Nov. 8, 1949 S. LEBER ET AL 2,487,565

STAPLING APPARATUS

Filed Nov. 27, 1946 2 Sheets-Sheet 1

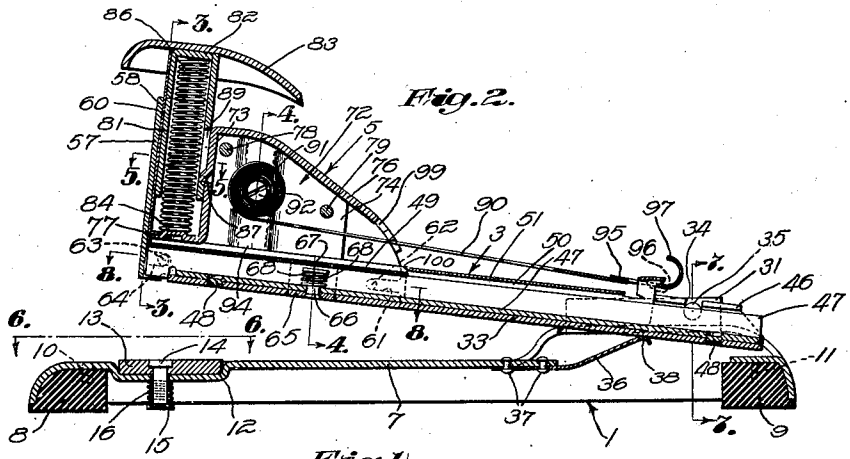


Fig. 2.

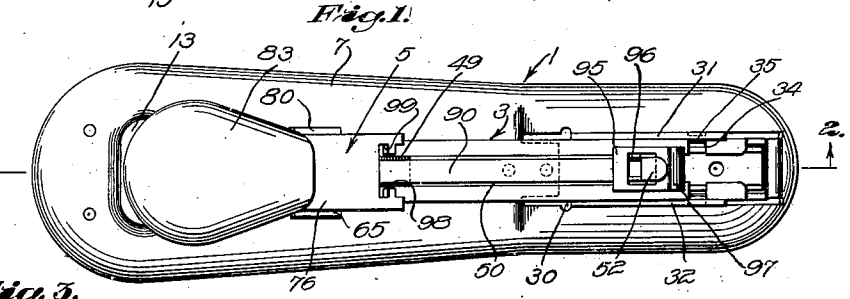


Fig. 1.

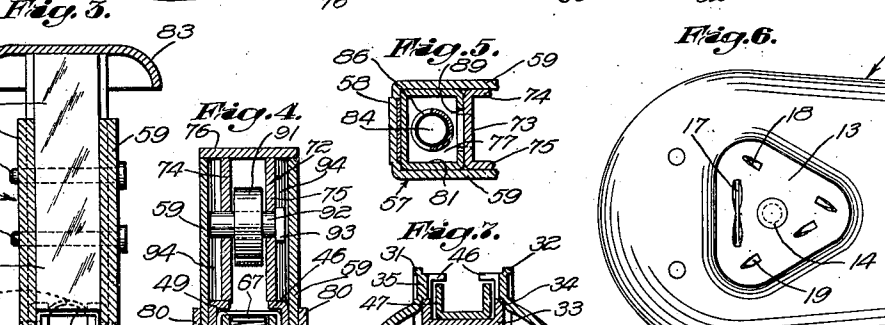


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 7.

Fig. 6.

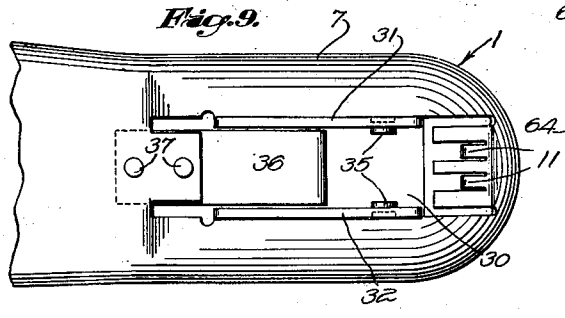


Fig. 9.

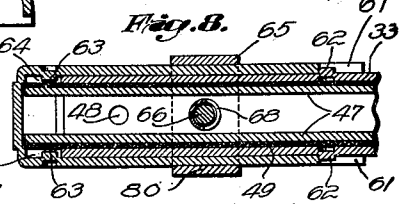


Fig. 8.

Inventors
Samuel Leber
Emil U. Zeller
by Robert S. Dunham
Attorney

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STAPLING APPARATUS

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Fig. 13.

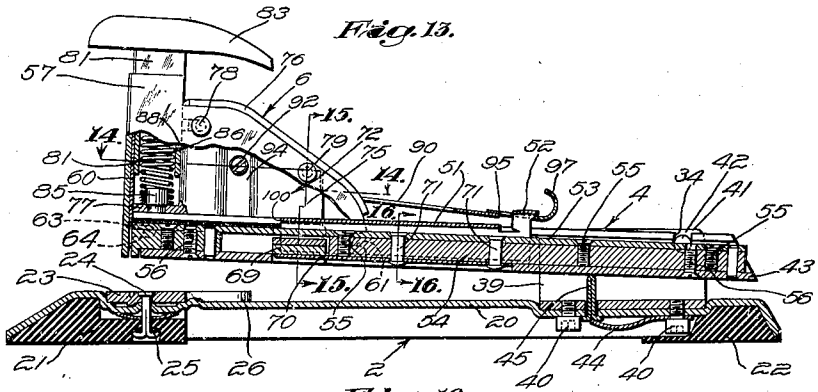


Fig. 10.

