

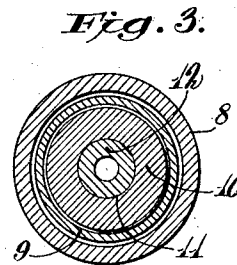
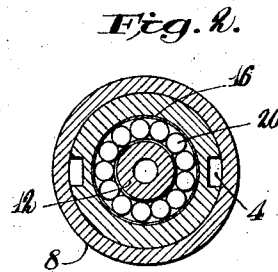
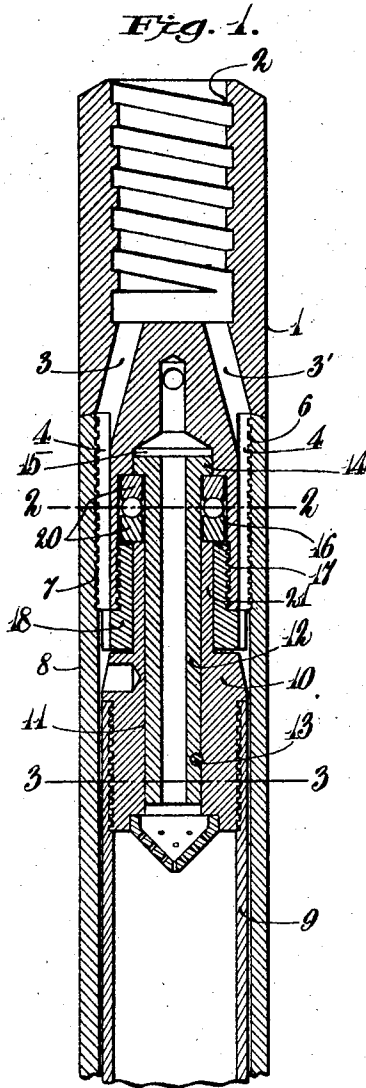
Sept. 27, 1927.

H. B. HALVORSEN

1,643,338

CORE DRILL

Filed March 26, 1921



Inventor:
Halbert B. Halvorsen.
by
[Signature]
att'y.

UNITED STATES PATENT OFFICE.

HALBERT B. HALVORSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

CORE DRILL.

Application filed March 26, 1921. Serial No. 456,012.

My invention relates to core drilling mechanisms and more particularly to boring tools of the double tube core barrel type for use with such mechanisms.

5 An object of my invention is to provide an improved boring tool. A further object of my invention is to provide an improved boring tool of the double tube core barrel type. A still further object of my invention is to provide an improved boring tool having an improved double thrust bearing for the inner core barrel. Further objects of my invention will appear hereinafter.

15 In the accompanying drawings, I have shown for purposes of illustration, one embodiment which my invention may assume in practice.

In these drawings,—

20 Fig. 1 is a central longitudinal section through the upper end of a double tube core barrel provided with my improved construction.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

25 Fig. 3 is a similar section on the line 3—3 of Fig. 1.

In boring tools of the double tube core barrel type which are employed in drilling in friable formations, it is customary to employ an outer barrel and, concentrically arranged within the latter, an inner core barrel, the outer barrel being attached to the drill rod and rotating with the same while the inner barrel remains stationary. 30 In order to permit the inner barrel to remain stationary, and so to protect the core from the friction of the rotating parts, a ball thrust bearing is arranged between the upper ends of the inner and outer barrels. In the accompanying drawings and the present specification I disclose an improved and simplified type of ball thrust bearing in which the balls are enclosed, thereby preventing, in the event of possible loosening of the thrust, the escape of the balls and their falling to the bottom of the hole and interfering with the drilling and possibly injuring the diamonds. By virtue of this construction, the ball bearing is completely 40 enclosed and protected from grit or borings, whereby any danger of clogging the balls and locking the outer and inner tubes together is avoided. A much simpler construction is also provided by my improved device.

