Sept. 18, 1951 E. G. WALKER 2,568,573

WELL DRILL BIT

Filed Aug. 26, 1948

Fig. 1.

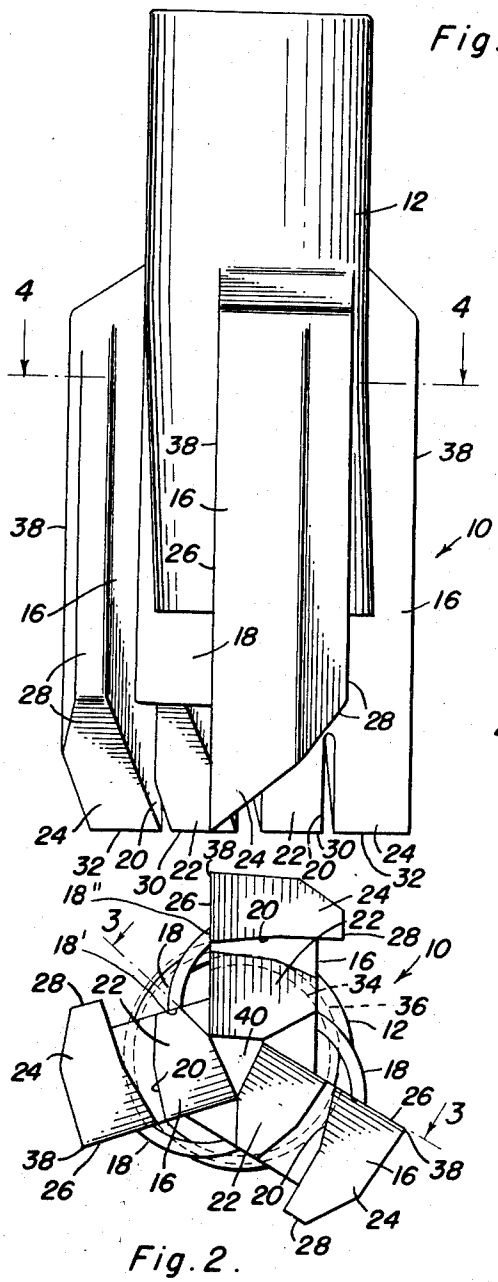
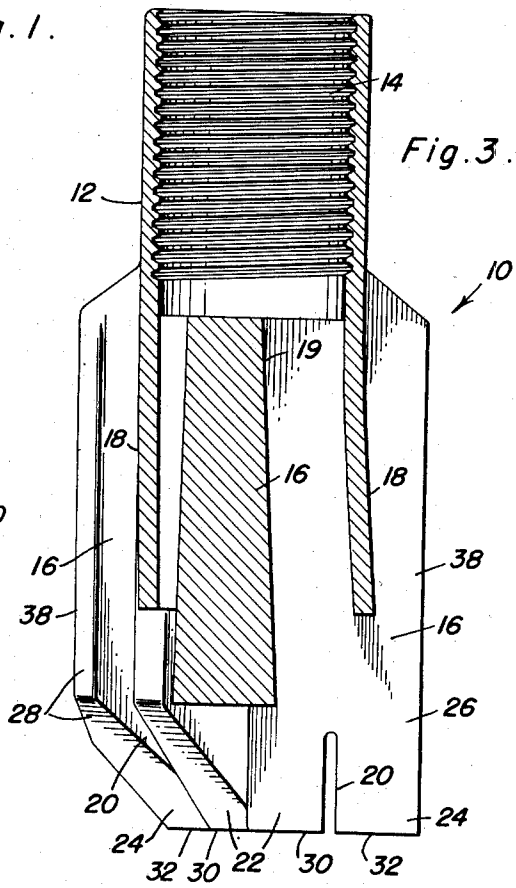


Fig. 2.

Fig. 3.



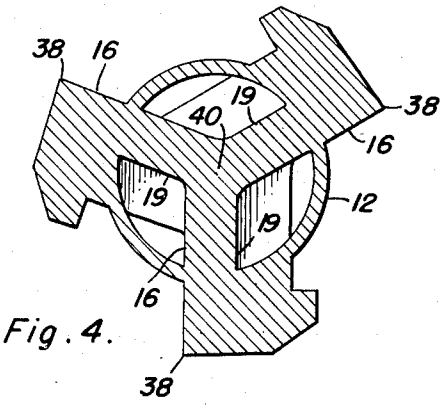


Fig. 4.

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WELL DRILL BIT

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1 Claim. (Cl. 255—61)

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This invention relates to new and useful improvements and structural refinements in drill bits for wells such as water wells, oil wells, and the like, and the principal object of the invention is to facilitate convenient and expeditious performance of the drilling operation, notwithstanding the impervious nature of subterranean strata, such as stone, rock, or the like, which are commonly encountered.

