

H. B. KING.
WELL DRILL.

APPLICATION FILED JUNE 30, 1908.

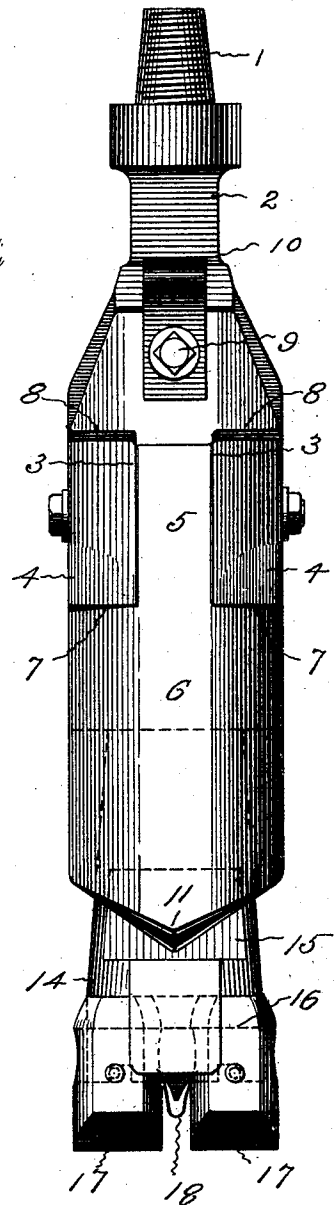
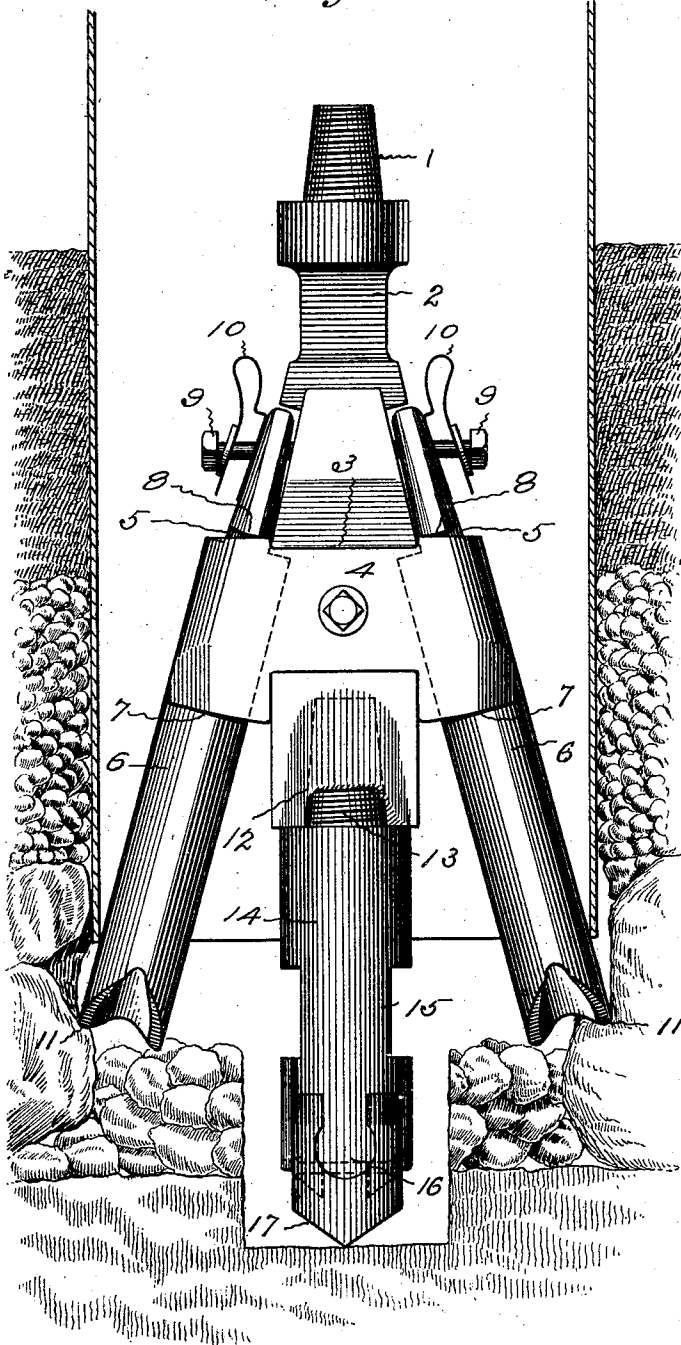
933,762.

