Dec. 6, 1966 I. BALDWIN 3,289,456

STAPLING PLIERS

Filed March 30, 1964

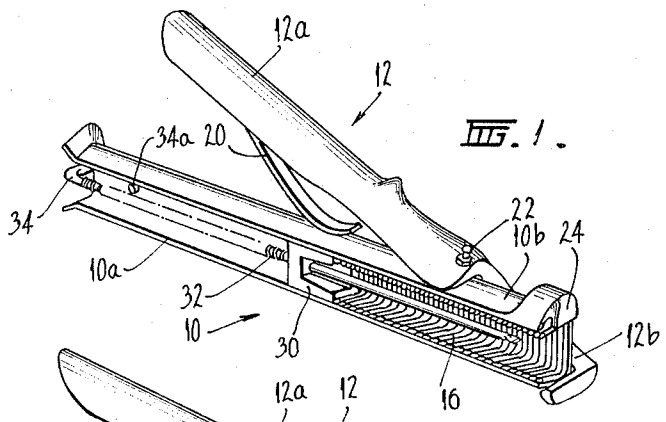


FIG. 1.

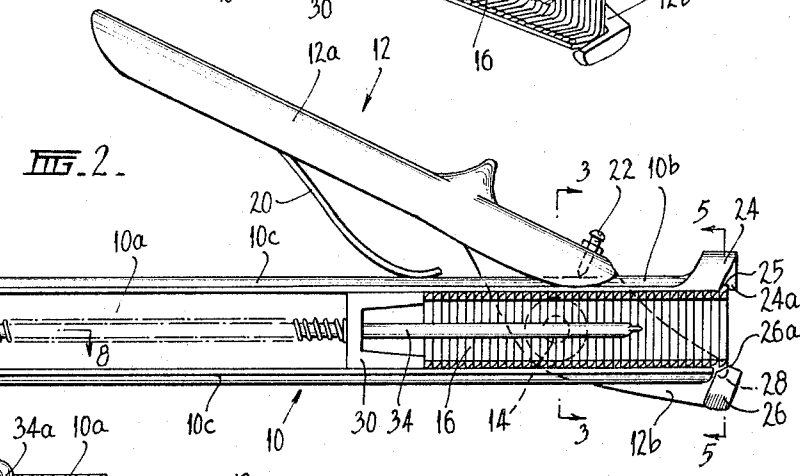


FIG. 2.

FIG. 8.

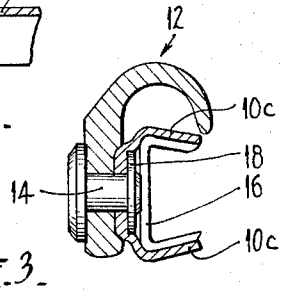


FIG. 3.

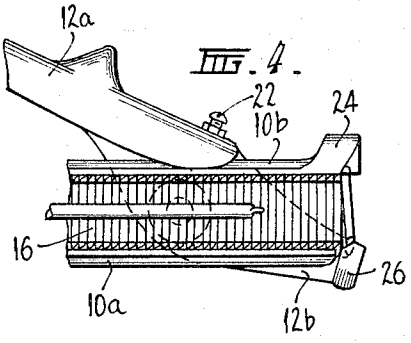


FIG. 4.

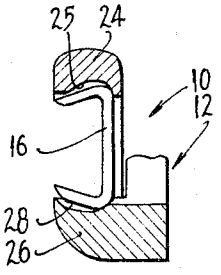


FIG. 5.

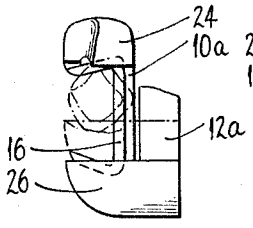


FIG. 6.

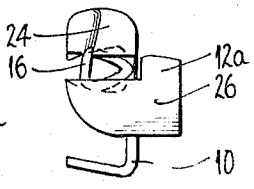


FIG. 7.

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STAPLING PLIERS

Ivan Baldwin, 49 Earl St., Kew, Victoria, Australia

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8 Claims. (Cl. 72—410)

This invention relates to pliers for use in applying staples of the kind known as ring staples and sometimes as hog ring staples.

Stapling pliers of this kind having a magazine for a strip of wire staples are already known and it is the general object of this invention to provide improvements in pliers of this type, while one particular objective is to provide a tool of this kind wherein the magazine is more conveniently arranged.

Accordingly, the invention includes stapling pliers comprising two pivotally connected members carrying opposed jaws for engaging the opposite sides of a staple and characterized in that one of the said members forms a magazine for the staples.

More particularly, the said magazine member is preferably approximately of channel shape in cross-section and the staples are preferably inserted into the outer end thereof and are preferably fed forwardly towards the jaws by a spring-loaded pusher member which is readily removable to permit of the insertion of a fresh strip of staples.

