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VACUUM BAG CLIP FASTENER APPARATUS

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2 Sheets-Sheet 1

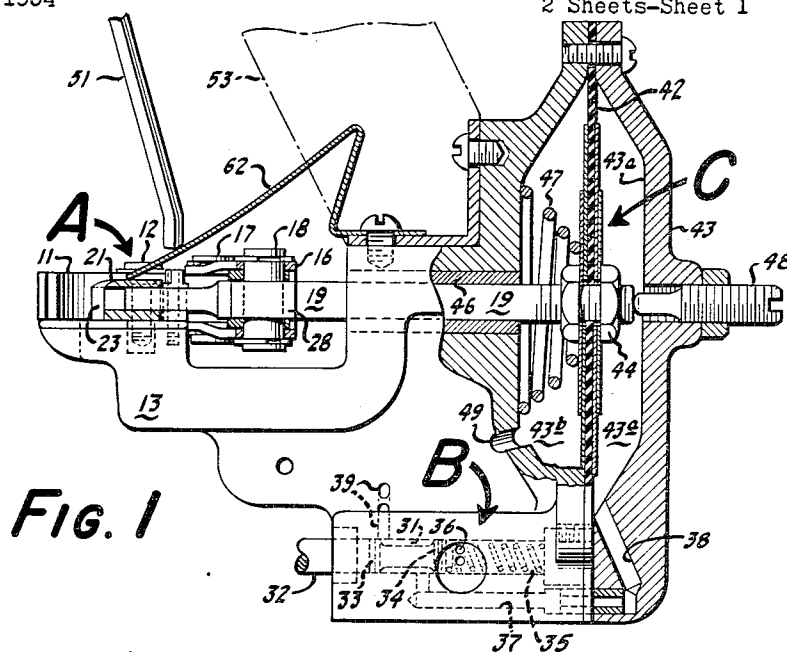


FIG. 1

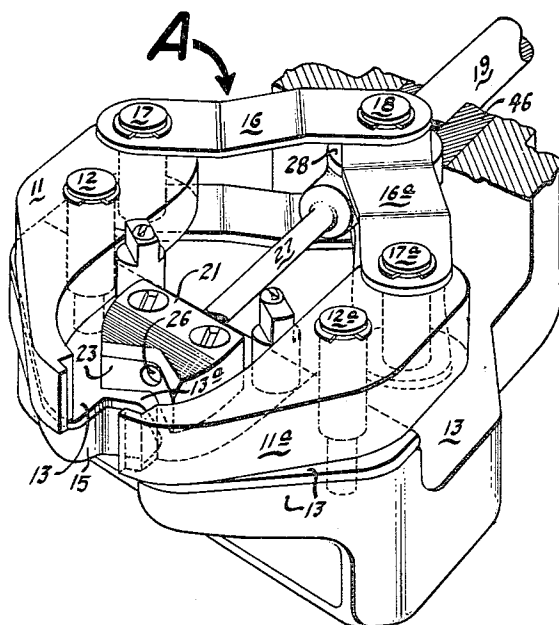


FIG. 2

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FIG. 7

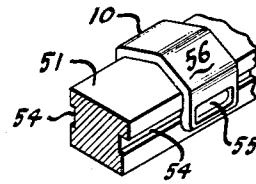
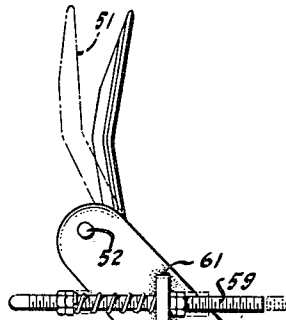


