

(No Model.)

2 Sheets—Sheet 1.

W. F. BENNETT & S. HILL.
EARTH AUGER.

No. 572,325.

Patented Dec. 1, 1896.

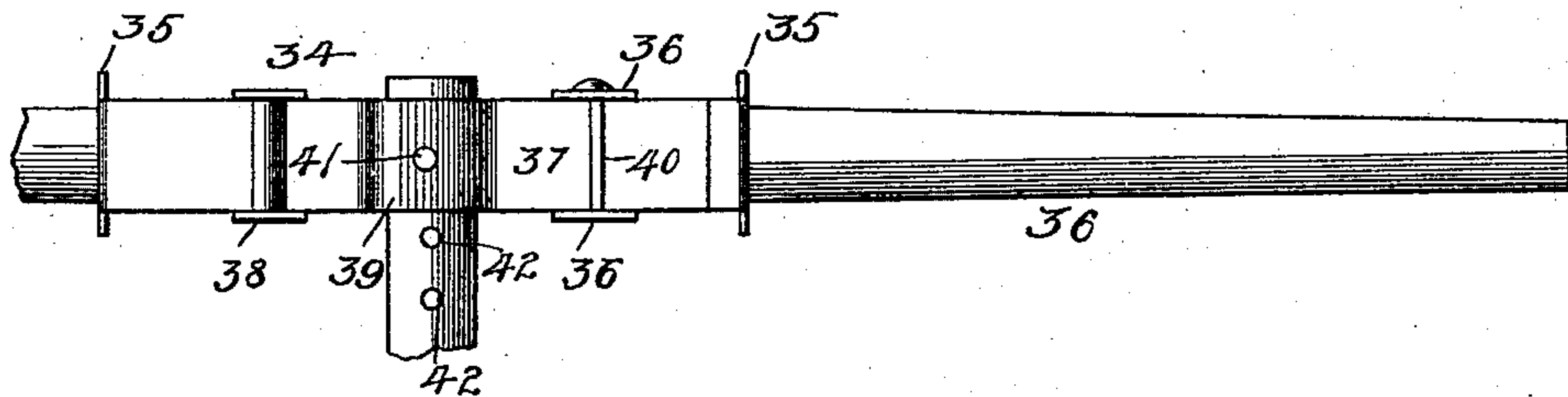


Fig. 6.

