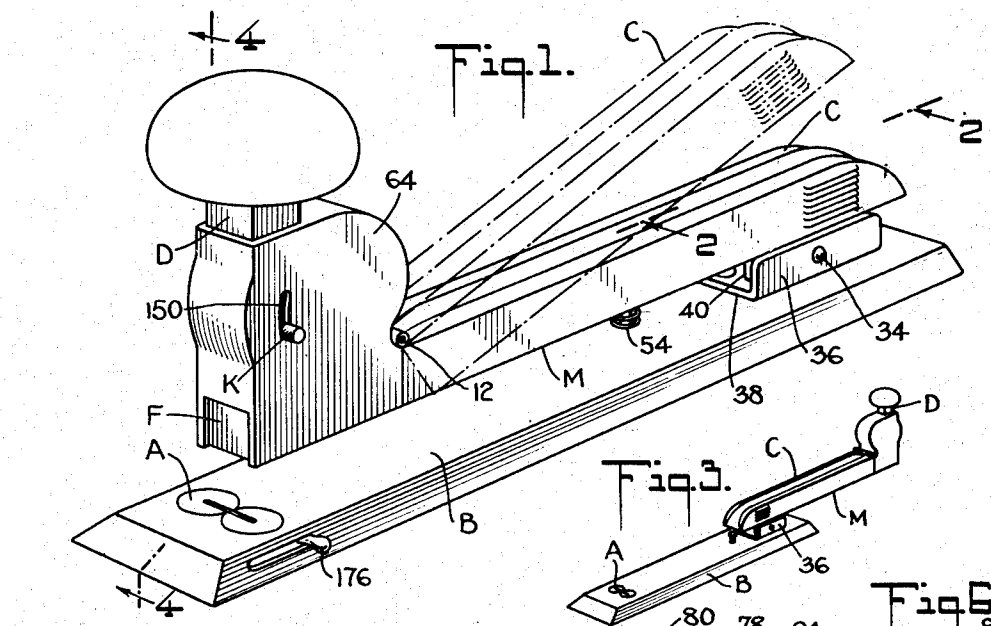
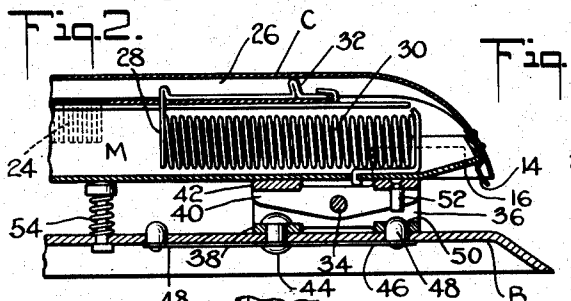
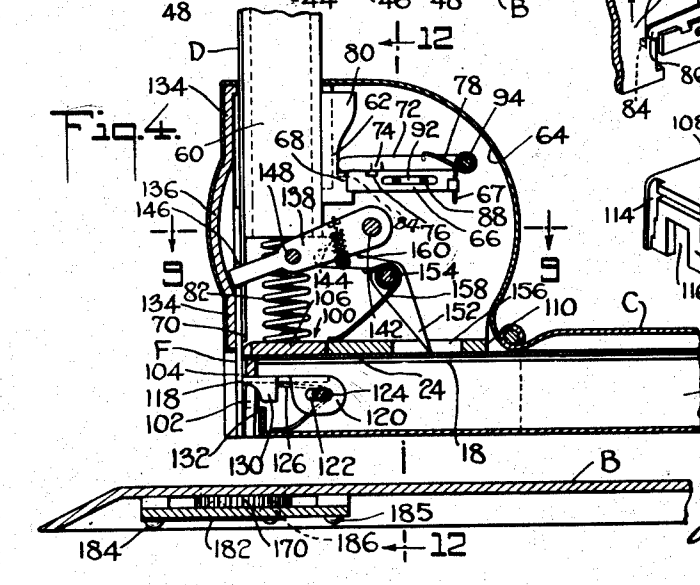
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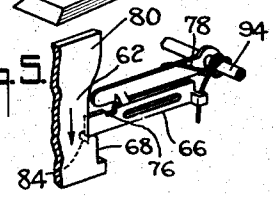
STAPLING MACHINE

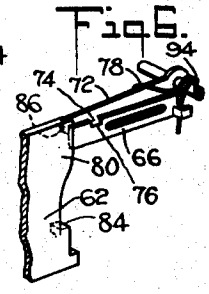
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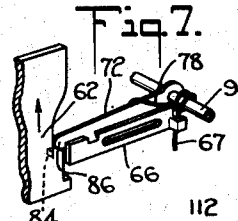


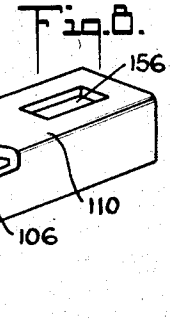












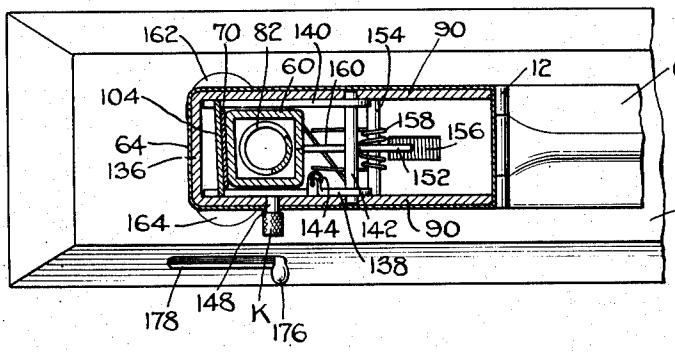
Inventor
William Drypolcher
BY James K. Mauldin
ATTORNEYS

July 7, 1942. W. DRYPOLCHER 2,289,307

STAPLING MACHINE

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Fig. 9.



