G. M. C. NIELSEN.

BOTTLE SEALING APPARATUS.

APPLICATION FILED MAY 6, 1907.

965,535.

Patented July 26, 1910.

3 SHEETS—SHEET 1.

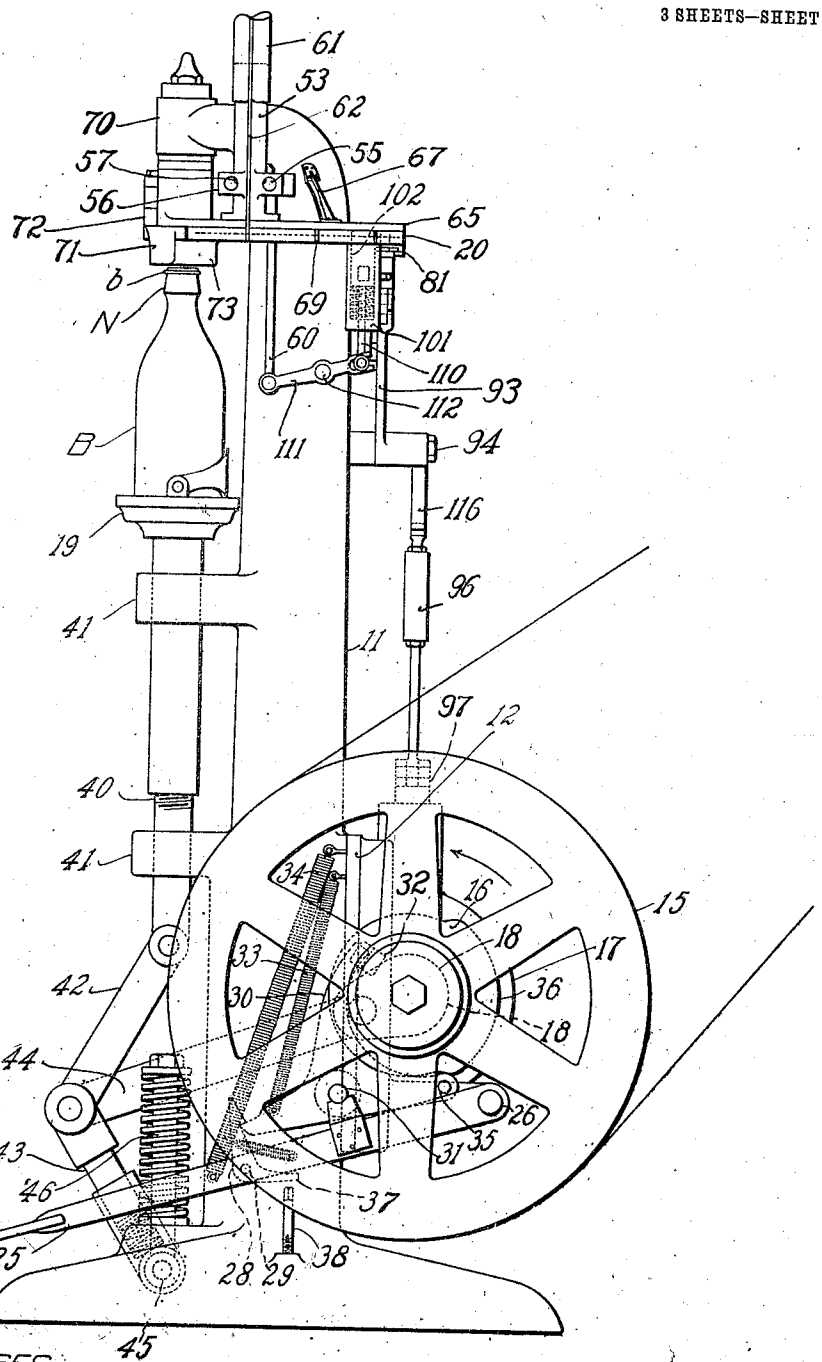

FIG. 1

WITNESSES

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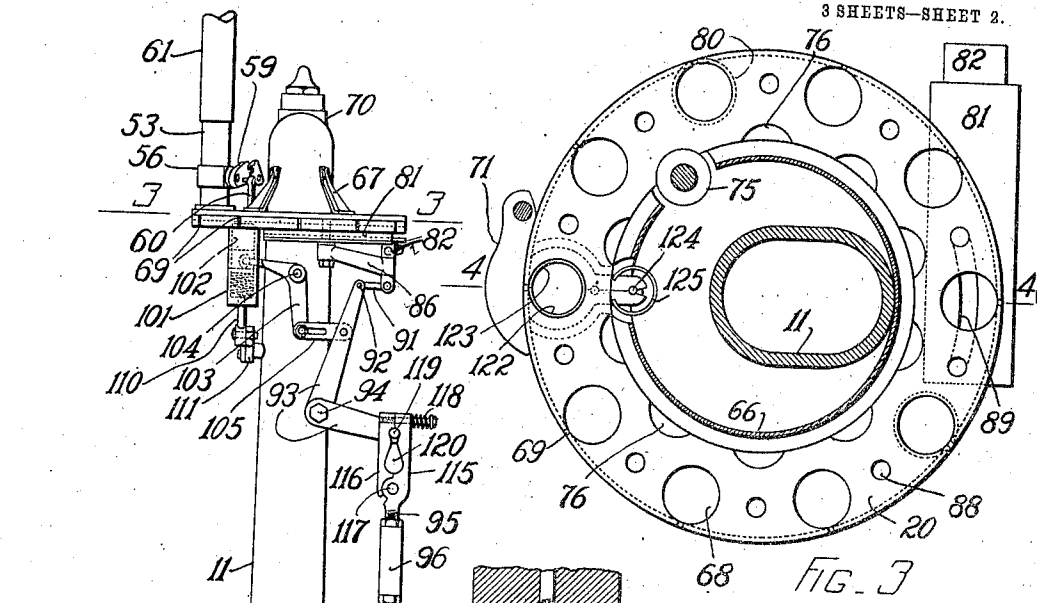

