

Oct. 22, 1940.

P. O. GERMAIN

2,218,934

FASTENER-APPLYING IMPLEMENT

Filed Oct. 26, 1939

2 Sheets-Sheet 1

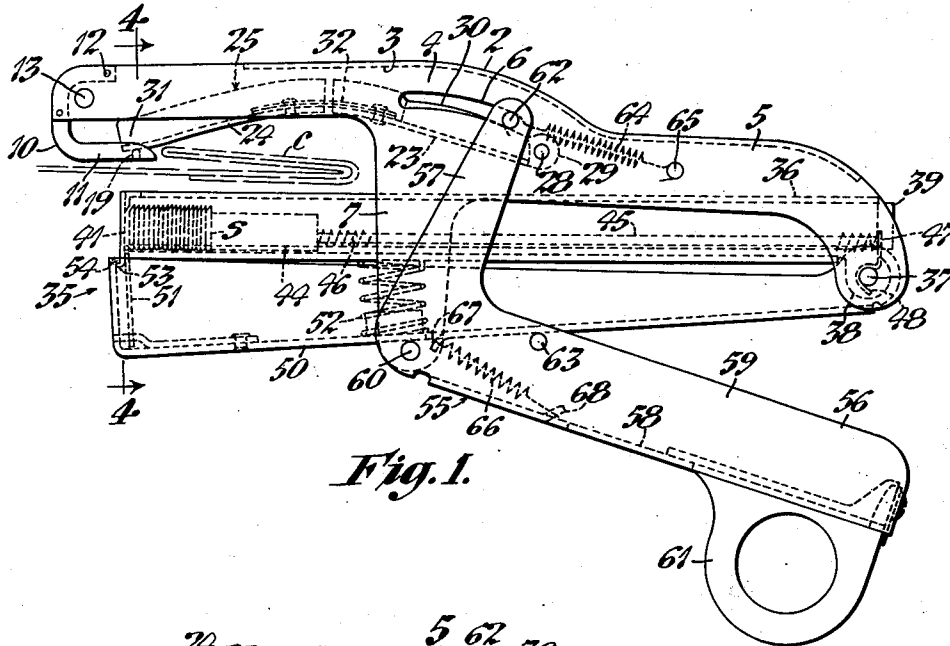


Fig. 1.

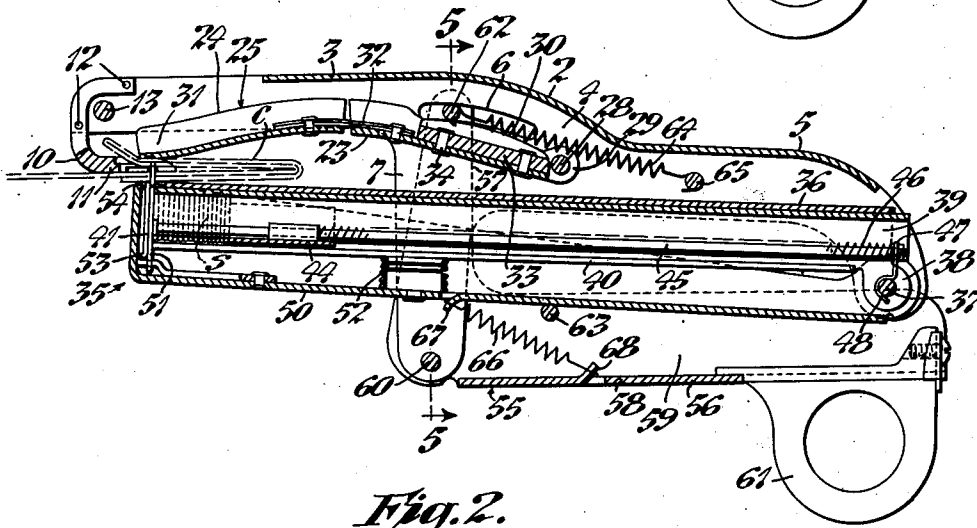


Fig. 2.

