A. H. MAYNARD.

STAPLING MACHINE.

APPLICATION FILED JUNE 30, 1915.

1,169,339. Patented Jan. 25, 1916.

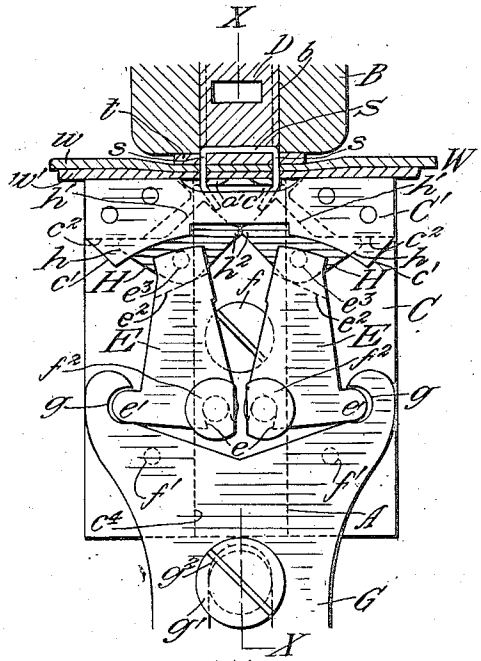

Fig. 1.

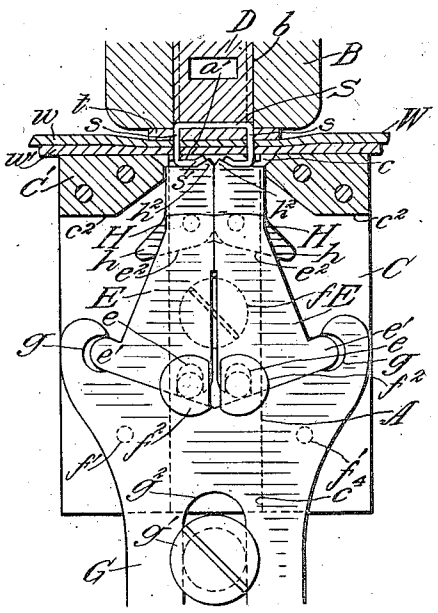

Fig. 2.

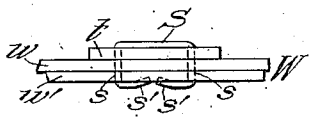

Fig. 6.

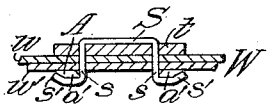

Fig. 7.

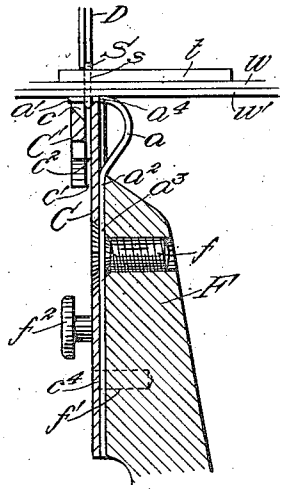

Fig. 3.

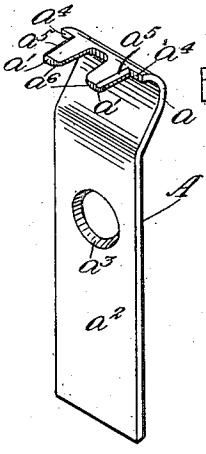

Fig. 4.

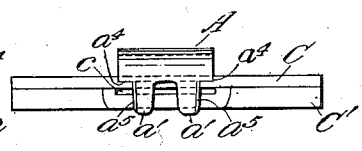

Fig. 5.

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STAPLING-MACHINE.

1,169,339. Specification of Letters Patent. Patented Jan. 25, 1916.

Application filed June 30, 1915. Serial No. 37,183.

To all whom it may concern:

Be it known that I, ARTHUR H. MAYNARD, a citizen of the United States, residing at Warwick, in the county of Kent, State of Rhode Island, have invented certain new and useful Improvements in Stapling-Machines, of which the following is a specification.

My invention relates to improvements in wire-stitching or stapling-machines for applying staples or like fastening-devices to various articles to secure them together or to attach labels or tags thereto.

My improvement consists particularly of an auxiliary forming-means or anvil adapted to coöperate with the usual clencher-mechanism of the machine in bending and clenching the legs of the staples in place

The object of my improvement is to prevent the staples from tearing, abrading or otherwise injuring the material being operated upon, and further to give a neater and more finished appearance to the work.

My new device is intended for use more particularly on machines for stapling tags onto textile goods or for securing together such articles as hosiery and underwear.

