

W. F. WITTICH.  
 DRILLING MECHANISM.  
 APPLICATION FILED MAY 21, 1908.

969,233.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.

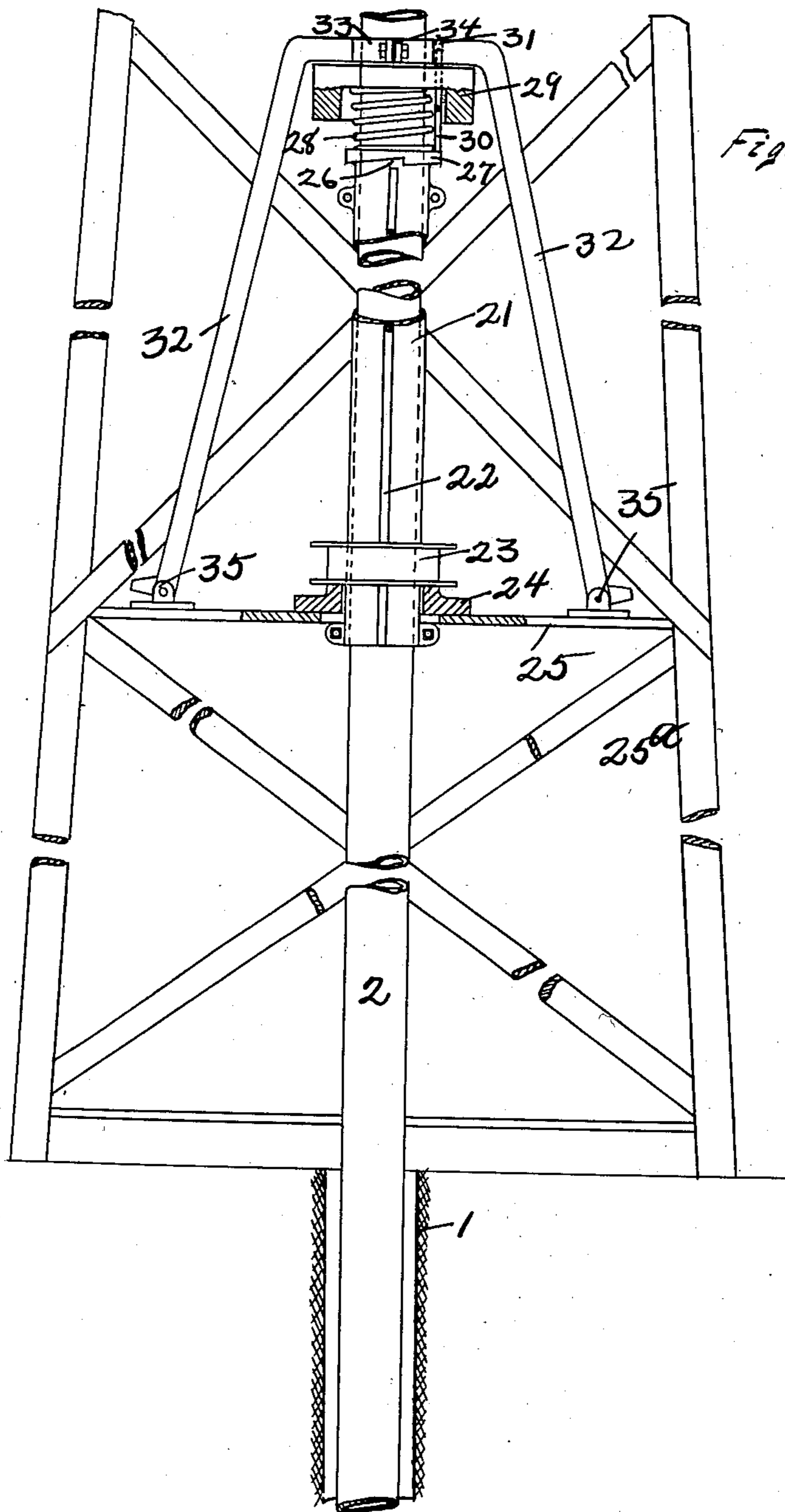


Fig. 1.

