Jan. 17, 1928.

1,656,526

R. A. LINCOLN

CUTTING TRAP

Filed April 7, 1927

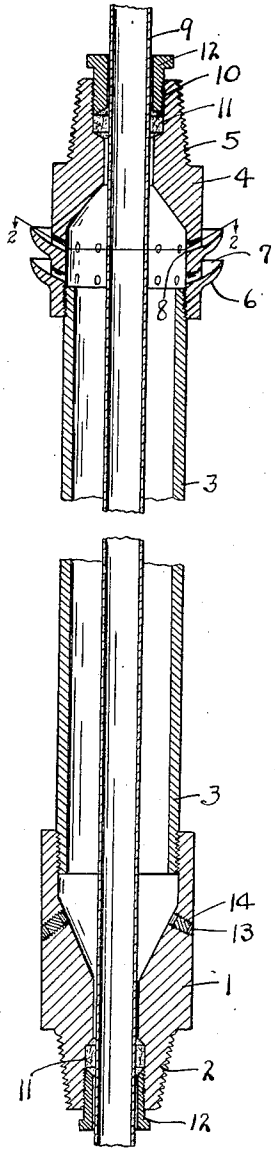


Fig. 1

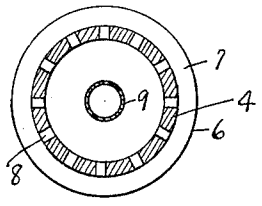


Fig. 2

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UNITED STATES PATENT OFFICE.

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CUTTING TRAP.

Application filed April 7, 1927. Serial No. 181,814.

My invention relates to a device for receiving cuttings from a well drill during the operation of drilling deep wells.

In some formations where the rotary system of drilling is employed, it is almost impossible to get the flushing fluid to circulate into and from the well, on account of the fact that the formation in which the drill is working is of a porous rock having a gas pressure therein. This gas pressure is sufficient to prevent a moderate amount of water from passing into the gas stratum, but when the pressure of the gas is exceeded by the column of liquid in the hole, the liquid pressure is sufficient to cause the water to pass into the porous rock against the gas pressure, and in such case there will be no returns of the flushing fluid to the surface. The cuttings from the drill are not, therefore, removed from the well and it is impossible to obtain samples of the formation and to prevent the accumulation of the cuttings in the hole.

It is an object of my invention to provide a trap for the cuttings from the drill which will receive and hold the said cuttings and enable the operator to bring said cuttings along with the drill and drill stem to the surface.

It is desired to form in connection with the usual drill stem and drill collar now employed a container and a guide leading thereto to receive and direct the cuttings into the container, so that the cuttings may be removed from the well.

The invention resides in the particular construction and arrangement of the parts making up the invention, and for a clear understanding thereof attention is directed to the drawing herewith, wherein Fig. 1 is a central vertical section through a portion of the drill stem with my invention applied thereto. Fig. 2 is a transverse section on the plane 2—2 of Fig. 1.

In carrying out my invention, it is to be understood that any suitable type of well drill may be employed, the device being particularly adapted for use with hard formation or rock drills. It is customary in drilling to provide above the drill a few sections of drill stem of somewhat larger diameter than the remainder of the drill stem, these sections being adapted to more nearly fill the well bore and therefore act to guide the drill in a straight line. In the drawing, I have shown at the lower end of my device a tool joint pin or collar 1, the lower end of which is formed with a tapered threaded shank 2 for engagement with a drill collar. The upper end of this tool joint is threaded for engagement with a section 3 of drill stem.

The upper end of the drill stem section 3 is secured to a special coupling member 4, the upper end of which has a threaded shank 5 for engagement with a coupling member by means of which it is secured to the adjacent section of drill stem. The member 4 has formed on its outer periphery one or more upwardly flaring rings or guide members 6, the construction of which will be noted from Fig. 1. These rings are curved upwardly and away from the body of the coupling and are saucer-shaped so as to receive within the upper side 7 thereof the cuttings which are flushed upwardly away from the drill. There may be one or more of these cutting receivers and the wall of the coupling within the said rings is perforated, as shown at 8, to allow the cuttings received within the guides to pass into the interior of the drill stem. As will be noted from Fig. 2, there is a series of these openings allowing the free passage of cuttings to the drill stem from all sides.

To conduct the flushing fluid through the drill stem on its way downwardly to the drill, I contemplate employing a separate tube or barrel 9 extending centrally downward through the coupling members 4 and 1. This tube 9 forms a fluid tight connection with the two coupling members by the use of stuffing boxes in the said couplings. A recess 10 is formed in the ends of said couplings to receive a compressible packing 11 and a gland 12 may be screwed downwardly in the recess against the packing to compress it against the tube 9.

I contemplate using my invention with more than one section of the drill stem, if necessary, and the tube 9 will extend through the sections of drill stem equipped with my invention, thus permitting the flushing fluid to pass from the upper sections of the drill stem downwardly to the drill in an obvious manner.

The tool joint pin 1 may have lateral openings 13 therein which are threaded to be closed by plugs 14. These openings are provided for purposes of cleaning the interior of the section 3 by means of fluid under pressure after the device has been withdrawn from the hole.

In the operation of a drill equipped with my invention, the drill in cutting up and disintegrating the formation will allow the passage therethrough of flushing liquid which will engage with the cuttings of the drill and carry them upwardly by the force of the current for some distance before the level of the liquid in the well has been reached, and the force of the flushing fluid spent. The cuttings thus carried upwardly outside the drill stem will drop back by gravity and will be received within the guide rings 6 and will pass through the openings 8 into the interior of the drill stem section 3. The drill stem sections are ordinarily in excess of twenty feet in length and each section will therefore contain a material supply of these cuttings before it has been entirely filled. When it is thought that the sections have been filled with cuttings, the drill may be withdrawn and the cuttings removed. In removing the cuttings the plugs 14 may be unscrewed from the joint 1 and fluid under pressure may be forced through said openings so as to help wash the cuttings from the pipe.

The advantages of this construction will be apparent to those skilled in the art without further description.

What I claim as new and desire to protect by Letters Patent is:

1. A device of the character described including a section of drill stem, coupling members at each end thereof, a tube extending longitudinally through said couplings and pipe section, means to form a fluid tight fit between said couplings and said tube, and guide rings extending laterally from the upper of said couplings, there being openings in said coupling member from within said guide rings in the manner described.

2. In a device of the character described a drill stem section, coupling members at the upper and lower ends thereof, laterally extending guide members formed on the upper of said couplings, there being openings from above said guide members to the interior of said coupling, and means to conduct flushing fluid through said drill stem and said couplings.

3. In a device of the character described a drill stem section, a coupling at the upper end of said section, said coupling having openings therein to receive cuttings, and means to guide said cuttings into said openings comprising upwardly flaring guide rings on said coupling connected therewith below said openings.

In testimony whereof I hereunto affix my signature this first day of April, A. D. 1927.

ROBERT A. LINCOLN.