(No Model.) 2 Sheets—Sheet 1.

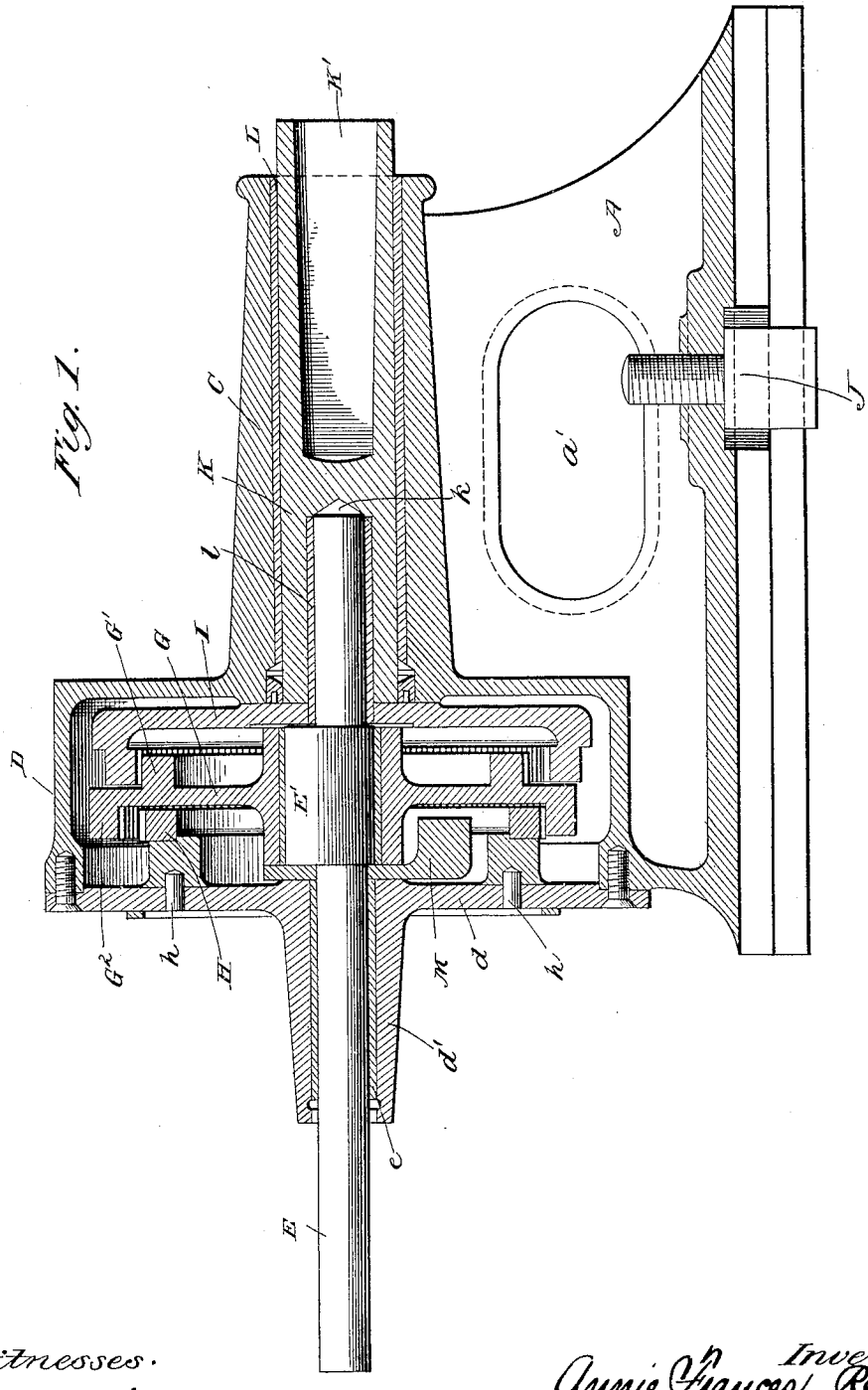
D. S. REGAN, Dec'd.

A. F. REGAN, Administratrix.

DRILLING MACHINE.

No. 595,076. Patented Dec. 7, 1897.

Fig. 1.



Witnesses.
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A. W. Bayard.

