

No. 819,063.

PATENTED MAY 1, 1906.

H. R. HARDENBURG.  
SAND AND CAVINGS PUMP.  
APPLICATION FILED SEPT. 21, 1905.

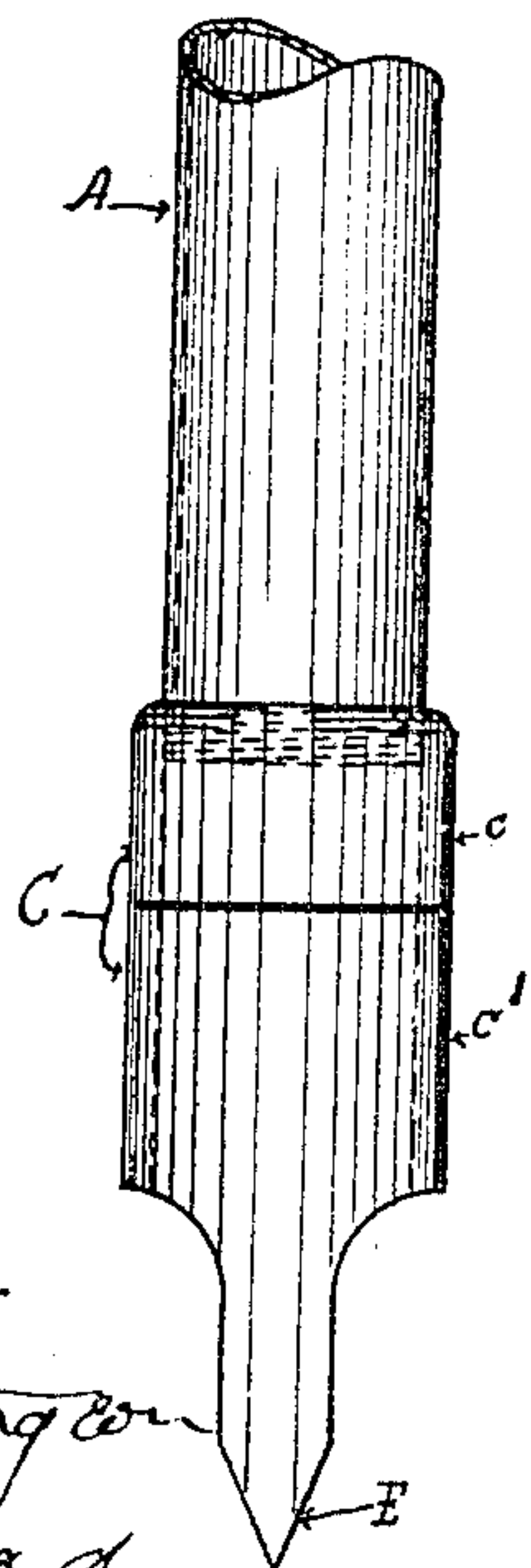
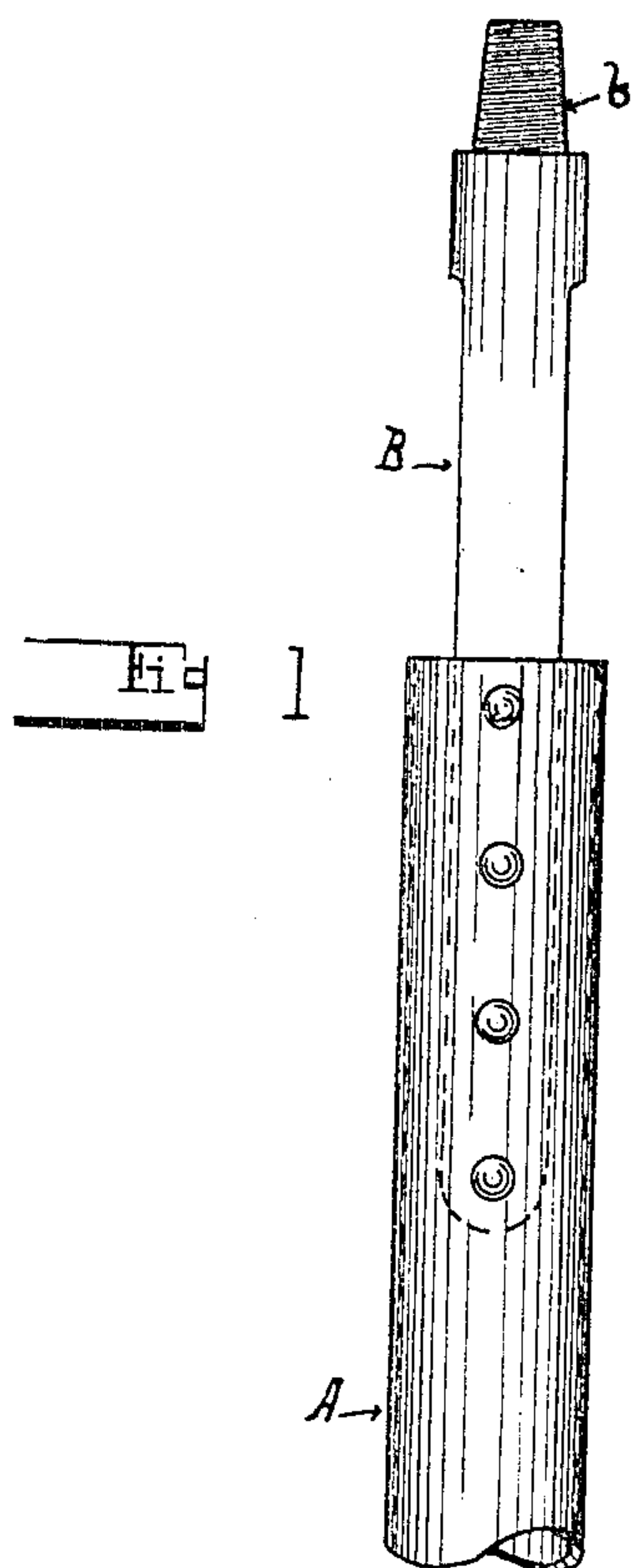


