

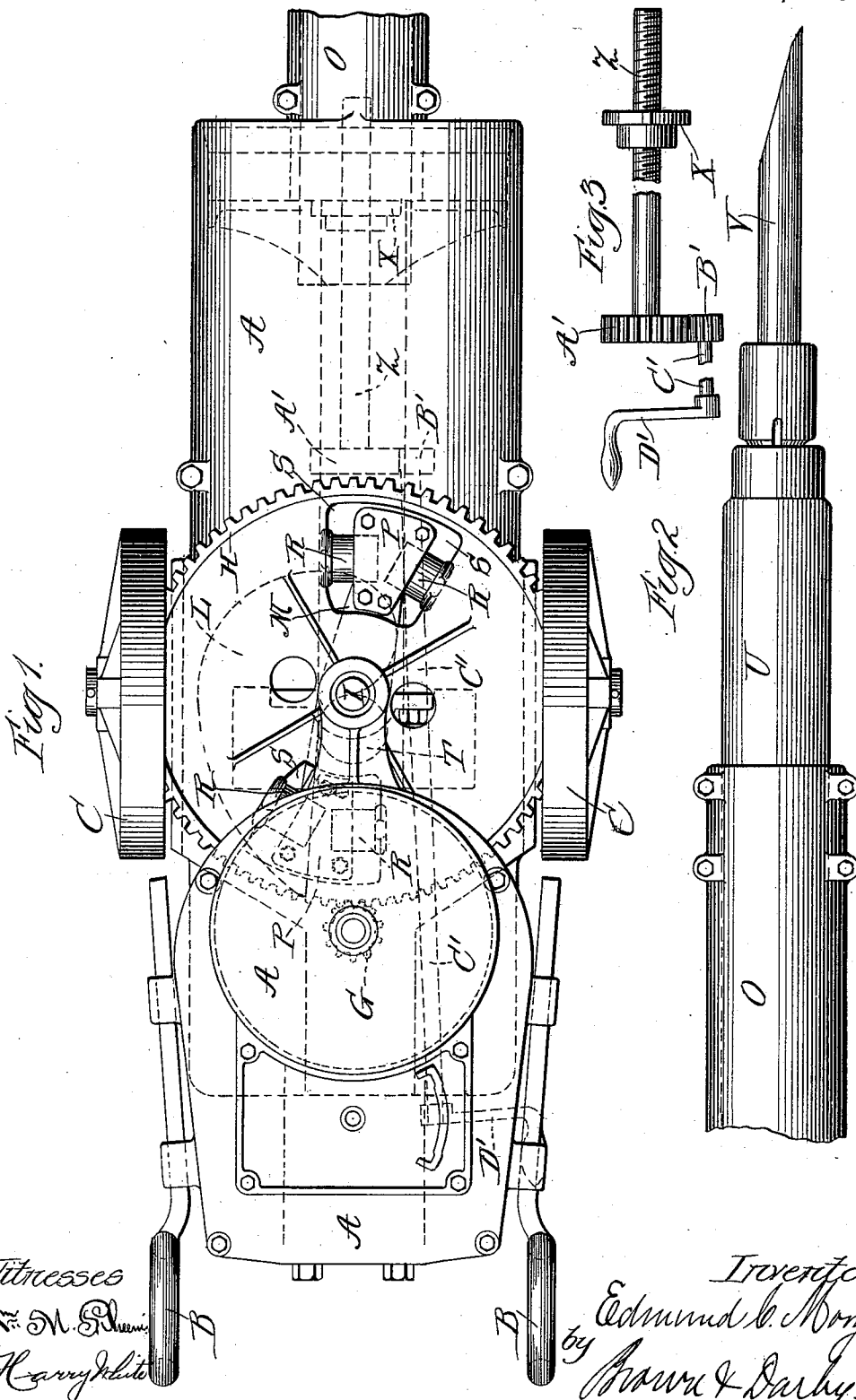
(No Model.)

2 Sheets—Sheet 1.

E. C. MORGAN.
ELECTRIC MINING MACHINE.

No. 536,438.

Patented Mar. 26, 1895.



