

Oct. 19, 1965

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3,212,317

TOGGLE ACTUATED CRIMPING TOOL

Filed Oct. 1, 1963

2 Sheets-Sheet 1

Fig. 1

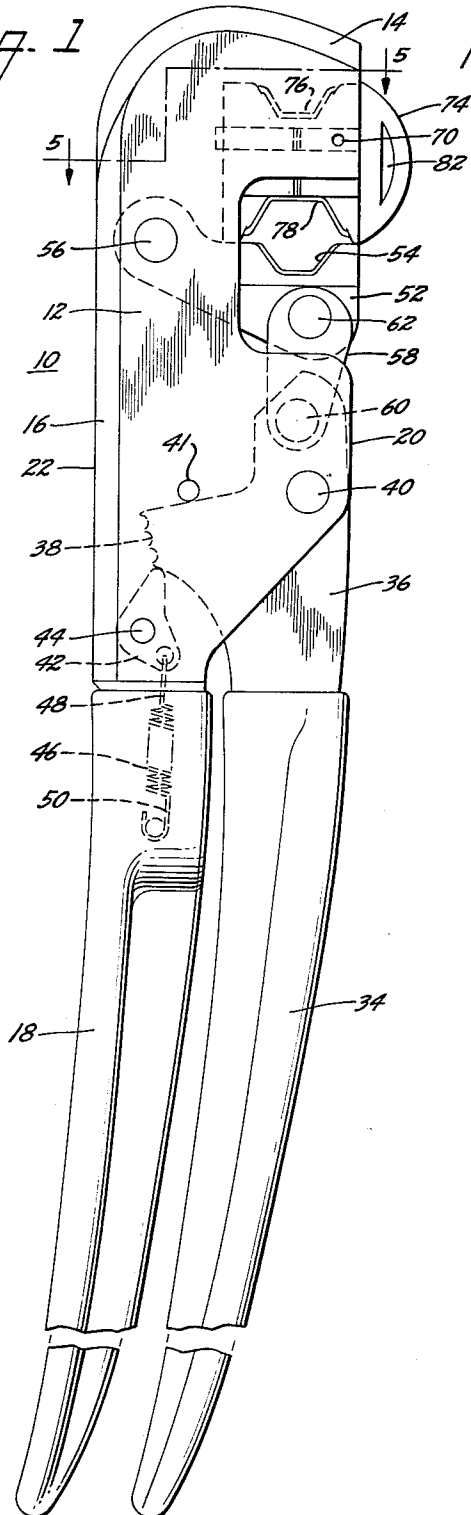
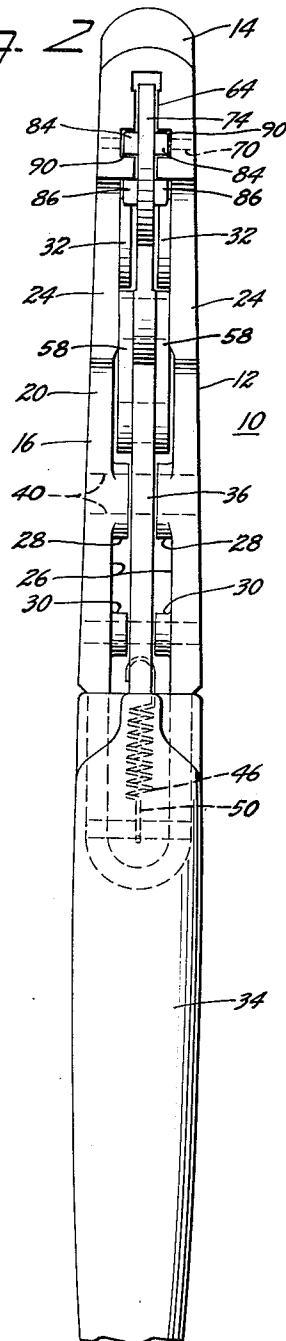