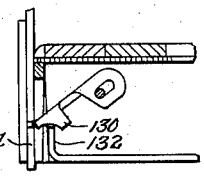


Fig. 16.

Fig. 10.

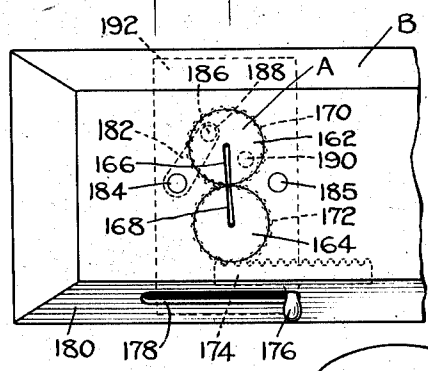


Fig. 11.

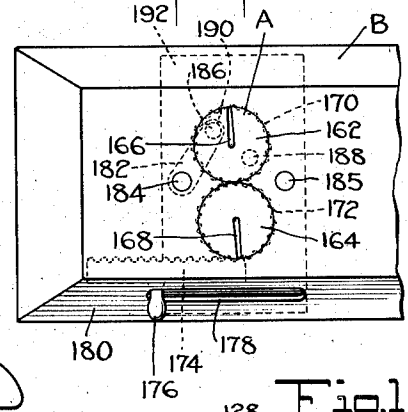


Fig. 12.

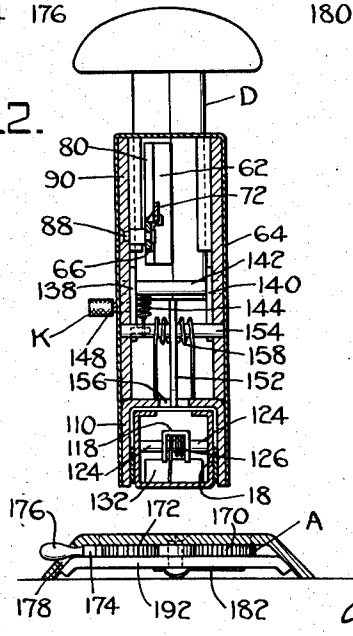


Fig. 13.

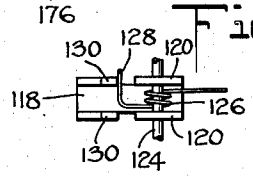


Fig. 14.

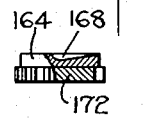
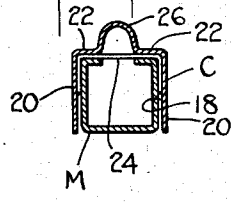


Fig. 15.



Inventor

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Patented July 7, 1942 2,289,307

UNITED STATES PATENT OFFICE

2,289,307

STAPLING MACHINE

William Drypolcher, Valley Stream, N. Y., assignor to Lou Obstfeld, Brooklyn, N. Y., and Abraham Obstfeld, New York, N. Y.

Application October 12, 1936, Serial No. 105,196

• 18 Claims. (Cl. 1—3)

This invention relates to stapling machines.

The primary object of my invention is to generally improve stapling machines and to widely increase the range of usefulness of the same.

Some of the objects of my invention center about the staple magazine and feed mechanism. Heretofore these parts were exposed to dust and corrosion. Moreover, the staple feed channel was a fixed channel so that accidental piling or wedging of staples in the channel would necessitate complete disassembly of the machine. In accordance with my invention the staple magazine and feed mechanism are enclosed by a suitable cover or hood, and this cover is preferably movable or openable to provide access to the staple magazine. Furthermore, the staple feed channel is formed between a staple core and parts of the cover so that the channel is entirely opened when the cover is opened. In this way crooked or jammed staples are readily removed from the core. Moreover, a new clip of staples may be loaded into the magazine from above the core, if desired, instead of through a door at one end of the magazine.

Another object of my invention is to make the stapling machine readily usable as a tacker, thereupon driving the legs of the staples completely or deeply into the material, say wood, without any clinching operation. It has already been suggested to convert a stapling machine into a tacker by dropping the base downward, but this construction is characterized by important disadvantages, for it is not possible to obtain the desired accurate adjustment of the pivot brackets; the base swings loosely on the magazine arm and is not usable as a handle; or in the alternative, special locking means must be provided in an effort to hold the base in alignment with the staple magazine. In accordance with my invention the base is arranged to swing laterally about the pivoted end of the magazine arm, and the base is therefore readily usable as a handle for supporting the machine.

In my opinion it is much more convenient to provide a stapling machine for front loading rather than for rear loading, because this facilitates the loading operation and provides complete accessibility to the front of the machine or driving channel in the event of trouble such as clogging or jamming of staples in the same. The front loading arrangement, however, introduces several disadvantages which it is a further object of my invention to overcome. One such disadvantage is the necessity for constructing the loading door with sturdy mountings and precision in dimension and location, for the door itself forms one side of the drive channel. Considerable increase in manufacturing cost has heretofore been occasioned by the front loading door construction. In accordance with the present invention a reciprocable or sliding door is provided, this door preferably being housed directly within the housing ordinarily employed for the driving mechanism of the stapling machine. Additional means may be provided accessible outside the housing for elevating or lowering the slidable door at will, the door, when elevated, being moved entirely clear of the forward end of the staple core or magazine. The arrangement is inexpensive and neat in appearance.

