Sept. 6, 1949. W. KIRBY 2,481,023

CLINCHING ANVIL FOR STAPLING MACHINES

Original Filed March 20, 1945 2 Sheets-Sheet 1

FIG. 1.

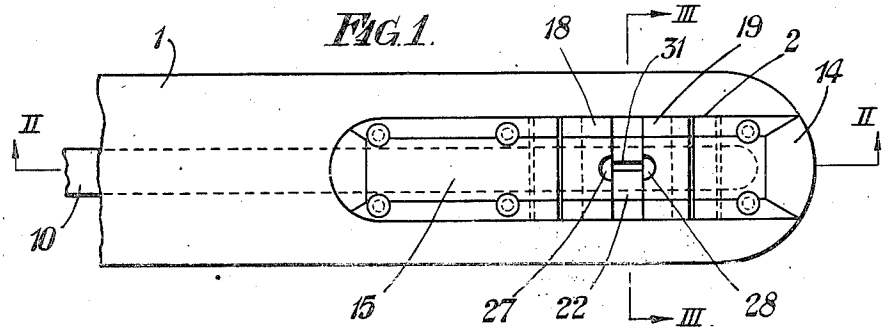


FIG. 2

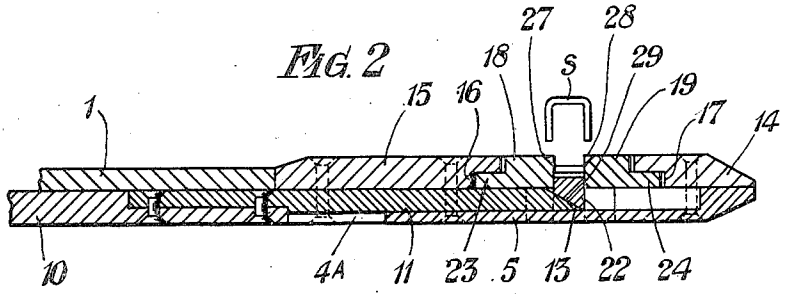


FIG. 3.

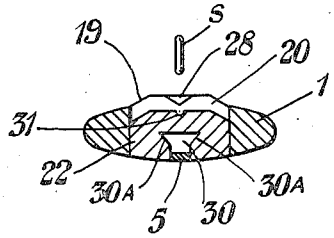


FIG. 4.

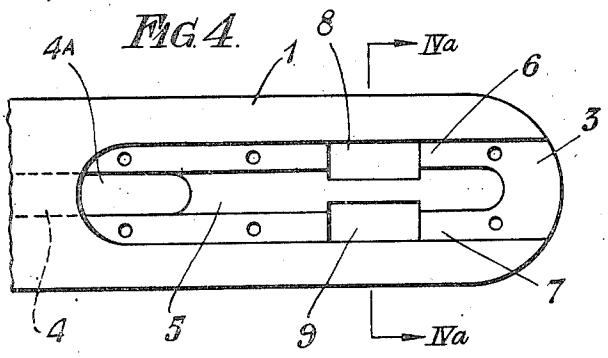
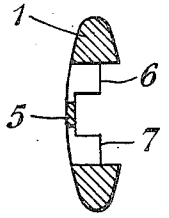


FIG. 4a.



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FIG. 14.

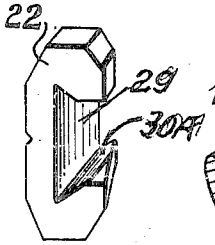


FIG. 5.

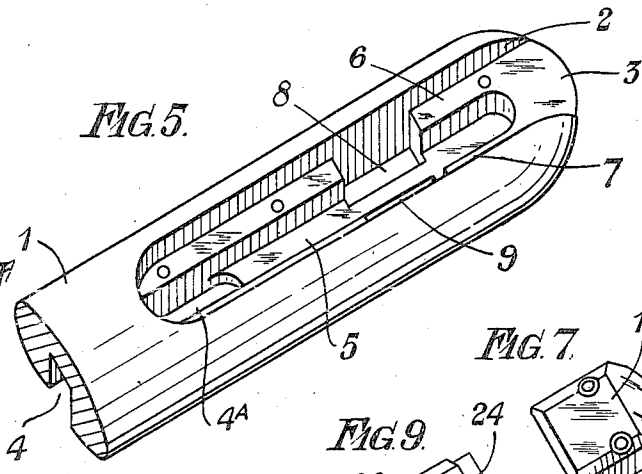


FIG. 7.