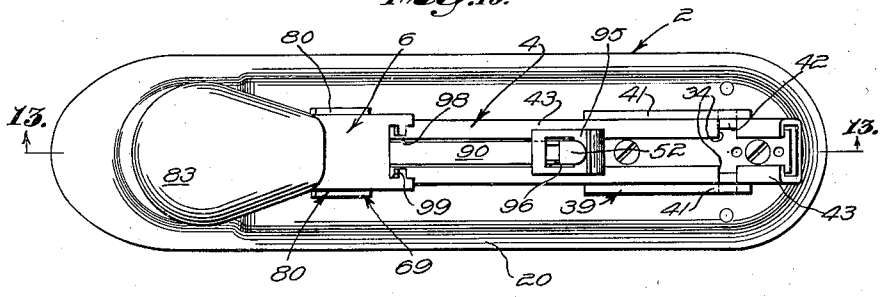


Fig. 11.

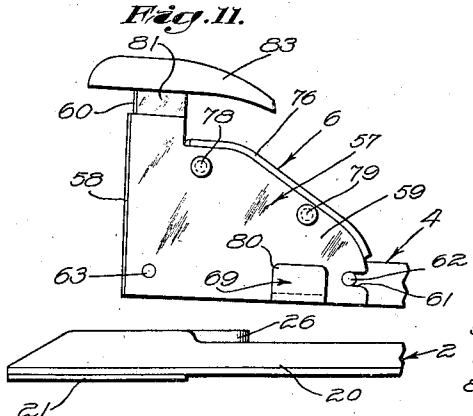


Fig. 12.

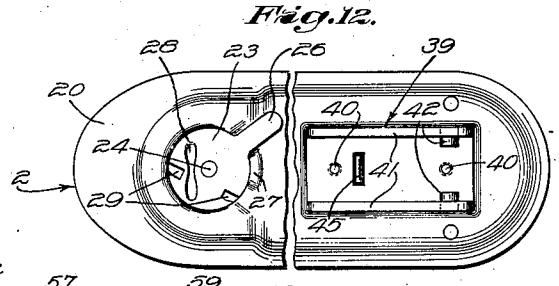


Fig. 15.

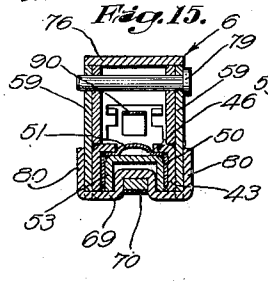


Fig. 16.

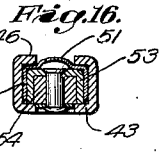


Fig. 14.

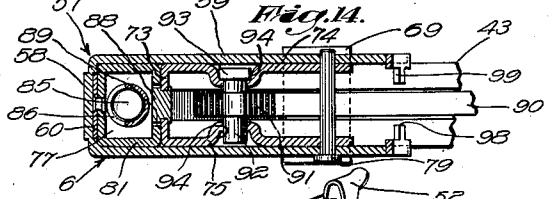
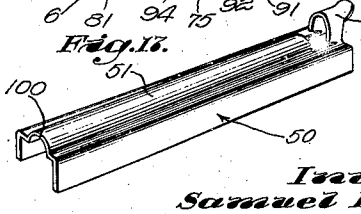


Fig. 17.



Inventor
Samuel Leber
Emil U. Zeller
by Robert S. Drummond
Attorney

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UNITED STATES PATENT OFFICE

2,487,565

STAPLING APPARATUS

Samuel Leber, Belle Harbor, and Emil U. Zeller, Belle Rose, N. Y., assignors to Consolidated Wire Products Co., New York, N. Y., a partnership

Application November 27, 1946, Serial No. 712,710

9 Claims. (Cl. 1—3)

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Our present invention relates to a stapling apparatus and more particularly to that type of stapling apparatus, which is portable and is adapted to be used on a desk and which further may be removed from the base and used as a hand stapling device whenever such use is desired.

While there have been many types of stapling devices in the past, some of which are fairly satisfactory, a difficulty has arisen with some at least of these earlier devices due to the tendency thereof to jam, possibly in part due to the construction of the apparatus itself and possibly due to imperfect staples or to foreign matter finding its way into the interior of the apparatus. Such prior art devices have usually been quite difficult to take apart for the purpose of clearing such jams, at least without special tools.

Among the principal objects of the invention, therefore, are to provide an improved type of stapling device of this general character, which may be readily disassembled without requiring any special tools to a sufficient extent to clear any jams which may occur incident to defective staples or foreign matter finding its way into the apparatus and which may again be readily reassembled. As thus reassembled, the parts will be accurately positioned, so that the device will operate at its maximum efficiency.

A further object is to provide for the complete disassembly of the apparatus with a minimum of tools so as to permit the replacement of any parts which have become so worn in use or broken for some reason and to permit the rapid reassembly of the device in an accurate manner.

