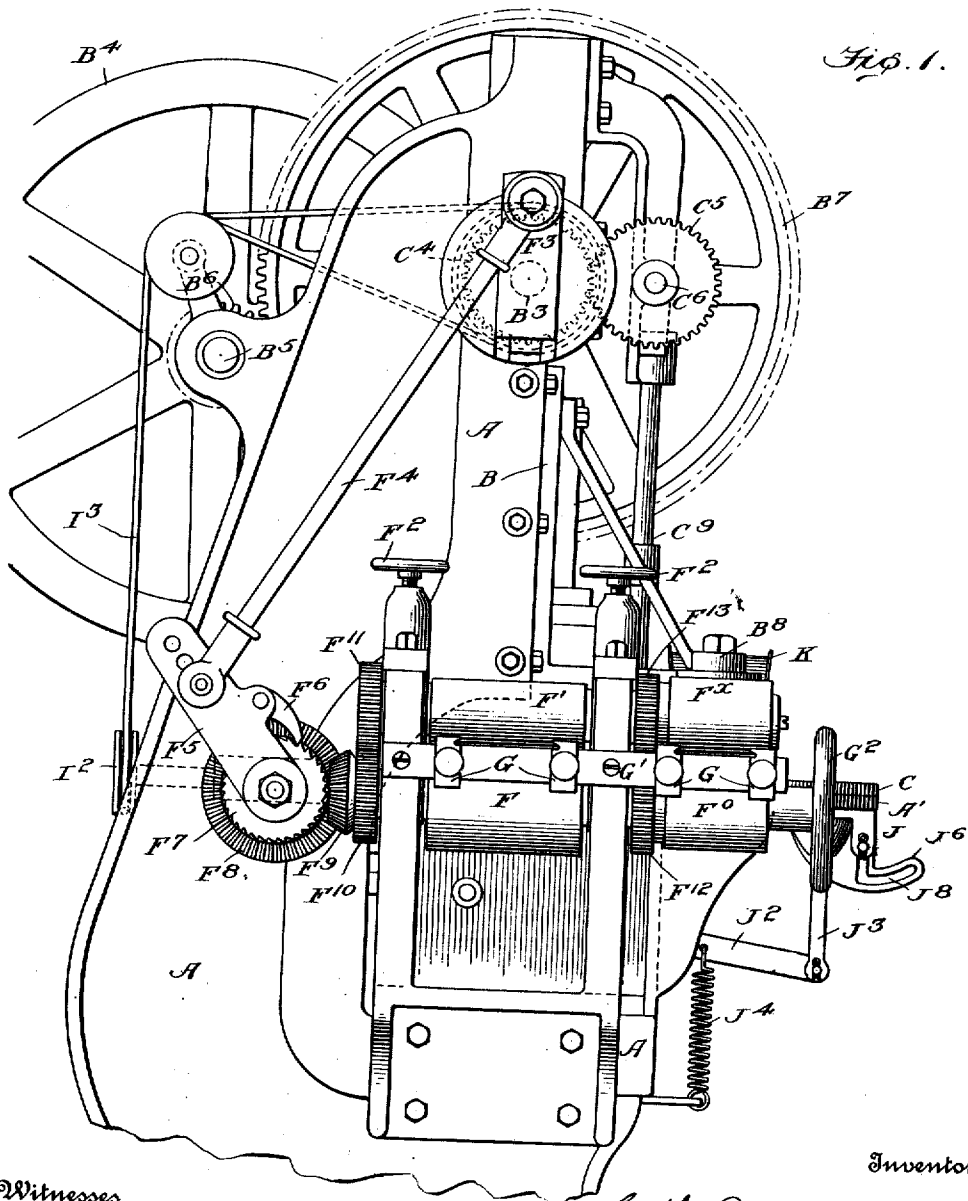


C. F. JENKINS.
CLOSURE MAKING MACHINE.
APPLICATION FILED MAR. 4, 1910.

1,017,549.

Patented Feb. 13, 1912.
5 SHEETS—SHEET 1.



Witnesses
Edwin L. Bradford
R. Craig Greene

Inventor
C. F. Jenkins
By Wallace & Co.,
Attorney.

