R. L. PORTER & G. D. WATSON.

WELL DRILLING TOOL.

APPLICATION FILED MAR. 2, 1911.

1,019,357.

Patented Mar. 5, 1912.

Fig. 1.

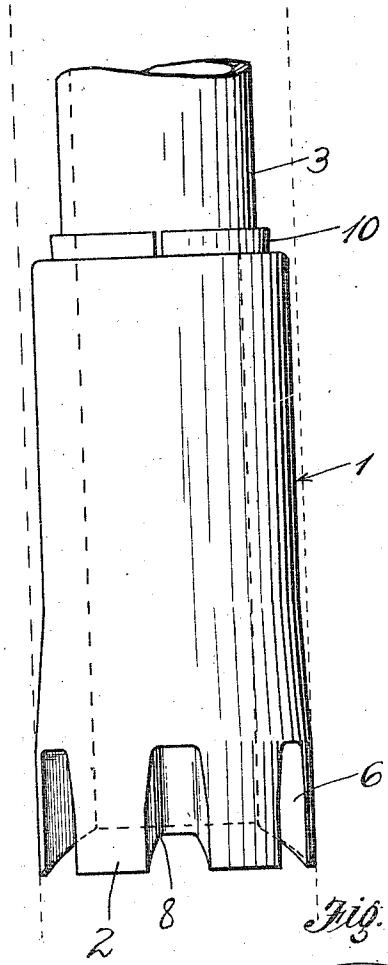


Fig. 2.

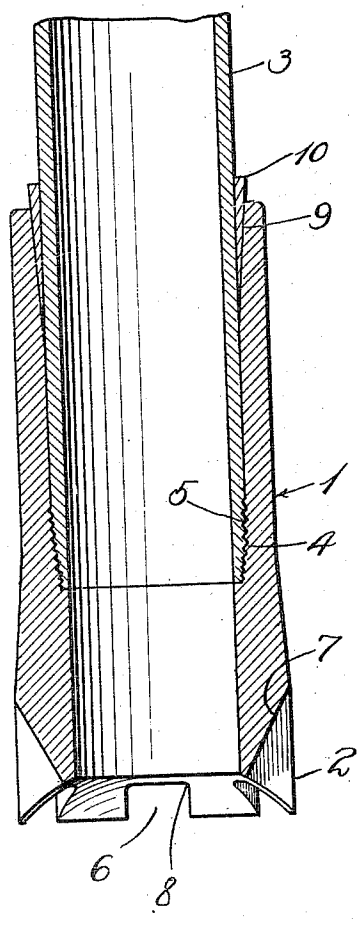
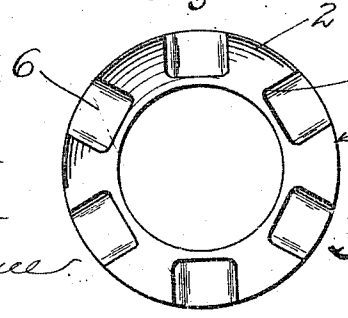


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT L. PORTER AND GEORGE D. WATSON, OF LOS ANGELES, CALIFORNIA.

WELL-DRILLING TOOL.

1,019,357. Specification of Letters Patent. Patented Mar. 5, 1912.

Application filed March 2, 1911. Serial No. 611,752.

To all whom it may concern:

Be it known that we, ROBERT L. PORTER and GEORGE D. WATSON, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Well-Drilling Tools, of which the following is a specification.

This invention relates to improvements in well drilling tools, and particularly to that class of tools known as casing shoes, and is particularly adapted for use in wells which are drilled by the vertical reciprocation of the tool by means of any suitable machinery, and has particular relation to the cutting portion of the mechanism, the said cutting portion being adapted to cut the bore of the well the proper size and to pack the material at the sides in the process of producing the bore.

It is a further object of the invention to provide a tool in which the cutting device or shoe is connected with the sectional casing by which it is lowered into the well and reciprocated, not only by the usual screw threads but also by an additional wedging collar adapted to prevent any movement or twisting strain between the cutting point and the casing carrying the same.

In the drawing forming a part of this specification, Figure 1 is a side elevation of the improved boring tool forming the subject matter of the present invention. Fig. 2 is a vertical central longitudinal sectional view through the same. Fig. 3 is an elevation of the cutting end of the tool.

