No. 710,012. Patented Sept. 30, 1902.

A. L. RONALDSON.

BORING APPARATUS.

(Application filed July 6, 1900.)

(No Model.)

Fig. 1.

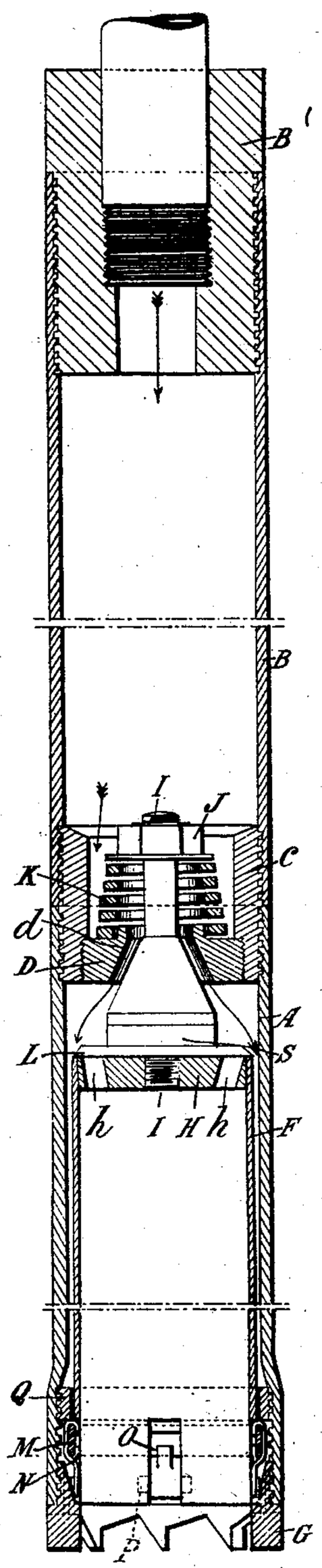


Fig. 2.

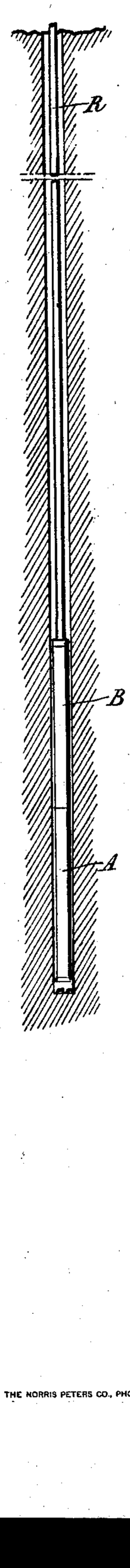


Fig. 3.

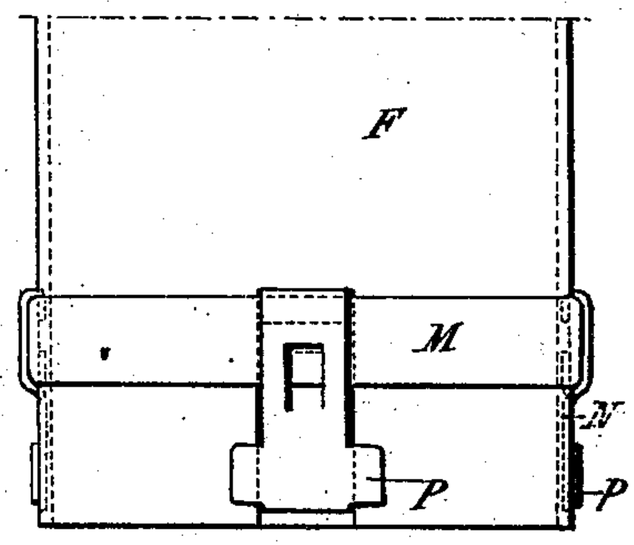
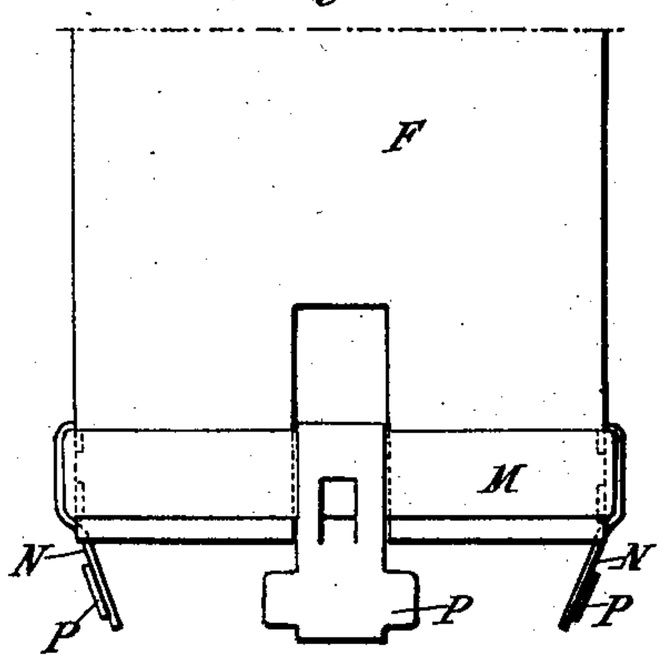


Fig. 4.



