

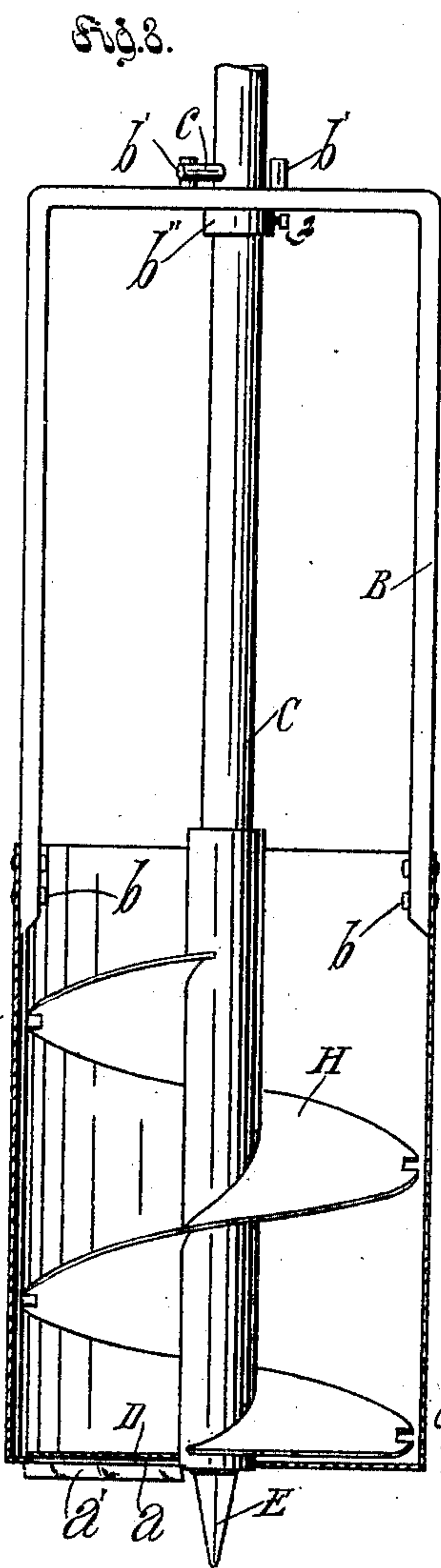
