

[54] **STAPLER**
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 of Mass.

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[22] Filed: **Aug. 27, 1973**

[21] Appl. No.: **391,777**

[52] U.S. Cl. 227/127, 227/120, 227/132
 [51] Int. Cl. **B25c 5/06**
 [58] Field of Search 227/120, 121, 122, 123,
 227/124, 125, 126, 127, 128, 132

[57] **ABSTRACT**

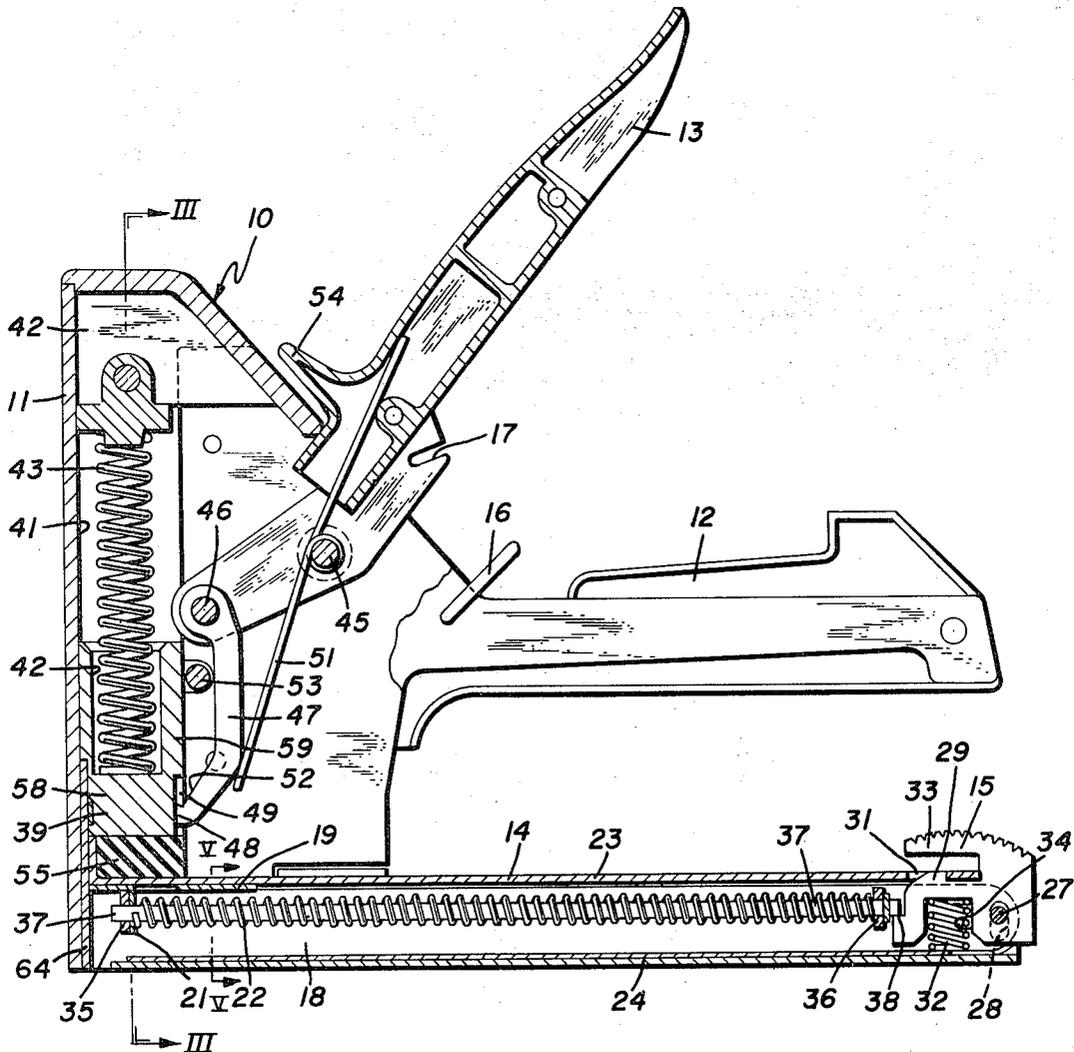
A stapler having a cantilevered gripping handle and a
 slidably loading cartridge.