Another difficulty which arises with front loading machines is the possibility of the operator opening the door without preliminarily latching the staple feed spring against movement. As a result the staple clip tends to feed forward rapidly and may be completely ejected from the machine, with the possibility of striking someone or in any event of wasting the staple clip. An object of the present invention is to overcome this difficulty and to provide improved and simplified safety control means for the staple clip.

Still further objects of my invention center about the anvil or clinching mechanism of the stapling machine. It has already been suggested to employ two alternatively usable anvils, one having slots directed toward one another for clinching the legs of the staple, and the other having slots directed away from one another for bending the legs outwardly, thus providing a staple which acts essentially as a pin or temporary clip for a group of papers or the like. Such dual purpose clinching mechanism has, however, added considerably to the cost of manufacture of the stapling machine, for the movable anvils must be retained accurately in position during the stapling operation. Otherwise the legs of the staples may miss the clinching or bending slots on the anvil. In accordance with my invention the same anvil or clinching device is employed for either permanent or temporary fastening of the staples. I provide two rotatably mounted members disposed side by side beneath the driving mechanism of the stapling machine. One staple bending slot is provided on each of the members, and these slots preferably extend from the center of rotation of the member toward the outside thereof. For convenience I preferably provide a special actuating means for rotating or oscillating the mem-

bers in order to change the relative directions of the slots thereon, these slots being readily movable from one extreme position in which they are directed toward one another, to an opposite extreme position in which they are directed away from one another. The arrangement is economical in manufacture and is characterized by dependability and accuracy because the center of each of the oscillatable members, or in other words the starting end of each of the bending slots, remains permanently fixed in proper location beneath the driving mechanism. Any slight mis-adjustment of the slots merely changes the angle of the same, thus shifting the legs of the staple slightly in one direction or another. The relation of the cross bar of the staple to the anvil is a permanently fixed one, and there accordingly can never be complete failure or jamming of the stapling operation, such as may result with a completely movable or bodily shiftable anvil having a plurality of sets of staple clinching slots.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the stapling machine elements and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings in which:

Fig. 1 is a perspective view of a stapling machine embodying features of my invention;

Fig. 2 is a section taken in elevation through the rear end of the machine, as is indicated by the section line 2—2 in Fig. 1;

Fig. 3 is a perspective view showing the manner in which the stapling machine may be converted for use as a tacker;

Fig. 4 is a section in elevation through the front end of the machine taken in the plane of the line 4—4 of Fig. 1;

Fig. 5 is a perspective view showing the mechanism for insuring completion of each driving stroke, and showing the relation of the parts after a driving stroke has been started;

Fig. 6 shows the relation of the parts at the end of the driving stroke;

Fig. 7 shows the relation of the parts near the end of the upward or return stroke;

Fig. 8 is a perspective view of a yieldably movable insert forming a part of the staple feed and staple driving channels;

Fig. 9 is a section taken in plan in the plane of the line 9—9 of Fig. 4;

Fig. 10 is a plan view of the forward end of the base showing the anvil or clinching mechanism in proper relation for permanently clinching the staples;

Fig. 11 is a similar view showing the relation of the parts for bending the staple legs outwardly for temporarily pinning or fastening papers together;

Fig. 12 is a vertical section taken in the plane of the line 12—12 of Fig. 4;

Fig. 13 is a detail of the staple retractor;

Fig. 14 is a detail showing one of the gear discs employed in the clinching mechanism;

Fig. 15 is a section through the staple magazine showing the formation of the staple feed channel; and

Fig. 16 is explanatory of a detail of the invention.

Referring to the drawings, the staple machine comprises a base B on which is oscillatably mounted a magazine arm M, said arm carrying staple driving mechanism D. The base B carries anvil or clinching mechanism A. In the present machine the magazine arm M is provided with a movable hood or cover C which when opened exposes the staple clip on the staple core and makes the staples accessible for removal or for loading. The magazine arm M may be swung laterally with respect to the base B, thus bringing the parts in the relation shown in Fig. 3. The machine may then be used as a tacker and the base B may be used as a handle to help support the tacker during operation of the same. The anvil or clinching mechanism A is novel in that a single mechanism may be employed either for clinching, as indicated in Fig. 10, or for temporary pinning together of sheets of paper or the like, as indicated in Fig. 11. The machine may be loaded with staples from the front, and the front loading door F is vertically slidable within the housing of the driving mechanism, it being moved by a conveniently accessible operating knob K.

Considering the mechanism of the stapling machine in greater detail, and referring first to Figs. 1, 2 and 15 of the drawings, the hood or cover C is in the present case hinged at one end, specifically the forward end of the machine, the hinged connection being indicated at 12. The opposite end of the cover is preferably provided with a suitable spring catch clearly shown at 14 in Fig. 2 for holding the same closed. Catch 14 snaps over the end 16 of a projection extending rearwardly from the staple core.