A further general object of the present invention is to provide apparatus of the character described, which may be readily assembled by relatively unskilled operators and be assured of accurate assembly and proper operation when assembled.

Further and more detailed objects of the present invention will become apparent from the following description and appended claims when considered in connection with the accompanying drawings in which:

Figure 1 is a plan view of a preferred form of stapling apparatus in accordance with the present invention;

Fig. 2 is a view of this apparatus taken substantially in vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a view in section somewhat inclined to the vertical taken substantially on the line 3—3 of Fig. 2;

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Fig. 4 is a similar section taken on the broken line 4—4 of Fig. 2;

Fig. 5 is a fragmentary view in section on the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary view, substantially in plan of one end portion of the base taken on the line 6—6 of Fig. 2;

Fig. 7 is a detailed view substantially in vertical section on the line 7—7 of Fig. 2;

Fig. 8 is a fragmentary detailed view in section on the line 8—8 of Fig. 2;

Fig. 9 is a fragmentary view substantially in plan of the right hand end portion of the base as seen in Figs. 1 and 2;

Fig. 10 is a view substantially in plan, similar to Fig. 1, illustrating a somewhat modified form of the invention;

Fig. 11 is a fragmentary view in elevation of the left hand portion of the device shown in Fig. 10;

Fig. 12 is a foreshortened view, the central portion being broken out and omitted, of the base of the apparatus shown in Fig. 10, the view being substantially in plan;

Fig. 13 is a view of the device of Fig. 10 substantially in vertical section on the line 13—13 thereof;

Fig. 14 is a fragmentary view in section on the broken line 14—14 of Fig. 13;

Fig. 15 is a fragmentary view in section on the line 15—15 of Fig. 13;

Fig. 16 is a fragmentary view in section on the line 16—16 of Fig. 13; and

Fig. 17 is a view substantially in perspective of the staple follower used in both forms of the invention.

In considering the two forms of the device shown in the accompanying drawings, the description of both will be carried on simultaneously as the functions in general of the several parts of each are substantially equivalents respectively and the variations can best be pointed out in this manner.

The apparatus consists in general of three separate assemblies: a base or base assembly generally designated at 1 in the form of the invention of Figs. 1–9 and designated at 2 in the form of the invention in Figs. 10 to 16, a staple magazine assembly designated 3 in the form of the invention of Figs. 1 to 9 and at 4 in the form of the invention of Figs. 10-16, and a head assembly designated 5 in the form of Figs. 1 to 9, and 6 in the form of Figs. 10 to 16.

Means are provided in both forms of the invention for removing the base assembly from the

remaining parts so as to permit such remaining parts to be used separately as in the stapling or tacking of a staple into wood, bulletin boards or work of that nature. Such means forms per se and generally no part of the present invention as this subject matter is disclosed in Hoehn Patent No. 1,507,775, granted September 9, 1924.

Means are also provided as hereinafter set forth in detail for removing the head assembly as a unit from the magazine assembly for permitting the clearing of jams, which may occur as aforesaid incident to defective staples or to dirt or other foreign matter getting into the apparatus. This operation is so arranged as to require no tools of any kind, yet upon reassembly the parts are positively secured in an exactly predetermined position, so that the device will operate at maximum efficiency.

Referring first to the first form of the invention shown in Figs. 1 to 9, the base assembly 1 comprises a main base member 7 which may be struck up from sheet metal by a stamping operation and which has downwardly turned edge portions to give it a finished appearance. This member may be finished on the outside, i. e., the top, in any manner usual for the finishing of metal parts. At its forward and rear ends the base member 7 carries suitable pads 8 and 9 of resilient material, such as rubber, for the purpose of preventing damage or scarring to any surface such as the top of a desk on which the device may be supported. As shown, the rubber parts 8 and 9 are secured to the base member 7 by inwardly turned integral tabs 10 and 11 respectively (Fig. 2).

The base member 7 may be formed with a suitably shaped recess as indicated at 12 in which is located an anvil member 13. This member may be secured to the base by a pin 14 rigid therewith extending through an aperture in the base and carrying a head 15 riveted or otherwise secured thereon, a compression spring 16 being located between the head 15 and the underside of that portion of the base within the depression 12. As best shown in Fig. 6, the anvil may have three sets of staple turning die portions 17, 18 and 19 for turning the ends of the staples, both inwardly, both outwardly, and one in and one out respectively. As the depression 12 is substantially triangular in horizontal cross section and shaped similarly to the outer horizontal contour of the anvil member 13, the latter may be moved upwardly against the compression of the spring 16 and rotated to bring a desired one of the die sets into alignment with the path of a staple being driven by the means hereinafter described.

Turning now to the Figs. 10–16 form of the invention, a similar base 20 is provided having similar pads 21 and 22 suitably secured thereto and having an anvil member 23, which may be connected by a cotter pin 24 or some similar device through the base to a washer shown at 25, this washer being located in a depression formed in the rubber pad 21, which in this case serves the function of the spring 16. The anvil 23 has a principal circular portion received within a circular depression in the base 20 and has an actuating arm 26 which may be located in either of a pair of depressions separated by a hump portion 27 of the base 20, Fig. 12, to locate the anvil positively in either of two positions. This anvil is provided with two die portions 28 for turning the staple ends inwardly and 29 for turning them outwardly. It is contemplated that either form of anvil may be used in accordance

with the present invention, or a single die-type anvil fixed in character as is conventional with many prior art devices may also be used.

