

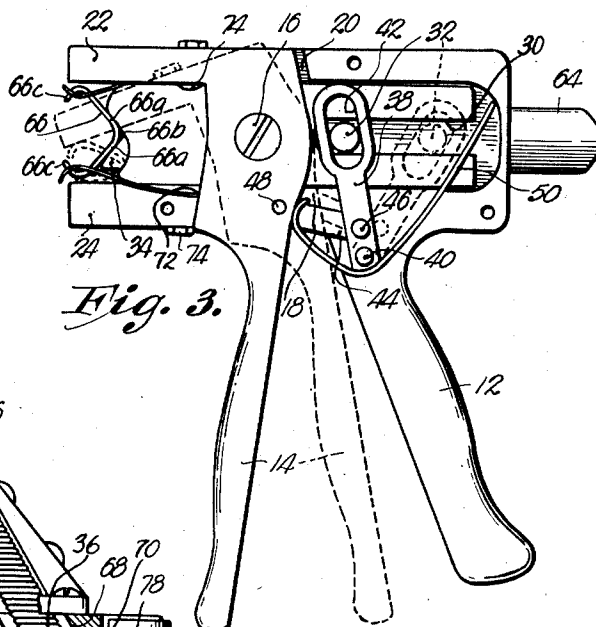
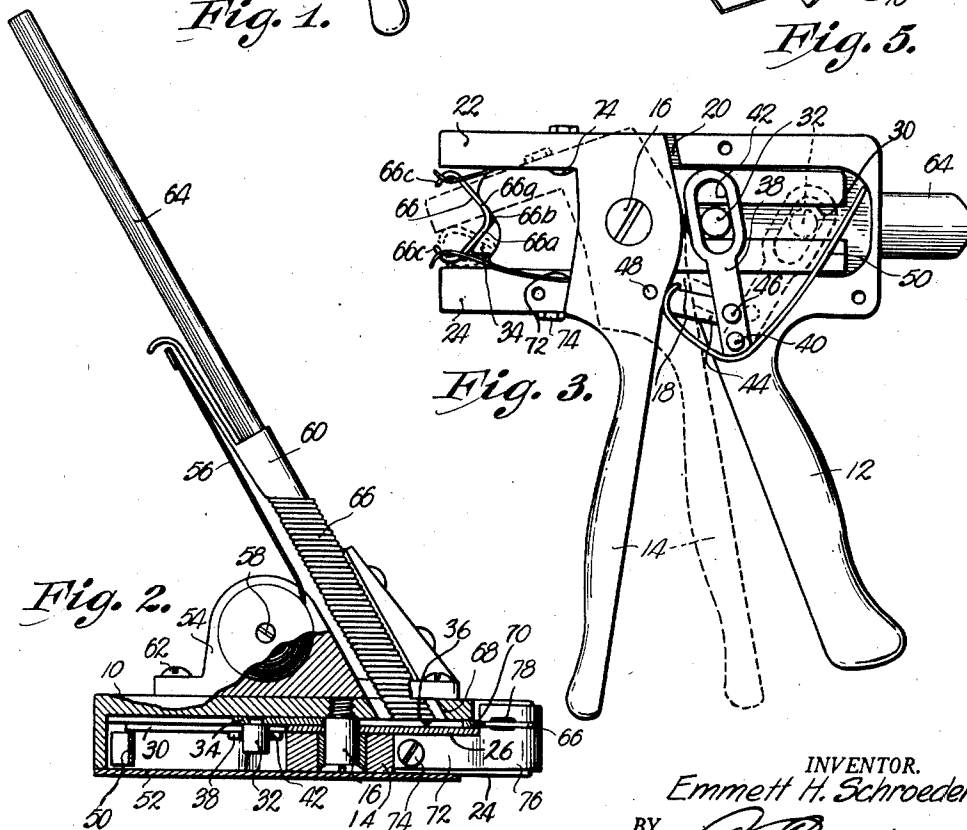
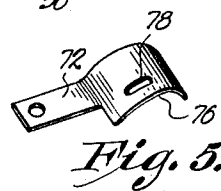
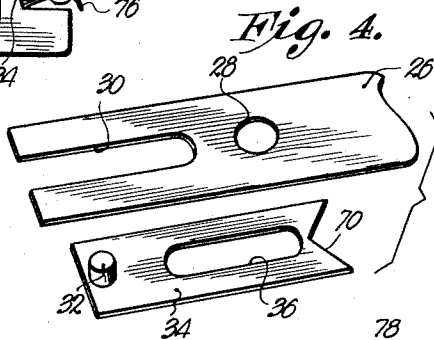
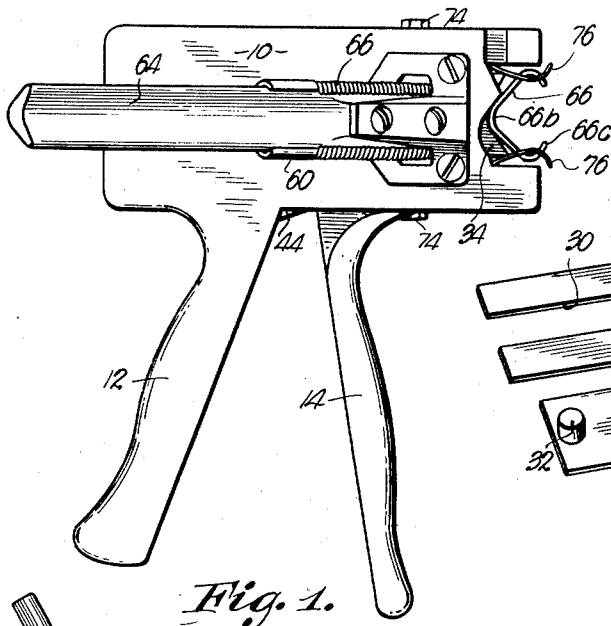
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CLIP-APPLYING TOOL

