May 21, 1968 J. E. NARDUZZI ET AL 3,383,746

DEVICE FOR SECURING FASTENERS ON FLEXIBLE CONTAINERS

Filed Sept. 22, 1965 3 Sheets-Sheet 1

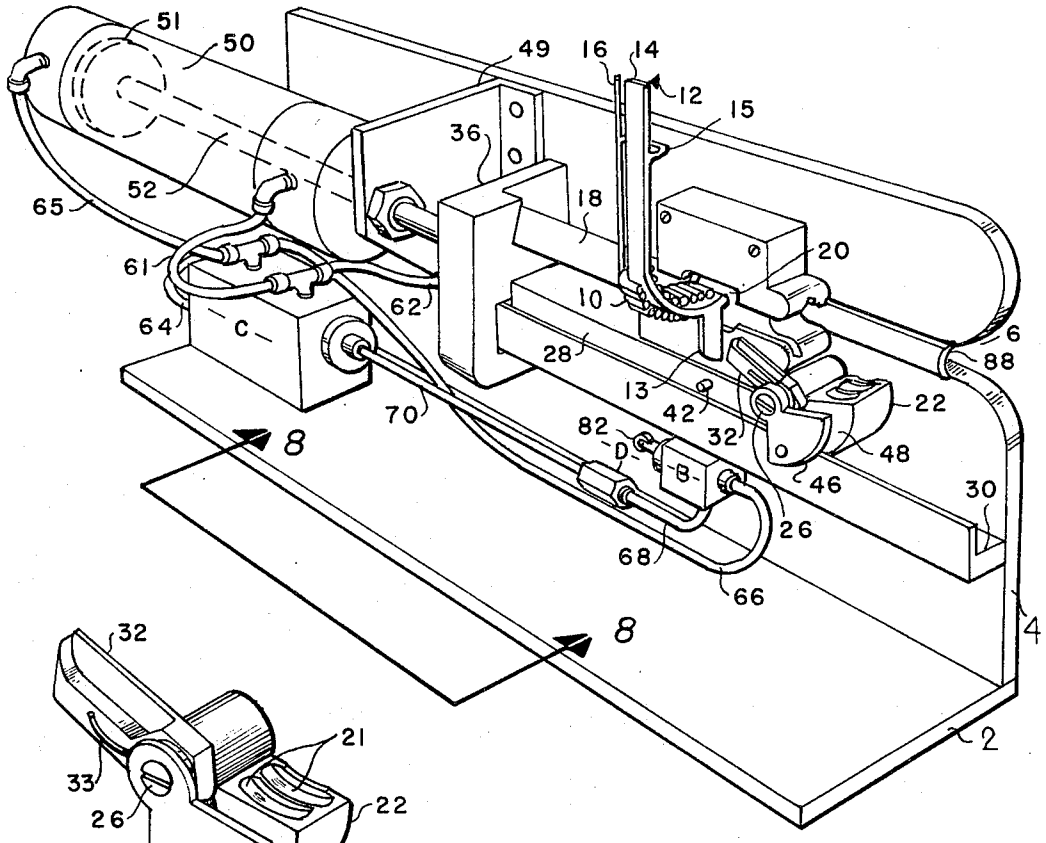


Fig. 1.

Fig. 2.

