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M. L. KLINGLER

3,423,987

HAND TOOL FOR INTERCHANGEABLE HEADS

Filed March 7, 1966

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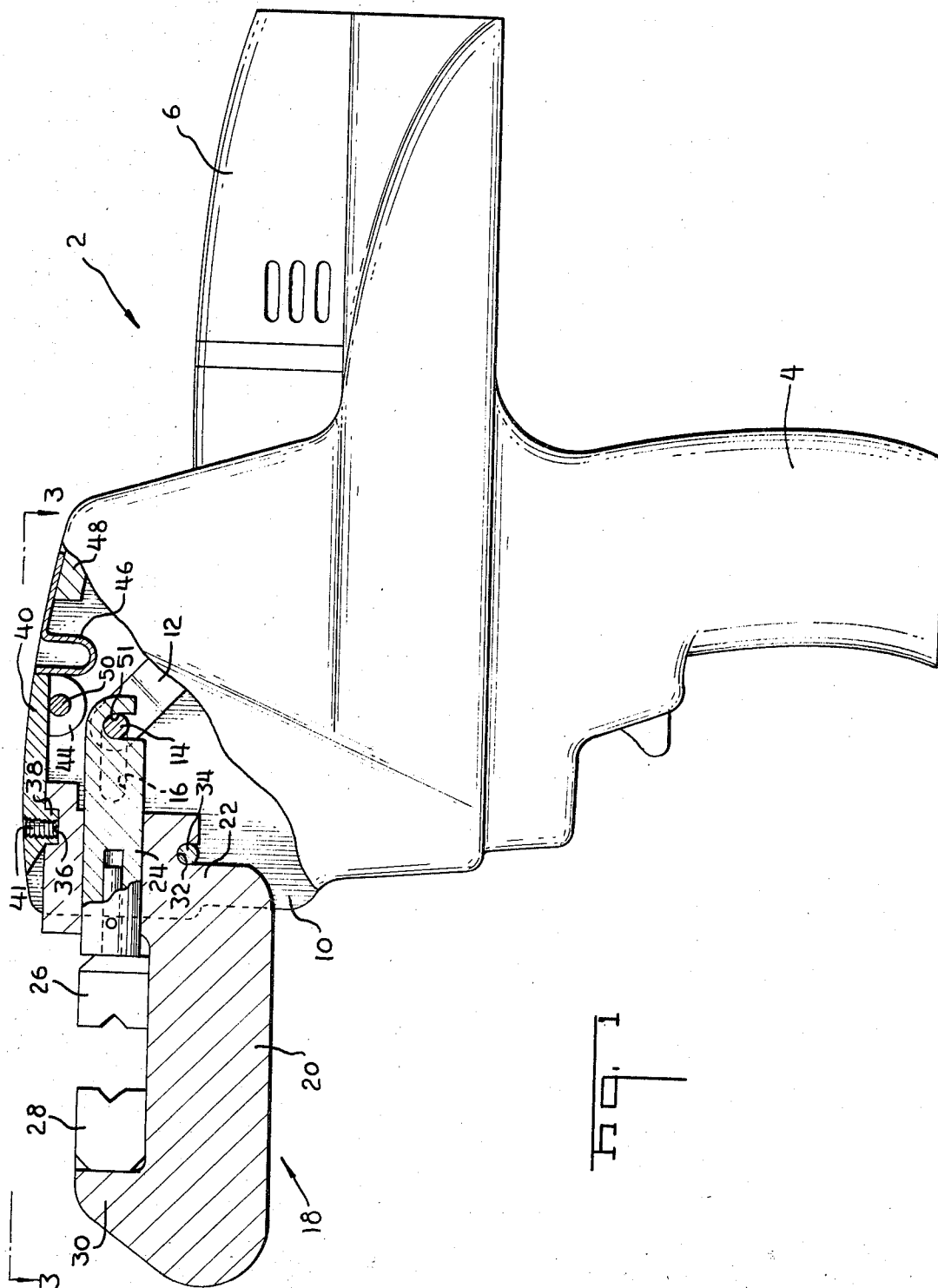