C. F. JENKINS.
CLOSURE MAKING MACHINE.
APPLICATION FILED MAR. 4, 1910.

1,017,549.

Patented Feb. 13, 1912.

5 SHEETS—SHEET 2.

Fig. 2.

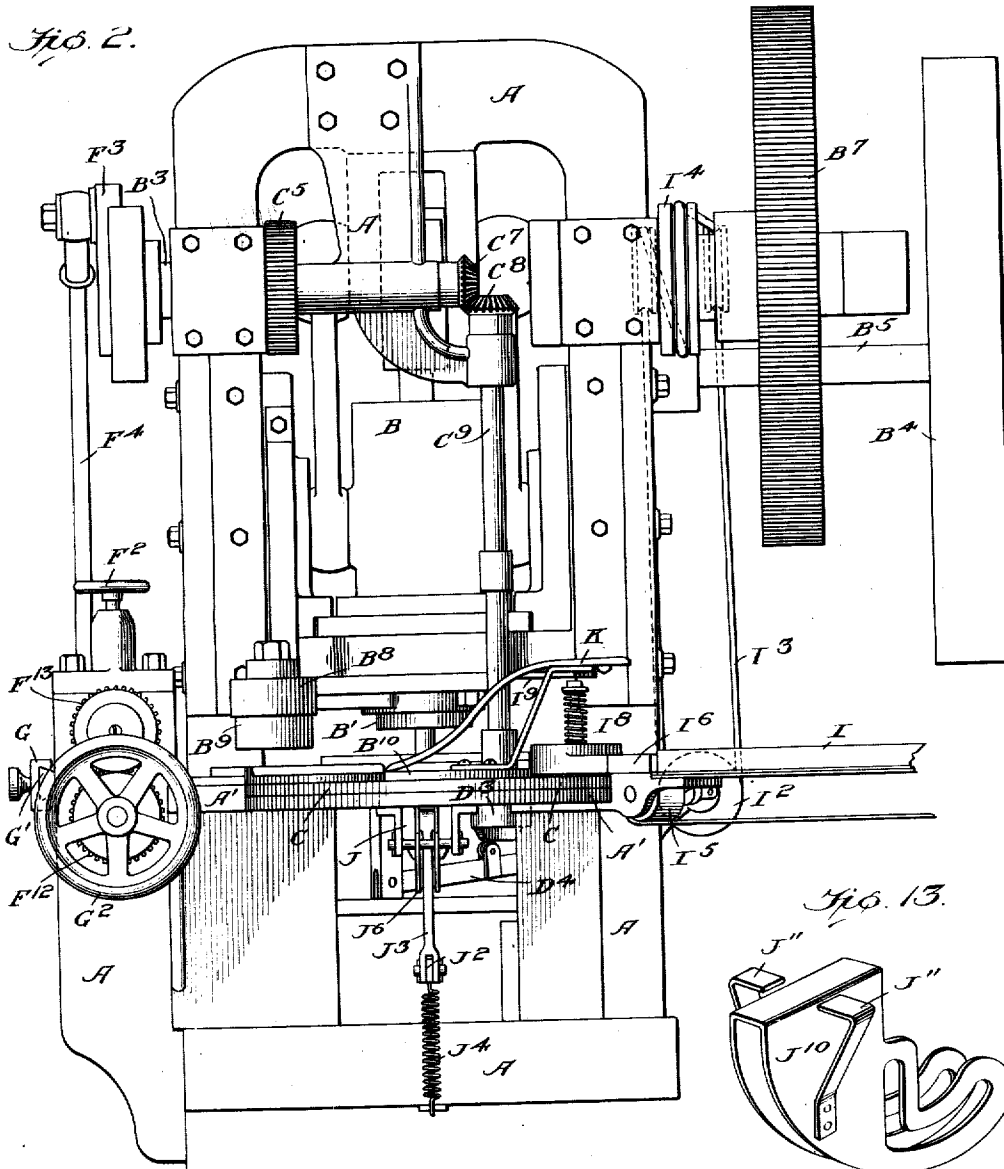
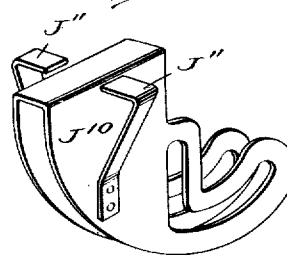


Fig. 13.



