No. 688,873. Patented Dec. 17, 1901.

E. C. MORGAN.

ELECTRIC MINING MACHINE.

(Application filed June 10, 1901.)

(No Model.) 2 Sheets—Sheet 1.

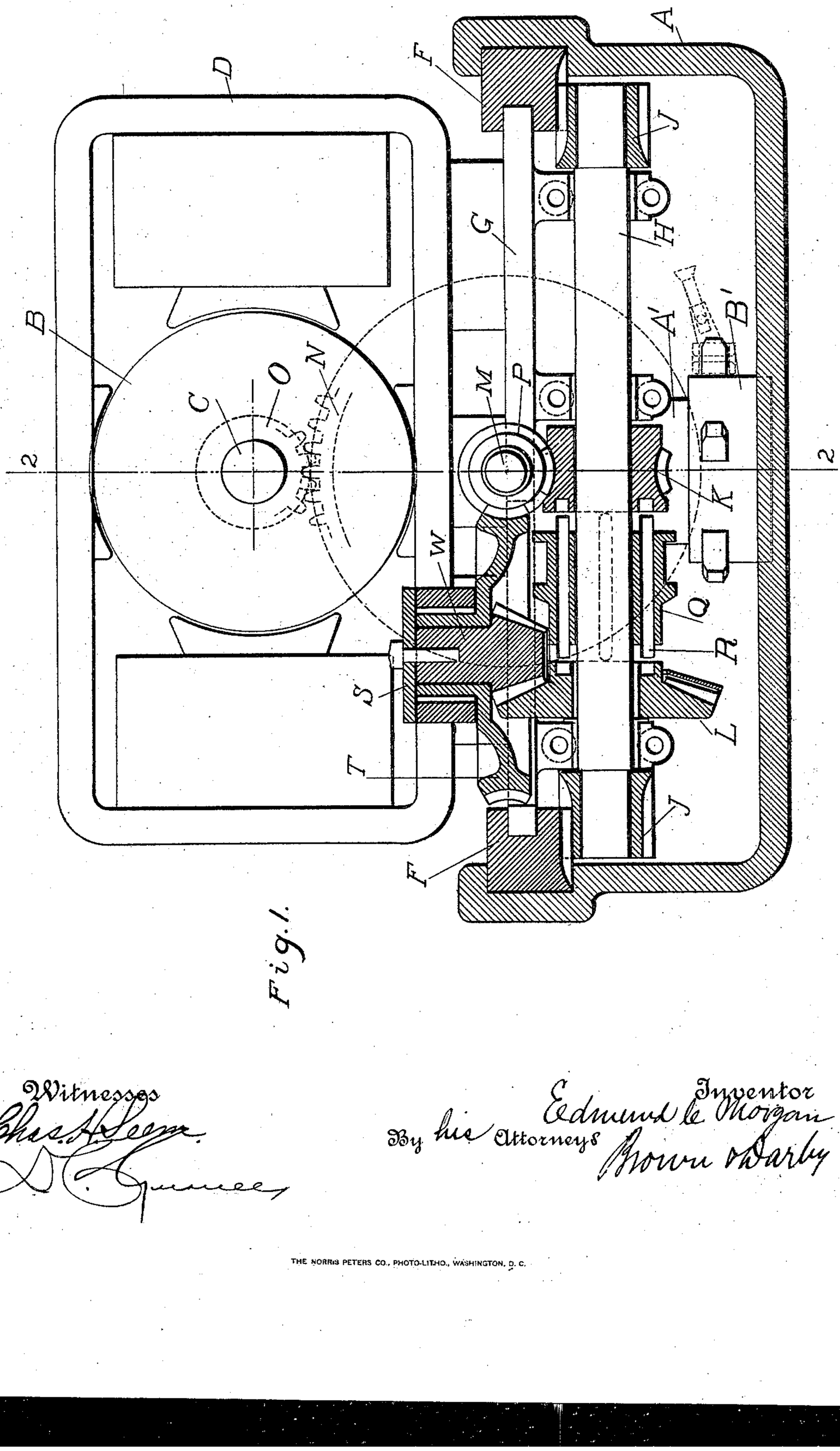

Fig. 1.

