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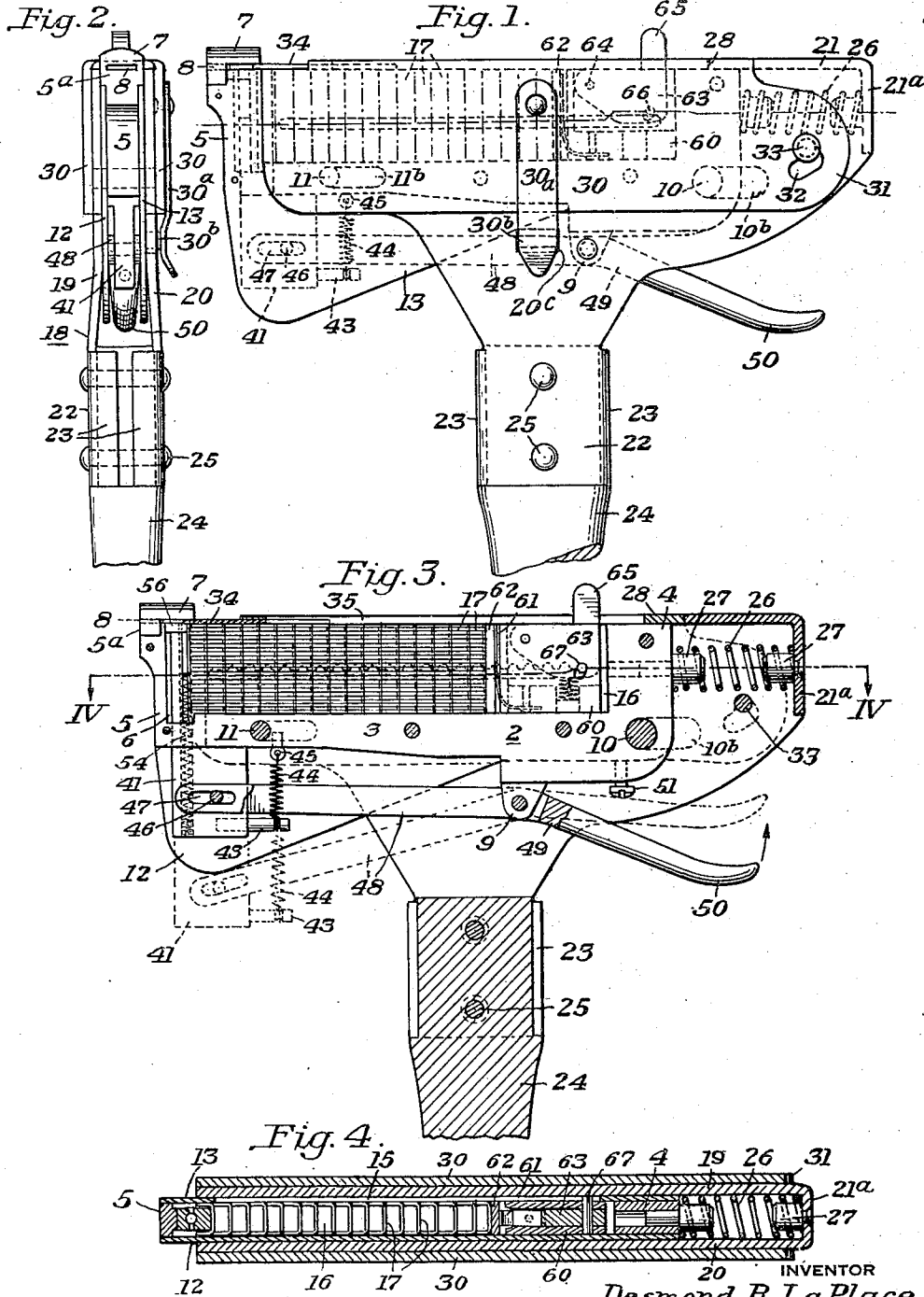
D. R. LA PLACE

2,279,624

STAPLING HAMMER

Filed March 12, 1940

3 Sheets-Sheet 1



INVENTOR  
Desmond R. LaPlace

By his attorney  
Stettin, Blank, Parmelee

April 14, 1942.

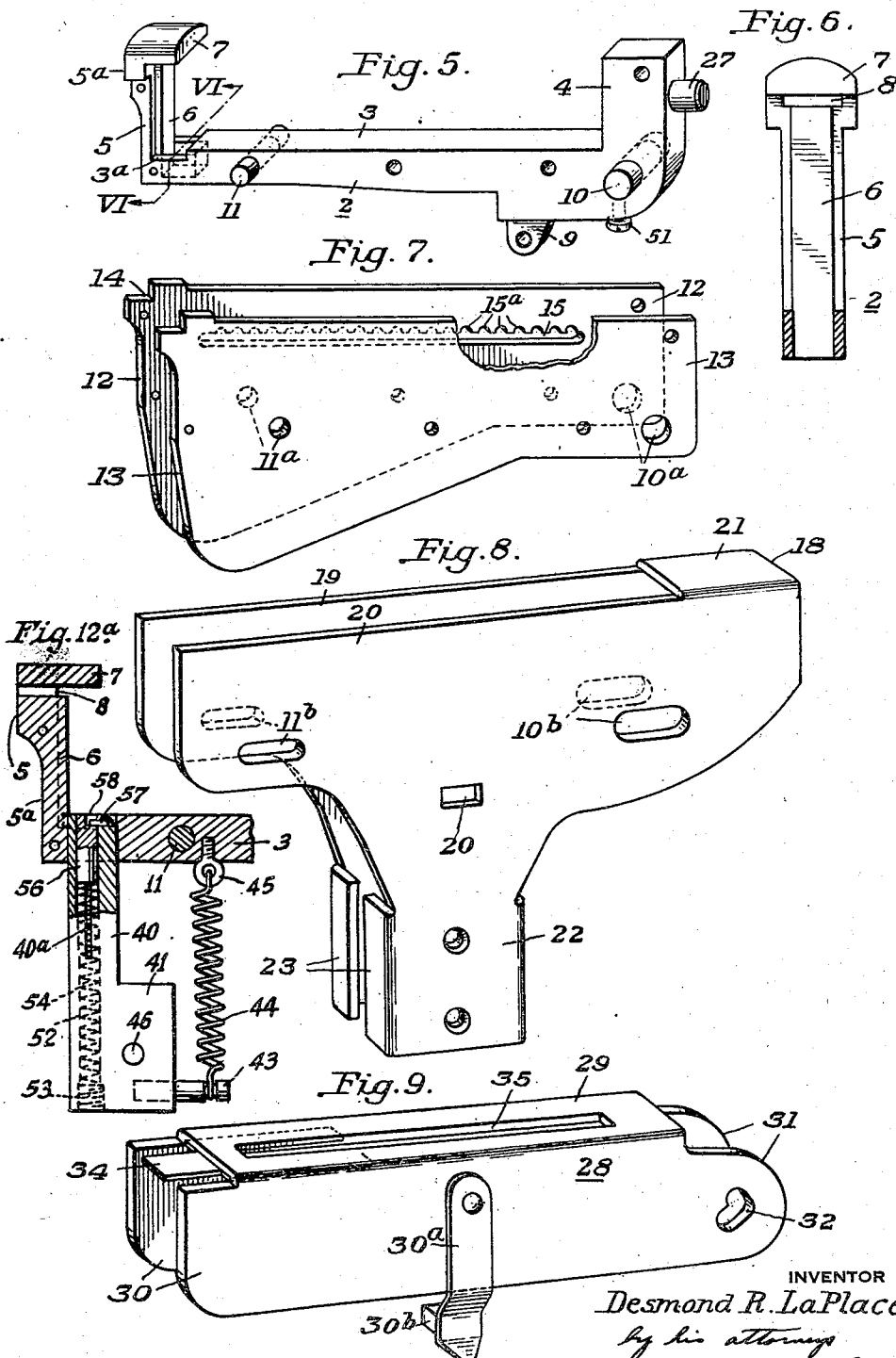
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3 Sheets-Sheet 2



