

June 19, 1934.

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1,963,306

MACHINE FOR SEALING BAGS AND LIKE CONTAINERS

Filed Nov. 5, 1932

2 Sheets-Sheet 1

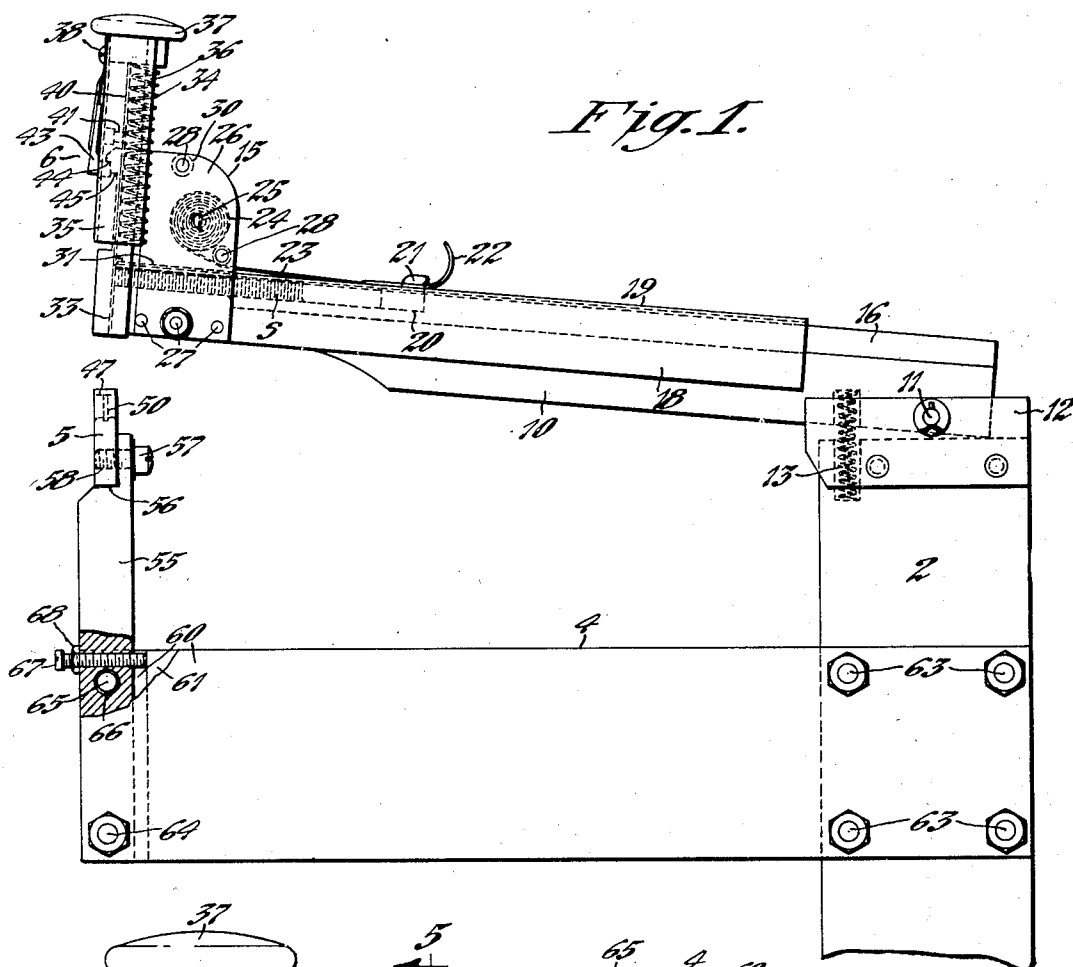


Fig. 1.