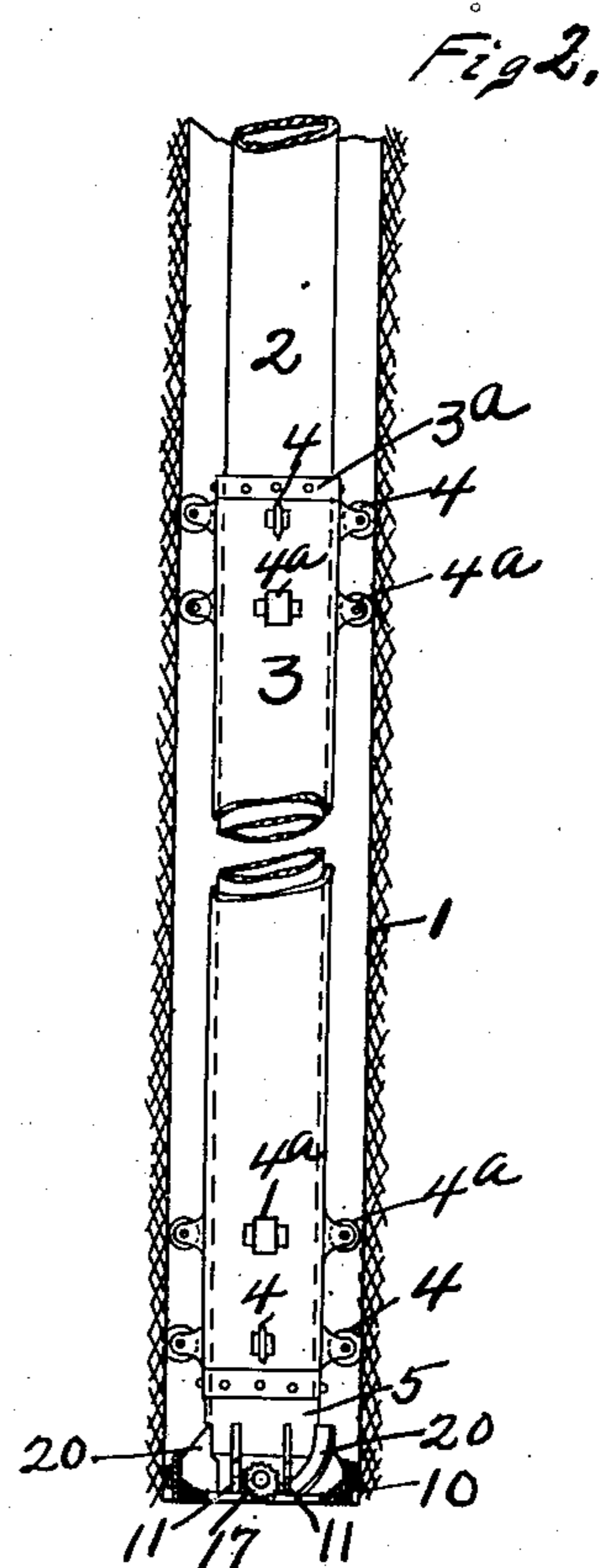


Fig. 2.

