

No. 640,622.

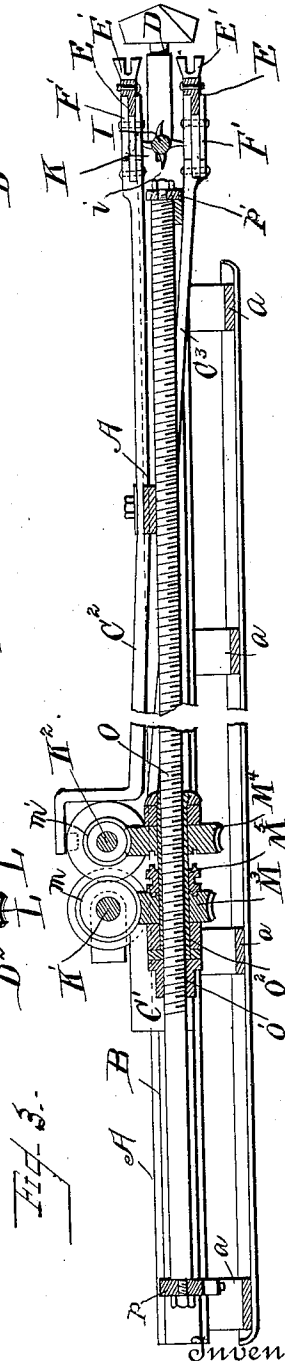
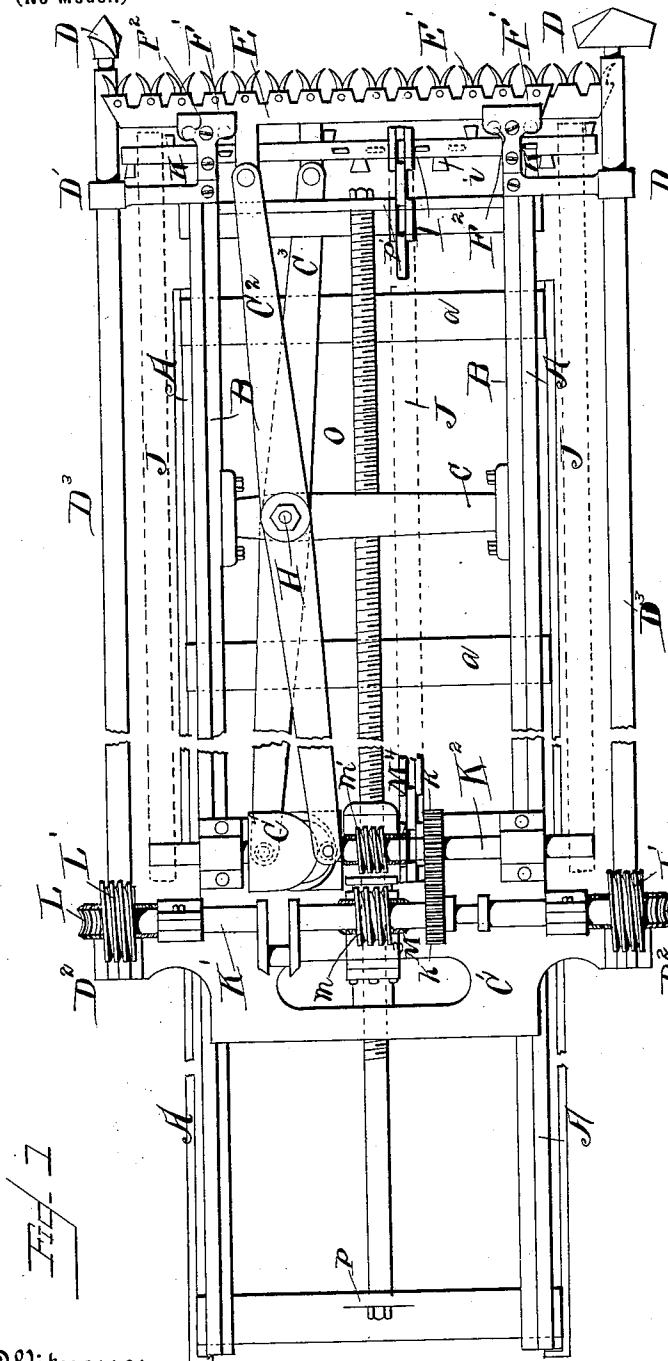
Patented Jan. 2, 1900.