INVENTOR  
Desmond R. LaPlace  
by his attorneys  
Stebbins, Blankin, & Parnell

April 14, 1942.

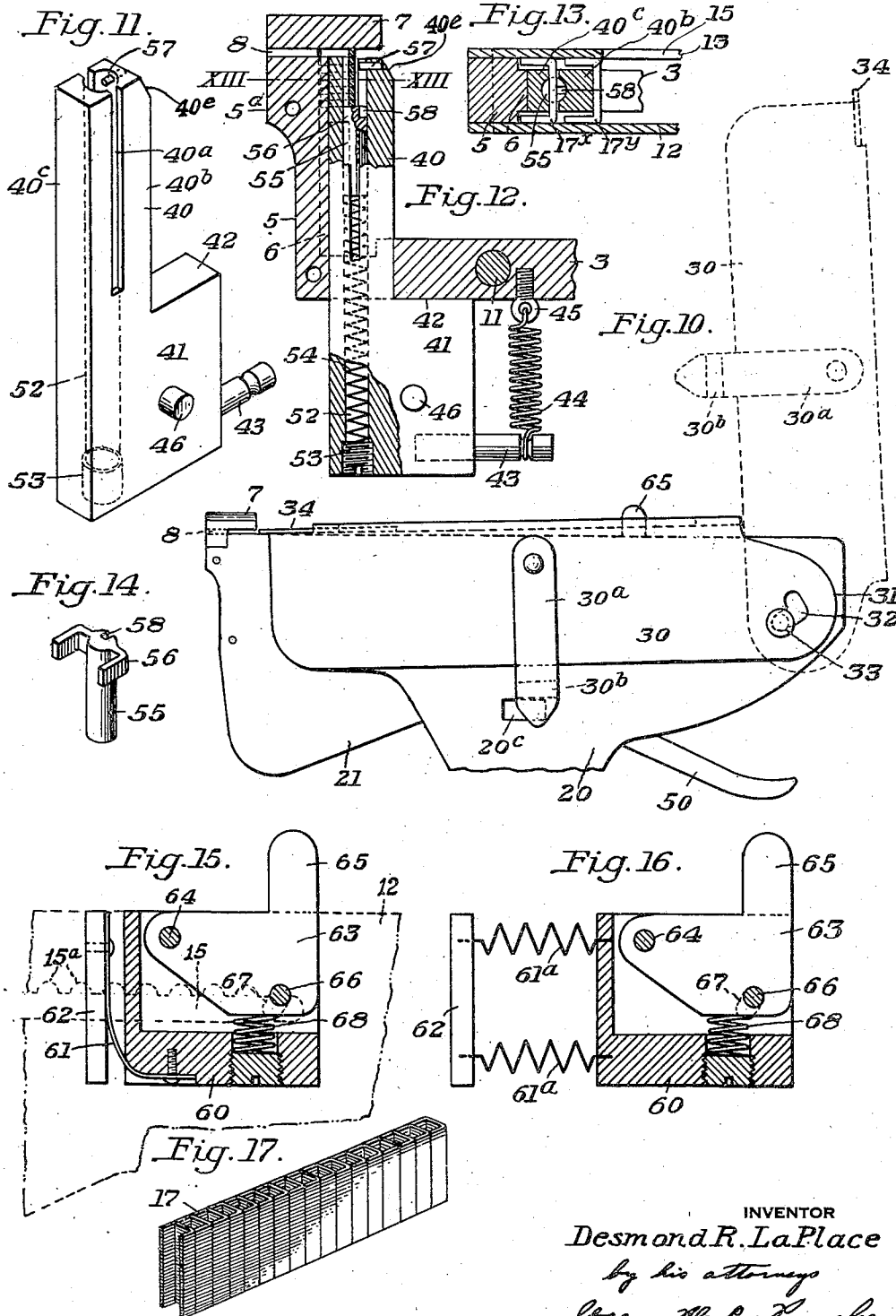
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3 Sheets-Sheet 3



INVENTOR  
Desmond R. LaPlace  
by his attorneys  
Stebbins, Blankenship & Carmichael

## UNITED STATES PATENT OFFICE

2,279,624

## STAPLING HAMMER

Desmond R. La Place, Beaver Falls, Pa., assignor  
to Bocil Corporation, Pittsburgh, Pa., a corporation of Delaware.

Application March 12, 1940, Serial No. 323,551

25 Claims. (Cl. 1—49)

This invention is for a stapling device and relates particularly to a stapling device in the form of a hammer. The invention in certain respects constitutes an improvement over the stapling device disclosed in my copending application Serial No. 304,360 filed November 14, 1939.

Heretofore it has been proposed to provide a stapling apparatus in the general form of a hammer, but such devices of this nature as have heretofore been commercially available are deficient in certain respects. One serious drawback to devices of this character as heretofore constructed has been the relatively limited capacity of the apparatus. Only a comparatively few staples can be driven and then it is necessary to reload the device. Another difficulty has been that such devices as have heretofore been available are difficult and awkward to use.

