Sept. 10, 1929. G. B. LOUDERBACK 1,727,655

DRILLING BIT

Filed Oct. 8, 1928

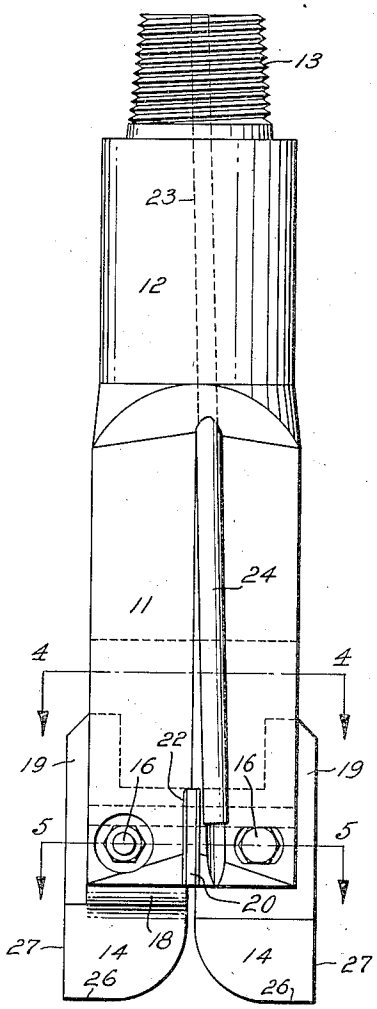


Fig. 1.

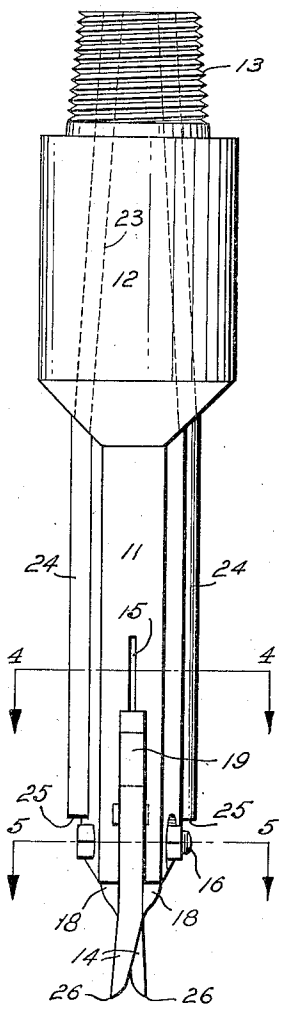


Fig. 2.

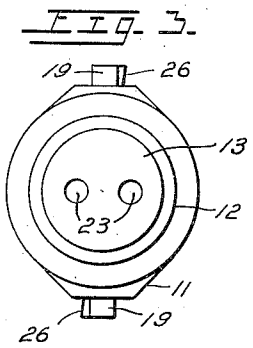


Fig. 3.

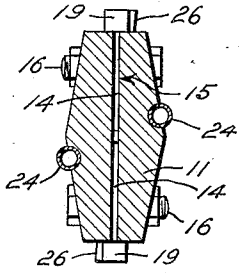


Fig. 4.

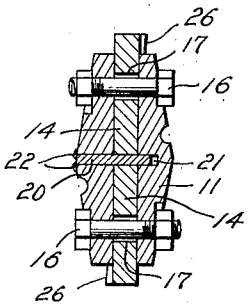


Fig. 5.

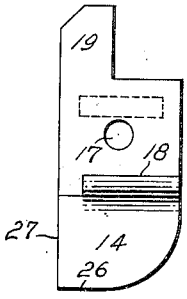


Fig. 6.

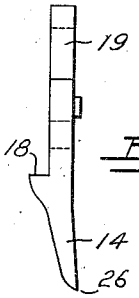


Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE B. LOUDERBACK, OF COMPTON, CALIFORNIA.

DRILLING BIT.

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In this specification, and the accompanying drawing, I shall describe and show a preferred form of my invention, and specifically mention certain of its more important objects. I do not limit myself to the forms disclosed, since various changes and adaptations may be made therein without departing from the essence of my invention as hereinafter claimed; and objects and advantages, other than those specifically mentioned, are included within its scope.

