

Dec. 6, 1966

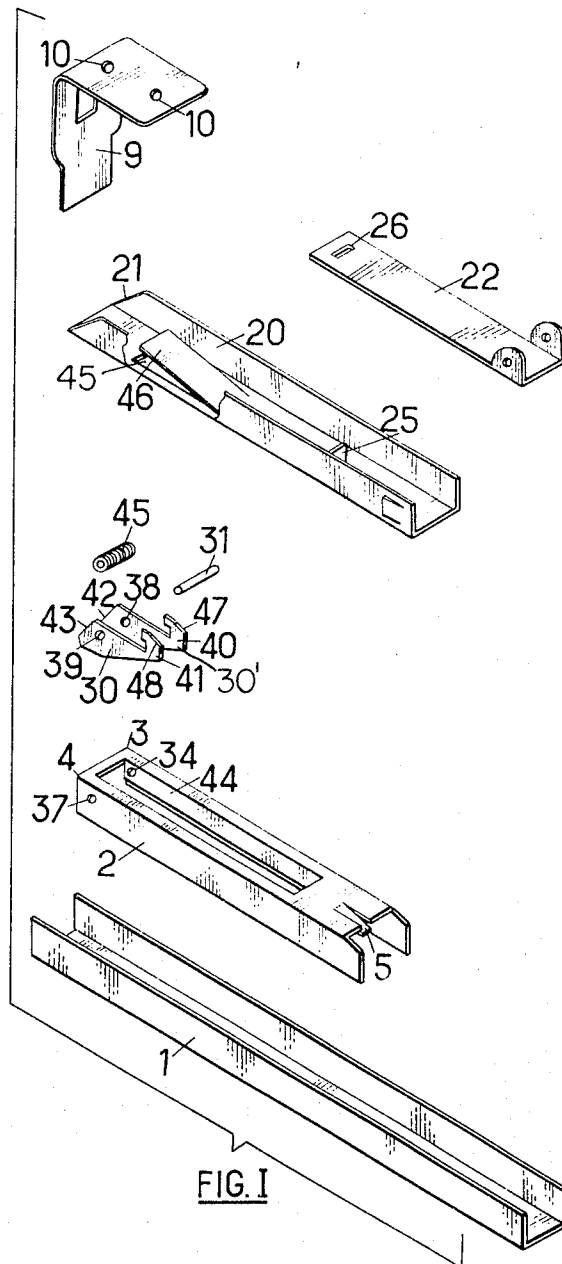
R. LESCURE

3,289,910

STAPLING MACHINE OF LARGE CAPACITY

Original Filed June 25, 1962

3 Sheets-Sheet 1



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STAPLING MACHINE OF LARGE CAPACITY

