

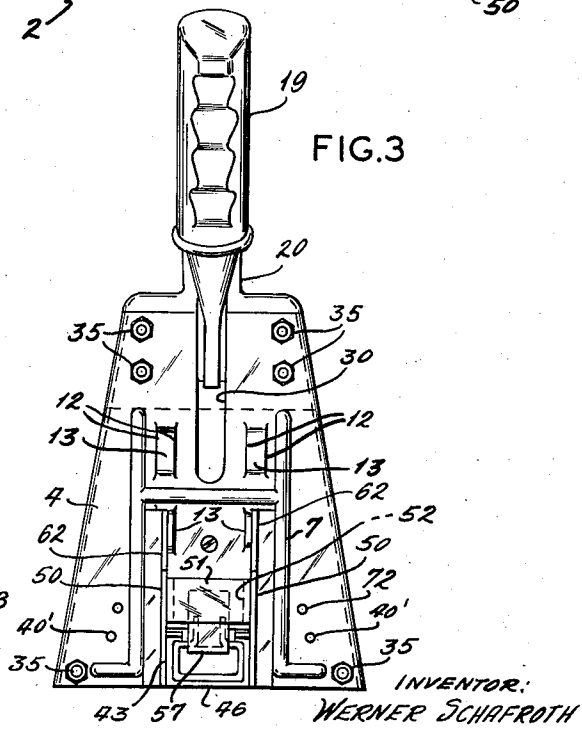
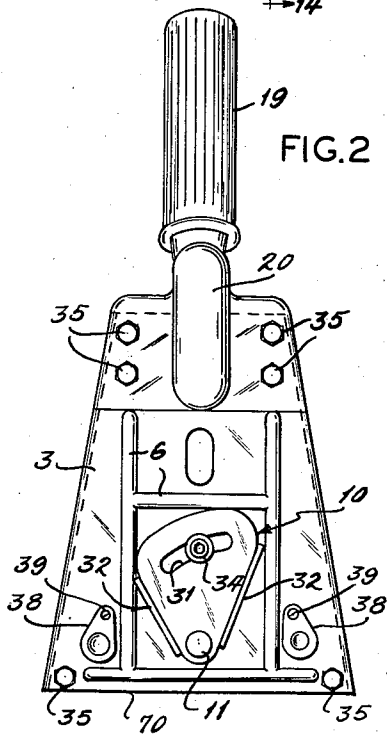
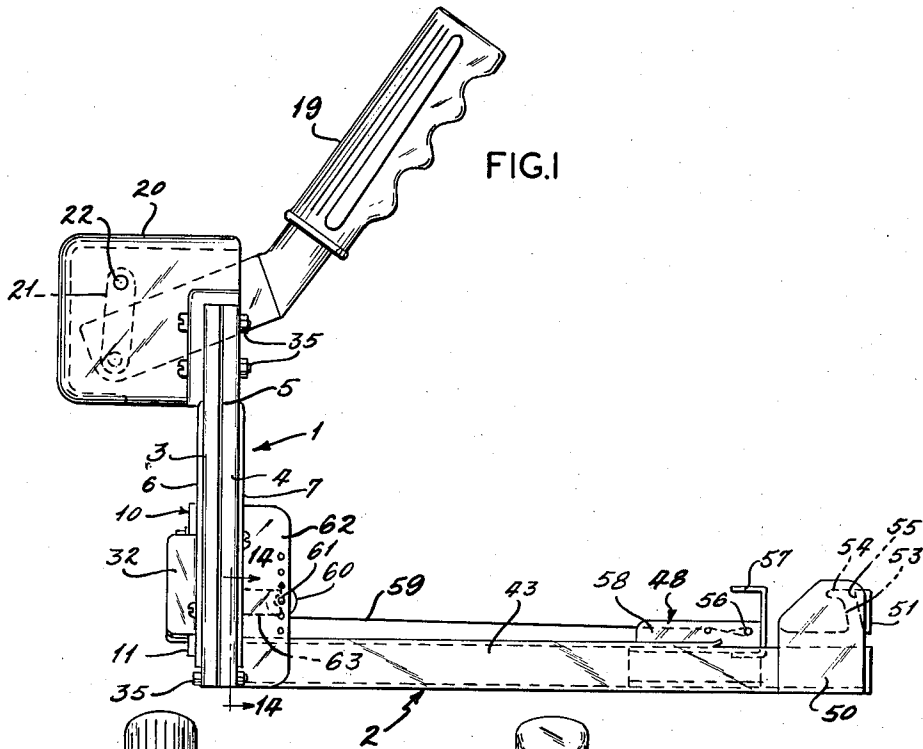
Aug. 4, 1959