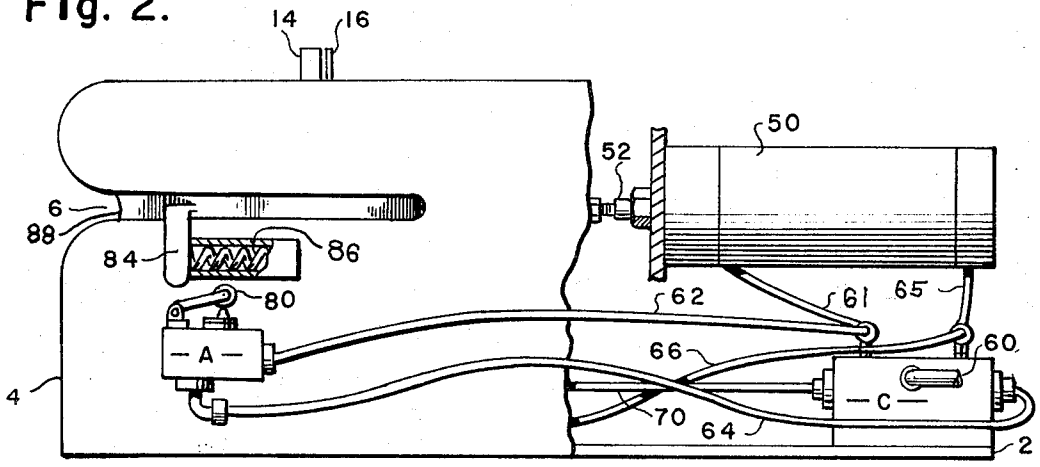


Fig. 3.

DEVICE FOR SECURING FASTENERS ON FLEXIBLE CONTAINERS

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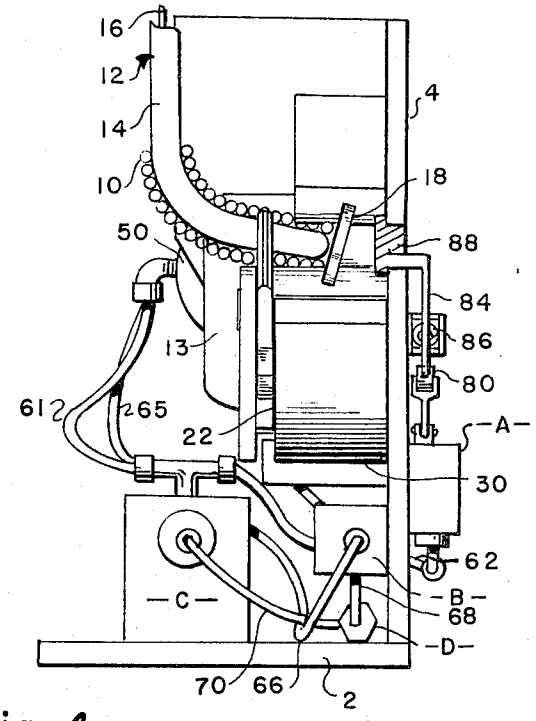
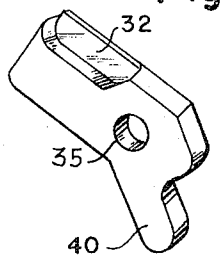


Fig. 4.

Fig. 5.



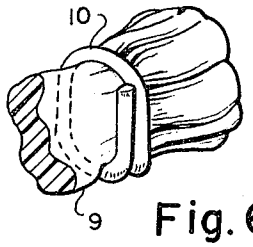


Fig. 6.