A. BAILEY.
MINING MACHINE.

(Application filed Nov. 27, 1893.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses

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By his Attorneys

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No. 640,622.

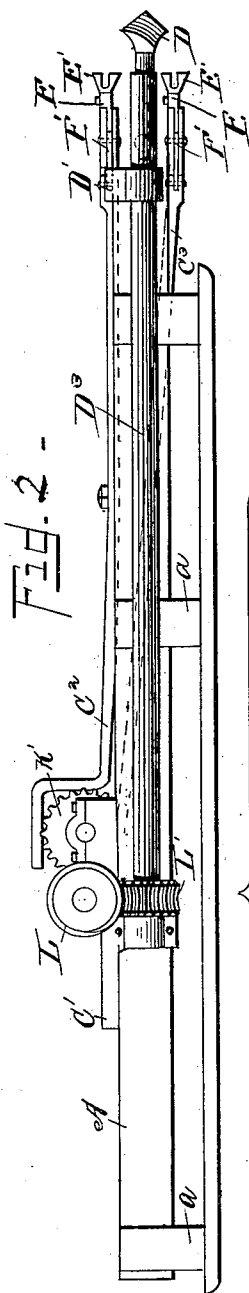
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WITNESSES -
Chas. W. LaPorte
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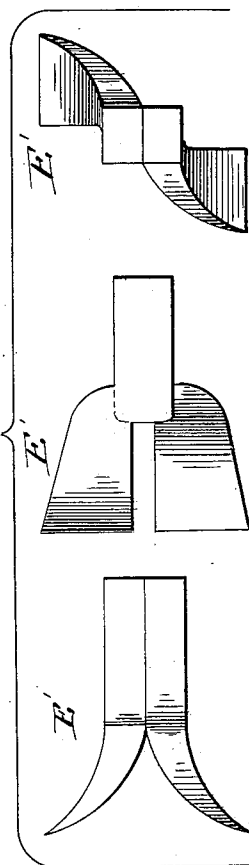