Fig. 2



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Fig. 3

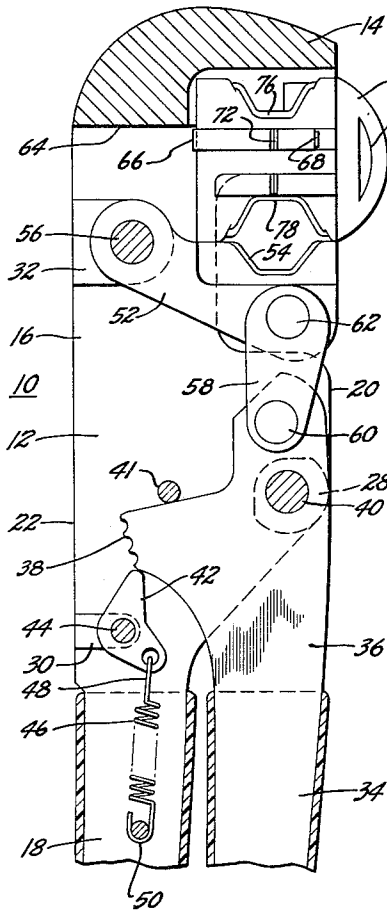


Fig. 4

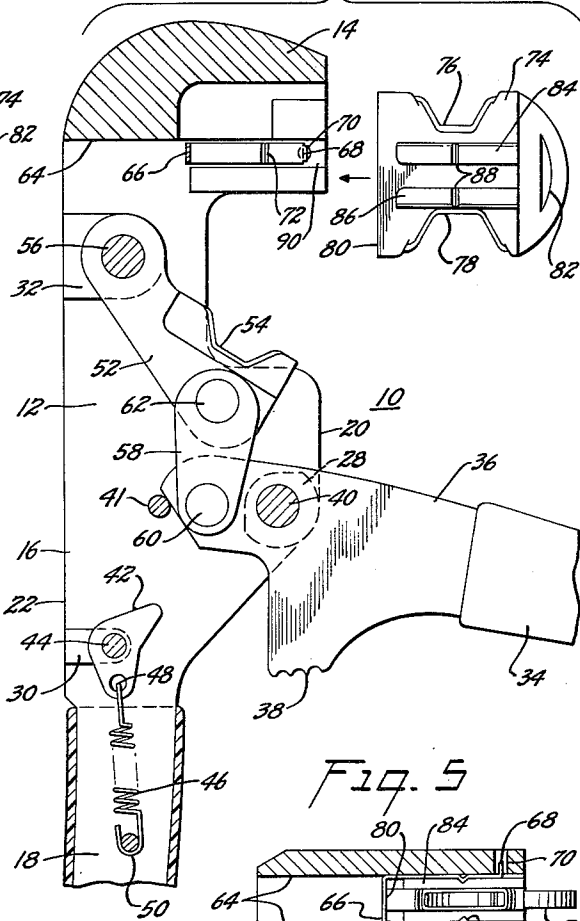


Fig. 5

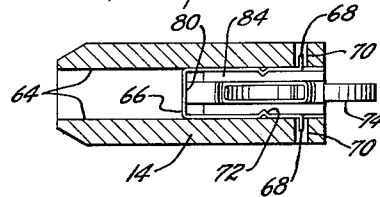


Fig. 6

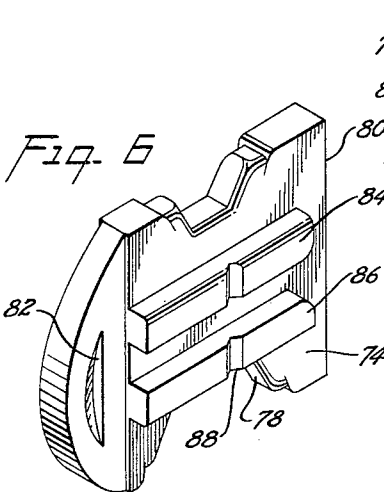
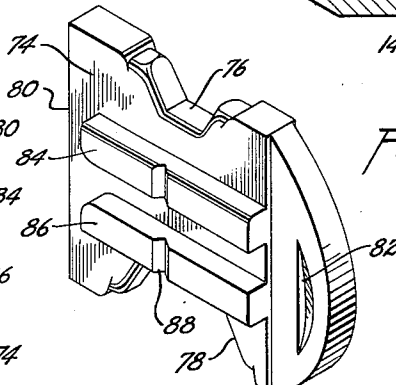


Fig. 7



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TOGGLE ACTUATED CRIMPING TOOL

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1 Claim. (Cl. 72-413)

The present invention relates to hand tools of the pliers type, for example, and more particularly to improvements in the jaw structure of hand tools of the general character exemplified in U.S. Patents 2,696,747 and 2,738,693.

More specifically, the invention resides in a hand tool of the character specified wherein the opposed working surfaces of its jaw members comprise complementary die members and wherein one of its die members is provided with two different size die faces in opposed relation and said die member adapted to be reversed in the head-end of the tool or removed therefrom for the substitution of another complementary die member in the head-end of the tool for co-action with the movable jaw member of the tool on articles having different diameters.

In a squeeze pressure hand tool, as known heretofore, the fixed relatively movable jaw members were provided in or on their opposed working surfaces with complementary die elements which were not instantly removable or reversible and adapted solely for operating on a cable conductor or splicing sleeve therefore of a given diameter. Thus, since insulated conductive cables and splicing sleeves therefor come in a number of different sizes as regards diameter, the cost of squeeze pressure hand tools, of the character described, for each size thereof was prohibitive.