Fig. 1

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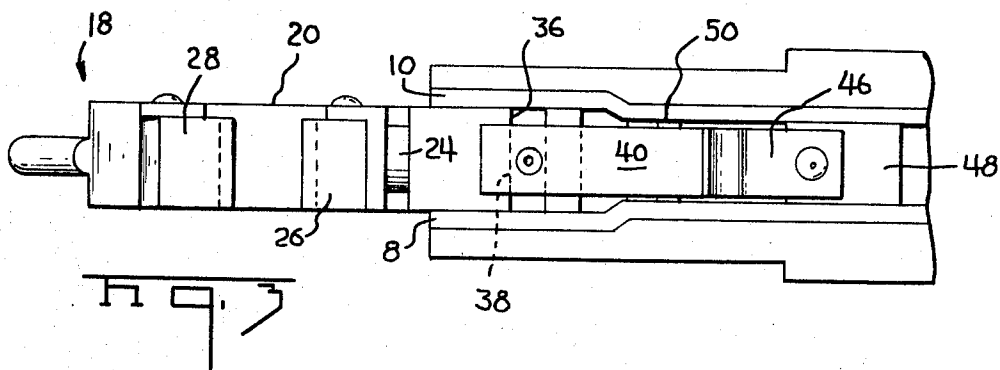
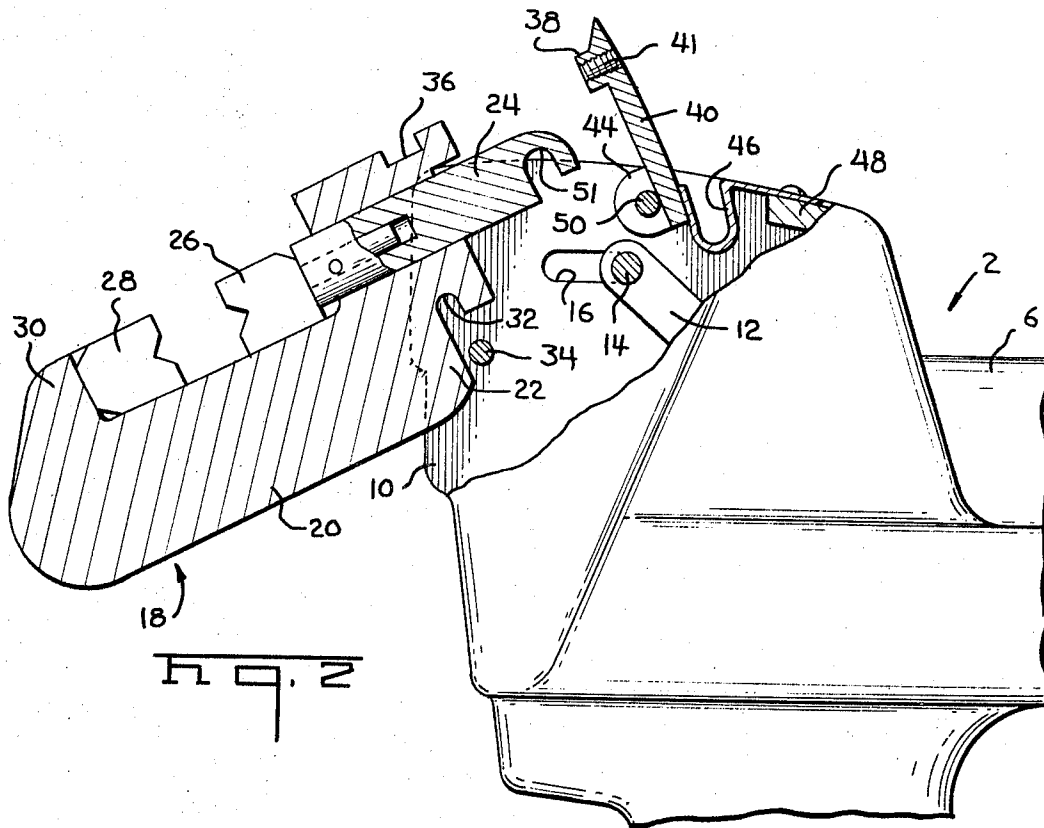
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HAND TOOL FOR INTERCHANGEABLE HEADS
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4 Claims

Int. Cl. B25f 1/02; B21j 7/46, 13/04

ABSTRACT OF THE DISCLOSURE

Hand tool has interchangeable head comprising frame and reciprocable ram. Notches are provided in the head frame and the ram and face in a common direction. Tool has reciprocable actuating member having a pin mounted thereon which is received in the notch in the ram. Additional pin is fixed in tool and is received in the notch in the head frame. A latch member mounted adjacent to head frame locks the head to the tool so that the head may be removed by disengaging the latch and moving tool head laterally.

