G. A. AND R. M. STAFFORD.

TOOL JOINT.

APPLICATION FILED SEPT. 2, 1919.

1,344,774. **Patented June 29, 1920.**

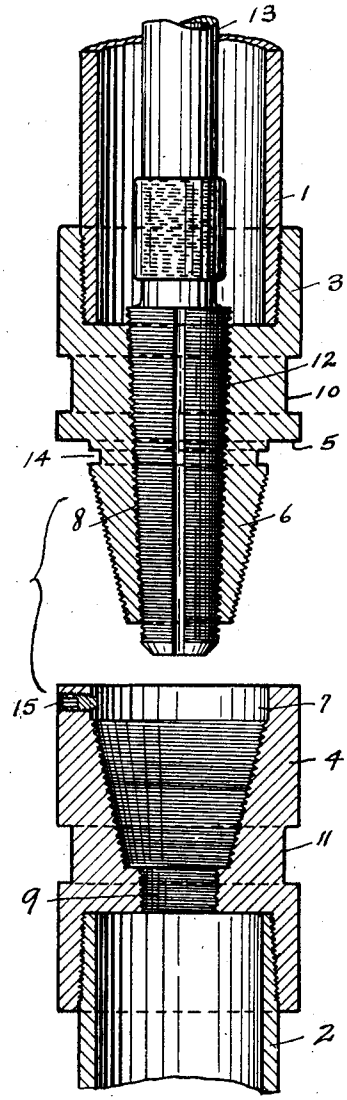


Fig. 2.

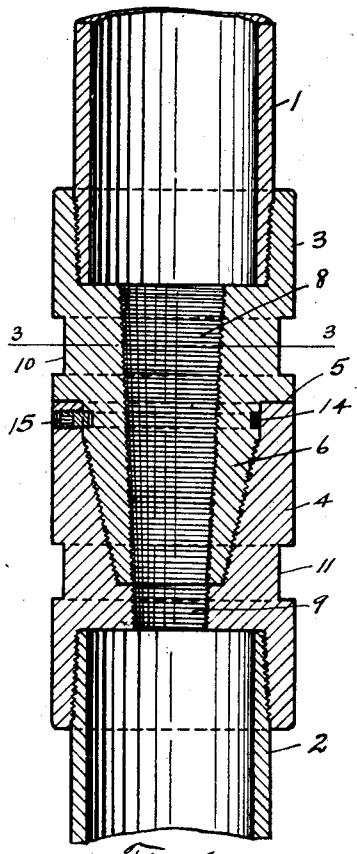


Fig. 1.

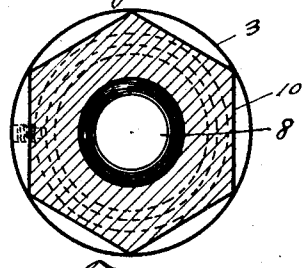


Fig. 3

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UNITED STATES PATENT OFFICE.

GEORGE A. STAFFORD AND ROY M. STAFFORD, OF SOURLAKE, TEXAS.

TOOL-JOINT.

1,344,774. Specification of Letters Patent. Patented June 29, 1920.

Application filed September 2, 1919. Serial No. 320,973.

To all whom it may concern:

Be it known that we, GEORGE A. STAFFORD and ROY M. STAFFORD, citizens of the United States, residing at Sourlake, in the county of Hardin and State of Texas, have invented certain new and useful Improvements in Tool-Joints, of which the following is a specification.

This invention relates to new and useful improvements in a tool joint.

One object of the invention is to provide a tool joint of the character described which has been specially adapted for the purpose of connecting sections of a drill stem used in drilling wells by the rotary process.

In drilling oil or water wells by the well known rotary process, a drill stem is employed, to the lower end of which the drill bit is attached. This stem is rotated from the surface of the ground by a rotary well known to those familiar with the art of rotary drilling, and in the process of drilling, the bit soon becomes dull, and consequently, the stem must be often removed for the purpose of taking off the old bit and attaching a new one. In withdrawing the stem, it is unscrewed at every third or fourth joint, and broken up, for convenience in handling, and then when the new bit is attached, is again made up and let down into the bore. The joints where the stem is broken up are connected by tool joints which are so constructed as to be easily unscrewed and screwed together, and the intermediate joints are usually connected by the ordinary pipe couplings. The device herein described has been devised for the purpose of application to the stem so that the joints to be connected and disconnected in making up and breaking up the stem may be screwed together and unscrewed quickly and easily.