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2 Sheets-Sheet 2

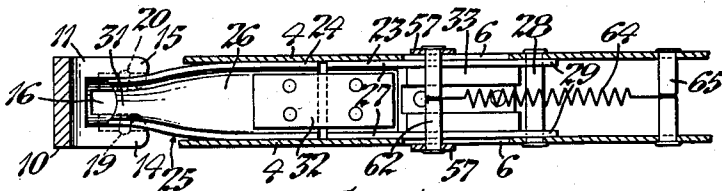


Fig. 3.

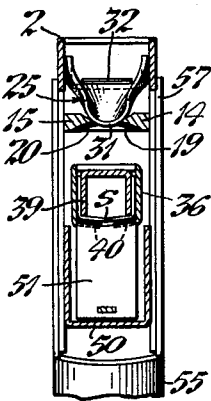


Fig. 4.

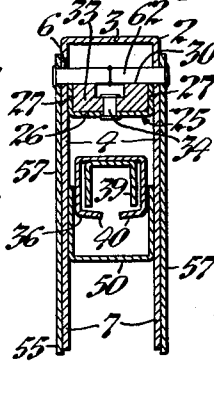


Fig. 5.

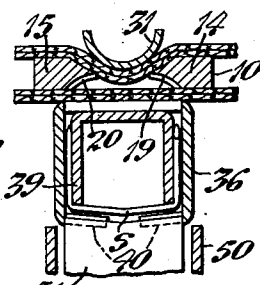


Fig. 6.

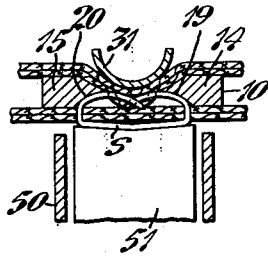


Fig. 7.

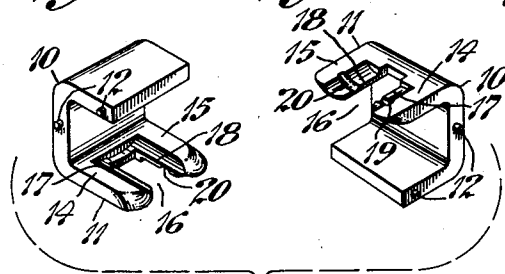


Fig. 8.

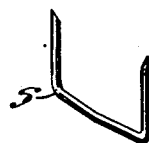


Fig. 9.

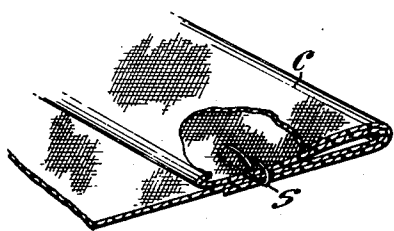


Fig. 10.

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UNITED STATES PATENT OFFICE

2,218,934

FASTENER-APPLYING IMPLEMENT

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Application October 26, 1939, Serial No. 301,444

16 Claims. (Cl. 1-49)

The present invention relates to fastener-applying implements and more particularly to a plier-type implement adapted to be held and operated in one hand.

One of the objects of the present invention is to provide a device of the type indicated adapted to attach the cuffs to the leg-portions of trousers with a metal fastener so as to form a blind stitch.

Another object of the invention is to provide a device of the type indicated adapted to produce a bend in the cuff through which the legs of the metal fastener are guided to cause them to penetrate the inner fabric layer without penetrating the outer fabric layer of the cuff fold.

Another object of the invention is to provide a device of the type indicated having a hook-like anvil adapted to be inserted between the cuff and leg-portion of the trousers, a presser-bar engageable with the outside of the cuff and cooperating with the anvil to produce a bend in the cuff, and fastener-applying means for driving a fastener through the trousers leg and the bend in the cuff.

Another object of the invention is to provide a device of the type indicated having actuating means for simultaneously operating the presser-bar and fastener-applying means.