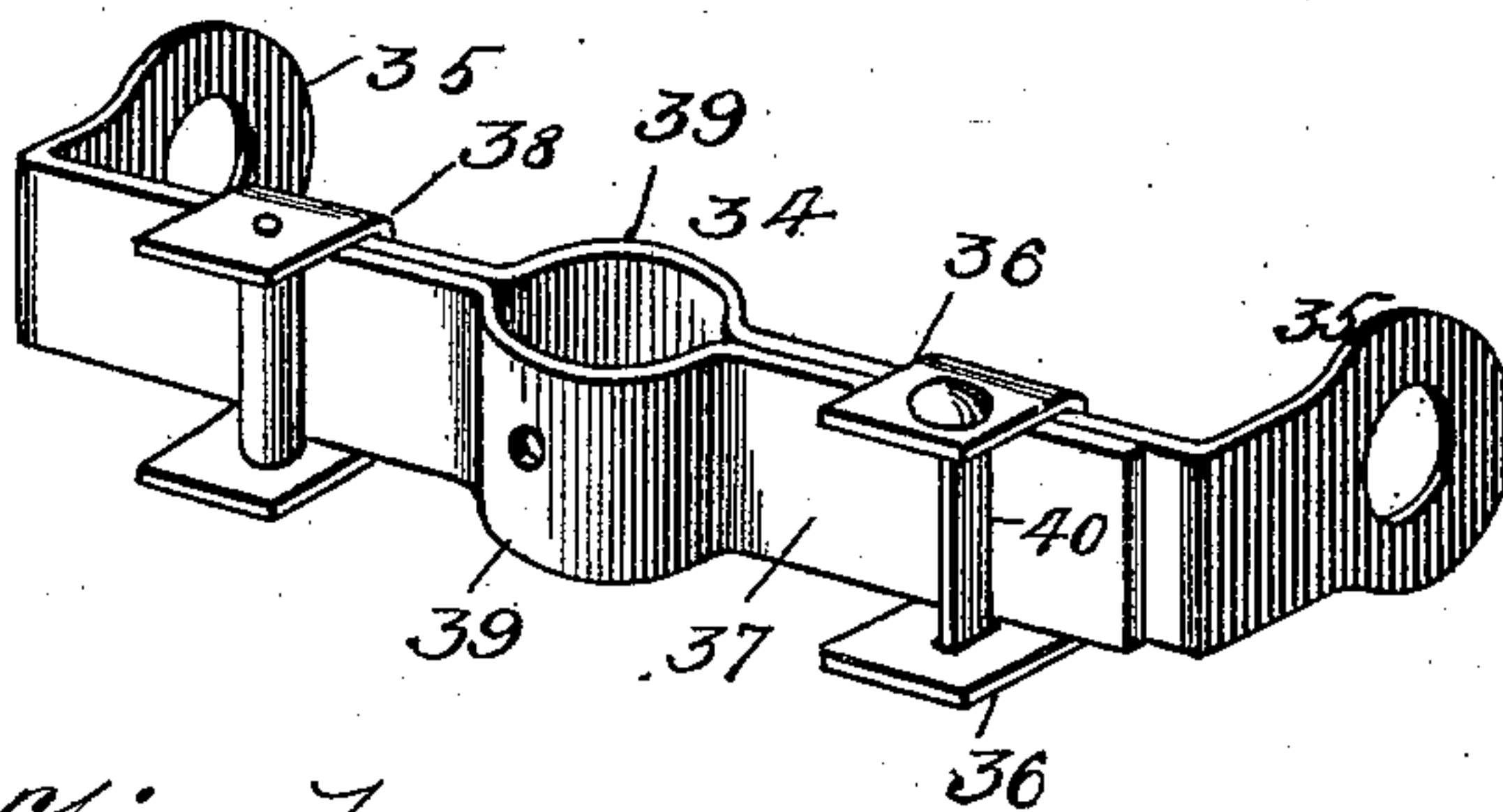


Fig. 7.