FIG. 9.

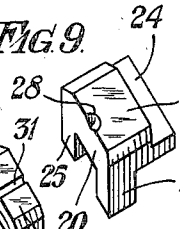


FIG. 10.

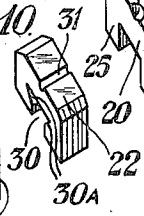


FIG. 8.

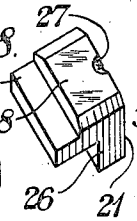


FIG. 6.

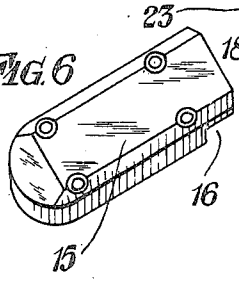


FIG. 11.

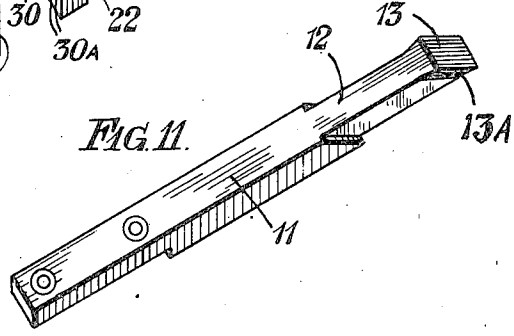


FIG. 12.

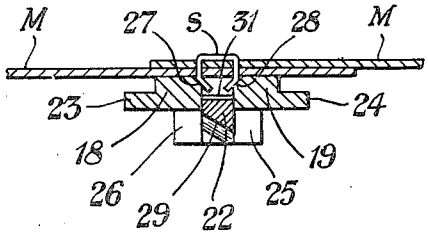


FIG. 15.

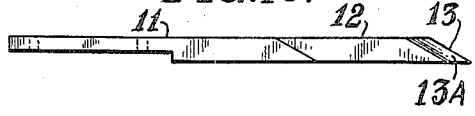
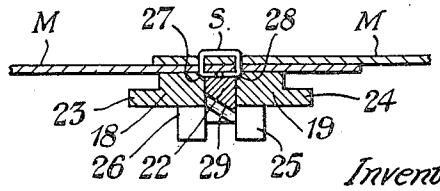


FIG. 13.



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2,481,023

CLINCHING ANVIL FOR STAPLING MACHINES

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Continuation of application Serial No. 583,791, March 20, 1945. This application December 26, 1946, Serial No. 718,401.

3 Claims. (Cl. 1—2)

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This invention relates to wire stitching machines, and especially to the clinching mechanism of such machines. Its chief object is to enable a plunger clinching device to be employed in cases where the restrictions imposed by limiting dimensions have hitherto precluded the use of this type of clincher. It is particularly valuable in the case of machines provided with blade or tongue anvils which have to function in very restricted spaces. Such anvils are provided with either a functionally immobile, suitably profiled, clinching die, or with pivoted swivel clinchers. Both have serious practical disadvantages in certain classes of work, which are overcome by the adoption of a plunger clinching device, if this can be made available.

This present invention which is a continuation of application Serial No. 583,791, filed March 20, 1945, now abandoned, provides clinching mechanism that will be applicable to blade or tongue anvils and employs plunger clinching.

The term "blade anvil" used herein and in the appended claims is intended to refer to an anvil which has its dimensional extent along the line in which the stitch is driven reduced to the minimum construction possible, and the smaller this minimum the better adapted it will be to its functional purpose as a "blade" or tongue.

In order that the present invention may be clearly understood and readily carried into effect, the same will now be further described with reference to the accompanying drawings, wherein:

Figure 1 is a plan view of a blade anvil according to the invention,

Figure 2 is a section taken on the line II—II of Figure 1,

Figure 3 is a section taken on the line III—III of Figure 1.

