

Nov. 21, 1939.

W. O. SIMS

2,180,484

METAL STITCHING MACHINE

Filed Dec. 21, 1936

3 Sheets-Sheet 1

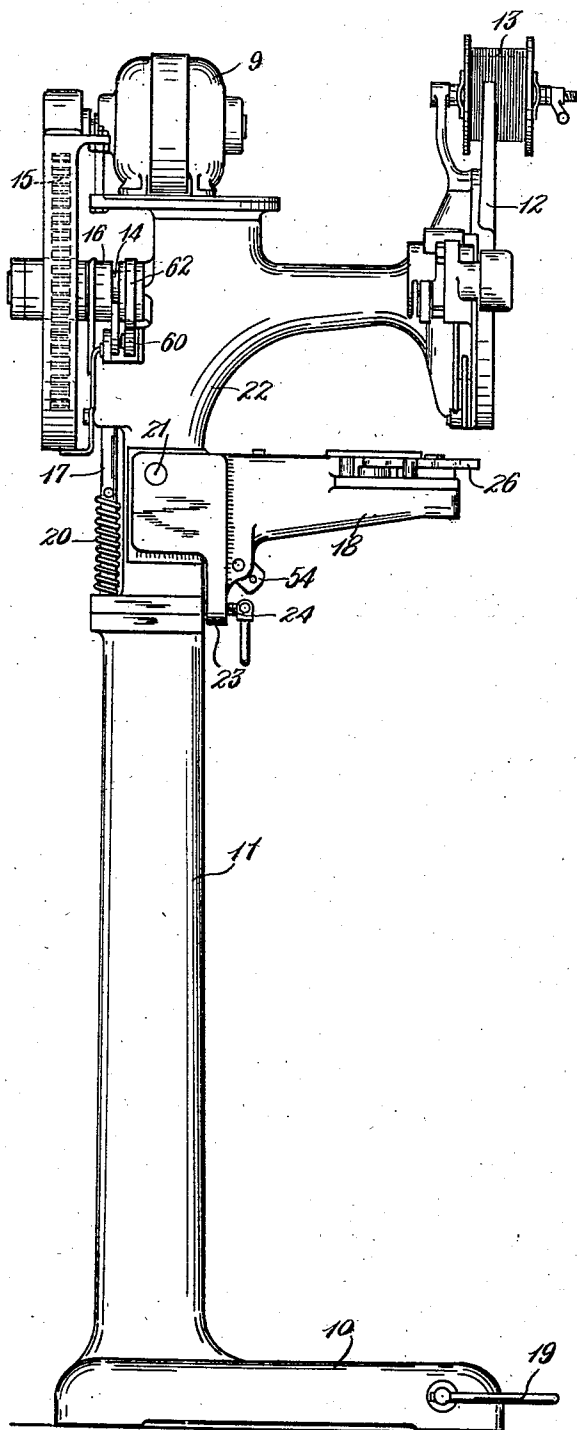


FIG. 1

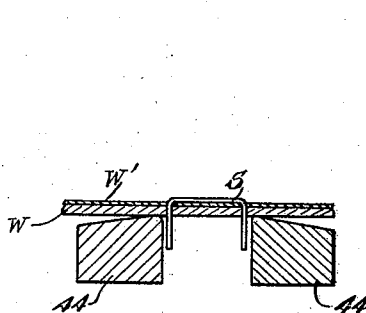


FIG. 8

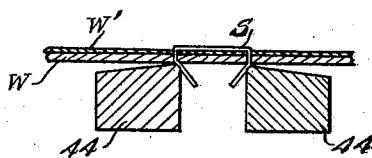


FIG. 9

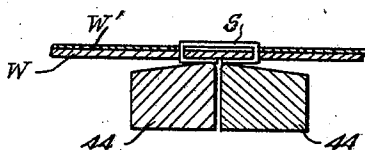


