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SLUSH TUBE

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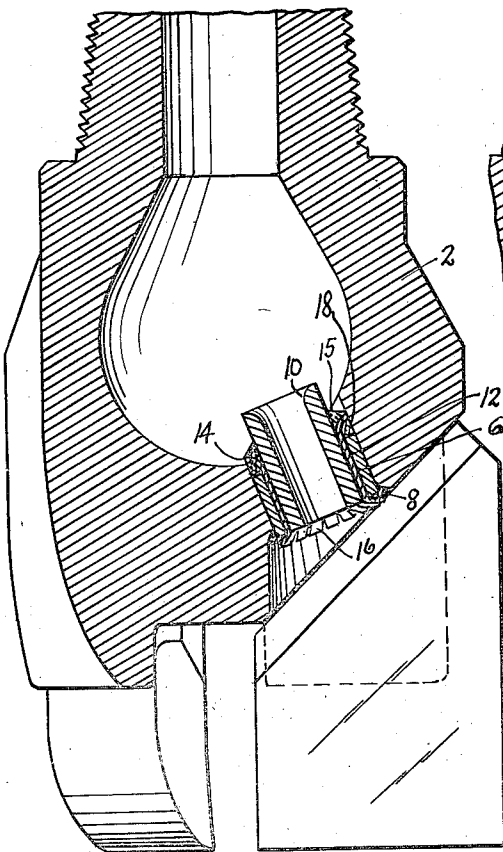


Fig. 2.

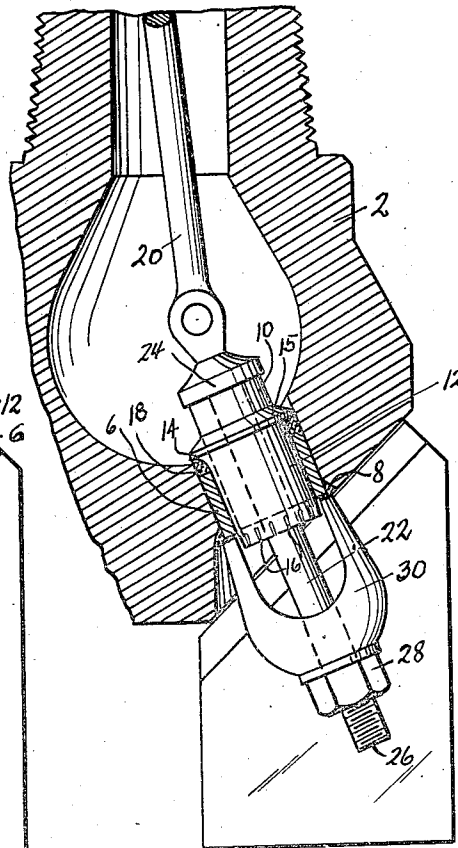


Fig. 3.

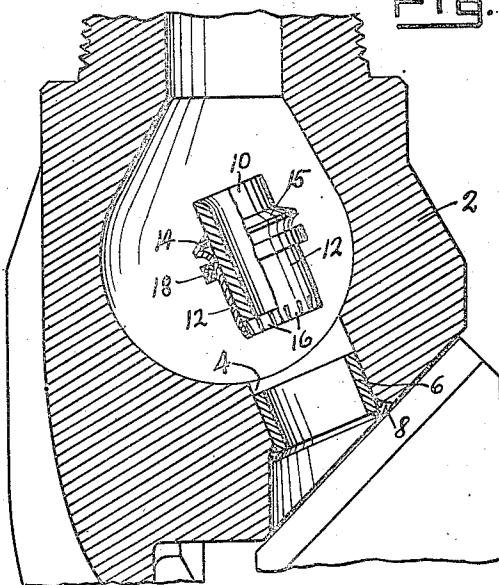


Fig. 1.

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SLUSH TUBE

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My invention relates to a well drilling bit provided with quick change slush tubes.

The bit is substantially conventional in form but is provided with quick change slush tubes which are arranged and held by the bit in position to direct the slush so that upon emerging from the slush tube it will be directed to impinge upon the cutting surface of the cutters which are carried by the bit.

An object of my invention is to provide quick change slush tubes or nozzles which may be securely held in a properly adjusted position to direct slush pumped therethrough to the cutting surfaces of the cutter-blades.