WITNESSES:
Ella L. Giles
Otto Munk

INVENTOR
Adam Lindesay Ronaldson
BY
Richardson
ATTORNEYS

UNITED STATES PATENT OFFICE.

ADAM L. RONALDSON, OF LONDON, ENGLAND.

BORING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 710,012, dated September 30, 1902.

Application filed July 6, 1900. Serial No. 22,741. (No model.)

To all whom it may concern:

Be it known that I, ADAM LINDESAY RONALDSON, a citizen of Great Britain, and a resident of 1 Leadenhall street, London, E. C., England, have invented certain new and useful Improvements in or Relating to Boring Apparatus, (for which I have applied for a patent in Great Britain, No. 9,553, bearing date May 24, 1900,) of which the following is a specification.

This invention relates to boring apparatus used for the production of cores of the strata which are bored or drilled through, and specifically pertains to an improved core-barrel for use in such apparatus.

The object of the invention is to secure reliable and accurate cores, especially in the case of coal or other friable deposits, the cores of which are particularly liable to be worn away and ground in the operation of boring. In such apparatus as usually employed water is caused to pass downwardly through the core-barrel and to pass upwardly through the annular space between the bore and exterior of the core-barrel, carrying with it the particles or chips that are ground or cut away on the operation of the annular cutting tool or crown.

The invention consists in providing means for arresting this flow of water when a core of determined length has been produced or when the core has become jammed within the barrel, so that the borer at the surface may instantly have a positive indication thereby that resistance is offered to the core-tube and that the amount of core produced must be withdrawn to avoid grinding and wearing away.

The invention further consists in the provision within the ordinary core-barrel of an inner tube, which envelops the core as the boring proceeds and affords a protection to it against the rapid rush of water that usually does much to disintegrate friable and fragile cores. Such inner tube, according to the invention, is also provided so as to be capable of having an upward movement in relation to the surrounding core-barrel, so that on such relative upward movement the water-supply may be cut off, and in addition springs or grippers may be released, so as to firmly seize the core at its lower part that it may be detached on the upward movement or withdrawal of the core-barrel.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of an improved core-barrel having the invention embodied in its construction. Fig. 2 is a vertical elevation, on a smaller scale, of the improved core-barrel connected to the ordinary core-barrel and boring-rods in position within a bore. Fig. 3 is a detail elevation, on a larger scale than Fig. 1, of the core-gripping device; and Fig. 4 is a corresponding detail elevation with the gripping device in its lower position for engaging the core.

In carrying the various features of the invention into effect in accordance with one construction, as illustrated in the accompanying drawings, the improved core-barrel A may be secured to the ordinary core-barrel B by means of an internally-screwed sleeve C, which at the same time may carry a plate or diaphragm D, that may serve as a seat for a conical or other valve E for controlling the water-supply and serve to partially or wholly carry the weight of an inner core-tube F. This core-tube F is provided with its interior flush with the inner face of the boring-crown G, which is fitted or screwed to the lower enlarged part of the supplementary or improved core-barrel A, so that in the downward progress of the barrel A the core may pass into the inner tube F without any obstruction.

The core-barrel B is provided with a screwed boss or sleeve B′, into which the boring rod or tube R is screwed.

The boring-crown G, which is preferably of steel, is provided with vertical holes *g*, through which the water may downwardly pass.

A plate H is secured at the top of the inner core-tube F, and a pin or bolt I is screwed therein and passes through the valve-aperture *d* in the diaphragm or plate D and has a nut J or collar secured upon its upper extremity, between which and the plate or diaphragm D a spiral spring K is provided to partially or wholly carry the weight of the inner core-tube F, and thus render it sensitive to the slightest resistance between itself and the core within it.

The plate or cover H, secured to the top of the inner core-tube F, is preferably provided with passages *h*, through which any water inclosed within the tube F may find egress upwardly as the lowering of the rod and core-barrel in the bore proceeds, the interior of the inner core-tube being protected from the inrush of water from outside by means of a flexible washer L, arranged upon the exterior of the plate. Upon this washer and around the pin or bolt I, carrying the inner core-tube F, the conical valve E is so arranged that upon the upward movement of the inner core-tube F it will close the valve-aperture *d* within the plate or diaphragm D aforesaid.