The next feature of the device to be described is the means for mounting the magazine assembly and head assembly as a unit on the base assembly and for providing the normal resilient force tending to keep the forward end of the magazine and head assemblies above the anvil, so as to permit the insertion of work to be stapled therebetween.

Referring now to the Figs. 1 to 9 form of the invention, the base member 7 is provided with a punched out portion providing an aperture 30 having substantially vertical side flanges 31 and 32 between which the magazine assembly 3 is arranged to be pivoted. The magazine assembly 3 itself includes an outer channel-like member 33 which has formed therein a pair of aligned recesses or slots 34 for receiving inwardly punched stud portions 35 of the side flanges 31 and 32. By this construction a hinge means is provided without the use of any separate parts, the pins or studs 35 normally resting in pivotal relation on the lower ends of the depressions or slots 34.

Resilient means are provided for urging the rear end of the magazine assembly and parts moving therewith upwardly, so as to retain the lower ends of the recesses or slots 34 against the studs 35. For this purpose there is shown a resilient leaf spring 36, which may be secured to the base 7 in any suitable manner as by rivets 37, see Figs. 2 and 9. In order, however, that the spring 36 be effective not only to retain the hinged parts in their desired location, but also to urge the magazine assembly and parts carried thereby to the position of these parts shown in Fig. 2, permitting the insertion of work to be stapled, the bearing point of the spring 36 on the underside of the magazine assembly 3 shown at 38 is to the left, as seen in Fig. 2, of the hinge point for the magazine assembly, i. e., between this point and the point at which staples are driven therefrom.

Due to the construction of the parts aforesaid, the hinged connection may be easily and readily disengaged by depressing the rear end of the magazine assembly sufficiently so that the upper portion thereof is completely below the studs 35, which is permitted by the flexing of the spring 36. The magazine assembly and parts carried thereby may then be moved to the left as seen in Fig. 2, so as to disengage them completely from the base assembly 1. This operation requires no tools and is so simple that it may be performed by any unskilled person. Upon reassembly of the parts by reversing the operation, these parts are held in an exactly predetermined position with respect to one another, so that the device will operate properly.

Considering now the similar parts of the form of the invention shown in Figs. 10–16, the base 20 is provided with a separate part 39 secured thereto as by screws 40. The part 39 is U-shaped in cross section and provides a pair of upstanding flanges 41, which are in turn provided with inwardly directed studs 42. In this form of the invention the studs may be formed as separate parts suitably rigidly carried by the flanges 41. The magazine assembly 4 shown in this form of the invention is similarly provided with an outer channel-like member 43 having slots or recesses 34 formed therein corresponding to the similarly numbered recesses shown in Fig. 2 and engaging the studs 42 in a similar manner. In this case

there is provided a resilient leaf spring means 44 carried by one of the screws 40 and bearing upon a free floating plunger member 45, which projects through aligned apertures in the base 20 and the member 39 and engages the underside of the channel member 43 of the magazine assembly 4. The parts operate in the same manner as hereinabove described for the preferred form of the invention.

The magazine assembly itself is constructed as simply as possible and, in accordance with the preferred form of the invention shown in Figs. 1 to 9 inclusive, is formed solely from sheet metal parts suitably formed into desired shapes. Referring first to these figures, the magazine assembly 3 includes an outer portion 33, which is formed as a channel having its upper edges inturned as shown at 46 (Fig. 4). Located within the member 33 is an inner channel member 47 formed as a U-shaped channel and suitably secured to the member 33. For the purpose of locating these members with respect to one another in the assembly thereof the outer member 33 may be formed with one or more punched-up portions as shown at 48, Fig. 1, and the inner member formed with corresponding punched-out portions or apertures in alignment therewith for predetermining the proper assembled positions of the parts. This serves the operators in the assembly operation in locating the parts, after which they may be spot welded together or otherwise suitably secured to one another.

The inner member 47 provides a staple support for receiving thereon a stack of staples as indicated at 49, Figs. 2, 3 and 4. The staples are loaded into the rearward end of the channels thus formed, at the right as seen in Fig. 2, and thereafter are confined between the upper edges of the inner channel 47 and the inturned edges 46 of the outer member 33, thus positively preventing any dislocation of the staples in use.

A staple follower generally indicated at 50 is provided, this follower being shown in perspective in Fig. 17 and having substantially the cross section of a stack of staples with the exception of a central raised rib portion 51 provided for a purpose hereinafter described and a struck-up hook portion 52 at the rear thereof for connection with the means by which the follower is resiliently urged forwardly to move the stack of staples 49 to the staple driving position, i. e., to the left as seen in Fig. 2.

Referring now to the form of the invention shown in Figs. 10–16, the inner member of the staple magazine may be formed of a downwardly turned channel 53 having an inner solid block 54 therein and these parts held together by screws or other similar means as shown at 55, and to the outer member 43 by screws 56. The function of the parts is substantially the same, however, in both forms of the invention, the outer member 43 in this form similarly having inturned flanges designated at 46 and corresponding to the similarly numbered portions of the outer member 33, shown in the preferred form of the invention.

