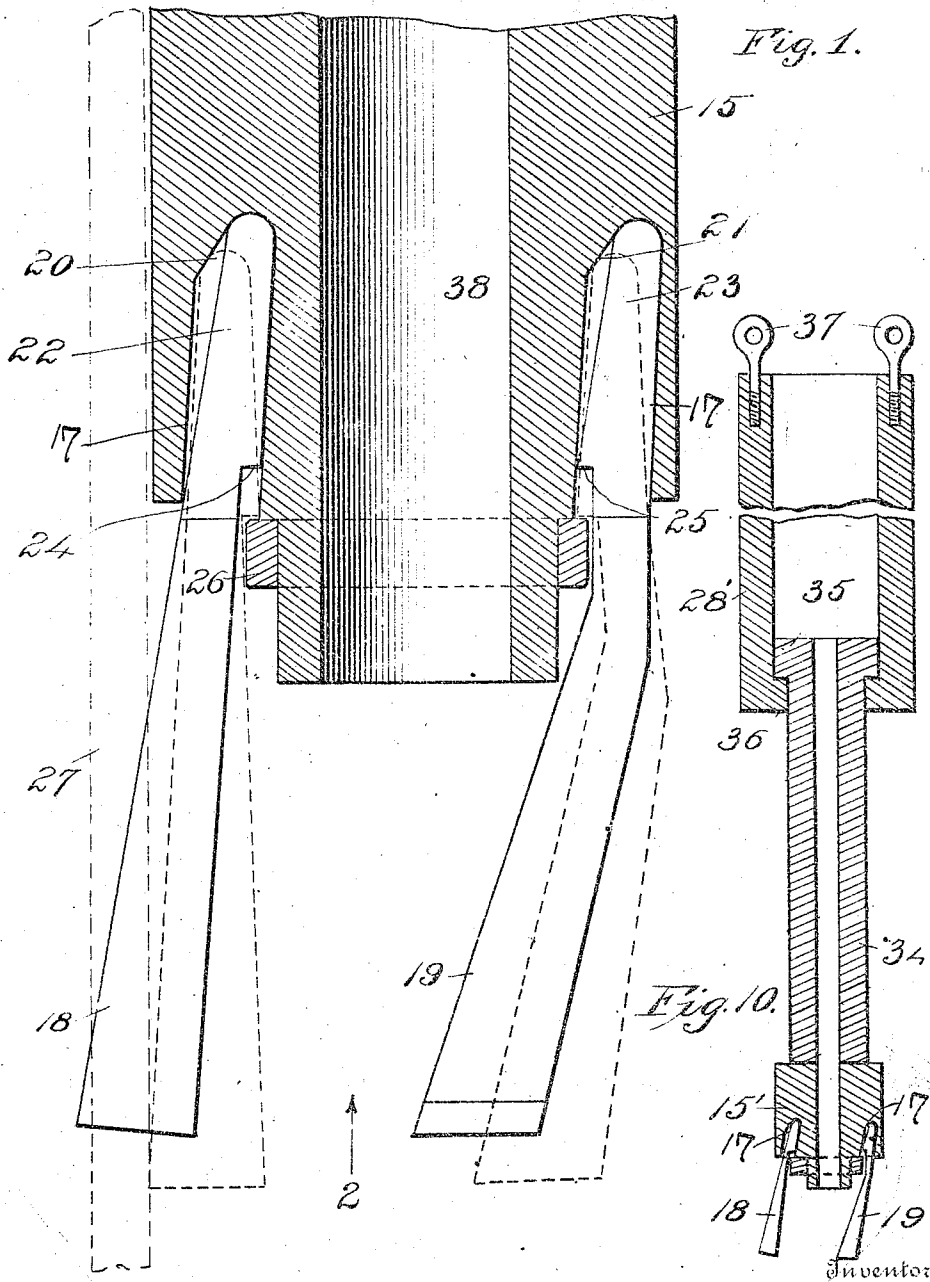


Patented June 27, 1911.

3 SHEETS—SHEET 1.

996,595.



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 MULTIPLE TOOL WELL DRILL.
 APPLICATION FILED NOV. 2, 1909.

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 3 SHEETS—SHEET 2.

996,595.

Fig. 2.