FIG. 3

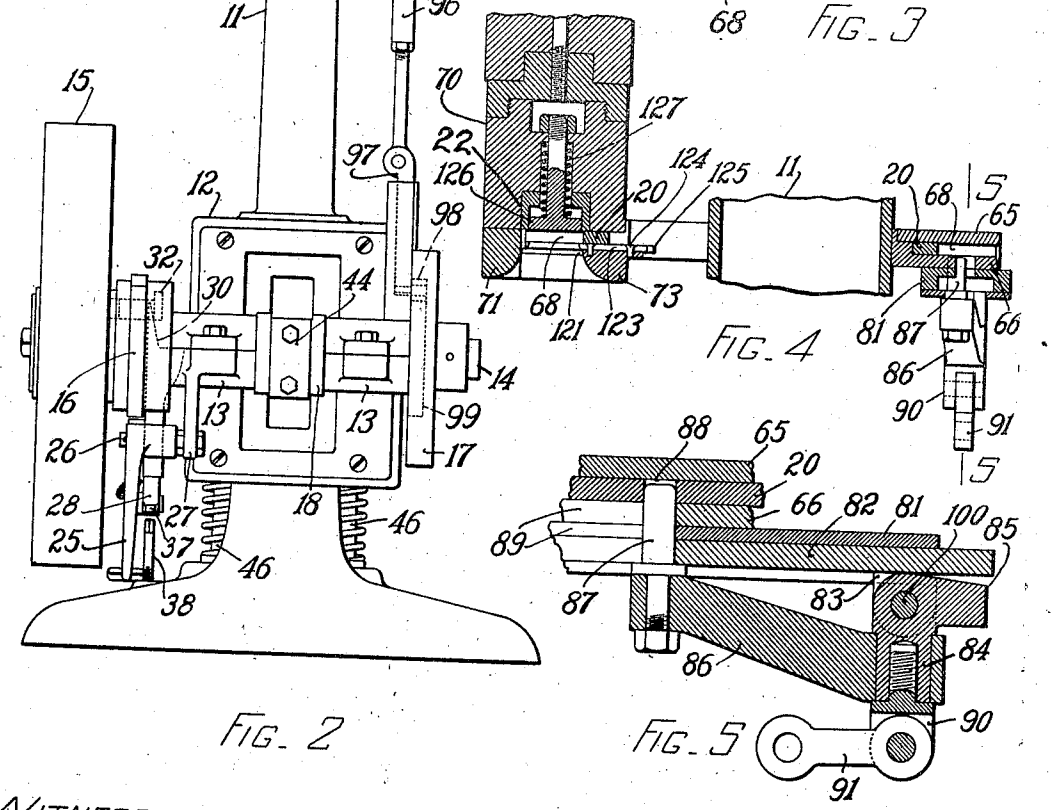

FIG. 2

FIG. 4

FIG. 5

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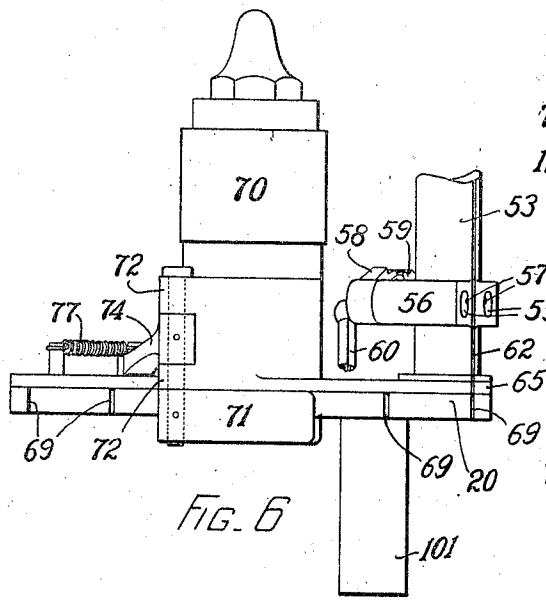


