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J. J. FRANK
CLOSURE FASTENING

3,113,379

Original Filed March 11, 1952

2 Sheets-Sheet 1

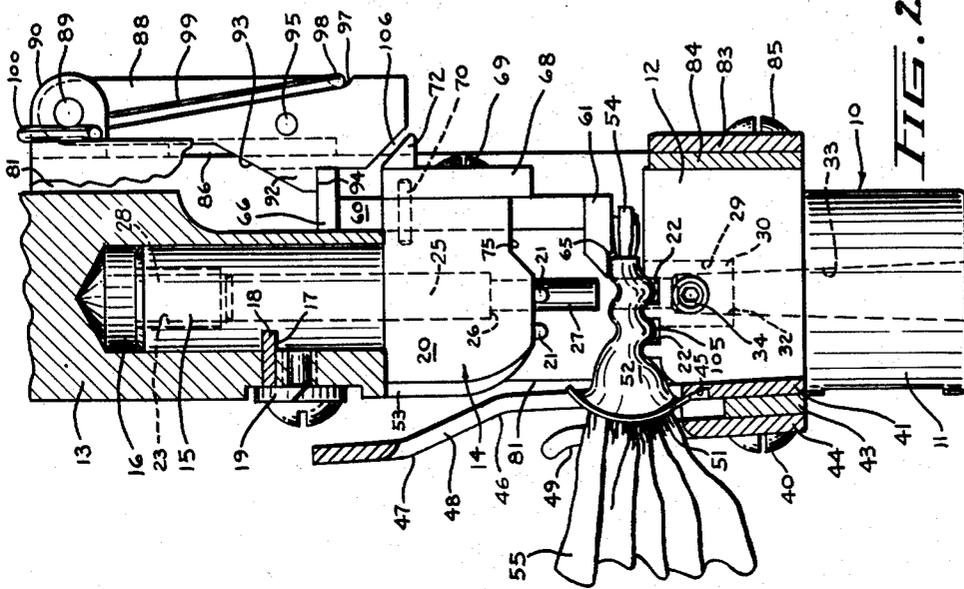


FIG. 2

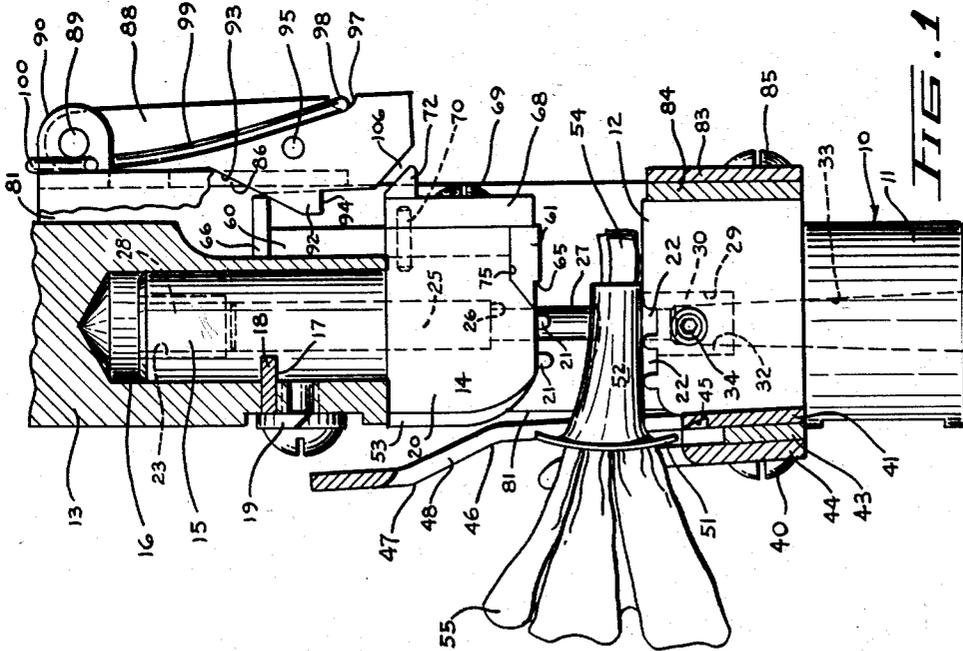


FIG. 1

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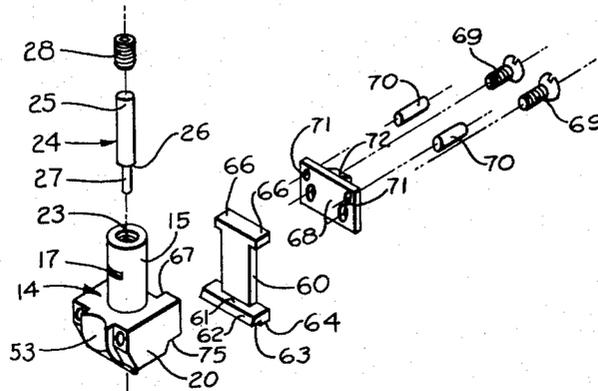