My invention relates to bits for deep-well drilling, and particularly to bits of this kind that are provided with detachable cutting blades. The duty imposed upon such tools is very severe, and one of the principal problems has been to secure detachable cutters to a bit body in an adequate and satisfactory manner. Among my objects in this invention are; first, to provide a tool of this nature wherein detachable cutters are adequately secured to a bit body by a single bolt through each; second, to furnish ample means for resisting all of the operating shocks and stresses that may be imposed upon such cutting blades, without subjecting the fastening bolts thereto; third, to supply improved means for discharging a circulating jet in advance of the cutting edges of the blades; and, fourth, to accomplish the stated objects in a simple and relatively inexpensive construction of great inherent strength.

My objects are attained in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of my complete invention;

Figure 2 is a side elevation of the same;

Figure 3 is a plan view of the top of the tool;

Figure 4 is a cross-section of the tool taken on the lines 4—4 of Figs. 1 and 2;

Figure 5 is a similar cross-section taken on the lines 5—5 of Figs. 1 and 2;

Figure 6 is a front elevation of one of the detachable cutters of the tool by itself; and

Figure 7 is a side elevation of this cutter.

Similar reference numerals refer to similar parts throughout the several views.

My improved bit comprises a bit-body having a wedge-shaped lower portion 11, of approximately elliptical section; a cylindrical intermediate portion 12; and a tapered screw "pin" 13 at the top, adapted for engaging a standard tool-joint or the like. The lower end of the body is slotted along its major transverse axis, and cutting blades 14 are inserted in this slot which they closely fit. A narrower transverse slot 15 along the major axis, extends upward a considerable distance from the top of the first slot, and the two slots effectively bifurcate the tool body, so as to permit the cutters to be tightly gripped in the lower slot by means of a bolt 16 through each of them and the tool body. The bolt holes 17 in the cutters are of slightly larger diameter than the bolts, so that no transverse operating stresses can be imposed upon the bolts in view of the fact that the cutters are otherwise positioned to resist such stresses. Each cutter has a transverse flange 18, across its rear face, engaging the lower end of the tool body and capable of supporting the weight of the tool string above it. Each cutter also has an up-standing arm 19, fitted snugly into a longitudinal peripheral groove in the tool body, adapted for preventing the cutter from turning in the direction of its engagement.

The tool body has a longitudinal slot extending upwardly from its lower extremity in the plane of its minor transverse axis, and of a length along this axis that is more than half of the thickness of the tool body so as to more than bisect the slot into which the cutters are fitted. A plate 20 is fitted into this longitudinal slot with its inner edge spaced from the end thereof, as shown at 21. Its outer edge is then welded to the tool body, as shown at 22. The inner longitudinal edges of the cutters abut against plate 20, and their inward stresses are resisted thereby. Thus an inward stress upon either cutter will not be transmitted to the other.

It will be seen from the foregoing description that the cutters of my improved tool are adequately positioned to withstand all of the operating shocks and stresses to which they can be subjected. In the first place, they are strongly gripped within the bifurcation of

the tool body by means of the tension of bolts 16. Secondly, the weight of the tool string is supported by flanges 18. In the third place, the inward thrust of the cutters is resisted by plate 20. And, finally, the cutters are prevented from turning by means of flanges 18 and arms 19. The bolts 16 are subjected only to the tension required to grip the cutters between the bifurcated lower legs of the tool body, and do not have transverse stresses imposed upon them.

For the purpose of delivering circulating water at the cutting edges of the bit, I form the upper portions of the body with two, internal passages 23, leading downwardly and outwardly from the top and terminating at the periphery of the tool body just below body portion 12. At the latter points, pipes 24 are welded to the body and continue these water courses downward to discharge just above the respective cutting edges, at 25, and just in advance of the cutters.

It will be seen that the invention that I have described and illustrated comprises, in effect, a fish-tail bit of improved construction, having easily removable cutters that in service are very firmly positioned without danger of subjecting the attaching bolts to transverse stresses. The lower edges 26 of the cutters are adapted for drilling, and the laterally extending edges 27 are adapted for reaming to maintain the gauge of the hole.

Having thus fully described my invention, I claim:

A drilling bit having a body, bifurcated at its forward extremity and comprising a transverse terminal slot intermediately partitioned at said extremity; a pair of removable cutters fitted into said slot, abutting said partition and extending from the tool body; and bolts passed through the cutters and drawing the legs of the body together to tightly compress the cutters between the walls of said slot; said cutters being positioned to resist operating stresses without subjecting the bolts to transverse stress; and the intermediate partition comprising a plate bisecting said slot, slidably fitted within a groove at right angles thereto and secured to only one of the legs of the tool body, so that said legs may be drawn toward each other.

GEORGE B. LOUDERBACK.