Inventor
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

2 Sheets—Sheet 2.

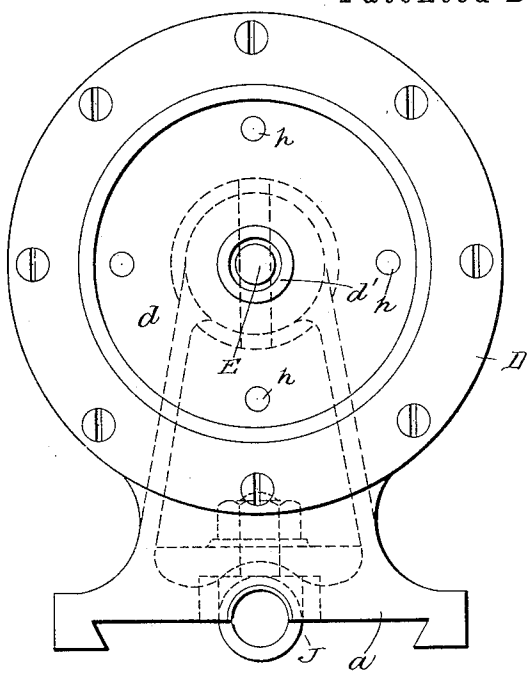
D. S. REGAN, Dec'd.

A. F. REGAN, Administratrix.

DRILLING MACHINE.

No. 595,076. Patented Dec. 7, 1897.

Fig. 2.



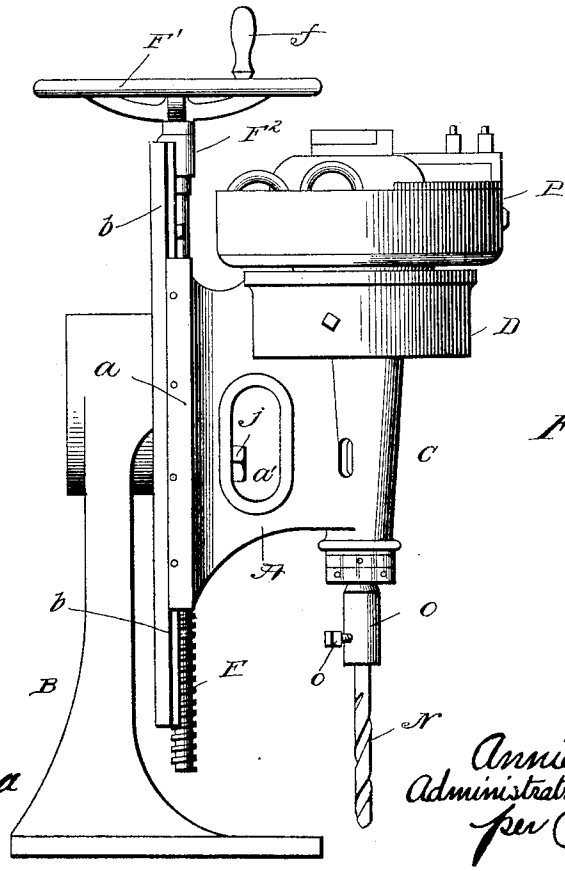


Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

ANNIE FRANCES REGAN, OF BROOKLYN, NEW YORK, ADMINISTRATRIX OF DANIEL S. REGAN, DECEASED, ASSIGNOR TO THE POWER TRANSMITTER COMPANY, OF JERSEY CITY, NEW JERSEY.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 595,076, dated December 7, 1897.

Application filed March 20, 1896. Serial No. 584,118. (No model.)

To all whom it may concern:

Be it known that I, ANNIE FRANCES REGAN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, verily believe DANIEL S. REGAN, deceased, to have invented certain new and useful Improvements in Drilling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

These improvements refer to a drilling-machine, preferably one that is operated by an electric motor or some other high-speed power; and the object of the invention is to adapt a new and improved form of reduction-gearing for use in connection with a drilling device, so that the high speed of the driving-shaft, which, as has been suggested, may be the armature-shaft of an electric motor or some other high-speed prime mover, may be reduced to a lower speed in the driven element—to wit, the drill—when rotating at a given ratio, the same depending upon the proportions of the different gears and their relation and combination with respect to each other. By means of the improved form of reduction-gearing alluded to the speed of the drill may be diminished, or if operated by a slow-running motor it may be increased, and the drill-bit may be driven in the same direction as or in a direction the reverse of that of the motor-shaft. Said novel form of reduction-gearing just referred to has been made the subject of Letters Patent No. 546,249, granted to Daniel S. Regan on September 10, 1895.

