

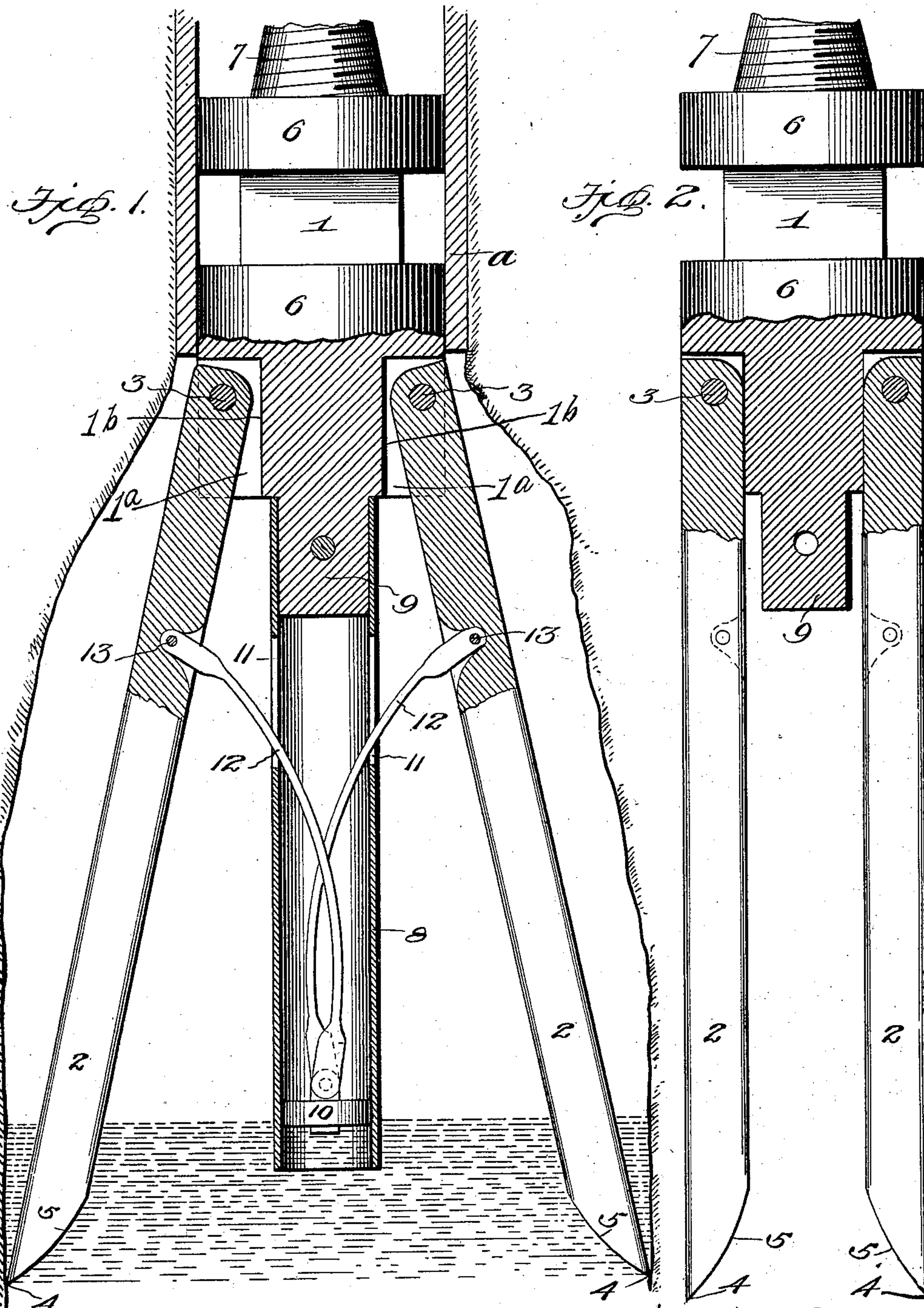
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Patented Oct. 21, 1902.

W. E. JOHNSTON.  
DRILL FOR OIL OR OTHER WELLS.

(Application filed Aug. 23, 1901.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM E. JOHNSTON, OF CONOQUENESSING, PENNSYLVANIA.

## DRILL FOR OIL OR OTHER WELLS.

SPECIFICATION forming part of Letters Patent No. 711,506, dated October 21, 1902.

