

No. 659,984.

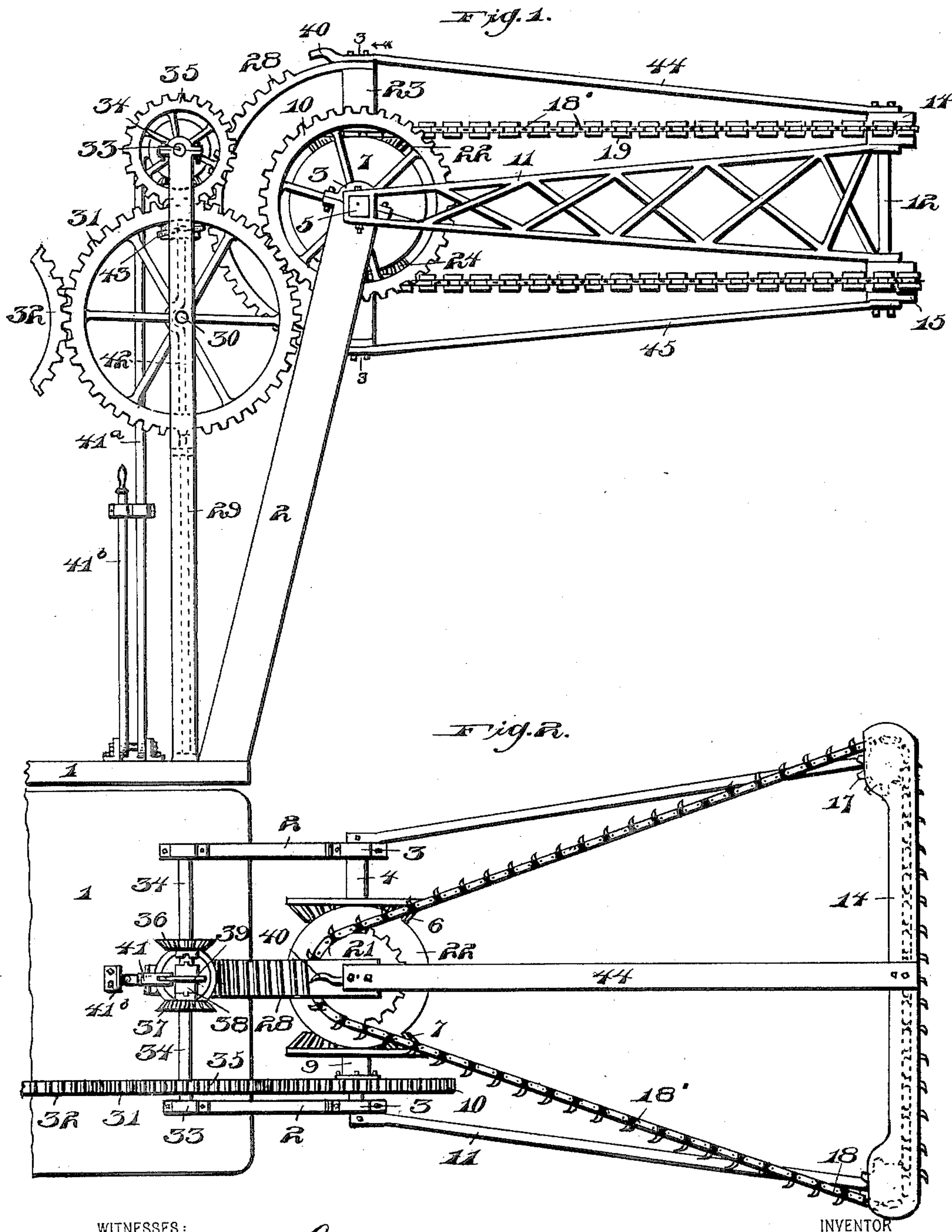
Patented Oct. 16, 1900.