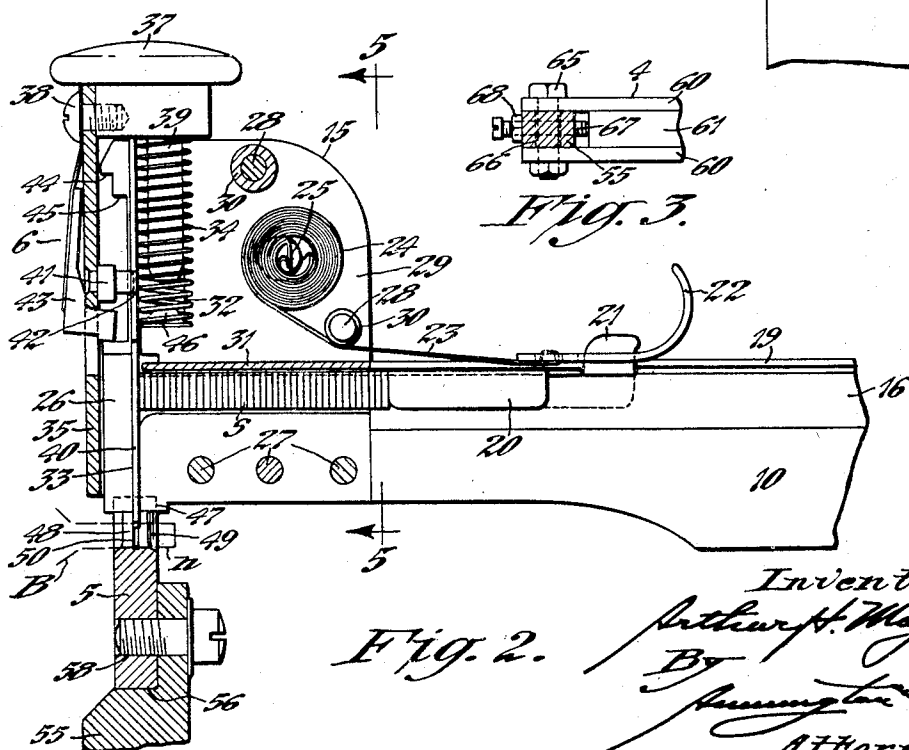


Fig. 2.

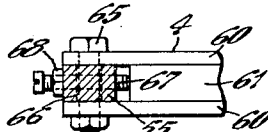


Fig. 3.

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2 Sheets-Sheet 2

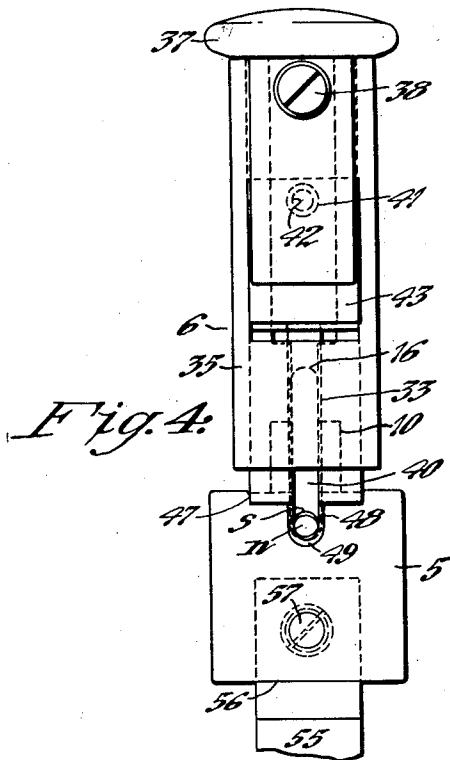


Fig. 4.

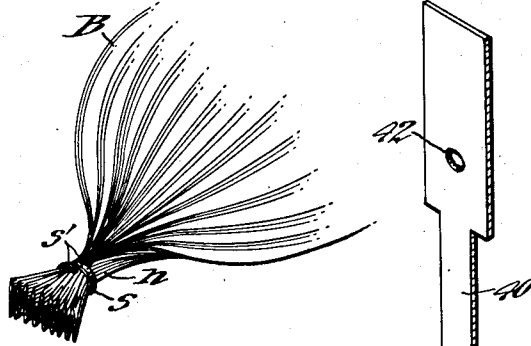


Fig. 9.