One of the said jaws is fixed to and overlaps one side of the free inner end of the channel section magazine member, while the coacting jaw is carried by the free end of the other member, and when disposed at its maximum separation, it overlaps the opposite side of the magazine member so that the jaws co-operate to obstruct the discharge of the strip of staples.

One preferred construction of stapling pliers according to the invention is hereinafter more fully described with reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of the stapling pliers,

FIGURE 2 is a view of the pliers from the front,

FIGURE 3 is a view in sectional end elevation taken on the line 3—3 of FIGURE 2,

FIGURE 4 is a fragmentary view similar to FIGURE 2 and shows a stage in the staple closing operation,

FIGURE 5 is a view in sectional end elevation taken on the line 5—5 of FIGURE 2,

FIGURES 6 and 7 are views in end elevation of the jaws showing successive stages in the closing operation, and

FIGURE 8 is a detail sectional view taken on the line 7—7 of FIGURE 2.

The illustrated ring staple applicator or pliers comprises a magazine member generally designated **10** and an actuating member generally designated **12** which are pivotally connected together in crossing relationship by a pivot pin **14**.

The pivot pin is located at an intermediate position in the length of each of the members such that each member is subdivided into a comparatively long handle portion **10***a* or **12***a* and a comparatively short work arm **10***b* or **12***b*.

The magazine member **10** is straight throughout its length and is of channel shape in cross-section with the opposed flanges **10***c* converging at a small angle towards the open side of the channel.

Thus a strip of staples **16** having similarly inclined side arms may be slid endwise into the channel section magazine member through the open outer end of the handle portion **10***a* thereof and the strip when thus inserted is prevented by the inclined side flanges **10***c* from falling through the open side of the magazine.

The handle portion **12***a* of the actuating member is disposed side-by-side with the handle portion **10***a* of the magazine while the work arm **12** and adjacent portion of said actuating member are offset so as to extend behind the back of the magazine. The pivot pin **14** is arranged on the longitudinal centerline of the magazine and is secured thereto by a washer **18** located within a recess in the bottom of the channel so that the strip of staples **16** may slide freely above it.

The handle portion **12***a* is of convex shape externally to provide a comfortable grip for the fingers and a cantilever strip spring **20** secured to the hollow inner side thereof bears against the adjacent side of the magazine so as normally to be disposed at its maximum distance therefrom as determined by an adjustable stop screw **22**.

The outer side of the free end of the work arm **10***b* of the magazine is formed with a projecting jaw **24**, the outer part **24***a* of which projects slightly above the adjacent side of the staple channel and thus forms a stop shoulder for that side of the leading staple in the strip, while below this shoulder, the inner face of the jaw is formed with a shallow recess **25** in which the respective side arm of the leading staple is received.

The free end of the work arm **12***b* of the actuating member is similarly provided with a coacting jaw **26** shaped at the inner side thereof to provide a stop shoulder **26***a* above a locating recess **28** for the other side arm of the leading staple. This jaw **26** is disposed in lateral opposition to the jaw **24** for which purpose, it projects laterally from the free end of the work arm **12***b* so as to move inwardly above the adjacent end of the magazine and towards the coacting jaw **26** when the tool is closed by squeezing the handles together.

When the jaws are closed as shown in FIGURE 7, they are disposed in transverse alignment with respect to the length of the magazine, but as the jaw **26** moves in an arcuate path relatively to the magazine, this jaw, when fully open as shown in FIGURE 2, is disposed slightly closer to a line passing transversely through the pivotal axis. For this reason, the adjacent end of the magazine is correspondingly curved or inclined to provide necessary clearance.

The strip of staples **16** is continuously urged forwardly in the magazine by a slidable pusher member **30** and an associated spring **32** mounted on and abutting at one end against a guide rod **34** which extends forwardly through a central clearance hole in the pusher member and has its outer end detachably connected to the outer end of the magazine. For this purpose, the outer portion of the guide rod is bent to a U-shape and has an inturned free end **34***a* which is inserted into a hole formed centrally in the back of the magazine. (See FIGURE 8.)

Thus the pusher member and the guide rod and spring may be quickly and conveniently removed to permit of the insertion of a fresh strip of staples.

Thus when the tool is disposed in its normal open position shown in FIGURE 2, the leading staple **16** in the strip thereof has just emerged from the magazine channel and the side arms thereof are disposed in abutting engagement with the stop shoulders **24***a* and **26***a* of the opposed jaws, which shoulders project inwardly above the respective sides of the magazine.

Consequently, when the handles are squeezed together, the jaw **26** moves inwardly above the inner end of the magazine and towards the opposite jaw **24** whereby the back or base of the leading staple is bent and the arms thereof are turned inwardly until they overlap to form a closed ring of approximately triangular shape when the jaw **26** has completed its inward movement as shown in FIGURE 7.

