

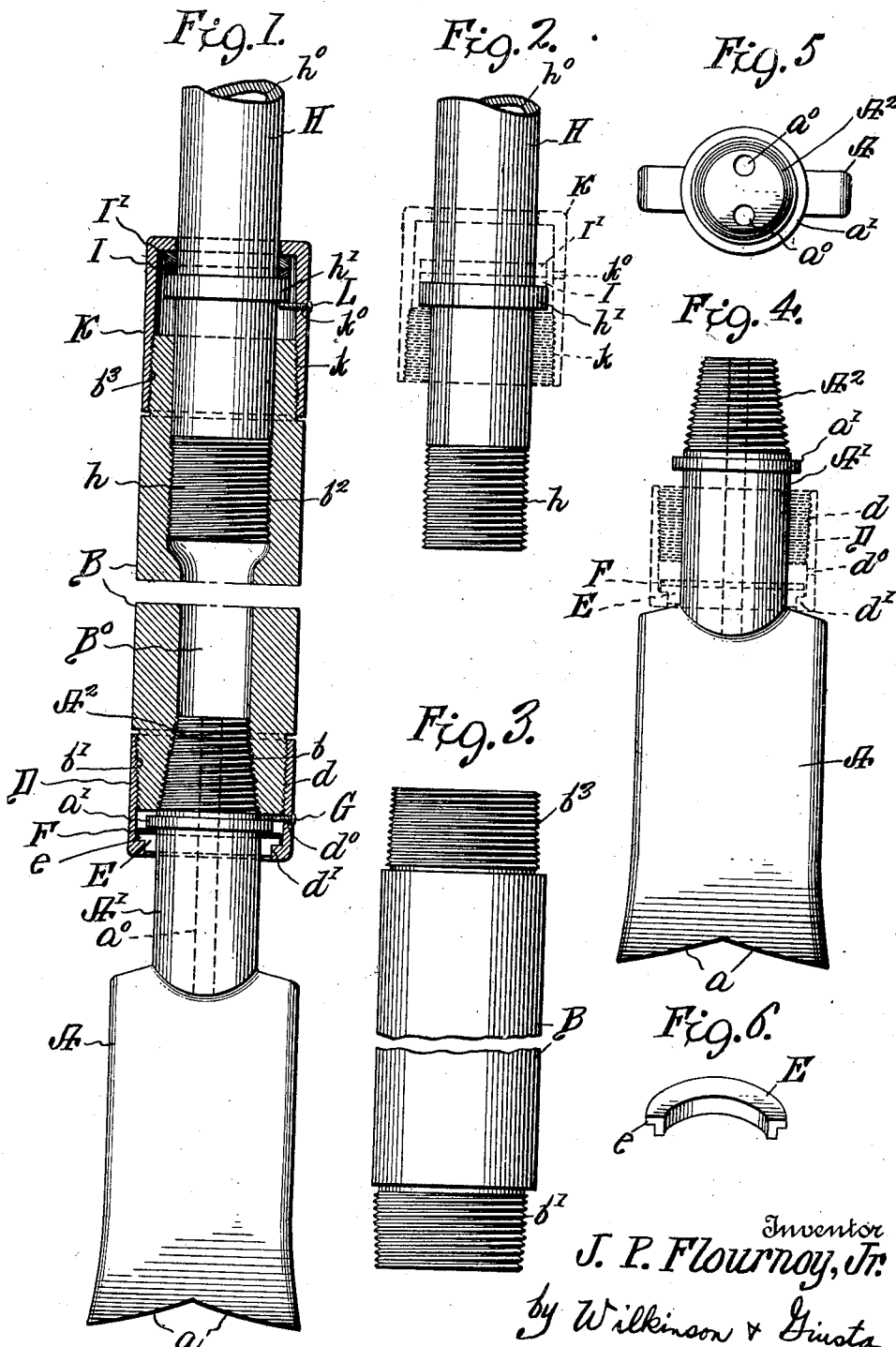
Apr. 3, 1923.

1,450,845

J. P. FLOURNOY, JR

DRILL BIT AND COLLAR THEREFOR

Filed Aug. 27, 1921



Inventor
J. P. Flourney, Jr.
by Wilkinson & Givsta
Attorneys.

Patented Apr. 3, 1923.

1,450,845

UNITED STATES PATENT OFFICE.

JAMES P. FLOURNOY, JR., OF SHREVEPORT, LOUISIANA.

DRILL BIT AND COLLAR THEREFOR.

Application filed August 27, 1921. Serial No. 495,998.