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3 Sheets-Sheet 2

FIG. II

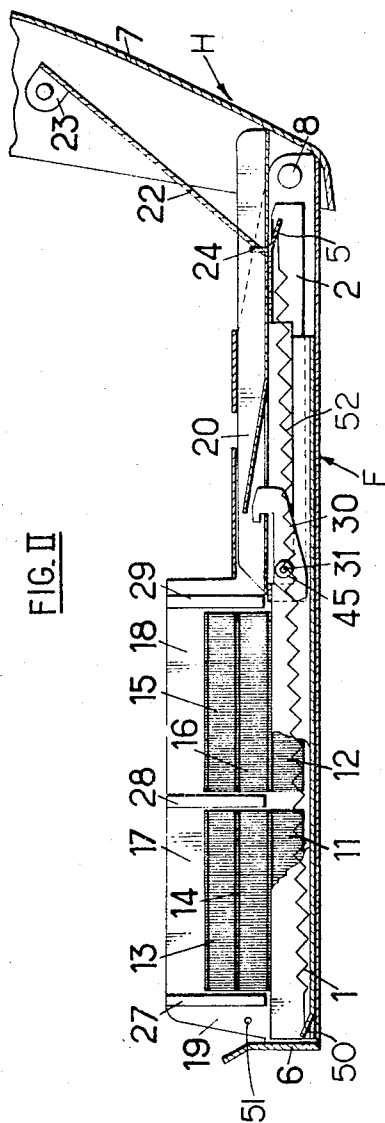
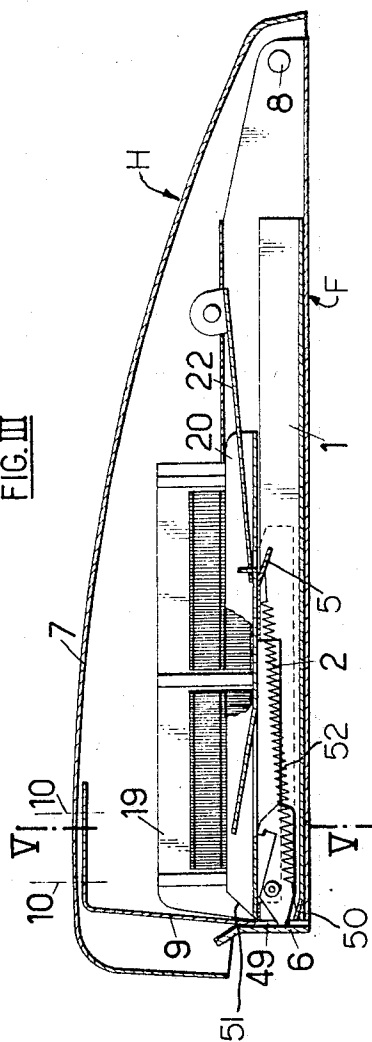


FIG. III



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FIG. IV

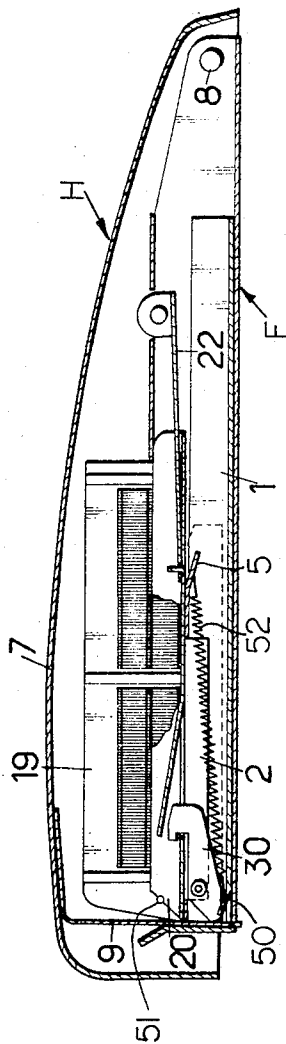
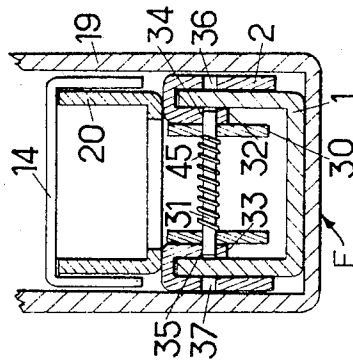


FIG. V



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STAPLING MACHINE OF LARGE CAPACITY

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Continuation of application Ser. No. 204,718, June 25, 1962. This application Oct. 1, 1965, Ser. No. 496,237
4 Claims. (Cl. 227—135)

This is a continuation of my pending application Serial No. 204,718, now abandoned.

The invention relates to stapling machines.

The staples are generally supplied to the consumer in charges constituted by rows of staple fasteners of predetermined length. More particularly the invention relates to stapling machines provided with a magazine having a depth sufficient to hold in superimposed position a plurality of rows of staples.

In the known of this kind, the capacity of the magazine is only of a single stack of charges, for the reason that the magazine cannot extend to the full length of the track. In the most favorable known case if L is the length of a charge, and if the magazine holds N charges, the track holding a double straight-in line charge of staples, the total capacity of said machines for a length 3L is N+2 charges. It will be shown that, in the same conditions, but on a length reduced to 2L, the capacity of the machine according to the invention will be 2N+2 charges.