E. O'TOOLE.
MINING MACHINE.

(Application filed Feb. 17, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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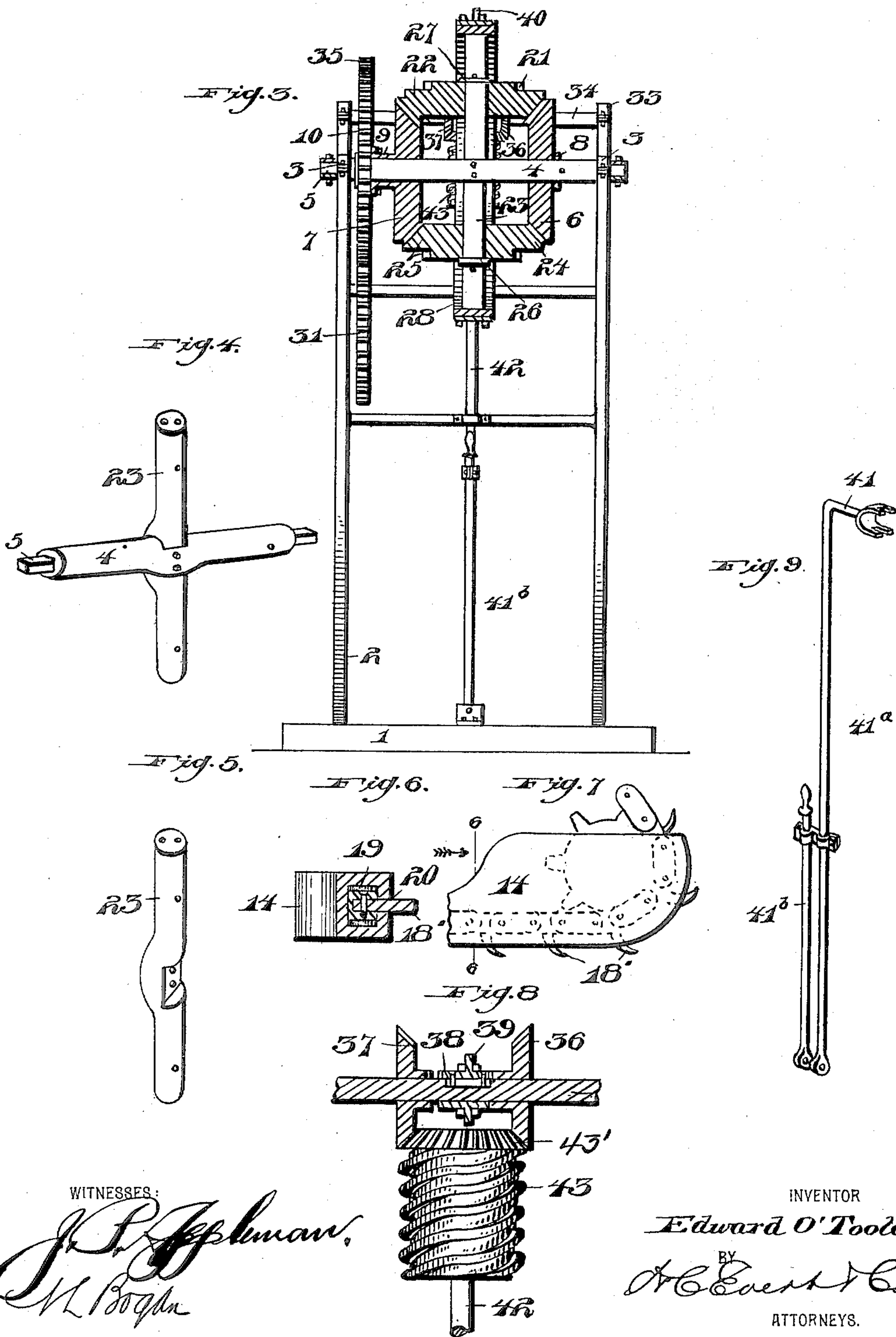
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WITNESSES:

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UNITED STATES PATENT OFFICE

EDWARD O'TOOLE, OF LEISENRING, PENNSYLVANIA.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 659,984, dated October 16, 1900.

Application filed February 17, 1900. Serial No. 5,604. (No model.)

To all whom it may concern:

Be it known that I, EDWARD O'TOOLE, a citizen of the United States of America, residing at Leisenring, in the county of Fayette and State of Pennsylvania, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in mining-machines, and is particularly adapted for use in mining coal or other mineral substances.

The object of my invention is to construct 15 a machine of this character with a pair of cutter-chains operating in opposite directions and with means for imparting an oscillatory movement to the said chains during their operation.