Patented Sept. 14, 1909.

3 SHEETS—SHEET 1.

Fig. 1

Fig. 2



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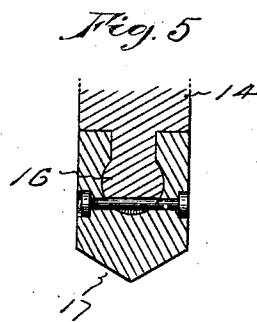
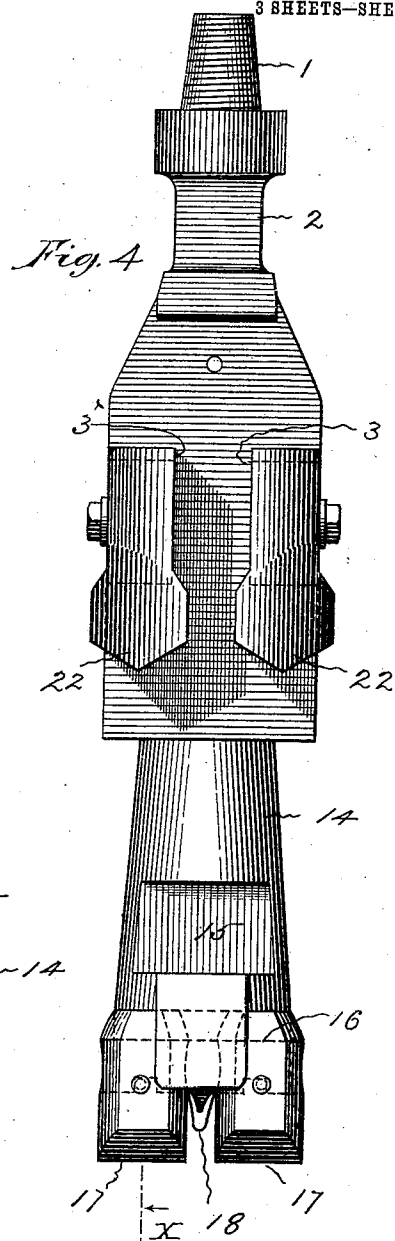
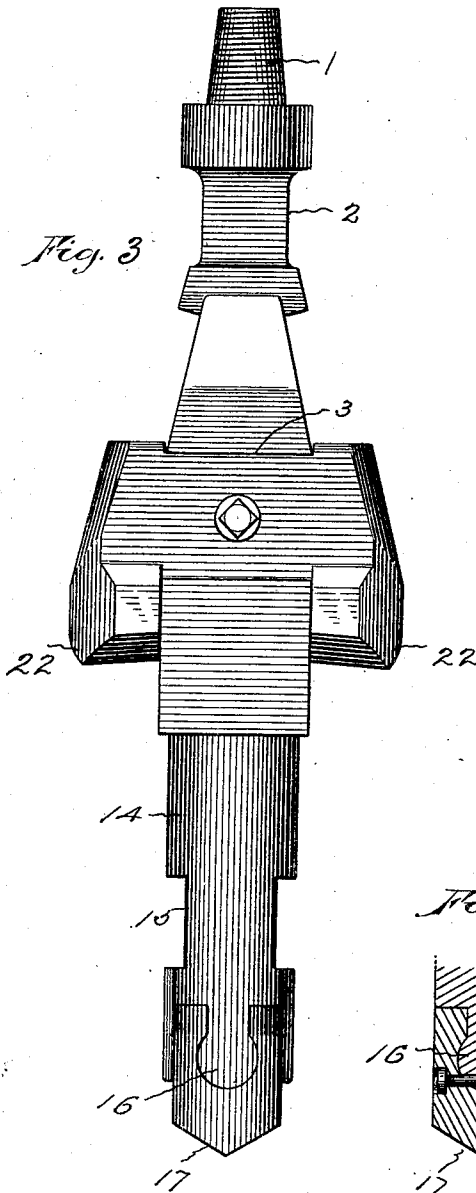
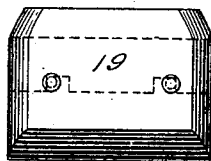


