

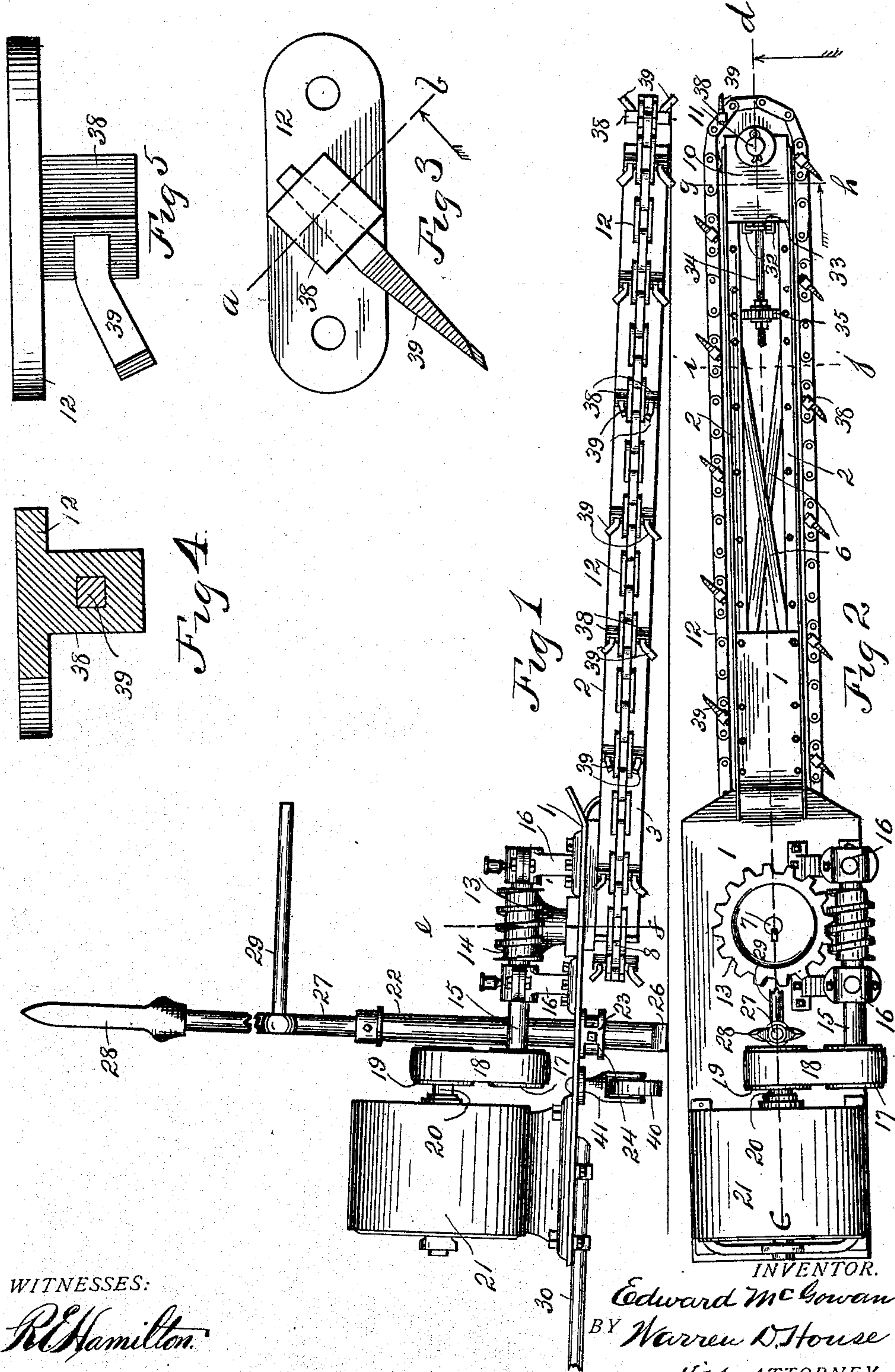
E. MCGOWAN.
MINING MACHINE.

