May 2, 1950 S. RAKUSIN 2,506,038

FASTENER APPLYING IMPLEMENT

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Fig. 1.

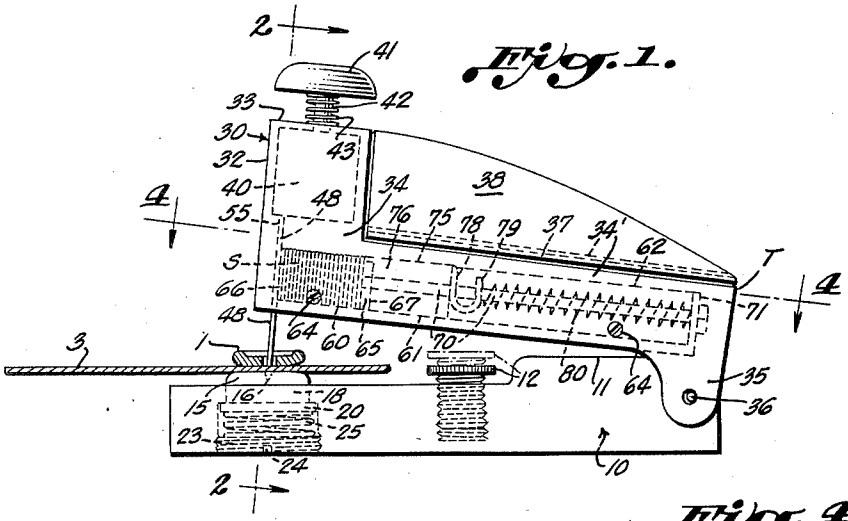


Fig. 4.

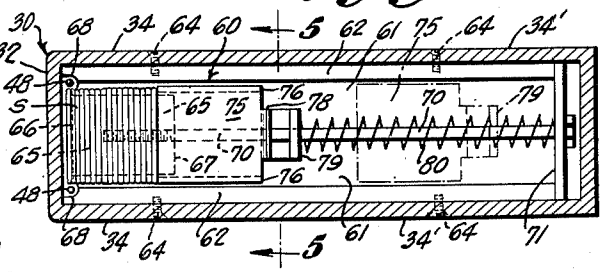


Fig. 2.

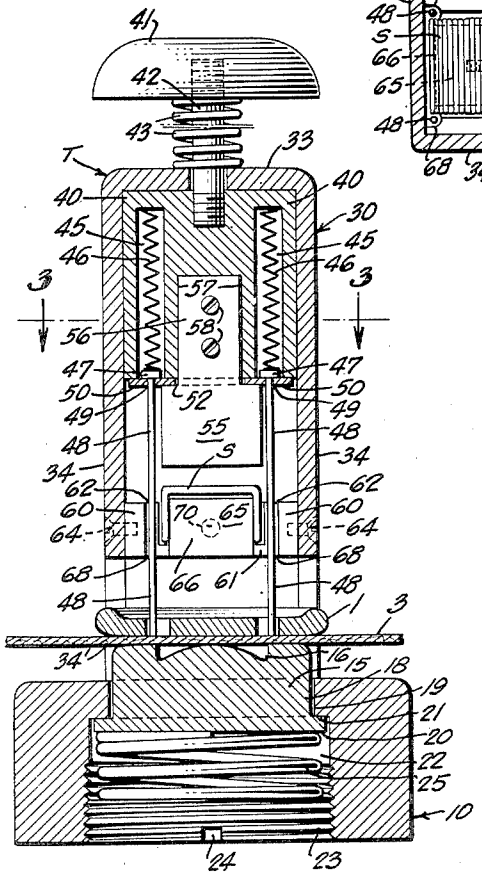


Fig. 5.

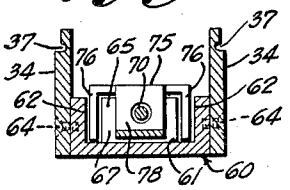
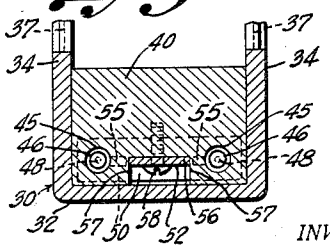


Fig. 3.



