

No. 711,643.

Patented Oct. 21, 1902.

R. E. NOBLE.
MINING MACHINE.

(Application filed May 13, 1901.)

3 Sheets—Sheet 1.

(No Model.)

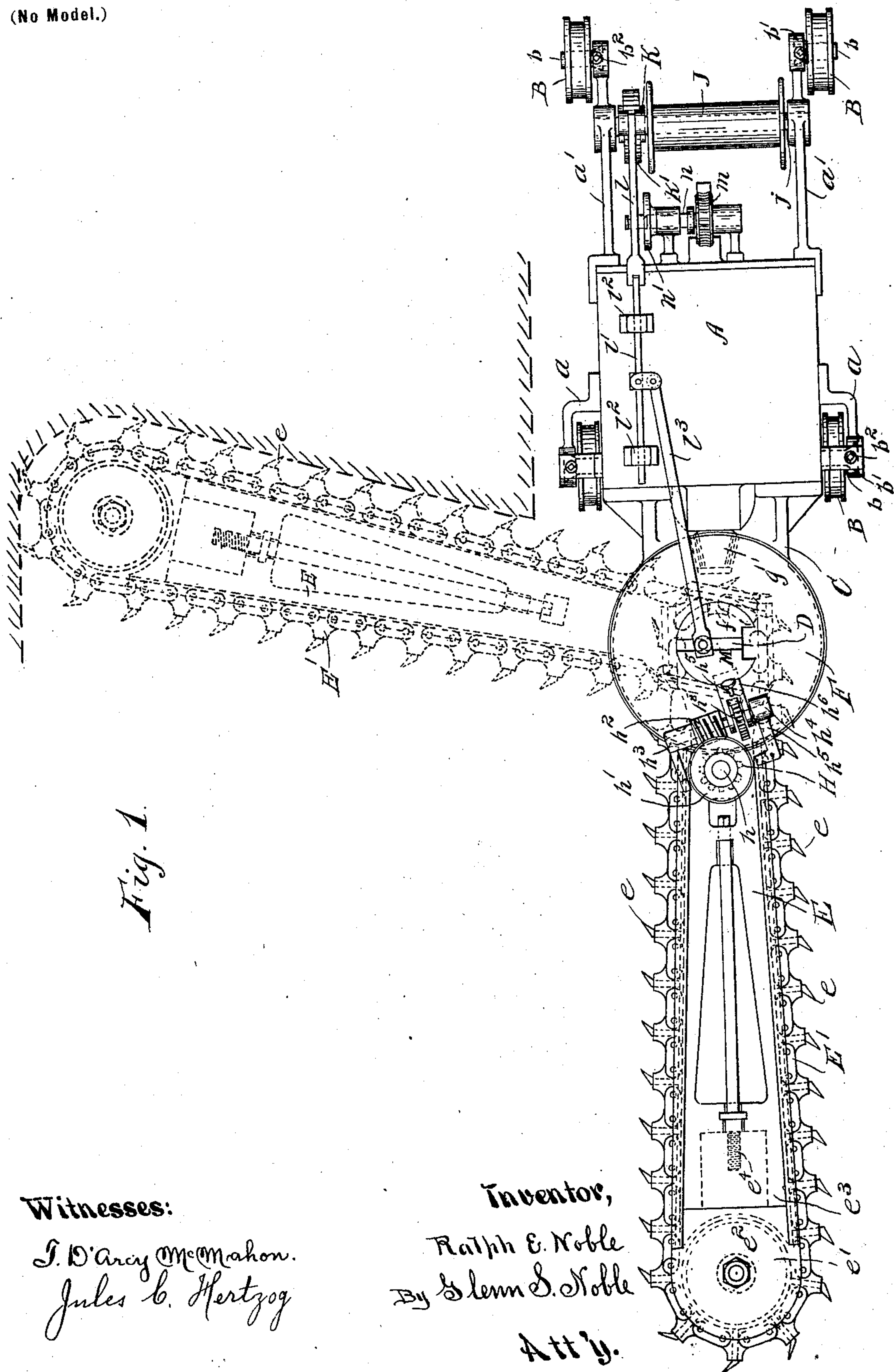


Fig. 1.

