Oct. 9, 1928. 1,687,306

E. O'TOOLE

MINING MACHINE

Filed Aug. 11, 1927 4 Sheets-Sheet 1

Fig. 1.

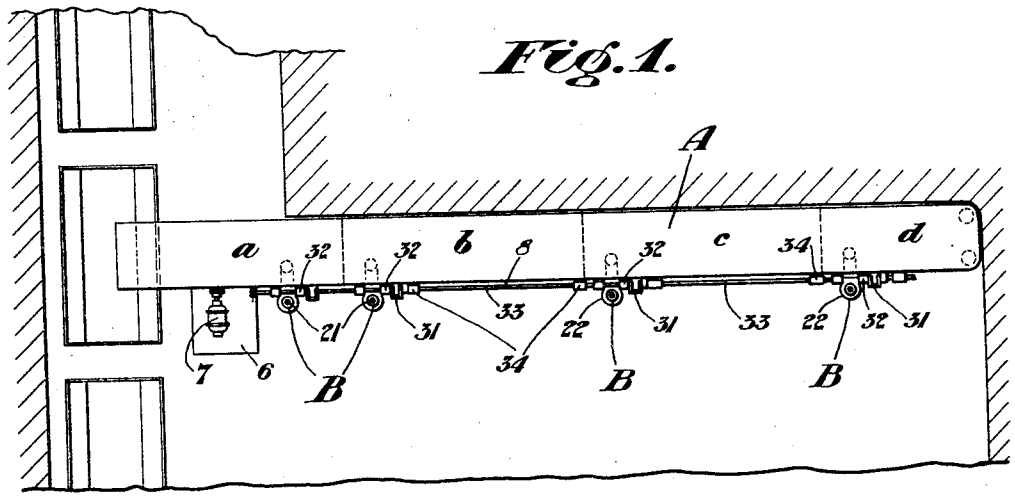



Fig. 7

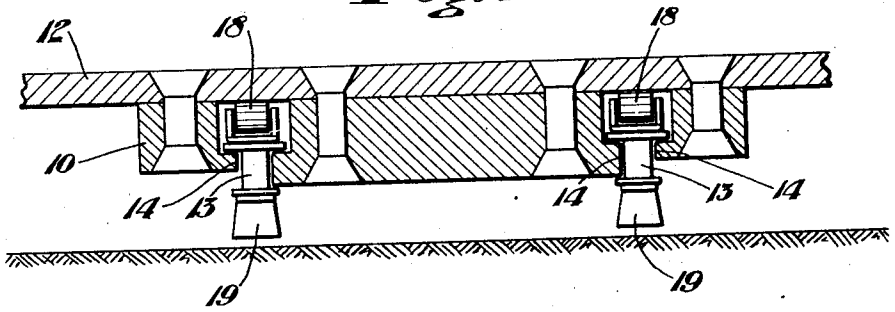
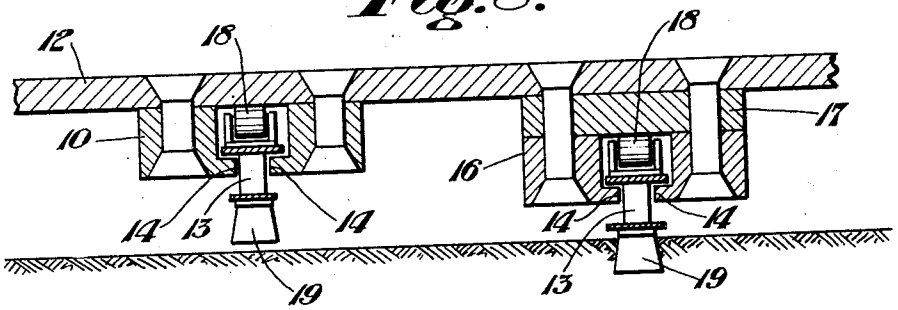



Fig. 8.




Witnesses:

Edwin Israel

Inventor:

EDWARD O'TOOLE,

by: D. Anthony Usina

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MINING MACHINE

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Fig. 2.