Inventor

C. F. Jenkins,

Witnesses

Edwin L. Bradford
R. Craig Greene

By

W. H. Hall, Jr.,

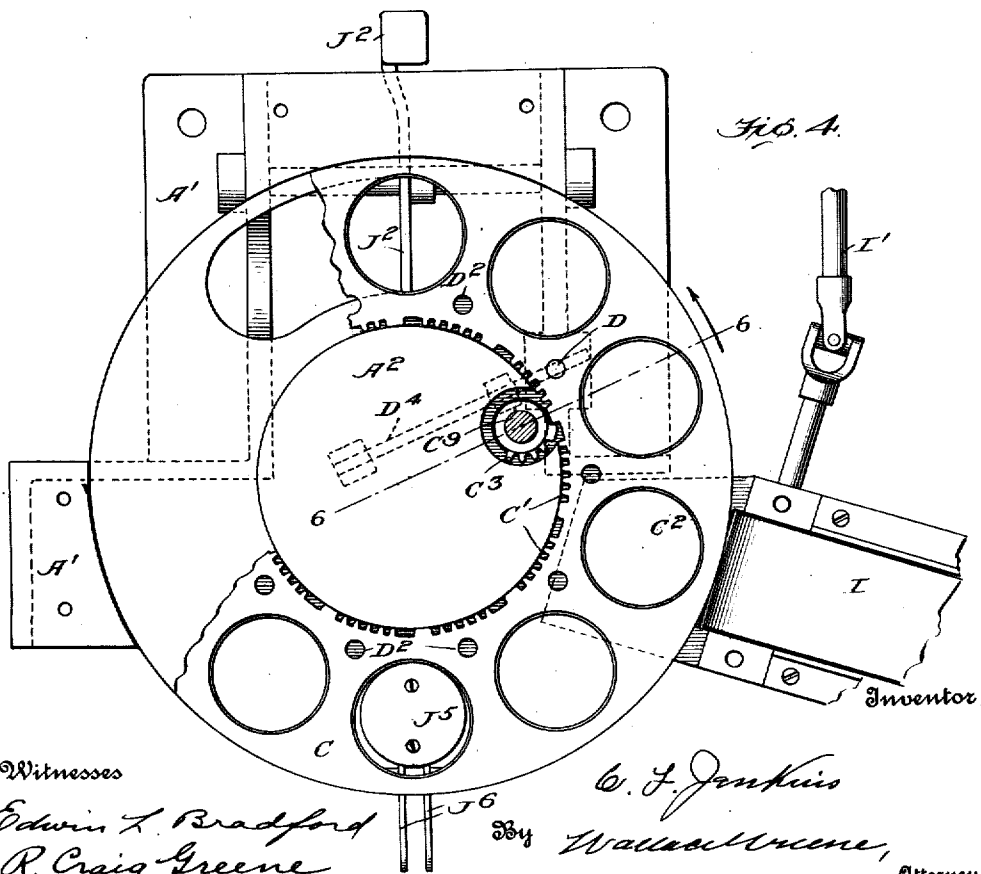
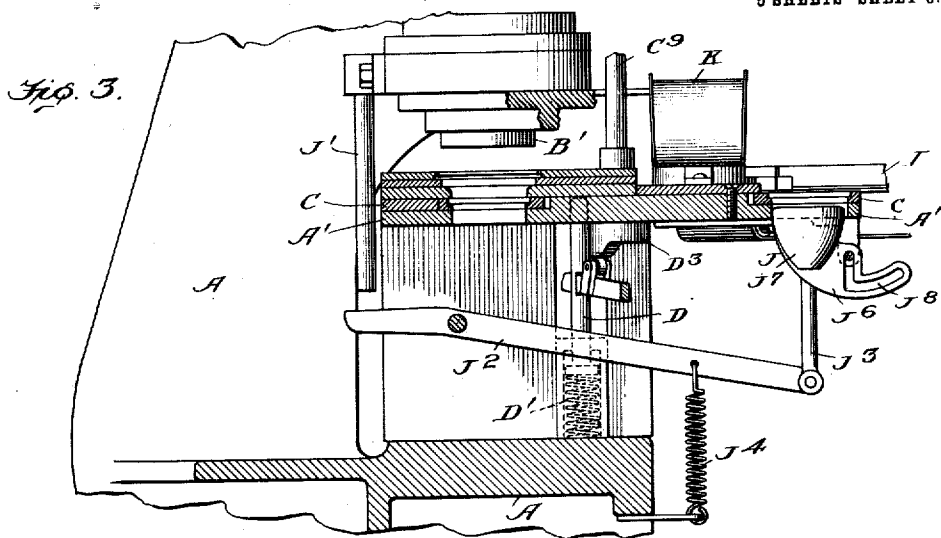
Attorney,

