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BOTTLE CORKING MACHINE

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2 Sheets-Sheet 2

FIG. 3.

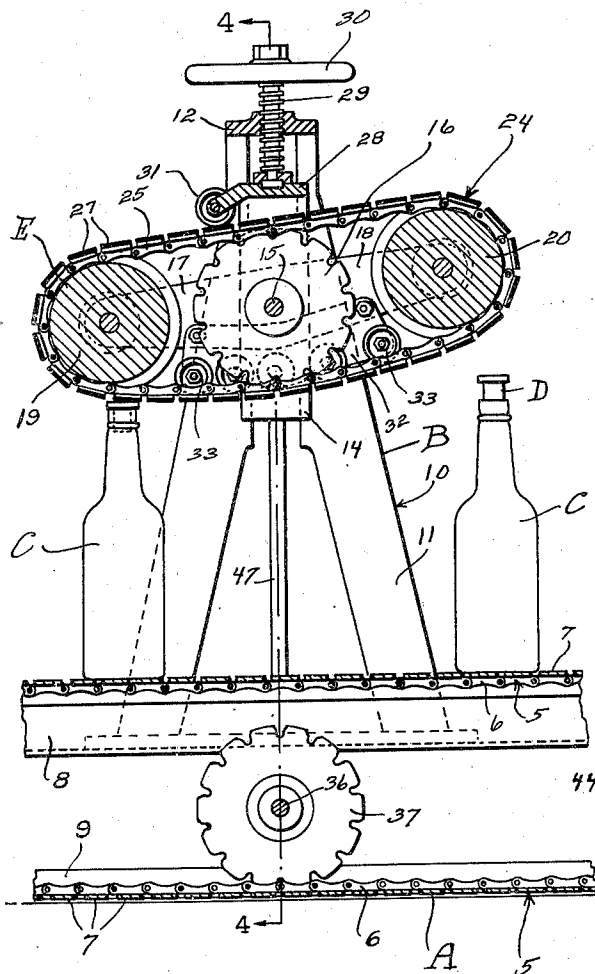


FIG. 4.

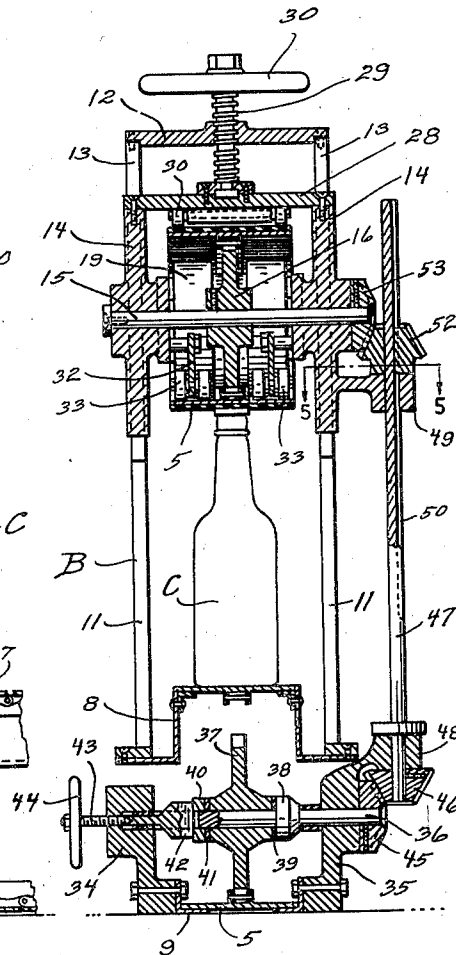


FIG. 5.

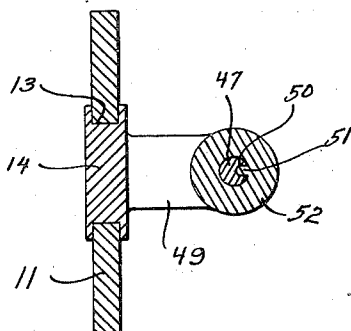
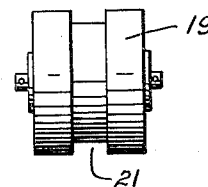


FIG. 6.



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BOTTLE CORKING MACHINE

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6 Claims. (Cl. 226—89)

The present invention relates to machines primarily intended for closing containers such as bottles, jars and the like having closures in the form of corks or stoppers which are adapted to be forced or pressed into the mouth of the container for closing the same.

