No. 618,130. Patented Jan. 24, 1899.

C. O. PALMER.

MINING MACHINE.

(Application filed Aug. 27, 1896. Renewed July 8, 1898.)

(No Model.)

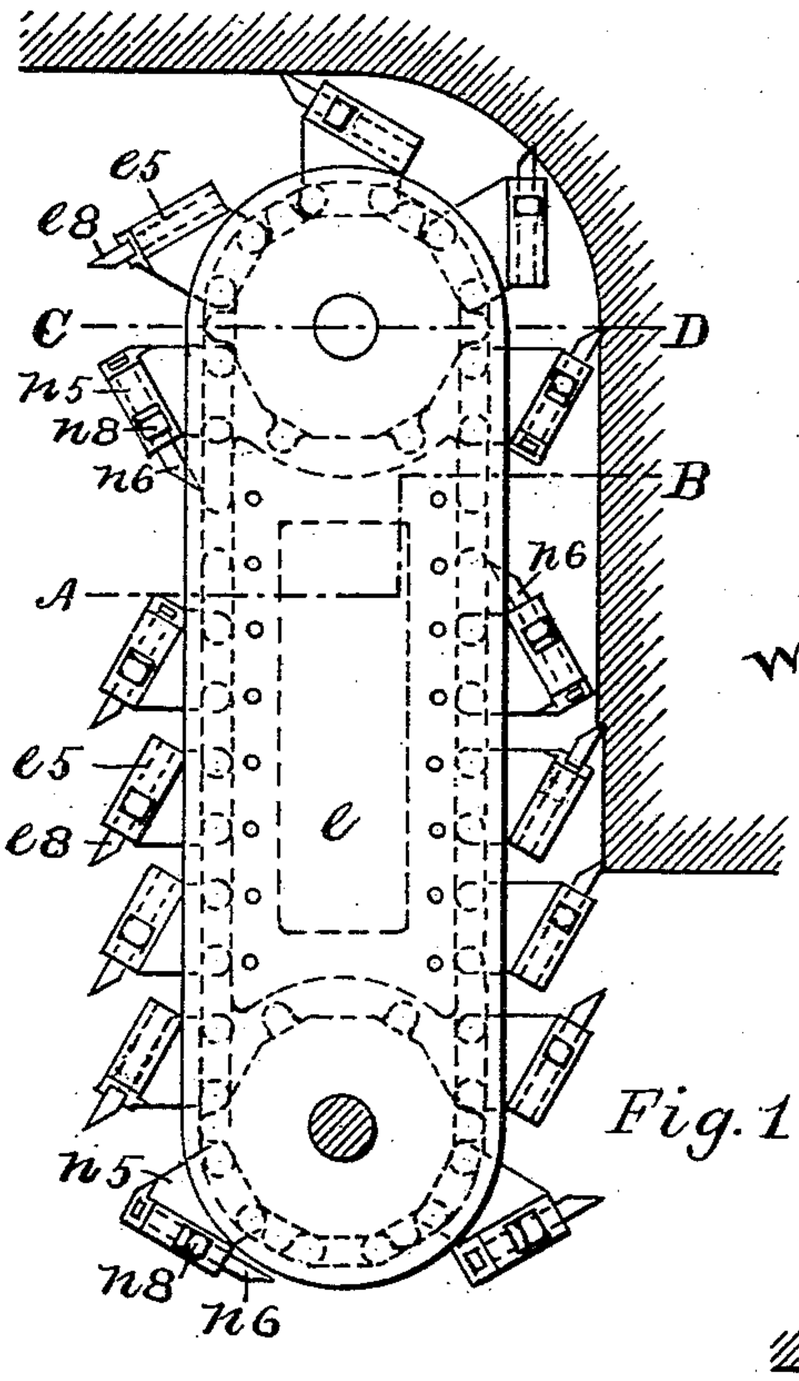