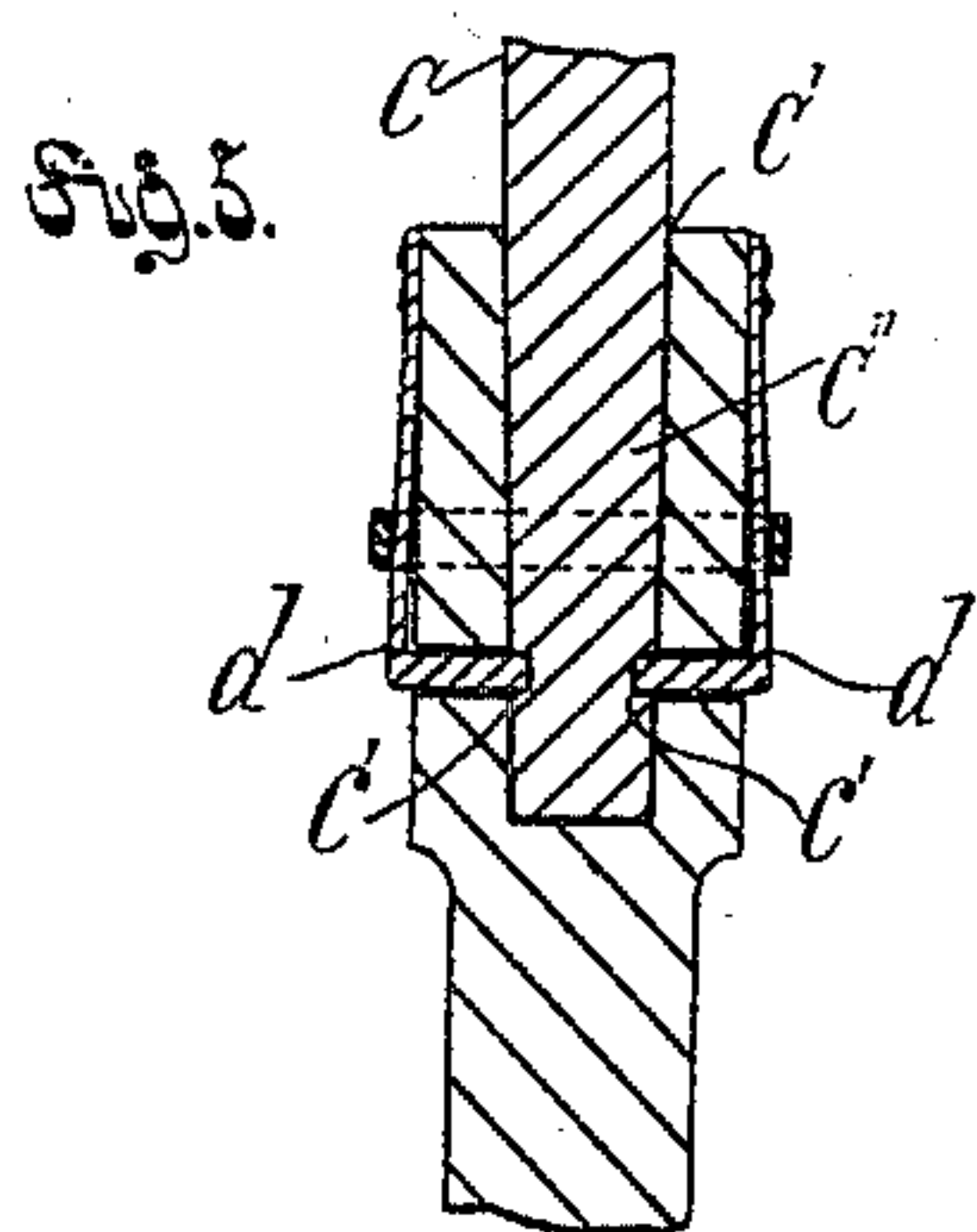
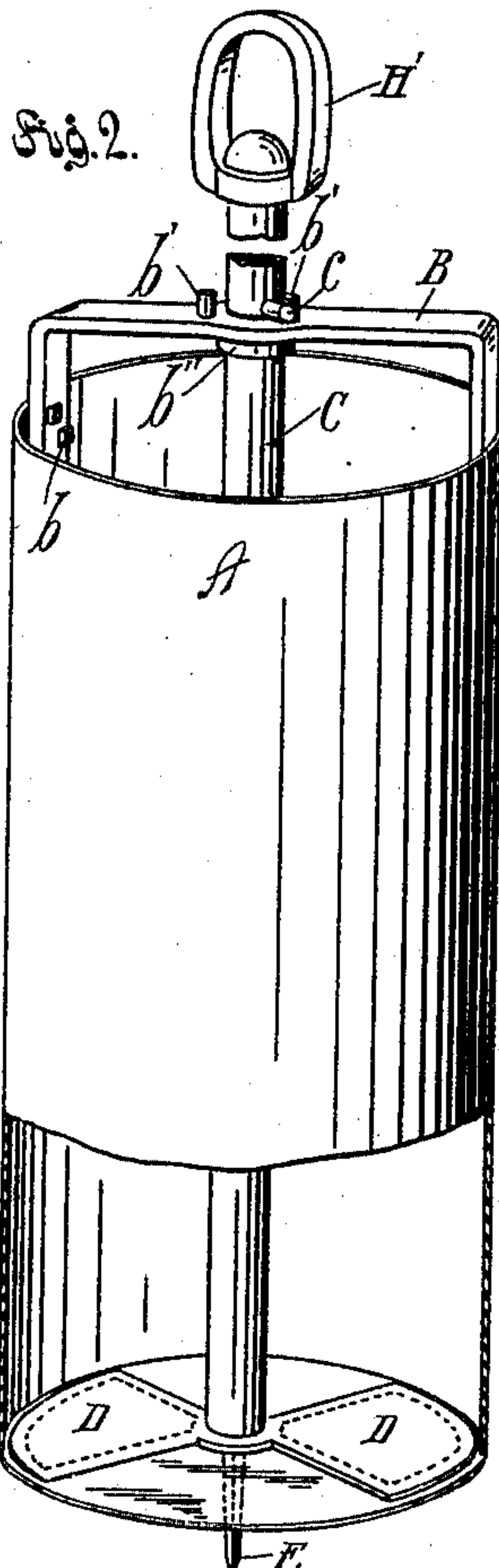