According to the present invention as applied to hand stapling devices, there is provided an apparatus of this character which in general appearance somewhat resembles the contour of a hatchet. There is provided in the device a handle and a head which is rigidly secured to the handle. The head is provided with a hollow interior in which is slidably mounted the stapleholding and guiding unit one end of which normally projects beyond the striking end of the hammer. The hammer itself carries a driver which cooperates with the relatively movable unit in the driving of the staples. The unit is constructed to provide a magazine in which several clips of staples may be placed simultaneously, the arrangement being such that as one row of staples is exhausted, another row of staples may be easily moved into place. The unit is provided also with a feeding device which moves the row of staples which is being consumed toward the driver, the feeding device being readily retractable when one row of staples is consumed to enable another row to come into position to be used. In the present preferred form of the invention, access to the magazine is through a hinged cover forming a part of the head of the hammer, the arrangement permitting the magazine to be easily accessible for reloading.

My invention provides an implement in the form of a hammer which is well balanced and which may conveniently have a capacity in excess of 500 staples and wherein the staples may be driven merely by forcefully striking the striking end of the hammer against the surface into which the staples are to be driven. The construction, moreover, is one which may be manufactured at relatively low cost. My invention

further provides certain novel improvements in a magazine type of stapling tool with improved means for feeding the staples, including the provision of means for separating the row of staples which is being used from the other rows of staples in the magazine.

The invention may be more fully understood by reference to the accompanying drawings which illustrate one present preferred embodiment of my invention and in which

Figure 1 is a side elevation of a stapling hammer embodying my invention;

Figure 2 is an end elevation of the tool shown in Figure 1 looking at the striking end of the tool;

Figure 3 is a longitudinal vertical section through the tool, some of the internal parts, however, being shown in elevation;

Figure 4 is a longitudinal transverse section in substantially the plane of line IV—IV of Figure 3;

Figure 5 is a perspective view of the relatively movable striking unit which also provides the magazine;

Figure 6 is a transverse vertical section in substantially the plane of line VI—VI of Figure 5, the view being on a larger scale;

Figure 7 is a perspective view of the side plates which are secured to each side of the member shown in Figure 5;

Figure 8 is a perspective view of the outer casing forming the head of the tool;

Figure 9 is a perspective view of the combined cover plate and driver that is secured to the top of the part shown in Figure 8 and which straddles the part shown in Figure 8;

Figure 10 is a side elevation similar to Figure 1 but showing the combined cover and driver member shifted from a normal position to a position where it may be opened, the open position and the cover member being partially shown in dotted lines;

Figure 11 is a perspective view of the slide member at the driving end of the magazine in which is supported the row of staples being consumed and which holds the next succeeding row of staples in the machine out of contact with the one being consumed;

Figure 12 is a transverse vertical section through the forward end of the striking member showing the guide member of Figure 11 in position thereon, both Figures 11 and 12 being shown on an enlarged scale;

Figure 12a is a view similar to Figure 12 but showing the parts retracted from the position

shown in Figure 12 to permit the feeding forward of the staples to the position to be consumed, this view being on a slightly smaller scale than Figure 12.

Figure 13 is a transverse section in substantially the plane of line XIII—XIII of Figure 12;

Figure 14 is an enlarged perspective view of the follower that works along the guideway in the member shown in Figure 11 and which serves to propel the row of staples being consumed toward the driver;

Figure 15 is a longitudinal section through the pusher which operates in the magazine to propel successive rows of staples toward the discharge end of the magazine;

Figure 16 is a view similar to Figure 15 of a slightly modified form of pusher; and

Figure 17 is a perspective view illustrating a clip of staples constructed to be charged into the magazine of the stapling device.

Referring to the drawings, the construction of the device may be most readily understood by referring especially to Figures 5 to 9 showing the principal large elements of the tool. Starting first with Figures 5 and 6, there is a combined striker and magazine unit which has a main body member 2, this body member comprising a longitudinally extending bar 3 with an integral upright leg 4 at one end thereof and with an integral upright leg 5 at the other end thereof. This leg is provided with a central rib 6, and the leg terminates at its upper end in an integral lug 7. There is a slot 8 through the end of the leg 5 as best shown in Figure 6, this slot being at the end of the rib 6 and under the cap piece or lug 7. It is through this slot that the staples are guided as they are being driven. The upper part of the leg 5 is forwardly offset as indicated at 5a and the face of this offset portion forms the striking face of the hammer. The unit 2 is provided with a downwardly extending ear 9 on the undersurface thereof. It is illustrated as having several holes therethrough for the reception of rivets and it is also provided with two transverse pins 10 and 11. The member 2 while illustrated as being an integral piece, may for manufacturing purposes, actually be constructed of two longitudinally separated pieces layed in face to face relation. The width of the crossbar 3 is substantially equal to the outside width of the rows of staples to be used in the device. Since the forward end of this device constitutes the striking end of the hammer, the unit 2 is of relatively strong metal.

Riveted to each side face of the body 2 are side plates 12 and 13 which side plates are shown in perspective in Figure 7. The side plates are of similar shape. The upper left-hand corner of each, as viewed in Figure 7, is notched out at 14 to engage a lug or shoulder that projects laterally from each side of the leg 5 so that when the plates 12 and 13 are riveted to the member 2, these plates support the leg 5 and prevent it from bending inwardly under the force of the blows to which it is subjected. Holes are provided in the plates 12 and 13 at 10a and 11a through which the pins 10 and 11 respectively pass.

One of the side plates as for example, the side plate 12, is provided with a longitudinally extending slot 15 therein which extends through the plate, and the upper edge of this slot is notched at regular intervals, the notches being designated 15a.

It will be seen that when the two plates 12

and 13 are riveted to the unit 2 they are separated from each other a distance substantially equal to the width of a row of staples adapted to be used in the machine, and a chamber or magazine is thus formed, the bottom of the chamber being provided by the flat top of the crossbar 3 of the unit 2, the side walls of the chamber being provided by the plates 12 and 13, and one end wall of the chamber is provided by the upright leg 4 while the other wall of the chamber is provided by the upright leg 5. This magazine or chamber is designated 16, and it is adapted to receive at one time several rows of staples which rows of staples stand endwise in the magazine with the lower end of each row of staples resting on the crossbar 3. These rows of staples are designated 17.

The magazine unit comprising the member 2 and the side plates 12 and 13 is in turn received in the member 18 shown in Figure 8, this member constituting the main frame of the machine or the head of the implement. The member 18 is preferably formed from a single piece of sheet metal stamped and bent to the shape shown in Figure 8. It has two spaced-apart face plates 19 and 20 which are connected at the top at one end of the frame by a bridge 21. The face plates 19 and 20 are provided with downwardly elongated extensions 22, these extensions having inwardly turned ears 23 thereon. The extensions 22 with the ears 23 provide a socket for the reception of the handle 24 which handle is preferably made of wood and conforms in shape substantially to the conventional hammer handle. The handle 24 is attached to the main frame or head 18 by transverse screws or rivets 25.