FIG. 6

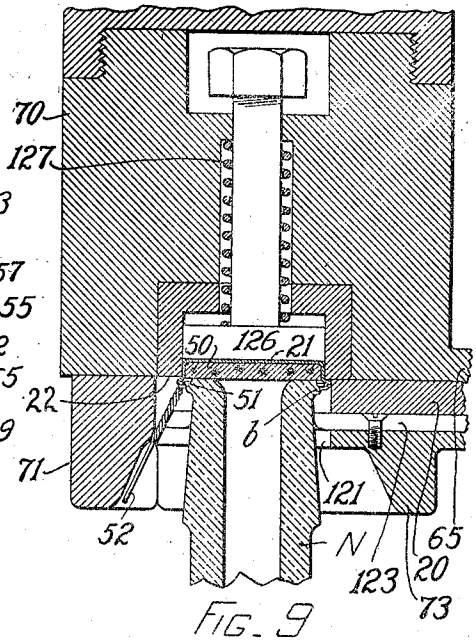


FIG. 9

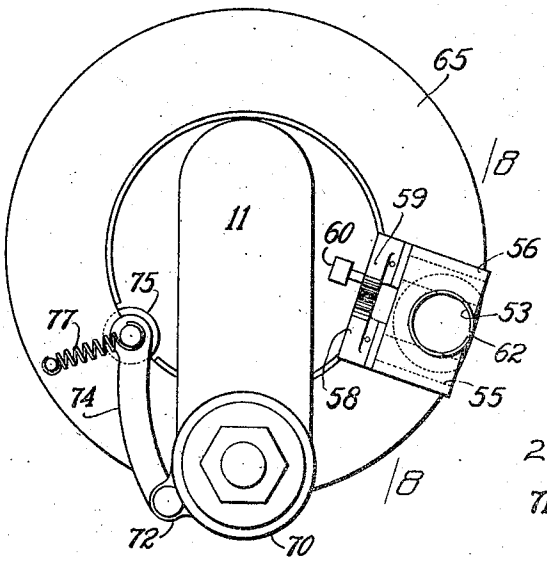


FIG. 7

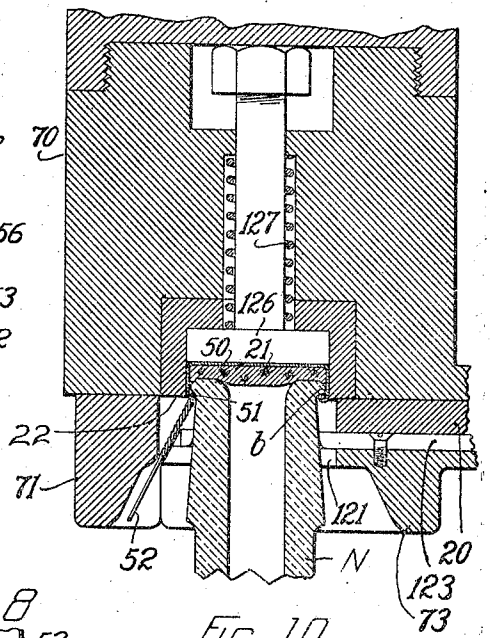
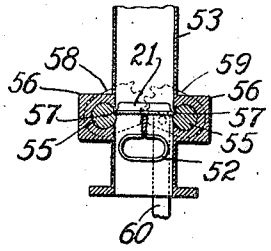


FIG. 10

FIG. 8



WITNESSES
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UNITED STATES PATENT OFFICE.

GEORG M. C. NIELSEN, OF MILLIS, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED CORK AND SEAL COMPANY, OF MILLIS, MASSACHUSETTS, A CORPORATION OF MAINE.

BOTTLE-SEALING APPARATUS.

965,535. Specification of Letters Patent. **Patented July 26, 1910.**

Application filed May 6, 1907. Serial No. 372,204.

To all whom it may concern:

Be it known that I, GEORG M. C. NIELSEN, a citizen of Denmark, and a resident of Millis, in the county of Norfolk and State of Massachusetts, United States of America, have invented certain new and useful Improvements in Bottle-Sealing Apparatus, of which the following is a specification.

This invention relates to bottle sealing apparatus.

More particularly, it relates to mechanism for sealing the mouth of a bottle with a cork cap; and it comprises apparatus for feeding caps, one at a time, to the bottle, affixing and fastening the caps; and incidental mechanism for controlling the operation of these parts accurately and with safety to the mechanism and to the caps and bottles on which the machine is at work.

The principles of the invention will appear from the following description of a machine which forms one embodiment of the invention, reference being had to the accompanying drawings, in which—

