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2,279,129

DRILL BIT

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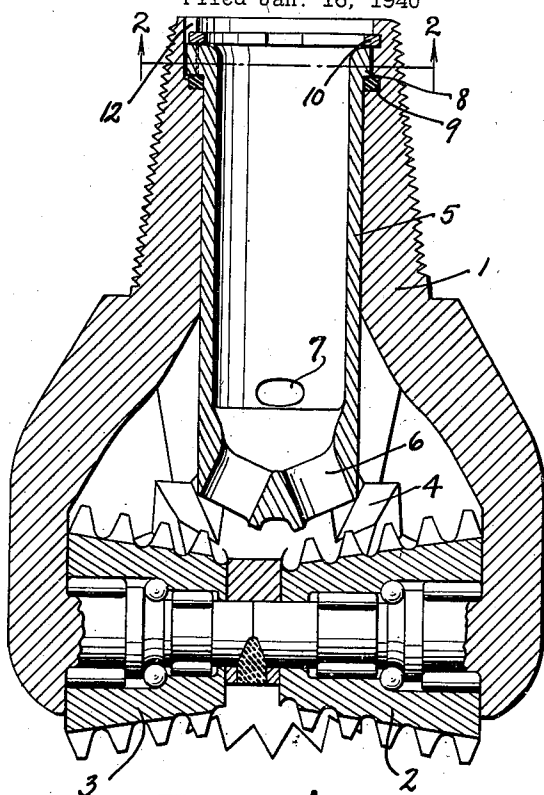


Fig. 1.

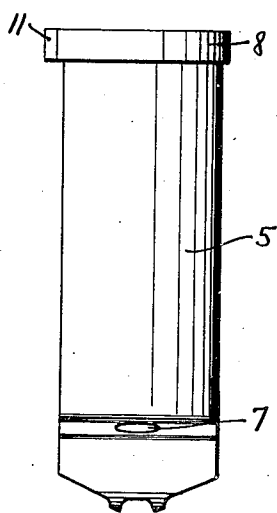


Fig. 3.

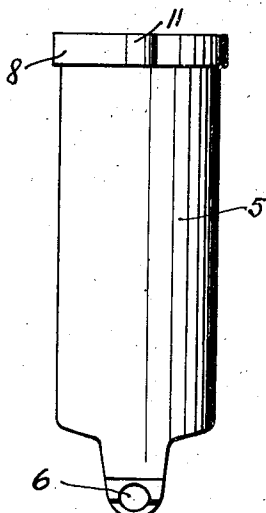


Fig. 4. BY

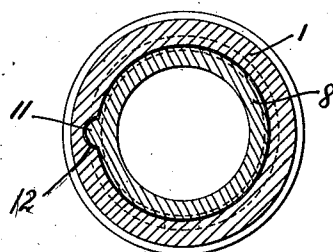


Fig. 2.

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UNITED STATES PATENT OFFICE

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DRILL BIT

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Application January 16, 1940, Serial No. 314,027

1 Claim. (Cl. 255—71)

This invention relates to a drill bit for use in drilling wells, and has particular reference to a means for directing the flow of slush through the bit head during the drilling operation.

It is a particular object of this invention to provide such a device which may be easily removed and replaced without disturbing the bit assembly.

In the drilling of wells various earth formations are encountered and various drilling conditions arise depending upon the nature of the drilling equipment, which makes it desirable to use different types of slush nozzles or distributing openings in the bit. Heretofore it has been necessary in such cases either to use a different bit or to partially disassemble the bit in order to change to a different size or type of slush opening. Furthermore, in certain types of bits when the cutters have become worn the entire bit head is discarded and in such instances it is desirable to salvage as many of the parts as possible. By providing a nozzle assembly which is removable it is made possible to salvage the nozzle assembly from a worn out bit.

It is therefore a further object of this invention to provide a slush nozzle assembly for a drill bit, which assembly can be easily removed either for replacement purposes or for the purpose of salvaging it from a worn out structure.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawing, in which:

Fig. 1 is a longitudinal cross section through a bit embodying a slush nozzle assembly constructed in accordance with this invention.

