

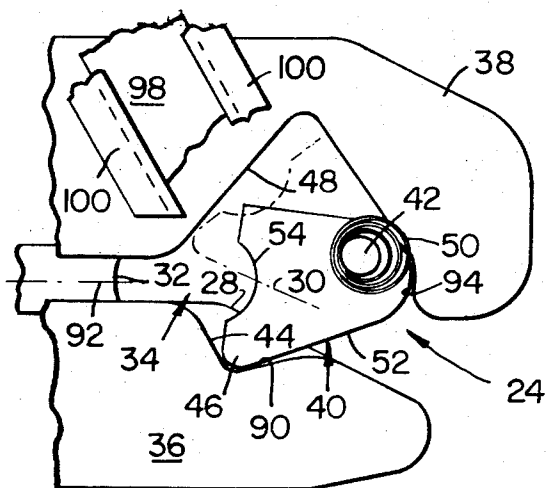
March 4, 1969

W. F. KNUPPEL
BAG CLOSING APPARATUS

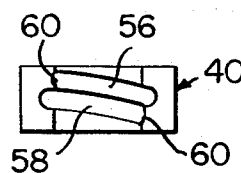
3,430,320

Filed April 26, 1967

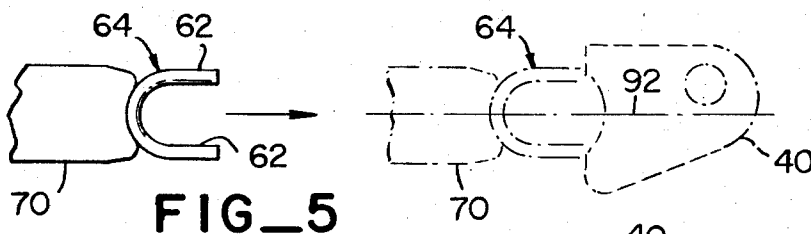
Sheet 2 of 2



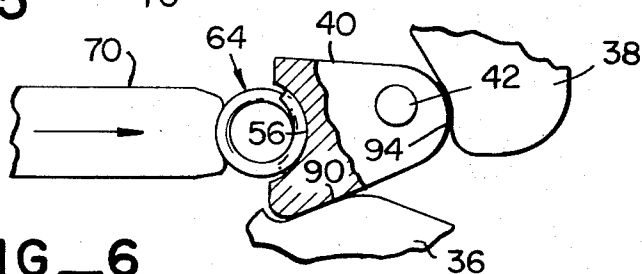
FIG_3



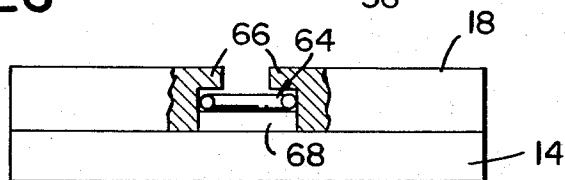
FIG_4



FIG_5



FIG_6



FIG_7

INVENTOR
WILLIAM F. KNUPPEL

BY

Townsend and Townsend
ATTORNEYS

1

3,430,320

BAG CLOSING APPARATUS

William F. Knuppel, Boyes Hot Springs, Calif., assignor to Hydrachone Equipment Division John Mohr & Sons, Milwaukee, Wis.

Filed Apr. 26, 1967, Ser. No. 633,919

U.S. Cl. 29—33.5
Int. Cl. B65b 51/04

16 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for closing the neck of a bag with a U-shaped, bendable clip wherein the bag neck is moved into a clip-receiving location in a slot normally closed by a shiftable gate. The gate opens to allow the bag neck to pass to the location and then returns to its normal position, following which a ram forces a clip onto the bag neck and against cam means on the gate to bend the sides of the clip and thereby close the bag neck.

This invention relates to improvements in clip fastening devices for bags and, more particularly, to clip closing apparatus of the type wherein a bag to be closed is manually moved by the neck into the path of travel of a U-shaped clip.