FIG. 8

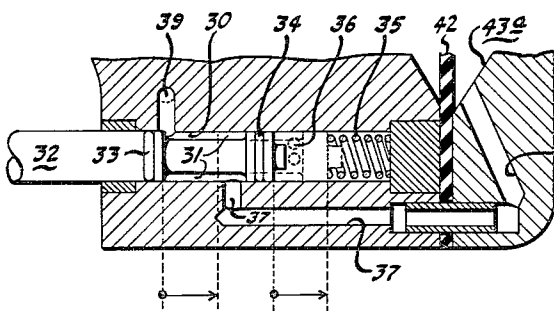


FIG. 4

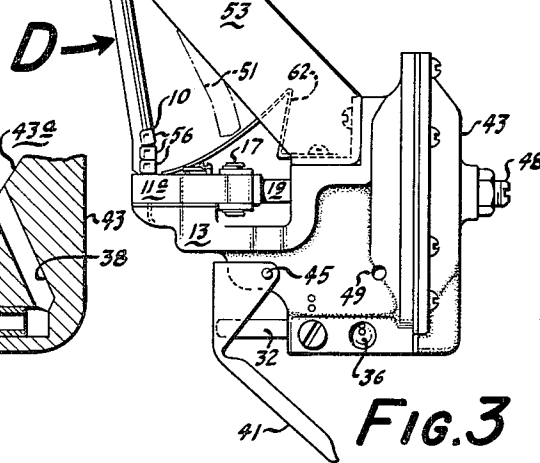


Fig.3

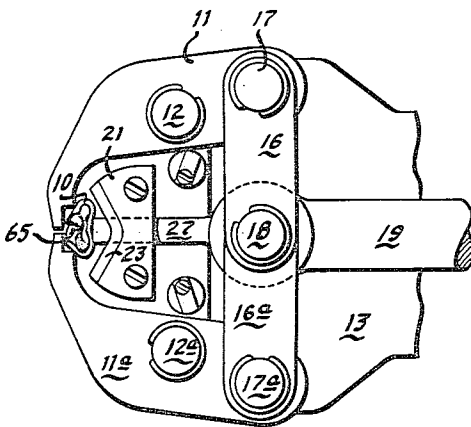


FIG. 6

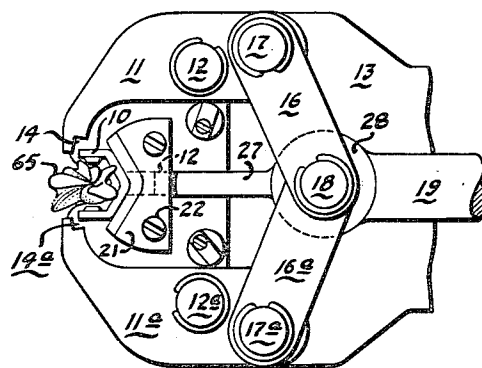


FIG. 5

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VACUUM BAG CLIP FASTENER APPARATUS

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Application January 21, 1954, Serial No. 405,314

3 Claims. (Cl. 1—187)

This invention relates to a new and improved vacuum bag clip fastener apparatus.

It is common practice for many commercial processors of commercial fowl such as turkeys to vacuum pack the birds in collapsible air-tight bags of suitable synthetic plastic material, such as, for instance, pliofilm or polyethylene. In my copending application Serial No. 262,103 there is described and shown a vacuum packing and lifting device suitable for use in the vacuum packaging of fowl within collapsible plastic bags.

One frequently employed way of vacuum packaging birds involves the steps of inserting the fowl within the bag and then, through means of a vacuum nozzle inserted within the bag mouth, exhausting the air from the bag interior. Before removing the vacuum nozzle from the bag mouth it is customary to twist the bag a number of times around its own axis to cause the neck of the bag to twist tightly around itself forming an air-tight constriction to prevent air from entering the bag interior after removal of the vacuum nozzle. Thereupon, the twisted neck portion of the bag is tied or sealed permanently closed as by means of a generally U-shaped metal clip forcefully crimped and flattened around the constricted bag neck.

