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STRUCTURE DRILL

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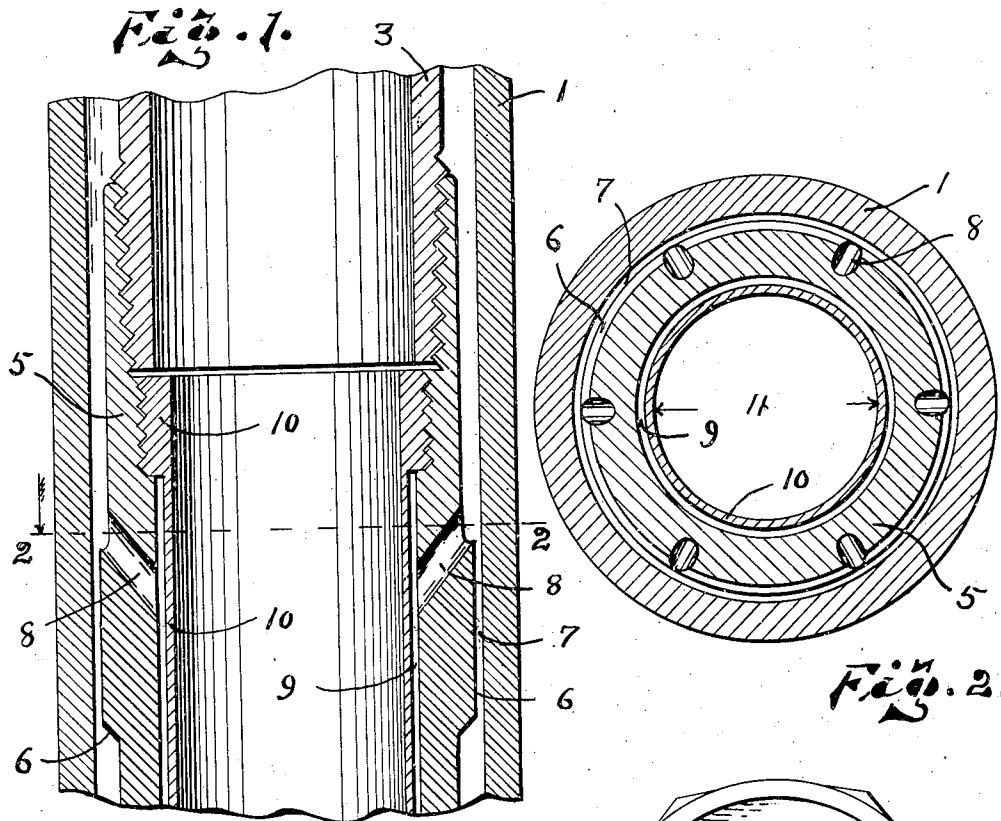


Fig. 2.

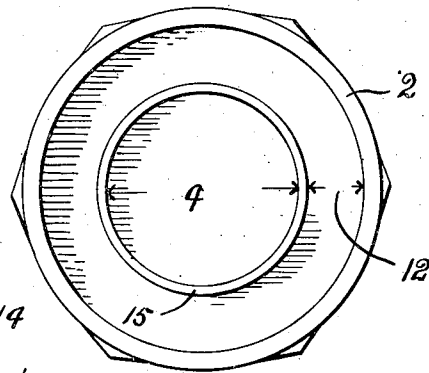
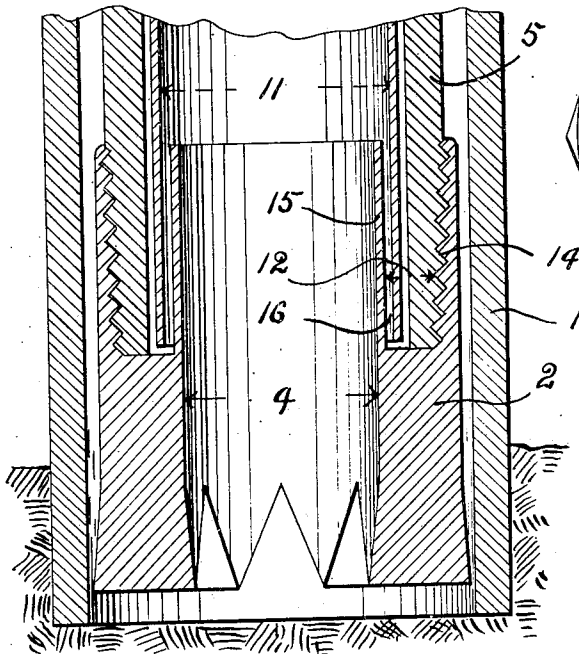


Fig. 3.



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STRUCTURE DRILL

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7 Claims. (Cl. 255-72)

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This invention relates to drilling apparatus and has special reference to such apparatus which is used for drilling and obtaining samples of the material drilled through at the same time, which is sometimes referred to as structure drilling.

