This invention relates to stapling machines and more particularly to an improvement in hand-operated hammer
staplers.

Stapling machines of the hammer type, as that considered in this application, are most often utilized where
heavy staples are required in large quantities and where mobility of the stapler is of prime consideration. One
such use is in the siding and roofing of buildings where, for example, asphalt shingles are used.

Use of a hammer stapler entails the striking of the surface to be stapled with the staple magazine after which
the hammer is forced, as well as the staple driver, by momentum and leverage, down upon the magazine, thus
driving the staple. The part of the staple magazine which strikes the surface to be stapled is usually the first part
to wear out. Such wear-out then necessitates the replacement of the worn parts, which in present stapler designs
amounts to replacement of the entire magazine.

Also, considering that the hammer stapler dispenses a large quantity of staples, it is understood how certain
removable stapler parts can be lost during the many reloading operations encountered, during a single house siding job for example. One such removable element is the conventional pusher assembly which maintains the staple supply urged forwardly in the stapler housing. Such assemblies are usually retracted from the stapler preparatory to loading whereafter the staples are inserted through the rear end of the housing. Then the pusher assembly is reinserted and clamped into engagement with the staples.

In view of the above discussion, an object of this invention is to provide a hand-operated hammer stapler,
that is automatically and successively fed staples, which incorporates a hinged front jaw that may be opened to
allow the insertion of the front end of the stapler housing as opposed to insertion of staples in the rear
d, thereby avoiding complete removal of the staple pusher assembly.

Another object is to provide a hammer stapler which utilizes a front jaw as set forth above that, in cooperation
with a portion of the housing, forms a staple guideway and retaining means when it is closed and also serves
as a guide means for the staples as they are driven.

A further object of this invention is to provide a hammer stapler which utilizes an inexpensive front jaw
as set forth above which may be discarded when excessively worn or damaged and replaced with another like
element in a minimum of time and effort.

A still further object is to provide a hammer stapler utilizing a front jaw as set forth above which essentially
renders the staple guideway jam free when the stapler is operated properly but which allows ready removal of
a fouled staple if, for example, an impregnable surface is encountered by the staple.

Still another object is to provide a hammer stapler which utilizes a biased staple pusher that is so engaged
with the housing that the chance of losing it during loading of the stapler is minimized.

Another object is to provide a hammer stapler which utilizes a pusher mechanism which will flex each time a
staple is driven.

A still further object is to provide a hammer stapler which will accommodate staples of different lengths.
These objects and advantages of this invention will more fully appear from the following descrip-
tion, made in connection with the accompanying drawings, wherein like reference characters refer to the same
or similar parts throughout the several views and in which:

FIGURE 1 is a top view of the hammer stapler;
FIGURE 2 is a side elevational view of the stapler;
FIGURE 3 is a bottom view of the stapler;
FIGURE 4 is a front end elevational view of the stapler taken from the left side of FIGURE 2;
FIGURE 5 is a view similar to that of FIGURE 4 except that the front jaw has been lowered to the staple
loading position;
FIGURE 6 is an enlarged cross-sectional side view of FIGURE 1 taken on line 6-6;
FIGURE 7 is a partial cross-sectional side view similar to that of FIGURE 6, however, showing the front jaw
in the opened or loading position and showing the insertion of a rack of staples into the stapler;
FIGURE 8 is a full cross-sectional end view of FIGURE 6 taken on line 8-8;
FIGURE 9 is a partial cross-sectional top view of FIGURE 6 taken on line 9-9;
FIGURE 10 is a cross-sectional side view of the hammer stapler having a modified form of front jaw latch
arrangement; the jaw is shown in closed position;
FIGURE 11 is an enlarged partial cross-sectional side view similar to that of FIGURE 10 showing the front
jaw in the open position; and
FIGURE 12 is an enlarged perspective view of the front end of the staple magazine whereby to more clearly
show the front jaw and its latching means.

General reference now will be made to FIGURES 1-5 and more specific reference made to FIGURES 6-9. The
hammer stapler referred to generally as number 10 has a housing 11 which is essentially divided into two
portions, namely, a hammer portion 12 and a handle portion 13. As shown in FIGURE 6, handle portion 13 is
provided with an outer hand protective covering 14.

The hammer portion 12, it will be noted, is essentially a rectangular structure which has formed at the head
end 15 an enlarged portion adapted for reciprocally receiving the staple magazine 16 and more particularly
the front jaw 17.