It is a principal object of the present invention to provide an improved metal clip jaw clamping device which is particularly suitable and useful for forcefully clamping and flattening out U-shaped metal clips of the type above referred to around the constricted neck of a conventional vacuum bag used by many turkey processors at the present time. A more specific object of the invention is to provide a metal clip fastener which incorporates laterally movable jaws for initially crimping the legs into clamping engagement around the bag neck, in conjunction with a booster rod or plunger synchronized with the action of the jaws to forcefully engage and flatten the web of the horseshoe clip after the jaws have operated to substantially fully close the legs of the clip against the bag neck. I have discovered that the booster rod synchronized to operate in conjunction with the laterally movable clamping jaws in the manner above mentioned functions to more forcefully clamp and flatten out a U-shaped clip around a bag neck and thereby provide a tighter air seal than can be accomplished using more conventional clip fasteners in use today.

A further object of the invention is to provide a clip fastener of the type briefly mentioned above which may be employed to close and flatten out U-shaped clips of a single preselected standard size around the necks of different size bags which may vary considerably in the diameter of bag neck size. In this connection it is usual practice in the vacuum packaging of birds to use clips of varying sizes to accommodate different size bags, in which the diameter of the constricted neck may vary considerably. Thus, according to more conventional practice, in packaging fowl in a relatively smaller size bag presenting what might be considered as a minimum restricted neck diameter a relatively smaller size metal clip

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is employed than would be in the case of sealing the neck of a comparatively larger size bag. Processors engaged in the packaging of different size birds generally find it necessary or practical to keep on hand and to use as many as three different sizes of U-shaped clips to secure an air-tight seal around bag necks of varying sizes. As indicated hereinabove the present clip fastener functions to clamp and flatten out even the largest of what is generally regarded as standard size U-shaped clips to such an extent that it is unnecessary to use smaller size clips even when sealing the smaller size bags. Hence in using the present clip fastener it is unnecessary for a processor to stock and keep on hand different size clips, nor is it necessary for an operator of the machine to initially concern himself over the selection of what size clip should be used in connection with a given bag sealing operation.

Numerous other objects and advantages 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 vertical sectional view of the device showing portions broken away in section.

Fig. 2 is an enlarged fragmentary view in perspective of the clamping jaw mechanism.

Fig. 3 is a side elevational view of the clip fastener.

Fig. 4 is an enlarged longitudinal sectional view of the air inlet valve assembly.

Fig. 5 is a fragmentary top plan view of the jaw clamping mechanism in open position.

Fig. 6 is an enlarged fragmentary view of the jaw clamping assembly in fully closed position.

Fig. 7 is an enlarged perspective view of a type of U-shaped clip suitable for use in conjunction with the fasteners.

Fig. 8 is an enlarged fragmentary perspective view of a U-shaped clip supported on a clip mechanism feed bar.

Referring more specifically to the drawings, the clip fastener apparatus embodying the invention is shown as comprising, generally, a clamping jaw assembly A, an air inlet and exhaust valve assembly B, an air cylinder and diaphragm assembly C, and a clip magazine and feed assembly D.

The jaw clamping mechanism, heretofore indicated generally at A, comprises, more specifically, a pair of laterally swingable clamping jaws 11—11a, pivotally mounted by pins 12—12a to the frame structure 13 of the apparatus. The forward ends of each jaw are notched as at 14 and 14a to provide a means for retaining U-shaped clip such as indicated at 10 securely between the jaws and to prevent forward or lateral displacement of the clip positioned between the jaws during clamping operations. Jaws 11 and 11a are operated from open to closed position by means of a toggle mechanism comprising arms 16 and 16a pivotally attached as at 17 and 17a to the rear ends of jaws 11 and 11a respectively. Both of the toggle arms 16 and 16a are pivotally secured by pin 18 to ring bearing 28 of piston rod 19 extending from air cylinder and diaphragm assembly C.