The present invention is directed to bag closing apparatus of the above-mentioned type wherein a guide member having a slot extending thereinto from an outer peripheral edge thereof is normally closed by a shiftable gate having cam means on its inner surface. A bag neck forced into the slot causes the gate to shift to a position allowing the bag neck to move further into the slot and into alignment with the path of travel of a ram which forces a U-shaped clip toward and on opposed sides of the bag neck. When the bag neck is properly positioned in the slot, the gate automatically returns to its starting position with the cam means aligned with the bag neck and the path of the ram. Thus, the sides of a clip advanced by the ram will engage the cam means after being forced onto the bag neck, resulting in the closing of the clip about the bag neck and thereby the closing of the bag itself.

Prior clip fastening machines utilize a fixed cam against which a clip is forced to close the neck of a bag. This requires a bag-receiving guide slot having an irregular or circuitous configuration to position the bag neck between the clip and the cam. One portion of the slot is generally required to be substantially coextensive with the path of the clip and another portion must extend transversely to the coextensive portion. By causing the bag neck to traverse such a path, considerable effort is required to properly position the bag neck for closing. Also, it is difficult to maneuver the bag neck into the slot if a vacuum conduit inserted in the bag neck for bag evacuation purposes remains therein as the bag neck is inserted in the slot. This is generally necessary if the bag contents, such as foodstuffs or the like, require a certain vacuum to be maintained during and after the closing of the bag. Without the contents in the bag neck, air could possibly leak into the bag to cause contamination or other damage to the bag contents.

The present invention overcomes the above problems by providing the shiftable gate-cam normally disposed across the neck-receiving slot so that the slot itself is substantially straight and not irregular as in prior machines. This construction allows the bag neck to engage and thereby shift the gate to a position clearing the slot so that the bag neck will become aligned with the path of travel of a clip. Then, the gate returns to its closed position and its cam will be behind the bag neck and in a position to be engaged by and to bend the clip as the latter is forced

2

about the bag neck by a ram aligned with the cam. By mounting the apparatus with the slot in a horizontal position, the bag can gravitate from the apparatus after the clip has been placed on the bag neck so that the apparatus is immediately ready for receiving and closing the neck of another bag.

The aforesaid construction also allows the slot to have a minimum length so that the evacuating conduit inserted in the bag need only move a relatively short distance when it is in the bag neck. Normally, the conduit will be swingably mounted and relatively rigid rather than flexible. Since the slot of this invention is relatively straight, the conduit remains in one plane as it swings to allow the bag neck to enter the slot.

The above construction allows the use of a clip magazine which extends upwardly from the path of travel of the ram. The magazine is disposed to deposit stacked clips, one by one, in the path of the ram and to allow the latter to underlie the remaining clips in the magazine so as to prevent downward movement of the clip stack as a preceding clip is being forced onto the neck of a bag in the slot.

The apparatus of this invention is simple and rugged in construction, can be made with a minimum number of parts and can be readily mounted in place adjacent to a bag filling line for closing bags immediately after they have been filled. The apparatus is provided with suitable actuating means which is, at all times, under control of the operator, and the moving parts of the apparatus are positioned so as to prevent any injury to the operator during the clip closing operation. Maintenance of the apparatus presents no problem since worn parts can be readily replaced when necessary and all parts of the apparatus can be effectively cleaned at the end of the bag closing operation so as to maintain sanitary conditions and to comply with health regulations if the apparatus is used for closing bags containing foodstuffs.

The primary object of this invention is to provide apparatus for closing a U-shaped, bendable clip about the neck of a bag wherein the apparatus has a shiftable cam normally closing a generally straight slot into which the neck of a bag can be manually forced, whereby the cam will shift to allow the bag neck to enter the slot and then return to its starting position on one side of the bag neck to close the clip about the bag neck as the clip approaches the neck from the opposite side thereof.

