

A. G. COLLINS.
WELL DRILLING APPARATUS.
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996,002.

Patented June 20, 1911.

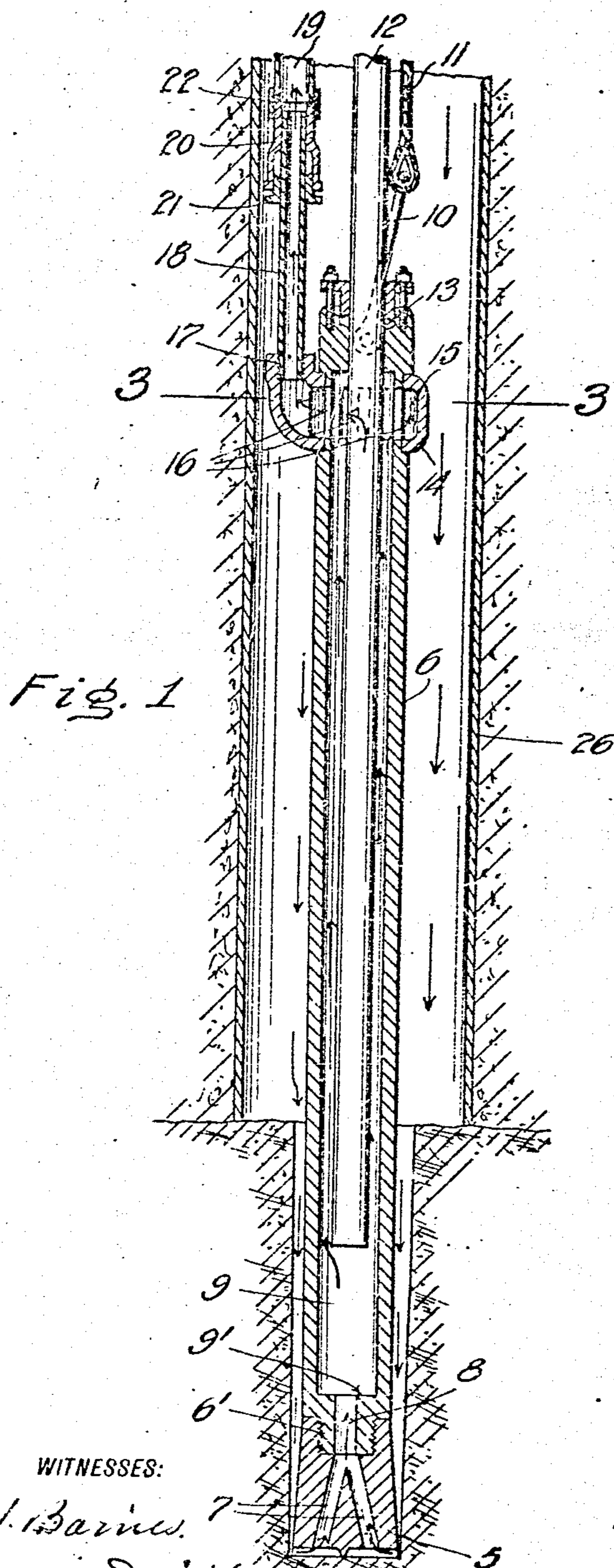


Fig. 1

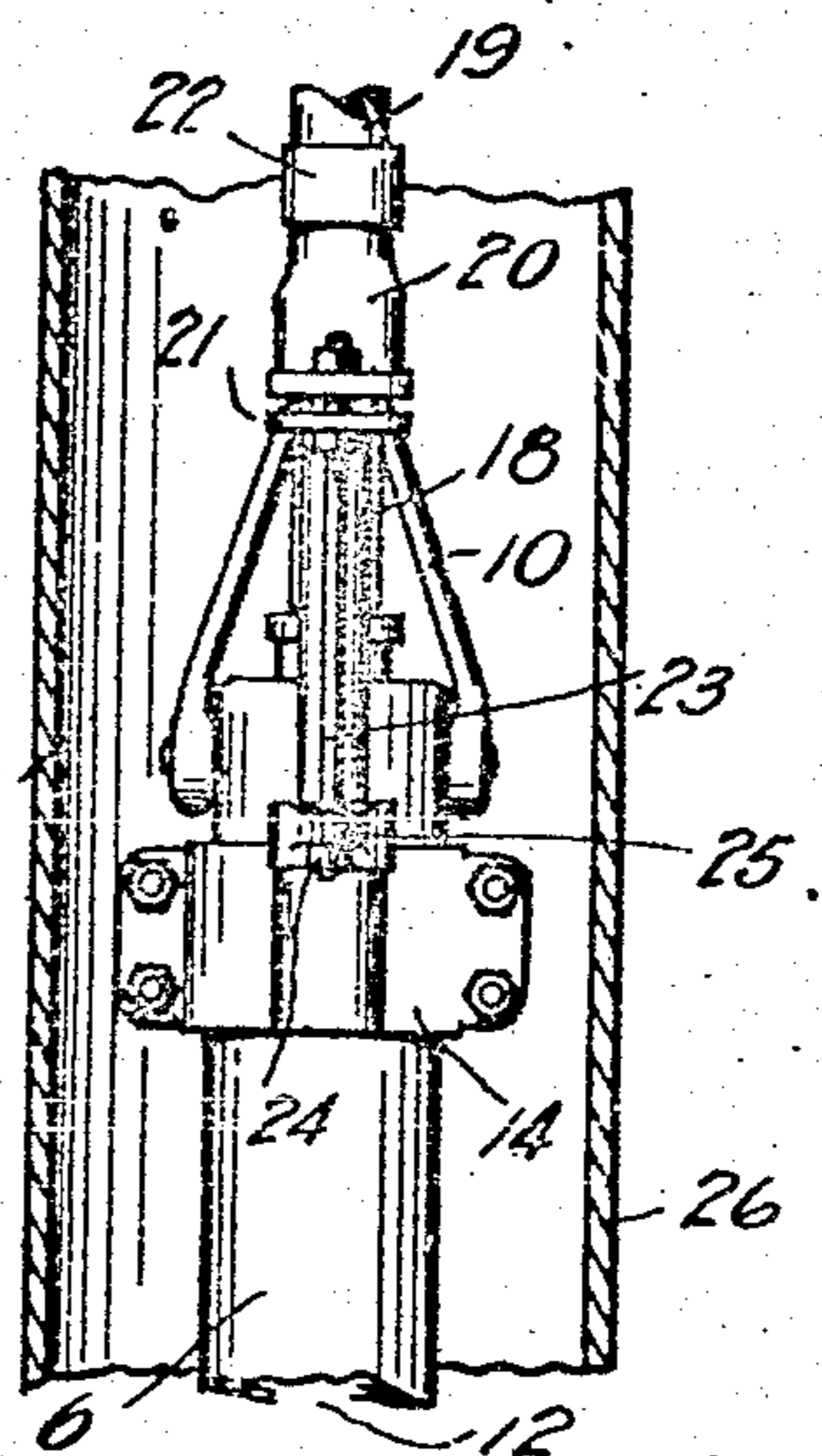


Fig. 2

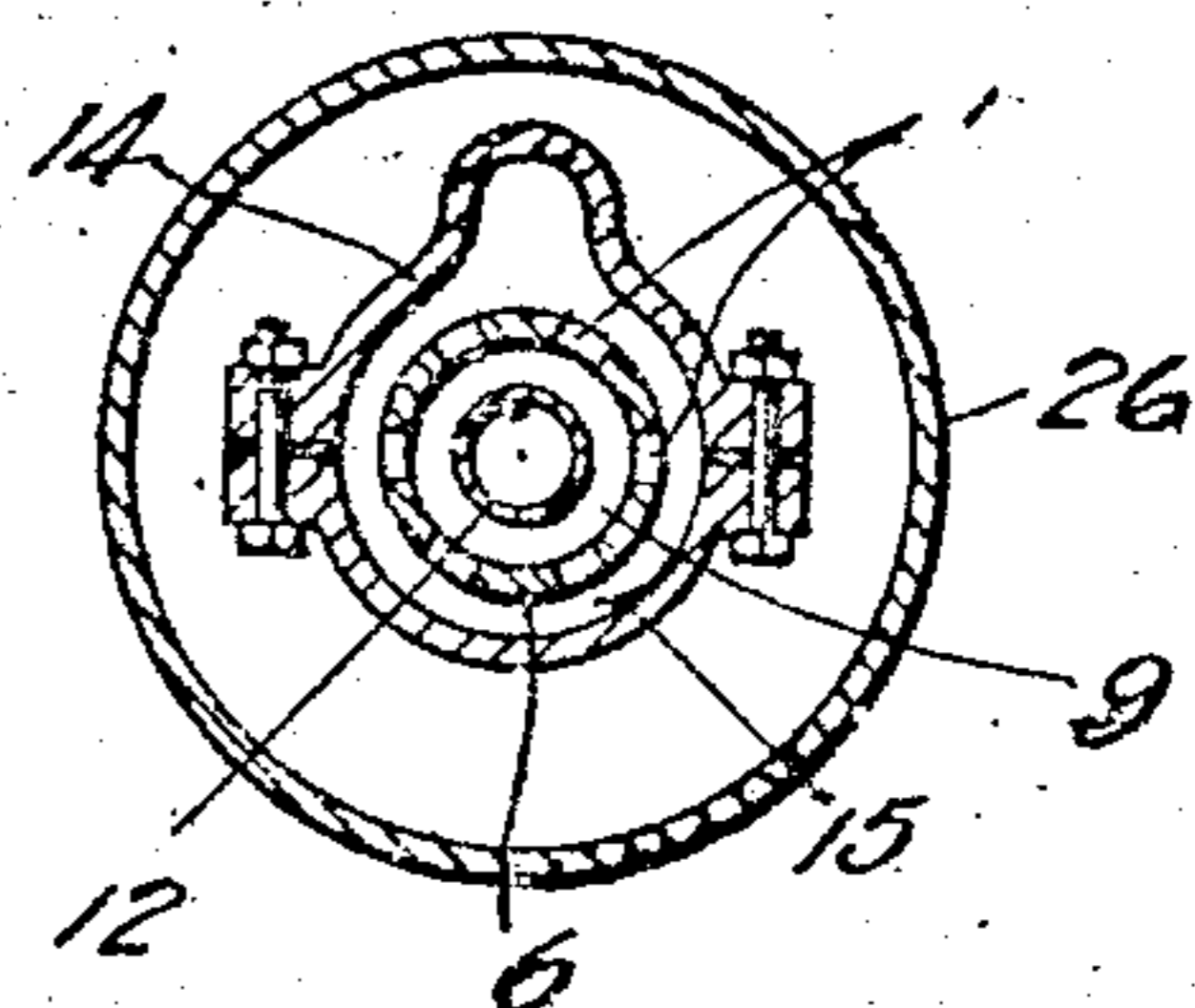


Fig. 3

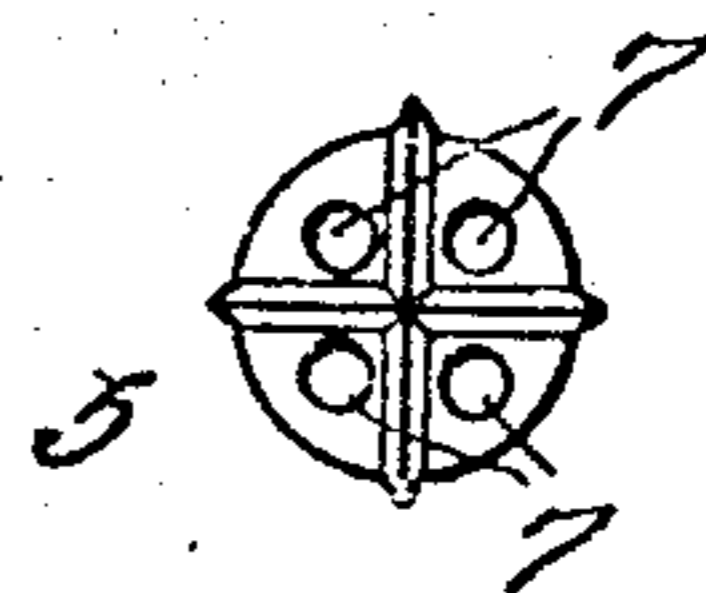


Fig. 4

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WELL-DRILLING APPARATUS.

996,002.

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To all whom it may concern:

Be it known that I, ASA G. COLLINS, a citizen of the United States, residing at Everett, in the county of Snohomish and State of Washington, have invented certain new and useful Improvements in Well-Drilling Apparatus, of which the following is a specification.

This invention relates to well boring devices; and its object is the provision of means whereby the operations of such apparatus are facilitated.