The striker and magazine unit comprising the member 2 with its attached side plates, being positioned between the face plates 19 and 20 of the main frame member, is held in position by the pins 10 and 11. The ends of the pin 10 project into slots 10b in the face plates 19 and 20, and the pin 11 has its ends projecting into similar slots 11b in the face plates 19 and 20. The pins 10 and 11, while holding the magazine unit in position in the main frame member, allow for a relative sliding movement between the main frame member and the magazine unit. As best shown in Figure 3, there is a downwardly turned flange 21a at the rear end of the main frame at one end of the bridge 21. A compression spring 26 is confined between this flange or abutment 21a and the rear edge of the leg 4 of the magazine unit. The leg 4 and the abutment 21a are each provided with aligned pins or studs 27 over which the ends of the spring 26 fit, these studs not only serving to retain the spring 26 in place, but providing an additional means for limiting the relative longitudinal movement between the magazine unit and the main frame unit, this limiting means being in addition to the slots 10b and 11b. The function of the spring 26 is to normally urge the magazine unit with its striking end toward the left as viewed in Figure 3 so that the striker portion 5a normally projects beyond the left-hand edges of the face plates 19 and 20.

It will be noted that while the magazine unit is received between the face plates 19 and 20, the bridge 21 is so located that it does not extend across the top of the chamber or magazine 16 but that access may be had to the magazine between the top edges of the two face plates 19 and 20. By reason of this arrangement the main frame does not obstruct access to the magazine

for the charging of staples into it. However, in order to provide a closure for the magazine, the assembly has a cover unit 28, a perspective view of which is shown in Figure 9. This cover unit has a top plate portion 29 and two spaced-apart depending flanges 30. Each flange 30 is provided with a rearwardly extending projection 31, and in each projection 31 is an angle-shaped opening 32. A transverse pin 33 passes through the face plates 19 and 20 of the main frame member and has its ends projecting through the angular slots 32. The cover member 28 sets on top of the main frame member 21 and the flanges 30 straddle the main frame while the cross pin 33 provides a pivotal support to enable the cover to be swung from a closed position shown for example in Figure 10 to an open position as indicated by the dotted lines in Figure 10. By opening the cover, access may be had to the magazine for charging it. As an additional means for holding the cover from becoming accidentally displaced, especially under the impact of hammering, a latch may be provided in the form of a short leaf spring 30a attached to one of the flanges 30. The free terminal of the spring 30a is provided with a lug 30b which has a working fit in an opening 20c in the face plate 20 of the main frame member. This latch normally serves to hold the pivoted end of the cover from relative movement with respect to the pin 33 due to the impact of hammering. At the same time, when it is necessary to open the cover, it is merely necessary to spring the latch outwardly and then manipulate the cover to open it.

The cover plate 29 in addition to forming a closure for the magazine, also provides the carrier for the driver which drives the staples through the slot 8. This driver designated 34, is at the forward end of the cover 29 and it is formed of hardened steel. It is welded or riveted to the undersurface of the plate 29, the plate 29 being properly recessed to receive it so that it is flush with the undersurface of the cover 29. The portion 29 of the cover member is also provided with a longitudinally extending slot 35 which is for the purpose hereinafter to be described.

When the cover is in the normal operating position, which is the position shown in Figures 1 and 3, the driver 34 projects under the lug 7 at the top of the leg 5 of the striker and it is directly in line with the guide opening 8 through which the staples are projected. By reason of the fact that the lug 7 overhangs the driver, the cover is normally prevented from coming open. When the cover is in the normal position, the pin 33 is in the top of the angular slot 32 (see Figure 9) of the extensions 31 of the flanges 30 of the cover member, and the right-hand end of the top plate portion 29 abuts against the forward edge of the bridge portion 21 of the main frame member so that when the cover is closed it is rigidly held against any longitudinal movement and the thrust of driving the staples is transmitted through the cover plate 29 to the main frame by reason of the right-hand end of the cover abutting against the cross bridge 21 of the main frame member. This abutting relation of the parts is clearly shown in Figure 3. To open the cover the right-hand end as viewed in Figure 3 is pulled up and simultaneously slid toward the right so that the cover member is tilted to the full line position shown in Figure 10 and because of the angular disposition of the slot 32, the cover member is permitted to move

far enough to the right so that the tip of the driver is withdrawn from under the overhanging lug 7, and when the cover is in this position, which is the position illustrated in Figure 10, it may be readily swung open to the dotted line position shown in the same figure to enable the magazine to be charged.

Using the implement as a hammer with the end portion 5a of the magazine unit as the striking surface, when the striking surface encounters a fixed object such as a wall, it of course cannot move further in the direction in which the hammer is swinging, but the main frame of the hammer will continue to move until the front edges of the main frame also contact the same object, or until the pins 10 and 11 have traveled the full length of the slots 10b and 11b. In this relative movement of the frame with regard to the striker and magazine, the driver 34 will move from the position shown in Figure 1 down through the slot 8 to drive a staple. Then when the hammer is lifted away from the obstacle, the spring 26 will immediately act to thrust the magazine unit in the opposite direction and restore the parts to the position shown in Figures 1 and 3. Each time that the driver 34 is retracted to the normal position, a staple must be thrust in front of it so that upon the next operation, the staple will be driven.

We shall now describe the mechanism through which the staples are individually advanced to a position in front of the driver and also, the mechanism by means of which the succession of staples in the magazine are successively moved down to the driving end of the magazine after the preceding row of staples has been entirely exhausted.

Passing through the left-hand end of the bar 3 as viewed in Figure 5 immediately at the base of the leg 5 of the striker and magazine assembly there is a rectangular opening. This opening receives and provides a sliding fit for the bifurcated rectangular extension 40 of the block-like member 41 shown in detail in Figures 11 and 12. The extension 40 is of a length such that when the shoulder 42 on the member 41 is flush against the lower face of the bar 3 as shown in Figure 12, the uppermost end of the member 40 will be spaced from the overhang 7 a distance equal to the thickness of one staple or equal to the thickness of the slot 8. The slide 41 is provided with a pin 43 to which is attached one end of a tension spring 44. The other end of this tension spring is anchored at 45 to the bar 3 so that the spring 44 tends to hold the shoulder 42 in contact with the undersurface of the bar 3. The member 41 is provided with a transverse pin 46. This pin is received in a slot 47 formed in the bifurcated arms 48 of a lever 49 which lever is pivotally supported on the ear 9 and which has an operating extension 50 that projects from between the face plates 19—20 of the main member. The arrangement is such that when the operating extension is pushed in the direction of the arrow shown in Figure 3, the block 41 will be pulled down against the tension of the spring 44. It may be pulled down until the operating extension 40 hits an adjustable abutment screw 51 on the underside of the member 2. When the block member 41 has been thus pulled down, the extension 40 will be flush with the top of the face of the bar 3. When the extension 40 is thus retracted, the row of staples in the magazine immediately adjacent it may be advanced toward the left as viewed in Figure 3 bringing

