July 5, 1938. A. L. HANSEN 2,122,815

STAPLING MACHINE

Filed Jan. 9, 1937 2 Sheets-Sheet 1

Fig. 1

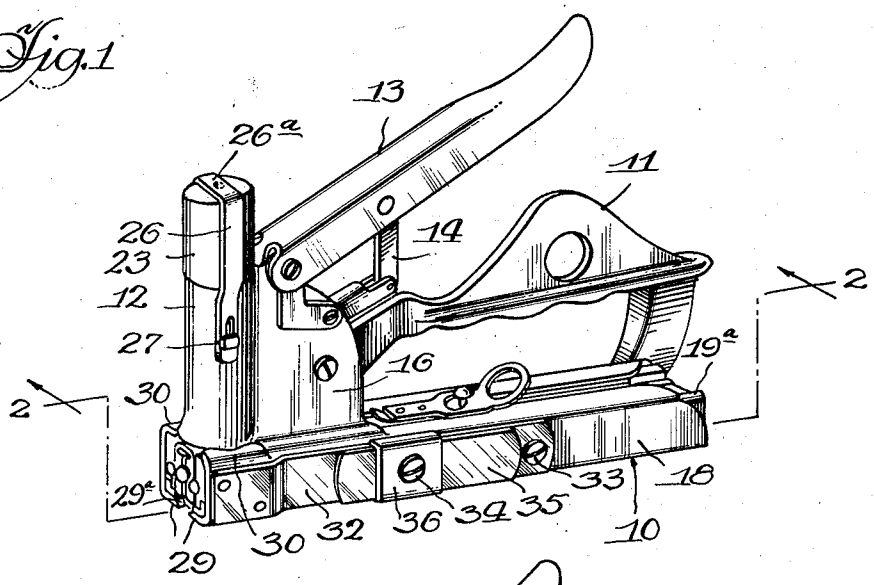
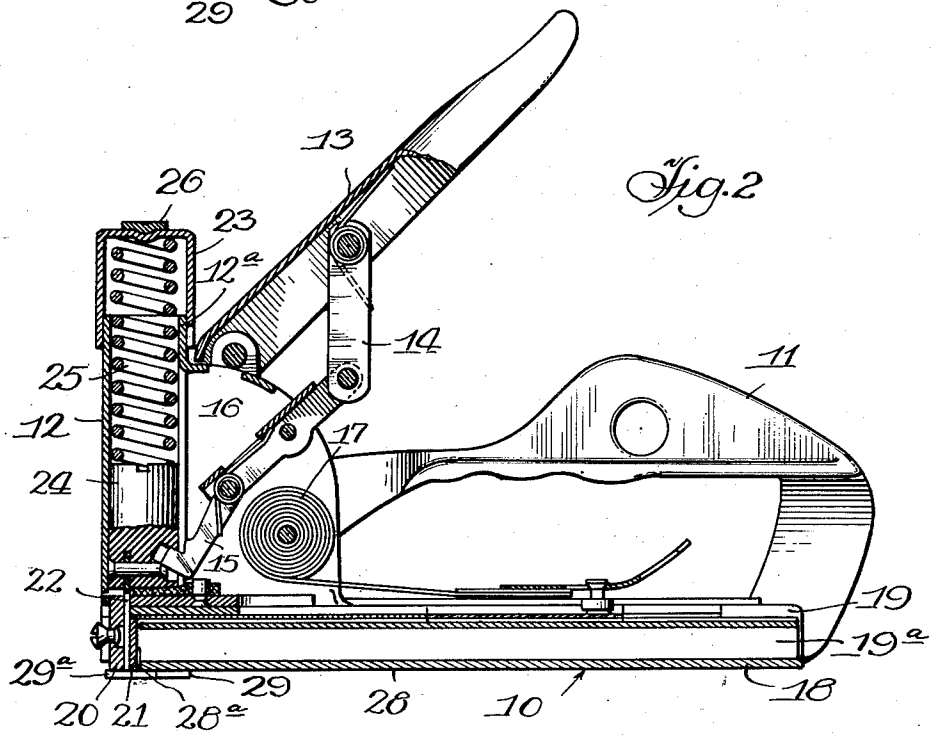


