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CORE DRILLING MACHINERY.

APPLICATION FILED NOV. 26, 1909.

1,025,333. Patented May 7, 1912.

Fig. 1,

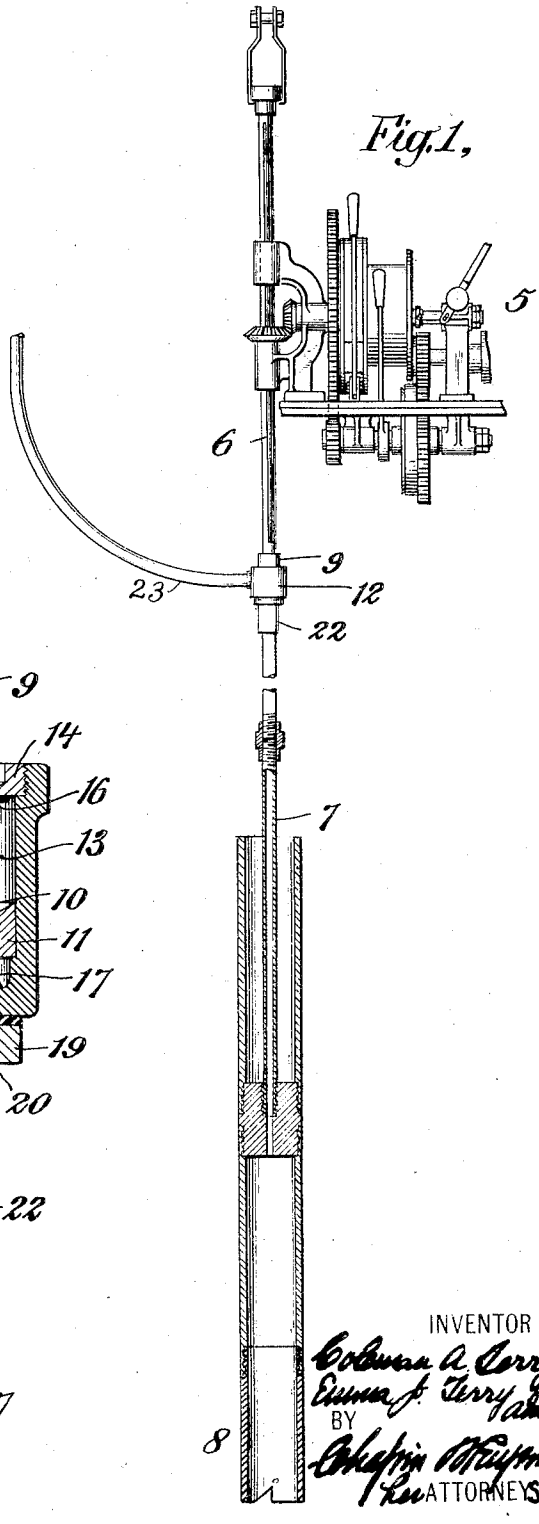
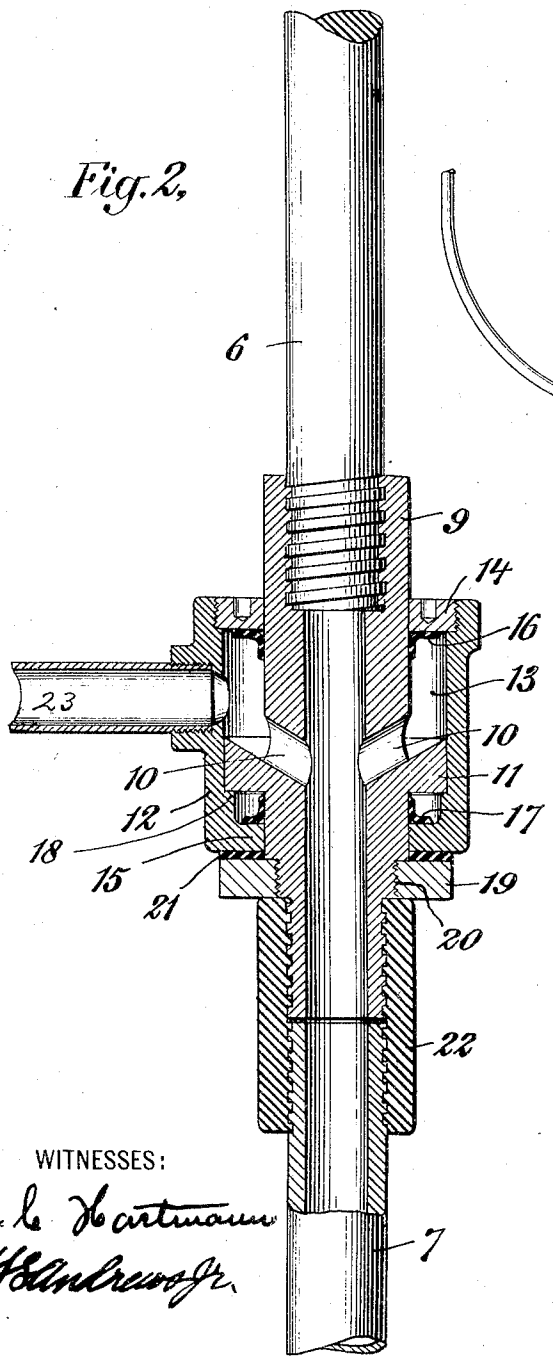


