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APPARATUS FOR BENDING CONTAINER FASTENER LUGS AND FOR PRINTING ON CONTAINERS

Filed Feb. 3, 1951 2 Sheets-Sheet 1

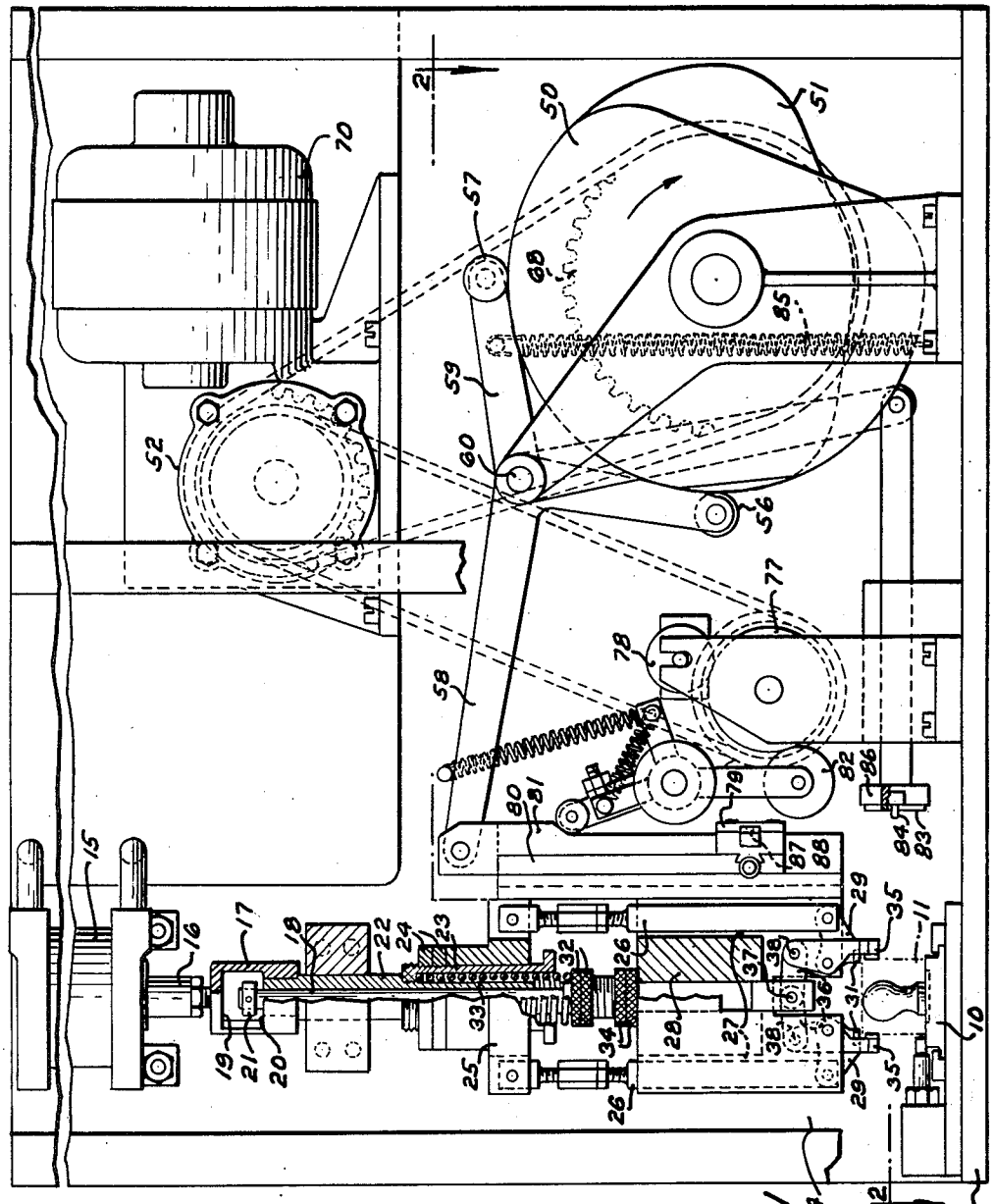


FIG. 1

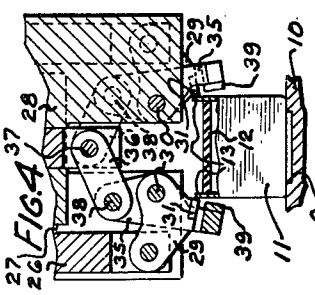


FIG. 4

