

(Model.)

W. C. WELLS.
WELL DRILL.

No. 336,187.

Patented Feb. 16, 1886.

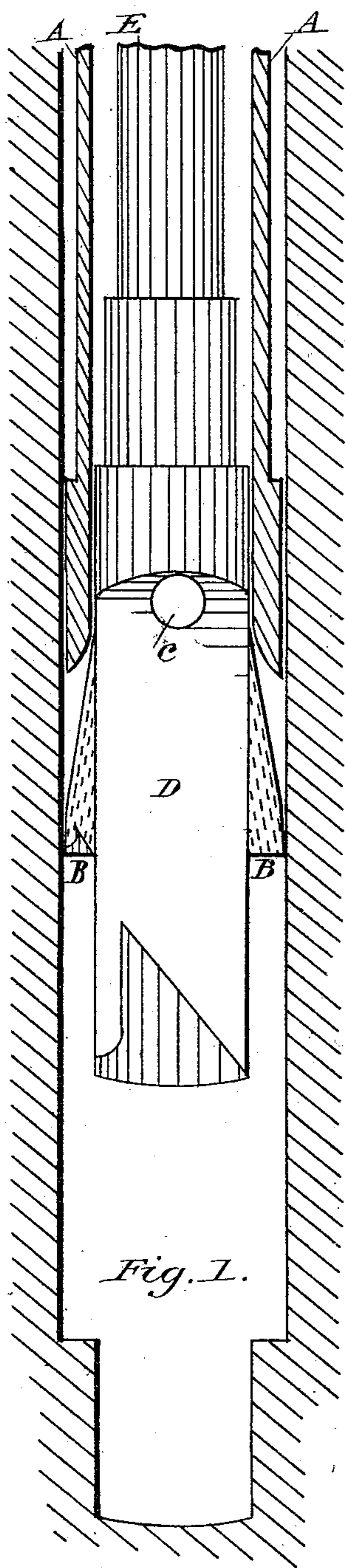


Fig. 1.