Figure 4 is a plan view similar to Figure 1 except that certain parts are removed,

Figure 4A is a section on the line IV—IV*a* of Figure 4,

Figure 5 is a perspective view corresponding to Figure 4,

Figures 6, 7, 8, 9 and 10 are all perspective views of parts of the mechanism which co-operate, and these figures may be collectively regarded as a single exploded view,

Figure 11 is a perspective view of an actuating element, and,

Figures 12 and 13 are sectional details illustrating the clinching action of the mechanism.

Figure 14 is a perspective view of the clinching plunger.

Figure 15 is a side view of the structure shown in Figure 11.

In the drawings the blade anvil body is indicated generally at 1. As seen best in Fig. 5, the upper side of the anvil body 1 has a groove 2 cut so as to leave an internal shelf 3. The under-

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side of the anvil body 1 has a further groove 4 which opens into the groove 2. As shown best in Figures 4 and 5, the groove 4 has a portion 4A at the location of which there is an aperture in the anvil body. Beyond the portion or region 4A the groove 4 extends within the anvil body in such manner as to leave a thin platform 5 lying parallel to and below the level of the shelf 3. Because of the continuation of the groove 4 to form the platform 5, the shelf 3 is mainly centrally gapped having side portions 6 and 7. Both the side portions 6 and 7 are apertured as at 8 and 9 (see particularly Figs. 4, 4*a* and 5).

The groove 4 accommodates the principal actuating member 10 of any well-known reciprocating driving mechanism, such mechanism being, for example, of the kind that positively moves the member 10 in a direction towards the right as seen in Figs. 1 or 2, against the action of a spring which returns the member 10 in a direction towards the left as seen in the said figures. The reciprocating mechanism is well known, and forms no part of the present invention. As will be obvious from Fig. 2, the extent of translational movement of the actuating member 10 will be limited by the extent of the region 4A of the groove 4. The upper side of the member 10 has a lap connection with an actuating element 11. The element 11 slides on the platform 5 between the side portions 6 and 7 of the shelf 3, and this element 11 has a neck 12 which is flared out to form inclined working surfaces 13, 13A (see Fig. 11). The working surfaces 13, 13A are inclined in the sense that they lie obliquely across the length of the actuating element 11, as seen best in Fig. 2.

The upper groove 2 of the anvil body 1, receives several elements which are held in position by two retaining plates 14 and 15. The retaining plates 14 and 15 are secured permanently in position in the groove 2 as by means of rivets (shown in dotted lines in Fig. 2), both the retaining plates being seated upon the shelf 3. Each retaining plate is recessed at one end, as at 16 and 17, for respective co-operation with guide members 18 and 19. The guide members possess guide faces 20 and 21 which are intended to act as guiding and bearing surfaces for the clinching plunger 22. When all the various parts of the anvil are assembled together, the guide members 18 and 19 lie in the position shown in Fig. 2. Each member has a tongue 23, 24 adapted to engage under the recessed portions 16 and 17 of the associated retaining plates 15 and 14. The guide surfaces 20 and 21 are each centrally apertured, so that the guide members have depending legs 25 and 26. The pairs of legs 25 and 26 seat in the apertures 8 and 9 of the anvil body 1, each aperture receiving a leg from each pair. The lower sides of the tongues 23 and 24 seat upon the shelf 3 of the anvil body and the actuating

element 11 may thus pass through the guiding and bearing surfaces 20 and 21, such passage being permitted between the pairs of legs 25 and 26. There are wire-directing recesses 27 and 28 upon the guide members 18 and 19.

As will be appreciated the clinching plunger 22 is received between the guide members 18 and 19, such plunger having a groove 30 for engagement with the inclined surface 13 of the actuating element 11. The groove 30 as seen in the sections of Figures 2, 12 and 13, has an inclined face 29, and as appears from Figure 10 the side walls 30a of the groove converge towards one another in a direction away from such face so that in transverse section the groove is dovetailed or V-shaped (see Fig. 3). The upper side of the clinching plunger 22 has the usual wire-directing groove 31.