The invention set forth and claimed in the present application is therefore a carrying forward and adaptation to the purposes of an electric or high-speed drilling-machine of the invention described and claimed in said patent.

The invention therefore consists, essentially, in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and then more particularly pointed out in the claims.

Referring to the accompanying drawings, there is illustrated therein one preferred embodiment of the invention, the same being sufficient to explain the principles thereof and enable those skilled in the art to make and use the invention, and it will be understood that the details of construction and arrangement of parts may be varied to suit the exigencies of different cases without departing from the spirit of the present improvements.

In the drawings, Figure 1 is a longitudinal sectional view of the present improved drilling mechanism, the same being shown on an enlarged scale and apart from the electric motor, the supporting-frame, and the operating-screw. Fig. 2 is a top plan view of the parts represented in Fig. 1, but on a diminished scale. Fig. 3 is a side elevation, complete, of the present improved drilling-machine.

Similar letters of reference designate corresponding parts throughout the different figures of the drawings.

A designates a main casting or frame having on one side a dovetailed groove or recess *a*, which embraces a correspondingly-shaped rib or flange *b* on the side of the stationary upright or standard B, which is mounted upon a suitable bed or framework. The frame A is therefore adapted to travel vertically up and down upon the lateral vertical flange *b* of the stationary frame B. The frame A carries the electric motor, the drilling device, and the interposed reduction-gearing.

F denotes a vertical adjusting-screw having at its upper end a wheel F′, which is provided with a handle *f*, whereby the screw F may easily and conveniently be rotated. Screw F is supported in a bearing F^2 at the upper end of the guide-flange *b*, and said screw F engages a nut on the frame A, so that in consequence of such engagement when the screw F is rotated the frame A will be adjusted up or down, as the case may be. One form of screw-nut employed for this purpose is shown in Fig. 1 at J. On the inner end of the screw-threaded bolt which forms a part of the nut J is a clamping-nut *j*, to which access is had through the lateral opening *a′* in the frame A, and by means of which clamping-nut the nut J is firmly held in position. (See Figs. 1 and 3.)

Integral with the sliding frame A and built as a part thereof is a casing or chamber D. This may be termed an "oil-casing," because it is adapted to contain a certain amount of lubricating material, and within this chamber is arranged a gearing mechanism, which is submerged within the lubricant and operates therein, running noiselessly in consequence, besides being kept thoroughly oiled. The casing D is formed at its central point on one side, which will be the under side when the casing D is in its normal horizontal position, as shown in Fig. 3, with an elongated shaft-bearing C, having an internal cylindrical bore, said shaft-bearing being likewise integral with and made as a part of the frame A. The opposite side of the casing D is closed by means of a circular cover-plate *d*, which is secured in position upon the circular peripheral edge of the casing D by means of screws, bolts, or other fastening devices, and is removable whenever desired in order to allow access to the interior of the casing D. This removable cover-plate *d* is provided at its central point with a horizontal integral stationary shaft-bearing *d'*, the axis of which is in alinement with the axis of the other shaft-bearing C, although the bearings themselves may be of different sizes or diameters if preferred. Accordingly it will be seen that the stationary circular casing A, besides acting as an inclosing chamber to receive a gear mechanism and surround the same with a lubricant, serves also to provide a bearing on each of its sides for sustaining and holding the driving-shaft and the driven shaft, one or both, by means of which shaft or shafts the power of a motor is communicated therefrom through an intermediate gearing to a drilling implement.

E denotes a shaft, which may be a driven shaft or a driving-shaft, but which in the present instance is preferably the armature-shaft of an electric motor.

P denotes the electric motor. This motor P is simply presented here by way of example, and I do not think it necessary to enter into any detailed explanation of the construction, arrangement, and operation thereof. Suffice it to say that the motor P is mounted upon the sliding frame A by being superposed on the casing D and that the shaft E, being the armature-shaft of the motor, is so related thereto and connected therewith as to be driven at a very high rate of speed by the mechanism of the motor. The shaft E is supported vertically within the shaft-bearing *d'*, a bushing *e* being preferably interposed between the shaft E and the bearing *d'*. Within the other shaft-bearing C is situated a shaft K, which may be a driving-shaft or a driven shaft, as the case may be, but which in this particular example of the invention is obviously a driven shaft, the aforesaid shaft E being the driving-shaft, and between this shaft K and the bearing C is preferably interposed a sleeve or bushing L, as clearly shown in Fig. 1. The shaft K extends entirely through the bearing C, and the end of the shaft K which projects beyond the bearing C is preferably cored out or bored to provide the recess K', into which is fastened the drill proper, N, the same being held by means of the connection O, provided with the set-screw *o*. The invention is not restricted to any particular drill or any special means for attaching the same to the driven shaft, and in actual practice the attachment may be made in any desired manner. Furthermore, it will be observed that the shaft K is formed with a recess *k*, which provides a sort of step or cup-bearing, and in this recess enters loosely and revolubly the end of the driving-shaft E, there being, preferably, a bushing *l* interposed between this end of the driving-shaft E and the wall of the recess *k*, as clearly shown in Fig. 1 of the drawings.