Furthermore, in the machines of the prior art, the charges are to be maintained in the magazine by resilient means. In the machine according to the invention, resilient means may be dispensed with and gravity may be used to drop the charges of the magazine in position for use. Thus the mechanism is greatly simplified.

With these objects in view, the invention provides a slideable magazine drawer member which normally sustains the stacks of charges, which, upon retraction, let said stacks drop on the track, and which, returned in the normal position, sustains the stacks in the magazine by engaging the charges immediately adjacent to the charges lying on the track.

In the attached drawings:

FIG. 1 is an exploded view representing the principal part of the mechanism.

FIG. 2 shows a central longitudinal section, the stapler being in the position of recharging.

FIG. 3 shows the same section, the stapler being in the position of use, shown at the moment where all the staples except the last one, of the charges in position of use, have been used up.

FIG. 4 shows the same section after utilization of the last staple of the charges in the position of use, the latch being in a position to allow the recharging operation.

FIG. 5 is a partial transverse view along line V—V of FIG. 3.

It is well known that ordinary staples are U-shaped, the legs being perpendicular relative to the back portion of the staple and forming angles which are clearly defined. The usual charges or rows of staple fasteners of 50 or more staples thus form the shape of a trough. It is likewise recalled that these staples and these charges are manufactured with great precision, which is necessary for the correct functioning of the staplers.

In the same manner as in the customary staplers, the stapler of the present invention comprises housing on a driving head H as generally indicated, having a frame F which has not been fully illustrated in the drawings and to which a rail or track 1 is connected. The rail 1 is U-shaped and the charge of staples is placed on the

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rail in a straddling fashion, the sides of the charge being disposed on the outside of the side walls of the rail.

The charge of staples is pushed forwardly by a slideable staple-pusher 2 which is also U-shaped and which straddles also the rail 1 behind the staple charge in such a manner that this staple-pusher engages by means of its front edges 3 and 4 the last staples of the charge and pushes it toward the position of use. For this purpose the slideable pusher as usual in such arrangements, is permanently biased forwardly by means of a very strong spring 52 one end of which is secured at 5 to a hook which is provided on a rearwardly extended portion of the slideable pusher and which is obtained in the present case by turning down a portion of the top wall of the pusher plate at its inner end. The other extremity of the spring is anchored to a fixed anchor point on the frame at an anchoring device disposed in the vicinity of abutment wall 6, for example at an anchoring device solid with rail 1 in the vicinity of the discharge end thereof. Such a device is represented in FIGURES 2-4 by a hook designated by numeral 50 in FIGURE 2 and obtained by turning up a portion of the bottom wall of rail 1. This abutment wall, which forms part of the base, stops the charge which tends to move from the right to the left as seen in the drawing, under the action of said spring. As already known, the machine comprises an operating handle 7 which is pivoted on the base, for example at 8 on the rail to which it is thus connected. This handle is of a hollow form and carries a staple driving plunger 9 which is secured to the handle by any suitable means, for example by rivets 10 in rivet holes 10'. The blade is disposed in a substantially vertical position and acts upon the first staple of the charge, which is the staple that is pushed directly against the abutment wall 6 (see FIG. 3). By exerting a strong pressure on the driving plunger, the latter transmits this pressure to the first staple at the front and separates it from the remainder of the charge. It causes a penetration of the legs of the staple through the sheets of paper to be connected together. These legs are bent in the back of the sheets by the effect of a special cam surface arranged at the front of the base beneath the staple, as it is well known in the art, and not illustrated in the drawings.

When the pressure is removed from the handle, the blade moves back up and out of the path of the charge under the action of conventional means or under the action of the resiliency of the handle as it is well known in the art or as represented under the action of the resiliency of the plunger itself which is represented in FIG. 1 by a bent portion, the angle of which diminishes when the plunger is pressed down and the charge under the effect of the slideable pusher, is caused to move forwardly on rail 1 by a distance which is equal to the thickness of a single staple, the second staple of the initial charge taking thus the place of the first staple which has been used and the apparatus is thus ready for a new stapling operation.