An important feature of the invention resides in the provision of a well drill bit including cutting blade members which are particularly adapted to resist breakage, thereby assuring that the drilling operation may be effected in an expeditious manner and without delay resulting from damage of the drilling equipment.

An additional feature of the invention resides in the particular arrangement of the cutting blade members, these having what may be referred to as radially overlapped cutting edges, so that one cutting blade member removes material which was not removed by the preceding cutting blade member, thus resulting in a balanced distribution of torque and resistance exerted on and offered to the various blade members of the drill bit, so that the stress and strain on the drill bit is substantially minimized.

Important advantages of the invention lie in its simplicity of construction and in its adaptability to economical manufacture.

With the above more important objects and features in view, and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is a side elevational view of the invention;

Figure 2 is a bottom plan view thereof;

Figure 3 is a cross sectional view, taken substantially on the plane of the line 3—3 of Figure 2, and

Figure 4 is a cross sectional view, taken substantially on the plane of the line 4—4 of Figure 1.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention consists of a well drill bit designated generally by the reference character 10, the same embodying in its construction a tubular body 12 having an open lower end and provided in the upper end portion thereof with internal screw threads 14 constituting what may

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be referred to as a socket whereby the entire bit may be attached to the drill shaft (not shown) as will be clearly apparent.

The lower portion of the body 12 is provided with a plurality of slots which extend upwardly from the open lower end of the body and separate the lower portion of the body into a set of elongated and transversely arcuate segments 18, each segment having a leading edge 18′ and a trailing edge 18″. The segments 18 are longitudinally twisted, so that their leading edges are closer to the longitudinal axis of the body 12 than their trailing edges. A plurality of elongated cutter blade members 16 are disposed in the lower portion of the body 12 so that they are seated in and project outwardly through the slots between the segments 18.

The lower end portions of the blade members 16 extend beyond the lower end of the body, thus providing what may be referred to as a set of cutting teeth hereinafter more fully described.

It is to be noted that the blade members 16 are relatively narrow at their upper ends as indicated at 19, (see Figure 4) but as the blades extend downwardly, they gradually increase in thickness, so that intermediate portions thereof are substantially enlarged. The lower end portions of the members 16 are formed with vertically disposed, open ended slots 20, these slots separating the lower end portion of each blade member into what may be referred to as inner and outer cutting tooth members 22, 24, respectively.

It is to be noted that each of the blade members 16 includes what may be called a flat leading surface 26 and a trailing surface 28, the lower end portions of the blades progressively decreasing in thickness so that the trailing surfaces 28 converge with the leading surfaces 26 and provide sharp cutting edges 30, 32 on the inner and outer cutting tooth members 22 and 24 respectively, as will be clearly apparent.

By virtue of the thickened intermediate portions of the members 16 tapering to the sharp cutting edges, the cutting tooth members 22, 24 will substantially be reinforced, and the possibility of their breakage will be considerably minimized.

Moreover, it is to be noted that the inner and outer cutting tooth members 22, 24 on the several blade members 16 are of different widths (see Figure 2) so that the cutting edges of the inner and outer tooth members on each blade are radially overlapped by and radially overlap the cutting edges of the tooth members on the other

blades. In other words, the cutting edges of the inner tooth member on each blade are radially overlapped by the cutting edges of the outer tooth member or members on the other blades, so that when the drill bit is rotated, the cutting edges on each blade will drill material untouched by the cutting edges on the next previous blade, substantially as indicated by the phantom lines **34**, **36** in Figure 2. It should, of course, be understood that the outer longitudinal edges **38** of the blades **16** are equidistant from the central, longitudinal axis **40** of the drill bit as a whole.

Finally, it should be explained that the leading and trailing edges **18'**, **18''** of the segments **18** are welded to the respective trailing and leading portions **28**, **30** of the adjacent blade members **16**.

It is believed that the advantages and use of the invention will be clearly apparent from the foregoing disclosure and accordingly, further description thereof at this point is deemed unnecessary.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

In a well drill bit, the combination of a substantially tubular body having an open bottom end and an upper end portion adapted for connection to a drill shaft, said body being provided with a plurality of slots extending upwardly from said open end and separating the lower portion of the body into a plurality of elongated and transversely arcuate segments, each segment having a leading edge and a trailing edge at the respective opposite longitudinal edges thereof and being longitudinally twisted whereby said leading edge is located at a lesser distance than the trailing edge from the longitudinal axis of said body, and a set of elongated cutter blade members disposed in the lower portion of said body and projecting downwardly therefrom, said blade members being seated in and projecting outwardly through said slots and terminating at their lower ends in sharp cutting edges, said blade members having leading and trailing surfaces welded to the respective trailing and leading edges of the adjacent segments.

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