FIG. 10

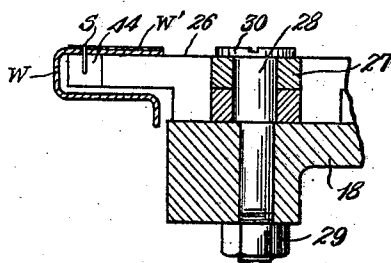


FIG. 11

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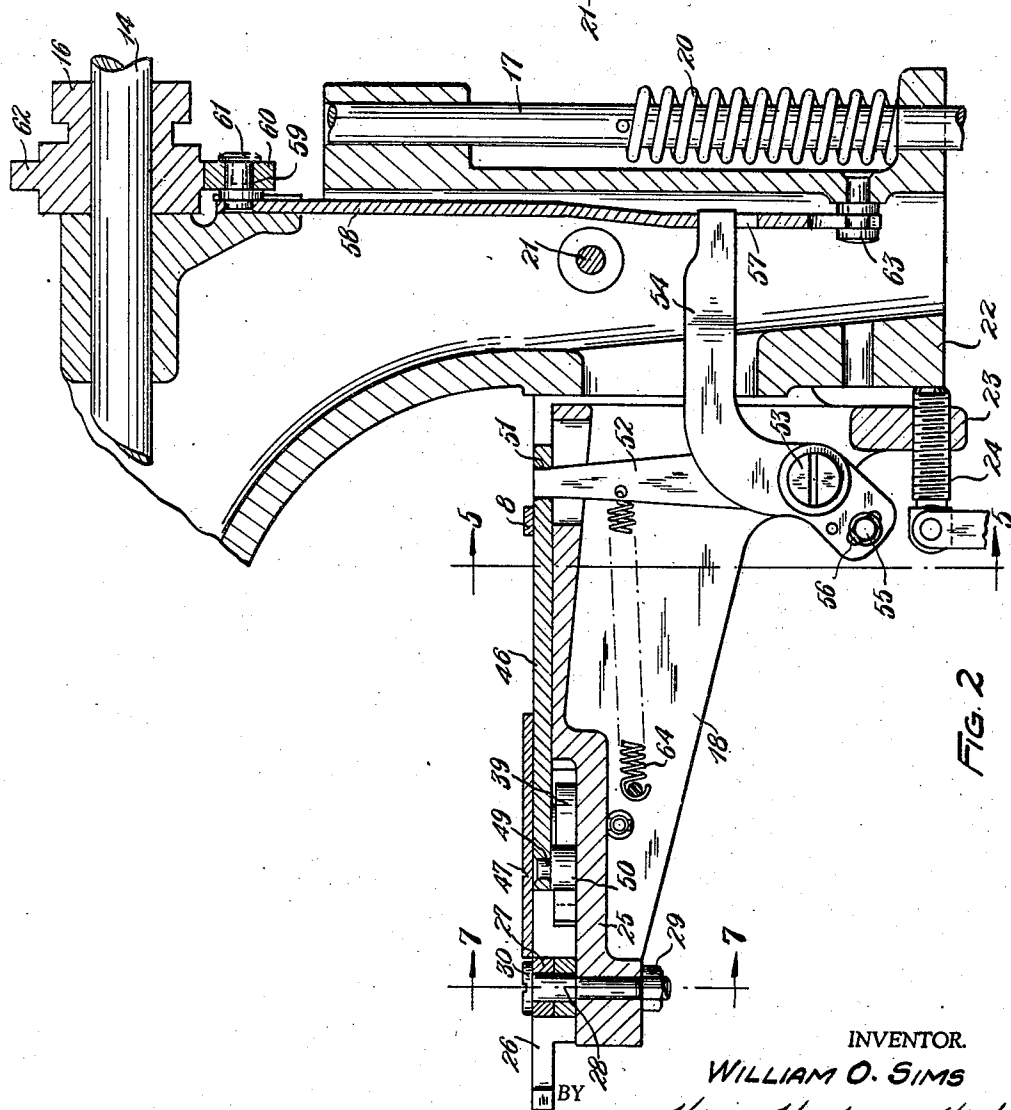
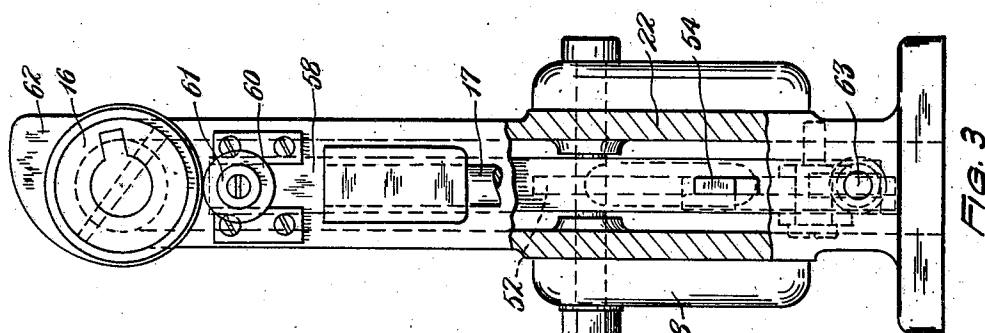
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3 Sheets-Sheet 2