W. SCHAFROTH
STAPLING MACHINE

2,897,502

Filed Jan. 17, 1958

5 Sheets-Sheet 1



INVENTOR:
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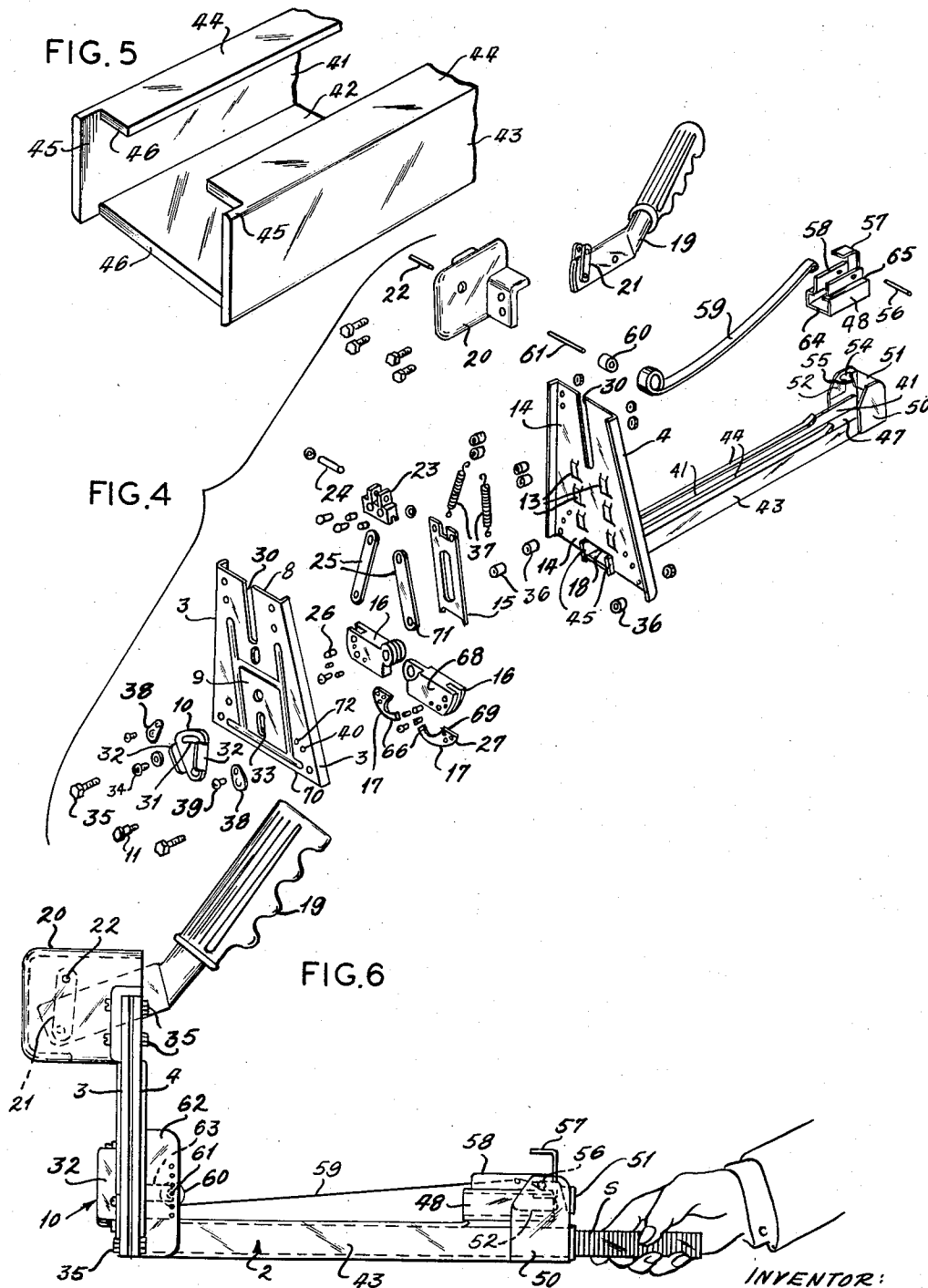
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5 Sheets-Sheet 3

