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COMBINATION BAG CUTTER AND BAG CLIPPING DEVICE

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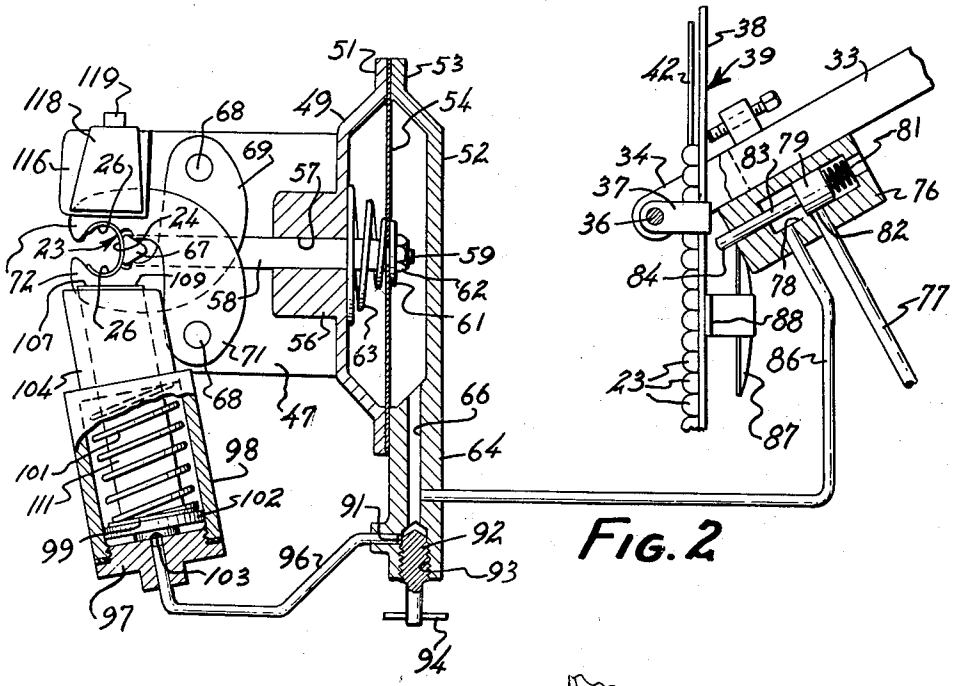

FIG. 2

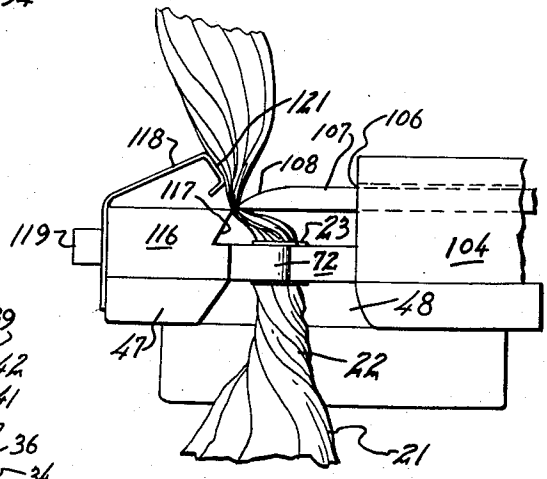

FIG. 3

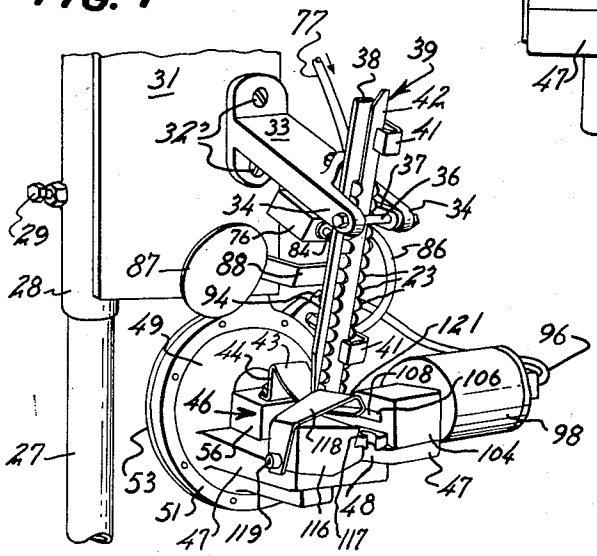

FIG. 1

INVENTOR.
FRANK H. INE
BY
Townsend and Townsend
ATTORNEYS

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COMBINATION BAG CUTTER AND BAG CLIPPING DEVICE

Frank H. Ine, Milwaukee, Wis.