The substance of what has been described above is well known and for that reason it is not necessary to describe it in greater detail.

The stapler according to a preferred embodiment of my invention and which has been illustrated in the drawings, has been designed to receive two charges 11 and 12, which in the position of use, are disposed in a straddling fashion on rail 1 (FIG. 2). In their position of use these two charges act in fact as a single charge because they are pushed one against the other by the action of the staple pusher (in FIG. 2 the staple-pusher has not become effective yet and these charges are shown separated by a small interval).

On the other hand, the stapler according to the invention, is designed in the present example to receive six complementary refill charges; charges 13, 14, 15 and 16 may be seen in FIG. 2, and provision is made, as shown at 17 and 18, to receive still a 5th and 6th refill charge.

The capacity of the stapler according to the invention is thus 8 times the capacity of the usual commercial stapler.

The replacement charges 13 through 16 are contained in a magazine 19 consisting of two longitudinal vertical walls, the bottom of which is formed by a slideable guide channel or drawer 20 having also the form of a U, which slides parallel to rail 1, but at a sufficient distance from the latter to be able to move regardless of the presence of the stapler-pusher, owing to the fact that the drawer slides on the upper edges of the pusher as well as on the back portion of the charge straddling rail 1. The drawer 20 has its side walls cut away at the forward end to form a beveled front 21 which is capable of slightly displacing upwards the lowest refill charges 14 and 16, when the drawer is displaced from the right to the left (FIG. 2).

FIG. 5 shows a cross section in which the refill charge 14 may be seen. The charge 11 should be shown straddling the rail 1, but this charge has not been illustrated on this figure in order to be able to show the staple-pusher 2 more clearly.

As seen in FIGURES 2 and 5, the charges 13 and 15 are located above charge 14 and rest with their weights on the charges 14 and 16 so that, when the drawer is retracted, the charges 14 and 16 drop on the rail 1 and charges 13 and 15 will move down automatically with and on charges 14 and 16.

Drawer 20 may be directly operated by hand, but in the present embodiment, drawer 20 is articulated relative to the handle 7 by means of a draw arm 22 which is pivoted at 23 on the handle 7 and at 24 on the drawer 20. In order to provide this latter articulation, one may provide for example a tongue 25 in the bottom of the drawer, by turning up a portion of this bottom, this tongue engaging a cut out 26 of the draw arm 22.

The replacement charges are guided in magazine 19 in the vertical direction by means of guide members 27, 28, 29.

While I have specifically described the implement of my invention, it may also be noted that a further improvement will be now described in the present preferred embodiment of my invention. This improvement is constituted by a security device, which has for its object to prevent that, by inadvertence, the drawer could be retracted before the last staple of the charges on the rail has been employed.

On the inside of the staple-pusher 2 a latch 30, 30' is provided which is mounted pivotally on a shaft 31. Shaft 31 is thus supported by the staple-pusher 2, but not by the side walls of the latter. The support of shaft 31 is obtained by means of two tongues 32 and 33, which are not shown in FIGURE 1 but which may be seen in FIGURE 5, and which have been produced by cutting the upper surface of the staple-pusher 2 and by bending the cut portion inwardly.

These tongues are bent down at a certain distance from the inner surfaces of the side walls of the staple pusher in such a way that the side walls of rail 1 may pass between these inner surfaces of the staple-pusher and said tongues, as may be seen in FIG. 5. This arrangement is adjusted in a sufficiently precise manner so that the shaft 31 is maintained in place in two holes 34 and 35 provided in the tongues by means of the side walls of rail 1.

The walls of the staple-pusher have also two holes 36 and 37 opposite holes 34 and 35, but these holes 36 and 37 serve only for mounting purposes to allow the shaft to be inserted, but do not aid in maintaining the shaft in its operating position.