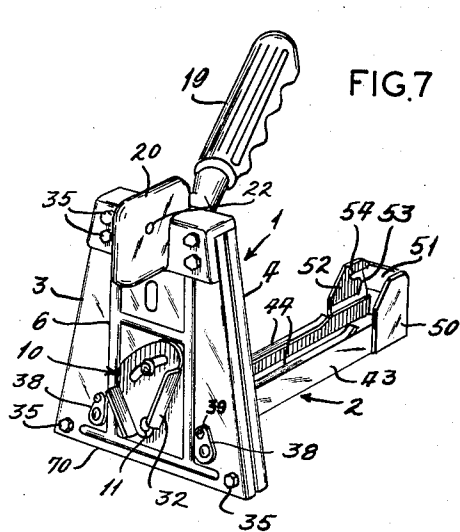


FIG. 7

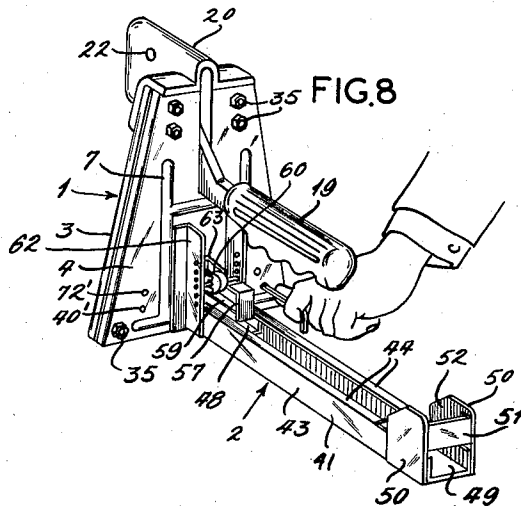


FIG. 8

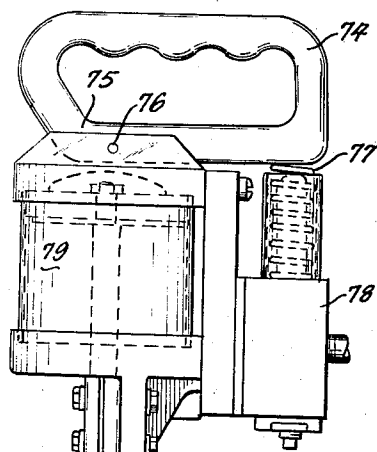


FIG. 9

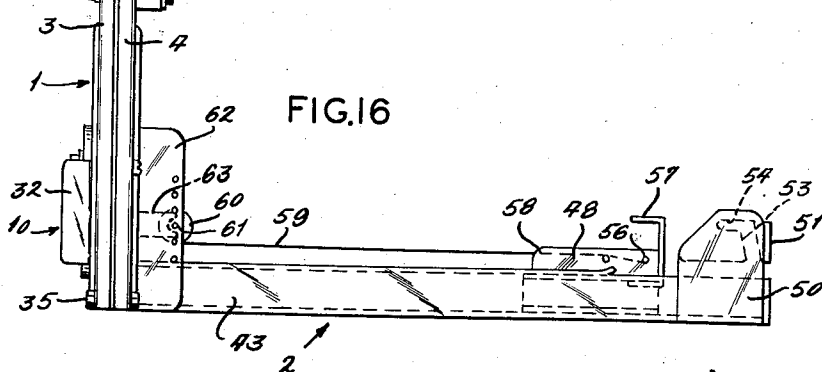


FIG. 16

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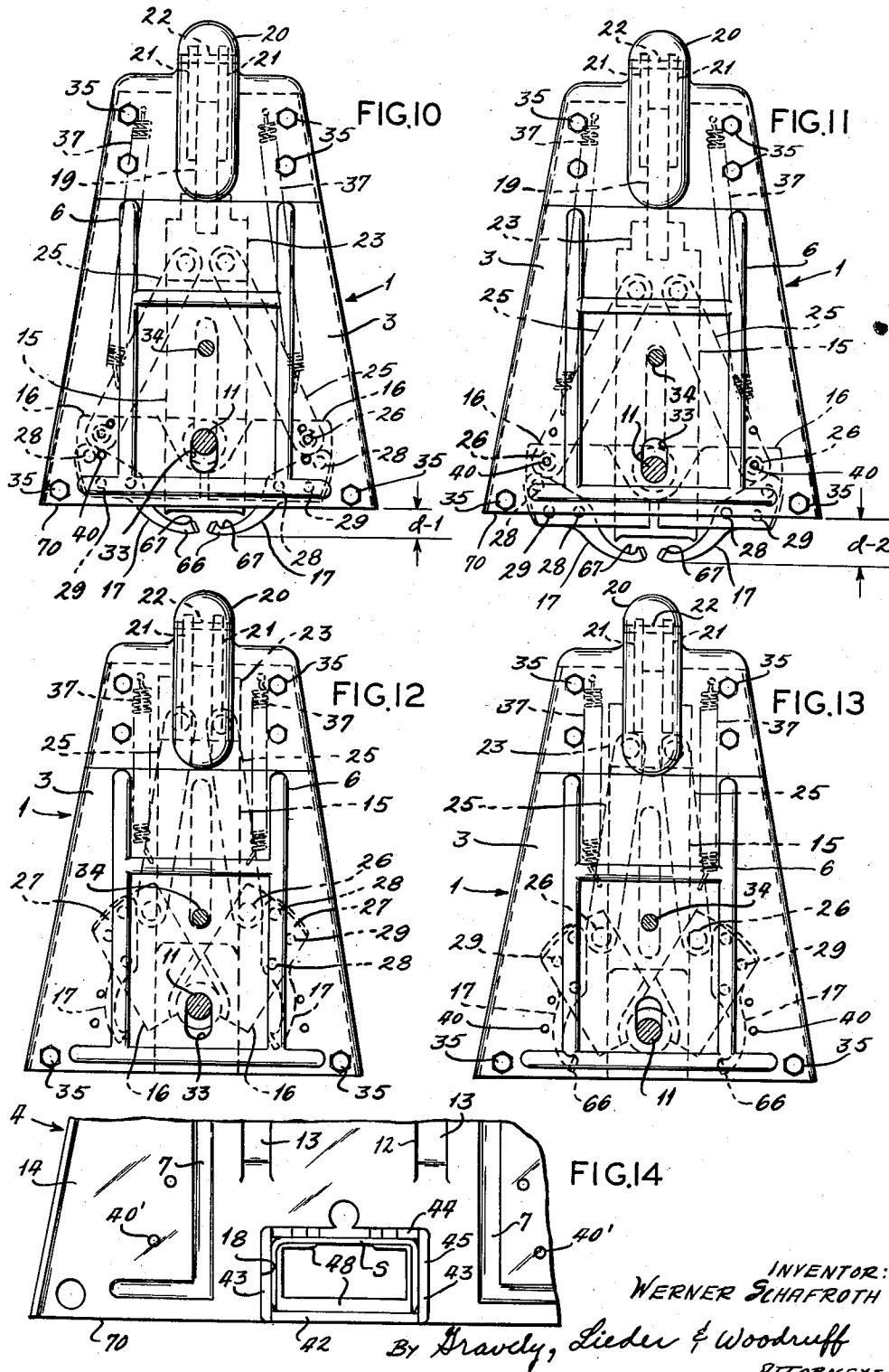
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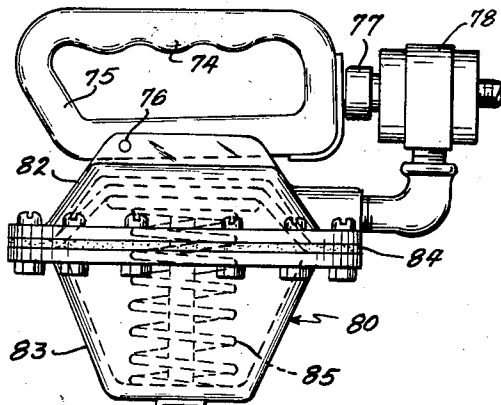