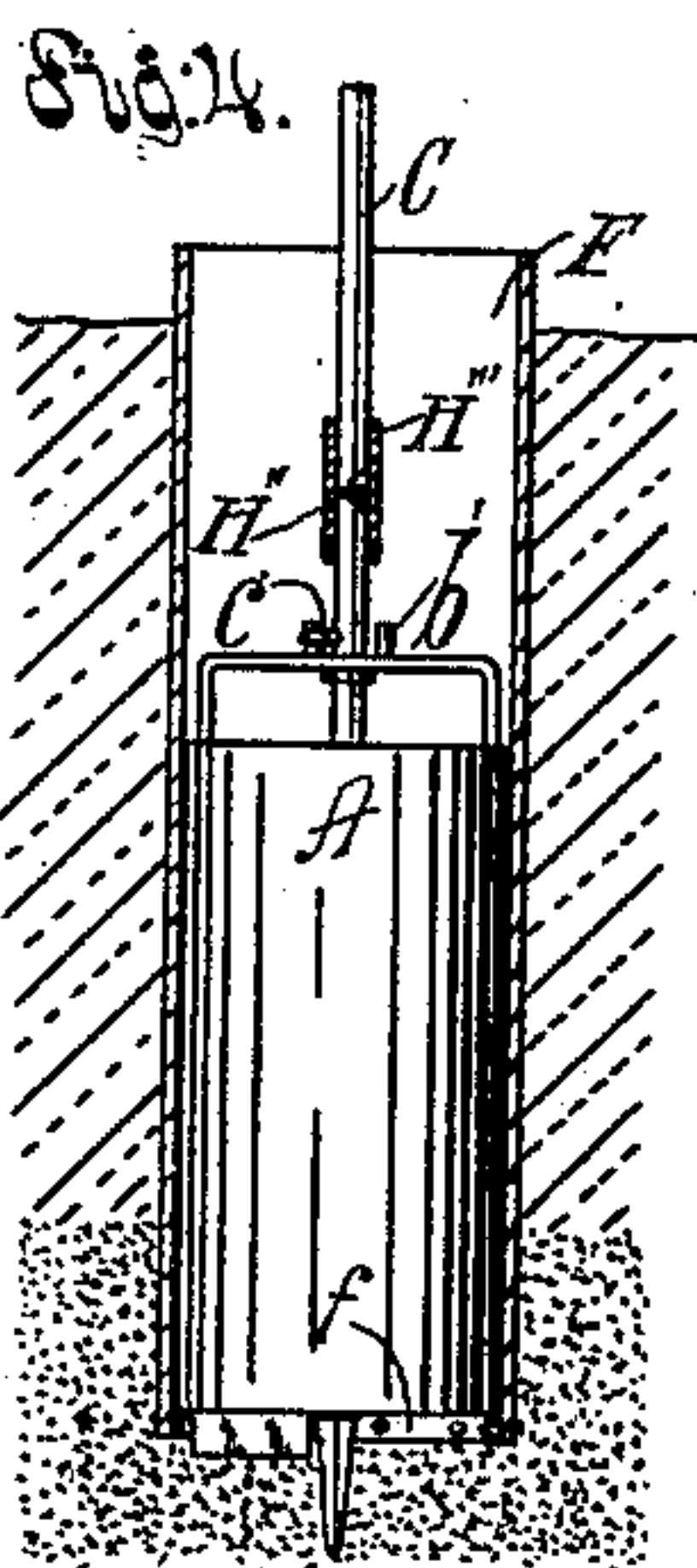
