Nov. 30, 1937. O. C. SNELL 2,100,615

DRILL

Filed April 30, 1936 2 Sheets-Sheet 1

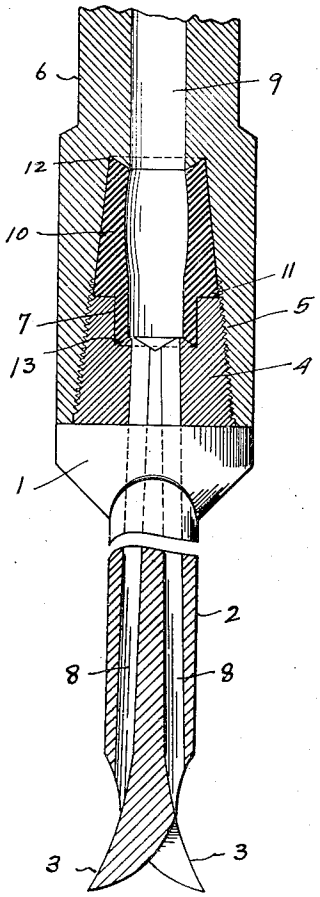


Fig. 1.

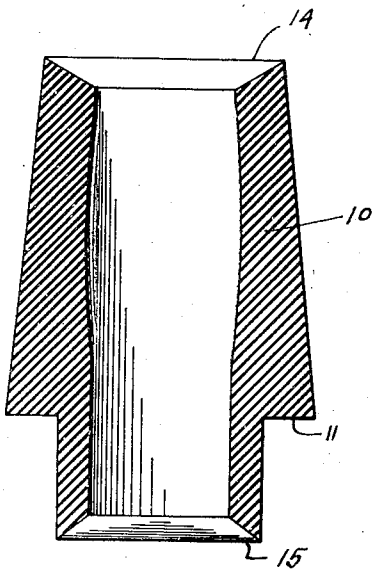


Fig. 2.

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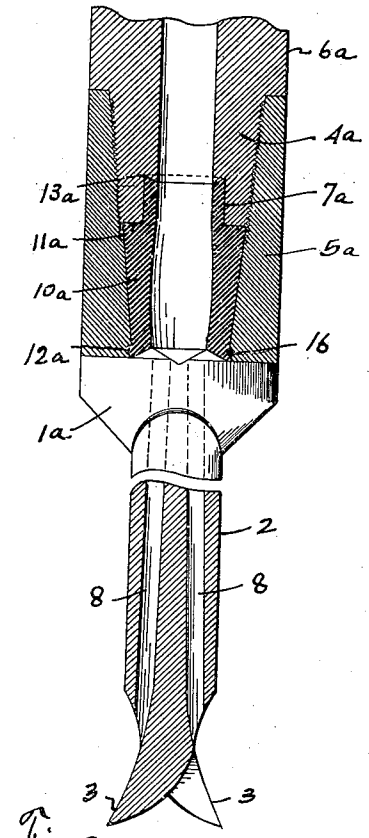


Fig. 3.

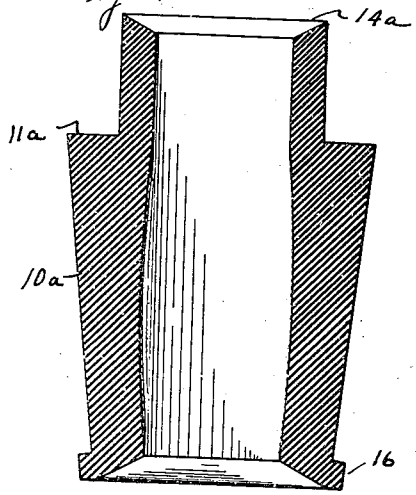


Fig. 4.

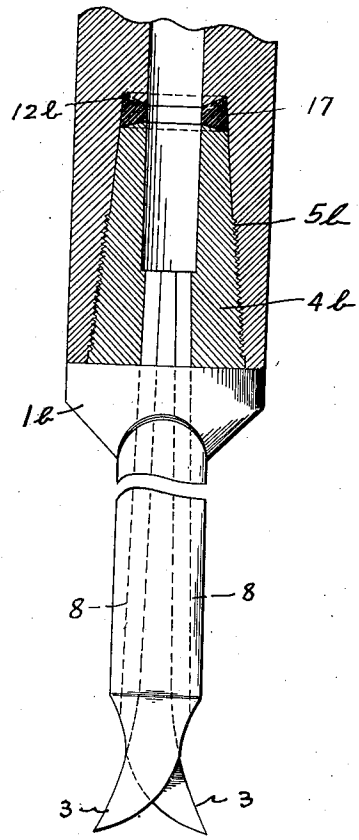


Fig. 5.

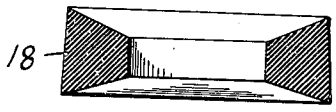


Fig. 6.

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2,100,615

UNITED STATES PATENT OFFICE

2,100,615

DRILL

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Application April 30, 1936, Serial No. 77,228

3 Claims. (Cl. 285—146)

This invention relates to a drill.

An object of the invention is to provide, in a drilling tool, a novel type of packing for forming a close fitting joint to protect the threads of the pin and box whereby the drill is connected to the drill collar or other driving member.

As is well known in the drilling of deep wells a mud laden drilling fluid is forced under high pressure down through the drill stem and out through channels in the drill to the drill cutters to carry away the cuttings. The drilling tool is connected to the drill collar of the drill stem by means of an outwardly threaded pin screwed into an inwardly threaded box and in many cases a leakage occurs through the threads, permitting the escape of the drilling fluid and this fluid being under high pressure and containing abrasive material, soon cuts away the threads, destroying the pin or box or both and thus destroying the usefulness of the tool. It is an object of the invention to provide a sleeve like packing of a special design to be mounted within the box in abutting relation with the pin to form a very effective seal, when the pin is screwed home in the box, against the escape of the drilling fluid through the threads connecting these parts.