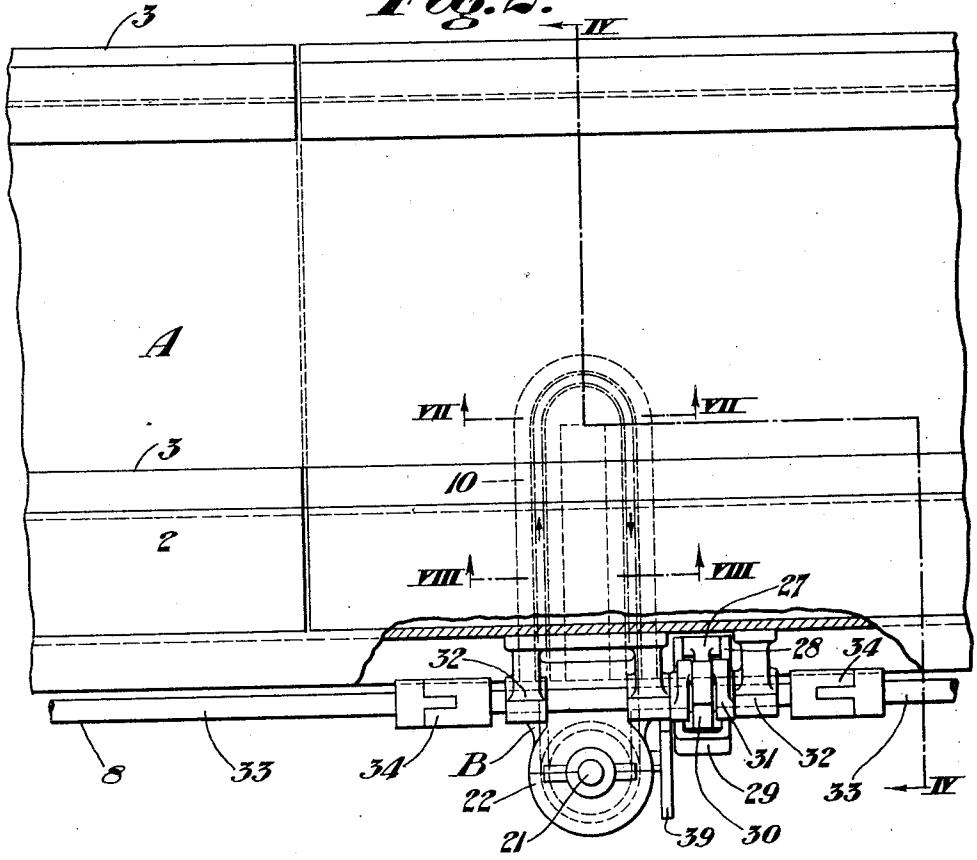
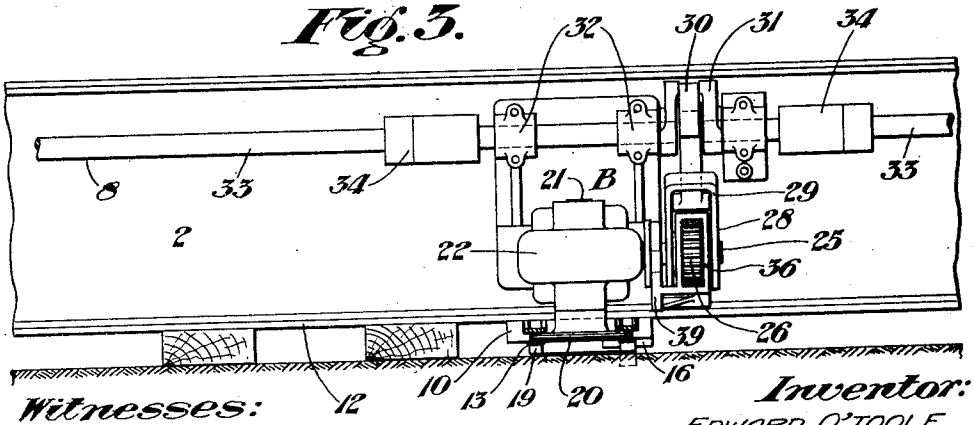



Fig. 3.




Witnesses:

Edwin Trueb

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Oct. 9, 1928.