Means are provided in accordance with the present invention for removably securing the head assembly to the magazine assembly and for positioning these assemblies accurately when they are reassembled. This becomes important for the reason that the head assembly includes an outer member 57, which is substantially U-shaped in horizontal cross section and includes a front portion 58 and vertical side wall portions 59. The plunger means or staple driving means includes

as hereinafter more particularly described a driving blade 60, which bears against and is guided by the front portion 58 and is arranged to pass between this front portion and the left hand end, as seen in Figs. 2 and 13 of the magazine assembly, the space provided between the end of the magazine assembly and the front 58 of the outer member 57 of the head assembly being just sufficient to permit the passage of this blade. As the blade itself is substantially the thickness of a single staple, the space is also just sufficient to permit the free passage of a single staple. In order that this space be kept constant and at a desired width, it is necessary that the head assembly be accurately located on the magazine assembly; as too large a space would permit more than one staple to get into the space and cause a jam, while too small a space would prevent even a single staple from being driven.

Referring now to both forms of the invention, means are provided, including at least one horizontal recess in one of these assemblies and a stud in the other thereof, cooperating with said recess, for locating the head assembly in respect to the magazine assembly at least about the center of the stud. Additional means are then provided to prevent relative rotation about this center, in this case such additional means include additional studs and recesses spaced longitudinally of the magazine assembly from the first-named stud. From a broad point of view it is immaterial which of the assemblies the recess is formed in and which the stud is formed on. The means for preventing rotation about the first stud may from a broad point of view be a part of the head assembly resting upon the magazine assembly or otherwise engaged therewith.

In both forms of the invention, however, there are shown a pair of aligned slots 61 formed in the lower rear edge of the side wall portions 59, these slots being an example of recesses which may or may not extend completely through the thickness of the walls 59 and with which cooperate a pair of aligned outwardly extending studs 62 as best shown in Figs. 2 and 8 for the first form of the invention, and in Figs. 11 and 13 for the second form thereof. As particularly shown in Fig. 8, the stud 62 may in practice be formed by striking outwardly portions of the outer member 33 of the magazine assembly at the appropriate points.

The means for holding the head assembly against rotation about the axis of the studs 62 is shown as a pair of inwardly directed and aligned studs 63, Figs. 2, 3 and 8, formed by striking inwardly portions of the outer head member 57 or as separate parts as shown for the corresponding numbered studs in Figs. 11 and 13, these studs cooperating with a pair of aligned, horizontally extending slots 64 formed in the left hand end as seen in Figs. 2 and 13 of the outer channel members 33 or 43 of the magazine assembly.

It will be seen that by the pin and recess or slot connections just described, the head assembly will be prevented from rotation in respect to the magazine assembly and will be prevented from all movement in respect thereto with the exception of a movement longitudinally of the magazine assembly, the slots or recesses 61 and 64 all being parallel to the longitudinal extent of the magazine assembly.

Means are provided, which are somewhat different in the two forms of the invention for locking the head assembly to the magazine assembly against movement longitudinally of the latter.

For this purpose, as shown in connection with both forms of the invention, there is provided a latch member, preferably spring pressed toward its operative position, in one of these assemblies cooperating with a suitable recess in the other such assembly.

Referring now to the form of the invention shown in Figs. 1 to 9, this latch member is indicated at 65 and is formed substantially U-shaped in cross section, with the bight of the U extending under and transversely of the magazine assembly and arranged to be located at its operative position in recesses formed in the underside of the magazine assembly and in the lower edges of the side wall portions 59 of the outer member 57 of the head assembly. These recesses are of such dimensions as closely to embrace the latch member 65, while permitting the free movement thereof in a substantially vertical direction, which is in particular, perpendicular to the longitudinal extent of the magazine assembly.

As shown best in Figs. 2 and 4 the latch member 65 has rigid therewith a stud 66 extending through an aperture of the magazine assembly centrally thereof and carrying a head or washer 67 at its upper end, a compression spring 68 surrounding this stud between the washer and the upper surface of the web of the magazine assembly through which the stud passes. By this construction the latch 65 is always urged upwardly towards its operative position and dislocation thereof from the magazine assembly is positively prevented. The engagement of the latch 65 with the lateral side portions of the recesses in the side wall portions 59, with which it engages, positively prevents lateral movement of the head assembly in respect to the magazine assembly in a direction longitudinal of the latter and thus serves completely to lock these assemblies in an exactly predetermined position in respect to each other.

Referring now to the form of the invention shown in Figs. 10 to 16 there is provided a latch 69 generally corresponding to the latch member 65, but somewhat differently shaped, as particularly shown in Fig. 15, in that the central portion thereof is bent upwardly to form a recess for a leaf spring 70, which may be secured to the magazine assembly 4 in any suitable way as by one or more rivets 71 and have its free end disposed below the latch 69. The spring 70 urges the latch 69 upwardly at all times into transversely aligned recesses substantially embracing the latch in its operative position and formed in the magazine assembly 4 and in the side wall portions 59 of the outer member 57 of the head assembly. The operation is substantially the same as that described for the preceding figures.

