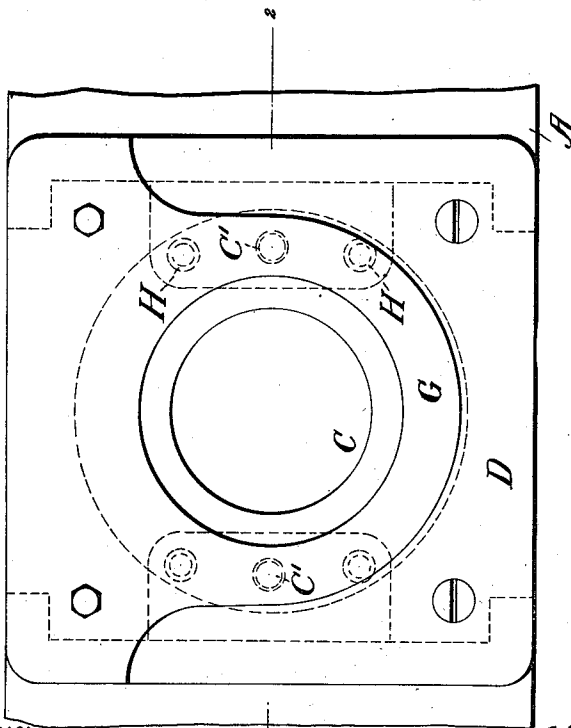


C. F. JENKINS.
 APPARATUS FOR MAKING AND INSERTING BOTTLE CAPS.
 APPLICATION FILED JUNE 19, 1908.

950,022.

Patented Feb. 22, 1910.

Fig. 1.



Witnesses
 Jos. H. Collins.
 R. Craig Greene

Fig. 2.

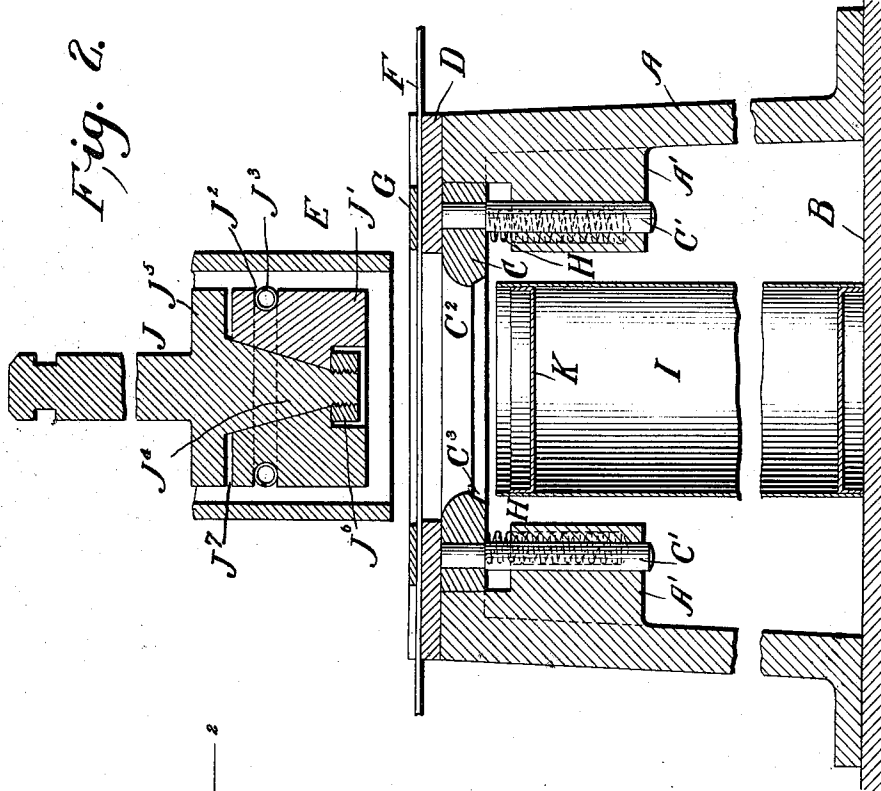
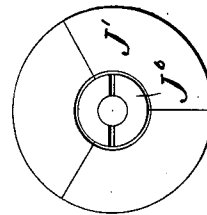


Fig. 3.



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APPARATUS FOR MAKING AND INSERTING BOTTLE-CAPS.

950,022.

Specification of Letters Patent.

Patented Feb. 22, 1910.

Application filed June 19, 1908. Serial No. 439,431.

To all whom it may concern:

Be it known that I, CHARLES FRANCIS JENKINS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Apparatus for Making and Inserting Bottle-Caps, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to forming from sheet stock and instantly inserting in bottles a closure of suitable form. Both the stock and the bottle to be closed are usually of paper, but other material may be used.