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CLIP-APPLYING TOOL

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1 Claim. (Cl. 1—49)

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This invention relates to hand tools for automatically applying conventional clips of the kind formed from bendable metallic material, such as steel wire, and initially having a substantially U-shape and being bendable to a closed looped condition when applied.

The most important object of this invention is to provide a clip-applying tool having a pair of jaws movable toward and away from each other through the medium of manually operable grips or handles having connection with the jaws and, also, provided with reciprocable structure operable by movement of the jaws for automatically moving the clip to be applied to a position between the jaws where the clip can be squeezed together in a loop-forming condition.

Another important object of this invention is the provision of a clip-applying tool as above mentioned, wherein the reciprocable structure constitutes a plate-like plunger adapted to move to and from a position between the jaws as the latter are shifted and to carry therewith a clip to be applied for positioning between said jaws.

A further object of this invention is to provide a clip-applying tool of the aforementioned character having a resilient means in the form of slotted leaf springs positioned on proximal faces of the jaws for holding the clip in a position for closing by the jaws after the plunger shifts to a position from between the jaws.

Other objects of this invention include the way in which novel linkage is disposed between the reciprocable plunger and one of the jaws for actuating the former; the way in which a plurality of clips are fed singly to a position within the path of travel of the plunger when the latter is at one end of its path of travel away from the jaws; the manner in which a passageway is formed to present a guide for the clips as the same move from the fed position to the position between the jaws; and the manner in which the plunger per se is formed at one end thereof to conform to the contour of the clip as initially manufactured.

Other objects will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Fig. 1 is a top plan view of a clip-applying tool made in accordance with the present invention.

Fig. 2 is an end elevational view thereof, parts being broken away and in section to reveal details of construction.

Fig. 3 is an inverted plan view with the case-covering plate entirely removed.

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Fig. 4 is a perspective stretched-out view of the reciprocable plunger and its guide plate, showing the same entirely removed from the tool itself; and,

Fig. 5 is a perspective view of one of the resilient holding means for the clips, showing such holding means entirely removed from its jaw.