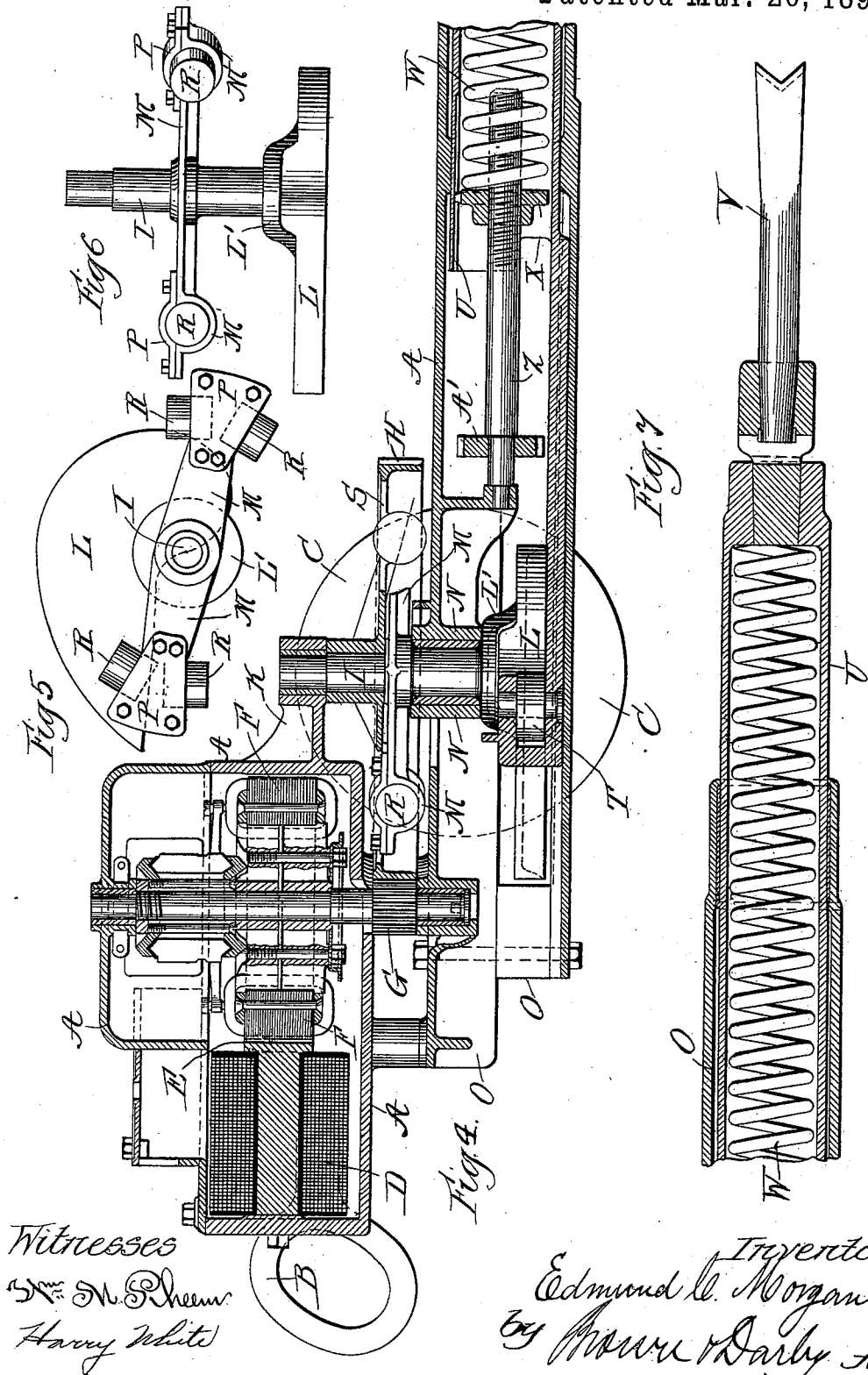
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ELECTRIC MINING MACHINE.

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Witnesses
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Inventor
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by Moore & Darby Attys.

UNITED STATES PATENT OFFICE.

EDMUND C. MORGAN, OF CHICAGO, ILLINOIS.

ELECTRIC MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,438, dated March 26, 1895.

Application filed July 18, 1894. Serial No. 517,872. (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 new and useful Improvements in Electric Mining-Machines, of which the following is a specification.

This invention relates to improvements in electric mining machines, and its object is to strengthen and render more durable and efficient such machines.