This type of drilling has always presented problems in the way of obtaining an accurate and continuous sample of the material being drilled due to the fact that the water used in the process is often lost in sandy material or material which may have openings or fissures therein which permit the water and sample to be washed away and lost by its not being forced back up through the core of the drilling apparatus.

One of the principal objects of my invention is to provide means for insuring an up-current of water in the drill core to carry the sample upwardly therewith.

A further object is to provide a novel structure drill rod or barrel which is attached adjacent the lower end of the wash rod next to the bit to provide a water diverting means.

A further object is to control and direct an adequate portion of the water adjacent the bit to insure proper functioning thereof in carrying a sample to the surface.

A further object is to utilize the water under pressure to best advantage adjacent the lower end of the drill bit.

These and other objects and advantages will become more apparent as the description of the invention proceeds.

In the accompanying drawing forming a part of this application:

Fig. 1 is a vertical central sectional view of a drilling set up illustrating one form of the invention.

Fig. 2 is a horizontal sectional view on the line 2-2 Fig. 1, and

Fig. 3 is a top plan view of the drill bit shown in Fig. 1.

In the drawing, the reference numeral 1 indicates the casing of the drilled hole, which is common in the art, and through which the drill bit 2 extends and is operated to chip out the material to be sampled.

It is common practice to force water, under a pressure of about 175 pounds, down between the casing 1 and the so-called wash rod 3, which forms the connecting link from the bit 2 to the surface, in hopes that this water, upon reaching the end of the casing where the bit 2 is chipping out material, will be turned back and enter the central bore or opening 4 of the bit and carry at

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least a large part of the chips or particles cut by the bit along with it.

In practice this has not proven too successful, so I have provided an auxiliary rod or barrel section 5 to be installed intermediate of the wash rod 3 and drill bit 2 which will cause a large amount of the water which is forced down the casing to be diverted upwardly into the core or central opening of the wash rod through which the water and sample are carried to the surface, while the remaining or minor portion of the water continues down to the bit to clear same when it is in operation. This diversion and diverting of water will overcome the disadvantages of this type of structure drilling as under the old system, all the water, under high pressure, hit the bottom of the drilled hole and then was expected to be turned back upon itself into the drill core to carry the sample material upwardly to the surface. Naturally if the material being drilled through was loose or if cavities or fissures were present, the water would follow the path of least resistance and be lost to practical use.

The body portion of the rod or barrel section 5 is of any suitable length, though three to five feet is preferred, and is adapted to be secured to the lower end of the wash rod 3 as by screw-threads as shown in Fig. 1. The section 5 is enlarged somewhat as indicated at 6, which provides a shoulder-like lateral extension or annulus entirely around the section 5. This enlargement or shoulder 6 is of the proper extent to limit the amount of water which can pass through the opening 7 between same and the inner walls of the casing to the drill bit.

Above the enlarged portion or shoulder portion 6, I have provided a plurality of openings or holes 8 through the section 5, preferably on a downward inclination as shown, through which the major portion of the water is to be diverted. The relative size of the opening 7 and the radial openings 8 is, of course, predetermined so that the proper diversion and division of the water will be obtained.

Within the rod or barrel section 5 I prefer to provide for an inner channel 9 leading from the openings 8 downwardly to adjacent the end of the section 5 so that water coming through the holes or openings 8 will be carried downwardly to the lower end of the section 5 to which the bit 2 is screwthreadedly attached. The channel 9 may be provided in any suitable manner, however, one simple means for such provision is a tube 10 screwthreadedly installed or possibly welded within the bore of the section 5, the tube

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10 being of less diameter than the bore of the section 5 to provide a channel 9 therebetween. It is deemed apparent, however, that any other means to provide for the channel 9 will function in the same manner.

To divert the water from the channel 9 back upon itself, and upwardly through the inner bore or opening 11 of the rod or barrel section 5, I employ a slightly modified drill bit 2, the modification being on the inner upper end of the bit body. The instant bit has two separate bores, an outer bore 12 and an inner bore 4, the inner bore being through, and the outer bore only partially through, the body of the bit. The outer wall of the outer bore is threaded to receive the threaded end of the rod or barrel section 5 as indicated at 14, and the bore 12 is of sufficient width intermediate of its outer threaded wall and its inner upwardly projecting wall 15 to provide space for the end of the tube 10 to be received therein with a channel 16 intermediate of the tube and the wall 15. The tube 10 is of such length that it will not reach the bottom of the bore, that is, it remains spaced from the bottom of the bore 12 so that water coming down the channel 9 will hit the bottom of the bore 12, and pass upwardly through the channel 16 and into the inner bore or opening 11 of the rod section 5. It is apparent that the base or bottom of the bore 12 is used to turn the water back upon itself so that it will be forced upwardly through the channel 16 and that the base of the bore is not subject to having a changing character whereby the water would be lost to practical use as is the case of the bottom of a drilled hole.