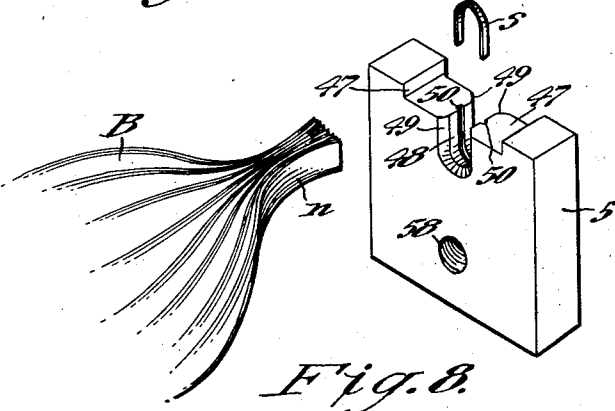


Fig. 8.

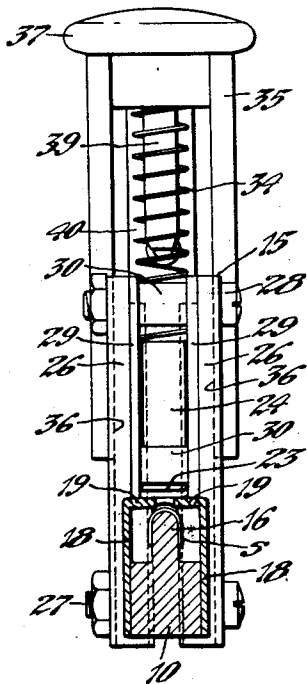


Fig. 5.

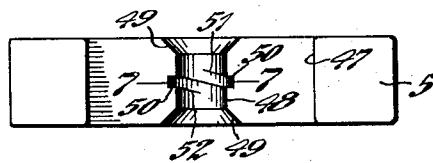


Fig. 6.

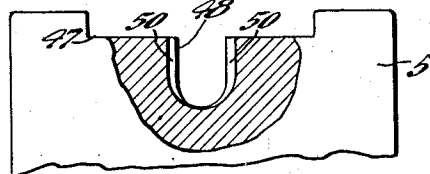


Fig. 7.

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UNITED STATES PATENT OFFICE

1,963,306

MACHINE FOR SEALING BAGS AND LIKE
CONTAINERS

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Application November 5, 1932, Serial No. 641,346

17 Claims. (Cl. 153—1)

This invention relates to stapling or wire stitching machines and consists particularly in a machine for sealing the gathered mouths of bags, envelopes and like containers of commodities by binding wire staples or like fastening means around the necks thereof.

One object of the invention is to provide a machine of the type specified for applying a wire staple or like fastening means to the contracted neck of the container and bending or clinching it therearound to effect a substantially air-tight seal.

Another object of the invention is to provide a machine of the type specified having means for holding the neck of the closed container, applying a wire staple thereto and clinching it therearound at a single operation.

Another object of the invention is to provide a machine of the type specified which may be operated either manually or by power to apply the wire fasteners to the neck of the containers and clinch them therearound at a rapid rate.

Another object of the invention is to provide a machine of the type specified which is automatic in operation, proof against derangement or getting out of order and efficient in use for the purpose specified.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the machine, by way of example, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a side view of the machine showing the parts in position ready for operation upon a bag or container;

Fig. 2 is an enlarged vertical sectional view of the stapling mechanism of the machine with the parts illustrated in position at the completion of a stapling operation;

Fig. 3 is a detailed plan view of the mounting for the clincher-anvil;

Fig. 4 is a front elevation of the forward end of the stapling mechanism showing the parts in position at the completion of a stapling operation;

Fig. 5 is a vertical sectional view through the stapling mechanism taken on line 5—5 of Fig. 2;

Fig. 6 is a plan view of the clincher-anvil of the stapling machine;

Fig. 7 is a side elevation of the same, part sectional, on the line 7—7 of Fig. 6;

Fig. 8 is a composite perspective view illustrating the clincher-anvil, the staple-driver and a staple in operative relation with respect thereto; and showing the closed neck of a bag or container before positioning it in the anvil; and

Fig. 9 is perspective view illustrating the closed mouth of a bag or container with the staple clinched around the neck thereof.