[56] **References Cited**

UNITED STATES PATENTS

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5 Claims, 5 Drawing Figures



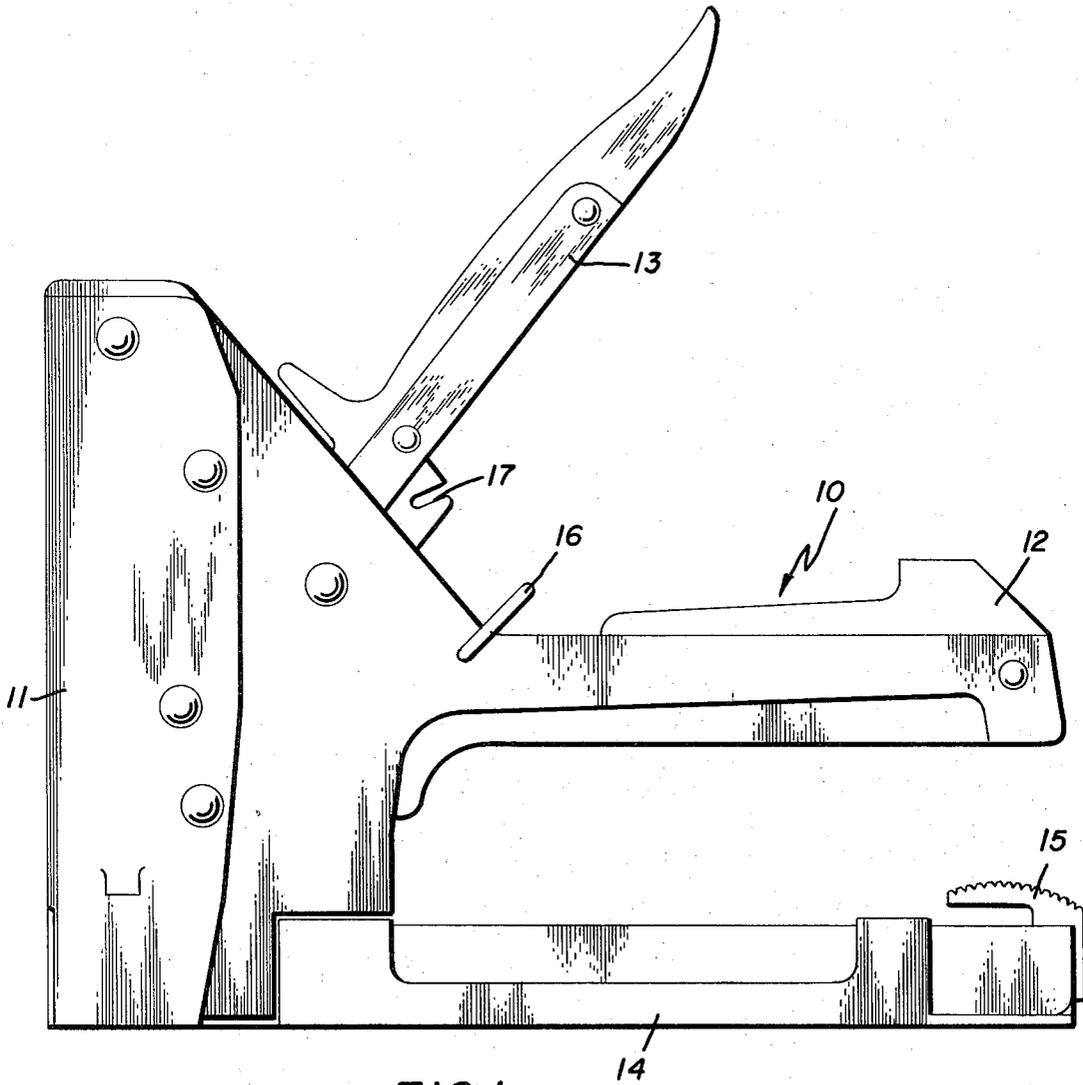
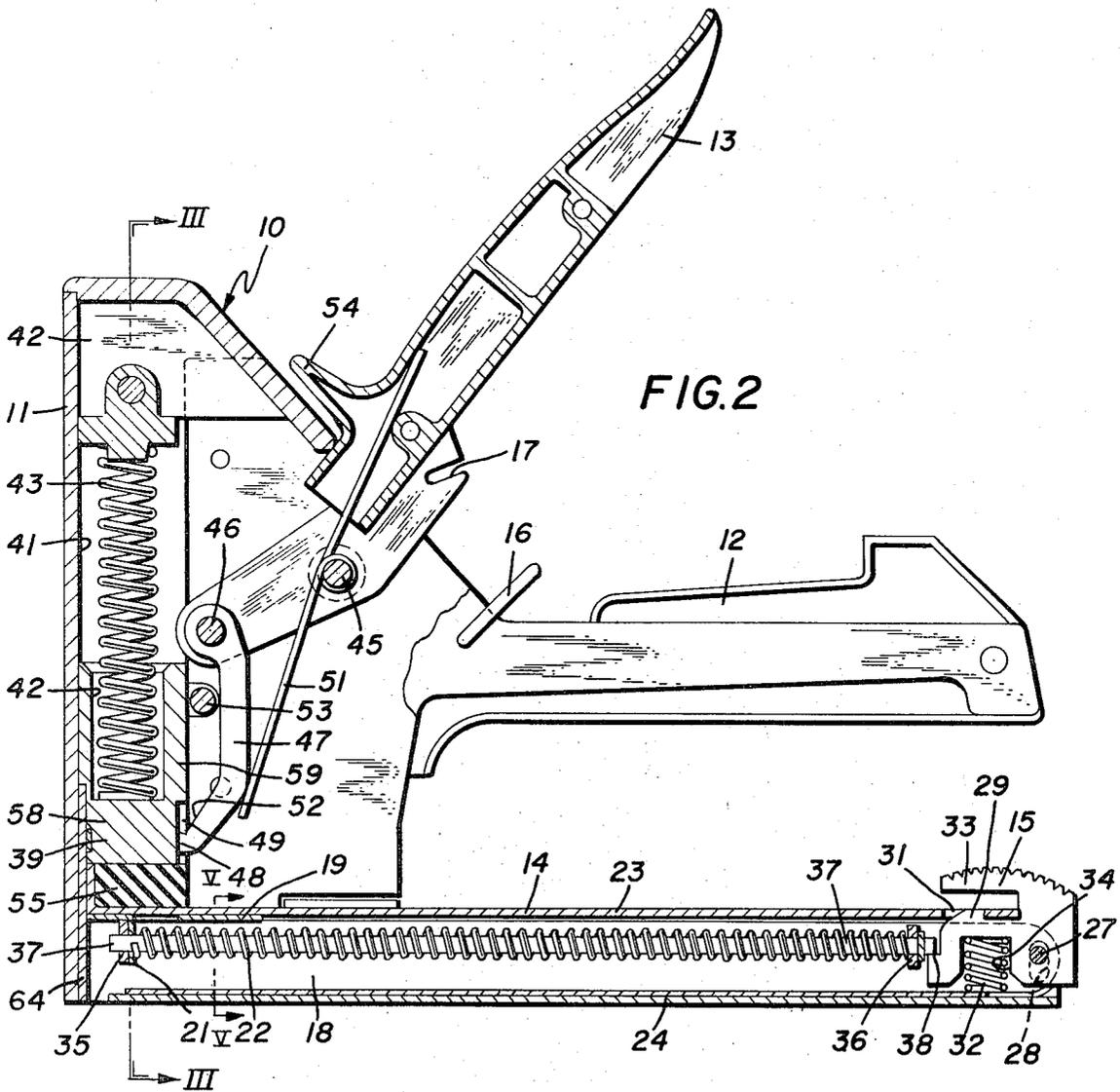


