March 27, 1928. 1,663,757

R. B. GRAINGER

STANDARD TOOL CORE DRILL

Filed Oct. 5, 1927

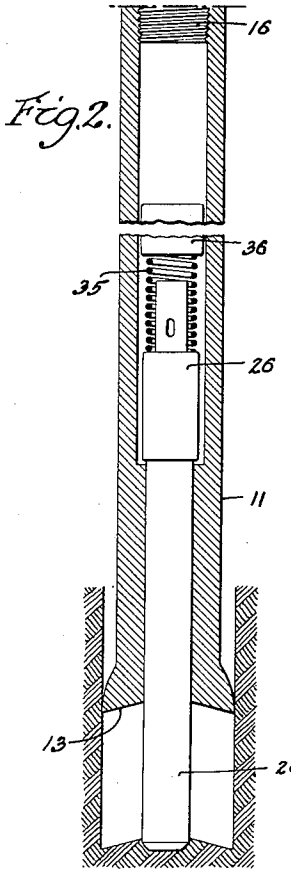

Fig. 2.

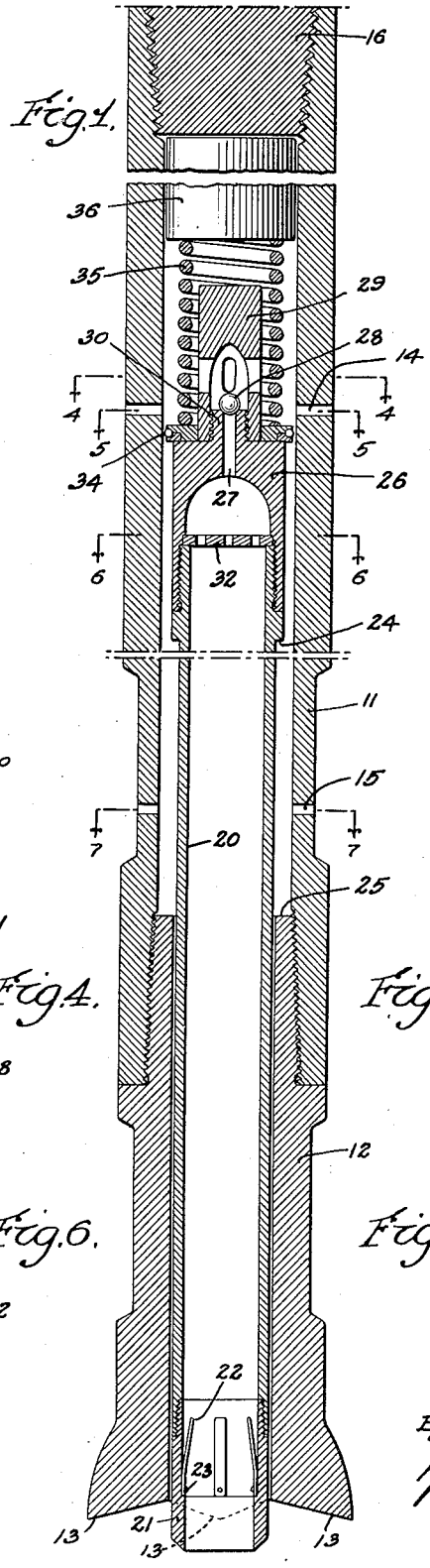

Fig. 1.

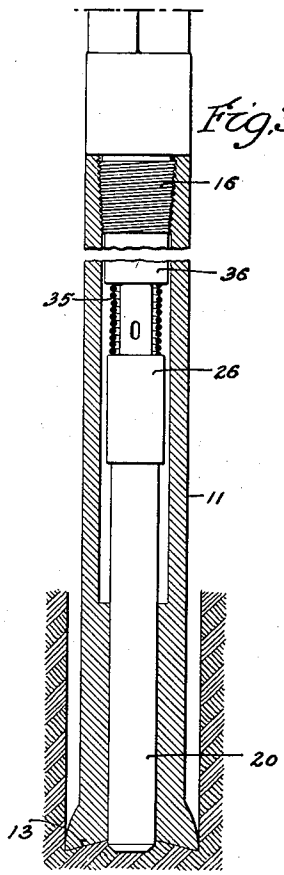

Fig. 3.