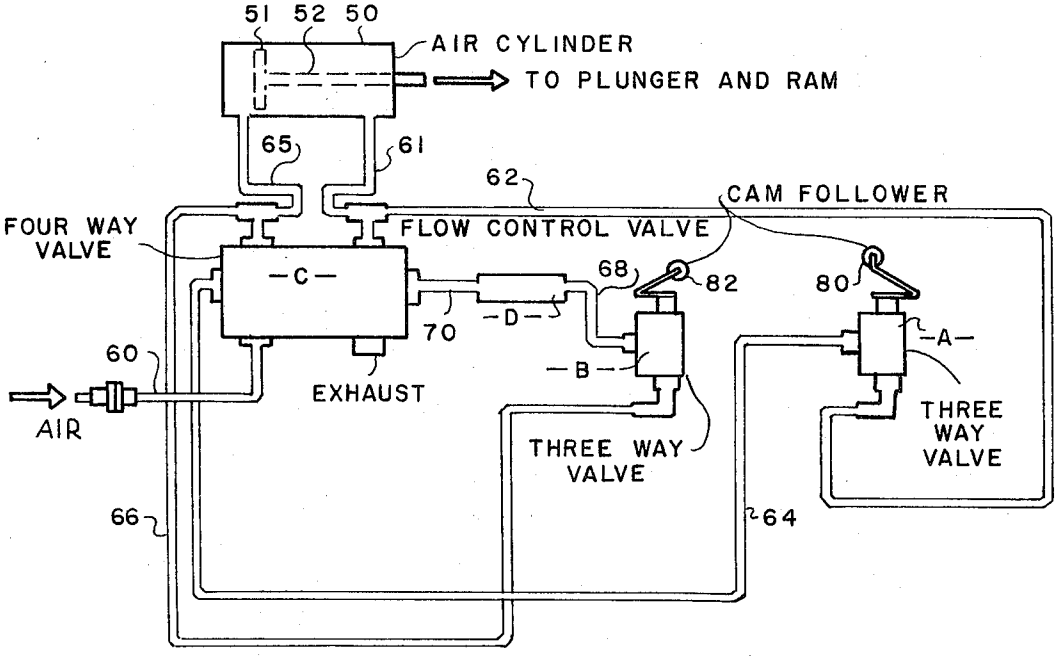


Fig. 7.

DEVICE FOR SECURING FASTENERS ON FLEXIBLE CONTAINERS

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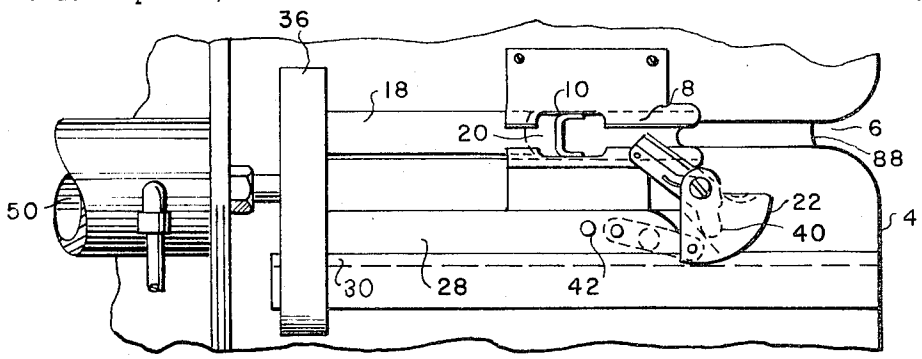


Fig. 8.

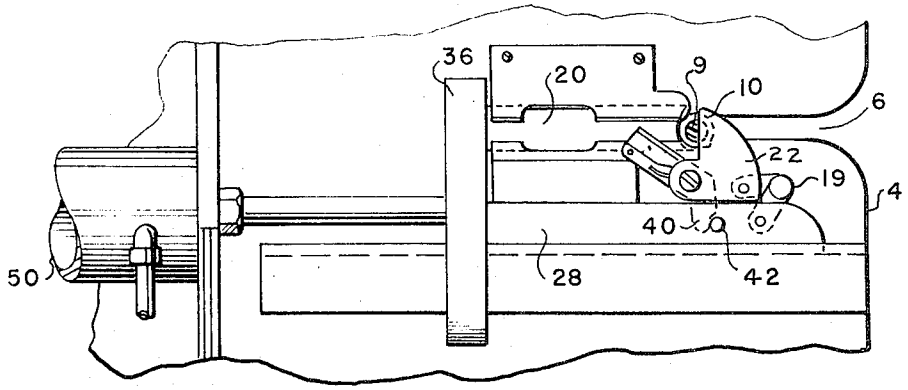


Fig. 9.