In accordance with modern methods of packaging foodstuffs, confectionery and other merchandise the goods are enclosed in wrappers or containers of wax paper or other transparent material such as the cellulose acetate product sold under the trade-mark "Cellophane". Conveniently, the wrappers or containers are manufactured in the form of flat tubular envelopes with either one or both ends left open and their surfaces are usually printed with indicia to show the origin of the goods contained therein.

In accordance with a common practice the tubular containers or envelopes are employed as sacks or bags and their mouths closed by gathering the sides together in folds. To seal the mouths of the bags a cord or string is tied around the closed necks thereof and heretofore this operation of sealing the containers has been performed manually. To economize in the labor and cost of packaging goods in the preferred manner described the present invention provides a machine into which the closed end or contracted mouth of the container may be inserted and a wire in the form of a staple applied therearound and clinched or set in place to form a substantially air-tight seal. The open ends or mouths of the bags or containers may be closed by manual manipulation or the sides of the mouths may be mechanically gathered and crimped in folds by means of the apparatus shown and described in my copending application, Serial No. 639,573, filed October 26, 1932. As illustrated in the application referred to, the bag-closing device may be embodied in a stapling or stitching machine to be operated concurrently with the stapling mechanism thereof, or it may be employed as a separate apparatus.

Referring to the accompanying drawings, the present invention is herein illustrated as embodied in a hand-operated stapling machine, but it is to be understood that the stapling mechanism thereof may be actuated from a foot-treadle, as shown in the application before referred to; or the machine may be driven under power through the means of an electric motor arranged as shown in United States Letters Patent No. 1,868,536, dated July 26, 1932.

As shown in Fig. 1 of the drawings the present form of stapling machine is mounted on a column or standard 2 rising from a suitable base, not shown, and supporting a horizontal arm 4 projecting at its top to provide a rest for the work. A clincher-block or anvil 5 is adjustably mounted at the forward end of the arm 4 in position to cooperate with stapling mechanism, indicated generally by the reference character 6, which is carried at the forward end of a rockable arm 10. The rearward end of the stapling arm 10 is pivoted on a pin 11 projecting through opposite plates 12 riveted to the sides of the standard or

column 2. A helical spring 13 pocketed in a recess in the top of the column 2 and extending into an opening in the bottom of the arm 10 tends to maintain the latter in elevated position with its rearward end resting against the top of the standard to limit the rocking motion of the arm.

The stapling mechanism is mounted in a head 15 carried at the forward end of the arm 10, which latter is constructed to provide a magazine for containing a supply of staples. As shown most clearly in Fig. 5, the stapling arm 10 comprises a main central bar formed with a relatively narrow, raised rib or fin 16 extending longitudinally of its upper side and rounded on the top to adapt it to support U-shaped staples *s* straddling the sides thereof. Welded or otherwise secured to the sides of the central bar of the arm 10 are longitudinally extending strips or plates 18 bent inwardly at the top to form flanges 19 which overlie the top of the staples *s* to prevent them from rising up off the rib 16 which serves as a guide-rail or core therefor.

The staples *s* are urged forwardly along the guide-rail or core 16 by means of a sliding pusher 20. The pusher 20 conforms to the shape of the staples to adapt its sides to straddle the core 16 and at its rearward end it has an upwardly projecting ear or lug 21 engaged through a slot in a curved finger-piece 22. Fastened to the forward end of the finger-piece 22 is a flat ribbon 23 of tempered metal wound into a volute coil at 24 to serve as a spring for impelling the staple-pushers 20 forwardly on the core 16. The spring-coil 24 is supported on an arbor 25 extending between the sides of the head or housing 15 for the stapling mechanism.

