May 18, 1954 J. L. BONANNO 2,678,578

MAGNETIZABLE HAND TOOL

Filed Aug. 30, 1951

Fig. 1

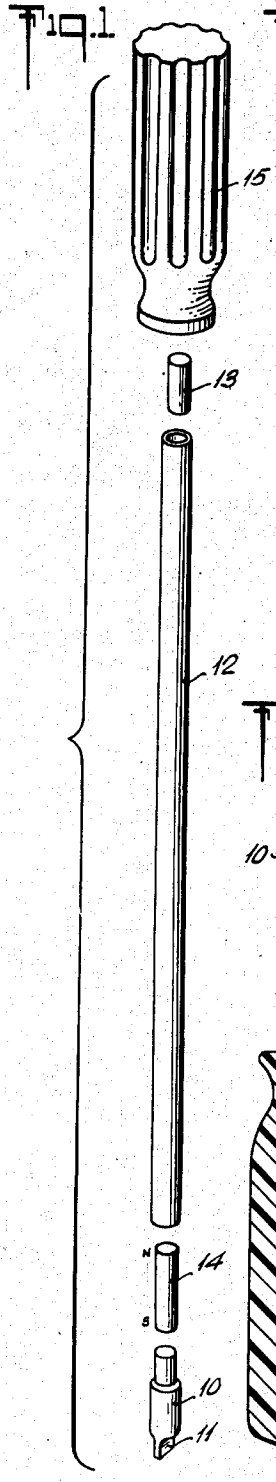


Fig. 2.

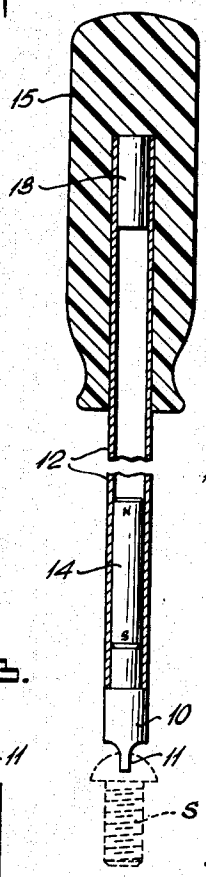


Fig. 4.

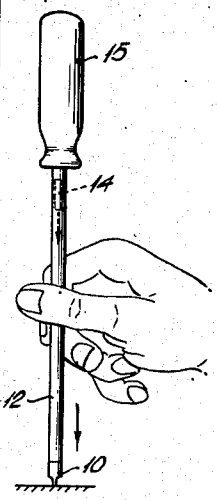


Fig. 5.

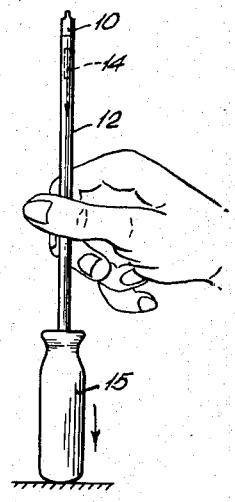


Fig. 3.

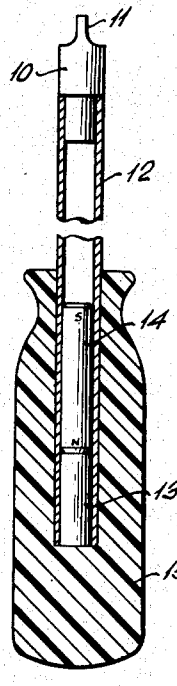


Fig. 6.

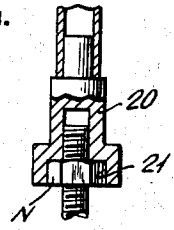


Fig. 7.

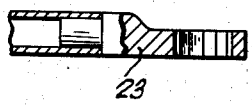
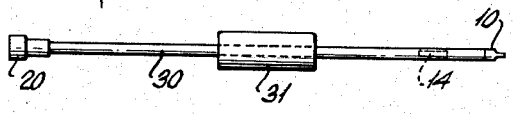


Fig. 8.