Figure 1 is a side elveation of one form of apparatus embodying the invention, showing a bottle in place to be sealed. Fig. 2 is a rear elevation of the same. Fig. 3 is a plan, in section, on line 3—3 of Fig. 2, somewhat enlarged, showing the head. Fig. 4 is an elevation, in section, of part of the head on line 4—4 of Fig. 3. Fig. 5 is an elevation, in section, on line 5—5 of Fig. 4, further enlarged, showing the reciprocating mechanism. Fig. 6 is a front elevation of the head. Fig. 7 is a plan of the same. Fig. 8 is an elevation, in section, on line 8—8 of Fig. 7. Figs. 9 and 10 are full size elevations, in section, showing different stages in the operation of sealing the bottle.

In the drawings, the invention is represented as it may be embodied in a machine suitable for closing bottles with cork caps or stoppers of the general type shown in the patent to Frederick Recht, No. 646,627, dated April 3, 1900; but the invention is not limited to this particular use, nor to the particular construction here shown and described.

In operation, the circular plate 2 (see Figs. 3, 4, 5, 9 and 10) is rotated a certain angular distance periodically, thus positioning stopper caps 21 successively under head 70; and in the intervals the stand 19 raises a bottle against the stopper thus positioned and forces both bottle and cap into cylindrical die 22, bending or drawing the cap flange downward until the wire engages under a bead *b* on the bottle.

The frame 11 carries near its base a rectangular flange 12, having two journal boxes 13 for supporting the driving shaft 14. The latter carries a clutch member 16 and loose driving pulley 15; a cam 17 for operating the feed mechanism; and a crank 18 for operating the bottle support 19.

