

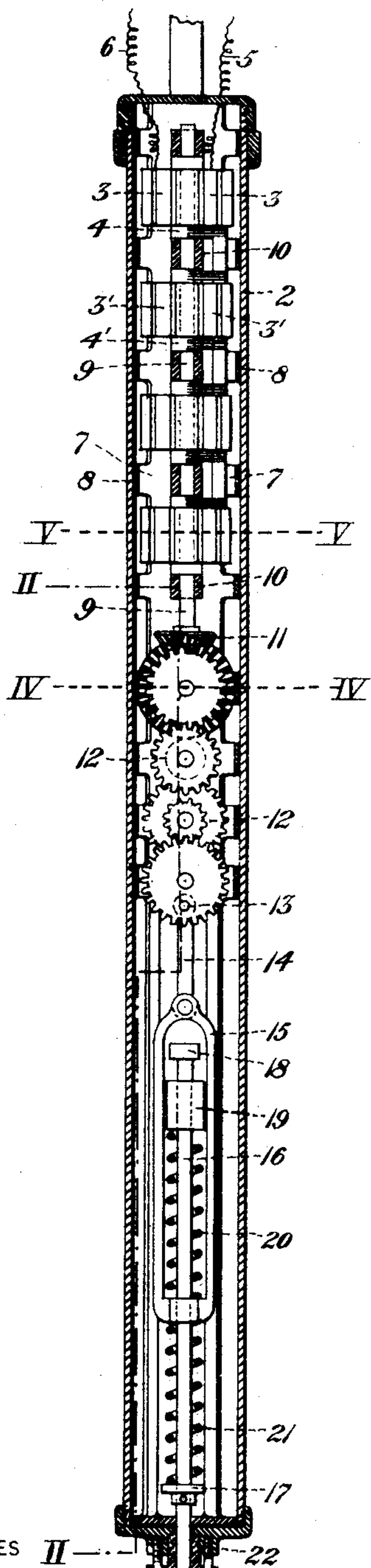
W. WEBBER.
WELL DRILLING APPARATUS.

No. 446,588.

Patented Feb. 17, 1891.

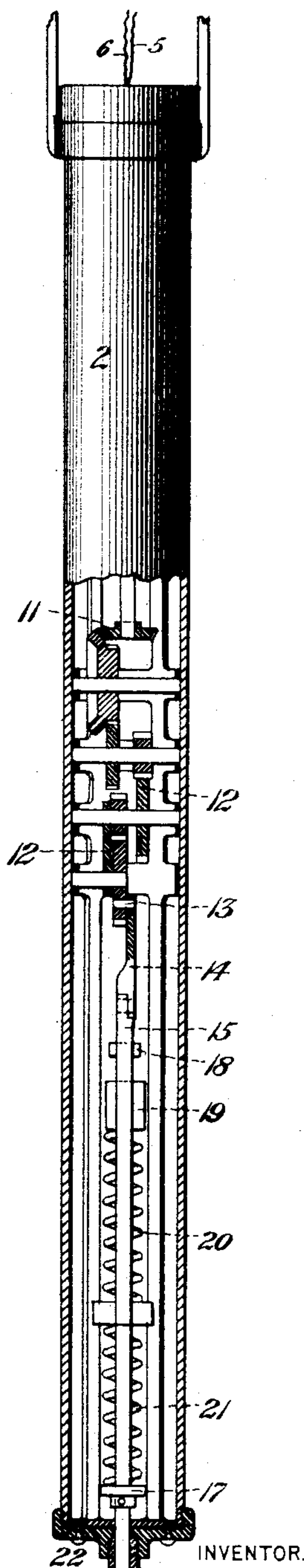
Fig. 1.

Fig. 2.



