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S. C. SKIDMORE ET AL
STABILIZER FOR DRILL BIT

2,978,049

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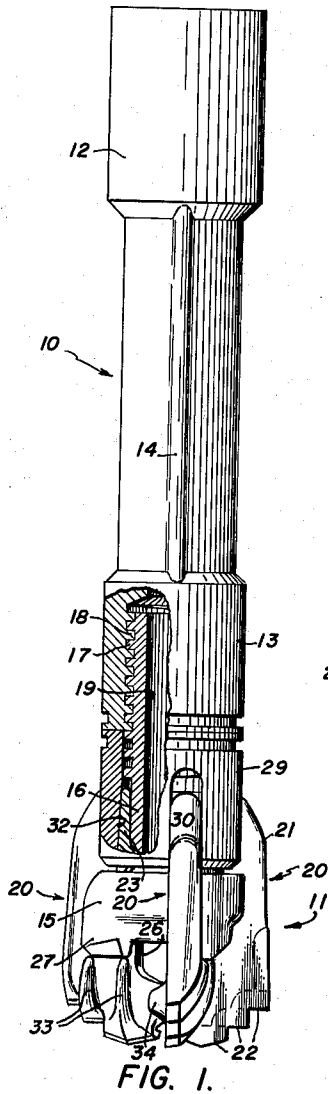


FIG. 1.

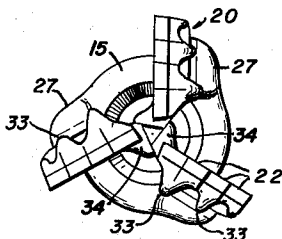


FIG. 2.

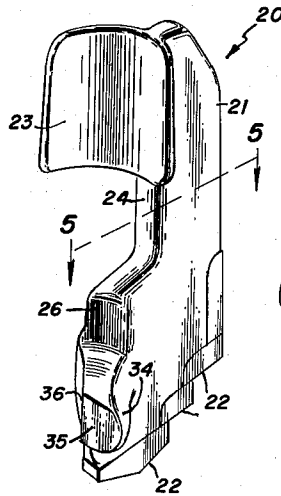


FIG. 3.

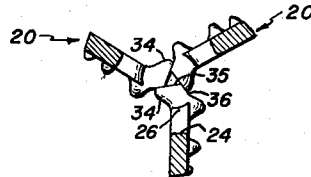


FIG. 4.

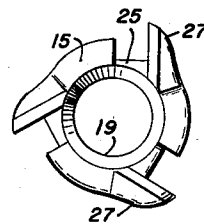


FIG. 5.

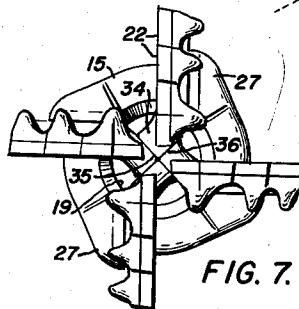


FIG. 6.

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STABILIZER FOR DRILL BIT

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3 Claims. (Cl. 175—391)

This invention relates to drill bits and has reference to improvements in bits having removable cutting blades. In bits of the type referred to the blades extend below the bit heads and are subjected to some bending by reason of the torque loads applied during drilling operations. Recently the cutting edges or teeth of the blades have been provided with tool steel inserts in the manner of machine cutting tools, and the bending of the blades, though slight, frequently caused the inserts to break.

The primary object of the invention is to provide a bit having increased drilling footage before replacement or repair.

Another object is to provide means for stabilizing removable blades in a drilling bit.

A further object is to provide a bit having contacting stabilizing lugs on removable blades arranged to hinder plugging in the axial water course in the bit when drilling in relatively soft formations.

These and other objects will become apparent from the following description and the accompanying drawing, wherein:

Figure 1 is an elevation, shown partly in section, of a drill bit embodying the present invention.

Figure 2 is a bottom plan view of Figure 1 showing three cutter blades in assembly.

Figure 3 is an enlarged perspective view of a drilling blade unit and showing one of the novel stabilizing lugs integral therewith.

Figure 4 is a bottom plan view of the blade unit illustrated in Figure 3, and showing contact with other blade units, the latter being indicated by means of dotted lines.

Figure 5 is a transverse sectional view of three contacting blade units, and which section is taken approximately on line 5—5 of Figure 3.

Figure 6 is a bottom plan view of a drilling bit head with the cutting blades removed, and

Figure 7 is a bottom plan view similar to Figure 2 but showing an arrangement of four cutting blades in assembly.

