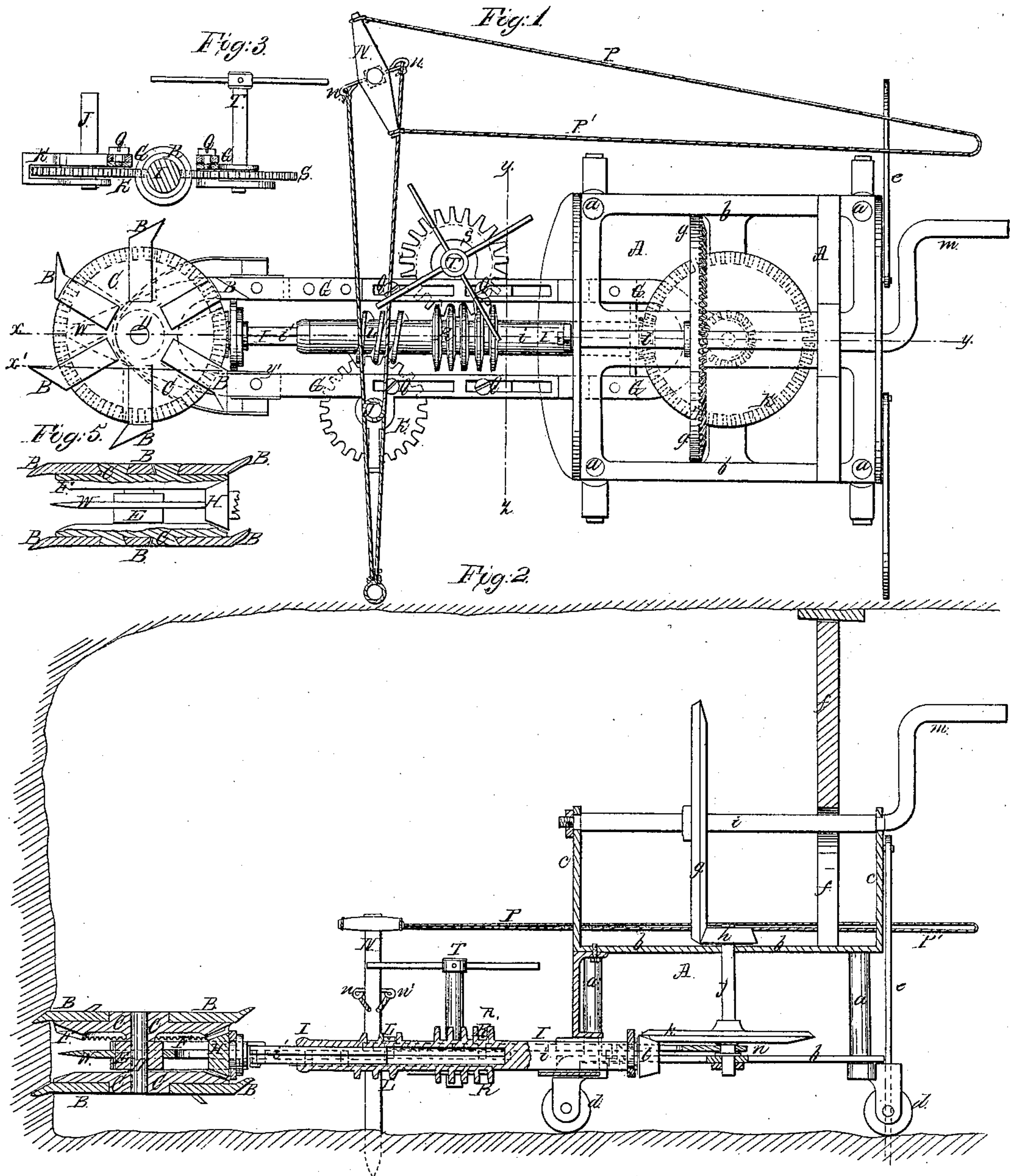


Haupt & Smith, Mining Machine.

N^o 47,168.

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Witnesses:
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UNITED STATES PATENT OFFICE.