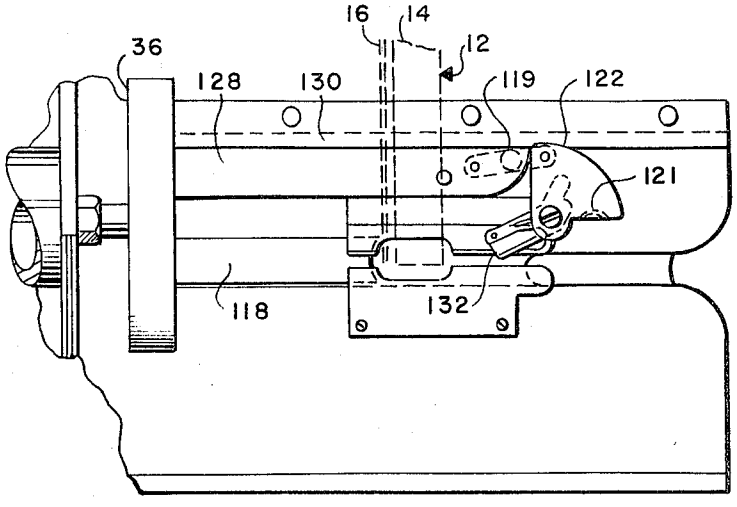


Fig. 10.

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3,383,746

DEVICE FOR SECURING FASTENERS ON FLEXIBLE CONTAINERS

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10 Claims. (Cl. 29—33.5)

ABSTRACT OF THE DISCLOSURE

A device for fastening the neck portion of a flexible bag with a staple fastener comprising a member adapted for receiving the neck portion of a bag, means for positioning a fastener about the bag neck, a rotatable anvil which moves into and out of position to receive the open end of a fastener positioned about the bag neck, and a driver anvil for driving said fastener against the rotatable anvil thereby securing this fastener about the bag neck.

This invention is related to securing fasteners on flexible containers such as plastic bags, sausage casings, paper bags and the like. In one aspect the invention relates to a device for forming a sealed flexible container.

The packaging of articles, such as foodstuffs, in flexible containers has employed a wide variety of techniques for closing the container to protect the product. In recent years the use of tubes or bags of thin flexible films has become very important particularly with the advent of shrinkable type film, e.g. biaxially oriented polyolefins, saran, polyvinyl chloride and the like. The product is placed in a tube of film or a bag having an open end and the end(s) sealed. In some instances the end(s) may be thermally sealed by welding but difficulties arise when the area to be sealed is too thick or when the end or neck of the bag or tubing is twisted or gathered. The use of staple type metal fasteners has become widespread and it is frequently possible to obtain a substantially hermetically sealed package. The staples are placed over the gathered or twisted end of the bag or tubing and the ends or legs crimped to tightly encircle the bag or tubing neck. The excess film is then severed.

Many devices have been proposed for crimping or securing these fasteners. Most of these devices have become rather complicated in an attempt to insure an effective seal and to reduce the possibility of operator error.

It is an object of the invention to provide apparatus for forming a sealed flexible container.

It is another object of the invention to provide apparatus for securing a fastener about a constricted portion of a flexible container.

These and other objects of the invention will be readily apparent to those skilled in the art from the accompanying disclosure, drawings and appended claims.

These objects are broadly accomplished by a fastening device for staple-type fasteners wherein the clinching anvil is rotatable so that the constricted portion of the container, e.g. bag neck, may be placed in position for receiving the fastener with the clinching anvil out of the way. The clinching anvil is then rotated into position to receive the forward open end of the fastener. In one embodiment, a severing means is associated with the rotatable anvil so as to automatically sever the bag neck when the fastener has been secured.

The invention is not restricted to any particular type, size or shape of fastener. A preferred fastener is a U-shaped open ended member generally made from aluminum wire and frequently referred to as a wire clip. The clips may

be joined together into an assembly prior to use in the device such as by adhesive, shellac, varnish, strips of adhesive or the like although such is not necessary and generally not preferred for the operation of this device.

FIGURE 1 is a perspective view of the device of the invention in its entirety.

FIGURE 2 is a perspective view of the forming anvil, cut-off knife and knife shield.

FIGURE 3 is a rear elevation of the device partially in section.

FIGURE 4 is a front elevation view of the device in partial section.

FIGURE 5 is a perspective view of the cut-off knife and spur.

FIGURE 6 is a perspective view of the neck of the flexible bag with the wire clip fastener formed thereon.

FIGURE 7 is an air flow diagram showing the air flow for the valves.