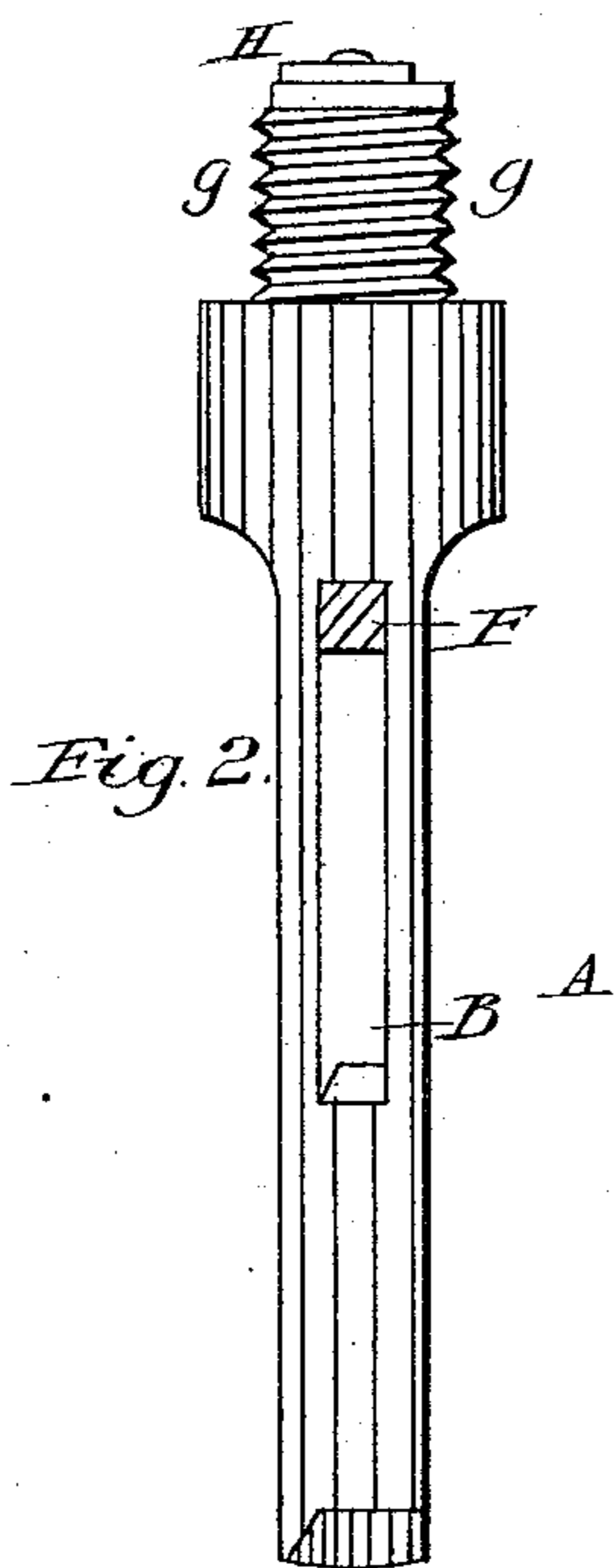


Fig. 2.

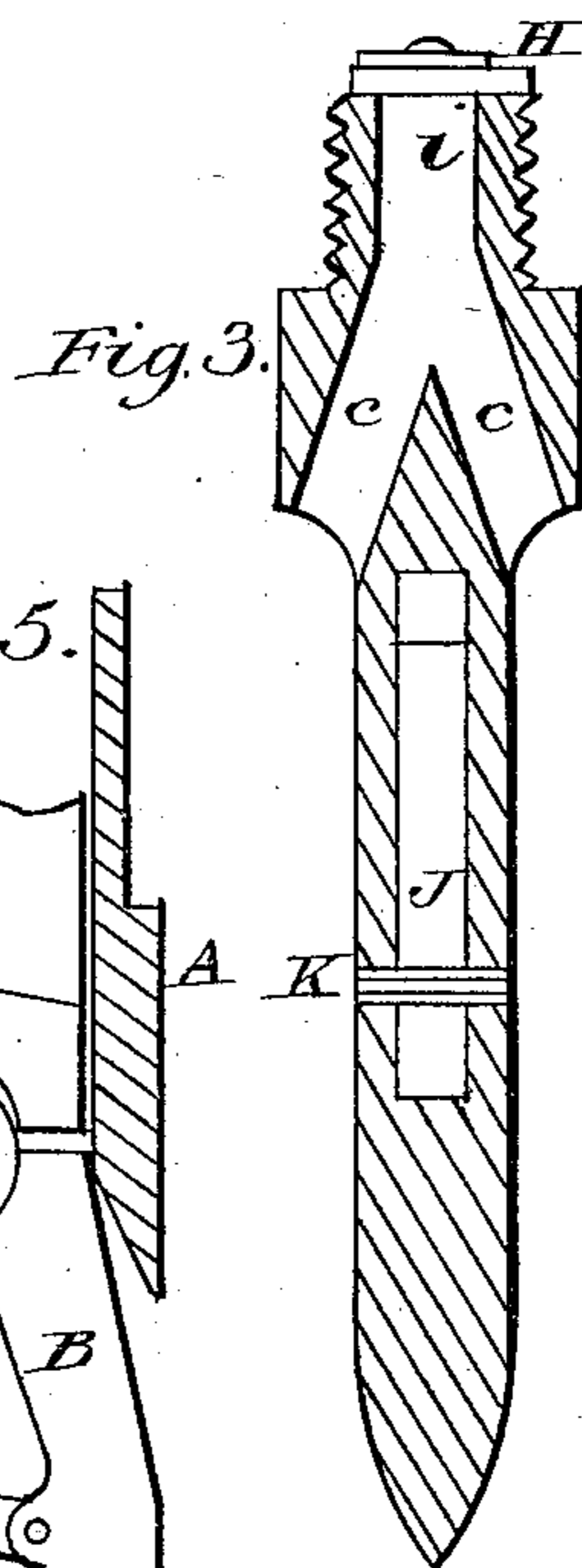


Fig. 3.

