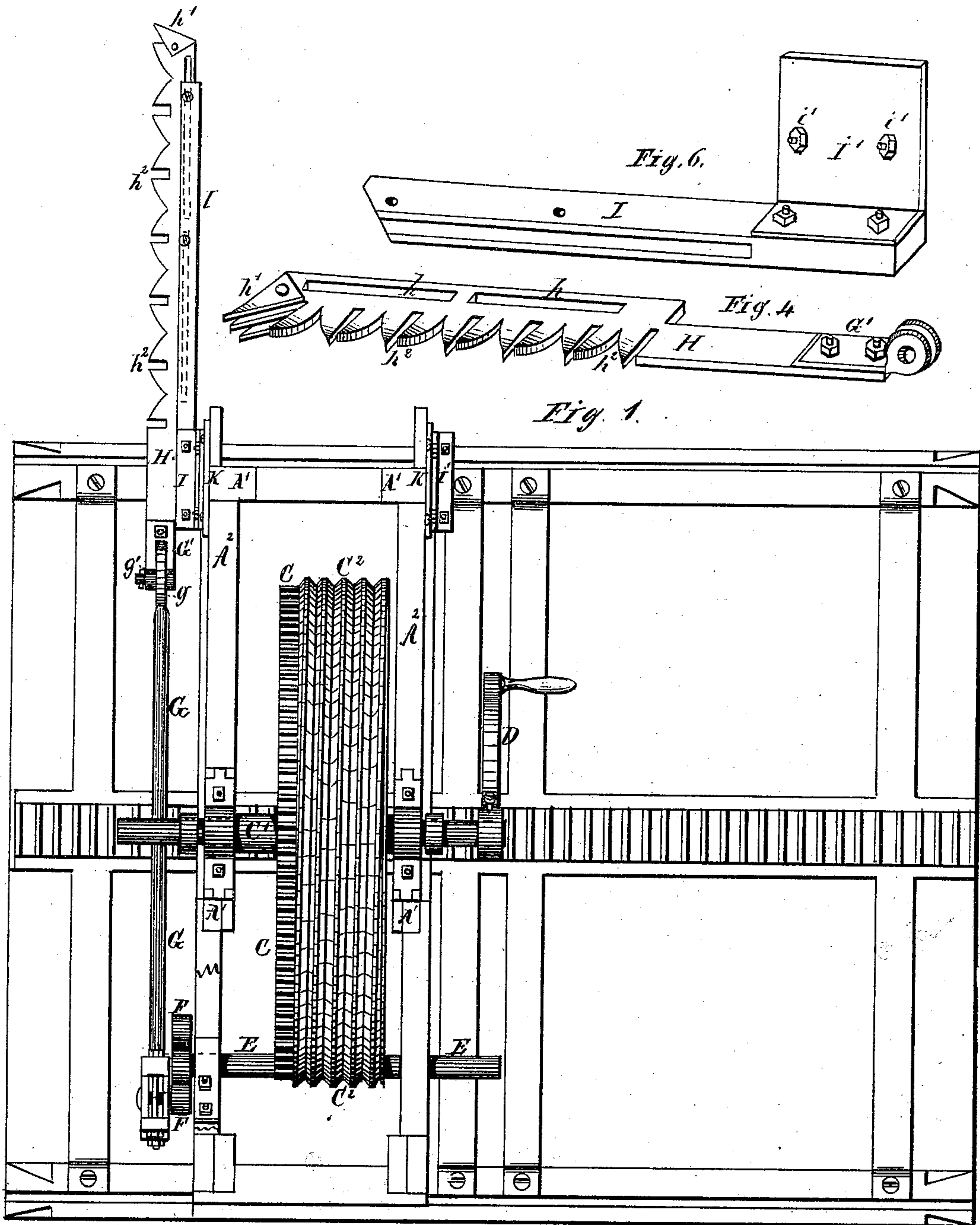


J. GALLICHER.

MACHINE FOR MINING COAL, &c.

No. 172,875.

Patented Feb. 1, 1876.



