(No Model.)

G. G. FRYER.

ELECTRICAL APPARATUS FOR DRIVING ARTESIAN WELLS.

No. 422,201. Patented Feb. 25, 1890.

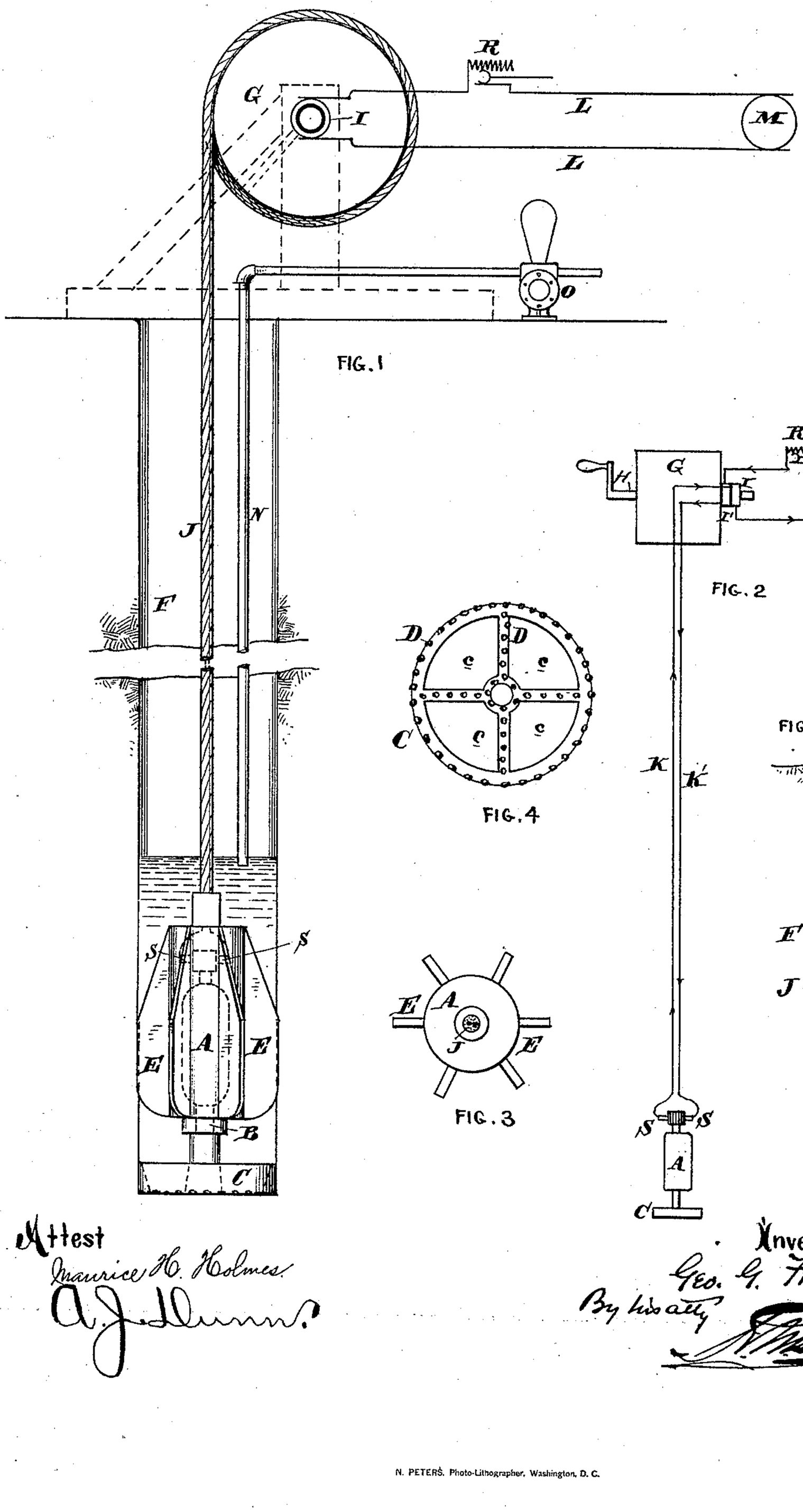

FIG. 1

FIG. 4

FIG. 3

FIG. 2

FIG. 5

Attest
Maurice H. Holmes.
A. J. Dunn.

Inventor
Geo. G. Fryer
By his atty
J. Thos. Johnson

UNITED STATES PATENT OFFICE.

GEORGE G. FRYER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICAL APPARATUS FOR DRIVING ARTESIAN WELLS.

SPECIFICATION forming part of Letters Patent No. 422,201, dated February 25, 1890.

Application filed January 2, 1890. Serial No. 335,574. (No model.)

To all whom it may concern:

Be it known that I, GEORGE G. FRYER, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Electrical Apparatus for Drilling Artesian Wells, of which the following is a specification.