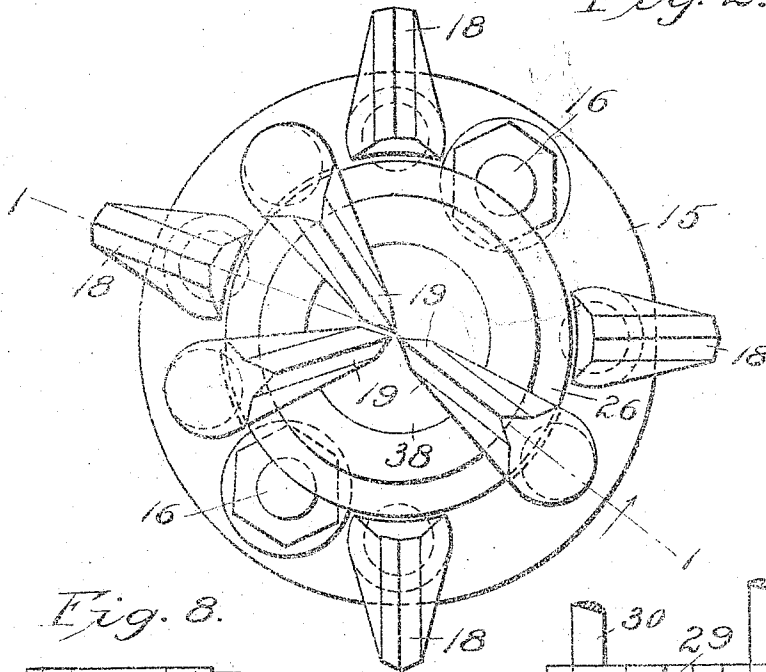


Fig. 8.

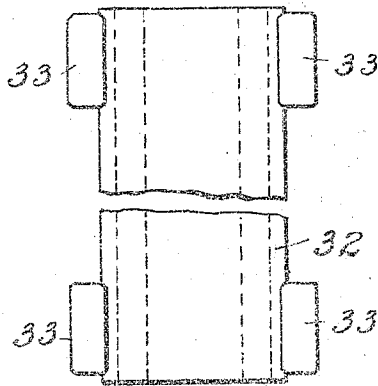


Fig. 6.

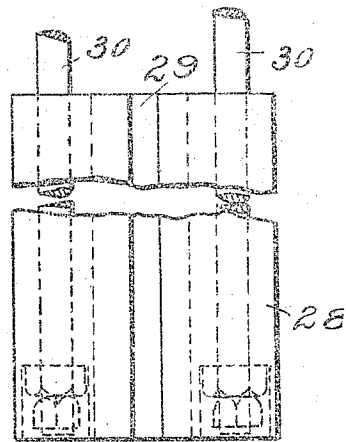
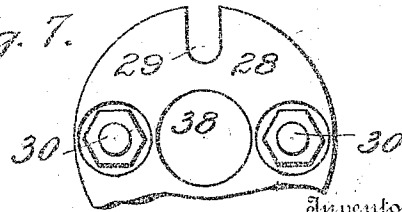


Fig. 7.



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3 SHEETS-SHEET 3.

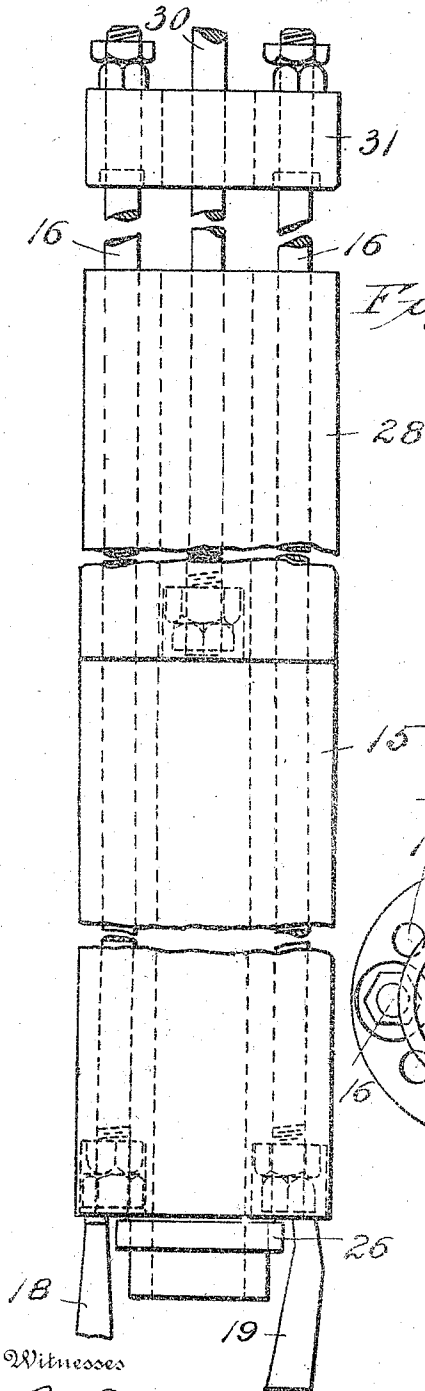
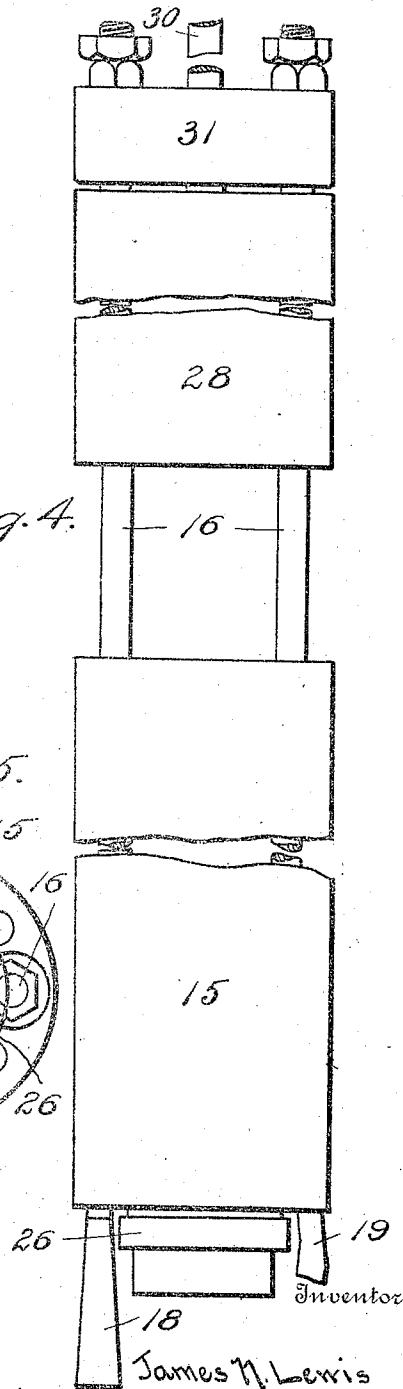
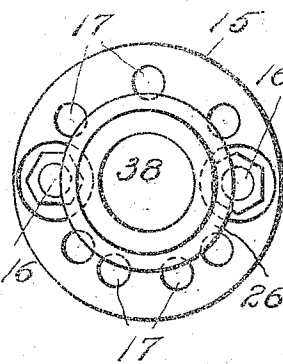