Witnesses
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D. Gurney

Inventor
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By his Attorneys
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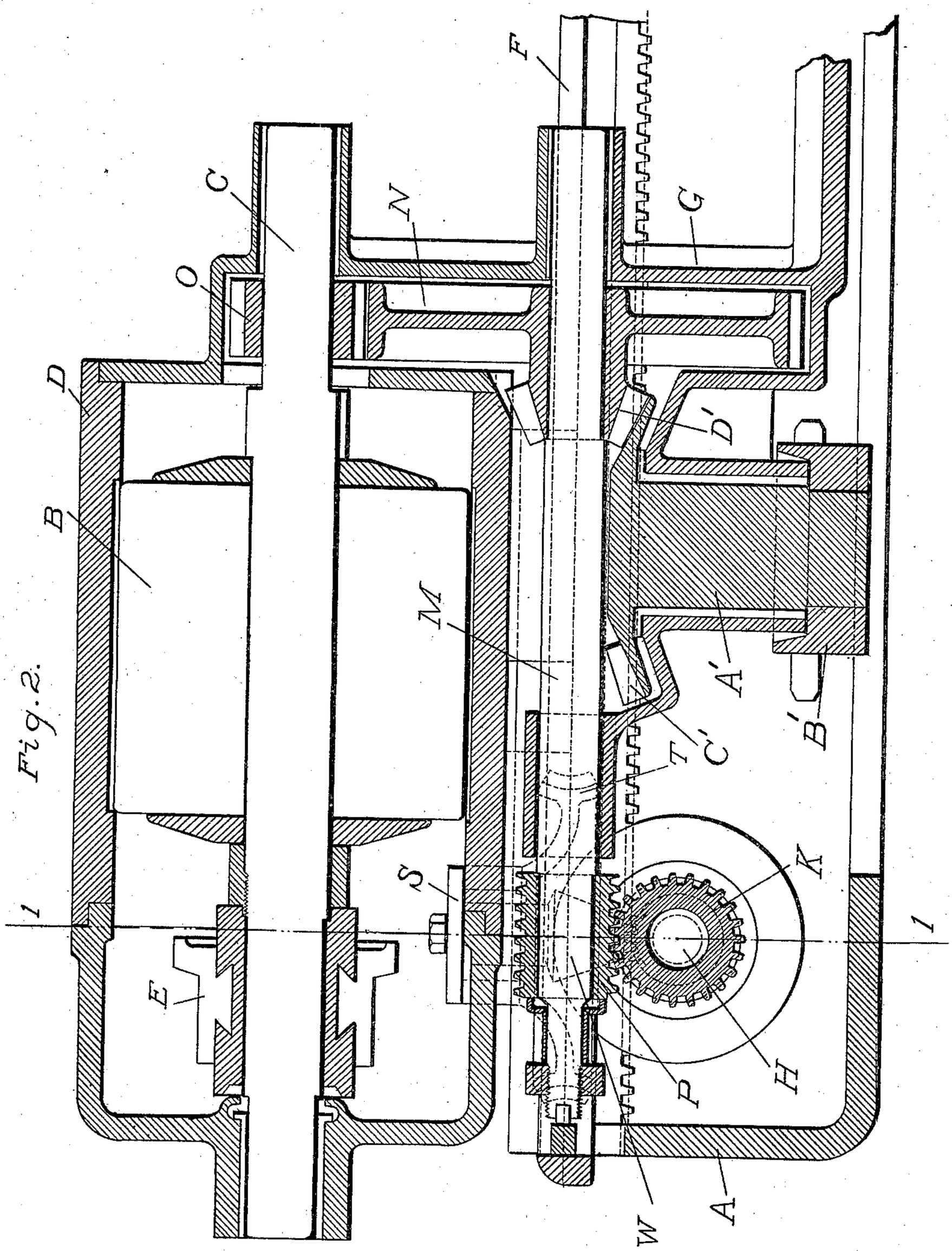

Fig. 2.

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UNITED STATES PATENT OFFICE.

EDMUND C. MORGAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MORGAN ELECTRIC MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELECTRIC MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 688,873, dated December 17, 1901.

Application filed June 10, 1901. Serial No. 63,865. (No model.)