Referring to FIGURE 6, the staple magazine 16 is pivotally secured to the hammer portion 12 adjacent the
handle by a hinge pin 18. Through the cooperation of this pivotal securement of the staple magazine 16 and a
bias means such as spring wire 19, reciprocal movement of the staple magazine will be allowed when a working
surface is struck by the front jaw 17. The spring wire 19, which is secured to the housing by means of retainer
pin 20, biases the staple magazine 16 to the position shown in FIGURE 6 which is the relaxed position. Cooperatively
functioning with the housing 11 is a stopper plate 21 which prevents the staple magazine from separating from
the hammer portion 12 too far and it thus provides the extreme limit to which the staple magazine may be separ-
ated from the hammer portion.

In more detailed explanation of the head end 15 of the hammer portion 12, a weight assembly 22 is provided
which has a weight member 23 and a securing means or bolts 24. The weight assembly 22 is provided to addi-
tional driving inertia to the hammer portion when a staple is being driven. Centrally located within the weight
assembly 22 is a resilient bumper 25 which absorbs the shock when the staple magazine and hammer portion come
together after the staple has been driven.

Also secured to the head end 15 is a reciprocable staple driving member such as staple ram 26. To allow the ram
26 to acquire arcuate movement during the staple driving operation, the ram is loosely mounted upon a pair of
bolts 27. Interposed between the ram 26 and the weight assembly 22, and encircling the bolts 27, is a load spring 28 which merely biases the ram to a normal position shown in full line drawing in FIGURE 7.

Referring now to the staple magazine 16, a main magazine housing 29 is provided (see FIGURE 8) which has a recessed inside the rear part of the magazine and is supported by supports 30 and 31. The magazine housing 29 is essentially a closed rectangular element while the upstanding staple supports 30 and 31 are simply single plane elements which provide, in cooperation with the magazine housing 29, a staple supply chamber 32 which extends for the length of the magazine.

To provide an enclosed pusher chamber 33, a magazine front wall 34 is provided which is fixedly secured to the forward free end of the magazine housing in an upstanding relation (see FIGURES 7 and 5).

Referring to FIGURE 6 and 7 now, the front jaw 17 consists primarily of a shoe 35 and an upstanding U-shaped wall 36 which has a front plate 37 and a pair of side plates 38 and 39. As seen in each of the figures, the shoe 35 has an upturned forward end 40, commencing at bend 41 where the front plate 37 joins the foot plate 42, and a rearward lip portion 43 which is displaced from the plane of the foot plate 42. The rearward lip portion serves to temporarily latch the front jaw to the magazine housing 29, which therefore appears as being apparent permanently secured on the upper surface of the foot plate 42 is an angled hook 44 which is provided with an upper bearing surface 45 and a lower bearing surface 46. As will be explained in more detail subsequently, the upper bearing surface 45 serves as a support when the front jaw 17 is in an opened position and lower bearing surface 46 provides a support for the front jaw when it is in the closed position.

Securing the angled hook 44 to the foot plate 42 is a screw and block combination 47. The combination 47 provides a second or dual purpose also in that it abuts against the front wall 34 of the magazine housing when the front jaw 17 is in the closed position and as shown in FIGURE 7, the front jaw 17 is in the closed position as shown in FIGURE 6. Thus the front jaw is prevented from sliding laterally forward when the jaw is in the closed position and staples being driven. The staple opening 48 is then precisely positioned below the vertically disposed staple guideway 49 (see FIGURE 6) which is formed by the cooperation between front plate 37 and front wall 34.

Also forming a part of this novel jaw arrangement is a slider assembly referred to generally as 50. The slider assembly, as will be also explained subsequently, allows the front jaw 17 to be positioned in the closed or opened position, or alternatively allow the front jaw to be removed. The assembly consists primarily of a two-position slider or retaining means 51 and a locking assembly 52.

The slider means 51 has a main angulated bar 53 which has a forward catch 54 and a rearwardly disposed actuator portion 55. Disposed between the forward catch 54 and rearward actuator portion 55 is an angled portion 56 which provides the functions as seen in FIGURES 6 and 7 of allowing the front jaw to be in one of two positions, namely, the opened position as shown in FIGURE 7 and the closed position of FIGURE 6.

Secured to the rearward actuator portion 55 is a slide plate 57 which is spaced from the angulated bar 53 by a spacer 58. Screws may be used to secure the slide plate to the actuator portion 55.