Fig. 3.

Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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MULTIPLE-TOOL WELL-DRILL.

996,595.

Specification of Letters Patent. Patented June 27, 1911.

Application filed November 2, 1909. Serial No. 525,922.

To all whom it may concern:

Be it known that I, JAMES N. LEWIS, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Multiple-Tool Well-Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to drills, and especially to drills for drilling wells and the like, and has for an object to provide a drill which can be slipped down inside of the casing tube, but which when in operative position will cut out a hole larger than the tube and large enough for the tube to follow.

A further object of the invention is to provide a drill head having sockets for receiving the bits so proportioned that the bits when not in use occupy a different position than when in use, so that the head carrying such bits may be slipped down within the casing tube which is to follow the drilling produced by the bits.

With these and other objects in view the invention comprises certain novel constructions, combinations and arrangements of parts, as will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a view in section of the drill head carrying two drill bits. Fig. 2 is a view in end elevation of the drill head carrying the bits and showing a position line 1—1 indicating the section of Fig. 1. Fig. 3 is a view in side elevation of the drill head and hammer with the hammer in contact with the head. Fig. 4 is a view in side elevation similar to Fig. 3 but showing the hammer drawn upwardly. Fig. 5 is a view in end elevation of the drill head with the bits removed. Fig. 6 is a view of the hammer in side elevation at right angles to the view in Figs. 3 and 4. Fig. 7 is a view in end elevation of the hammer as shown at Fig. 6. Fig. 8 is a view in side elevation of an additional weight to

apply to the hammer and for drilling in deep wells where the water pressure reduces the effective force of the hammer. Fig. 9 is a view in end elevation of the additional weight seen at Fig. 8. Fig. 10 is a modified form of drill spindle and hammer.

Like characters of reference designate corresponding parts throughout the several views.

The drill which forms the subject-matter of this application is of the type employed for drilling ahead of the casing tube of a deep well and embodies a hollow drill head 15 having rods 16 extending longitudinally therethrough and beyond the end of the drill head opposite the bits. The drill head is provided with sockets 17 to receive bits 18 and 19 in any desired number shown at Fig. 2 as four of the bits 18 and three of the bits 19, although it is to be understood that any approved number of such bits may be employed.

The sockets 17 are formed as shown at Fig. 1, those for receiving the bits 18 having inwardly extending angularly disposed cam faces as indicated at 20 while those adapted to receive the bits 19 are provided with outwardly extending angularly disposed cam faces as indicated at 21. The bits 18 and 19 are respectively provided with shanks 22 and 23 having shoulders 24 and 25 adapted to rest upon the positioning collar 26 so that when idle the bits will hang in the position shown in dotted lines in Fig. 1 and well within the periphery of the casing tube which is indicated in dotted lines at 27.