C. F. JENKINS.
CLOSURE MAKING MACHINE.
APPLICATION FILED MAR. 4, 1910.

1,017,549.

Patented Feb. 13, 1912.

5 SHEETS—SHEET 3.

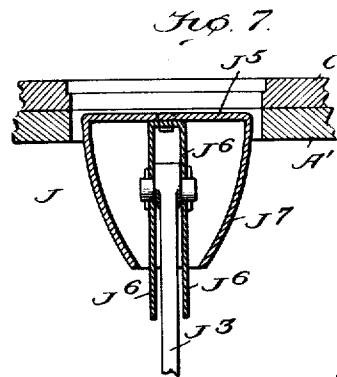
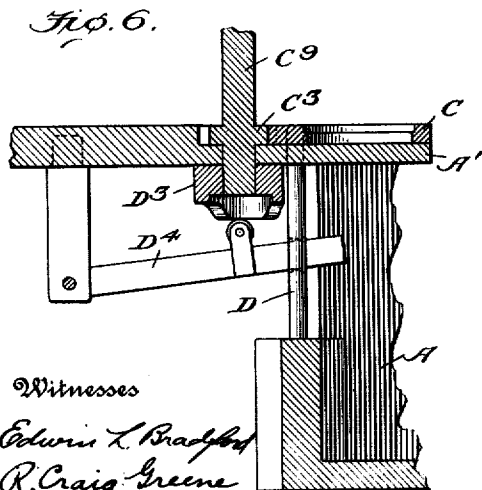
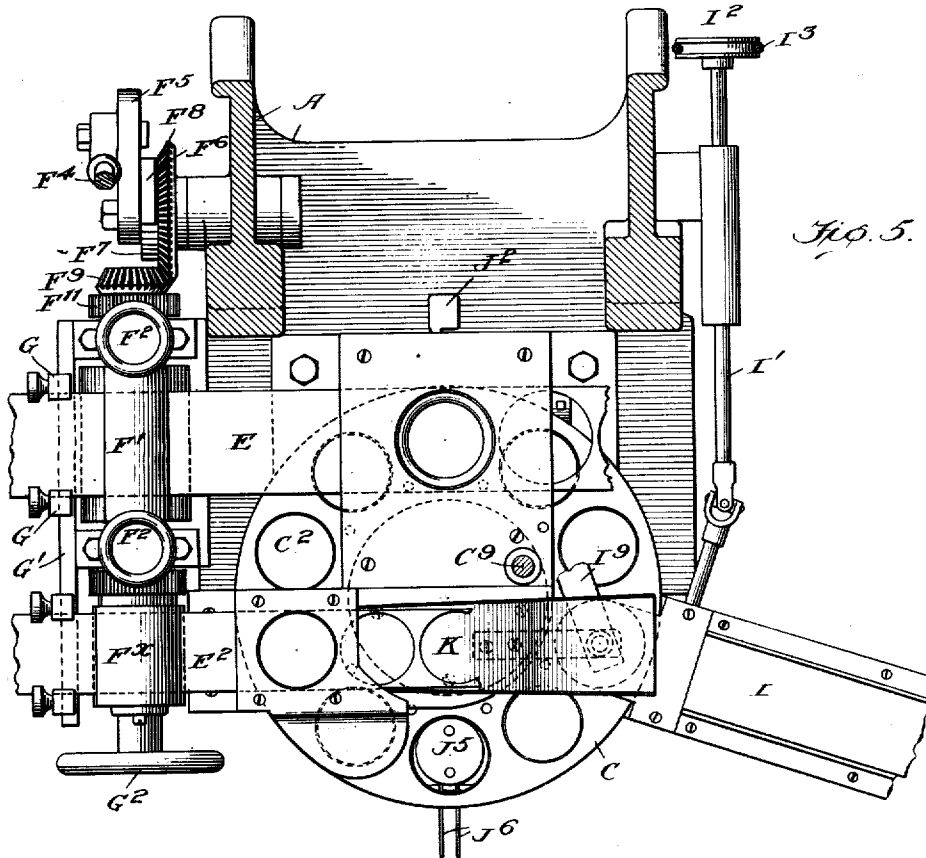