The primary object of the invention is to provide an improved machine for progressively forcing or pressing corks into bottles while the bottles are in motion upon a conveyor, and irrespective of variation of spacing between adjacent bottles on the conveyor.

A further object of the invention is to provide a bottle corking machine which is adaptable to existing bottle conveyor systems, and wherein the machine is driven from the conveyor belt which conveys the bottles thru the machine.

A further object is to provide a bottle corking machine which may be readily positioned at any preferred location along the bottle conveyor and embodying novel power take-off means for controlling operation of the machine whereby the conveyor may operate without the corking machine when such is desired.

A further object resides in the provision of a machine of this character which is easily and quickly adjustable to accommodate bottles of different heights.

A still further object resides in the specific arrangement of the closure means whereby the corks will be properly pressed into the mouths of the bottles without likelihood of the corks being bent over or flipped out of place, nor likelihood of the bottles being overturned at the delivery end of the closure means.

Other objects and advantages of the invention will be apparent from the following detailed description, taken in connection with the accompanying drawings forming a part of this specification and in which drawings:—

Figure 1 is a view in side elevation of the bottle corking machine shown in operative relation to a conveyor.

Figure 2 is an end view of the same, looking at the receiving end of the machine.

Figure 3 is a vertical longitudinal section on the line 3—3 of Figure 2.

Figure 4 is a vertical transverse section on the line 4—4 of Figure 3.

Figure 5 is an enlarged fragmentary section on the line 5—5 of Figure 4.

Figure 6 is a view of one of the belt wheels for the closure belt or apron.

Figure 7 is an enlarged fragmentary section on the line 7—7 of Figure 1.

Figure 8 is an enlarged transverse section thru the closure belt or apron.

Referring to the drawings in detail and wherein like reference characters designate corresponding parts thruout the several views, the letter A designates a bottle conveyor with which the improved corking machine B is associated in a manner whereby as the bottles C are moving along the conveyor the corks or closures D will be forced or pressed into the mouth of the bottle.

Referring first to the conveyor A, the same may be of ordinary construction and in the example shown comprises an endless conveyor belt 5 of the single strand type embodying a drive chain 6 carrying transverse slats 7. The belt 5 is arranged to provide superposed horizontal runs, the upper run moving on an upper supporting track or runway 8 and the lower or return run moving on a lower track or runway 9. The chain 6 is of course at the confronting sides of the runs so that the upper surface of the upper run presents a substantially flat supporting surface for the bottles C.

The corking machine B is adapted for positioning in operative relation to the conveyor A at any desired location therealong and comprises a supporting frame 10 including a pair of spaced uprights 11 which may be secured at their lower ends to the conveyor A as upon the upper track 8 so as to straddle the upper run of the conveyor belt. Connecting the upper ends of these uprights 11 is a cross head 12. Provided at the upper portion of each upright 11 is a vertical guideway 13 and these guideways provide for the mounting of a vertically movable corking unit E.

The corking unit E comprises a pair of guide blocks or members 14 one of which is retained for vertical guided movement in each of the guideways 13. Journaled at its end portions in the guide blocks 14 is a drive shaft 15 having a sprocket wheel 16 fixed thereon midway between the guide blocks. Extending in opposite directions from each of the guide blocks 14, inwardly of the uprights 11, are fixed arms which provide a pair of rear bracket arms 17 extending toward the delivery end of the unit, and a pair of front bracket arms 18 extending toward the receiving end of the unit. These bracket arms, as shown in Figure 1, are inclined downwardly toward the delivery end of the corking unit. Journaled in the outer ends of the bracket arms 17 is a belt wheel 19, while journaled in the outer ends of the arms 18 is a belt wheel 20. These belt wheels 19 and 20 are of the same size and are provided midway between their end faces with a circum-

ferential groove 21. Take-up adjusting screws 22 are provided for the belt wheel 20.

Trained over the belt wheels 19 and 20 is a single strand endless closure belt or apron 24 comprising a chain 25 to which is secured a series of flat transverse metal slats 26 which are faced with rubber or other suitable cushioning material 27 for engaging the corks D. The end portions of the slats 26 are adapted to engage the end portions of the belt wheels, while the chain travels in the circumferential groove of the wheels and serves to prevent lateral movement of the closure belt. As shown clearly in Figure 3, the sprocket wheel 16 meshes with the runs of the chain 25 for imparting travel to the closure belt.