The fact that the water is directed upwardly into the inner bore or opening 11 of the rod section 5 creates an upcurrent or suction within the central opening 4 of the bit and rod section 5, which draws up the material which was chipped loose by the bit for samples, and also the water which was allowed to reach the end of the bit by way of the outside opening between the wash rod and casing is drawn up, thereby, a much more efficient sample is obtained as it is not lost as readily due to the characteristics or condition of the material being drilled as the controlled upcurrent of water is started within inches of the cutting edges of the drill bit, and that is where it is needed most, leaving but a very short distance between the continuous, constant upcurrent or suction and the bit end, which is not affected by the material being drilled and is not dependent upon such independable material for its action.

From the above it is deemed apparent that I have devised a drilling apparatus which will accomplish the objects set forth and overcome the disadvantages of the present drilling apparatus.

Having thus described my invention, what I claim is:

1. In an apparatus for drilling and obtaining samples of the material drilled by means of water being forced downwardly intermediate of the casing and wash rod and back up through a central bore in the drill bit and washed rod, a rod section installed intermediate of said wash rod and bit, said rod section having a hollow body portion and at least a portion thereof adapted to regulate the amount of water which can pass intermediate thereof and said casing, said rod section having openings through the walls thereof above said regulative portion, a tube installed within said body portion to form a channel leading from each of said openings longitudinally 75

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of said body portion to the end thereof, and means adjacent the end of said rod section to divert said water into the interior of said rod section in an upward direction.

2. The structure as set forth in claim 1 and said means comprising said drill bit having an inner and an outer bore, said section being adapted to be secured to the outer walls of said outer bore whereby a channel is formed intermediate of the wall separating said bores and said section whereby said water will be directed upwardly within said last mentioned channel and into said hollow rod section.

3. In a drilling arrangement utilizing water forced intermediate of the wash rod and casing to be diverted upwardly through the center of the drill bit and said wash rod and carry a sample therewith, a rod section installed intermediate of said rod and bit to regulate the flow of water through the lower portion of said casing, said rod section having openings therethrough to divert a portion of said water interiorly of said rod, and means within said rod section to direct said water upwardly within said rod to create an upcurrent of water therein, said means comprising a channel connected with said openings and leading to the end of said rod section adjacent said bit, and an upwardly projecting wall on said bit inwardly of said channel.

4. In an apparatus for drilling and obtaining samples of the material drilled by means of water being forced downwardly intermediate of the casing and wash rod and back up through a central bore in the drill bit and wash rod; a rod section installed intermediate of said bit and wash rod, said rod section having a hollow central bore, and a concentric channel intermediate of said bore and the exterior walls thereof, said rod section having openings through the exterior walls thereof into said channel to divert a portion of said water from between said casing and rod into said channel, said channel extending longitudinally of said rod section to the lower end thereof, and an upwardly projecting wall adjacent the lower end of said rod section to divert the water from said channel into said bore in an upward direction.

5. In an apparatus for drilling and obtaining samples of the material drilled by means of water being forced downwardly intermediate of the casing and wash rod and back up through a central bore in the drill bit and wash rod; a rod section installed intermediate of said bit and wash rod, said rod section having a hollow central bore, and a concentric channel intermediate of said bore and the exterior walls thereof, said rod section having openings through the exterior walls thereof into said channel to divert a portion of said water from between said casing and rod into said channel, said channel extending longitudinally of said rod section to the lower end thereof, and means adjacent the lower end of said rod section to divert the water from said channel into said bore in an upward direction.

6. In an apparatus for drilling and obtaining samples of the material drilled by means of water being forced downwardly intermediate of the casing and wash rod and back up through a central bore in the drill bit and wash rod; a rod section installed intermediate of said bit and wash rod, said rod section having a hollow central bore, and a concentric channel intermediate of said bore and the exterior walls thereof, said rod section having openings through the exterior walls thereof into said channel to divert a

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portion of said water from between said casing and rod into said channel, said channel extending longitudinally of said rod section to the lower end thereof, said bit having an inner and an outer bore, said section being adapted to be secured to the outer walls of said outer bore whereby a channel is formed intermediate of the wall separating said bores and said section whereby said water will be directed upwardly within said last mentioned channel and into said hollow rod section.

7. In an apparatus for drilling and obtaining samples of the material drilled by means of water being forced downwardly intermediate of the casing and wash rod and back up through a central bore in the drill bit and wash rod; a rod section installed intermediate of said bit and wash rod, said rod section having a hollow central bore, and a concentric channel intermediate of said bore and the exterior walls thereof, said rod section having openings through the

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exterior walls thereof into said channel to divert a portion of said water from between said casing and rod into said channel, said channel extending longitudinally of said rod section to the lower end thereof, said bit having an inner bore and a wall projecting upwardly therefrom and defining a portion of said last mentioned bore, and said channel ending below and outwardly from said wall whereby water from said channel is directed upwardly into the bore of said rod section by said wall.

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REFERENCES CITED

- 15 The following references are of record in the file of this patent:

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