Considering now the construction of the head assembly per se, it comprises, as hereinabove described, an outer structural member 57 forming the front and side walls of a housing for the head assembly and an inner structural member generally designated as 72, which is given the same designation as to both forms of the invention as these parts are substantially similar with the exception of certain minor differences, which will be pointed out as the description proceeds. The inner structural member 72 is preferably formed from a single piece of sheet metal suitably shaped and bent to a desired conformation. This piece is formed to provide a substantially vertical front wall 73, side walls 74 and 75 bent rearwardly from the front wall, a top wall portion 76 bent rearwardly from the front wall and forming with the side wall portions 59 and front wall 58 of the outer member 57 a housing for the head assembly, and a forwardly directed shelf portion 77.

Means are provided for securing the inner and outer members of the head assembly together in their operative assembled relation. For this purpose there are shown two pins 78 and 79, which pass through the side wall portions 59 of the outer member 57 and through suitably aligned apertures formed in the inner member 72. These pins preferably have a drive fit, so as to hold the members together by their frictional engagement with the apertures in the outer member. They may, however, be removed by the use of a punch should this removing become necessary, as for the replacement of some one or more parts. They are not, however, normally disassembled during the ordinary use of the device.

As a further means for holding the head in assembled relation, the latch member 65 or 69 is provided with upstanding side wing portions, as best shown at 80, Figs. 4, 10, 11 and 15. These side portions serve to embrace the lower edges of the sides 59 of the outer member 57 and hold these parts in assembled relation. The side portions 80 of the latches further serve as hand grip portions for use in moving the latches to their lower positions, permitting the disassembly of the parts as above set forth.

The inner and outer members 72 and 57 forming the head assembly, as aforesaid, together define a passage or slideway for the main body portion of the depressible plunger indicated at 81. This is defined on three sides by the front and side portions 58 and 59 of the outer member 57 of the head assembly and on the fourth side by the front wall 73 of the inner member 72 of the head assembly. The body portion 81 of the plunger may also be formed of sheet metal as the other parts, and for this purpose is formed substantially rectangular in cross section, being bent at right angles at each corner to form a substantially vertical pillar-like structure, the top of which may be closed by a bent-over portion of the front surface as shown at 82. To the upper end of this structure and particularly to the part 82 thereof, a suitable cap or striking member 83 may be secured in any suitable manner as by spot welding. The driving blade 60 may be suitably secured as by riveting or in any other suitable way to the front surface of the body portion 81, thus providing a hollow column structure carrying the blade 60. This blade and the sides of the structure 81 are arranged in sliding relation with the other parts previously described, thus guiding the plunger in its movement.

The shelf 77 may be formed with a struck-up center stud portion 84, Fig. 2, or this portion may be formed as a separate part as shown at 85, Fig. 13. Located by the stud portions 84 or 85 is a long compression spring 86 received within the hollow body portion 81 and serving to urge the plunger and parts moving therewith to its uppermost position.

Means are provided for determining the upper and lower positions of the plunger structure, thus formed, and particularly for preventing contact between the lower portion of the plunger body 81 and the stack of staples 49 being moved toward the staple driving position in alignment with the blade 60. This is the primary function of the shelf 77 in addition to its function to provide an abutment for the spring 86. As will be

seen in Figs. 2 and 13, the lower end of the body portion 81 will engage against the shelf 77 and thereby will be prevented from engaging any of the staples in the stack 49 thereof.

For determining the upper end limit of the movement of the plunger structure, a part of the front wall 73 may be struck outwardly, as shown at 87 in Fig. 2, or a separate part 88 may be secured to the front wall 73 of the inner member of the head assembly as seen best in Fig. 14. In either case this abutment normally works in an aperture 89 formed in the rear wall of the hollow body portion 81 of the plunger and serves to engage the lower end of this aperture as best shown in Fig. 2.

Thus should the spring 86 break, it may be replaced by withdrawing pins 78 and 79, removing the inside member 72 of the head assembly and then withdrawing the plunger structure complete. The assembly of these parts may be effected in a reverse manner.

While a number of different arrangements might be used to exert a resilient force on the stack of staples 49 to urge them to a position in which the endmost staple may be driven by the driving blade 60, we have chosen to show in the accompanying drawings an arrangement by which the follower 50 is urged to the left as seen in Figs. 2 and 13 for the two forms of the invention by a strip-like spring, one end of which is coiled to exert a tension on the other end, such arrangements being sometimes known as a "clockwise" spring, although this expression does not necessarily have anything to do with the direction in which the spring is wound, which depends upon the side from which it is viewed. Such a spring is shown in the accompanying drawings at 90. The inner end portion of the spring 90 is wound in a coil illustrated at 91 in Figs. 2, 4 and 14.