Fig. 2



Witness:
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Filed Jan. 9, 1937 2 Sheets-Sheet 2

Fig. 3

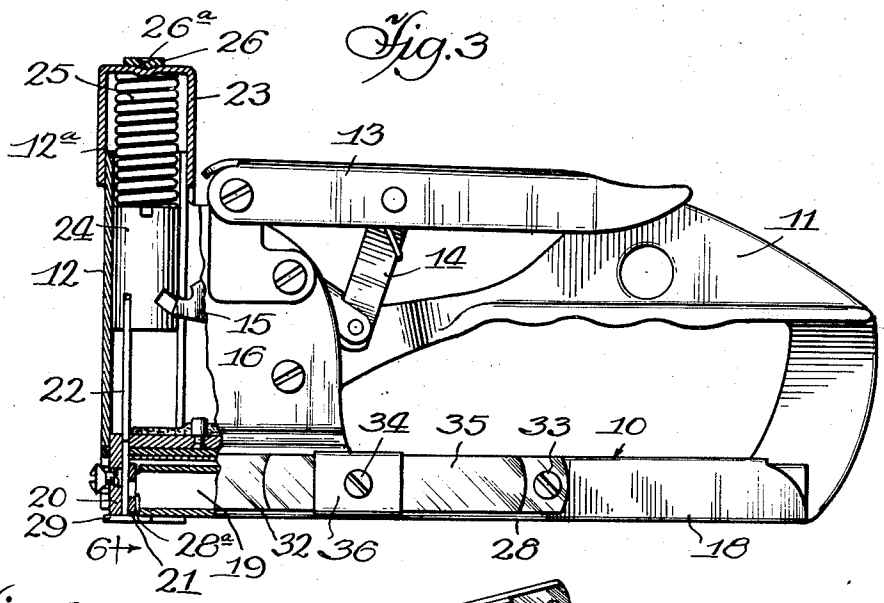


Fig. 4

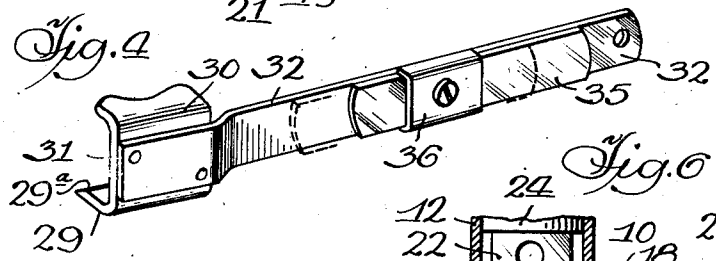


Fig. 5

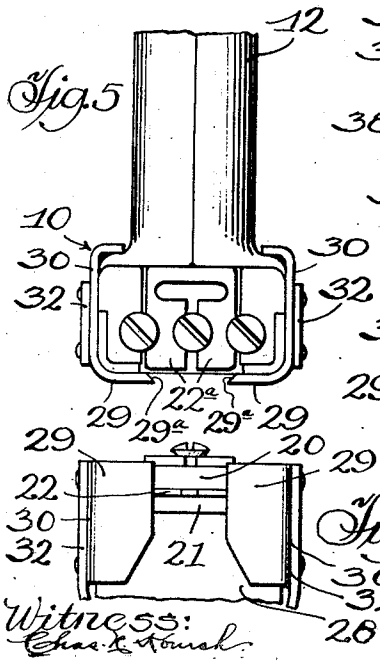


Fig. 6

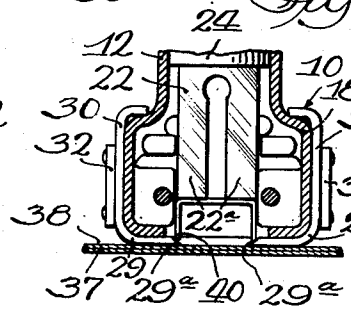


Fig. 7

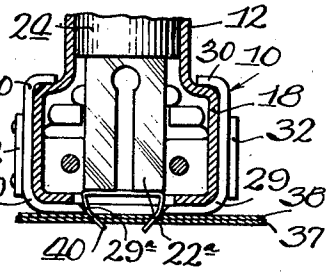


Fig. 8

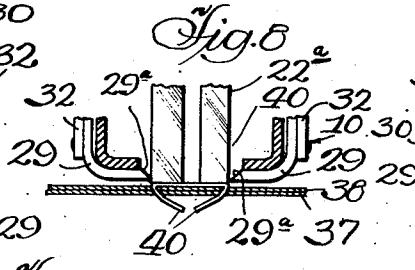


Fig. 9

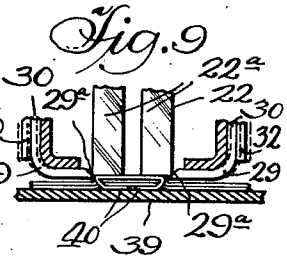


Fig. 10

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Patented July 5, 1938 2,122,815

UNITED STATES PATENT OFFICE

2,122,815

STAPLING MACHINE

Augie L. Hansen, Chicago, Ill., assignor to A. L. Hansen Mfg. Co., Chicago, Ill., a corporation of Illinois

Application January 9, 1937, Serial No. 119,813

4 Claims. (Cl. 1—49)

This invention relates to stapling machines for securing together cards, sheets or materials of any kind which may be penetrated by a staple driven by the machine. As illustrated herein, the invention is embodied in a stapling machine of the type disclosed in the patent to Hugo J. Bauer, No. 1,978,983, issued October 30, 1934.

In stapling machines of this type, except when the staple is to be driven with its legs parallel into a member to which a card, sheet or the like is to be attached, a mandrel or anvil, either as a part of the stapling machine or as a part separate therefrom, as a bar or plate, impenetrable by the staple legs, is required to clinch the legs of the staple against its head in order to secure the said cards, sheets or other materials together.

The object of the invention is to provide a novel and improved stapling machine which will operate to deflect the legs of a staple at such an oblique angle to its head, as and when it is driven into and/or through the cards, sheets or other materials to be attached together, that the staples will be sufficiently engaged to hold said materials together, without the use of a mandrel or anvil of any kind to clinch them.

The objects and advantages of the invention will appear more clearly from the following specification.

In the drawings:

Figure 1 is a perspective view of a stapling machine of the kind provided with my improved mechanism.

Figure 2 is a sectional view of the stapling machine, the plane of the section being indicated by the line 2—2 of Figure 1.

Figure 3 is a section similar to that shown in Figure 2, but with the parts in position prior to release of the staple driving plunger.

Figure 4 is a perspective view of one member of the device which, when embodied in the machine, brings about the clinching of the staple.

Figure 5 is a front fragmentary view of the stapling machine.

Figures 6 and 7 are fragmentary sectional views showing the staple driving mechanism in successive stages of operation, the plane of the section being indicated by the line 6—6 of Figure 3.

Figures 8 and 9 are like sections showing further successive stages of the operation of the driving plunger.

Figure 10 is a bottom view of a front end of the stapling machine.

