C. M. HALL.

MINING-MACHINE.

No. 187,225. Patented Feb. 13, 1877.

Fig. 1.

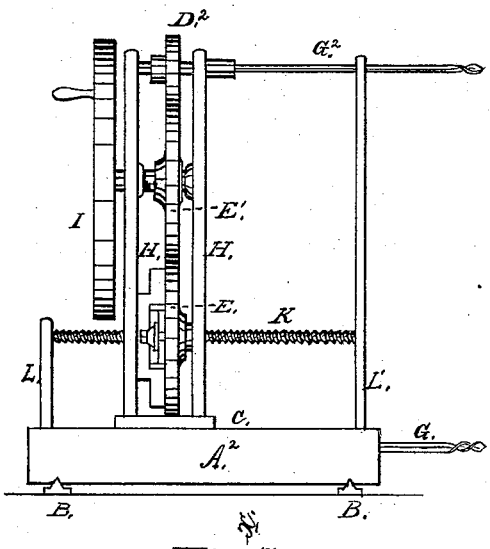


Fig. 2.

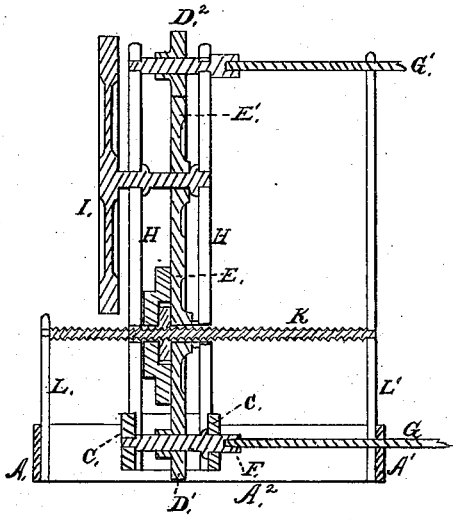


Fig. 3.

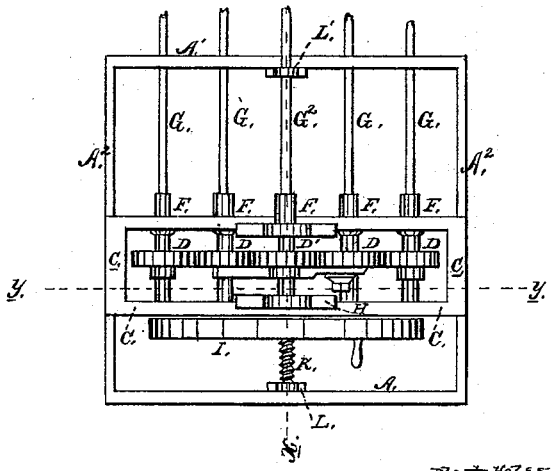
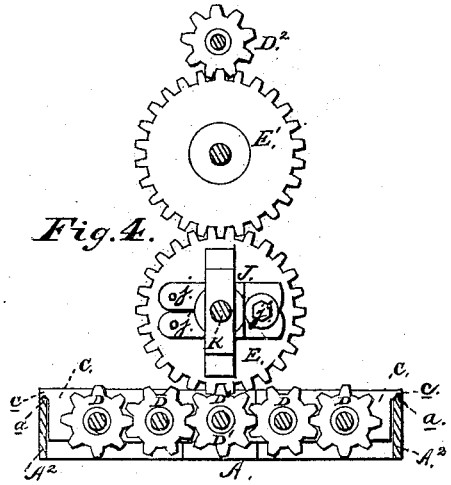


Fig. 4.

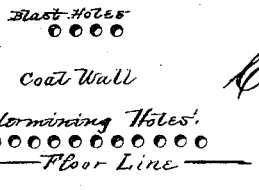


Witnesses:

John A. Koeppen

Albert F. Lang.

Fig. 5.



Inventor:

Charles M. Hall

UNITED STATES PATENT OFFICE.

CHARLES M. HALL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MINING-MACHINES.

Specification forming part of Letters Patent No. **187,225**, dated February 13, 1877; application filed December 21, 1876.

To all whom it may concern:

Be it known that I, CHARLES M. HALL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Mining-Machines; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to machinery for mining coal; and consists of certain improvements in boring or drilling machines, as and for the purposes hereinafter more fully and at large will appear.