Fig. 1

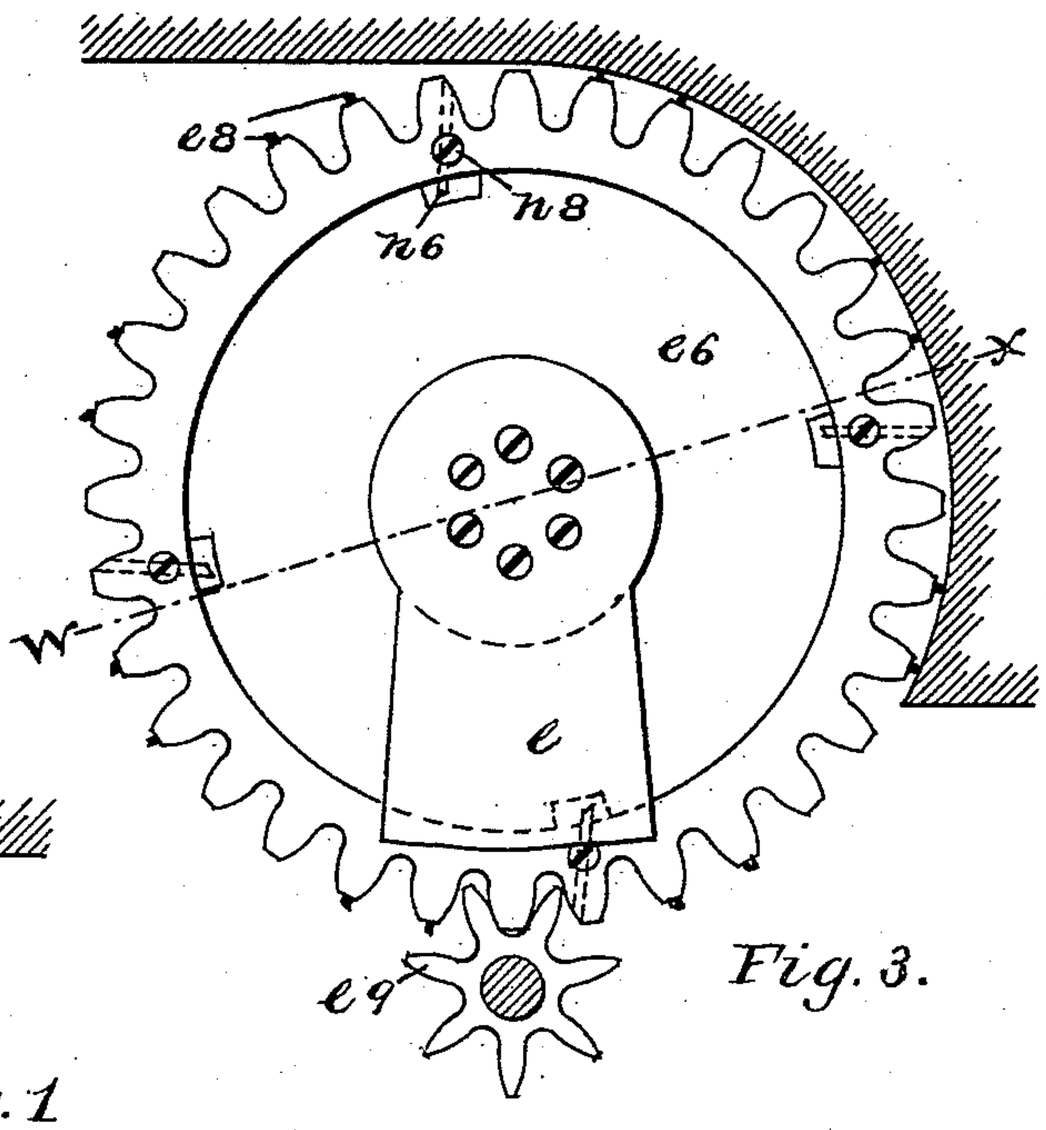


Fig. 3.

Fig. 2.

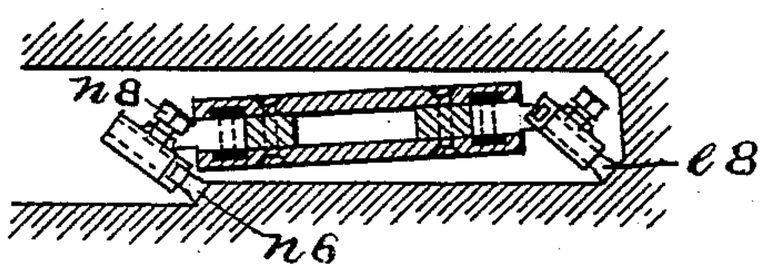


Fig. 4.

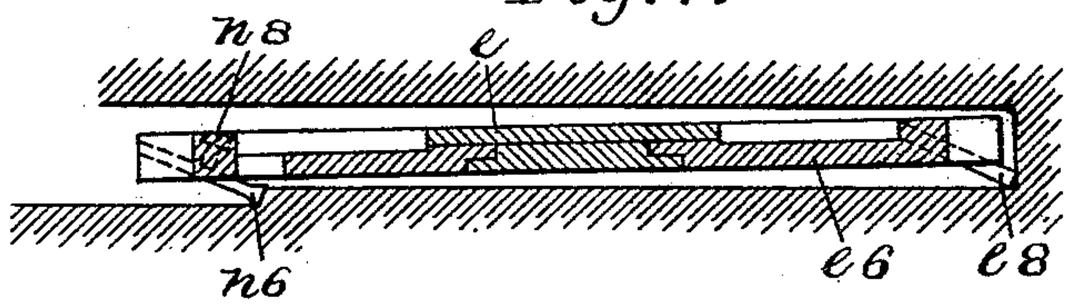


Fig. 6.

