A. D. SMITH.

ART OF AND APPARATUS FOR PRODUCING CLOSURES FOR CONTAINING VESSELS.

APPLICATION FILED MAY 15, 1920.

1,420,875. Patented June 27, 1922.

2 SHEETS—SHEET 1.

FIG. I

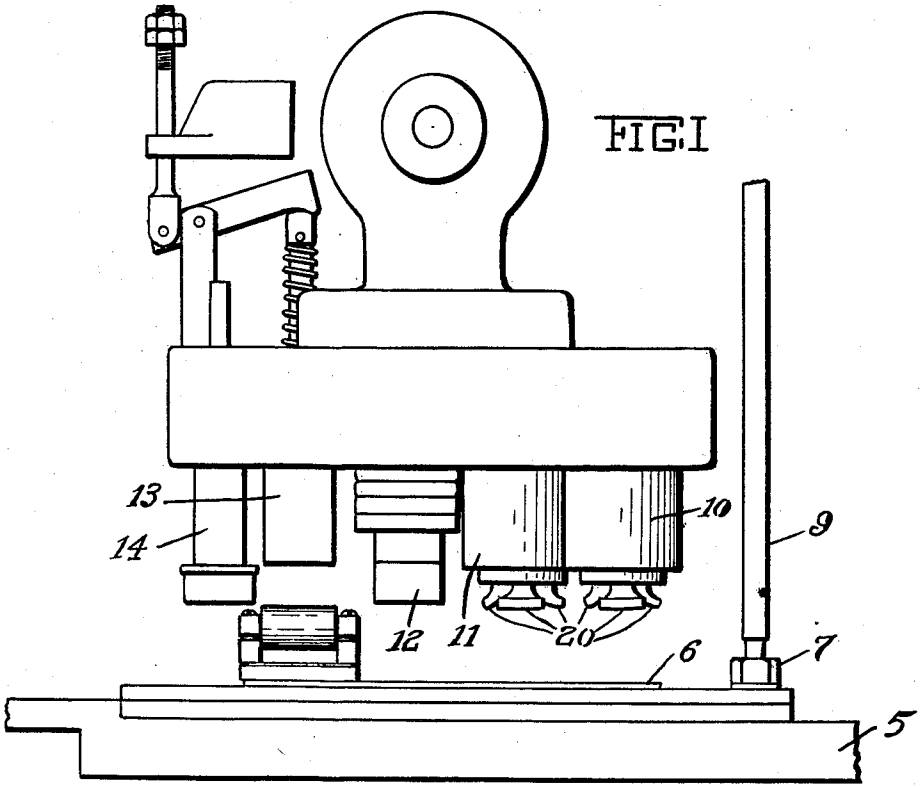
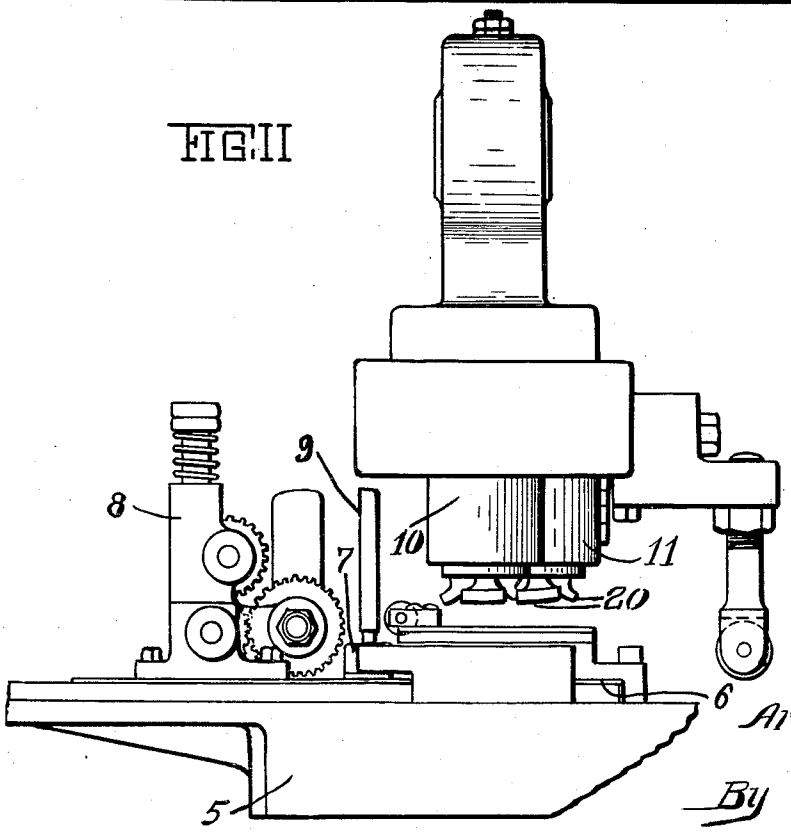