Fig. 2.

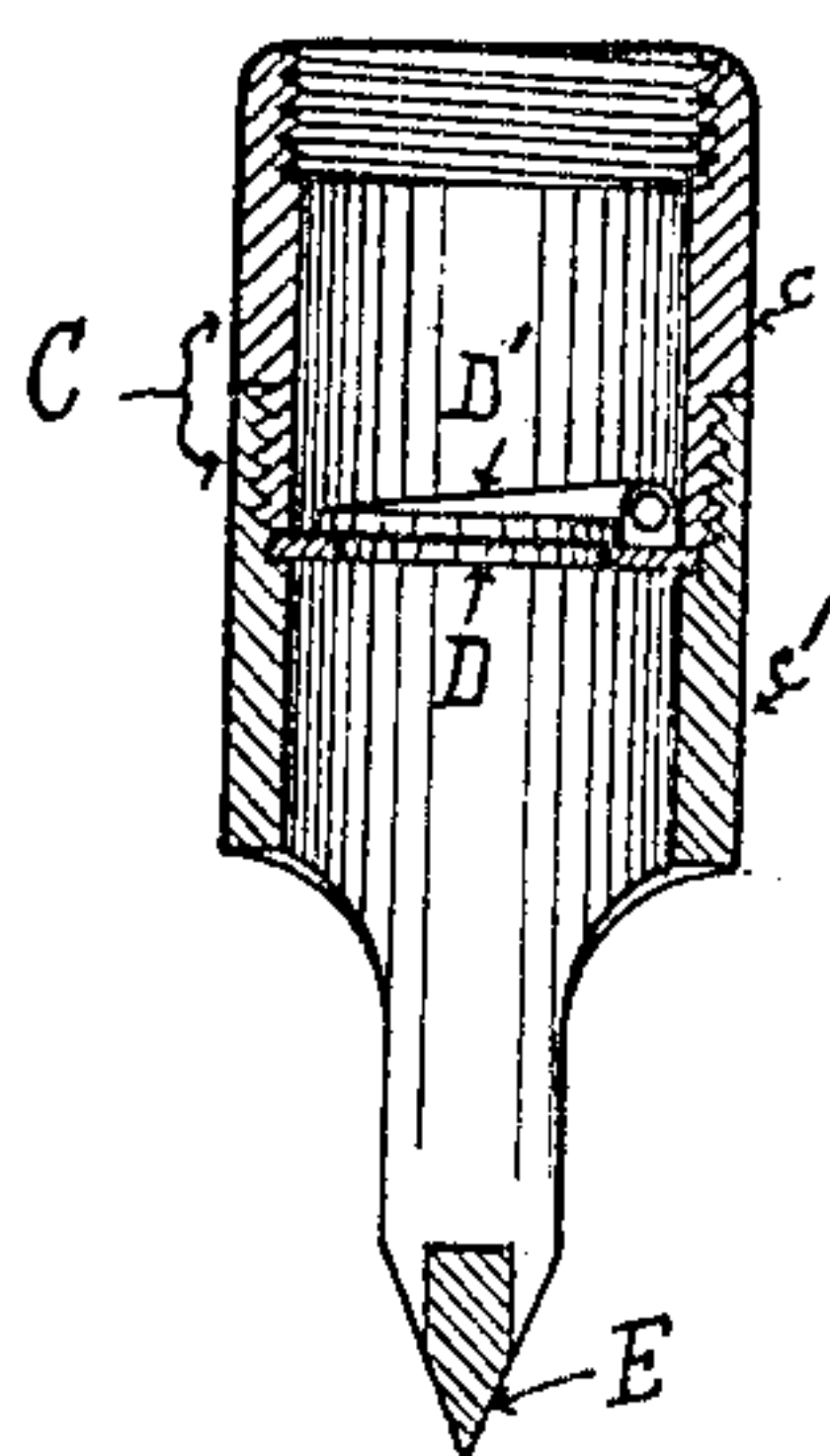


Fig. 3.