Referring now more particularly to FIGURE 1, it may be seen that the latch has been represented as consisting of two elements respectively designated by numerals 30, 30'. Two holes 38 and 39, one for each element, are adapted to receive the shaft 31, and latch 30, 30' has also two hooks 40 and 41 one for each element and at the opposite side with respect to the shaft, two noses 42 and 43 one for each element. The dimensions of these two noses are predetermined so that these noses project relative to the vertical plane which passes through the edges 3 and 4, of the staple pusher by a distance which is exactly equal to the thickness of one staple.

On the upper surface of the staple-pusher 2, a rectangular opening 44 is provided whose position and dimension are predetermined so that when the latch 30, 30', is pivoted, the hooks 40 and 41 may pass through this opening and project above the upper surface of the staple-pusher, thus engaging the edge of an aperture 45, provided in the bottom of the drawer 20 by turning up the tongue 45'.

A spiral retainer spring 45 is placed around shaft 31 which bears against the two sides of latch 30, 30' in such a manner that the latter remains in any position in which it is placed without moving on its own, for example by the action of inertia forces.

The operation of the device is as follows:

When a staple clip has been used, the driver 9 within the driving head H comes down and hits the end of the noses 42 and 43 causing hooks 40 and 41 to pivot upwardly about pin 31. Friction spring 45 will then maintain the hooks 40 and 41 in the up position for engagement with the leading edge of the slot 45 formed by cam tongue 46.

When drawer 20 is pulled back by means of draw arm 22 connected to the draw 20 by means of the cutout 26 engaging the tongue 25, the leading edge of slot 45 will engage hooks 40 and 41 and cause stapler pusher 2 to slide to the rear on track 1 against the urging of spring 52 secured to the lug 5 and the lug 50.

When the stapler pusher 2 has been retracted to its full rear position, it will have passed the last row of stacked staples 16. The staple clips next in series will then drop into position within the track 1.

When handle 7 is again moved to closed position, drawer 20 will be shoved forward. Edges 3 and 4 of the pusher 2 will engage against the staple clips now in position to prevent further forward movement of the pusher 2 while being maintained in abutting relation by means of the spring 52.

As the drawer 20 moves forward, the beveled front 21 will raise the staples to permit the drawer 20 to continue its forward travel. Simultaneously, the tongue 46 will engage the ramps 47 and 48 causing hooks 40 and 41 to swing downwardly so as to be out of engagement with the leading edge of the slot 45.

As the staples are used, the pusher 2 moves the staples forward until the last staple is used and then the driver 9 again causes the hooks 40 and 41 to pivot upwardly for engagement with the leading edge of the slot 45 for refilling as heretofore described.

When the handle 7 has been returned into the position of use, the stapler will appear as illustrated in FIG. 3, and it should be observed that in this position the drawer 20 must not bear against the abutment 6 in order to permit the passage of the blade of the driving plunger 9. This position may be predetermined if necessary by means of abutment stops such as 5'.

In view of the dimensions given for the noses 42 and 43, these noses project only slightly inside the reverse U-shape of the staple 49, so that if a pressure is exerted one last time on handle 7 to press down staple 49 into the papers to be connected together, the back or web portion of the staple and in any case the blade of driving plunger 9 will engage the noses 42 and 43 and will cause the pivoting of latch 30, whose hooks 40 and 41 will

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then project through opening 44 above the upper surface of the staple-pusher. That position is illustrated in FIG. 4.

In order to refill the apparatus, the handle 7, is pivoted back into the position illustrated in FIG. 2 and this movement will produce simultaneously the retraction of drawer 20 carried along by the draw-arm 22 and the movement of the staple-pusher 2 which is carried along by the drawer 20 by means of hooks 40 and 41 engaging the edge of aperture 45. Consequently the assembly of the drawer and the staple-pusher will return into the position illustrated in FIG. 2, which is the initial position from which the above description of the refilling operation was started.