Another object of this invention is to provide apparatus of the type described wherein abutment means is provided adjacent to the cam to brace the latter during the clip closing operation to minimize the stresses on the cam and thereby maintain its structural integrity and that of its mounting means.

A further object of this invention is to provide apparatus of the aforesaid character wherein cutter means is provided for severing the excess parts of the bag neck as an adjunct to the clip closing operation to avoid having to cut the bag at a later time and thereby to render the overall bag closing and cutting operations more efficient.

Another object of this invention is to provide improved clip closing apparatus for use with an article packaging line wherein articles placed in bags can be immediately closed even while the bags are being evacuated to thereby render the apparatus suitable for use in packaging foodstuffs.

Other objects of this invention will become apparent as the following specification progresses, reference being had to the accompanying drawings which illustrate a preferred embodiment of the apparatus.

In the drawings:

FIG. 1 is a top plan view, partly broken away, of the

3

apparatus showing the neck of a bag about to enter the slot thereof;

FIG. 2 is a side elevational view of the apparatus;

FIG. 3 is a fragmentary top plan view of one end of the apparatus showing the shiftable gate or cam which normally blocks the neck-receiving slot;

FIG. 4 is an end elevational view of the cam means on one face of the gate;

FIG. 5 is a sequential view of the movement of a U-shaped clip by a ram toward and against the cam means on the gate;

FIG. 6 is a view similar to FIG. 5 but illustrating the way in which the clip is bent by the cam means about the bag neck; and

FIG. 7 is an end elevational view of a portion of the apparatus, illustrating the means for guiding the clip toward the back neck.

Bag closing apparatus 10 includes a support or guide member 12 having a normally horizontal base plate 14 and a top plate 18 on base plate 14. A mounting plate 20 is secured to and extends upwardly from plates 14 and 18 (FIGS. 1 and 2) and is provided with a tubular mounting device 22 at one side edge thereof (FIG. 1). Device 22 is provided with adjustment screws 24 which bear against a mounting rod or other means inserted into device 22 so that the support 12 can be mounted rigidly in a desired position. Generally, device 22 will receive a vertical rod or shaft which depends from overhead mounting structure to avoid support structure below apparatus 10. Thus, the space below the apparatus is unrestricted to permit conveyors or other structure to be disposed beneath the apparatus if such is deemed desirable or necessary. With device 22 mounted in a vertical position, plates 14 and 18 will be generally horizontal and can be positioned adjacent to a bag filling station so that immediately after a bag is filled with an article or articles to be packaged, the bag can be moved directly into an operative position relative to apparatus 10 to be closed thereby.

Guide member 12 is provided with an open end slot 24 extending inwardly from one end 26 thereof for receiving a neck of a bag to be closed. To define the lower portion of slot 24, plate 14 is provided with a pair of spaced, inner peripheral faces 28 and 30 and an innermost face 32 (FIG. 3). The slot portion defined by plate 14 is substantially straight and it presents a bag neck-receiving location denoted by numeral 34 (FIG. 3).

Plate 18 is provided with a pair of sections 36 and 38 (FIG. 3) which are spaced apart and are secured in any suitable manner to the upper surface of plate 14. Sections 36 and 38 have side edges or faces which define the upper portion of slot 24 and also allow a swingable cam or gate 40 to be mounted on a pin 42 extending upwardly from plate 14. To this end, section 36 is provided with a substantially V-shaped inner face 44 defining a recess above a first portion of plate 14, this recess being disposed for receiving a projection 46 on gate 40 when the latter is in a first position (full line position of FIG. 3) across slot 24. Similarly, section 38 is provided with a V-shaped inner face 48 which is opposite to face 44 of section 36 and provides another recess above a second portion of plate 14. This other recess is adapted to receive the gate as the latter swings to a second position (dashed line position of FIG. 3) clearing slot 24. In its second position, the gate allows the neck of a bag to be moved to location 34.