The stapling head 15 is formed by plates 26 bolted or otherwise fastened to the sides of the arm 10 at 27 and projecting upwardly thereabove with cross-pins or studs 28 extending therebetween. Abutting the inner faces of the side plates 26 are lining plates 29 held thereagainst by enlarged hubs 30 on the studs or pins 28. The lining plates 29 have opposite flanges 31, see Fig. 2, bent inwardly from their lower edges to overlie the staples on the forward end of the core or guide-rail 16 whereby to prevent them from riding upwardly at this point. The fore part of each lining plate 29 is cut away at 32 and tongues 46 projecting from the metal left at the bottom are bent inwardly to form a seat or rest for a helical spring 34 which acts to maintain the stapling plunger 35 in raised position as shown in Fig. 1 of the drawings. The plunger 35, which carries and actuates the staple-driver to be later described, is of hollow channel form arranged with its sides overlapping the side plates 26 of the stapling head 15 and provided with lateral tongues 36 fitted to slide in vertical grooves in said plates. Inserted into the top of the plunger 35 is a hand-rest or knob 37 secured in place by means of a screw 38, see Fig. 2. The upper end of the spring 34 bears against the under side of the knob 37 and is guided by a pin 39 projecting downwardly therefrom through the coils of the spring.

The staple-driver 40 consists of a flat hardened metal plate or blade as best illustrated in Fig. 8. The upper portion of the blade or driver 40 is wider than its lower portion and arranged with its edges fitted to slide in vertical slots or grooves 33 formed in the inner faces of the side plates 26. A stud or rivet 41 extends rearwardly from the forward wall of the plunger 35 with its end engaged through a hole 42 in the driver 40. The

upper edge of the driver 40 engages against the bottom of the knob 37 to take the thrust of the latter as the plunger is forced downwardly thereby on the stapling head. The lower narrower portion of the staple-driver 40 has its bottom edge of arcuate shape to conform to the curved tops or crossbars of the staples *s* and its side edges are beveled or inclined inwardly at this point.

The plunger 35 carries a spring-pressed pawl 43 on its forward side, the lower toe-like end of which projects through an opening in the wall of the plunger to adapt it to engage detent steps or shoulders 44 and 45 on the forward ends of the side plates 26. The pawl 43 is operated automatically to cause it to be retracted when the plunger reaches the limit of its descent whereby at the return stroke of the plunger the toe of the pawl will engage the shoulder 44 before mentioned. Should, however, the plunger not be carried down throughout its full stroke to complete the setting of the staple the pawl 43 will be held against retraction and, during the upward stroke of the plunger, be caused to engage the lower step or shoulder 45 to prevent the staple-driver 40 from being raised above the top of the staple-core to release another staple. The purpose and method of operation of this part of the machine are explained more fully in United States Letters Patent No. 1,780,530, dated November 4, 1930.

It will be understood from the foregoing that as the staples *s* are slid forwardly on the core 16 with the staple-driver 40 elevated, the foremost staple will be fed beneath the driver in position to be driven down through the grooves in which the latter slides as the plunger 35 is carried downwardly by manual pressure upon its knob 37. During the driving of the staple in the manner as above indicated the clincher-anvil or die 5 cooperates therewith to bend or clinch its legs around the neck of the bag. For this purpose the anvil-block or die 5 is constructed and arranged as next described.