WITNESSES II

Thomas W. Russell
J. M. Corwin



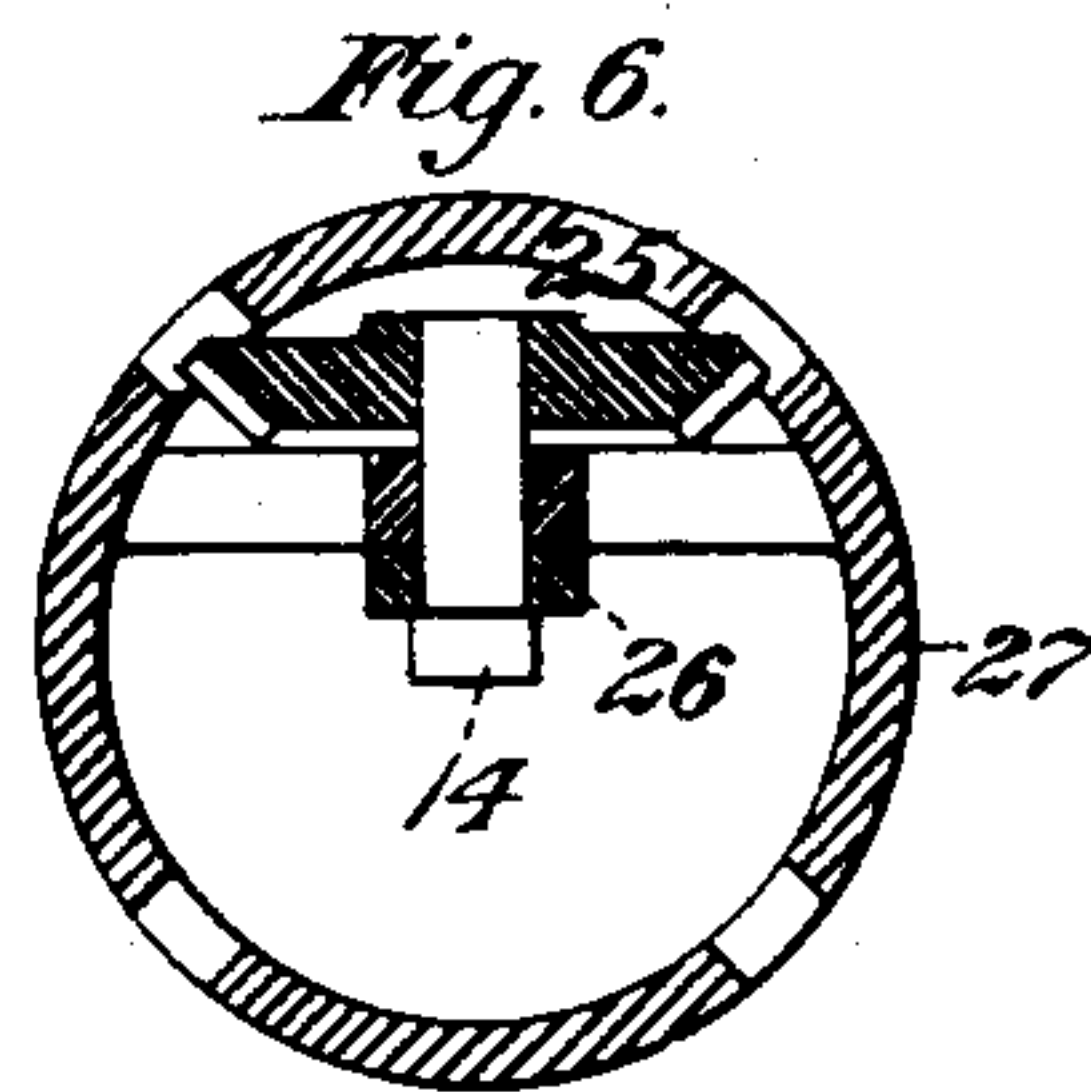