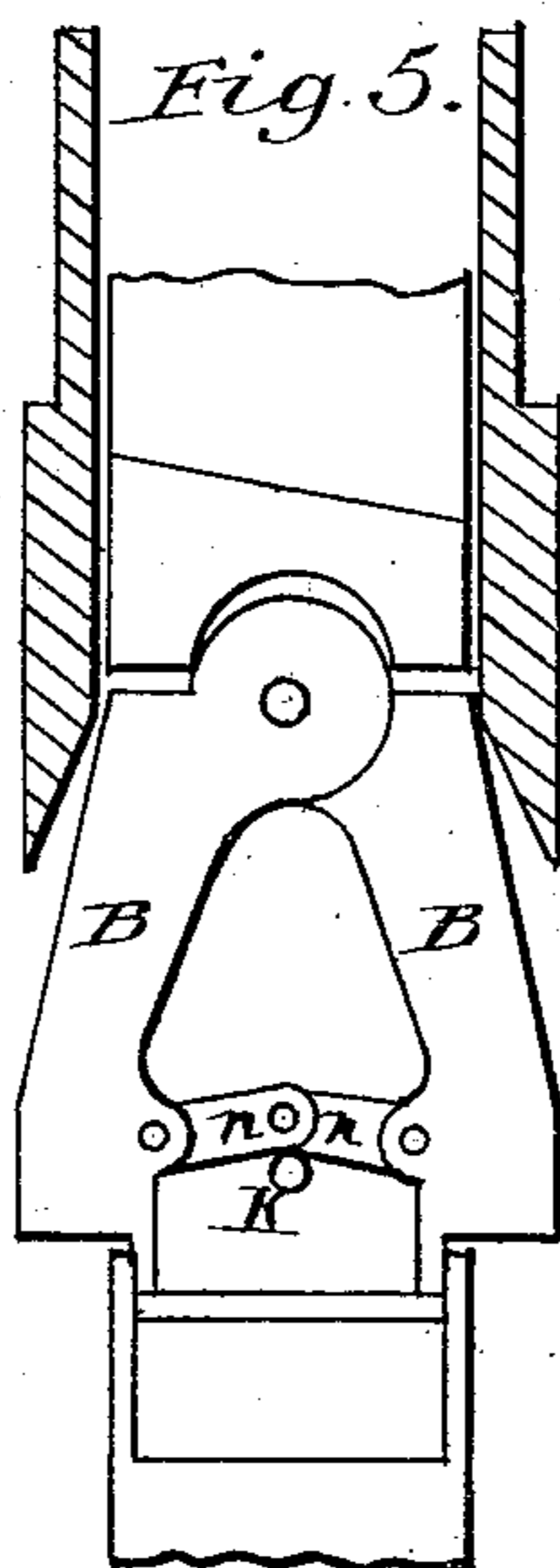


Fig. 5.

