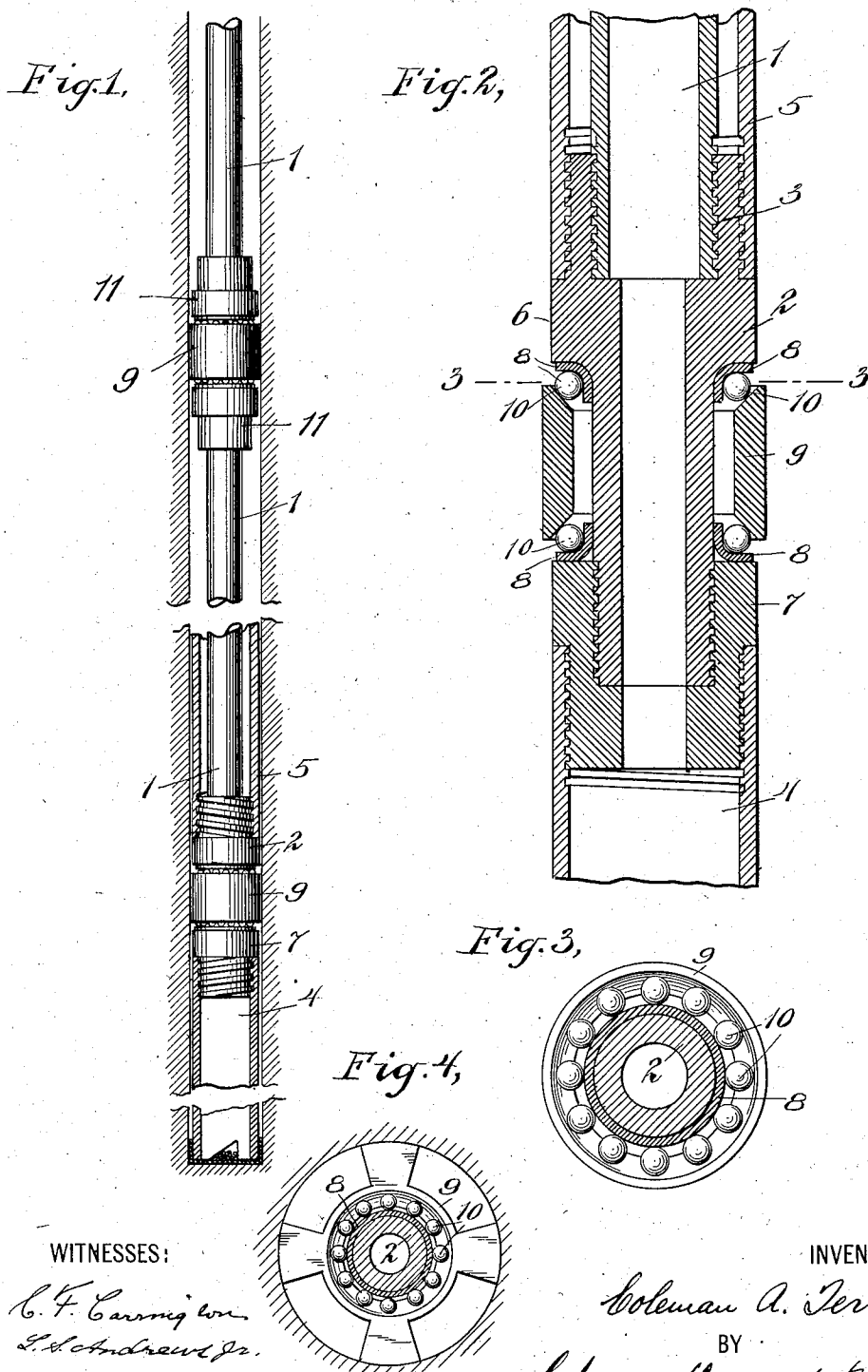


No. 790,330.

PATENTED MAY 23, 1905.

C. A. TERRY.
CORE DRILL.

APPLICATION FILED JUNE 10, 1904.