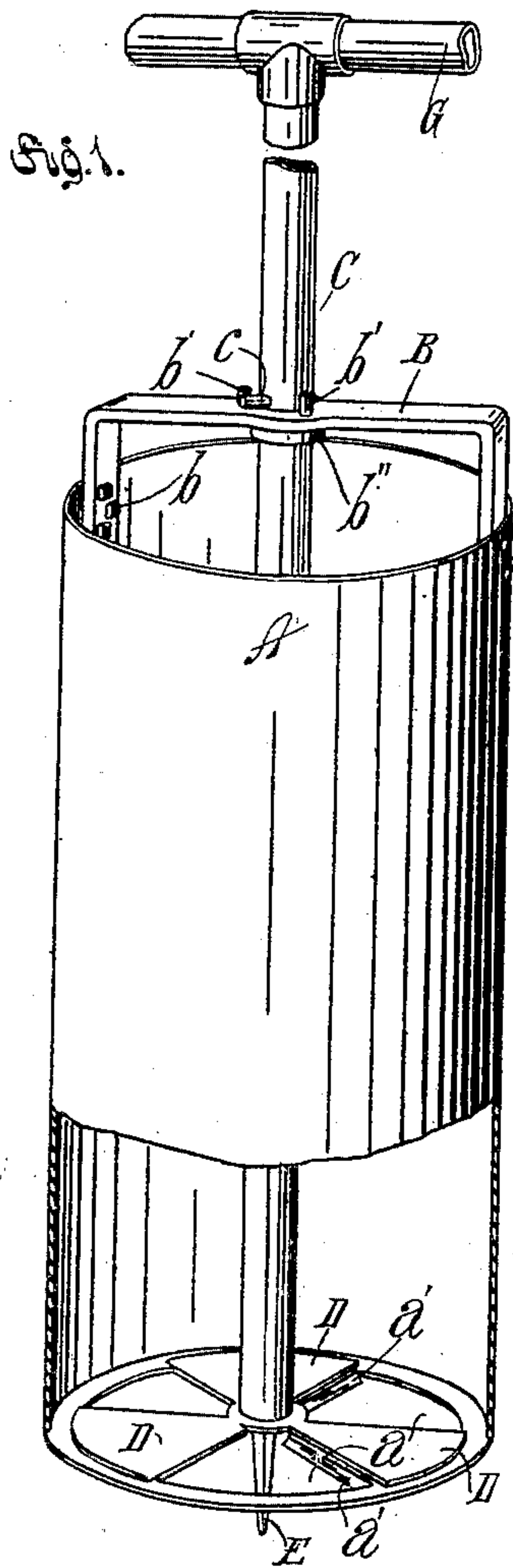
No. 706,396.

