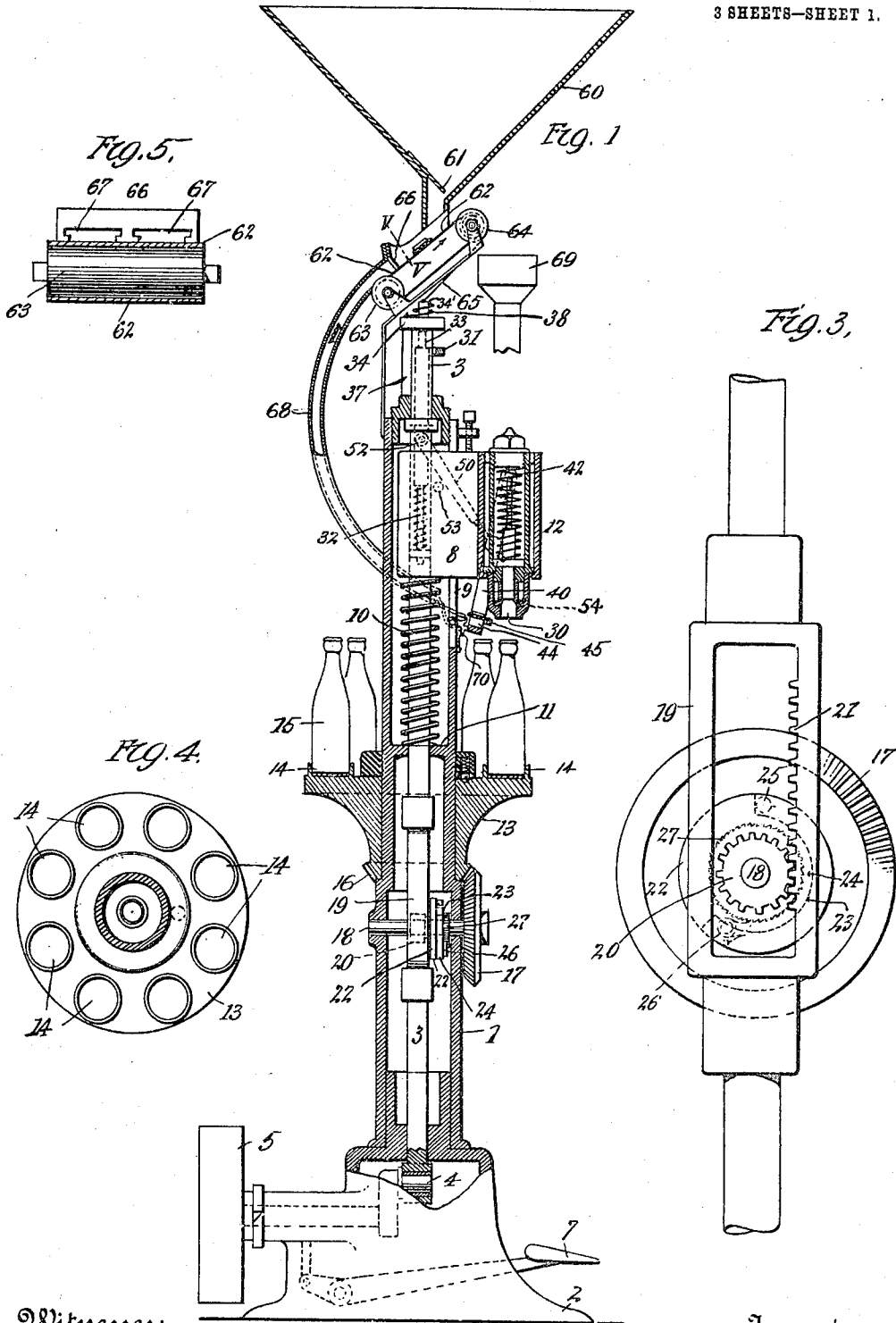


G. KIRKEGAARD.
 DUPLEX CAPPING MACHINE.
 APPLICATION FILED MAY 26, 1908.

948,688.