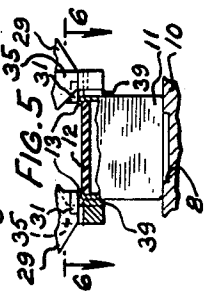


FIG. 5

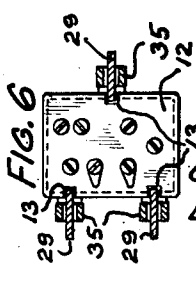


FIG. 6

INVENTORS
J. S. FRANKS
C. R. RASMUSSEN
BY E. F. Kane
ATTORNEY

Oct. 5, 1954 J. S. FRANKS ET AL 2,690,727

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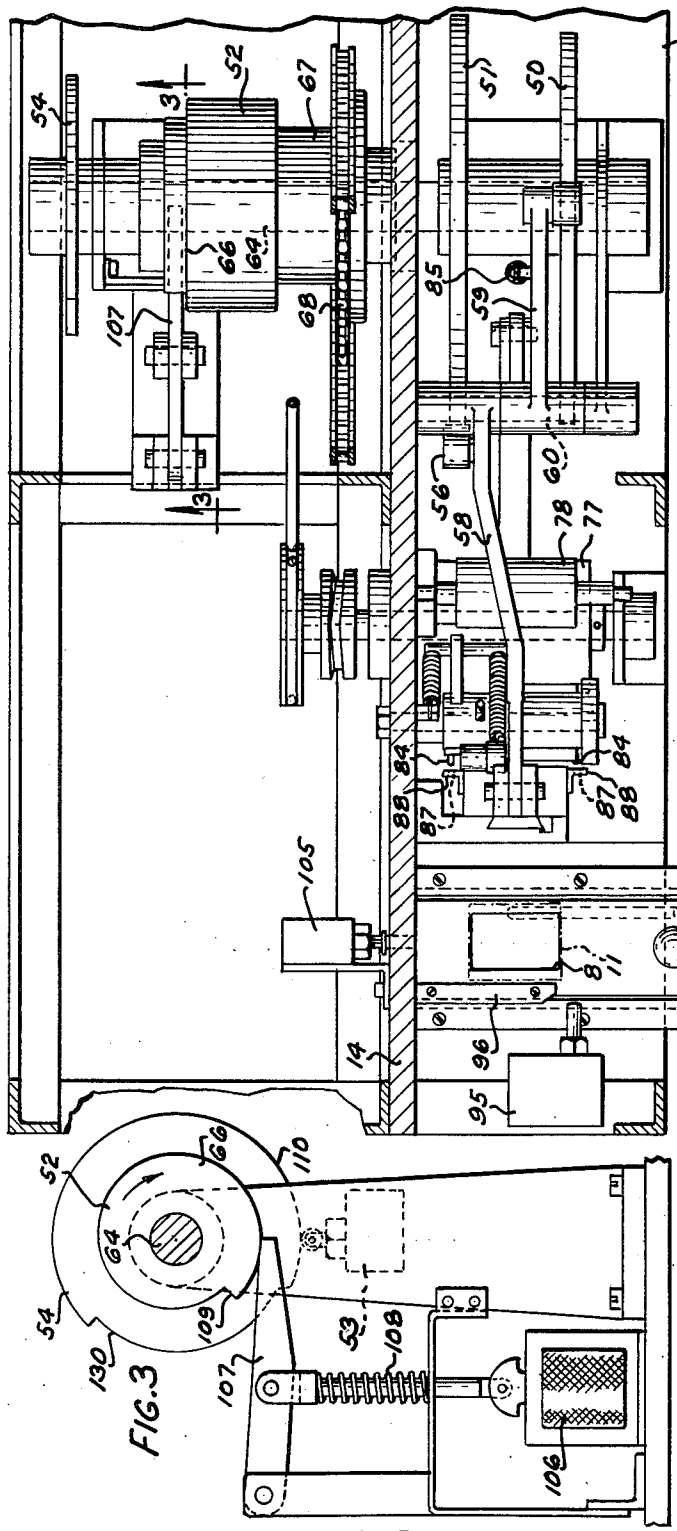