Still another object of the invention is to provide a device of the type indicated which is efficient in performing its intended functions and of simple and compact construction to adapt it for economical manufacture.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the device, by way of example, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a side elevational view of a plier-type implement incorporating the novel features of the present invention;

Fig. 2 is a longitudinal sectional view through the implement showing the hook-like anvil inserted between the trouser leg and cuff and the relationship of the parts at the completion of a fastener-applying operation;

Fig. 3 is a sectional plan view showing the cooperative relationship of the presser-bar and the spaced prongs of the anvil;

Fig. 4 is a transverse sectional view taken on line 4-4 of Fig. 1 showing the rounded form of the end of the presser-bar to adapt it to enter the opening between the spaced prongs of the anvil;

Fig. 5 is a transverse sectional view taken on line 5-5 of Fig. 2 showing the transverse pin on the actuating lever in engagement with the cam face on the presser-bar;

Fig. 6 is an enlarged transverse sectional view through the forward portion of the implement showing the presser-bar in cooperative relation to the anvil to produce a bend in the cuff material in the opening between the anvil prongs;

Fig. 7 is a view similar to Fig. 6 showing the legs of the metal fastener deflected by the anvil prongs across the opening therebetween to cause their ends to penetrate only the innermost fabric layer of the cuff;

Fig. 8 comprises two perspective views of the anvil illustrated in upright and inverted positions to show the beveled edges on opposite sides of the prongs adjacent the central opening;

Fig. 9 is a perspective view of the fastener showing the opposite bevels at the ends of its legs to cause them to pass by each other; and

Fig. 10 is a perspective view, partly in section, of a portion of a trousers leg showing the metal stitch penetrating the leg portion and inner fabric layer of the cuff fold.

The accompanying drawings illustrate a plier-type implement incorporating the novel features of the present invention and comprising a supporting frame 2 extending longitudinally throughout the length of the implement. The frame 2 is of inverted channel-shape having a top wall 3 and depending side walls 4 which project beyond the ends of the top wall. Adjacent one end of the frame 2 the top and side walls 3 and 4 are shaped to provide a hand-grip portion 5. Intermediate the ends of the frame 2 the side walls 4 are extended downwardly to provide spaced stanchions 7, and arcuate slots 6 are formed in the side walls adjacent the top wall 3 with a radius substantially equal to the length of the stanchions.

A hook-shaped member 10 mounted between the side walls 4 at one end of the frame 2 has an end portion which projects downwardly and inwardly to provide an anvil 11 located in spaced relation to the lower edges of the side walls of the frame. Preferably, the member 10 is of a width to adapt it to fit closely between the extended ends of the side walls 4 of the frame 2 and a plurality of pins 12 at its sides project through suitable holes in the side walls to mount the member on the frame. A headed pin or bolt 13 extends transversely between the extended ends of the side walls 4 to hold them from spreading laterally and thereby reinforce the structure. As illustrated in detail in Fig. 8, the anvil 11 is formed with spaced prongs 14 and 15 with a central opening 16 therebetween. The inner edges 17 and 18 of the prongs 14 and 15 adjacent the opening 16 are beveled on opposite sides and, as herein illus-

trated, the bevels are formed with concaved faces. The beveled edges on the bottom sides of the prongs 14 and 15, that is remote from the frame 2, are provided with transverse grooves 19 and 20 for guiding the legs of the fasteners in the manner as explained later. It will be understood that the anvil 11 may take other forms from that herein shown to provide spaced side portions with an opening therebetween.

10 A two-part presser-bar 25 is mounted on the frame 2 for movement toward and away from the anvil 11. As illustrated in Figs. 2, 3 and 4, the presser-bar 25 is generally of channel-shape having a bottom wall 26 and upstanding spaced side walls 27. The side walls 27 of the presser-bar 25 have rearwardly-projecting ears 29 for pivotally mounting the presser-bar on a pin 28 extending between the side walls 4 of the frame 2 and through holes in the ears. A channel-shaped block 33 is nested between the sides of the presser-bar 25 adjacent the pivot-pin 28 and permanently attached to its bottom wall 26 by means of rivets 34, see Fig. 2. The upper faces of the sides of the channel-shaped block 33 are of substantially arcuate shape to provide cam-faces 30 which project upwardly beyond the lower edges of the slots 6 in the frame 2. At its outer or free end the presser-bar 25 is formed with a curved or rounded bottom 31 as illustrated in Fig. 4 adapted to partially enter the opening 16 between the spaced prongs 14 and 15 of the anvil 11, the beveled edges 17 and 18 providing clearance therefor. Preferably, the presser-bar is made in two sections 23 and 24 connected by a stiff leaf-spring 32 to permit a limited flexure between its ends.