From the preceding description and the different figures it will be easily seen that if the user should inadvertently start the recharging action which the last staple of the one or more charges in the position of use has not been used up, the movement of the handle 7 would have the effect of withdrawing the drawer 20 but the latter could not take along the staple-pusher during its movement due to the fact that the hooks 40 and 41 are withdrawn inside the staple pusher. This untimely movement of the handle will thus have merely the effect that the refill charges 13 and 14 will move down slightly and their legs will come to rest on the charges which are in the position of use, or if the latter have already been substantially used up, the upper charges will drop down on the staple-pusher. But when the user realizes his mistake by the fact alone that during the opening movement of handle 7, he does not meet the customary resistance provided by the return spring of the staple-pusher, he will return the handle into the position of use, the drawer 20 will engage again charge 16 and thereafter, under charge 14, lifting them up slightly together with the charges which are superimposed upon them and thus return into the normal position of use.

What I claim is:

1. A staple driver assembly for receiving a multiple supply of staple clips comprising:
 - (a) a housing frame having front, bottom and side walls including a magazine for receiving a plurality of staple clips,
 - (b) a staple guide track mounted in the bottom wall of said housing,
 - (c) a staple pusher member slidably movable on said guide track,
 - (d) a staple driver,
 - (e) an operating handle pivotally mounted to said frame and connected to said staple driver,
 - (f) spring means connected to said pusher member and to said head constantly urging said pusher member in a forward direction,
 - (g) a magazine drawer member slidably mounted above said guide track and said pusher member and disposed to be the bottom of said magazine and to support the staple clips stored herein,
 - (h) means connecting said drawer member to said handle,
 - (i) cooperating latching means on said pusher and drawer members including nose means normally projecting forward of the end of said pusher member,
 - (j) said cooperating latching means including means for maintaining said latching means in separate disconnect and connect positions,
 - (k) one of said members including cam means for disconnecting said latching means and positioning said latching means in disconnect position when said drawer member is moved forwardly,

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(1) whereby, when the last staple of a clip is used, said driver hits said nose means causing said latching means to be positioned for connection, whereby when said handle means is pivoted rearwardly said drawer member will travel rearwardly and latch said latching means so as to also cause said pusher member to be moved rearwardly with said drawer member, thereby permitting a new clip of staples to drop into position on said track for feed to said staple driver.

2. A staple driver assembly for receiving a multiple supply of staple clips comprising:

- (a) a housing frame having front, bottom and side walls including a magazine for receiving a plurality of said staple clips,
- (b) a staple guide track mounted in the bottom wall of said housing,
- (c) a staple pusher slidably movable on said guide track and having a top surface,
- (d) hook means pivotally mounted on said pusher normally positioned below the top surface of said staple pusher,
- (e) said hook means including a friction retainer for maintaining said hook means in any position to which it has been rotated,
- (f) said hook means including projecting nose means normally projecting forward of the end of said pusher,
- (g) a staple driver,
- (h) an operating handle pivotally mounted to said frame and connected to said staple driver,
- (i) spring means connected to said pusher and to said head constantly urging said pusher in a forward direction,
- (j) a magazine drawer slidably above said track and said pusher,
- (k) said drawer having a cam tongue for engaging said hook means after said hook means has been rotated upwardly to move said hook means down to normal position when said drawer is moved forwardly,
- (l) means on said drawer for cooperation with said hook means when said hook means has been rotated upwardly and said drawer retracted rearwardly, and
- (m) means connecting said drawer to said handle,
- (n) whereby, when the last staple of a clip is used, said driver hits said nose means causing said hook means to pivot upwardly to be in a position to be engaged by said drawer means and whereby when said handle means is pivoted rearwardly said drawer will travel rearwardly and engage said hook means so as to also cause said pusher to be moved rearwardly with said drawer thereby permitting a new clip of staples to drop into position on said track for feed to said staple driver.

3. A staple driving head as in claim 2 and wherein:

- (a) said staple pusher includes a slot for receiving said hook means when said hook means is pivoted upwardly, and
- (b) said means on said drawer for cooperation with said hook means includes a slot.

4. A staple driver assembly as in claim 3 and wherein:

- (a) said drawer means includes a beveled front for separating the first clip of staples from the next succeeding clip in the magazine.

References Cited by the Examiner

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GRANVILLE Y. CUSTER, JR., *Primary Examiner.*