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Patented May 18, 1954

2,678,578

UNITED STATES PATENT OFFICE

2,678,578

MAGNETIZABLE HAND TOOL

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Application August 30, 1951, Serial No. 244,349

6 Claims. (Cl. 81—125)

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The present invention relates to magnetizable hand tools and more particularly to hand tools suitable for use either magnetized or non-magnetized.

The present invention contemplates hand tools such as wrenches and screwdrivers having work engaging tips or ends adapted to cooperate with the magnetizable work piece, such as a screw, a nut or a bolt head, and provided with a permanent magnet which can be brought into position to magnetize the tip so that it then acts as a keeper, or shifted to another position, where upon the magnetized tip loses its magnetism, and the permanent magnet is retained there. It is thus possible to use the screwdriver, wrench or similar article as an ordinary nonmagnetized tool or as a magnetized tool, as desired.

According to the present invention the shank of the tool is made of non-magnetizable tubular material, such as stainless steel, and is connected at its end or ends to a suitable tip for the work intended. At the end of the non-magnetizable tube remote from the magnetizable tip there is a second magnetizable keeper adapted to retain the permanent magnet against it. Where the tool has two working ends each may be magnetizable.

Other and further objects will appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, several embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is an exploded perspective view illustrating a screwdriver in which the present invention is embodied;

Figure 2 is a sectional view of the screwdriver assembled and showing the magnet in position to magnetize the screwdriver bit;

Figure 3 is a view similar to Figure 2 showing the magnet in position to demagnetize the tip;

Figure 4 is an elevational view illustrating the manipulation employed when the permanent magnet is to be shifted toward the work engaging tip;

Figure 5 is a similar view illustrating the shifting of the magnet away from the same;

Figure 6 is a fragmentary sectional view illustrating the use of a magnetizable tip in the form of a wrench socket;

Figure 7 is a fragmentary view illustrating the magnetizable tip in the form of a box wrench; and

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Figure 8 is an elevational view on a small scale illustrating the tool adapted for use as both a wrench and screwdriver.

As shown in Figs. 1 to 5, the screwdriver is of conventional appearance. It has a hard steel magnetizable tip or bit 10, reduced at the end as indicated at 11 to fit the slot of a screw S, and received in the lower end of a nonmagnetizable metal tube 12, preferably stainless steel. The parts 10 and 12 are brased together. The upper end of the tube 12 receives a soft iron insert 13 which is held in place in any suitable manner. The tube 12 also receives a magnet 14 permanently magnetized lengthwise, as indicated. The upper end of the handle as shown in Figs. 1 and 3 receives a handle 15 which may be secured to it in any suitable manner, as for example, by knurling on the tube 12. The length of the tube 12 is such that some free space is provided between the permanent magnet 14 and the magnetizable members 11 and 13 so that when the magnet is in contact with one of the magnetizable members there is an air gap between it and the other magnetizable member.

The permanent magnet 14 has sufficient mass relative to the attractive force it exerts on the keepers 10 or 13 so that it can be dislodged from whichever keeper it is in contact with and shifted to the other keeper. If one wishes to have the tip 10 magnetized, such a condition may be assured by grasping the screwdriver as illustrated in Fig. 4 and bringing the tip down against some relatively fixed stop so that the movement of the entire screwdriver is suddenly interrupted. This will have imparted sufficient inertia to the magnet so that it will break away from the upper keeper 13 and slide down the tube to the lower keeper or tip and will then adhere to and magnetize it.

If, on the other hand, one desires to be sure that the tool does not have a magnetized tip, the screwdriver is grasped as indicated in Fig. 5 and the handle of the screwdriver brought against an object with sufficient force to cause the magnet to separate from the magnetized tip 10. It then passes down the tube and adheres to the keeper 13 in the handle end of the screwdriver. The operation of shifting the magnet the entire length of a long tube is facilitated by gravity when the tube is brought down against the abutment or stop. When the tube is short, sufficient inertia can be imparted to the magnet to separate it from one keeper and bring it against the other.

Figure 6 illustrates a modification in which the protruding keeper 20 has a downwardly opening socket 21 adapted to fit nut N. When a mag-

netizable nut is inserted into the socket it is held there. In the form shown in Fig. 7 the magnetizable element **23** is in the form of a box wrench. Other forms such as Allen and open-ended wrench heads may of course be employed.