Patented Feb. 8, 1910.

3 SHEETS—SHEET 1.

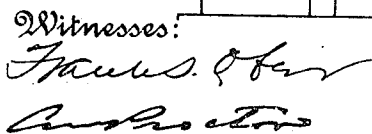


Witnesses:
Paul O. ...
...

Inventor
Georg Kirkegaard
 By his Attorneys
Rosenbaum & Stockbridge

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3 SHEETS--SHEET 2.



Inventor
Georg Kirkegaard
 By his Attorneys
Rosenbaum & Stockbridge

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3 SHEETS—SHEET 3.

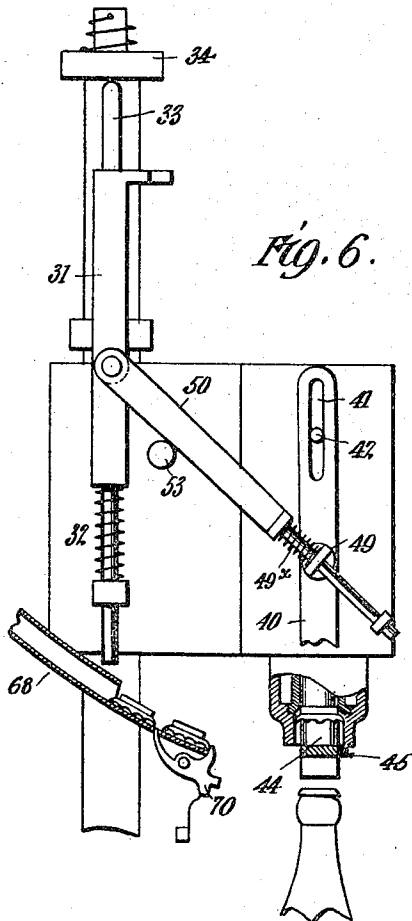


Fig. 6.

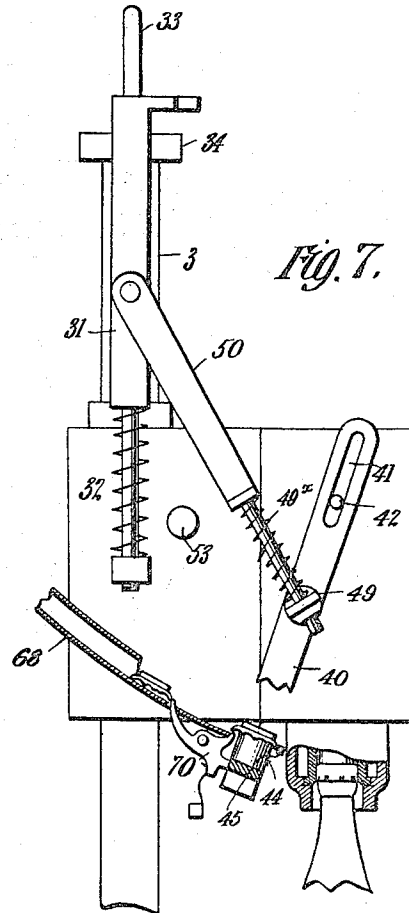


Fig. 7.

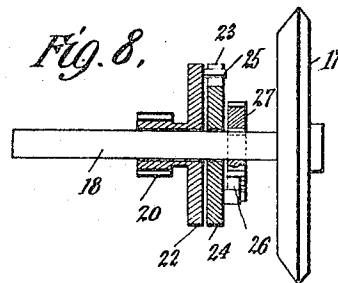


Fig. 8.

Witnesses:
Frank S. Ober
Arthur

Inventor
Georg Kirkegaard
 By *Wm. H. Storrey*
Racine, Wis.

UNITED STATES PATENT OFFICE.

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

DUPLEX CAPPING-MACHINE.

948,688.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed May 26, 1908. Serial No. 435,102.

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 Duplex Capping-Machines, of which the following is a full, clear, and exact description.