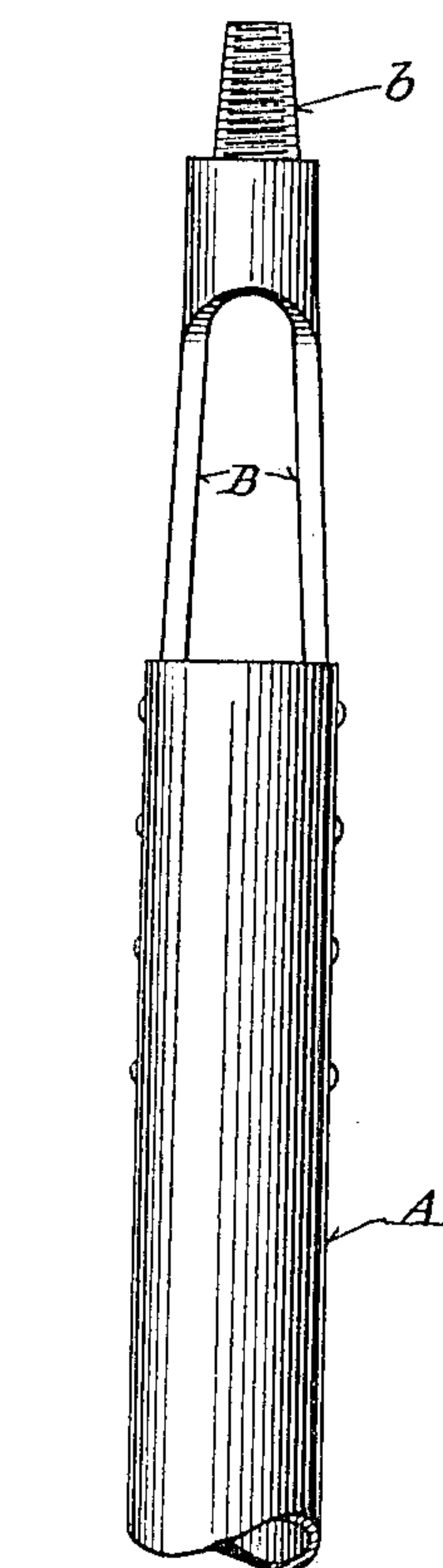