In assembling the blade anvil described above, it is initially assumed that the actuating element 11 has been connected to the actuating member 10 as by riveting, and the actuating element has been introduced into the anvil body to occupy the position shown in Fig. 2, whilst the retaining plates 14 and 15 also have been located and fixed. From this point, the two guide members 18 and 19 are inserted, being for this purpose introduced one at a time through the gap between the retaining plates. The actuating element 11 is now drawn in a direction towards the right-hand end of Figs. 1 and 2, until the neck 12 lies beneath the gap between the guide members 18 and 19. The element 11 now occupies a position where it lies beyond the extent of its normal working or sliding movement. The clinching plunger 22 is inserted between the guide members, so that the groove 30 therein engages over the neck 12 of the element 11. The latter is now released and travels back under the spring associated with the reciprocating mechanism, such travel causing the working faces 13A to engage the walls 30A of the V-groove 30 of the clinching plunger. The blade anvil is now ready for use, and reciprocation of the element 11 during its usual operating cycle (from left to right Figure 2) causes the inclined face 13 cooperating with the inclined face 29 of the plunger 22 to raise the plunger to clinch the staple. On the return movement of the element 11, the flared out portions 13A cooperate with the side walls 30A of the groove 30 to depress the plunger.

It is important to realise that the bearing surfaces offered to the clinching plunger by the guide members 18 and 19, are comparatively great and therefore ensure steady working of the clinching plunger. The steadiness of the plunger in its clinching action is usually a decisive factor in successful wire-stitching. With the mechanism of the invention a maximum guiding area is afforded to the plunger by the guide members whose guiding surfaces extend substantially over the whole dimensional extent of the anvil body along lines parallel to the direction of working movement of the plunger.

In the employment of the blade anvil so far described, two pieces of sheet material M (Figs. 12 and 13) may be stitched together with wire stitches S. Initially the stitches S are in the form of staples, as seen in Fig. 2. A staple is driven through the assembled sheets M until the legs of the staple extend through the sheets and enter the wire-directing recesses 27 and 28, which cause the legs to be bent in the manner indicated in Fig. 12. At this stage of operation, the clinching plunger 22 is in its lower position.

When now the actuating element 11 is thrust towards the right-hand end of the anvil (as seen in say, Fig. 2) the plunger 22 rises and the extremities of the legs of the wire stitch are guided into the recess 31, so that they are carried to occupy the position shown in Fig. 13. The stitch has now been clinched and the operation is complete.

To withdraw the plunger 22 and the guide members 18 and 19, it is necessary only to move the actuating element 11 to a position somewhat beyond its normal extent of automatic movement to the right (as seen in Fig. 2), whereupon the plunger 22 can be lifted from the neck 12. Thereafter the guide members 18 and 19 can be removed one at a time, utilising the gap vacated by the plunger 22. The easy removal of the parts indicated, is a great advantage since these parts become most rapidly worn in the use of the anvil, and require periodic replacement.

I claim:

1. A blade or tongue anvil for a wire stitching machine comprising an anvil body, a clinching plunger mounted in said anvil body for performing reciprocating clinching movements in a direction substantially perpendicular to the working face of the anvil, an actuating member movable in a direction transverse to the direction of movement of said plunger, means permitting transmission of motion from the actuating member to said plunger, a pair of side guides adapted to receive said plunger between them, means to permit said actuating member to pass therethrough and impart working movements to said plunger.

2. A blade or tongue anvil for a wire stitching machine comprising an anvil body, a clinching plunger mounted in said anvil body for performing reciprocating clinching movements in a direction substantially perpendicular to the working face of the anvil, an actuating member movable in a direction transverse to the direction of movement of said plunger, means permitting transmission of motion from the actuating member to said plunger, a pair of side guides adapted to receive said plunger between them, openings in said side guides to permit said actuating member to pass therethrough and impart working movements to said plunger.

3. A blade or tongue anvil for a wire stitching machine comprising an anvil body, a clinching plunger mounted in said anvil body for performing reciprocating clinching movements in a direction substantially perpendicular to the working face of the anvil, an actuating member movable in a direction transverse to the direction of movement of said plunger, means permitting transmission of motion from the actuating member to said plunger, a pair of side guides adapted to receive said plunger between them and having openings to permit said actuating member to pass therethrough and impart working movements to said plunger, and bearing surfaces for said plunger upon said side guides extending over substantially the whole dimensional extent of the anvil along lines parallel with the working travel of said plunger.

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The following references are of record in the file of this patent:

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