As might well be appreciated, the need for a simple, sturdy and easily-operated device for applying relatively heavy clips where needed has become apparent. It is appreciated that many manually operable devices have heretofore been made for affixing clips, particularly those for fastening together loose leaves of paper, but heavier clips used for tagging merchandise, joining together articles of relatively strong and heavy material and the like, are ordinarily affixed by hand or through use of tools not capable of feeding the clips automatically.

The tool shown in the drawing includes an elongated hollow body broadly designated by the numeral 10, having a handle 12 extending laterally from one edge thereof and preferably integral with body 10. A second handle or grip 14 is mounted for movement toward and away from grip 12 as illustrated by a dotted line in Fig. 3 of the drawing through the medium of a pivot pin 16. The grip 14 extends through an opening 18 formed in said edge of body 10 having grip 12 extending therefrom and projects through body 10 into a slot 20 formed on the opposite edge of body 10.

As shown in Fig. 2 of the drawing, the pivot pin 16 is entirely enclosed within the body 10 and is threaded into one wall thereof. One end of the grip 14 extends laterally, presenting a jaw 22 disposed in opposed relationship to a jaw 24 extending laterally from one end of body 10. Said end of body 10 is open and a guide plate 26 mounted within body 10 extends outwardly therefrom in the same direction as jaws 22 and 24.

Guide plate 26 has an opening 28 intermediate its ends for receiving the pivot pin 16 which holds plate 26 in place within body 10. Plate 26 is, also, provided with an elongated slot 30 extending inwardly from one end thereof, said slot 30 being entirely disposed within body 10 and providing clearance for a laterally-projecting stub pin 32 formed adjacent one end of a reciprocable plunger 34. Plunger 34 slides upon one face of guide plate 26 and has an elongated slot 36 disposed longitudinally therein for clearing the pivot pin 16 as plunger 34 reciprocates.

As shown in Fig. 3 of the drawing, the hollow portion of body 10 extends a distance into the

grip 12 for pivotally receiving an elongated link 38. This said one end of link 38 is pivotally joined as at 40 directly to the grip 12 and has an elongated cam slot 42 formed adjacent its opposite end for receiving the stub pin 32 that projects through slot 30 of plate 26. A short link 44 pivotally interconnects link 38 and grip 14 as at 46 and 48, respectively.

A substantially L-shaped leaf spring 40 within the body 10 is looped around the end of link 38 adjacent pivot pin 40 and bearing against the grip 14 for yieldably holding the same separated from the grip 12 and, consequently, for yieldably holding the jaws 22 and 24 separated. A flat plate 52, removably mounted upon body 10 in any suitable manner, entirely encloses spring 50, links 38 and 44, a portion of the grip 12 and a portion of plate 26, as well as plunger 34.

One face of the body 10 opposite to the plate 52 carries a housing 54 for an elongated spring 56 that is coiled about an axis 58 and extends outwardly from housing 54 for connection with a follower 60. Housing 54 is joined directly to body 10 through the medium of screws or the like 62 and has an elongated rod 64 extending laterally, outwardly and at an angle from said one face of body 10. This rod 64 is peculiarly contoured in cross section to slidably receive a plurality of clips 66.

As clearly illustrated in Figs. 1 and 3 of the drawing, these clips 66 are substantially U-shaped and, more specifically, are circular and are provided with sharpened free ends. These clips 66 are threaded upon the rod 64 as is the follower 60, the latter serving to yieldably hold clips 66 toward the innermost end of rod 64 by means of the leaf spring 56.

Body 10 has an opening 68 formed in that wall thereof opposite to plate 52, communicating with the clips 66 on rod 64, said clips being fed by action of spring 56 into the body 10 and in front of one end of the plunger 34 when the latter is at one end of its path of travel within body 10. This end of the path of travel of plunger 34 is illustrated by dotted lines in Fig. 3 of the drawing. The leading end of plunger 34 for receiving clips 66 has a triangular notch 70 formed therein that conforms substantially to the contour of clips 66.

