

Sept. 24, 1929.

C. H. M. BULL
ROLLER CUTTER MOUNTING

1,729,062

Filed Aug. 15, 1927

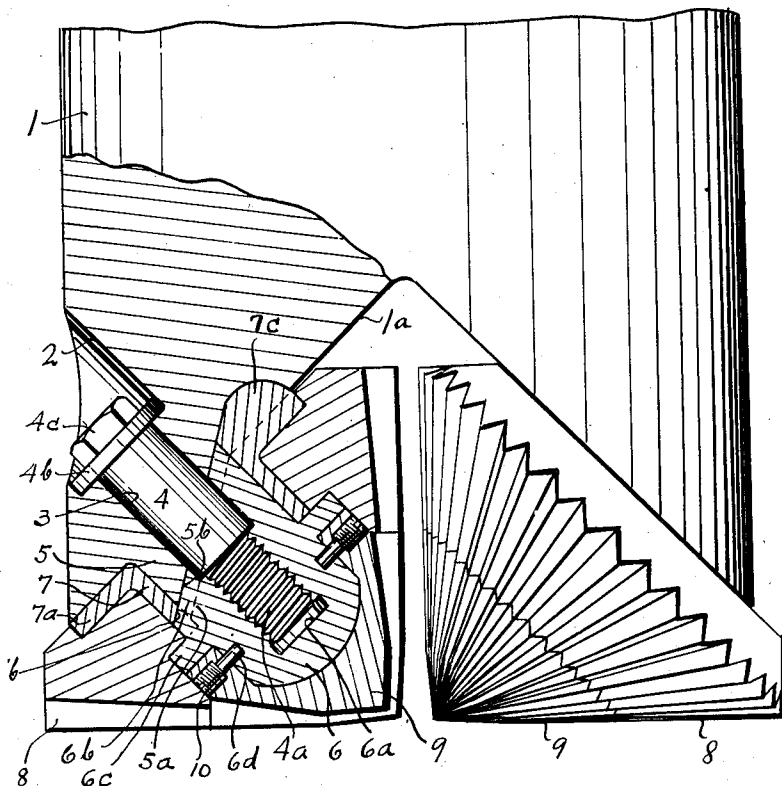


Fig. 1.

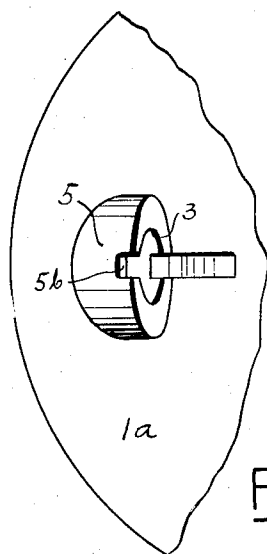


Fig. 2.

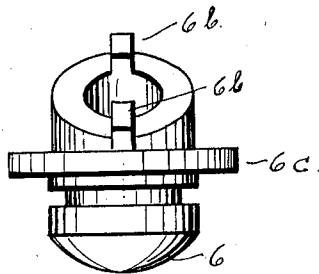


Fig. 3.

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ROLLER-CUTTER MOUNTING

Application filed August 15, 1927. Serial No. 212,993.

This invention relates to roller bits for use in deep well drilling and more particularly to means whereby roller cutters may be mounted in bit heads, comprising a modification of the invention shown and claimed in my application for Letters Patent of the United States, filed March 28th, 1927, Serial No. 178,987.

The invention shown in my said application is adapted particularly for use with a two-piece bit head.

It is the object of the present invention to provide a construction similar to that disclosed in my said application but adapted for use with a one-piece bit head.

In roller bits of this general type, wherein roller cutters are mounted on opposite sides of a recess in the bottom of a bit head, the distance between the roller cutters is less than the distance either of said roller cutters would have to be moved toward the other to effect removal thereof from the head. This has made necessary two-piece heads.

It is particularly the object of this invention to provide means whereby said roller cutters may be moved laterally into and out of a one-piece head, each independently of the other.

The invention, however, has various other objects which, together with the many other advantages thereof, will be apparent to those skilled in the art, from the accompanying drawings and following description.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein Fig. 1 is a side elevation, partly in section of the parts assembled in the bit head; Fig. 2 a detail fragmentary view of a part of the head showing the spindle bore, beveled annular flange, and key slots; and Fig. 3 a detail view of the bushing.

Referring more particularly to the drawings, a one-piece bit head is indicated at 1, having a recess 1^a in the bottom thereof, and also a recess 2 in the outer face thereof, and a bore 3 leading inwardly from recess 2 to recess 1^a, and adapted to receive a spindle 4, spindle 4 having a reduced screw-threaded inner end 4^a and a circumferential flange 4^b,

and a squared projection 4^c on its outer end. Circumferential flange 4^b rests in the bottom of recess 2.

In the present invention, an annular transversely beveled flange 5 is provided adjacent bore 3, said flange being beveled from its lower portion upwardly, the beveled face of said flange being indicated at 5^a. A bushing 6 having a correspondingly beveled inner face, has a screw-threaded recess 6^a, to receive spindle 4, and when said bushing is screwed on said spindle, the inner beveled face thereof rests against the beveled face of annular flange 5.

In the prior constructions, it has been customary to provide an annular flange projecting inwardly from the head adjacent the bore, said flange being of substantially cylindrical form. Such construction has necessitated the employment of a two-piece head, for the reasons hereinabove pointed out.

The present invention provides a construction whereby independent removal of the cutters can be effected by laterally sliding the same into and out of the head, the contacting beveled faces of the flange 5 and bushing 6 being in a substantially vertical plane. The spindle 4, it will be understood, is removable outwardly from bushing 6 and bore 3, after which removal the beveled face of bushing 6 is free to slide on the beveled face of flange 5.