My invention has reference to electrical apparatus for drilling Artesian wells; and it consists of certain improvements, which are fully set forth in the following specification, and shown in the accompanying drawings, which form a part thereof.

In carrying out my invention I provide an electric motor of suitable construction with a drill arranged close to the motor, so as to employ as short a shaft as is conveniently possible. The motor is suspended from the end of a cable, by which it may be raised or lowered, and is provided with conductors leading from the surface of the ground for supplying it with electrical energy. A windlass is arranged adjacent to the upper part of the hole which is being bored for the purpose of lowering or raising the electric motor and drill. A pump and suction-pipe may be employed for removing the water and dirt from the hole while being bored. I arrange the motor so that as it descends in the hole it is maintained close to the drill-head, and is, furthermore, in practice surrounded or enveloped by the water, and thus kept in a perfectly cool condition. The motor is incased so as to be water-tight, and is also provided with radiating wings or arms, which, while allowing the water and material drilled to pass upward, act to prevent the rotation of the motor-frame.

The object of my invention is essentially to apply the electric power at or close to the drill, whereby exceedingly deep Artesian wells may be bored without the necessity of employing long cumbersome drill rods or shafts, which are most expensive to construct and handle, as well as having a tendency to become injured and cause great loss to the operator.

In the drawings, Figure 1 is a sectional elevation through the well, showing my apparatus in elevation. Fig. 2 is a diagram illustrating the arrangement of the electric circuits. Fig. 3 is a plan view of the motor. Fig. 4 is an inverted plan view of the drill, and Fig. 5 is a sectional elevation showing a modification of my invention.

A is the electric motor, and is incased in metal, so as to make a water-tight covering for the insulation and moving parts, such as the armature and commutator. The outer portion of this casing of the motor is provided with radial arms or ribs E, which, while the motor is being lowered in the hole F in the earth, fit against the sides thereof and prevent the motor from rotating.

B is the motor-shaft, and is fitted with the drill bit or head C. This drill head or bit is provided with apertures *c* and the usual diamond points D. This drill head or bit may be made in any suitable manner and of any material.

The motor A is suspended by a cable J, and by it and a windlass G, having a crank H, it may be raised or lowered in the hole F. The windlass G is provided with two rings I I′, which receive current from line-conductors L, leading from an electric generator M or suitable source of electric energy. The rings I I′ are connected, respectively, with the conductors K K′, which are insulated and extend through the cable J to the brushes S of the motor. By this construction the motor may be raised or lowered, and at all times be in electrical connection with the source of energy M. The circuit L may be provided with a regulator R to control the speed or power of the motor A.

O is a suction-pump, and is provided with a suction-pipe N, which is placed in the hole F, so as to remove the water and dirt from above the motor A, and preferably so as to leave the motor always submerged for the purpose of keeping it and the drill cool. When deep Artesian wells are being bored, it is necessary to place the pump down the hole and force the water upward in the usual way. It is also evident that in drilling into sandy or earthy soils it may in many instances be necessary to insert a casing to prevent the hole filling up, and such casing would follow up the motor. This construction is shown in Fig. 5, in which J′ represents a section of the casing and carries at its lower end the motor A. It is thus evident that the casing may act as the raising and lowering devices in place of the cable. In this case independent conduct-

ing-wires K K′ would be used to supply electric energy to the motor.

I do not limit myself to the details of construction, as they may be modified in various ways without in the least departing from the spirit of my invention.

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

1. The combination of an electric motor provided with a drill-bit arranged close to the motor adapted for boring Artesian wells and a cable for raising and lowering the electric motor and drill.

2. The combination of an electric motor provided with a drill-bit arranged close to the motor adapted for boring Artesian wells, a cable for raising or lowering the electric motor and drill, electric conductors leading from the motor to a source of electric energy arranged above the surface of the ground, and a regulator to control the current flowing to the motor.

3. The combination of an electric motor having a drill-bit arranged upon its shaft close to the body of the motor, a cable from which the motor is suspended, a windlass or lifting device for raising or lowering the cable and motor, a source of electric energy, conductors to supply current from the source of electric energy to the motor, and hydraulic devices for removing the water and dirt which accumulate above the motor and drill in the operation of boring an Artesian well.

4. The combination of an electric motor having a water-tight casing, a drill-bit secured to the shaft of the motor, lifting devices for raising and lowering the electric motor, and electric conductors leading from above the ground down to the motor for supplying electric energy thereto.

5. The combination of an electric motor provided with a water-tight casing and radiating arms or ribs adapted to fit the hole being bored, a drill-bit secured to and rotating with the shaft of the motor, lifting-cable for raising or lowering the motor, and conductors leading from above the ground down to the motor for supplying electric energy thereto.

In testimony of which invention I have hereunto set my hand.

GEORGE G. FRYER.

Witnesses:
R. M. HUNTER,
ERNEST HOWARD HUNTER.