Witnesses.  
Henry Orth  
Henri Guillaume

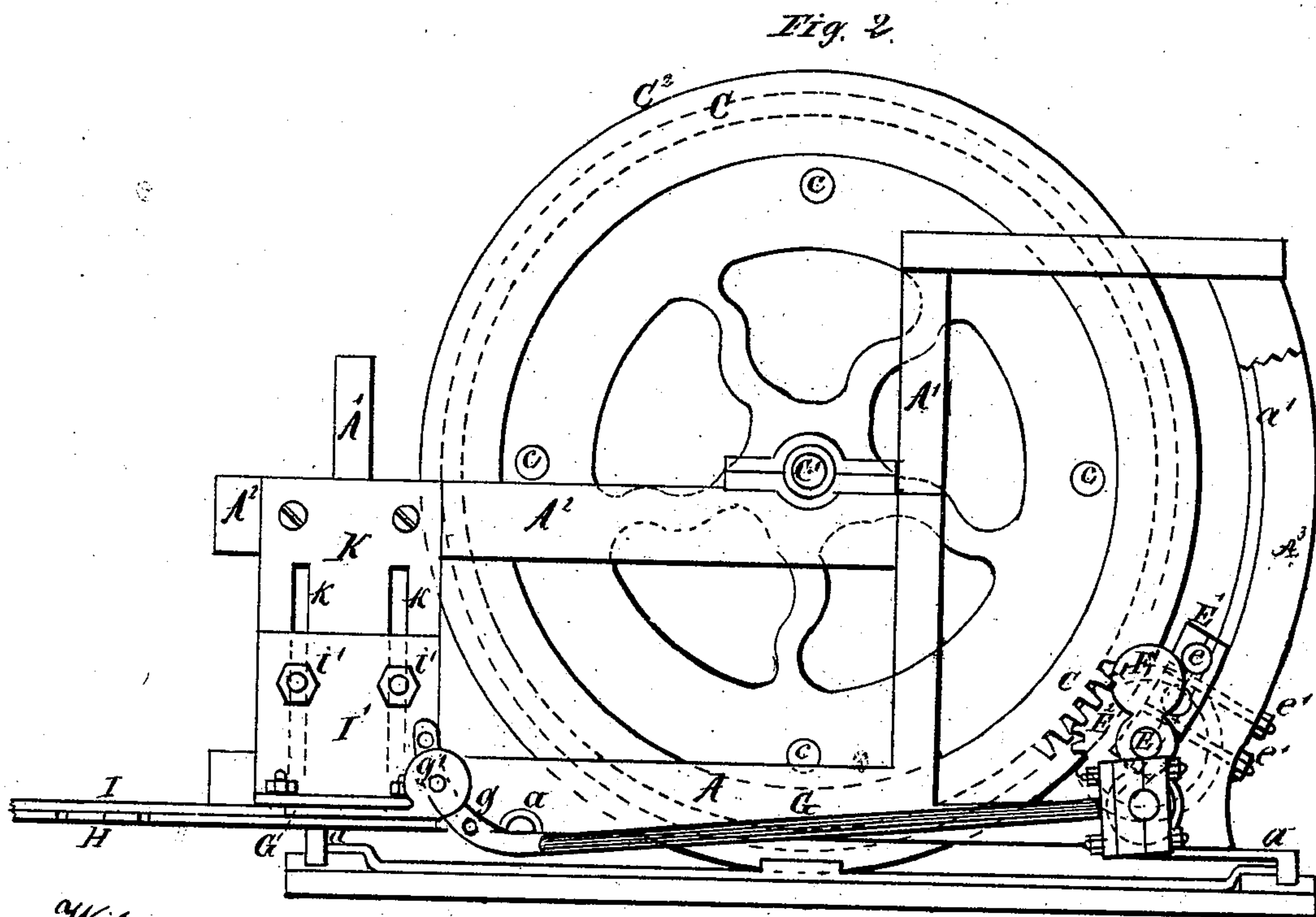
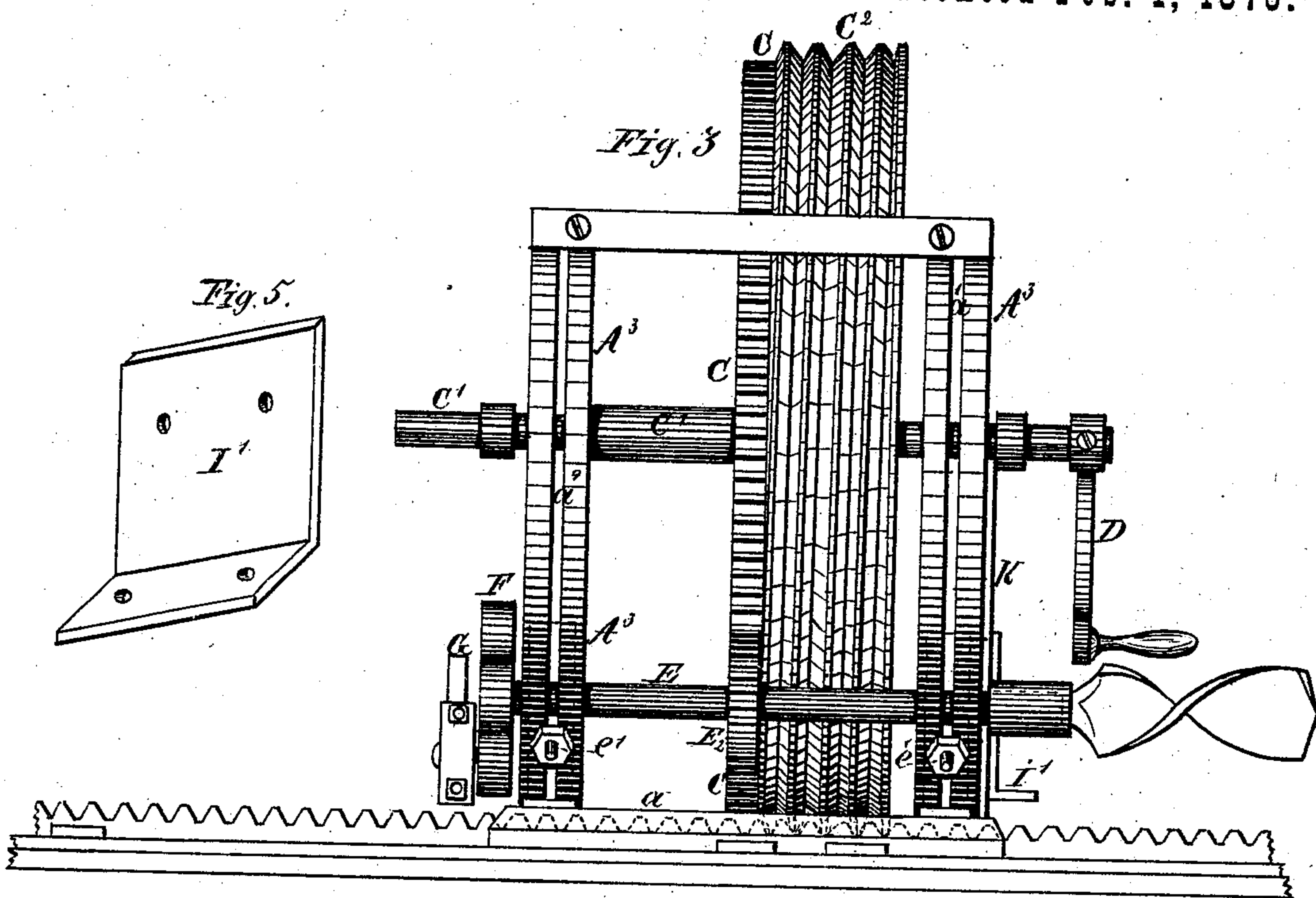
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# UNITED STATES PATENT OFFICE.