Fig. 6



WITNESSES:

E. B. Burdett
Josephine M. Strempfer

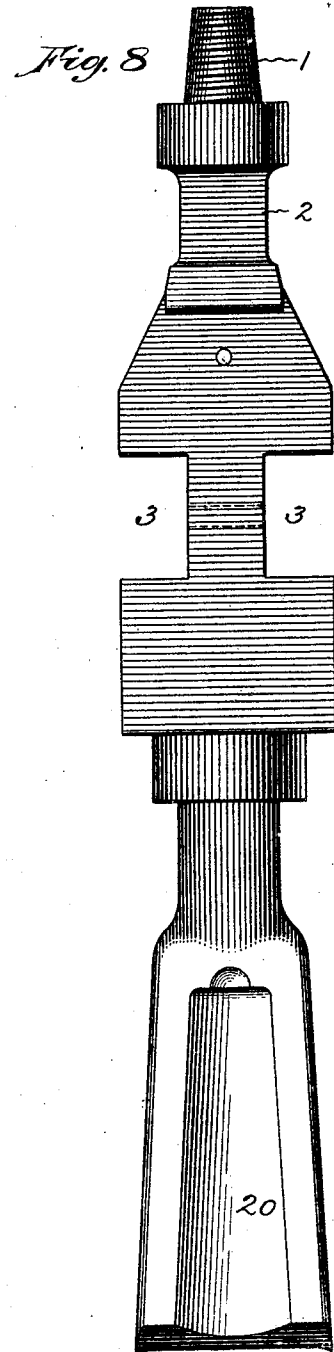
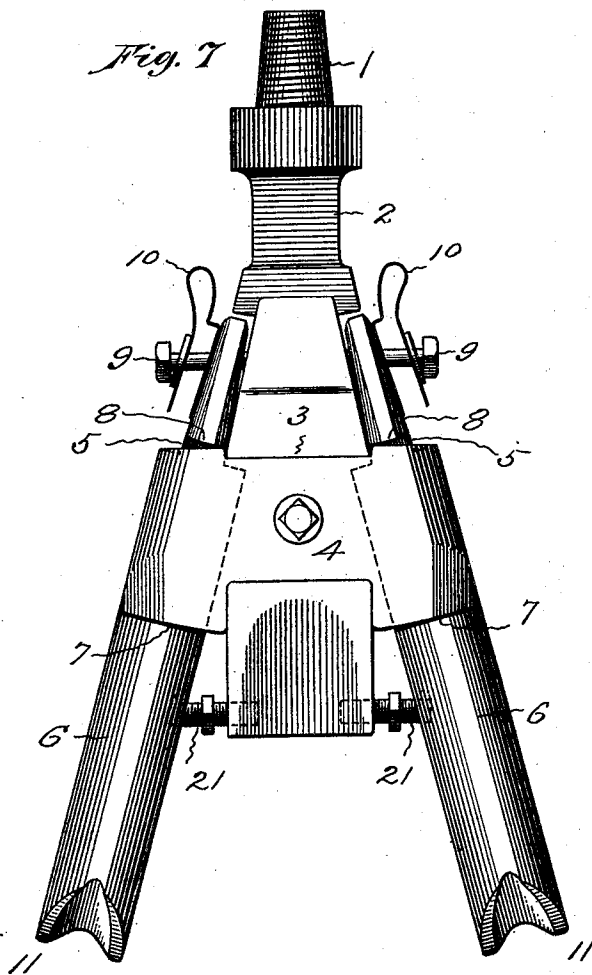
INVENTOR:

Harvey B. King, by
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3 SHEETS—SHEET 3.