On the shaft E, at a point centrally within the circular oil-casing D, is an eccentric E'. On this eccentric, revolving loosely and driven thereby, is a combined external and internal gear-wheel consisting of a web G, on one side of which is an internal gear-wheel G^2 and on the other side of which is an external gear-wheel G'. The internal gear-wheel G^2 engages the teeth of an external gear-wheel H, which is secured rigidly to the inner face of the cover-plate *d* by means of pins *h h*, which rigidly hold the gear-wheel to the cover-plate, or, if desired, the gear-wheel H may be made integral with the cover-plate *d*. The external gear-wheel G' of the combined external and internal gear engages the teeth of an internal gear-wheel I, which is made integral with or is firmly attached to the recessed driven shaft K. Furthermore, on the shaft E, preferably at a point between the bearing *d'* and the eccentric E', is placed a suitable counterbalance M, the function of which is to secure uniformity of motion and speed when the mechanism is running at a very high velocity. Also it is to be observed that a bushing is preferably interposed between the eccentric E' and the combined internal and external gear-wheel, which is mounted revolubly thereon.

The operation of the present improved electrical drilling device will be evident from the foregoing description of the construction and arrangement of the several parts without need of any additional detailed explanation.

It will be understood, of course, that the power of the electric motor will be applied directly to the shaft E, causing said shaft, with its eccentric E', to revolve, and thereby actuating the train of gears, which are arranged as described, and communicating motion through these gears to the driven shaft K and to the drill N. As the shaft E revolves the fixed eccentric E' thereon will actuate the combined internal and external gear-wheel, which, as we have seen, engages the stationary gear-wheel on the stationary cover-plate of the casing D and likewise the internal gear-wheel, which is attached to the driven shaft

K. The result will be that the driven shaft K will be reduced in speed below the rate of rotation of the driving-shaft E and will revolve in the same direction. The gearing which has been described effectuates this valuable and useful result in the most approved and satisfactory manner.

Various changes in the precise construction, arrangement, and relative proportions of the different parts to adapt the invention for use in various locations and to suit the exigencies of different cases and for the purpose of controlling the relative rates of speed of the driven element and the driving element, and also for controlling the direction of rotation of one shaft relatively to the other, causing the one to rotate in the same direction as the other, or the reverse, may be made without departing from the scope of the present invention.

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

1. In a drilling-machine, the combination with a vertically-adjustable drill-carrying frame and its standard, of an oil-tight casing formed integral with the frame and having shaft-bearings on the opposite sides thereof, the driving-shaft supported in one of said bearings, an electric motor supported on said casing and applying its power for the rotation of said driving-shaft, an eccentric fixed on the driving-shaft and revolving therewith, a combined external and internal gear-wheel revolving upon and driven by the eccentric, a driven shaft supported in the other shaft-bearing and connected with the driving-shaft, and a controlling device attached to the driven shaft, substantially as described.

2. In a drilling-machine, the combination of a standard or support, a vertically-adjustable drill-carrying frame which is movable up and down upon said stationary standard, an adjusting-screw for the movable frame, an oil-tight casing integral with the movable frame, an electric motor supported upon the said casing, a reduction-gearing arranged within the casing and consisting essentially of a combined external and internal gear-wheel mounted revolubly upon an eccentric-provided driving-shaft, which shaft is actuated by the motor, and a driven shaft actuated by the combined gear-wheel, together with the drilling device carried by the driven shaft, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ANNIE FRANCES REGAN,
Administratrix of the estate of Daniel S. Regan, deceased.

Witnesses:
CHAS. HOWARD WILLIAMS,
GEORGE A. SUMNER.