The invention is fully described in the following specification, illustrated by the accompanying drawings, in which like reference characters designate like parts.

In the drawings:—Figure 1 is a front elevation of the clenching-mechanism of a usual type of stapling-machine showing my improvement applied thereto and illustrating the parts in position at the commencement of the operation of bending and clenching the legs of the staple; Fig. 2, a similar view showing the mechanism at the completion of the operation of clenching the staple; Fig. 3, a vertical, sectional view of the work-support and clencher-plate taken on the line X—X of Fig. 1, and showing my improved forming-anvil applied thereto; Fig. 4, a detail view in perspective of the forming-anvil; Fig. 5, a plan view of the same showing its relation to the clencher-plate; Fig. 6, a view showing the manner in which the staple is clenched through the material to secure a tag thereto; and Fig. 7, a similar view, in section, showing a slightly different method of bending and clenching the legs of the staple.

Referring first to Figs. 1 and 2, the stapling-mechanism here illustrated is of a well-known type common to various styles of machines of the class specified, such, for instance, as that shown in United States Patent No. 850,290, granted to T. A. Briggs, April 16, 1907. It comprises essentially the main head or bonnet B, in which is slidably mounted a driver D for driving the staple S down through the material to be stapled, and a clencher-plate C arranged below to adapt it to serve as a support for the work placed underneath the head. The driver D slides in a slot *b* in the head B, or in a slotted face-plate attached to the front of the head, and is operated from any suitable means such as a bell-crank-lever as illustrated in the patent above referred to, but not here shown or described. With this type of machine the staples are delivered to the machine from a magazine or "stick" on which they have previously been assembled, but in some instances the staples are formed automatically in the machine from a supply of wire fed thereto.

In order to avoid unnecessary description in the present specification I have here shown my improvement as applied to a machine of the simplest form, but it is to be understood that the invention is capable of being used with practically all types of stapling- or stitching-machines.

The clencher-plate C which supports the work W and also carries the clencher-mechanism for the staples is provided at its top with a staple-receiving throat *c*. For some classes of work a horizontal work-table is attached to the machine with its top flush with the upper edge of the plate C. This provides for a more extended support for the material being operated upon, and in other cases, where the stapling is to be done on hosiery or underwear, convex forms are employed for holding the work. As these parts are not essential to the operation of the present improvement, they have been omitted from the present drawings for the sake of clearness.

Riveted to the front of the plate C is a clencher guide-plate C′ which is cut away or slotted at *c′*, *c′* to form horizontal cam-faces c^2, c^2 disposed on opposite sides of the staple-receiving throat *c*. Referring to Fig. 3, the clencher-plate C is supported on an arm F which projects from the main frame of the machine, not here shown, and is secured in position by the screw *f* and dowel-

pins f', see also Figs. 1 and 2. Projecting from its front face are two headed-studs f^2, f^2 which serve as pivots for the clencher-arms E, E mounted thereon by means of their slots e, e. These arms have laterally-extending projections e', e' which engage recesses g, g of a slide G. The slide G is adapted to be reciprocated vertically in relation to the plate C and slides on headed studs g', only one of which is here shown, which engage suitable slots g^2. The slide G is reciprocated from a going part of the machine which may be operated through a treadle or from any other convenient source of power.

At their upper ends the arms E, E are recessed or cut away on their rear faces, as illustrated by the dotted lines e^2, e^2, and carry rearwardly projecting studs or pintles e^3, e^3. Pivotally mounted on the studs e^3, e^3 are the rockable and slidable clenchers H, H held in position in the slotted portions of the clencher guide-plate C'. The clenchers H, H are formed with tail-like extensions h, h which engage the cam-faces c^2, c^2 on the clencher-guide C' to rock them about their pivots when the arms E, E are moved together. The arms E, E are oscillated from the upward movement of the slide G and thereby the ends h', h' of the clenchers H, H are caused to engage the legs s, s of the staple S, after the latter has been driven down through the work W by the driver D, to bend the legs inwardly or toward each other and clench them together.