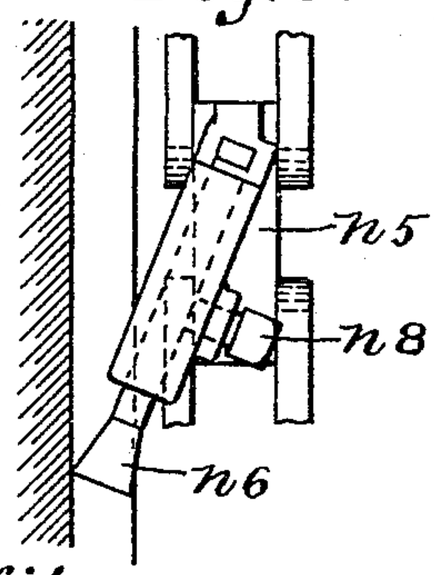


Fig. 5.

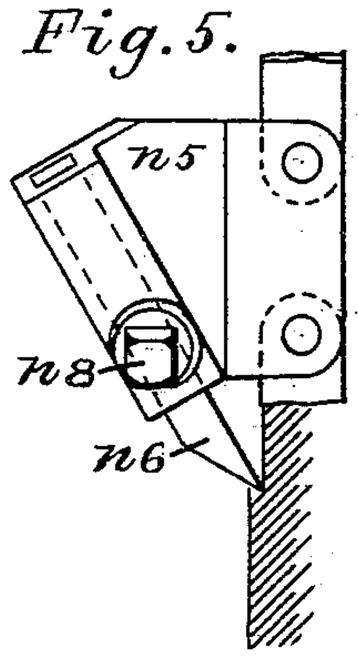
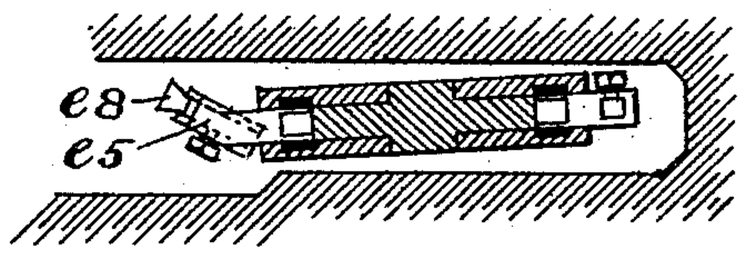


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES O. PALMER, OF CLEVELAND, OHIO.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 618,130, dated January 24, 1899.

Application filed April 27, 1896. Renewed July 8, 1898. Serial No. 685,444. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. PALMER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification.

My invention relates to that class of mining-machines having a horizontally-revolving cutter carried on a cutter-arm projecting from the side of the machine-frame and adapted when working to travel parallel to the working face.

The objects of my invention are to prevent the upper edge of the bits on the rear side of the revolving cutter acting on the coal on the upper side of the kerf, and thus bringing it down on the moving cutter and interfering with its running; also, to increase the clearance on the upper side of the cutter-arm to prevent its being wedged against the roof of the kerf and bent or broken.

With this end in view my invention consists in the construction and combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings I have only shown so much of the entire machine as is necessary to disclose the invention—that is to say, the horizontally-revolving cutter, with its attached cutter-bits, its supporting-arm, and means for driving the said cutter. The arrangements for holding the cutter-arm and communicating power from the motor to the rotary cutter for driving and feeding the same and all the other necessary parts of a complete machine may be of any of the suitable constructions well known in the art.

In the drawings, Figure 1 is a plan of a horizontally-revolving cutter of the chain type embodying my invention as seen in the operation of undercutting the coal, the direction of feed being toward the right. Fig. 2 is a vertical section in line A B of Fig. 1. Fig. 3 is a plan of a horizontally-revolving cutter of the wheel type embodying my improvement as seen in operation, the direction of feed being toward the right. Fig. 4 is a vertical section in line W X of Fig. 3. Fig. 5 is a top view of the cutter-block of my improved cutter-chain. Fig. 6 is an edge view of the cutter-block shown in Fig. 5. Fig. 7 is a vertical section in line A B of Fig. 1.