10 This invention relates to bottle capping machines, particularly of that class adapted for use with sheet metal caps having a depending or flanged edge and a cork or other lining, and which are engaged upon the bottle by drawing or compressing the metal edge.

The purpose of the present invention is to provide a machine which is substantially automatic in all its operations, and which caps the bottles with very great rapidity, the caps being supplied to a hopper, and the bottles being applied on a movable table which transfers them to the position where they are capped. Means are provided by which the bottle caps are properly fed into position for use by the mechanism, regardless of the indiscriminate way in which they are initially deposited in the supply hopper. As will later appear, I accomplish this result by allowing the caps to fall indiscriminately upon a surface from which those which fall upside down or improperly are diverted into a separate channel from those which are fed to the cap-applying mechanism.

I have illustrated the bottles adapted to be carried into a relation to be capped two at a time, but it is evident that the mechanism may be arranged to cap single bottles or any other number at each operation.

The invention consists in the features of construction and combination as hereinafter set forth and claimed.

In the drawings: Figure 1 is a vertical sectional view of a bottle capping machine embodying the principles of my invention; Fig. 2 is a partial front elevation of the same; Fig. 3 is a detail side view of certain of the parts; Fig. 4 is a top view of the support or table for the bottles, and Fig. 5 is a sectional view on the line *v-v* of Fig. 1. Fig. 6 is a detail side view of part of the feed mechanism. Fig. 7 is a similar

view showing the parts in a different position. Fig. 8 is a sectional view of the mechanism for intermittently rotating the bottles.

Referring to the drawings, in which like parts are designated by the same reference sign, 1 indicates a frame or standard which is conveniently made in the form of a vertical hollow column having an enlarged base 2 by which it is rigidly supported.

3 designates a reciprocating rod guided to have a vertical movement in the standard 1 and operated by a crank 4 driven from the pulley 5 through any suitable or desired clutch within the base 2.

7 designates a treadle by which the clutch is engaged to operate the crank 4 from the pulley 5.

The reciprocating rod 3 carries a cross-head 8 which projects laterally through a slot 9 in the standard 1.

10 denotes a spring inclosed within the standard 1 beneath the cross-head 8 and abutting against a diaphragm 11, so as to normally impel said cross-head upward. This cross-head carries the cap-applying dies or mechanisms, broadly designated 12 in the drawings, and which are depressed by such cross-head to compress or apply the caps to the bottles.

13 designates a table loosely sleeved upon a portion of the standard 1, so as to be revolvable thereabout. This table has a circular series of cavities 14 in which bottles may be received. The arrangement and disposition of these cavities are such that two bottles within these cavities may always be moved into a position beneath the cap-applying heads 12 so as to be simultaneously acted upon thereby.

I have illustrated a means for automatically actuating the table 13 in the operation of the machine, so that the bottles are successively presented in their cap-applying relation.

16 designates a bevel gear integral with the table 13, and 17 designates another bevel gear meshing with the gear 16 and fixed on a shaft 18 journaled within the standard 1. The reciprocating rod 3 is bifurcated or slotted at its portion 19 adjacent to the shaft 18, so as to embrace or inclose said shaft and permit of the independent vertical reciprocation of said rod. Loosely sleeved on the

shaft 18 is a pinion 20 having an integral disk 22 which in turn carries a laterally projecting pin 25. Also loosely sleeved on the shaft 18 is a mutilated disk 24 having a cut out portion or sector opposite the pin 25 and in which said pin has a certain amount of play or angular movement. 27 is a ratchet wheel fixed to the shaft 18 and engaged by a pawl 26 pivoted to the side face of the disk 24. The arrangement is such that the bevel gear 17 is rotated through a predetermined angular distance at each upward movement of the rod 3, but, on the return or downward movement of the rod 3, the pawl 26 slides backward over the ratchet wheel 27 so that the bevel gear 17 is not driven. The table 13 is rotated with the bevel gear 17, being directly geared thereto, so that the bottles are moved through a predetermined angular distance at each upward movement of the rod 3. As will later appear this distance is just sufficient to position two new or uncapped bottles in the path of the cap-applying heads. The arrangement of the disks 22 and 24 is such that there is a considerable degree of lost motion in the movement of the table under the action of the driving pinion 20. It is not practical to have the table commence its movement of rotation at the very beginning of the return stroke of the cap-applying head; this movement should not begin until the cap-applying heads are entirely free from the bottles. This is provided for by the two disks 22 and 24 which becomes engaged in positively driving relation only after half a rotation or more of lost motion. Accordingly the table does not commence to turn until the reciprocating rod 3 has ascended for a considerable distance in its upward movement.