Patented Aug. 5, 1902.

C. EHRENFELD.
DREDGE AND WELL BORER.

(Application filed May 2, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

CHARLES EHRENFELD, OF PASADENA, CALIFORNIA.

DREDGE AND WELL-BORER.

SPECIFICATION forming part of Letters Patent No. 706,396, dated August 5, 1902.

Application filed May 2, 1898. Serial No. 679,537. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EHRENFELD, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented new and useful Improvements in Dredges and Well-Borers, of which the following is a specification.

The particular object of my invention is to provide a dredge or well-borer which will be adapted for dredging quicksands or gravel in river-bottoms and whereby the auriferous deposits may be removed therefrom to the surface, so that the gold can be separated from the waste.

It is also an object of my invention to produce a device of this kind which may be used either as a dredge or as a well-boring machine and whereby soil, small rocks, gravel, and clay can be rapidly excavated and readily discharged from the cylinder of the dredger-bucket.

My invention comprises the various features of construction and combinations of parts, whereby I am enabled to provide a dredge which will cut from the underlying sand, gravel, clay, or soil sufficient to fill the dredge and the opening then closed, so that the dredge, with its accumulated load of material, including the finest particles, may be raised to the surface for treatment. The peculiar feature of my dredge is that the closure of the dredge is effected by means of a shearing or sliding motion of the gate, whereby there is no liability of any obstruction preventing the proper closure of the gate, which would allow the escape of the material from the dredge.

In carrying out my invention I employ a hollow cylindrical body provided with a bottom having one or more openings, with a cutting-blade at one edge of each opening, a yoke extending over the top of the cylinder and provided with upwardly-projecting lugs, a shaft slidingly journaled in the yoke and in the bottom of the cylinder and provided at its lower end, above the bottom of the cylinder, with a blade to form a gate to close the opening in said bottom, and a lug extending from the side of the shaft above the yoke to engage with the lugs of the yoke to cause the

cylinder to rotate with the shaft when the blade which forms the gate is against the bottom of the cylinder, but to release the shaft and allow it to rotate when the blade has been withdrawn from the bottom. I have also provided the shaft with a screw to fit inside the cylinder, and I provide means for holding the screw from rotating after the lug of the shaft has been withdrawn from the lugs of the yoke. I also provide a collar on the shaft underneath the yoke with a set-screw to fasten the collar to the shaft to prevent the shaft from sliding when in operation, but to allow the shaft to be slid upward at the pleasure of the operator when it is desired to dump the contents.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevation of one of my improved dredges, portions being broken away to expose the construction. In this view the gates are in their open position. Fig. 2 is a like view showing the gates in their closed positions. Fig. 3 is a vertical mid-section of a modified form of dredge. Fig. 4 is a side elevation of my improved dredge in position in the casing, whereby the quicksand may be prevented from running into the shaft excavated by the dredge. Fig. 5 is a longitudinal section of one of my improved joints for connecting the sections of shaft for operating the dredge.

In the drawings, A represents a hollow cylindrical body which forms the dredge and is provided in its bottom with one or more openings *a*. As shown in Fig. 1 of the drawings, three openings are provided, and in Fig. 2 but two openings are shown, while in Fig. 3 only one opening is provided. Thus it will be seen that a greater or smaller number of openings may be provided, depending upon the size of the dredge and the character of the material to be worked. Upon the bottom of the dredge at one side of each opening is secured a blade or cutter *a'*, which is adapted to sever the material and to direct it upward into the dredge. These cutters are removable, so they may be replaced with others when necessary.

B is a yoke which is secured to the top of the body by means of bolts *b*.

C is an axially - arranged shaft which is

journalled in the yoke and in the bottom of the casing and is provided with a pin or stop-arm *c*, which is adapted to engage with stops *b'* upon the yoke to limit the rotation of the shaft. A collar *b''*, arranged beneath the yoke and adjustably secured to the shaft by the set-screw 2, prevents the withdrawal of the shaft from the dredge.

D represents gates which are secured to the lower end of the shaft and are adapted to close and uncloze the openings *a*, according to the direction in which the shaft and casing are being rotated.

The actuating-shaft C is made in lengths in the usual manner, the top of each section being provided with a square socket *C'*, into which fits the square lower end *C''* of the succeeding section. Dogs *d* take into notches *c''*, provided in the square-shouldered end, and prevent its withdrawal from the socket.

E represents a point or center which is screwed into the lower end of the shaft to center the dredge during its downward travel, and F is a tubular casing or pipe which may be forced downward through the quicksand and gravel to prevent the filling in of the shaft as the dredge opens the shaft. A ring *f* is secured upon the inside of the bottom of the casing, and the dredge is arranged to engage therewith while the cutters project below the ring to sever the material in advance of the casing; but the dredge cannot advance faster than the casing; also, the weight of the dredger assists in forcing the casing down.