Means are provided for holding the inner end of this coil against rotation upon the stretching of the spring or under the tension thereof. For this purpose there is employed a slotted pin 92, which receives in the slot thereof the inner end of the spring 90. The pin 92 is held, as best shown in Fig. 4 and 14, in a pair of aligned apertures in the inner member 72 of the head assembly. Rotation of this pin and hence of the inner end of the spring is prevented by providing it with a non-circular head 93, in this case square, for the pin 92. This head 93 is received in a suitably shaped depression preferably having at lease one flat side for engaging a flat side of the head 93. In the present instance, we have found it desirable to provide such depressions in the form of vertical depressions or grooves, as indicated at 94 and best shown in substantially horizontal section in Fig. 14. This form is chosen for facility in manufacturing but is not essential except that there be a depression in at least one side of the member 72 of sufficient depth to receive the head 93 of the pin 92 and of such shape as to prevent the rotation of this pin. However, by the present means, the pin may be adjusted in rotation in quarter-turn increments so as to predetermine the tension of the spring 90, and may be inserted from either side indiscriminately. When the parts are in assembled position, dislodgment of the pin is prevented by the lateral side portions 59 of the outer head member 57, one of which overlies the head of the pin 92.

The other end of the spring 90 may have a suitable fitting 95 secured thereto and provided with an aperture 96 to engage over the hook portion 52 of the follower 50. As shown, the fitting 95 further has a hooked portion 97 by which it may be readily grasped for engaging it with the follower 50 as particularly shown in the accompanying drawings. In the usual operation of the device, i. e., with the parts in the positions shown in Figs. 2 or 13, the spring 90 extends through a slot or aperture in the cover or top wall portion 76 of the housing for the head assembly, this slot or aperture being shown at 98. When it is desired to fill a stack of staples into the device, the fitting 95 is disengaged from the hook portion 52 of the follower 50 and placed at an inoperative position. The follower is then withdrawn completely from the apparatus, the staples inserted, and the follower re-inserted and again hooked to the fitting 95. In order to provide a satisfactory inoperative position for the fitting 95 and the spring 90 when the refilling operation is taking place, we have provided an enlargement as shown at 99 for the aperture or slot 98 which is adapted to receive the fitting 95 and hold it in an out of the way position.

Another feature of considerably practical interest which is embodied in the present invention is the provision of means by which, in the event that there are no staples in the apparatus, the blade 60 is prevented from coming into abutting contact, as distinguished from silding contact, with any part of the staple follower 50. For this purpose the raised or rib portion 51 of the follower 50 is provided, the forward end of which is indicated at 100, Fig. 17, and this end being flush with the leading end of this follower and of such height that it will abut against the side of the blade 60 at the uppermost position of the latter, thus permitting the blade to move past the follower without damage to either. The lower portion of the inside member 72 of the head assembly is of sufficient height above the path of the follower 50 as to permit that follower to move completely up to a position in engagement with the side of the blade 60, so as to permit the driving of the last staple of a group or stack thereof. In this way the device is arranged for maximum efficiency in the use of staples prior to the requirement for the refilling of the apparatus with additional staples, while positively preventing any undesired operation incident to such use.

While we have herein shown and described but two embodiments of the present invention, some variants thereof have been suggested and others will occur to those skilled in the art. We do not wish to be limited, therefore, except by the scope of the appended claims, which are to be construed validly as broadly as the state of the prior art permits.

What is claimed is:

1. A stapling apparatus, comprising an elongate staple magazine assembly, a head assembly adapted to be secured to said magazine assembly and including means for successively driving staples supplied from said magazine assembly, and means for removably securing said head assembly to said magazine assembly and for locating said head assembly in an exactly predetermined position on said magazine assembly when the parts are in their operative position, the last named means including a longitudinally disposed recess in one of said assemblies and a stud for cooperation with said recess on the other of said assemblies, means for preventing relative

rotation of said assemblies about the axis of said stud when this stud is disposed in said recess in the operative position of said assemblies, whereby said assemblies are prevented from relative movement in a direction laterally of said magazine assembly by said recess and stud and the relative rotation preventing means, and a resiliently mounted latch means separate and distinct from the means previously recited and mounted in one of said assemblies and engaging a recess in the other thereof for positively preventing relative movement of said assemblies longitudinally of said magazine assembly.

2. A stapling apparatus, comprising an elongate staple magazine assembly, a head assembly adapted to be secured to said magazine assembly and including means for successively driving staples supplied from said magazine assembly, and means for removably securing said head assembly to said magazine assembly and for locating said head assembly in an exactly predetermined position on said magazine assembly when these parts are in their operative position, the last named means including at least two sets of longitudinally disposed recesses and respectively associated stud members, the recess of each set being in one of said assemblies and the respectively associated stud, in the other of said assemblies, and said sets being spaced longitudinally of said magazine assembly from one another and so arranged that said assemblies may be engaged with one another by relative movement in a direction longitudinally of said magazine assembly, whereby said assemblies are prevented from relative movement in a direction laterally of said magazine assembly by said recesses and studs, and a resiliently mounted latch means separate and distinct from the means previously recited and mounted in one of said assemblies and engaging a recess of the other thereof for positively preventing relative movement of said assemblies longitudinally of said magazine assembly.

