Sept. 4, 1928.

1,682,955

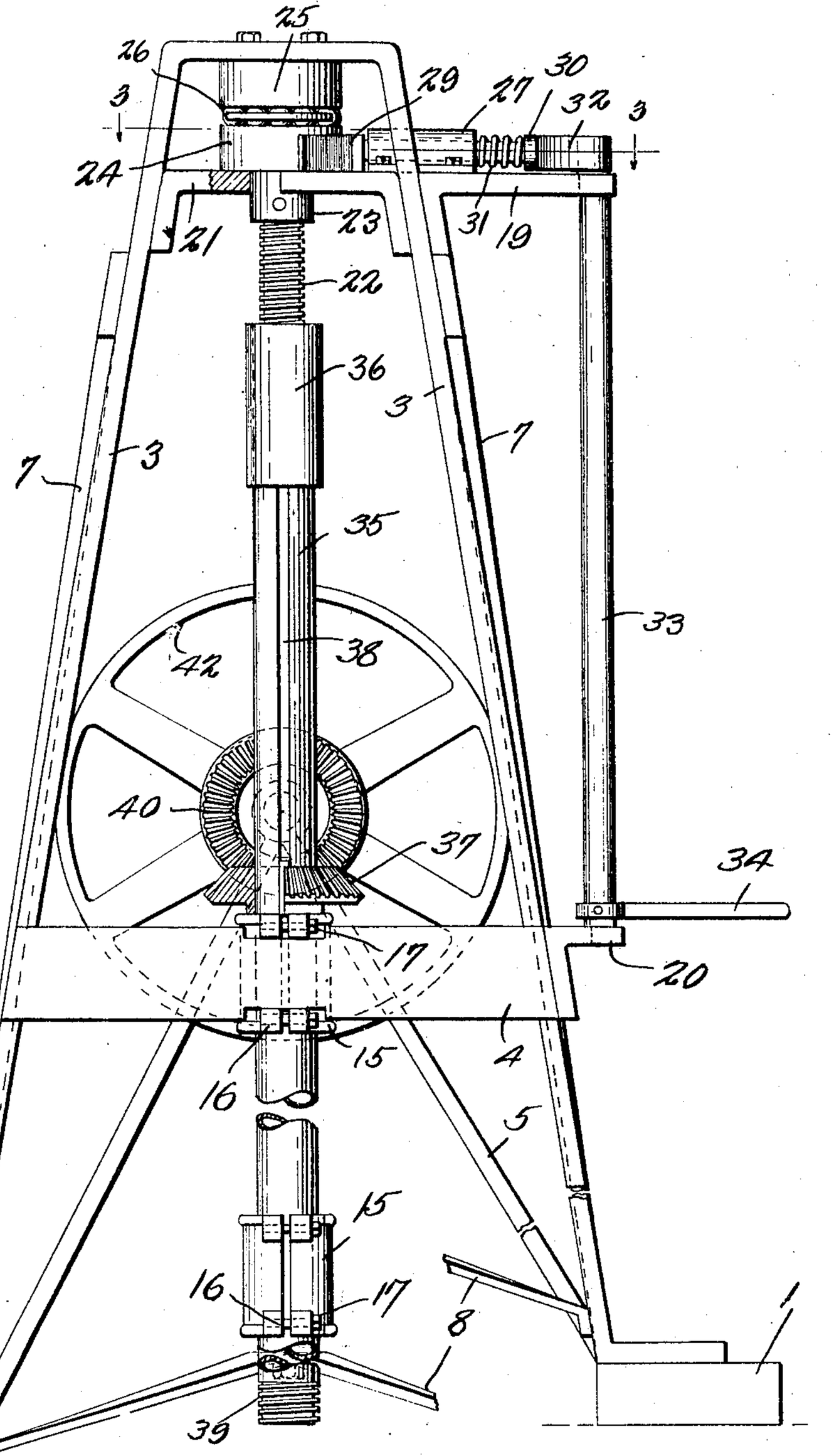
A. G. COPELAND

DRILLING MACHINE

Filed Aug. 25, 1926

2 Sheets-Sheet 1

Fig. 1.



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DRILLING MACHINE

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2 Sheets-Sheet 2

Fig. 3.

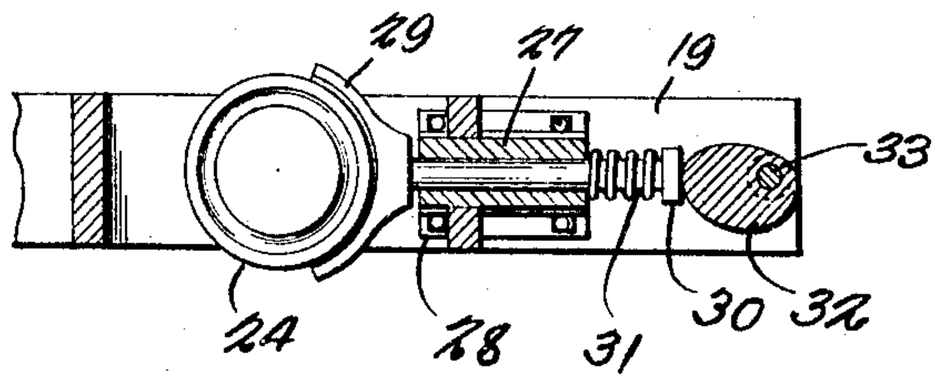

Fig. 2.

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Patented Sept. 4, 1928. 1,682,955

UNITED STATES PATENT OFFICE.

ARCH GLEN COPELAND, OF RICH HILL, MISSOURI, ASSIGNOR OF ONE-HALF TO FRED V. REAGEL, OF JEFFERSON CITY, MISSOURI.