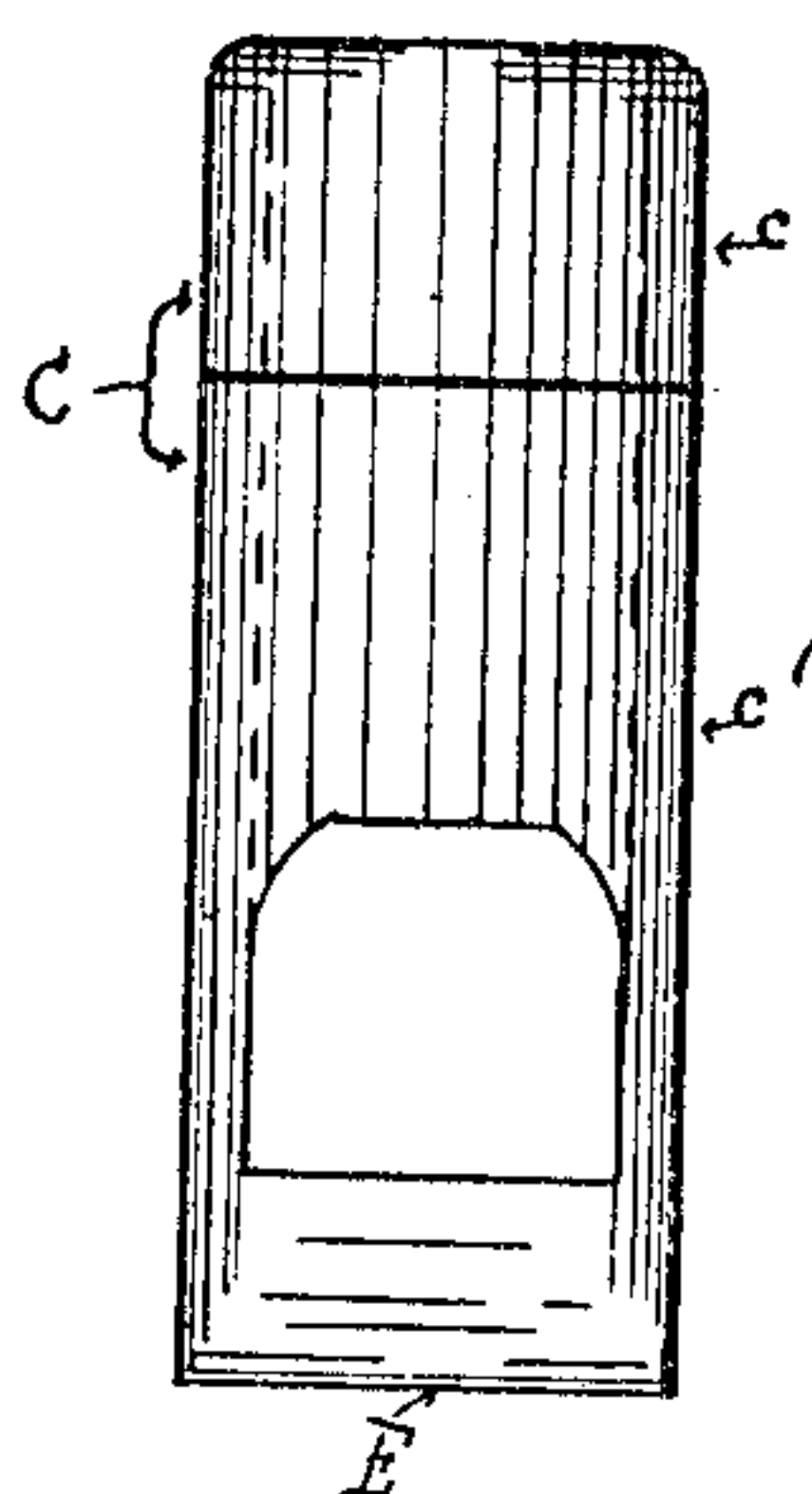