FIG. 2

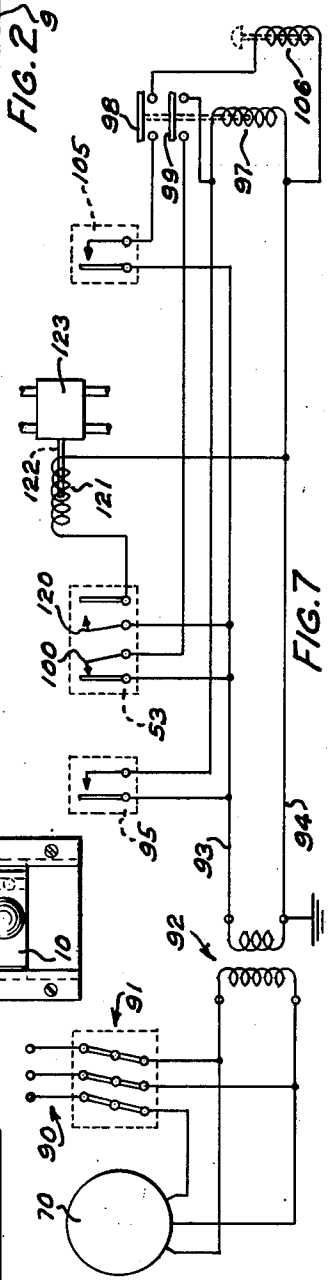


FIG. 7

FIG. 3

INVENTORS
J. S. FRANKS
C. R. RASMUSSEN
BY E. F. Kane
ATTORNEY

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APPARATUS FOR BENDING CONTAINER FASTENER LUGS AND FOR PRINTING ON CONTAINERS

Jerome S. Franks, Cicero, and Clarence R. Rasmussen, La Grange, Ill., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

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7 Claims. (Cl. 113—1)

1

This invention relates to an apparatus for closing containers, and has for an object thereof the provision of new and improved apparatus for closing containers.

A further object of the apparatus is to provide apparatus for bending lugs of containers to secure covers to the containers and printing data on the containers.

An apparatus illustrating certain features of the invention may include a support and opposed means for clamping a container in a predetermined position on the support. Means are provided for applying a cover to the container, and a printer prints data on a side of the container while it is held by the container-clamping means.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which

Fig. 1 is a fragmentary, partially sectional front elevation of an apparatus forming one embodiment of the invention;

Fig. 2 is a stepped, horizontal section taken along line 2—2 of Fig. 1;

Fig. 3 is a vertical section taken along line 3—3 of Fig. 2;

Fig. 4 is an enlarged, fragmentary, vertical section of a portion of the apparatus shown in Fig. 1;

Fig. 5 is an enlarged, fragmentary, vertical section similar to that shown in Fig. 4;

Fig. 6 is a horizontal section taken along line 6—6 of Fig. 5, and

Fig. 7 is a diagrammatic view of the circuit for controlling the apparatus shown in Fig. 1.