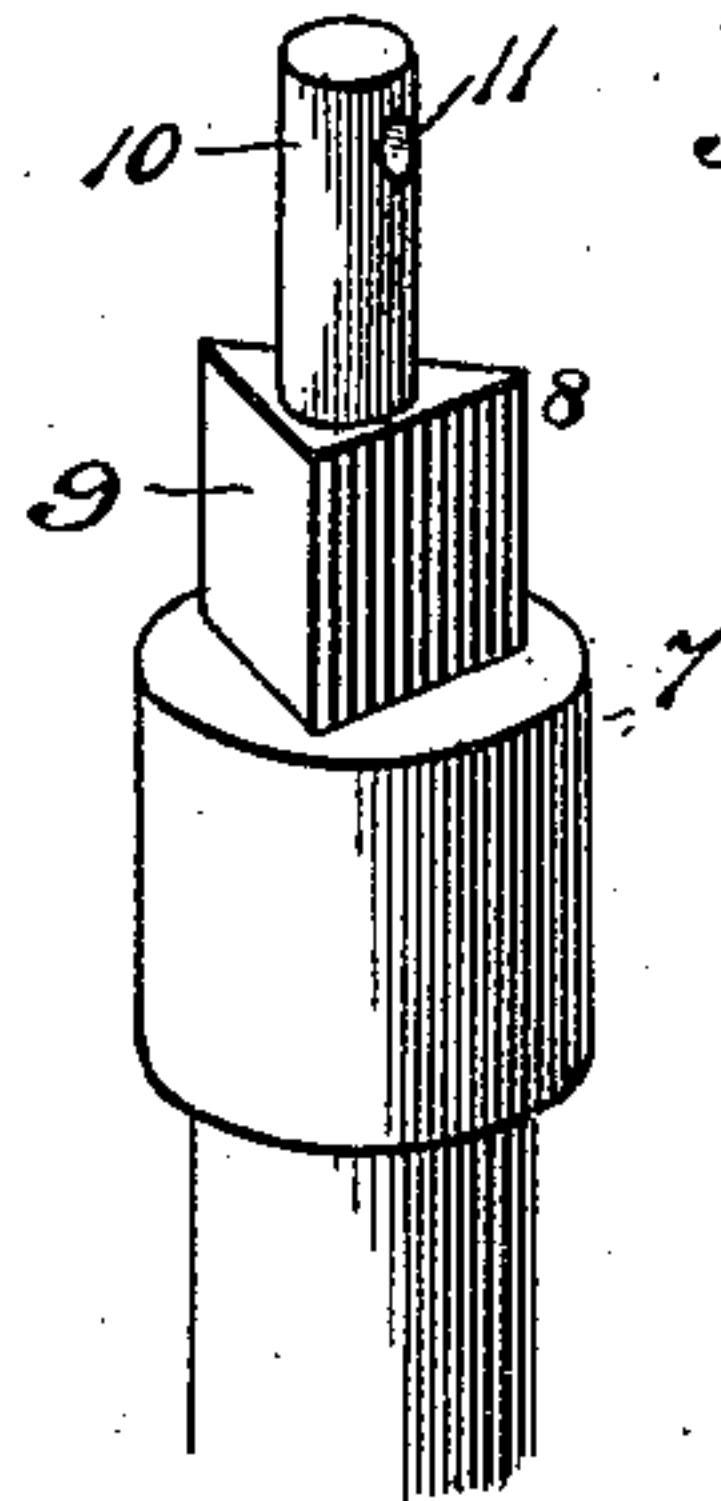
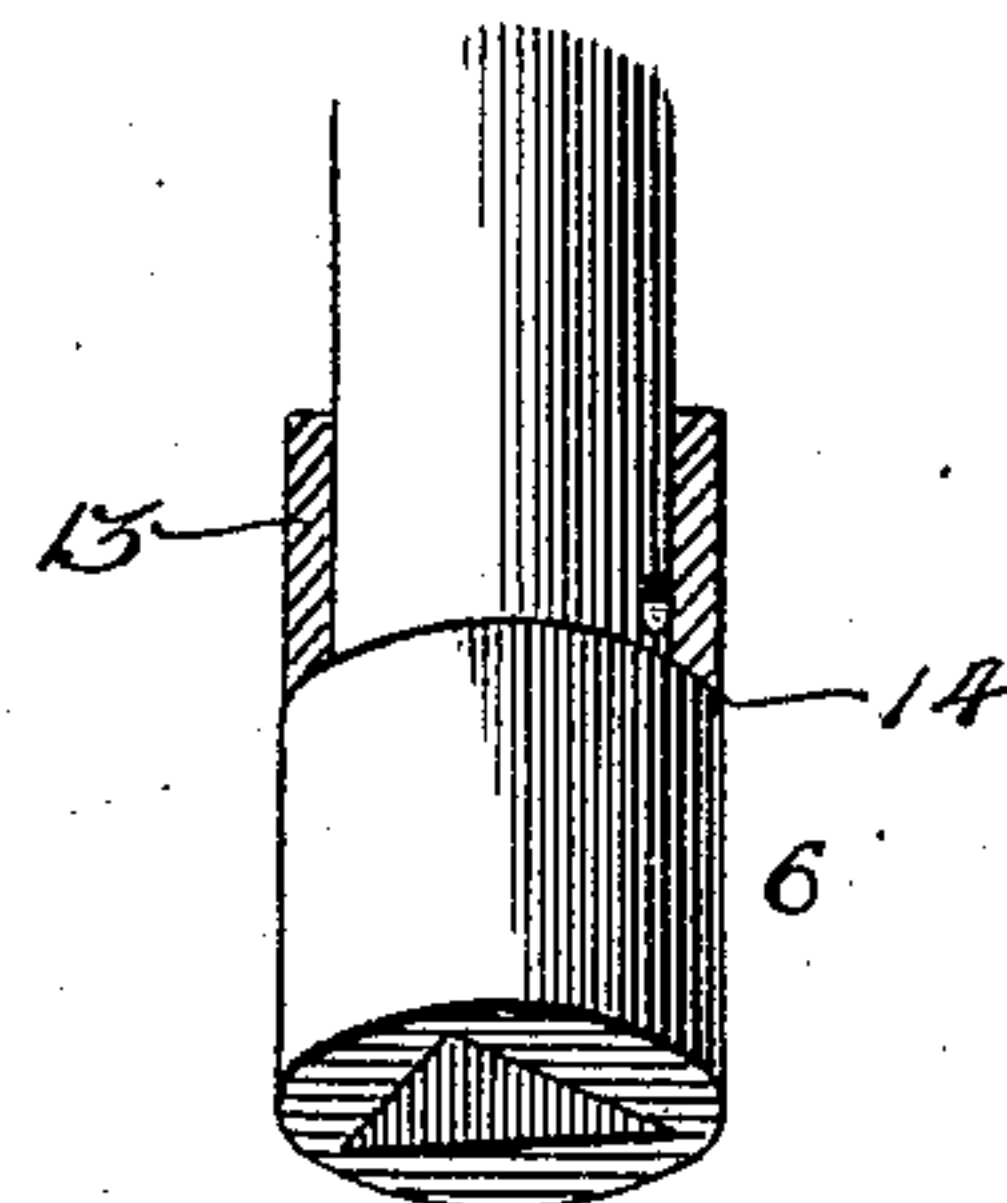