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8 Claims. (Cl. 1—120)

This invention relates to a new and improved combination bag cutter and bag clipping device.

The present device is used in the clipping of plastic bags wherein the neck is twisted and the machine fastens a metal clip around the closed neck of the bag in the zone where it is twisted in order to secure the bag in closed position and seal the contents thereof. The clips employed are formed of heavy gauge sheet metal and are substantially C-shaped in original condition. The clips are bent by the apparatus into a substantially circular shape, with one of the arms of the "C" overlapping the other and with the twisted, closed neck of the bag clamped tightly inside the clip. Customarily a portion of the bag extends above and beyond the clip and one of the features of the present invention is the provision of a cutter actuated in combination with the clip closing mechanism, which cutter severs the excess bag material.

Reference is made to copending patent application Serial No. 561,732 filed January 27, 1956, for Automatic Packaging Clip Feeding and Fastening Device. The present invention constitutes an improvement thereon.

The structure whereby the clip is closed comprises a pair of pivoted jaws and a plunger which pushes the base of the clip outwardly and causes the jaws to pivot to close the clip. The plunger is pneumatically actuated. One of the features of the present invention is the fact that the same source of compressed air which closes the clip moves the cutter, and further, that the valve which actuates the clip-closing mechanism also actuates the cutter moving mechanism.

Still another feature of the invention is the construction of the pneumatic system hereinafter described in detail in such manner as to insure that the cutter blade is not moved until the pivoted jaws have closed the clip, thereby insuring that the excess bag material will not be severed until the clip is properly secured in place.

A pivoted magazine is employed to deliver the clips into proper position between the jaws prior to insertion of the twisted neck of the bag therein. By the attraction of gravity this magazine is normally in vertical position and when in such position drops the lowermost clip from the magazine into the space between the open jaws. When the operator inserts the twisted neck of the bag into the clip, the movement necessarily pushes the lower end of the magazine back out of the way and this movement brings the magazine into proximity to the valve which actuates the jaws and cutter blade. Accordingly the present invention provides an arrangement of parts such as to facilitate rapid production whereby manual effort to actuate the mechanism is reduced to a minimum.

Still another feature of the invention is the provision of safety means to protect the operator from the cutter blade.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar

characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a fragmentary perspective view of a bag closing machine of which the present invention forms a part, showing the lower end of the magazine pivoted rearwardly;

Fig. 2 is an enlarged schematic view showing portions of the actuating mechanism partly broken away in section; and

Fig. 3 is an enlarged fragmentary front elevational view of the cutter blade and associated mechanism.

The present invention is employed in closing bags **21**, such as plastic bags used to package meat products and the like. Preferably by means forming no part of this invention the bags **21** are air-evacuated and the necks **22** are manually twisted. The apparatus hereinafter described clamps asheet metal clip **23** around twisted neck **22** in order to hold the same in tightly clamped position and prevent air from entering the evacuated bag. Viewed in top plan, the clip is essentially C-shaped, with a rounded base **24**. The outer extremities of arms **26** of the "C" are also rounded to prevent injury to the bag when the clip is applied.

As illustrated in Fig. 1, the machine which forms the present invention is preferably mounted on a vertical stanchion **27**. Surrounding a portion of stanchion **27** is a sleeve **28** carrying a set screw **29** threaded therethrough whereby the elevation of the sleeve on the stanchion may be set at a convenient height. A vertical plate **31** is welded to sleeve **28** and provides a mounting for the other mechanism of the machine, only part of which is illustrated herein. Fastened to plate **31** by means of screws **32** is a downwardly, forwardly extending bracket **33**, the outer end of which is formed with bifurcations **34** through which passes a pivoting pin **36** which forms a horizontal pivotal mounting for a clevis **37**. Clevis **37** is welded to the back of base-supporting member **38** of the lower magazine section **39**. Hook shaped supports **41** are fixed to base support **38** and at their opposite ends to arm-supporting member **42** which extends parallel to but spaced from base-supporting member **38**. Lower magazine section **39** receives clips **23** with base **24** thereof against base-supporting member **38** and legs **26** straddling the arm-supporting member **42**. Below lower magazine **39** is an arcuately shaped sheet metal retainer **43** which is formed with a leg **44** fastened to valve housing **46**, which in turn is supported from vertical plate **31**. The center of curvature of arcuate retainer **43** is the center of pivot pin **36** and hence as lower magazine **39** is swung backwardly to its retracted position, retainer **43** prevents clips **23** from being dislodged therefrom.