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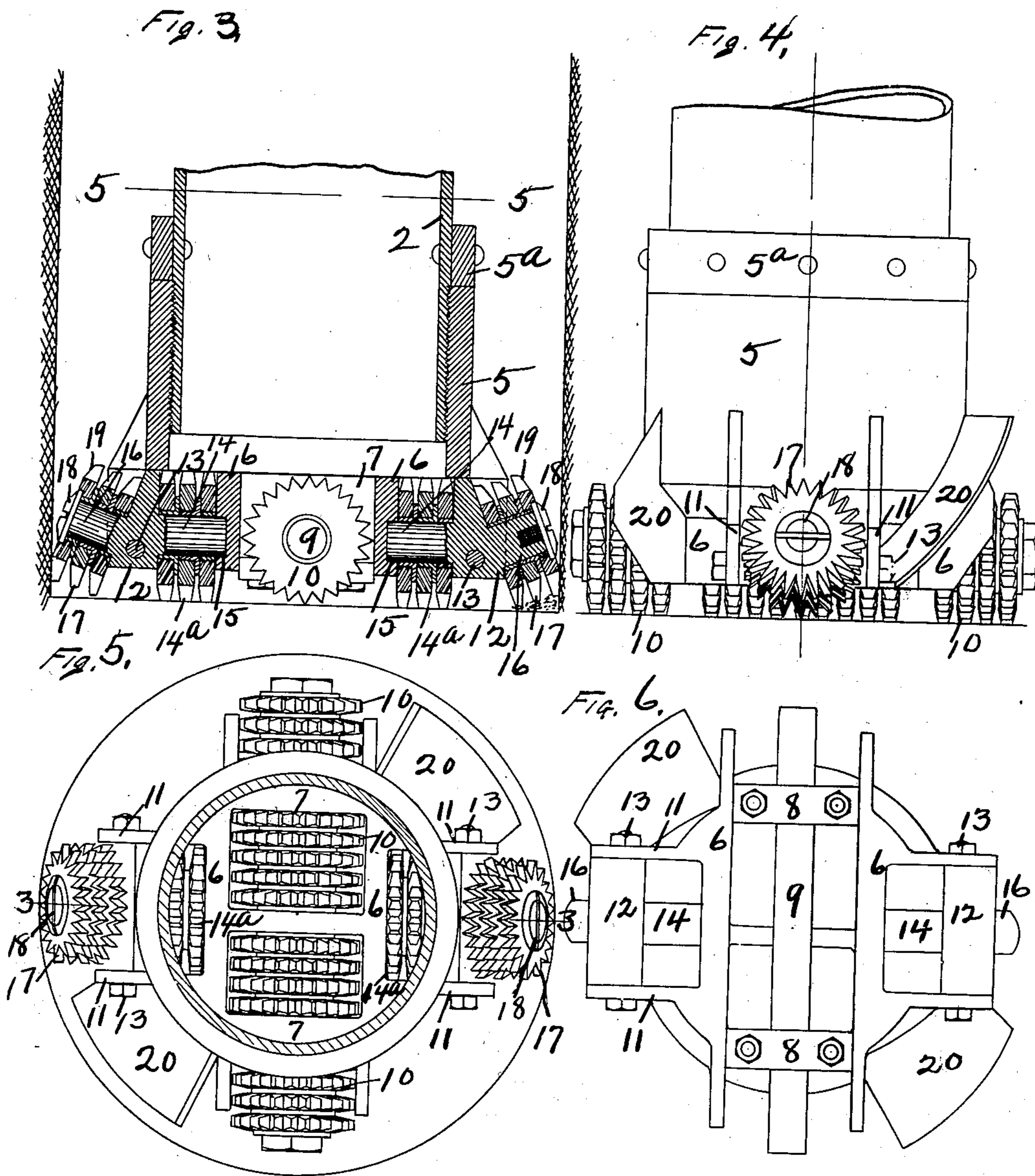
Inventor  
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# UNITED STATES PATENT OFFICE.

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## DRILLING MECHANISM.

969,233.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed May 21, 1908. Serial No. 434,070.

*To all whom it may concern:*

Be it known that I, WILLIAM F. WITTICH, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Drilling Mechanisms, of which the following is a specification.

This invention relates to drilling mechanisms, and consists in certain improvements in the construction thereof as will be hereinafter fully described and set forth in the claims.

The mechanism is designed to drill by a rotative movement of a driving head, and in the preferred construction the cutters for effecting the drilling are rotatively mounted on the head. In order to give clearance to these cutters, the cutters nearest the outer periphery that is those making the wider sweep are preferably inclined.

In the preferred construction, the driver is in the form of a pipe, and this extends somewhat above the top of the hole being drilled, so that a head of water may be maintained in this hollow driver, and a constant current of water may be maintained through the driver past the cutters and up the outside of the driver, so as to raise the cuttings. To facilitate this, flights are arranged on the head. It is also desirable as the head is rotated to jar it with a tappet mechanism, and it is of course necessary to have this tappet mechanism so arranged to follow the cutting action.

Other details of the invention will appear from the specification and claims.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a side elevation of the mechanism as it is arranged at the top of the well. Fig. 2 a section of the well with an elevation of the mechanism at the bottom. Fig. 3 a section on the line 3—3 in Fig. 5. Fig. 4 a side elevation of the cutting head, the view being from the right of Figs. 3 and 5. Fig. 5 a section on the line 5—5 in Fig. 3. Fig. 6 a bottom view of the head with the cutters removed.