APPLICATION FILED JULY 5, 1907.

Patented Jan. 26, 1909.

3 SHEETS—SHEET 1.

910,944.



WITNESSES:

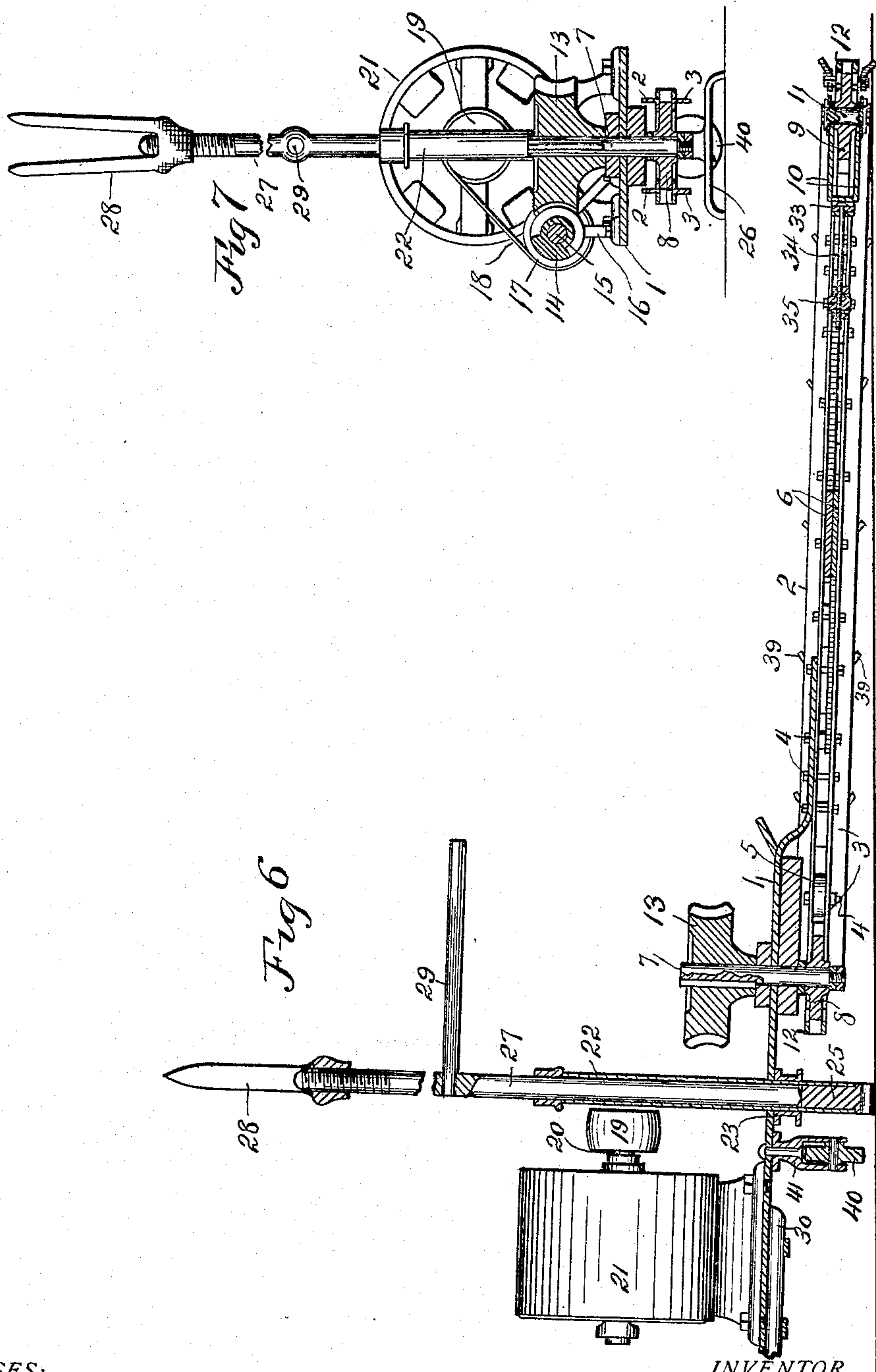
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INVENTOR.
Edward McGowan