The cap-applying heads 12 may be of the usual or any desired construction. Each has a cavity 30 within which a bottle cap is adapted to be received and held preliminary to the descent of the cap-applying head upon the bottle to be capped.

I provide means for automatically feeding caps from a hopper into a position below the cap-applying heads and projecting them upward from this position into the heads, where they are grasped and carried downward onto the bottles to be capped.

Referring particularly to Fig. 2, 31 designates a U-shaped bail or sliding frame guided to have a vertical movement parallel to the reciprocating rod 3. 32 designate springs by which this bail or frame is normally impelled upward. On its upper surface this bail carries a projection 33 in the path of a block 34 swiveled on a stud 34' at the upper end of the reciprocating rod 3. The block 34 has a sector-shaped part 35 which directly overlies the projection 33 under certain circumstances. 36 designates a portion of the block 34 which is adapted to be engaged by

a cam 37 forming a fixed part of the frame of the machine. The block 34 is normally impelled angularly by a spring 38 which keeps the arm 36 pressed against the cam surface 37. By this means the block 34 is displaced through part of a revolution whenever the reciprocating rod 3 descends, and makes a corresponding return movement during the ascent of the rod 3. Under these circumstances the projection 33 and bail 31 are depressed by the sector 35 during a portion of each downward movement of the reciprocating rod 3, but, after this movement is partly completed, the sector 35 passes off of the projection 33 by virtue of its angular movement, whereupon the bail 31 rises abruptly under the impulse of its springs 32. Depending from the cap-applying heads 12 there is another bail 40 which has a sliding connection 41 with the pins 42 of the cap-applying heads, so as to be capable of being displaced upwardly in the direction of the axes of the cap-applying heads. This bail has a pair of rigid plugs 44 which are adapted to enter the cavities 30 of the cap-applying heads when properly positioned with respect thereto. These plugs 44 are of a size adapted to fit inside of and support a bottle cap, as particularly shown in Fig. 2. 45 designates a yoke movably supported on the bail 40 being depressible thereon. I provide pins 46 which rigidly project from the yoke and loosely enter holes 47 of the bail 40. 48 designates a spring by which the yoke 45 is normally pressed upward into the position shown in Fig. 2. At points along the length of the side members of the bail 40 there are swiveled eyes 49 which loosely receive the extremities of arms 50 pivoted to the bail 31 on the axes 52. The arms 50 are joined to the swiveled eyes 49 of the part 40 by tensile springs 49* which are also capable of acting as compression springs when sufficiently compressed or retracted. 53 designate pins rigidly projecting from the frame of the machine in the path of the arms 50 (see particularly Fig. 1.) The arrangement is such that, when the bail 31 descends, the arms 50 are caused to fulcrum about the pins 53, causing the bail 40 to be swung to the right in Fig. 1, until the plugs 44 are beneath the cavities 30 of the cap-applying heads. At this point the outwardly swinging movement of the bail 40 is arrested by the stops 54, and any further descent of the bail 31 can only take place by an upward movement of the bail 40. The bail 40 is, however, free to make such an upward movement on account of its slotted connections 41 with the cap-applying heads, and the plugs 44 are accordingly impelled upward into the cavities 30. As will later appear, these plugs carry bottle caps at this time, which are accordingly properly positioned within the cavities of the cap-applying heads. The

fact has been referred to that the bail 31 only partakes of part of the downward movement of the reciprocating rod 3. Before the downward movement of the latter is completed, the projection 33 is disengaged from the sector 35 and the bail 31 rises under the influence of its impelling springs 32. The upward movement of the bail 31 is accompanied by a reverse movement of the bail 40 in all respects, that is to say, the bail 40 first descends and subsequently swings to the left in Fig. 1. This movement is impelled by the tensile springs 49* from the arms 50, the latter being drawn upward by the springs 32. Accordingly this bail is out of the way of the bottles by the time the cap-applying heads have descended thereon to compress or apply the caps.