The cover functions not only as a housing to prevent dust and dirt from collecting in the staple magazine, but also is preferably used to form walls of the staple feed channel. Referring to Fig. 15 it will be seen that the staple feed channel 18 is relatively closely encompassed by the side walls 20 and the top wall 22 of the cover, and these parts form a staple channel in which the staple clip 24 is received. The center part of the top wall is preferably pressed upwardly or channeled as indicated at 26 in order to stiffen and strengthen the cover in a structural sense, and in order to form clearance for movement of certain upwardly projecting parts of the staple pusher 28 best shown in Fig. 2. As will be understood by those skilled in the art, the pusher 28 rides on the staple core and is urged toward the driving end and against the staple clip by a suitable feed spring 30. In the specific structure here disclosed the upward projection 32 riding within channel 26 is a manually operable handle for moving the pusher 28 rearwardly and latching the same in retracted position. This is done during reloading of staples whether the staple clip be loaded from the top or from the forward end. It will be understood that because the cover forms the outer portion of the staple feed channel, the channel is entirely opened when the cover is opened, and it is for this reason that the staple clip may be loaded from the top and also that bent or piled-up or jammed staples may be removed from the staple core.

Referring now to Figs. 1, 2 and 3, the magazine arm M is vertically oscillatable by reason of pivotal connection 34. This connection or pin passes through upwardly flanged bearings 36 on the bearing plate 38, and also passes through downwardly bent flanges 40 on a plate 42 permanently secured to the bottom of the magazine arm. Bearing plate 38 is rotatably mounted on base B by means of a pin 44. Because of the

rotatable connection at 44, the magazine arm may be swung laterally about the base to a position such as that shown in Fig. 3. At this time the base will move upwardly or downwardly relative to the magazine arm only slightly, for the permitted range of movement is slight. The base B may thus be used as a handle for conveniently supporting the mechanism with one hand while operating the driving mechanism D with the other hand.

It is important to keep the magazine arm M and the base B in alignment when using the machine as a stapler and for this reason I provide the parts with appropriate detent or locating mechanism. Referring to Fig. 2, the base B is provided with a leaf spring 46, the fixed part of which may, if desired, be supported by pin 44 and the movable ends of which carry rounded protuberances or locating pins 48. The bearing plate 38 is perforated at 50 to receive either detent 48. Top plate 42 is preferably provided with a pusher pin 52 disposed directly over perforations 50. It will be manifest from inspection of Fig. 2 that the bearing plate 38 and consequently the magazine arm are normally held strictly in alignment with the base by means of detent 48, but that by elevating the magazine arm M more than its normal elevation by restoring spring 54, the pusher pin 52 will bear against and depress detent 48, thus freeing bearing plate 38 so that the magazine arm may be swung laterally about pin 44 to convert the machine from a stapler to a tacker. Hole 50 is then engaged by the other detent 48, thus keeping the magazine arm and the base in alignment.

The stroke control mechanism is best shown in Figs. 4, 5, 6 and 7, and referring to these figures, it will be seen that the plunger 60 of the driving mechanism is provided on its rear face with a stepped member 62. The housing 64 of the driving mechanism carries a horizontally reciprocable lock bar 66. Lock bar 66 is normally urged toward stepped member 62 by resilient means 67. In Fig. 4 the plunger is in elevated position, and by comparing Fig. 4 with Fig. 5, it will be seen that as soon as the plunger is moved downwardly a short distance equal to the height of the step 68 on stepped member 62, lock bar 66 slides above step 68, thus holding the plunger from returning to its full elevated position. The parts are preferably so proportioned that the vertical dimension of step 68 is greater than the vertical clearance between the bottom end or tip 70 of the staple driving blade and the staple clip 24.

The stroke control mechanism further includes a detent 72 having a tooth 74 adapted to be received in a notch or recess 76 on lock bar 66 whenever the lock bar is moved rearwardly far enough to bring these parts in alignment. Inasmuch as detent 72 is normally urged downwardly by the end 78 of spring 67 previously referred to, the parts thereupon assume the locked condition shown in Fig. 6. To move lock bar 66 rearwardly to locked position shown in Fig. 6, the stepped member 62 is provided with a camming surface 80 which rides in front of and bears against the end of lock bar 66. Camming surface 80 is disposed near the top of stepped member 62, and the parts are so dimensioned that the lock bar is not locked in retracted position by the detent until the driving stroke of plunger 60 has been completed. Detent 72 then functions to hold the lock bar 66 retracted in order to permit the upward or restoring movement of the plunger 60, this being caused by a compression spring 82 located beneath the plunger, as is best shown in Fig. 4.

It is necessary to again release the lock bar at the top of the upward or return stroke of the plunger in order that the mechanism may function for the next stroke. For this purpose a trip lug 84 is bent sidewardly from stepped member 62, and detent 72 is made with a tip 86 (Fig. 7) adapted to ride at one side of stepped member 62 and to lie in the path of trip lug 84, as is best shown in Figs. 4 and 7. In Fig. 7 the relation of the parts near the top of the return stroke of the plunger is shown, and it will be noted that strip lug 84 bears against and elevates detent 72, thus freeing lock bar 66, which thereupon moves forwardly to the position shown in Fig. 4. Lock bar 66 is supported by a pair of pins 88 anchored on the adjacent side wall 90 of the frame of the operating mechanism, as is best shown in Fig. 12, and passing through an elongated slot 92 (Fig. 4) in lock bar 66. Detent 72 is oscillatably mounted on a pin or rod 94 which may most simply extend between the side walls of the frame. Spring 67, 78 may be coiled about pin 94, the arrangement of the parts being clearly shown in the drawing.