Any suitable clutch controlling mechanism may be employed without affecting the principle of the invention. In that here shown, foot lever 25, pivoted at 26 to ear 27 depending from flange 12, carries a spring controlled dog 28, pivoted at 29, positioned to engage a lip on a clutch-disengaging member 30, which is pivotally mounted on the frame at 31. The member 30 is adapted to control the action of lug 32, in a well known manner, to cause or to prevent engagement and rotation of member 16 and shaft 14 with the constantly rotating pulley 15. Spring 33 holds member 30 normally against the clutch member 16, and spring 34 holds lever 25 normally up. Clutch lug 32 is caught at each revolution by the wedge point of 30 and thereby drawn out of engagement with its driving wheel 15. When foot lever 25 is depressed, carrying dog 28 downward and thus swinging the wedge point of 30 outward to let lug 32 into engagement with wheel 15, the tail 37 of dog 28 is arrested by fixed pin 38, and further depression of lever 25 causes dog 28 to swing around its pivot 29 until its upper portion is disengaged from member 30, whereupon spring 33 draws this member back inward, so that it is again in position to intercept lug 30 and open the clutch upon the completion of the first revolution of the lug. A raised cam-like portion 36 of clutch member 16 is provided, and a roller or pin 35 on member 30 is adapted to be engaged and forced outward by it, with the effect of forcing the wedge point of 30 inward into its position for engaging the lug 32, or of maintaining it there, despite the possible carelessness of the operator in depressing the lever 25 at the wrong time, or maintaining it depressed too long. During a single complete revolution of the clutch a complete cycle of the

bottle sealing operations occurs; and the purpose of the mechanism last described is to make sure of a sufficient interval for properly inserting a fresh bottle before the machinery starts on the next.

Any suitable bottle closing mechanism may be used. As here represented, the bottle support 19 is guided by ears 41, 41 on frame 11, and is actuated by toggle links 42, 43, controlled by connecting rod 44 and crank arm 18 on shaft 14. The lower pivot pin 45 of link 43 is hung on two spring-supported posts 46, 46, to allow bottle support 19 to yield under excessive strain caused by misplacement of the bottle. The height of the bottle stand is adjustable at 40.

The stoppers 21, comprising a cork wafer 50 and a wire ring 51, both incased within a tin cap (Figs. 8, 9, 10), are fed to plate 20 from storage tube 53, 61 through mechanism which they enter by gravity and which assures the feed of one stopper 21 for each revolution of shaft 14. Referring to Fig. 8, 55, 55 are two barrier shafts journaled in ears 56, 56 on tube 53, each of which has a groove 57 in its periphery normally positioned to receive by gravity the rim of the lowest stopper 21. The rear ends of shafts 55, 55 are provided with intermeshing sectors 58, 59, to the latter of which is pivotally attached a guiding or actuating rod 60. In action no stopper can get past shafts 55 except by means of grooves 57. Tube 53, which may be supplemented by auxiliary tube 61, is provided throughout its length with a narrow slot 62, through which project the handles 52 of the various stoppers which fill the tube above shafts 55.

The feeding disk 20 is a disk or annular plate rotatably inclosed between two stationary plates 65 and 66 secured to frame 11 by braces 67, 67. It is provided with a series of recesses 68 (see Fig. 3) for receiving stoppers 21 from tube 53 and conveying them into position for attachment to the bottles. Narrow slots 69, matching with slot 62 in tube 53, are formed on the periphery of disk 20 opposite each recess 68, through which a handle 52 may project. As stopper 21 is fed through its last stage to the head 70, a retaining arm 71 pivotally mounted in ears 72, 72 (Fig. 6) on head 70, yields slightly to permit passage of handle 52 and then closes to form a complete inclosing ring 73 (Figs. 1, 9). The operation of arm 71 is controlled by a lever 74, pivotally mounted in the same ears 72, whose inner end carries a roll 75 adapted to engage segmental recesses 76, 76 on the inner periphery of disk 20, said engagement being insured by means of spring 77. During the rotation of disk 20 roll 75 is moved inwardly against the action of spring 77 to cause the aforesaid opening of arm 71, while a cap 21 is carried under head 70. When roll 75 reaches the next recess 76 the arm 71 closes; and simultaneously disk 20 stops rotating.

