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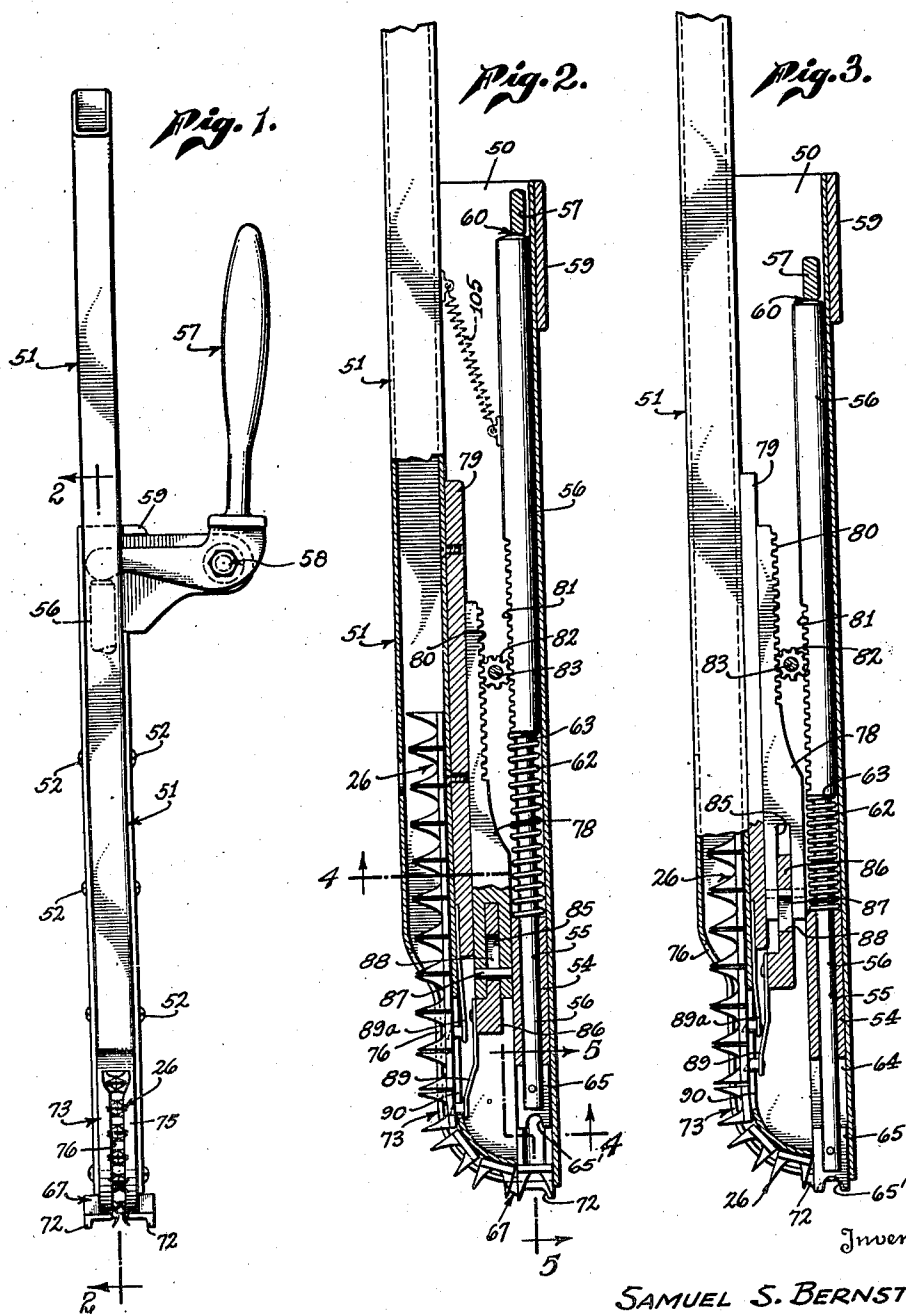
S. S. BERNSTEIN

2,296,493

STAPLING MACHINE

Filed Nov. 15, 1939

2 Sheets-Sheet 1



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Sept. 22, 1942.