All of the elements described above are of substantially the same construction and arrangement as usually employed in machines of this type, and my improvement is applied to use in connection with this well-known mechanism as follows: As before stated, my new device consists essentially of an auxiliary forming-anvil which coöperates with the clenchers H, H to bend the legs of the staple into place. Heretofore it has been the practice to clench the legs of the staple into the material without employing any means for holding them at the points where they are bent. That is to say, the stock or material through which the staple is inserted is depended upon to hold the legs of the staple apart while their ends are being bent over to be clenched into place. With such materials as cardboard, strawboard or stiff paper, the stiffness of the stock is generally sufficient to thus hold the legs of the staple in place while they are being bent over, but in stapling textiles, it has been found that the material is not rigid enough to resist the pressure on the staples and therefore the material is liable to be torn, abraded, and pulled out of shape or otherwise damaged. In my present improvement I provide against this contingency by employing a bending and forming-anvil A adapted to abut the legs of the staple where they project from beneath the material and around which the ends of the legs may be bent during the clenching operation. This forming-anvil A may be of any suitable construction and arrangement as best adapted to the mechanism of the machine to which it is to be applied, the present showing being the preferred embodiment of the device.

Referring to Fig. 4, I have here preferred to illustrate the anvil A as constructed in the form of a relatively thin plate, bent rearwardly at its top and then curled over in the hook portion a which is formed with two forwardly projecting fingers or prongs a', a'. Referring to Fig. 3, the main or body portion a^2 of the anvil is of a width to adapt it to fit snugly into a vertical slot or recess c^4 formed on the back of the clencher-plate C, and the screw f which holds the latter in place also passes through a hole a^3 in the anvil. In this manner the anvil A is secured firmly in place against the arm F on which the plate C is supported, with the forwardly extending prongs a', a' projecting across the upper edge of the clencher-plate. Referring to Figs. 1 and 2, it will be observed that the prongs a', a' are seated in the recessed throat c of the plate C so that their upper faces come flush with the top of the plate. In this way they are prevented from obstructing the work W while the latter is supported on and passed across the edge of the plate C. Referring to Figs. 3 and 4, the shoulders a^4, a^4 at the sides of the prongs a', a' abut the rear face of the plate C at its upper edge and help to support the anvil in position.

The purpose of the hook or goose-neck a at the top of the anvil A is to provide for a slight yielding action or resilient movement of the operative part of the anvil. That is to say, this construction adapts the prongs a', a' to spring upwardly when acted upon by the clenchers H, H so that they will assume their proper relation during the clenching operation. This prevents danger of the prongs being broken off or bent out of place through improper adjustment of the clenchers in relation thereto or from variations in the thickness of the wire of the staple being operated upon. In addition, the yielding nature of the prongs allows for greater freedom in the release of the clenched staple as the work is drawn out of the machine. It is also to be noted that the upper faces of the prongs a', a' are beveled off at a^5, a^5 along their outer edges, while the under faces of the prongs are beveled at a^6, a^6 along their inner edges, see Figs. 1 and 4. The purpose of this construction is to provide that when the staple is driven down through the material, should its legs

happen to strike against the projections a', a', the beveled edges thereof will act to force the legs apart to allow them to slide down past the prongs. That is to say, in driving the staples down through the work, should their legs accidentally come into contact with the prongs a', a', the latter will spread them apart so that they can pass by the anvil without obstruction. The purpose of the bevels a^6, a^6 on the under sides of the prongs a', a' is to provide for bending or forming the legs of the staple S with hook-like ends s', s' as illustrated in Fig. 2. It will be observed from this view of the drawings that the ends of the clenchers H, H are formed with angular faces h^2, h^2, which are brought into position opposite the bevels a^6, a^6 when the clenchers come together, so that the legs of the staple S will be bent upwardly at their ends to form the hooks s', s' which are adapted to be clenched into the material W, see Figs. 6 and 7.

The method of operation of the complete clenching-mechanism, with my improvement applied to use in connection therewith, is as follows: Referring to Figs. 1 and 2, w and w' represent two thicknesses of material, such, for instance, as the tops of a pair of hose, and t is a tag to be attached thereto. As the machine starts to operate the head or bonnet B is first brought down into position against the work W to hold the material in place similar to the action of a pressure-foot. The driver D is then carried down in its guideway b, to force the staple S, previously fed thereto through the work W with its legs s, s projecting downwardly therefrom into the throat c of the clencher-plate C. During this operation, if the legs of the staple are not properly formed or should they have been accidentally bent together or distorted, the beveled edges of the prongs a', a' on the anvil A act as guides to spread them apart in proper relation. The clenching-mechanism next comes into operation to bend over and clench the legs of the staple into position as follows: Referring to Fig. 1, as the slide G starts to move upwardly it rocks the arms E, E together and this brings the ends of the clenchers H, H against the legs of the staple S to bend the latter toward each other. During this operation the sides of the prongs a', a' on the anvil A act to hold the legs of the staple apart at the points where they are being bent, and in this way prevent them from cutting through or tearing the material w, w', or the tag t. As the clenchers H, H continue their rocking motion, their side edges are brought together, as shown in Fig. 2, and meanwhile their ends are carried upwardly to press the legs s, s of the staple S against the under sides of the prongs a', a'. Finally the inclined faces h^2, h^2 on the clenchers bend the extremities of the legs s, s against the beveled faces a^6, a^6 of the prongs to form the hooked ends s', s'. During the stapling operation, the material w, w' is compressed or flattened out somewhat by the pressure of the head or bonnet B. Now, when the bonnet B is raised from the work, the latter can be pulled forward to draw the staple out through the throat c of the plate C, and the ends of the staple will slide off from the prongs of the anvil A. Immediately the staple S is thus released from the anvil A, the inherent elasticity of the material w, w', or other stock being operated upon, will cause it to assume its original thickness and the hooked ends s', s' will be drawn up into the work to grip the latter and effect a most secure fastening. Furthermore, the ends of the staple being thus buried or hooked into the material prevents them from catching in other articles and from pricking or scratching the fingers during handling, besides giving a more finished appearance to the work.