The principal object of the invention is to provide automatic means for rapidly providing receptacles which are capable of being readily crushed longitudinally, with closely fitting closures, and without danger of crushing such receptacles during the operation.

In the particular art for which this apparatus was especially devised, the closures are not of felt, or the like, but are of more nearly rigid or unyielding material, hereinafter designated as non-cushioning. Practically, unlike closures of felt or the like, closures of such material are at the instant of insertion radially non-yieldable, and are given such size and contour that they accurately fit the receptacles when properly inserted therein. In order that such a closure may be instantly inserted, as it is by high speed machines, without danger of crushing the receptacle, the mouth of the receptacle must be in perfect general registry with the closure, and its mouth must, in advance, assume accurately the contour of the closure lest the closure meet the end face of the receptacle wall and the receptacle be crushed. If the closure be circular and the receptacle wall be thin paper, for example, it is obvious that even relatively slight deviation of the receptacle mouth from circular form will cause crushing, and that a mere general alinement of receptacle and closure will not, therefore, suffice.

The apparatus involves a cutting die and a co-acting plunger, a forming die adapted to descend slightly and force the bottle mouth into exact form and position for receiving its closure, an automatically expanding and contracting forming plunger to co-act with the forming die, and a stripping de-

vice to prevent the stock sheet from following the return movement of the cutting plunger.

In the accompanying drawings, Figure 1 is a plan view of the lower portions of the novel part of the machine; Fig. 2 is a section on the line 2—2, Fig. 1; Fig. 3 is a bottom plan view of the forming plunger.

In these figures, A represents a suitable base or frame resting on a support B and provided with diametrically opposite in-which slides an annular forming die C provided with a central cylindrical opening in which slides an annular forming die C' provided with depending guide rods C' sliding in ways in the lugs A', respectively. Upon the top of the frame is fixed a cutting die D having a central opening concentric with the forming die opening but of materially greater diameter. With this cutting die co-acts a tubular reciprocating plunger E actuated at proper times by devices not shown. Over the die D is fed a stock strip F from which the die in descending cuts a disk, and as the die is retracted the stock is prevented from rising with it by a stripper plate G fixed just above the path of the strip and provided with an opening concentric with and slightly larger than the disk itself.

The forming die is normally held above the lugs A' and in contact with the die D by springs H, supported by the lugs, but under the strain of forming the disks the die descends and rests temporarily upon these lugs. The central opening in this die has the upper portion C² of its walls rounded outward, as usual, so that the marginal portion of the disk may be gradually forced inward, and in the lower side of the die is a conical recess C³ the inclined walls of which as the die descends center and force into exact form the upper end or mouth of bottles I, of paper or other flexible material, which rest upon the support B or other support which brings the mouth to the proper horizontal plane. The disks when cut to form are at once forced down by a reciprocating plunger J which co-acts with the die C to form the disks into cup-like closures K, each of which is pressed into one of the bottles, by the further descent of the plunger J after the closure is formed, the bottles being presented in succession at proper times by any suitable means. As shown, the die C overhangs and

protects the upper margin of the bottle wall and the lugs or stops A' arrest the descent of the die before this overhanging portion presses materially upon that margin, and thus no matter how suddenly the plunger advances and inserts the closure, the bottle receives no strain whatever other than that due to the frictional engagement of the closure with its internal surface; and hence bottles are never crushed. The overhanging portion is not concerned in pressing the bottle mouth accurately into the exact form of the closure, this portion together with the lugs A' constitute devices for effectually preventing the crushing of the bottle.

Although the parts are so proportioned that the closure fits closely in the bottle, it also fits the plunger very closely, and to avoid the possibility of its being withdrawn from the bottle with the plunger, the latter is caused to contract slightly as soon as it begins its ascent. To this end the plunger is formed with a cylindrical body J' provided with a circumferential recess J² and divided radially into segments which are yieldingly pressed together by an elastic band J³ of coiled wire or the like. This body is provided with an axial downwardly converging recess in which fits a conical projection J⁴ from the upper portion J⁵ of the plunger. The two parts of the plunger are prevented from separating by a nut J⁶ or the like, and the possible descent of the part J⁴ in its recess is no greater than the slight space J⁷ normally separating the parts J' and J⁵.

The plunger is normally in the condition shown in Fig. 2, the diameter of the part J' being slightly less than it should be while forming the disk. When in the descent of the plunger this part J' meets the die it is arrested, and its segments are instantly forced apart by the cone J⁴, and the next instant the whole plunger moves on together, forming the disk and forcing it into the bottle, but as soon as the ascent begins, the cone is withdrawn and the band J³ causes the body to again contract, thereby releasing the formed cap.