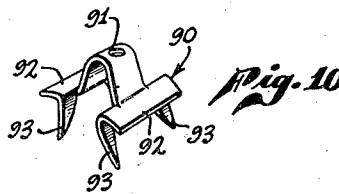
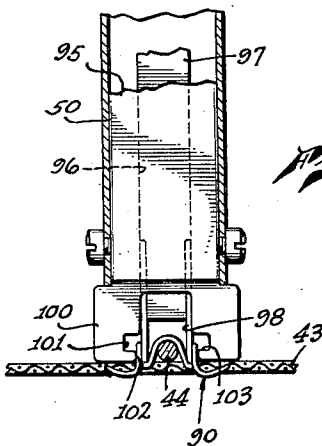
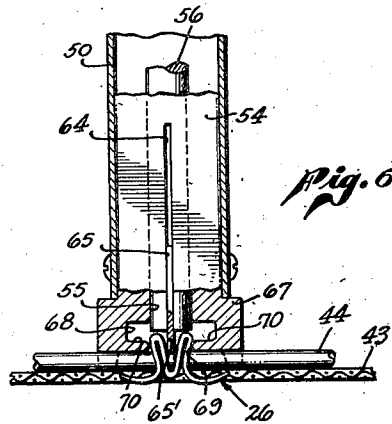
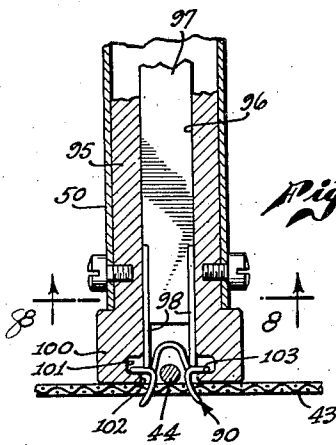
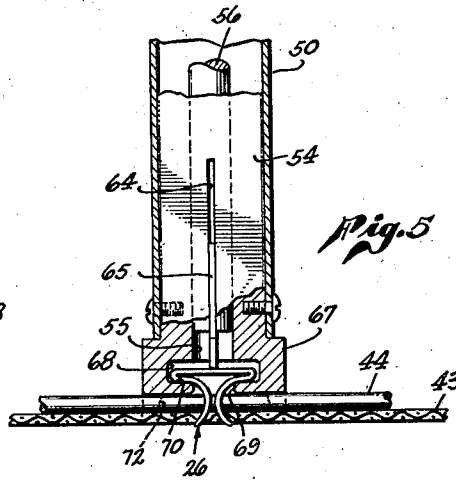
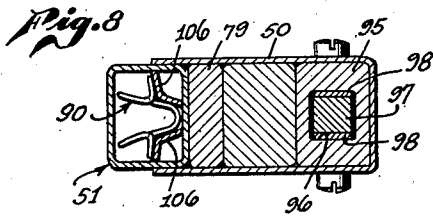
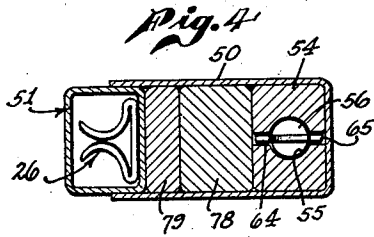
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STAPLING MACHINE

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2 Sheets-Sheet 2



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2,296,493

STAPLING MACHINE

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Application November 15, 1939, Serial No. 304,634

8 Claims. (Cl. 1—49)

This invention relates generally to devices for inserting or installing staples or fasteners. More particularly the invention relates to devices for inserting or installing fastening means of the type shown and described in my co-pending application for patent, Serial No. 177,551, filed December 1, 1937, Letters Patent No. 2,180,500, of which this application is a continuation in part, and in Letters Patent No. 2,232,994.

It is a primary object of this invention to provide means for inserting or installing staples of the type described and shown in the above mentioned patents and other staples of a similar nature designed particularly for use in fastening coil springs to spring supporting fabrics or the like in upholstery construction. In this connection it is also an object of this invention to provide a device which is operative for the installation of fastener means wholly from one side of the sheet of material or the like to which the fastener is to be applied and which does not require any anvil or part of the device on the opposite side of said sheet even where the sheet is soft or flexible.

It is also an object of this invention to provide a device of the character indicated which is of simple construction and which is easy to operate.

It is a further object of this invention to provide as a part of the stapling device a feed mechanism for actuating staples from a magazine to a staple receiving part of the device. In this connection it is a particular object to provide a feed mechanism which is operatively associated with the staple driving or inserting mechanism so that the feed mechanism has a delayed or timed action or movement relative to said staple driving mechanism in order to accomplish the feeding of the staples at the desired time.