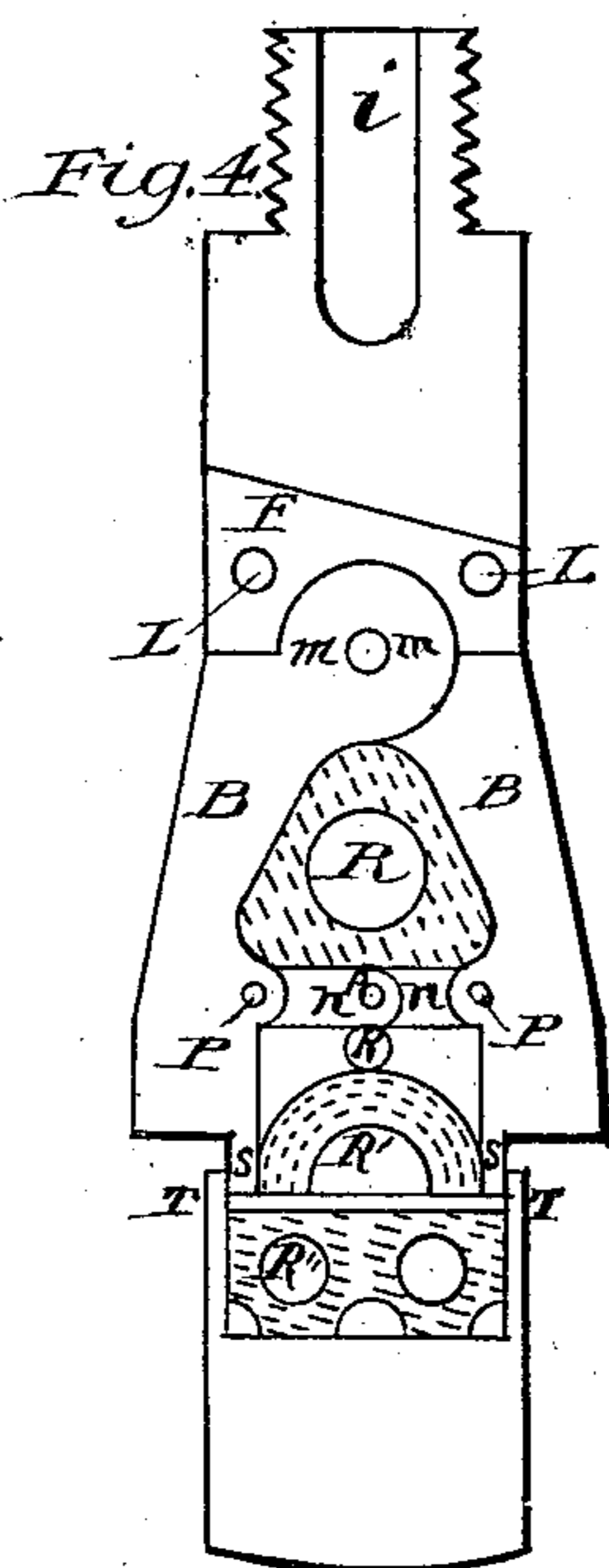


Fig. 4.