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

Figure 1 shows an edge view of a drill partly in section showing the drill collar and packing in section.

Figure 2 shows an enlarged sectional view of the packing.

Figure 3 shows an edge view, partly in section, of another form of the drill, showing a modified form of packing sleeve therein.

Figure 4 shows an enlarged sectional view of the packing sleeve shown in Figure 3.

Figure 5 shows an edge view partly in section of another modification of the drill, showing another type of packing therein, and

Figure 6 shows an enlarged sectional view of the type of packing shown in Figure 5.

Referring now more particularly to the drawings wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a head of the conventional type of drill, said drill having the body 2 terminating at its lower end in cutters 3, 3.

Extending above the drill head and formed integrally therewith there is a reduced upwardly tapering outwardly threaded pin 4 adapted to be screwed into a correspondingly shaped internally threaded box 5 of the drill collar 6 by means of which the drill is connected to the drill stem. The pin 4 has a bore 7 in the upper end thereof and leading downwardly from this bore through the drill are the channels 8, 8 through which the drilling fluid passes to the cutters 3. The drill stem of which the collar forms a part, is tubular having the axial channel 9 for the downward passage of the drilling fluid. The lower end of the channel 9 is enlarged and downwardly flared and located in said enlarged portion there is a sleeve like packing 10 formed of rubber or similar packing material. The lower end of the packing sleeve 10 is reduced forming an external downwardly facing shoulder 11 which rests closely against the upper end of the pin 4 and the reduced end of this sleeve fits closely within the bore 7. The upper end of the enlarged portion of the channel 9 has an annular under cut groove 12 and the lower end of the bore 7 has a similar annular undercut groove 13 and the upper and lower ends of the packing sleeve 10 are outwardly tapered forming the lips 14 and 15 which conform to the shape of and fit snugly within the grooves 12, 13. When the pin 4 is screwed home in the box 5 it will apply endwise pressure to the packing sleeve 10 so as to form close fitting joints in the grooves 12 and 13 as well as between the end of the pin and shoulder 11 and will effectively prevent the drilling fluid from reaching the threads connecting the pin to the box.

The inner side of the sleeve 10 is slightly concaved so that when endwise pressure is applied thereto the sleeve will not bulge inwardly and restrict the passage of the drilling fluid therethrough. In the form shown in Figure 3 the pin 4a is on the drill collar 6a and is screwed into the box 5a upstanding from and formed integrally with the head 1a of the drill. In this form the pin is formed with the socket 7a terminating at its upper end in the undercut groove 13a. The lower portion of the box is blank and terminates in an annular groove 12a. Seated in the blank portion of the box there is a packing sleeve 10a formed of rubber or similar packing material and whose upper end is reduced forming the annular external upwardly facing shoulder 11a, which abuts the lower end of the pin 4a when the pin is screwed home. The reduced upper end of the packing 10a fits closely within the bore 7a in the pin, and terminates in an annular lip 14a which conforms to the shape of and fits closely within the undercut groove 13. The lower end of the

packing 10a has an external annular rib 16 which fits snugly within the annular inside groove 12a at the lower end of the box.

In this form also the inside of the packing sleeve 10a is slightly concaved for the purposes hereinabove stated in connection with the description of the packing 10.

In the form shown in Figure 5 the pin 4b upstanding from the head 1b of the drill is extended beyond the threads thereof and is blank and the drill collar has the internally threaded box 5b which is threaded to receive the external threads of the pin and is blank above said threads to receive the blank portion of the pin which is fitted closely therein. The upper end of the box in this form is undercut forming the groove 12b and the upper end of the pin is upwardly and inwardly tapered and spaced from the groove 12b. There is thus formed between the upper end of the box and the upper end of the pin a dovetailed groove 17 and an annular dovetailed packing sleeve 18 is fitted closely in the groove 17 and is subjected to endwise pressure by the pin 4b when screwed into the box to form a fluid tight joint to prevent the drilling fluid under pressure from reaching the threads.

The drawings and description disclose what are now considered to be preferred forms of the invention by way of illustration only, while the broad principle of the invention will be defined by the appended claims.

What I claim is:

1. In combination a drill and a driving member, one having an externally threaded pin and the other having an internally threaded box to receive the pin, the assembly having a channel for the passage of drilling fluid therethrough to the drill cutters, a sleeve like packing in the box through which the channel extends, the box having an annular wall groove to receive one end of the packing and the pin abutting the other end of the packing, said pin having an end socket and the abutting end of the packing being reduced and fitted into said socket.

2. In combination a drill, a driving member for the drill, said drill and member being provided, one with an externally threaded pin having an end socket and the other with an internally threaded box to receive the pin, a packing member fitted closely in the box one end of which abuts the corresponding end of the box and whose other end is reduced and fitted into the pin socket and formed with an external annular shoulder which abuts the free end of the pin.

3. A drilling apparatus having a fluid passageway therethrough and comprising adjacent parts, one having a pin provided with external threads and a tapering blank portion beyond the threads and the other part having a box provided with internal threads to receive the threads of the pin and a blank portion into which the blank portion of the pin fits closely when the parts are screwed together, the end of the pin and the opposing portion of the box being formed to provide an annular inside dovetailed groove and an annular dovetailed packing sleeve fitted closely into the groove and subject to endwise compression by the pin when the pin is screwed to home position in the box.

OWENS C. SNELL.