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SCREW AND DRIVER

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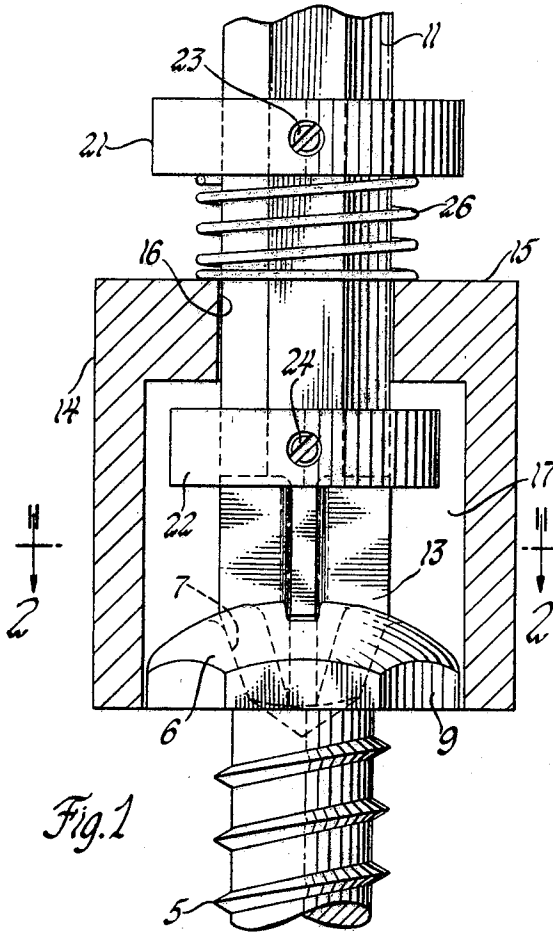


Fig. 1

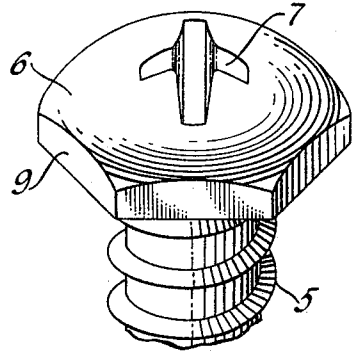
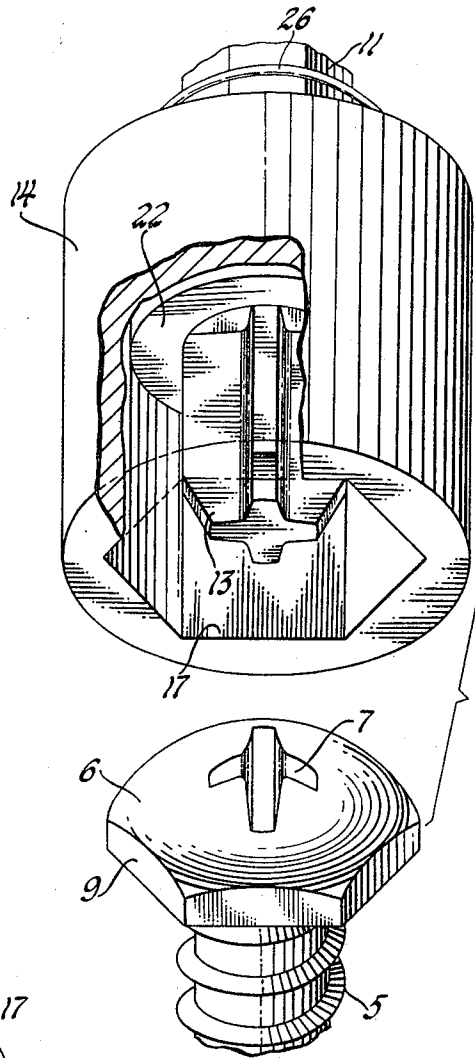


Fig. 3

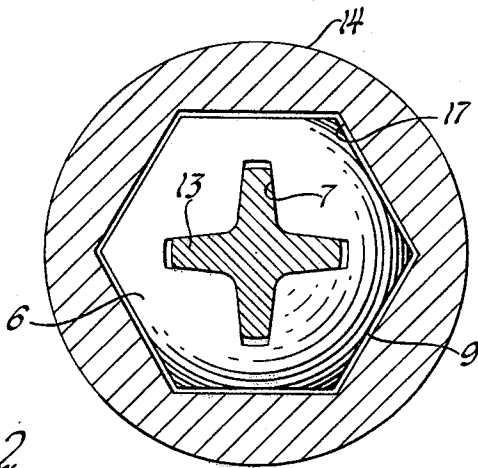


Fig. 2

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SCREW AND DRIVER

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ABSTRACT OF THE DISCLOSURE

An arrangement for driving devices such as rotatable fasteners. The fastener has both peripheral and central configurations to engage a driver. The driver incorporates a wrench socket engaging the peripheral configuration and a screwdriver bit engaging the central configuration. These two driving members are nonrotatively but slidably coupled together and are biased by springs so that first one engages the driven device, and then upon axial movement the other engages.