FIG. 15

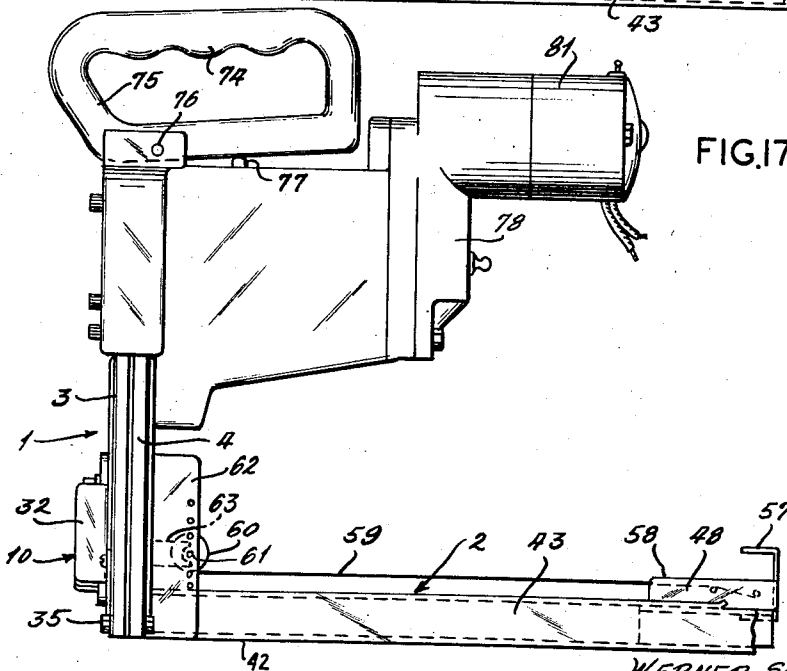
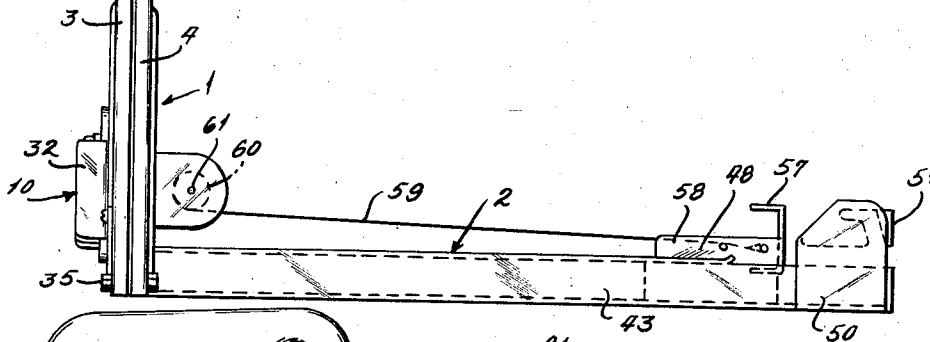


FIG. 17

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2,897,502

STAPLING MACHINE

Werner Schafroth, Herrin, Ill.

Application January 17, 1958, Serial No. 709,500

8 Claims. (Cl. 1—49)

This invention relates in general to stapling machines and means for feeding staples to the stapling mechanism thereof. In particular, this invention relates to a stapling machine of the movable anvil type having an improved heavier and simplified construction, a penetration control, a magazine with an unobstructed interior, and a pivoted carrying handle for actuating the power driven form of said machine.

This invention represents a practical improvement over stapling machines and magazines heretofore used, such as those shown in several prior patents including Schafroth Patent No. 2,740,119, dated April 3, 1956, Schafroth Patent No. 2,778,022 dated January 22, 1957, and Schafroth et al. Patent No. 2,722,001 dated November 1, 1955.

In the past, it has been common practice to make stapling machines from a relatively large number of parts even at the critical places where the staples pass from the magazine into the casing where they are driven by a sliding staple driving blade which must be guided by guides. The problems of such a multi-piece construction are inherent and serious since any inaccuracies or misalignment in assembly, which is usually done by welding, tends to increase the possibility of jamming, which not only results in a temporary stoppage of the stapling machine but sometimes results in serious damage to the machine, especially to previous machines whose casings, magazines, or other parts were made from relatively light material which might bend when a staple is jammed.

Also, it has been common practice to provide a magazine having a U-shaped outer channel and a parallel U-shaped inner channel on which the staples rest in an elevated position until they are slidably moved along said inner channel by a follower or pusher sliding on said inner channel. The forward end of the inner channel was closed by a vertical wear plate having a lateral projection at each lower corner thereof. The wear plate often caused difficulty unless extreme care was taken during manufacture and assembly of the various parts, and together with the inner channel resulted in staples being received in the casing in an elevated position. This frequently resulted in the jamming of staples. In some instances, the crown of the staple would catch on the top surface of the wear plate and would be out of alignment when the staple driving blade moved downwardly. This condition was made worse because the staple driving blade was bevelled along the edge adjacent to the wear plate to prevent the two from abutting against each other. Thus the driving blade normally contacted each staple at its forward edge primarily, and not over the entire top surface of the staple.

One of the principal objects of the present invention is to provide a magazine which requires no inner channel member whatever and which eliminates the wear plate. Another object is to provide a stapling machine and magazine in which legs of the staple slide directly on the bottom surface of the magazine and the staple is driven from the machine from the bottom and not from

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an elevated position near the bottom. Another object is to provide a magazine whose interior is completely unobstructed. Another object is to provide a magazine construction which is less sensitive to the height of the staples and in which a staple cannot jam or pivot or turn. Another object is to provide a construction wherein the staple after passing over the forward edge of the magazine is free to be driven downwardly and in which there is no wear plate or other projections which might catch or pivot the staple as it is being driven.

Another principal object of the present invention is to provide a magazine made substantially from one continuous channel of heavier gauge material with no inner channels therein. Still another object is to provide a magazine which can be loaded from the open rear end thereby increasing the effective carrying capacity of the magazine or allow more staples to be placed therein per unit of magazine length.

