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1,555,647

A. FALCONER

QUICKLY DETACHABLE TOOL JOINT

Filed July 14, 1922

FIG. 1.

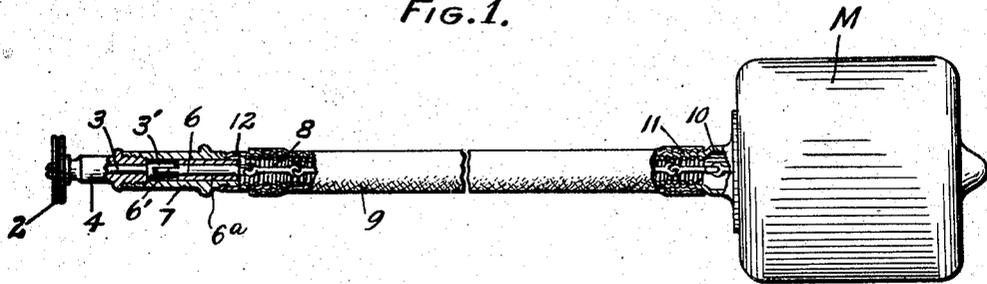


FIG. 2.

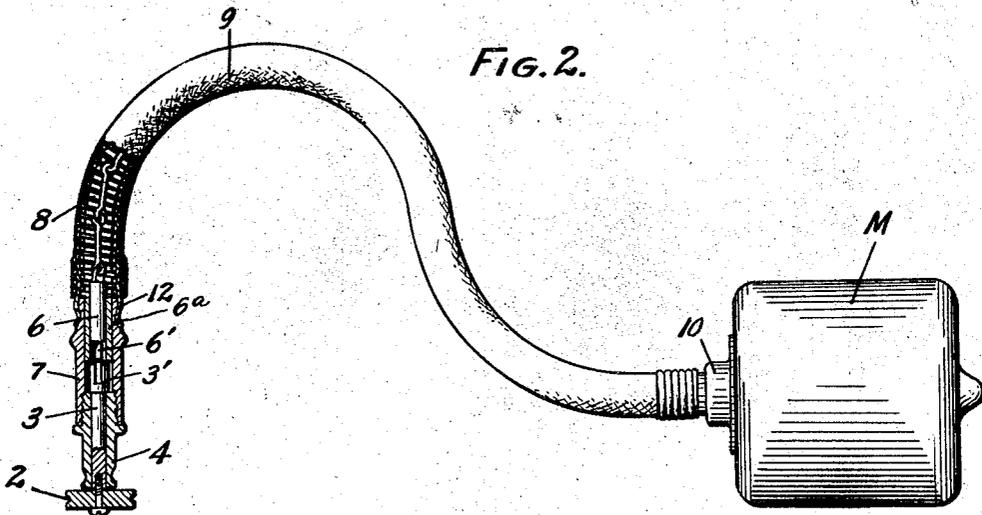


FIG. 3.

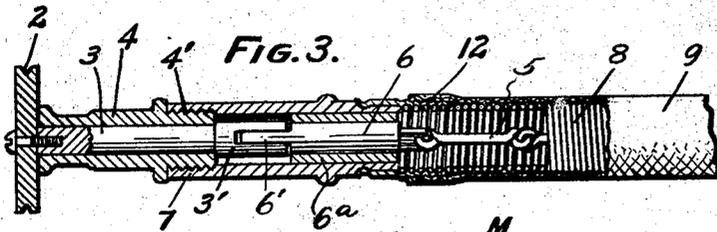
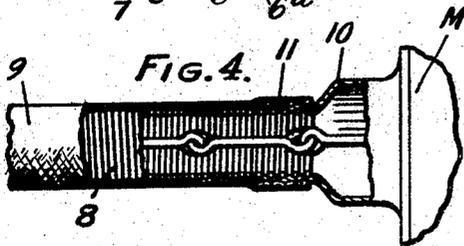


FIG. 4.



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ALLAN FALCONER, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO THE ELECTRIC MANICURING COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

QUICKLY-DETACHABLE TOOL JOINT.

Application filed July 14, 1922. Serial No. 574,929.

To all whom it may concern:

Be it known that I, ALLAN FALCONER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Quickly-Detachable Tool Joints, of which the following is a specification.

This invention relates to detachable tool joints.

It is an object of the present invention to provide a simple, inexpensive, practicable and substantial rotary driving tool joint, and more particularly it is an object to provide a tool having a driving shaft to which there is adapted to be readily attached a detachable element or instrument, and which instrument is automatically locked in position by the driving shaft when the instrument is applied to the tool casing or shell.

Another object is to provide an instrument having a flexible shaft and to which instrument there is adapted to be attached a removable implement, means being provided for automatically disconnecting the driving shaft from the driven part of the implement when the flexible shaft is distorted to a predetermined degree.

Other objects will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation and longitudinal section of the invention as combined in a portable manicuring tool, the flexible shaft being in a true straight line arrangement.