Fig. 2 is a horizontal cross section of the same structure taken along the line 2—2 of Fig. 1.

Fig. 3 is a side elevation of the slush nozzle assembly unit illustrated in Fig. 1.

Fig. 4 is a side elevation of the same structure taken at right angles to the view shown in Fig. 3.

In the drawing, the numeral 1 designates the bit head or body, which may be of any conventional construction. In this particular instance the embodiment shown in the drawing is a rock bit of the cross roller type having cross roller cutters 2 and 3 and side roller cutters 4. These are provided with any desirable type of bearings or other mounting and with any desired type of teeth, the same constituting no part of this invention.

The slush nozzle assembly illustrated consists of a tubular part 5 having slush openings 6 and 7 therefrom adjacent its lower end. In the em-

bodiment illustrated, these slush openings are formed integral with the tubular member but it will be understood that they might be made of separate elements and rigidly secured in place.

The number, size, shape and disposition of these openings does not form a part of this invention, it being contemplated that different slush assemblies may be provided for different drilling conditions and made interchangeable with each other so that a slush assembly may be provided in a given bit for any given set of conditions that might be encountered. It is desirable, however, that these openings shall not protrude laterally from the regular outline of the tubing portion of the assembly.

The upper portion of the tubular part of the assembly is provided with a small lateral flange 8 which is adapted to seat upon a suitable sealing ring 9 upon a shoulder within the bit head. The entire assembly is held in place within the bit head by means of a snap ring 10 of any conventional construction.

At some point in the periphery of the flange 8 there is provided a projection in the form of a small key 11 which is adapted to fit within a slot or key way 12 in the bit head for the purpose of preventing rotation of the nozzle assembly within the bit head. This structure will therefore maintain the proper orientation of the nozzles at the lower end of the nozzle assembly with respect to the cutting elements of the bit.

It will be appreciated that in order to assemble the device just described all that is necessary is to place the single unit nozzle assembly within the bit head with the sealing ring 9 in position below the flange 8 and to snap the ring 10 in place, and the bit is ready for service.

In the event it is desired to change the nozzle assembly so that the nozzle may have different sizes of openings or be disposed differently or have different shapes, all that is necessary is to remove the ring 10, lift out the nozzle assembly, and replace it with one of the desired characteristics.

It will be appreciated that by this invention there has been eliminated the necessity for keeping on hand in remote localities where drilling is being conducted a supply of bits equal in number to the number of different types of nozzle assemblies that may be required. Instead, all that is necessary is to carry the number of different types of bits that may be required and to carry a number of nozzle assemblies sufficient to furnish the various types of combinations of nozzles that may be required in the work. Thus,

the size of stock on hand in any particular location may be materially reduced with a consequent reduction in the amount of inventory.

It will thus be seen that a means has been provided for achieving all of the objects sought by this invention.

Having described my invention, I claim:

In combination, a drilling bit comprising a head having a relatively large opening longitudinally therethrough for the passage of slush, said opening being counterbored from its upper end for a portion of its length and said counterbore terminating in an annular upwardly facing shoulder, said counterbored portion having a keyway formed therein extending longitudinally of the opening, and having an annular groove therein at a point spaced above said shoulder, a sealing ring seated against said shoulder, and a slush nozzle assembly comprising a hollow tubular member adapted to fit within and co-operating with said opening through the bit head, said member having an external flange adapted to seat removably against said sealing ring to prevent the flow of slush through said

head around the outside of said tubular member, said nozzle assembly having a plurality of relatively small openings providing slush nozzles to direct a plurality of streams of slush against the cutting parts of the bit below said opening in the head, said nozzles being close enough together to be within the contour of said opening through the head, whereby the openings forming the nozzles of said slush nozzle assembly may be disposed in a manner to direct the streams of slush therefrom in such ways and directions as may be desired, and whereby said slush nozzle assembly may be replaced with a similar nozzle assembly having its nozzles adapted to direct the streams of slush differently according to the conditions encountered, means on said flange engaging said keyway to prevent relative rotation of said tubular member and said drill bit, and a resilient snap ring adapted to interfit with said annular groove in the counterbored portion of the head and engage the upper surface of said flange to hold said tubular member in place.

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