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FASTENER APPLYING IMPLEMENT

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8 Claims. (Cl. 1—3)

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This invention relates in general to implements and tools for applying fasteners and deals, more particularly, with improvements in implements for applying fasteners in the form of staples, and the like, for attaching and securing buttons on clothing and other articles on which buttons are used.

The implement or tool of the invention is in the general nature of a stapling device adapted to be operated easily and quickly in the manner of a conventional stapler to drive and clinch a staple for securing a button on any article on which buttons are usually sewed by a needle and thread.

A primary object of the invention is to provide a stapling implement of this character which comprises a staple driving member combined with means for positioning and retaining a button in aligned relation to the staple prior to and during the operation for driving the staple in a manner whereby the legs of the staple are readily guided through the usual holes in the button to complete the attachment of the button in a minimum of time and effort.

A further object of the invention is to provide such a stapling implement in which the means for positioning and retaining a button to be attached is provided in the form of a pair of spaced pins which are received in the usual spaced holes in the button to hold the same in alignment with the legs of the staple prior to and during the staple driving operation.

Another object of the invention is to provide a stapling implement, as aforesaid, in which such pins for positioning and retaining the button to be attached are provided on or carried by the staple driving member of the implement.

A further object of the invention is to provide a stapling implement of the kind described in which the spaced pins on the staple driving member for positioning and retaining a button to be attached, are adapted to yield as necessary to permit the final driving and setting of the staple for securing the button in the most effective manner.

Another object of the invention is to provide a stapling implement in accordance with the foregoing together with suitable means for protecting the button from damage during the driving and clinching of the staple.

Further objects and advantages of the invention and other new and useful features in the construction, arrangement and general combination of parts thereof will be readily apparent as the following description proceeds with reference to the accompanying drawings, for purposes

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of illustration but not of limitation, in which like reference characters designate like parts throughout, and in which:

Fig. 1 is a side elevational view of a stapling implement in accordance with the invention, and showing in section a button in position to be secured to a piece of material;

Fig. 2 is a sectional view of Fig. 1 along line 2—2, looking in the direction of the arrows;

Fig. 3 is a sectional view of Fig. 2 on line 3—3;

Fig. 4 is a sectional view of Fig. 1 on line 4—4 showing the staple feeding mechanism in the implement; and,

Fig. 5 is a sectional view along line 5—5 of Fig. 4.

Referring now, more particularly, to the drawings, Fig. 1 illustrates a typical arrangement of an implement or tool in accordance with the invention as provided for applying staples to attach buttons to the cloth of a garment or other article instead of the usual sewing by needle and thread. The customary procedure for sewing buttons onto clothing and other articles is a tedious, and laborious operation and frequently is effective only a relatively short time before the buttons become loose and separated from the garment and must be resewed thereon. By the use of the present invention, a button may be easily and quickly secured in the simple manner of a conventional stapling operation and in a much stronger and more durable attachment through the use of small metallic fasteners of wire, sheet metal, or the like.

The implement or tool of the invention is provided, in general, in a highly simplified construction comprising a base and a hingedly mounted arm thereon which includes a magazine for a supply of fasteners and a housing for the fastener-applying or staple driving member of the implement. These component parts of the implement may, of course, be provided in various forms and in any size in proportion to the size and gauge of the staples or other fasteners with which the implement is intended to be used. In the present example, the implement is shown as provided in the general form of a stapling implement or tool T, comprising a base 10 and a hingedly mounted arm 30 carried by said base. Preferably, the base 10 is provided with a raised portion 11 at its rearward end defining a fixed stop which limits the downward movement of the hingedly mounted arm 30 relative to the base for a purpose presently to be described. An adjustable stop 12 having a similar function is also provided in the manner of a set screw threaded

into a recess in the reduced portion of the base 10 adjacent the fixed stop 11. This adjustable stop 12 is provided with a suitable knurled edge by which an operator may readily turn the same to adjust said stop from its normal position below the fixed stop 11 to a position in which it projects above said fixed stop 11 as illustrated in dotted lines in Fig. 1.