The means which I have provided for feeding the caps automatically onto the plugs 44 preliminary to the above described operation comprises a hopper 60 having a gate 61 at its lower portion, through which the caps continuously drop. 62 designates a belt of felt or similar flexible material with a friction surface which is guided over a pair of pulleys 63 and 64. This belt may be caused to have an intermittent movement in the direction of the arrow in Fig. 1 in any suitable way, for example, by means of a cord 65 passing over a portion of the pulley 64 and connected to the upper end of the reciprocating rod 3. It will be noted that the belt structure particularly adapts itself to the separation of properly disposed from improperly disposed caps, in that there is a direct rectilinear retraction of the improperly disposed caps away from the mouth of the chute, which avoids the grinding and churning action of wheel-like devices commonly employed heretofore for this purpose. Further, the belt being of felt, and hence non-metallic, cannot scratch the decorations on the faces of the caps. 66 denotes a screen having a pair of openings 67 of such a shape that they will permit the passage of a cap therethrough in inverted relation, but not with the prongs or flange downward. Each of these openings communicates with a separate chute 68. These chutes respectively lead into proximity to the plugs 44 directly behind the yoke 45 when the bail 40 is in its normal position of rest, as shown in Fig. 1. Any bottle caps which enter these chutes 68 accordingly fall by gravity until they are arrested by the detent 70, or by contact with the yoke 45 which is cut away at two portions opposite the chutes 68 so as to properly receive the caps. When the caps are brought to rest in this way they settle upon the plugs 44 from which they are eventually transferred to the cap-applying heads in the manner which has already been described.

The operation of the machine is as fol-

lows: A supply of caps being furnished to the hopper 60, it is evident that they will fall in greater or less numbers through the gate 61 onto the inclined belt 62. Some of the caps will fall with their flanged side downward and some will fall with their flanged side upward. Those which fall with the flanged side downward engage the belt 62 with a considerable degree of friction on account of their prongs or rough edges, but those which fall with their smooth top surface downward are not frictionally engaged by the belt to any extent. Accordingly the latter caps slide about upon the belt in proximity to the screen 66 until they eventually enter the openings 67 and pass downward through the chute 68. On the other hand, the caps which fall with their prongs or flanged side downward are carried upward by the belt at each movement thereof in the direction of the arrow in Fig. 1, so that they are carried over the pulley 64 and fall into a receiving chute 69 which leads to any desired receptacle. These ejected caps may be resupplied to the hopper 60 from time to time. The caps which pass downward through the chutes 68 are not permitted to issue freely at the lower ends, on account of the detent 70 provided for each chute, which is depressed by the bail 40 when the latter is in the position shown in Fig. 1. Accordingly caps can be applied to the plugs 44 when the bail 40 is in the position shown in Fig. 1, but, during the time that these caps are transferred to the cap-applying heads, the lower ends of the chutes 68 are barred by the detents 70. These caps are swung forwardly and upward into the cap-applying heads during the descent of the reciprocating rod 3 in the manner already described. The bail 40 also makes its return movement out of the way of the bottles during the descent of the cap-applying heads. During the return or upward movement, the table 13 carrying the bottles is rotated through a sufficient distance to place two new bottles beneath the cap-applying heads, but this movement does not take place until the cap-applying heads are free from the bottles already capped, on account of the lost motion between the disks 22 and 24 of the table shifting mechanism.

What I claim is:—

1. In a bottle capping machine, a vertically reciprocating cap-applying head, a movable table for receiving the bottles, and means for actuating said table to present the bottles in operative relation to said head exclusively during the latter part of the upward movement or reciprocation thereof.

