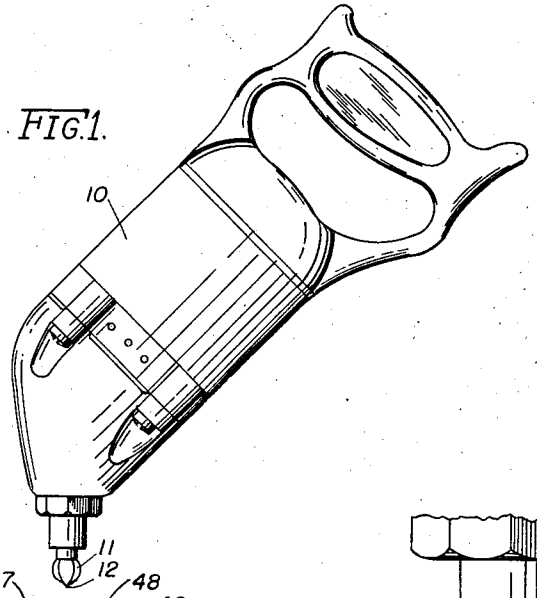
July 25, 1944. W. W. DANIEL 2,354,184

DRIVE SOCKET CONNECTOR

Filed May 1, 1941

FIG. 1.



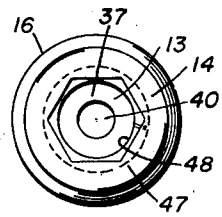


FIG. 4.

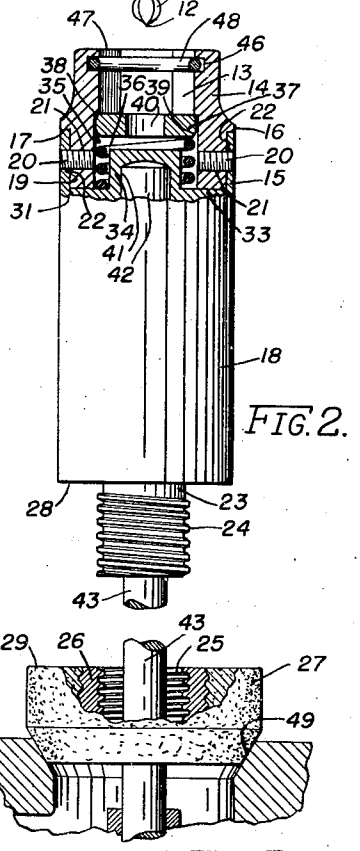


FIG. 2.

FIG. 3.

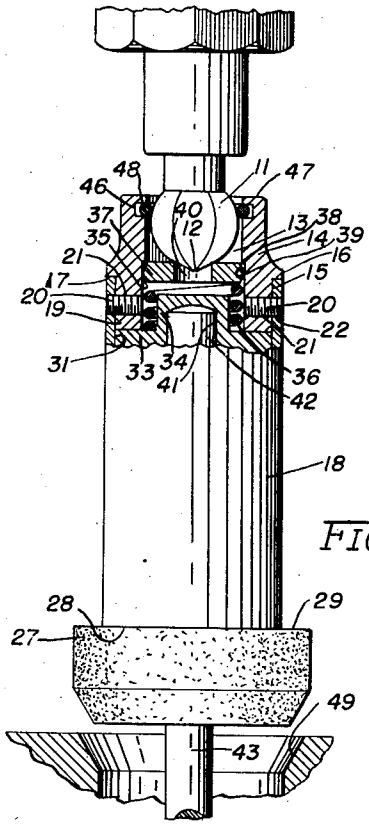


FIG. 5.

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DRIVE SOCKET CONNECTOR

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Application May 1, 1941, Serial No. 391,286

3 Claims. (Cl. 51—241)

This invention relates to drive socket connectors and more particularly to drive connectors for valve seat grinder stone carriers, although it may be employed with equal advantage for other purposes.

It contemplates more especially the provision of a driving socket for valve grinding stone carrier assemblies or nut turning sockets so that the driver may be elevated or lowered with the driven socket connector without any accidental separation therebetween.

In nut turning sockets and valve grinding carrier assemblies there is the requirement to lift the socket of the carrier from the work without interrupting the continuity of operations. This is especially true in grinding valves wherein the grinding wheel and its carrier must be lifted from the valve seat to maintain the proper speed of rotation and to afford the removal of filings responsive to the centrifugal force incidental to the high speed rotation of the carrier. Without removing the filings the valve seat would become scored and non-uniform wear would be occasioned to the grinding stone.