the row of staples in position to be consumed. When the operating extension 50 is released, the spring 44 immediately returns the element 41 to its normal position. As the bifurcated extension 40 moves crosswise on this return movement of the member 41, the bridge portion of the row of staples which is to be consumed will enter the slot 40a in this extension while the leg 40b of the bifurcated extension will ride under the bridge portion of the next adjacent row of staples in the magazine and prevent this next row of staples from bearing in against the top of the row of staples to be consumed. The nose of the leg 40b is slightly beveled at 40e to enable the end of the leg 40b to wedge itself under the bridge of such succeeding row of staples and cam or force this row of staples back from the row of staples to be consumed and thereby separate the row of staples to be consumed from the remaining staples in the magazine. In other words, the leg 40b of the extension 40 constitutes a reciprocating or retractable barrier which, when it is withdrawn, permits a row of staples to move over into position to be fed to the driver but which, when it is in its normal position, holds back the staples in the magazine from exerting pressure against the row of staples to be used, and if the rows of staples are cemented together as herein-after described, it serves to detach the end row from the other rows of staples.

When the row of staples which is to be used moves over to the left at the time the barrier is withdrawn, the rib 6 on the leg 5 enters between the two legs of the row of staples and holds the row of staples in position. Then, as the part 40c of the extension 40 moves from the retracted position up to the normal position, it slides over the face of the rib 6 and under the bridge portion of the row of staples which is then in position, the bridge portion of this row of staples as previously stated being received in the slot 40a. This is clearly shown in Figure 13 where 17x indicates the row of staples which is in position to be consumed and 17y is the next adjacent row of staples in the magazine and which is held out of contact with the staples 17x by the intervening barrier 40b.

The member 40-41 has a hole drilled from the tip of the extension 40 to the opposite end of the portion 41, this hole which is best shown in Figure 12 being designated 52. The outer end of this hole is closed by a screw plug 53. Within the hole is a compression spring 54 which is considerably weaker than the tension spring 44. The inner end of this spring 54 bears against portion 55 of a follower member 56 which follower member is shown in detail in Figure 14. The portion 55 of the follower is cylindrical in order to enter the hole, and the portion 56 is a relatively thin flat U-shaped element integral with the part 55. The two arms of the U-shaped portion 56 extend through the slot 40a in the extension 40, and then turn to provide the two legs as shown which embrace the sides of the portion 40c of said extension. The spring 54 continuously urges the follower 55-56 toward the upper end of the extension 40. A limiting pin 57 is secured in the member 40b in a position to prevent this follower from being pushed out the open end of the extension 40 while the follower is provided with a notch 58 whereby the end of the follower can move to a position flush with the end of the extension 40. Thus the follower can travel along the extension 40 sufficiently far to project the last staple of a row of staples into the space be-

tween the end of the extension 40 and the underside of the overhanging lug 7 or in other words, the follower can push the last staple into the path of travel of the driver 34. The pin 57 also causes the follower to be moved back until the member 40 is retracted so that when the next row of staples comes into position to be used the follower 55-56 is in position to engage and advance the new row of staples. This is shown in Figure 12a where all of the parts are retracted to the position to which they are moved for feeding another row of staples into position to be used.

In the operation of the device after the last staple of a row has been driven and the follower 56 is out to the extreme upper end of the extension 40a, the lever 48-50 is operated to retract the barrier 40b and as the barrier is retracted, the follower is likewise drawn back so as to be received in the notched-out portion 3a at the left-hand end of the bar 3. When the barrier and its follower 55-56 are retracted, the next row of staples can be forced into position to be used. Then when the block member 41 moves back to its normal position with the portion 40c of the extension 40 traveling under the bridge of the row of staples which has just moved into place, the end of this row of staples will prevent the follower 56 from moving up and the spring 54 will thus be compressed and the follower will be adjacent the inner end of the slot 40a. It will exert a pressure against the row of staples which has been moved into position tending to urge this row of staples up against the lug 7. The uppermost staple in the row will thus immediately be projected into the path of the driver. As each staple in turn is driven, the follower will urge the strip of staples along the guiding rib 40c until, as previously indicated, the last staple in the row is projected into the path of the driver.

Operation of the lever 48-50 therefore, not only serves to withdraw the barrier to enable another row of staples to be moved into position to be driven, but it also serves to retract the follower 55-56 so as to be in position to engage the inner end of the row of staples when the row of staples has so moved into position and to compress the spring 54 so that it will exert adequate pressure to propel the follower 55-56.

In addition to the follower which is provided to feed the row of staples which is being consumed to the driver, there is a second follower or pusher in the magazine itself which feeds the successive rows of staples toward the left as viewed in Figure 3 as they are consumed and which keeps the several rows of staples in position in the magazine preventing them from falling over. This pusher which is shown in detail in Figure 15 preferably comprises a block 60 of a width such that it will have a close sliding fit in the magazine 16. It is provided at its forward edge with a leaf spring 61 to which is attached a thin bar 62. The thin bar 62, as clearly shown in Figure 3, serves to press against the staples while the spring 61 allows this pressure to be yieldably exerted. The block 60 is bifurcated in such manner as to receive a detent member 63 pivotally supported in the block at 64 and having an operating extension 65. This detent member has a transverse pin 66 passing therethrough, the ends of this pin projecting into a vertically elongated slot 67 in the two side faces of the block 60. At one side of the block the pin 66

projects beyond the side face of the pusher so that it may extend into the slot 15 or into the notches 15a at the upper edges of this slot. A compression spring 68 exerts an upward pressure against the bottom of the detent member 63 thus tending to rock the detent member 63 in a direction such as to urge the pin 66 to the upper limit of the slot 67 which is the normal position for the detent member. The extension 65 on the detent member normally projects up through the slot 35 in the cover member so that this operating extension is accessible when the cover is closed.

When the detent member is in the normal position, the pin 66 is engaged in one of the notches 15a in the side plate 12. This normally holds the pusher against longitudinal movement in the magazine. In order to move the pusher, it is merely necessary to push down on the extension 65 and at the same time shove the pusher in the direction which it is to travel. When pressure is relieved from the extension 65, the detent member will be operated to bring the pin 66 into one of the notches 15a. The pusher is operated at the time the barrier is withdrawn from the left-hand end of the magazine to push all of the rows of staples in the magazine along the magazine so that the row of staples next to the barrier is pushed into position to be used. When the last row of staples in the magazine has been exhausted, the bar 62 of the pusher will bear against the barrier 40b. After the last row of staples has been moved into position to be used, the pusher can be retracted to the extreme opposite end of the magazine to enable the magazine to be reloaded with more rows of staples.