BY *Warren D. House*
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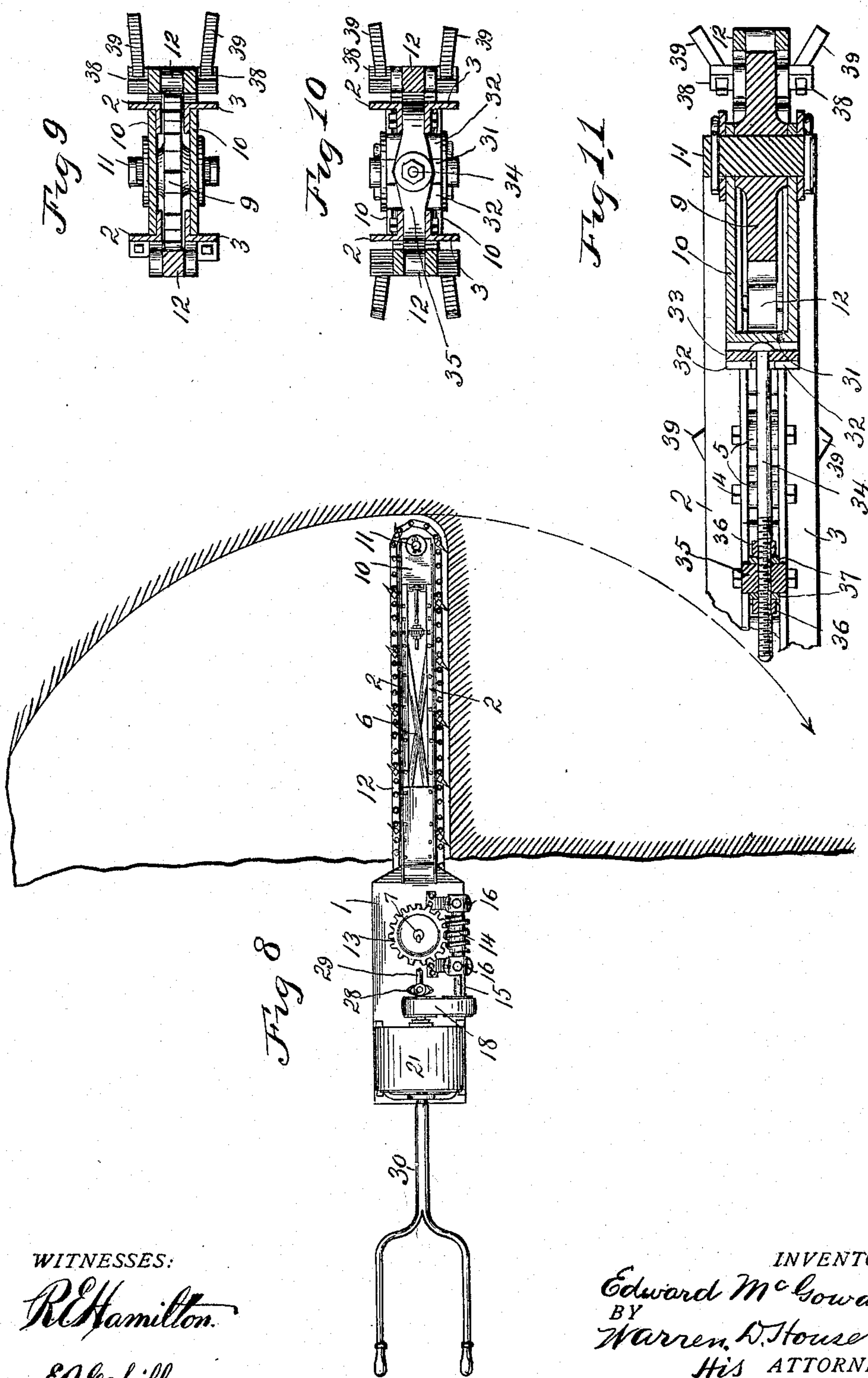
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EDWARD MCGOWAN, OF MULBERRY, KANSAS.