The staples constituting the strip are usually lightly adhered together and the slight upward and inward curvature of the path of closing movement of the jaw **26** assists in separating the leading staple from the strip as shown

in FIGURE 4 and this separation may be further facilitated by suitably shaping the aforesaid recess or recesses in the inner faces of either or both of the jaws whereby the leading staple is forced outwardly during the initial stage of the inward movement of the jaw 26. The bending of the staple in the aforesaid manner is also facilitated by preforming the staples so that the base is slightly convex outwardly.

From the preceding description, it will be understood that the improved ring staple pliers described above are simple and comparatively inexpensive in construction in that one of the pivotally connected members constituting the tool serves also as the magazine for a strip of staples whereas in known tools of this kind, the staple magazine is a separate member which, in some tools of the relevant kind, constitutes an inconvenient projection.

Although it is preferred that the staples constituting a strip thereof should extend transversely with respect to the length of the strip, this is not essential as they may extend somewhat obliquely in the strip if desired, and this may be advantageous for some purposes, it being understood that in either case, the side arms of the staples when mounted in the pliers are disposed approximately parallel to the axis of the pivotal connection between the jaws thereof.

In the tool as described above, the pivotal axis extends transversely through the longitudinal centerline of the strip of staples, but in some cases, as for example, when the staples are arranged obliquely in the strip, the pivotal axis may advantageously be disposed at one side of the aforesaid longitudinal centerline.

I claim:

1. Stapling pliers comprising a magazine member and an actuating member, and means pivotally connecting said members together in crossing relationship and at such positions in the length of each member that said members are subdivided into an opposed pair of short work arms and an opposed pair of handles, said magazine member being of channel shape in cross-section throughout its length thereby forming a guiding channel for a channel-shaped strip of staples, a projecting jaw on that side of the free end of the work arm of the magazine member which is remote from the work arm of the actuating member, a co-acting jaw on the free end of the work arm of the actuating member, said jaws, when fully separated, having their outer portions projecting into the path of forward movement of the side arms of the leading staple of said strip, and the inner faces of said jaws being formed with recesses to receive the respective side arms of said staple, whereby when said jaws are subsequently moved together, said leading staple is compressed and bent to a ring shape therebetween, a spring-loaded pusher member mounted on the magazine member behind the strip of staples to urge the latter forwardly therein, means removably connecting said pusher member to said magazine member to permit of the insertion of further staples into the outer end of the handle of the magazine member, adjustable stop means for limiting the maximum separation of the jaws and a spring interposed between the handle portions of said pivoted members to urge the latter apart.

2. Stapling pliers for forming ring staples comprising a magazine member, an actuating member, means pivotally connecting said members together in crossing relationship whereby said members are divided into an opposed pair of work arms and an opposed pair of handle portions, and a transversely opposed pair of co-acting jaws on said work arms for engagement with the respective side arms of a staple arranged therebetween, said magazine being hollow thereby to accommodate a strip of staples longitudinally therein, and said strip being slidable forwardly within said magazine member towards and into engagement with said jaws, whereby the leading staple while still on the strip thereof may enter the space between said jaws when the latter are retracted, and whereby when said jaws are subsequently moved inwardly towards each other, the back of said leading staple is bent and the free ends of the arms thereof are caused to close together.

3. Stapling pliers as defined in claim 2, in which the hollow space within said magazine member is in the form of a longitudinally disposed cavity extending from said handle portion into said work arm and accommodating a slidable channel-shaped strip of staples, and in which there is provided a resilient pusher means arranged to urge such staple strip forward in said channel towards the space between said jaws.

4. Stapling pliers as defined in claim 2, in which said magazine member is channel shaped in cross-section throughout its length whereby to accommodate a channel-shaped strip of staples forwardly slidable therein into engagement with said jaws, and is crossed at the back thereof by said actuating member, said jaws when fully separated having their outer portions projecting into the path of movement of the respective side arms of the leading staple in such strip of staples and having recesses in their inner faces to receive the said side arms, and resilient means arranged to urge said staple strip forwardly towards said jaws thereby to cause the leading staple to enter the space therebetween when the jaws are fully separated.

5. Stapling pliers according to claim 3, in which said cavity in the magazine member extends throughout the length of said member and includes means removably connecting said resilient pusher means to said magazine member, thereby promoting the insertion of the staple strip into the outer end of the handle portion of said magazine member.

6. Stapling pliers according to claim 3, wherein the opposite sides of said magazine member converge towards the open side of the channel therein, thereby to retain the staple strip in said channel.

7. Stapling pliers according to claim 4, including adjustable stop means for regulating the maximum separation of said jaws, and resilient means urging said pivotally connected members towards their fully open positions.

8. Stapling pliers according to claim 5, in which the work arm and the adjacent portion of the actuating member are offset relatively to the handle portion thereof, whereby the latter is disposed in lateral opposition to the handle portion of said magazine member.

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CHARLES W. LANHAM, *Primary Examiner.*

R. D. GREFE, *Assistant Examiner.*