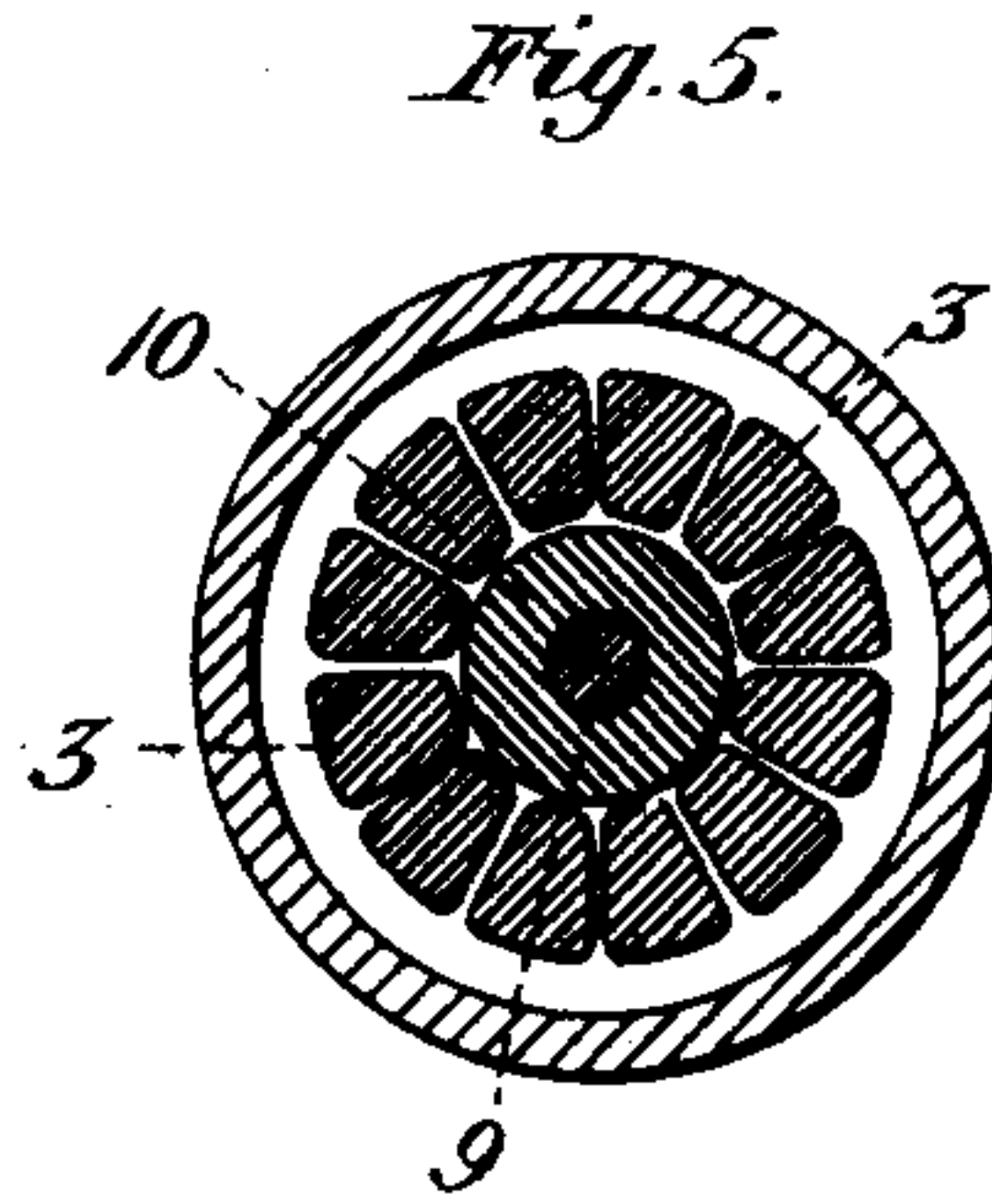