A coil spring 50 is disposed in surrounding relationship to pin 42 and is coupled to the latter and to gate 40 in any suitable manner to bias gate 40 toward its first or slot-blocking position. Thus, when a bag is forced into the slot and engages face 52 of gate 40, the gate will swing to the dashed line position, allowing the bag neck to be further forced into the slot to location 34. The gate will then return to its normal or first position under the influence of spring 50. Section 36 provides a stop limiting the swinging movement of the gate.

4

Gate 40 is provided with a concave innermost face 54 having a pair of side-by-side grooves 56 and 58 formed therein, each groove having an open end 60 permitting one side 62 of a U-shaped, bendable clip 64 to enter the corresponding groove and thereby be bent by the latter as the clip is forced toward the gate. Thus, grooves 56 and 58 provide cam means for gate 40.

Sections 36 and 38 of plate 18 have overhanging projections 66 (FIG. 7) spaced above a platelike insert 68 spanning the distance sections 36 and 38. Projection 66 and insert 68 define track means for clip 64 and a flat-sided ram 70 which advances the clip into engagement with the camming grooves 56 and 58. Ram 70 extends through a hole (not shown) in plate 20 and is coupled to a fluid actuated, piston cylinder assembly 72 secured to the upper surface of plate 14 (FIGS. 1 and 2). The cylinder of assembly 72 is adapted to be coupled to a source of fluid under pressure and a valve 74, mounted on one face of plate 20, is coupled to assembly 72 for controlling the same. A handle 76 is swingably mounted on valve 74 and extends downwardly and terminates at a button or cap 78 adjacent to and directly above location 34 (FIG. 2). Thus, the hand of an operator inserting a bag neck in slot 24 and into location 34 will automatically engage button 74 to swing handle 76 to, in turn, actuate valve 74. This action will actuate assembly 72 to thereby cause the ram to advance a clip 64 in the manner shown in FIG. 5 toward gate 40 and into the open end 60 of grooves 56 and 58. The sides of the clip will then be bent about a bag neck in the manner shown in FIG. 6 since the grooves are substantially concave and partially surround location 34 when gate 40 is in its normal position. Additional movement of the ram may be desired to crimp or compress the clip still further from that shown in FIG. 6 to obtain a more positive closing of the bag.

A clip magazine 80 mounted on plates 18 and 20 overlies a widened portion (not shown) of the space separating sections 36 and 38. Thus, a stack 82 of clips 64, may be fed, one by one, into the path of ram 70. Since the ram has a flat upper side, it will close the bottom of the magazine as it advances a clip toward the gate. Thus, the ram will prevent further gravitation of the clips during a bag closing operation. Upon completion of the clip closing step, the ram will be reciprocated to its starting position after which another clip will gravitate into its path and thereby be ready for movement toward gate 40.

Magazine 80 may be of any suitable construction. For purposes of illustration, it includes a front plate 84 having a core 86 secured thereto for mounting stack 82. A cover 88 encloses the stack and is open at its top to allow the stack to be inserted as a unit onto core 86.

Certain parts of sections 36 and 38 of plate 18 are located in proximity to gate 40 when the latter closes slot 24. The purpose of this is to have these sections absorb the greater portion of the thrust of ram 70 during the clip closing operation so that the gate and its mounting 42 will not be subjected to this thrust and thereby not be structurally weakened. To this end, face 44 on section 36 has a segment 90 (FIG. 3) which is in the path of travel of projection 46 which not only provides a stop for maintaining the gate in its normal position but also provides an abutment to prevent rotation of the gate under the influence of the ram thrust. As shown in FIG. 3, the line of action 92 of ram 70 is spaced laterally of pin 42 so that a moment is applied to gate 40 tending to rotate it in a counterclockwise sense when viewing FIG. 3. This moment is countered by the abutment action of segment 90.