Another object is to provide a novel arrangement for feeding staples which includes the use of a spring and a novel pusher which is positioned above the level of said magazine as staples are loaded from the rear end. Still another object is to provide a magazine wherein staples being fed to the stapling mechanism cannot jam and cannot turn or sneak back into the magazine as they are being driven. Still another object is to provide a magazine whose top flanges are sufficiently strong to prevent the forward portions from bending upwardly as was the tendency in the past when staples jammed.

Another principal object of the present invention is to provide a penetration control, which controls the depth of penetration of the staples before they are clinched. Another object is to provide a penetration control which cannot be tampered with readily by the operator and which is free from any timing problem and wherein the staple is driven against the same portion of the anvil at the start of the clinching operation regardless of the depth of penetration desired. In other words, the staple contacts the same point on the anvil both at its extreme minimum and maximum depth penetrations, thereby eliminating the possibility of missing the anvil entirely or contacting the anvil at a point which reduces the operator's effective mechanical advantage or the bending of the legs of the staple. Another object is to fully support the staple at its rear and forward portions entirely throughout the staple driving stroke regardless of the penetration desired.

Another principal object of the present invention is to provide anvil holders mounted on a common pivot, thereby preventing the penetration control from getting out of time. Another object is to so position the guide member for the staple driving blade so as to permit the anvils to have greater securing portions and to be secured to the anvil holders by means spaced farther apart, thereby rigidizing and strengthening the anvil itself. Still another object is to provide a construction wherein the anvils can be removed if desired without disassembling the entire stapling machine. Another object is to provide a heavier simplified construction for a stapling machine including the magazine which has fewer parts and which are easier to assemble and inherently less likely to be assembled in an improper manner.

Still another principal object is to provide a carrying handle for a power actuated stapling machine which when pivoted slightly actuates the stapling machine to effect the clinching of a staple. Another object of the present invention is to provide a new power actuated stapling machine using air which does not have to be purified or oiled, thereby eliminating the filtering and oiling apparatus previously required.

These and other objects and advantages will become apparent hereinafter.

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The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed. In the accompanying drawings which form part of this specification and wherein like numerals and symbols refer to like parts wherever they occur:

Fig. 1 is a side elevational view of a stapling machine embodying the present invention, the handle being in its raised or inoperative position,

Fig. 2 is a front elevational view thereof,

Fig. 3 is a rear elevational view thereof,

Fig. 4 is an exploded perspective view thereof,

Fig. 5 is a fragmentary perspective view of the forward portion of the magazine,

Fig. 6 is a side elevational view showing the pusher in its elevated position,

Fig. 7 is a front perspective view thereof,

Fig. 8 is a rear perspective view showing the handle in a lowered position,

Fig. 9 shows the handle in its lowered position with pins inserted through the casing to allow the anvil holders and anvils to be removed,

Figs. 10 and 11 are fragmentary views showing a staple being driven when the penetration control is in its upper and lower positions respectively,

Figs. 12 and 13 show the anvil holders in their extreme positions avoiding the guides for the staple driving blade,

Fig. 14 shows an enlarged cross-sectional view along the line 14—14 of Fig. 1 showing the staple within the magazine,

Fig. 15 is a side elevational view of the stapling machine previously shown powered by an air diaphragm motor actuated by a pivoted carrying handle,

Fig. 16 is a side elevational view of said device with an air piston motor, and

Fig. 17 is a side elevational view of a portable electric stapling machine having a pivoted carrying handle.

Referring now to the drawings in detail it will be seen that the embodiment of the invention which has been illustrated comprises a casing 1 with a magazine 2 rigidly connected thereto. The casing 1 comprises a front housing 3 and a rear housing 4 with a stapling mechanism 5 therebetween. The front and rear housings 3 and 4 are made from heavier material than formerly used, preferably steel of about 0.078 inch thickness, and are provided with reinforcing or strengthening and positioning ribs 6 and 7.

The front housing 3 which has a rear face 8, is provided with a slotted reinforcing plate or portion 9 and carries a penetration control cam 10 pivotally mounted on a pin 11. The rear housing 4 is provided with two pairs of spaced parallel vertical cuts or lances 12 so that the metal may be bent out of its plane to form guides 13 on its front face 14 for a stapled riving blade 15, said guides 13 each comprising a plurality of segments, the lower of which is spaced upwardly from the bottom of the casing 1 and above the magazine 2 so as to permit the relatively large anvil holders 16 with anvils 17 thereon to freely pivot within the housing. The lower segments are above the level of a rectangular unobstructed opening 18 adjacent to the lower edge of the rear housing 4. The guides 13 are integral with the rear housing 4 and are formed by dies and are therefore always accurate and properly positioned. The guides 13 are bent out of the plane of the rear housing not more than the thickness thereof so that no slits or openings will be present.

The driving blade 15 is provided in the plane of and between the anvils 17 and is adapted to move vertically upon the operation of the handle 19 which is pivotally suspended within a nose 20 on links 21 pivotally mounted on a pin 22. The upper portion of the blade 15 is secured to a yoke 23 which holds yoke pins 24 on which links 25 are pivotally mounted. The lower ends of the

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links 25 are pivotally mounted in the anvil holders 16 on pins 26. An anvil 17 having a relatively large upper securing portion 27 is secured to each of the anvil holders 16 by means of two pins 28 spaced far apart and a screw 29 therebetween. Because of the new guide arrangement, heavier anvils with larger securing portions can be used within the same limits of space thereby increasing the strength of the anvils several times its previous strength.