C. F. JENKINS.
CLOSURE MAKING MACHINE.
APPLICATION FILED MAR. 4, 1910.

1,017,549.

Patented Feb. 13, 1912.

6 SHEETS—SHEET 4.



Witnesses

Edwin L. Bradford
R. Craig Greene

Inventor

C. F. Jenkins,

By Wallace & Brown,

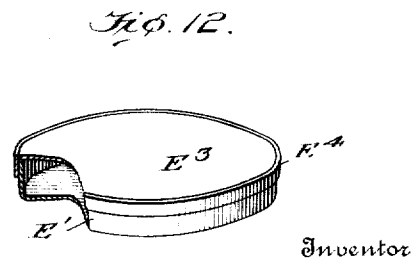
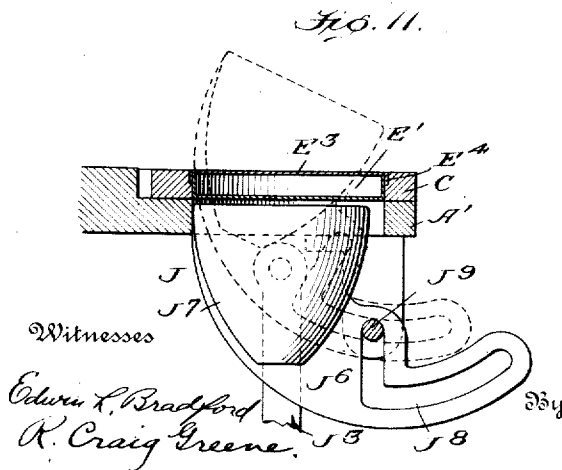
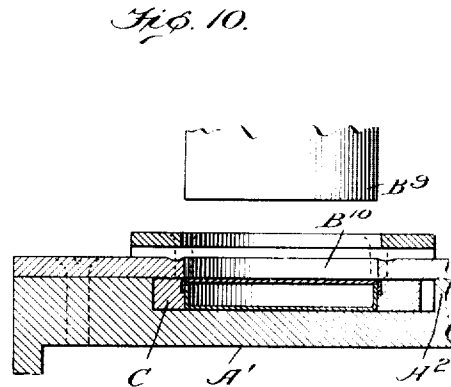
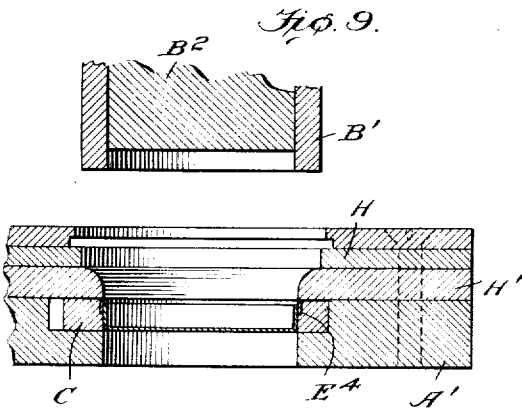
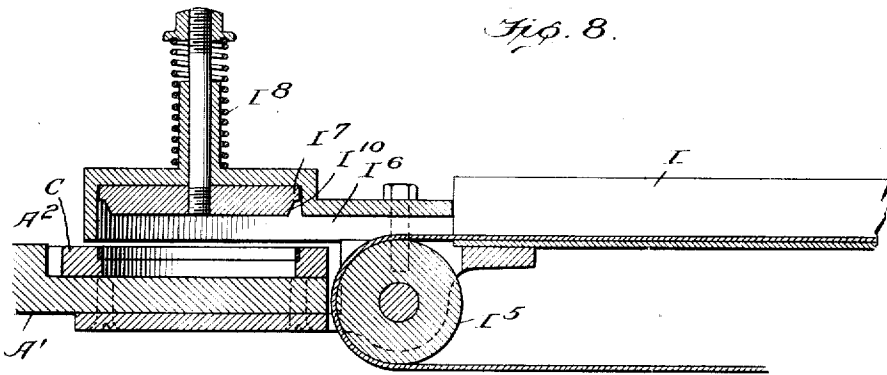
Attorney,