Consequently in valve grinding operations the driver is continuously operated when the stone is lifted from the valve seat at intervals to preclude slowing down and also afford cleaning of the filings therefrom. This lifting of the grinding wheel from the valve seat is a specified requirement in such operations and is desirable in order to produce the desired surfacing effect upon the valve seat. It is important, therefore, that the driver and the grinding wheel carrier be maintained in operative connection during the seating and un-seating of the grinding stone relative to the valve seat. It is intended, therefore, to provide instrumentalities for preventing the driver knuckle from becoming detached from the driven socket constituting a part of the grinding stone carrier unless the attendant desires to effect their separation.

One object of the present invention is to simplify the construction and improve the operation of devices of the character described.

Another object is to provide improved means for maintaining the desired detachable association between the power driver and grinder stone carrier or other elements involving substantially the same construction and operating characteristics.

Still another object is to provide improved means for frictionally connecting a driver knuckle to a socket to effect rotation in unison without any accidental separation therebetween.

A further object is to provide improved friction engaging means between the driver and a socket complemental thereto so that they will rotate in unison and without any possible accidental separation.

A still further object is to provide improved circumferential yielding means to effect frictional connection between the driver knuckle and stone.

Still a further object is to provide improved engaging means and a stone complemental thereto so that one may be lifted with the other or rotated at relative angles without permitting their accidental separation.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawing:

Figure 1 is a perspective view of a driver having a driving knuckle in connection with a valve driving stone carrier embodying features of the present invention.

Figure 2 is a fragmentary sectional view in elevation of a valve grinding stone carrier embodying features of the present invention.

Figure 3 is a view in elevation of a grinding stone shown in association with the fragmentary valve seat to be newly surfaced therewith, parts thereof being shown in section to clarify the illustration.

Figure 4 is a top plan view of a valve grinding stone carrier shown in Figure 2.

Figure 5 is a fragmentary sectional view in elevation of a grinder stone carrier with the driver knuckle operatively connected therewith and lifted from the valve seat without causing a separation between the driver knuckle and its socket.

The structure selected for illustration is illustrated in connection with a power driver 10 that terminates in a polygonal knuckle 11 having its sides converge to a point 12 so that its largest diameter is removed or spaced therefrom. The driver knuckle 11 is adapted to be telescopically received in a correspondingly sized polygonal socket 13 broached or otherwise provided in a tubular tool holder cap 14. The tool holder cap 14 is provided proximate the lower end thereof with a cylindrical surface 15 of somewhat smaller diameter than the larger exterior portion 16 thereof in order to present a peripheral portion 17. The cylindrical surface 15 with its shoulder 17 serves to receive an elongated tubular exterior sleeve 18 that is pressed or otherwise telescoped thereover for abutment with the peripheral shoulder 17.

To this end, the inside diameter 19 of the outer sleeve 18 proximate to its upper portion corresponds with the interior diameter of the cylindrical surface 15 to provide for a tight or pressed fit therebetween. To preclude any possible separation between the tubular cap 14 and the outer sleeve 18, a plurality of stud screws 20 are disposed radially through correspondingly threaded and aligned apertures 21—22 provided in the cap

14 and outer sleeve 18, respectivelly, along equidistant radii. This precludes any separation between the driving cap 14 and the outer sleeve 18 so that one will rotate responsive to the corresponding rotation of the driver knuckle 11 that is a complement of the socket 13.

As shown, the outer sleeve 18 extends downwardly to terminate in a reduced cylindrical tubular boss 23 which is exteriorly threaded as at 24 to mesh with corresponding threads 25 provided in a metallic bushing 26 comprising the core of a grinding wheel 27. The reduced tubular boss 23 defines an exterior peripheral shoulder 28 which serves as a seat or stop for the upper surface 29 of the grinding wheel 27. The cylindrical wall 31 of the outer sleeve 18 is of somewhat smaller inside diameter than the cylindrical wall 15 of the tool holder cap 14 to afford a press-fitted connection therebetween in conjunction with the threaded studs 20.