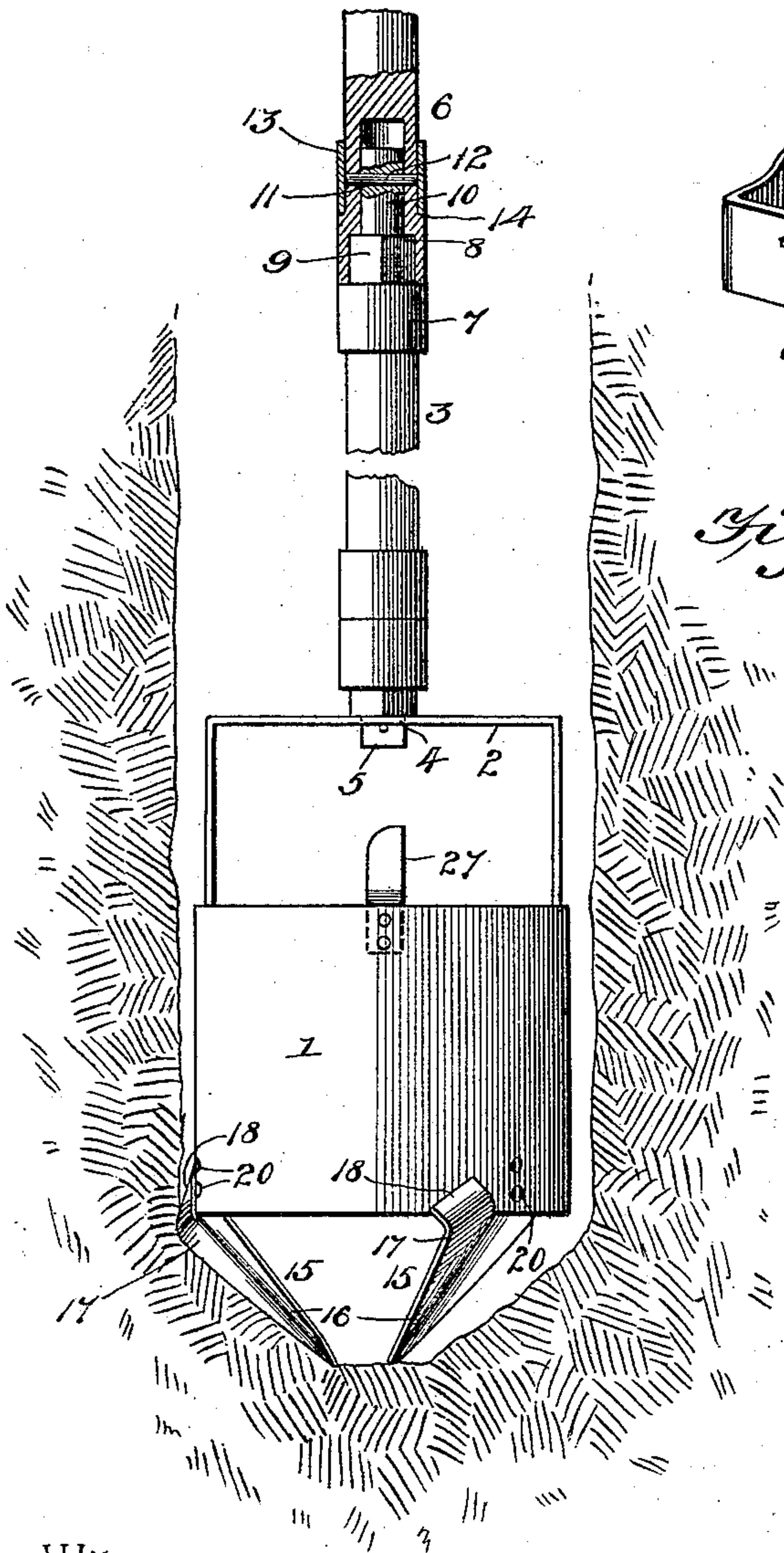