Fig. 4.

Witnesses.

B. A. Sturgeon  
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# UNITED STATES PATENT OFFICE.

HOWARD R. HARDENBURG, OF SAGINAW, MICHIGAN.

## SAND AND CAVINGS PUMP.

No. 819,063.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed September 21, 1905. Serial No. 279,477.

*To all whom it may concern:*

Be it known that I, HOWARD R. HARDENBURG, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Sand and Cavings Pumps; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

This invention relates to sand or cavings pumps used in drilling oil and other deep wells, and has for its object the construction of a pump which will take up the chips and sand produced by the action of the drill and the caving of the walls of the well without the necessity of first pulverizing said chips and cavings with the drill.

The features of this invention are fully set forth and described hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of my improved cavings-pump. Fig. 2 is a central vertical section of the valve-case and bit, showing the valve therein. Fig. 3 is a view in elevation of the valve-case and bit. Fig. 4 is a view in elevation, showing a side view of the bail and bit of my improved sand and cavings pump.

In the construction of my improved cavings-pump I make the body portion A thereof of tubing and secure within its upper end a yoke or bail B, preferably provided with a screw-nipple *b*, by which the pump can be attached to the lower end of a drill-stem or rope-socket. The upper end of the pump-body A is left open, the bail B spanning and extending somewhat above the upper end of said body portion A, so as to permit the emptying of sand and cavings out of the upper end of said pump. The lower end of this pump is provided with a bit, as shown, Fig. 1, and with a valve therewithin adjacent to its lower end. In construction, however, I preferably secure upon the lower end of the tubular body A a valve-case C, which is com-

posed of two sections, preferably secured together by means of screw-threads, as shown in Fig. 2. Between the two sections *c* and *c'* of the valve-case C, I place a valve-seat D, upon which a valve D' operates. The lower end of the section *c'* I cut away, as shown in all the figures, and provide it with a bit E.

In operation this pump is secured upon a tool-stem, such as a drill is ordinarily attached to, but preferably of less weight, and is then lowered into the well from which cavings and drillings are desired to be removed and is given an upward and downward reciprocation by means of the usual mechanism ordinarily employed in well-drilling. The weighted pump-stem forces the pump-bit down into and among the chips of rock and cavings, thereby stirring them up, and with each downward movement or reciprocation of the pump forcing the said rock-chips and cavings upward through the opening in the valve-seat, where they are retained by the valve D' until the pump-body is full, when the pump is raised out of the well and emptied and the operation repeated until all the cavings and chips are removed.

Having thus described my invention, so as to enable others skilled in the art to which it appertains to construct and utilize the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

The combination in a sand-pump of a tubular body-section, a bail rigidly secured within the upper end of said body portion so as to leave said upper end open, a nipple on said bail adapted to be screwed into the lower end of a drill-stem, a sleeve of larger diameter than the body portion upon the lower end thereof, another sleeve having a transverse bit formed on its lower end, secured upon the first-named sleeve, a valve-seat secured between said sleeves, and a valve pivoted to and seated upon said valve-seat, substantially as set forth.

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

HOWARD R. HARDENBURG.

Witnesses:

M. C. SLOAN,  
F. W. HEWITT.