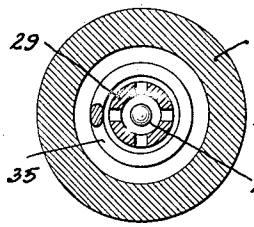

Fig. 4.

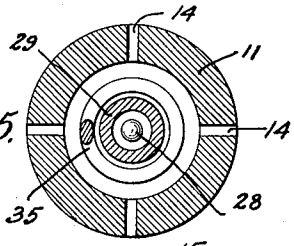

Fig. 5.

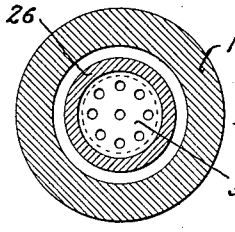

Fig. 6.

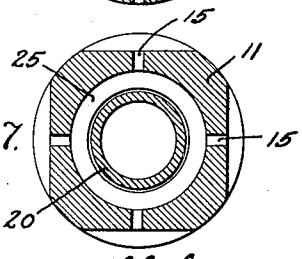

Fig. 7.

INVENTOR
REID B. GRAINGER
By Munn & Cunningham
ATTORNEY

Patented Mar. 27, 1928. 1,663,757

UNITED STATES PATENT OFFICE.

REID B. GRAINGER, OF REDONDO BEACH, CALIFORNIA, ASSIGNOR TO ELLIOTT CORE DRILLING COMPANY, A CORPORATION OF CALIFORNIA.

STANDARD TOOL CORE DRILL.

Application filed October 5, 1927. Serial No. 224,234.

My invention relates to core drills, such as are used in the art of drilling oils, being more particularly a core drill of the type known as the double barrel core drill, in which the outer barrel reciprocates over the inner barrel, means being provided whereby the outer barrel is permitted to reciprocate freely over the outer barrel, throughout a limited stroke.

In core drills of the reciprocatory type, difficulty has been encountered in holding the inner barrel or core tube on the formation, at the time the outer barrel starts upwardly on its up stroke. If the inner barrel or core tube is permitted to jump off the formation, the core is damaged and either lost in whole or part, thereby bringing about a failure to recover a true specimen of the formation and defeating the very purpose of the core drill.

It is one of the principal objects of my invention to so construct a core drill of the class described, in which provision is made to overcome any tendency of the inner barrel leaving the formation or bottom of the hole until the coring operation is completed.

In carrying out the principal object of my invention, as above indicated, I provide a weight resiliently supported on the inner barrel, such weight being free of the inside walls of the outer barrel and arranged to receive impact from the outer barrel, to drive the inner barrel or core tube downward into the formation and heavy enough to insure contact of the inner barrel with the bottom of the hole, during the up stroke of the outer barrel.

Other objects and advantages will appear hereinafter, from the following description.

Referring to the drawings which are for illustrative purposes only,

Fig. 1 is a vertical sectional view of a core drill embodying a form of my invention showing the parts in their relation during the down stroke of the outer barrel.

Fig. 2 is a diagrammatic vertical sectional view of a core drill shown in Fig. 1, in which the outer barrel is at the upper end of its stroke.

Fig. 3 is a diagrammatic vertical sectional view of the core drill shown in Fig. 1, the outer barrel being shown at the end of its downward stroke.

Fig. 4 is a sectional plan view on the lines 4—4 of Fig. 1.

Fig. 5 is a sectional plan view on the lines 5—5 of Fig. 1.

Fig. 6 is a sectional plan view on the lines 6—6 of Fig. 1.

Fig. 7 is a sectional plan view on the lines 7—7 of Fig. 1.

The drill, as illustrated, consists of an outer barrel 11, interiorly threaded at its lower end to receive the upper end of a cutter body 12, such cutter body having a plurality of cutters 13, the outer diameter of which is slightly larger than the diameter of the outer barrel. The outer barrel 11 is provided with a series of perforations 14 and 15, for the purpose of permitting the egress of any accumulation of material between the two barrels. The upper end of the outer barrel 11 is interiorly threaded to receive a coupling member 16, this coupling member in the present instance constitutes an impact head or member for the outer barrel.

20 indicates the inner barrel or core tube, terminating at its lower end in an annular cutter 21 provided with core catchers 22 which, in the present instance, consists of flat spring members secured at their lower ends by means of suitable rivets 23, the upper ends of the spring members extending inwardly as shown in Fig. 1.