1,687,306

E. O'TOOLE

MINING MACHINE

Filed Aug. 11, 1927

4 Sheets-Sheet 3

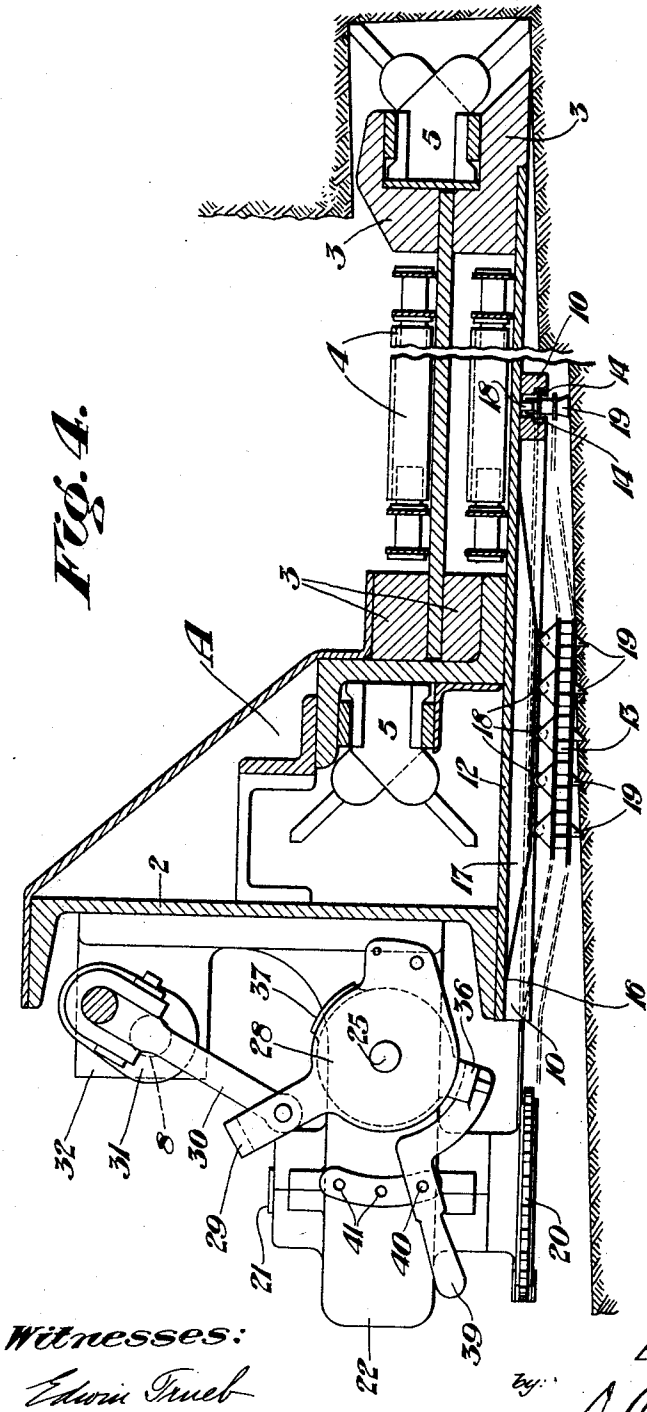


Fig. 4.

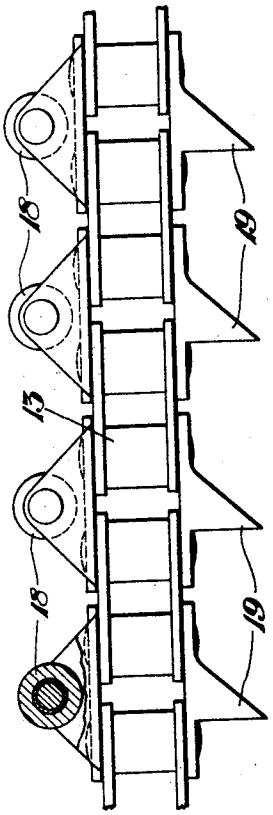


Fig. 5.

Witnesses:

Edwin Trueb

Inventor:

EDWARD O'TOOLE,

by: D. Anthony Usina

his Attorney.