The locking assembly 52, mentioned previously consists of a spring metal strip 59 secured to the main magazine housing 29 by a pair of rivets 60. Secured to the forward end of the metal strip 59 is a locator bar 61 which, depending upon the position of the slider means 51, either rides upon the foot plate 42 or abuts against the rearward end 62 of the bar 53 when the slider is in the other extreme position as shown in FIGURE 6. To release the ball from the position shown in FIGURE 6, a finger-operated release means is provided which may be pushed from its position within opening 64. To maintain the forward catch 54 in precise location, a guide bar 65 is provided which is secured across the magazine housing 29.

Referring now to FIGURE 6 and 9, the staple pusher assembly will be described in detail. The staple pusher assembly consists of a main flexible cable 67 which is fixedly secured at its rearward end 68 to a pinch clip 69. The securement means may be by nut 70. The pinch clip 69 consists of a wide band of spring metal which is bent into a U-shape as shown in FIGURE 9 and which has a tendency to spring back to its original line. The flexible cable 67 is journaled through the pinch clip opening 71. To maintain the pinch clip secured to the handle portion, the housing 11 is provided with wall catches 72 which project inwardly into the handle chamber 73 to temporarily lock the pinch clip.

The forward end 74 of the flexible cable 67 is slidably journaled through the staple pusher 75 at the cylindrical portion 76 thereof. Interposed in expanding relation between the cylindrical portion 76 and pinch clip 69, and encircling the flexible cable 67, is a compression spring 77. The spring 77, in its usual manner, encircles cable 67 with its convolutions and urges the pusher 75 forwardly within the staple chamber 32 whereby to force a rack of staples 78 forward toward the front plate 37 of front jaw 17. To prevent the staple pusher 75 from extending into the guideway 49 when the staples are completely expended, a lip 79 is provided which will abut against the front wall 34 when the last staple has been driven. Thus the ram 26 will not be jammed against the pusher 75 after the last staple has been driven.

In the use and operation of this form of the invention, a rack of staples 78 is inserted into the staple chamber 32 from the front end, as shown in FIGURE 7, after the front jaw 17 has been lowered to the opened position. To allow the front jaw to be dropped to the position shown, the locking assembly 52 is released by finger pressure upon release means 63 whereby to raise the ball 61 above the rearward end 62 of the angulated bar 53. Thus the bar 53 may be slid rearwardly to the position shown in FIGURE 7. It will be noted that the rearward lip portion 43 of the shoe 35 binds with the angulated portion 56 of the bar 53 and the magazine housing 29 to prevent separation thereof. The upper bearing surface 45 hooks the forward catch 54 of the slider assembly.

After the rack of staples has been inserted within the staple chamber 32, the front jaw 17 is swung upwardly to the closed position as shown in FIGURE 6. Flipper 71 has been thus moved, and the slider means 51 is simply urged forward, to the position shown in FIGURE 6, by means of finger pressure upon the slide plate 57. Thus the forward catch 54 will then engage with the lower bearing surface 46 and the angulated portion 56 of the angulated bar 53 will engage the rearward lip portion 43. Also, the screw and block 47 will abut against the front wall 34 as explained previously. In the closed position of FIGURE 6, it will be noted that the locator bar 61 of the locking assembly 52 has seated into the normal position whereby the ball 61 abuts against the rearward end 62 of the angulated bar 53.

If it is desired to remove the front jaw 17 from the staple magazine, the jaw is first dropped to the open position shown in FIGURE 7. With the jaw in this position, the slider means is then moved forward thereby releasing the pivot between the rearward lip portion 43 and magazine housing 29. Thus without greater detailed explanation, the jaw may easily be removed.

During the loading operation with staples, it is necessary to release the spring tension upon the staple pusher 75. To do this, the pinch clip 69 is squeezed together at the slot of the bar 53 as shown in FIGURE 7 or abuts against the rearward end 62 of the bar 53 when the slider is in the other extreme position as shown in FIGURE 6. To release the interfitting of the wall catch 72 with the clip 69 and then let the flexible cable 67 and spring 77 be partially withdrawn from the handle chamber 73. At this point, another novel feature of this invention enters in. By providing the handle 13
in such a configuration that the height of the handle chamber 73 is greater than the width, the staple pusher 75 may be withdrawn from the stapler housing 11 only upon turning it 90 degrees from its position as retained in the staple chamber 32. When the staple pusher is retracted for staple loading of the magazine, it will abut against the housing 11 at about 80, thus the staple pusher assembly 66 cannot be removed and the chance of loss thereof is thus eliminated. However, it is essential that the assembly be removed for repair, then disassembly of the stapler by removal of hinge pin 18 will allow the necessary disassembly to permit the pusher 75 to be rotated the 90 degrees.