A further object is to provide slush tubes or nozzles which may be held in the drill bit in a manner which will prevent the slush from leaking outwardly between the nozzle and the drill bit.

A further object is to provide a slush tube or nozzle which may be readily removed from a drill bit for replacement.

In the drawing I have shown what may be properly called a drag type or fish tail bit, but it will be understood that my slush tube or nozzle may be similarly attached to other types of bits, such, for example, as a bit having rolling cutters which are carried by the bit-head.

In rotary drilling, it is well known that the bit is secured to the lower end of a rotary drill stem, which extends upwardly through the well being drilled from the bit to the surface of the earth. A suitable mud or slush may be pumped down through the drill stem and into the bit to be discharged through the slush tubes or nozzles during drilling, and thereby be directed upon the cutting surfaces of the cutters on the bit.

In the accompanying drawing:

Fig. 1 is a fragmentary cross-section of a drill bit showing my slush tube or nozzle in position to be inserted through an opening provided in the bit;

Fig. 2 is a cross-section through a drill-bit showing my slush tube or nozzle secured thereto; and

Fig. 3 is a fragmentary cross-section showing mechanism which may be utilized to properly adjust and hold the slush tube or nozzle in position within the drill bit while the nozzle is being secured thereto.

The drill bit shown is substantially conventional in form, and in the present representation is a bit of the drag type or fish-tail type, it being understood, however, that my invention may be applied to any suitable or desirable rotary drill,

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such, for example, as a drill bit provided with rolling cutters. Also the drawing discloses the attachment of only one nozzle to a drill bit, but it will be understood that a plurality of nozzles may be provided.

The bit 2 is provided with a suitable hole 4 drilled therethrough at a desired angle and adapted to provide a suitable opening through the bit through which a slush tube or nozzle may be inserted and secured. The drilled hole 4 of the bit 2 is fitted first with a bushing 6 of hard metal, which bushing is preferably secured to the bit by welding as at 8, or it may be secured by other suitable methods, such, for example, as sweating it into position.

The bushing 6 having been properly positioned in the bit, the slush tube or nozzle 10, which is also preferably of hard metal, is fitted into the bushing 6. Around the outer surface of the slush tube or nozzle 10 I provide a sleeve 12 of softer material than the material of the nozzle, which at one end thereof is provided with a belled periphery 14, and at the opposite end thereof is cut to make a plurality of fingers 16. Preferably, the belled periphery 14 is welded to the outer surface of the nozzle 10, as is shown at 15. Around the sleeve 12 I provide a suitable gasket 18, which is adapted to abut against the belled periphery 14, after the slush tube or nozzle 10 and the sleeve 12 have been inserted into the bushing 6. The combined nozzle 10 and sleeve 12 are inserted into the bushing 6 and are forced well within the sleeve 6 until such time as the gasket 18 is compressed between the bushing 6 and the belled periphery 14, as is shown clearly in Fig. 2. After the nozzle 10 has been thus positioned, the fingers 16 on the end of the nozzle are bent outwardly therefrom to secure the nozzle in its then adjusted position.

In Fig. 3, I have shown a device for aiding in the installation of a slush nozzle. It includes a suitable rod 20, which has pivoted thereto at one end a rod 22 provided at the end thereof near the point of pivot to the rod 20 with a suitable cap 24. At the end of the rod 22 remote from its point of pivot with the rod 20 I provide conventional screw-threads 26. The rod 22 is adapted to be inserted through the slush tube or nozzle 10, which in turn is inserted (together with its sleeve 12 and the gasket 18) into the bushing 6 in the bit 2. When thus positioned, the bell-shaped bifurcated clamp 30 is placed over the screw-threaded end of the rod 22 and the nut 28 is screwed onto the threads 26. The ends of the bifurcated clamp 30 thus become engaged

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around the surface of the bit 2 and/or the sleeve 6 by tightening the nut 28 on the screw-threads 26. By tightening the nut 28, the cap 24 will be drawn toward the clamp 30, carrying with it the nozzle 10 and its sleeve 12. When held in this position, the fingers 16 on the end of the sleeve 12 around the nozzle 10 may be bent outwardly to hold the nozzle securely in its adjusted position.