20 Briefly described, my invention comprises a suitable frame carrying gears upon which the cutter-chains are trained and operated by a segmental rack and worm for imparting the oscillating movement to the cutter-chains 25 and suitable operating means for the said worm and gears, all of which construction will be hereinafter more specifically described and then particularly pointed out in the appended claims; and in describing the 30 invention in detail reference will be had to the accompanying drawings, forming a part of this specification and wherein like numerals of reference indicate like parts throughout the several views of the drawings, in 35 which—

Figure 1 is a side view of my improved mining-machine. Fig. 2 is a top plan view thereof. Fig. 3 is a transverse vertical sectional view taken on the line 33 of Fig. 1. Fig. 4 is a 40 detail perspective view of the supporting-shafts for the gearing. Fig. 5 is a detail perspective view of the vertical supporting-shaft for the gears upon which the cutter-chains are trained. Fig. 6 is a cross-sectional view 45 taken on the line 6 6 of Fig. 7. Fig. 7 is a top plan view of a part of one of the guides for the cutter-chain, showing the latter therein. Fig. 8 is a horizontal sectional view of the clutch-gearing for the worm. Fig. 9 is 50 a perspective view of the clutch-operating lever.

Referring to the drawings by reference-numerals, 1 indicates a base, upon which is mounted a pair of inclined standards 2, having bearings 3 on their upper ends, in which 55 is journaled the horizontally-extending rock-shaft 4, provided on each end with a tenon 5, these tenons extending outwardly beyond the standards 2. Upon the rock-shaft 4, between the standards 2, are mounted miter- 60 gears 6 7, the former keyed to or secured to the rock-shaft by a collar 8, the latter having a collar 9, which is connected to a pinion 10, mounted on said rock-shaft 4. The side bars 11 of the frame are mounted at their forward 65 ends on the tenons 5 of the rock-shaft and are rigidly secured thereto, and at their other ends these side bars of the frame carry vertical shafts 12, extending above and below the said side bars, and upon which extending 70 ends are mounted the upper guide 14 and the lower guide 15 for the endless cutter-chains. Mounted within these guides, near the ends thereof, are sprocket-wheels 17, over which the cutter-chains 18 are trained, said chains 75 operating through the guides lengthwise of the same, with only the cutting-teeth of the chains extending beyond the outer face of the guides. For this purpose the guides are 80 each provided with an elongated runway 19, extending from end to end of the guides and terminating in the outer face of the guides in a groove 20, through which the teeth 18' of the cutter-chains 18 travel during the travel of the links of which the cutter-chain consists 85 through the runway 19. The upper of these cutter-chains is trained over its sprocket-wheels in the guide 14 and a sprocket-wheel 21, which may be either formed integral with or secured to a miter-gear 22, rotatably 90 mounted on a vertical shaft 23. This vertical shaft 23 is centrally secured to the horizontal shaft 24 and has rotatably mounted thereon, below such shaft 4, a miter-gear 24, having formed integral therewith or se- 95 cured thereto a sprocket-wheel 25 to receive the lower endless chain, the latter operating over said sprocket-wheel in its guide 15. The miter-gear 24 is held against displacement upon its shaft either by keying or by 100 means of the collar 26, while the miter-gear 22 is likewise held against displacement either

by keying or by the collar 27. These miter-gears 22 24 mesh with the miter-gears 6 and 7 on the rock-shaft 4, so that when motion is communicated to the gear 7, by reason of its connections with the pinion 10, the gears over which the chains are trained will be operated simultaneously. An oscillatory or up-and-down movement is imparted to the cutter-chains by means of a segmental rack 28, the ends of which are rigidly connected to the ends of the shaft 23. This rack is adapted to engage a worm for imparting the oscillatory movement to the frame and cutter-chains, as will now be described.

The base 1 has mounted thereon, besides the inclined standards 2, a pair of vertical standards 29, in which is journaled a shaft 30, having a pinion 31 mounted thereon to mesh with the pinion 10 and with the drive-pinion 32. Bearings 33 are mounted on the upper ends of these standards 29 and have journaled therein a shaft 34, upon which is mounted to mesh with the pinion 31 a pinion 35, so that this shaft may be driven simultaneously with the shaft 30. This shaft 34 has loosely mounted thereon a pair of miter-gears 36 37, each having clutch-bushings alternately engaged by the clutch-sleeve 38, arranged upon the shaft 34 and adapted to be shifted longitudinally upon such shaft, so as to alternately engage the clutch-bushings of the miter-gears. This clutch-sleeve 38 is provided with a peripheral flange 39, which is adapted to be engaged by the shifting pin or finger 40, mounted at the upper end of the segmental rack, and by a shifting fork 41.

