

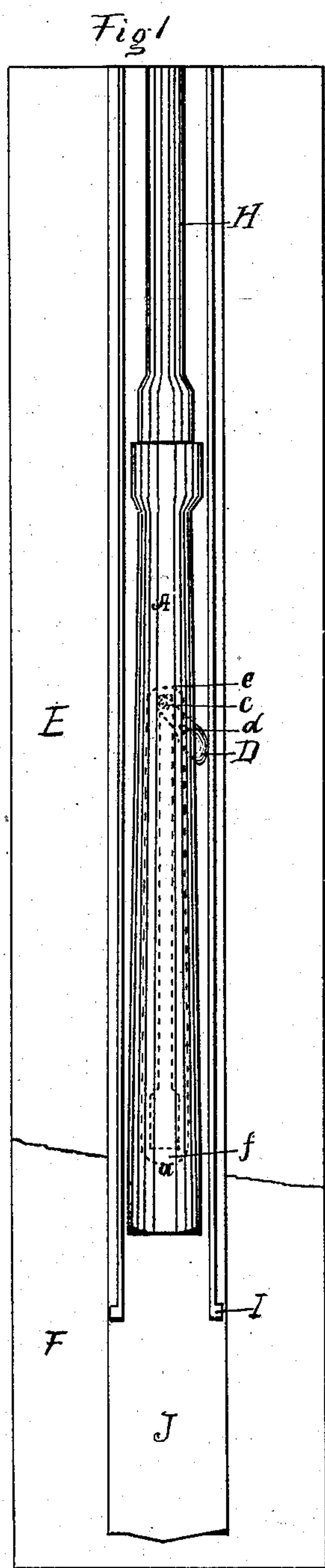
(No Model.)

W. D. BRADEN.

WELL REAMER.

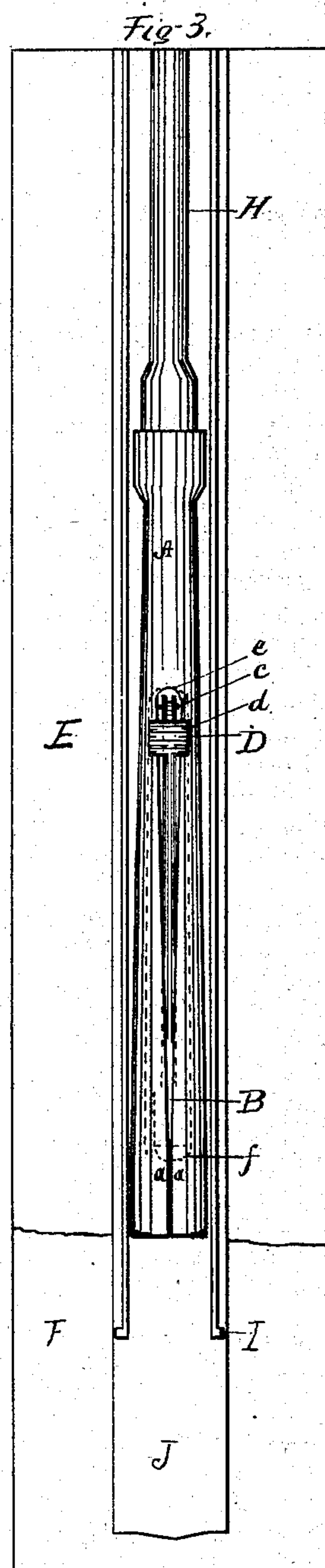
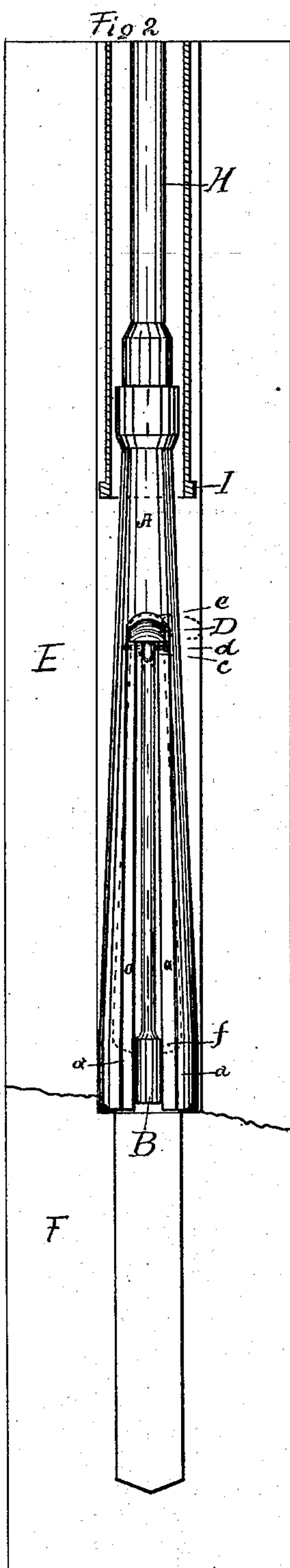
No. 315,596.