FIG. II



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2 SHEETS—SHEET 2.

FIG. III

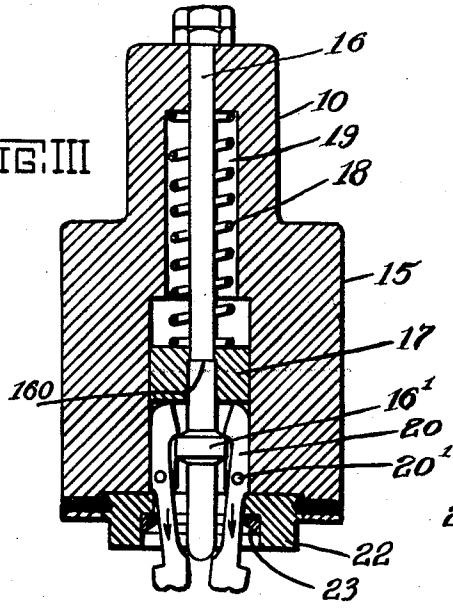


FIG. IV

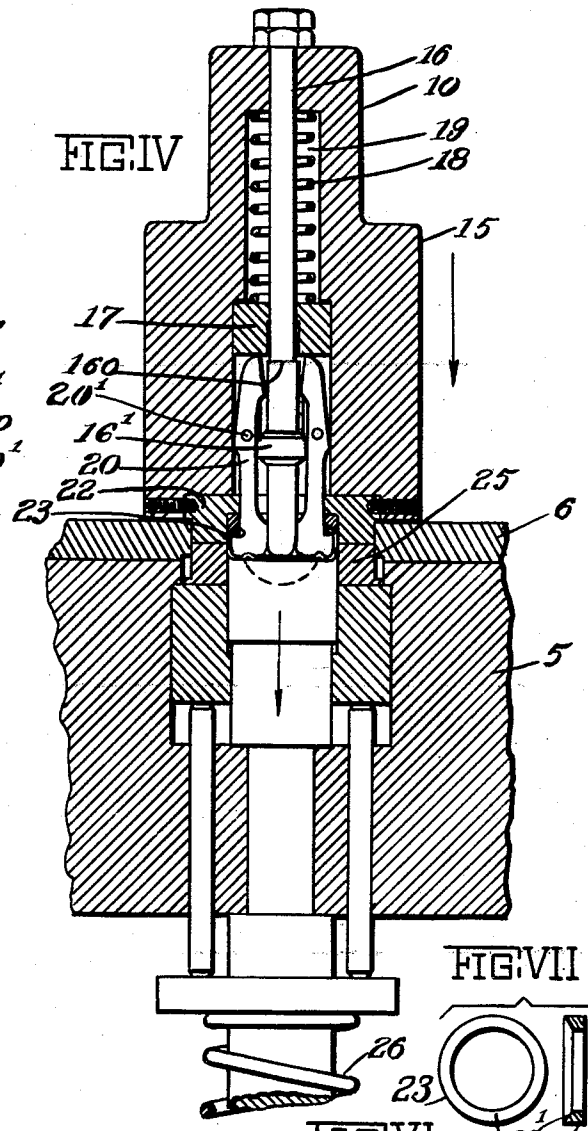


FIG. V

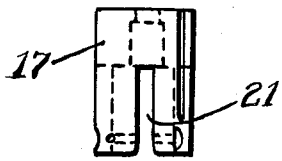


FIG. VIII

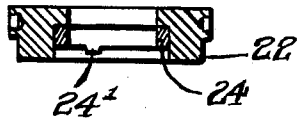


FIG. VII

FIG. IX

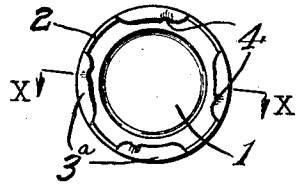


FIG. X

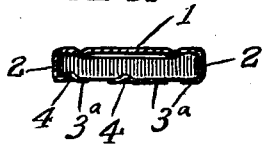


FIG. VI

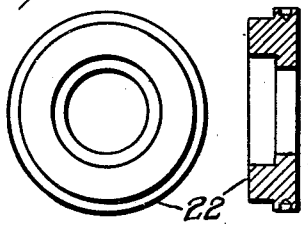
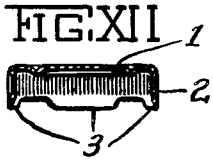


FIG. XI



FIG. XII



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UNITED STATES PATENT OFFICE.

ARTHUR D. SMITH, OF PORTLAND, MAINE, ASSIGNOR TO NATIONAL SEAL COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ART OF AND APPARATUS FOR PRODUCING CLOSURES FOR CONTAINING VESSELS.

1,420,875. Specification of Letters Patent. Patented June 27, 1922.

Application filed May 15, 1920. Serial No. 381,583.

To all whom it may concern:

Be it known that I, ARTHUR D. SMITH, a citizen of the United States, residing at Portland, county of Cumberland, State of Maine, have invented certain new and useful Improvements in Art of and Apparatus for Producing Closures for Containing Vessels, of which the following is a specification.

This invention relates to metal bending, and particularly to the production of metallic closures for containing vessels. As illustrative of the type of closure involved herein, reference is made to the patent to Rivers, No. 1,304,098, May 20, 1919.

Generally stated, the present invention contemplates an accurate and efficient automatic machine for producing seals of this particular type in commercial quantities. More specifically, my invention contemplates certain improvements in the bending mechanism for producing the inturned lug-engaging lips or flanges of the cap. These and various other features which will appear more fully hereinafter, are secured in the machine of the present invention, the construction and operation of which, together with a selected embodiment which well illustrates the principles involved, is described and shown in the following specification and drawings, throughout which like reference characters are correspondingly employed. In the drawings:

Figs. I and II are somewhat conventional elevations of a dial press of known type equipped with my invention.

Figs. III and IV are detail sections of a lip bending die, and showing the open and closed positions thereof.

Fig. V is a detail of the cage or holder in which the segmental bending jaws are mounted.

Fig. VI is a detail of the holder for the bending die.

Fig. VII is a detail of the first bending die for turning in the cap lips.

Fig. VIII is a detail of the second bending die for producing the indents or stops in the cap lips.

Figs. IX and X are details of the cap after the indented lips have been bent inwardly from the skirt thereof, Fig. X being a section on the line X—X of Fig. IX, and

Figs. XI and XII are details of the cap proior to bending inwardly the lips of the cap skirt.