Fig. 15

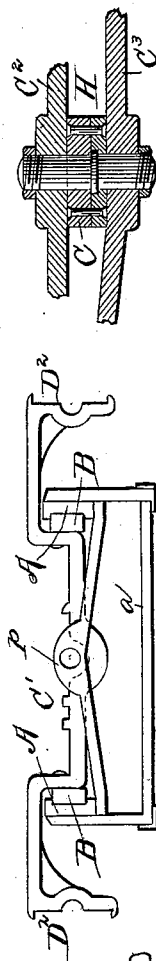


Fig. 14

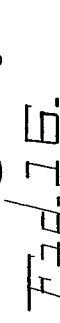


Fig. 16

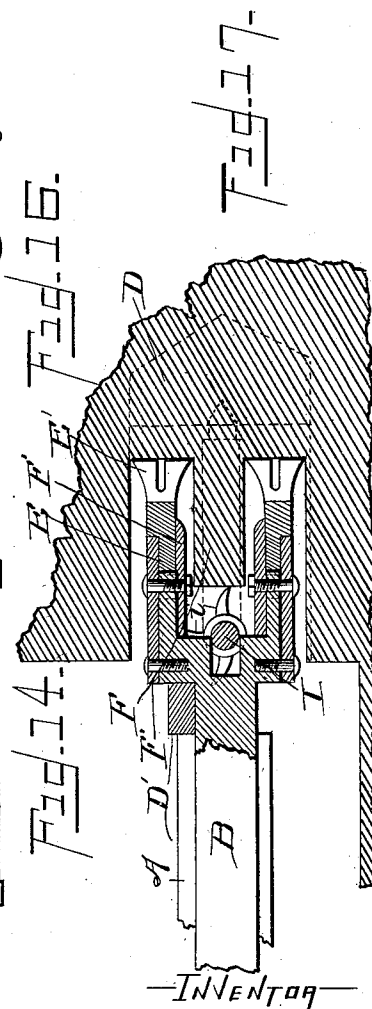


Fig. 17

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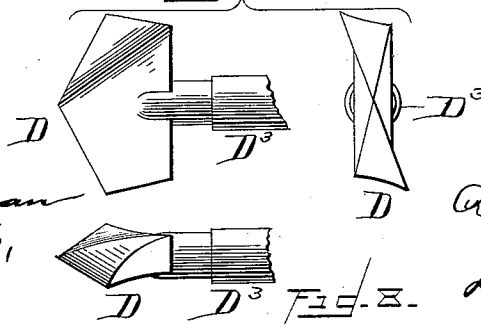
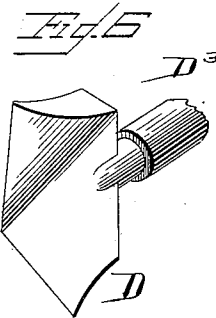
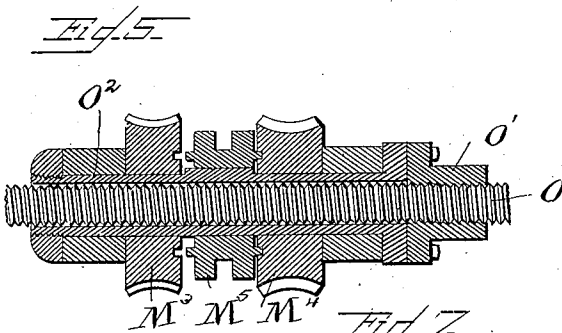
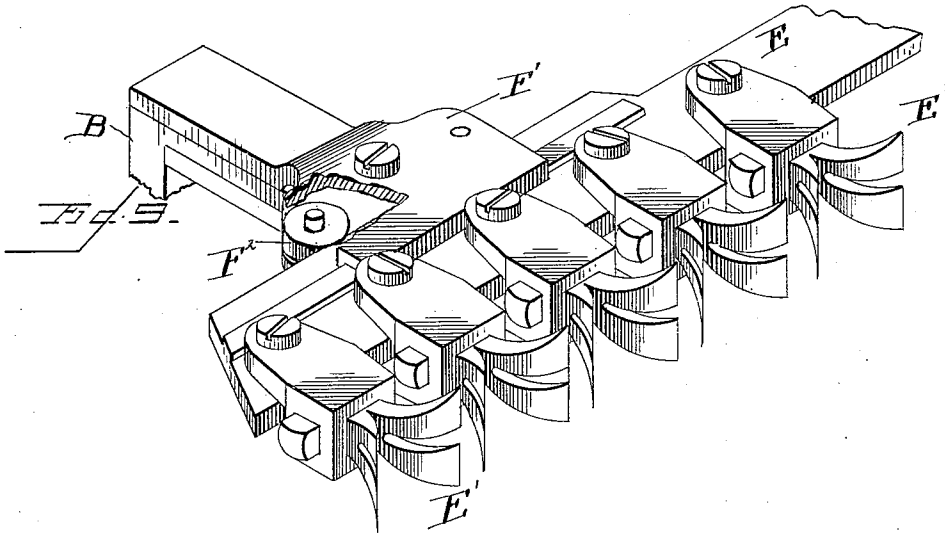
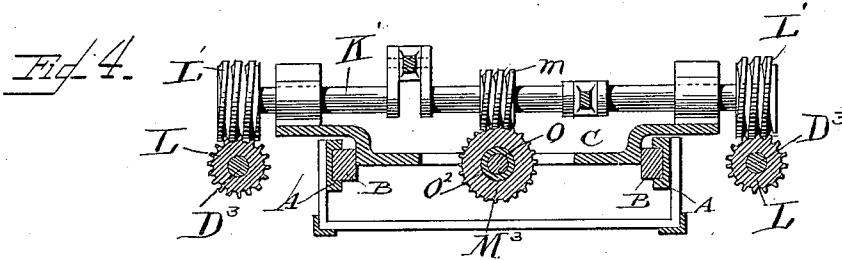
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(No Model.)