Patented Apr. 14, 1885.



WITNESSES:

*Simon Cohen*  
*Goodlander*



INVENTOR

*William D. Braden.*

BY

*J. A. McAnulty.*  
ATTORNEY



# UNITED STATES PATENT OFFICE.

WILLIAM D. BRADEN, OF DENVER, COLORADO.

## WELL-REAMER.

SPECIFICATION forming part of Letters Patent No. 315,596, dated April 14, 1885.

Application filed May 26, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM D. BRADEN, a citizen of the United States, residing at Denver city, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Well-Reamers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in well-reamers; and the objects of my invention are to provide a means by which a well may be driven a uniform size from the surface to the bottom, and a means by which the casing may follow the work in order to prevent caving in. These objects I attain by means of the device illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side view of the reamer as represented passing down or up through the casing; Fig. 2, a view of the reamer in its normal position as in use; Fig. 3, a front view of the reamer in the position assumed during descent and ascent through the casing.

Similar letters refer to similar parts throughout the several views.

In sinking wells where rock and quicksands or like substances have to be penetrated, the practice heretofore has been to bore or drill down to the rock and insert casing to prevent caving in of the quicksand or other like material. A drill is then used to penetrate the rock sufficiently smaller than the first used to pass down and up through the casing. After drilling through the rock, should quicksands succeeded by rock again be encountered, the same process is repeated until the diameter of the well is lessened insomuch as in many cases to necessitate abandonment.

In order to continue the well a uniform size from the surface of the ground, I have devised a compressible reamer, which is designated in the accompanying drawings by the letter A, the lower part of which is divided into two arms, *a a*, that normally diverge somewhat, as shown in Fig. 2, and the inside surfaces of which are provided with grooves from the points *e* to *f*, which are indicated in the drawings by dotted lines.

Between the parts *a a* is suspended a mandrel, B, by means of a short lever, D, which is fulcrumed between the parts *a a* by means of the pin *d*. One end of the lever is coupled to the stem of the mandrel D by means of the pin or bolt *c*. The outer end of the lever is convexed in such a manner as to fit neatly inside of the well-casing when in the position shown in Fig. 1.

E in the drawings represents quicksand or other material that might have a tendency to cave in, and F represents rock or other solid substances that may be encountered.

Having drilled down to the rock, the casing is placed in the well, extending within a few feet of the rock, or may extend to the rock. A drill is then passed down through the casing, and a hole driven through the rock, considerably less in diameter than the size of the well, from the surface to the rock. The casing is then raised a few feet above the rock. The reamer is then compressed, as shown in Figs. 1 and 3, and forced down through the casing.

In order to compress the reamer sufficiently to pass down through the casing, the mandrel is raised upward from the position shown in Fig. 2 to the position shown in Figs. 1 and 3 by forcing downward the outer end of the lever D. The parts *a a* may then be pressed together, as shown in Fig. 3, and inserted into the casing and forced downward. As the parts *a a* pass out of the lower end of the casing, the reamer resumes its normal position, and when that part of the reamer to which the lever D is fulcrumed passes below the casing the lever is released, which allows the mandrel to drop downward into the position shown in Fig. 2, which holds the parts *a a* in their normal position, preventing their compression while reaming out the well to the same size of that above the rock. In raising the reamer out of the well the outer end of the lever D comes in contact with the lower end of the casing, which forces it into the position shown in Fig. 1, raising the inner end of the lever D upward, carrying the mandrel B up opposite the grooves in the parts *a a*. The latter is then compressed together by the contact of the casing as the reamer is drawn upward.



By reference to the drawings it will be seen that the grooves indicated by dotted lines serve as a receptacle for the mandrel B when the parts *a a* are compressed together, that the reamer resumes its normal position when passing below the casing, and that the lever D is released when below the tubing, which allows the mandrel to drop into position between the parts *a a* in such a manner as to retain them a sufficient distance apart to ream the well the same size of that in which the tubing is placed.

Having thus fully set forth the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as set forth, of the stock A and the normally-diverging arms *a a*.
2. The combination, substantially as set forth, of the stock, its normally-diverging

arms, and the mandrel located between the arms.

3. The combination, substantially as set forth, of the stock, its normally-diverging grooved spring-arms, and the mandrel located between the arms.

4. In a reamer, the combination, substantially as set forth, of the stock, its normally-diverging arms, the mandrel located between the arms, and the lever for raising and lowering the mandrel that projects laterally from the arms, whereby the mandrel may be automatically adjusted as the reamer is raised or lowered.

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

WILLIAM D. BRADEN.

Witnesses:

JAMES C. STARKWEATHER,  
A. MIAL.