The closure herein described and illustrated consists of a rotatable cap of sheet metal having a top portion 1 and a pendent annular skirt or rim 2 which is nurled to facilitate rotation of the cap. The skirt 2 terminates in a plurality of spaced inturned lip or finger areas 3, which when bent horizontally inwardly provide lips 3^a. The leading ends of the lips 3^a are adapted to engage with lugs spaced about the mouth of the container to draw the cap downwardly into sealing contact with the container mouth, and the following ends of said lips have indentations or stops 4 adapted to limit the rotation of the cap in its seating direction.

The present machine receives the caps after they have been blanked, drawn and nurled and first bends over the lip areas 3 radially inwardly from the skirt and then indents them as indicated at 4. After the lips are bent over and indented, the caps are embossed and sealing packs are inserted. These several operations, preferably in the sequence set forth, may be conveniently performed in a dial press of known type which I have conventionally illustrated in Figs. I and II. Referring to these Figures, the numeral 5 indicates a bolster plate of the press, 6 the dial, 7 the cap feed-way, 8 the cap feed mechanism, 9 the cap feed stem adjacent the discharge end of the feed-way for inserting the cap into an aligning socket or die of the dial, 10 the first bending plunger, 11 the second bending plunger, 12 the embossing plunger, 13 the pack plunger, and 14 the knock-out stem and operation-register for machine, all of said elements automatically operating in properly timed relation and sequence.

Referring now to Figs. III to VII inclusive, wherein one of the lip bending plungers and its die is detailed, it will be noted that the plunger consists of a casting or chuck indicated specifically by the numeral 15 in these figures, which is adapted to be reciprocated from a moving part of the press, as the crank shaft thereof, an axial stem 16 relatively stationarily mounted in said chuck, a cage or holder 17 socketed within said chuck for movement relative to said stem, a coiled spring 18 confined within a chamber or counterbore 19 of said chuck and active upon said holder 17, a plurality of symmetrically disposed segmental bending jaws 20 pivotally mount-

ed at 20^1 in vertical slots 21 in said holder, a die holding ring 22 inserted within the lower open end of said chuck 15, and a bending ring or die 23 inserted in said holding ring 22.

The construction and operation of the first and second bending plungers 10 and 11 is identical, except for a slight difference in the bending rings themselves. The under face of the first bending ring 23, detailed in Fig. VII is slightly beveled off. as indicated at 23^1; that of the second bending ring 24 detailed in Fig. VIII is horizontal, but is provided with a plurality of indentations 24^1, corresponding to the number of lips 3 on the cap 1, and adapted to indent the cap lips to provide the stops 4 hereinabove described.

The plunger detailed in these figures is adapted to enter the sockets of the dial 6 as they are successively presented to it. Each socket includes an anvil 25 which is yieldingly mounted as indicated at 26.

The operation of the lip bending mechanism is as follows:—When the chuck 15 is in the raised position indicated in Fig. III, the outer ends of the segmental bending jaws 20 are substantially together so that the jaws are sufficiently contracted to enter the skirt opening of the cap. As the chuck descends and the jaws enter the seal they and their holder 17 are forced back over the stationary stem 16, compressing spring 18, and are opened or expanded in such travel by passage over a wedge-formed surface 16^1 on stem 16. The expanded jaws hold the cap skirt in shape while the lips 3 are being bent over them by the bending ring 23. On the upstroke of the chuck, the compression spring 18 forces the holder 17 back down over the stem 16, during which movement the surface 16^1 causes the lower ends of the jaws to again contract sufficiently to permit them to be withdrawn from under the ring 23 thereby freeing the cap.

As shown in Fig. IV, the anvil yields slightly on the downstroke of the press, and the spring 26 automatically returns it to position as the chuck starts back.

The stem 16 may be shouldered as indicated at 160 to limit the downward movement of the holder 17 for the jaws.

Various modifications in the form and construction of my device may obviously be resorted to if within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. The method of producing lips in the skirt of a cap or the like having portions of its perimeter extending as spaced lip areas, consisting in collapsing and inserting an expansible member within the cap skirt, in expanding said member radially against the cap skirt, in applying a bending ring to the free edges of said lip areas, and in moving said bending ring towards said expansible member to bend said lip areas inwardly.