To all whom it may concern:

Be it known that I, JAMES P. FLOURNOY, Jr., a citizen of the United States, residing at Shreveport, in the parish of Caddo and State of Louisiana, have invented certain new and useful Improvements in Drill Bits and Collars Therefor; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the construction of drill bits for use in boring deep wells, and in the manner of attaching the bit to the stem. It is well known that such bits have to pass through strata of various formations, such as hard rock, sand, mud, water, gravel, or the like, and these bits are frequently required to operate at great depths, such as several thousand feet. At this great depth, especially where drilling through water, there is a tremendous pressure and there is a tendency of the gritty sand to get into the various joints, especially between the screw threads and elsewhere, and either cause the screw threads to become worn, or cause the sand, mud and the like to lock the bit so that it is impossible to remove the same from the collar when desired.

The action of the sand with the ordinary threads where the bit shank enters the collar as well as the drill stem, very often causes them to cut in such a manner that it is impossible to disconnect the bit and drill stem from the collar, the threads having become "frozen", as the expression is used, to the collar. This is probably because the threads are mutilated by the sand, and in the effort to back the bit or drill stem off the collar it would jam in such a way that the threads would not follow each other. This will cause a loss of bit and collar, as well as a 20 foot joint of drill stem.

According to my invention I provide means for protecting the threads from sand, or the like.

My invention will be more fully understood after reference to the accompanying drawings, in which like parts are indicated by similar reference symbols throughout the several views, and in which:

Figure 1 shows a section through the collar, with the bit and the stem attached thereto shown in elevation.

Figure 2 shows the lower end of the stem

with the cap for attaching the collar thereto shown in dotted lines.

Figure 3 is an elevation of the collar, parts being broken away.

Figure 4 is an elevation of the bit as detached from the apparatus, showing the cap connecting the bit to the bottom of the collar in dotted lines.

Figure 5 is a top plan view of the bit; and

Figure 6 is a detail showing one of the members of the pivoted packing ring interposed between the bit and the bit cup.

A represents the bit which is provided with the cutting edges *a* of any suitable or desired type. This bit is also provided with the usual cylindrical shank *A'*, having the flange *a'* below the tapered screw threads *A²*. The shank *A'* is provided with suitable opening *a⁰* for the circulating water.

B represents the collar which is hollowed as at *B⁰*, and is provided at its lower end with tapered screw threads *b* to engage the tapered screwthreaded portion *A²* of the bit. By having the tapered screw threaded connection as shown, the bit may be quickly attached to or disengaged from the collar, as by a few turns only instead of a large number of turns, and coarse screw threads may be used which are not so apt to be injured by the sand.

The collar B is screw threaded near its lower end, as at *b'*, to engage the cup-shaped cap D which is internally screw threaded as at *d*. These screw threads *d* and *b'* are also preferably slightly tapered for the advantages similar to those in connection with the tapered screw threads *b* already referred to. This cup-shaped cap is provided on its lower end with an inwardly projecting annular flange *d'*, which is spaced away from the shank *A'* of the bit, as shown in Fig. 1.

Mounted above this flange *d'* are the two segments of the ring E, one segment of which is shown in Fig. 6, which ring has an outwardly projecting flange *e* engaging over the annular flange *d'* of the cap D. Above this segmental ring E is the ordinary hydraulic packing F, of suitable material, which engages beneath the flange *a'* on the shank of the bit.

G, see Fig. 1, represents a set screw.

The collar B is provided near its upper end with internal screw threads *b²* to engage the screw threads *h* on the bottom of the stem H which is hollowed as at *h⁰*. This

stem is provided with the flange h' to engage the hydraulic packing I mounted beneath the packing ring I' which packing ring is held beneath the cup-shaped cap K as shown in Fig. 1. This cap is provided with internal screw threads h adapted to engage the screw threads b^3 on the exterior of the upper end of the collar B. These screw threads h and b^3 are also preferably tapered somewhat for reasons already described.

L represents the set screw which engages beneath the flange h' and is inserted through the screw threaded opening h^0 in the cap K. The set screws L and G are inserted after the parts are otherwise assembled and serve to lock the parts together, as will be evident from an inspection of Fig. 1.

In order to assemble the bit, collar and the stem, place the bit A in an upright position and slip the cap D down to the position shown in dotted lines in Fig. 4. This cap will pass freely over the flange a' . Now insert the half rings E by dropping same between the cap D and the shank of the bit, then insert the hydraulic packing F, then screw the collar B down on top of the bit so that the threads on the part A² will engage the tapered threads b of the collar B, then screw the cap D up in the position shown in Fig. 1, making a tight joint with the packing F, and finally insert the set screw G.

The bit will now be held firmly attached to the lower end of the collar and the stem may be attached to the collar as will now be described.

The cap K being loose on the collar, as indicated in dotted lines in Fig. 2, the screw threads h of the stem H are screwed into the screw threads b^2 of the collar B until the parts assume the position shown in Fig. 1, then the cap K is screwed down, compressing the packing I and I' against the flange h' , and forming a tight joint as shown in Fig. 1; and finally the set screw L is screwed through the screw threaded opening h^0 of the cap K.

