J. F. LINDBERG.

CORE HOLDER FOR TUBULAR ROCK DRILLS.

APPLICATION FILED MAY 5, 1914.

1,145,323. Patented July 6, 1915.

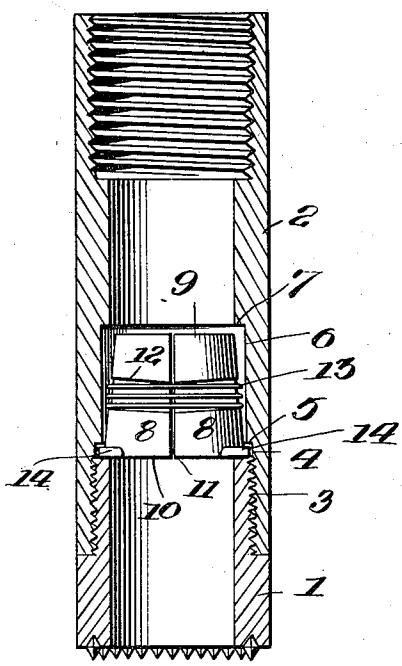


Fig. 1.

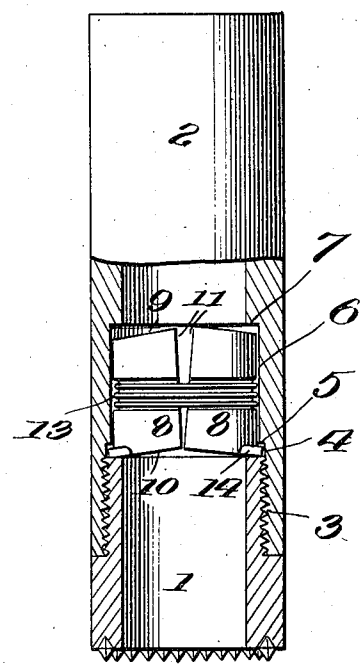


Fig. 2.

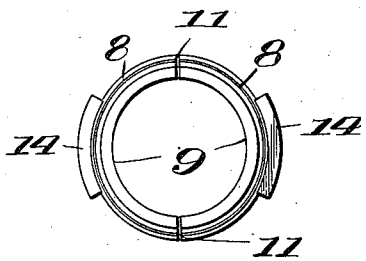


Fig. 4.

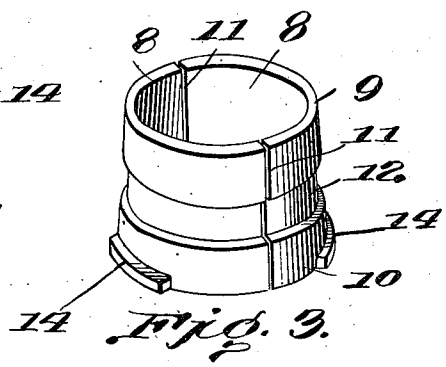


Fig. 3.

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CORE-HOLDER FOR TUBULAR ROCK-DRILLS.

1,145,323. Specification of Letters Patent. Patented July 6, 1915.

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To all whom it may concern:

Be it known that I, JOHN F. LINDBERG, citizen of the United States, residing at Hibbing, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Core-Holders for Tubular Rock-Drills, of which the following is a specification.

This invention relates to core holders for tubular rock-drills and has for its object the provision of a simple and efficient device by which a core cut from the rock or earth, as the drill advances, will be held against dropping and may be easily withdrawn from the well.

A secondary object of the invention is to provide an improved construction for supporting the core holder within the drilling tube, and the invention also seeks to provide a device for the stated purpose which, when in use, will offer no obstructions to the passage of the core through the drill.

The invention is illustrated in the accompanying drawings and will be hereinafter fully described, the novel features being subsequently particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view showing a portion of a tubular drill in section and showing my improved core holder in position therein in elevation, the core holder being illustrated in the position it assumes when the drill is not in use and is not in the well; Fig. 2 is a similar view showing the position assumed by the core holder when the drill is at work and a core is being supported, the core, however, not being shown; Fig. 3 is a detail perspective view of the core holder, the means for holding the members of the core holder together being omitted. Fig. 4 is a plan view of the same.