A retainer disc 33 in the counterbore 15 presents an upraised axial projection 34 of comparatively smaller diameter than the inner bore 35 of the tool holder cap 14. This provides for ample space within which a coil spring 36 is disposed to envelope the upraised axial retainer disc or driver engaging seat projection 34. The coil spring 36 serves to support the disc 37 against the peripheral shoulder 38 defined by a driver cap bore 35 which terminates in communication with the somewhat smaller vertical socket 13 therein. As shown, the spring supporting disc 37 has a rounded peripheral exterior edge 39 to permit the tilting thereof as the spring 36 is caused to yield responsive to pressure exerted by the driver knuckle 11 thereon.

In order to center the driver knuckle 11 on the spring supporting disc 37, the latter is provided with an axial aperture 40 which is somewhat larger than the tip 12 of the knuckle 11 for reception therein. It should be observed that the axial boss 34 on the retainer disc 33 is inwardly recessed to provide the bore 41 for freely receiving the upper extremity 42 of a pilot stem guide 43. The pilot stem guide 43 may be of any suitable type and is intended for mounting in the valve stem bore of an internal combustion engine cylindrical head.

To preclude accidental detachment between the driver knuckle 11 and the outer socket 13, the latter is provided with an annular groove 46 proximate to the upper open edge 47 thereof to receive a split wire ring 48. The split wire ring 48 is of somewhat lesser diameter than the annular groove 46 so that the inner circumferential edge thereof will lie within the exterior confines of the socket 13 with sufficient space in the annular groove 46 to permit the outward expansion of the ring 47. Consequently, the largest diameter of the driver knuckle 11 will be somewhat greater than the normal inside diameter of the split wire ring 48 to cause the latter to expand responsive to the displacement of the driver knuckle 11 therethrough for registry with the socket 13 when the driver knuckle tip 12 is within the axial aperture 40 of the spring supported disc 37.

In this position the larger diameter of the knuckle 11 will pass beyond the split ring 48 which will then contract to its normal diameter over the driver knuckle 11 and preclude its accidental removal from the socket 13 and still permit its insertion therein without any appreciable difficulty. This arrangement affords a simple and inexpensive spring retainer for the driver knuckle 11 when it is in its operative position of full registry with the outer sleeve holder cap socket 13. This enables the power driver 10 to be lifted with the grinding stone carrier stone 13 so that the grinding wheel 27 will be removed from its valve seat 49 without any possible separation between the knuckle 11 and stone 13 while they are rotating in unison at high speed.

This enables the grinding stone 27 to be seated and unseated relative to the valve seat 49 for the desirable maintenance of the speed of rotation and also to clear the valve seat 49 from all filings that are created responsive to the resurfacing and reshaping. The extent of separation between the grinding stone 27 and valve seat 49 may be a variable factor depending upon the requirements of each valve grinding operation, but such must be accomplished without separation or detachment between the driver knuckle 11 and the socket 13 in order to reseat the grinding wheel 27 on the valve seat 49. This seating and unseating operation is continuously effected during valve grinding operation.

With the arrangement of parts above described, a simple and dependable expedient has been provided to maintain the driver knuckle 11 in registry with the socket 13 against accidental displacement or separation to insure positive rotation in unison. It should be appreciated that the teachings of the present invention may be employed with equal advantage for nut turning sockets and handles therefor as well as many other similar situations.

Various changes may be made in the embodiment of the invention herein described without departing from the invention or sacrificing any of the advantages or features thereof, and nothing herein shall be construed as limitations upon the invention, its structural embodiment or concept as to the whole or any part thereof except as defined in the appended claims.

I claim:

1. In a device of the character described, the combination with a driven member having a polygonal socket, of a spring impelled driver sustaining seat in said socket, a polygonal driver member complemental to said socket, and circumferentially expansible means in said polygonal socket to yieldingly retain said driver member against accidental withdrawal from said socket, said spring impelled sustaining seat being initially in an engaging position therewith.

2. In a device of the character described, the combination with a driven member having a polygonal driver receiving socket, a spring impelled driver sustaining seat in said socket, and resilient friction means in said polygonal socket to circumferentially engage a driver therein and prevent accidental removal therefrom, said resilient friction means being partially recessed in the wall of said socket to render such expansible therein for permitting the controlled engagement and disengagement of a driver with said socket.

3. In a device of the character described, the combination with a driven member having a polygonal driver receiving socket, a spring impelled driver sustaining seat in said socket, and resilient friction means circumferentially engageable with said driven member in spaced relation to said spring impelled driver sustaining seat for yieldable retention of a driver member in said socket for permitting the controlled engagement and disengagement of a driver with said socket.

WILLIAM W. DANIEL.