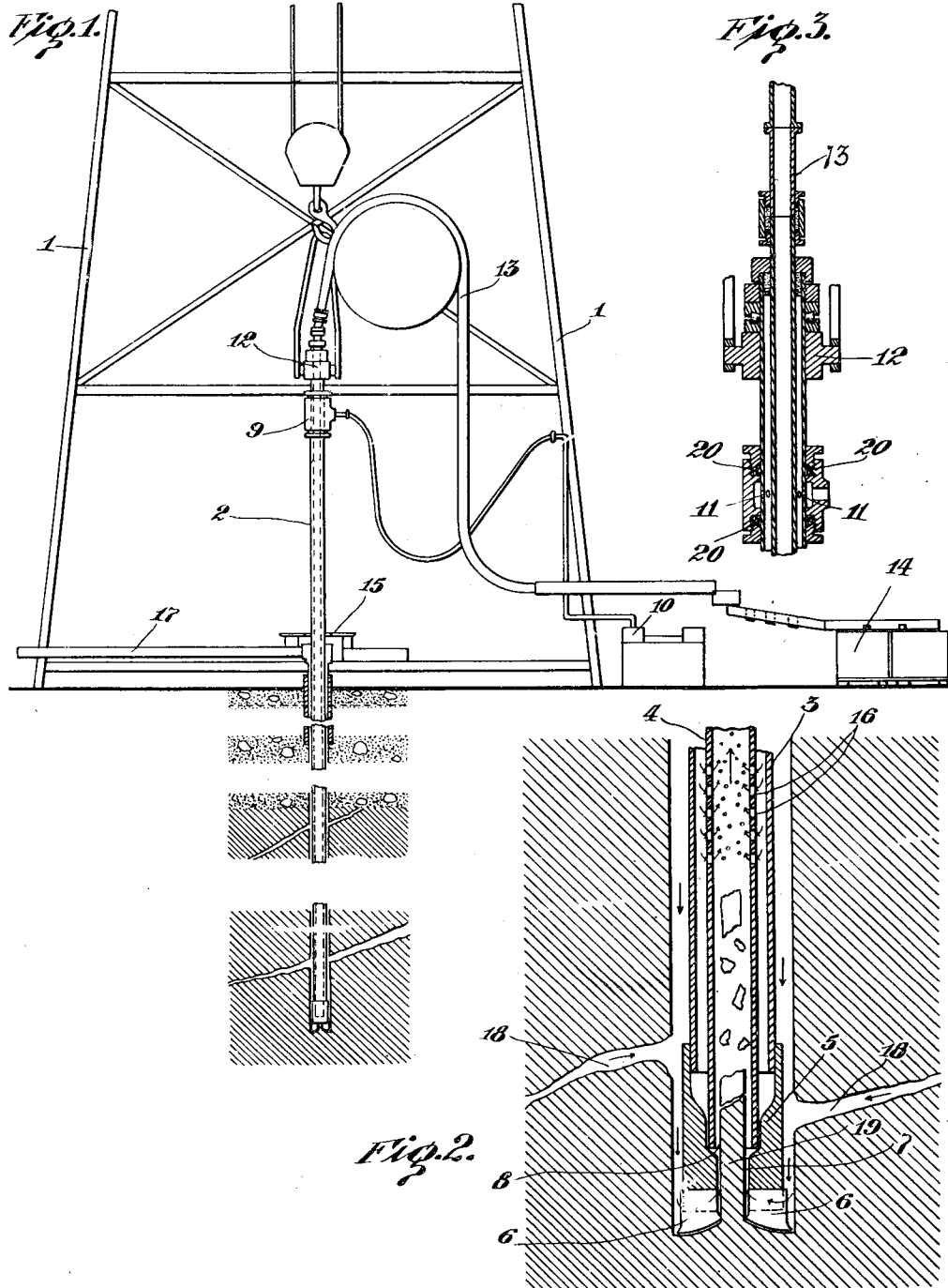


B. ANDREWS.
MINERAL PROSPECTING APPARATUS.
APPLICATION FILED JAN. 26, 1912.

1,071,199.

Patented Aug. 26, 1913.



Witnesses:
Cashley
m. s. m. l. n. t. p.

Inventor
Benjamin Andrews
By *Attorneys*
Sheffield, Bentley & Bile

UNITED STATES PATENT OFFICE.

BENJAMIN ANDREWS, OF HOUSTON, TEXAS.

MINERAL-PROSPECTING APPARATUS.

1,071,199.

Specification of Letters Patent.

Patented Aug. 26, 1913.

Application filed January 26, 1912. Serial No. 873,810.

To all whom it may concern:

Be it known that I, BENJAMIN ANDREWS, a citizen of the United States, residing in the city of Houston, county of Harris, and State of Texas, have invented or discovered certain new and useful Improvements in Mineral-Prospecting Apparatus, of which the following is a clear and complete disclosure.

My invention relates to apparatus for prospecting for minerals, more particularly to apparatus for drilling and obtaining samples or specimens of minerals.

Much difficulty has heretofore been experienced in obtaining uniform and reliable samples of ores, which are either so loosely held together or are so friable as to break up into small, finely divided particles when acted on by a diamond drill or other drills now used for drilling and sampling. This difficulty is aggravated when the formation from which the sample is to be taken is one full of cavities or fissures permeated or filled by streams or bodies of water. When these conditions exist, the fine particles are forced into the cavities or fissures and are washed away by the water; or, as is sometimes the case, the finely divided material held in suspension by the water is brought into the well and mixes with the material loosened by the drill, so as to damage the sample. On account of these difficulties the drilling and sampling arrangements heretofore used have not given satisfactory results when used in such formations.

