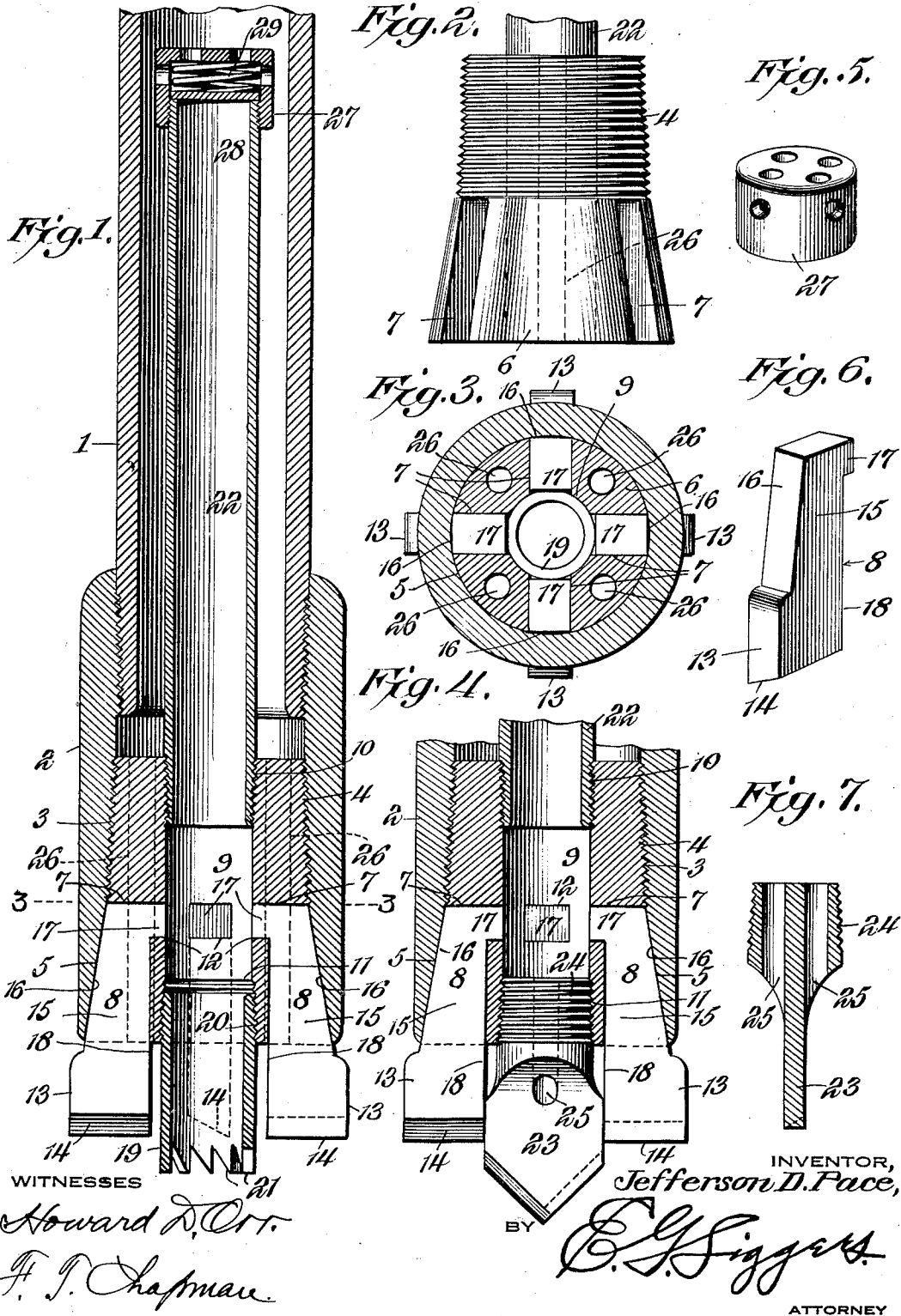


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WELL DRILLING BIT FOR OIL, WATER, OR GAS.
APPLICATION FILED JULY 19, 1919.