The drilling tube is of the usual form and consists of a bit body or drilling head 1 and a plurality of tubular sections connected therewith, an intermediate sleeve section 2 being provided to connect the drill head 1 with the main plain sections of the drilling tube. The drill head 1 is externally reduced at its upper end and externally threaded upon its reduced portion, as shown at 3, and the connecting sleeve section 2 is internally reduced and threaded at its lower end so as to fit over and engage the upper reduced end of the drill head. A short unthreaded portion 4 is provided immediately above the internally threaded portion of the section 2, thereby providing an annular shoulder 5 which will be spaced from and partly overhang the upper end of the drill head 1. Extending axially of the sleeve from the shoulder 5 is a smooth annular surface 6, which describes a circle having a diameter less than the diameter of the smooth portion 4 and greater than the main diameter of the section 2, whereby a second internal annular shoulder 7 will be provided in said section. The axial length of the surface 6 is slightly greater than the height or axial length of the core holder so as to permit the necessary movement of the parts of the core holder, as will presently appear. The core holder consists of two semi-cylindrical members 8 which have their upper and lower edges 9 and 10 arranged at acute angles to lines running longitudinally of their outer surfaces so that when the said members rest upon their lower edges, as shown in Fig. 1, their straight longitudinal edges 11 will meet in the central longitudinal plane of the drill tube, and the upper end of the core holder will have a diameter less than its lower end. The said members are also provided with external circumferential grooves 12 which receive spring rings 13 whereby the members will normally be held toward each other but may yield to permit the passage of a core. The internal diameter of the core holder is such that when the members are in the position shown in Fig. 1 the diameter will diminish toward the upper end of the core holder, but when the members are spread apart, as shown in Fig. 2, the diameter will be uniform and will be the same as the internal diameter of the drill head and the section 2 so that a continuous smooth uninterrupted passage for the core will be provided. The core members are provided at their lower edges with external projections or lugs 14 which are adapted to enter the seats formed by the upper end of the drill head and the overhanging annular shoulders 5 of the section 2. The said projections or lugs are somewhat shorter than the annular surface 4 so that they will have a slight play within the said seats and vibration of the members of

the core holder sufficient to accommodate the core will be permitted.

It is thought the operation of the device will be readily understood from the foregoing description taken in connection with the accompanying drawings. The parts are assembled by placing the core holder upon the upper end of the drill head and then screwing the connecting sleeve or section 2 onto the drill head so that the annular shoulder 5 will extend over the lugs 14 and prevent withdrawal of the core holder. The drill is then operated in the usual manner, and as the core is cut from the rock or earth it will pass up through the drill and impinge against the inner surface of the core holder members and will force the said members apart to the position illustrated in Fig. 2 and will thus rise through the several sections of the drilling tube as the drill descends in the earth. The spring rings 13, encircling the core holder, will permit the same to readily yield to the core and will hold the parts against the core with sufficient force to effectually retain the core and support the same when the tubing is withdrawn so that the core will be positively lifted with the tubing.

It will be readily noted that my core holder is supported at its lower end and is so mounted that its members may rock upon the upper end of the drill head but are held against longitudinal movement by the connecting sleeve. The upper ends of the mating members, before the core enters the drill tube, are projected across the bore of the connecting sleeve, while the lower ends thereof present a diameter equal to the diameter of the bore of the drill head so that the advancing core may enter readily between the members of the core holder and will spread or open the same without meeting excessive resistance at the upper end thereof. When the core holder is free to move longitudinally of the drill tube or barrel, such longitudinal movement is arrested only when the upper end of the core holder meets an internal shoulder or other obstruction within the barrel or tube, and the frictional engagement between the upper end of the core holder and this internal annular shoulder or other projection increases as the pressure exerted by the core increases and, therefore, the resistance to the opening of the core holder is increased so that at times it becomes great enough to entirely stop the core from passing through the holder with the result that the core and the core holder springs are ground up as fast as the drilling progresses and the drill is blocked or choked so that operations must cease until the tube or barrel can be cleaned out and the holder and core removed. In my improved core holder, the core members readily spread apart or open as the core advances and offer very little resistance to the upward movement of the core inasmuch as they are held at their lower ends and meet no resistance at their upper ends.

The several parts are exceedingly simple in their construction and arrangement and may be very cheaply manufactured and assembled. Should breakage occur through accident, or the parts become inefficient through wear due to long continued use, the device may be readily disassembled and new parts substituted without the loss of any considerable period of time.

Having thus described my invention, what I claim is:

1. The combination of a tubular drill head, a sleeve secured to the drill head and having an internal annular shoulder partly overhanging the upper end of the drill head in spaced relation thereto, mating core holder members resting at their lower ends directly upon the upper end of the drill head and having external projections at their lower ends loosely engaging under the annular shoulder of the sleeve whereby said members may rock on the upper end of the drill head but will be held against longitudinal movement by the said annular shoulder, said members extending upwardly in the sleeve beyond said shoulder and means for yieldably holding the members together.

2. The combination of a tubular drill head, a sleeve secured to the upper end of the drill head and having an internal annular shoulder partly overhanging the same and spaced therefrom, the sleeve having a second internal annular shoulder above the first mentioned shoulder and the internal diameter of the sleeve between the shoulders being greater than the internal diameter of the drill head and above the second shoulder being equal to the internal diameter of the drill head, semi-cylindrical core lifting members resting directly upon the upper end of the drill head and extending into the sleeve below the said second shoulder, said members having external circumferential projections at their lower ends extending under the first mentioned shoulder on the sleeve, the end edges of said members being at an acute angle to the longitudinal edges thereof and the internal diameter of the same at the lower end being equal to the internal diameter of the drill head, and yieldable means for holding said members normally together.

3. The combination of a tubular drill head, a connecting sleeve secured to the upper end of said drill head and having an internal annular shoulder overhanging and spaced from the upper end of the drill head and a second internal annular shoulder above and spaced from the said first mentioned annular shoulder, and a core holder

consisting of mating members resting upon the upper end of the drill head and having external projections extending under the first mentioned annular shoulder, the said members extending toward the second mentioned annular shoulder, and means for yieldably holding said members together.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. LINDBERG. [L. S.]

Witnesses:
HENRY A. MANN,
WALTER SCHAFER.