Accordingly, it is an object of the invention to provide improvements in a hand tool as described, which by reason of said improvements has greater utility and size range than similar tools used heretofore.

A further object of the invention is to provide an improved hand tool of the character described whereby tool costs involved in the splicing of different sizes of multi-strand cable conductors, by means of malleable metal splicing sleeves, are materially reduced.

Another object of the invention is to provide an improved hand tool of the character described wherein a single pair of relatively movable die elements are adapted for crimping malleable metal cable splicing sleeves of several different diameters.

A further object of the invention is to provide an improved hand tool having a variable size range which may be instantly increased or decreased by reversing one of its relatively movable jaw members.

Another object of the invention is to provide an improved hand tool of the character described wherein one of its relatively movable jaw members is adapted to be reversed, removed and replaced speedily and simply without the use of additional tools or the like as well as without an unusual degree of skill.

A further object of the invention is to provide an improved hand tool of the character described wherein a fixed jaw portion, integral with the body of the tool, is internally recessed for housing a removable jaw insert having opposed die faces differing in size and adapted to be reversed and reinserted therein or another insert having other size die faces substituted therefor.

With the above and other objects in view, the invention resides in the novel construction and arrangement of parts, the novel features of which are set forth with particularity in the appended claim, the invention itself, however, both as to its organization and method of operation, together with additional objects and advantages

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thereof, being best understood from the following description of a specific embodiment thereof, when taken in connection with the accompanying drawings in which:

FIGURE 1 is a side elevational view of the improved tool;

FIGURE 2 is a front edge view of the tool;

FIGURE 3 is a longitudinal sectional view through a major portion of the tool illustrating the removable jaw insert in co-actable engagement with a pivoted, relatively movable jaw member and the linkage actuating the same in response to relative movement of its handle members.

FIGURE 4 is a similar longitudinal sectional view through the tool showing the removable jaw insert withdrawn from its head-end portion and the relatively movable handle members as actuated to move the pivoted jaw member into open position;

FIGURE 5 is a detail sectional view taken on the line 5-5 of FIGURE 1, showing the manner in which the removable jaw insert is detachably retained in the head-end portion of the tool;

FIGURE 6 is a perspective view of the removable jaw insert per se, as seen from the right side of the sheet showing its opposed die faces and one pair of its spaced, parallel load carrying elements; and

FIGURE 7 is a similar perspective view of the removable jaw insert per se, as seen from the left of the sheet showing the opposite pair of its spaced, parallel load carrying elements.

Referring to the drawings, the improved hand tool generally indicated at 10, comprises a flat, elongated body member 12 of cast metal having substantial thickness and width defining a head-end portion 14, an intermediate portion 16, and a tapered tail-end portion forming a handle member 18, which is suitably insulated and curves slightly toward the rear edge face of the body member 12.

As shown in FIGURES 2, 3 and 4, the intermediate portion 16 of the body member 12 is internally recessed in the plane thereof, in known manner inwardly from its front edge face 20 to its opposite or rear edge face 22 to form two spaced parallel walls 24, each of which is notched or cut out in transverse alignment, inwardly from a portion of their front edge face 20 to provide a rectangular clearance opening 26, for the exposure of the working faces of a pair of relatively movable die members as hereinafter described.

As best shown in FIGURE 2, the inner faces of the body member 12 are provided with opposed bosses 28, 30 and 32, suitably spaced apart to provide for pivotally receiving the relatively movable elements, now to be described, therebetween. Thus, as shown in FIGURE 1, a slightly curved complementary, insulated handle member 34 having a flat end portion 36 and a ratchet faced projection 38, formed on one edge face thereof, is inserted between the walls 24, and the opposed bosses 28, and pivoted therebetween by means of a pivot pin 40 whereby the handle member 34 is adapted to have relative swinging movement between the limits imposed thereon by a step pin 41, fixed transversely of the recessed, flat body member 12, as shown in FIGURES 3 and 4.

A pawl 42, adapted to coast with the ratchet teeth 38, on the aforesaid end portion 36 of the handle member 34, is pivoted between the opposed bosses 30 on the inner sides of the walls 24 forming the body member 12 by means of a pivot pin 44, and yieldably biased into engagement with said ratchet teeth 38 by means of a retractile spring 46 connected at one end to a depending arm of the pawl 42, as at 48, and at its opposite end to a fixed pin 50 extending transversely of and through a suitable recess (not shown) in the handle member 18,

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and constituting the "full stroke compelling mechanism" as fully described in Bergan Patent 2,696,747.