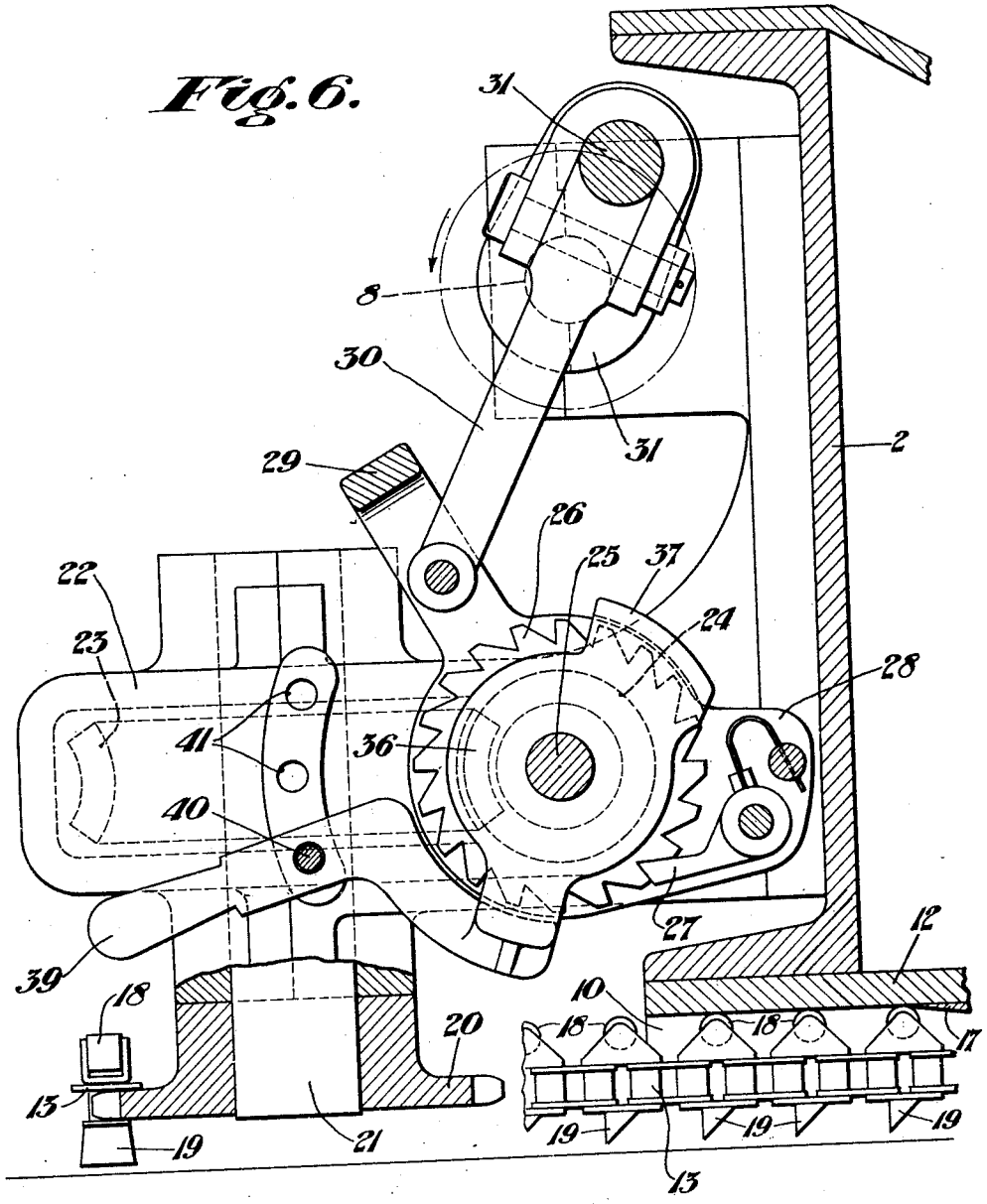
Oct. 9, 1928. 1,687,306

E. O'TOOLE

MINING MACHINE

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Fig. 6.




Witnesses:
Edwin Ernest

Inventor:
EDWARD O'TOOLE,
by D. Anthony Usina
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Patented Oct. 9, 1928. 1,687,306

# UNITED STATES PATENT OFFICE.

EDWARD O'TOOLE, OF GARY, WEST VIRGINIA.

## MINING MACHINE.

Application filed August 11, 1927. Serial No. 212,285.

This invention relates to mining machines and, while not limited thereto, relates more particularly to mining machines of the long-wall type, and has for its object the provision of a machine of this class having self-contained propelling mechanism for propelling or advancing the machine into the face being mined.

Heretofore, machines of this type have generally been propelled or advanced into the work by means of screw jacks, cables and other auxiliary means which require the use of supports to push against or anchors to pull on, and the advance of the machine has not been as satisfactory as desired.

In the drawings—

Figure 1 is a small scale diagrammatic plan of a machine having this invention applied thereto.

Figure 2 is an enlarged plan of a portion of the machine of Figure 1.

Figure 3 is an enlarged rear elevation of the portion of machine shown in Figure 2.

Figure 4 is a transverse section taken on the line IV—IV of Figure 2.

Figure 5 is a side elevation showing details in the construction of the tractor chain.

Figure 6 is a transverse section showing details of the ratchet operating mechanism.

Figures 7 and 8 are sectional details on the lines VII—VII and VIII—VIII of Figure 2.

Referring more particularly to the drawings, the letter A designates the machine as a whole, which is of the general type shown in my Patent No. 1,583,992, dated May 11th, 1926. The machine A is constructed in sections as designated by the letters *a*, *b*, *c*, and *d*, and comprises a main frame 2 including cutter-chain guides 3, an endless flight conveyer 4 and a cutter-chain 5.