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Electric Mining-Machine, of which the following is a specification.

This invention relates to electric mining-machines.

The object of the invention is to simplify and improve the construction of machines of this class and to render the same more efficient in operation.

A further object of the invention is to provide a construction of operating-gearing for electric mining-machines comprising but few parts and which is strong and durable and inexpensive in manufacture.

The invention consists, substantially, in the construction, combination, location, and arrangement, all as will be more fully hereinafter set forth, shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view in rear end elevation, partly in transverse section, on the line 1 1 of Fig. 2 looking in the direction of the arrows. Fig. 2 is a central longitudinal section of the same on the line 2 2, Fig. 1, looking in the direction of the arrows.

The same part is designated by the same reference-sign wherever it occurs throughout both views.

Referring to the accompanying drawings, reference-sign A designates a base or frame upon which are supported the various operative parts of the machine. B is an electric motor, the shaft C of which is journaled in suitable bearings. D is the field-magnet frame, and E the commutator. These parts may be of the usual or any well-known construction and arrangement.

Reference-sign F designates rack-bars suitably mounted in fixed relation in the framework or base A and along the sides thereof, as clearly shown in Fig. 1, said bars extending lengthwise of said frame and in parallel relation with respect to each other.

G designates an auxiliary frame in which are formed the bearings for the motor-shaft C, said frame G being mounted to travel with respect to the base or frame A. In suitable bearings formed in or carried by frame G is a transverse shaft H, upon the ends of which are mounted gears J, respectively engaging and meshing with the teeth of rack-bars F. Loosely sleeved upon shaft H to rotate thereon is a worm-block K. Also loosely sleeved to rotate upon shaft H is a bevel-gear L, of larger diameter than the diameter of worm-block K. Suitably journaled in bearings formed on or carried by the auxiliary frame G is a shaft M, arranged to extend longitudinally of the machine and in parallel relation with respect to the motor-shaft C and geared to said motor-shaft through a gear-wheel N and pinion O, respectively mounted upon said shafts M and C. Also mounted upon to revolve with shaft M is a worm-gear P, arranged to mesh with and to rotate worm-block K. Suitably splined to rotate with shaft H, but capable of movement longitudinally thereof, is a clutch-block Q, having clutch-pins R, the ends of said clutch-pins projecting beyond the faces or ends of such clutch-block and arranged when shifted in one direction or the other longitudinally of shaft H to engage worm-block K or bevel-gear L, as the case may be, to lock the same to rotate with shaft H. Thus when the clutch-block Q is shifted in one direction the projecting ends of the clutch bars or pins R will engage in suitable sockets or seats formed in worm-block K, and when such clutch-block is shifted in the other direction the other ends of said clutch pins or bars engage in sockets or recesses in the opposed face of bevel-gear L. The range of movement of clutch-block Q longitudinally upon and with respect to shaft H is sufficient to permit an intermediate position of such clutch-block such as will enable the clutch-pins R to be out of engagement with both of said parts K and L. In a bracket S or other convenient part of the framework is journaled a worm-wheel T of large diameter, formed with or connected to a stud W, having bevel gear-teeth thereon arranged to mesh with bevel-gear L. The worm-wheel T is arranged to mesh with and to be rotated or driven from worm-gear P on shaft M.

From the foregoing description it will be seen that the desired forward-and-backward feed of the auxiliary frame G is effected by the actuation or operation of motor B, the rotation of the motor-shaft being imparted to shaft M through the intermeshing gear and pinion N O, which gear and pinion may be so relatively proportioned as to secure the desired reduction in speed. When the clutch-block Q occupies its intermediate position—that is, when the clutch-pins R, carried thereby, are disengaged from both the worm-block K and bevel-gear L—rotation of shaft H is arrested. When, however, the clutch-block Q is shifted into position to engage worm-block K, rotation is imparted to shaft H in one direction through the locking of worm-block K to revolve or rotate with said shaft, and when said clutch-block is shifted in the opposite direction to engage with bevel-gear L rotation in the opposite direction is imparted to shaft H from shaft M through the intermeshing worm-gear P, worm-wheel T, and the bevel gear-stud W, meshing with bevel-gear L, and the rotation of shaft H when driven through bevel-gear L may be at a higher speed than the rotation of said shaft through the intermeshing of worm-wheel P with worm-block K, according to the relative size and proportion of the gears and worm-block, thus securing a slow feed of the auxiliary frame G to advance the cutting apparatus to its work and a more rapid movement when the cutting mechanism is being withdrawn from its work, and both feed movements are imparted from a motor which may be operated continuously and in a continuous direction.