Similarly, face 48 has a segment 94 in close proximity to the outer peripheral face of gate 40 adjacent to pin 42. Segment 94 is in a position to absorb the main or straight line portion of the thrust and thereby provides backing support for pin 42.

A cutter blade 96 is shiftable mounted on the upper

surface of section 38 (FIG. 1) and has a cutting edge 98 which transverses the slot at location 34 to sever the upper part of a bag neck positioned at location 34. A pair of guides 100 allow reciprocation of blade 96 under the influence of a fluid actuated piston and cylinder assembly 102 coupled to valve 74 and adapted to be coupled to a source of fluid under pressure. The valve operates to move ram 70 toward gate 40 and during this movement, to actuate assembly 102 to advance blade 96. Thus, the excess part of bag neck is severed immediately after the clip has been closed. As soon as the bag neck is severed and a clip is closed thereon, the operator lets the bag loose and it drops and is preferably received on a conveyor for movement to another station.

Operation

To place apparatus 10 in use, it is mounted so that slot 24 is horizontally disposed. For purposes of illustration only, it is shown mounted in FIGS. 1 and 2 adjacent to a shiftable vacuum conduit 104 which is insertable in the neck 106 of a bag to be closed. The conduit is adapted to be coupled to a vacuum source for evacuating the bag as the clip closing step is performed. To complete the initial preparations for use, magazine 80 is loaded with a stack of clips with the lowermost clip positioned in the path of travel of ram 70.

An operator handling a bag containing an article to be packaged inserts the neck of the bag over the outlet end of conduit 104 and then twists the bag neck while assuring that the conduit remains in fluid communication with the interior of the bag. The twisted part of the bag neck is below the conduit but the latter is left on the neck to assure against air leakage into the bag through the twisted neck. The operator then shifts conduit 104 and the bag on the conduit in a direction to force the bag neck into slot 24, against gate 40 to swing the latter to the dashed line position of FIG. 3, and then into location 34. During this time, the conduit remains in the bag neck so that the latter can now be closed with a clip before the conduit is removed therefrom.

If the operator moves the bag neck into location 34, cap 78 is engaged and handle 76 is swung toward plate 20 to actuate valve 74. This causes assembly 72 to be energized and ram 70 then moves toward gate 40 in the manner shown in FIGS. 5 and 6. A clip 64 is then forced onto the bag neck and is bent about the latter so as to close the bag. During this operation, assembly 102 is energized and blade 96 cuts off the upper or excess part of the bag. The operator turns loose of the bag and it gravitates from apparatus 10 and is caught in any suitable manner such as by a conveyor which carries it to another handling station. The apparatus is then ready to receive the neck of another bag evacuated in the same manner.

Magazine 80 can be filled as the need for additional clips arises. Also, some suitable means may be employed to remove the severed portions of the bag from the working area of the apparatus to prevent interference with the various moving parts.

The present invention is especially suitable for use in packaging foodstuffs wherein the bag must be sealed after being evacuated. The substantially straight line characteristic of slot 24 allows conduit 104 to swing in only one plane. Thus, the conduit can comprise a rigid pipe swingably mounted at its upper end.

Apparatus 10 is simple and rugged in construction and is easy to maintain because of the small number of parts and the accessibility of the parts for cleaning. The apparatus is relatively small and lightweight in construction so that it is essentially portable and can be moved from one station to another as the need arises.

While one embodiment of this invention has been shown and described, it will be apparent that other adaptations and modifications can be made without departing from the true spirit and scope of the invention.

What is claimed is:

1. In apparatus for closing the neck of a bag comprising: a support having an open end slot for receiving the neck of a bag to be closed; a gate movable from a first position blocking the slot to a second position clearing the slot to allow a bag neck to be moved thereinto, said gate being biased toward said first position; a reciprocal ram disposed for advancing a substantially U-shaped, bendable clip toward said gate; and cam means on said gate in alignment with the path of travel of said ram when the gate is in said first position for bending the clip about the bag neck in said slot as the clip is urged toward the gate by said ram.