Fig. 2,



WITNESSES:

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COLEMAN ARTHUR TERRY, DECEASED, LATE OF NEW YORK, N. Y.; EMMA J. TERRY, ADMINISTRATRIX, ASSIGNOR, BY MESNE ASSIGNMENTS, TO McKIERNAN-TERRY DRILL COMPANY.

CORE-DRILLING MACHINERY.

1,025,333. Specification of Letters Patent. Patented May 7, 1912.

Application filed November 26, 1909. Serial No. 529,948.

To all whom it may concern:

Be it known that COLEMAN ARTHUR TERRY, deceased, formerly a citizen of the United States of America and a resident of the city of New York, borough of Manhattan, county and State of New York, did prior to his decease invent certain new and useful Improvements in Core-Drilling Machinery, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to improvements in core drilling machinery, and particularly to means for introducing water into the hollow drill rods for carrying away detritus from the foot of the drill hole, and also for introducing abrasive material employed for many drilling purposes.

In core drilling, it is the common, if not universal, custom of the present day to introduce water through a water swivel located at the top of the drill rods and hence above the mechanism employed for imparting rotary movements to the drill rods. This is objectionable for many reasons, chief among which are, first, that a water swivel is quite likely to leak and the water thus escaping splashes on to the rotating apparatus, and second, it compels the use of a hollow member at the top of the drill rods at the point where they are engaged by the rotating mechanism. Both of these objections are overcome by the present invention in which the water is introduced into the drill rods beneath the rotating mechanism.

In the well known shot drilling system in which chilled metallic spheres known as "shot" are employed as an abrasive material for grinding away the rock at the foot of the drill, this shot has to be constantly supplied to the drill bit, and the general method of so introducing the shot is to carry the same in with the water through the drill rods. In the present invention, the coupling admitting water to the drill rods beneath the rotating apparatus is specially designed with a view to also receiving this shot or other abrasive material, and the additional advantage is thereby gained that the danger of spilling the shot into the rotating mechanism is thereby obviated, for it will be understood that if abrasive material be allowed to fall into the rotating apparatus, the abrasive action thereof will quickly destroy the bearings and running parts. It will hence be seen that no small part of the value of the present invention lies in the fact that convenient means is thereby provided for inserting the shot at a point beneath the operating machinery.

For a thorough understanding of this invention, reference is made to the accompanying drawings illustrating an embodiment thereof, and to the following detail description of the embodiment thus illustrated the novel features being thereafter specifically pointed out in claims.

In the drawings: Figure 1 is a view in partial side elevation and partial vertical transverse section of a core drilling apparatus constructed in accordance with this invention. Fig. 2 is a view in central vertical longitudinal section through the water swivel and shot admitting means.

The drilling apparatus, in general, comprises a rotating apparatus 5, a driving member 6 to which movements of rotation are imparted, a set of hollow tubular elements comprising a hollow drill rod 7 and a core barrel and drill bit 8. In the present instance, a solid rod 6 may conveniently be substituted for the drill ordinarily employed at this point. This member is rotatively engaged by the rotating mechanism, but has a splined or similar connection as is common whereby it is permitted to have a relative movement with respect thereto in the direction of its length. Between the lower end of the said member 6 and the upper end of the drill rod 7 is located a member or coupling piece 9, the said coupling piece being hollow and provided with one or more transverse channels 10 which penetrate the side walls thereof. The channels 10 are preferably arranged obliquely, being downwardly inclined from the outside of the coupling piece to the inside thereof, and the said coupling piece is preferably provided with a cylindrical collar 11 disposed immediately beneath the said channels, the upper face of which collar is preferably arranged at an oblique angle coincident with the angles of the said channels. By arranging the upper surface of the collar 11 angularly on a radial section

