

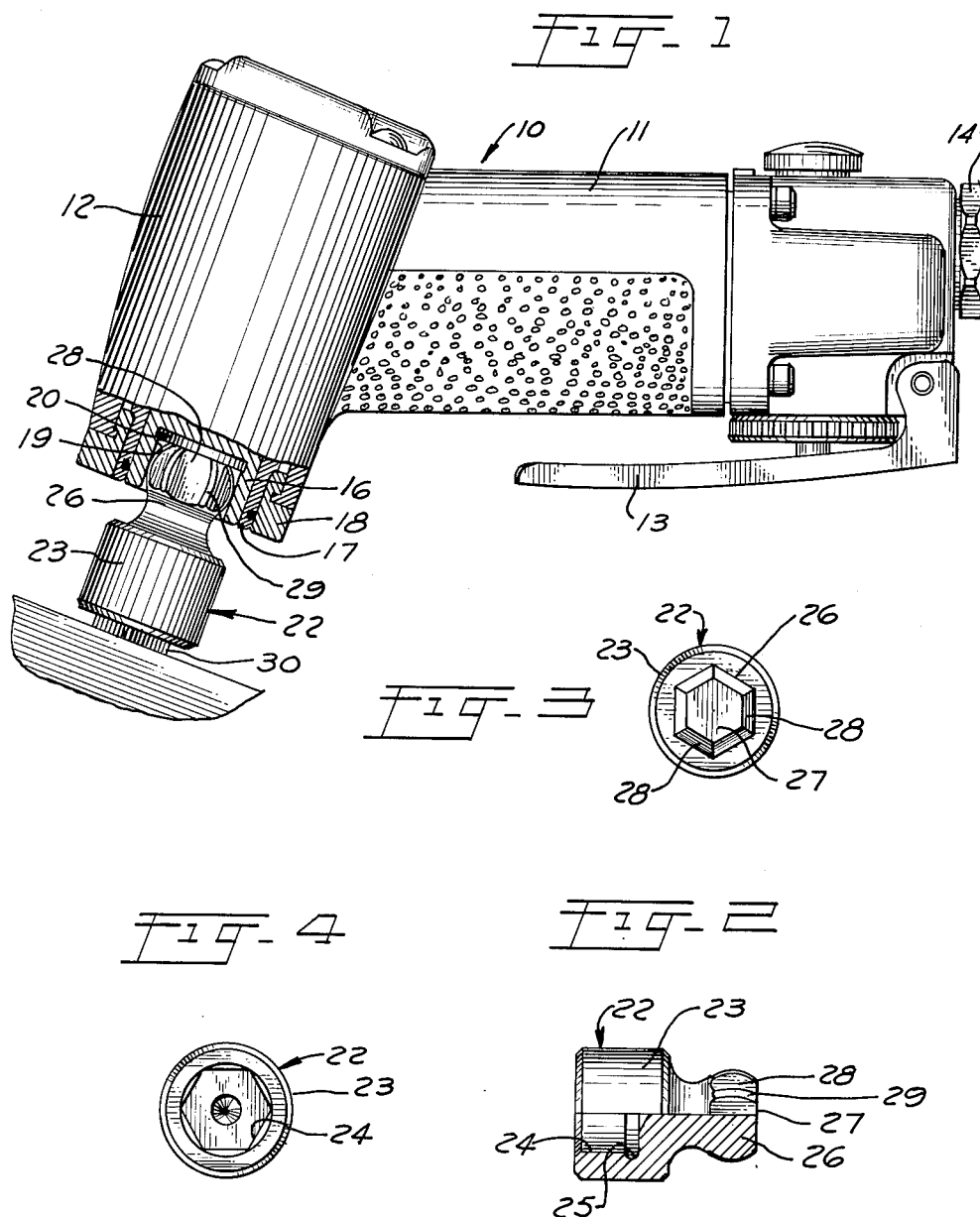
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SWIVEL-TYPE TOOL ADAPTER

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SWIVEL-TYPE TOOL ADAPTER

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1 Claim. (Cl. 81-177)

This invention relates to adapters for rotary tools, and more particularly to a new and improved adapter for making a swivel connection with a rotary tool for transmitting torque from the latter to a threaded fastener.

This invention pertains to adapters having special, although not exclusive, application to rotary power tools for transmitting torque from the latter to threaded fasteners, such as nuts. These adapters have been provided in two piece form with a swivel joint for connecting a power tool with a fastener in a manner permitting the tool to be swiveled while connected with the fastener. An adapter with such a joint permits manipulation of the tool to some degree during running a nut, for example, which is advantageous when working in confined locations. Adapters of this type are somewhat large in size by reason of their joined construction, and they are somewhat susceptible of being easily broken. It is of course desirable for these swivel-type adapters to be strong and of small and compact design so as to occupy as little space as possible, which is important when using the adapters in confined locations.

It is an object of the present invention to provide a new and improved compact adapter including a body having a ball-like knob which has side faces curved along their length and flat along their width, whereby the knob is adapted to be received in an associated driving socket in driven relation with the latter and adapted to permit swiveling of the driving socket while maintaining the driven relationship therewith.

Other objects of the invention are: to provide a small one-piece adapter having means adapting it for making a swivel engagement with a rotary tool; to provide a swivel-type adapter which is simple and inexpensive to construct; and to provide a swivel-type adapter which is extremely durable in operation.