The invention, generally stated, consists in the employment with a drill which is made hollow and associated with tubular connections which serve to convey water to the drill-bit to assist in the disintegration of the material and the subsequent removal of the same from the drill-hole.

The invention consists in the structural details and the combinations thereof, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical elevation of apparatus embodying my invention. Fig. 2 is a fragmentary elevational view of the same, with the shaft casing shown in section. Fig. 3 is a section taken through 3—3 of Fig. 1. Fig. 4 is an underside plan view of a drill-bit such as illustrated in Fig. 1.

Referring to the drawings, the numeral 5 designates a drill-bit which is detachably connected with a tubular stem 6, as by the provision of a screw threaded plug 6' inter-fitting with a threaded recess of the other. Said bit is provided with one or more passages 7 extending from the under side thereof and communicating through a duct 8 in said plug with the chamber 9 within the drill stem 6. Said chamber terminates with a shoulder 9' at the bottom.

10 indicates a bail having its branches pivotally connected to the drill stem and serves to make connection with a hoisting line 11 which is operated from suitable hoisting mechanism. Extending axially of the stem and into its chamber 9 is a rod 12 which may be of tubular form.

Provided at the top end of the drill-stem and about the rod 12 is a stuffing-box 13 whereby the joint about the rod is packed and relative motions are afforded to the drill and rod. In proximity to the upper end of the stem, it is formed with an annular recess to accommodate a sleeve 14 and to prevent the longitudinal displacement of the same

with respect to the stem. Within the sleeve is a cavity 15 which extends about the stem and is communicatively connected with the stem-chamber 9 through apertures 16 provided in the intervening portions of the stem-wall. Upon the sleeve is a socket 17 which is interiorly screw-threaded for connection with a vertical tube 18 which in turn is slidably connected with a vertical pipe 19 which in turn, is connected with a pump not shown in the drawings. Such connection may consist of a hub 20 formed with a stuffing-box including a gland 21 for making a practically non-leakable slip-joint with the tube 18, and the hub may be rigidly connected with the pipe 19 by a coupling member 22. Advantageously, the sleeve 14 and the hub 20 are coupled in such manner as to limit their separation such that the tube 18 would not be accidentally withdrawn from its companion member, the hub 20. Such coupling means may be afforded by prolonging the gland securing bolt 23 (see Fig. 2) to extend through and receive a check-nut below a lug 25 provided upon the sleeve.

26 represents a casing which is driven into the ground from the surface to protect the contained portions of the apparatus from cave-ins of the surrounding material.