The angular advance of disk 20 carries each recess 68 forward into the position previously occupied by the one ahead, and thus after each advance a stopper is loaded from the tube 53 into one recess 68, while another is fitted to the bottle from the second recess ahead (Fig. 3), the intermediate recess 68 carrying a stopper *en route*. If the machine is mishandled so that a stopper 21 passes head 70, it will drop through a recess 80 (shown by dotted lines in Fig. 3) in the lower plate 66, and may be caught in a suitable trough, not shown.

The intermittent rotation of disk 20 is caused by a reciprocating device attached to lower plate 66, described as follows: Guide 81 is provided with a suitable recess for receiving a slide plate 82 having ears 83 (Figs. 2, 3, 4 and 5). Pivotally mounted on these ears is a swivel block 84, having a rearward projection 85 which acts as a stop block. Feed lever 86 is pivotally mounted on swivel block 84, and carries at its forward end the feed pin 87, adapted to engage successively holes 88 in disk 20 through curved slot 89 in plate 66 and guide 81. To swivel block 84 is secured a slotted head 90 in which is pivotally mounted a link 91, the other end of which is pivotally connected at 92 to rock-arm 93, pivoted to frame 11 at 94. The other end of rock-arm 93 is engaged by cam rod 95, connected by adjusting nut 96 to cam slide 97, which carries at its lower end cam roll 98 engaging cam slot 99 in cam 17. Swivel block 84 permits pin 87 to follow the hole 88 in its circular path, and stop-block 85 is so shaped that it prevents the pivotal motion in ears 83 from exceeding that necessary for the pin to engage and disengage holes 88. When rock-arm 93 is pushed rearwardly, feed lever 86 and pin 87 at first oscillate on pivot 100 until stop-block 85 impinges against the under side of slide plate 82. This causes disengagement of pin 87; which is still guided in curved slot 89 during its backward movement which next ensues. After pin 87 is retracted sufficiently to register with the next hole 88, a forward movement of rock-arm 93 causes engagement therewith by 86 and 87 turning about pivot 100.

To provide a positive lock for disk 20 during the corking operation, there is attached to the under side of plate 66 and back of tube 53 a cylinder 101, which carries a spring-pressed piston 102 which registers with and exactly fits recesses 68 in disk 20. In Fig. 2 the linkage is shown in position ready for feeding, with feed pin 87 in one of the holes 88. At this time piston 102 is drawn down, out of engagement with the particular recess 68 that registers with it.

leaving disk 20 free to revolve. The withdrawing of piston 102 is accomplished by a rock-arm 103 pivoted to frame 11 at 104, the lower end of which is adjustably secured to rock-arm 93 by a slotted link 105. As the feeding operation progresses, forward movement of the upright stem of rock-arm 93 causes an upward movement of the forward arm of rock-arm 103, thereby releasing piston 102 and allowing its spring to press it against the under side of disk 20, there being no recess 68 then in register. As soon as the feed motion is completed the next recess 68 registers with piston 102, which is then forced into the recess. This securely locks disk 20 while the corking operation is in progress. Piston 102 has a downwardly projecting stem 110 which is pivotally connected to the forked end of lever 111, fulcrumed at 112 to frame 11, said lever 111 being pivoted at its other end to actuating rod 60, before mentioned. Thus, every movement which takes place in the head is caused by the operation of the cam 17, insuring harmonious action of the different motions.

In addition to the provision at the foot of the toggle links 42, 43, to take care of any undue strain caused by "jamming", it is advisable to provide means for relieving the strain upon the linkage for operating the head, should any parts become jammed or obstructed in action. Referring to Fig. 2, the upper end of cam-rod 95 is formed of two pieces 115, 116, pivotally connected at 117 and normally held together by spring 118 to form the mounting for pin 119 in rock-arm 93. If, during the upward motion of cam-rod 95, an obstruction should exist in the head mechanism, pin 119 would force open the jaws 115, 116 against the action of spring 118, and would slip ineffectively into the space marked 120. This action is automatic, recovering itself when cam-rod 95 descends, and continuing as long as the obstruction exists, thus preventing injury to the machine.