The forward part of valve housing **46** is irregularly shaped. The front portion thereof is formed with a horizontal table **47** having an arcuate recess **48** to receive neck **22** of bag **21**. The size of arcuate recess **48** is such that clip **23** deposited thereon as it drops off the lower end of lower magazine **39** does not pass through, but is held on the upper surface partially surrounding neck **22**. Rearwardly of table **47** housing **46** is formed with a front chamber-forming portion **49** which is concave and is surrounded by a substantially annular flange **51**. In back of valve housing **46** is a rear chamber-forming portion **52** which is likewise concave and formed with a peripheral flange **53**. A resilient diaphragm **54** is clamped between flanges **51** and **53**. Housing **49** is formed with a boss **56** having a horizontal bore **57** substantially concentric with diaphragm **54**. Slideable in bore **57** is a rod **58**, the inner end **59** of which is threaded and passes through a central aperture in diaphragm **54**. A washer **61** is provided on the end of rod **58** opposite

boss 56 and held thereon by nut 62 threaded on the end of rod 58. A spiral spring 63 is interposed between diaphragm 54 and boss 56 and biases the diaphragm toward the right, as viewed in Fig. 2. Rear chamber-forming portion 52 is formed with a downwardly extending projection 64 having a duct 66 communicating with the rear chamber-forming portion. When compressed air enters duct 66 as hereinafter explained, it flexes the diaphragm to the left, as viewed in Fig. 2, which pushes rod 58 to the left. The forward end of rod 58 carries a triangular shaped plunger 67, the forward end of which is formed with an arcuate recess conforming to the curvature of the back of base 24 of clip 23. Plunger 67 moves clip 23 disposed on table 47 forwardly when air enters duct 66.

Projecting upwardly from table 47 on opposite sides and spaced rearwardly of recess 48 are a pair of studs 68 which form pivots for jaws 69 and 71. Righthand jaw 71 is pivoted to lefthand stud 68 and lefthand jaw 69 is pivoted to righthand stud 68. Jaws 69 and 71 are laminated and interfitting, the construction forming no part of the present invention and not being illustrated or described in detail herein. So as to permit the two jaws 69 and 71 to pivot simultaneously about studs 68, the outer ends 72 of the jaws are curved inwardly, the inner edges conforming to the curvature of arms 26 of clip 23. When plunger 67 moves forward and pushes clip 23 forwardly, the ends of arms 26 engage points 72. By reason of the fact that the jaws are pivoted to studs 68, the forward movement of clip 23 produces an inward pivotal movement of the jaws which compresses the clip.

Actuation of plunger 67 is controlled by valve 76 attached to the bottom of bracket 33. The air supply for the machine enters valve housing 76 through intake pipe 77 which communicates with the valve cylinder 78. A valve piston 79 reciprocates in cylinder 78 and is biased by spring 81 to a position closing off the intake port 82 of air inlet pipe 77. Stem 83 attached to piston 79 extends forwardly through the front wall of valve housing 76 and the outer end 84 projects beyond housing 76. When lower magazine 39 is pivoted rearwardly about pivot pins 36, base supporting portion 38 thereof contacts end 84 of stem 83 and pushes piston 79 rearwardly against the force of spring 81 until port 82 is cleared, whereupon communication is established between air inlet pipe 77 and pipe 86. To insure opening of the valve, a concave disk 87 is attached by means of arm 88 to lower magazine 39 so that when the operator inserts the neck of the bag between the arms of clip 23, as has been heretofore described, in the event that the consequential movement of magazine 39 is not sufficient to open valve 79, disk 87 can be contacted to complete the opening movement. Pipe 86 communicates with duct 66 and accordingly the pressure of air behind diaphragm 54 moves plunger 67 forwardly.

Adjacent the lower end of projection 64 is a duct 91 which may be opened to communication with duct 66 when needle valve 92 is opened. Valve 92 comprises a pointed threaded plug in tapped hole 93 in the lower end of extension 64. By turning handle 94 on the end of plug 92, communication between ducts 66 and 91 may be cut off and by proper adjustment of valve 92 the flow from duct 66 to duct 91 may be controlled. Duct 91 communicates with conduit 96 which extends into a plug 97 in the outer end of cutter cylinder 98. Within cylinder 98 is a disk 99 biased toward the outer end of cylinder 98 by spring 101. A cup 102 is fixed to the surface of disk 99 facing plug 97, there being a groove 103 in the center portion of cup 102 so that when cylinder disk 99 is in fully retracted position communication with conduit 96 is not cut off.