At the forward end of the base 10, a clinching means is provided preferably in the form of a yieldably mounted anvil 15 having suitable clinching surfaces 16. In the present example, the anvil 15, Fig. 2, is shown as provided with a flat-sided body portion 18 received in a similarly shaped, flat-sided opening 19 in the base 10 and having a bottom flange 20 abutting a shoulder 21 defined by a bore 22 in line with and larger than the anvil receiving opening 19. The bore 22 includes a threaded portion for a threaded screw plug 23 which urges a coil spring 25 into firm engagement with the bottom of the anvil 15. The arrangement, accordingly, is such that the anvil 15 is yieldably supported on the spring 25 in slightly projecting but nonturnable relation to the base 10 by virtue of the flat-sided body portion 18 thereof received in the similarly shaped opening 19 in said base. The clinching surfaces 16 on the anvil 15 are thus maintained at all times in a fixed transverse position on the base 10 while the anvil itself is adapted to yield whenever a force thereon is sufficient to compress the coil spring 25. The anvil 15 is thereby supported in what may be termed a cushion mounting and such a cushion may be provided with any required spring force by a suitable coil spring 25. This spring force of the coil spring 25 in providing such a cushion mounting for the anvil 15 may be increased or diminished as necessary through axial adjustment of the screw plug 23 and this is readily effected simply by turning the said screw plug from the underside of the base 10 by a suitable tool applied to a tool receiving recess 24 provided therein.

The arm 30 is hingedly mounted above the base 10 and this arm comprises a unitary housing for the staple driving member of the implement and also the magazine for the staples and the mechanism for feeding the staples into position to be applied by the driving member. The housing 30 is shown provided in an inverted generally channel-shaped shell having a front portion 32, a top portion 33, forward side portions 34, and elongate rearward side portions 34' terminating in downwardly extending ears 35. These ears 35 straddle the base 10 and are provided with holes for receiving the ends of a pintle 36 for hingedly mounting the entire arm 30 on said base 10. The elongate rearward side portions 34' of the housing are formed with longitudinal grooves 37, Figs. 1 and 5, for slidably receiving corresponding ribs on the inner sides of a complementary channel-shaped cap member 38, Fig. 1, which preferably is so designed as to provide the implement with a pleasing symmetrical and streamlined outward appearance. The cap member 38, accordingly, is adapted to slide out readily from such attached position to permit access to the staple carrying magazine within the housing for loading the implement with a supply of staples whenever needed. Such a cap member for the housing may, of course, be provided in various other designs and hinged, clipped, or otherwise separably retained on the arm 30 in any suitable manner to serve a similar purpose.

At the forward end of the housing 30, the front 32, top 33 and side portions 34 define a guideway for a plunger 40 adapted to reciprocate in said housing in serving as the staple driving member of the implement. The plunger 40 comprises a simple block which is connected to a handle 41 by a stud 42 extending through a passage in the top 33 of the housing and secured in a threaded hole in said block as clearly shown in Fig. 2. A coil spring 43 encircling the stud 42, exerts a constant expansive force between said top 33 of the housing and the underside of the handle 41 to maintain said plunger 40 normally raised in inoperative position and ready for a driving operation upon suitable force on the handle 41.