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Jules C. Hertzog

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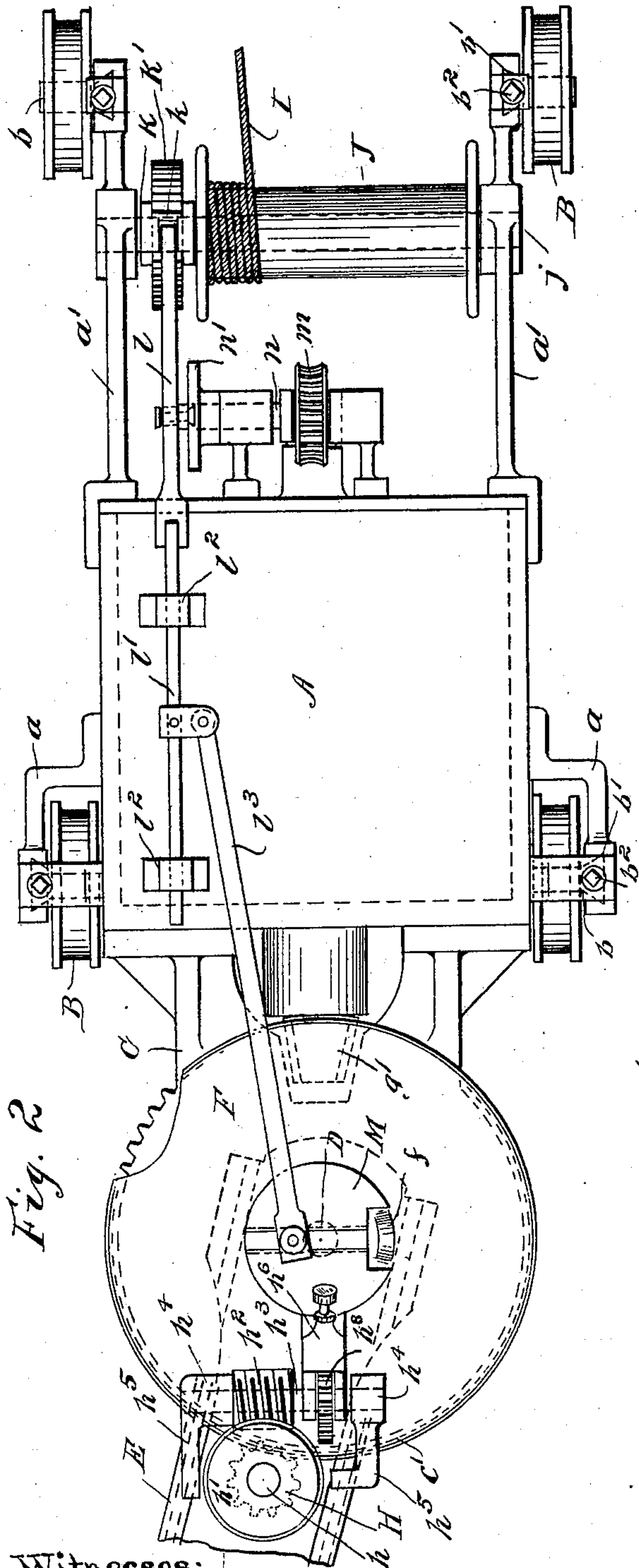
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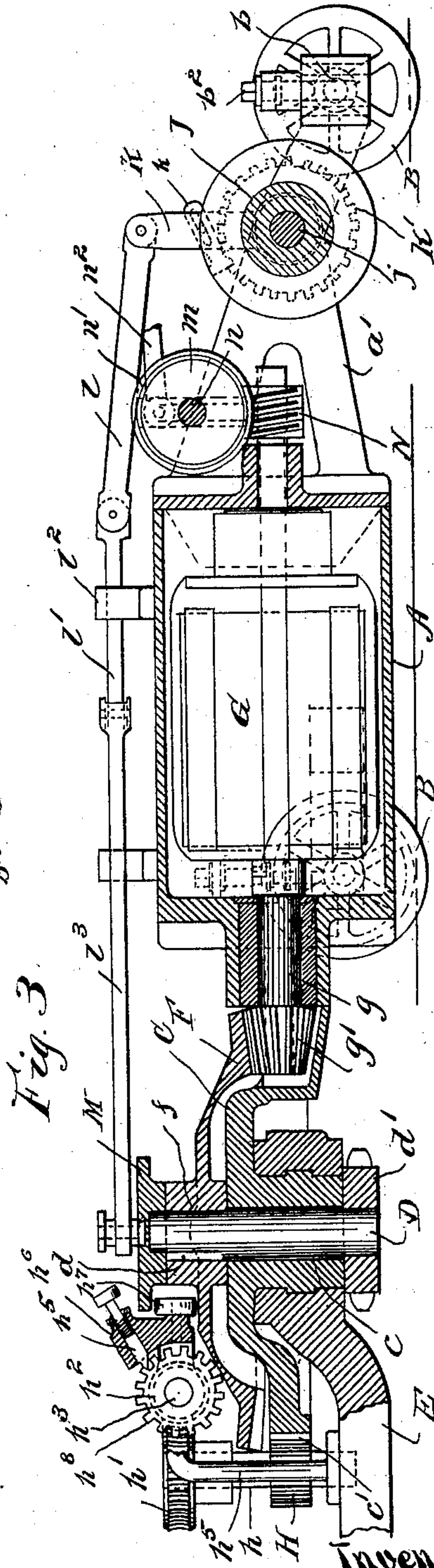