Fastener-applying means indicated generally at 35 are mounted on the frame 2 for movement toward and away from the anvil 11 at its side opposite from the presser-bar 25. The fastener-applying means 35 may take any suitable form but, as herein illustrated, is of well-known construction and arranged in inverted position for applying U-shaped wire staples *s* to the underside of the work. The staples *s* are of conventional construction as shown in Fig. 9 except that the legs are longer than usual with their ends oppositely beveled to adapt them to pass by each other during the driving operation.

50 Suffice it to state herein that the fastener-applying means 35 comprise a magazine-arm 36 positioned between the extended ends of the side walls 4 at the end of the frame 2 opposite from the anvil 11. The magazine-arm 36 is of inverted channel-shape with depending ears 38 at its rearward end by which it is pivotally mounted on a pivot-pin 37 extending between the side walls 4 of the frame 2 and through holes in the ears. A core 39 is carried within the magazine-arm 36 extending centrally thereof and the lower edge portions 40 of the side walls of the arm are folded inwardly to cooperate with the core to support a supply of the staples *s* therein. The magazine-arm 36 has a throat 41 at its forward end through which the staples are driven and is open at its rearward end to permit staples to be supplied thereto.

The staples *s* are advanced in the magazine toward the throat 41 by means of a pusher 44 supported on a rod 45 with its side flanges straddling the core 39. A coiled spring 46 mounted on the rod 45 acts between an abutment 47 at the rearward end of the rod and the pusher 44 to propel the latter forwardly in the magazine-arm 36. The rod 45, pusher 44, and spring 46 are

adapted to be removed from the magazine-arm 36 as a unit, the rod having a depending hook-like finger 48 engageable with the pivot-pin 37 between the ears 38 to detachably mount the assembly in the magazine-arm.

A staple-driving or operating arm 50 of channel-shape embraces the front and sides of the magazine-arm 36, being pivoted at its rearward end on the projecting ends of the pin 37 which extends through holes in its side walls. The operating arm 50 carries a staple-driver 51 at its forward end for reciprocation in the throat 41 at the forward end of the magazine-arm 36. A coiled spring 52 is provided between the magazine-arm 36 and the operating arm 50 to yieldingly hold them in spaced relationship as illustrated in Fig. 1. A stop-finger or lug 53 on the magazine-arm 36 cooperates with a lug 54 on the operating arm 50 to limit the extent of relative movement therebetween, see Fig. 1.

In accordance with the present invention an actuating lever 55 is provided for simultaneously moving the fastener-applying means 35 toward the under side of the anvil 11 while applying pressure to the presser-bar 25 and thereafter operating the fastener-applying means to drive a staple *s*. The actuating lever 55 is of bell-crank form having a handle-portion 56 of a shape to adapt it to be grasped by the fingers and an angularly-extending arm 57. As illustrated herein the lever 55 is of channel-shape having a bottom wall 58 and upstanding spaced side walls 59 embracing the stanchions 7 and the sides of the operating arm 50, the extensions of the side walls constituting the spaced sides of the arm 57. The actuating lever 55 is pivotally mounted on the projecting ends of a pin 60 extending through the stanchions 7 and projecting through holes in the side walls 59 adjacent the forward end of the handle-portion 56 of the lever. The handle-portion 56 of the lever 55 normally projects at an angle to the staple-driving arm 50 and is provided with a finger-grip 61 at its rearward end to adapt the implement to be supported by the little finger of the hand in which it is held. A pin 62 extends between the spaced sides of the arm 57 adjacent its end and projects through the arcuate slots 6 in the frame 2 to overlie the cam-faces 30 on the presser-bar 25. A second pin 63 extends between the sides 57 of the lever 55 adjacent their upper edges and bears against the bottom of the operating arm 50 of the fastener-applying means 35.