Referring now to Figs. 4 and 8, I shall next describe the yieldable feed channel. The staple core 18 is provided at its forward end with an L-shaped member or insert 100. The arms of this member are preferably disposed at an angle somewhat greater than 90°. The approximately vertical arm 102 functions as one side of the drive channel for the staple, the other side of the drive channel being formed by the front loading door 104 heretofore referred to. For the present purpose, the door 104 may be considered a fixed side, while the vertical arm 102 of insert 100 may be considered a movable side, and it will be understood that where no front loading door is desired, a truly fixed member may be used instead of the door 104. The approximately horizontal arm 106 of insert 100 is supported directly on the side walls of a member 110, though these parts are shown separated somewhat in Fig. 8 to clarify the separable construction. With arm 106 resting on member 110, the arm overlies core 18 with sufficient space therebetween to receive the staple clip 24. The member 100 rocks or pivots about the corners 111, one of which is visible in Fig. 8, for, as above mentioned, the angle of member 100 is greater than the angle of the forward end of member 110. A relatively powerful compression spring 82 bears downwardly against the horizontal arm 106, thus tending to turn insert 100 clockwise, or in other words, tending to close the drive channel or space between the relatively movable members 102 and 104. This insures close or tight frictional support of the staples during the driving operation, which in turn prevents bending or crumpling of the same. The desired staple support is provided despite minor variations in staple dimension. It will be noted that horizontal arm 106 is provided with a locating projection 108 over which the lower end of spring 82 is received.

It should be noted that with the present arrangement it is conveniently possible to use a single spring, that is the spring 82, for two purposes, that is, for restoring plunger 60 to elevated position and for yieldably reducing or closing the drive channel. Moreover, this arrange-

ment with a common spring 82 has the advantage that the resistance to buckling of the staple is increased as the stapling stroke nears completion.

It has previously been mentioned that the staple feed channel is closed at the top by cover C. Within the housing 64 of the driving mechanism the staple feed channel is completed by a member 110. The ends of member 110 and the horizontal arm 106 of insert 100 come into abutting relation. These ends are preferably cut at a substantial angle or bias, as is indicated at 112 in Fig. 8. This is done so that the space or crevice therebetween is directed at an angle relative to the staples passing therebeneath, thus preventing a staple from rising up into or becoming caught in the crevice. Again referring to Fig. 8, it will be observed that the vertical arm 102 of member 100 is cut away in inverted U-shape at 114, thus forming a passage through which the staples pass as they are fed to the drive channel. Arm 102 is also cut away at 116 to form a space or recess in which a retractor tongue is movable, as will be subsequently described. It will be understood that the insert 100 may be made of hardened steel appropriately tempered for long wear, in contrast with the ordinary working parts of the machine which may be made of ordinary steel. Where the drive channel is not made of a separate member such as the insert 100, it is necessary to make a considerable part of the machine of hardened steel, or else an inferior machine subject to rapid wear results. The ends 117 of the side walls of member 110 come immediately in back of arm 102 and positively limit its maximum movement to a slight amount, say five thousandths of an inch.

The retractor tongue above referred to is clearly shown at 118 in Figs. 4 and 13. The tongue is provided with downwardly bent ears 120, and these are slotted at 122 to receive a support pin 124 which extends across the staple core 18. A spring 126 is coiled about pin 124 and functions to normally urge retractor tongue 118 upwardly or clockwise as viewed in Fig. 4. The upper end 128 (Fig. 13) of spring 126 is turned sidewardly and bears against the inner wall of camming lug 130. Spring end 128 functions to normally urge the retractor tongue forwardly, that is, into the staple drive channel. It will be evident that as so far described the retractor tongue will function in the usual manner, it tending to support the center or bridge of the staple against downward movement. Moreover, the present construction, by reason of the slots 122, has the advantage of not excessively binding the driving blade 70 during the driving stroke, and even more importantly, during the upward or return stroke. This is so because any tendency of the tongue to wedge or jam against the driving blade during its upward movement is relieved by rearward bodily movement of the tongue on support pin 124.

In the present construction, the retractor tongue serves an even more important function, namely that of increasing the driving pressure in the latter portion thereof. To this end the spring 126 of the retractor tongue is made relatively heavy, and the tongue is provided with downwardly bent cam members 130 which cooperate with an upwardly bent stationary camming member 132 (see Figs. 4 and 16).

It will be clear from inspection of the drawings that after the driving stroke has been partially completed and in the last portion thereof, the curved cam surfaces or forward edges of the cam members 130 reach and ride on the upwardly turned member 132. Any continued downward movement of the retractor tongue immediately causes the tongue to move rearwardly on pin 124, the end of the tongue being abruptly moved out of the staple drive channel, as shown in Fig. 16. In this way the plunger load is suddenly relieved of the resistance theretofore offered by the retractor tongue, thus increasing the effective pressure on the plunger near the end or clinching part of the driving stroke.