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METAL STITCHING MACHINE

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3 Sheets-Sheet 3

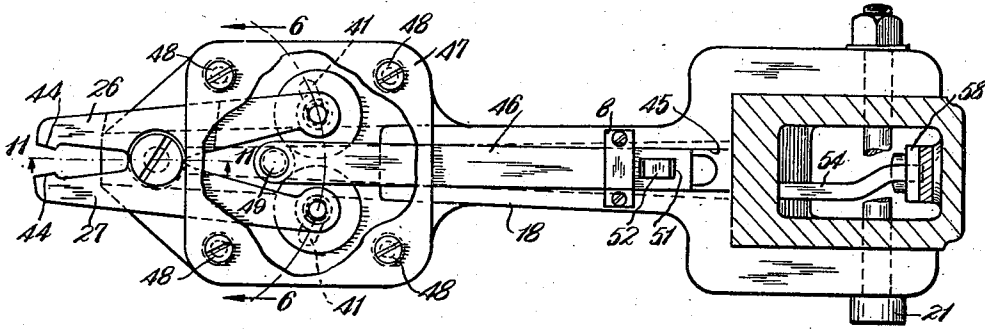


FIG. 4

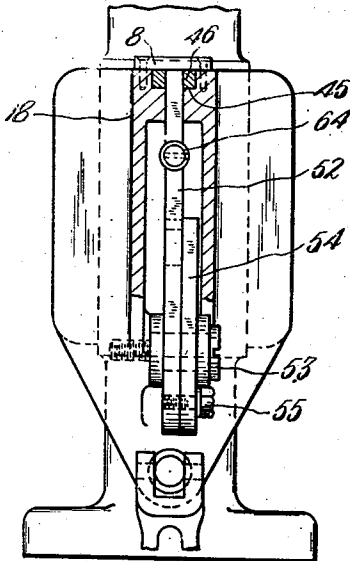


FIG. 5

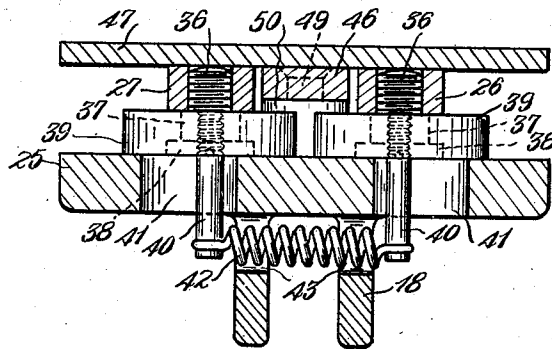


FIG. 6



FIG. 14

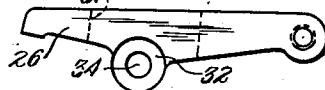


FIG. 12



FIG. 13

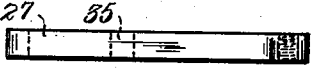


FIG. 15

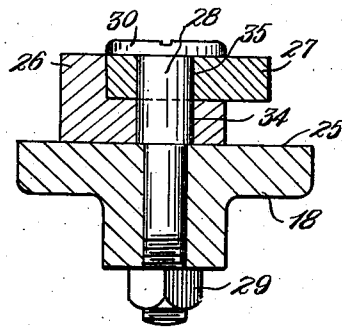


FIG. 7

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METAL STITCHING MACHINE

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Ohio, a corporation of Delaware

Application December 21, 1936, Serial No. 116,851

6 Claims. (Cl. 1—2)

This invention relates to improvements in metal stitching machines, that is to say machines for driving wire staples, and has reference principally to the clinching of the staples.

One of the objects of the invention is the provision of movable clinching elements which shall have very small vertical dimensions beneath the work, thereby making possible the stitching together of parts which it would be impracticable to handle on machines of this general character heretofore built.

Another object of the invention is the provision of novel clincher operating means.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which

Fig. 1 is a side elevation of a machine embodying my invention.

Fig. 2 is a vertical sectional view on a larger scale of a fragment of the stitcher head and the arm in which the clincher mechanism is mounted.

Fig. 3 is a rear elevation of the same with certain parts broken away.

Fig. 4 is a top plan view of the arm partly broken away.

Figs. 5, 6 and 7 are vertical sectional views taken substantially on the lines 5—5 of Fig. 2, 6—6 of Fig. 4 and 7—7 of Fig. 2, respectively.

Figs. 8, 9 and 10 are detail vertical sectional views through the clincher elements in different positions.

Fig. 11 is a vertical sectional view taken substantially on the line 11—11 of Fig. 4, but on a larger scale.

Figs. 12 and 13 are plan views of two clincher bars used in connection with the invention, and

Figs. 14 and 15 are elevational views of the bars shown in Figs. 12 and 13, respectively.