C. F. JENKINS.
CLOSURE MAKING MACHINE.
APPLICATION FILED MAR. 4, 1910.

1,017,549.

Patented Feb. 13, 1912.

5 SHEETS—SHEET 5.



W. F. Jenkins
Wallace Greene,
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES FRANCIS JENKINS, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO SINGLE SERVICE PACKAGE CORPORATION OF AMERICA, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CLOSURE-MAKING MACHINE.

1,017,549.

Specification of Letters Patent.

Patented Feb. 13, 1912.

Application filed March 4, 1910. Serial No. 547,377.

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 Closure-Making Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

For certain classes of receptacles it is desirable to have closures which are inserted, cork-like, with their projecting portion overlapping the wall of the receptacle mouth so far as to be laterally flush with the exterior of such wall so that a simple label may serve as a seal.

To provide an automatic machine for making such closures from thin sheet stock is the general object of this invention, and a further object is to form and deliver such closures rapidly and automatically with both ends so closed that there is no depression or recess in either end. With these objects in view, a ring in the form of a short tube is provided, a disk is pressed into cup-like form and pushed into such ring until its lower end projects beyond one end of the same while its margin lies below or within the plane of the opposite end, and finally to insert a disk to rest upon said margin and lie flush with the corresponding end of the tubular ring. When thus made, the closure appears as if made by placing upon a shallow cup a disk of equal diameter and pressing a relatively narrow tubular ring over both, to cover the joint. For automatically making such closures, the tubular rings are fed into suitable recesses in a plate rotating step by step, disks are cut from a stock strip, formed into cups and pushed into the rings during a rest period of the plate, other disks are cut from a stock strip and pushed into the ring against the margin of the cup during a subsequent period of rest, and finally the completed closures are ejected before the plate completes a full revolution.

In the accompanying drawings, Figure 1 is a side elevation of the main portion of the machine. Fig. 2 is an elevation looking from the right in Fig. 1. Fig. 3 is a view looking in the same direction as in Fig. 1, the rotary plate being shown in diametrical

vertical section and other parts being correspondingly cut. Fig. 4 is a plan view on a larger scale of a portion of the rotary plate, its support and some adjacent parts. Fig. 5 is a horizontal section, at a short distance above the rotary plate, showing the latter, stock feeding devices and ejecting mechanism. Fig. 6 is a fragmentary vertical section on the line 6—6 Fig. 4, showing certain plate-locking devices. Fig. 7 is a fragmentary section through a part of the ejecting devices, the plane of section being the same as in Fig. 3. Fig. 8 is a vertical section, radial with respect to the rotary plate, through certain ring-supplying devices. Fig. 9 is a like radial section showing the cup-forming and inserting devices. Fig. 10 is a similar section showing disk-forming and inserting means. Fig. 11 is a detail view showing the manner of ejecting the completed closures. Fig. 12 is a perspective view showing a completed closure with a small portion broken away. Fig. 13 shows a modified ejector-head, in perspective.