In the illustrative embodiment, I have 55 shown a socket element 1 at the upper end of the outer core barrel and this I provide with an internal threaded socket 2 for attachment to the drill rod. As the drill rod with double tube core barrels is normally hollow for the supply of water, passages 3 and 3' extend from the lower end of the socket 2 to the outer periphery of the member 1 and then longitudinally thereof by means of extensions 4 consisting of grooves extending 60 longitudinally in the periphery of the member. The periphery of the member 1 at its lower end is somewhat reduced in diameter though still cylindrical in form and is externally threaded as shown at 6 for the purpose of making a threaded connection with the internal threads 7 upon the upper end of the outer core barrel 8. This core barrel partakes of the rotation of the drill rod and carries at its lower end the diamond bit (not shown). Concentrically disposed within the outer core barrel is the inner core barrel 9 spaced from the inner wall of the outer barrel by a slight distance to permit the flow of water between them and to reduce friction. Threadedly engaged with the upper end of the barrel 9 is a member 10 which is bored throughout its length as indicated at 11 and provided within said bore with a hollow hanger 12 secured therein in any suitable manner, herein by a transverse pin 13. The member 12 is provided with an enlarged annular collar or head 14 at its upper extremity. This collar is freely received in a socket 15 formed centrally of the lower end of the member 1. The member 1, at a point below the socket 15, is provided with a slightly larger cylindrical bore 16 and at the lower end of the bore, with a threaded portion 17, the inner ends of the threads being in the same surface as the peripheral surface of the portion 16. Prior to the assembly of the members 12 and 10, an annular collar or sleeve 18 is slipped over the member 12 and likewise a ball bearing provided with a double race as indicated at 20. The relative position of the collar 14 and the upper end of the upwardly extending annular collar 21 on the member 10 is so adjusted prior to the securing of the members 12 and 10 by the pin 13 that the ball race is held in approximately proper relative position with respect to members 10 105

and 12. When now the sleeve 18 is screwed into the lower end of the member 1 by means of the engagement of its threads with the threads 17, the ball race and inner core barrel will be locked against any relative movement as to member 1 except rotation about a longitudinal axis. In assembling the parts, the inner core barrel is first connected to the member 1 and the outer core barrel is thereafter slipped over the inner barrel and screwed on to the threads prepared for it.

From the foregoing description, it will be obvious that by means of a single ball thrust bearing, I have provided mechanism which will hold the inner core barrel in fixed relative position to the outer core barrel both while raising the core and while drilling, and which will also provide relatively frictionless rotation between the parts.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

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

1. In a core drill, the combination with an outer core barrel having a drill rod connection; of a rotatable inner core barrel positively supported in said outer core barrel and precluded against any substantial longitudinal movement relative thereto, a single ball thrust bearing, a mounting for the latter in rigid relation to the drill rod connection, and means associated with the inner core barrel for transmitting longitudinal thrust in either direction therefrom to said ball thrust bearing.

2. In a core drill, the combination with an outer core barrel, of a rotatable inner core barrel and means for positively supporting said inner core barrel within the outer one and precluding any substantial longitudinal movement relative thereto, said means including but a single ball bearing and means for supporting the weight of said inner barrel thereon and for transmitting the upward thrust of said inner barrel thereto during drilling operation.

3. In a core drill, the combination with an outer core barrel, of a rotatable inner core barrel, and means for positively supporting said inner core barrel within the outer one, and precluding any substantial longitudinal movement relative thereto, said means including a hanger member secured to said inner core barrel, a ball thrust mounting secured to said outer core barrel, and but a single ball thrust bearing between a portion of said hanger member and said mounting, said mounting being adapted to support

said ball bearing against any substantial longitudinal movement in either direction independently of said hanger.

4. In a core drill, the combination with an outer core barrel, of a rotatable inner core barrel and means for supporting said inner core barrel within the outer one, said means including a hanger member secured to said inner core barrel, a ball race mounting secured to said outer core barrel and but a single ball thrust bearing between a portion of said hanger member and said mounting, said inner core barrel also having a member secured thereto for transmitting upward thrust to said ball thrust bearing and said ball race mounting having a portion to receive the upward thrust from said ball thrust bearing.