Jaw clamping mechanism A further comprises a clip positioning and abutment block or member 21 secured as by screws 22 to frame 13 of the device. The guide face of the member is formed with a generally V-shaped cut-out 23, shaped and proportioned to conform to the substantially wide V-shaped web of the metal clips 10 which are adapted to be used in connection with the device. The positioning block 21 is also formed with a central bore 26 having its axis aligned with the point of closing between jaws 11—11a. A booster or follower rod 27 is slidably mounted within the bore 26 and is secured at

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its rearward end to ring bearing 28 provided as an integral extension on piston rod 19. As will more fully hereafter appear when the piston rod 19 is driven forwardly upon operation of piston diaphragm assembly C, the booster or follower rod 27 will move in synchronized relation to the closing of jaws 11—11a by toggle arms 16—16a so as to contact and flatten the web of a clip around the neck of a bag after jaws 11—11a have substantially fully closed against the legs of the clip.

The forward edge of frame 13 is formed with a vertical slot or groove 15 large enough to accommodate the constricted neck of a vacuum bag to be clipped. The clip positioning block 21 is secured to the frame 13 with the V-shaped face 23 of the block spaced rearwardly of the rearward edge of frame 13, thereby defining a narrow ledge or seat 13a extending a short distance forwardly of block 21 for supporting a U-shaped clip in position for clamping between the jaws 11—11a.

The air inlet valve assembly, heretofore indicated generally at B, may comprise more specifically, a valve chamber 31 in which slidably reciprocates a piston valve 32 provided with a pair of spaced gaskets or O-rings 33 and 34 respectively. The portion of the piston 32 which is disposed between O-rings 33 and 34 is of substantially reduced diameter providing an annular space or passage 30 between the piston and the interior walls of the valve chamber 31.

An inlet air port 36 adapted for connection to a source of air under pressure such as an air compressor (not shown) communicates with the interior of valve chamber 31. Conduit 37, which may be formed as a bore through the valve housing itself, establishes communication between the valve chamber 31 and the air cylinder inlet port 38. Exhaust port 39, also formed as a bore through the valve casing, is provided to establish communication from chamber 31 to atmosphere.

It is noted that the aforementioned ports and conduits 36, 37 and 39 are spaced from one another longitudinally of the valve chamber 31. More specifically inlet port 36 is spaced to one side of conduit 37 a distance somewhat less than the distance between O-rings 33 and 34, whereby, when the piston valve 32 is moved inwardly against the force of valve spring 35, air communication will be established between the compressory source and the air piston and cylinder assembly C, via inlet port 36, annular passage 30, conduit 37, and cylinder inlet port 38.

When the piston valve occupies its normal position (i. e. to the left in Figs. 1 and 4), O-ring 34 will occupy a position between inlet port 36 and conduit 37, thereby shutting off air communication to the air cylinder from the compressory source. By the same token, movement of the piston valve to its normal position under influence of spring 35 will establish air communication between air cylinder C and atmosphere via conduits 38 and 37, annular passage 30, and exhaust port 39.

To facilitate manual operation of the valve a pusher plate 41, or the like, pivoted as at 45 to frame 13 of the device and adapted to bear against the outer projecting end of valve stem 32 may be provided. Manual pressure against the pusher plate will of course, cause the piston valve to move inwardly to open communication between the compressory source and air cylinder as aforesaid.

The air cylinder assembly heretofore indicated generally at C may comprise a conventional piston diaphragm 42 formed of reinforced rubber or the like, and secured about its periphery transversely within cylinder casing 43. The piston rod heretofore designated at 19 is secured as by clamp nuts 44 to the piston diaphragm centrally thereof—the piston 19 being adapted to reciprocate back and forth within bearing 46 corresponding to movements of the piston diaphragm 42. The piston diaphragm is shown as being normally held in position extending centrally of the cylinder 43 by means of an expansion spring 47 disposed on one side of the piston and an adjustable abutment member 48 threadedly projected through the base

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of cylinder 43 for engagement against the rearward end of piston 19. It is seen that the length of piston stroke as determined by movement of the diaphragm can be regulated through adjustment of member 48. The side of the cylinder casing 43a away from the jaw clamping mechanism is, of course, in communication with conduit 37. The opposite side 43b of the cylinder casing is open to atmosphere via vent 49.