FIG. 3

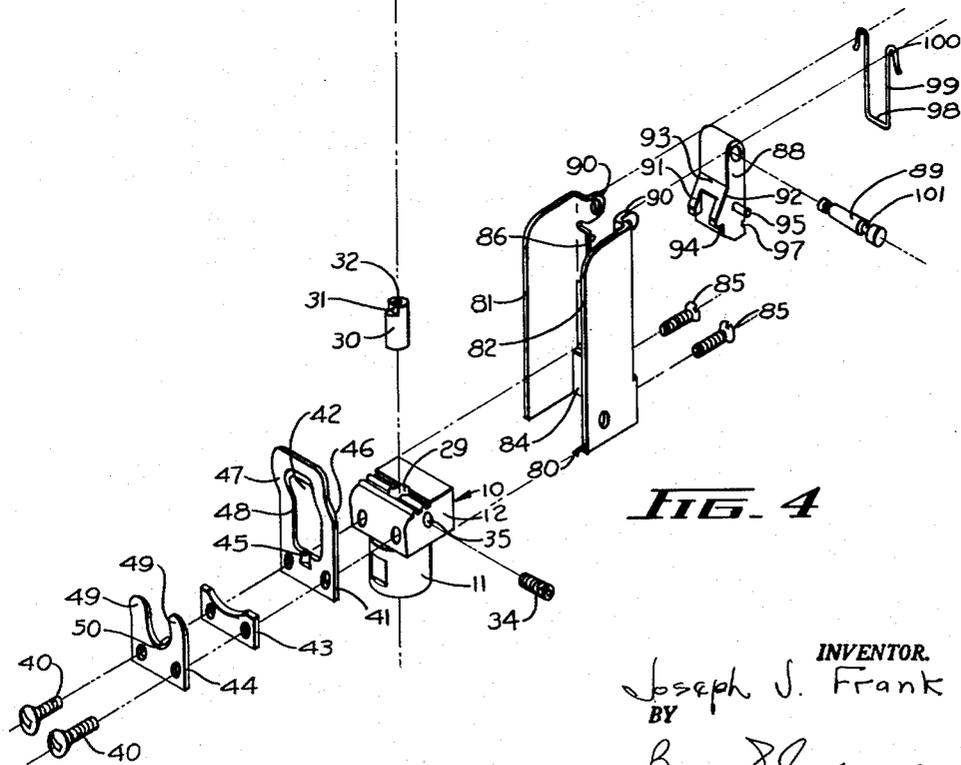


FIG. 4

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3,113,379

CLOSURE FASTENING

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3 Claims. (Cl. 29-566)

This application is a continuation of Joseph J. Frank, Serial No. 276,015, filed March 11, 1952, now abandoned.