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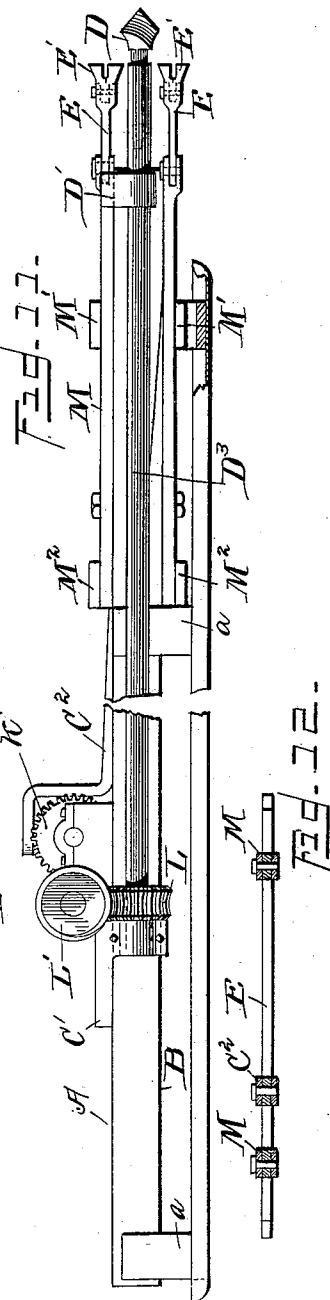
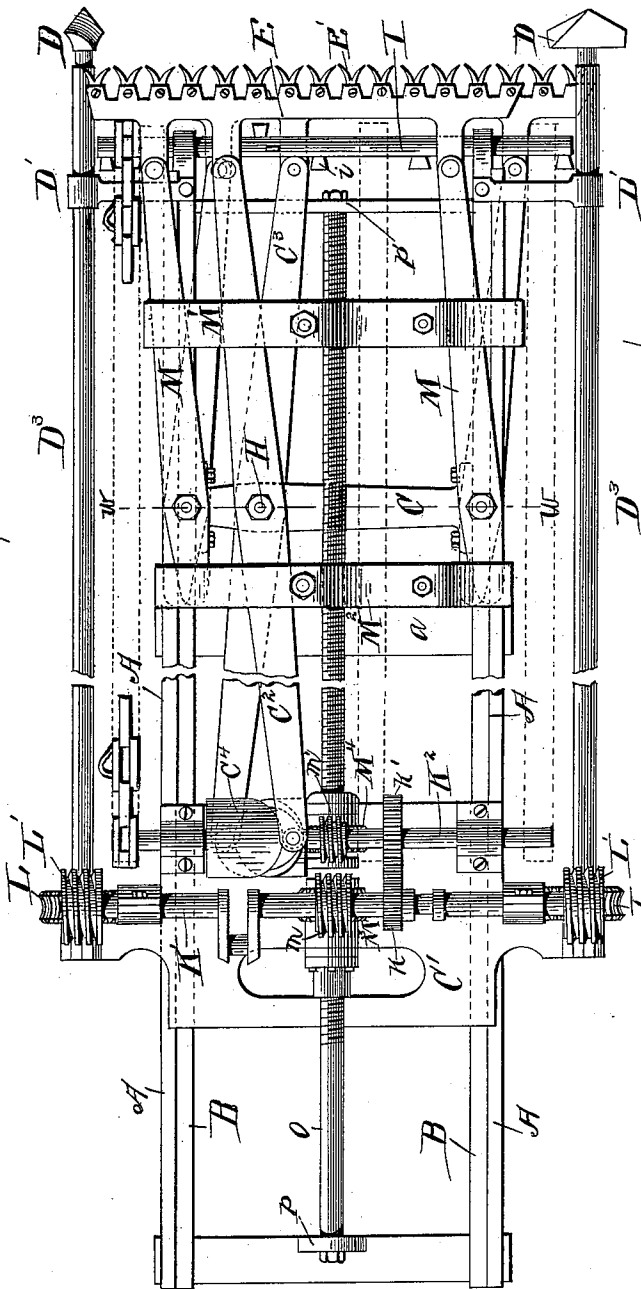
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(No Model.)

5 Sheets—Sheet 4.



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No. 640,622.