Fig. 3.

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Fig. 4

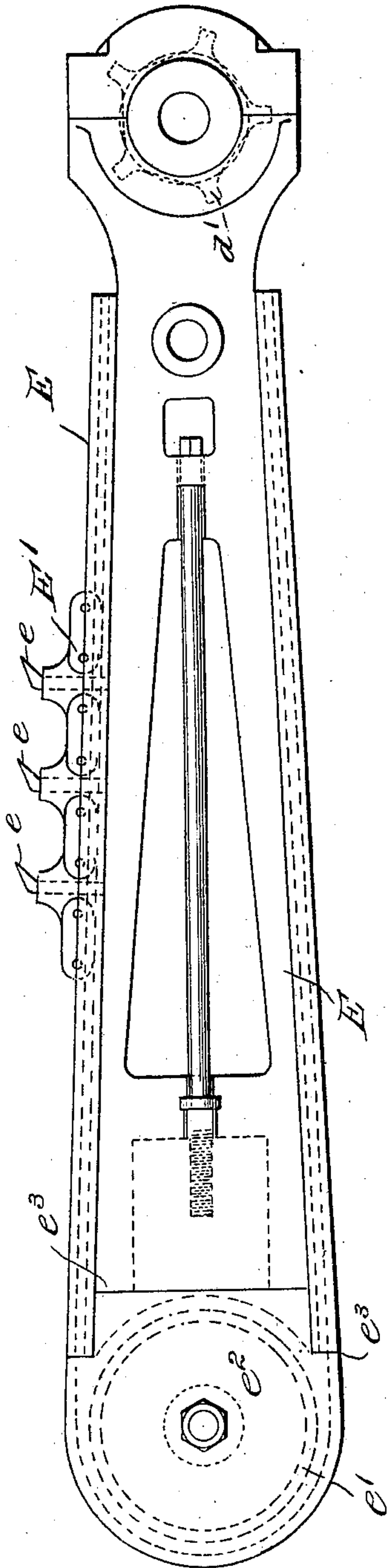
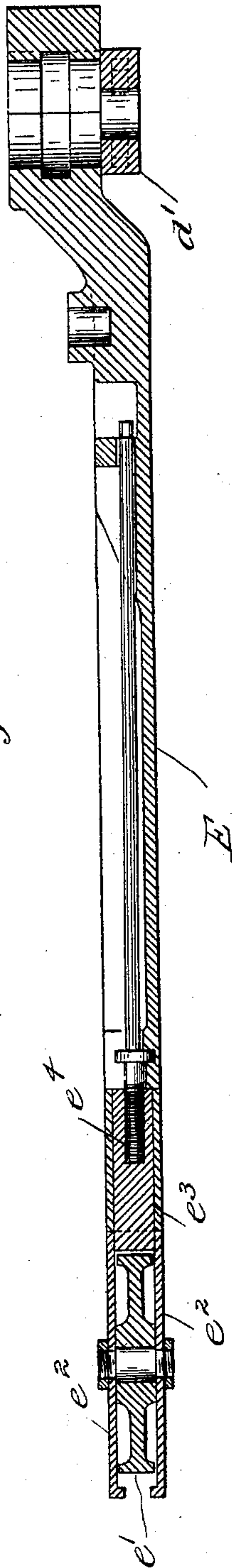


Fig. 5



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UNITED STATES PATENT OFFICE.