In the drawings, Figure 1 represents a side elevation of the apparatus complete; Fig. 2, a central vertical section on the line *x x*, Fig. 3; and Fig. 3, a plan view of same; Fig. 4, a transverse section on the line *y y*, Fig. 3; Fig. 5, a diagram of the operation of the apparatus on a coal-wall.

A A^1 is a frame or car, upon which the entire boring apparatus is mounted. This car, containing the boring machinery, slides or runs on tracks B B, which are laid within the galleries or tunnels in the coal-mine. C C is a frame, supported and sliding in the car A by pieces *c c*, which are grooved on the under side and fit beveled edges *a a* on the top of the side rails A^2 of the car. Within this frame C C is mounted a series of cog-wheels, D, which mesh with each other, and by a central one, D^1, with a larger cog-wheel, E. The shaft of each of the cog-wheels D has a head, F, with keyed mouth, adapted to receive and retain the ends of bits or drills G. These drills are supported and guided at their outer ends by the front rails of the car A^1, through which they pass, as shown in Fig. 2. H H are standards, secured to the sliding frame C, between which are mounted two large gear-wheels, E E′, which mesh with each other, and with a smaller drill cog-wheel, D^2, at top, and are driven by power-wheel I. To the lower large cog-wheel E is secured a two-part or hinged nut, J, which runs on a slow screw-shaft, K, mounted at each end in standards or supports L L′, secured to each end of the car A. The top part of the standard L′ also forms the outer support or guide for the upper or blasting drill G′. The screw-shaft K runs loosely through the shaft of the cog-wheel E, it being made hollow for that purpose. The two-part nut J is pivoted at one end to the wheel E, as shown at *j*, Fig. 4, and united or clamped together and onto the threads of the screw-shaft K by nut *j′* at the other end.

The top drill is termed the "blast-drill," and the lower series of drills the "undermining-drills."

The operation of the apparatus is as follows: The tracks B B being laid within the gallery or tunnel where it is desired to operate, the car A is placed upon the track and brought up to the desired position. At this stage of the operation, the sliding frame C is back against the back A of the car, as shown in Figs. 1, 2, and 3, with the nut J clamped tight upon the screw-shaft K, as shown in Fig. 4. Upon turning the power-wheel I, the drills G G′, through the medium of the cogs D D^1 D^2 E E′, are operated or driven in different directions, the drills being made, and boring either right or left, as the case may be, or it is necessary, by reason of the direction of revolution of the cog-wheels D. As the cog-wheel E revolves, it carries with it the nut J, which, engaging on the screw-shaft K, drives or feeds the frame C, with operating machinery and drills, slowly forward. When the drills have made a sufficient depth of bore or cut, or the frame C has reached the end of the car-frame, the thumb-nut *j′* is loosened, the nut J opened or released from the screw-shaft K, when the frame C, with drills, &c., may be drawn back to its normal position. The car A is then pushed slightly forward, when the operation may be repeated.

After one or more operations with the drilling-machine, the coal can be broken loose by blasting in the blast-holes; or, by drilling a number of holes together, the coal-wall can be wedged out, thus breaking the coal loose.

The diagram, Fig. 5, explains the operation of the apparatus.

The machine may be used in the same way and with the same effect upon stone or rock, as is apparent.

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

1. In a machine for mining coal, in combination with the gear-wheels D D^1 E E′ D^2, the top drill G^2 and lower series of drills G, arranged and operating substantially as described, whereby the cutting or boring of the blast and undermining holes are performed at one and the same operation.

2. In a machine for mining coal, the sliding frame C and supports H H, with gear-wheels D D^1 D^2 E E′, mounted and operating therein substantially as and for the purposes described.

3. In a machine for mining coal, the combination, with the sliding frame C and wheel E, of slow screw-shaft K and two-part nut J, for advancing the entire series of drills, substantially as described.

4. The machine for mining coal, consisting of car A, sliding frame C H, upper drill G′, lower drills G, series of small cog-wheels D D^1 D^2, large wheels E E′, nut J, screw-shaft K, and power-wheel I, all constructed, arranged, and adapted to operate substantially as and for the purposes described.

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

CHARLES M. HALL.

Witnesses:

JOHN A. KOEPPER,

ALBERT F. LANG.