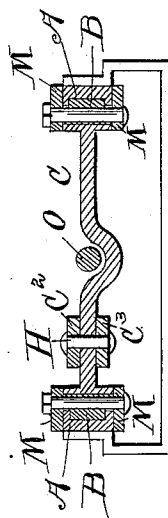
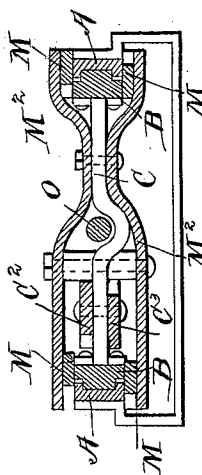
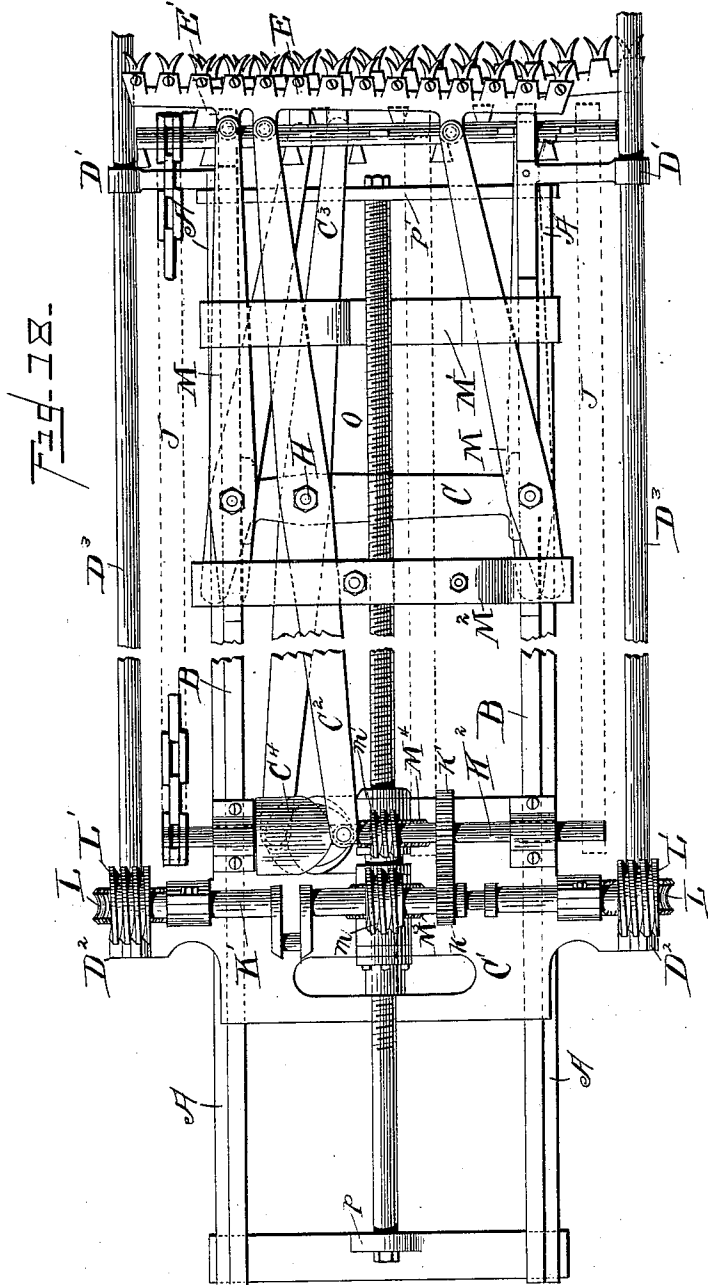
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MINING MACHINE.

(Application filed Nov. 27, 1893.)

(No Model.)

5 Sheets—Sheet 5.



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UNITED STATES PATENT OFFICE.

ARCHIBLE BAILEY, OF PHILIPSBURG, PENNSYLVANIA.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,622, dated January 2, 1900.

Application filed November 27, 1893. Serial No. 492,314. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBLE BAILEY, a citizen of the United States, and a resident of Phillipsburg, in the county of Centre and State of Pennsylvania, have invented certain new and useful Improvements in Mining-Machines, whereof the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to improvements in mining-machines of the class having a cutting mechanism which is advanced into the material.

Figure 1 is a plan view of a machine embodying my improvements. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal section. Fig. 4 is a cross-section. Figs. 5 to 9 show details. Fig. 10 is a plan view of a modified form. Fig. 11 is a side view of Fig. 10. Fig. 12 is a detail view, partly in section, of a portion of the form of machine shown in Fig. 10. Fig. 13 is a section on line W W of Fig. 10. Figs. 14 to 17 show modified details. Figs. 18 and 19 show another arrangement of links.