Surrounding flange 5 is another bushing 7, said bushing being cylindrical in form, and having a circumferential base flange 7^a. Bushing 7 and flange 5 have key slots 7^b and 5^b, respectively, to receive key 6^b of bushing 6, whereby bushing 6 is locked against rotation with respect to the head. The upper end of key 6^b also projects slightly into the head, as shown. A key 7^c is formed integral with the base flange 7^a of bushing 7. The head 1 has a recess, as shown, to receive key 7^c, whereby bushing 7 is locked against rotation with respect to the head.

Bushing 6 has a circumferential flange 6^c. The cutter comprises a base section 8 and a point section 9, the base section 8 having a bore to receive bushing 7, and a recess to receive flange 6^c of bushing 6.

Point section 9 is mounted upon the end of

bushing 6, and rests slidably upon flange 6^c, within base section 8. Bushing 6 has a circumferential groove 6^d, and into this groove screw-threaded pins 10 project to rotatably lock point section 9 on bushing 6. 11 indicates a companion cutter mounted on the opposite side of the recess in the bottom of the head.

The assembly of the parts may be outlined, and the many advantages thereof briefly referred to, as follows:

Bushing 6 is first slipped into the recess in point section 9, and the pins 10 are screwed inwardly into circumferential groove 6^d, to rotatably lock said point section on said bushing. Point section 9 may then be placed within the recess of base section 8. Circumferential flange 6^c of bushing 6 will rest in the recess of base section 8, and the beveled portion thereof will extend into the bore in base section 8. Bushing 7 may then be interposed between base section 8 and bushing 6, key 6^b of bushing 6 entering key slot 7^b of bushing 7.

Thus assembled, the cutter with its bushings, may be slid laterally and upwardly into place in the head, and when it is so slid, key 6^b will engage in slot 5^b in the lower end of flange 5, and the upper end of key 6^b will project slightly into the head, as shown; and key 7^c of bushing 7 will extend into the recess provided therefor in the head.

After the cutter has been moved into place, spindle 4 is inserted from the outside of the head into bore 3 and screwed into bushing 6. A suitable wrench may be brought into engagement with the squared projection 4^c of spindle 4 to screw said spindle into bushing 6. The spindle 4 is screwed inwardly until flange 4^b thereof rests upon the bottom of recess 2. The assembly of the cutter in the head is thereby completed.

No inward movement of the roller cutter with respect to the head, or, stated differently, toward the other cutter, is necessary to the removal of said cutter. When spindle 4 is unscrewed said cutter will ordinarily drop out of the head. If the friction between the parts is such that the force of gravity is insufficient to move said cutter out of the head, a slight pull downwardly will effect removal thereof.

It will be obvious to those skilled in the art that the invention provides a strong and durable construction, and the ease with which cutters may, by the means shown, be removed from and mounted in one-piece heads, will be appreciated.

While I have illustrated and described my invention in connection with a particular type of bit, it is to be understood that my invention is not limited either to the specific use or construction disclosed and described. The invention may be used in various other

ways, and the construction thereof may be greatly changed, without departure from the scope of the following claims.

I claim:

1. In a rotary boring drill, a head having a projection thereon, a cutter, a transversely beveled bushing in said cutter to engage said projection, and means to removably secure said cutter on said projection.

2. In a rotary boring drill, a head having a transversely beveled annular flange thereon, a cutter, an annular transversely beveled bushing in said cutter to engage said flange, and means to removably secure said cutter on said flange.

3. In a rotary boring drill, a head having a bore, a transversely beveled flange projecting from said head adjacent said bore, a cutter, a transversely beveled bushing in said cutter adapted to slidably engage said flange, and a removable spindle resting in said bore and extending into said bushing.

4. In a rotary boring drill, a head having a bore, a transversely beveled flange projecting from said head adjacent said bore, a cutter, a bushing rotatably locked in said cutter and having a transverse beveled surface to engage said flange, and a spindle locked in said bushing and secured in said bore.

5. In a rotary boring drill, a head having a bore and an annular flange adjacent said bore, said flange having a slot therein, a transversely beveled bushing resting on said flange and having a key fitting in said slot, a cutter on said bushing, and removable means to hold said bushing against said flange.

6. In a rotary boring drill, a head having a recess, a bore, and a transversely beveled flange adjacent said bore and projecting into said recess, a cutter, a transversely beveled bushing in said cutter to engage said beveled flange, and a spindle inserted from the outside of said head into said bore, and means to removably secure said bushing to the inner end of said spindle.

7. In a rotary boring drill, a head having a bore, a recess, and an annular transversely beveled flange adjacent said bore and projecting into said recess, a cutter, an annular transversely beveled bushing in said cutter to engage said flange, a spindle in said bore, and means to removably secure said bushing to the end of said spindle, said spindle being removable outwardly through said bore.

8. In a rotary boring drill, a head having a substantially V-shaped recess in the bottom thereof, and a pair of substantially conical cutters in said recess, said head having a transversely beveled annular flange extending into said recess, a transversely beveled bushing in one of said cutters adapted to engage said flange, and means to removably secure said bushing on said flange.

9. In a roller bit, a bushing having a transversely beveled end, and an annular flange, and a cutter on said bushing, said cutter comprising a point section on one side of said flange and a base section on the other side of said flange.

10. A roller cutter bushing comprising a body having a transversely beveled end and a key on said end.

11. A roller cutter bushing comprising a body having a transversely beveled end, an external annular groove, and an external annular flange between said end and said groove.

In testimony whereof, I hereunto affix my signature.

CLINTON H. M. BULL.

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