It is desirable to have the spring 61 interposed between the block 60 and the member 62 not only because it will exert a continuous yieldable pressure against the staples in the magazine, but also because from a manufacturing standpoint it is difficult to position the notches 15a at just exactly the right place for the follower if the spring 61 were not provided to press against the staples at all positions along the magazine. The spring 61 allows such yielding movement as is necessary to take up for any inaccuracy between the positioning of the staples with respect to the spacing between the notches 15a.

As a modification of the construction shown in Figure 15, the pusher may be constructed as shown in Figure 16. In all essential respects the pusher is the same as previously described and similar reference numerals have been used to designate the corresponding parts. The only difference is that instead of the spring 61 being used, two compression springs 61a are employed for yieldably pushing the follower bar 62 toward the staples. The advantage of this arrangement is that the bar 62 may be advanced by the springs 61a a considerable distance in advance of the block 60 before the pressure of the springs is spent. By reason of this arrangement, two or three rows of staples may be used before it is necessary to manually operate the pusher to its next station in the magazine, whereas with the arrangement shown in Figure 15 it is necessary to operate the pusher after each row of staples has been exhausted.

It is believed that from the foregoing description the operation of the tool will be apparent. It may be stated that in commercial practice it is contemplated that the staples 17 be packaged in paper clips or wrappers so that the pack-

age will contain a sufficient number of rows of staples to fully charge the magazine at one time. In a device of the actual size shown in Figure 3, for example, the magazine will accommodate 17 rows of staples at one time, in addition to that row of staples which is under the barrier in position to be used. There are, in staples of the size illustrated, 30 staples in a row. This means that the magazine of the device will hold 510 staples at one loading plus any that may be in position to be used.

It is at present contemplated that the rows of staples may be cemented together to form a clip, as shown in Figure 17. The several rows of staples designated 17 in this figure are joined together in the relation shown by relatively fragile glue. The clip of staples, with all of the rows of staples glued together, may be inserted as a unit in the magazine, and in the operation of the stapler, each row of staples as it is pushed into position to be used, will be broken away or separated from the remaining rows of staples. The individual staples in a row are glued together as is well understood in the art at the present time, and my invention contemplates that the rows of staples will be glued together in the same fashion using a similar adhesive.

The stapling machine here described, especially when used as a hand tool, provides for the use of relatively short rows of staples, whereas most stapling machines now available use rows of staples which are several inches long. These long rows of staples easily break in handling or when they are dropped, whereas short rows of staples do not easily break into shorter pieces. Workmen using devices of this kind not infrequently throw away broken rows of staples and there is, therefore, an advantage in my invention in that shorter rows of staples may be used. The biscuit of staples herein illustrated and described is claimed in a copending application filed by me, Serial No. 346,958 filed July 23, 1940.

In the operation of the tool, in order to charge the magazine, the cover member 28 is opened in the manner previously described, the follower moved back to the extreme right-hand end of the magazine as viewed in Figure 3, the clip of staples charged into the magazine, and the cover then closed. The operator then presses on the end 50 of the lever to retract the member 40-41 and at the same time moves the follower as far as he can push it. Then he releases the end 50 of the lever and the tool is ready to be used. It is then manipulated as an ordinary hammer, and each time that the tool is hit against an obstruction, the relative movement between the driver and the striking element will cause the staple to be ejected through the slot into the object into which the staple is to be driven. When the hammer is lifted away from the surface being struck, the magazine unit is moved forward by the spring 26 relative to the main frame or head of the hammer, and the follower 55-56 then pushes the row of staples being consumed against the overhang lug 7 bringing a new staple into position to be driven. One complete row of staples can be consumed before any operation of the follower 60 in the magazine is necessary and where the follower is of the construction shown in Figure 16, several rows of staples may be used before any manipulation of this follower is required.

An important feature of the invention is the provision of the extension 40 on the block 41 bifurcated in the manner described so posi-

tioned that the inner leg 40b of the extension 40 constitutes a barrier to prevent the staples in the magazine from pressing against the row of staples being consumed. This barrier also keeps the rows of staples in the magazine from tilting as the one row of staples is consumed as they would tend to do if this barrier were not provided.

It may also be noted that the staples are positioned between the plates 12 and 13 which bear against the outside of the legs of the staple and that there may be clearance between the extension 40 and the inner surfaces of the legs of the staples. Likewise the staples are engaged on the underside of the bridge of the staples when they are supported in position to be fed to the driver. By reason of this arrangement, so long as the outside width of the staples is kept the same and the length of the legs is kept the same, the diameter of the wire used for forming the staples may be changed to be made either larger or smaller as the case may require.

The machine provides a convenient form of hand-operated stapling tool which is much more compact than stapling hammers heretofore constructed and it has a capacity of several hundred more staples than any hammers heretofore provided. It is of relatively simple construction and it may be simply manufactured.

While I have specifically described the invention as applied to a hand tool in the general form of a hammer, it will be understood that the invention insofar as the magazine and the staple feeding mechanism is concerned is also adapted for use in various types of stapling machines including power operated stapling machines. Because of the large number of staples that can be used in a relatively small magazine, the mechanism is well adapted to power or machine staplers where provision for accommodating a large number of staples in a limited space is required.

While I have illustrated and described in detail one present preferred embodiment of my invention, it will be understood that this device may be modified and changed in various ways within the contemplation of my invention and under the scope of the following claims.

I claim:

1. A stapling hammer comprising a handle having a main frame member secured thereto and forming the head of the hammer, a combined staple holding and feeding unit carried by the frame member and rectilinearly slidable therein relatively thereto in a fore and aft direction, one end of said unit normally projecting beyond one end of the frame member to provide the striking surface for the hammer, and a driver on the frame cooperating with the staple holding and feeding unit for driving staples through said striking part of the hammer.

2. A stapling hammer comprising a handle having a main frame member secured thereto and forming the head of the hammer, a combined stapling, holding and feeding unit in the frame slidable therein relatively to the frame in a fore and aft direction, said staple holding and feeding unit having a magazine therein, and a cover member on the top of the frame affording access to the interior of said magazine and which normally closes said magazine, and a driver on the cover member cooperating with said staple holding and feeding unit.

3. A stapling hammer comprising a handle having a main frame member secured thereto

and forming the head of the hammer, a slidable staple holding and feeding unit in the frame having one end normally projecting beyond one end of the frame and constituting a striking part of the hammer, means for urging said unit to said normal position, said staple holding and feeding unit having a magazine therein, and a cover member on the frame affording access to the staple holding and feeding unit, said cover having a driver thereon that operates through the striking part of the hammer, said unit having means for feeding staples into the path of movement of said driver.