The clip magazine and feed assembly heretofore designated generally at D, may comprise a feed bar 51 pivotally supported as at 52 to bracket 53 extending upwardly from frame 13 of the device.

The feed bar 51 is shown as being formed with opposite longitudinally extending grooves 54 for slidably receiving the guide lugs 55 of the U-shaped clips 56. In this connection I have found it convenient to employ metal clips of the type commercially produced and sold by Dewey Almy Chemical Company of Cambridge, Mass., under the trade name "Cry-O-Vac." These types of clips comprise a V-shaped web portion 57 and spaced parallel legs 58 formed with stamped inwardly projecting guide lugs or indentations heretofore indicated at 55.

A feed bar of the type shown in the drawings and which is grooved longitudinally throughout its entire length permits the metal clips to be continuously slidably fed onto the bar from the top end and to be continuously fed one by one into position between the clamping jaws from the bottom end of the feed bar. The lower end of said bar 51 is normally spring biased into its feed position directly above V-shaped face 23 of positioning block 21. A spring biased plunger arm 59 may be mounted on bracket 53 to normally spring bias the bottom end of the feed bar into its feed position. The spring force of arm 59 may be adjusted so as to permit the lower end of the feed bar to be easily, manually swung rearwardly out of feed position during the interval that a bag neck is moved into or occupies a position within the jaws 11—11a. To prevent the metal clips from dropping off when the feed bar is swung in or out of its feed position, an arcuate flat spring slide 62 may be mounted to extend upwardly and rearwardly from block 21 against which the bottom end of the bar can slidably move. In Fig. 3 the position of the feed bar in its normal feed position directly above the V-shaped face 23 of guide block 21 is shown in full lines, whereas the position of the feed bar in its rearward retracted position is shown in broken lines.

The use and operation of the device can be readily understood by having reference to a typical example of how the apparatus can be employed to clamp and fasten a metal clip around the neck of a vacuum bag such as indicated at 65, in which a turkey or the like has been packaged. After air has been exhausted by means of a vacuum nozzle or the like inserted within the mouth of a vacuum bag in which a turkey is packaged, the bag neck can be temporarily sealed to prevent air communication between the bag interior and atmosphere by twisting the bag neck a number of times around its own axis. With the bag in this condition, it is convenient for an operator to grasp with both hands the twisted neck portion of the bag to move the same into position within the clamping jaws 11—11a of the device and between the legs 58 of a clip 10 positioned for clamping between the jaws by feed bar 51. By placing his two hands above and below the portion of the bag neck to be clamped, one hand of the operator can move below and the other above the jaws in manipulating the bag neck into or out of position between the clamping jaws.

As the operator's upper hand is moved inwardly above the clamping jaws to bring the bag neck into position between the jaws, it will necessarily strike against the lower end of the feed bar and cause it to swing rearwardly along slide 62 against the light spring force of arm 59. Then, with the twisted bag neck positioned within the clamping jaws, an operator, by pressing inwardly on pressure plate 41 with his lower hand or with his lower forearm or

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elbow, will actuate piston valve 32 to open communication between the compressory source and air cylinder. Air pressure introduced into side 43a of the air cylinder will drive diaphragm 42 forwardly and move piston rod 19 correspondingly to cause jaws 11—11a to forcefully clamp shut against and crimp legs 58 of clip 10.

The length of booster or plunger rod 27 is preferably such that its forward end moves through aperture 26 in block 21 and into forceful engagement with web 57 of clip 10 just when the toggle arms 16—16a are approaching center (as shown in Fig. 6) and when the jaws 11—11a have substantially fully closed and crimped the legs of the clip tightly around the bag neck. Thus, during the last fraction of an inch or so in travel of the piston rod 19 under influence of air pressure acting against the diaphragm 42, follower rod 27 will forcefully engage and flatten the web 57 of the clip into tight clamping engagement about the neck of the bag. As already noted, by being able to forcefully flatten the web of the clip after the legs thereof have been tightly crimped against the bag neck, it is possible to obtain a much tighter seal around the bag neck than would be possible simply by crimping the legs of the clip together in a more conventional fashion. Moreover, it is also possible with the present clip fastener to seal the necks of both the relatively smaller and larger bags using only a single preselected size clip which eliminates the necessity of having to choose and use different size clips for different size bags as is conventional practice in many of the commercial fowl processing plants in operation today.