Another object of the invention is to provide a tool joint of the character described whose members have alined water passageways therethrough, to permit the water to pass down through the stem to the cutting points of the bit for the purpose of flushing away the cuttings as abraded from the bottom of the bore. In drilling, the bit sometimes becomes stuck and the stem is twisted off down in the bore, and in such event, the twisted off section must be fished out by means of a fishing tool commonly employed. For that reason, the water passageways through the members of the tool joint herein described, are internally threaded, so that the fishing tool may be readily engaged therewith, for the purpose of fishing out the lower end of the stem which has been twisted off.

A further feature of the invention resides in the provision of a tool joint of the character described whose members are so secured together that they will not become accidentally unscrewed during the process of drilling. In drilling through rock, or other hard strata, the bit often "hangs" and when it is attached to a long stem, the stem will twist until the bit becomes disengaged from the strata, and then will "jump," that is, the lower end of the stem will rapidly spin or untwist which sometimes causes one of the joints to entirely unscrew, permitting the stem to separate. The tool joint herein described has been so constructed as to prevent the accidental unscrewing of its members.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1, is a vertical sectional view of the tool joint, showing its members screwed together,

Fig. 2, is a vertical sectional view showing the members separated, and Fig. 3, is a cross sectional view taken on the line 3—3 of Fig. 1.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1, refers to a section of the drill stem, located above the tool joint shown, and numeral 2, refers to a section located beneath said joint. The lower end of section 1 is screwed in the upper end of the joint member 3, and the upper end of the section 2 is screwed into the lower end of the joint member 4. The member 3 is reduced at its lower end forming the abrupt shoulder 5, and the tapering outwardly threaded pin 6, and the joint member 4 is formed with an internally threaded tapering box 7, adapted to receive said pin which is designed to be screwed therein, and when

said pin is screwed home, the upper end of the member 4 abuts against the shoulder 5 of the member 3. The respective members have the water courses 8 and 9, therethrough, which aline when the members are screwed together, and these water courses are internally threaded for a purpose to be hereinafter stated. The respective members have polygonal sections 10, and 11, respectively, designed to receive a wrench to be used in screwing the members together and in unscrewing them.

The tapering form of the pin and box will permit the same to be screwed together, and unscrewed with only a few turns, and when the pin is screwed home, all of the threads of the pin and box interengaging, a very strong tool joint will thus be provided.

In hard drilling, the stem often becomes twisted off, in which case, the upper section may be readily withdrawn, but the lower section remains "stuck" in the bore, and must be "fished" out. For this purpose, a fishing tool 12 is employed which is let down into the stem by means of a suitable rod 13. This fishing tool has a slight taper, and is externally threaded and is let down into the stem and screwed into the threads of the water courses 8 and 9, so as to be firmly engaged therewith, and by an upward pull on the rod 13, the stuck section may be withdrawn from the bore.

In order to prevent the members from unscrewing and the stem from separating, as hereinbefore explained, the pin 6 adjacent the shoulder 5 is provided with an annular peripheral groove 14, and a set bolt 15 is threaded through the upper end of the member 4 and its inner end projects into said groove, thus preventing the separation of the members 3 and 4, during the process of drilling.

What we claim is:

1. A tool joint including two joint members, one of which is formed with a reduced outwardly threaded tapering pin, and the other of which is provided with a correspondingly shaped internally threaded box, adapted to receive said pin, said members being provided with alined internally threaded water passageways therethrough.

2. A tool joint including two joint members, one of which is formed with an externally threaded pin, and the other of which is provided with an internally threaded box, adapted to receive said pin, said members having alined water passageways therethrough, said passageways being internally threaded and adapted to receive and engage with, an externally threaded fishing tool.

3. A tool joint including two joint members, one of which is formed with a reduced externally threaded pin, having an annular groove therearound, and the other of which is provided with an internally threaded box adapted to receive said pin, and a set bolt threaded through said box, and whose inner end projects into said groove, said members being provided with alined water passageways therethrough, said water passageways being internally threaded to receive an externally threaded fishing tool.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE A. STAFFORD.
ROY M. STAFFORD.

Witnesses:
E. V. HARDWAY,
IRENE I. BRUNS.