The housing members are provided with vertical slots 30 in their central upper portion for receiving the pivoted operating handle 19.

The penetration control includes a cam 10 having an upwardly inclined cam slot 31 therein and flanges 32 thereon to aid in pivoting said cam 10. The cam 10 is pivotally mounted on a pin 11 within a vertical slot 33 in the front housing 3, and is maintained in a fixed but adjustable position by means 34, such as an Allen screw, which requires a special tool to make an adjustment thereby preventing the operator from accidentally or inadvertently changing the depth which the staples should be driven. This is important since if the penetration control is improperly positioned, either the staples will not close the container or the anvils and staples will damage the contents.

The housing members 3 and 4 are secured together in spaced relation by bolts 35 at each of the corners with spacers 36 surrounding the inner portions thereof. Springs 37 are fixedly secured to the casing and to the intermediate portions of the links 25 for aiding in returning the stapling mechanism 5 to its inoperative position as best shown in Figs. 12 and 13.

The front housing 3 is provided with tabs 38 secured in position by screws 39 over holes 40 which are used to replace the anvils 17 without disassembling the machine as will be explained later. The rear housing 4 has holes 40' aligned with holes 40.

Magazine

The magazine 2 comprises one continuous channel 41 made from relatively heavy gauge material, such as steel 0.078 inch thick, with no inner parts therein. The channel 41 has a bottom 42, two upstanding walls 43 with top flanges 44 extending inwardly therefrom a short distance substantially throughout the entire length of the magazine. The upstanding walls 43 have a forward portion 45 which extends through the rear housing 4 and forwardly of the front face 14 thereof a distance equal to the thickness of a staple to form the lower portion of the guides 13. The top flanges 44 and bottom 42 are foreshortened as at 46 and are flush with the front face 14 of the rear housing 4. The rear portions of said top flanges 44 are cut away as at 47 to allow a pusher 48 which slides in the channel 41 to move upwardly. The magazine 2 has an open rear portion 49 for receiving staples, but is provided with two end plates 50 with an end brace 51 therebetween above the height of the staples, said end plates 50 having small cam plates 52 secured thereto for holding the pusher 48 in an upper position in the vertical cam track 53 and cam notch 54. The end brace 51 has sloping inner portions 55 for directing a pusher pin 56 into the notch 54 of the cam plate 52.

The pusher 48 is made from one heavy piece of material with a handle member 57 secured thereto. The pusher pin 56 extends through the upper portion 58 thereof and holds one end of a pusher spring 59 as well as riding in the cam plate to lock the pusher in its elevated rear position when staples are loaded. The other end of the spring 59 is coiled around a roller 60 rotatably mounted on a roller pin 61 positioned within holes in two vertical brackets 62 which are heli-arc welded to the rear of the rear housing 4 along the positioning ribs 7 thereof and heli-arc welded to the magazine 2 along the rear and bottom edge of said bracket. A

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separate U-shaped member 63 acts as a guide to roll up the spring 59. The spring 59 produces uniform tension on the pusher 48 throughout its entire length of travel and is biased downwardly on the tops of the staples due to its curvature.

The brackets 62 rigidly secure the heavy magazine to the heavy rear housing so strongly that several times the force or weight can be placed on the magazine without it bending the machine or causing misalignment of parts sufficient to prevent driving a staple.

Operation of the magazine

In order to operate the stapling machine, staples S are first inserted into the unobstructed channel 41 of the magazine 2 by moving the pusher 48 to the extreme rear of the magazine 2 against the action of the spring 59 until the pusher 48 is free to move upwardly as at 47 beyond the rear ends of the top flanges 44. In so doing, the pusher pin 56 is directed upwardly in the cam groove 53 and into the cam notch 54 which holds the pusher 48 in an elevated rearward position, as shown in Fig. 6. Clips of staples S are then inserted into the magazine from the rear. The pusher 48 is then moved slightly rearwardly and downwardly so that its bottom 64 rests on the magazine bottom 42 and its upper flanges 65 are free to slide forwardly beneath the magazine top flanges 44. In this position, the spring 59 urges the pusher 48 forwardly and due to its curvature contacts the tops of the staples over a portion of the length of the magazine. The pusher 48 contacts the adjacent staple over its entire area and the staples are held firmly but slidably at the bottom, side, and top and are contacted over a greater area than previously. The staples slide on their own legs and the inner channels, which had a tendency to warp or fail, have been eliminated.

Operation of the stapling mechanism

With staples loaded and the handle in its upward position, as shown in Fig. 1, the stapling machine is placed over the carton or container to be fastened. The handle 19 is then forced downwardly thereby causing the driving blade 15 to move downwardly and drive a staple S through the material and causing the piercing ends 66 of the anvils 17 to pierce the material. Continued movement of the handle 19 causes the clinching surfaces 67 of the anvils 17 to engage the lower ends of the staples S and bend them into fastening position. The handle 19 pivots from its suspended forward fulcrum 22 and rides downwardly in the handle slots 30 in the casing, thereby forcing the yoke 23 downwardly causing the links 25 to move the outer portions of the anvil holders 16 outwardly and downwardly in a pivoting or rotating action about the common anvil holder pivot pin 11.

In so pivoting, the forward faces 68 of the anvil holders 16 are supported by and are in direct sliding contacting relation with the rear face 8 of the front housing 3. Since the integrally formed guides 13 on the rear housing 4 terminate short of the bottom of the casing, the rear faces 69 of the anvil 17 are free to slide and be supported over a large area by the front face 14 of the rear housing 4. Thus, the anvil holder-anvil assembly is pivotally mounted on a single pin 11 and is slidably supported directly by the inside faces of the front and rear housings without the necessity of additional support pieces or blocks.