RALPH E. NOBLE, OF CHICAGO, ILLINOIS.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 711,643, dated October 21, 1902.

Application filed May 13, 1901. Serial No. 59,892. (No model.)

To all whom it may concern:

Be it known that I, RALPH E. NOBLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification.

This invention relates more particularly to that class of machines used for undercutting coal or like material; and its general objects are to provide a machine of this nature that will be simple in construction and economical and efficient in operation.

Other objects are to provide a frame of peculiar and rigid construction the swinging portion of which is sufficiently narrow to admit of changing grades or following irregular veins and face-walls; to provide an automatic feeding device and cable-winding device; to provide means for tightening the cutter-chain, and to provide means whereby the cutting apparatus is presented to the work at such an angle that the machine will not be crowded away from the work, thereby overcoming the thrust on the track and rendering a track unnecessary on regular or ordinary bottoms.

It consists, then, in combining with a suitable carriage-frame a swinging frame and means for swinging said frame, in combining with a carriage-frame a swinging frame carrying the cutter-chain and provided with means for tightening said chain, means for driving said chain and operating said swinging frame, and means for pulling the machine to its work, and in such other features and details as will be more fully pointed out hereinafter and shown in the accompanying drawings, in which—

Figure 1 is a general plan view showing the method of operating the machine. Fig. 2 is a plan view of a portion of the machine. Fig. 3 is a sectional view of the same. Fig. 4 is a plan of the cutter-chain frame. Fig. 5 is a sectional view of the same.

A represents the carriage-frame of the machine, and it is provided with rear brackets *a* and front brackets *a'* for bearing-wheels B, the trunnions *b* of which are carried on adjustable dovetailed slides *b'*, engaging with screws *b²*, secured in the frame-brackets. A circular bracket C, secured to the end of the frame A, has a bearing *c* for a vertical shaft

D, Fig. 3, and the swinging chain bearing frame E. The shaft D is driven by a bevel-gear F, secured thereto, as by a key *d*, which meshes with a pinion *g'* on the shaft *g* of the motor G, mounted in the frame A.

Any suitable motor or driving means may be used; but an electric motor, as shown, is preferred. The frame A forms substantially a dust-proof casing for the motor.

On the lower end of the shaft D is mounted a sprocket-wheel *d'*, which drives the cutter-chain E', carrying the forwardly-projecting cutters *ee*. An idler-wheel *e'*, around which the chain is carried, is mounted in a suitable bearing *e²*, carried in guideways *e³* in the end of the frame E and may be forced forward to tighten the chain by means of the screw *e⁴*, mounted in the frame and engaging the slidable bearing-block and having its shank extending back to the end of the frame next the machine, where it is squared to engage a suitable wrench and may be readily turned without withdrawing the frame from the work.

A particular feature of this invention is the means whereby the cutter-frame may be automatically swung into any desired position under the coal, and more especially to one somewhat beyond ninety degrees from its forward position in line with the carriage. When it is in this position, as shown in dotted lines in Fig. 1, the cutters will be presented at such angle to the coal that instead of forcing the carriage away from the face and against the track there will be no tendency of a thrust of this kind, and the machine will keep its normal position, thus render bracing the track unnecessary, or in certain cases the track may be dispensed with and shoes or flat-faced wheels used in place of the flanged wheels. This is accomplished by means of a pinion H, mounted on a vertical shaft *h*, Fig. 3, which engages with gear-teeth *c'* in the periphery of the circular bracket C. The shaft *h* is stepped in the frame E and is driven by a worm-gear *h'* at the top, which engages a worm *h²*, mounted on a shaft *h³*, supported in bearings *h⁴* in arms *h⁵*, secured to the frame E. The shaft *h³* is in turn driven by a ratchet-wheel *h⁸*, mounted thereon and having a reversible pawl *h⁵*, mounted in a double-arm lever *h⁶*, pivoted on the shaft *h³*. A roller *h⁷* on the end of the lever *h⁶* normally rests upon

the gear-wheel F and is raised sufficiently to throw the ratchet by a projection *f* in its path on the gear F. When the frame has been swung around to its desired position, the pawl
5 is thrown out of action by raising the lever *h*⁶ out of engagement with the gear-wheel F, the disk M being cut away over the projection *f* to allow such a movement.