The object of my invention is to provide apparatus for obtaining accurate samples of ores from deposits of the kind above referred to. I accomplish this object by certain novel combinations and arrangements, one embodiment of which is shown in the drawing accompanying and forming a part of this specification.

In this drawing, Figure 1 is a side elevation, partly in section, of apparatus embodying my improvements. Fig. 2 is a detail sectional view of the lower end of the double drill stem with the hollow core-cutting bit affixed thereto shown in Fig. 1. Fig. 3 is a detail sectional view of the upper end of the double drill stem shown in Fig. 1, showing the swivel for supporting the drill stem and the means for introducing compressed air.

Referring in detail to the apparatus shown, the numeral 1 designates a derrick of

any ordinary construction, from which the drill stem 2 is lowered, supported and manipulated. The drill stem 2 is a double drill stem formed by an outer pipe 3 and an inner pipe 4. At its lower end the outer pipe 3 is fixed to a hollow core-cutting bit 5 having cutting members 6, and an inner core opening 7. The inner drill stem extends down to and rests on the bit 5, and has its lower open end 8 so disposed as to receive the core formed by the hollow bit and the particles which become detached from the core or are released by the bit. A T 9 surrounds the outer pipe 3 near its upper end, and compressed air from a pump 10 is introduced into the outer pipe 3 through the T and the small openings 11 formed in the wall of the outer pipe. The T is provided with packing 20 at its ends in order that the drill stem may rotate independently of it. At its upper end the outer pipe is closed by the swivel 12. The inner pipe extends through the swivel 12 and connects with the conduit 13, which discharges into suitable apparatus 14 for collecting the samples obtained from the well.

The drill stem comprising both outer and inner pipes, is rotated by a rotary 15 of any usual construction, and compressed air from the pump 10 is forced through the T 9 into the outer pipe, and travels down the outer pipe to the small openings 16 in the wall of the inner pipe above the bit. As the drill is rotated, water is supplied down the well on the outside of the drill stem from the pipe 17; or, if there be a sufficient supply of water from the veins in the ground, such as are shown at 18, the supply of water may be omitted. As the drilling progresses, the core 19 formed by the hollow bit, from time to time breaks off and, with the cuttings removed by the bit and any finely divided particles which become detached from the core, is elevated by the upward flow of water in the inner pipe induced by the compressed air entering through the openings 16, and delivered into the collecting apparatus 14.

It will be observed that the inner pipe 4 is unobstructed throughout its length. This is an advantage, because it is desirable to elevate the material in as large pieces as possible, and any obstruction in the inner pipe would break up and disintegrate the large core pieces and thus make it more difficult to determine from the samples the

character of the formation. Where the water from the cavities and veins in the deposit is depended on, and where such water contains impurities which contaminate the samples, any error due to such contamination may be corrected by stopping the drill and elevating samples of water from the veins and cavities and determining the amount of impurities therein, so that the effect of the water on the samples may be determined.

My improved apparatus may be used for prospecting for minerals of various kinds. I have found it particularly useful in prospecting for deposits of sulfur which occurred in a stratum from 700 to 800 feet below the surface of the ground, full of cavities and crevices and permeated by impure water.

Having now described my invention, what I claim is:

1. In an apparatus of the kind described, the combination with a bit, of a double drill stem connected therewith formed of two concentric pipes, and means for forcing air down through the outer and into the inner pipe, the inner pipe having its open lower end disposed to receive the material removed by the bit, substantially as described.

2. In an apparatus of the kind described, the combination with a hollow core-cutting bit, of a double drill stem connected therewith formed of two concentric pipes, the inner pipe having its open lower end disposed to receive the core removed by the bit and having air passages formed in its wall above the bit, and means for forcing air down the outer pipe and through said passages, for the purpose described.

3. Apparatus of the kind described, comprising a bit with a hollow drill stem connected therewith, and an inner pipe having an unobstructed interior, and means for delivering air into the said inner pipe intermediate its ends, for the purpose described.

4. Apparatus of the kind described, comprising a hollow core-cutting bit with a hollow drill stem connected therewith, and an inner pipe having an unobstructed in-

terior, and means for delivering air into said inner pipe near its lower end above said bit, substantially as described.

5. In apparatus of the kind described, a double drill stem comprising concentric outer and inner pipes, with an air space between their walls, a hollow core cutting bit fixed to said stem, a T mounted on said outer pipe near its upper end, so as to permit the rotation of the pipe with respect to the T, means for rotating said stem, and means for forcing air into said T and through said air space and into said inner pipe substantially as described.

6. In apparatus of the kind described, a double drill stem, comprising concentric outer and inner pipes with an air space between their walls, a hollow core cutting bit fixed to said stem, a discharge conduit and a joint connecting said conduit with said inner pipe and arranged to permit relative rotation of the two, a T mounted on said outer pipe near its upper end, so as to permit the rotation of the pipe with respect to the T, means for rotating said stem, and means for forcing air into said T and through said air space and into said inner pipe substantially as described.

7. Apparatus of the kind described comprising a well casing, means for forcing water therein, a double drill stem located in said casing, and comprising concentric outer and inner pipes with an air space between their walls, a hollow core cutting bit fixed to said stem, a discharge conduit and a joint connecting said conduit with said inner pipe and arranged to permit relative rotation of the two, a T mounted on said outer pipe near its upper end, so as to permit the rotation of the pipe with respect to the T, means for rotating said stem, and means for forcing air into said T and through said air space and into said inner pipe substantially as described.

BENJAMIN ANDREWS.

Witnesses:

L. A. CORLTON,
GEO. C. SCOTT.