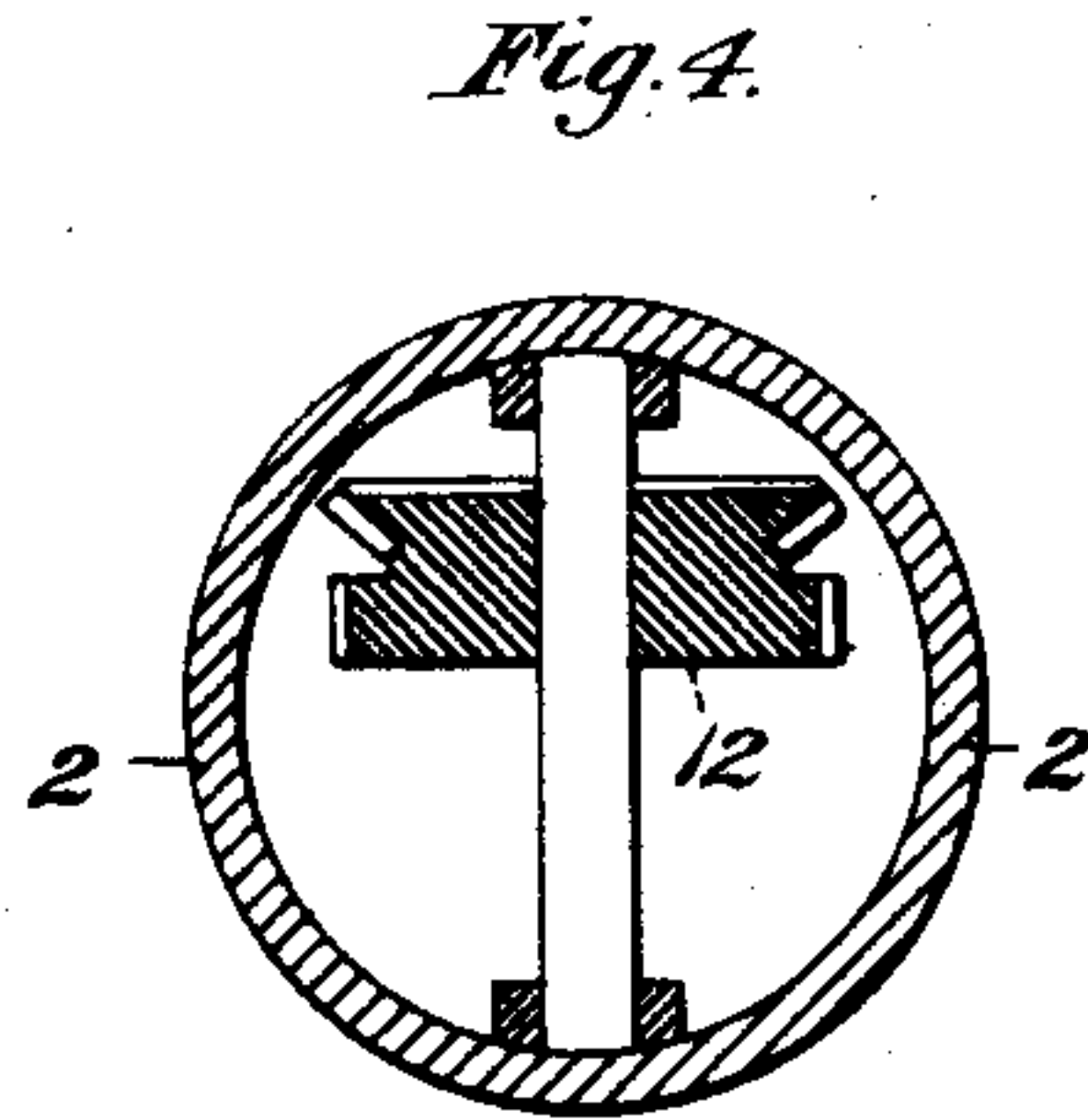
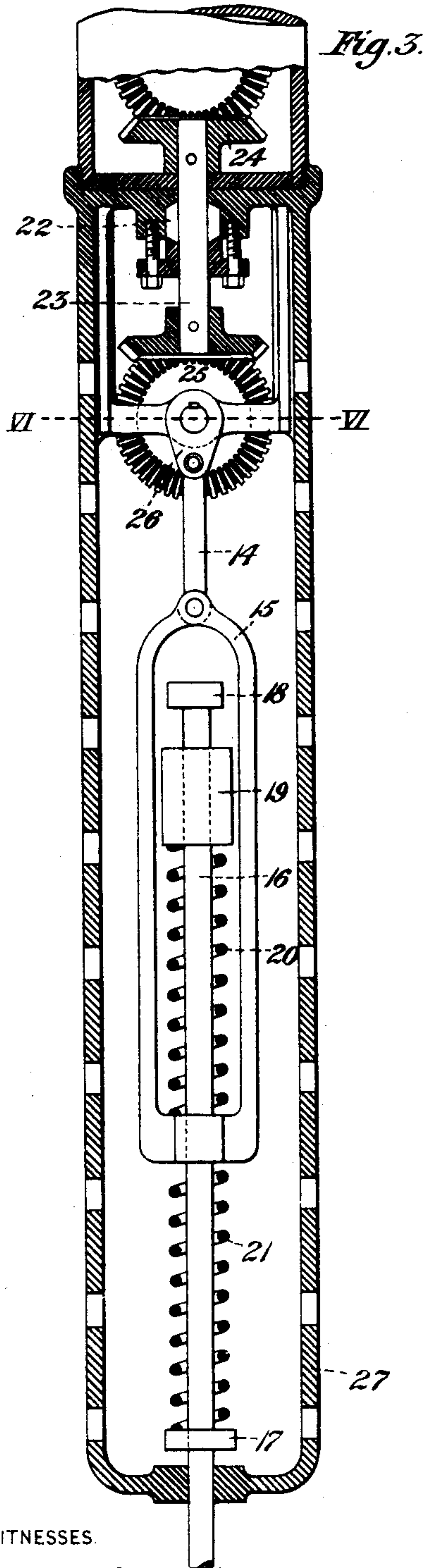
INVENTOR.