FIGURE 8 is a partial elevation of FIGURE 1 taken on line 8—8 with the clip in the feed track and the anvil in the rest position.

FIGURE 9 is a partial elevation of FIGURE 1 taken on line 8—8 with the clip positioned around the neck of the bag and being deformed by the forming anvil.

FIGURE 10 is a partial elevation of a device similar to the device shown in FIGURE 1 with the forming anvil being positioned above the clip feed track.

Although the clip forming device of this invention can be positioned horizontally, vertically, obliquely or upside down. The horizontal position is shown in FIGURE 1. Any suitable type of support member can be employed such as a table or the like. It is generally preferred that the device be portable and mounted on a relatively simple framework. For example, the device can be mounted on a base member 2 having a backing member 4 vertically positioned at right angles to the base. The shape of the base and backing member will be dictated by consideration other than the actual functioning of the machine with the corners being rounded, rectangular or the like. Cover plates may be employed to improve its appearance and to protect the functioning elements. A throat 6 formed by cutting an elongated slot in backing member 4 is employed for guiding the neck of the bag, which may be twisted or gathered, into position to receive the clip 10. The clips are preferably formed from wire, such as aluminum, into U-shaped members with the legs or prongs and throat widths being sufficient to completely encircle the neck portion of the gathered or twisted bag 9 as shown in FIGURE 6. The clips 10 must be positively fed into position so as to permit the open end to slide over and under the gathered bag positioned in throat 6. The clips may be fed to the device by any suitable means, such as a clip feed track 12 comprising a guide member 14, a flange support member 13 and flange member 15 combined with a rod 16. The clips are dropped over the upper extremity of clip guide track 14 and may be fed by gravity into clip feed station 20 for feeding into throat 6. It is within the skill of the art to provide a weighted member (not shown) which is positioned on top of the uppermost clip to insure positive feed. The clips, one at a time, are fed into a clip guide track 8 which has an enlarged opening or clip feed station 20 in the side thereof so that the clips will be fed forwardly being positively guided in a vertical position by the track 8. Any suitable driving means may be employed for causing the first clip to be removed forwardly from feed station 20 into feed track 8. For example, a periodically actuated clip ram or drive anvil 18 may be employed to force the clip forward. Suitably, a horizontal reciprocating piston 51 positioned interiorly of a cylinder 50 and having a piston rod 52 connected to a ram plunger 36

may be used to drive anvil 18 fixedly secured to plunger 36. Air or other fluid may be injected rearwardly of piston 51 through conduit 65. There may be provided support for the cylinder and piston rod such as by support member 49 suitably attached to backing member 4 (or base member 2). When the gathered neck of the bag 9 is pushed by the operator into throat 6, the trigger 88 is pushed rearwardly. The anvil 22 is pivotally mounted such as by pin 26. The anvil 22 is shown in FIGURE 1 in the rest position, that is, with no bag in the device. The movement of trigger 88 rearwardly causes trigger arm 84 to move rearwardly thereby tripping switch 80 and actuating valve A which initiates movement of piston 51 forwardly. Not only does ram plunger 36 cause clip ram 18 to move forwardly but it also causes anvil ram 28 to move forwardly thus striking the lower portion of the forming anvil 22 and causing anvil 22 to pivot about its axis (pin 26). The anvil 22 is a quadrant so that when the anvil ram 28 causes the anvil to pivot 90° the upper surface of anvil ram 28 also supports the lower portion of anvil 22 in this position so that the anvil grooves 21 are essentially vertical. The grooves 21 are so shaped and positioned that the forward portion of the legs of the clips 10 are caused to be deformed about the bag as shown in FIGURE 6.

