United States Patent

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a part interest

[54] **SCREWDRIVER**
7 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **145/50**
[51] **Int. Cl.** **B25b 15/02**
[50] **Field of Search** 145/50

[56] **References Cited**
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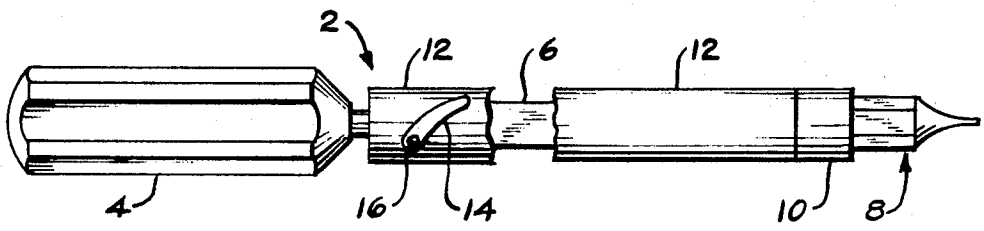
ABSTRACT: A screwdriver providing a rigid torsional connection between the handle and bit including means for varying the relative positions of the main centerline of the screwdriver and the centerline of the bit. The screwdriver includes a handle, a central shaft, a movable member, a universal connecting means, a bit-receiving chuck, and a bit.



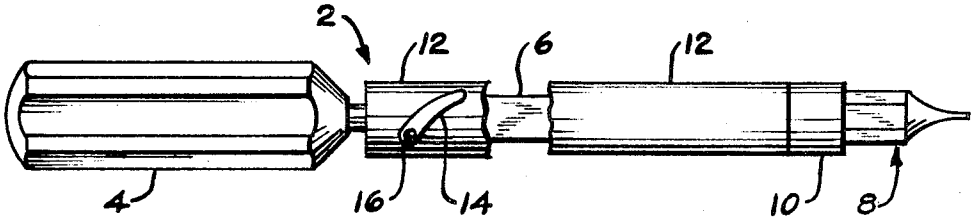


FIG. 1

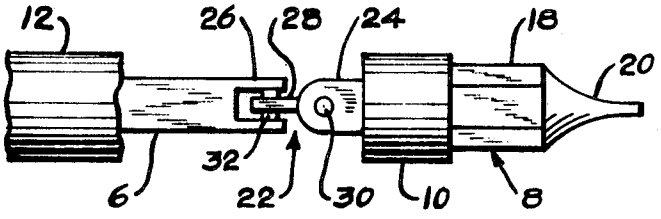


FIG. 2

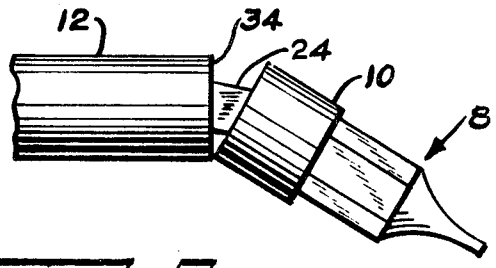


FIG. 3

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SCREWDRIVER

BACKGROUND OF THE INVENTION

This invention relates to a new and improved screwdriver having a positive torque connection between the handle and the bit with means for varying the relative position between the main center line of the screwdriver and the centerline of the bit in order to manipulate the screwdriver handle at an angle other then 180° to the bit to remove or replace screws in generally inaccessible places.

As is perhaps well-known, rigid handle tools or various forms are in common usage for setting and unsetting nuts, bolts, and screws. Numerous flexible handle tools have been designed and employed for use in special instances where the items to be manipulated are relatively inaccessible. Many flexible handle tools have flexible members between the handle and the bit that allows relative rotary movement between the handle and the bit. Such devices make it difficult, if not impossible, to remove tightly fastened screws, bolts and nuts.

SUMMARY OF THE INVENTION

A screwdriver providing a rigid torsional connection between the handle, shaft and bit including means for varying the relative positions between the main centerline of the screwdriver and the centerline of the bit. The screwdriver includes a handle, a central shaft, a movable member, a universal connecting means, a bit-receiving chuck that rotates on the distal rim of the movable member, and a bit.

It is an object of this invention to provide a noncomplex tool that has means for varying the angle between the main centerline of the tools and the center of the bit.

A further object of this invention is to provide a tool that can vary the main centerline of the tool and the centerline of the bit and provide a rigid torsional connection between the handle and the bit.

