Nov. 3, 1959 C. H. KLEIN 2,910,900

ADJUSTABLE MULTIPLE LEVER TOOL

Filed Jan. 30, 1958

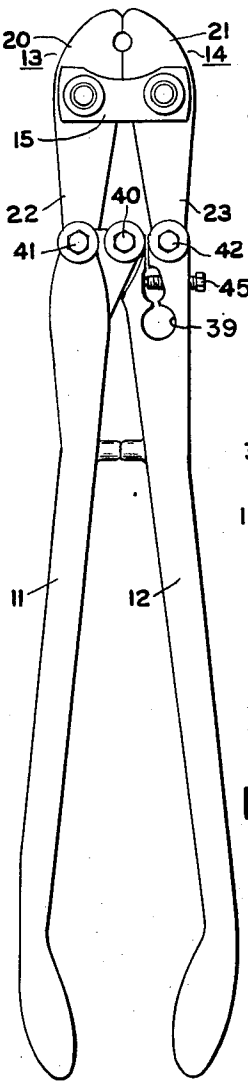

FIG. 1

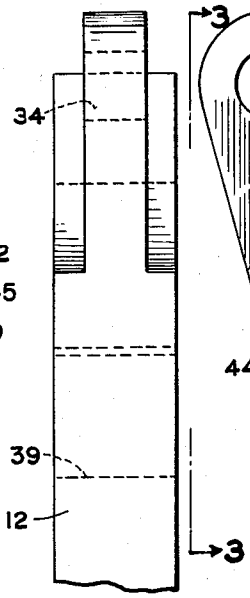

FIG. 3

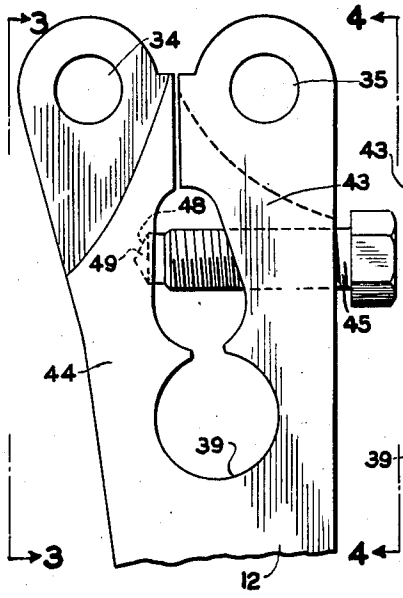

FIG. 2

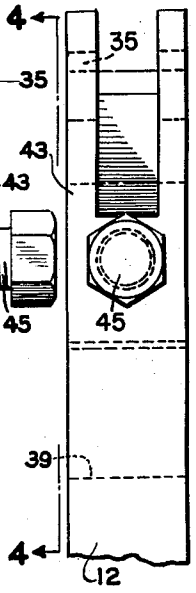

FIG. 4

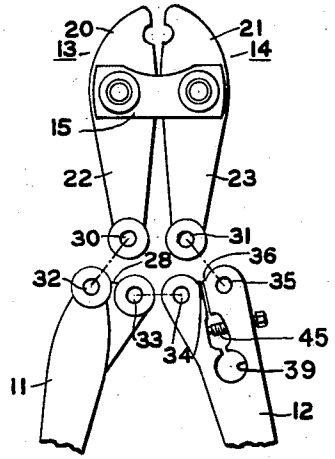

FIG. 5

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United States Patent Office 2,910,900
Patented Nov. 3, 1959

2,910,900

ADJUSTABLE MULTIPLE LEVER TOOL

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Application January 30, 1958, Serial No. 712,113

3 Claims. (Cl. 81—15)

This invention relates to tools of the multiple or compound lever type in which jaws which operate on the work are pressed against it through the operation of a toggle moving towards the straightened position, and the object is to provide an improved construction which permits the relative positions of the pivotal centers to be adjusted as necessary to control the action.

One field of use for such a tool (to which however the invention is not limited) is for the work of compressing metal sleeves about electric conducting wires, in which case the sleeve is indented, and it is desired that the force exerted and the resultant indentation be at an optimum value and this will generally correspond to a position of the working jaw faces relative one to another when the toggle reaches tis final position substantially close to the dead center position. A tool intended for this use is shown by way of example and specifically described in the following specification.

Multiple lever tools of the type disclosed in the patents to Lindsay 146,829 and 147,850 in which the jaws are actuated by a toggle are well known and the tool herein illustrated and described is of that general type. Heretofore various constructions have been provided for adjusting the relative positions of the pivotal centers of the toggle, but these have been relatively complicated and expensive as contrasted with the arrangement which is the subject matter of the present invention, which is superior in its simplicity, strong within the existing dimensional limitations and readily manipulated.

The invention will be well understood by reference to the following description of the embodiment thereof shown by way of example in the accompanying drawings, wherein:

Fig. 1 is a front view of an adjustable, hand-driven, toggle-operated tool constructed in accordance with the invention, the parts being in closed position;

Fig. 2 is a front view of the forward end portion of the right hand operating lever of the tool;

Figs. 3 and 4 are side views of the same as seen from the left-hand and the right-hand side of Fig. 2, looking in the directions of the arrows 3—3 and 4—4 respectively; and

Fig. 5 is a front view coresponding to Fig. 1, showing the parts at the forward end of the tool separated.

In the following description the words ''right" and "left" have been used with reference to the drawings and the words "forward" and "rearward" are used from the point of view of a user grasping the tool at the lower end viewing Fig. 1 and holding it extended away from his body, "forward" being toward the jaw-carrying end at the upper portion of Fig. 1 and "rearward" in the direction of the handle extremities at the bottom of Fig. 1. The words are of course relative for convenience of description and have no inherent significance.