In the arrangement shown in Fig. 8, the tube **30** carries a handle **31** intermediate its ends and on one end has a screwdriver bit **10** and the other a wrench head such as **20**. Here the permanent magnet **14** travels from one end of the tube **30** to the other and each of the keepers is shaped to cooperate with the work piece, screw or nut.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, I wish it to be understood that the particular form shown is but one of these forms, and various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A hand tool usable as a magnetized tool or as a nonmagnetized tool, comprising a nonmagnetic shank including a hollow tube, two tube-carried, magnetizable keepers which with the tube form an elongated chamber closed at the ends, one keeper protruding and shaped to cooperate with a work piece, and a permanent magnet in the space between the keepers and shorter than said space, the magnet being contactable with one keeper only at a time to magnetize it and having sufficient mass to acquire, in response to a sudden jolt in a direction opposite the force of magnetic attraction, an inertia sufficient to dislodge it from the magnetized keeper so that the keeper loses its magnetism and the magnet may move freely in the tube and when brought adjacent the other keeper magnetize the same and be held in position thereby.

2. A screwdriver usable as a magnetized screwdriver or as a nonmagnetized screwdriver, comprising a nonmagnetic shank including a hollow tube, two tube-carried, magnetizable keepers which with the tube form an elongated chamber closed at the ends, one keeper protruding and shaped to form a screwdriver bit to cooperate with a work piece, a permanent magnet in the space between the keepers and shorter than said space, the magnet being contactable with one keeper only at a time to magnetize it and having sufficient mass to acquire, in response to a sudden jolt in a direction opposite the force of magnetic attraction, an inertia sufficient to dislodge it from the magnetized keeper so that the keeper loses its magnetism and the magnet may move freely in the tube and when brought adjacent the other keeper magnetize the same and be held in position thereby, and a handle secured to the shank.

3. A wrench usable as a magnetized wrench or as a nonmagnetized wrench, comprising a nonmagnetic shank including a hollow tube, two tube-carried, magnetizable keepers which with the tube form an elongated chamber closed at the ends, one keeper protruding and shaped to form a wrench head to cooperate with a work piece, a permanent magnet in the space between the keepers and shorter than said space, the magnet being contactable with one keeper only at a time to magnetize it and having sufficient mass to acquire, in response to a sudden jolt in a direction opposite the force of magnetic attraction, an inertia sufficient to dislodge it from the magnetized keeper so that the keeper loses its magnetism and the magnet may move freely in the tube and when brought adjacent the other keeper magnetize the same and be held in position thereby, and a handle secured to the shank.

4. A hand tool usable as a magnetized tool or as a nonmagnetized tool and comprising, a stainless steel, tubular, manually rotatable shank, a magnetizable tool head fixedly secured at one end of the shank and closing off that end of the shank, a magnetizable keeper spaced from the tool head and closing off the shank to form an elongated space, a handle carried by the shank, and a permanent magnet in the space between the magnetizable elements and shorter than said space, the magnet being contactable with one such element only at a time to magnetize it and having sufficient mass to acquire, in response to a sudden jolt in a direction opposite the force of magnetic attraction, an inertia sufficient to dislodge it from the magnetized element so that it loses its magnetism and the magnet may move freely in the tube and when brought adjacent the other magnetizable element magnetize the same and be held in position thereby.

5. A screwdriver having a magnetizable screwdriver bit, a tube of nonmagnetizable metal into the end of which the bit is nonrotatably secured, a magnetizable plug carried in the other end of the tube, a handle secured to the tube and a permanent magnet shorter than the spacing of the magnetizable parts and movable in the tube between the magnetizable parts, the magnet having insufficient adherence to the magnetizable part with which it is in contact to hold it there when the screwdriver is subjected to a sudden jolt tending to dislodge the magnet.

6. A wrench having a magnetizable wrench head, a tube of nonmagnetizable metal into the end of which the wrench head is nonrotatably secured, a magnetizable plug carried in the other end of the tube, a handle secured to the tube and a permanent magnet shorter than the spacing of the magnetizable parts and movable in the tube between the magnetizable parts, the magnet having insufficient adherence to the magnetizable part with which it is in contact to hold it there when the wrench is subjected to a sudden jolt tending to dislodge the magnet.

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