4. A stapling hammer comprising a substantially U-shaped striking element the outer face of one leg of which forms the striking surface of the hammer, said element having side plates thereon whereby a magazine for receiving rows of staples is formed by the element in combination with the side plates, the leg of the element which forms the striking end of the hammer having a staple delivering guide opening there-through adjacent its outer end, the element having an overhanging projection beyond said guide opening, means adjacent the inner face of said leg for moving a row of staples toward said overhanging abutment whereby the staples are presented one at a time across said opening, a frame member in which said element and its attached guide plates is slidably mounted for limited relative movement in a fore and aft direction, a spring for urging said element forwardly so that the end of the element which forms the striking surface of the hammer projects beyond the end of the frame, a driver on the frame cooperating with said staple delivery opening, and a handle rigidly attached to the frame.

5. A stapling hammer comprising a substantially U-shaped striking element the outer face of one leg of which forms the striking surface of the hammer, said element having side plates thereon whereby a magazine for receiving rows of staples is formed by the element in combination with the side plates, the leg of the element which forms the striking end of the hammer having a staple delivering guide opening there-through adjacent its outer end, the element having an overhanging projection beyond said guide opening, means adjacent the inner face of said leg for moving a row of staples toward said overhanging abutment whereby the staples are presented one at a time across said opening, a frame member in which said element and its attached guide plates is slidably mounted for limited relative movement in a fore and aft direction, a spring for urging said element forwardly so that the end of the element which forms the striking surface of the hammer projects beyond the end of the frame, a driver on the frame cooperating with said staple delivery opening, and a handle rigidly attached to the frame, said driver having a cover member mounted on the top thereof and movable from a position where it covers the magazine to a position where it is clear of the magazine, said driver, being carried on the cover member.

6. A stapling hammer comprising a substantially U-shaped striking element the outer face of one leg of which forms a striking surface of the hammer, said element having side plates thereon whereby a magazine is formed between the legs of the U-shaped member and between the side plates, a follower in said magazine movable therealong to push rows of staples toward that leg which forms the striking end of the

hammer, a second follower movable transversely to the first and positioned adjacent the inner surface of that leg which forms the striking end of the hammer for pushing a row of staples crosswise of the magazine, an abutment at the outer end of said leg to limit the travel of the row of staples under the pressure of said second follower, said leg having a staple guiding opening therethrough so positioned that a staple being pressed against the abutment may be driven through said opening and ejected from the striking surface of the hammer, a hammer-shaped frame member in which said element is mounted for limited sliding movement in a fore and aft direction, means for resiliently urging said element in a direction to project the striking portion thereof beyond the end of said frame, a driver carried by the frame normally engaging under said abutment for pushing the staples through said delivery opening when said element is reciprocated relatively to the frame in an aft direction, and means for retracting said second follower.

7. A stapling hammer comprising a substantially U-shaped striking element the outer face of one leg of which forms a striking surface of the hammer, said element having side plates thereon whereby a magazine is formed between the legs of the U-shaped member and between the side plates, a follower in said magazine movable therealong to push rows of staples toward that leg which forms the striking end of the hammer, a second follower movable transversely to the first and positioned adjacent the inner surface of that leg which forms the striking end of the hammer for pushing a row of staples crosswise of the magazine, an abutment at the outer end of said leg to limit the travel of the row of staples under the pressure of said second follower, said leg having a staple guiding opening therethrough so positioned that a staple being pressed against the abutment may be driven through said opening and ejected from the striking surface of the hammer, a hammer-shaped frame member in which said element is mounted for limited sliding movement in a fore and aft direction, means for resiliently urging said element in a direction to project the striking portion thereof beyond the end of said frame, a driver carried by the frame normally engaging under said abutment for pushing the staples through said delivery opening when said element is reciprocated relatively to the frame in an aft direction, and means for retracting said second follower, said first follower having an operating extension thereon, the frame having a slotted cover across its top through which the operating extension of the first follower is accessible.

8. A stapling hammer comprising a substantially U-shaped striking element the outer face of one leg of which forms a striking surface of the hammer, said element having side plates thereon whereby a magazine is formed between the legs of the U-shaped member and between the side plates, a follower in said magazine movable therealong to push rows of staples toward that leg which forms the striking end of the hammer, a second follower movable transversely to the first and positioned adjacent the inner surface of that leg which forms the striking end of the hammer for pushing a row of staples crosswise of the magazine, an abutment at the outer end of said leg to limit the travel of the row of staples under the pressure of said second follower, said leg having a staple guiding opening

therethrough so positioned that a staple being pressed against the abutment may be driven through said opening and ejected from the striking surface of the hammer, a hammer-shaped frame member in which said element is mounted for limited sliding movement in a fore and aft direction, means for resiliently urging said element in a direction to project the striking portion thereof beyond the end of said frame, a driver carried by the frame normally engaging under said abutment for pushing the staples through said delivery opening when said element is reciprocated relatively to the frame in an aft direction, and means for retracting said second follower, said first follower having an operating extension thereon, the frame having a slotted cover across its top through which the operating extension of the first follower is accessible, said cover being movable from a position where it closes the top of the magazine to a position where it exposes said magazine.

9. In a stapling device having a frame member and a relatively movable combined magazine and staple feeding unit adapted to receive a plurality of rows of staples, means at one end of the magazine for moving a row of staples in a direction crosswise of the magazine, and a retractable barrier for separating the row of staples engaged by said means from the other rows of staples in the magazine.

10. In a stapling device of the class described, a magazine unit adapted to receive a plurality of rows of staples one row being placed adjacent the next, all of the rows of staples being turned in the same direction, means at one end of the magazine movable transversely thereto for feeding the row of staples at said end of the magazine across the end of the magazine in the direction of the axis of the row of staples, and a retractable barrier element for separating a row of staples engaged by said means from the other rows of staples in the magazine.

11. In a stapling device of the class described, a magazine unit adapted to receive a plurality of rows of staples one row being placed adjacent the next, all of the rows of staples being turned in the same direction, means at one end of the magazine movable transversely thereto for feeding the row of staples at said end of the magazine across the end of the magazine in the direction of the axis of the row of staples, and a retractable barrier element for separating a row of staples engaged by said means from the other rows of staples in the magazine, said means for pushing the staples crosswise of the magazine being mounted for movement along said barrier element, and an operating element accessible at the exterior of said unit for simultaneously retracting the barrier element and said means for pushing the one row of staples, and means for returning the barrier element to position relatively to said means.

12. In a stapling machine having a magazine unit adapted to receive a plurality of rows of staples, follower means adjacent one end of the magazine for moving the endmost row of staples across the end of the magazine to be consumed, and a retractable barrier member for holding the other rows of staples in the magazine out of contact with said end row, and a common operating means for retracting the barrier and said follower means when a new row of staples is brought into position to be used.