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INVENTOR:

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UNITED STATES PATENT OFFICE.

HARVEY B. KING, OF HARTFORD, CONNECTICUT, ASSIGNOR TO FRANK J. KNOX, OF HARTFORD, CONNECTICUT.

WELL-DRILL.

933,762.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed June 30, 1908. Serial No. 441,134.

To all whom it may concern:

Be it known that I, HARVEY B. KING, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Well-Drill, of which the following is a specification.

This invention relates to a tool which is designed to be used with any form of jar and any type of well drilling machine for boring holes of the usual diameters through any formation of loam, sand, clay, gravel or boulders, for the purpose of sinking casings, and into ledge or solid rock for obtaining water, oil or other liquid, gas, or minerals and for drilling holes of relatively larger diameter for shafts and supports for plunger elevators and other structures which require a deep, uniform and absolutely vertical hole.

The object of the invention is to provide a comparatively simple, cheap and very effective tool which is easily manipulated, that is, easily handled, adjusted, sharpened and kept to gage, and which can be quickly set for drilling a small or large hole for these purposes in any formation, which will be round, uniform, straight and vertical, and will be of such exact size that the casings, tubes or pipes can be accurately sunk and easily removed if at any time such is necessary.

Figure 1 of the accompanying drawings illustrates a tool which embodies this invention sunk in an opening in the ground. Fig. 2 shows an edge view of the tool which is shown in side view in Fig. 1. Fig. 3 shows a side view of the tool with a different form of wing cutters. Fig. 4 shows an edge view of the tool arranged as shown in Fig. 3. Fig. 5 shows a section of the lower end of the tool on the plane indicated by the dotted line X on Fig. 4. Fig. 6 shows a modified form of cutter that may be used at the lower end of the tool. Fig. 7 shows a side view of the tool without the central cutter and with the wing cutters held out by positive means. Fig. 8 shows an edge view of the body of the tool with an extended central cutter.

The body of the tool has a threaded stem 1 at its upper end which is designed to be screwed into a threaded socket in a drill jar of any desired construction and which may be connected with any common form of drilling machine for lifting, turning and

dropping the string of tools. Below the stem is a squared section 2 for the application of a wrench for screwing the drill to or unscrewing the drill from the jar or other part of the operating string. In mortises 3 formed in the sides of the body are bolted wing plates 4. Between the projecting ends of these wing plates loosely extend the shanks 5 of the wing cutters 6. The bodies of these wing cutters are provided with shoulders 7 with which engage the lower edges of the wing plates for driving down the cutters, and the heads of these cutters are provided with shoulders 8 with which the upper edges of the wing plates engage for lifting the cutter. Extending through slots in the heads of the wing cutters and into the body of the tool are bolts 9 and between the heads of these bolts and the heads of the wing cutters are springs 10 which tend to press the heads of the cutters against the body of the tool and thus throw the cutting edges 11 at the lower ends of the wings outwardly away from the body of the tool. These wing cutters are preferably made with double cutting edges at their lower ends so that when they become worn on one side, by removing the bolts, the wings may be taken out and replaced in a reverse position so that they may be again used without re-sharpening.