2. In apparatus as set forth in claim 1, wherein is provided means adjacent to said slot for severing the upper portion of a bag neck therein.

3. In apparatus as set forth in claim 1, wherein is provided a clip magazine adjacent to the path of travel of said ram for depositing a clip in the last-mentioned path between the ram and said gate.

4. In apparatus as set forth in claim 1, wherein said gate is swingably mounted on said support, the line of action of said ram being laterally spaced from the axis of swinging movement of the gate, and means abutting the gate when the latter is in said first position to counter the thrust of said ram as it urges said clip sides against said cam means.

5. In apparatus as set forth in claim 4, wherein said abutting means includes an abutment in the path of swinging movement of the gate, said line of action being between said abutment and said axis.

6. In apparatus as set forth in claim 4, wherein said abutting means includes an abutment substantially aligned with said path of travel of the ram and disposed downstream of said axis with respect to said path of travel.

7. In apparatus as set forth in claim 4, wherein said abutting means includes a first abutment in the path of swinging movement of said gate on the opposite side of said line of action from said axis, and a second abutment substantially aligned with said path of travel of the ram and disposed downstream of said axis with respect to said path of travel.

8. In apparatus as set forth in claim 1, wherein said support is provided with track means for guiding said ram and a clip advanced thereby toward said gate.

9. Bag closing apparatus comprising: a guide member having an open end slot extending thereinto from the outer periphery thereof; a gate shiftable mounted on said guide member and movable from a first position in blocking relationship to said slot to a second position clearing the slot, whereby the movement of the neck of a bag to be closed into the slot and against said gate will cause the latter to shift to said second position to thereby allow the bag neck to be moved to a location in said slot between the inner end of the latter and said first position of the gate; means biasing said gate toward said first position whereby the gate will return to said first position after said bag neck is at said location; a ram; means mounting the ram on said support for reciprocation relative thereto and along a path aligned with said location and said first position; means adjacent to said path for depositing a substantially U-shaped, bendable clip in said path between said ram and said slot with the open extremity of the slot facing said location; cam means on said gate for bending the sides of said clip inwardly and toward each other as the clip is advanced toward said gate by said ram, whereby the clip will be closed about a bag neck at said location; actuable means coupled with said ram for reciprocating the same; and means coupled with said reciprocating means for controlling the actuation thereof.

10. Apparatus as set forth in claim 9, wherein said bag is formed from a material capable of being cut, and wherein is included cutter means on said guide member adjacent to said slot for cutting the bag neck, said control

means being coupled with said cutter means for actuating the latter.

11. Apparatus as set forth in claim 9, wherein said control means is responsive to the position of said bag neck in said slot.

12. Apparatus as set forth in claim 9, wherein said reciprocating means includes a fluid-actuated device, said control means including a fluid valve coupled with said device and having a shiftable actuating member movable in response to the movement of a bag neck to said location.

13. Apparatus as set forth in claim 9, wherein is provided a pin, said gate being rotatably mounted on said pin, said bias means including a spring coupled to said pin and said gate.

14. Apparatus as set forth in claim 13, wherein is provided abutment means on said guide member and disposed for engagement by said gate when the latter is in said first position for countering the thrust of said ram to thereby minimize the thrust on said pin.

15. Apparatus as set forth in claim 9, wherein is provided a shiftable vacuum conduit adjacent to said guide member and adapted to be inserted into the neck of said bag for evacuating the latter, said conduit movable in a direction to permit the bag neck to move into said slot and to said location while the conduit remains in said bag neck.

16. Apparatus as set forth in claim 9, wherein said gate is provided with a concave inner surface having a pair of side-by-side grooves therein defining said cam means.

References Cited

UNITED STATES PATENTS

3,279,033	10/1966	Normand	-----	29—33.5
3,337,935	8/1967	Vilutis	-----	29—33.5

RICHARD H. EANES, JR., *Primary Examiner*.