and spaced from said vacuum port-opening in the table, a slide reciprocable on said table between said discharge outlet of the cap-holding hopper and the vacuum port-opening in said table, said slide being provided with a port-opening movable into and out of communication with said vacuum

port-opening in the table whereby it is adapted to grip a cap discharged from the discharge outlet of said cap-holding hopper, and laterally-spaced cap-controlling fingers presented forwardly from said slide, said cap-controlling fingers being arranged beneath the cap-flange and on opposite sides of the crown of said cap during the outward movement of said slide.

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