MINING-MACHINE.

No. 910,944.

Specification of Letters Patent.

Patented Jan. 26, 1909.

Application filed July 5, 1907. Serial No. 382,229.

Be it known that I, EDWARD MCGOWAN, a citizen of the United States, residing at Mulberry, in the county of Crawford and State of Kansas, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification.

My invention relates to improvements in mining machines.

It relates particularly to machines designed to mine coal.

The object of my invention is to provide a machine which will quickly and economically mine or under cut coal, clay or other material generally found in coal mines.

The novel features of my invention are hereinafter fully described and pointed out in the claims.

In the accompanying drawings illustrative of my invention, Figure 1 is a side elevation of the machine, a part of the lever being broken away, and also a part of the floor and roof support or post. Fig. 2 is a top view of the machine, the lever being broken away. Fig. 3 is an enlarged top view of one of the links which is shown engaged with and supporting a cutter. Fig. 4 is an enlarged vertical sectional view taken on the dotted line *a-b* of Fig. 3. Fig. 5 is an enlarged view of a link and cutter taken at right angles to that shown in Fig. 3. Fig. 6 is a longitudinal vertical sectional view taken on the dotted line *c-d* of Fig. 2. Fig. 7 is a vertical sectional view taken on the dotted line *e-f* of Fig. 1. Fig. 8 is a plan view of the machine in smaller scale shown in operative position. In this view a section of earth has been removed by the previous operation of the machine. Fig. 9 is an enlarged cross section taken on the dotted line *g-h* of Fig. 2. Fig. 10 is an enlarged cross section taken on the dotted line *i-j* of Fig. 2. Fig. 11 is an enlarged vertical sectional view of a portion of the machine, taken on the dotted line *c-d* of Fig. 2.

Similar characters of reference denote similar parts.

The machine comprises the following principal parts:—a support having means for engaging the roof and floor of a tunnel, a frame or platform pivotally supported by the said support, an endless belt carrying cutters and supported by the frame or platform, the frame being pivotally mounted so as to be swung in a plane parallel with the plane of movement of the endless belt, and means for driving the endless belt. Means are also provided by which a single operator may swing

the frame so as to have the cutters of the endless belt perform their functions.

Referring to the drawings which illustrate a preferable form of my invention, I will first describe the swinging frame or platform.

A nearly horizontal sheet metal plate 1 is secured at its forward end to the inwardly turned flanges of two angle irons 2, disposed parallel with each other and parallel with the plate 1, said angle irons 2 being disposed respectively above and parallel with two angle irons 3, each having one flange inwardly turned and the other flange downwardly turned. The angle irons 2 and 3 are respectively connected to each other by bolts 4, washers 5 being disposed intermediate the angle irons 2 and 3 of each pair. Crossed diagonal braces 6 have their respective ends secured between the upper and lower angle irons 2 and 3. Rotatively mounted in the plate 1 is an upright shaft 7 on which is rigidly secured, below the plate 1, a sprocket wheel 8. A sprocket wheel 9, disposed adjacent the forward end of the frame, is rotatively mounted between two arms of a U shaped plate 10, upon an upwardly extending shaft 11 having its ends mounted in the arms of the plate 10, said arms being slidably mounted on the inwardly extending flanges of the upper and lower angle irons 2 and 3, respectively.

12 denotes an endless chain belt mounted upon the sprocket wheels 8 and 9, said chain belt being disposed with both sides of the belt lying in a plane parallel with the angle irons 2 and 3. On the shaft 7 is rigidly secured a worm wheel 13 which meshes with a worm 14 secured on a shaft 15 disposed parallel with the plate 1 and rotatively mounted in bearings 16 supported on the upper side of the plate 1. On the shaft 15 is mounted a pulley 17 which is connected by a belt 18 with a pulley 19, secured upon the armature shaft 20 of an electric motor 21, which in turn is preferably supported by the plate 1. When the motor 21 is running the chain belt 12 is driven through the intermediacy of sprocket wheel 8, shaft 7, worm wheel 13, worm 14, shaft 15, pulleys 17 and 19, belt 18, and armature shaft 20. It is obvious that any other type of motor than an electric motor may be employed instead of an electric motor.