Referring to Figs. 6, 7 and 8 of the drawings the clincher-anvil or forming die 5 consists in a plate or block having its top recessed at 47 to adapt the foot of the stapling head 15 to be received therein. Extending downwardly from the recessed face 47 is a notch or opening 48 of appropriate width to accommodate the folded and crimped neck *n* of a bag or container such as illustrated at B in Fig. 8. Preferably, the outer edges of the notch or opening 48 are rounded or beveled at 49 to remove sharp corners liable to cut or abrade the material of the bag or container when its neck is held therein. The bottom of the notch or opening 48 is curved or rounded as shown most clearly in Fig. 7 and the sides of the opening are scored with grooves 50 for receiving the legs of the staple *s* as the latter is driven downwardly thereinto by the driver 40. The grooves 50 are disposed directly opposite each other in the sides of the opening 48 but at the bottom of the opening the ends of the two grooves are offset or inclined helically away from each other at 51 and 52 as shown in Fig. 6. The purpose of this offsetting or lateral displacement of the ends of the grooves 50 is to cause the legs of the staple *s* to be offset laterally, one with respect to the other, as they are bent or clinched around the neck of the bag so that the ends of the wire will pass by and lie alongside each other as shown at *s'* in Fig. 9. Through this provision the staples may be clinched tightly around the neck or closed end of the bag to compress and bind its folds together to form an air-tight seal.

The clincher-anvil or die-block 5 is mounted

on a support or standard 55 rising from the end of the work-support or arm 4, see Fig. 1. The upper end of the standard 55 is recessed to provide a seat 56 for the bottom of the block 5 and a screw 57 passing through the support engages a threaded hole 58 in the anvil. To provide for setting the anvil to accurately aline its clincher-grooves 50 with the staple-driver 40 in the head 15 the support or standard 55 is adjustably mounted on the arm 4.

As shown in Figs. 1 and 3, the arm 4 is constructed of parallel spaced plates 60 abutting the sides of an intermediate strip or bar 61. The rearward ends of the plates 60 abut the sides of the column 2 and are bolted thereto at 63. The two side plates 60 project outwardly beyond the forward end of the bar or strip 61 and the support or standard 55 is mounted in the space therebetween. A bolt 64 passes through the sides of the plates 60 and a hole in the bottom of the standard 55 and a similar bolt 65 extends through the sides of the plates and an enlarged hole 66 in the standard. The standard 55 may thus be rocked to a slight extent on the axis of the lower bolt 64, due to the play between the sides of the enlarged hole 66 and the upper bolt 65, whereby to adjust the lateral position of the clincher-block 5. To provide for a minutely accurate setting of the clincher-block an adjusting screw 67 is threaded through the front of the standard 55 to engage against the forward end of the bar 61. The screw 67 carries a check-nut 68 for locking it in position after the proper adjustment has been secured; it being understood that the nuts on the bolts 64 and 65 are loosened during the adjustment of the screw 67 and afterward tightened to secure the standard 55 in fixed position. The construction and arrangement of the machine having now been described in detail its method of operation will next be explained.

Fig. 1 illustrates the machine with the stapling arm 10 raised and the stapling mechanism inactive. After the mouth of the bag or other like container B has been gathered in folds, as shown at the left in Fig. 8, the closing of the bag being performed either manually or in the apparatus described in my copending application hereinbefore referred to, its neck *n* is grasped between the fingers and inserted in the notch or opening 48 in the anvil-block 5 as indicated by the dash lines in Fig. 2. The sides of the notch 48 hold the folds of the neck tightly compressed and while the bag is steadied with one hand the operator presses down on the knob 37 of the plunger 35 with the other hand. The spring 13 which holds the arm 10 raised is of considerably less tension than the spring 34 for the plunger 35 and therefore as pressure is applied to the knob 37 the arm 10 will be swung downwardly until the foot of the stapling head 15 brings up against the recessed seat 47 in the top of the clincher-block or anvil 5; it being noted that the compressed neck of the bag does not project above this seat.

Continued pressure on the knob 37 will now cause the plunger 35 to be slid downwardly on the stapling head 15 to force the staple-driver 40 downwardly with its lower arcuate edge impinging against the top of the staple *s* which has been fed therebeneath. As the staple-driver 40 descends it carries the staple *s* downwardly through the grooves 33 in the sides of the head 15 and forces its legs into the grooves 50 in the sides of the notch 48 of the anvil 5. As the driver 40 reaches the end of its descent the legs of the

staple *s* are bent toward each other in the curved bottom of the notch 48 and caused to be displaced laterally to pass by one another.