Connecting the upper ends of the guide blocks 14 is a cross piece or member 28 to which the lower end of a height adjusting screw 29 is rotatably secured. The screw 29 is threaded thru the cross head 12 and is provided at its upper end with a hand wheel 30 whereby the entire corking unit is vertically adjustable in the supporting frame 10. The cross member 28 carries suitable idler rollers 31 for bearing upon the upper run or flight of the closure belt.

Secured to the inner or confronting sides of the bracket arms 17 and 18 to extend parallel thereto between the belt wheels 19 and 20, are two supporting plates 32 upon each of which is mounted a series of pressure rollers 33 which are adapted to bear upon the upper surface of the lower run of the closure belt at opposite sides of the chain 25. As will be observed particularly in Figure 3, these pressure rollers 33 and the belt wheels 19 and 20 are so arranged as to cause the lower run of the closure belt to extend substantially on a downward arcuate incline toward the delivery end of the machine. The object of this will be later described.

Power take-off means F is provided whereby the machine may be driven from the conveyor A upon which the bottles are carried thru the machine. This means F preferably comprises a friction clutch device which is associated with the lower track 9 of the conveyor and driven from the lower run of the conveyor. Secured to the lower track 9 are bearing brackets 34 and 35 in which is journaled a drive shaft 36 extending transversely of the conveyor between the upper and lower runs thereof. Rotatable upon the central portion of the shaft 36 is a drive sprocket 37 which is in constant mesh with the drive chain 6 on the lower run of conveyor belt 5. Fixed upon the shaft 36 at one side of the sprocket 37 is a collar 38 and encircling the shaft between the sprocket and collar is a clutch disc 39. Encircling the shaft 36 at the other side of the sprocket 37 is a collar 40 which is movable longitudinally along the shaft and arranged between this collar and the sprocket is a clutch disc 41. The shaft 36 is transversely slotted to receive a key 42 having a stem which extends thru the shaft so as to be engaged at its end by the inner end of a clutch actuating screw 43 which is threaded thru the bearing bracket 34. When the screw 43 is threaded inwardly by the hand wheel 44 an end thrust is exerted on the key 42 whereby the sprocket wheel 37 is frictionally held between the clutch discs 39 and 41 so as to impart rotation to the drive shaft 36. By threading the screw 43 outwardly, the sprocket 37 is free to rotate on the shaft.

Secured to the drive shaft 36 at the outer side of the bearing bracket 35 is a bevel gear 45 which meshes with a bevel gear 46 fixed upon the lower end of a vertical drive shaft 47. This vertical

shaft 47 is journaled at its lower end in an extension 48 on the bearing bracket 35 and has its upper portion journaled in a slide bearing 49 provided on one of the guide blocks 14. Provided in the upper portion of the shaft 47 is a longitudinal keyway 50 for receiving the key 51 of a bevel gear 52 whereby the gear is held for rotation with the shaft and permitted to move axially therealong. This bevel gear 52 meshes with a bevel gear 53 which is fixed upon one end of the drive shaft 15. Thus the drive coupling means between the power take-off means F and the corking unit E is such as to permit vertical adjustment of the unit E to adapt the machine for use with bottles of various heights.

The size of the sprocket wheels 16 and 37, and the bevel gears 45, 46, 52 and 53 is such that the closure belt 24 will travel at the same linear speed as that of the conveyor belt 5.

Referring more particularly now to the specific formation or contour of the lower run of the closure belt 24, it will be noted that the belt wheel 20 at the receiving or entering end of the corking unit is at a slightly higher elevation than the belt wheel 19 at the delivery end and that the pressure rollers 33 extend on an arc longitudinally of the unit whereby the lower run of the closure belt extends in a general downward arcuate incline toward the delivery end of the unit. At the entering end of the corking machine, the lower run of the closure belt 24 is at a substantial angle to the horizontal and this is to give the corks a good firm start into the bottles so that when the bottles reach the lowest point of the run approximately midway of the run, and at which point the greatest pressure is applied, there will be no chance of bending or canting of the cork such as would snap or flip the cork out of the mouth of the bottle. From a point approximately midway of the lower run of the closure belt the run extends in a slight upward incline to the belt wheel 19 so as to relieve the bottle of any pressure so that it will not be kicked forward at the critical high point release and possibly be overturned. The substantially steep entering angle of the lower run of the closure belt will also allow for use of very long corks which cannot be inserted very far into the mouth of the bottle by hand.