The proximal faces of each of the jaws 22 and 24 are provided with a resilient holding member 72. These holding members 72 are of identical character and are joined by screws or the like 74 directly to the corresponding jaw 22 or 24 and are arched as at 76 adjacent the free end thereof. Each of these members 72 is provided with an elongated slot 78 for receiving the clips 66 in the manner illustrated in Figs. 1 and 3 of the drawing.

When mounted upon the jaws 22 and 24, members 72 curve inwardly and, since the same are resilient, they readily straighten when jaws 22 and 24 are brought together for bending clip 66 into a substantially closed loop.

In operation, clips 66 are at all times held at one end of their path of travel on rod 64 within opening 68 by means of the spring 56. When the grips 12 and 14 are separated, as shown by full lines in Fig. 3 and, also, as illustrated in Fig. 1, the reciprocable plunger 34 is disposed between the jaws 22 and 24 because of the peculiar shape and disposition of links 38 and 44.

When the grips 12 and 14 are manually moved together by application of a squeeze action thereto, the plunger 34 slides inwardly to one end of

its path of travel, where the notched end 70 thereof clears the next clip 66 to be fed through opening 68, whereby said clip 66 moves into the body 10 in front of plunger 34. When the grips 12 and 14 are released for separation with a consequent separation of jaws 22 and 24, the plunger 34 will shift to the opposite end of its path of travel between jaws 22 and 24, carrying therewith a single clip for positioning between the members 72. Such clip will automatically be fed into the slots 78 and remain therein after plunger 34 returns into the body for receiving another clip.

As grips 12 and 14 are manipulated to so return the plunger 34, the clip 66 that is disposed between jaws 22 and 24 will be squeezed to a loop-forming condition by the action of jaws 22 and 24 moving together. The clips 66 will readily slip from the slots 78 after the same have been formed into a loop.

Manifestly, the supply of clips 66 may be easily replenished on rod 64 by slipping the follower 60 therefrom as spring 56 is pulled outwardly from within housing 54. Clips 66 in their expanded condition have a form as illustrated in Figs. 1 and 3. The form of the expanded clip 66 is U-shaped with the legs 66-a diverging from a relatively narrow bight 66-b that forms the zone of flexure when the legs 66-a are moved together by force exerted thereon through the movement of jaws 22 and 24.

The free ends of legs 66-a have sharpened, in-turned spurs 66-c that abut or overlap when a complete loop is formed by the tool. These spurs 66-c are substantially perpendicular to legs 66-a when the clip 66 is in an open condition, and jaws 22 and 24 exert pressure upon clip 66 at the zone of juncture between legs 66-a and spurs 66-c.

Clips 66 are usually secured together by lacquer, glue or other frangible substance that will allow the clips to be fed from the stick thereof by the tool as it is in operation. The clip stick has the clips 66 thereof disposed at an angle to the longitudinal axis of the stick. The clips are parallel to the outward path of travel of the clip being fed as grip 14 is moved in one direction.

Advantages arising from disposing rod 64 at an angle are obvious to those skilled in the art, and it will be further observed that manipulation is facilitated by such arrangement.

It can now be appreciated that a strong, sturdy and efficient clip-applying tool has been produced that is not likely to get out of order and that requires very little operator attention or repair.

It is desired, therefore, to be limited only by the spirit of this invention and the scope of the appended claim.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

A clip applying tool comprising a body having a jaw and a handle rigid thereto; a second handle pivotally secured to the body and movable toward and away from said body handle; a second jaw rigid to the second handle and movable toward and away from said body jaw as said second handle is moved toward and away from the body handle respectively; a magazine for clips mounted on the body; and mechanism carried by the body and operably connected with said second handle for feeding clips singly from the magazine to a position between said jaws as said second handle is moved away from said body handle, said mechanism including a member reciprocable in

a rectilinear path to and from a position between the jaws, there being an element pivotally inter-connecting said body and said member for reciprocating the latter, and a link pivotally joining said element and said second handle.

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