The details of the invention will now be more specifically described, reference being had to the accompanying drawing in which—

1 indicates the body portion of the drilling tool, 2 the cutting or excavating points and 3 a portion of the hollow casing or stem carrying the cutting tool.

The drilling tool is preferably made cylindrical in shape and is slightly enlarged at its lower end as will be clearly seen by reference to Figs. 1 and 2. The tool is usually made hollow and is provided with interior screw threads at 4 adapted to engage corresponding exterior screw threads 5 formed upon the lower end of the supporting and operating casing 3. The lower end of the said tool is thickened sufficiently to bring its inner surface flush with the inner surface of the casing 3 as shown in Fig. 2. The lower end of the tool is preferably curved inwardly to form a portion of a spherical surface giving the inner side of the toothed drilling end of the tool a somewhat hollow shape as clearly shown in Fig. 2. The teeth 2 are formed by cutting slots as 6 into the lower edges of the tool. The said slots are cut backwardly from the edges thereof a sufficient distance to form inclined material tamping faces 7 between the adjacent teeth. The said notches 6 forming the teeth are preferably made of the same width and are usually curved at their inner corners at 8, the shape of said slots being such that there is no chance for the material cut by the teeth to pack and become wedged in place in the notches. Thus the tool thoroughly clears itself from the cuttings produced by its operation.

The shape of the teeth with the notches between it having the inclined tamping faces 7 makes the tool especially well adapted for use in more or less soft or sandy soils, the outer face of the teeth cutting and trimming the bore of the well as indicated by dotted lines in Fig. 1 while the material between the teeth is forced outwardly and tamped and packed tightly flush with the inner face of the bore of the well, thus largely obviating the tendency of the soft or sandy materials to tumble inwardly after the tool has passed a given point. The outer faces of the teeth 2 are preferably made parallel with the inner surfaces of the bore at least back to the point where the inclined face 7 reaches the periphery of the tool. In this way the points 2 are adapted to cut the full diameter desired in producing the bore of the well and the inclined tamping faces 7 will pack the material even with the bore produced by the outer faces of the said teeth. The construction of the upper end of the tool 1 is also important since it prevents the likelihood of breaking the lower end of the casing 3 which carries the tool. The socket for receiving the end of the tool 3 is carried well into the upper end of the said tool 1 so that the threaded portion is nearer the lower end of the tool than the upper end. The upper end of the bore of the tool is then provided with an outward flare as at 9, thus leaving a wedge shaped annular space between the end of the tool 1 and the casing 3. A split ring 10 beveled or tapered in cross section is slipped upon the casing 3

and after the said casing has been screwed tightly into the tool 1, the said beveled ring or wedge 10 is forced down tightly between the casing and the upper edge of the tool as indicated in Figs. 1 and 2 of the drawing. In this way the connection between the casing 3 and the boring tool is made absolutely positive and firm and any rocking action between the parts under the strain of boring the well is obviated. With the ordinary casing tubing the surfaces thereof are apt to be uneven and it is difficult to form a snug and tight joint between the same and the boring tool and when the boring tool encounters bowlders or hard materials upon the side only it is apt to be twisted upon the casing 3. The using of the wedge 10 at the upper end of the tool prevents any rocking movement due to the unevenness of the materials used and greatly strengthens the connection between the parts.

By employing the split ring wedge the wedge can accommodate itself to any unevenness in the parts and can be made to fit more snugly in the flaring portion 9 of the tool 1.

What we claim is:—

1. A drilling tool comprising a body portion having teeth formed at its lower edge provided with straight outer surfaces parallel with the axis of the tool and curved inner surfaces and inclined tamping spaces arranged between the said teeth.

2. A drilling tool comprising a hollow casing have a series of teeth formed at its lower edge, and provided with rearwardly extending outwardly inclined faces between the teeth extending to the peripheral surfaces of the tool and adapted to guide the material between the teeth and tamp the same even with the bore of the well produced by the tool.

3. A drilling tool comprising a body portion having teeth formed at its lower edge provided with straight outer surfaces parallel with the action of the tool and having inner inclined surfaces, outwardly and upwardly inclined tamping surfaces being arranged between the said teeth.

In witness that we claim the foregoing we have hereunto subscribed our names this 24th day of February, 1911.

ROBERT L. PORTER.
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Witnesses:
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