through said collar so as to incline downwardly from the outer surface, with the plane of such surface forming a substantial continuation of the plane of the bottom wall of the radial opening 10, the water or other material which is introduced through the connection 23 tends to normally gravitate toward the central opening of the coupling piece, requiring no pressure to provide this movement of the matter being introduced after such material has reached the inner wall of the shell. A cylindrical shell 12 is arranged to surround the coupling 9 intermediate the ends thereof, the inner cylindrical bore of the said shell being fitted accurately to the periphery of the collar 11. A chamber 13 is thus inclosed by the shell above the collar 11, the upper end of the said chamber being closed by a head 14 which is conveniently secured to the said shell by means of a screw threaded connection. At its lower end the shell is provided with a flange 15 which forms a closure therefor, and leather washers 16 and 17 of the character known as "hydraulic packing" are provided between the coupling piece and the said upper and lower heads 14 and 15. The shell 12 is conveniently provided with a shouldered portion 18 just beneath the flange 11 and which bears against the lower portion of and forming a seat for the flange, and a nut 19, screw-threaded upon a reduced portion 20 of the coupling piece 9, holds the shouldered portion 18 of the shell 12 up against the lower face of the flange 11, as will be well understood by reference to Fig. 2 of the drawings. An anti-friction washer 21 may conveniently be employed between the upper face of the nut 19 and the lower face of the flanged portion 15 of the shell 12.

By this construction, the entire mechanism for retaining the casing against axial movement relatively to the member 9 is located entirely below the casing inlet for the water, permitting the formation of an annular channel of proper size without unduly elongating the casing, and at the same time permitting the use of the head 14, the removal of which permits the chamber 13 to be exposed in its entirety for cleaning purposes without disturbing any of the connections, such removal also permitting the member to be removed therefrom, the interior of the shell being free from projections or other configurations which would affect or be affected by the periphery of the flange 11. Furthermore, the particular structure shown practically renders the shell and member 9 unitary with respect to relative axial movement, so that movements of the rod 6 in either direction provide similar movements to the casing with no possibility of a disturbance in the relative axial positions of the casing and member 9.

A collar 22 serves as a final connecting element to connect the coupling piece 9 to the upper end of the drill rod 7.

In operation, power is applied to the rotating apparatus 5 to impart movements of rotation to the driving element 6, and these movements of rotation are imparted through the coupling member 9 and collar 22 to the drill rod 7 and the drill bit 8. The coupling member hence rotates with the rotating mechanism and the drill rods, but the shell 12 is held stationary at this time, the construction and arrangement of parts permitting relative movements of rotation between the coupling piece 9 and the shell 12 as will be well understood. A hose pipe or other connection 23 communicates with the chamber 13 of the shell 12 through a transverse channel therein, and water is admitted through this connection for the purposes of supplying the drill. The water passes through the chamber 13 and channels 10 down through and into the hollow drill rods to the foot of the drill bit. When the shot or similar system of drill is employed, shot or other abrasive material is also inserted through this connection 23, and the parts are all constructed and arranged with a view to receiving the shot and to prevent its acting destructively upon the moving parts. This material has a strong abrasive action, and where valves and similar parts are employed, it frequently happens that the joints are quickly worn out by the action of the material. In the present case, the only unprotected joint is the joint between the flange 11 and the inner wall of the shell 12. The angle of the upper face of collar 11 renders it improbable that any abrasive material will pass down through this joint because the material is being constantly deflected away from it, but should any material pass down through this joint, it will then be received within the annular space contained between the lower face of the flange 11 and the upper face of the flange 15 where it will be prevented from doing any further damage by the hydraulic packing 17. It will thus be seen that if this space is occasionally cleaned out, the abrasive material cannot do any serious harm to the machinery. It will furthermore be quite apparent, as has been stated, that by employment of this invention, the danger of spilling the shot into the rotating apparatus, such as commonly occurs with the present method of introducing the shot into the drill, is entirely done away with.