Fig. 3.

Witnesses

E. N. Moore

By their Attorneys,

C. E. Hoyle

Inventors
William F. Bennett.
Stephen Hill.

C. A. Snow & Co.

(No Model.)

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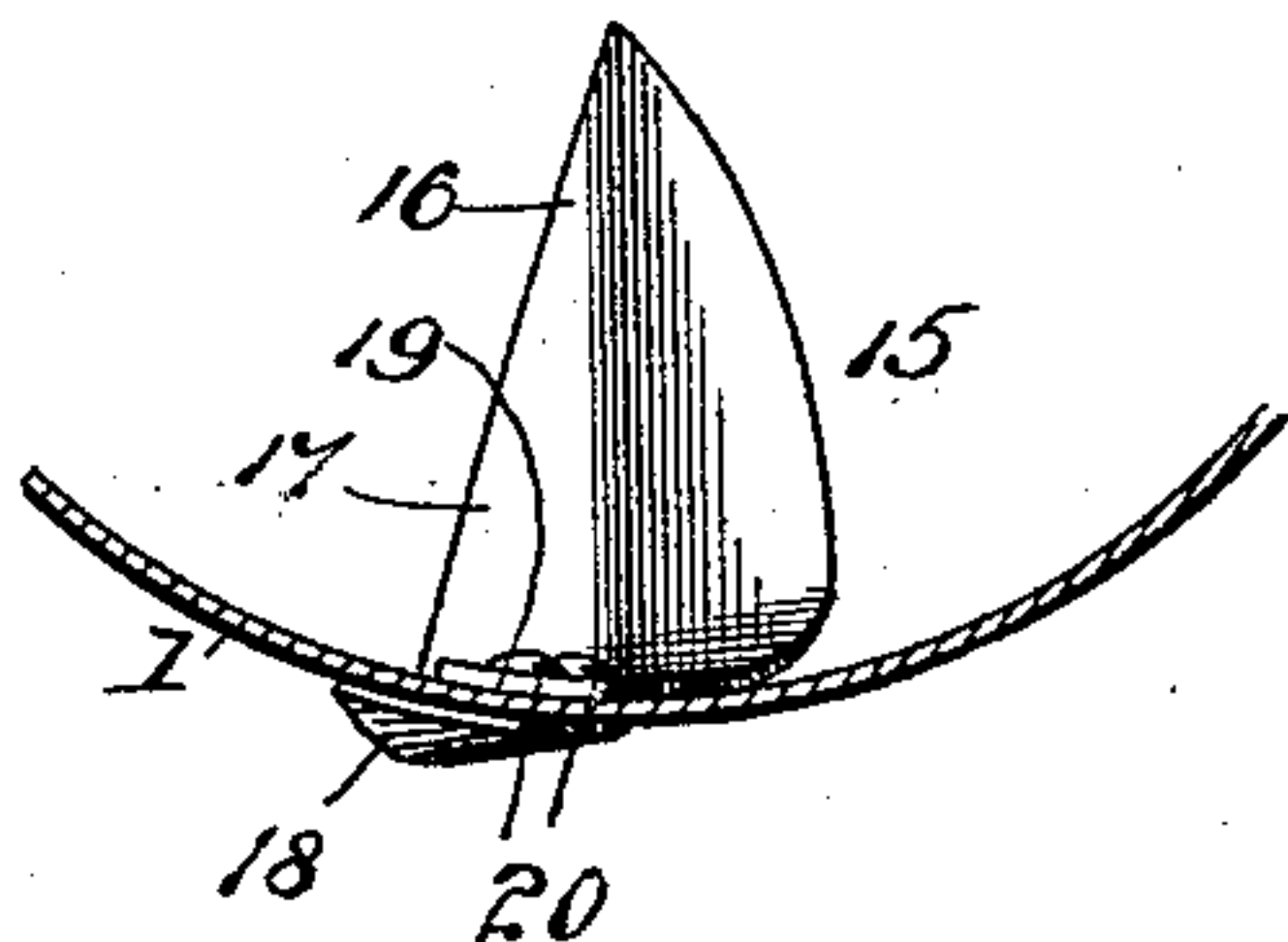
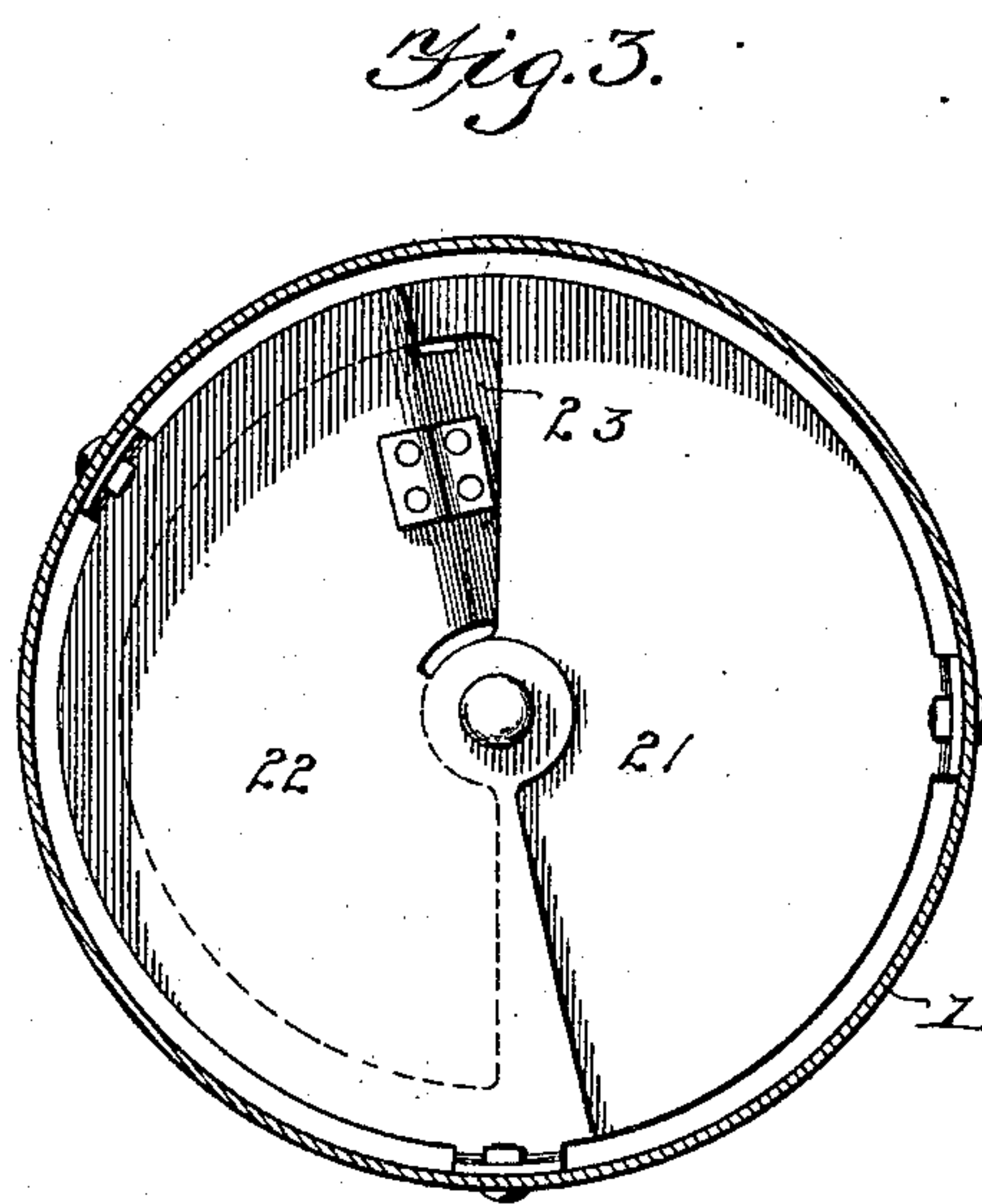
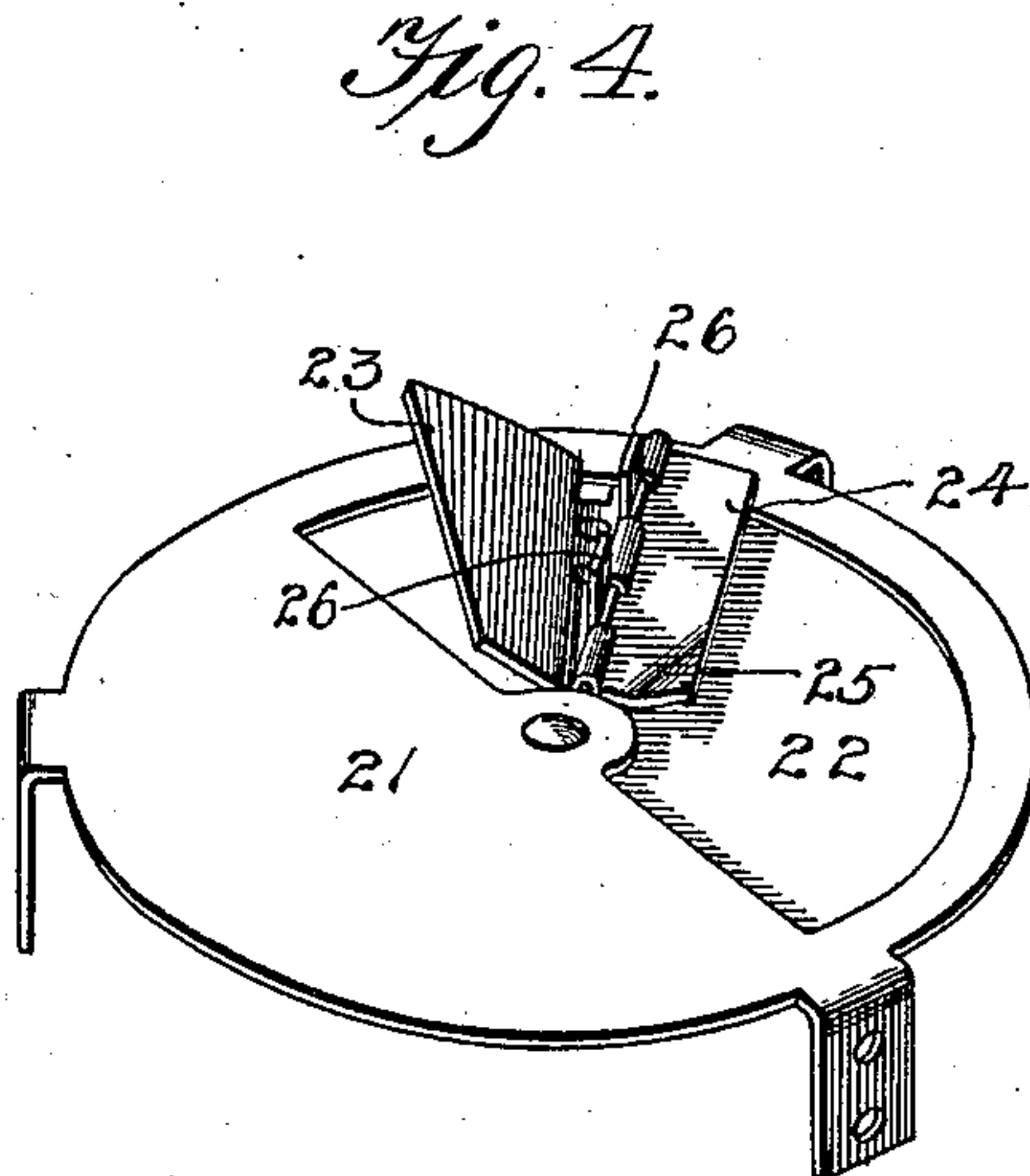
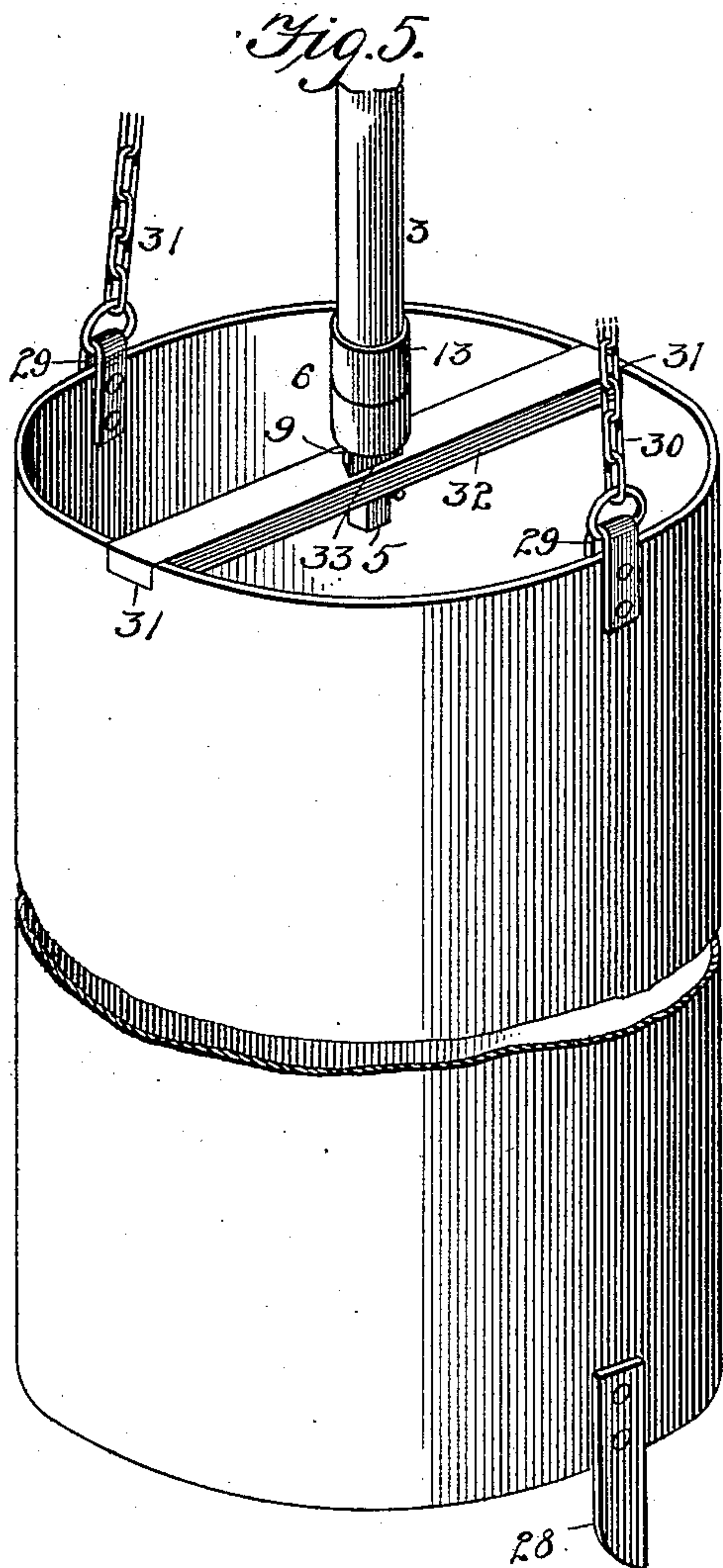