These and other objects will be apparent from the drawings and the following description thereof. Referring to the drawings which are for illustrative purposes only:

Fig. 1 is a front elevation of a form of stapling device embodying the invention;

Fig. 2 is a fragmentary sectional elevation slightly enlarged, of the device of Fig. 1, taken on line 2—2 of that figure showing the parts in retracted or normal position;

Fig. 3 is a view similar to Fig. 2 but showing the parts in extended or staple driving position;

Fig. 4 is a cross section taken on line 4—4 of Fig. 2;

Fig. 5 is an enlarged fragmentary sectional elevation on line 5—5 of Fig. 2 showing the driv-

ing element in a position intermediate that in which it is shown in Figs. 2 and 3;

Fig. 6 is a view similar to Fig. 5 but showing the driving element in extended position;

Fig. 7 is a view similar to Fig. 5 showing a modified form of driver element and staple receiving portion for use in connection with another form of staple;

Fig. 8 is a cross section of the form of device shown in Fig. 7. Part of the section is taken on line 8—8 of Fig. 7 and the remainder is taken as of line 4—4 of Fig. 2 showing a modified magazine;

Fig. 9 is a view similar to Fig. 7 showing the device of Fig. 7 in extended or staple driving position; and

Fig. 10 is a perspective view of the staple shown in Figs. 7 and 9.

More particularly describing the invention in Figs. 1 to 6 there is shown a form of stapling device which is designed to operate or insert the staples by driving the staples from above at approximately the center of the staple to cause the staple to bend back upon itself. This form of the invention is designed for driving or inserting staples of the type shown and described in my Patent No. 2,180,500 hereinabove referred to.

Referring to Figs. 1 to 6 the stapling device comprises a frame 50 which is generally U-shaped in cross section as indicated in Fig. 4. Adapted to be mounted on this frame is a magazine 51. Any suitable means may be provided for attaching the magazine to the frame 50 such, for instance, as the screws 52 shown in Fig. 1. The magazine element 51 is adapted to fit inside of the open side of the U-shaped frame 50 as indicated in Fig. 4, the screws 52 passing through suitable holes in the frame 50 and being secured to a part or parts of the magazine element 51.

Mounted inside of the frame 50 near the lower end thereof, is what will be termed a bearing block 54 which is centrally apertured at 55 to slidably accommodate a driver element or drive bar 56 extending longitudinally of the frame. The drive bar 56 is adapted to be actuated by means of a handle 57 which is pivotally mounted at 58 on an extended plate portion 59 mounted on the frame 50. The inner end of handle 57 abuts against the upper end of the driver bar 56 at 60 and when operated forces the driver bar downwardly against the action of a spring 62 which is interposed between the bearing block 54 and a shoulder 63 on the member 56. The driver bar 56 might be made of the same di-

ameter throughout in which case a pin or other means could be used for holding the spring in place of shoulder 63.

The lower end of the bearing plate is slotted at 64 to accommodate a drive plate 65 mounted in the bar 56 and adapted to drive the staples into place.

The outer or lower end of the bearing block 54 terminates in a head 67 which is provided with a staple receiving recess 68. An opening 69 extends from front to rear of the head and communicates with the recess. The slot and recess construction forms supporting ledges 70 upon which a staple 26 may rest. The prong portions of the staple extend through the opening 69 as illustrated in Fig. 5.

The head 67 is provided with projections 72 which are adapted to act as a guide in positioning the device on a spring supporting fabric or the like.

Communicating with the staple receiving recess 68 is a guide or trackway 73 which forms an extension of the magazine 51. The trackway is formed by an extension of the inner wall of the magazine bent back upon itself along its side margins at 75 to form guide channels to accommodate the side edge portions of the staples 26. The prongs of the staples extend through the slot 76. The magazine itself comprises a tubular member substantially rectangular in cross section as shown in Fig. 4.

In order to provide for feeding the staples into the staple receiving recess 68 where they may be acted upon by the driver bar 56, a staple feeding mechanism is provided which is designed to be operated by movement of the driver bar 56. This mechanism comprises a feed bar 78 which bears against a bearing plate 79 mounted on the inner side of the feed magazine. The feed bar also bears against the bearing block 54. The bar 78 is provided with a rack 80 and the driver bar 56 is provided with a corresponding rack 81. Interposed between these racks is a rotatable pinion 82 mounted upon shaft 83 which is journaled in the frame 50 in any suitable manner.