As best shown in FIGURES 3 and 4, a movable jaw member 52, in the form of a link having a die cavity or face 54 of substantially hexagonal configuration, but not a true hexagon configuration formed in one edge face thereof, is pivoted at one end thereof between a pair of opposed bosses 32 on the inner faces of the walls 24 of the tool 10 by means of a pivot pin 56 with its die cavity or face 54, disposed uppermost, the free end of the movable jaw 52 being pivotally connected to the flat, free end 36 of the handle member 34 by means of a pair of oppositely disposed toggle links 58, including pivot pins 60 and 62, therefor whereby the jaw member 52 is adapted to have angular movement across the cut-out area 26 in the walls 24 of the body member 12 in response to relative movement of the handle member 34.

In accordance with the invention and as best shown in FIGURE 2, the head-end portion 14 of the body member 12 is also recessed in the plane thereof, as by broaching, milling, slotting or other suitable machining operation to provide the tongue and groove configuration, indicated at 64 for the reception of an insert retention spring 66 of U-configuration having oppositely turned ends 68 yieldably extending into a pair of oppositely aligned openings 70 in said slotted head-end portion 14, whereby to hold the spring 66 in place as shown in FIGURE 5, the parallel legs of the spring 66 being bent as at 72, whereby the spring 66 co-acts with a complementary jaw insert 74, now to be described.

As clearly shown in FIGURES 6 and 7, the jaw insert 74 comprises a substantially rectangular plate-like member having a squeeze pressure crimping die face or cavity 76 of one size formed in one edge face thereof, and another die face or cavity 78, of a larger size formed in its opposite edge face, the rear edge face 80 being perpendicular to the die faces 76 and 78 and its parallel front edge face being rounded and provided with opposite side "Finger Grip" recesses 82.

Further in accordance with the invention, the complementary jaw insert 74 is further provided on each of its side faces with a pair of spaced, parallel load carrying keys or tongues 84 and 86, each of which are notched transversely intermediate their ends with a V-groove 88, adapted to register with the V-bend 72, provided therefor in each leg of the retention spring 66, the pair of keys 84 being common to the die face or cavity 76 and the pair of keys 86 common to the die face or cavity 78. Thus, when the removable jaw 74 is inserted in the head-end portion 14 of the tool 10, with its larger die face 78 in opposed working relation with the die face of the pivoted jaw 52, the load carrying keys 84 will be disposed in the opposed slots 90, formed in the walls defining the recess 64, extending in the plane of and substantially through the head-end portion 14 of the tool. With the jaw insert 74 so positioned, the bent portions 72 of the spring 66 will be seated in the V-grooves 88 in either of the load carrying keys or tongues 84 or 86, whereby the jaw insert 74 is yieldably retained in the head-end portion 14 of the tool 10 for coactable engagement with the pivoted jaw 52, in the crimping of an article of compatible size therebetween.

When, for example, the article to be crimped is not of compatible size or diameter with respect to the die cavity

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76, the jaw insert 74 is withdrawn from the recess 64 in the head-end 14 of the tool 10, and reversed and re-inserted therein in which case the load carrying keys 86 will be disposed in the opposed slots 90 therein and the opposite die face 78 thereof thus positioned for coactable engagement with the die face 54 of the pivoted jaw 52 as in FIGURE 3. In cases where a true hexagonal crimp is not necessary or desired, a jaw insert having larger or smaller die cavities or die cavities of other than hexagonal configuration, within certain narrow limits, with respect to the cavity 54 in the jaw 52, may also be employed in comprise fashion as suggested in FIGURE 1.

While the invention has been shown and described with respect to a preferred embodiment thereof, it is to be expressly understood that various changes and modifications may be made therein without departing from the inventive concept underlying the same. Therefore, the herein described invention is not to be limited except as is necessitated by the prior art and the scope of the appended claim.

What is claimed is:

In a hand tool of the character described, the combination of a flat, cast steel body member having a recess in the plane thereof substantially throughout its width and length providing a pair of spaced, parallel walls, said recessed body member terminating at one end in a recessed head-end portion extending normal thereto, and at its opposite end in a tapered handle member, a second handle member having a flat end portion pivoted between said walls in complementary relation to said first named handle member and adapted for movement relative thereto, a jaw member having a die cavity in one edge face thereof pivoted between said walls adjacent said head-end portion, a pair of toggle links pivotally connected between the flat end portion of said pivoted handle member and the free end portion of said pivoted jaw, the improvement comprising; a substantially rectangular jaw insert having a different size die cavity in each opposite side edge face thereof removably seated in the head-end portion of said body member with one of its die cavities in opposed working relation with the die cavity in said pivoted jaw, coactable means integral with said head-end portion and said jaw insert comprising recessed bearing surfaces on said head-end portion and elongated load carrying keys on said jaw insert, and resilient means within said recessed bearing surfaces adapted to coact with said load carrying keys for yieldably retaining said jaw insert against endwise movement in said head-end portion, and a finger grip portion formed on one of the lateral edges of said insert and extending outwardly of the body member.

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