The plunger body 40 is provided with a pair of spaced longitudinally extending blind holes 45 defining wells for lightweight coil springs 46. Said coil springs 46 bear upon the heads 47 of elongate pins 48 projecting from the lower end of said plunger 45 for holding and retaining a button 1 in position during a fastener applying operation. These button retaining pins 48 extend through apertures 49 in a cover plate 50, Figs. 2 and 3, which secures said pins in yieldably mounted position in the plunger 40 under the expansive force of said coil springs 46. The pins 48 are thus maintained in a normal projecting relation to the plunger 40 and are adapted, under force on the free ends thereof, to compress the springs 46 and move upwardly as necessary into retracted position within the spring wells 45 in the plunger. The cover plate 50 is secured in position in this completed assembly by the shank portion of a staple driver 55 provided in the form of a T-shaped blade. The staple driver 55 includes a shank portion 56 which extends through a corresponding slot 52 in said cover plate 50 and seats in a groove 57, Fig. 3, in the front face of the plunger 40. In this position, one or more screws 58 secure the shank 56 of the T-shaped staple driver or blade 56 to the plunger 40, and as best seen in Fig. 2, said blade 55 in turn secures the cover plate 50 to the plunger 40 to complete the yieldable mounting of the button retaining pins 48 in said plunger, as aforesaid. The complete assembly is such that the button retaining pins 48 are aligned transversely with the blade 55 of the staple driver as illustrated in Fig. 3, and adjacent the outer side edges of said blade 55 as seen in Fig. 2.

As shown in Figs. 1, 4 and 5, a staple magazine 60 is mounted in the housing 30 between the spaced sides thereof, each of which is defined by the forward side portion 34 and the elongate rearward side portion 34'. The staple magazine 60 is provided as a generally U-shaped guide channel comprising a bottom wall 61 between a pair of spaced side walls 62 having a spacing approximating the outer width of the strip at staples *s* to be employed. The magazine 60 is advantageously provided as a unit complete in itself and adapted for a simple mounting in the housing 30 by screws 64 securing the same to the side portions 34, 34' of said housing. This staple guide channel or magazine 60 includes at its forward end a central guide bar 65 having its outer face 66 offset slightly inwardly from the outer ends of the side walls 62, as represented by dotted lines in Fig. 4, to define a shear-plate which cooperates with the staple driving blade 55 in severing the leading staple from the strip in a fastener applying operation. The rear face 67 of said central guide bar 65, Fig. 4, defines a stop surface for a purpose presently to be described. Vertical grooves 68 are formed in the

outer ends of said side walls 62 defining guide surfaces which bolster the lower portions of the slidable button retaining pins 48 as shown in Fig. 2. The arrangement is such that a strip of staples *s* is snugly received between the spaced side walls 62 of the staple guide channel with the forward staples of the strip straddling the central guide bar 65 as shown in Figs. 2 and 4. The staples are thus supported for precise and exact feeding to the shear plate 66 at the end of said guide bar 65 where they are individually severed from the strip in each fastener applying operation by the movement of the staple driver 55 past said shear plate 66.

A rod 70 in said guide channel 60 is provided preferably as an elongate bolt threaded into a hole in the rear of the central guide bar 65 and having its headed end supported in an opening in an end wall or flange 71 extending upwardly from the bottom wall 61 of the staple magazine or guide channel 60. Thus, when a strip of staples *s* is loaded in said magazine, the forward staples straddle the central guide bar 65, as aforesaid, while the rearward staples straddle across the rod 70. All staples in a strip are snugly received between the side walls 62 of the magazine with the ends of the staple legs resting on the bottom wall 61 of the magazine; and in this manner, the entire strip of staples is guided and supported in the forward feeding movement thereof.

The feeding of the staples is effected by a spring urged staple pusher 75, Figs. 4 and 5, which is provided in an inverted channel shape corresponding substantially to the shape of the staple and comprises, similarly, legs 76 resting on the bottom wall 61 of the guide channel and an intermediate portion adapted to engage the intermediate portions of the staples. A generally U-shaped extension attached to said intermediate portion of the staple pusher 75 defines a pair of spaced connecting ears 78, 79, which are provided with aligned holes through which the rod 70 extends, in a manner whereby the staple pusher is connected to the rod 70 at spaced points and is adapted to slide longitudinally thereof. A helical spring 80 is coiled around the rod 70 in compressed relation between the rear connecting ear 79 on the staple pusher and the end wall 71 of the magazine and thereby serves to slide the pusher 75 forwardly toward the shear plate 66 defined by the forward end face of the central guide bar 65.