To retract the anvils 17 after clinching, the handle 19 is pivoted upwardly which causes the anvils, anvil holders, staple driving blade, and other connecting parts to move in opposite direction with the aid of the springs 37. In practice, the parts are arranged so that the handle can be moved a distance downwardly before resistance is encountered by the driving blade contacting the staple to be driven. This play or lost motion is desirable since it places the handle 19 in a more horizontal position so that the operator can more comfortably drive the staple.

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Furthermore, the mechanical advantage is greater and this distance allows for a greater range of penetration control as will be later explained.

Operation of penetration control

Penetration controls for stapling machines heretofore provided have had serious limitations since they required the addition of certain supporting blocks within the casing on which the anvil holders were mounted. These blocks, along with separate pivots for the anvil holders, prevented the anvils from being properly supported at their upper portion and also caused the driven staple to contact the anvil at different points depending upon the depth of penetration desired. In some instances, after severe use the parts became so misaligned through lack of support that the ends of the staples completely missed the anvils and were not clinched. This condition was also aggravated by the staple entering the casing at a higher position and being unsupported over a great distance.

The present penetration control eliminates all timing problems between the staple and anvils and causes the staple to contact the anvils at precisely the same point for more efficient clinching regardless of the depth of penetration desired, that is, regardless of whether one, two, five or six thicknesses of material, for example, are being stapled together. This result is obtained without an inner sliding block through the use of an external cam 10 having an upwardly curved cam slot 31 therein. As shown in Figs. 10 and 12, the cam is set for short penetration since the common pivot pin 11 has been moved to its uppermost position within the slot 33 to elevate the anvils so that they will extend only a short distance $d-1$ from the bottom 70 of the casing when the handle 19 is actuated. To change the depth of penetration, a special tool or wrench is used to loosen the screw 34 and the cam 10 is pivoted leftwardly any desired amount to a leftward limit, as shown in Figs. 11 and 13, so as to move the common pivot pin 11 downwardly within the slot 33 to its lowermost position, thereby moving the anvils 17 downwardly so that upon actuation, they extend a greater distance $d-2$ below the casing to penetrate a greater amount of material. The common pivot pin 11 eliminates all timing problems since the staple is moved by the driving blade 15 so that it contacts the anvils 17 at the same point on the clinching surfaces 67 regardless of the setting of the penetration control cam 10.

The play or lost motion between the driving blade 15 and the driven staple changes as the penetration control cam 10 is moved, there being more play when the pivot pin 10 is in its lower position, but at either extreme some play is provided for greater comfort and greater mechanical advantage.

Replacement of anvils

The foregoing arrangement allows anvils 17 to be replaced without disassembling the entire stapling machine as was heretofore necessary. To remove a broken or worn anvil, the screws 39 and tabs 38 are removed. The handle 19 is depressed until holes 71 in the links 25 become aligned with the holes 72 from which the screws 39 were removed. Two wrenches or pins 39 are then inserted through the registering holes 72 and 72' to hold the links 25 in their correct position from the rear, a third pin is used to push the pins 26 out through the holes 40. A special wrench is used to remove the cam screw 34 and cam 10 with the pin 11 thereon, thus allowing the anvil holders and anvils to be removed from the bottom of the machine.

The worn anvils 17 are then removed by removing the anvil screws 29. New anvils 17 are fastened to the anvil holders 16 by the screws 29 and are properly oriented by the pins 28. It should be noted that the foreshortened guides 13 and common pivot pin 11 arrangement allow anvil holders 16 of greater size to be used within the same size casing thereby allowing the upper or fastennig portion

27 of the anvil to be increased to allow same to be supported by pins 28 spaced farther apart than heretofore possible. This extra support, such as by increasing the distance between the pins 28 from $\frac{1}{2}$ " to $\frac{3}{4}$ " increases the support for and the rigidity of the anvils about 2½ times.

After new anvils are attached, the anvil holders are placed into the machine until holes are aligned for receiving the pin 11 and pins 26 which are then inserted as the temporary pins 73 are removed. The handle 19 is then released to its upper position and the tabs 38 and screws 39 are reinserted. The machine is then ready to operate with its new anvils.

Operation of pivoted carrying handle

If desired, power means such as air or electric motors may be used to actuate the stapling mechanism. Such power means should preferably be light and small in portable stapling machines. Such a device requires a convenient carrying handle such as the handle 74 shown in Figs. 15-17, and also an operator controlled triggering means to effect the driving of a staple. In the past, separate levers, buttons, or triggers such as used on a gun were used. The present carrying handle is designed to act also as trigger. This is done by pivotally mounting said handle 74, preferably at its forward portion, as at 75, so that the weight of the machine is suspended from the pin 76. The operator places the machine over the carton or container at the desired point and simply pivots said handle 74 downwardly a short distance to drive a staple. The pivoting motion causes the handle to depress a plunger 77 which trips a valve or switch 78 thereby actuating the power means 79.

The present invention may be embodied in a power driven stapling machine powered by any one of several different types of power means. For example, Fig. 16 shows an air piston motor 79, Fig. 15 shows an air diaphragm motor 80, and Fig. 17 shows a portable electric motor 81. An air diaphragm motor 80 is advantageous in systems where compressed air is available and has the further advantage in that the compressed air need not be as pure or oiled as required with an air piston motor. The air diaphragm motor 80 comprises a two-piece casing 82 and 83 with a flexible diaphragm 84 mounted therebetween with a spring 85 biasing said diaphragm 84 to its normal or raised position. As shown in Fig. 15, the actuator 77 is so positioned as to be actuated by the rear portion of the pivoted handle 74. However, other power arrangements may have the actuator 77 positioned in and registered directly beneath the handle 74 as shown in Figs. 16 and 17. The power means shown are merely representative of a great number of different power means which may be used in stapling machines embodying the present invention.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What I claim is:

1. A stapling machine having a casing with a front housing and a rear housing, staple driving means mounted in said casing, a pair of anvil holders each having an anvil thereon operatively mounted within said casing, said anvil holders being pivotally mounted on a common pivot, said pivot extending through an opening in the front housing, adjustment means mounted on the outside of said front housing, said adjustment means having a pin therethrough extending into said front housing, the distance between said pin and said common pivot being adjustable for controlling the depth of the penetration of said anvils through the material being stapled.