The shape of the notch 48 and grooves 50 is such that as the staple is applied in the manner explained its legs will be bent inwardly and firmly clinched or bound around the neck of the bag as illustrated in Fig. 9. After the closed mouth of the bag has been sealed in this manner it is removed from the opening 48 in the anvil-block 5 as pressure is released from the knob 37. Immediately pressure on the knob is released the plunger 35 will be slid upwardly under the action of its spring 34 to withdraw the staple-driver 40 upwardly in the stapling head 15 and as the plunger reaches the upper end of its stroke the arm 10 is raised by the action of its spring 13. As the lower edge of the staple-driver 40 is retracted above the core 16 the staple-pusher 20 is urged forward by its spring 23 to feed another staple into position beneath the driver to prepare the machine for the next operation.

The machine may be operated continuously in the manner explained to apply wire staples or like fasteners to the necks of the bags and its speed of operation is limited only by the dexterity and proficiency of the operator. It will thus be realized that the sealing of the bags may be accomplished at a very high rate of speed whereby to economize in the cost of the operation to thereby reduce the expense of packaging the goods. While it is possible for the operator to attain a high rate of production on the manually operated machine herein illustrated, a still higher rate is obtainable by driving the machine under power and for this purpose an electric motor may be used with an arrangement similar to that shown and described in United States Letters Patent No. 1,868,536, hereinbefore referred to.

The present invention provides a particularly simple yet efficient machine for applying staples or binder wires to the closed necks of bags, envelopes and like containers whereby to secure a more effective seal while also improving the appearance of the package. The machine may be operated at a high rate of speed to economize in the cost of sealing the containers and it is thus of great advantage in the packaging of various types of merchandise.

While the machine is herein shown and described as embodied in a preferred form of construction, it is to be understood that modifications may be made in the structure and arrangement of its parts without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. In a machine of the type specified, the combination of a die having upstanding rigid portions forming a recess for holding and confining the contracted end of a bag or like container, and stapling means comprising a staple-driver adapted to enter the recess in the die to drive a staple thereinto to bind it around the neck of the bag to seal its mouth.

2. In a machine of the type specified, the combination of a die formed with a U-shaped opening the sides of which are rigid and of sufficient depth for confining the contracted mouth of a bag or like container to prevent it from opening, and means for applying a U-shaped fastener to the neck of the bag and binding it therearound.

3. In a machine of the type specified, the combination of a one-piece die provided with a U-shaped opening of sufficient depth for receiving and confining the closed mouth of a bag or like

container, and means for inserting a U-shaped fastener into said opening in the die and bending its legs to enclose the neck of the bag confined therein.

4. In a machine of the type specified, the combination of a die having a U-shaped opening the opposite walls of which are rigid with the die and adapted for receiving and confining the closed mouth of a bag or like container, a magazine for containing a supply of wire fasteners, means for applying the fasteners around the neck of the bag to seal its mouth comprising a driver adapted to enter the opening in the die, and means for feeding the fasteners to the applying means.

5. In a machine of the type specified, the combination of a die having an opening with spaced sides for receiving and confining the closed mouth of a bag or like container with grooves in the sides of said opening, and means for applying a wire fastener around the mouth of the bag comprising a driver adapted to slide in the grooves of the opening to drive the fastener therethrough.

6. In a machine of the type specified, the combination of a rigid die having a parallel sided opening for receiving and confining the closed mouth of a bag or like container with grooves extending downwardly in the sides of the opening and across its bottom, means for feeding U-shaped fasteners to position them above the opening in the die, and a driver slidable in the lateral grooves of the die for forcing a fastener down into the bottom grooves in the die to bind it around the neck of the bag.