The following is claimed:

1. In core drilling machinery comprising a rotating apparatus and a hollow drill rod to be rotated thereby, means for introducing water into the drill rod at a point below the rotating apparatus, said means including a non-rotative casing and a member extending through said casing and connected to and

rotated by the rotating apparatus, said member having a drive connection with the drill rod and being channeled to provide water admission from a source of supply to the drill rod through the casing, said casing being supported by and held against axial movement with respect to the member solely below the point of entrance of the water to the casing.

2. In core drilling machinery comprising a rotating apparatus and a hollow drill rod to be rotated thereby, means for introducing abrasive material into the hollow drill rod at a point beneath the said rotating apparatus, said means including a member rotatable with the drill rod and having a radial passage a wall of which inclines obliquely to the axis of the drill rod.

3. In core drilling machinery comprising a rotating apparatus and a hollow drill rod to be rotated thereby, means for introducing abrasive material into the hollow drill rod at a point beneath said rotating apparatus, said means including a member rotatable with the drill rod and having a radial passage, a wall of which is inclined obliquely to the axis of the drill rod, said member having an annular surface without the inlet end of and forming an extension to the passage, said surface extending substantially coincident with the plane of said passage wall.

4. In core drilling machinery, a swivel comprising a hollow coupling piece provided with an opening through the side wall thereof, a collar having its upper face annular to the wall through which said opening extends, a cylindrical shell surrounding a portion of said coupling piece and fitted to said collar, and a head at the upper end of said shell, the portion between the head and collar forming a chamber annular with respect to said wall, said shell being provided with a lateral opening for admitting water or other material to said chamber and thence through said opening into the hollow portion of the coupling piece, said shell and coupling piece being connected together against relative axial movement solely below said lateral opening and being free for relative rotative movement.

5. In core drilling machinery, a swivel comprising a hollow coupling piece having an oblique channel through the side wall thereof, a collar having its upper face annular to the wall through which said opening extends, a radius of said face being on a plane in substantial continuation of the plane of the lower wall of said channel, a cylindrical shell surrounding an intermediate portion of said coupling piece and fitted to said collar, said shell and coupling piece being free to revolve relatively, said shell being provided with a seat for the lower face of said collar, an upper head carried by said shell, a nut at the lower end of said coupling piece for forcing said seat against the lower face of the collar, said nut and collar and seat serving to retain the shell and coupling piece against relative axial movement, said shell being provided with a lateral inlet opening through the side wall thereof, said inlet opening being in constant communication with the interior of the coupling piece through the annular space between the shell and coupling piece above said collar and through said opening of the coupling piece.

6. In core drilling machinery, comprising a rotating apparatus and a hollow drill rod to be rotated thereby, means for introducing water into the drill rod at a point below the rotating apparatus, said means including a rotary coupling member connected at the bottom with the hollow drill rod and provided with an inclined passage arranged obliquely to the axis of the drill rod and communicating at its lower end with the same, said rotary coupling member being provided at the upper end of the said passage with an outer inclined annular wall, a stationary outer shell fitted on the rotary coupling member and having an opening communicating with the said inclined passage for admitting water or other material to the same.

7. In core drilling machinery, comprising a rotating apparatus and a hollow drill rod to be rotated thereby, means for introducing water into the drill rod at a point below the rotating apparatus, said means including a rotary coupling member connected at the bottom with the drill rod and provided with an inclined passage arranged obliquely to the axis of the drill rod and communicating with the interior of the same, a stationary shell fitted on the rotary coupling member and having an opening for admitting water and other material, said shell and rotary coupling member forming an annular channel, which communicates with the opening of the shell and the inclined passage of the rotary coupling member at all times.

8. In core drilling machinery, comprising a rotating apparatus and a hollow drill rod to be rotated thereby, means for introducing water into the drill rod at a point below the rotating apparatus, said means including a rotary coupling member connected at the bottom with the hollow drill rod and provided with an exterior supporting portion and having an inclined passage arranged obliquely to the axis of the drill rod and communicating with the interior of the same, a stationary hollow shell fitted on the rotary coupling member and supported by the said portion and provided with an opening for admitting water and other material, said rotary coupling member and shell forming an annular channel, which communicates

at all times with the opening of the shell and the inclined passage of the coupling member, and means located wholly beneath the said opening for retaining the outer shell on the said supporting portion and for holding the shell and the coupling member against relative axial movement.

Witness my hand this 15 day of Nov. 1909.

EMMA J. TERRY,
Administratrix of the estate of Coleman Arthur Terry, deceased.

Witnesses:
C. M. WAMBAUGH,
ELLEN TERRY.