This invention relates to a machine for fastening closures. In United States Patent No. 2,493,063, there is disclosed a new method of fastening closures and a new closure fastener, the latter of which is called a barrel fastener or a malleable cylinder fastener. In the application of such fasteners the fastener, a small metal cylinder with a flange at one end, is collapsed upon the neck of a flexible tube or bag and crimped in place, while a punch makes a hole in the fastener and the material fastened, so that the container and its enwrapped material can be suspended from a hook. The apparatus heretofore employed for making this punch closure has been commercially successful, but has given some difficulty because of the wearing of the punch parts, and because of the difficulty of removing the punched fastener, after it has been crimped, from the punch stud.

It is an object of this invention to make a machine, for applying malleable cylinder closure fasteners, of generally improved characteristics, and particularly to improve the means of stripping the fastener from the stud of the punch after punching, and to prolong the life of the dies used in the operation.

The objects of the invention are accomplished generally speaking by the mechanism set forth in the accompanying drawing and claimed in the attached claims.

In the drawing,

FIG. 1 is a vertical partial section through the upper and lower plunger members and the punching, crimping, and stripping mechanisms forming a part of the invention;

FIG. 2 is a second view similar to that of FIG. 1 showing the parts in a different operative position;

FIG. 3 is an exploded view of the parts of the top set or die;

FIG. 4 is an exploded view of the parts of the bottom set or die.

In the type of machine which is shown in the drawings, the lower set 10 is received in a hole in a support not shown, lower set 10 includes a shank 11 which fits within a correspondingly-shaped opening within a fixed support, not shown, and is surmounted by a die or head 12 integral therewith and which, in operating position, rests upon the support. Means not shown are provided to fix shank 11 in correct rotational position within, and against withdrawal from the opening in the support. An upper support or plunger 13 is mounted by means not shown, for guided reciprocation toward and from lower set 10. This plunger has an aperture within which fits the shank 15 of a top set generally identified by numeral 14 and including a head 20 integral with the shank. Plunger 13 and shank 15 are formed with aligned keyways, such as 17, to receive a key 18 and thereby fix shank 15 in correct position with respect to the plunger. In this position the upwardly-facing surfaces of head 20 contact the lower surface of the plunger, as clearly shown upon the drawing. Key 18 is secured in position by a screw and washer combination 19, in a manner obvious from inspection of FIGURE 1. The upper face of die 12 is formed with channels or grooves 22 which define a pair of spaced parallel ribs upstanding therefrom. Similarly the lower face of head 20 is formed with a pair of spaced parallel ribs 21. The parts are so constructed and ar-

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anged that when head 20 is forced downwardly upon die 12 in operation of the machine, each rib 21 enters a respective channel 22 to thereby deform a workpiece resting upon die 12.

Top set 14 has a hole extending therethrough coaxially of shank 15. At its lower end this hole is of reduced diameter, thus forming an upwardly-facing circular shoulder. As clearly depicted upon FIGURE 3, a punch 24 is formed of upper and lower axially-aligned cylindrical parts 25 and 27 of greater and lesser diameters, respectively, to define a downwardly-facing circular shoulder 26. The upper end of the hole is threaded at 23 to receive a screw 28. The punch is sized so that its two parts fit smoothly in the corresponding portions of the hole of top set 14, and when screw 28 is turned down it engages the top end of the punch to hold shoulder 26 seated upon the aforesaid upwardly-facing shoulder of the hole. In this position the part 27 of the punch extends below ribs 21, as shown upon FIGURE 1.

Thus when the punch becomes worn, it may be replaced merely by removal of screw 28, followed by upward withdrawal of the punch from top set 14.