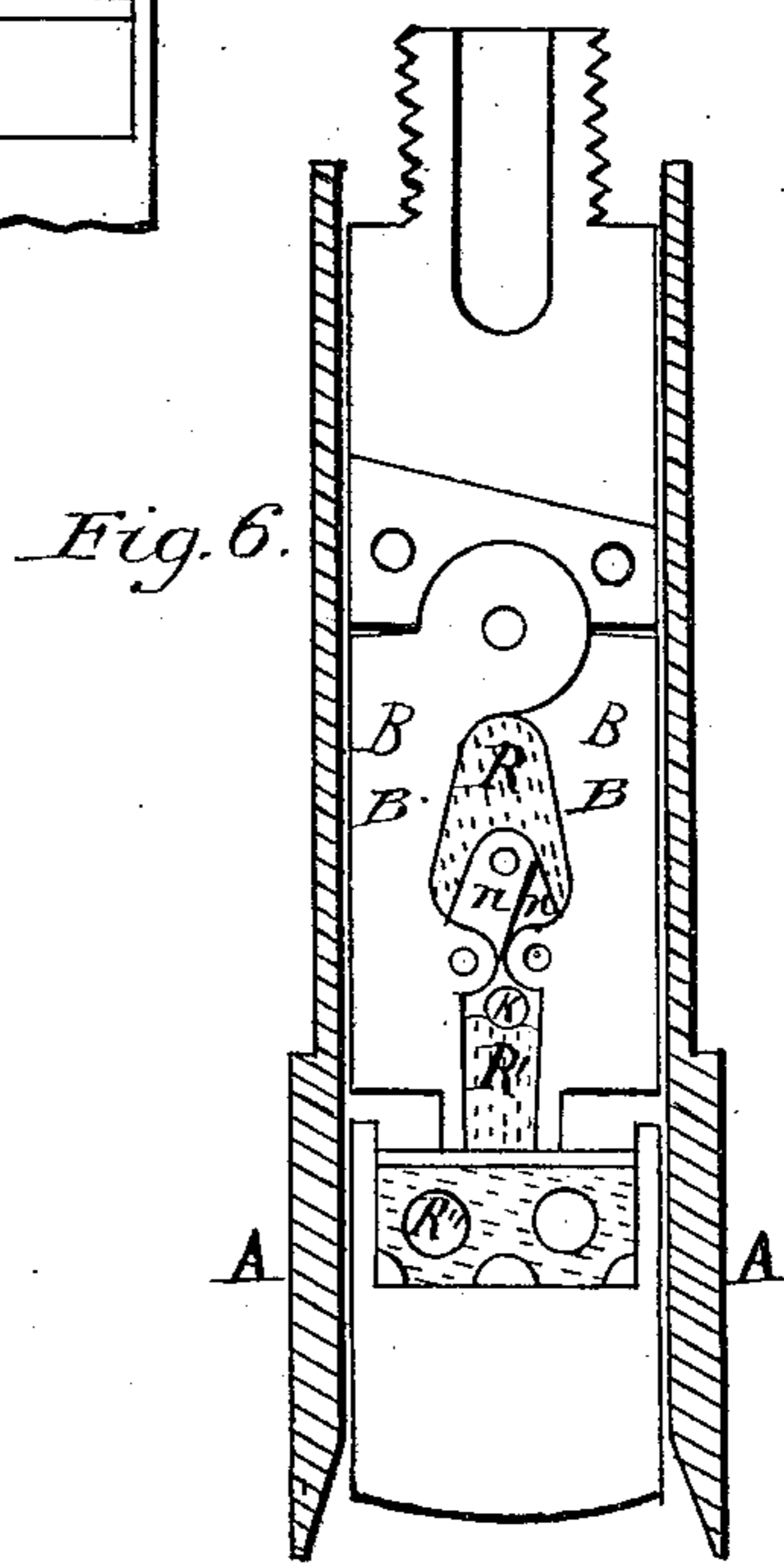


Fig. 6.

WITNESSES

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WELL-DRILL.

SPECIFICATION forming part of Letters Patent No 336,187, dated February 16, 1886.

Application filed April 10, 1885. Serial No. 161,862. (Model.)

To all whom it may concern:

Be it known that I, WILLET C. WELLS, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have invented a new and useful Improvement in Well-Drills, of which the following is a specification.

My invention relates to that class of reciprocating drills which by repeated blows excavate the well. Its special object is to provide for the automatic expansion and contraction of the cutting-wings of the drill while securing a rigid support of those wings in their expanded position during the operation of drilling.

In the accompanying drawings, Figure 1 shows an elevation of my drill at work as seen from the side; Fig. 2, an elevation of the same as seen from the edge; Fig. 3, a vertical section taken transversely of Fig. 1; Fig. 4, a vertical section taken transversely of Fig. 2, showing the wings in their expanded position. Fig. 5 shows the cutting-wings partly contracted or forced together as the operation of withdrawing the drill through the tube begins. Fig. 6 shows their position when the drill has passed within the tube and the contraction of the wings has become complete.

E is a hollow drill-stock, having openings C communicating therewith.

D is the drill head or bit.

B B are the expansible cutting-wings, pivoted at *m*.

A is the casing or tubing through which the drill passes.

G is the shank having valve H.

The screw-thread for uniting the shank to the drill-stock is shown at *g*.

F is a key or socket plate held in position by pins or rivets L L.

I is the vertical opening in the drill-stock.

J is the slot in the drill-head for the reception of the expansible wings.

R R R represent compressible springs, serving to hold the wings normally in their expanded position.

n n are arms or bars pivoted to the wing at *p p* and connected by pivotal joint at *r*, forming together a toggle-joint. *r* is a tripping pin below this joint, and S S are shoulders on the key or socket plate.