The yieldable cushioning material 27 such as rubber or the like with which the closure belt 24 is surfaced will not only provide for accommodation of bottles of slightly varying height without likelihood of crushing the bottle, but will also provide a gripping surface for the tops of the corks facilitating in the retention of the corks in proper vertical position and without requiring use of pockets or the like on the closure belt.

In operation of the corking machine for forcing or pressing corks into bottles as the bottles are conveyed in line thru the machine, the corks may be placed in the bottles by hand at any location on the conveyor A in advance of the corking machine. With the corking unit E adjusted vertically with respect to the upper run of the conveyor belt 5 by the height adjusting screw 29, the hand wheel 44 may be rotated for actuating the friction clutch means and imparting rotation to the sprocket wheel 37 from the lower run of the conveyor chain 6. This will impart travel to the closure belt 24 which will travel at the same linear speed as that of the conveyor belt. As the bottles pass beneath the corking unit, the corks will be engaged by the lower run of the closure belt and gradually forced or pressed into

the bottles as they are conveyed beneath the corking unit.

When desiring to permit operation of the conveyor A without the corking machine being operated, the friction clutch device may be actuated for releasing rotation of the sprocket wheel 37 and if required, the corking unit E may be elevated to permit free passage of bottles or other articles on the conveyor belt.

- 10 It will be seen that with slight modifications to the supporting frame of the machine, the machine may be associated with various types of conveyor systems. It will also be seen that the machine may be arranged at any preferred location along the conveyor and derives its operating power from the run of the conveyor belt with which the machine is associated so that travel of the conveyor and the closure belts is synchronized.
- 20 Changes in the shape, size and arrangement of parts may be made to the form of the invention as herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

25 We claim:

1. A bottle corking machine comprising in combination, a horizontal endless conveyor belt including a drive chain, a frame, a corking unit vertically adjustable on the frame and including an endless closure belt, a releasable friction clutch device including a sprocket in mesh with said drive chain, and drive coupling means between the closure belt and clutch device for imparting travel to the closure belt with the same linear speed as that of the conveyor belt.

- 35 2. In a bottle corking machine, in combination with a horizontal endless conveyor belt including a drive chain, a frame having vertical guideways, a corking unit vertically guided in the guideways and including an endless closure belt, height adjusting means for the unit, power take-off means including a sprocket meshing with said drive chain, clutch means for the sprocket, and drive coupling means between the power take-off means and the closure belt and including a splined vertical drive shaft permitting vertical adjustment of the corking unit.

- 45 3. A bottle corking machine comprising in combination, a conveyor including horizontal upper and lower tracks, an endless conveyor belt

having superposed runs guided on said tracks, a frame having vertical guideways, a closure unit frame vertically adjustable in the guideways, means for vertically moving the closure unit frame, an endless closure belt supported on the closure unit frame, means guiding the lower run of the closure belt in an arcuate and downward direction toward the delivery end of the unit, a power take-off device including a sprocket in constant mesh with the lower run of the conveyor belt, drive releasing means for the sprocket, and positive drive coupling means between the power take-off device and the closure belt.

4. In a bottle corking machine, a conveyor belt including upper and lower runs, a corking unit including a vertically adjustable frame, an endless closure belt supported on the frame and including a chain, a sprocket meshing with the chain, a releasable power take-off device associated with the lower run of the conveyor belt, and drive coupling means between the power take-off device and said sprocket including a vertical drive shaft and a bevel gear splined on said shaft.

5. In a bottle corking machine, a corking unit including a frame, a circumferentially grooved belt wheel journaled in each end of the frame, an endless closure belt trained over said wheels and including a chain fitting in said grooves, pressure rollers engaging the lower run of the belt between the belt wheels, a yieldable cushioning at the outer surface of the belt, a drive shaft journaled in the frame between the belt wheels, and a sprocket on said shaft and meshing with the chain of the closure belt.

6. In a bottle corking machine, a main frame, a corking unit comprising guide blocks vertically guided in the frame, pairs of bracket arms carried by the blocks, a belt wheel journaled in each pair of arms, an endless single strand closure belt trained over the belt wheels, pressure rollers supported from said arms in engagement with the lower run of the belt between the belt wheels, a drive shaft journaled in the guide blocks, a sprocket wheel fixed on the shaft for imparting travel to the closure belt, and means for raising and lowering the corking unit.

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