In accordance with these and other objects which will be apparent hereinafter the instant invention will now be described with particular reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1, is a side view of the screwdriver with the movable shaft member partially cutaway;

FIG. 2, is an enlarged cutaway view of the distal end of the screwdriver showing the universal joint; and

FIG. 3 is an enlarged view of the distal end of the screwdriver with the main centerline of the screwdriver at an angle less than 180° to the centerline of the bit.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing, wherein an embodiment of the invention is shown, and, referring, particularly, to FIG. 1, the screwdriver, generally designated as numeral 2, includes a handle 4, a central shaft 6, a bit 8 connected to bit-receiving chuck 10. The bit-receiving chuck 10 is forced into the position as shown in FIG. 1 by the distal rim of the movable member 12. The distal rim lies flush against the bit receiving chuck 10. The movable member 12 includes a slot 14. An upright pin 16 is rigidly connected to the central shaft 6 with its upper distal end in slot 14. As the movable member 12 is rotated about the central shaft 6 the pin 16 will force the movable member 12 back and forth on the central shaft 6. The movable member 12 will move toward and away from the bit-receiving chuck 10.

Referring now to FIG. 2, bit 8 includes a hexagonal base portion 18 with a screw engaging tip 20. The bit-receiving chuck 10 may be magnetized in order to hold the bit 8 in the chuck. The inside of the bit-receiving chuck is also hexagonal in order to receive the bit 8 and to provide a rigid torsional connection between the chuck and the bit. The universal joint generally designated by numeral 22, includes a connecting

arm 24 connected to the bit-receiving chuck 10, a similar connecting arm 26 connected to the central shaft 6, pins 30 and 32 connecting universal member 28 between connecting arm 24 and 26.

Referring now to FIG. 3, the main centerline of the screwdriver, passing centrally through shaft 6, is at an angle to the centerline of the bit 8. Movable member 12 is rotated and moved to the left of the position shown in FIG. 1. The distal rim is moved away from the bit-receiving chuck 10, allowing the edge of the base of the bit-receiving chuck to rotate about the distal rim 34 of the movable member 12. Therefore the handle may be rotated at an angle other than 180° to the centerline of the bit. The screw may have a centerline at an acute or obtuse angle to the centerline of the main body portion of the screwdriver. At the same time, the screwdriver has a positive torsional connection between the handle and the bit.

It should be noted that universal member 28 and connecting arms 24 and 26 may be made of tool steel. Preferably the universal member 28 will have a width approximately equal to the width of the connecting arm opening, not as shown in FIG. 2. When the universal member is approximately equal to said width of the arm opening, the said universal member will take the twisting or torque forces. As shown, the pins would have to be strong enough to withstand the torque forces. It should be noted that the distance between the centerlines of the pins 30 and 32 should be as small as practical in order to keep the angle between the main centerline and the centerline of the tip approximately equal when the screwdriver is retracting or replacing a screw. The ends of member 24 and 26 may abut one another.

The slot 14 may be curved in order to lock the pin 16 from movement when the slot 14 would be generally vertically adjacent to pin 16 as illustrated in FIG. 1.

The tip 20 may be a philips head on a universal one quarter inch bit.

The instant invention has been shown and described herein in what is considered to be the most practical and preferred embodiment. It is recognized, however, departures may be made therefrom within the scope of the invention. Therefore, the instant invention is not to be limited to the details discussed herein but to be accorded the full scope of the claims so as to embrace any and all equivalent apparatus and articles.

What I claim is:

1. A tool comprising,
   - a body member with a main centerline,
   - a bit member with a main centerline, said bit member connected to said body member,
   - a single rigid torsional connecting means connected between said body member and said bit member, and
   - a movable member slidable along said body member into and out of engagement with said bit member for varying the angular relationship between the main centerline of said body member and said bit member.

2. A tool as set forth in claim 1 wherein, said movable member is a tabular member movable longitudinally over said body member.

3. A tool as set forth in claim 3 wherein,
   - said moveable member is moveably connected to said body member to vary the distance between the adjacent end of said moveable member and an adjacent end of said bit to vary the angle between the main centerline of the said body member and said bit.

4. A tool comprising:
   - a body member including a shaft with a main centerline;
   - a bit with a main centerline connected to said shaft,
   - a rigid torsional connecting means connected between one end of said shaft and said bit, said rigid torsional connecting means includes a universal join;
   - a tubular moveable member for varying the angular relationship between the main centerlines of said shaft and said bit, said tubular moveable member moveable longitudinally over said shaft, said tubular moveable member

moveably connected to said shaft to vary the distance between the adjacent end of said tubular moveable member and the adjacent end of said bit.

5. A tool as set forth in claim 4 including,

a pin connected to said shaft, and

a slot in said movable member to guide the movement of said movable member with said pin in said slot.

6. A tool as set forth in claim 5 wherein,

the edge of said chuck rotates on the rim of said movable

means when said centerline of the handle is at an angle less than 180° to the centerline of said bit.

7. A tool as set forth in claim 3 wherein,

said adjacent end of said tubular moveable member rotates about the adjacent end of said bit member when the main centerline of the body member of the tool is held at an angle other than 180° to the main centerline of the bit member.