As has already been mentioned, the machine is provided with a door F for front loading. Referring to Figs. 4, 9 and 12, the door mechanism comprises a strip or blade 104 housed within and vertically reciprocable in the housing 64 of the driving mechanism. Door 104 is guided between the side walls 90 of the frame of the driving mechanism and is held against outward movement by the end wall 134 of the frame. A part of the end wall 134 is convexed outwardly, as is indicated at 136, in order to receive the ends of a pair of door-operating arms, and it is because of this convexity at 136 that a substantial space is shown in Fig. 9 between door 104 and the housing wall. A pair of door-operating arms 138 and 140 are provided on opposite sides of plunger 60. Arms 138 and 140 are secured to a rod 142 and therefore move together. One of the arms, in this case 138, is provided with a small pull spring 144 which normally urges the arms downwardly. The ends of the arms are received in slots 146 in door 104. One of the arms, in this case the arm 138, has fixed thereto the pin 148 of a suitable operating knob K. The housing wall is slotted at 150 (see Fig. 1) to receive pin 148. It will be evident that by moving the knob K upwardly in slot 150 the front loading door 104 is elevated, thereby clearing the end of the staple core and permitting the delivery of a new staple clip into the machine. It will also be understood that this front loading door is characterized by the usual advantages of most front loading arrangements in that the drive channel is fully accessible and openable in the event of a staple jam.

The staple pusher should, of course, be locked in retracted position before the front loading door is opened. If not, there would be a tendency to eject the staple clip from the machine. To prevent this possibility, even if the pusher is not latched in retracted position, I provide a safety pawl 152 best shown in Figs. 4, 9 and 12. The staple pawl is oscillatable on a rod 154 supported in frame 90. The lower end of the staple pawl is movable in a suitable clearance slot 156. The pawl is normally moved clockwise as viewed in Fig. 4 by a suitable torsion spring 158. Operatively connected to and preferably formed integrally with pawl 152 is an operating arm 160 the end of which is disposed slightly beneath the lower end of plunger 60. It will be evident from inspection of Fig. 4 that when the plunger is partially depressed, the pawl 152 is moved out of engagement with the staple clip, thus permitting forward or feed movement of the staples. Of course, during the downward stroke no feed movement takes place because at first the endmost staple is in the way and thereafter the driving blade 70 is in the way. However, during the last portion of the upward movement of plunger 60, the staple clip is moved forward. When the upward stroke of the plunger has been completed the staple clip can no longer move forward, the

pawl 152 coming into engagement with the transverse ridges formed by the staples of the staple clip. The operating parts are so proportioned that pawl 152 is disengaged from the staple clip when the driving blade has moved downwardly to a point intermediate the staple clip and the uppermost position of the driving blade.

The anvil or clinching mechanism of the stapling machine may be described with reference to Figs. 10, 11, 12 and 14. In these figures it will be noted that the anvil comprises discs 162 and 164 disposed side by side on the base of the machine and beneath the driving mechanism. Disc 162 is provided with a slot 166 extending from the center of the disc outwardly toward the periphery thereof, and similarly, disc 164 is provided with a slot 168 extending from the center of the disc toward the periphery thereof. The discs are rotatably mounted in the base, and it will be apparent from comparison of Figs. 10 and 11 that by appropriately rotating the discs, the slots may be moved from a position directed toward one another, as in Fig. 10, to a position directed away from one another, as in Fig. 11. With the parts in the relation shown in Fig. 10, the legs of the staple are bent beneath the staple and are clinched in place. With the parts in the position shown in Fig. 11, the legs of the staple are bent outwardly and the staple is therefore readily removable. This forms a temporary attachment equivalent to the use of a pin or clip.

For convenience, I provide suitable operating means to rotate the discs in unison. Specifically, discs 162 and 164 are provided with gear teeth 170 and 172, these teeth being in mesh. I further provide a gear rack 174, the teeth of which are in mesh with one of the discs, specifically disc 164. Rack 174 is provided with an operating handle 176 reciprocable in a slot 178 cut through a side wall 180 of the base. It will be evident that by shifting the handle 176 back and forth, the discs may be oscillated in unison to assume either the position shown in Fig. 10 or that shown in Fig. 11. To help lock the discs in desired position, spring detent mechanism may be provided. Specifically, I provide a leaf spring 182 fixedly secured to the base of the machine at 184. The movable end of spring 182 is provided with a suitable detent projection or knob 186, and this is adapted to fit into either of two detent holes or recesses indicated at 188 and 190 in Fig. 10. In special cases the discs may be stopped after, say, 90° rotation, thus bending the staple with the legs perpendicular to the cross bar.

For the sake of economy, the gears 170 and 172 are preferably stamped from sheet metal by a simple die operation. The discs 162 and 164 are also stamped from sheet metal, and the parts are welded together, as is most clearly shown in Fig. 14. Disc 164 is preferably made somewhat smaller in diameter than gear 172 so that the parts may be held in position by inserting discs 162 and 164 in mating holes in base B and thereafter holding the same in elevated position by a suitable bottom plate 192 which may be welded at its ends to the base of the machine, and which may be further secured in place by rivets 184 and 185. Plate 192 also functions to support and guide the rack 174. By making the thickness of discs 162 and 164 substantially equal to the thickness of the metal forming the base of the machine, the anvil or clinching device is made flush with the top of the base, which is very convenient when using the machine, as sheets to be stapled are readily slid in place.

It is believed that the construction and operation as well as the many advantages of my improved stapling machine will be apparent from the foregoing detailed description thereof. The staple magazine is provided with a cover or hood which completely encloses the magazine and staple feed mechanism. This improves the appearance of the machine and prevents the collection of dust or dirt, as well as direct exposure of the staples to corrosive atmosphere. The cover may be moved to open position, at which time the staple channel is also open, thus exposing the staples to facilitate the removal of crooked or jammed staples. Moreover, a new staple clip may be loaded into the machine from above.

The magazine arm may be swung laterally about its pivoted end, thus bringing the arm away from the base so that the machine may be used as a tacker rather than as a stapler. At this time the base may be held with one hand to support the machine while the driving mechanism is operated with the other hand.