The form of the invention illustrated in Figures 1 through 6 includes a tubular sub 10 for connecting a demountable bit 11 with the lower end of a drill string, not shown, and which sub has upper and lower shoulders 12 and 13 around the ends thereof. Vertical integral ribs 14 may be provided for engaging pipe tongs or wrenches on the surface of the sub 10. The demountable bit 11 includes a head 15, an integral axially aligned tubular body 16 extending upwardly therefrom and enlarged threads 17 on the upper end of the body for engagement with corresponding threads 18 in the lower sub shoulder 13. The usual axial water or air course 19 is provided through the head 15 and tubular body 16.

The blades 20 are of the drag bit type and include flat laterally extending vertical shanks 21 having staggered teeth 22 at the lower ends thereof, said teeth being in the form of tool steel inserts. The upper inner edge of each blade 20 has an integral arcuate plate 23, the inner surface of which is adapted to engage the tubular body

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16 of the head unit 15 and fit thereon between the head 15 and threads 17. The upper inner edges 24 of the blade shanks 21 beneath the plates 23 are received in vertical slots 25 in the head 15, and the lower inner edges of said shanks are inwardly formed as at 26. Laterally projecting ears 27 are provided on corresponding sides of the vertical slots 25 in the head 15 and engage the back surfaces of the blades 20. The vertical edges of the arcuate plates 23 are slightly separated in assembly.

A cylindrical locking ring 29 has vertical slots 30 extending upwardly from its lower edge to receive the upper portions of the blade shanks 21, and the outer surfaces 31 of the arcuate plates 27 are downwardly and outwardly tapered to engage the correspondingly tapered inner surface 32 of the locking ring. The back surface of each blade 20 is provided with vertically extending reinforcing ribs 33, one above each tooth 22.

The present invention is directed to projecting lugs 34 on the forward faces of the blades 20 at the lower inner edges 26 thereof. These lugs project not only forwardly of the blades 20, but inwardly toward the axial center of the bit 11 where adjoining said lugs contact each other in assembly. The forward and rear surfaces of the lugs 34 are flat, as at 35 and 36, where they contact each other. Thus, the included angle between forward and rear flat surfaces 35 and 36 on one lug 34 is 120° for three bladed bits.

Since the bit assembly illustrated in Figure 7 is identical with the foregoing description, except for the number of blades employed, the same reference numerals are applied. This form of bit 11 has four blades 20 instead of three, and the included angle between flat surfaces 35 and 36 on each lug is 90° instead of 120°.

In operation, when torque and shock loads are applied during drilling operations, flexing of the shanks 21 is reduced by reason of adjoining lugs 34 bearing against each other. Thus, the insert teeth 22 are not subjected to breakage by flexing of the blades. The invention provides a practical means for maintaining tool steel cutting edges in operating position and thus provides greater drilling footage before replacement or repair. It is also pointed out that since the lower inner edges 26 and lugs 34 thereon meet there is less tendency to plug the water course 19 when drilling in soft formations. It is also pointed out that the described construction does not impair circulation of fluid or air medium for conveying cuttings to the earth's surface.

The invention is not limited to the exemplary constructions herein shown and described, but may be made in various ways within the scope of the appended claims.

What is claimed is:

1. In a drill bit having a central body and vertically disposed cutting blades demountably secured on the sides of said body, said blades having their inner edges lying adjacent each other, and wherein the corresponding lower portions of said blades extend toward each other beneath said body, the construction comprising laterally angularly projecting lugs on said lower end portions and in freely abutting contact with each other.

2. In a drill bit having a central body and vertically disposed cutting blades demountably secured on the sides of said body, said blades having their inner edges lying adjacent each other, and wherein the corresponding lower portions of said blades extend toward each other beneath said body, the construction comprising laterally angularly projecting lugs on said lower end portions and in freely abutting contact with each other, the surfaces of said lugs being flat where they contact each other.

3. A drill bit comprising a body adapted to be connected with the lower end of a drill string, depending blades on said body and having their lower ends formed to extend toward each other at the axial center of said

bit, said blades being of a length and material to provide limited flexing thereof when in operation, tool steel inserts mounted in the lower forward surfaces of said blades with respect to direction of rotation, laterally angularly projecting lugs on corresponding surfaces of 5 said blades at the lower edges thereof and in freely abutting contact with each other.

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Disclaimer

2,978,049.—*Sam C. Skidmore* and *Fred B. Crook*, Fort Worth, Tex. STABILIZER FOR DRILL BIT. Patent dated Apr. 4, 1961. Disclaimer filed June 12, 1962, by the inventors.

Hereby enter this disclaimer to claim 1 of said patent.
[*Official Gazette July 24, 1962.*]