2. In a bottle capping machine, a reciprocating cap-applying head, a table adapted to receive a plurality of bottles and actuable to present said bottles successively in the path of said head, and means acting ex-

clusively during the latter part of the upward movement of said head for so actuating said table.

3. In a bottle capping machine, a cap-applying head, a reciprocating rod connected thereto and having a rack section, a pinion meshing with said rack section, a disk or member having a lost motion connection with said pinion, another disk or member adapted to be actuated by angular movements of said first named disk or member in one direction only, and a table for receiving bottles geared to said second disk or member.

4. In a bottle capping machine, a reciprocating cap-applying head, and means movable into and out of said head during the downward movement thereof for feeding caps thereto.

5. In a bottle capping machine, a cap-applying head, a reciprocating rod connected thereto, and means actuated by said reciprocating rod to move into and out of said cap-applying head during the downward movement thereof, for feeding caps thereto.

6. In a bottle capping machine, a cap-applying head and means beneath said head having a lateral, an upward, a downward, and another lateral movement during each downward reciprocation of said head for feeding caps thereto.

7. In a bottle capping machine, a cap-applying head, a reciprocating rod connected to said head, and means actuated by said rod for moving laterally under and up into the head to feed a cap thereto during each downward movement thereof.

8. In a bottle capping machine, a cap-applying head, means having a slotted connection with the head and depending beneath the same to receive a bottle cap, and means for moving said cap receiving means laterally and upwardly into said head.

9. In a bottle capping machine, a cap-applying head, means secured thereto and depending therefrom and adapted to receive a bottle cap, a rod for reciprocating the head, and connections between said rod and said means for moving the latter laterally and upwardly to position a cap in said head.

10. In a bottle capping machine, a cap-applying head, means depending from said head to receive a bottle cap, a reciprocating rod connected to said head, and connections from said rod to said means for moving the latter laterally, upward, downward, and again laterally during each downward movement of the head.

11. In a bottle capping machine, a cap-applying head, means for inserting caps therein, a chute for delivering caps to said means, a hopper or magazine for delivering caps to said chute, and means movable rec-

tilinearly for diverting from said chute caps which fall from the hopper in improper relation.

12. In a bottle capping machine, a cap-applying head, means for inserting caps therein, a chute for delivering caps to said means, a hopper or magazine for delivering caps to said chute, and movable means having a friction surface for diverting from said chute caps which fall from said hopper in inverted or improper relation.

13. In a bottle capping machine, a cap-applying head, means for inserting caps therein, a chute for delivering caps to said means, a hopper or magazine for delivering caps to said chute, and a belt having a friction surface for diverting from said chute the caps which fall from the hopper in inverted or improper relation.

14. In a bottle capping machine, a cap-applying head, means for inserting caps therein, a chute for delivering caps to said means, a hopper or magazine for delivering caps to said chute, and an intermittently movable belt having a friction surface for diverting from said chute the caps which fall from the hopper in inverted or improper relation.

15. In a bottle capping machine, a reciprocating head, means for feeding caps thereto, a chute for delivering caps to said means, a screen having a gate or opening at the entrance to said chute and adapted to permit the entrance of a cap only in inverted relation, means having a friction surface and movable in an inclined direction away from said screen, and a hopper or magazine for supplying caps to said friction surface.

16. In a bottle capping machine, a cap-applying head, a reciprocating rod connected thereto and having a block swiveled to its upper end, a cam for angularly displacing said block during the downward movement of said head, means for receiving caps and supplying them to said head, and connections from said block to said means for moving the same into and away from its cap-applying relation during each downward movement of the head.

17. In a bottle capping machine, a cap-applying head, means for inserting caps therein, a chute for delivering caps to the said means, a hopper or magazine for delivering caps to said chute, and non-metallic means for diverting from said chute caps which fall from the hopper in improper relation.

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

GEORG KIRKEGAARD.

Witnesses:

WALDO M. CHAPIN,
JAMES D'ANTONIO.