The forward end of cutter cylinder 98 is formed with an extension 104 which projects to a position closely proximate arcuate cutout 48 of table 47. A rectangular aperture 106 is formed in extension 104 and slidable in aperture 106 is cutter blade 107. Blade 107 is formed with a bevel 108 in its outer end in top plan, as best illustrated in Fig. 2, and the outer end 109 of blade 107 is oblique to the direction of movement of the blade. The inner end of blade 107 is fastened to rod 111 attached to disk 99. Hence when valve piston 79 opens port 82, air pressure is established behind disk 99 extending to move blade 107 outwardly. It is an important feature of this invention that the dimensioning of duct 66 and conduit 96 and the areas of diaphragms 54 and disk 99 and the force of springs 63 and 101 is such that plunger 67 is fully moved to projected position and hence clip 23 is closed before cutter blade 107 is projected.

On the side of recess 48 opposite extension 104 is a shear block 116 which cooperates with blade 107 to cut off the excess of the neck of the bag. A slight bevel, as indicated by reference numeral 117 on shear block 116 insures proper shearing action in cooperation with blade 107. To prevent the fingers of the operator from being pinched between blade 107 and shear block 116, a guard 118 is fastened to block 116 by screw 119. A hook portion 121 extends inwardly and rearwardly to a position slightly above the point of contact between blade 107 and block 116, hook portion 121 preventing the fingers from being pinched.

In operation, after the ingredients have been placed in bag 21 and the bag evacuated, if required, the attendant twists neck 22 and inserts the neck in recess 48 in table 47. Prior to such insertion magazine 39 has assumed a vertical position and lowermost clip 23 has dropped from the bottom of the magazine onto the space between jaws 69—71. As neck 22 is moved rearwardly into recess 48, it is positioned between open arms 26 of clip 23 and lower magazine 39 is pushed back, as shown in Fig. 2. Additional clips are prevented from falling off the bottom of magazine 39 by retainer 43. As lower magazine 39 moves back, it contacts end 84 of valve rod 83 and pushes piston 79 back to open port 82 of valve 76. If the movement of magazine 39 is not sufficient to open the valve, the attendant pushes disk 87 rearwardly to complete that operation. When the valve is opened, compressed air flows through conduit 86 to housing 52 and exerts a pressure behind diaphragm 54, causing plunger 67 to move outwardly, and this forces arms 26 of clip 23 against points 72 of jaws 69—71, causing the jaws to pivot together and clamp clip 23 around neck 22, thereby sealing the contents of bag 21. At the same time, so long as valve 92 is open, air passes through conduit 96 to cutter cylinder 98. However, as has been explained above, the dimensioning of the conduits and the forces required to move the parts insures that clip 23 will be closed before disk 99 is moved by the compressed air to project blade 107 to clip off the excess bag material by a shearing action with shear block 116, as illustrated in Fig. 3. In this connection, the resistance to movement under air pressure of cutter blade piston cup 102 biased by spring 110 is made greater than the resistance to movement under air pressure of clip fastener diaphragm 54 biased by spring 63. This being so, compressed air admitted to conduit 86 from valve 79 will first fill the air chamber defined between diaphragm 54 and member 52 and under influence of progressive build-up of pressure move diaphragm 54 and cause actuation of clip fastening jaws 69 and 71 before there can occur sufficient build-up of pressure in cylinder 98 to overcome the resistance to movement of air piston actuated cutter elements 107 and 111.