As mentioned above, the staple pusher assembly 66 is provided with a flexible cable 67. It has been found that if cable having flexure properties similar to that of spooler cable or the like is used, adequate stiffness characteristics are provided which prevent the spring from bending or binding on the cable, yet with a sufficient flexibility so that successive flexures due to the reciprocating nature of the staple magazine will not cause binding or ultimately breakage failure of the cable.

Referring to FIGURE 10–12 now, and particularly to the front jaw 17, a medially angulated hook or bracket 81 is provided which has only a single bearing surface 82. Instead of providing the upper bearing surface 45 as set forth above, a retaining means such as ball 83 is provided which is secured at its ends to the side plates 84 and 85 of the front jaw 17. As seen in FIGURE 12, the medial portion 86 of the ball 83 looks over the staple magazine 16. Thus the front jaw is allowed to drop only to the allowed limit for the staple loading operation. To maintain the orientation of the ball 83 with respect to the front jaw 17, the side plates 84 and 85 are provided with recessed notch areas 97 at the point of securement of the ball 83.

To prevent the ball 83 from extending too far forward during the loading operation, a bumper plate 86 is provided against which the ball 83 will abut. (See FIGURE 11). The bumper plate 86, in addition, provides a resting means against which the ram 26 rests. In this form of the invention, the ram 26 is urged toward the bumper plate by placing a resilient means 89, such as sponge rubber or the like, between the housing 11 and the upper ends of the ram 26. Thus, whereas previously the front jaw provided a retaining and guiding means for the ram, now the bumper plate provides the guiding means.

In the use and operation of this modified form of the invention, it is quite apparent that the ball 83 prevents the front jaw from becoming unintentionally separated from the staple magazine. The loading and stapling orientation of the front jaw 17 is essentially identical to that of the previously disclosed form of the invention, one of the distinctions being the substitution of the ball 83 for the upper bearing surface 45 of the angled hook 44. If it is required to remove the front jaw from the staple magazine, all that need be done is the disengagement of the ball from the side plates 84 and 85 after which the slider means 51 may be pushed forward thereby releasing the shoe from the housing completely. In all forms of this invention, it will be noted that the front jaw, in cooperation with the staple magazine front wall 34, provides a staple guideway which protects or aligns each staple prior to its being driven as well as during the driving operation. An impregnable surface is encountered by the staple being driven, and the staple may be clinched in the guideway or become fouled otherwise, it is a very simple matter to move the front jaw to the opened position whereafter the staple may be easily removed.

Due to the extreme versatility and simplicity of the front design, the removal and replacement of the jaw, upon wear out or for cleaning, may be accomplished by any unskilled operator with a minimum of down time and expense involved.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportions of the parts without departing from the scope of this invention as set forth in the appended claims.