DRILLING MACHINE.

Application filed August 25, 1926. Serial No. 131,487.

The device forming the subject matter of this application is a machine adapted for shallow drilling, such, for instance, as cutting cores out of concrete pavement. The invention aims to provide novel means for rotating and feeding the drill shaft.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:—

Figure 1 shows in side elevation, a device constructed in accordance with the invention, parts being broken away;

Figure 2 is a side elevation wherein the device is viewed at right angles to the showing of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 1.

The numeral 1 marks a base which carries a frame 2. The frame 2 is a composite structure and is made up of an inverted U-shaped standard 3, across which extends a tie strip 4. The frame 2 includes an inverted V-shaped support 5 having a bearing 6 at its upper end, the support 5 being spaced horizontally from the standard 3. Braces 7 connect the upper part of the standard 3 with the lower part of the support 5. The side portions of the standard 3 are connected with the lower ends of the support 5 by a spider 8. The numeral 9 designates an upright, which may be fashioned out of common pipe elements, as shown in Figure 2. The lower end of the upright 9 is secured at 10 to the spider 8. The upright 9 is equipped with an angular rear arm 11, upon the upper end of which there is a bearing 12. The upright 10 has horizontally disposed and vertically spaced forward arms 14 carrying split bearings 15 provided with ears 16 connected by tightening devices 17, such as screws, the bearings 15 thus being adapted to a shaft which is journaled in them, to wit, a tubular shaft 35 hereinafter described. There is a bearing 18 on the upper end of the upright 9. An upper angle bracket 19 is secured to one side portion of the standard 3, and to the said side portion of the standard 3 is connected a lower angle bracket 20, the brackets 19 and 20 projecting outwardly and laterally, as shown clearly in Figure 1. A cross piece 21 extends across the standard 3 near to the upper end thereof, as shown in Figure 1.

The numeral 22 marks a screw, to which is secured a collar 23, the collar 23 being journaled in the cross piece 21. The collar 23 has a head 24, which, cooperating with the cross piece 21, limits the downward movement of the screw 22. The head 24 constitutes one part of a ball race, the other member of the ball race being marked by the numeral 25 and being secured to the top of the standard 3. Balls 26 are interposed between the race members 24 and 25, and the construction is such that although the screw 25 can rotate in the frame of the machine, the screw cannot move endwise therein.

On the upper angle bracket 19, a guide 27 is mounted, a plunger 28 being carried for reciprocation in the guide 27, the plunger 28 forming part of a brake mechanism whereby the rotation of the screw 22 can be limited or stopped, at the will of an operator. An arcuate shoe 29 is fixed to the inner end of the plunger 28, and is adapted to bear upon the periphery of the head 24 of the screw 22. On its outer end, the plunger 28 has an abutment 30, as shown in Figure 3. A compression spring 31 is disposed about a portion of the plunger 28, one end of the compression spring engaging the abutment 30, and the other end of the compression spring engaging the guide 27. The function of the spring 31 is to retract the plunger 28, thereby to hold the shoe 29 out of engagement with the head 24 on the screw 22. The plunger 28 and the shoe 29 are advanced by means of an eccentric 32 secured to the upper end of a shaft 33, the said shaft being mounted to rock in the angle brackets 19 and 20. An operating handle 34 is secured to the shaft 33 near to the lower end thereof.

The lower end of the screw 22 extends into a tubular shaft 35, the shaft 35 being equipped at its upper end with an enlargement 36 into which the screw 22 is threaded. The shaft 35 is journaled in the bearings 15, as has been intimated hereinbefore. The

shaft 35 extends throngh a beveled gear 37 supported on the uppermost bearing 15. The shaft 35 is splined as at 38 to the beveled gear 37, so that when the gear 37 is rotated, the shaft 35 will participate in the rotation, it being possible, nevertheless, for the shaft 35 to have vertical right-line sliding movement in the gear 37. The shaft 35 is threaded at its lower end, as shown at 39.

The beveled gear 37 meshes with a beveled gear 40 on a horizontal shaft 41, the shaft 41 being journaled in the bearings 18, 12 and 6. A pulley 42 and a set collar 43 are secured to the shaft 41 and are located on opposite sides of the bearing 12, so as to limit the longitudinal movement of the shaft 41, thereby to maintain the beveled gear 40 in mesh with the beveled gear 37.

Let it be supposed that the brace shoe 29 is spaced from the head 24 of the screw 22 as shown in Figure 3. Then, if the shaft 41 is rotated by means of the pulley 42 or its equivalent, the beveled gear 40, cooperating with the beveled gear 37, will rotate the shaft 35, the shaft and the screw 22 rotating together, and their being no downward feeding movement of the shaft 35. An operator, however, may rock the shaft 33 through the instrumentality of the handle 34, and the eccentric 32 will advance the plunger 28 in the guide 27, and press the shoe 29 against the head 24 on the screw 22, thereby limiting the rotation of the screw 22 with the shaft 35, or holding the screw 22 at rest, so that the screw 22 does not rotate at all with the shaft 35. When the rotation of the screw 22 is limited or stopped, the shaft 35 and the drilling or cutting tool will be fed downwardly with respect to the work.

What is claimed is:—

In a device of the class described, a frame, a drill shaft supported for rotation on the frame, a screw having threaded connection with the drill shaft, means for rotating the drill shaft, a plunger slidable upon the frame, a shoe carried by the plunger and cooperating with the screw to limit the rotation thereof, spring means for retracting the plunger and the shoe with respect to the screw, a second shaft journaled on the frame, mechanism under the control of an operator for rotating the second shaft, and an eccentric on the shaft and coacting with the plunger to advance the plunger and the shoe with respect to the screw.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

ARCH GLEN COPELAND.