Referring now to that embodiment of the invention illustrated in the drawings:—10 indicates the base of the improved stapling machine; 11 indicates a handle carried by said base; 12 indicates a tubular head at the driving end of the base, for housing the driving plunger and the spring for driving it; 13 indicates an operating lever to be gripped by the palm of the hand, with the fingers engaged below the handle 11, when operating the plunger to drive a staple; 14 indicates a spring-controlled linkage connecting the lever 13 to a pawl 15 which raises the plunger and releases it at a predetermined point; and 16, 16 indicate spaced upright wings extending rearwardly from the head 12. Said wings provide support for the lever 13, the linkage 14, and pawl 15, and have an arbor on which is mounted the coiled spring 17, which acts to feed the staples to be driven.

The base 10 as shown comprises a shell or shoe 18 and a housing including channel plates 19, 19 and 19^a, 19^a which provide a horizontal way through which the staples are fed to the vertical driveway between spaced plates 20, 21 fixed to the front end of the channel plates 19, 19. 22 indicates the driving blade depending from the plunger and operating through said vertical driveway. The tubular head 12 is open at the top end 12^a, which is closed by tubular cap 23 telescoped thereon.

24 indicates the driving plunger, to the bottom end of which is fixed the driving blade 22. 25 indicates a heavy coiled spring interposed between the top end of the cap 23 and the top of the plunger 24. 26 indicates a yoke which straddles the top of the cap 23 with its legs pivotally connected by pin and slot connections 27 to the tubular head 12. The slots are for the purpose of depressing the yoke to remove the cap when assembling or replacing the spring in the head 12. The bottom wall 28 of the base is notched out at its forward end, as indicated at 28^a (see Figures 2 and 3), to permit the spaced plates 20, 21 defining the vertical driveway to project down through said bottom wall so as to terminate in the plane of the bottom plane of said base. The parts thus far described are familiar, operate in the usual manner and require no further description.

At the sides of and below the vertical driveway between the plates 20, 21 are laterally movable jaws 29, 29 (see Figures 4, 5 and 6). Said jaws normally project into the path of the legs of the staple as it is driven downwardly through the said vertical driveway which obstruct the continued movement of said legs in parallel and deflect them to follow paths at an oblique angle to the head of the staple. The proximate ends 29^a, 29^a of the jaws 29, 29 are preferably beveled or otherwise formed to present contact faces at angles to each other to be engaged by the ends of the legs of the staple. As illustrated, and preferably, the angles of said faces are convergent. The driving blade 22 normally projects below the bottom wall 20 of the base 18 to engage said faces.

The deflecting jaws 29, as shown, each form the

bottom flange of a short channel bar 30 which embraces the lateral top and bottom margins of the base 18 with its web normally engaged against the side of the base. Said channel bar is carried by a flat elongated spring bar 32, which is attached at its rear end to the side of the base 18, as by a screw 33. The spring bar 32 is also attached intermediate its ends to the side of the base by a screw 34. It is thus mounted to operate as a spring-controlled cantilever acting to resist the movement of the channel bar 30 away from the side of the base 18 and the resultant movement of its bottom flange, namely, the deflecting jaw 29, aside from its normal position in the path of movement of the leg of a staple. Preferably a reinforcing short flat spring bar 35 is secured against the face of the spring bar 32 by a flanged clip 36,—the screw 34 taking through said clip and both springs, as shown in Figures 3 and 4. As shown, the reinforcing spring bar 35 has its greater length extending rearwardly of the screw 34. By removing the screw 34 and the clip 36 said spring bar may be reversed end for end so that its longer end extends forwardly of the screw 34.

From the above description, it will be obvious that the channel bars 30 are normally held by the springs 32 and 35 with their webs in close contact with the sides of the base 18, but that they are capable of a lateral yielding movement away from the sides of said base. As a result, the associated deflecting jaws 29 are capable of lateral yielding movement from their normal positions in line with the paths of travel of the legs of a staple to positions aside said paths.

