May 16, 1933.

F. L. SCOTT

1,909,129

DISK BIT

Filed July 2, 1931

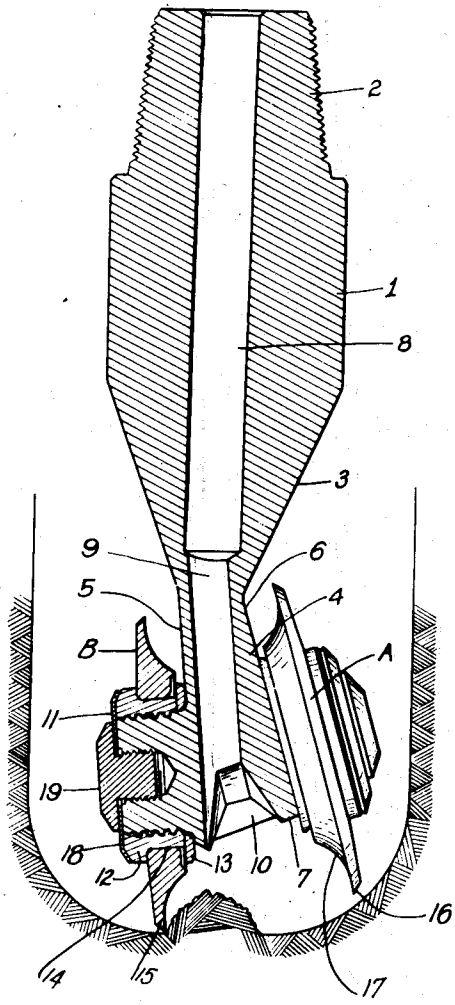


Fig 1

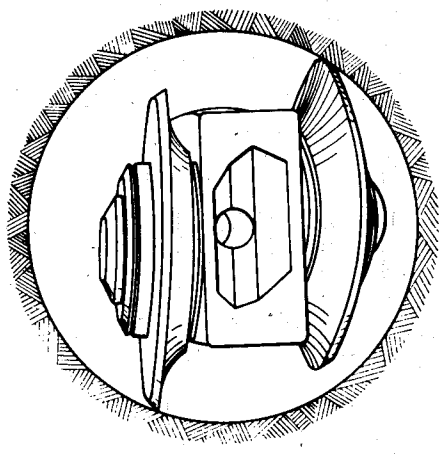


Fig 2

FLOYD L. SCOTT INVENTOR

BY Jesse R. Stone

ATTORNEY

Patented May 16, 1933 1,909,129

UNITED STATES PATENT OFFICE

FLOYD L. SCOTT, OF HOUSTON, TEXAS, ASSIGNOR TO HUGHES TOOL COMPANY, OF HOUSTON, TEXAS, A CORPORATION OF TEXAS

DISK BIT

Application filed July 2, 1931. Serial No. 548,315.

My invention relates to disk bits employed in deep well drilling.

I contemplate the provision of a simple and cheap construction of disk bit which will be strong and durable and also formed to cut rapidly in the softer formations.

I have as an object the setting of the two cutters at different angles relative to the axis of the drill and thus accomplish a more effective cutting action and also effect the better turning of the cutters and prevent their clogging.

I desire to mount each cutter so as to cut a different track on the well bottom and still bring each cutter into contact with the wall of the well to provide turning traction and steady the rotative action of the drill.

The invention resides largely in the mounting and positioning of the cutters on the head whereby the above objects are accomplished.

In the drawing Fig. 1 is a side view largely in central vertical section showing the construction of the invention. Fig. 2 is a bottom plan view illustrating the contact of the cutters with the side of the hole.

My drill bit body 1 is approximately cylindrical with an upper threaded shank 2 thereon. The lower end of the body is flattened and tapered downwardly at 3 terminating in a head 4. This head has opposed flat faces 4 and 5 which are in planes not parallel but inclined at different angles relative to the axis of the bit.

As will be seen from Fig. 1, the side face 5 is inclined slightly to the right and toward the central axis of the bit at its lower end, but the face 6 is inclined still farther to the right at a more acute angle relative thereto and away from said axis. Thus the lower extremity 7 is thicker than at a point farther up on the head. A water channel 8 in the body connects with the channel 9 in the head. Said channel 9 discharges into a flared opening 10 at the lower end which provides a discharge orifice large enough to prevent clogging under ordinary circumstances.