1 marks the well. 2 the hollow driver which extends from the cutting head to the top of the well. This driver is journaled near the head in a guide bearing 3. The guide bearing is centered in the hole by a spider preferably formed by wheels 4. The head 5 is screwed onto the end of the driver contacting a shoulder 5<sup>a</sup>, the shoul-

der forming a seat for the bearing 3, the bearing 3 being free to follow the head as it descends. The head is made up of the frame having the longitudinal bars 6 connected by the cross bars 7. A shaft 9 is clamped on the cross pieces by the clamps 8. Cutters 10 are arranged on this shaft. The ears 11 extend laterally from the longitudinal pieces 6 and the supplemental frames 12 are secured between these ears by means of the bolts 13. Pins 14 extend from the supplemental frame into sockets 15. Pins 16 extend from these supplemental frames 12, the pins 16 being inclined. Cutters 14<sup>a</sup> are arranged in the pins 14, and cutters 17 are arranged in the pins 16. The cutters 17 are secured on the pins by means of screws 18 screwed into the ends of the pins. The cutters 17 are sufficiently inclined to give clearance to the cutter as the head is rotated, the intention being that these cutters shall form the periphery of the hole. I prefer to bevel the outside cutters 17 at 19, the bevel being such as to conform to the curve of the periphery of the hole. In this way a nicely finished hole might be made. The driver 2 extends above the top of the hole a sufficient distance to give a head to water delivered to it, so as to create a current downwardly through the driver, outwardly through the cutters, thus lubricating them and thus picking up the cuttings and carrying the same up outside of the driver to the top of the hole. To facilitate this movement I provide the flights 20 which are rotated with the head, and so inclined as to act as a turbine to aid in starting the cuttings, and giving the proper current to the water.

A sleeve 21 is clamped on the driver at the top of the well. This sleeve is provided with a shoulder 22, which operates in a slot (not shown) in a pulley 23. The pulley rests on a bearing 24 the bearing being of sufficient size to permit the turning of the shoulder 22. The driver is rotated by means of the pulley, and the sleeve 21 follows down the driver as the cutting proceeds, the spline and groove connection between the pulley and sleeve permitting this. The sleeve has an inclined step 26 at its upper end on which is arranged a tappet 27 having an opposing inclined step. A coil spring 28 is arranged around the shaft above this tappet, and is given tension by a weight 29. The tappet 27 is locked against rotation by means of a

pin 30 which extends upwardly through an arm 32. The arms 32 carry a bearing 33 for the upper end of the driver. These arms are pivotally mounted in bearings 35 and are secured together by bolts 34. If it is desired to elevate the driver the bolts 34 are removed and the arms drawn back, thus leaving a clear space for this purpose.

In operating the device, the driver is driven rapidly, and the cutters revolve by traction, and thus perform the cutting action. This is facilitated by the tapping effected by the tappet 27. Water is constantly supplied through the driver and the upward current of liquid outside of the driver carries away the cuttings. As the driver proceeds, the sleeve 21 is shifted, and if desired the driver may be made in sections, so as to be readily handled.

I prefer to form the wheels 4 with the cutting edge, so that they are forced into the walls of the hole slightly as the drilling proceeds, thus preventing the bearing 3 from turning with the driver. To accomplish this, I place the shoulder 3<sup>a</sup> on the driver immediately above the bearing. I also prefer to provide flat wheels 4<sup>a</sup> adjacent to the wheels 4, the wheels 4<sup>a</sup> having sufficient surface to prevent their entering the walls of the hole even though the material encountered may be quite soft. In this way hard material is encountered at one

side and comparatively soft material at the other. The bearing is still maintained in its central position.

What I claim as new is:

1. In a drilling mechanism, the combination of a rotative head; means for driving said head; a frame having the longitudinal bars therein; a shaft secured between said bars; cutters on said shaft; a supplemental frame extending laterally from said longitudinal bars and carrying a shaft lying in the plane at right angles to the axis of the head, and a shaft inclined to said plane; and cutters on said shafts.

2. In a drilling mechanism the combination of a head; a frame thereon having longitudinal bars extending diametrically across the head; cross pieces connecting said bars; a shaft on the cross pieces; cutters on said shaft; ears extending radially from the longitudinal bars; auxiliary frames secured between the ears and extending to the longitudinal bars; inclined pins extending from the auxiliary frame; and cutters on the inclined pins.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM F. WITTICH.

Witnesses:

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J. D. McLAUGHLIN.