This invention relates to hand tools or the like and particularly to an improved arrangement for providing an interchangeable head feature on a hand tool.

An object of the invention is to provide a hand tool having an improved interchangeable head feature. A further object is to provide a hand tool having a head which can be removed and replaced in a minimum of time and without the necessity for removing or changing fasteners such as screws. A further object is to provide a hand tool having an interchangeable head including a reciprocable ram and in which the ram is precisely guided along its path of reciprocation.

These and other objects of the invention are achieved in a preferred embodiment of hand tool comprising a body portion and a head. The body portion comprises a pair of spaced-apart plates and the head portion comprises a frame which extends between these plates. The actuator comprises a pin disposed between the plates of the body portion which is reciprocable along a rectilinear path and which may include any suitable power means such as a motor or a piston cylinder. The head portion includes a ram having a hook on its end which is adapted to engage the pin. The head is contained between the plates by two interengaging means, one of these interengaging means comprises a pin and notch on one side of the head and the other interengaging means comprising a latch on the other side. The arrangement is such that the head can be removed by disengaging the latch and moving the head laterally from between the plates.

In the drawings.

FIGURE 1 is a side view of one form of hand tool in accordance with the invention having parts broken away to show the manner in which the head is mounted in the body portion of the tool;

FIGURE 2 is a fragmentary view similar to FIGURE 1 but showing the manner in which the head can be removed from the body portion; and

FIGURE 3 is a view taken along the lines 3-3 of FIGURE 1.

The invention is herein disclosed in conjunction with an electric tool 2 of the general type described and claimed in my co-pending application Ser. No. 380,398, filed July 2, 1964, now abandoned. Tools of this type comprise a pistol-grip type handle 4 on which there is mounted an electrical motor 6. This motor drives a motion translation mechanism which includes a toggle means having an arm 12 on the end of which there is provided a reciprocable pin 14. Reference is made to the above-identified co-pending application for details of this motion translation mechanism. For purposes of the present disclosure, it is

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merely necessary to understand that the pin 14 moves leftwardly in the slots 16 of the side plates and then back to its position of FIGURE 1 during each complete operating cycle of the tool.

The present invention is generally directed to a replaceable tool head 18 having a ram which is connected to the pin 14. The head 18 comprises a C-shaped frame member 20, the right-hand end portion 22 which extends between the plates 8, 10 of the tool body. A ram 24 is slidably mounted in this portion 22 of the frame and has, in the disclosed embodiment, the crimping die 26 on its end which is cooperable with a fixed crimping die 28 mounted on the arm 30 of the frame. It will be understood that any alternative type of tooling can be provided on the ram. It should be mentioned, for reasons which will be explained below, that tools of the type shown are non-reversible. Thus, if the motor is energized and the ram 24 starts to move towards the arm 30, the ram must travel to the limit of its leftward movement before it will return to its starting position.

The head 20 is secured to the body portion of the tool by means of a pair of notches 32, 36 on opposite sides of the frame and facing in opposite directions. The notch 32 which faces downwardly in the disclosed embodiment is adapted to receive a pin 34 that extends between, and is secured to, side plates 8, 10. The notch 36 which faces upwardly is adapted to receive a tooth 38 on the end of a latch arm 40. This latch arm has bearing boss portions 44 on its underside through which extends a pin 50. This pin extends between, and has its ends mounted in, the side plates 8, 10. When the latch is in the position of FIGURE 1, it is maintained in latched engagement with the notch 36 by a U-shaped spring 46, one arm of which bears against the righthand side of the latch arm and the other arm of which is secured to a portion of the tool body as shown in 48. The ram 24 has a notch 51 at its inner end which faces downwardly as viewed in the drawing, as does the notch 32, and which extends partially around the pin 14 on the end of the lever 12. It will be apparent that reciprocatory motion of the pin 14 will be transmitted to the ram 24 when the parts are engaged as in FIGURE 1.