After the clip fastener has operated to crimp the metal clip around the neck of the bag, the jaws will automatically open upon the operator's manual release of the valve pusher plate 41. More specifically and as above noted, spring 35 in valve chamber 31 functions to normally spring bias the piston valve 32 to its position shown in solid lines in Fig. 4. In this position, air communication between the air cylinder and atmosphere is established via conduits 38—37, annular passage 30 and exhaust port 33. Therefore, exhaust of air pressure from side 43a of the air cylinder will permit spring 47 to move diaphragm 42 back to its normal position within the air cylinder. This diaphragm movement also, of course, causes reciprocation of piston rod 19 to the right as shown in Fig. 1 with consequent opening of the clamping jaws and retraction of the booster rod 27 to its position disposed rearwardly of guide surface 26 of the positioning block. Moreover, as soon as the operator moves his hand away from above the jaws, the feed bar 51, under influence of spring biased arm 59, will swing back to its feed position directly above and forwardly of face 23 of the block to automatically feed a new clip into position for clamping.

Although the present 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 made within the spirit of the invention and scope of the appended claims.

I claim:

1. A clip fastener for crimping U-shaped metal clips around the neck of a vacuum bag comprising: a stationary clip positioning block formed with a front guide surface adapted to engage and position a U-shaped metal clip for crimping; a pair of oppositely disposed clamp-

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ing jaws pivotally supported on said supporting frame for closing and opening relatively toward and away from one another and relatively toward and away from said clip positioning block; a booster rod mounted on said supporting frame for relative reciprocal movement toward and away from the plane of the guide surface of said positioning block for engaging the web of a U-shaped clip positioned against said guide surface; and driving means for forcefully closing said clamping jaws toward one another and said block and for forcefully reciprocating said booster rod beyond the plane of the guide surface of said block and into forceful engagement with the web of a clip positioned against said surface; the reciprocal movement of said booster rod being synchronized relative to the movement of said clamping jaws to reciprocate beyond the plane of the guide surface of said positioning block and into contact with a web of a U-shaped clip after said clamping jaws have moved to a substantially fully closed position against the legs of a said U-shaped clip.

2. A clip fastener for crimping U-shaped metal clips around the neck of a vacuum bag comprising: a stationary clip positioning block formed with a front guide surface adapted to engage and position a U-shaped metal clip for crimping; a pair of oppositely disposed clamping jaws pivotally supported on said supporting frame for closing and opening relatively toward and away from one another and relatively toward and away from said clip positioning block; an axial bore formed through said positioning block extending from the back surface to the front guide surface of said block; a booster rod slidably supported in said axial bore for reciprocal movement from a point disposed rearwardly of the guide surface of said block to a point projecting forwardly of said surface; driving means including a piston rod located rearwardly of said piston block mounted for reciprocal movement relatively toward and away from said block; means connecting said piston rod with said clamping jaws for forcefully moving said clamping jaws to closed position when said piston rod is reciprocated toward said block; and means connecting said piston rod with said booster rod for forcefully reciprocating said booster rod from its position disposed rearwardly from the guide surface of said block to its position projecting forwardly of said guide surface when said piston rod is reciprocated toward said positioning block.

3. The combination of claim 2 and wherein the reciprocal movement of said booster rod is synchronized relative to the closing movements of said clamping jaws so that said booster rod moves forwardly of the guide surface of said positioning block and into engagement with the web of a U-shaped clip positioned against said block only after said clamping jaws have moved to substantially fully closed position against the legs of the U-shaped clip.

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