It being obvious that changes may be made in the devices described without passing beyond the proper limits of the invention, I desire and intend to cover the invention without limitations other than such as appear in the claims as they may be allowed.

What I claim is:

1. In an apparatus of the class described the combination of a support for a receptacle capable of being readily crushed longitudinally; of means for inserting in the mouth of said receptacle a closure of non-cushioning material, said inserting means and closure being of substantially the same size as said receptacle mouth and substantially non-yieldable radially during the insertion of the closure; and means for caus-

ing the mouth of said receptacle to assume accurately the shape of said closure in advance of the closure inserting operation, substantially as set forth.

2. In an apparatus of the class described the combination of a support for a receptacle capable of being readily crushed longitudinally; of closure inserting means; means for flanging the closure to be inserted and said inserting means and said closure being non-yieldable radially during the insertion; means for causing said receptacle to register with said inserting means; and means of substantially the same size as the receptacle mouth overlying and protecting the end edge of the receptacle wall from the thrust of said inserting means during the closure inserting operation, substantially as set forth.

3. The combination with a support for a paper receptacle capable of being readily crushed longitudinally, of closure cutting devices, a reciprocating closure forming and inserting plunger associated operatively therewith, in position to move toward and from the open end of a receptacle resting on said support and adapted to form with the closure which it carries a radially non-yieldable body of substantially the diameter of the receptacle mouth, and a movable forming and holding device co-acting with the plunger and provided with means for engaging every part of the external periphery of the receptacle's mouth and forcing the latter accurately to the path of a closure carried by the advancing plunger.

4. The combination with a support for a paper receptacle capable of being readily crushed longitudinally, of a reciprocating closure forming and inserting plunger in position to move directly toward and from the open end of a receptacle carried by said support and adapted to form with the closure a radially unyielding body of substantially the diameter of the receptacle's mouth, an independently movable device co-acting with and actuated by the plunger in the advance of the latter, and adapted to engage the exterior only of said end and press it on all sides accurately to the path of a closure carried by the advancing plunger, and springs yieldingly resisting the movement of said device by the plunger and restoring it to initial position when released.

5. In apparatus of the class described, the combination with a reciprocating forming plunger, of an annular forming die, in line with the plunger, mounted to move with the plunger, and adapted to engage and shape a flexible bottle end as it descends, means yieldingly resisting such movement, means for limiting the extent of such movement and means for placing a paper closure disk between said plunger and die.

6. The combination with a support for a

paper receptacle capable of being readily crushed longitudinally, of a closure forming die mounted above the place of a receptacle resting upon said support to move toward and from the latter and provided with an upwardly converging recess in its lower face to press against the entire outer periphery of the mouth of the receptacle and force it into circular form, and a co-acting forming and inserting plunger arranged to engage a closure disk and carry it through the die into such receptacle, and adapted to form with the closure, after passing the die, a radially non-yieldable body of substantially the diameter of the receptacle's mouth.

7. The combination with a rigid frame, of an annular cutting die fixed to the frame, a smaller forming die mounted in the frame, in registry with the cutting die, to move to and from the latter, springs resisting the movement from the cutting die, lugs limiting the movement allowed by the springs, and cutting and forming plungers co-acting with the cutting and forming dies, respectively.

8. The combination with a support for a receptacle, of a reciprocating forming and inserting plunger in position to insert a closure in a receptacle resting against said support, a co-acting annular forming die encircling the path of the plunger normally at some distance from the place of such receptacle and arranged to be carried to the receptacle by an intervening closure advanced by the plunger, and means for re-

storing the die to initial position when released.

9. The combination with a support for a paper receptacle, of an adjusting and forming device arranged for externally engaging the open end portion of said receptacle, means for lessening the distance between said support and forming device, to cause the latter to engage and shape the mouth of a flexible receptacle, a spring opposing such lessening, positive means for limiting such lessening to the height of the receptacle, and a reciprocating plunger arranged to move to some distance outside said receptacle and device, leaving a clear intermediate space for the lateral insertion of a closure, and to engage and force into the receptacle, on its return, an intervening closure.

10. The combination with a reciprocating closure inserting plunger, of an alining receptacle support, a receptacle adjusting device arranged for movement in the same direction as the plunger and provided with means for engaging externally as it advances, all parts of the mouth of a flexible receptacle resting against said support and pressing them into circular form, and positive means for arresting said device at the completion of such forming action.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES FRANCIS JENKINS.

Witnesses:

WALLACE GREENE,
S. M. BROSIUS.