Fig. 2 is a side elevation and partial section showing the automatic disconnection of the driving means from a driven part of the tool upon a given degree of flexure of the flexible shaft.

Fig. 3 is a longitudinal section of the coupling elements of the device.

Fig. 4 is a longitudinal section and partial elevation showing the means for connecting the flexible shaft and its casing to a motor.

The present invention is incorporated in a tool, such for instance as a manicuring outfit which includes in a given case, a number of interchangeable rotatively driven elements or parts, one of which is herein indicated as the grooved edge cutting file 2. This wheel is provided with a substantial spindle 3 rotatively mounted in a barrel 4. One of the series of implements when ap-

plied to the tool is adapted to be rotatively driven, as for instance by a motor M to the shaft of which is connected any suitable type of flexible shaft which is here shown as consisting of a number of links 5. The outermost link is provided with a driving rod 6, and this is provided with a noncircular driving part to be coupled to the spindle 3 of the implement to be driven.

The rotating coupling, as here shown, comprises a driving tongue or lug 6' on the end of the rod 6, and this lug is designed to enter and engage a yoke or slotted head 3' of the spindle 3. The spindle is prevented from end movement in its barrel 4.

A feature of the invention consists of means for substantially automatically clutching up or coupling up the driving rod 6 and the driven spindle 3. For that purpose the barrel 4 is provided with a threaded end 4', and this is designed to enter a socket 7 in which the driving rod 6 is rotatively mounted within a fixed sleeve or bushing 6^a in which it is slidable axially. The flexible shaft 5 is encased suitably as for instance by a substantial, close coiled wire sleeve 8 thus forming a flexible jacket. This may be, and preferably is, enclosed in a pliable cover or tube 9 of cloth or other suitable material.

The motor M is provided with a thin metal hub 10 which has rolled or otherwise formed threads 11, receiving the contiguous end of the coiled jacket 8, thus providing a simple and effective and inexpensive form of connection between the jacket and the motor housing. The opposite or free end of the flexible jacket 8 is similarly threaded in a thimble 12 suitably secured upon the contiguous end of the socket 7.

Since the jacket of coiled wire 8 is closely coiled, when the jacket is in a straight line position as shown in Figs. 1 and 3, the coils lie snug against each other, but if the jacket is bowed it will be seen that the concave side of the bowed jacket forms, along each coil, a pivot about which the convex curved edge of the bowed jacket separates or opens pivotally as is shown in Fig. 2. This provides for the automatic disconnection of the driving rod 6 and the driven spindle 3 as is shown in Fig. 2, because of the relative increasing in the length of the flexible tube or jacket 8 without complementary increase in the length of the flexible shaft which therefore produces a differential movement

of the socket 7 as to the rod 6, the socket shifting forwardly along the rod and carrying the driven spindle 3 out of engagement with the driving rod 6.

5 In the application of a tool implement, including the spindle 3 and its barrel 4, the threaded end of the barrel is applied to the socket 7 and turned in just sufficient to engage the driving lug 6' and the clutch jaws 3', whereupon because of the rotation of the spindle by the driving rod, the friction of the spindle in the bearing or barrel 4 causes the latter to quickly rotate into its final position in the threaded end of the socket 7. It will therefore be seen that the tools or implements, applicable to the device, can be applied and removed without stopping the operation of the motor M.

It is desirable that the driving rod 6 be disconnected from the driven member 3 after the shaft and its casing has been distorted beyond a suitable angle, so as to reduce the friction of the flexible shaft in the distorted casing and also to prevent chattering of the wheel driving member 3. The distortion of the shaft 5 proper out of a straight line as the housing bends, further serves as means for relatively shifting the driving rod 6 inwardly from the attached driving spindle 3.

Further embodiments, modifications and changes may be resorted to within the spirit of the invention as here claimed.

What is claimed is:

35 1. In an instrument having a flexible

shaft and a flexible jacket surrounding said shaft, a tool joint comprising a socket member secured to said jacket, a fixed sleeve within said socket member, a driving rod rotatable and slidable within said sleeve and secured to said flexible shaft, said socket being internally threaded to receive an externally threaded barrel, a driven rod rotatable within said barrel, means formed upon said driven and driving rods to provide for interlocking engagement, said means being so formed and so arranged that when said flexible shaft and jacket are materially bent, said driving rod will be caused to disengage said driven rod.

2. In an instrument having a flexible shaft and a flexible jacket surrounding said shaft, a tool joint comprising a socket member secured to said jacket, a fixed sleeve within said socket member, a driving rod rotatable and slidable within said sleeve and secured to said flexible shaft, said socket being internally threaded to receive an externally threaded barrel, a driven rod rotatable within said barrel, a head formed upon said driving rod, a socket formed upon said driven rod, said head and the last mentioned socket being so arranged that when said flexible shaft and jacket are materially bent, said driving rod will be caused to slide axially within said sleeve causing said head to disengage the socket upon said driven rod.

In testimony whereof I have signed my name to this specification.

ALLAN FALCONER.