The anvil ram 28 is guide by anvil ram guide 30 suitably attached to backing member 4. The anvil assembly shown on FIGURE 2 also comprises a knife or cut-off member 32 with a shield 46. Suitable spacing 48 is provided between anvil 22 and shield 46 for rotation of the knife about pin 26. As best shown in FIGURE 5, the knife 32 is a portion of the assembly which consists of an opening 35 for pin 26 and a spur 40 on the lower portion of the knife member. As shown in FIGURE 1, the knife is positioned rearwardly and below the position in which the bag neck will reside. A pin or projection 42 is positioned on the anvil ram 28 so that as ram 28 is moved forwardly pin 42 will slide by spur 40 on knife 32 and cause but a minor deflection downwardly of knife 32. A hair spring 33 interconnecting knife 32 and pin 26 causes the knife to return to its rest position after projection 42 passes forward of spur 40. After the anvil 22 has been rotated to a vertical position and the clip 10 has been formed about the neck of bag 9, air flow to the rear of piston 51 is terminated and instead injected through conduit 61 onto the forward face of piston 51 thus causing piston rod 52 and consequently rams 18 and 28 to move rearwardly. As projection 42 moves rearwardly, it strikes the forward face of spur 40 thus causing knife 32 to pivot clockwise about pin 26 so as to sever the bag neck. The operator then removes the bag neck and severed portion from throat 6 thus permitting a compression spring 86 to drive trigger arm 84 and trigger 88 forwardly to permit a new cycle.

The operation of the various rams, anvils, knives and the like may be effected by any suitable means, mechanical, electrical or pneumatic. For example, a suitable pneumatic system is illustrated by the air flow diagram in FIGURE 7. Air by any suitable source is supplied through conduit 60 to valve C. Air is permitted by suitable valving means C to flow through conduit 61 to the front of piston 51 thus keeping it in the rest position as shown in FIGURES 1 and 8. Air is also permitted to flow through conduit 62 to a 3-way valve A.

When the operator pushes trigger 88 rearwardly by insertion of the bag neck into throat 6, this causes trigger projection 84 to strike cam follower 80 thus opening valve A which permits air to flow through conduit 64 causing 4-way valve C to close conduits 61 and 62 and to permit air to flow through conduit 65 into the rear of piston 51 thus driving the piston rod 52, plunger 36, anvil ram 28 and clip ram 18 forwardly. Air is permitted to flow through conduit 66 to 3-way valve B.

When the plunger 36 moves forward it strikes cam follower 82 thus opening valve B which permits air to flow through conduit 68, flow regulator D and conduit 70 to 4-way valve C. This causes the valve C to close conduits 65 and 66 and permits air to flow through conduits 61 (and 62) thus causing the return of piston 51 rearwardly which allows a new cycle to begin.

The operation of the device is best illustrated in FIGURES 8 and 9 showing anvil 22 in its rest position in FIGURE 8 with the clip in feed station 20 of track 8 whereas FIGURE 9 shows the anvil 22 pivoted 90° upwardly by anvil ram 28 in position for receiving clip 10 about the bag neck 9. It will also be readily seen in FIGURE 9 that projection 42 is positioned so as to strike spur 40 and to pivot the knife 32 clockwise so as to sever the neck of bag 9. Also shown is mechanical linkage 19 for interconnecting the anvil 22 and ram 28 to provide for return of anvil 22 to its rest position upon rearward movement of ram 28.

FIGURE 10 illustrates one of the many possible modifications of the device wherein the anvil 22 is positioned above the throat 6 instead of below the throat as shown in the preceding figures. Thus, anvil ram 128 moves forwardly above the throat 6 in track 130 so as to strike anvil 122 moving it clockwise downwardly. The clip driving anvil 118 and the anvil ram 128 are interrelated essentially identically as in the device previously shown so that the clip will strike anvil grooves 121. The knife 132 and linkages 119 operate essentially the same as the device described in FIGURE 1.

Although specific processes and apparatus have been described for purpose of illustration, the invention is not to be so limited. Various modifications can be effected by those skilled in the art within the scope of the invention.