2. The method of producing lips in the skirt of a cap or the like having portions of its perimeter extending as spaced lip areas, which consists in collapsing and inserting a plurality of expansible bending jaws within the cap skirt, then expanding same radially against the cap skirt, then applying a bending ring to the free edges of said lip areas, and finally moving said bending ring toward said jaws to bend the lip areas inwardly.

3. The method of producing lips in the skirt of a cap or the like having portions of its perimeter extending as spaced lip areas, consisting in collapsing and inserting a pivotally expansible anvil-functioning element internally of the cap skirt, in expanding said element radially against the cap skirt, and in moving a bending element towards said expanded anvil element to bend said lip areas thereover, and in collapsing said anvil element to permit withdrawal thereof from the cap skirt.

4. The method of producing lips in the skirt of a cap or the like having portions of its permimeter extending as spaced lip areas, consisting in collapsing a pivotally expansible anvil member to permit insertion thereof into the recess defined by the cap skirt, in expanding said member radially to engage the cap skirt, in applying a bending member to the free edges of the lip areas in opposition to said anvil, and in moving said bending member towards the anvil to bend the lip areas inwardly thereover.

5. In bending apparatus of the class described, a chuck having an axially disposed chamber, a relatively stationary stem in said chamber having a jaw expanding surface between its ends, a jaw holder slidable on said stem within said chamber, a spring coiled about said stem and active upon said holder, a pair of expansible bending jaws pivoted between their ends to said holder, and expanded and contracted by movement of the holder past said expanding surface of the stem, and a bending ring fast to said chuck externally of said jaws and cooperative therewith.

6. In bending apparatus of the class described, a chuck, a relatively stationary stem mounted thereon and having a jaw expanding surface between its ends, a jaw holder slidable relative to said stem, a spring active upon said holder, a pair of expansible bending jaws pivoted to said holder and expanded and contracted by movement of the holder past said expanding surface of the stem, and a bending element fast to said chuck and cooperative with said jaws.

7. In bending apparatus of the class described, a stationary stem having a jaw ex-

panding surface between its ends, a jaw holder slidable along said stem, a spring active upon said holder, a pair of expansible bending jaws pivoted between their ends to said holder and expanded and contracted by movement of the holder past said expanding surface of the stem, and a bending element cooperative with said jaws.

8. In bending apparatus of the class described, a stationary stem, a pair of bending jaws intermediately pivoted and slidably mounted along said stem, and means cooperative with said jaws radially to rock said jaws on their pivots in the movement thereof on said stem.

9. In bending apparatus of the class described, a stationary stem, a pair of bending jaws intermediately pivoted and slidably mounted along said stem, and a wedge surface on said stem cooperative with said jaws radially to rock said jaws on their pivots in the movement thereof on said stem.

10. In apparatus for bending the skirt of a cap or the like, a pair of intermediately pivoted bending elements capable of expanding to a maximum external diameter greater than the maximum internal diameter of the cap skirt, and means for rocking said elements on their pivots to reduce their effective diameter sufficiently to allow them to be inserted interiorly of the cap skirt.

11. In apparatus for bending the skirt of a cap or the like, an intermediately pivoted bending element capable of expanding to a maximum external diameter greater than the maximum internal diameter of the cap skirt, and means for rocking said element on its pivot to reduce its effective diameter sufficiently to allow it to be inserted interiorly of the cap skirt.

12. In a bending apparatus of the class described, a staionary stem having a jaw expanding surface between its ends, a jaw holder slidable on said stem, and a pair of bending jaws pivoted between their ends to said holder and expanded and contracted by sliding movement of the holder on said expanding surface of the stem.

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

ARTHUR D. SMITH.

Witnesses:
MARION F. WEISS,
GEORGE B. RAWLINGS.