By thus securing a slush tube or nozzle 10 into the position in which it is shown in Fig. 2, whether this is done in the manner described above, referring particularly to Fig. 3, or whether it is done by some other suitable means, provides a slush tube or nozzle 10 which is securely held in proper position in the drill bit 2, and which may be readily replaced in the event that it becomes worn or damaged. It will be understood, of course, that the slush referred to as being pumped downwardly through the drill stem and outwardly through the slush tube or nozzle to impinge upon the cutting blades during the drill operation, is customarily a slush which is of a very gritty nature, and, therefore, relatively promptly wears the slush tube or nozzle 10, and would materially wear the sleeve 12 positioned around the nozzle 10 and the bushing 6, if any leakage were permitted around the outside of the slush tube or nozzle.

When it becomes necessary or desirable to replace the slush tube or nozzle 10, it will be necessary only to release or straighten the fingers 16 on the end of the slush tube or nozzle 10, and release it from its position within the bushing 6 held in the hole 4 provided in the drill-bit.

It is believed that it will be unnecessary to explain further the operation of the drill-bit and slush tube because it is believed that the conventional manner of drilling oil wells with the commonly known drag type or fish tail bit, or other types of bits, will be well understood by one skilled in the art.

I claim:

1. In combination, a bit having an aperture therein, a bushing in said aperture, a slush tube secured within a sleeve, and said tube and sleeve positioned and secured within the said aperture and bushing, the said sleeve having at one end thereof a belled periphery and at the other end thereof an axially cut periphery.

2. The combination including a well drilling bit having an aperture therein, a bushing in said aperture, a slush tube, a sleeve secured around the tube, said sleeve made up of soft material relative to the tube and bushing, the said tube and sleeve being adapted to be inserted into the said bushing and aperture, and means forming a part of said sleeve to secure the said sleeve against axial movement in its position in the bushing.

3. In a drill bit having a bushed aperture therein, the combination of a slush tube secured within a sleeve said tube and sleeve positioned within said bushing and aperture, a belled periphery

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at one end of the said sleeve, an axially slit periphery at the other end of said sleeve, and a compressible gasket positioned around the said sleeve and between the said belled periphery and the said bushing in the said aperture in the drill bit.

4. A drill bit having an aperture therein, a bushing within said aperture, a slush tube secured within a sleeve said tube and sleeve positioned within said bushing and aperture, one end of said sleeve having a belled periphery, the other end thereof having approximately axial slits in the periphery thereof, a compressible gasket around said sleeve and positioned between one end of the said bushing and the belled periphery of the sleeve, the slitted periphery of the said sleeve being bent backward upon itself and engaging the other end of the bushing to secure the slush tube and sleeve in position in the drill bit bushing and aperture.

5. In combination, a bit having a slush opening therein adapted to receive a slush tube assembly, a slush tube extending through said opening, a sleeve surrounding said tube within said opening and secured and sealed to said tube, said sleeve having a flared portion adjacent one end for limiting movement of said sleeve and tube in one direction through said opening and a portion bent outwardly adjacent the opposite end of said sleeve for holding said sleeve and tube against withdrawal from said opening, and sealing means surrounding said sleeve adjacent said flange for sealing between said sleeve and the opening in the bit.

6. A slush tube assembly comprising a hardened tube, a sleeve of relatively soft material as compared with the material forming said tube surrounding said tube and secured and sealed thereto, said sleeve having a flared portion adjacent one end and a portion adjacent the other end adapted to be bent outwardly.

7. A slush tube assembly comprising a hardened tube, a sleeve of relatively soft material as compared with the material forming said tube surrounding said tube and secured and sealed thereto, said sleeve having a flared portion adjacent one end and a portion adjacent the other end adapted to be bent outwardly, and sealing means surrounding said sleeve adjacent said flared portion for sealing said sleeve within an opening.

8. In combination, a bit having an aperture therein, a bushing within said aperture and fixed with respect to the wall thereof, a sleeve fitting within said aperture and removably secured within said bushing, and a slush tube within and permanently secured to said sleeve, said sleeve being longer than said bushing and so positioned with respect thereto in the assembled position in said bit that the sleeve projects beyond said bushing at the opposite ends of said bushing and releasable means carried by said sleeve ends securing the sleeve and tube within the bushing.

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