The lower set 10 has a recess 29 aligned with the punch in the top set 14, and a die sleeve 30 fits this recess and has its face machined, as at 31, FIG. 4 to form a part of the operating face of the die, opposite left rib 21. Right rib 21 is in two parts which receive sleeve 30 between them. The die sleeve 30 has a bore 32 equal in size, at the top, to the diameter of part 27 of the punch 24, and which extends completely through die sleeve 30 and communicates with a passage 33, FIGS. 1 and 2, extending downwardly through the central portion of lower set 10 so that punchings will drop through and be caught in a receptacle not shown. When the die sleeve 30 becomes worn or in any way damaged, it can be instantly replaced by removing the set screw 34 which is received in a threaded hole 35 in the side of the head 12 of the lower set and which holds it in proper alignment with the grooves during operation.

It should be understood, that dies of this type are expensive and that these improvements, which have been made in the upper and lower die sets, greatly prolong the life of the dies and reduce the cost of replacement when they are damaged.

A novel and improved guide is provided for the generally cylindrical fastener which is to be punched and crimped upon the neck of the closure. This guide is secured by screws 40 to the front of the lower set 10 and is composed of an inner guide plate 41 which has an opening 42 through which the unflanged end of the fastener is thrust by the operator when the fastening operation is begun. A spacer 43 is placed between the plate 41 and front blade 44 of the guide. The inner guide plate 41 is conically undercut to define a notch 45, and is bent away from the dies at 46, thus providing an outwardly cammed section 47 which assists the operator in correctly and quickly positioning the fastener. The edge of the opening 42 is bevelled as at 48. The upper ends of the front, U-shaped blade 44 are outwardly bent as at 49 and are bevelled as at 50. The construction of the guide as thus described, cooperates in great detail with the operation as indicated in FIGS. 1 and 2. The front blade 44 and the inner guide plate cooperate to impose some limitation upon the extent to which the flange 51 of the fastener 52 can be deformed, while the notch 45 of the inner guide plate receives the inbending lower edge of the flange 51 and maintains the cylindrical portion of the fastener in precisely centered position during the crimping and punching.

The front face of head 20 of top set 14 is provided with a convex land 53 which serves both as a guide for the flange 51 of the fastener 52 and a brace to prevent

the flange from bending too far during the crimping of the fastener, in this way cooperating with notch 45 in the plate 41. The width of the opening 42 in plate 41 is just slightly smaller than the diameter of flange 51. The notch 45 has a square base as shown in FIG. 4 which serves to stop the operator from lowering the flange 51 of the fastener too far, and notch 45 is also broader at the base than at the top, which furnishes an additional centering factor. The convex land 53, in combination with notch 45, acts to center the fastener by cooperating with the curved contact portions of the flange 51, and makes a more perfect seal by combining with the ribs 21 and grooves 22 to put longitudinal tension upon the metal of the malleable cylindrical portion of the fastener as it is being compressed upon the neck 54 of the bag or sausage casing 55; the curved lower face of land 53, as best seen in FIG. 1, is valuable in permitting the flattened part of the malleable cylinder, which is directly between the ribs and grooves of the dies, to conform itself naturally to the circular shape of the metal at the base of the flange.