W. Webber

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Patented Feb. 17, 1891.



WITNESSES.

Thomas W. Oakwell
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UNITED STATES PATENT OFFICE.

WESLEY WEBBER, OF PITTSBURG, PENNSYLVANIA.

WELL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 446,588, dated February 17, 1891.

Application filed October 24, 1890. Serial No. 369,183. (No model.)

To all whom it may concern:

Be it known that I, WESLEY WEBBER, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Well-Drilling Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in longitudinal central section of my improved apparatus. Fig. 2 is a side elevation, partly in vertical section, on the line II II of Fig. 1. Fig. 3 is a side elevation, partly in section, showing a modified construction of the lower part of the apparatus. The construction shown in this figure is the preferred construction and is claimed by me specifically herein. Figs. 4 and 5 are horizontal cross-sections on the lines IV IV and V V, respectively, of Fig. 1. Fig. 6 is a cross-section on the line VI VI of Fig. 3.

Like symbols of reference indicate like parts in each.

My invention relates to an improvement in electrical apparatus for drilling wells for which I have obtained Letters Patent of the United States No. 431,131. In that case I claim an apparatus for operating or drilling deep wells, which consists in an elongated case adapted to be let into the well, and a series of electric motors arranged therein in tandem and mechanically connected.

The apparatus forming the subject of this application embodies the same principle and has the motors arranged in tandem; but instead of using belt-gearing for connecting the armatures of the several motors I connect said armatures directly with a single shaft which extends longitudinally of the apparatus.

Another important feature of the invention which I intend to claim herein consists in locating the reciprocating part of the motor which operates the drilling-bit or pumping-rod entirely outside the case in which the motors are contained. The reason for this is that when the motor-case is let into a well under a deep overlying stratum of water the hydrostatic pressure exerted by the water is so great that it would seriously impede the operation of a piston reciprocating from the interior of the case outwardly. I now obvi-

ate this by rotating the shaft which projects from the end of the case and converting the rotary to reciprocating motion on the exterior of the case.

My invention consists in other details, which will be shown in the following description:

In the drawings, 2 represents a case, preferably of cylindrical form and of proper size to admit its insertion into the well to be drilled or operated. Within this case are electric motors, preferably two or more, of which 3 3 are the magnets and 4 the armature of one motor, and 3' 3' the magnets and 4' the armature of another motor. In Fig. 1 I show four motors arranged within the case. For the purpose of having the motors of as small size as possible, I prefer to arrange the magnets longitudinally within the case.

5 6 are the electrical conductors, which are connected with the magnets in series and which are of sufficient length to extend from the top to the bottom of the well to be drilled or operated. In the use of the apparatus these conductors are connected to a suitable generator of electricity situate at the surface of the ground. The magnets are held in position in the case 2 by suitable supporting plates 7, which are insulated from the case by insulating material 8. Each armature is fixed to a rotary shaft 9, which rotates in bearings 10 in the case 2 and extends longitudinally thereof. On said shaft is a gear-wheel 11, which, by means of other gear-wheels 12, constructed as shown in the drawings, actuates a crank-pin 13, which may be on the last gear-wheel of the series. This gearing is arranged so as to convert the rapid rotation of the armature to a slower rotation suitable to the operation of the drilling-bit or pumping-rod.

14 is a rod, which connects the crank-pin with a link 15. A rod 16 passes longitudinally through an eye at the lower end of the link 15, and is provided with collars 17 and 18, arranged as shown. A sleeve 19 is set on the rod 16 within the link 15. A spiral spring 20 is interposed between the sleeve and the lower end of the link, and a spring 21 is interposed between the collar 17 and the link.

As shown in Figs. 1 and 2, the rod 16 passes through a stuffing-box 22 at the end of the case 2.