The invention consists substantially in the construction illustrated in the accompanying drawings, set forth in the subjoined description, and more particularly pointed out in the claims.

Like letters refer to the same parts in the several figures of the drawings, in which—

Figure 1 illustrates a plan view of the machine. Fig. 2 illustrates a side elevation in detail of the tool holding plunger and frame, and tool in position. Fig. 7 is a vertical section of the same. Fig. 3 is a detail view of the devices for adjusting the plunger spring. Fig. 4 is a central vertical section of the machine. Fig. 5 is a top view in detail of the cam devices. Fig. 6 is a side elevation of the same.

In the operation of machines for mining coal and other substances the continuous impact of the mining tool against the substance to be mined produces constant jarring and great strain, so that the parts are rendered brittle and liable to break, and, if they are keyed together, rapidly wear loose.

It is an aim of the present improvement to dispense with as many joints as possible and cast in one piece as many of the parts as is practicable.

The main frame which incloses the motor, including the magnet and armature, is designated by the letter A and need not be specially described, for it is of any suitable construction. It is provided with the usual handles B and supported upon wheels C, C. The motor is preferably of the bi-polar form, with a single magnet D, having its salient pole, E, in front of it at one side of the armature, and its consequent pole constituted by the frame at the other side of such armature. The armature is designated by the letter F, and is preferably, though not necessarily, of the

form shown and described in an application for a patent filed July 18, 1894, Serial No. 517,874. The lower portion of the shaft of such armature is cast integrally with a pinion G, which meshes with and drives a spur wheel H, the axis of which is perpendicular to and in a line connecting the wheels which support the machine. By this arrangement of mechanism the machine is balanced on the axle joining the wheels, and the spur gear, although quite large, nevertheless permits construction of a comparatively narrow machine, for the reason that said spur gear may on each side revolve partly within the space inclosed by the periphery of the supporting wheels. The spur wheel H, has a hub which journals upon a shaft I, which latter extends above and below such wheel. The upper end of the shaft I has a bearing in the bushing inclosed in the cylindrical bore of the bracket K, extending from the main frame; and the lower end of said shaft is cast in one piece with a cam L and with the superposed buffer plate M, and at the point of conjunction with this latter is enlarged and beveled so as to form a bearing in the bushing placed in journal box N, extending from the tool frame O, the shaft then again being reduced and passing through the bushing into the cam, of which latter it also forms an integral part.

The buffer plate or holder plate M is composed of two arms, extending rigidly from the shaft on opposite sides thereof and terminating in open sockets M'. In each of these open sockets are placed two rubber buffers, facing in opposite directions, and confined therein by top plates P, which complete the socket, and may be secured to the other portion of such socket by bolts, or in any other suitable manner. These rubber buffers are designated by the letter R. In the horizontal web of the spur gear H are formed, on each side of the shaft, openings through such web, with the metal turned down so as to constitute abutments. These openings and abutments are designated in the drawings by the letter S. The buffers pass partially through these openings, but said openings are large enough to allow a certain movement before the buffers are engaged by the walls or abutments in the opening. The motor drives the pinion G, and the latter meshing with the

spur gear H rotates it, and causes its walls or abutments to contact with a pair of buffers diagonally arranged on opposite sides of the cam shaft and thereby impart rotation to such shaft and give the throw to the cam. When the gearing is moved in one direction one set of buffers is engaged, and when the gearing is moved in the opposite direction the other set of buffers is engaged, the set engaged always comprising two arranged on opposite sides of the shaft, and facing oppositely to each other.