In order to draw the machine forward
10 against the work, a rope I is attached to some stationary object at some distance ahead and the end brought around the drum J, which is then gradually turned and winds up the rope, thereby drawing the machine forward. The
15 drum is mounted on a shaft *j*, secured in bearings in the brackets *a'*. A double swinging arm K, pivoted on the shaft *j*, carries a pawl *k*, adapted to engage a ratchet-wheel K' on the same shaft. The arm is operated by a
20 rod *l*, pivoted to a reciprocating rod *l'*, mounted in bearings *l*² on the frame A. A pitman *l*³ connects this rod by means of an adjustable crank-pin with a disk M, mounted on the top of the shaft D and rotated thereby.

25 An alternative device for operating the drum consists of a worm N, mounted on the shaft of the motor, which drives a worm-wheel *m*, mounted on a shaft *n*, carrying a disk *n'* at the end thereof, which may be connected,
30 by means of a pitman *n*², with the lever-arm K.

Having thus described my invention, which I do not limit to the exact construction or details shown, what I claim, and desire to secure by Letters Patent, is—

35 1. In a device of the type set forth, a frame carrying a toothed circular extension, a cutter-chain frame pivoted to said extension, a shaft carrying a gear engaging said toothed extension mounted in said cutter-chain frame,
40 a shaft mounted in the said extension and having a gear-wheel keyed thereto, with means for driving the gear-wheel, means for intermittently actuating said first-named shaft operated by said last-named gear-wheel, and
45 means operated by the shaft in the extension for moving the entire machine.

2. In a mining-machine, the combination of a frame, a motor mounted in said frame, a toothed circular-shaped extension on said
50 frame, a cutter-chain frame pivoted to said extension, a shaft mounted in said cutter-chain frame, a gear on said shaft engaging the teeth on the circular extension, a worm-gear on said shaft engaging a worm on a shaft
55 supported in bearings from said frame, a

ratchet-wheel on said worm-shaft, a reversible ratchet-pawl, carried in a swinging arm from said shaft, a roller on said arm adapted to normally rest on and be lifted by a cam on a gear-wheel mounted on a shaft in said circular extension and driven by a gear on the motor, substantially as described. 60

3. A device of the type set forth, consisting of a frame carrying a toothed circular extension, a cutter-chain frame pivoted to the
65 extension, a shaft mounted on the cutter-chain frame and carrying a gear meshing with the teeth of the extension, a shaft journaled in the extension and having a gear keyed thereto, with means for operating the gear, a worm-
70 gear carried by the shaft of the cutter-frame, a second shaft supported by the cutter-frame and carrying a worm meshing with the worm-gear, and a gear-wheel carried by said last-named shaft, with means for operating the
75 last-named shaft actuated by the gear-wheel of the extension, a disk carried by said shaft of the extension, a drum journaled in the rear of the frame, a rope connected thereto and to a stationary point, and means connecting said
80 disk and the drum, whereby the latter is actuated by the disk.

4. A device of the type set forth, comprising a frame carrying a toothed circular extension on its rear a shaft journaled therein
85 and carrying a gear-wheel, means carried by the frame for actuating said gear-wheel, a cutter-chain frame pivoted to the extension, a shaft with a gear on its lower portion engaging the toothed extension, means actuated
90 by the said gear-wheel carried by the extension for actuating said shaft of the cutter-chain frame, a disk in the shaft of the extension, a drum carried at the rear of the frame, a
95 ratchet-wheel connected to the drum, a double swinging arm pivoted to the shaft of the drum and carrying a pawl for engagement with the ratchet-wheel of the drum, an arm supported on the frame and connected to the double swinging arm, a pitman pivotally
100 connected to said arm on the frame and to the said disk, a rope connected to the drum and to the stationary point, whereby the entire machine may be moved when the drum is operated.

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Witnesses:

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