When the electric current is supplied by

the conductors 5 and 6, the rotation of the armatures is communicated by the shaft 9 to the gearing 12, and by the crank-pin 13 a reciprocating motion is imparted to the rod 14 and link 15, which, acting through the springs 20 and 21, impart a reciprocating motion to the rod 16. The function of the springs is to prevent the apparatus from acting with shocks or jars which might otherwise interfere with its work, and if in the act of drilling the case be nearer the bottom of the hole than required for the tool to strike and penetrate the earth the motion of the crank-pin after such engagement and penetration of the tool will be taken up by compression of the spring. When the apparatus is to be used for drilling, it is let in the well by a cable, a suitable drilling-tool having been attached to the end of the rod 16, so that when the case is lowered to the bottom of the well the reciprocation of the two shall cut away the earth.

During the drilling operation the case 2 may be turned from time to time to give the proper action to the drilling-tool, or the same effect may be produced by providing the drilling-tool with suitable appliances known to the art, by which reciprocation produces also rotation on its longitudinal axis. In drilling, the apparatus should be drawn from the well from time to time for the purpose of permitting the insertion of a sand-bail to remove the débris or cuttings.

When the apparatus is used for the purpose of pumping wells, the pump rod or plunger is attached to the reciprocating rod 16. In such case it is desirable to place the apparatus in the well and into the fluid, with the rod 16 projecting upwardly.

It often happens in the use of drilling-tools that the bits become jammed in the well, and to prevent this I construct the parts so that they shall act with a jarring action. The use of the sleeve 19 makes this possible, since this sleeve, by engaging the head 18, serves the function of a jar, which is made effective in the reciprocation of the rod 14 by means of the motors.

In Fig. 3 I show the preferred arrangement of the case, which is designed to prevent the evil effects of the great upward pressure on the rod 16, which would occur when the case is lowered in a well containing a large amount of water. In this instance, instead of having a reciprocating rod 16 project from the end of the case, I use a short rotary shaft 23, which passes through a stuffing-box 22, and on the inside of the case is connected by a gear-wheel 24 to the last gear-wheel of the series 12. On the outside of the case the shaft 23 is connected by gearing 25 with a crank 26. To this crank are connected the rod 14, link 15, rod 16, and their other auxiliary parts, as illustrated in Fig. 1. The parts are preferably protected by a perforated case 27, the lower part of which is adapted to serve the

purpose of a guide. The reciprocating parts of the apparatus are thus exposed and work in the water in the well, so that they do not have to overcome the immense hydrostatic pressure to which the mechanism of Fig. 1 is subjected. This is a very valuable part of my invention and is claimed, broadly, herein.

The advantages of my invention have already been indicated and will be appreciated by those familiar with the disadvantages attending the use of the drilling and pumping appliances heretofore in use.

The apparatus is simple in construction, not apt to get out of order, and is easy to remove from and to place in the well, and affords a great saving of mechanical power and in the time necessary to be spent in their use as compared with the use of the heavy and cumbrous drilling-tools heretofore known in the art.

Many modifications in the form, details, and general arrangement of the apparatus will suggest themselves to the skilled mechanic.

I claim—

1. In apparatus for operating or drilling deep wells, the combination, with a case adapted to be let into the well, of a series of electric motors arranged therein in tandem, and a common power-transmitting shaft, which extends longitudinally of the case and is fixed to the armatures of the motors, whereby motion of the armatures is transmitted directly to the shaft, substantially as and for the purposes described.

2. In apparatus for drilling or operating deep wells, the combination of a case adapted to be let into the well, an electric motor contained in the case, a rotary shaft driven by the motor and projecting outside the case, and mechanism situate outside the case and connected with the shaft and adapted to transfer the rotary motion thereof into a reciprocating motion, substantially as and for the purposes described.

3. In apparatus for drilling or operating deep wells, the combination of a case adapted to be let into the well, a motor contained in the case, a rod connected with the motor and reciprocated thereby, and a sliding jar-section connected with the rod, substantially as and for the purposes described.

4. In apparatus for drilling or operating deep wells, the combination of a case adapted to be let into the well, a motor contained in the case, a rod connected with the motor and reciprocated thereby, a link having a sliding connection and adapted to form a jar, and a spring acting on the rod and link, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 13th day of October, A. D. 1890.

WESLEY WEBBER.

Witnesses:

THOMAS W. BAKEWELL,
H. M. CORWIN.