1,351,003.

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UNITED STATES PATENT OFFICE.

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WELL-DRILLING BIT FOR OIL, WATER, OR GAS.

1,351,003.

Specification of Letters Patent. Patented Aug. 24, 1920.

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To all whom it may concern:

Be it known that I, JEFFERSON D. PACE, a citizen of the United States, residing at Shreveport, in the parish of Caddo and State of Louisiana, have invented a new and useful Well-Drilling Bit for Oil, Water, or Gas, of which the following is a specification.

This invention has reference to drilling bits for oil, water or gas, and its object is to provide a deep well bit by means of which samples of the cuttings may be obtained from time to time and the alinement of the bore may be maintained.

In accordance with the invention, a hollow drill rod is employed in order that water may be supplied to the drill bits and the cuttings may be removed as the drilling progresses. The hollow rod is provided with a head or coupling at the drilling end for carrying a suitable number of bits, and in conjunction with the bits the coupling carries a core barrel capable of receiving a core cutter or a centering bit, whereby the alinement of the bore is maintained. Provision is made for feeding water to the active ends of the cutters to clear them from the cuttings, and the core barrel, which may be relatively short, has at its upper end an upwardly opening valve permitting the escape of water therethrough but retaining the core produced by the core cutter.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Figure 1 is a longitudinal diametric section of the cutting end of the drill rod.

Fig. 2 is an elevation of the drill holding body.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1 but restricted to the lower or cutting end of the drill and showing a centering bit in place.

Fig. 5 is a perspective view of a valve cap for the upper end of the core barrel.

Fig. 6 is a perspective view of one of the drill bits.

Fig. 7 is a longitudinal section of the centering bit shown in Fig. 4.

Referring to the drawing there is shown a hollow drill rod 1 which may be of any suitable length and, following the usual custom, may be considered as made up of numerous sections screwed together.

A coupling sleeve 2 is screwed at one end onto the lower end of the rod 1 and at an intermediate portion of its length is provided with internal screw-threads 3 to receive a block or body 4 exteriorly threaded to fit the screw-threads 3. The lower end of the coupling 2 has an interior flare or bevel 5 to receive a correspondingly flared extension 6 of the body 4, which flared extension is provided with a circumferential series of grooves 7 each receiving a cutting bit 8. Extending axially through the body member 4 and its extension 6 is a bore or passage 9 having screw-threads 10 at what constitutes its upper end and other screw-threads 11 at what constitutes its lower end. Each groove 7 at the upper end has an angle extension or slot 12 which may open into the bore 9 radially thereof. Each groove 7 receives a bit 8 which consists of a body member with a laterally expanded cutting end 13 having a beveled edge 14 constituting the active edge of the cutter and a shank 15 with a bevel wall 16 conforming to the bevel 5 at one end of the coupling 2. At the small end of the shank 15 there is provided a lateral projection 17 adapted to enter the extension 12 of the groove 7 in which the cutter is seated. The cutter is provided with a straight wall 18 on the side opposite from the wall 16. When the cutters are placed in the grooves 7 the projections 17 enter the extensions 12

so that the cutters are held against movement longitudinally of the body member or cutter carrier 4 and the bevel wall 5 engages the edges 16 of the cutters, thereby locking them firmly in place.

There are two center cutters provided, one center cutter 19 being hollow and open at both ends with one end 20 exteriorly screw-threaded to lodge in the threads 11 of the bore 9. The other or outer end of the cutter 19 is provided with a circular series of teeth 21 which may be similar to milling teeth and are designed to cut their way into the material being bored, leaving a core which will pass through the cutter 19 and enter the bore 9 and finally enter a core barrel 22, the lower end of which is screwed into the bore 9 by way of the screw-threads 10.