In the lower end of the body of the tool is a threaded socket 12, and into this socket is screwed the threaded shank 13 of the stem 14 of a central cutter. This stem may have a flattened or squared section 15 for the application of the wrench which is used to screw or unscrew the parts. The central cutter stem at its lower end may be provided with a transverse tenon 16 which is preferably circular, although it may be dovetail, and on this tenon are slipped and secured by suitable means cutting blades 17. These blades may be formed in two parts as shown in Fig. 2, and there may be a spring 18 of suitable form arranged between to press them outwardly so that they will automatically expand as their outer edges wear away under the friction incident to rubbing against the walls of the hole they are cutting and thus keep the hole the same diameter at all depths. If desired, however, the central cutting blade at the lower end may be in one piece 19 as shown in Fig. 6 and slipped upon the tenon, or the stem of the central tool shown in Fig. 1 may be removed

and a long solid rock drill cutter 20 may be screwed into the socket in the lower end of the body of the tool.

The lower ends of the wing cutters are contracted when the drill is inserted in a casing, but are expanded by the pressure of the springs at their upper ends when below the lower end of the casing so that they will cut the hole slightly larger than the casing and thus allow the casing to follow down as the cut is made, as illustrated in Fig. 1. These cutters are driven downwardly by the lower edges of the wing plates, which are set in the mortises in the body of the tool, and as they project outwardly the impact of the edges when cutting a boulder or piece of rock is somewhat outwardly so that they will not glance, but will chip off the rock and keep the hole straight and slightly larger than the diameter of the casing. The central cutter tends also to guide the tool and keep it straight and the hole vertical.

If it is desired to chip only rock the central cutter can be removed and set screws 21, or similar means may be arranged between the body of the tool and the wing cutters as shown in Fig. 7. These screws will keep the cutters expanded to the proper degree and may be adjusted from time to time as the edges of the cutters wear away so that the hole will be cut uniform in diameter.

If it is necessary to cut hard rock, the expanding wing cutters may be removed and solid wing blades 22 may be fastened in the mortises in the body, in place of the wing plates used to hold the extension wing cutters, as shown in Figs. 3 and 4, and of course if it is desired to drill only a small hole the body may be used with a single central tool as shown in Fig. 8, or with only the central tools shown in Figs. 4 and 6. This tool is adapted to be used with any type of drilling machine and any form of jar and can be quickly changed for boring or drilling a hole through any formation of earth or rock for any purpose, and as stated, it can be used for boring holes for casing, tube or pipe of wide range of diameters and the hole bored is of such nature that the casing, tubing or pipe can be easily sunk absolutely straight and vertical, for the hole cut by this tool will be plumb and of uniform diameter from top

to bottom of any depth. The cutting blades of this tool are firmly and solidly yet easily attached to the body, depending upon the formation to be cut, and they are comparatively small and of light weight so that they may be easily handled and sharpened and regaged by anyone when it becomes necessary.

The invention claimed is:

1. A well drill having a body, wing plates secured to the body and outwardly and downwardly projecting wing cutters loosely held in place by said plates, substantially as specified.

2. A well drill having a body, wing plates secured to the body, wing cutters loosely supported by said plates and springs holding the upper ends of said cutters against the body and causing the cutting edges of the cutters to project outwardly, substantially as specified.

3. A well drill having a body, wing plates secured to the body, reversible wing cutters loosely held by said plates and means for causing the lower ends of the cutters to project outwardly, substantially as specified.

4. A well drill having a body, a tenon wing plates secured in said mortises, and downwardly and outwardly projecting wing cutters loosely supported by and held from upward movement by said wing plates, substantially as specified.

5. A well drill having a body, wing plates removably secured to the body, downwardly and outwardly projecting wing cutters loosely held in place by said plates, and a cutter held centrally of the body between the wing cutters, substantially as specified.

6. A well drill having a body, wing plates secured to the body, wing cutters loosely mounted on said plates and expansible cutters connected with the body centrally between said wing cutters, substantially as specified.

7. A well drill having a body, a tenon at the lower end of the body, expansible cutters arranged on the tenon centrally of the body, and means for expanding the cutters, substantially as specified.

HARVEY B. KING.

Witnesses:

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