A coiled spring 64 has one end connected to the pin 62 and its opposite end anchored to a pin 65 on the frame 2 thereby tending to rock the lever 55 to its inoperative position shown in Fig. 1. A second spring 66 has one end anchored to a lug 67 on the operating arm 50 of the fastener-applying means 35 and its opposite end connected to a lug 68 on the lever 55 whereby to act to withdraw the fastener-applying means away from the anvil 11 after each operation of the implement. One embodiment of the invention having been described in detail the mode of operation of the implement is explained as follows:

As stated above, the implement constituting the subject matter of the present invention is particularly adapted for attaching or tacking the cuff to the leg-portion of trousers with a blind metal stitch. To this end the lower edge of the trouser-leg, including the cuff-portion *c* comprising a fold of the trouser material, is inserted between the anvil 11 and magazine-arm 36 in the manner indicated by dash-lines in Fig. 1. The

implement is then partially withdrawn to hook the spaced prongs 14 and 15 of the anvil 11 between the folded cuff c and the leg-portion of the trousers as indicated in Fig. 2. The handle-portion 56 of the actuating lever 55 is then pressed toward the frame 2 while the implement is held in one hand. Rocking movement of the lever 55 on its pivot 60 causes the pin 62 at the end of its arm 57 to move in an arcuate path in the slots 6 in the frame 2. Due to the form of the cam-faces 30 on the presser-bar 25 the pin acts to apply pressure on the presser-bar tending to rock it about its pivot 28 to the position shown in Fig. 2.

The action of the lever 55 on the rearward section 23 of the presser-bar 25 causes its resiliently-connected forward end 31 to press yieldingly against the outside of the cuff c to force it against the anvil 11. The rounded end-portion 31 of the presser-bar 25 is thus caused to partially enter the opening 16 between the prongs 14 and 15 of the anvil 11 to cooperate with the beveled edges 17 and 18 to produce a bend in the cuff c by forcing the fabric down into the opening, see Fig. 6. Simultaneous with the operation of the presser-bar 25 the pin 63 on the actuating lever 55 acts against the bottom of the operating arm 50 of the fastener-applying means 35 to move the latter and the magazine-arm 36 as a unit to engage the end of the arm 36 with the leg-portion of the trousers on the underside of the anvil 11 in the manner illustrated in Fig. 6. Under the continued movement of the actuating lever 55 the operating arm 50 of the fastener-applying means 35 will be moved relatively of the magazine-arm 36 to thereby force the driver 51 through the throat 41 to apply a staple s.

The pointed beveled ends of the legs of the staple s first penetrate the leg-portion of the trousers and then engage the grooves 19 and 20 in the prongs 14 and 15 of the anvil 11 to cause the legs to be deflected to slide across the opening 16. Due to the curvature of the grooves 19 and 20 the legs of the staple are continuously deflected during the driving operation so that they tend to first move inwardly toward each other and then toward the cross-bar of the staple, the length of the legs being such that their ends pass by each other and partially interlock with the fabric of the cuff as shown in Fig. 7 to provide a permanent stitch. The curvature of the grooves 19 and 20 in the prongs 14 and 15 and the curvature of the rounded end 31 of the presser-bar 25 are so proportioned as to cause the ends of the staple-legs to penetrate the inner layer or fold of the cuff c without penetrating the outer fold, see Figs. 7 and 10. It has been determined that the present implement is thus particularly efficient for attaching or tacking the cuff to the leg portion of trousers with a blind metal stitch and it may be used with all kinds and thicknesses of material with equally good results. This is due to the control of the bend in the cuff c by the presser-bar 25 which acts to compress the material and the accurate control of the deflection of the legs of the staple to cause their ends to move in a predetermined path through the fixedly held bend in the cuff c.

Upon release of the actuating lever 55 the spring 64, acting between the pins 62 and 65, rocks the lever from the position shown in Fig. 2 to that shown in Fig. 1 and thereby releases the presser-bar 25. Simultaneously, the spring 66 acting between the lug 67 on the operating arm 50 of the fastener-applying means 35 and the lug

68 on the lever 55 rocks the fastener-applying means away from the anvil 11 as a unit. As the fastener-applying unit 35 moves away from the anvil 11 the compression spring 52, acting between the magazine-arm 36 and operating arm 50 moves them away from each other to withdraw the driver 51 from the throat 41. After each operation of the implement the pusher 44 is energized by the propelling spring 46 to advance the staples in the magazine-arm 36 to feed the next adjacent staple s into the throat 41. The implement is then ready for another fastener-applying operation which may be performed in the same manner as explained above.