In loading the magazine 60 with a supply of staples, the staple pusher 75 is slid rearwardly by the operator's finger to a retracted position, as represented in broken lines in Fig. 4. The coil spring 80 is readily compressed as necessary for this purpose between the rear connecting ear 79 on the staple pusher and the end wall 71 of the magazine, and in such retracted position of said pusher 75, a complete strip of staples is readily inserted into the magazine in straddling relation to the rod 70 and central guide bar 65, as previously explained. The pusher 75 is then permitted to engage the rear end of the strip of staples under tension to advance said staples the distance of the staple removed in each fastener applying operation. The feeding action takes place regularly until only one staple remains in the magazine, whereupon the forward movement of the pusher is stopped upon engagement of the forward connecting ear 78 on said pusher with the stop surface defined by the rear face 67 of the central guide bar 65. In this stopped position, the leading edge of the pusher 75 is substantially in line with the shear plate 66 at the forward face of the central guide bar 65, and cannot move into the path of the staple driving blade 55 after the application of the last staple in the magazine. Thus, in the event that the driving blade 55 is actuated when the staples are exhausted, said driving blade 55 moves harmlessly in its usual path without danger of striking the pusher 75 in any manner which might damage either said staple driving blade 55 or the staple pusher 75.

The staples *s* may be provided in any color to blend with the color of the button or the color of the fabric to which the button is to be secured. The staples may be prepared in such colors by a thin coating of paint or plastic in various ways and preferably are provided in the form of strips, as described, although individual staples may be inserted and applied in the same general operation and use of the implement.

It will be understood that the implement of the invention is readily constructed for any size staple required for securing various buttons in which the holes in the buttons have approximately the same spacing; and, in this regard, many buttons in a selected range of sizes have a substantially standard spacing between the holes therein. Thus, as shown in Fig. 2, the implement is constructed, as aforesaid, in accordance with any such standard by providing the button retaining pins 48 thereof in a suitable spacing to be received in the spaced holes in a button 1 adjacent the outer edges of said holes and with legs of the staples *s* adapted to pass through the remaining areas of said holes adjacent said retaining pins 48.

In the use of the invention, accordingly, a button 1 to be secured to a piece of cloth or other material 3 is placed over the anvil 15 as shown in Figs. 1 and 2. The button is retained by the pins 48 received in the holes therein and the button otherwise located at the proper point of attachment to said material 3. This is readily effected simply by raising the housing arm 30 as necessary to slip the retaining pins 48 through the holes in the button, whereupon the housing arm 30 is lowered and the material 3 shifted as necessary to dispose the button at its proper point of attachment thereto. For most buttons of a selected standard, as aforesaid, the stop 11 defined by the raised portion on the base 10 is provided at a predetermined point to prevent any possible crushing effect on the button during the staple driving operation. In the event that the button is somewhat thicker than normal, the adjustable stop 12 is turned as necessary to project above the fixed stop 11 as shown in dotted lines in Fig. 1 to thereby serve the same purpose.

The securing of the button 1 to the fabric 3 is then easily and quickly effected simply by actuating the handle 41, Fig. 2, to move the plunger 40 downwardly for the fastener applying operation. The downward motion of the plunger 40 moves the staple driving blade 55 into engagement with the foremost staple of the strip and simultaneously causes the upper ends of button retaining pins 48 to slide upwardly into the wells 45 in said plunger. This retracting movement of the pins 48 permits the entire arm 30 of the implement to move toward the button 1 to the extent limited either by the fixed stop 11 or the adjustable stop 12, as the case may be. In this relation, the ends of the staple legs are in precise alignment with the holes in the button inasmuch as the ends of the guide pins 48 are disposed in said button holes for this specific purpose.

Accordingly, as the foremost staple *s* is engaged by the driving blade 55 and separated from the strip of staples, the legs of the staple pass readily into the holes in the button 1 and through the fabric 3 and are bent over at the underside of the fabric by engagement with curved clinching surfaces 16 on the anvil 15. In the final clinching and tightening of the staple, any undue force that might tend to damage the button is avoided by virtue of the cushion mounting of the anvil 15 which permits said anvil to yield as necessary to alleviate any such undue force on the button.