In these views A represents the frame of the machine and A' a horizontal bed-plate carried thereby. Above the bed-plate is a crosshead B sliding vertically in suitable ways in the upper part of the frame and carrying at its lower end a tubular cutting plunger B' within which works a differently moving forming or inserting plunger B², both head and plunger driven by a crank-shaft B³, itself actuated from a power pulley B⁴, by a shaft B⁵, pinion B⁶, and gear B⁷, engaged with the crank by means of a common friction clutch. The bed-plate is recessed to form a central circular boss A² and, around it, a way in which fits an annular plate C provided with gear teeth C' on its inner margin and with a series of equally spaced circular openings C². The plate is rotated step by step, to bring the openings in succession to precisely the same points, by means of a mutilated gear C³ lying in a recess in said boss and at proper times engaging the inner margin of the plate. The gear is rotated by the crank-shaft, gears C⁴, C⁵, shaft C⁶, bevel gears C⁷, C⁸, and a vertical shaft C⁹ to which the mutilated pinion is fixed. The crosshead has a rigid attachment B⁸ which carries a

cutting and inserting plunger B², which, like the plunger B¹, always aline with one of the openings C² when the plate C is at rest. The plate, when at rest, is locked in exact position by means of a vertically sliding rod D urged upwardly from below by a spring D' into one or another of several apertures D² in the plate into which its rounded end enters. The rod is forced downward at proper times by a cam D³, on the lower end of the shaft C², acting against a roller on a pivoted arm D⁴ which passes through the rod, the releasing of the rod occurring an instant before each engagement of the mutilated gear. A strip E of stock for the closure-bodies or cups E' (Fig. 12) is intermittently fed beneath the plungers B¹, B² by means of rollers F, F', adjustable in distance apart by screws F² and driven at the same peripheral speed by means of a crank F³ of adjustable eccentricity carried by the shaft B³, a pitman F⁴, arm F⁵, pawl F⁶, ratchet F⁷, bevel gears F⁸, F⁹, and gears F¹⁰, F¹¹, upon the roller shafts. A second stock strip E² for forming closure tops E², Fig. 12, is also intermittently fed below the plunger B², but as these tops or disks are smaller, the strip is fed by shorter steps to avoid waste. This is accomplished, although the rollers are rotated by the same devices as the others, by making the lower roller F¹⁰ smaller than the lower roller of the other pair fixed to the same shaft, and arranging the upper roller F¹¹ to rotate about but not with the upper roller-shaft, and driving this loose roller from the lower shaft and at the same surface speed as its companion, by gears F¹², F¹³. The strips, in entering the rollers, are accurately guided laterally by blocks G adjustably fixed upon a rigid bar G', and the rollers are readily rotated in either direction, when the pawl is disengaged, by means of a hand wheel G² upon the lower shaft.

The closure-body strip being fed beneath the plungers B¹, B² and stopped, a disk is cut from it by the plunger B¹ and a coacting die H, Fig. 9, and this disk is at once pressed through a forming die H' and into one of the apertures in the rotary plate C, which already contains in its enlarged upper part a tubular ring E⁴ of the same internal diameter as the non-enlarged portion of the opening. The rings are inserted in the openings automatically, being brought into opposition singly by a belt conveyer I driven by a shaft I', pulley I², belt I³ and pulley I⁴ upon the crank-shaft. As shown in Fig. 8, one of the conveyer drums I⁵ lies close to the margin of the rotary plate and as the rings advance singly upon the belt and as each passes off the belt, it is gently advanced by the friction of its successor on the belt, into a guide I⁶ which allows it to advance only so far as to aline exactly with

one of the openings in the plate when the latter is locked as before described. When in such position the ring lies directly below an inserting plunger I' which is normally held above the plane of the rings by a spring I⁸ and is depressed at proper times by a spring arm I⁹, Fig. 2, carried by the cross-head. It has upon its lower face a conical boss I¹⁰ which presses the ring, if distorted, into exactly circular form before it is met by the body of the plunger. The arm I⁹ is made elastic so that in case two rings should by any chance be superposed beneath the plunger no harm results.