3. A stapling apparatus, comprising an elongate staple magazine assembly, a head assembly adapted to be secured to said magazine assembly and including means for successively driving staples supplied from said magazine assembly, and means for removably securing said head assembly to said magazine assembly and for locating said head assembly in an exactly predetermined position on said magazine assembly when the parts are in their operative position, the last named means including a longitudinally disposed recess in one of said assemblies and a stud for cooperation with said recess on the other of said assemblies, means for preventing relative rotation of said assemblies about the axis of said stud when this stud is disposed in said recess in the operative position of said assemblies, whereby said assemblies are prevented from relative movement in a direction laterally of said magazine assembly by said recess and stud and the relative rotation preventing means, at least one downwardly directed recess in said head assembly having substantially vertical boundaries, and a latch means mounted in said magazine assembly for substantially vertical movement in respect thereto and spring pressed toward the upper limit of such movement, said latch having dimensions such as substantially to fill said recess between the vertical boundaries thereof, so as to prevent relative lateral movement between said assemblies.

4. A stapling apparatus in accordance with claim 3, comprising in addition a laterally extending recess in the underside of said magazine assembly for receiving said latch means, a stud rigid with said latch means, extending centrally through an aperture in said magazine assembly and having an enlarged head at its upper end, a compression spring surrounding the last named stud and extending between said enlarged head and a part of said magazine assembly tending to urge said latch means upwardly in respect to said magazine assembly, and wherein said head assembly has a pair of oppositely disposed recesses for receiving portions of said latch means, so as to lock said head assembly uniformly against relative longitudinal movement in respect to said magazine assembly.

5. A stapling apparatus in accordance with claim 3, comprising in addition a transversely extending recess in the underside of said magazine assembly in which said latch means is vertically movable and serving to restrict said latch means against movement longitudinally of said magazine assembly, and wherein said latch means also cooperates with recesses in said head assembly, and a leaf spring secured to the underside of said magazine assembly and bearing against the underside of said latch means, tending to move it upwardly into the recesses of said magazine assembly and said head assembly.

6. A stapling apparatus, comprising an elongate staple magazine assembly, a head assembly adapted to be secured to said magazine assembly and including a staple driving blade having a thickness substantially equal to that of a single staple for successively driving staples supplied from said magazine assembly, and means for removably securing said head assembly to said magazine assembly and for rigidly and immovably locating said head assembly in an exactly predetermined position on said magazine assembly when the parts are in their operative position, such that an inside wall of said head assembly and the end of said magazine assembly jointly define a slot through which a single staple is driven and wherein said slot is of such width as just to permit the passage of a single staple and of said blade, the last named means including a longitudinally disposed recess in one of said assemblies and a stud for cooperation with said recess on the other of said assemblies, means for preventing relative rotation of said assemblies about the axis of said stud when this stud is disposed in said recess in the operative position of said assemblies, whereby said assemblies are prevented from relative movement in a direction laterally of said magazine assembly by said recess and stud and the relative rotation preventing means, and a resiliently mounted latch means separate and distinct from the means previously recited and mounted in one of said assemblies and engaging a recess in the other for positively preventing relative movement of said assemblies longitudinally of said magazine assembly.

7. A stapling apparatus, comprising an elongate staple magazine assembly, a head assembly adapted to be secured to said magazine assembly and including means for successively driving staples supplied from said magazine assembly, and means for removably securing said head assembly to said magazine assembly and for locating said head assembly in an exactly predetermined position on said magazine assembly when these parts are in their operative position, the last named means including a pair of similar slots formed in the end of said magazine assembly on opposite sides thereof, a pair of aligned studs

directed inwardly from parts of said head assembly for cooperation with said slots, a pair of aligned and outwardly directed studs formed on said magazine assembly, a pair of slots formed in depending side wall portions of said head assembly for cooperating with the last named studs, all said slots being disposed in a direction longitudinal of said magazine assembly when the parts are assembled, whereby said assemblies are prevented from relative movement in a direction laterally of said magazine assembly by all said slots and studs, and a resiliently mounted latch means separate and distinct from the means previously recited and mounted in one of said assemblies and engaging a recess in the other for preventing relative movement of said assemblies longitudinally of said magazine assembly.

8. A stapling apparatus, comprising an elongate staple magazine assembly, a head assembly adapted to be secured to said magazine assembly and including an outer member formed of sheet metal and having a forward portion and side portions integral therewith and directed rearwardly therefrom, and means for successively driving staples supplied from said magazine assembly, and means for removably securing said head assembly to said magazine assembly and for locating said head assembly in an exactly predetermined position on said magazine assembly when the parts are in their operative position, the last named means including a substantially U-shaped latch member carried by said magazine assembly and having upwardly directed arms embracing the side portions of said head assembly, said side portions having recesses for receiving the bight of the "U" of said latch for locating said head assembly in a direction longitudinal of said magazine assembly, and the arm portions

of said latch serving at least in part to prevent lateral dislocation of the side portions of said head assembly and further serving as hand grip portions for releasing said latch.

9. A stapling apparatus in accordance with claim 8, wherein said head assembly includes an inner member removably associated with said outer member and serving therewith to confine a depressable plunger forming a part of said head assembly and serving to drive staples supplied from said magazine assembly, means removably securing said inner and outer members of said head assembly together and serving in conjunction with said latch in preventing lateral dislocation of the side portions of said head assembly, whereby upon the depression of said latch, said head assembly may be removed as a unit from said magazine assembly for clearing any jam which may occur.

SAMUEL LEBER.
EMIL U. ZELLER.

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