Upon the outer periphery of the core-tube F at its lower extremity a spring-ring M is sprung into position and carries springs or spring-gripping levers N, which downwardly project and have their extremities protruding through slots O, provided in the periphery of the tube, and have a strong tendency to press against the outer face of the tube F, but are prevented from passing through the slots by such means as side lugs P, so that upon the upward movement of the inner core-tube the ring M, before referred to, will engage with a corresponding ring Q, screwed within the interior of the core-barrel A, above the ring M, with the result that the ring M will be forced downwardly, carrying with it its engaging springs N, to such an extent that the latter are released, so as to pass through the peripheral slots O, provided in the tube F, thereby engaging with pressure upon the core within the tube, so that the core may be broken off and retained when the barrel and core-tube are withdrawn.

It will thus be understood that the operation is as follows: The boring apparatus and tubular rods R are rotated. Water is pumped in the usual manner down the tubular rods and passes through the valve-aperture *d*, thence between the inner core-tube F and outer barrel A downwardly, and then upwardly around the exterior of the barrel A, carrying upwardly with it the particles ground or cut away by the tool or bit G. The core is produced and becomes of a length corresponding to the inner core-tube F or becomes jammed within it by its disintegration or angular cleavage. The outer core-barrel A continues to rotate, passing downwardly; but the inner tube F, being thus held stationary, has a relative upward movement in relation to the outer core-barrel A, by which the valve-aperture *d*, which admits water around the annular space between the inner tube F and outer barrel A, is closed, and an indication is thus afforded to the borer at the surface that the core should be taken up. Simultaneous with this closing movement of the valve E the core-gripping springs or levers N are released, as before described, so that the core may be broken and withdrawn. By such means fragile and friable cores are preserved and grinding and disintegration are avoided, so that in the case of coal and similar friable deposits an accurate record may be produced of the strata bored through.

The improved core-barrel A is preferably employed by being screwed to the extremity of the usual core-barrel B and used only in penetrating friable strata. It may, however, be secured direct to the boring-rods.

Washers S may be inserted beneath the valve E, so that its closure may be adjusted in relation to the releasing of the core-gripping levers or springs N. Provision is also made for a thin cutter to be attached to the outer cutter when required.

It will be understood that the invention is not confined to the particular means for gripping the core that are before described, as any suitable means may be employed that may be actuated upon the relative movement of the inner tube and outer barrel.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In core-boring apparatus, means for arresting the flow of water through the core-barrel, consisting of a valve arranged to be moved longitudinally of the core-barrel by the pressure from the core to close, said valve having movement independent of the core-barrel for the purpose hereinbefore described.

2. In combination, the core-barrel, an inner core-tube and a valve, said valve and inner core-tube being connected and being movable upwardly under the action of the core independently of the core-barrel, substantially as described.

3. In core-boring apparatus, means for arresting the flow of water through the core-barrel, consisting of a valve, an inner core-tube connected to said valve, said core-tube being movable and closing the valve automatically when a core has been formed, an outer core-barrel, a valve-seat secured within said core-barrel, and a spring resting upon the valve-seat for supporting the inner core-tube, substantially as described.

4. In core-boring apparatus, means for arresting the flow of water through the core-barrel, consisting of a valve closed by the core, said valve having a movement independent of the core-barrel, and means for gripping the core upon the flow of water being arrested, substantially as described.

5. In core-boring apparatus in combination, means for arresting the flow of water through the core-barrel by the action of the core, and means for gripping the core on such flow of water being arrested consisting of a movable inner core-tube, a ring mounted at the bottom of said inner core-tube and movable between the same and the core-barrel, said ring carrying spring core-grippers, said grippers being held back from contact with the core by the outer wall of the inner core-tube, substantially as described.

6. In core-boring apparatus in combination, means for arresting the flow of water through

the core-barrel, and means for gripping the core on the flow of water being arrested consisting of a movable inner core-tube, a ring mounted at the bottom of said inner core-tube, carrying spring-grippers, said spring-grippers lying within vertical slots in the inner core-tube and carrying projections which engage upon the periphery of the inner core-tube to prevent the grippers engaging the core till the ring is caused to move downwardly.

7. In core-boring apparatus, in combination, automatically-operating means for arresting the flow of water through the core-barrel, said means comprising a valve having movement under the action of the core independent of movement of the core-barrel, means for gripping the core on such flow of water being arrested, said gripping means being normally retracted from the core-space and entering the core as the valve is operated, and means for adjusting the closure to the valve in relation to the gripping means when the core is formed.

In witness whereof I have hereunto set my hand in presence of two witnesses.

A. L. RONALDSON.

Witnesses:
WILLIAM EDWARD EVANS,
ANTON PAULI.