We claim:
1. In a hammer stapler having an elongate staple magazine and a front wall secured at the front end thereof, a front jaw swingably secured to said staple magazine adjacent the front wall comprising, a shoe plate having a rearward lip portion adapted to interfere with said staple magazine for securing thereto, a front plate secured to said shoe plate adapted to swing into a spaced relation with said front wall whereby to form a vertical staple guideway therebetween when said front jaw is swung to a closed position, means for retaining said front jaw in closed position, and means for retaining said front jaw in engagement with said staple magazine when said front jaw is swung open from the closed position to a load position, whereby to expose said front wall for loading of said staple magazine with a rack of staples.
2. A hammer stapler comprising, a housing having a handle portion and a hammer portion, a staple magazine hingedly secured at the rearward end thereof to said hammer portion of said housing adjacent the handle portion and adapted to reciprocably interfit within said hammer portion of said housing, means biasing said hammer portion and said staple magazine apart, said staple magazine having a staple supply chamber thereof adapted for retaining a rack of staples, means adapted for urging said staples toward the forward end of said magazine, a front jaw interfitting with the forward end of said magazine, said front jaw having a shoe plate, said shoe plate in turn having a rearward portion interfitting with said staple magazine, an angulated hook secured to said shoe plate and adapted to lock said front jaw when it is swung to a closed position as well as to retain said front jaw engaged with said staple magazine when said front jaw is swung open to a load position, said front jaw also having a front plate secured to said shoe plate which cooperatively forms a vertical guideway with said staple magazine when said front jaw is in the closed position, said staple magazine also having a two position slider means for engaging said rearward portion of said shoe plate and said angulated hook whereby to lock said front jaw in the open and load positions, and a reciprocable staple driving member adapted to drive staples from within said guideway.
3. A hammer stapler comprising, a housing having a handle portion and a hammer portion, a staple magazine hingedly secured to said hammer portion of said housing adjacent the handle portion and adapted to reciprocably interfit within said hammer portion, said staple magazine having a staple supply chamber extending for the length thereof, bias means inserable through said handle portion, said bias means having a pusher slidably engaged in said staple supply chamber and adapted for urge staples away from said handle portion, said pusher being retractable from said housing only upon 90° rotation thereof whereby to align corresponding dimensions thereof with that of said handle, said bias means further having a pinch clip engageable with said handle portion, and a flexible cable fixedly secured at one end to said pinch clip and slidably engaged with a portion of said pusher, means adapted for aligning successive staples preparatory to driving thereof, and a reciprocable staple driving means secured to said hammer portion.
4. A hammer stapler comprising, a housing having a handle portion and a hammer portion, a staple magazine hingedly secured at the rearward end thereof to said hammer portion of said housing adjacent the handle portion thereof and adapted to reciprocably interfit within said hammer portion, said staple magazine having a forward free end, said staple magazine further having a staple supply chamber extending for at least a portion of its length, a staple driving means secured to said hammer
portion, means for aligning staples preparatory to driving thereof, a staple pusher assembly having a staple pusher slidably engaged in said staple supply chamber and adapted for urging staples toward said staple magazine forward freely, said staple pusher being substantially larger than said handle, said staple pusher assembly further having a pinch clip engageable with said handle portion which is removable externally, a flexible cable fixedly secured at one end to said pinch clip and slidably engaged with said staple pusher at the other end, and a compression spring interposed between said pinch clip and said staple pusher and having its convolutions thereof encircling said flexible cable.

5. In a hammer stapler having a housing and a staple magazine pivotally secured to said housing and adapted for reciprocable arcuate interfitting with said housing, said staple magazine having a front wall, a front jaw for said staple magazine comprising, a shoe plate having a portion adapted to interfit with said staple magazine for removable securement thereon, an upstanding wall secured to said shoe plate adapted to cooperate with said staple magazine at its front wall whereby to provide a vertical stable guideway therebetween when said front jaw is in a closed position, a retainer means secured to said shoe plate for retaining said front jaw in the closed position, said means engaging said retainer means, and a means secured to said upstanding wall for retaining said front jaw in an open load position whereby to allow said staple magazine to be loaded with staples but preventing complete separation of said front jaw from said staple magazine.

6. In a hammer stapler having a housing and a staple magazine pivotally secured to said housing and adapted for reciprocable arcuate interfitting with said housing, said staple magazine having a front wall, a front jaw for said staple magazine comprising, a shoe plate having a portion adapted to interfit with said staple magazine for removable securement thereon, an upstanding wall secured to said shoe plate adapted to cooperate with said staple magazine at its front wall whereby to provide a vertical stable guideway therebetween when said front jaw is in a closed position, a retainer means secured to said shoe plate for retaining said front jaw in the closed position, said means engaging said retainer means, and a means secured to said upstanding wall for retaining said front jaw in an open load position whereby to allow said staple magazine to be loaded with staples but preventing complete separation of said front jaw from said staple magazine.

7. In a hammer stapler having a housing and a staple magazine pivotally secured to said housing and adapted for reciprocable arcuate interfitting with said housing, said staple magazine having a front wall, a front jaw for said staple magazine comprising, a shoe plate having a portion adapted to interfit with said staple magazine for removable securement thereon, an upstanding wall secured to said shoe plate adapted to cooperate with said staple magazine at its front wall whereby to provide a vertical stable guideway therebetween when said front jaw is in a closed position, a retainer means secured to said shoe plate for retaining said front jaw in the closed position, said means engaging said retainer means, and a means secured to said upstanding wall for retaining said front jaw in an open load position whereby to allow said staple magazine to be loaded with staples but preventing complete separation of said front jaw from said staple magazine.

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