These and other objects and advantages of the invention will become apparent from the accompanying specification describing a preferred embodiment of the invention which is illustrated in the accompanying drawing:

In the drawing:

FIG. 1 is an elevational view of the adapter of this invention connecting a rotary-power tool with a threaded fastener, with a portion of the power tool being shown in section for illustrating the connection between the tool and the adapter;

FIG. 2 is a partial elevational view and a partial longitudinal sectional view of the adapter;

FIG. 3 is an end elevation of the adapter as seen from the right end thereof in FIG. 2; and

FIG. 4 is an end elevational view as seen from the left end thereof in FIG. 2.

Referring now to the drawing, a rotary power tool adapted to have the adapter of this invention associated therewith is generally designated 10 and includes a handle portion 11 and a head portion 12. The interior or working components of the power tool are not illustrated, as the power tool itself forms no part of the present invention. However, it will be understood that tool 10 includes a motor, which may be of the pneumatic type, in handle portion 12. The motor is actuated by manipulating lever 13 which admits a fluid under pressure, such as air, to the tool motor through a suitable conduit connected to the tool at a fitting 14. Tool 10, which is of the rotary impact type, includes a motor driven impact clutch in

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head portion 12 for imparting rotational impact blows in a periodic manner to a rotary driving member 16 which is journaled at the output end thereof in a bearing 17 secured in a nose ring 18 forming a part of head portion 12.

Rotary driving member 16 is provided with a multi-sided driving socket 19. Driving socket 19 terminates within rotary member 16 at an annular groove 20. It will be understood that driving socket 19 itself is of conventional form, i.e., it contains a plurality (usually six) of identical flat sides.

The novel swivel-type tool adapter of this invention, generally designated 22, will be seen to include a cylindrical body portion 23. One end of body 23 is provided with a conventional socket 24 which is defined by a plurality of identical flat sides. Socket 24 terminates within body 23 at an annular groove 25. Socket 24 is preferably hexagonal in configuration and is adapted for making a driving connection with a standard threaded fastener, such as a bolt head or nut, for example.

Adapter 22 includes a ball-like knob 26 which is integral with cylindrical body 23 and extends co-axially with the latter. Knob 26 includes a flat surface 27 defining one end of the tool adapter. Knob 26 also includes a plurality of identical side faces 28. In the preferred form of the invention, the knob includes six side faces for complementary engagement with a hexagonal driving socket in a manner to be referred to below.

As noted in FIG. 2, the juncture between adjacent side faces is slightly rounded and indicated at 29. Also, as noted in FIGS. 1, 2 and 3, each face 28 is arcuate or curved along the length thereof which extends in a direction longitudinally of the adapter, and each face 28 is flat across the width thereof which extends transversely of the longitudinal axis of the adapter. It will be understood that the dimension across the width of each face 28 at its portion of greatest width, i.e., at its mid-portion as taken along the length thereof, is slightly less than the dimension across the width of each of the flat sides defining driving socket 19 in the rotary driving member.

In FIG. 1, the tool adapter is seen with the knob thereof detachably received within driving socket 19 and the tool adapter has the socket thereof in driving engagement with a nut 30.

It will be understood that knob 26 of the adapter is dimensioned to cooperate with an associated driving socket for providing a non-rotatable engagement between the tool driving member and the adapter. This is accomplished by providing faces 28 of the knob with a width at their mid-portion which is just slightly less than the width of the sides defining driving socket 19. Accordingly, when the knob is inserted in the driving socket, the engagement of the mid-portions of faces 28 with respective sides of driving socket 19 causes rotation of the adapter upon rotation of the tool rotary driving member. Because of the curvature or arcuate shape of faces 28, it will be apparent that the power tool may be swiveled or manipulated about the adapter while maintaining the non-rotatable or driving engagement between the tool and the adapter. The amount of swiveling movement between the power tool and the adapter is limited either by engagement of adapter surface 27 with the inner end of socket 19 or by engagement of the mouth of socket 19 with the neck of knob 26, i.e., the portion adjacent faces 28.

The invention is not to be limited for use with the particular rotary power tool illustrated. It will be understood that the adapter has utility with any form of rotary tool having a rotary driving member associated with a flat sided driving socket. Also, it will be understood that the knob portion of the adapter may be provided with any number of surfaces corresponding to the number of sides on an associated driving socket.

While the invention has been shown in but one form it will be obvious to those skilled in the art that it is not to be so limited, but on the contrary it is susceptible of various changes and modifications without departing from the spirit and scope of the appended claim.

I claim:

In combination, a rotary tool and a swivel-type adapter therefor, said tool including a rotary driving member having a driving socket defined by a plurality of identical flat sides, said adapter including a generally cylindrical body member having means on one end thereof for detachably engaging a threaded fastener in driving relation with the latter, a ball-like knob rigid on the other end of the body and arranged in co-axial relation with the latter, said knob being detachably received in said socket and being provided with a plurality of identical side faces corresponding in number to the number of said flat sides, each of said faces being arcuate along its length which extends longitudinally of the body and being substantially flat across its width which extends transversely of the body, the dimension across each of said faces at its portion of greatest width being slightly less than the dimension across the width of each of said flat sides, whereby

said adapter may be driven by said rotary driving member and the latter swivelled about its axis of rotation while maintaining a driving relation between the driving member and the adapter, which driving relation is established solely by engagement of said flat sides with said faces.

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