Mounted upon the base 1 is a shaft 42, which has rotatably secured on its upper end a worm 43 for engagement with the segmental rack 28 and carries a bevel or miter gear 43' for engagement with the miter-gears 36 and 37.

The frame is strengthened by connecting braces 44 and 45 to the upper and lower ends of the rock-shaft 23 and upper and lower cutter-chain guides, respectively.

The operation of the device is as follows: The drive-pinion 32 being operated, motion is imparted to the pinions 31, 35, and 10, revolving the bevel-gear 7 and operating gears 22 24, the said gears 22 24 operating in opposite directions and imparting the same motion to the cutter-chains 18, the sprockets mounted upon the gears 22 24 causing the operation of the cutter-chains 18. Simultaneously with the operation of the cutter-chains the worm 43 is rotated, which, meshing with the rack 28, will give an oscillating movement to the frame, carrying the cutter-chains in the same direction, and if the movement of the frame is in the upward direction the same will continue until the shifting pin at the head of the rack comes into engagement with the flange 39 of the clutch-sleeve connecting the gear 37 and causing the same to rotate the worm in an opposite direction, im-

parting the downward movement to the frame. When the frame has reached the limit of its downward movement, the handle 41^b is operated, causing the shifting fork to move the clutch-sleeve in the opposite direction and reversing the movement of the frame.

It is thought that the many advantages of my improved mining-machine can be readily understood from the foregoing description, taken in connection with the accompanying drawings, and it will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

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

1. In a coal-mining machine, the combination with the base and inclined supporting-standards, of a rock-shaft mounted in said standards, a vertically-disposed shaft 23 connected centrally of the ends of said rock-shaft, miter-gears 22, 24 loosely mounted on said shaft 23, miter-gears 6, 7, loosely mounted on the rock-shaft for engagement with the gears 22, 24, a frame mounted on the ends of the rock-shaft, guides carried by said frame, endless cutter-chains disposed one above the other, said chains operating through said guides and engaging the gears 22, 24, means connected to said miter-gear 7 for driving the train of miter-gears and operating said chains, a vertically-disposed rotating worm, a segmental rack connected to the shaft 23 and engaging said worm, and means for shifting the rotation of said worm to impart an oscillatory movement to the cutter-chains simultaneously with their endless travel, substantially as described.

2. In a coal-mining machine, the combination with the base and supporting-standards 2, of a rock-shaft carried by said standards, a vertically-disposed shaft connected to the rock-shaft centrally of its ends, a train of miter-gears loosely mounted on said shafts, a frame mounted on the ends of the rock-shaft, guides carried by said frame, a pair of endless cutter-chains operating through said guides and engaging the miter-gears on the vertically-disposed shaft, a segment-shaped rack carried by said vertically-disposed shaft, a rotating worm engaging said rack, and means for shifting the rotation of said worm to impart an oscillatory movement to said cutter-chains simultaneously with their endless travel, substantially as described.

3. In a coal-mining machine, the combination with the base, the inclined supporting-standards 2, and the vertical standards 29, of the rock-shaft mounted on said standards 2, the vertically-disposed shaft 23 connected to said rock-shaft, the train of intermeshing miter-gears loosely mounted on said shafts, means connected to one of said gears for driving the train, the frame mounted on the ends of said rock-shaft, the guides carried by said

frame, the cutter-chains operating through
said guides and engaging the miter-gears on
the vertical shaft 23, the rack connected to
the ends of said vertical shaft 23, the vertical
5 shaft 42 mounted on the base, the rotatable
worm carried by said shaft and engaging said
rack, and means for shifting the rotation of
said worm to impart an oscillatory movement

to the cutter-chains simultaneously with their
endless travel, substantially as described. 10

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

EDWARD O'TOOLE.

Witnesses:

W. H. HUGHES,

GEO. W. L. BATON.