In Fig. 1 I have illustrated a stitching machine which is more or less conventional in general respects. It comprises a base 10, a column 11, a stitching head 12 with a roll of wire 13 from which the staples are cut and formed in the head, a shaft 14 by means of which the stitcher is driven, a large gear 15 with a clutch 16, a clutch actuating rod 17 for connecting the gear 15 to shaft 14, an electric motor 9 for driving the gear 15, and an arm 18 which carries the staple clinching means. As indicated herein the rod 17 may be moved longitudinally through suitable lever mechanism in the base 10 by means of a foot pedal 19 against the action of a coil spring 20.

The arm 18 is mounted to have a limited swing-

ing adjustment around a pivotal connection 21 between the arm and the head frame 22, and in order to adjust the arm 18 with nicety it is formed to include a depending ear 23 through which a screw 24 is threaded so as to bear against a flat front surface of the frame member 22.

The structural features above described are well known in the art, and no more detailed reference to them or their mode of operation is deemed necessary. The present invention has to do primarily with staple clinching means and operating mechanism therefor. The arm 18 at its forward end has a downwardly offset or depressed platform 25. Upon this platform are supported a pair of clincher bars or levers 26 and 27 that are pivotally mounted upon the smooth upper portion of a post 28 which has a smaller diameter threaded lower end extending through a vertical bore in the arm 18 and receiving a nut 29 on its extremity by means of which the shoulder between the larger and smaller portions of the post is pulled down tightly against the platform 25. A large head 30 on the post holds the bars 26 and 27 down in proper relation to each other and to the platform.

By reference to Figs. 12 to 15 inclusive it will be apparent that bar 26 has a thick central portion 31 in which is formed a depression 32 which receives the central part 33 of the bar 27. Holes 34 and 35 which receive the post 28 are formed centrally in the parts 32 and 33 of the bars. These bars therefore resemble a pair of pliers, except that the ends which would correspond with the handle ends of pliers must be separated in order to bring the jaws or clinching elements together.

The rear ends of the bars 26 and 27 are drilled and threaded to receive from below the threaded constricted ends of screws 36. These screws have smooth shanks 37 and heads 38 upon which are rotatably mounted rollers 39. The screws 36 are also drilled and tapped to receive the threaded upper ends of posts 40. These posts project downwardly through curved slots 41 in the platform 25, and the two lower extremities of the posts are connected by a coil spring 42 which extends through holes 43 in the side walls of the arm 18. The rollers 39 are therefore drawn toward each other normally to maintain the jaws or clinching elements 44 separated, as indicated in Figs. 4 and 8 of the drawings.

In the upper part of the arm 18 there is a guide groove 45 in which is mounted a slide 46. At its forward end this slide extends beneath and engages the lower surface of a cover plate 47 which

is secured to the arm 18 and its platform 25 by screws 48. This plate covers a considerable portion of the platform 25 just above the bars 26 and 27. It stops short of the post 28 and is flush with the top of that post, as shown in Fig. 2. Near its rear end the slide 46 is held against upward movement by a narrow plate 8 that is fastened to the side walls of the arm by screws or other fasteners. The forward end of the slide 46 is bored and counterbored to take the shank 49 of a depending button 50. The upper end of this shank is riveted into the counterbore to make the button 50 a rigid part of the slide. When the slide is moved rearwardly this button serves to spread apart the rollers 39 on the two bars 26 and 27.

Reciprocation of the slide 46 is effected by the rotation of shaft 14 which operates the mechanism in the stitching head. In the rear extremity of slide 46 there is a slot 51 into which projects the upper end of a lever 52 which is mounted to turn upon a pivot 53. A second lever 54 that is principally horizontal is also mounted to turn on the pivot 53 directly adjacent the lever 52. The lower end of lever 52 beyond the pivot is drilled and threaded to receive a set screw 55 which projects through a curved slot 56 in lever 54. These two levers may be thereby secured together, and may be adjusted angularly with respect to each other to a limited extent. The rear end of lever 54 is offset laterally to bring it into the same plane with lever 52. This rear end extends into a slot 57 in a vertical connecting rod 58. This connecting rod at its upper end has fixed therein a pivot pin 59 upon which a roller 60 is mounted to turn, the roller being retained in place on the pivot by a removable head 61. Roller 60 is moved downwardly by a cam 62 which is rigidly mounted upon or integral with the clutch element 16, keyed to shaft 14. When the clutch is in engagement this element 16 is driven by the cooperating clutch element which is fixed against rotation with respect to the constantly rotating gear 15. The lower end of connecting rod 58 may be guided by suitable means, as for instance by a headed pin 63 that is mounted in the frame and is straddled by the bifurcated lower end of the connecting rod. Lever 52 is urged toward forward inoperative position by a coil spring 64, and the pull from the spring is transmitted through lever 54 to connecting rod 58 to hold roller 60 against the face of cam 62.