It will be observed from the foregoing description that the present invention provides a novel form of fastener-applying implement particularly adapted for attaching or tacking the cuffs to the leg portions of trousers with a blind metal stitch and for other similar types of work. It will also be observed that the implement may be held and operated in one hand and is of simple and compact construction to adapt it for economical manufacture.

While the present invention is herein described and illustrated as applied to a preferred form of device it will be understood that various modifications may be made in the form and arrangement of its elements without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. A device of the type indicated comprising an anvil having an opening therein, presser means at one side of the anvil, said anvil and presser means being so constructed and arranged as to receive the work therebetween, fastener-applying means at the opposite side of the anvil, and means for relatively moving the anvil, presser means and fastener-applying means toward each other and thereafter operating the fastener-applying means to drive a fastener through the opening in the anvil and into the work at the opposite side thereof.

2. A device of the type indicated comprising an anvil having spaced prongs with an opening therebetween, presser means at one side of the anvil, said anvil and presser means being so constructed and arranged as to receive the work therebetween, fastener-applying means at the opposite side of the anvil, and means for moving the presser means and fastener applying means toward the anvil and thereafter operating the fastener-applying means to drive a fastener through the opening between the prongs of the anvil and into the work at the opposite side thereof.

3. A device of the type indicated comprising an anvil having spaced prongs with an opening therebetween, a presser-bar at one side of the anvil having a rounded portion adapted to enter the opening between the prongs of the anvil, fastener-applying means at the opposite side of the anvil, and means for moving the presser-bar and fastener-applying means toward the anvil and thereafter operating the fastener-applying means to drive a fastener.

4. A device of the type indicated comprising an anvil having spaced prongs with an opening therebetween, a presser-bar at one side of the anvil having a convex portion adapted to enter the opening between the prongs, fastener-applying means at the opposite side of the anvil, and means for moving the presser-bar and fastener-applying means toward the anvil and thereafter operating the fastener-applying means to

drive a fastener, the prongs of said anvil being so constructed and arranged as to direct the ends of the legs of the fastener across the opening.

5 5. A device of the type indicated comprising an anvil having spaced prongs with an opening therebetween, said prongs being beveled on their edges adjacent the opening and having guiding grooves on one side thereof, a presser-bar at one
10 side of the anvil for cooperation with the beveled edges of the anvil-prongs, fastener-applying means at the opposite side of the anvil, and means for moving the presser-bar and fastener-applying means toward the anvil and thereafter oper-
15 ating the fastener-applying means to drive a fastener, the guiding grooves in the anvil-prongs being adapted to direct the ends of the legs of the fastener across the opening between the prongs.

20 6. In a device of the type indicated, a supporting member having a hook-shaped end portion providing an anvil in spaced relation thereto, presser means mounted on the supporting member for movement toward and away from the
25 anvil at one side thereof, fastener-applying means mounted on the supporting member for movement toward and away from the anvil at the opposite side thereof, and an actuating member for moving the presser means and fastener-
30 applying means toward the anvil and thereafter operating the fastener-applying means to drive a fastener.

7. In a device of the type indicated, a supporting member having hook-like prongs at one
35 end in spaced relation thereto, a presser-bar pivoted at one end to the supporting member and having a convex portion at its opposite end adapted for movement into the opening between the prongs, fastener-applying means pivotally
40 mounted on the supporting member at the opposite side of the prongs, and an actuating lever pivotally mounted on the supporting member and having means engaging the presser-bar and fastener-applying means to move them toward
45 the anvil and thereafter operate the fastener-applying means to drive a fastener.