After the excess material has been cut off, the operator releases disk 87, which closes valve 76 and thereupon plunger 67 is retracted and jaws 69—71 opened. Additionally, cutter blade 107 is retracted by spring 101. Thereupon the operator removes the closed bag and magazine 39 returns to vertical position, dropping the next clip 23 into position. Actuation of cutter blade 107 may be discontinued by closing needle valve 92. This also permits the operator to remove defective clips 23

without danger of injury to the fingers because of accidental air operation of the bag cutter blade **107**.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. In a machine for closing bag clips, a table, a pair of jaws pivotally mounted on said table, a magazine for depositing bag clips one at a time on said table, a reciprocable plunger positioned to engage a clip on said table and to pivot said jaws to closed position to close said clip, first fluid-actuated means connected to said plunger to reciprocate said plunger, a source of compressed fluid, a first conduit for said fluid extending from said source to said first fluid-actuated means, a valve in said conduit, a cutter blade, means mounting said blade for reciprocation proximate said jaws, a shear block cooperating with said blade to trim excess bag material extending beyond a closed clip, second fluid-actuated means connected to said cutter blade to reciprocate said cutter blade, a second conduit communicating with said first conduit between said valve and said first fluid-actuated means and extending to said second fluid actuated means, whereby upon opening of said valve said plunger and blade are projected.

2. A machine according to claim 1 wherein said second fluid-actuated means requires for actuation greater fluid pressure build-up than said first fluid-actuated means and whereby said plunger is projected to close said clip and then said blade is projected to trim excess bag material.

3. In a machine for closing bag clips, a table, a pair of jaws pivotally mounted on said table, a magazine for depositing clips one at a time on said table, means pivotally mounting said magazine for movement of its lower end toward and away from said jaws, a reciprocable plunger positioned to engage a clip on said table and to pivot said jaws to closed position to close said clip, first fluid-actuated means connected to said plunger to reciprocate said plunger, a source of compressed fluid, a first conduit for said fluid extending from said source to said first fluid-actuated means, a valve in said conduit, said magazine when moved away from said jaws contacting said valve to open said valve, a cutter blade, means mounting said blade for reciprocation proximate said jaws, a shear block cooperating with said blade to trim excess bag material extending beyond a closed clip, second fluid-actuated means connected to said cutter blade to reciprocate said cutter blade, and a second conduit communicating with said first conduit between said valve and said first fluid-actuated means and extending to said second fluid-actuated means, whereby upon opening of said valve said plunger and blade are projected.

4. In combination, a frame, first means mounted on said frame for receiving the twisted neck of a bag and for supporting an open clip for said neck, second means on said first means to close a clip tightly around said neck, pneumatically-actuated third means on said frame to actuate said second means, a cutter blade, fourth means

on said frame reciprocably mounting said cutter blade on said frame proximate said first means and on the side of said frame opposite said first means, said blade when projected passing across the locus of a clip held in said first means, fifth means on said frame cooperating with said blade to trim excess bag material above said clip, pneumatically-actuated sixth means actuating said blade, a conduit connecting said third means and sixth means, and a valve for actuating said third and sixth means.

5. The combination of claim 4 in which greater pneumatic pressure is required to actuate said sixth means than said third means and whereby said third means is first actuated and then said sixth means.

6. The combination of claim 4 in which is further provided a magazine and means pivotally mounting said magazine on said frame, said magazine when in a first position depositing a clip on said first means and when pivoted from said first position to a second position contacting and opening said valve.

7. In the art of closing and trimming the necks of plastic bags and the like, the combination of a clip fastener unit including clip clamping jaws operable to apply a clip around the neck of a bag, and a bag cutter including a reciprocable cutter blade operable adjacent said jaws to cut through the neck of a bag above the clip applied by said jaws; first compressed air responsive driving means for closing the jaws of said fastener and causing application of a clip to said bag neck; second compressed air responsive driving means for reciprocating said cutter blade to cut through said bag neck; a source of compressed air in common communication with both said first and second driving means; common valve means for simultaneously opening and closing communication between said source and first and second driving means; said second driving means having a substantially higher air pressure operating response than the pressure operating response of said first driving means, whereby said first driving means will, upon opening of said common valve means, operate to close said clamping jaws and apply a clip to said bag neck prior to operation of said second driving means.

8. In the art of closing and trimming the necks of plastic bags and the like, the combination of a clip fastener unit including clip clamping jaws operable to apply a clip around the neck of a bag, and a bag cutter including a reciprocable cutter blade operable adjacent said jaws to cut through the neck of a bag above the clip applied by said jaws; first compressed air responsive driving means for closing the jaws of said fastener and causing application of a clip to said bag neck; second compressed air responsive driving means for reciprocating said cutter blade to cut through said bag neck; a source of compressed air; means including valve means for establishing compressed air communication to both said first and second driving means; means operable upon opening of said valve means for automatically successively actuating said first and second driving means with actuation of said second driving means occurring substantially immediately following actuation of said first driving means.

No references cited.