The support on which the frame is pivotally mounted is preferably extensible and is provided at its ends with means for engaging

the floor and roof of a tunnel. The said support comprises, in its preferable form, the following parts:

22 denotes an upright tube which extends
5 through the plate 1 in a hole provided in said plate and has longitudinally slidably mounted upon it, a collar 23 which is retained in the position to which it may be adjusted lengthwise of the tube 22, by a set screw 24, Fig. 1.
10 In the lower end of the tube 22 is inserted the upright end or stem 25, of a foot piece 26, the lower end of which is preferably bifurcated. Rotatively mounted in the tube 22 is a bar 27, the lower end of which rests upon
15 the stem 25, and the upper end of which is screw-threaded and fitted to a screw-threaded hole provided in the lower end of the member 28, the upper end of which is preferably forked and adapted to be engaged
20 with the roof of a tunnel. The foot piece 26 normally rests upon the floor of the tunnel. The bar 27 is provided with a transverse hole in which is mounted one end of a lever 29 which serves to rotate the bar 27 when it
25 is desired to adjust the length of the support for the plate 1. The upper and lower ends of said support are preferably forked or bifurcated so that the foot piece 26 and the forked member 28 will not turn when the
30 lever 29 is rotated to adjust the length of the supporting post or support, comprising the member 28, bar 27, tube 22 and foot piece 26.

Secured to the rear end of the plate 1 is a lever 30 by which the operator may swing
35 the frame and chain belt upon the upright support or post.

Referring particularly to Figs. 2 and 11, which illustrate the mechanism for tightening the chain belt, it will be noted that the
40 U-shaped plate 10, between the upper and lower sides of which is mounted the sprocket wheel 9, has at its rear end an upright connecting portion 31, in the opposite ends of which are cut two tongues 32, which extend
45 rearwardly and inwardly, a space being provided between the tongues 32 and the upright central portion 31 to receive a plate 33, in which is secured the forward end of a rod 34, disposed parallel with the angle irons 2
50 and 3. The rear end of the rod 34 extends through a transverse bar 35, the ends of which are secured between the upper and lower angle irons 2 and 3, at each side of the frame. The rear end of the rod 34 is screw
55 threaded and has mounted thereon nuts 36 which bear against washers 37 disposed upon opposite sides and bearing against opposite sides of the bar 35. The rod 34 is slidably mounted in the hole provided therefor in the
60 bar 35 and by adjusting the nuts 36 the bar 34 may be moved lengthwise so as to slide the U-shaped plate 10 on the flanges of the angle irons 2 and 3, thereby moving the shaft 11 and with it the sprocket wheel 9 so as to
65 tighten or loosen the chain belt 12.

I will now describe the cutting mechanism carried by the chain belt 12:—Some of the upper and lower links of the chain belt 12 are provided respectively with upwardly and downwardly extending projections 38. 70 These projections are provided with sockets, preferably tapering and preferably of a form other than round, as for instance, a rectangular form. In the sockets of the projections 38, are fitted the shanks of the cutters 39. 75 These cutters 39 may be of any desired shape, but are preferably shaped like a lathe tool having a chisel shaped edge. The cutters are preferably arranged in pairs disposed one above the other, and project laterally beyond the outer sides of the links of the belt 12. Some of the pairs of cutters 39, as shown in Fig. 1, diverge upwardly and downwardly from the belt 12 and project respectively above and below the planes in 85 which lie respectively the upper and lower edges of the angle bars 2 and 3. Such disposition of some of the cutters 39 is for the purpose of having such cutters form a clearance space so as to permit easy swinging movement of the frame in the channel which is cut by said cutters. As shown in Fig. 1, cutters of some of the pairs converge toward the belt. These last named cutters 39, which converge, 95 serve to break up or cut away the material which is not loosened or disturbed by the diverging cutters and which lie in a plane located between the upper and lower diverging cutters. The cutters 39 are disposed preferably at an angle of about 45 degrees 100 more or less, and project in the direction of movement of the links which carry the cutters. By employing tapering sockets to receive the shanks of the cutters 39 the cutters are securely held, but may at the same 105 time be easily loosened and removed for the purpose of sharpening or for being replaced with new cutters.