Fig. 2.

Witnesses

E. N. Monroe

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*William F. Bennett and
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UNITED STATES PATENT OFFICE.

WILLIAM F. BENNETT AND STEPHEN HILL, OF GOLDSMITH, INDIANA.

EARTH-AUGER.

SPECIFICATION forming part of Letters Patent No. 572,325, dated December 1, 1896.

Application filed January 16, 1896. Serial No. 575,773. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. BENNETT and STEPHEN HILL, citizens of the United States, residing at Goldsmith, in the county of Tipton and State of Indiana, have invented a new and useful Earth-Auger, of which the following is a specification.

Our invention relates to earth-augers especially adapted for boring wells; and the object in view is to provide a simple, inexpensive, and efficient implement provided with means for boring in hard earth and removing loose soil, such as sand, and also adapted for removing obstacles, such as rocks; furthermore, to provide means for facilitating the sinking of a casing to exclude or prevent the caving in of loose soil, as sand, and, furthermore, to provide means for manipulating or communicating motion to the parts.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view, partly in section, of a drilling apparatus constructed in accordance with our invention, the reaming-bits being arranged in operative position. Fig. 2 is a plan view of one of the drill-bits, showing the contiguous portion of the drill-bucket. Fig. 3 is a horizontal sectional view of the drill-bucket with the sand-bottom arranged in operative position therein. Fig. 4 is a detail view in perspective of the sand-bottom, the same being detached and inverted. Fig. 5 is a detail view of a section of the casing. Fig. 6 is a detail view in perspective of the clamp by means of which the operating-lever is connected to the auger-stem. Fig. 7 is a detail view of one of the joints of the auger-stem.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a cylindrical bucket provided with a fixed bail 2 for attachment to an auger-stem 3, said bail having a central angular opening 4 to receive the angular stud 5 on the extremity of the lowermost section of the stem. The stem is sectional in order to provide for suiting the length thereof to the depth of the boring-tools, and in order to fa-

cilitate the coupling of sections successively as the boring-tools reach a greater depth we provide a union comprising a socket member 6, which is preferably secured to the lower end of a section and is provided with an angular bore, preferably cross-sectionally triangular, and a stud member 7, preferably secured to the upper end of the section and having a stud 8, of which one portion, 9, is cross-sectionally triangular, to fit the socket in the socket member, while the extremity thereof is rounded and reduced, as shown at 10, to fit in the reduced upper portion of the socket. This reduced portion of the stud is provided with a transverse perforation 11, adapted to register with a corresponding opening in the upper portion of the socket, and a locking-pin 12 is fitted in the registering perforations to prevent accidental disengagement of the section. A sleeve 13 is fitted to slide upon the body portion of the section and is adapted after the insertion of the locking-pin to be dropped down and cover the extremities of said locking-pin by closing the ends of the transverse opening in the socket, said sleeve resting upon an exterior shoulder 14.

The boring-bits 15, of which we preferably employ three, are attached to the lower edge of the bucket, as shown in Fig. 1, each bit having an inwardly and downwardly inclined blade 16, tapered toward its extremity, the front edge of said blade being deflected or bent outwardly to form a wing 17, terminating at its upper end in a curved ear 18, said ear extending inward toward the surface of the bucket and terminating contiguous thereto to serve as a means for providing clearance for the bucket. The attaching-ear 19 is secured to the inner surfaces of the bucket (said attaching-ear being independent of the clearance-ear) by means of upper and lower bolts 20, engaging registering openings in said ear and bucket. The bit may be struck from a single flat plate, in which case the attaching and clearance ears are separated by a kerf formed upon the longitudinal center of the bit and extending toward the tapered end thereof a distance equal to the desired length of said ears. The attaching-ear is then arranged at an angle to the body portion of the blade, whereby when said attaching-ear is

secured to the inner surface of the bucket the blade occupies a downwardly and inwardly inclined position. The front edge of the blade is turned out to form a cutting-wing, and the clearance-ear, which is formed as an extension of the cutting edge, is curved inward to terminate contiguous to the surface of the bucket.

In well-drilling, as well as in general work of this class, it is common to meet with an obstruction, such as a stone, which is of too great a size to pass into the bucket between the bits, and hence we have employed the above-described means for detachably securing the bits to the bucket, whereby one or two of the bits may be detached and the tool used with the remaining bit. By thus arranging the device a stone of any size which will enter the bucket may be lifted.