FIG. 1



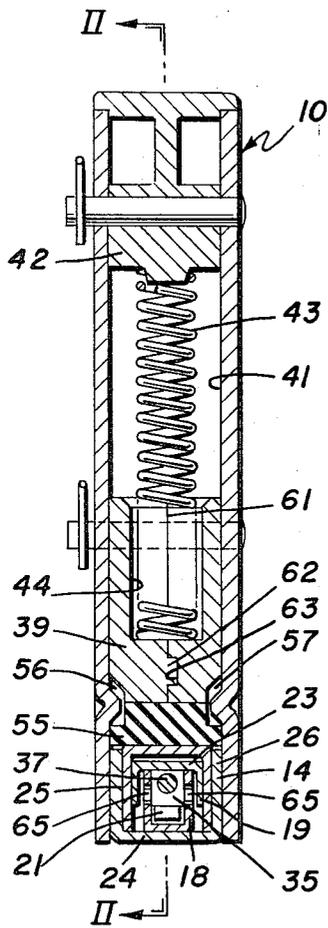


FIG. 3

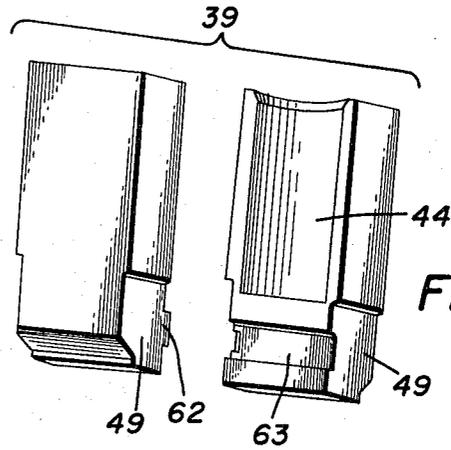


FIG. 4

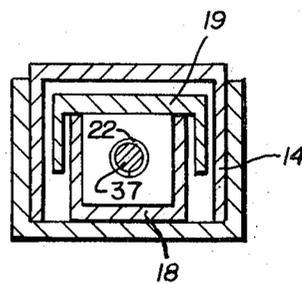


FIG. 5

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STAPLER

BACKGROUND OF THE INVENTION

During the last few years there has been considerable progress in the design and manufacture of stapling guns, mainly due to the increased popularity of the stapler for use in the building trades. The state of the art is very well represented by the patent of LaPointe et al. U.S. Pat. No. 2,982,966, which shows the general construction used a dozen years or so with a swingable loading cartridge. Various improvements have taken place along the lines shown in the patent of Priest U.S. Pat. No. 3,158,870; the patent of Johnson U.S. Pat. No. 3,158,868; the patent of Johnson U.S. Pat. No. 3,149,339; and the patent of Johnson U.S. Pat. No. 3,275,212. Although these stapling guns perform their function adequately, they have a number of shortcomings. Among other things, they have been expensive to manufacture and, therefore, have been high priced in the retail market; they are subject to breakage and wear to a considerable extent. Some of the operations become tiresome when carried on for great lengths of time because of the particular handle arrangement. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

Another object of this invention is the provision of a stapler which is relatively inexpensive to manufacture.

A further object of the present invention is the provision of a stapler which is relatively easy to manipulate during use.

It is another object of the instant invention to provide a stapler which can be easily loaded without removing the operating hand from the gripping handle.

A still further object of the invention is the provision of a stapler which can be loaded with a minimum of danger of injury.

It is a further object of the invention to provide a stapler having a hammer and lifter mechanism which are simple in construction, relatively foolproof in operation, and which are inexpensive to make.

It is a still further object of the present invention to provide a stapler having a gripping handle and a latch for the loading magazine related in such a way that the magazine can be easily opened while one hand is gripping the grip handle.

SUMMARY OF THE INVENTION

In general, the invention consists of a stapler having a main housing with a grip handle and an operating handle and having an elongated compartment underlying the main body and extending in the same general direction as the grip handle. A staple track is slidable in and out of an opening in the compartment and has a pusher slidably mounted on the track. A latch is mounted in the staple track adjacent the opening in the compartment, the latch normally preventing the track from leaving the compartment.

More specifically, the grip handle is spaced and parallel to the said compartment, the grip handle is of cantilever construction with its free end overlying the said latch, and the operating handle extends away from the main housing on the opposite side of the grip handle from the compartment. A lifter is pivotally mounted on the operating handle and has a hook at its lower end that engages a downwardly-directed horizontal surface of a spring-loaded staple hammer to pull it upwardly

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against the spring. A rod extends across the housing beside the path of the hammer and a cam surface is formed on the upper edge of the hook and located to engage the rod at a predetermined point in the upward movement of the hammer to rotate the lifter away from the hammer and release the hook from the hammer so that the hammer may move downwardly.

BRIEF DESCRIPTION OF THE DRAWINGS

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawings, in which:

FIG. 1 is a front elevational view of a stapler embodying the principle of the present invention.

FIG. 2 is a vertical sectional view of the stapler taken on the line II—II of FIG. 3.

FIG. 3 is a vertical sectional view of the stapler taken on the line III—III of FIG. 2.

FIG. 4 is an exploded perspective view of a hammer used in the stapler, and

FIG. 5 is a sectional view taken on the line V—V of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, wherein are best shown the general features of the invention, the stapler, indicated generally by the reference numeral 10, has a main housing 11 from which extend a grip handle 12 and an operating handle 13. An elongated staple storage compartment 14 underlies the main body 11 and extends in the same general direction as the grip handle 12. A latch 15 is associated with the compartment 14 and underlies the free end of the grip handle 12.