The machine is provided with a door for front loading, and is characterized by a number of advantages attendant upon such an arrangement. However, the usual disadvantages of increased expense and objectionable appearance are overcome, for the door is a simple sliding door concealed by and housed within the machine, yet readily movable by means of an operating knob accessible outside of the machine housing. With this simplified door construction the door may be made of a good grade of steel without substantial expense, for the door is merely a flat strip of sheet metal. At the same time the possibility of undesired ejection of a staple clip from the machine on opening of the front door is eliminated by the provision of a locking pawl which bears against the staple clip and holds the same against forward movement whenever the plunger is in elevated position, which, of course, is the position it would have in all practical cases on attempting to open the door.

The machine may be used not only for stapling and for tacking, but also for temporarily securing sheets together as by bending the staple legs outwardly instead of clinching the same inwardly. The anvil provided for this purpose possesses the important advantage that the entrant or starting ends of the slots which bend the staple legs are fixed in location. The discs can not go out of adjustment except rotationally, and any slight oscillation or misalignment of the slots does not noticeably affect the stapling operation, for the legs of the staple are merely shifted a trifle in direction. At no time is it possible to move the anvil to a position in which the legs of the staple will not be received in the clinching slots.

It will be apparent that while I have shown and described my invention in a preferred form, many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention defined in the following claims.

Those features of the invention which have been described but not claimed herein are claimed in a co-pending application of Charles J. Fancher and Frederick W. Schmidt, Serial No. 297,834, filed Oct. 4, 1939.

I claim:

1. A stapling and tacking machine comprising a base including clinching mechanism, an arm

including a staple magazine and staple driving means at one end of said magazine, a vertical pivot at the opposite end of the magazine securing the end of the arm to one end of the base, whereby the arm is laterally swingable to a position away from the base for tacking, and means to hold the arm over the base when the machine is used for stapling.

2. A stapling and tacking machine comprising a base including clinching mechanism, a stapling arm vertically oscillatably mounted on said base, resilient means for normally elevating the arm relative to the base, and pivot means whereby the arm is laterally swingable away from the base, whereby the machine may be used as a tacker.

3. A stapling and tacking machine comprising a base including clinching mechanism, a bearing plate rotatably mounted on top of said base, a stapling arm vertically oscillatably mounted on said bearing plate, releasable detent means for holding the bearing plate with the arm in alignment with the base, the arm being laterally swingable with the bearing plate to a position away from the base, whereby the machine may be used as a tacker.

4. A stapling machine comprising staple driving mechanism including a staple drive channel, a staple core, staple feed mechanism to feed staples to the staple drive channel, a reciprocable sliding door at the forward end of the stapling machine, and guide means for holding said door accurately in proper position, said door forming one side of the staple drive channel when closed, and being arranged to slide for so great a distance as to completely expose the end of the staple core when slid open.

5. A stapling machine comprising staple driving mechanism, a housing therefor, a staple magazine and feed mechanism to feed staples to the staple driving mechanism, a vertically reciprocable sliding door at the forward end of the stapling machine located within and guided by said housing, and means accessible outside the housing for elevating or lowering the door, said door when elevated being cleared from the forward end of the staple magazine.

6. A stapling machine comprising staple driving mechanism including a staple driving plunger and blade secured thereto, a staple guide core, staple feed means for feeding a clip of staples along the core to the staple driving mechanism, an openable door at the front of the staple guide core, and means to prevent undesired ejection of the clip of staples upon opening of the door, said means including a holding pawl constantly resiliently urged downwardly into engagement with the staple clip and an arm formed integrally with said pawl and lying in the path of movement of the plunger, the parts being so disposed that the pawl is moved free of the staple clip when the bottom of the blade is moved to a point intermediate its top position and the staple clip.

7. A stapling machine comprising staple driving mechanism including a staple driving plunger, a staple guide core, staple feed means for feeding a clip of staples along the core to the staple driving mechanism, an openable door at the front of the staple guide core, and means to prevent undesired ejection of the clip of staples upon opening of the door, said means including a holding pawl constantly resiliently urged downwardly into engagement with the staple clip, and an arm formed integrally with and extending from said pawl and lying in the path of movement of the plunger, the parts being so disposed that the pawl is in its normal lowered position, but is moved away from the staple clip when the plunger is depressed a small amount.

8. A stapling and tacking machine comprising a base including clinching mechanism, a stapling arm vertically oscillatably mounted on said base, resilient means for normally elevating the arm relative to the base, pivot means whereby the arm is laterally swingable away from the base so that the machine may be used as a tacker, detent means for holding the arm either directly over the base or displaced 180° from the base, and additional means for releasing the detent means when the position of the stapling arm relative to the base is to be changed.

9. A stapling machine comprising staple driving mechanism including a staple driving channel, a staple core, staple feed mechanism to feed staples to the staple drive channel, a reciprocable sliding door at the forward end of the stapling machine, said door when closed forming one side of the staple drive channel, and being arranged to slide for so great a distance as to completely expose the end of the staple core when slid open, and resilient means tending normally to close the door.

10. A stapling machine comprising staple driving mechanism including a staple drive channel, a staple driver, a staple magazine open at its front end to permit insertion of staples, a staple feed mechanism to feed staples to the staple drive channel, a closure at the front end of said magazine mounted for rectilinear sliding movement to expose or close at opposite extreme positions of its movement the said opening, and guide means for guiding said closure in its movement, said closure forming one side of the staple drive channel and being at all times engaged by and parallel to said staple driver.