In the drawings I have shown a bed-frame having side bars A A joined by girths a a. These bed-bars may be arranged vertically or horizontally, the latter arrangement being preferred. The carriage is placed on the bed and has two sliding side bars B B, which are fitted to grooves in the edges of the bed-bars. These bars B are joined by cross-bars C C of any suitable number, there being a plate at C' for supporting the engines or power mechanism; but, as above said, the parts described may be formed and fitted together in any preferred way. The cutting apparatus comprises one or more cutters adapted to form apertures at the end or ends of the cut and transversely-moving cutters working in the horizontal planes of the aforesaid cutters. Preferably the cutters first aforesaid are of the nature of rotating drills, as shown at D D, one or more. Each is mounted in suitable bearings carried by brackets or hangers D' D' D² D², which are secured to the side bars of the sliding carriage. The operative parts of these drills, their stems or shafts D³, and their supporting devices may be modified in several ways without departing from the essen-

tial features of the invention as regards them. The other part of the cutting apparatus comprises two sets of cutters arranged to work in the transverse planes of the drills. In Figs. 1 to 9 these are reciprocating cutters, there being two cutter-bars E E, one above the other and substantially parallel. The cutters are shown at E', they being of any suitable sort and being arranged so as to cut a path for the bars E E and for the parts in the rear which carry and operate them.

The cutters can be so disposed as to remove entirely the material in advance of them—that is, all of the material lying in that part of the vertical plane of the cutters between the lowermost line and the upper line of the teeth or bits, or they can be so arranged as to form two kerfs with a web between them, as shown at F.

The cutter-bars can be held in guides F' F' with antifriction-rollers F², as shown in Fig. 1 and others, or they can be mounted upon a swinging support, as in Fig. 10. To actuate these cutter-bars, use is preferably made of one or more vibrating levers. Two are shown at C² C³. They are respectively pivoted to the bars E E and to supports at H held by the carriage, and at the rear ends they are connected to the driving mechanism in such way as to receive vibration. Any suitable mechanism can be used for imparting to them the required motion, such as a drum with a cam-slot or crank-wheel.

By using the drills in advance of the cross-cutting devices a clearance is made for the latter at the ends of the cut as they move into and out from the apertures formed by the drill. By having the cross-cutters moving simultaneously and opposite to each other I overcome the side thrust experienced when using a single cutter, and by placing the two cross-cutters at a distance apart, so as to leave a space between them, I provide an ample path for the backward removal of the slack or cuttings which are formed by the machine.

The web of material at F can be removed by chains acting directly on them or acting upon a rotary bar such as shown at I. This bar is situated transversely of the machine on a line as close to the cutter-bars E E as practicable and is provided with fingers or cut-

ters, adapted to engage with and break down said web. In this way there is considerable saving in the material removed by the cutting apparatus, as the particles are not reduced in size as when all of the material is attacked by sharp cutters.

The bar I is rotated by chains J J of any suitable number, which not only transmit power, but also withdraw the cuttings. It is mounted in adjustable bearings K, whereby the tension of the chains can be adjusted.

The engine or motor is connected to the chain driving-shaft and to the drill-shafts in any suitable way. As shown, there is a shaft K' geared to the chain-shaft K² and connected to the drill-shaft by means of worms and worm-wheels L L'.

The means for actuating and connecting the shafting and gearing and also those for moving the cutter-carriage are exactly the same as those I have shown in an earlier application, Serial No. 407,155, filed September 29, 1891. The shaft K' is driven by a suitable engine and is connected to shaft K² by gear-wheels k k'. The aforesaid slotted drum at C⁴ for actuating the levers C² C³ is shown as secured to shaft K². Shafts K' K² carry worms m m', engaging with the loose wheels M³ M⁴, mounted loosely on the tubular shaft O², fastened to nut O', which engages with the feed-screw O, secured to the bed at p p', there being a clutch at M⁵ splined to the tubular shaft O².

By referring to Figs. 10 to 18 it will be seen that rigid guides for the cutter-bars can be dispensed with and that they can be held by freely-moving supports. M M are links pivoted to the cutter-bar and also pivoted to the carriage. When they are used, the friction and the resistance to the cutters are greatly reduced. These links can be reinforced by means of braces at M' M², preferably one in front and one in rear of the supporting-pivot. In Figs. 18 and 19 I have shown how the links can be arranged out of parallelism, so as to effect a swinging movement of the ends of the cutter-bars, whereby the ends are alternately thrown into and out from a cutting position for the purpose of decreasing the amount of power required.

I do not herein claim anything as to the particular style of teeth carried by the cutter-bars, whether they be oscillating or not, as I have made that the subject-matter of the claims in my aforesaid application, nor do I here claim a revolving drum engaging directly with pins on the cutter-bars, nor the web-breaking shaft I, as these features are also claimed in said other application; but it is herein shown that as concerns the use of the drills or mechanism for forming an aperture at the ends of the main kerf there are several ways of supporting the cutting mechanism which forms the cross slot or kerf between the end apertures, and it is also shown that the cutter-bars may be mounted in several ways to swing as well as to recip-

rocate in rectilinear guides, and these features are herein claimed.