The cutter-chain shown in Fig. 1 has the usual upper and lower links alternating with a middle link. The cutter-blocks are the links that carry the cutter-bits and as here shown are middle links. The links are held together with pins through their ends in the ordinary manner. The chain is provided with outside cutter-bits e^8, which are held in the outside cutter-blocks e^5 and project from the periphery of the cutter to operate on the coal when in the front side of its revolution in the ordinary manner. In addition to these outside cutter-blocks I add to the chain one or more inside cutter-blocks N^5, for reasons hereinafter stated. Each inside cutter-block has passing diagonally through it a mortise, in which is secured the cutter-bit N^6, whose cutting edge points downward, inward, and forward and is adapted to cut the floor of the kerf when on the rear side of its revolution. The bit may be secured by a set-screw N^8 or other means known in the art.

To cut a perfectly-flat kerf requires that the cutter be kept continually in the same plane; but this is practically impossible, because of the difficulty of keeping the machine-rails in the same plane, caused principally by the inequalities of the floor which supports the rails. With the ordinary cutter if the cutter-arm rises the bits dig into the top of the kerf and loosen the coal, to fall down on the revolving cutter, become jammed in its running parts, and interfere with their proper working. I overcome this difficulty by lowering the rear side of the revolving cutter, so that the cutter-arm may be raised a short distance before the outside cutter-bits come in contact with the top of the kerf. This lowering of the rear side of the horizontally-revolving cutter or inclining it to the direction of feed makes the outside cutter-bits when on the rear side drag on the floor of the kerf being formed, and so scrape an additional amount proportional to the clearance that is given the bits e^8 in Fig. 7 on the upper rear side of the revolving cutters.

Each outside cutter-bit is set pointing outward at the angle most advantageous for peripheral cutting, which is done on the front

side of revolution. So when this cutter-bit is made to act also on the rear side it has the material to be acted on presented on the rear side of the cutting edge. The angle which the material makes with the cutter-bit is thus a scraping, not a cutting, angle.

To operate on the rear side to the best advantage requires the cutting ends of the bits to point inward. This obstacle I overcome by adding one or more extra bits N^6, whose cutting end points inward and whose duty it is to cut on the rear side of revolution. This it does in the most advantageous manner because set in the position best adapted for cutting when on the rear side of its revolution.

In the other form of horizontally-revolving cutter, which is shown in Figs. 3 and 4, the inside cutter-bits N^6 project inward from the rim of the wheel, in which they are secured by the set-screw N^8. The cutter-wheel e^6 has its driver e^9 and is held by arm e^6, while the inside cutter-bit n^6 operates in the same manner as the inside cutter of the chain already described.

Having thus described my invention, what I claim as new is—

1. In a coal-cutting machine adapted to travel parallel to the working face of the coal, the combination of a horizontally-revolving cutter inclined to its direction of feed, outside cutter-bits projecting from its periphery and adapted to cut on the front side in its revolution, mortises in said cutter extending from the periphery downward and inward, cutters in said mortises with their cutting edges pointing inwardly and adapted to cut in a single plane on the rear side of its revolution, together with means for driving said cutter and feeding the same to its work.

2. The combination in a coal-cutting machine adapted to travel parallel to the working face of the coal, of a horizontally-revolving cutter inclined to its direction of feed, outside cutter-bits projecting from its periphery and adapted to cut on the front side in its revolution, mortises in said cutter extending from the periphery downward and inward, chisel-shaped cutter-bits situated in said mortises with their vertical cutting edges pointing inwardly and adapted to cut in a single plane on the rear side of its revolution, together with means for driving said cutter and feeding the same to its work.

3. In a coal-cutter, the combination of a horizontally-revolving cutter-chain, inclined to its direction of feed; outwardly-projecting cutters adapted to cut on the front side, and one or more cutter-bits having an inwardly-projecting cutting edge, adapted to cut on the under and rear side of said chain; together with means for driving and guiding the same.

4. In a coal-cutter, the combination of a horizontally-revolving cutter-chain inclined to its direction of feed, outwardly-projecting cutters adapted to cut on the front side in its revolution, one or more cutter-bits having an inwardly-projecting cutting edge adapted to cut in a single plane on the under and rear side of said chain, together with means for driving and guiding the same, substantially as described.

5. The combination with a coal-cutter chain of a cutter-block; a cutter-bit secured in said block whose cutting edge projects downward, inward and forward, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES O. PALMER.

Witnesses:

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N. A. GILBERT.