JAMES GALLICHER, OF CANTON, OHIO.

## IMPROVEMENT IN MACHINES FOR MINING COAL, &c.

Specification forming part of Letters Patent No. **172,875**, dated February 1, 1876; application filed November 19, 1875.

*To all whom it may concern:*

Be it known that I, JAMES GALLICHER, of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Machines for Mining Coal and other substances; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a plan view of the machine and track. Fig. 2 is a side elevation. Fig. 3 is an end elevation. Figs. 4, 5, and 6 are detached views of the cutter-bar and its supporting devices.

The frame is composed of the sills A, one on each side, the vertical posts A<sup>1</sup>, girts A<sup>2</sup>, and circular posts A<sup>3</sup>. At each end of the sills there is a track-runner, *a*, which fits and slides in a groove, *b*, in a track, B B, Fig. 1, which is laid on the floor of the mine for the machine to run upon. The sections of the track are attached to each other by means of dovetails *b*<sup>1</sup>, and secured to the floor of the mine by any desired or usual devices. B<sup>1</sup> is a worm-threaded rack, secured to and arranged centrally between the grooved ways B B. The pitch of the thread or the teeth upon this rack corresponds with the thread of a worm-wheel to be described. C is a master spur-wheel, mounted upon shaft C<sup>1</sup>, which revolves in bearings on girts A<sup>2</sup>, and is driven by power applied through crank D or otherwise. C<sup>2</sup> is a worm-wheel rigidly attached to, and carried by, the spur-wheel C by means of screws *c*.

By making the worm-wheel of greater diameter than the cogged master-wheel C, I can attach the worm to the master-wheel, as the cogs will not interfere with a proper working relation between the worm-wheel and the worm-threaded rack B<sup>1</sup>; and by making the worm-wheel separately, and attaching it to the cogged master-wheel, the construction of these parts and their repair are facilitated, as it would be difficult, if not impossible, to cast them in one and the same piece. The thread of worm-wheel C<sup>1</sup> engages with the cogged rack B<sup>1</sup>. Hence the machine is propelled for-

ward or backward upon the track as the worm-wheel is made to revolve in one direction or the other. E is a crank-shaft, mounted in boxes E<sup>1</sup>, one at each end, and having a pinion, E<sup>2</sup>, which meshes with, and is driven by, the spur-wheel C. Each box E<sup>1</sup> has two or more bearings, *e*, for a purpose which will soon be explained, and is arranged to slide in a recess, way, or groove, *a*<sup>1</sup>, cut for its reception in each of the circular posts A<sup>3</sup>. These posts are each formed in an arc of a circle, the center of which is the center of the shaft C<sup>1</sup>, and each post is slotted perpendicularly, as shown at *a*<sup>2</sup>, Fig. 3. Thus it will be seen that the shaft E can be set at different heights upon posts A<sup>3</sup> without disturbing a proper working relation between spur-wheel C and pinion E<sup>2</sup>, and may be firmly held in the desired position by means of the stay-bolts *e*<sup>1</sup>, which pass through the boxes E<sup>1</sup> and slots *a*<sup>2</sup>. F is a crank, secured to the projecting end of crank-shaft E. G is the pitman, attached to the crank by any usual or approved box or pitman-head. H is the cutter-bar, driven by the pitman G. The end of the pitman which is attached to the cutter-bar is provided with a series of holes, *g*. I is the cutter-bar carrier, grooved upon its front face, as shown at *i*, Fig. 5. The cutter-bar has two slots, *h h*, near its rear edge, through which pass two pins, *i*<sup>1</sup> *i*<sup>1</sup>, in the cutter-bar carrier I, thus securing the cutter in place. I<sup>1</sup> is a carrier-plate, having a flange, I<sup>2</sup>, to which the cutter-bar carrier is bolted. K is a plate, firmly attached to the frame of the machine, and slotted vertically, as at *k k*. The carrier-plate I<sup>1</sup> is secured to plate K by means of bolts *i*<sup>2</sup> *i*<sup>2</sup>, which pass through slots *k k*. L is an auger, similar to those usually employed in drilling rock or coal, and provided with a socket, L<sup>1</sup>, and set-screw *l*, fitting the end of crank-shaft E. *o o* are bearings formed in the under side of the sills A, to receive the axles of truck-wheels, upon which the machine can be easily moved. The outer end of the cutter-bar H is armed with three teeth, *h*<sup>1</sup>, whose aggregated thickness will cut a kerf of sufficient width to readily admit the cutter-bar carrier I, and the remaining teeth *h*<sup>2</sup> have an amount of "set" corresponding to the cut made by the three teeth *h*<sup>1</sup>.