11. A stapling machine comprising staple driving mechanism including a staple drive channel, a staple driver, a staple magazine closed at its rear end and open at its front end to permit insertion of staples, a staple feed mechanism to feed staples to the staple drive channel, a closure at the front end of said magazine mounted for rectilinear sliding movement to expose or close at opposite extreme positions of its movement the said opening, and guide means for guiding said closure in its movement, said closure forming one side of the staple drive channel and being at all times substantially parallel to said staple driver.

12. A stapling machine comprising staple driving mechanism including a staple drive channel, a staple driver, a staple magazine closed at its rear end and open at its front end to permit the insertion of staples, a staple feed mechanism to feed staples toward the front end to the staple drive channel, a closure slidably mounted at the front end of said magazine in order to close or expose the open front end of the magazine, guide means for said closure, said closure being slidable in a direction generally parallel to the staple driver and being slidable to such an extent as to completely expose the open front end of the magazine for loading purposes, said closure forming one side of the staple drive channel and being engaged by the staple driver during operation of the machine.

13. A stapling machine of the front loading type comprising staple driving mechanism including a staple drive channel, a staple driver, a staple magazine and associated parts so arranged at its rear end as to prevent the in-

sertion of staples from the rear, said magazine being open at its front end to permit the insertion of staples, a staple feed mechanism to feed staples toward the front end to the staple drive channel, a closure slidably mounted at the front end of said magazine in order to close or expose the open front end of the magazine, guide means for said closure, said closure being slidable in a direction generally parallel to the staple driver and being slidable to such an extent as to completely expose the open front end of the magazine for loading purposes, said closure forming one side of the staple drive channel and being engaged by the staple driver during operation of the machine.

14. In a stapling machine, a staple guide comprising collateral side walls to guide a load of staples, said staple guide being exposable to receive staples, stop means at the forward end of the staple guide to limit the movement of the staples, staple feed mechanism to feed the staples along the guide toward the stop means, and a readily releasable latched hood readily openable by a single arcuate motion to instantaneously expose the staples when the hood is opened, said hood being independent of said stop means so that opening of the hood to expose the staples does not move the stop means, a cross-section through said hood being an inverted U in shape, said hood having top and side walls which are sufficient in length and depth to complete the desired protective covering of said staples and staple feed mechanism throughout the staple feeding operation when the hood is closed.

15. A stapling machine comprising a base, a staple support pivoted to said base, said staple support comprising an arm which is substantially U-shaped in section, staple stop means at the forward end of the arm to limit the movement of the staples therealong, feed mechanism for feeding staples along the arm toward the stop means, and a hood or cover pivotally mounted over said staple support, said hood being inverted U-shaped in section and being provided with readily releasable detent means so that it may be instantly opened to expose the staples and staple feed mechanism, said hood being independent of said stop means so that opening of the hood to expose the staples does not move the stop means, said hood having top and side walls which are sufficient in length and depth to complete the protective covering of said staples and staple feed mechanism throughout the staple feeding operation when the hood is closed.

16. A stapling machine comprising a base, a magazine arm for receiving staples, said arm being pivoted to said base and comprising guide walls for guiding the staples, stop means at the forward end of the staple guide walls to limit the movement of the staples, a staple feeding mechanism to feed the staples toward the stop means, readily releasable detent means, and a readily openable inverted trough-shaped hood or cover engaging said detent means and being readily instantaneously openable in a single arcuate motion, said hood being independent of said stop means so that opening of the hood to expose the staples does not move the stop means, said hood having top and side walls which are sufficient in length and depth to complete the desired protective covering of said staples and staple feed mechanism throughout the staple feeding operation and thereby preventing idle manipulation of the staple feed mechanism while the hood of the machine is closed.

17. A stapling machine comprising a staple driving mechanism, a staple feed mechanism to feed staples to the staple driving mechanism, staple stop means at the staple driving mechanism to prevent movement of staples beyond said staple driving mechanism, and a readily releasably latched hood or cover protectively concealing the staples and the staple feed mechanism throughout the staple feeding operation, and thereby preventing idle manipulation of the staple feed mechanism while the hood is closed, said hood being instantaneously openable in a single arcuate motion to expose the staples and the staple feed mechanism, said hood being independent of said stop means so that opening of the hood to expose the staples does not move the stop means, said hood having top and side walls which are sufficient in length and depth to complete the desired protective covering of said staples and staple feed mechanism throughout the staple feeding operation when the hood is closed.

18. A stapling machine comprising a base, an arm mounted on said base, staple driving mechanism, staple guide walls forming a fixed part of said arm, staple feed mechanism to feed staples to the staple driving mechanism, stop means to stop the leading staple at the staple drive mechanism, a pivoted hood or cover received over said arm and protectively housing and concealing the staple guide walls and staple feed mechanism throughout the staple feeding operation, and detent means between said hood and said arm, a part of said hood being located closely adjacent to and acting with the staple guide walls to form a staple feed channel, said hood being movably secured relative to the arm and being instantly openable in a single arcuate motion to expose the staples on the staple guide walls for inspection, removal if jammed, or for loading, said hood being independent of said stop means so that opening of the hood to expose the staples does not move the stop means, said hood having top and side walls which are sufficient in length and depth to complete the protective covering of said staples and staple feed mechanism throughout the staple feeding operation when the hood is closed.

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