The implement is thus adapted to be operated repeatedly by similar successive fastener applying operations, and after each staple is applied, the spring force on the staple pusher 75 causes the same to effect a progressive feeding of the strip of staples *s* to the forward end of the magazine 60 where they are severed individually from the strip and applied by the action of the staple driver 55 in a repetition of the foregoing described procedure.

While the invention has been described in detail with a specific example, such example is intended as an illustration only inasmuch as it will be apparent that various changes may be made in the construction, arrangement and general combination of parts of the implement without departing from the spirit and scope of the invention. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, with all changes falling within the scope, meaning and range of equivalency of the claims intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and means on said base for supporting a button over said material, a housing associated with said base, a member in said housing provided with means for driving said fastener, means on said member and retractable relative thereto for retaining said button in position for the fastener applying operation, and means in said housing for feeding fasteners to said driving means.

2. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and means on said base for supporting a button over said material, a housing associated with said base, fastener feeding means in said housing, a member in said housing provided with means for driving said fastener, and a pair of spaced retractable pins on said member adapted to be received in spaced holes in said button to retain the button in position for the fastener applying operation.

3. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and means on said base for supporting a button over said material, a housing hinged to said base, a member in said housing provided with means for driving said fastener, a pair of spaced pins on said member adapted to be received in spaced holes in said button to retain the button in position for the fastener applying operation, means in said housing for feeding fasteners to said driving means, and a stop on said base for limiting the movement of said housing toward said base.

4. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and an anvil on said base for supporting a button over said material, a housing hinged to said base, a member in said housing provided with means for driving said fastener, a pair of spaced pins on said member adapted to be received in spaced holes in said button to retain the button in position for the fastener applying operation, means in said housing for feeding fasteners to said driving means, and means yieldably mounting said anvil on said base adapted to prevent undue force on the button during the fastener applying operation.

5. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and means on said base for supporting a button over said material, a housing hinged to said base, a member in said housing provided with means for driving said fastener, a pair of spaced pins on said member adapted to be received in spaced holes in said button to retain the button in position for the fastener applying operation, means in said housing for feeding fasteners to said driving means comprising a guide channel, a shear plate at the forward end of said channel, and means for advancing fasteners in said guide channel to said shear plate.

6. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and means on said base for supporting a button over said material, a housing hinged to said base, a member in said housing provided with means for driving said fastener, a pair of spaced pins on said member adapted to be received in spaced holes in said button to retain the button in position for the fastener applying operation, means in said housing for feeding fasteners to said driving means comprising a guide channel, a shear plate at the forward end of said guide channel, means for advancing fasteners in said guide channel to said shear plate, and a stop on said base for limiting the movement of said housing toward said base.

7. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and an anvil on said base for supporting a button over said material, a housing hinged to said base, a member in said housing provided with means for driving said fastener, a pair of spaced pins on said member adapted to be received in spaced holes in said button to retain the button in position for the fastener applying operation, means in said housing for feeding fasteners to said driving means comprising a guide channel, a shear plate at the forward end of said guide channel, means for advancing fasteners in said guide channel to said shear plate, a stop on said base for limiting the movement of said housing toward said base, and means yieldably mounting said anvil on said base adapted to prevent undue force on the button during the fastener applying operation.

8. An implement for applying a fastener to secure a button to a supporting material, said implement comprising a base and an anvil on said base for supporting a button over said material, a housing hinged to said base, fastener driving means in said housing comprising a reciprocable member having a pair of spaced holes, springs in said holes, and spaced button retaining pins yieldably mounted in said holes under force of said springs and adapted to be received in spaced holes in said button to retain the button in position for the fastener applying opera-

tion, means in said housing for feeding fasteners into the path of said driving means comprising a guide channel, a shear plate at the forward end of said guide channel, means for advancing fasteners in said guide channel to said shear plate, a stop on said base for limiting the movement of said housing toward said base, spring means yieldably mounting said anvil to prevent undue force on the button during the fastener applying operation, and means for varying the force of said spring means on said anvil.

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