When the machine is operated for drilling only, the crank F, the cutter-bar, and its supports may be detached, and the auger or drill L only employed; and as the shaft E can be arranged in either of the bearings *e*, and the boxes E<sup>1</sup> can be set at any height within the slots *a*<sup>2</sup>, holes can be drilled near the floor or the roof of the mine, or at any intermediate point.

When drilling, the track B and cogged rack B' may be arranged at right angles to the face of the coal or rock which is to be drilled. Then if the worm C<sup>2</sup> engages with the rack, the entire machine will be advanced toward the wall as the drill is caused to revolve, and the drill will be forced into the coal or rock, as will be readily understood without further explanation.

When the cutter-bar H is employed the track and rack should be laid on a line substantially parallel with the wall through which it is desired to cut, and at such distance therefrom as the proposed depth of cut shall indicate. The auger is then removed and a reciprocating motion imparted to the cutter-bar by turning the crank D, when the machine and cutter-bar will be advanced through the coal or other substance.

If it be desired to change the height of cut from that shown in the drawings, it can be done by raising the carrier-plate I; and in case it is desired to raise said plate but a short distance no change need be made in the location of the crank-shaft, as a proper working relation between the pitman and the cutter-bar may be maintained by shifting the pin *g*' into another of the holes *g* in the pitman.

When desired, both the crank-shaft and the carrier-plate may be raised, and the position of the carrier-plate may be reversed, putting the flanged end up instead of down, as shown, in order to support the cutter-bar as high as the top of the machine.

By connecting the ends of the sections of track with each other by means of dovetailed joints, the facility with which one section may be taken up and laid in front of another as the machine advances is greatly increased.

As both ends of the crank-shaft E and main shaft C<sup>1</sup> project beyond the frame-work, and there is a plate, K, upon each side of the machine, and the clip G' connecting the pitman to the cutter-bar is made reversible, the machine may be used to cut back and forth upon the same wall of the mine.

In consequence of the pitman being made adjustable relative to the cutter-bar by means of holes *g*, the slots *h* in the rear edge of the cutter-bar may be made of but little greater length than is required for the throw of the crank.

The organization of my machine being such that the worm-wheel is vertical, I am enabled to make it (the worm-wheel) engage directly with the worm-threaded rack B', thus dispensing with all intermediate gearing, and simplifying the construction.

Having thus described my invention, what I claim is—

1. The grooved track provided with the worm-threaded rack B', in combination with the worm-wheel C<sup>2</sup> for feeding the mining-machine forward upon said track, substantially as set forth.

2. In a mining-machine, the combination of the spur-wheel C, the crank-shaft E, pinion E<sup>2</sup>, and adjustable boxes E<sup>1</sup>, substantially as set forth.

3. In a mining-machine, the box E<sup>1</sup>, provided with a series of bearings, *e*, for adjusting the height of the shaft E, substantially as set forth.

4. In a mining-machine, the combination of the grooved cutter-bar carrier I, the slotted cutter-bar H, and pins *i*, substantially as set forth.

5. In a mining-machine, the flanged carrier-plate I', cutter-bar carrier I, slotted plate K, and bolts *i'*, substantially as set forth.

6. In combination with the vertically-adjustable cutter-bar H the adjustable pitman G, substantially as set forth.

7. In combination with the frame, having a plate, K, upon each side, the reversible cutter-bar H, crank F, and pitman G, substantially as set forth.

8. The combined master and worm wheel C C<sup>2</sup>, made in separate parts and united by means of screws *c*, or their equivalents, in such manner as to be carried by the same shaft, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES GALLICHER.

Witnesses:

JAMES SMITH,  
PERCY S. TOWERS.