HERMAN HAUPT, OF CAMBRIDGE, MASSACHUSETTS, AND JOHN Y. SMITH,
OF ALEXANDRIA, VIRGINIA.

IMPROVED MINING AND TUNNELING MACHINE.

Specification forming part of Letters Patent No. 47,168, dated April 4, 1865.

To all whom it may concern:

Be it known that we, HERMAN HAUPT, of Cambridge, in the county of Middlesex and State of Massachusetts, and JOHN Y. SMITH, of Alexandria, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Apparatus for Mining and Tunneling; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of the said apparatus, and Fig. 2 a sectional elevation of the same on line xy ; Fig. 3, a vertical section of the same according to line yz ; Fig. 5, a similar section through the rotary pick on line $x'y'$, and Fig. 4 a perspective view of an auxiliary tool used in lieu of the pick in certain mining and tunneling operations.

The object of our invention is to reduce, by the employment of machinery, the time, labor, and consequently expense, attending certain mining operations; and it consists in the combination and arrangement of machinery hereinafter more fully set forth.

To enable others to make and use this our invention, we shall now proceed to describe the manner in which the same is or may be carried into effect.

And referring to the said drawings, A is the frame, made of wood or iron, consisting of four standards, d , duly braced and counter-braced by horizontal skeleton frame-work b , with suitable bearings for the shafts upon which the main gear-wheels are mounted. From the upper skeleton frame spring two vertical brackets, c , in which the driving-shaft is held in its proper relation to the other gear-wheels to transmit its movement to the operative parts. The whole frame is supported upon wheels d , swinging on the caster principle on shanks sunk in sockets or the hollow standards a , thus giving the whole apparatus the greatest mobility, so that its position may be readily changed according to the work to be done. To secure the machine in place, it is braced vertically against the roof of the gallery by means of a triangular wooden brace, f , and one or more wedges, g , also by means of two swinging clamps, e , which, indenting in the ground of the gallery, prevent the apparatus from moving laterally.

The mining tool proper is constructed on the miner's pick principle, and is operated by imparting rotary motion thereto.

In the accompanying drawings we have shown the picks arranged in two series, each being composed of six. They are arranged radially on and inserted in a disk, C, by dovetail joint, (see Fig. 5,) so that they can be easily slipped out and in for repairs or rechange, and are secured in their places by set-screws or otherwise. The picks B are constructed with their cutting ends forming an angle with the shank in both planes, cutting the shank through the axis vertically and horizontally, and when inserted in the disk the pick ends are all pointed in the direction of the rotation, but are alternately inclined up and down with respect to the plane of the disk. If the shank be of sufficient thickness, the pick ends may be formed by simply beveling down either side, and which is done alternately, so that the channel formed by the cutter may be of even width throughout its whole depth. One, two, or more disks armed with picks may be mounted upon one and the same shaft, D, which is held in a collar, E, on the outer end of a horizontally-swinging frame, G, and either of said disks provided on the side opposite the picks and near the circumference with bevel-gear F, meshing in with a pinion, H, on a shaft, I, centrally located with respect to the swinging frame G.

It will be understood that both disks may be geared with the pinion, but then the two disks would rotate in opposite directions. The arrangement of the bevel gear at or near the rim of the disk is deemed an important feature in this machine, since the force of the blow is proportionate to the leverage of the power applied.

Rotary motion is imparted to the picks in the manner as follows: Upon the main driving-shaft i , which is turned through the crank m , or otherwise, by the operator or by any other prime mover, is mounted the main driving-wheel g , with which is geared the pinion h , through whose shaft j and bevel gear-wheel k the rotary motion is transmitted to the pinion l , fast on the end of the shaft I. This shaft I carries at its other end the pinion H, which directly gears in with the bevel-cogs F of the disk C. In order that the pinion l may never

get out of gear, it is important that the frame G, within which it is held, should swing on the axis of the wheel K. For this purpose the collar *n* of the frame G encircles the shaft *j*, and a circular plate or support is provided, upon which blocks, attached to the under side of the frame, are free to slide to the right or to the left at the will of the operator. In this manner a translatory or lateral movement may be imparted to the picks simultaneously with their rotatory movement. To shift the rotary picks to the right or left, the following device may be used: To the side of the frame is attached a bracket, in which is held a vertical shaft, J, projecting above the said frame. Upon this shaft is fast a worm-wheel, K, the teeth of which fit the spaces between the spiral thread L on the shaft I. A rope, the ends of which are fastened to levers *n n'*, projecting diametrically from a movable post, N, is wound around the shaft J in opposite directions, and is finally secured to a fixed point, M, in the side of the gallery.