When the bits 18 and 19 engage the rock or other material upon which they are to operate the weight of the head 15 forces the bits upwardly within the sockets and along the cam faces 20 and 21 to the position shown in full lines in Fig. 1 so that the bit 18 then extends outwardly beyond the outer periphery or the casing tube indicated in dotted lines, while the bit 19 is in position to cut within the circle cut by the bit 18.

Upon the rods 16 which extend above the

drill head a hammer 28 is mounted being formed with furrows 29 formed along the sides within which the rods 16 are embraced and with rods 30 rigidly secured to the hammer and serving as a means by which the hammer may be lifted and permitted to fall upon the drill head 15. The rods 16 are connected at their upper heads by a keeper 31 which serves simply to limit the upward movement of the hammer under the impulse of the lifting cable.

In operating in deep wells the water pressure neutralizes the weight of the hammer to such an extent that a sufficient force is not secured and it becomes desirable to employ longer rods 16 and 30 and to add to the hammer additional weights 32 which are provided with lugs 33 adapted to engage the rods 30 of the hammer and the body of the weight being of such diameter as to operate between the rods 16.

Instead of employing the rods 16 and 30 as shown at Figs. 1 to 9 inclusive a drill head 15' may be provided with a tubular extension 34 having a head 35 formed at its upper end and the hammer 28' may be formed as a cylinder having an intumed flange 36 adapted to engage the head 35 to limit the upward movement and to strike the drill head 15' upon the return movement. For attaching the cables eye bolts 37 may be employed to which said cables are secured.

Whatever the form of the device the portions are such that the drill bits 18 will extend beyond the periphery of the drill head to a sufficient extent to cut a circle larger than the casing tube indicated at 27 but when it is desirable to withdraw or insert such drill to fall to dotted position shown at Fig. 1 to permit its passage through such casing tube.

Whatever its form the device is also provided with a central opening indicated at 38 through which the products of drilling may be carried away by water in the usual manner.

What I claim is:—

1. In a drilling device, a drill head provided with longitudinally extending sockets and cam surfaces formed within the sockets similarly inclined upon opposite sides of and relative to the axis.

2. In a drilling device, a hollow drill head having sockets projected into the end of the head and with similarly inclined cam surfaces formed within the sockets extending substantially parallel upon opposite sides of the head.

3. In a drilling device, a hollow drill head with sockets projected into the end of the head, a cam surface formed within each of

the sockets, the cam surface of certain of the sockets having an inclination opposite to that of adjacent sockets.

4. In a drilling device, a hollow drill head having sockets formed within the end of the head, drill bits inserted within the sockets and provided with shoulders, and a removable collar secured upon the head adapted to engage the shoulders of the bits and prevent displacement from the sockets.

5. In a drilling device, a hollow drill head having a reduced portion at the end forming a shoulder with sockets projected longitudinally in the head at the shoulder, drill bits inserted within the sockets and provided each with a shoulder, and a collar secured upon the reduced portion and positioned to engage the shoulders of the bits and prevent their displacement from the sockets.

6. In a drilling device, a hollow drill head having a reduced portion at the end forming a shoulder and with sockets projected longitudinally in the head at the shoulder, drill bits inserted within the sockets and provided each with a shoulder, and a collar secured upon the reduced portion and positioned to engage the shoulders of the bits and prevent their displacement from the sockets.

7. In a drilling device, a hollow drill head having a reduced portion at one end forming a shoulder and with sockets projected into the head adjacent the shoulder, drill bits inserted within the sockets and provided with shanks each having a laterally extending shoulder, such shanks being shorter than the socket, and a collar secured upon the reduced portion of the head positioned to engage and limit the movement of the bits.

8. In a drilling device, a hollow drill head, drill bits inserted into the end of the head, rods rigidly secured to the head and extending upwardly, a hammer mounted to reciprocate upon the rods and to impinge upon the head, and other rods secured to the hammer and adapted for connection with a source of power.

9. In a drilling device, a hollow drill head, and drill bits inserted loosely in the end of the head, rods rigidly secured to the head and extending upwardly, a hammer in the form of a hollow core mounted to reciprocate upon the rods and to impinge upon the head, and other rods secured rigidly to the hammer and adapted for connection with the source of power.

10. In a drilling device, a hollow drill head, and drill bits inserted loosely in the end of the hollow head, rods extending upwardly from the head, a hammer having

guides formed in the side thereof for engagement with the rods, and other rods rigidly secured to the hammer and extending upwardly in position for connection with the source of power.

11. In a drilling device, a hollow drill head, drill bits inserted in the end of the head, a hammer in the form of a hollow core, means connecting the hammer with the head forming a guide for the hammer

permitting a reciprocation of the hammer to impinge upon the head, and means extending upwardly from the hammer adapted for connection with the source of power.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES N. LEWIS.

Witnesses:

G. WARD KEMP,
J. O. NASLIN.