For the purpose of supporting the rear end of the frame when it is desired to downwardly tilt the rear end of the frame for the purpose of swinging it, a roller 40 is provided, said roller being rotatively mounted between the bifurcated lower end of a bearing 41, the upper end of which is secured to 115 the plate 1 at the rear of the bearing collar 23.

The motor 21 is carried upon the supporting frame at the side of the support on which the frame is pivoted opposite to the side upon which is mounted the cutter belt 12. 120 This disposition of the cutter belt and motor causes the weight of the motor to counterbalance the weight of the cutter belt, thereby enabling a single operator to readily swing the supporting frame laterally. 125

In operating the machine it is placed in the tunnel adjacent the end thereof and near the middle of the tunnel, the upright support being engaged respectively with the floor and roof and disposed in a slightly inclined posi- 130

tion, as shown in Fig. 1. In this position the support lies in a vertical plane disposed parallel with the sides of the tunnel but inclines upwardly and forwardly from the vertical position. By properly turning the bar 27 by means of the lever 29 the forked member 28 and foot piece 26 may be made to tightly engage the floor and roof of the tunnel so as to hold the support in the proper position. The motor 21 is then started, thus driving the chain belt 12 in the manner hereinbefore described, after which the operator may, by means of the lever 30, swing the frame which supports the endless belt 12 so that the cutters 39 will engage and cut the material at the adjacent end of the tunnel. The machine is first disposed with the frame and endless belt lying transversely across the tunnel at either side of the center thereof after which it is swung either to the right or left so as to have the cutters 39 cut a slightly inclined channel of arcuate form, as shown in Fig. 8. By slightly inclining downward the frame carrying the endless belt a space is provided below the belt and frame at the rear end of the belt to receive the excavated material and to permit of the insertion of shovels below the frame for the purpose of removing such excavated material. After the arcuate channel has been completed the lever 29 is turned so as to free the support from the roof and the machine is then withdrawn until after the coal lying above the excavated portion has been removed. The floor of the tunnel then may be leveled up and the machine again set up in proper position and the operation of channeling again repeated in the manner already described.

It will be obvious that when desired the machine may be set up so that the endless belt may lie in a horizontal plane or at any angle thereto.

Various modifications within the scope of

the appended claims may be made without departing from the spirit of my invention. 45

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a mining machine, the combination with a lengthwise adjustable support, of a frame comprising a plate vertically slidable on and rotative upon said support and parallel bars secured to said plate, means for adjusting said plate lengthwise of said support, a shaft rotatively mounted on said frame, a motor carried by said frame, means for transmitting rotation to said shaft from said motor, a sprocket wheel secured on said shaft, a bearing supported upon and adjustable lengthwise of said parallel bars, a second sprocket wheel rotatively supported on said bearing, a chain belt mounted on said sprocket wheels, and cutters carried by said chain belt. 50 55 60

2. In a mining machine, the combination with a frame comprising a plate and parallel bars secured to said plate, of a support on which said frame is pivoted and adjustable lengthwise of said support, a sprocket wheel, means for rotatively supporting the sprocket wheel upon said frame, a motor carried by said frame, means for transmitting rotation from said motor to said sprocket wheel, a bearing adjustable lengthwise on said bars, a second sprocket wheel rotatively supported by said bearing, a chain belt mounted on said sprocket wheels, and cutters carried by said chain belt. 65 70 75

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses. 80

EDWARD MCGOWAN.

Witnesses:

J. H. ENDICOTT,
WALTER BALDWIN.