At the end of the feed bar there is provided a slot 85 which is adapted to slidably accommodate a finger supporting member 86. The finger supporting member is secured in the feed bar by means of a pin 87 which extends through the slotted portion of the member 78. The member 86 is provided with a longitudinal slot 88 to slidably accommodate the pin 87 and thereby permit limited movement of the finger supporting member 86 relative to the feed bar 78.

Mounted on member 86 is a spring finger 89 which extends through a slot 90 in the trackway 73 and is adapted to engage the individual staples. A second spring finger 89a is fixedly mounted on the magazine 51 to prevent movement of the staples back away from the head 67. The outer ends of the fingers are beveled as shown in Figs. 1 and 2 to permit movement of staples toward the head but not away from it.

In operation, handle 57 is moved toward the magazine member 51 thereby forcing the driver element or bar 56 downwardly against a staple as shown in Fig. 5. In this particular form of the invention the drive plate 65 is provided with a cut-out portion 65' so that when the element is driven to the position in which it is shown in Fig. 6 it will straddle a wire 44 which may be considered as being the lower coil of a spring which it is desired to fasten to a spring supporting fabric 43. Movement of the handle forces

the drive bar against the staple and causes the staple to bend upon itself as illustrated in Fig. 6 until the bar reaches its extended position shown therein. During this movement the feed bar 78 is driven in an opposite direction to the movement of the bar 56 thereby moving with it the finger supporting element 86. However, the finger 89 by reason of the slot 88 in the element 86 is not immediately retracted. After pressure on the handle is released and the spring 62 forces the driver bar back to its normal position, the finger supporting element 86 is then in the position in which it is shown in Fig. 3 and upon return movement of the feed bar 78 the finger is caused to move downwardly due to the slot 88. The finger does not immediately begin its return movement however due to the pin and slot construction. Thus, before the finger has an opportunity to move the next succeeding staple downwardly and to force the staples ahead of it toward the head 67, the drive plate 65 is retracted out of the region of the staple receiving recess 68, thereby permitting the feeding of another staple into position.

In Figs. 7, 8 and 9 there is shown another form of driver bar and head element for inserting or operating another form of staple shown in Fig. 10 which is described and claimed in my above referred to Patent No. 2,232,994. The staple here desired to be operated is generally indicated by reference numeral 90 and comprises an upwardly bowed or rounded portion 91, laterally extending wing portions 92 and two sets of opposed prongs 93. Preferably the staple is formed from a single piece of metal.

In this form of the invention the bearing block indicated by reference numeral 95 is provided with a square hole 96 to slidably accommodate a drive bar 97 which is square in cross section. The lower end of the drive bar is provided with a pair of drive plates 98 which are adapted to contact and bear against the staple at each side of the rounded portion as shown in Fig. 7 where the bar is shown intermediate its retracted and extended positions. The bearing block 95 is provided with a head 100 which has a staple receiving recess 101. An opening 102 extends from front to rear of the head. This construction provides supporting ledges 103 upon which the staple is supported. When the driving element 97 is forced downwardly it bends the staple, forcing it through the opening 102 as indicated in Fig. 9 until the staple is in the holding position over the lower coil 44 of a spring in position on the fabric 43.

Since the use of a square driver bar leaves only limited space for a compression spring above the bearing block and since a round spring must be considerably larger than the bar it may be desirable to employ a tension spring 105 as shown in broken lines in Fig. 2 to yieldably hold the bar against movement in this form of the invention in place of the compression spring 62 formerly described.

The cross-sectional shape of the magazine is preferably altered to accommodate staples of the type shown in Fig. 10 by the addition of guide means in the form of two walls 106 as shown in Fig. 8.

The stapling mechanism of Figures 7 to 9 is designed to handle staples of the type shown in Figures 8 and 10, however, it can also handle staples having an original form of the staple shown in Fig. 7, that is, a staple with wing portions 92 arranged in the same plane. The construction

of Fig. 10 is preferred for the reason that with the wing portions downwardly angled a greater upward turn of the prongs is achieved when the staple is bent as in Fig. 9. Thus when the staple of Fig. 10 is deformed the prong portions take an extreme turn upwardly and penetrate in the fabric surface leaving no sharp points beneath the fabric.

Although the invention has been shown and described with reference to particular types of staples it is contemplated that the stapling mechanism with slight alterations would be suitable for use with other types of staples and the invention includes such changes as come within the scope of the claims.