We claim:

1. A device for fastening the neck portion of a flexible bag with a staple fastener comprising:
   (a) a base member having a throat opening in an edge thereof adapted for receiving the neck of the flexible bag,
   (b) a fastener feed track adapted for guiding a U-shaped fastener into position about the neck of said bag positioned in the rearward terminus of said throat opening,
   (c) fastener feed means for inserting a fastener into said feed track,
   (d) a reciprocal driver anvil adapted for transporting said fastener in said feed track from said feed means to said bag neck,
   (e) a rotatable clinching anvil having a pair of grooves in a face thereof, and means adjacent the forward terminus of said feed track for mounting said rotatable anvil,
   (f) means for severing the outer extremity of said bag neck after said fastener has been secured; said severing means being rotatable about a common axis with said rotatable anvil,
   (g) means for rotating said rotatable anvil so that said grooves are in position to receive the ends of a fastener partially enclosing said bag neck so that driver anvil forces said fastener ends into said grooves thus encircling said bag neck,
   (h) means for counterrotating said rotatable anvil, and
   (i) means for periodically actuating said driver anvil.

2. The device of claim 1 wherein said means for rotating said rotatable anvil comprises a reciprocal ram member having a forward surface which causes the anvil to rotate 90° and having a second surface which firmly secures said rotatable anvil during the securing of said fastener.

3. The device of claim 2 wherein an outwardly projecting pin disposed on said ram cooperates with an engaging means on said means for severing and is adapted to rotate said means for severing responsive to the rearward movement of said ram.

4. The device of claim 3 wherein said engaging means is adapted to slidably engage said ram pin during the forward movement thereof.

5. The device of claim 2 wherein said ram and said driver anvil are both reciprocally actuated by the same means for periodically actuating said driver anvil.

6. The device of claim 1 wherein said clinching anvil is rotatable about an axis adjacent and below said feed track when said device including driver anvil is horizontally disposed.

7. A device for fastening the gathered or twisted neck portion of a flexible bag with a U-shaped open-ended wire clip fastener comprising:

(a) a vertically disposed base member having an elongated horizontal throat opening in a side edge thereof,

(b) a horizontally disposed fastener guide track having its forward terminus terminating at the rearward terminus of said throat opening and adapted to guide fasteners in a substantially upright position, open end forward, to enclose a bag neck positioned horizontally within the rear portion of said throat opening and perpendicular to said base member,

(c) means for providing ingress of said fastener, one at a time, into a rear portion of said feed track,

(d) an upright arcuate fastener supply means for supplying fasteners to (c) in a substantially upright position,

(e) a horizontally reciprocal driver anvil adapted to remove said fastener from said supply means and transport said fastener forward in said feed track to first cause said open end of said fastener to partially enclose said bag neck, and then to drive said fastener ends against a rotatable clinching anvil to completely enclose said neck and secure said fastener,

(f) means for reciprocally actuating said driver anvil,

(g) a rotatable clinching anvil-knife assembly rotatable on an axis below said feed track and adjacent the forward terminus of said feed track,

(h) said rotatable clinching anvil comprising a quadrant shaped anvil with a pair of parallel grooves in an upper face,

(i) a horizontally reciprocal anvil ram positioned actuable by said means (f), the forward surface of said ram causing said rotatable clinching anvil to rotate 90° counterclockwise into position to receive the forward end of said fastener for securing about said bag neck, and the upper surface of said anvil ram securing said rotatable anvil in a fixed position during the securing of said fastener,

(j) linking means for returning said rotatable anvil when said anvil ram is reciprocated rearwardly,

(k) said knife being rotatable about the same axis as said clinching die and having an upward facing knife edge to the rear of said axis, said knife having a spur on the lower portion thereof, and

(l) a pin on said ram adapted to slidably engage said spur on its forward movement but engaging said spur on its rearward movement thereby rotating said knife clockwise so as to sever the bag neck exteriorly of said secured fastener.

8. The device of claim 7 wherein a trigger positioned in said throat opening is adapted to actuate said means (f) to cause the forward movement of said driver anvil and anvil ram when a bag neck is positioned in said throat.

9. The device of claim 8 wherein said anvil ram, at its forward terminus, causes said forward movement to cease and causes said means (f) to cause the rearward movement of said driver anvil and ram.

10. The device of claim 8 wherein said trigger is moved forward by an urging means when said bag neck is removed.

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