One of the problems encountered in operation of the apparatus is to remove the fastener from stud or punch 27 after the punch hole has been made. Stud 27 passes completely through the upper and lower faces of cylinder 52, which is subsequently deformed by the ribs and grooves 21 and 22. This deformation tends to make the metal of the fastener grip the stud 27 and to make its removal difficult. A novel stripper has been provided to cooperate with the other mechanism hereinabove described to improve the functioning of the apparatus and to reduce the time necessary to free the stud from the fastener by hand, which becomes necessary when stripping mechanism does not function properly. The stripper is a unitary item comprising a body portion 60 which is of rectangular shape, a foot 61 having its front edge bevelled as at 62, FIG. 3, and having the forward portion 63, of its bottom, adapted to engage the outer end of the fastener, this forward portion being backed by a portion of greater depth 64 establishing a shoulder 65, FIGS. 1 and 2, which is designed to act as a stop to prevent longitudinal displacement of the fastener during its removal from the punch stud. The body portion 60 has at its upper end a top 66, wider and longer than the body, which serves to limit the vertical motion of the stripper in the head 20, which is provided with a groove 67 of the same width as body portion 60 serving to limit the stripper to motion relatively to head 20 in the direction of reciprocation thereof. A stripper cover or plate 68 is provided to hold the stripper 60 in the groove 67 by means of fastening screws 69 which pass through the stripper cover into the portions of the head 20 which bound the groove 67. Dowel pins 70 are received in recesses 71 in the stripper cover 68 and enter recesses in the head 20, thus forming guides which provide for the perfect alignment of the stripper cover. Good alignment is advisable because the stripper cover carries a cam 72 for cooperation with parts subsequently described. Foot 61 is received in a recess 75 provided for it in the bottom of head 20 of top set 14. As clearly shown upon FIG. 4, a guard 80 is provided having side plates 81, 82 and a cross plate 83 of about the same height as head 12 of lower set 10. A spacer 84 is provided between the guard plate 83 and the head. The guard is held onto the head by screws 85. The side plates prevent the operator from being injured by inattention and each side plate carries, toward its top, an inwardly directed flange 86, flanges 86 serving as side guides for a latch 88 which is pivoted by latch pin 89 to ears 90 which project rearwardly from the guard, as clearly shown upon FIG. 4. The forward face of latch 88 has two projecting latch dogs 91, 92 which have upwardly directed cam faces 93 and downwardly directed abutments. Pins 95 project outwardly from the sides of the latch and prevent it from swinging too far toward the set, acting as stops against

the side guides 86. The back of the latch has a notch 97 which receives the bottom 98 of a spring 99 having hooked ends 100 which are received over the ears 90 in grooves 101 of latch pin 89, under which the ends of the spring pass, and act to urge the latch 88 inward toward the slider 66.

The operation of the device is as follows:

The end of a bag 55 is pleated, or rolled, as shown in FIG. 1, and a malleable fastener 52 is placed over the end. The flange 51 of the fastener is placed in the space provided by the spacer between the front and rear blades of the guide and the upper support 13 is moved downwardly. The end of stud 27 first contacts the fastener, which begins to collapse and to crimp under the pressure exerted by the punch. The cam faces 93 of the latch 88 engage the rearward edge of the top 66, which extends rearwardly beyond the body portion 60 of the slider. The slider is thus held in its upper position until the head 20 has moved downward and the recess 75 has engaged the foot 61, as shown in FIG. 1. The pressure exerted by the support 13 is sufficient to overcome the pressure of the spring 99 and the latch 88 is moved outward by the action of the top 66 against the cam face 93 until the top 66 has passed beneath the abutments 94 into the position of the slider and latch shown in FIG. 2. The further descent of the head 20 beyond the position shown in FIG. 1 completes the punching and crimps the fastener between ribs 21 and grooves 22 as the lower face of the die compresses and flattens the malleable fastener upon neck 54 flexible container 55. The portion 63 of the foot 61, which is aligned with the bottom face of the die as shown in FIG. 1, compresses the outermost end of the fastener to an equal degree. When head 20 starts the upstroke, stripper 60 is prevented from rising by latch abutments 94, as shown in FIG. 2, and, by means of the foot bearing upon the end of the fastener, permits the withdrawal of the stud 27. This is assisted by the notch 45 in plate 41, into which the lower edge of flange 51 has been introduced by the bending occasioned by the collapse of the fastener. Such notch 45 aids the operator in resisting any tilting occasioned by the withdrawal of the punch, which was the main source of jamming in prior apparatus of this general type. The apparatus of the present invention thus prevents the tilting and jamming of the fastener on the punch stud. The removal of stripper 60 is accomplished by the engagement of cam 72, on the back of the stripper cover 68, with cam face 106 on the lower end of the latch, moving the latch outward until the abutments 94 have cleared the top 66; thereupon the fastener is freed and can be readily removed from the machine.