WITNESSES:

C. F. Carrington
L. S. Andrews Jr.

INVENTOR

Coleman A. Terry

BY

Chapin Raymond Mable
ATTORNEYS.

UNITED STATES PATENT OFFICE.

COLEMAN A. TERRY, OF NEW YORK, N. Y., ASSIGNOR TO DAVIS CALYX DRILL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

CORE-DRILL.

SPECIFICATION forming part of Letters Patent No. 790,330, dated May 23, 1905.

Application filed June 10, 1904. Serial No. 211,944.

To all whom it may concern:

Be it known that I, COLEMAN ARTHUR TERRY, a citizen of the United States, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Core-Drills, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to core-drills employed for boring holes in the earth's strata; and my invention consists in certain improved means for guiding the core-barrel, drill-rods, or other part of the apparatus intermediate the top and bottom of the hole.

In core-drilling great difficulty has been experienced in working in certain classes of material on account of the grinding action between the revolving core-barrel and the side walls of the hole. This grinding action is so severe with certain material as to completely wear through the core-barrel in an hour or two; and the main object of my present invention is to so guide and support the core-barrel and other parts of the drilling apparatus as to prevent such abrasion, and thus to reduce wear upon the parts. In deep holes, where the length of drill-rod used is considerable, the drill-rods will also rub against the side of the hole, the length of rods as a whole bowing or bending, owing to their weight. When so bent, the rods will thresh against the sides of the hole at one or more points, usually at the points of coupling, and will wear severely, often wearing right through. In carrying out my invention, then, I employ one or more bearing-rings, as may be required, one bearing-ring arranged around or in proximity to the core-barrel, so as to hold the core-barrel away from the sides of the hole, and one or more bearing-rings, as may be required, at various points along the drill-rods, an annular passage-way being provided between the rings and the parts supporting them, whereby free escape of water and detritus is permitted.

My invention also consists in certain novel features of construction and combination of parts, as will hereinafter more fully appear.

I will now proceed to describe a core-drill

employing bearing-rings embodying my invention and will then point out the novel features in claims.

In the drawings, Figure 1 is a view in longitudinal sectional elevation of a core-drill embodying my invention, showing the same at work in a hole in the ground. Fig. 2 is an enlarged view, in central longitudinal section, through the plug constituting the core-barrel support and the bearing-ring carried thereby. Fig. 3 is a view in transverse section, the plane of section being taken substantially upon the line 3 3 of Fig. 2. Fig. 4 is a similar sectional view showing a modified form of bearing-ring.

The class of drill to which I have shown my present invention applied is the well-known form of Davis calyx drill; but it will of course be understood that it may equally well be applied to other forms of drill. The core-drill illustrated comprises a drill-rod 1, a plug 2, into which the lower end of the drill-rod 1 is screwed, as at 3, a core-barrel 4, screwed onto the lower end of the plug 2, and a calyx or cup 5, carried by the plug at its upper end. The drill-rod 1 and plug 2 are hollow, as is usual, to permit the passage there-through of water for washing up the detritus from the foot of the hole. The plug 2 for the purposes of the present invention is made in two parts, an upper main body portion 6 and a cap 7. The main body portion has a reduced neck, to which are fitted race-rings 8, the upper race-rings being fitted against the shoulder formed at the commencement of the reduced neck and a lower race-ring fitted upon the reduced neck and against the shoulder formed by the upper edge of the cap 7. A bearing-ring 9 surrounds the plug 2 opposite the reduced neck portion and is supported upon said plug by means of spherical balls 10, which, with the race-rings and runway portions upon the said ring, constitute ball-bearings about which the ring may freely rotate. In assembling the parts the ring is slipped into position before the cap is secured in place. The cap is secured in position by a screw-threaded engagement with the body portion of the plug, as shown.