The main body 11 is provided with a loop 16 which is capable of cooperating with a notch 17 formed in the operating handle 13 to lock the operating handle when the stapler is not being used. The grip handle 12 is spaced from and parallel to the storage compartment 14. The handle is of cantilever construction with its free end overlying the latch 15. The operating handle 13 extends away from the main housing 11 on the opposite side of the grip handle 12 from the compartment 14.

Referring now to FIGS. 2, 3 and 5, which show the details of construction, the staple track 18 is slidable in and out of the compartment 14 through an opening at the right-hand side (FIG. 2). As is evident in FIG. 3, the track 18 is U-shaped in cross section, opening upwardly. Straddling the track and slidable along it, is a pusher 19 which is of U-shaped cross section also but opening downwardly. Extending downwardly from the pusher 19 is a tongue 21 which lies between the side-walls of the track 18 and is engaged by a coil spring 22 which pushes it to the left in FIG. 2. The latch 15 is mounted in the right-hand end of the staple track 18 adjacent the opening in the compartment 14 and normally serves to prevent the track from leaving the compartment.

The compartment 14 is a tube of substantially square cross section and, therefore, is provided with a top wall 23, a bottom wall 24, and side walls 25 and 26 formed by welding together two nesting U-shaped channels as is evident in FIG. 3. The latch 15 is pivotally mounted in the track 18 by means of a horizontal transverse pivot pin 27 which extends through the side walls of the track 18 with its ends residing in vertically-elongated

slots 28 formed therein. The latch has a vertical finger 29 with a cam-shaped leading edge; the finger normally rests in a slot 31 formed in the top wall 23 of the compartment. A spring 32 extends between the latch 15 and the bottom wall of the track to resiliently bias the latch in the upward direction, as viewed in FIG. 2 and to maintain the finger pressed upwardly into the slot. An actuating arm 33 having a curved serrated upper surface, extends from the latch 15 and overlies the finger 29 and the slot 31. The latch 15 is of the same thickness as the distance between sidewalls of the track 18 so that it slides smoothly between the side walls. A downwardly-directed square slot 34 if formed in the latch; the side surfaces of this slot combine with the inner surfaces of the side walls of the track 18 to form a compartment in which the coil spring 32 is supported and confined.

As has been stated, the track 18 is of U-shaped cross section; it is important that the distance between the sides of the channel be exactly dimensioned in order that the staples stored thereon and slidable along it will fit properly. For that purpose the track is provided with cross braces 35 and 36, one adjacent each end. The cross brace 35 at the left-hand end is provided with a central circular aperture in which rests one end of a spring retaining rod 37. The cross brace 36 at the other end receives the other end of the rod. The spring 22 surrounds the rod and extends between the cross brace 36 at the right-hand end and the tongue 21 on the slide 19 on the other hand. In FIG. 2 the situation is illustrated when there are no staples on the track 18, so that the slide 19 is pressed far to the left with the tongue 21 resting against the cross brace 35. At its right-hand end the rod 37 extends to the right slightly beyond the cross brace 36. Extending from the left side of the latch 15 is a finger 38, having an upper horizontal surface which presses against the underside of the projecting ends of the rod 37. This limits the upward travel of the latch under the impetus of the spring 32. The rod 37 is suitably staked to keep it from sliding from the two cross braces. The cross braces 35 and 36 are of generally square conformation and are held in place by laterally-extending tabs 65 which reside in suitable perforations in the walls of the track 18. The sides of the braces which engage the inner surfaces of the walls of the track are very accurately formed to be parallel and spaced exactly to act as gages to maintain and cause the track to be exactly the right width to receive a supply of staples. When this construction is used, it is not necessary to have an inspector measure each of the tracks before it is incorporated into the stapler.

A staple hammer 39 mounted to be slidable vertically in the main housing 11 in the vertical chamber 41 provided therefor. The top of the chamber is closed by a cap 42 and a coil spring 43 whose lower end resides in a bore 44 in the top of the hammer. The operating handle 13 is pivotally mounted in the main housing 11 by means of a hinge pin 45 and its inner end is connected by a pivot pin 46 to the upper end of a lifter 47. The lifter has a hook 48 at its lower end which engages a recess 49 in the side of the hammer 39. A torque spring 51 serves to maintain the lifter 47 pressed toward the recess 49 and at the same time maintains the operating handle 13 biased toward its upper position. The lifter 47 is provided adjacent the hook 48 with an inclined cam surface 52 which engages on occasion with a hori-

zontal transverse pin 53 extending across the main housing.