13. In a stapling device of the type having a magazine unit adapted to receive a plurality of

rows of staples arranged one against another, of a retractable barrier element adjacent one end of the magazine for separating the endmost row of staples in the magazine from the other rows of staples in the magazine, and a follower carried by said barrier member relatively movable therealong for moving the end row of staples so separated in a direction lengthwise of the row of staples.

14. In a stapling device of the type having a magazine unit adapted to receive a plurality of rows of staples arranged one against another, of a retractable barrier element adjacent one end of the magazine for separating the endmost row of staples in the magazine, a follower carried by said barrier member for moving the end row of staples so separated in a direction lengthwise of the row of staples, said barrier element having a spring therein for moving said follower in one direction, means for limiting the movement of said follower under the influence of said spring arranged to enable the follower to move to the extreme end of said barrier element, means for retracting the barrier element from a position where it extends across the magazine to a position where it is clear of the magazine, said retracting movement of the barrier also serving to retract the follower, and spring means for returning the barrier to its normal position where it projects across the magazine and for compressing the spring which operates said follower.

15. In a stapling device of the type having a magazine unit adapted to receive a plurality of rows of staples arranged one against another, of a retractable barrier element adjacent one end of the magazine for separating the endmost row of staples in the magazine from the other rows of staples in the magazine, a follower carried by said barrier member for moving the end row of staples so separated in a direction lengthwise of the row of staples, said barrier element having a spring therein for moving said follower in one direction, means for limiting the movement of said follower under the influence of said spring arranged to enable the follower to move to the extreme end of said barrier element, means for retracting the barrier element from a position where it extends across the magazine to a position where it is clear of the magazine, said retracting movement of the barrier also serving to retract the follower, and spring means for returning the barrier to its normal position where it projects across the magazine and for compressing the spring which operates said follower, and a second follower member along the magazine for feeding the rows of staples toward the barrier as the staples are exhausted.

16. In a magazine type of stapling machine having a combined staple holding and feeding unit with a magazine therein, a bar normally extending transversely of the magazine adjacent one end thereof, said bar being retractable from the magazine, said bar being longitudinally bifurcated to provide a barrier portion and a guiding rib portion, and a spring-propelled follower movable along said bar.

17. In a magazine type of stapling machine having a staple holding and feeding unit, staple delivery means comprising a bar normally extending transversely of the magazine adjacent one end thereof and retractable from the magazine, means for reciprocating the bar to and from its retracted position, said bar being longitudi-

nally bifurcated, and a spring-propelled follower movable along the bifurcation in the bar.

18. In a magazine type of stapling machine having a staple holding and feeding unit, staple delivery means comprising a bar normally extending transversely of the magazine adjacent one end thereof and retractable from the magazine, means for reciprocating the bar to and from its retracted position, said bar being longitudinally bifurcated, a spring-propelled follower movable along the bifurcation in the bar, and cooperating parts on the bar and follower for limiting the movement of the follower when the follower is flush with the end of the bar.

19. In a stapling device of the class described having a staple holding and feeding unit with a driving end, including an overhanging lug portion on such driving end, a main frame in which said unit is relatively movable through a limited distance in a fore and aft direction, a cover element on the main frame having a driver which normally projects under said overhanging lug, said cover normally being held against longitudinal movement on the main frame, and means connecting the cover and the main frame arranged to enable the cover to be moved longitudinally to retract the driver from said lug after the cover has been moved out of its normal position, said means enabling the cover to be swung to an open position when the driver is clear of the overhanging lug.

20. A stapling machine of the class described comprising a staple holding and delivering unit having a chamber therein constituting a magazine, the width of the magazine being such that a row of staples may be slidably fitted into it, the depth of the magazine corresponding to the length of the row of staples, the sides of the magazine serving to center the rows of staples, one end of said magazine constituting a delivery end and having a staple guiding element thereon, said staple guiding element being of less width than the width between the legs of the staples and being of a height such as to engage under the crossbridge of the staples whereby the staples are positioned under the bridge of the staples and by means engaging the sides of the staples so that staples of different gauges of wire may be used.

21. In a stapling machine, a combined magazine and striker unit having a main bar with an upstanding leg at each end thereof, a side plate at each side thereof whereby a chamber is formed between the side plates, the legs and the bar which chamber constitutes a magazine, the leg at one end of the bar having an overhanging lug portion at the outer end thereof and having a staple delivery passage therethrough under the lug, means for holding a row of staples in position adjacent said leg, a follower means for yieldably urging said row of staples against the lug, and a main frame in which the unit is slidable to a limited extent in a direction parallel with the bar, said main frame having a driver carried thereon which operates upon relative movement of the unit and frame under said lug and through said opening for driving a staple.

22. In a stapling machine, a combined magazine and striker unit having a main bar with an upstanding leg at each end thereof, a side plate at each side thereof whereby a chamber is formed between the side plates, the legs and the bar which chamber constitutes a magazine, the leg at one end of the bar having an overhanging lug portion at the outer end thereof and having a staple delivery passage therethrough under

the lug, means for holding a row of staples in position adjacent said leg, a follower means for yieldably urging said row of staples against the lug, and a main frame in which the unit is slidable to a limited extent in a direction 5 parallel with the bar, a hinged cover member on the main frame forming a closure for said chamber, said cover having a driver at one end thereof which projects under the overhanging lug and being pivoted to the main frame at its 10 opposite end for movement in a direction up and down and longitudinally of the main frame.

23. In a stapling device having a magazine for holding a plurality of rows of staples, feeding means for advancing one of the rows of staples in 15 the magazine, and a retractable barrier between the row advanced by the last-named means and the remainder of the rows, said retractable barrier holding the remainder of the rows of staples out of contact with the single row advanced by 20 the feeding means whereby the latter row may be advanced without interference by the next adjacent row.

24. In a stapling device having a magazine for holding a stack of superimposed rows of pre-formed staples, feeding means for advancing one of the rows of staples longitudinally with respect to the remainder of the rows, and a retractable barrier for separating the row advanced by the last-named means from the remainder of the stack of rows and supporting the stack out of contact with the row being advanced, and a driver for successively driving individual staples from the row advanced by the feeding means.

25. In a stapling device having a magazine for holding a plurality of rows of superimposed staples, feeding means for advancing the lowermost row of staples longitudinally with respect to the other rows, means for advancing all of the rows of staples in the magazine, and a barrier for separating the lowermost row of staples from the remainder of the rows, said barrier being retractable to permit all of the rows of staples to be advanced to position a new row to be engaged by the feeding means.

DESMOND R. LA PLACE.