Each face 5 and 6 has a laterally extending cutter pin or shaft 11 integral with the head, and threaded to receive a bushing 12. Said bushing has a radial flange at the outer end and a washer 13 is fitted on the shaft between the inner end of the bushing and the face of the head. Between the washer and the flange is a seat 14 for the cutter 15.

The cutter is preferably made as shown with a marginal cutting edge 16 and a curved inner face 17. The bushing is locked against accidental unscrewing by a lock washer or plate 18 held in position by a cap-screw 19 screwed into the end of the shaft 11.

The effectiveness of my bit is due to the relative angles and positions of the cutters. The cutter A adjacent the face 6 is offset both vertically and horizontally from the cutter B which is parallel with the face 5. Thus the cutter B cuts nearer the center of the hole and somewhat in advance of the cutter A. Each cutter contacts with the side of the hole as will be apparent from Fig. 2. The cutter B bears strongly against the bottom of the hole, and the traction is hence sufficient between this cutter and the bottom of the hole so that the cutter B will rotate and not clog. The cutter A will also turn, for the reason that it is inclined more nearly so that it will have a true rolling engagement with the wall of the well. That is, it is in a position where it rolls easier and scrapes less than the cutter B.

The bottom of the hole will be more nearly flat than is the case with the ordinary disk bit. The cutter B cuts the bottom and some of the side wall, and the cutter A cuts the side wall above the cut made by the cutter B. It will be seen that the cutter B will support a large part of the weight of the bit and drill stem and will cut rapidly. By inclining the head 4 the cutter B is brought close to the center and will cut about the center in advance of the other cutter. The cutter A cuts and preserves the gage of the hole, making a slightly oversize hole.

The advantage of this construction lies in the rapid and smooth operation of the bit in use. This construction cuts distinctly faster by test than the usual type of disk but with symmetrically mounted cutters. It does not stick or clog and is more reliable in use.

What I claim as new is:

1. A disk bit including a body, a head at the lower end having opposed flat faces in-

clined at different angles relative to the axis of said bit body, cutter shafts integral with the head and extending at right angles to said faces, and two disk shaped cutters a single one mounted rotatably on each of said shafts, said two cutters serving to cut the full bottom of the hole.

2. A disk bit including a body, a head at the lower end having opposed flat faces inclined at different angles relative to the axis of said bit body, cutter shafts integral with the head and extending at right angles to said faces, and cutters rotatably mounted on said shafts, the shafts of one of said cutters being offset both vertically and laterally relative to the other.

3. A disk bit including a body, a head at the lower end having opposed flat faces, both of which are inclined in the same direction but at different angles relative to the axis of the bit body, cutter shafts integral with the head and extending at right angles to said faces, and a single cutter rotatably mounted on each of said shafts.

4. A disk bit including a body, a head at the lower end having opposed flat faces, cutters mounted parallel with said faces on said head, both said cutters being inclined in the same direction relative to the bit axis, but at different angles so as to diverge at their lower sides, whereby one cutter will cut in advance of the other both cutters together acting to cut the full bottom of the hole.

5. A disk bit including a body, a head having opposed cutter shafts formed integral therewith, two cutters rotatably mounted one one each of said shafts, said head being inclined toward one side of the bit axis, said cutters being mounted at different angles relative to said head in planes converging upwardly said two cutters together serving to cut the full bottom of the hole.

6. A bit body, a flattened head thereon, inclined toward one side of the bit axis, two cutter shafts on said head, cutters mounted rotatably one on each of said shafts, said cutters being inclined toward each other at their upper sides, said two cutters together serving to cut the full bottom of the hole.

7. A bit body, a head thereon inclined toward one side of the axis of the body, cutter supporting means on opposite sides of said head, and two cutters thereon inclined in planes converging upwardly, but at different angles relative to the axis of the bit, said two cutters together serving to cut the full bottom of the hole.

8. A disk bit including a body, a head inclined laterally from said body, a cutter thereon inclined to drill the bottom of the hole, and another cutter inclined at a different angle relative to the axis of the bit and mounted to engage the wall of the hole to the rear of said first mentioned cutter, said two cutters together serving to cut the full bottom of the hole.

9. A disk bit including a body, a head inclined laterally from the axis of the body, a pair of cutters mounted thereon and inclined in planes converging upwardly, one cutter being mounted to drill in advance of the other and both cutters contacting with the side wall of the hole, said two cutters together serving to cut the full bottom of the hole.

In testimony whereof, I hereunto affix my signature, this the 22nd day of June, A. D. 1931.

FLOYD L. SCOTT.