Referring now to the drawings, the tool shown comprises a pair of head levers 13 and 14 which are pivoted together and herein, since the levers do not cross, they are pivoted at intermediate points of their length on plates

15. The forward portions are jaws 20 and 21, which as shown have semicircular receses to engage and indent a sleeve for crimping it on an electric conducting wire, and the rearwardly extending portions 22 and 23 are tails which when forced apart cause the jaws to move together and operate on the work. The actuating levers 11 and 12 which move the jaw tails are, mechanically speaking, bent levers and these levers have at their forward extremities knuckle portions 33 and 34 receiving a central pivot 40 poining them together and respectively at points closely adjacent to this pivotal point 40 knuckles 32 and 35 which are joined to knuckles 30 and 31 on the tails of the head levers by pivot pins 41 and 42 to provide relatively short arms organized as a toggle of which the centers are 40, 41 and 42, although in the example illustrated the short arm between the centers 40 and 42 does not physically extend in a straight line between them. The actuating levers are extended beyond the centers 41 and 42 rearwardly, and herein form long actuating handles 11 and 12 which are integral with the forward parts of the levers although they need not be integral.

The tool shown is adapted to be operated by the hands of the operator grasping the rearward ends of the levers, moving the same together without the intervention of mechanical or power increasing mechanisms or motor driven mechanism, the application of which to such actuating arms is sufficiently obvious.

Referring to Fig. 1 it will be seen that if the levers 11 and 12 were moved outwardly to the left and right respectively, the center 40 of the toggle would move downwardly drawing together the centers 40 and 42 and opening the jaws 20 and 21 of the tool. In the opposite action the toggle is straightened, presses the centers 41 and 42 apart with great force and exerts correspondingly great pressure on the work. In accordance with the invention the relative position of the three centers 40, 41 and 42 of the toggle is subject to adjustment and herein I have shown such adjustment at the right-hand side viewing Fig. 1. For this purpose the forward end portion of the bent lever at the left, including the forward end of handle 12 and the knuckles 34 and 35, consists of a massive body of suitable metal, preferably forged steel which is ductile in the sense that it may be deformed by the means to be described without danger of fracture, but having such yield strength that in the cross sections involved the parts will be substantially inflexible under minor bending pressures substantially lower than those exerted by means of the toggle mechanism. The knuckles 34 and 35 which receive the pivots 40 and 42 are formed in this block of metal which as best seen in Fig. 2 is cleft rearwardly in a plane extending between those knuckles to provide integrally based pivot supporting parts 43 and 44 which are substantially inflexible for instance in the movement counterclockwise about the center 40 where the load is merely that involved in opening the jaws. They are held against movement toward one another and away from any given position of adjustment by means of a screw 45 threaded into the member 43 and having an end 49 abutting against a suitable surface of the right-hand side of the part 44. Thus the thrust of the toggle in operating between the pivots 40 and 42 is taken up by this screw and the two parts remain rigidly related one to another.

When it is desired to adjust the parts the screw may be set up causing such deformation of the two parts as to cause the toggle arm to lengthen so that movement of the center pivot 40 of the toggle toward dead center to a given position will move the jaws closer together than they would be moved without such adjustment.

The cleft defining these parts is preferably round at its bottom to obviate any sharp corner where a fracture would be more apt to start, and in particular it may ex-

tend into a portion 39 which is a major segment of a cylinder as seen in Fig. 2. This provides a fillet strengthening the two parts and, without localizing the line of bend too sharply, provides at the extremities of the horizontal diameter viewing Fig. 2 a relatively narrow neck defining a preferential zone of bending when the screw is operated for adjustment purposes.

While it would not be a proceeding likely to be resorted to in most instances, it is apparent that if the two parts 43 and 44 are spread apart too much, as for instance might be found to be the case if a new pair of head levers were substituted for a pair which had been unduly worn down after successive adjustments of the parts by means of the screw had been resorted to, that with the screw removed or slackened the part shown in Fig. 2 could be subjected to compression from either side to bend the two parts back to their initial positions. When the material of the end of the lever is properly chosen such proceeding might be resorted to a number of times without damage to the structure.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, as is in fact clear in several matters from the description itself. Reference is to be had to the appended claims to indicate those principles of the invention exemplified by the particular embodiment described and which I desire to secure by Letters Patent.

I claim:

1. A tool of the multiple lever type comprising a pair

of interpivoted head levers having work-deforming jaws at one side of the pivot and tails on the opposite, and means for moving the tails comprising two actuating levers pivoted together at their forward ends and adjacent to their common pivot being pivoted respectively to said tails to provide short arms extending between the tails as a toggle, the actuating levers extending rearwardly from the tails to provide actuating arms to which force may be applied to operate the toggle, in which tool the forward end portion of at least one of the actuating levers is a massive integral body of ductile metal in which body the pivots are organized, the body being cleft rearwardly in a plane extending between said pivots to provide integrally based projecting pivot-supporting parts essentially inflexible as against small strains and a screw mounted in one of said parts and bearing on the other for adjustably flexing them apart and for receiving the thrust of the toggle when the tool is operated.

2. A tool as set forth in claim 1 wherein the cleft rearwardly terminates as a curvilinear bottom portion.

3. A tool as set forth in claim 1 wherein the bottom portion is a major segment of a cylinder and at its sides defines relatively thin zones of preferential bend in said parts.

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