I claim as my invention:

1. A stapling device comprising a frame; a bearing block and head means mounted in said frame; a staple driver bar slidably mounted in said block and head means; a handle operatively associated with said bar; means for yieldably holding said bar against movement; and means formed in said stationary combined bearing block and head means for receiving and supporting a staple in the region of the path of movement of said bar.

2. A stapling device comprising a frame; a stationary combined bearing block and head means mounted in said frame; a staple driver bar slidably mounted in said frame and movable through said bearing block and head means; a handle operatively associated with said bar; means for yieldably holding said bar against movement; means formed in said bearing block and head means for receiving and supporting a staple in the region of the path of movement of said bar; magazine means mounted on said frame and communicating with said staple receiving and supporting means; and staple feed means operatively associated with said bar for moving staples from said magazine means into said staple receiving means upon operation of said handle and bar.

3. A stapling device comprising a frame; a driver bar slidably mounted for longitudinal movement in said frame, said bar being provided with rack teeth; staple receiving means for receiving and holding a staple in the path of movement of said driver bar; magazine means connected to said staple receiving means; a feed bar having rack teeth thereon and being slidably mounted in said frame; a pinion interposed between and operatively engaging said driver bar and said feed bar; a finger mounted in the end of said feed bar and extending into the path of staples in said magazine, said finger being slidably mounted in said feed bar to permit limited movement of said feed bar independent of said finger.

4. A stapling device comprising a frame; a bearing block mounted in said frame; a driver bar slidably mounted in said block; a handle pivotally mounted on said frame and operatively associated with said bar; said bearing block being provided with staple receiving means for holding a staple in the path of movement of said bar; a feed bar having rack teeth thereon and being slidably mounted in said frame; a pinion interposed between and operatively engaging said driver bar and said feed bar; a finger mounted in the end of said feed bar and extending into the path of staples in said magazine, said finger being slidably mounted in said feed bar to permit limited movement of said feed bar independent of said finger.

5. A stapling device comprising a frame; a

driver bar slidably mounted for longitudinal movement in said frame, said bar being provided with rack teeth; staple receiving means for receiving and supporting a staple in the path of movement of said driver bar; magazine means connected to said staple receiving means; a feed means slidably mounted in said frame having a portion provided with rack teeth thereon; a pinion interposed between and operatively engaging said driver bar and said portion of said feed means having the rack teeth; said feed means having a portion extending into the path of staples in said magazine.

6. A stapling device comprising an elongate frame; an elongate staple driver bar slidably mounted in said frame; stationary means in said frame for receiving and supporting a staple to be driven, said means being located on opposite sides of the path of movement of said bar, whereby a staple is supported in the path of movement of said driver bar; yieldable means for holding said driver bar with the staple driving end of said bar spaced from the region of said staple receiving and supporting means; means forming an elongate staple magazine extending substantially parallel to said driver bar, said magazine terminating in a curved portion extending from and connecting the major extension of said magazine to said staple receiving and supporting means; and a handle lever pivotally mounted on said frame and adapted to engage the other end of said driver bar for operating the same.

7. In a stapling device, a frame; a staple driver bar slidably mounted in said frame; a lever for operating said bar; a head rigidly mounted in said frame at one end thereof, said head being slotted at its outer end and having a pair of oppositely disposed guide recesses spaced inwardly of the outer end forming an internal lateral enlargement of said slot adapted to support a staple having laterally extending portions thereon in the path of movement of said bar, said recesses extending at right angles to the longitudinal axis of said bar; and yieldable means for holding said bar spaced away from the region of said recesses in said head; said bar being movable through the slotted end of said head to a position where it extends beyond the frame and head.

8. In a stapling device, a frame; a staple driver bar slidably mounted in said frame; means for operating said bar; a head integral with said frame at one end thereof; said head being slotted at its outer end and having a pair of oppositely disposed guide recesses spaced inwardly of the outer end forming an internal lateral enlargement of said slot adapted to support a staple having laterally extending portions thereon in the path of movement of said bar, said recesses extending at right angles to the longitudinal axis of said bar; said bar having a pair of laterally spaced parallel drive plates at its staple driving end and extending beyond the main portion of the bar a limited distance, said bar being so positioned with relation to said head that said plates are in parallel planes adjacent said recesses and at right angles to the direction of lateral extension of said recesses from the longitudinal axis of said bar; and yieldable means for holding said bar spaced away from the region of said recesses in said head, said bar being movable through the slotted end of said head to a position where it extends beyond the frame and head.

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