In the event of hard clay or other stable material being found beneath a bed of quicksand the ring *f* may be removed from the casing before sinking the casing, so that when the casing rests upon the clay the dredge may be operated to sink the shaft on through the clay, no casing being required in clay to prevent caving or filling in of the shaft.

In practical operation the dredge is placed upright and is rotated by means of a handle G, a wrench, or other suitable appliance secured to the shaft. If desired, steam or other power may be applied to operate it. As the dredge is rotated toward the right the shaft partially rotates until the stop-arm *c* comes into engagement with the stop *b'*, and then the openings are uncovered and the rotation of the dredge forces the cutters into the sand, gravel, or clay, and the loosened material passes upward through the openings into the dredge. When the dredge is filled with material, the shaft is partially rotated backward, the dredge remaining stationary, while the gates shear past the openings and close them. Afterward the dredge, with its contained load, is raised to the surface, the shaft partially rotated toward the right, thus uncovering the openings the same as during the operation of boring, and the material passes downward through the openings and out of the dredge.

In Fig. 3 I have shown a screw H secured to the shaft and free from the body, so that any clay passing upward through the opening

will be carried upward by the screw and prevented from packing in the lower portion of the dredge. In this form in order to facilitate the operation of discharging the clay from the dredge I make the screw removable from the dredge by elongating the side arms of the yoke B, so that by loosening the set-screw which holds the collar *b''* upon the shaft the collar may be slipped down until it rests upon the top of the screw H, and the shaft and the screw may then be withdrawn from the casing and the clay and other material removed from the screw, after which the screw is again inserted in the dredge and secured by the collar *b''*.

To prevent the rotation of the screw after the shaft has been raised sufficiently for the stop-arm *c* to be above the stops *b'*, the edge of the screw is preferably provided with notches *h*, which engage with the yoke and prevent rotation of the screw. By preventing the rotation of the screw the material within the body or casing will be raised upward until it slips off the screw and over the top of the casing. As soon as the casing has been emptied the screw is lowered until the stop-arm *c* enters between the pins *b'*, and the collar *b''* is raised on the shaft until it is just below the yoke, where it is rigidly secured by the set-screw, and the device is again ready for operation.

H' represents a swivel which may be secured to the top member of the shaft, so that a suspending-rope may be secured thereto to control the downward travel of the dredge and to also operate to raise the filled dredge.

It is obvious that where the bed of quicksand is not very deep the body of the dredge may be made of sufficient length to avoid the necessity of using the casing F in order to reach and remove the auriferous deposits.

H'' represents a joint arranged in the shaft just above the yoke, so that when desired the joint may be broken and the dredge turned upside down to empty therefrom any material which will not readily pass out through the openings at the bottom. A slip-collar H''' renders the joint stiff while the dredge is being operated.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A dredge comprising a hollow cylindrical body provided with a bottom having an opening; a yoke extending over the top of the cylinder and provided with upwardly-projecting lugs; a shaft slidably journaled in the yoke and in the bottom of the cylinder and provided at its lower end above the bottom of the cylinder with a blade to form a gate to close the opening; a lug extending from the side of the shaft above the yoke to engage with the lugs of the yoke to cause the cylinder to rotate with the shaft when the gate is against the bottom of the cylinder; means for temporarily holding the shaft with its lug in position to engage the lugs of the yoke; a

screw above the gate and fixed to the shaft; and means for locking the screw against rotation when the shaft is being slid upward.

2. A dredge comprising a hollow cylindrical
5 body provided in its bottom with an opening;
a yoke having elongated side arms secured
to the top of the casing; a shaft journaled in
the yoke and in the bottom of the dredge and
having a screw secured thereto, the edges of
10 the screw being provided with notches to en-

gage with the side arms and prevent rotation of the screw, stop-arms on the yoke; a pin on the shaft to engage with the stop-arms; and a collar on the shaft between the top of the yoke and the screw.

CHARLES EHRENFELD.

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