Referring now in detail to the drawings, there is shown therein a base 9, on which is mounted a horizontally slidable plate 10 having a socket 8 therein to receive a container 11, which is to be provided with a cover 12. The container 11 is provided with upwardly extending lugs 13 which are to be crimped over the cover by the machine. The crimping mechanism includes a frame member 14 which extends vertically from the base 9, and which carries an air cylinder 15, the function of which is to actuate the crimping mechanism. The air cylinder 15 actuates a double acting piston 16 secured adjustably to a sleeve 17 connecting the piston to a rod 18, which is vertically slidable in the sleeve 17 between abutments 19 and 20 of the sleeve as limited by a collar 21 fixed to the rod 18. The connecting sleeve 17 is connected at its lower end to a bushing 22, which is in turn connected to a counter-bored flanged

2

tube 23. The tube 23 is also provided with a plurality of adjustable collars 24—24, which are adapted to bear against the top of a spider 25 freely slidable on the tube 23, and contained between the collars 24—24 and the flange of the tube 23.

The spider 25 carries, for vertical movement therewith, adjustable push rods 26—26 freely movable within cylindrical slots 27—27 formed in a guide block 28 immovable with respect to the base 9. The lower ends of the rods 26—26 are connected pivotally to lug bending levers 29—29 pivotally mounted on pins 30—30 secured to the guide block 27, the levers 29—29 carry crimping dies 31—31, which are moved into positions to crimp the lugs 13—13 when the rods 26—26 are moved to their lowermost positions.

The container 11 is somewhat deformable in construction, and it is necessary to provide a clamping mechanism for firmly supporting the container at points just below the lugs during the crimping operation, and it is also necessary to firmly hold the container during the stamping operation. This clamping mechanism comprises the rod 18 which carries adjustable collars 32—32, which are continuously urged downwardly by a compression spring 33 nested between the bushing 22 and the counter-bored tube 23. The rod 18 is also provided with suitable collars 34—34 which are moved into engagement with the fixed guide 28 to limit downward movement of the rod 18 to prevent clamps 35—35 from exerting too much clamping force. The clamps 35—35 are bifurcated, and are mounted pivotally on the pins 30—30 in positions bracketing the levers 29—29. The lower end of the rod 18 is connected to one end of each of toggle joint links 36—36 by a pin 37. The other ends of the links 36—36 are connected by pins 38—38 to the clamps 35—35, the lower ends of which carry suitable hardened, clamping members 39—39, which are moved into clamping position when the lowermost collar 34 is moved downward to abut the fixed guide block 28.

Assuming that the elements are in clamping positions as shown in the drawing, the sleeve 17 has already been moved downwardly by the piston rod 16 out of engagement with the collar 21 at the top of the rod 18 to permit the spring 33 to move the rod 18 downward a sufficient amount to cause the lowermost collar 34 to abut the block 28. This movement of the rod 18 downward moves the pin 37 downwardly to swing the clamps 35—35 into engagement with the container 11. As the sleeve 17 continues its downward travel

carrying the bushing 22 and the tube 23 along with it, the spring 33 will continue to be compressed. However, no further clamping action will take place, since the lowermost collar 34 is stopped from further downward movement by the fixed guide block 28. In the condition of the machine shown on the drawing, the progress has reached this point, at which time the lowermost collar 34 contacts the spider 25, thereby causing the rods 26—26 to be driven downward, thus effecting the crimping or bending of the lugs 13—13. During the crimping, the clamps 35—35 support the container at points just below the lugs to prevent distortion of the supported portions of the container.

While the receptacle is still properly clamped, the printing operation is caused to be carried out. The printing equipment includes a pair of irregularly shaped cams 50 and 51, which are adapted to be rotated through one complete revolution by a one-revolution clutch 52. The clutch is in turn automatically actuated at the end of each crimping operation by a suitable limit switch 53 (Fig. 3) operable by a cam 54. The cams 50 and 51 are provided with cam rollers 56 and 57, respectively, the cam roller 56 being connected to a bell crank lever 58, and the cam roller 57 being connected to a bell crank lever 59, both of which are mounted pivotally on a pin 60. The clutch 52 includes a driven shaft 64 having a latching cam 66 secured thereto and a driving element 67, which may be driven continuously by a sprocket 68 driven by an electric motor 70.