The cam L, before alluded to is cast in one piece with its shaft, is formed so that its active, operating cam surface extends from its center to its point, its shape being best shown by dotted lines in Fig. 5, and its shaft being enlarged at the point of connection with the top of the cam into a circular projection or flange L' of sufficient surface to afford a strong connection and at the same time rest above the top of the cam a distance adequate to allow the play of the anti-friction roller against which such cam acts in operating the plunger and tool. Fig. 6 best illustrates how the projection is cut away on its under side to permit the play of the roller. This anti-friction roller, which is designated by the letter T, is journaled in a bracket formed at the inner end of the tool actuating plunger U, which, at the outer end, has the tool V secured thereto. The tool holding plunger has the usual spiral spring W, which bears at one end against the end of said plunger and at the other end against a nut X mounted upon a screw-threaded rod Z, which latter has near its inner end a spur gear A', and is journaled in the bracket depending from the frame O, in which the tool holding plunger plays. The nut X is kept from revolving by any suitable means such as a pin guided longitudinally in a slot, as shown in Fig. 4 of the drawings. Revolution may be given the screw and the nut advanced or retracted to compress or loosen the spring by means of the pinion B', mounted upon the end of a rod C', which extends rearwardly to the back of the machine in position to have its handle D' grasped by the operator of the machine. A detail of this mechanism is shown in Fig. 3 of the drawings and the position of the parts and extension of the rod and handle thereof are best shown by the dotted line in Fig. 1 of the drawings. It will be understood that the tension of the spring controls the force of the blow imparted by the pick or tool V, and that it is often important to regulate this tension without delay when the material being operated upon is found to vary in density, and the mechanism just described affords facilities for such regulation without removing any of the parts; and, indeed, this tension may be thus regulated without stopping the machine, although the machine would probably be preferably stopped for a moment for the purpose. The supplemental frame which incloses the plunger and cam for operating the

same, and which, as has been stated, is preferably composed of two sections, which as shown in Fig. 4 of the drawings, are fastened together by bolts, and thus these parts are readily put in place, or as easily removed and replaced when desired.

It will be understood that by reason of the fact that the cam and buffer plates are formed in one piece with the shaft that there is no danger of their working apart by wear and thesevere jarring to which they are subjected; and the same is true with reference to the shaft of the motor and the pinions which it operates.

In practice, if the motor is positively connected to the mechanism which directly operates the pick or tool, said motor is subjected to much jarring, and this is found to affect it most injuriously, and accordingly, in the present instance, the gear which is driven by such motor is provided with slots, the inner walls of which may be brought into engagement with the buffers when it is desired to drive the pick, and by reason of this loose form of connection much of the jarring occasioned by the blow is lost or overcome before it reaches the motor.

It is manifest that many variations may be made in the details of the construction hereinbefore set forth without departing from the principle of the invention, and I therefore do not wish to be understood as limiting myself to the exact construction specified.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In an electric mining machine, an electric motor, a mining tool, gearing interposed between such motor and mining tool, included in which gearing is a wheel having openings in the web thereof and a shaft having wings carrying holders for rubber buffers adapted to engage the walls of the openings in the gear, and a cam secured to the same shaft, and said wings and cam both being formed integrally with the shaft; substantially as and for the purpose set forth.

2. The combination with a cam having its active driving surface extended from the axial line of the shaft to a point on its periphery and a bracing flange projecting therefrom, and extending partly over and beyond the active surface of such cam and affording the connecting base for the shaft, of a plunger having a roller adapted to be engaged by the cam and to pass under the bracing flange in its travel; substantially as and for the purpose set forth.

3. The combination of a mining tool, a hollow plunger carrying such tool, a spring inclosed within the plunger and bearing at one end against the end next the tool, an adjustable collar affording a bearing for the other end of the spring, a screw threaded rod carrying the collar and having a gear thereon, an additional rod having a pinion at one end to engage the gear on the rod and extending

to the outside of the machine and provided with a handle accessible to the operator; substantially as and for the purpose set forth.

4. In a mining machine the combination of
5 an electric motor, a gear operated thereby by intermediate connections, having apertures formed in its web on opposite sides of its shaft, a shaft loosely journaled in the hub of such gear, wings secured to such shaft carrying
10 ing buffers projecting within the openings in such gear and adapted to be operated by the walls thereof, a cam secured to the lower end of the same shaft, a plunger operated in one direction by such cam and in the other direc-
15 tion by a spring, and a mining tool secured to the plunger; substantially as shown and described.

5. In a mining machine the combination of

an electric motor, a pinion driven thereby arranged upon one side of the axle of the machine, a mining tool, plunger and spring arranged upon the other side of the axle of the machine, a connecting driving gear mounted upon a vertical shaft in the same vertical plane with the axle and having its periphery
20 extended partly within the vertical plane of the wheels on the machine, whereby the machine is balanced upon said axle, and space is economized; substantially as and for the
25 purpose set forth.

In witness whereof I have hereunto set my hand this 12th day of June, 1894.

EDMUND C. MORGAN.

Witnesses:

FRANK T. BROWN,
M. I. CAVANAGH.