When loose soil, such as sand, is encountered, it is necessary to provide a bucket with means for lifting and removing the same, and the means which we have devised for this purpose consist of a sand-bottom 21, adapted to be detachably fitted in the lower end of the bucket by means of bolts engaging the perforations employed for securing the bits in place. This sand-bottom is curved with a centrally-pivoted slide or shutter 22, having at its front end a scraping-blade 23, which is inclined downward at such an angle as to engage and lift the sand into the bucket when the bucket is turned forwardly or in the direction of drilling. Hinged or pivotally mounted upon said slide or shutter contiguous to the scraping-blade is a closing-wing 24, which normally lies flat or parallel with the plane of the sand-bottom. When the bucket becomes full, a partial rotation thereof in a backward or reverse direction will cause the closing of the slide or shutter by the engagement of this closing-wing with the slide. The closing-wing is preferably deflected slightly at one angle, as shown at 25, to engage the slide when the motion of the bucket is reversed, and is also provided with a stud 26, which projects downwardly from the wing and is adapted to limit the downward movement or extension of the wing and hold it firmly in position during the reverse rotation of the bucket.

In Fig. 1, in addition to the boring-bits which are shown in connection with the bucket, we have illustrated reaming-bits 27, which are preferably attached to the bucket near its upper edge, and consist of blades which are bent or curved outwardly beyond the plane of the sides of the bucket to enlarge the hole for the reception of casing, such as that illustrated in Fig. 5, and the casing is provided at its lower end with clearing-blades 28, whereby the insertion thereof is facilitated. The means which have been provided for elevating and lowering the casing-sections consist of loops 29, secured to the edge of the section for the attachment of the extremities of elevating and lowering

chains 30, and at diametrically opposite points the upper edge of the casing is provided with seats or notches 31 to receive the extremities of the cross-bar 32, said cross-bar having a central angular opening 33 to receive the angular stud on the lower end of an auger-stem section, whereby the casing may be rotated.

The means whereby rotary motion is communicated to the auger-stem consist of a clamp 34, provided with opposite guides 35 for the reception of an operating-lever 36, said guides being arranged at opposite ends of the clamp. The body portion of the clamp is provided with fixed transversely opposite ears 36, and a hinged wing or side 37, which is adapted to be arranged opposite said body portion, is pivotally mounted upon a slide 38, fitted for longitudinal movement upon the body portion, whereby said hinged or pivotal side of the clamp is capable of longitudinal as well as swinging movement. The main and pivotal portions of the clamp are provided with opposite half-seats 39 to engage opposite sides of the auger-stem, and the hinged side of the clamp is held in place for engagement with the auger-stem by means of a transverse key 40, engaging registering openings in the fixed ears on the body portion of the clamp. A locking-pin 41 is also provided for engagement with registering perforations in the main and pivotal portions of the clamp and the portion of the auger-stem engaged thereby. The auger-stem is preferably provided with a plurality of transverse openings 42 for engagement by said transverse locking-pin 41, whereby the clamp may be arranged at different points of the stem to suit the depth of the boring-tool.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described our invention, what we claim is—

1. A drilling implement having a cylindrical bucket and drill-bits detachably secured to the lower edge of the bucket and each consisting of a blade split longitudinally to form a main or body portion arranged at its upper end in contact with the inner surface of the bucket, and a curved or bowed clearance-ear which is arranged outside of the circumference of the bucket, substantially as specified.

2. A drilling implement having a cylindrical bucket provided with means for the attachment of drill-bits, and a sand-bottom removably fitted in the bucket and provided with a centrally-pivoted slide or shutter having a pivotal scraping-blade and an oppositely-disposed pivotal closing-wing adapted to be extended when the rotation of the bucket is reversed to close the slide, substantially as specified.

3. A drilling implement having a cylindrical bucket provided with drill-bits, and a

sand-bottom arranged in the lower end of the bucket and comprising a plate provided with a segmental opening, a segmental slide or shutter pivoted coaxially with the bucket, a 5 hinged scraping-blade 23 adapted to occupy a downwardly-inclined position when the bucket is rotated forwardly, and a hinged closing-wing 24 adapted to occupy an inclined position to engage the soil when the bucket 10 is turned in the reverse direction, to close the slide or shutter, substantially as specified.

4. A drilling implement having a sectional stem, one end of each section having a cross-sectionally triangular socket and a rounded 15 extension thereof, and the other end of each section having a cross-sectionally triangular stud and rounded extension to fit in said socket, a transverse locking-pin adapted to engage registering perforations in the socket 20 and the rounded extension of the stud, and a sleeve mounted to slide upon the stem-section to cover and secure the locking-pin in place, substantially as specified.

5. In a drilling implement, a stem provided with transverse perforations, a clamp adapted 25 for attachment to said stem and provided with aligned guides for an operating-handle, said clamp having a body portion, a pivotal portion mounted for longitudinal adjustment upon the body portion, means for securing 30 the free end of the pivotal portion in its operative position, the main and pivotal portions of the clamp having opposite seats to receive the stem, and a transverse locking-pin adapted to engage one of the perforations 35 in the stem and aligned perforations in said seats, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

WILLIAM F. BENNETT.
STEPHEN HILL.

Witnesses:

L. B. NASH,
H. H. BUNCH.