The other cutter, which is shown in Figs. 4 and 7, is a double-bevel cutter or center bit 23 with the basic end 24 suitably threaded on the exterior to be held by the screw-threads 11. The basic end 24 is provided with passages 25 on opposite sides of the cutting end of the bit 23 and opening through the end 24 into the bore 9. The core cutter 19 and center bit 23 are interchangeable, the core cutter being employed when it is desired to obtain samples of the material being bored and the bit 23 being used as a centering or directing bit for the boring tool as a whole, it being understood that the boring or drilling tool is a rotary affair. The cutter 19, as Fig. 1 discloses, extends well below the drilling bits 9 so as to act itself as a centering bit when cores are being bored.

The body 4 is provided with passages or longitudinal ducts 26 outside of the bore 9 so that water fed through the drill rod will find its way to the cutters and will pass up through the well bore around the drill rod. The upper end of the core barrel 22 is threaded to receive a perforated cap 27 confining a valve disk 28 by means of a spring 29 inclosed by the cap 27.

Considering the drill as provided with the center bit 23 and that the drill rod is being rotated, the centering bit acts in advance of the cutters 8, which latter have their active edges close to the active end of the centering bit so that the well bore is produced to the full diameter determined by the cutters 8 but with a center guiding bore corresponding in size to the bit 23. In this manner the well bore is alined even to great depths whether the ground be soft or rocky. When it is desired to obtain samples of the material being bored the core cutter 19 is substituted for the center bit 23 and then as the boring proceeds the core cutter produces a core which enters into the core barrel 22, the valve 28 yielding to the escape of material in the barrel 22 pushed before the core by

the latter. In this manner samples showing the character of the ground are obtainable from time to time. The core cutter 19 having its cutting edge well below the cutting edges of the drilling bits will act as a centering bit as well as a core cutter so that the tool will be held in alinement with the bore. When the boring is proceeding in the usual manner without the necessity of obtaining samples the center cutter 23 is used, whereby any tendency of the drill bit to deflect is prevented.

The construction of the boring tool as a whole is such that it may be readily dismantled for sharpening or replacing the cutters, or for removing sample cores showing the character of the material being bored.

What is claimed is—

1. In a well drilling tool, a hollow drill rod, a coupling sleeve screwed upon the lower end of the drill rod, a block received within and screwed to the sleeve but spaced from the end of the drill rod, said block having a flared extension at its lower end, said extension having a circumferential series of slots, bits held upon the tool, said bits having beveled edges conforming to the flare of the extension, lateral extensions on each bit and adapted to fit said slots for holding the bits against longitudinal movement, said coupling sleeve being internally beveled to cooperate with the beveled edges of the bits to hold the bits in clamped position with their lateral extensions received within the slots.

2. In a well drilling tool, a block secured to said tool, said block having a central bore with a plurality of slots opening into said bore radially thereof, a plurality of bits each comprising a shank having a straight edge or wall and a beveled wall, each of said bits also having a laterally expanded cutting end at one extremity and a lateral projection at the other extremity, each of said lateral projections extending through one of said slots, a bit clamping means cooperating with the beveled walls of the bits to hold the same in place upon the tool.

3. In a well drilling tool, a hollow drill rod, a coupling sleeve connected to the lower end thereof and having an interior bevel and internal screw threads above the bevel, a body member having a flared extension to fit the bevel of the sleeve, and external screw threads to engage the threads of the sleeve so as to hold the body member within the sleeve and below the end of the drill rod, a core barrel carried by the body member and extending upwardly within the drill rod, drill bits carried by the body member and having an outer beveled wall corresponding with the bevel of the sleeve, and a central cutter also carried by the body between the drill bits and extend-

ing below the plane of cutting edges of said bits.

4. In a well drilling tool, a hollow drill rod, a coupling sleeve connected to the lower
5 end thereof, a body member retained within the coupling sleeve, said body member having a central longitudinal bore and a plurality of circumferential grooves each receiving a cutting bit, and a central cutting device connected to said bore and sur-

rounded by said bits, said device having its lower end extending below the cutting plane of the bits.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature. 15

JEFFERSON D. PACE.

Witnesses:

A. M. PYBURN,
R. C. CULPEPPER.