After the cup-shaped closure-body has been inserted in the ring, the step by step rotation of the plate brings the whole to rest beneath the plunger B² which in descending coacts with a circular die B¹⁰ to cut from the strip E² a disk which it, by its further descent, presses into the ring against the margin of the closure-cup or body and leaves it flush with the ring's upper margin. The further rotation of the plate brings the completed closure to rest directly over an ejector-head J which normally lies below the plane of the plate in an opening in the bed-plate and is periodically actuated by the crosshead (Fig. 3) through the action of a rigid bar J' carried by the crosshead, a lever J² pivoted between its ends, and a link J³ pivotally connected both to one end of the lever and to the head J. The bar J', in descending, strikes one end of the lever and thus raises the opposite head-bearing end, and when the bar rises, a spring J⁴ restores the parts to initial position. The head, as appears from Figs. 7 and 11, consists of a normally horizontal plate J⁵, rigidly fixed to a diametrical U-shaped member J⁶ between the parts of which the link is pivoted, and provided with an inwardly curved skirting J⁷ which limits the possible rocking movement of the head. Each branch of the member J⁶ extends outward through a slot in the skirting and is itself provided with a slot J⁸ through which passes a rod J⁹ rigidly supported from the bed-plate. The form of these slots is such that they allow the head to rise vertically at first and compel it to swing outward upon its pivot during its further rise, as indicated in dotted lines in Fig. 11, whereby the completed closure is both lifted from the opening in the plate and thrown outside its margin. In some cases this head is replaced by the ejector shown in Fig. 13, where the top of the U-shaped member J¹⁰ and the in-turned ends of flat springs J¹¹ secured to the branches of that member, respectively, form a closure-lifting surface. This form avoids the probability of clogging by bits of stock or the like falling into the aperture in which the head works,—an accident which is ordinarily prevented by

an inclined curved plate K fixed in position to receive the "scrap" from the plunger and die and carry it over the ejecting devices.

5 The apparatus described is especially intended for making closures of paper and is in practical use for that purpose, but it may be used with other material, where conditions are always much less difficult than with pliable and readily crushed paper.

10 It being obvious that the construction shown may be varied in many particulars without passing the proper limits of my invention, I desire to claim my invention broadly as well as specifically.

15 What I claim is:

1. The combination with automatic means for feeding short tubular rings successively into a predetermined position, of automatic means for pressing a cup-like closure-body 20 into each, while in such position, until it lies below the plane of the ring's upper margin, and automatic means for also pressing into the ring against the margin of the closure body a disk covering the open end of said 25 body and filling the space between the planes of said margins, whereby a hollow closure having an annular external shoulder is formed.

2. The combination with a rotary plate 30 having a series of openings or recesses, of the diameter of a closure-body, each counterbored to receive a short tubular ring, of means for rotating said plate step by step, means for inserting such rings in said open- 35 ings successively during corresponding periods of rest, means for inserting a closure-body in the ring-containing openings respectively during subsequent periods of rest, and means for also inserting terminal disks

in said rings respectively during later periods of rest.

3. The combination with a plate provided with a series of openings adapted to receive cup-like closure-bodies and counterbored 45 to receive tubular rings having the same internal diameter as the openings, of means for rotating the plate step by step in its own plane, ring-inserting devices, closure-body inserting devices, and disk-inserting devices arranged at successive points along the path 50 of said openings in position to align with different openings when the plate is at rest, and automatic means for actuating all the inserting devices.

4. The combination with a plate provided 55 with suitable closure receiving openings and arranged to be rotated step by step to bring said openings successively to an ejecting point, of an ejector mechanism arranged to lift closures from said openings and then 60 tilt to throw all in the same direction.

5. In apparatus of the class described, the combination with a plate having an opening adapted to receive a closure-body and enlarged upon one face of the plate to receive 65 a short tubular ring having the same internal diameter as the non-enlarged portion of the opening, of means for inserting such a ring in the enlarged portion, and means for forcing a closure-body in the same direction 70 partially through said ring and into said non-enlarged portion.

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

CHARLES FRANCIS JENKINS.

Witnesses:

JAMES L. CRAWFORD,

R. CRAIG GREENE.