The inner barrel 20 is of increased diameter at its upper end, forming a circular shoulder 24, which shoulder is designed to contact with the upper end or face 25 of the cutting member or body 12, during the removal of the core drill from the well, thereby preventing dislodgment of the inner barrel from the outer barrel. 26 indicates a head threaded onto the upper end of the inner barrel 20. 27 designates a passage in the head 26, the upper end of which is formed with a seat for a ball valve 28 in a cage 29 threaded to an extension 30, formed on the head 26. The cage 29 acts as an anvil to receive impact from the weight hereinafter referred to. 32 indicates a perforated plate resting upon the upper end of the inner barrel 20, for the purpose of preventing large particles or cuttings from passing upwardly through the passage 27 to the valve seat.

34 indicates an anti-friction bearing member mounted on the head 26, arranged to engage the inner face of the outer barrel 11. Seated on such anti-friction member 34 and

extending upwardly therefrom is a coil spring 35 which forms a resilient support for a heavy wieght 36.

The operation of the device is as follows: Assuming that the core drill is in the position shown in Fig. 2, it is to be noted that the inner barrel is resting on the bottom of the hole and the outer barrel is in elevated position. As the outer barrel descends, due to the weight of same and the supporting tools above, we may assume that it has descended to the position shown in Fig. 1 where the impact head 16 of the outer barrel is just about to strike the weight 36. The continued downward movement of the outer barrel causes the impact head 16 to strike the weight 36 with a blow sufficient to compress the spring 35 and to permit the weight to strike the upper face of the cage 29, imparting a blow thereto which causes the inner barrel to advance downwardly.

As the outer barrel starts on its up stroke, it will have a tendency to carry the inner barrel upwardly off the bottom of the hole, due to frictional contact of foreign matter between the barrels. This tendency of the inner barrel to leave the bottom of the hole will be overcome by the weight 36, which insures the inner barrel remaining on the bottom of the hole.

What I claim is:

1. In a reciprocating core drill, the combination of: an inner barrel; an outer barrel reciprocably mounted on the inner barrel; means for limiting the movement of the outer barrel on the inner barrel; resilient means on the inner barrel; a weight member supported on said resilient means and a head on said outer barrel arranged to engage said weight by impact.

2. In a reciprocating core drill, the combination of: an inner barrel; an annular cutter on the lower end of said inner barrel; an outer barrel reciprocably mounted on said inner barrel; a cutter body on the lower end of said outer barrel; means for limiting the reciprocative movement of the outer barrel on the inner barrel; resilient means on said inner barrel; a weight supported on said resilient means, and weight engaging means on said outer barrel.

3. In a reciprocating core drill, the combination of: an inner barrel; an annular cutter on the lower end of said inner barrel; an outer barrel reciprocably mounted on said inner barrel; a cutter body on the lower end of said outer barrel; means for limiting the reciprocative movement of the outer barrel on the inner barrel; a coiled compression spring on the upper end of said inner barrel; a weight supported on said spring; and weight engaging means on said outer barrel.

4. In a reciprocating core drill, the combination of: an inner barrel; an annular cutter on the lower end of said inner barrel; an outer barrel reciprocably mounted on said inner barrel; a cutter body on the lower end of said outer barrel; means for limiting the reciprocative movement of the outer barrel on the inner barrel; a coiled compression spring on the upper end of said inner barrel; a weight supported on said spring; weight engaging means on said outer barrel, and means on said inner barrel extending upwardly in said spring arranged to be engaged by said weight.

5. In a reciprocating core drill, the combination of an inner barrel; an annular cutter on the lower end of said inner barrel; an outer barrel reciprocably mounted on said inner barrel; a cutter body on the lower end of said outer barrel; a shoulder on said inner barrel arranged to engage the top of said cutter body; resilient means on said inner barrel; a weight supported on said resilient means, and weight engaging means on said outer barrel.

6. In a reciprocating core drill, the combination of an inner barrel; an annular cutter on the lower end of said inner barrel; an outer barrel reciprocably mounted on said inner barrel; a cutter body on the lower end of said outer barrel; a head on said inner barrel; valve means on said head; a valve cage on said inner barrel; a coiled spring on said inner barrel about said valve cage; a weight on said spring and a head on said outer barrel adapted to engage said weight.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 28th day of Sept., 1927.

REID B. GRAINGER.