What I claim is—

1. In a mining-machine, the combination of the stationary bed, the carriage, two oppositely-reciprocating cutters pivotally connected to the carriage and operating to cut distinct kerfs, a power-shaft, mounted on the rear of the carriage, power-transmitting devices connecting the power-shaft with the cutters for actuating them, and means for removing the material between the kerfs formed by said cutters, substantially as set forth.

2. In a mining-machine, the combination of the stationary bed, the carriage, the two oppositely-reciprocating cutters mounted at the front end of the carriage, the power-shaft K', the parallel shaft K², geared to shaft K', a cam on shaft K² and levers C², C³ connected to the cutters and actuated by the said cam, substantially as set forth.

3. In a mining-machine, the combination of the stationary bed, the carriage, the horizontal oppositely-reciprocating cutters, the drills at the ends of the cutters, the cross-shaft K' for actuating the drills, and the shaft K² and levers C², C³ for operating the reciprocating cutters, substantially as set forth.

4. In a mining-machine, the combination with the stationary bed, the carriage, the power devices on the carriage, the parallel, oppositely-reciprocating cutter-bars, extending transversely across the carriage from side to side and provided throughout their length with cutters, the pivoted levers for supporting said cutter-bars, and power-transmitting devices extending from the power devices on the carriage to the cutter-bars for operating them, substantially as set forth.

5. In a mining-machine, the combination of a bed, a carriage mounted on the bed, two oppositely-reciprocating, simultaneously-acting, cutter-bars supported on the carriage one above the other and extending substantially parallel to the front of said carriage and from one side thereof to the opposite side, power devices mounted on the carriage and connected with said cutter-bars for actuating them, means actuated by the power device for moving the carriage and cutter-bars longitudinally of the bed, and means mounted on the carriage and connected with the cutter-bars for moving the latter longitudinally of the carriage simultaneously with each reciprocation thereof, laterally of the carriage, substantially as set forth.

6. In a mining-machine, the combination with the bed and the carriage, of the power-shaft on the carriage, the oppositely-reciprocating parallel cutters E, E', extending substantially parallel to and entirely across the front of the carriage, power-transmitting devices connecting said cutters with the power-shaft, levers M supporting the cutters and arranged out of parallelism, whereby as the cut-

ters are reciprocated transversely of the carriage they are also adjusted longitudinally of the carriage, substantially as set forth.

5 7. In a mining-machine, the combination with the bed, and the carriage, of the power-shafting on the carriage, the transversely-arranged reciprocating cutter-bar, pivotally supported from and extending across the front end of the carriage substantially parallel to said end of the carriage, cutters carried by said bar, means actuated by said power-shafting, for feeding the carriage and cutters forward, and means supplemental thereto connected to the cutter-bar for advancing one
10 end of the said bar relatively to the other end, at each reciprocation, whereby only part of the cutters are operating at any instant as the cutter-bar advances into the breast of the coal, substantially as set forth.

20 8. In a mining-machine, the combination with a bed and a carriage mounted thereon, to move longitudinally thereof, of a cutter-bar extending across the front end of the carriage on a line substantially at right angles to the line of movement of the carriage, said
25 bar having cutters throughout its length, laterally-swinging levers pivoted to the carriage

and arranged within the side lines of the carriage and supporting said cutter-bar, power devices, and connections between the power
30 devices and the cutter-bar for reciprocating the latter transversely of the carriage, substantially as set forth.

9. In a mining-machine, the combination with a bed, and a carriage mounted thereon,
35 power devices, means connected with said power devices for moving the carriage longitudinally of the bed, of two levers, M, pivotally connected to the carriage, a cutter-bar connected to the outer ends of said levers and
40 extending transversely across the front end of the carriage, a third lever, H, fulcrumed on the carriage and connected at one end with the cutter-bar, and a cam actuated by the power devices and engaging with the other
45 end of said lever H, for vibrating it laterally, substantially as set forth.

In testimony whereof I have hereunto set my hand this 28th day of July, A. D. 1891.

ARCHIBLE BAILEY.

Witnesses:

CYRUS GORDON,
H. H. BLISS.