My invention is directed to rotatable fasteners such as screws and to a driver for such to improve the coupling between the driver and the driven device. It is particularly directed to means for driving rounded head or low profile screws.

According to my invention, the driver and the driven device (hereinafter called a screw) are doubly coupled through a central driver such as any suitable screwdriver arrangement, preferably a self-centering one, and an outer driver such as a socket wrench engaging the perimeter of the screw head. The driver embodies means to cause both drivers to engage the screw head fully.

The principal objects of my invention are to improve the drive of threaded fasteners and to facilitate the use of low-profile threaded fasteners.

The nature and advantages of my invention will be clear to those skilled in the art from the following detailed description of the preferred embodiment of my invention and the accompanying drawings thereof.

FIGURE 1 is a view, partly in section, illustrating the engagement of driver and screw.

FIGURE 2 is a sectional view taken on the plane indicated in FIGURE 1.

FIGURE 3 is an exploded axonometric view of the same.

Whenever a rounded head screw is desired for its lowness of profile or its lack of sharp edges found on hexagon head screws, common practice is the use of a slotted, Phillips, Posidrive or Allen head drive arrangement. Many times, especially with the slotted or Phillips drive, it is difficult to obtain the desired screw torque without the screw driver bit's slipping out of engagement with the screw head.

In order to maintain a pan head, truss head, round head, binding head or other low profile rounded head on any particular fastener, and at the same time improve the driving and torquing capabilities, a hexagon head would be used in combination with the slotted, Phillips, or other drive. The drawings show a pan head profile with Phillips impression but with a hex drive impressed within the basic diameter of the pan head.

While the head in itself might allow some choice as to the tool used to drive the screw, increased torque and improved retention of the driver is achieved by the use of my combination socket and driver. The socket is spring loaded and so positioned in relation to the driver point that some slight displacement of the socket occurs when the slotted, Phillips, or other driver is properly seated in the mating impression in the screw. The spring loaded feature accomplishes four things: (1) it adapts to variation in screw head and drive impression relation-

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ships; (2) it automatically compensates for wear in the driver point and socket lower edge; (3) it maintains socket to screw head engagement even though the screwdriver bit may "clutch" or disengage; and (4) it maintains maximum possible engagement of the socket on the hexagon head even though the longitudinal center line of the driver is tilted out of alignment with the longitudinal center line of the screw and also, under the same conditions, allows maximum engagement of the screwdriver point in the mating impression in the screw head which without this floating socket arrangement would tend to cam the center driver out of the screw head.

Referring to the drawings, a screw 5 having a head 6 of pan head profile is shown. The head has the conventional impression 7 for a Phillips driver and a hexagonal periphery 9 for engagement with a socket wrench.

The driver comprises a non-circular (hexagonal as shown) shaft 11 which may be driven manually or by any suitable motor and which terminates in a Phillips bit 13 to couple to the Phillips impression of the screw.

A socket wrench 14 has a web 15 with a hexagonal opening 16 non-rotatively coupled to the shaft 11 and a hexagonal driving socket 17 dimensioned to engage the hexagonal periphery 9 of the screw head. The socket could, of course, have the common 12-point configuration.

The web 15 is disposed between two collars 21 and 22 fixed on the shaft by set screws 23 and 24. A spring 26 disposed between collar 21 and web 15 biases the socket wrench toward collar 22, which limits its movement.

In use of the driver, the socket 14 is fitted to the screw head, and then the shaft 11 is pushed to seat the drive 13 fully in the Phillips socket of the screw, the spring 26 yielding.

The driver is then rotated to drive the screw, the double engagement of the central and peripheral drivers with the screw head providing high torque capability and eliminating slip.

The spring-loaded connection adapts to manufacturing tolerances and compensates for wear of the driver, and it maintains engagement of the socket wrench even if a relaxation of axial force permits disengagement of the central driver.

The description of the preferred embodiment of the invention for the purpose of explaining the principles thereof is not to be considered as limiting or restricting the invention, since many modifications may be made by the exercise of skill in the art.

I claim:

1. The combination of a driver and a driven device in which;
 - the driven device includes a unitary member having a head with a peripheral wrench receiving configuration and a central driving bit receiving configuration both on the same unitary body;
 - and the driver includes a first driving member with a driving bit thereon configured for relatively nonrotative coupling with the said central driving bit receiving configuration;
 - a second driving member with a wrench socket thereon configured for relatively nonrotative coupling with the said peripheral wrench receiving configuration;
 - means permanently coupling the said driving members in coaxial alignment, the said means providing for relative axial sliding of the members and restraining the members against relative rotation;
 - means on the driver for imparting rotation directly to said one driving member and thereby to the other driving member;
 - and means connected to the said driving members biasing the members in opposite axial directions, so

that upon engagement of the driver with the driven device one of said driving members is first coupled to the driven device and upon subsequent axial movement of the other member opposed by said spring the other driving member is thereafter coupled to the driven device.

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