5. In a core drill, the combination with an outer core barrel, of a rotatable inner core barrel positively supported in said outer core barrel and precluded against any substantial longitudinal movement relative thereto, a hanger secured thereto and having oppositely disposed thrust distributing surfaces, and but a single antifriction bearing disposed between said surfaces and held in fixed position relative to said outer core barrel.

6. In a core drill, the combination with an outer core barrel, of an inner core barrel rotatable with respect thereto, and means for positively supporting said inner core barrel within said outer core barrel and precluding any substantial longitudinal movement relative thereto, including but a single ball thrust bearing adapted to receive longitudinal thrust of said inner core barrel in either direction, said supporting means wholly enclosing said ball bearing.

7. In a core drill, the combination with an outer core barrel, of an inner core barrel rotatable with respect thereto, and means including but a single ball bearing fixed against any substantial longitudinal movement with respect to one of the same and means carried by the other thereof engaging the opposite sides of said ball bearing for positioning said inner barrel.

8. In a core drill, the combination with an outer core barrel having a threaded and shouldered bore, a separable member cooperating therewith to form a second shoulder, an inner core barrel rotatable relative to said outer core barrel, a member cooperating therewith to form a third shoulder, and a single thrust bearing cooperating with said second and third mentioned shoulders for receiving the longitudinal thrust of said inner core barrel in either direction.

9. In a core drill, a plurality of relatively rotatable inner and outer barrel members, a single bearing means adapted to allow said barrel members to cooperate, and means whereby said bearing means will have a normal operative relation with respect to one of

said barrel members independently of the other barrel member and held against any substantial longitudinal movement with respect to the one member.

5 10. In a core drill, a plurality of relatively rotatable inner and outer barrel members, a single bearing means adapted to allow cooperation between said barrel members, and means whereby said bearing means
10 will be maintained in a normal operative relation to one of said barrel members and adapted to be so maintained during relative longitudinal movement between said members.

15 11. In a core drill, a plurality of relatively rotatable inner and outer barrel members, a bearing, and means whereby said single bearing is maintained in a normal operative relation to one of said members and
20 held against any substantial longitudinal movement relative thereto but adapted to be removed therefrom, said bearing and member forming a unit adapted to cooperate with said other barrel member without disturbing
25 said bearing.

30 12. In a core drill, a plurality of relatively rotatable inner and outer barrel members, a single bearing means, means whereby one of said members is adapted to removably support said bearing means but adapted to maintain the same in a normal operative relation to said member, and connecting means carried by said member, said member, bearing and connecting means forming a unit

and said unit being adapted for cooperation 35 with said other member without disturbing said bearing means.

13. In a double tube core-barrel drill, the combination of a swivel head, an outer tube fixedly attached to said head, an inner tube 40 loosely secured to said head, whereby the outer tube and head may rotate with respect to the inner tube, and a single bearing interposed between said head and inner tube for taking thrusts in either direction longitudinally of the center of rotation of said head and outer tube. 45

14. In a double tube core-barrel drill, the combination of a swivel head, an outer tube connected to said head, an inner tube head 50 to which said inner tube is rigidly connected, an anti-friction bearing comprising a pair of raceways interposed between said heads, said inner tube being suspended from one of said raceways, and a shoulder on said 55 swivel head on which the other raceway of said bearing is supported.

15. In a double tube core-barrel drill, the combination of a swivel head having a recess therein, a bushing in said recess, an 60 anti-friction bearing comprising a pair of raceways in said recess with one of said raceways supported on said bushing, an outer tube carried by said swivel head, and an inner tube suspended from the other raceway 65 of said bearing.

In testimony whereof I affix my signature.

HALBERT B. HALVORSEN.

CERTIFICATE OF CORRECTION.

Patent No. 1,643,338.

Granted September 27, 1927, to

HALBERT B. HALVORSEN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 57, claim 3, after the word "one" strike out the comma; same page, line 100, claim 6, after the word "thereto" strike out the comma; page 3, line 17, claim 11, strike out the word "single" and insert the same before the word "bearing", in the same line; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of November, A. D. 1927.

Seal.

M. J. Moore,
Acting Commissioner of Patents.