7. In a machine of the type specified, the combination of a rigid die having a U-shaped opening for receiving the closed mouth of a bag or like container, said opening formed with opposite sides, a curved bottom and grooves in its opposite sides extending from the top of the die to its bottom, and means for driving a U-shaped fastener into the grooves in the die to cause it to be bent around the neck of the bag held in the die.

8. In a machine of the type specified, the combination of a die provided with an opening for receiving the closed mouth of a bag or like container, said die formed with alining grooves in the sides of its opening extending into the bottom thereof with their ends offset laterally with respect to each other, and means slidable in the grooves in the sides of the die for driving a U-shaped fastener through the grooves to bind it around the neck of the bag confined in the opening.

9. In a machine of the type specified, the combination of a rigid die having a U-shaped opening with a rounded bottom and grooves in its sides, said grooves being arranged in alinement and offset laterally with respect to each other in the bottom of the opening, and means slidable in the grooves in the opening for driving a U-shaped fastener through the grooves to cause its ends to be bent around and overlapped.

10. In a machine of the type specified, the combination of a die having a U-shaped opening with opposite parallel sides for receiving and confining the closed mouth of a bag or like container, a head movable against the top of the die, and means carried by said head slidable in the opening in the die to drive a staple and bend its legs around the neck of the container held therein.

11. In a machine of the type specified, the combination of a work-support, a rigid die mounted

on the work-support and formed with a U-shaped opening with parallel sides of sufficient depth for receiving and confining the closed mouth of a bag or like container, a head movably supported above the die, means to move the head downwardly against the top of the die, and mechanism carried by the head for driving a wire fastener down into the die to bind it around the neck of a closed bag held in the opening thereof.

12. In a machine of the type specified, the combination of a work-support, a die on said support provided with a recess in its upper face and a contracted U-shaped opening extending downwardly therefrom of sufficient depth for receiving the closed mouth of a bag or like container, said opening formed with opposite parallel sides, a rounded bottom and grooves in its sides, a head movable toward the die to seat in the recess thereof, and means carried by said head for driving a fastener into the grooves in the opening in the die to bind it around the neck of the container held therein.

13. In a machine of the type specified, the combination of a support, a standard pivoted to said support, a die carried by said standard and formed with means for bending the legs of a fastener, stapling mechanism mounted to move toward and away from the die, and means for adjusting the standard on its pivot to aline the die with the stapling mechanism.

14. In a machine of the type specified, the combination of a support, a member pivoted on said support, a die carried by said member, stapling mechanism movable toward and away from the die, a screw extending through the die-carrying member and engaging the support to adjust the position of the die with respect to the stapling mechanism, and means for locking said member in its adjusted position.

15. In a machine of the type specified, the combination of a support having an opening at its end, a member pivoted in said opening, a die carried on said member, stapling mechanism movable toward and away from the die, a screw extending through the support and an enlarged hole in the die-carrying member, and a screw extending through the die-carrying member to engage against the end of the opening in the support to effect adjustment of the die to register it with the stapling mechanism.

16. In a machine of the type specified, the combination of a standard, plates secured to the sides of the standard and extending forwardly therefrom to provide a work-support, a filler piece intermediate said plates having its end spaced from the outer ends thereof, a member pivoted in the opening between the plates adjacent the filler piece, a bolt extending through openings in the plates and said member, a second bolt extending through the plates and an enlarged hole in said member, a third bolt extending through the member with its end engaging against the filler piece, a die carried at the upper end of said member, and stapling means mounted on the standard to move toward and away from the die.

17. In a machine of the type specified, the combination of a standard, an arm projecting forwardly from said standard, a member pivoted to said arm, a die carried by said member and formed with clincher-grooves, an arm pivoted to the standard above the first arm, stapling mechanism carried by said arm to adapt it to cooperate with the clincher-grooves in the die, and means to adjust the die-carrying member to aline the grooves in the die with the stapling mechanism.

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