The printing and inking apparatus comprises a continuously driven ink roller 77 provided with a distributing roll 78, which maintains the ink on the ink roller 77 evenly distributed. The printing is carried out by the offset process, and includes a die 79 carried by a vertically sliding block 80. The upper end of the block 80 is connected to the bell crank arm 58, and is provided with a camming surface 81, which causes a transfer roller 82 to be moved into the path of the die 79, thereby transferring ink from the ink roller 77 to the die 79 when the block 80 moves downward. When the die 79 reaches the bottom of its travel, it is in a position opposite a rubber pad 83, which is movable horizontally through the bell crank lever 59 into a position abutting the die 79. As this occurs, liner pins 84—84 mounted for movement with the die in positions bracketing the container 11 enter holes 87—87 in guide brackets 88—88 mounted on the die 79 to align the die and the pad. This operation deposits the ink from the die onto the face of the pad 82, which is then slightly retracted by a spring 85 to withdraw the pins 84—84 from the holes 87—87 after which the die 79 is returned to its upward position by action of the cam 50. The pad 83 is then driven to the left by the cam 51 into printing engagement with the container 11. The pad 83 is provided with a suitable notch 86, which allows the pad to pass around the righthand clamp 35, which would normally be in its path.

After the printing operation, the pad 83 is retracted by the spring 85 and the piston 16 is then driven upwardly. Upward motion of the piston 16 carries the connecting sleeve 17 upward until it contacts the collar 21, at which time, the rod 18 is carried upward, thus retracting the clamps 35—35 from the container. As the sleeve 17 continues upward, the lower flange on the sleeve 23 engages the lower side of the spider 25 to carry the rods 26—26 upward and moving the crimping dies 31—31 out of position to allow manual withdrawal of the container 11 by the plate 10 and insertion of the next container.

A control circuit (Fig. 7) of the apparatus includes a three-phase powerline 90 leading to the motor 70 and having a manually operable toggle switch 91 therein. A transformer 92 supplies power to conductors 93 and 94. When a normally open loading limit switch 95 is closed by a cam 96 carried with the plate 10, which is the case whenever the plate 10 is in its retracted position and not in its operating position holding the container 11 in proper position for operations thereon, a relay winding 97 is energized to close a contact 98 and a holding contact 99. When the plate 10 is moved to its operating position, the cam 96 is moved out of engagement with the switch 95 to open the switch 95. However, the winding 97 remains energized through a normally closed contact 100 of the limit switch 53 in parallel with the switch 95.

As the plate 10 reaches its operating position, it engages and closes a normally open operating limit switch 105. This energizes a solenoid winding 106, which pulls a latch 107 (Fig. 3) against a spring 108 out of engagement with a notch 109 in the latching cam 66 to start the one-revolution clutch 52. The latching cam is rotated clockwise to move the notch 109 past the latch, and then a lobe 110 of the cam 54, which is rotated with the latching cam 66, engages the switch 53 to open the contact 100 (Fig. 7) and close a normally open contact 120 thereof. Opening of the contact 100 deenergizes the relay winding 97 to open contacts 98 and 99, thereby deenergizing the solenoid winding 106. Closing the contact 120 energizes a solenoid winding 121 to pull an armature 122 away from its normal, spring pressed position to actuate a four-way valve 123 to supply air under pressure to the upper end of the cylinder 15 and exhaust air from the lower end thereof. When the cam 54 is rotated to a position in which the lobe 110 moves out of engagement with the limit switch 53 and a dwell 130 engages the limit switch 53, the contact 100 is closed and the contact 120 is opened to deenergize the solenoid winding 121. The armature then is urged by spring pressure to a position actuating the valve 123 to exhaust the upper end of the cylinder 15 and supply air under pressure to the lower end of the cylinder 15.

Operation

With the plate 10 in its retracted position, the container 11 with the cover 12 positioned thereon is placed in the socket 8 in the plate and the plate is slid from its retracted position to its loading position. This movement first opens the switch 95, which has previously been closed to lock in the relay winding 97, and then closes the switch 105 to energize the solenoid winding 106 to withdraw the latch 107 to actuate the one-revolution clutch 52 to rotate the cams 50, 51, 54 and 66. As soon as the cam 66 is past its latching position, the cam 54 actuates the switch 53 to open the contact 100 and close the contact 120. Opening contact 100 breaks the holding circuit of the relay winding 97 which drops out to deenergize the solenoid winding 106. This releases the latch 107 so that it will stop the cam 66 at the end of the one revolution of this cam.