The operation of the head is as follows, referring to Figs. 3, 4, 9 and 10: Directly over bottle support 19 and under head 70 there is an opening 121 in plate 66 large enough to permit the entrance of the neck N of bottle B. As recesses 68 in disk 20 are of greater diameter than the extreme of stopper 21, the stopper would drop through this opening in plate 66 when brought into register with head 70 unless preventive means are provided. A recess is formed in plate 66 around the opening 121 containing two symmetrical halves 122, 123 (Fig. 3) forming an inclosing ring whose opening is smaller than the diameter of stopper 21. These halves are pivoted at 124 and are normally held together by a curved spring 125, in order to support stopper 21. When the bottle ascends, the neck N forces its way between these halves 122, 123, which open against spring 125, and presses stopper 21 against a spring plunger 126, in die 22, whose lower surface is normally flush with the under side of plate 65. As the neck N ascends, plunger 126 recedes upward against its spring 127 until the parts reach the position shown in Fig. 9, where the stopper 21 has partially entered the recess left by the ascending plunger 126, and is positioned upon the neck N for the final stage, shown in Fig. 10. Wire 51 is originally formed as an incomplete ring of a diameter too great to enter the plunger recess. When the cap in which this ring is inclosed is pushed upward into this die-recess the tendency is to force the ring downward and to form it into a ring of smaller diameter below the bead *b* on neck N; and the latter slightly compresses the cork 50 as shown in Fig. 10. The use of the yielding spring plunger 126 is twofold:—first it affords pressure on the top surface of stopper 21, sustaining it during the forming of wire 51 around bead *b*, thus compelling a close fit of the cork wafer upon the bottle top; and, second, it expels the corked bottle and overcomes the grip of the distended halves 122, 123 upon the corked bottle.

Special attention is directed to the slot 69. By making this slot narrow and a reasonably close fit for the stem of a handle 52, the stopper is led forward by the engagement of its handle in this slot, rather than pushed by the walls of recess 68 in which the body of the cap lies. This maintains the proper position of handle 52 with reference to head 70; prevents the arm 71 from closing upon handle 52 and clamping it, which might happen if said handle was angularly displaced a little from its intended position; and in general assures a uniform and free passage of caps to the bottle without their becoming jammed on the way.

In the claims the bottle sealing mechanism is referred to as "stationary," meaning by this that it does not move about laterally, but stands and operates in one position, although of course it is not utterly devoid of motion in said position, and its parts perform their motions of compression etc. with respect to each other hereinbefore described. In this respect the distinction is made between this apparatus and machines which have heretofore been proposed in which the compressing mechanism as a whole moves about the machine.

I claim:

1. Feeding mechanism, comprising the combination of a reservoir for stoppers with two rotatable barriers arranged upon opposite sides of the discharge passage leading therefrom and having superficial recesses adapted to admit a single stopper and by

rotation convey it through between them, said rotation being in the direction in which the stopper is conveyed.

2. Feeding mechanism, comprising the combination of a reservoir for stoppers; two rotatable barriers set under the discharge thereof, having recesses adapted to admit a single stopper; and means to oscillate the barriers on their axes, moving the recesses across the medial line between the axes.

3. The combination of vertically acting means for compressing together a bottle and a stopper, with an intervening horizontally moving carrier for stoppers bringing stoppers successively into position in the line of action of said compressing means, said carrier having a multiplicity of stopper-holders moving successively into said position.

4. The combination of a stationary bottle stand and a sealing head vertically over it and means to press these two together, with a disk pivoted on a vertical axis and having a circle of perforations each adapted individually to receive a stopper, said disk projecting between the bottle stand and sealing head with its circle of perforations intersecting the line of action thereof; and means to rotate the disk step by step, carrying the perforations successively into said line of action of the pressing means.

5. The combination, with bottle closing mechanism, of a carrier disk having recesses for stoppers, and narrow openings therefrom to the exterior allowing a handle on the stopper to project from the disk in the plane thereof.

6. The combination, with bottle closing mechanism, of a carrier disk having perforations for stoppers, and a stationary support thereunder for the stoppers; there being a narrow opening from each perforation to the exterior, forming a lug for dragging stoppers on said support to said mechanism.

7. The combination, with stationary bottle closing mechanism and a carrier conveying stoppers successively thereto, and having pockets of capacity for one stopper at a time; of a reservoir for stoppers, and means separating the reservoir from the carrier and feeding stoppers therefrom to the carrier one at a time.