2. A stapling machine having a casing with a front housing and a rear housing, staple driving means mounted in said casing, a pair of anvil holders each having an anvil

thereon operatively mounted within said casing, said anvil holders being pivotally mounted on a common pivot, said pivot extending through an opening in the front housing, adjustment means mounted on the outside of said front housing, said anvil holders being mounted in direct contacting relation with the inside of said front housing, the distance of said common pivot above the bottom of said casing controlling the distance which the anvils extend downwardly from the bottom of said casing when said anvils are actuated.

3. A stapling machine having a casing with a front housing and a rear housing, an opening in said rear housing adjacent to the bottom thereof for receiving staples from a magazine, staple driving means mounted in said casing adapted to move a staple driving blade and a pair of anvil holders each having an anvil thereon and each being mounted within said casing, said anvil holders being pivotally mounted on a common pivot, said common pivot extending through an opening in said front housing, said anvil holders and said anvils being in direct contacting sliding relation with the inner faces of said front and rear housings respectively, said common pivot adapted to be moved vertically within said casing by means on the outside of said front housing for controlling the depth of penetration of said anvils.

4. A stapling machine having a casing with a front housing and a rear housing, an opening in said rear housing adjacent to the bottom thereof for receiving staples from a magazine, staple driving means mounted in said casing adapted to move a staple driving blade and a pair of anvil holders each having an anvil thereon and each being mounted within said casing, said anvil holders being pivotally mounted on a common pivot, said common pivot extending through a slot in said front housing, said anvil holders and said anvils being in direct contacting sliding relation with the inner faces of said front and rear housings respectively, adjustable cam means positioned on the outside of said front housing for controlling the depth of penetration of said anvils, a pin extending through said cam means into said front housing for keeping said parts in a predetermined position, the distance between said pin and said common pivot being adjustable for controlling the depth of penetration.

5. In a stapling machine having a casing with a front housing and a rear housing, said machine having a pair of movable anvil holders and anvils therein, said anvils being mounted in movable relation adjacent to said rear housing, said rear housing having an opening therethrough for receiving staples from a magazine and having a front face with guides thereon for guiding a vertically movable staple driving blade, the improvement which comprises terminating said guides above said opening and extending the side walls of the magazine forwardly of the front face of said rear housing to guide said staple and said staple driving blade when a staple is driven.

6. In a stapling machine having a casing with a front housing and a rear housing, said machine having a pair of movable anvil holders and anvils therein, said anvils being mounted in movable relation adjacent to said rear housing, said rear housing having an opening therethrough for receiving staples from a magazine and having a front face with guides thereon for guiding a vertically movable staple driving blade, the improvement which comprises terminating said guides above said opening, making said opening substantially rectangular and unobstructed and positioning same at the bottom of said rear housing, and extending the side walls of the magazine forwardly of the front face of said rear housing to guide said staple and said staple driving blade when a staple is driven.

7. In a stapling machine having a casing and a front housing and a rear housing, said machine having a pair of movable anvil holders and anvils therein, said anvils

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being mounted in movable relation adjacent to the lower portion of said rear housing, said rear housing having an opening therethrough in the lower portion thereof for receiving staples from a magazine, said rear housing having a front face with vertical guides thereon for guiding a vertically movable staple driving blade, the improvement which comprises terminating said guides above the level of said opening, making said opening substantially rectangular and unobstructed and positioning said opening at the bottom of said rear housing, and extending the side walls of the magazine through said opening forwardly of the front face of said rear housing to form relatively thin lower guides for said staple and staple driving blade and leaving relatively wide areas on the front face of the lower housing laterally outwardly from said relatively thin lower guides thereby enabling each of said anvils to have a larger portion thereon for securing said anvil to said anvil holder and preventing misalignment of parts, said larger portions of said anvils being positioned to move in the areas laterally of said relatively thin lower guides.

8. In a stapling machine having a casing and a front housing and a rear housing, said machine having a pair of movable anvil holders and anvils therein, said anvils being mounted in movable relation adjacent to the lower portion of said rear housing, said rear housing having an opening therethrough in the lower portion thereof for receiving staples from a magazine, said rear housing

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having a front face with vertical guides thereon for guiding a vertically movable staple driving blade, the improvement which comprises forming said guides integrally from said rear housing and terminating said guides above the level of said opening, making said opening substantially rectangular and unobstructed and positioning said opening at the bottom of said rear housing, and extending the side walls of the magazine forwardly of the front face of said rear housing to form relatively thin lower guides for said staple and staple driving blade and leaving relatively wide areas on the front face of the lower housing laterally outwardly from said relatively thin lower guides thereby enabling each of said anvils to have a larger portion thereon for securing said anvil to said anvil holder and providing a continuous side wall for the staples from the rear of the magazine to a point directly below said staple driving blade, said larger portions of said anvils being positioned to move in the areas laterally of said relatively thin lower guides.

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2,522,931	Curtiss	Sept. 19, 1950
2,569,221	Batten	Sept. 25, 1951
2,722,001	Schafroth	Nov. 1, 1955
2,763,861	Wandel	Sept. 25, 1956