Closing the contact 120 energizes the solenoid winding 121 to actuate the valve 123 to drive the piston 16 downwardly. The piston 16 first pushes the rod 18 through the spring 33 to a position in which the lowermost collar 34 engages the guide block 28, and, in so doing, the

clamps 35—35 are moved into clamping engagement with the container 10. Further downward movement of the piston 16 pivots the lug-bending levers 29—29 so as to bend the lugs 13—13 over the cover 12. The piston 16 then is at the end of its stroke and is held in this position.

As the container 10 is clamped and the lugs 13—13 are bent, the cam 51 moves the slide 80 downwardly and the cam 81 moves the inking roller 82 into engagement with the die 79 as it is moved therepast to a position in line with the rubber pad 83, and the cam 50 moves the pad into engagement with the die to receive inked characters therefrom. The cam 50 then causes the pad 83 to be withdrawn slightly away from the die 79 and the cam 51 causes the die 79 to be retracted out of the path of the pad 83. The cam 50 then moves the pad into engagement with the container 11 to print inked characters on the container, and causes the pad to be retracted.

The cam lobe 110 of the cam 54 then is moved out of engagement with the limit switch 53, and the contact 100 (Fig. 7) is closed and the contact 120 is opened to deenergize the solenoid winding 121, which actuates the valve 123 to retract the piston 16 (Figs. 1 and 4). The piston 16 moves the lug-bending levers 29—29 away from the container and then swings the clamps 35—35 away from the container 11. The plate 10 is moved manually from its operating position to its loading position, and sequentially opens the switch 105 and closes the switch 95 to lock in the relay winding 97. The container then is removed and the operation described hereinabove is repeated.

The above-described apparatus serves to firmly support and clamp the container 11 while the lugs 13—13 are bent, and the clamps 35—35 and the lug-bending levers 29—29 both hold the container while the rubber pad 83 prints the side thereof.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A combined fastening and printing machine, which comprises a stationary support, a ram movable toward and away from the support, means for moving the ram toward and away from the support, a slide mounted slidably on the support for sliding a container having lugs at the top thereof and a cap placed over the lugs to a position between the ram and the support, a pair of opposed jaws carried by the ram, means for moving the jaws to positions clamping the container on opposite sides thereof as the ram is moved toward the support, means carried by the ram for bending the lugs over the cap while the jaws are in gripping engagement with the container, a printer, and means operating in synchronism with movement of the ram for moving the printer into engagement with a side of the container while the jaws are clamping the container and the lug-bending means are in engagement with the container.

2. A combined fastening and printing machine, which comprises a stationary support, a ram reciprocable toward and away from the support, means for reciprocating the ram with respect to the support, a slide having a socket therein adapted to receive the bottom portion of a container having lugs at the top thereof and a cover placed over the lugs mounted slidably on the support for sliding the container to a position between the ram and the support, a pair of opposed jaws carried by the ram, means for moving the jaws to positions supporting the container on opposite sides thereof as the ram is moved toward the support, means carried by the ram for bending the lugs over the cap while the jaws are in supporting engagement with the container, a printer, and means operating in timed relationship with movement of the ram for moving the printer into engagement with a side of the container while the jaws are in engagement with the container.

3. A combined fastening and printing machine, which comprises a stationary support, clamping means movable toward and away from the support, means for moving the clamping means toward and away from the support, a slide having a socket therein adapted to receive the bottom portion of a container having lugs at the top thereof and a cap placed over the lugs mounted slidably on the support for sliding the container to a position between the clamping means and the support, means for actuating the clamping means to clamp and support the container on opposite sides thereof as the clamping means is moved toward the support, means carried by the ram for bending the lugs over the cap while the jaws are in supporting engagement with the container, a printer, and means operating in timed relationship with respect to the movement of the ram for moving the printer into engagement with a side of the container while the jaws are clamping the container.