From the foregoing description it will be seen that I provide an exceedingly simple construction of electric mining-machines wherein few parts are employed, thereby reducing the cost of manufacture and of repair to an exceedingly low minimum. It will also be seen that the motor may operate continuously and in a continuous direction, thereby avoiding the injurious effects of stopping, starting, and reversing the motor and permitting the employment of a motor of simple and economical construction and avoiding the additional expense of reversing-switches. Moreover, I secure the desired variation in the speeds of travel of the cutting-carrying frame, whereby the cutting mechanism may be advanced slowly to its work and withdrawn or retracted more rapidly.

Any desired cutting mechanism may be employed in connection with my invention. As illustrative of an operative construction embodying the principles of my invention reference-sign A′ designates a stud suitably mounted and journaled upon the auxiliary frame G and carrying a sprocket-gear B′, over which operates a chain cutter in the ordinary manner. The stud A′ is provided with a bevel-gear C′, arranged to mesh with and to be driven from a bevel-gear D′, mounted on or forming part of the hub of gear N, through which rotation is imparted to shaft M from the motor-shaft C. Of course it is obvious that other forms of cutting mechanism and operating means therefor may be employed in connection with my invention. I do not desire, therefore, to be limited or restricted in this respect.

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In an electric mining-machine, a main frame having a rack-bar, an auxiliary frame mounted to move upon said main frame, a feed-shaft journaled in said auxiliary frame and having a gear arranged to mesh with said rack-bar, a worm-block and a bevel-gear loosely sleeved upon said shaft, a counter-shaft mounted in said auxiliary frame and having a worm-gear thereon arranged to mesh with said worm-block, a worm-wheel geared to said bevel-gear and also meshing with and driven from said worm-gear, a motor mounted on said auxiliary frame and arranged to drive said counter-shaft, and means for independently coupling said worm-block and bevel-gear to said feed-shaft, as and for the purpose set forth.

2. In an electric mining-machine, a main frame having a stationary feed-rack, an auxiliary frame mounted to move on said main frame, a feed-shaft journaled in said auxiliary frame and having a gear arranged to mesh with said feed-rack, a worm-block and a bevel-gear loosely sleeved upon said feed-shaft, a clutch-block splined to rotate with said feed-shaft but capable of longitudinal movement thereon and arranged between said worm-block and bevel-gear to alternately engage the same, whereby said feed-shaft may be rotated in opposite directions, a counter-shaft, a worm-gear thereon arranged to directly mesh with and rotate said worm-block, a worm-wheel also meshing with and driven by said worm-gear, a gear actuated by said worm-wheel for driving said bevel-gear, and means for driving said counter-shaft in a continuous direction, as and for the purpose set forth.

3. In an electric mining-machine, a main frame having longitudinally-extending feed-racks mounted at opposite sides thereof, an auxiliary frame mounted upon said main frame, a transversely-extending feed-shaft having gears thereon arranged to mesh with said feed-racks, a worm-block and a bevel-gear loosely sleeved upon said feed-shaft, a clutch-block movably splined upon said shaft and arranged between said worm-block and bevel-gear and adapted to be shifted into position to alternately lock said block and gear to rotate with said shaft, a counter-shaft having a worm-gear arranged to directly mesh with and drive said worm-block, a worm-wheel also arranged to directly mesh with and

to be driven from said worm-gear, a gear-stud connected to revolve with said worm-wheel and arranged to mesh with said bevel-gear to drive the latter, a motor, and reduction-gearing interposed between the shaft of said motor and said counter-shaft, whereby said counter-shaft is driven in a continuous direction, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 5th day of June, 1901, in the presence of the subscribing witnesses.

EDMUND C. MORGAN.

Witnesses:
E. C. SEMPLE,
CHAS. H. SEEM.