8. The combination, with stationary bottle closing mechanism, of a rotary plate having a succession of stopper carrier perforations, and means to bring the perforations successively into register with said mechanism; there being access for stoppers to the perforations on one side of said plate and final delivery of stoppers therefrom on the opposite side, the stoppers thus passing through said plate.

9. The combination with stationary bottle closing mechanism, a rotary disk pierced with a succession of perforations for conveying stoppers; and confining plates on each side of the disk, there being an opening through one plate for admission of stoppers, and an opening through the other plate for discharge thereof.

10. The combination of bottle closing mechanism with a stationary plate having an opening over the bottle stand, and a rotary plate above it, having pockets and peripheral slits suitable to receive handled stoppers and convey them along the surface of the under plate to the opening therein.

11. The combination of stationary bottle closing mechanism adapted to hold a bottle in vertical position; an adjacent supply reservoir of stoppers adapted to discharge downward; and a horizontally moving plate having stopper-holding recesses successively passing under the reservoir discharge and over the bottle stand, into the line of action of said mechanism, conveying stoppers thereto.

12. In combination with bottle closing mechanism, feed mechanism comprising a stationary plate having an opening above the bottle stand; an intermittently moving plate thereon, conveying stoppers thereon successively to said opening; spring-closed retaining ledges in said opening on the stationary plate, supporting the stopper therein and separable by the bottle.

13. In combination with bottle closing mechanism, a horizontal rotating feed plate having perforations for stoppers; a horizontal plate thereunder, supporting the stoppers, having an opening over the bottle stand and means normally sustaining a stopper therein, and a subsequent opening beyond the bottle stand affording free passage for stoppers.

14. The combination, with bottle closing mechanism, of feed mechanism for stoppers, comprising a stationary member and a carrier moving thereby having a succession of equally spaced pockets for stoppers; means to advance it intermittently; and a tapered spring bolt passing through the stationary member into the pockets, locking the same in register with the bottle closing mechanism, there being a lost motion connection to the intermittent feed withdrawing the bolt when the next advance commences.

15. Feed mechanism, comprising the combination of a rotary carrier disk, having a succession of bolt holes; an actuating pin adjacent, parallel to the holes and reciprocating in a straight line; there being a link pivoted thereon, a bolt on the link, fitting the holes, and a stationary plate adjacent, having a slot through which the bolt passes curved in the line of travel of said holes; whereby the rectilinear actuation of the pin effects curvilinear reciprocation of the bolt.

16. Feed mechanism, comprising a feed-

ing plate having a succession of latch holes; a pawl latching therein, said pawl being actuated successively in opposite directions and being also pivotally mounted on a block reciprocating harmoniously in ways; there being lost motion about the pivot between said pawl and block, whereby the initial movement when the pawl is actuated is a rotation about the pivot through the lost motion, followed by sliding on the ways, thus actuating the latch initially by the same drive motion which constitutes the feed.

17. The combination of a stationary bottle stand and a sealing head vertically over it and means to press these two together; a reservoir for bottle stoppers adjacent having a passage discharging therefrom vertically downward; a carrier for stoppers having means to receive stoppers individually from said discharge passage; means to guide the carrier horizontally, the carrier passing between said bottle stand and sealing head; said carrier having a multiplicity of stopper holders arranged and adapted to register with said reservoir and also with said pressing means; said pressing means comprising means to lift the bottle stand toward the sealing head, thereby, when a bottle is in place, lifting a stopper from the carrier into the sealing head; and means to move the carrier step by step intermittently in one direction, stopping intermittently with two of its pockets registering respectively with said reservoir and pressing means.

18. The combination, in bottle closing mechanism, of a stationary head for compressing a stopper upon a bottle; a carrier for stoppers horizontally entering the head; and a split ring close below the head, one portion thereof being pivoted on the machine, and there being a succession of cams upon the carrier swinging said ring member open and closed as each stopper carrying portion of the carrier enters under said head.

In testimony whereof I hereto affix my signature, in presence of two witnesses this 12th day of April, 1907.

GEORG M. C. NIELSEN.

Witnesses:
FREDERICK L. PERKINS,
EVERETT E. KENT.