8. A device of the type indicated comprising a supporting frame, a hook-shaped anvil at one
50 end of the supporting frame having spaced prongs, a presser-bar pivotally mounted on the supporting frame at one side of the anvil and having a cam-face intermediate its ends, fastener-applying means mounted on the supporting
55 frame for movement toward and away from the anvil at the opposite side from the presser-bar, and an actuating lever having means engaging the cam-face on the presser-bar and the fastener-applying means for simultaneously moving
60 them toward the anvil and thereafter operating the fastener-applying means to drive a fastener.

9. In a device of the type indicated, an anvil having an opening therein, presser means arranged in spaced relation to the anvil to re-
65 ceive the work therebetween, means for relatively moving the presser means and anvil toward each other to clamp the work in the opening in the anvil, and means on the opposite side of the anvil for applying a fastener, said anvil
70 being so constructed and arranged as to guide the legs of the fastener to cause them to penetrate the work clamped in the opening in the anvil.

10. In a device of the type indicated, an anvil having an opening therein, presser means ar-
75 ranged in spaced relation to the anvil to re-

ceive the work therebetween, means for rela-
tively moving the presser means and anvil to clamp the work, and means on the opposite side of the anvil for applying a fastener, said anvil being so constructed and arranged as to guide
5 the legs of the fastener across its opening to cause them to penetrate the work clamped therein.

11. In a device of the type indicated, an anvil having a central opening with beveled edges
10 at the sides thereof, a presser-bar arranged in spaced relation to the anvil to receive the work therebetween, means for relatively moving the presser-bar and anvil to press the work into the opening in the anvil, and means adjacent the
15 anvil for applying a fastener, said anvil being so constructed and arranged as to guide the legs of the fastener across the opening and through the work clamped therein.

12. In a device of the type indicated, an anvil
20 having a central opening with beveled portions adjacent the opening at opposite sides thereof, a convex presser-bar at one side of the anvil arranged in spaced relation thereto to receive the work therebetween, means for relatively mov-
25 ing the presser-bar and anvil to bend the work into the opening in the anvil, and means adjacent the anvil for applying a fastener, the beveled portions of the anvil at the sides of the opening being adapted to guide the legs of the fas-
30 tener across the opening and through the work clamped therein.

13. In a device of the type indicated, an anvil having spaced prongs with an opening there-
35 between, said prongs having beveled edges at the sides of the opening with opposed clincher-grooves therein, a convex presser-bar arranged in spaced relation to the side of the anvil opposite the clincher-grooves to receive the work
40 therebetween, means for relatively moving the presser-bar and anvil to bend the work into the opening between the prongs, and means for applying a fastener adjacent the side of the anvil having the clincher-grooves whereby the
45 legs of the fastener are guided across the opening and through the bend of the work.

14. A device for attaching the cuff to the leg
portion of trousers with a blind metal stitch comprising means for producing a bend in the
50 cuff, means for driving a fastener through the leg portion of the trousers, and means for deflecting the legs of the fastener to cause them to pass through the bend in the cuff to penetrate the inner fabric layer without penetrating the
55 outer fabric layer of the cuff fold.

15. A device for attaching the cuff to the leg
portion of trousers with a blind metal stitch comprising an anvil having a central opening
60 therein and adapted to be inserted between the cuff and leg portion of the trousers, a presser-bar engageable with the outside of the cuff to press the folds into the opening in the anvil, fastener-applying means engageable with the
65 inside of the trouser leg, and means for relatively moving the presser-bar and anvil to clamp the cuff therebetween and thereafter operating the fastener-applying means to drive a fastener through the trouser leg and the portion of the cuff projecting into the opening in the anvil.

16. A device for attaching the cuff to the leg
70 portion of trousers with a blind metal stitch comprising an anvil having spaced prongs with an opening therebetween, said anvil being adapted to be inserted between the cuff and leg portion of the trousers, a convex presser-bar engageable
75

5 with the outside of the cuff, staple-applying means at the opposite side of the anvil, and means for relatively moving the presser-bar and anvil to bend the cuff into the opening between the prongs and thereafter operating the staple-applying means to drive a staple, the legs of

said staple penetrating the trouser leg and the prongs of said anvil deflecting the legs to cause them to pass through the bend in the cuff and penetrate one layer only of its fold.

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