It will be understood that by producing tension to either side of the rope by turning the post N, which is done by the operator by means of a cord, P, fast on the ends of a rocking lever, the swinging frame will be drawn to the right or to the left without interfering with the rotation of the shaft I. The frame is thus swung, and consequently the picks are reciprocated along the whole width of the gallery by the operator, he alternately pulling the cord P and P'.

As it is inexpedient to advance the machine after each stroke of the rotary picks, we provide for the lengthening of the swinging frame and revolving shaft so that the cutters may be advanced as the work progresses without stopping the work in order to adjust the whole apparatus. To this effect both the frame G and the shaft I are made in two parts, one end being connected with the main frame in fixed relation to the gear mechanism, while the other is connected with the rotary disk in fixed relation to its gear mechanism. The two portions are united by a stop-joint—*i. e.*, the one part of the frame overlapping the other is slotted and sliding on screws or pins *q*, while the one end, *i*, of revolving shaft I is hollow, in which the other end, *i'*, is fitted so as to allow of the latter to slide upon the axis of the former. To elongate the frame, and thus to advance the picks, the shaft is provided with a screw, R, with which is geared a worm-wheel, S, mounted to the side of the frame. Handles or a hand-wheel, T, on the shaft of this worm-wheel are arranged for turning the worm-wheel, whereby that portion of the frame to which it is attached is moved together with the shaft portion connected with the disks, advanced to the face of the work. The method of progressing the cutter is here shown as arranged for operation by hand; but it will be understood that it may be made to work automatically by a screw-feed or otherwise.

Between the pick disks, and in front of the frame G, there is a stationary cutter or spear, W, to cut away the coal or ore-core in front of the picks and gear.

In lieu of arranging the picks upon disks revolving on a vertical axis, as described, they may be arranged on a bar or shaft, (represented in Fig. 4,) which, being inserted in the hollow shaft I, will revolve on a horizontal axis. The picks, if small enough, may thus be used with advantage in mining operations to bore holes and cut channels by reciprocating the cutter while revolving.

Having thus fully described our invention and the manner in which the same is or may be carried into effect, we shall state our claims as follows:

We claim—

1. The pick or series of picks, in combination with a mechanism for imparting rotary motion thereto, to operate in the manner and for the purpose substantially as herein set forth.
2. The method herein described of mounting the pick or picks upon bevel-gear disks, bevel-gear, and driving-pinion, being at or near the circumference of said disks, as set forth.
3. The bevel-pointed picks and the arrangement of the same upon the revolving disk with the bevel-faces alternately reversed, substantially as set forth.
4. The method of hanging the rotary pick-disks in a swinging frame so arranged in relation to the gear mechanism as that a translatory movement may be imparted to picks without interfering with their rotation.
5. In combination with the swinging frame and rotary picks, the method herein described of adjusting or feeding the picks up to the work as the operation progresses independently of the main frame of the apparatus, substantially as set forth.
6. The combination, with the rotary picks, held, as described, in a swinging frame, of a mechanism for laterally reciprocating the swinging frame, substantially as and for the purpose set forth.
7. The stationary cutter in front of the swinging frame under or between the rotary picks, for the purpose of removing the core of the ore or coal, substantially as set forth.
8. Locating within the swinging frame a shaft provided with pinions at either end thereof, and arranged in relation to the gear mechanism so as to receive from the prime mover and impart to the picks rotary movement, substantially as herein set forth.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

HERMAN HAUPT.
J. Y. SMITH.

Witnesses:

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