The parts will then be ready for use in the usual way.

To dis-assemble the parts, reverse the operation.

It will be obvious that various modifications might be made in the herein described apparatus, and in the construction, combination and arrangement of parts which could be used without departing from the spirit of my invention; and I do not mean to limit the invention to such details except as particularly pointed out in the claims.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. In well boring apparatus, the combination with a hollow tubular stem, and a hollow collar secured thereto, the said collar being provided with internal tapered screw

threads in its lower end, and also with external screw threads, of a bit provided with a shank having at its upper end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, a hollow screw cap provided with an inwardly projecting flange surrounding said shank and screwed over the external screw threads on said collar, a segmental metal packing ring made up of a plurality of segments, each L-shaped in cross section supported on said flange of said cap, and hydraulic packing held firmly between said segmental ring and said flange on the bit shank.

2. In well boring apparatus, the combination with a hollow tubular stem, and a hollow collar secured thereto, the said collar being provided with internal tapered screw threads in its lower end, and also with tapered external screw threads, of a bit provided with a shank having at its upper end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, a hollow screw cap provided with an inwardly projecting flange surrounding said shank and with tapered internal screw threads engaging the external screw threads on said collar, packing firmly held between said flange on said shank and said flange on said cap, and a set screw passing through the side of said cap and engaging said shank.

3. In well boring apparatus, the combination with a hollow tubular stem, and a hollow collar secured thereto, the said collar being provided with internal tapered screw threads in its lower end, and also with tapered external screw threads, of a bit provided with a shank having at its upper end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, a hollow screw cap provided with an inwardly projecting flange surrounding said shank and with tapered internal screw threads engaging the external screw threads on said collar, a segmental metal packing ring made up of a plurality of segments, each L-shaped in cross section supported on said flange of said cap, and hydraulic packing held firmly between said segmental ring and said flange on the bit shank.

4. In well boring apparatus, the combination with a hollow tubular stem, provided with an annular flange, and a hollow collar secured thereto, the said collar being provided with internal screw threads near its upper end and with internal tapered screw threads in its lower end, and also with external screw threads on both ends, of a bit provided with a shank having at its upper

end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, hollow screw caps mounted, respectively, over each end of said collar, each provided with an inwardly projecting flange surrounding said shank and stem respectively and screwed over the external screw threads on said collar, and packing firmly held between said flanges on said shank and stem, respectively, and said flange on said caps.

5. In well boring apparatus, the combination with a hollow tubular stem, provided with an annular flange, and a hollow collar secured thereto, the said collar being provided with internal screw threads near its upper end and with internal tapered screw threads in its lower end, and also with external screw threads on both ends, of a bit provided with a shank having at its upper end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, a hollow screw cap provided with an inwardly projecting flange surrounding said shank and screwed over the external screw threads on said collar, a segmental metal packing ring made up of a plurality of segments, each L-shaped in cross section supported on said flange of said cap, hydraulic packing held firmly between said segmental ring and said flanges on the bit shank, a second screw cap engaging the upper end of said collar and surrounding said stem, and hydraulic packing held between said second screw cap and the flange on said stem.

6. In well boring apparatus, the combination with a hollow tubular stem, provided with an annular flange, and a hollow collar secured thereto, the said collar being provided with internal screw threads near its upper end and with internal tapered screw threads in its lower end, and also with tapered external screw threads in both ends,

of a bit provided with a shank having at its upper end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, hollow screw caps each provided with tapered internal screw threads, mounted, respectively, over each end of said collar, each provided with an inwardly projecting flange surrounding said shank and stem, respectively, and screwed over the external screw threads on said collar, and packing firmly held between said flanges on said shank and stem, respectively, and said flange on said caps, and set screws passing through said caps and engaging, respectively, said shank and said stem.

7. In well boring apparatus, the combination with a hollow tubular stem, provided with an annular flange, and a hollow collar secured thereto, the said collar being provided with internal screw threads near its upper end and with internal tapered screw threads in its lower end, and also with tapered external screw threads on both ends, of a bit provided with a shank having at its upper end tapered screw threads engaging in the internal screw threads on said collar, the said shank being also provided with an annular flange below its tapered screw threaded portion, a hollow screw cap provided with an inwardly projecting flange surrounding said shank and tapered screw threads engaging the external screw threads on said collar, a segmental metal packing ring made up of a plurality of segments, each L-shaped in cross section supported on said flange of said cap, hydraulic packing held firmly between said segmental ring and said flanges on the bit shank, a second screw cap engaging the upper end of said collar and surrounding said stem, and hydraulic packing held between said second screw cap and the flange on said stem, and set screws passing through said caps and engaging, respectively, said shank and said stem.

JAMES P. FLOURNOY, Jr.