Operation.—With respect to the operation of the clinching means, reference should be had particularly to Figs. 8 and 11 inclusive. As illustrative of a special type of work which this machine is capable of performing, I have shown in Fig. 11 a cross section of a piece of molding W used in automobile bodies. The jaws of clinching bars 26 and 27 project readily into the narrow space between the sides of the molding. The strip W' represents insulation material which is to be attached to the molding by metal stitches. It will be understood that a suitable length of wire is cut from the coil of wire 13 by mechanism in the stitcher head, then bent into U-form, and then driven downwardly through the molding W and insulation W'. This U-shaped staple is shown at S in the drawings. When it is driven through the work the jaws 44 are positioned as in Fig. 8, so as to clear the legs of the staple while at the same time affording a support for the work to take the force of the staple driving blow. The position of the cam 62 on the clutch elements 16 is such that as soon as the staple S

is driven the slide 46 begins to move rearwardly, spreading apart the rear ends of the bars 26 and 27 and causing the inner corners of the jaws 44 to bend the legs of the staple toward each other, as illustrated in Fig. 9. This movement continues until the high point of the cam 62 is reached, at which point the jaws 44 are practically together and the legs of the staple are folded in tightly against the work, as illustrated in Fig. 10. The work is then moved along to the position for the next stitch, the operator's foot being held upon the pedal 19 in the meantime. The stitching and clutching action may be discontinued at any time by the mere release of the pedal 19, as will be readily understood, or if preferred the pedal 19 may be momentarily depressed for each stitch that is to be formed and driven.

Having thus described my invention, I claim:

1. In a stitching machine, means for driving a staple in a vertical plane, clinchers arranged normally to support the work just beyond the legs of the staple as the latter is being driven, two horizontal bars upon the forward ends of which said clinchers are mounted, said bars being supported exclusively at points removed from their forward ends and means for actuating said bars for moving the clinchers thereafter toward each other for clinching the legs of the staple.
2. In a stitching machine, means for driving a staple vertically, a pair of levers pivotally mounted to swing horizontally and provided with clinching surfaces on the forward extremities thereof arranged normally outside of the position of the driven staple and adapted to swing toward and away from each other, said levers constituting the sole support for the work, said levers having their pivot points to the rear of their work engaging portions, means acting upon the rear portions of the levers to take the load imposed by the driving of the staple, and means for actuating said levers to cause said clinching surfaces to approach each other and clinch the driven staple.
3. In a stitching machine, means for driving a staple in a given plane, a pair of clincher elements pivotally mounted to swing in a plane normal to said first named plane, a roller on each of said clincher elements, and reciprocating means acting against said rollers to force the clincher elements toward each other for clinching the legs of the staple.
4. In a stitching machine, a stitching head, an arm positioned therebeneath, a pair of levers pivotally mounted on said arm to swing in a horizontal plane, the forward ends of said levers constituting clinchers working horizontally beneath the stitching head, rollers on the rear ends of said levers and a slide in said arm reciprocable in synchronism with actuation of the stitching head and provided with wedging means to engage said rollers for swinging said levers to effect a clinching of the staple.
5. In a stitching machine, a stitching head, an arm positioned therebeneath, means in said head for driving a staple in a vertical plane, clinchers arranged normally to support the work just beyond the legs of the staple as the latter is being driven, two horizontal bars pivotally connected together intermediate their ends carrying said clinchers at their forward ends, said bars being supported exclusively at points removed from their forward ends, means for actuating said bars to move the clinchers toward each other for clinching the legs of the staple and a cover plate carried by the arm above the horizontal bars rearwardly of their pivotal connection adapted

to prevent upward movement of the rear ends of the bars during the staple driving operation.

6. In a stitching machine, a stitching head, an arm positioned therebeneath, a pair of levers pivotally mounted on said arm to swing in a horizontal plane, the forward ends of said levers constituting clinchers working horizontally beneath the stitching head, rollers on the rear ends of said levers, a slide in said arm reciprocable in

synchronism with actuation of the stitching head and provided with wedging means to engage said rollers for swinging the levers to effect a clinching of the staple, and a cover plate carried by the arm above the levers rearwardly of their pivotal mounting adapted to prevent upward movement of the rear ends of the levers during the staple driving operation.

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