4. A combined capping and printing machine, which comprises a support, a ram reciprocable toward and away from the support, means for reciprocating the ram with respect to the support, a feed slide for moving a rectangular container having lugs at the mouth thereof to a position on the support in line with the ram, a carrier mounted slidably on the ram, means urging the carrier toward the support, a jaw mounted pivotally on the carrier offset to one side thereof, a jaw mounted pivotally on the carrier offset to the side of the carrier opposite to the first-mentioned side thereof, lug-benders carried by the ram for bending the lugs over a cover on the carrier, means for stopping movement of the carrier and moving the jaws into clamping engagement with said sides of the container prior to engagement with said sides of the container prior to engagement of the lug-benders with the lugs, a printer movable to a printing position engaging the container and to a retracted position, means responsive to movement of the ram for moving the printer to and from said printing position while the jaws are clamping the container, and inking means movable in synchronism with the movement of the ram for inking the printer when the printer is not in its printing position.

5. A combined closing and marking machine, which comprises a pair of opposed clamps movable to and from clamping positions, a pair of lug-benders movable to and from lug-bending positions, lost-motion means for moving the clamps and the lug-benders sequentially to said clamping and lug-bending positions, fluid-pressure means for operating the lost-motion means, a carriage movable between a loading position and an operating position for locating a con-

tainer having lugs between the clamps, a printer, cam means for moving the printer into engagement with a container and retracting it, solenoid valve means for actuating the fluid pressure means, relay means for actuating the cam means, a limit switch operable by movement of the carriage to its loading position for actuating the relay means, a switch operable by the cam means for energizing the solenoid valve means to actuate the fluid-pressure means, and means for stopping the cam means.

6. A lug-bending apparatus, which comprises means for supporting a container having lugs projecting upwardly from the sides thereof, a guide mounted above the support, a pair of lug-bending levers mounted pivotally on the guide, a pair of clamping levers having bifurcated portions bracketing the lug-bending levers mounted pivotally on the guide, a rod slidable in the guide, a pair of links connecting the rod to the clamping levers, operating means mounted above the guide movable toward the guide, a pair of links connecting the lug-bending levers to the operating means, means connecting the rod to the operating means for limited movement toward and away from the operating means, means urging the rod away from the operating means, means for moving the operating means toward the guide to move sequentially the clamping levers into engagement with the container and the lug-bending levers into engagement with the lugs to bend them, and means for holding the rod against further movement with the operating means after the clamping levers have been moved into engagement with the container.

7. A combined closing and marking machine, which comprises means for clamping an article, means for deforming a clamped article, a carriage movable between a loading position and an operating position for locating an article in position to be clamped and deformed, fluid-pressure actuated means for operating the article-clamping means and the article-deforming means, a source of fluid under pressure, a valve for connecting the source to the fluid-pressure actuated means, a solenoid having a winding for actuating the valve, a printer, cam means for reciprocating the printer to and from an article in said position thereof, a single revolution clutch having a driven member connected to the cam means, a driving member and a latch, continuously driven means for rotating the driving clutch member continuously, a clutch solenoid having a winding for releasing the latch, a powerline for supplying power to said solenoid windings in parallel, a relay having a winding in series with the powerline and in parallel with the solenoid windings, a normally open holding contact and a normally open operating contact in series with the clutch solenoid winding, a loading limit switch in series with the relay winding closable by the carriage when the carriage is in its loading position and openable when the carriage is in its operating position, an operating limit switch in series with the holding contact closable by the carriage when the carriage is in its operating position and openable when the carriage is in its loading position, a third switch having a contact in series with the valve-actuating solenoid winding and a second contact in series with the holding contact and the operating limit switch, and a cam rotated with the driven clutch member for closing the first contact of the third limit switch and opening the second contact thereof shortly after the start of the revolution of the driven clutch member and for opening said first contact and closing said second contact near the end of the revolution of the driven clutch member.

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