In operation, the casing 26 is first sunk into the ground until it reaches rock or hard pan and the material within the casing removed through the medium of devices of the type illustrated and explained in, United States Patent No. 952,636, issued March 22, 1910. When this has been accomplished the drill, comprised of the bit 5 and stem 6, is lowered with the associated rod 12 and pipe 19 to the bottom of the space within said casing. The drill is then raised by a suitable hoisting engine through the medium of a line 11 and, upon being released, falls to strike the work therebelow, and so on while being intermittently turned in the sleeve 14 by manipulating the hoisting line 11 from the ground surface. The drill by a repetition of such blows effects the boring of a hole. To facilitate the boring operations and to remove the particles of disintegrated rock or body of material being bored, water is employed as in the aforesaid patented invention. The course of the water being downwardly upon the outside of the drill and its stem, thence upwardly through the bit passages 7, the duct 8 and through the chamber 9 within the drill stem to be re-

turned to the water controlling pump by the pipe.

In the stages of the work, rod 12 and pipe 19 would be immovably held while the drill, its stem and the tube 18 would be vertically reciprocated through the offices of a hoisting engine. When the drill and connected parts are allowed to drop it is evident that the body of water below the drill-bit will be caused to flow with considerable rapidity through the bit-passages 7 and thus cooperate with the aforementioned pump and be instrumental in carrying into the chamber 9 the particles of broken rock or other material produced in boring.

After the drilling of a hole has been accomplished for a distance, the rod 12 and pipe 19 are adjustably lowered and secured, and the boring operations resumed. The amount of extension or distance the pipes are to be lowered between each stage of operation of the drill, is regulated by lowering the rod 12 to contact with the shoulder 9' of the drill stem when the latter is for that purpose held at the top of its stroke for the following stage of drilling operations. The pipe 19 is to be lowered between each stage of the operation of the drill to have the tube 18 housed, or nearly so, in the pipe 19 and connected hub 20.

It is to be understood that the boring operations are effected by successively dropping the drill to impact against the bottom of the bore and that as the drill is raised it is given a partial turn between the successive strokes. In certain formations of material and also when the drill becomes much worn, the drill will oftentimes get wedged in the bore. Under such circumstances, it can ordinarily be loosened by a repetition of jars imparted to the drill through a succession of blows delivered against the drill shoulder 9' through the instrumentality of the rod 12.

What I claim as my invention, is—

1. A well boring device comprising a tubular stem, a bit connected to the lower end thereof and provided with passages opening into the stem, said stem at its upper end provided with a peripheral groove with the vertical wall thereof formed with openings, a sleeve surrounding said stem and engaging

ing the upper and lower walls of the groove and provided with an interiorly threaded socket, a vertical tube connected to said socket, and a pipe slidably connected to said tube.

2. A well boring device comprising a tubular stem, a bit connected to the lower end thereof and provided with passages opening into the stem, said stem at its upper end provided with a peripheral groove with the vertical wall thereof formed with openings, a sleeve surrounding said stem and engaging the upper and lower walls of the groove and provided with an interiorly threaded socket, a vertical tube connected to said socket, a pipe slidably connected to said tube, and a tubular rod extending through the upper end of and into said stem.

3. A well boring device comprising a tubular stem, a bit connected to the lower end thereof and provided with passages opening into the stem, said stem at its upper end provided with a peripheral groove with the vertical wall thereof formed with openings, a sleeve surrounding said stem and engaging the upper and lower walls of the groove and provided with an interiorly threaded socket, a vertical tube connected to said socket, a pipe slidably connected to said tube, a tubular rod extending through the upper end of and into said stem, and a bail connected to the upper end of said stem.

4. A well boring device comprising a tubular stem, a bit connected to the lower end thereof and provided with passages opening into the stem, said stem at its upper end provided with a peripheral groove with the vertical wall thereof formed with openings, a sleeve surrounding said stem and engaging the upper and lower walls of the groove and provided with an interiorly threaded socket, a vertical tube connected to said socket, a pipe slidably connected to said tube, a tubular rod extending through the upper end of and into said stem, a bail connected to the upper end of said stem, and a packing box connected to the upper end of the stem and surrounding said rod.

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