When it is desired to remove the head 18 from the tool and replace it by a head having different tooling thereon, it is merely necessary to move the latch arm 40 against the biasing force of the spring 46, swing the arm 40 through a slight counterclockwise arc from the position of FIGURE 1 and move the head laterally upwardly from between the side plates. Insertion of the different head into the tool merely involves the reverse of the operations of these operations.

It will be apparent that the head 18 can thus be removed from the tool by a series of very simple manipulative operations and a different head can be placed in the tool by an equally simple series of operations. The head itself, nonetheless, can be precise and exact so that the dies 26, 28 or their equivalents will be precisely mounted towards and away from each other.

As previously explained, the tool shown is non-reversible which means that if a jam should occur, it would ordinarily be impossible to clear the tool without disassembling it. A jam might occur, for example, if a solid piece of metal (rather than a crimpable connector) were to be placed between the dies 26, 28 and the motor were to be energized to move the die tightly against the solid bar. The ram would then be prevented from traveling to the leftward limit of its stroke and could not be returned to its starting position. In order to permit rapid cleaning of such jams, a set screw 41 is provided in the latch arm 40. The lower end of this set screw is normally substantially flush with the lower surface of the tooth 38. If a jam should occur while the tool is being cycled, it is only

necessary to deenergize the motor 6 and turn the set screw inwardly to cause the latch arm 40 to be jacked upwardly and out of engagement with the notch 36. It will be understood that when a jam does occur, the parts will often be highly stressed so that the latch arm cannot be manually lifted or even pried up with a lever.

This feature, of providing a jack screw for lifting the latch arm in the event of a jam, is advantageous in other types of non-reversing tools in which the interchangeable head feature of the invention is provided. By way of example, many plier-type handcrimping tools are provided with a full stroke compelling mechanism (to insure complete crimping of the terminal) which, in effect, renders the tool nonreversible. One type of full stroke compelling mechanism is shown in U.S. Patent No. 2,618,993.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

I claim:

1. A tool comprising a body portion and a replaceable head, said body portion comprising a pair of spaced-apart plates, reciprocable actuator means contained between said plates, said head comprising a frame and ram means slidably mounted in said frame, said frame extending between said plates, said ram means and said actuator means being reciprocable along a predetermined path, a first interengaging means on said ram means and said actuator means, a second interengaging means on said frame and said body portion, said first and second interengaging means each comprising a notch and a pin, said notches facing in a common lateral direction with respect to said path, said interengaging means being disengageable upon relative movement of said head away from said body portion in a lateral direction which is opposite to said common lateral direction whereby said head can be removed from said body portion upon movement of said head in said opposite lateral direction.

2. A hand tool as set forth in claim 1 wherein said first interengaging means is on one side of said body portion and including latch means on the other side of said

body portion, said latch means comprising a latch notch in said head having its open side facing in said opposite lateral direction and said latch means further comprising a pivoted latch arm on said body portion, said latch arm being adapted to enter said latch notch.

3. A hand tool comprising, a body portion and a replaceable head, said body portion comprising a pair of spaced-apart plates, a reciprocable actuator contained between said plates, said head comprising a frame and a ram slidably mounted in said frame, said frame having end portions extending between said plates, said ram and said actuator being reciprocable along a predetermined path, a first interengaging means on said ram and said actuator, a second interengaging means on said frame and said body portion, said first and second interengaging means comprising open-sided notches on said ram and frame and pins on said actuator and said tool body portion, said pins extending between said plates and the open sides of said notches facing in a common lateral direction relative to said path, said second interengaging means being located on one side of said body portion and frame, and a latch means on the other side of said body portion and frame, said latch means comprising a latch notch on said frame and a latch arm on said body portion, said notch facing laterally in the direction opposite to said common lateral direction whereby, said head can be removed from said body portion upon disengagement of said latch arm from said latch notch and moving said head portion in said direction opposite to said common lateral direction.

4. A device as set forth in claim 3 including a jack screw in said latch arm located to bear against said latch notch whereby, said latch arm can be disengaged from said latch notch when said tool is jammed.

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U.S. Cl. X.R.

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