In Fig. 7, I have illustrated a slightly different method of clenching the staple S through the material consisting in bending the ends of the legs s, s outwardly instead of inwardly or toward each other. With this method the forming-anvil A is of substantially the same arrangement except that its prongs are positioned farther apart and are beveled at the top on their inside edges and at the bottom on their outer edges.

It will be seen that with my improvement as above described the staples can be driven through the work and their legs clenched in place without danger of tearing or cutting the material. This is especially important in applying tags to textile articles since it prevents tearing the relatively thin pasteboard or paper and therefore avoids an unsightly appearance or the liability of the tag becoming detached. Moreover with my improved device the bending and clenching of the legs of the staple can be accomplished without danger of tearing or otherwise damaging the material of the articles being operated upon, and in addition a much neater appearance is given to the work.

Various modifications might be made in the form and construction of the parts of my improved device without departing from the spirit or scope of the invention.

Therefore, without limiting myself to the exact embodiment shown and described, what I claim is:—

1. In a stapling-machine, the combination with means for driving the staple through the work, of clencher-means for bending over the legs of the staple, and an auxiliary forming-anvil having prongs around which the ends of the legs of the staple are bent by the action of the clencher-means.

2. In a stapling-machine, the combination with the staple driving and clenching-mech-

anisms, of a resiliently-mounted anvil adapted to yieldingly coöperate with the clenching mechanism to provide for clenching the ends of the legs of the staple thereagainst.

3. In a stapling-machine, the combination with the staple driving and clenching-mechanisms, of resiliently-mounted means arranged to engage the legs of the staple as they protrude from the work being operated upon to yieldingly resist the pressure of the clenching mechanism during the operation of clenching the ends of the legs thereagainst.

4. In a stapling-machine, the combination with means for driving the staple through the work, of an anvil arranged to engage the legs of the staple to force them apart and maintain them in proper relation as they protrude through the material, and clencher-means for bending the ends of the legs of the staple around the anvil.

5. In a stapling-machine, the combination with means for driving the staple through the work, of a clencher-plate arranged below the work and formed with a staple-receiving throat, a forming-anvil having prongs projecting across the throat of the clencher-plate to engage the legs of the staple projecting through the work, and clencher-means coöperating with the anvil to bend the ends of the legs of the staple around its prongs.

6. In a stapling-machine, the combination with means for driving the staple through the work, of an anvil arranged below the work and formed with beveled sides adapted to engage the legs of the staple to guide them through the material and hold them in position as they protrude therefrom, and clencher-means coöperating with the anvil to clench the ends of the legs of the staple thereagainst.

7. In a stapling-machine, the combination with means for driving the staple through the work, of an anvil having prongs arranged below the work and formed with beveled edges on their under sides, and clenchers formed with inclined faces at their ends arranged to coöperate with the beveled edges of the prongs to bend the ends of the staple against said beveled edges to form upwardly projecting hooks.

8. In a stapling-machine, the combination with means for driving the staple through the work, of a yielding anvil arranged below the work to engage the legs of the staple as they protrude therefrom, said anvil formed with a body portion having a curved goose-neck provided at its end with prongs projecting into position to receive the legs of the staple as they are bent therearound, and clencher-means for clenching the ends of the legs against the under sides of the prongs.

9. An auxiliary forming-anvil for stapling-machines, comprising a vertically arranged plate-member bent rearwardly at its top and then forwardly in the form of a gooseneck with horizontally-disposed prong-members projecting forwardly therefrom.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR H. MAYNARD.

Witnesses:
MINNIE B. LOOMIS,
HARRY HACKNEY.