The outer diameter of the bearing-ring 9 is slightly larger than is the diameter of the core-barrel 4. In operation, therefore, the ring engages the side of the hole in which the drill is operating and acts as a bearing member holding the core-barrel, plug, and calyx away from the side of the hole. It will be remembered that in practice the diameter of the hole is always slightly larger than that of the core-barrel, the teeth of the bit, if a cutter-bit be used, being offset, so as to effect this result, or if the shot system of drilling be used the working of the shot around the shot-bit results in this excess of diameter. It is of course essential that clearance shall exist between the sides of the core-barrel and the walls of the hole, and for this reason the diameter of the hole always exceeds the diameter of the core-barrel; but where no means are employed for holding the core-barrel central with respect to the hole it has been quite common for the core-barrel to work against one side of the hole and wear badly. The diameter of the ring is designed to be such as to fairly accurately fit the hole, and no friction will result because of such engagement, by reason of the fact that the ring is designed to remain stationary, antifriction-bearings being provided between it and the drill, so that the drill will revolve freely against the ring as a bearing member.

The water and detritus washed up from the bottom of the hole flow around the core-barrel, and in order to permit free passage of the same past the ring I preferably employ a fewer number of balls that would entirely fill the race and run ways. I may use a full complement of balls, if desired, for there would still be spaces between them, owing to their spherical shape, which spaces might be sufficient to carry up the detritus and probably would be sufficient in shot-drilling; but in certain other forms of drilling, where the chips carried up are larger, it would be better to leave greater space between the balls, so as to prevent any possible clogging of the material beneath the ring.

In Fig. 1 I have shown a similar bearing-ring supported upon the coupling 11, which unites two sections of the drill-rods together, it being understood that in deep earth-boring the drill-rods are necessarily made in sections and joined together by suitable couplers. I may employ one or more of these bearing-rings at various points along the length of the drill-rod, as I may find desirable, such bearing-rings acting to prevent the drill-rod from bowing and threshing against the side of the hole.

In Fig. 4 I have shown a form of bearing-ring which I may employ upon the couplers where the difference between the diameter of the hole and that of the drill-rod is very large.

What I claim is—

1. A core-drill having a bearing-surface and provided with a loose bearing-ring rotatably mounted thereon, substantially as specified, and provided with a passage-way for water and detritus between the ring and the bearing-surface supporting it.

2. A core-drill having a bearing portion and provided with a loose bearing-ring rotatably mounted thereon, and ball-bearings therefor, a passage-way for water and detritus being provided between the ring and portion supporting it.

3. In a core-drill, the combination with a core-barrel and means for supporting same, of a bearing-ring loosely mounted with respect to said core-barrel, and of a diameter slightly larger than the diameter of said core-barrel, and ball-bearings between said bearing-ring and the part carrying it, an annular passage-way for water and detritus being provided between the said bearing-ring and the part carrying it.

4. In a core-drill, the combination with a drill-rod, a plug comprising a main or body portion, and a removable cap secured thereto, said main or body portion secured to the drill-rod; and a core-barrel secured to the said cap portion of the plug; of a loose bearing-ring disposed between the cap and body portions of the plug, and bearings for the said bearing-ring, permitting passage past same of water and detritus, substantially as specified.

5. In a core-drill, the combination with a drill-rod, a plug comprising a main or body portion, and a removable cap secured thereto, said main or body portion secured to the drill-rod; and a core-barrel secured to the said cap portion of the plug; of a loose bearing-ring disposed between the cap and body portions of the plug, and ball-bearings for the said bearing-ring, permitting passage past same of water and detritus, substantially as specified.

6. In a core-drill, the combination with a core-barrel and a plug supporting same, said plug comprising two separate and separable portions, of a bearing-ring rotatively mounted upon said plug and between said two portions thereof, the diameter of said ring slightly larger than the diameter of said core-barrel, said plug and ring having raceways for supporting bearing-balls, and having an annular passage-way between them for water and detritus, and a sufficient number of bearing-balls to partially, but not completely, fill said raceways, substantially as specified.

COLEMAN A. TERRY.

Witnesses:

D. HOWARD HAYWOOD,
C. L. HALL.