Application filed August 23, 1901. Serial No. 73,064. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. JOHNSTON, a citizen of the United States, residing at Conoquenessing, in the county of Butler and State of Pennsylvania, have invented a new and useful Drill for Oil or other Wells, of which the following is a specification.

My invention is an improved reciprocating drill for enlarging the cavities in oil-wells and the like below the casings thereof, the object of my invention being to provide a tool which may be readily operated by an oil-well rig of the type commonly employed and which is efficient in enlarging the cavity of an oil or water well when it is necessary to do so in order to increase the flow.

My invention consists in the peculiar construction and combination of devices hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is partly an elevation and partly a vertical sectional view of a drill embodying my improvements, showing the same in operative position in an oil-well in enlarging the cavity thereof below the casing. Fig. 2 is a similar view of a modified form of my improved drill.

My improved drill consists, essentially, of the head or body 1 and the pick-arms, the latter having their upper ends pivotally connected to the head at opposite sides of the latter, as at 3, and having their lower ends beveled on their inner sides to form the points 4, the bevels 5 of the said pick-arms being opposed to each other. As here shown, the head or body 1 is provided with a number of circular flanges 6, the diameter of which is slightly less than the interior diameter of the well-casing *a*. The upper portions of the pick-arms are disposed in mortises 1<sup>a</sup>, the lower and outer sides of which are open and the inner sides 1<sup>b</sup> of which are vertical and parallel with each other, so that the pick-arms are adapted to lie in a vertical position parallel with each other, as shown in Fig. 2, and within the radius of the head or body. At the upper end of the head or body is a screw-stud 7, by means of which the drill may be coupled to and operated by the drilling-cable ordinarily employed in connection with an oil rig for operating a drill. Thereby the drill is adapted to be reciprocated in a vertical direction, and being lowered in the well-casing to

the oil-bearing sand of an oil-well at a point below the casing by being moved alternately upwardly and downwardly the pick-arms as they descend will by the impact of their inclined surfaces 5 at their lower ends against the sand be forced outwardly, with the result that on the downstrokes of the drill the lower cutting edges of the pick-arms thereof will operate on the walls of the cavity to enlarge the said cavity, as will be readily understood. This the simplest form of my invention is shown in Fig. 2.

To adapt the pick-arms to be expanded or moved outwardly from each other at their lower ends on the downstrokes of the drill when the drill is operated in the oil or water in the well, I provide a cylinder 8, the upper end of which is detachably secured to a stud 9, that depends from the lower side of the body 1 between the picker-arms. The lower end of the said cylinder is open, and in the said cylinder operates a plunger 10. The cylinder is provided with slots 11 of suitable length in opposite sides thereof, and links 12 have their lower ends pivotally connected to the said plunger and their upper ends pivotally connected to the pick-arms, said links passing through and operating in the slots 11. The pins 13, which connect the upper ends of said links to the pick-arms, are removable from the latter to enable the said links to be disconnected therefrom.

The operation of my invention when thus organized, as shown in Fig. 1, is as follows: On each downstroke of the drill the plunger is forced upwardly in the piston by the impact thereof on the oil or water in the well. The power of the said plunger is imparted to the pick-arms by the links 12, and thereby the pick-arms have their lower ends, which operate on the sides or walls of the cavity, spread apart, hence enlarging the diameter of the said cavity. It will be understood that on each upstroke of the drill the picker-arms are disposed by their own gravity and by the contact of their outer sides with the well-casing in the parallel position, (shown in Fig. 2,) so that the drill may readily be moved upwardly in the casing.

Having thus described my invention, I claim—

1. In a reciprocating drill, the combination

of a head or body portion, pivoted pick-arms  
extending downwardly from said head or body  
portion, a cylinder, means to detachably con-  
nect it to the head or body portion so that  
5 the cylinder will depend therefrom, a plunger  
in the cylinder, links connected to the plun-  
ger and means to detachably connect the links  
to the pivoted pick-arms, substantially as de-  
scribed.  
10 2. In a reciprocating drill, the combination  
of a head or body portion having a depending  
cylinder, pivoted pick-arms extending down-

wardly from said head or body portion, a  
plunger in said cylinder and links connecting  
said plunger to said pick-arms, substantially 15  
as described.

In testimony that I claim the foregoing as  
my own I have hereto affixed my signature in  
the presence of two witnesses.

WILLIAM E. JOHNSTON.

Witnesses:

E. H. HUTCHISON,  
S. W. LOBAUGH.