Even if the lower end of the flange 51 of the fastener does not become fixed in the notch 45, no difficulty is experienced in clearing the stud 27, because the operator can easily hold the inner end of the fastener down, being assisted by engagement of the outer end of the fastener by the slider 60.

A main advantage of the invention is the provision of a highly efficient machine for performing the single task of applying a malleable fastener to a closure. The combination itself is believed to be novel, and there are novel elements which contribute to the combination. The novelty and the advantages have been explained in considerable detail hereinabove.

As many apparently widely different embodiments of the present invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments.

What is claimed is:

1. In a stripping mechanism for a punch, a die including an apertured sleeve, a head, a punch fixed with said head and projecting therebelow, means mounting said head and punch for reciprocation as a unit in a working

stroke wherein said punch enters the aperture of said sleeve in the punching of a hole in a workpiece on said die, such punching of the hole being followed by deformation of said workpiece by and between said die and head, a stripper mounted in said head for reciprocation therewith and for limited guided translation with respect to said head in the direction of reciprocation thereof, said stripper engaging the workpiece to hold the same to said die when said head is in workpiece-deforming position with respect to said die, latch means fixed with said die and in response to movement of said head and stripper into said position, engaging and releasably holding said stripper in said position fixed with respect to said die, and cooperating means on said head and latch means and moving said latch means to release the same from said stripper, by and in response to a retraction stroke of said head and punch to a position free of the workpiece.

2. Means for freeing a punched workpiece from a punch comprising, punch means, stripper means carried by said punch means for movement as a unit therewith, and for limited translation relatively thereto in the direction of movement thereof, said stripper means including a foot fixed therewith to engage and hold the workpiece in punched position, spring latch means fixed against reciprocation with said punch means and engaging said stripper means, said stripper means and latch means having (a) cooperating faces for engagement during the stroke of said punch means to raise and maintain the stripper means in uppermost position relatively to said punch means, and (b) cooperating faces rendered operative in response to movement of said punch means to punching position to hold said stripper means against initial movement in retraction with said punch means, and the punch means and the latch means having cooperating faces acting to move said latch means to release said latch means from said stripper means in response to movement of said punch means to a position in retraction free of the workpiece.

3. Means for freeing a workpiece from a punch com-

prising, a head, a punch, means mounting said head and punch for reciprocation as a unit toward and from the workpiece, there being a recess in the working face of said head, a stripper carried by said head for limited translation only with respect thereto in the direction of reciprocation thereof, said stripper including a work-engaging foot received in said recess when said stripper is in its upper limiting position relatively to said head, a latch fixed against reciprocation with said head and punch, a spring biasing said latch into contact with said stripper, said latch and stripper having (a) cooperating faces in engagement during travel of said head and punch on the punching stroke to position and maintain said foot in said recess, and (b) cooperating faces rendered effective by movement of said head to final position in its punching stroke to releasably hold said stripper with its foot fixed against initial retraction with said head and punch and the head and the latch means having cooperating faces effective to move said latch out of holding engagement with said stripper in response to retraction of said punch to a position free of the workpiece.

References Cited in the file of this patent

UNITED STATES PATENTS

25	403,940	Kerr	May 28, 1889
	655,074	Graves	July 31, 1900
	928,256	Grissom	July 30, 1909
	1,028,102	Erickson	June 4, 1912
30	1,035,092	Kraut	Aug. 6, 1912
	1,149,226	Stevenson	Aug. 10, 1915
	1,706,075	Rohlfing	Mar. 19, 1929
	1,805,128	Brackett et al.	May 12, 1931
	1,969,514	Lehman	Aug. 7, 1934
35	2,187,479	Zwierlein	Jan. 16, 1940
	2,268,787	Wales	Jan. 6, 1942
	2,411,399	Waipole	Nov. 19, 1946
	2,454,432	Crandall	Nov. 23, 1948
	2,670,524	Frank	Mar. 2, 1954
40	2,695,062	Taylor	Nov. 23, 1954