The operation is as follows: The springs

cause the wings to assume the position shown in Fig. 4, when the toggle-joint, being straightened, affords a perfectly rigid resistance to direct lateral pressure, while the shoulders at S afford a rigid resistance to any upward strain, the toggle and shoulder together serving to lock the wings rigidly against all strains which they have to resist in the operation of drilling. When the drill is to be withdrawn, either wholly or partially, the sloping outer faces of the wings are by the act of withdrawing it brought in contact with the outer tubing, which gives a diagonal downward and inward pressure upon them, forcing the toggle-joint against the trip K, whereby it is upset and the wings pass first to the position shown in Fig. 5, and then to that shown in Fig. 6, enabling the drill to be withdrawn through the tube. A single expanding-wing may be used in some cases, the jointed support therefor being attached to a fixed part of the drill.

Instead of making a toggle-joint, as shown, a pivoted bar or bars may be substituted, providing such bar or bars be so fulcrumed as to present rigid resistance to lateral pressure.

I prefer to use for the spring which is to expand the wings a flexible or compressible packing which serves at the same time to exclude detritus or sediment from the interior of the drill; but it is obvious that other kinds of springs may be substituted and secure other advantages of my invention, and that many other modifications in the construction of the parts may be made without departing from the essence of my invention.

I claim—

1. In a well-drill, two expansible wings having rigid vertical supports in bearings, in which they oscillate, and united by a toggle-joint, by which they are rigidly supported against lateral pressure when out of contact with the drilling-tube, substantially as described.

2. In combination with the expansible wing of a drill, connected by a toggle-joint and rigidly supported against vertical strains, a spring interposed between said wings and serving to force said wing or wings apart, for the purpose described.

3. In combination with a drill, an expansible wing formed with a projecting boss fitting into a corresponding socket-bearing, in which it oscillates, and provided with a shoulder

which rigidly abuts against a corresponding shoulder when the wing is in its expanded position, for the purpose described.

4. The combination of the wing or wings having a projecting boss or bearing-surface with a key or removable socket-plate having corresponding faces, in which said bosses are received and confined and in which they oscillate, substantially as described.

5. The combination of the wings having abutting shoulders, a toggle-joint uniting the wings, and an expansible spring serving to press the wings apart, for the purpose described.

6. The combination of an oscillating wing rigidly supported at its bearings against vertical strains, a bar pivotally connected to said wing below the center of oscillation of said wing and rigidly supporting the same in the expanded position when said wings are out of contact with the tube, and a trip mounted on the fixed part of said drill for upsetting said joint when said wing is contracted, substantially for the purpose described.

7. The combination, with the pivoted wings united by a toggle-joint, of a trip mounted on the fixed part of said drill, whereby the joint is automatically upset by the downward pressure of said wings forcing the toggle-joint against said trip when the wings are drawn upward through the tube, for the purpose described.

8. In combination with an expansible wing or wings, an elastic packing serving at once to force the wings to the expanded position and to exclude detritus or sediment from the interior, substantially as described.

9. The wings pivoted and connected by a toggle-joint normally held straight by means of outwardly pressing springs interposed be-

tween and bearing against said wings, as described, when said wings have rigid vertical support at their bearings and sloping outer faces, whereby a diagonal pressure is applied through their contact with the interior tubing when being withdrawn, for the purpose described.

10. An oscillating wing for a well-drill, having projected from the upper part thereof a boss adapted to oscillate in a corresponding socket, and abutting shoulder adjacent to said boss, and a cutting-edge at the lower end thereof, substantially as described.

11. The combination of socket-plate, wings having projecting bosses fitting into the sockets of said plate and oscillating therein, and shoulders abutting against the shoulders of said plate, a jointed connection between the wings, whereby they are rigidly supported against lateral strains, a trip for upsetting the joint, and spring for restoring the wings to their expanded position, substantially as described.

12. The combination of the drill having an expanding wing normally held in expanded position without external agency, and rigidly held in said position by a jointed support below the pivot of oscillation, with a hollow drill-stock, to which said drill is rigidly connected, said drill being provided with perforations, which communicate with the interior of said drill-stock, substantially as and for the purpose described.

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

WILLET C. WELLS.

Witnesses:

RUSH ABBOTT,
GEO. D. LOOMIS.