The operation of the staple driving mechanism is as follows:—The base of the stapling mechanism is brought against the materials to which the staples are to be applied (as cards or papers to be attached together, cards or papers to be attached to suspended sheets in a show window, closing flaps of a bag to be attached together, cards or papers to be attached to bags of material, or the like) with their proximate surfaces closely engaged, as indicated generally at 37, 38. The hand lever 13 is then operated to raise and release the plunger 24, which then under the impulse of the spring 25, operates the plunger 24 and the driving blade 22 to force the staple down through the vertical feedway towards and through said materials. In this movement the ends of the legs of the staple indicated at 40 strike the deflecting jaws 29 which, as heretofore pointed out, stand directly in their path. In the continued downward movement of the staple legs their ends slide off said jaws 29 which deflect them to follow an oblique angle to the head of the staple or as shown in the drawings to converge towards each other as shown in Figure 7. This movement is facilitated by the beveled, angularly disposed and/or converging ends 29ª, 29ª of said deflecting jaws. Obviously the continued downward travel of the staple legs will cause them to be deflected and, as shown, to converge more and more towards each other at an increasing angle, as they penetrate the materials to be attached together. Finally, the outer corners of the blade 22 strike the beveled ends 29ª, 29ª of the jaws 29, 29, with the head and legs of the staple engaged between them. And in the last movement of the blade it forces the deflecting jaws 29, 29 to move from the path of the staple and eject it. To facilitate this operation, the driving blade 22 in the embodiment of the invention herein illustrated, is preferably bifurcated to provide laterally spaced prongs 22ª, 22ª adapted to yield slightly toward each other when they strike the converging beveled ends 29ª, 29ª of the jaws 29, 29.

It will be understood that the movement of the blade 22 is very rapid under the impelling force of the spring, and that the oblique angular paths of movement, or as illustrated in the drawings the convergent angular paths of movement of the staple legs as they pass into the closely engaged materials, results in a somewhat lacing movement of the legs through the materials 37, 38 to which the staple is being applied, with the staple legs at a convergent angle to the head on the reverse side of the materials, as shown in Figure 8, as the staple is ejected. As a result, the materials to which the staple is applied are closely secured together in the driving of the staple and in the absence of a mandrel or anvil.

Obviously, the improved stapling machine may be used as the ordinary stapling machine, with an anvil, in which case the staple will be clinched as heretofore. A bar or plate, wall or table, will serve the purpose of an anvil, as shown at 39 in Fig. 9.

While in describing my invention I have referred to many details of construction and arrangement of parts, it will be understood that it is not to be limited thereto except as may be pointed out in the appended claims.

I claim as my invention:

1. In a stapling machine including a base provided with a staple driveway, a reciprocable spring-actuated plunger and a driving blade fixed to said plunger and movable through said driveway, flanged plates normally engaged with the sides of said base having their flanges projecting into the edges of said driveway, and spring metal bars fixed to said plates, said bars extending rearwardly along the sides of said base and being attached thereto.

2. In a stapling machine including a base provided with a staple driveway, a reciprocable spring-actuated plunger and a driving blade fixed to said plunger and movable through said driveway, channel plates embracing the top and bottom margins of said base with their bottom flanges extending into the edges of said driveway, said flanges being beveled towards each other on their proximate edges, and spring metal bars extending rearwardly along the sides of said base and being fixed thereto.

3. In a stapling machine including a base provided with a staple driveway, a reciprocable spring-actuated plunger and a driving blade fixed to said plunger and movable through said driveway, flanged plates normally engaged with the sides of said base having their flanges projecting into the edges of said driveway, said flanges being beveled towards each other on their proximate edges, and spring metal bars fixed to said plates, said bars extending rearwardly along the sides of said base and being attached thereto.

4. In a stapling machine including a base provided with a staple driveway, a reciprocable spring-actuated plunger and a driving blade fixed to said plunger and movable through said driveway, channel plates embracing the top and bottom margins of said base with their bottom flanges extending into the edges of said driveway, and spring metal bars extending rearwardly along the sides of said base and being fixed thereto.

AUGIE L. HANSEN.