The operating handle 13 is provided with an integral finger 54 which engages a portion of the cap 42 when the operating handle is in its upper position. Lying in the chamber 41 of the main body between the bottom of the hammer 39 and the top of the compartment 14, is a rubber block 55 which is held in place by indentations 56 and 57 formed in the sides of the main housing.

As is evident in FIG. 4, the hammer 39 is formed of two pieces 58 and 59 of sintered powdered metal, the pieces being joined along a vertical longitudinal split or separating plane 61 with a key 62 formed on the piece 59 which fits tightly into a groove 63 formed on the piece 58. The lifter 47 is also formed of sintered powdered metal.

The operation of the apparatus will now be readily understood in view of the above description. When the stapler has been loaded with staples, the operator grasps the cantilevered grip handle 12 in his fingers with the operating handle 13 in the palm of his hand. In order to drive a staple, the operating handle 13 is pressed downwardly toward the grip handle 12. The action of the operating handle 13 moving downwardly toward the grip handle 12, causes the lifter 47 to be moved vertically, thus pulling the hammer 39 upwardly against the pressure of the spring 43. In its upward movement, when the handle 13 has moved approximately $24\frac{1}{2}^\circ$, the cam surface 52 engages the pin 53 and further movement causes the cam surface to slide along the pin and to draw the hook 48 out of the recess 49 in the hammer. When the hook leaves the recess 49, the hammer is free to move downwardly again under the energy stored in the spring 43 and to drive a staple plate 64 downwardly, thus driving a staple out of the apparatus.

When it is desired to load additional staples in the stapler, the operator presses the latch 15. This draws the finger 29 downwardly out of the recess 31 against the pressure of the spring 32. The track 18 is then free to be moved to the right in FIG. 2. When the track is free of the compartment 14, it may be provided with a number of staples. The staples are placed straddling the track 18 with the pusher 19 carried to the right against the pressure of the spring 22. The cartridge is then returned to the compartment 14 and the latch slides into place again. The track 18 is locked in place and its new supply of staples are held in place, the staples being pushed to the left toward driving position by the slide 19 and the spring 22.

It can be seen that the present construction provides a number of advantages. Having the latch 15 located under the grip handle 12 makes it easy to release the track for loading without the operator removing his hand from the grip handle 12. Having the grip handle 12 cantilevered means ready access is available to the apparatus and the hand is free to move toward and away from the grip handle without difficulty. The use of sintered powdered metal in the hammer 39 represents a large saving in cost of manufacture and this is true also of making the lifter 47 the same way. Use of the cross braces 35 and 36 to gage the width of the track 18 represents a saving in manufacturing cost, particularly in the labor cost, which was necessary in the past to gage each of the tracks before they were incorporated in a stapler.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

We claim:

- 1. A stapler, comprising
 - a. a main housing having a grip handle and an operating handle,
 - b. an elongated compartment underlying the main body and extending in the same general direction as the grip handle,
 - c. a staple track slidable in and out of an opening in the compartment and having a pusher slidably mounted on the track, the staple track being channel shaped and having a cross brace located adjacent each end, each brach having a central aperture,
 - d. a spring-retaining rod extending lengthwise of the track through the apertures,
 - e. a coil spring carried on the rod with one end engaging a cross brace and the other end connected to the staple pusher, and
 - f. a latch mounted in the staple track adjacent the opening in the compartment, the latch normally preventing the track from leaving the compartment, the latch having a horizontal lug that locks

under the adjacent end of the rod.

2. A stapler as recited in claim 1, wherein the stapler track is U-shaped channel, wherein the cross braces fit tightly between the sides, and wherein the braces and sides are interlocked by legs on the braces and apertures on the sides.

3. A stapler as recited in claim 1, wherein the compartment has top, bottom, and side walls, wherein the latch is pivotally mounted in the track by means of a hinge pin extending transversely therethrough with its ends resting in vertically-elongated openings in the side walls of the compartment, wherein the latch has a vertical finger substantially spaced from the pivot pin and normally resting in an aperture in the top wall of the compartment, wherein a spring extends between the staple track and the latch to bias the finger into engagement with the top wall of the compartment, and wherein an actuating arm extends from the latch and overlies the finger.

4. A stapler as recited in claim 3, wherein the arm has serrated curved upper surface underlying the grip handle.

5. A stapler as recited in claim 1, wherein the grip handle is spaced and parallel to the said compartment, wherein the grip handle is of cantilever construction with its free end overlying the said latch, and wherein the operating handle extends away from the main housing on the opposite side of the grip handle from the compartment.

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