The front section *a* is the power unit or section of the machine, and is also the loading end of the machine. The front section *a* is elevated so as to elevate the mined material into cars, and a rearwardly projecting platform 6 is provided on the section *a*, on which a motor 7 is provided which is connected by drive mechanism (not shown), to the operating mechanism for the cutter-chain 5 and conveyer 4, and also to drive-shaft 8, journaled in suitable bearings along the rear of the machine.

The mining machine proper is illustrated and described in detail in my prior patent and, therefore, will not be further described in detail.

A plurality of the propelling or advancing mechanisms designated generally by the letter B are provided along the machine A, one being provided for each of the sections *a*, *b*, *c*, and *d*. It will be understood, of course, that any number of the mechanisms desired or necessary may be used.

The advancing mechanisms B each comprises a stationary, substantially U-shaped track 10 secured to the under-side of the bottom plate or base 12 of the machine A in which a tractor-chain 13 is guided and travels. The track 10 is composed of two spaced rails which have their inner side faces cut away to form lower supporting shoulders 14 on which the chain rides. The chain 13 is trained around the track 10 and is adapted to be moved or propelled around the track by means to be described. The in-going side of the track 10 is mounted directly on the base 12 of the machine as is also the inner end of the track, but the return or out-going side of the track is bent downwardly intermediate its ends forming a dip-like section 16, and a filler-plate 17 is fitted between the section 16 of the track 10 and the base 12 of the machine.

The chain 13 is provided with anti-friction rollers 18 on its upper face and with traction-teeth 19 on its lower face. The rollers 18 are adapted to engage against the base 12 of the machine and the filler-plate 17, which forms an extension of said base, as the chain is moved around the track 10, and the teeth 19 are adapted to engage the floor of the mine as the chain passes through the dip section 16 of the track and thus propel or advance the machine.

The propelling means for the chain 13 includes a sprocket-wheel 20 secured on a shaft 21 journaled in the combined worm and worm-wheel housing and bearing support 22 secured to the rear face of the main frame 2 of the machine A. A worm-wheel 23 is secured on the shaft 21 and is meshed with a worm 24, carried by a shaft 25 journaled in the housing 22. The shaft 25 also has a ratchet-wheel 26 secured thereon, adapted to be engaged and rotated by a spring pressed pawl 27 carried by a lever 28 journaled on

the shaft 25 and having an operating arm 29 which is pivotally connected to one end of a connecting-rod 30. The other end of the connecting-rod 30 is connected to a crank portion 31 of the drive-shaft 8. The shaft 8 is journaled in bearings 32 on the housings 22 and the shaft 8 is formed in sections 33 and joined by couplings 34 to facilitate the assembling and dissembling of the apparatus.

From the above it will be readily understood that when power is applied to the shaft 8 to rotate said shaft, the pawl-lever 28 and pawl 27 will be oscillated by means of the crank 31 and connecting-rod 30 and thereby cause a step-by-step rotation of the ratchet-wheel 26. The movement of the ratchet-wheel 26 will be communicated through the shaft 25, worm 24, worm-wheel 23 and shaft 21 to the sprocket 20 so as to cause a step-by-step travel of the tractor chain 13 around the track 10. The step-by-step travel of the chain 13 will, of course, also cause a step-by-step advance of the mining machine.

An adjustable cover-guard 36 is journaled on the shaft 25 and provided with a cover portion 37 adapted to cover a portion of the teeth of the ratchet 26 so as to vary the effective area of the ratchet-teeth exposed to the pawl 27 and thereby vary the amount of rotation of said ratchet-wheel 26 and the amount of advance of the machine in each step of advancement.

The guard 36 is provided with a handle or lever-arm 39 by which it may be moved around the ratchet-wheel 26, and said handle is adapted to be held in selected position by a pin 40 which is adapted to be inserted through an opening in the handle and secured in a selected one of the holes 41 formed in the housing 22.

While I have shown and described my invention as applied to a certain form of mining machine it will be understood that I do not wish to be limited thereto since the advancing mechanism may be applied to various forms of mining and similar machines, and also it will be understood that various changes in and modifications of the advancing mechanism may be made without departing from the scope of my invention as defined in the appended claim.

I claim:

In a mining machine, a propelling mechanism for moving the machine into the face of the material being mined, said mechanism comprising a U-shaped substantially horizontally disposed guide track secured to the under side of said machine, an endless chain trained around said track, the return side of said track being bent downwardly intermediate its ends to a plane materially below the plane of the other parts of the track, teeth on said chain adapted to engage and be forced into the floor of the mine as the chain passes along said return side of said track, and means for propelling said chain, said means including a vertical shaft, a horizontal sprocket on said shaft and in engagement with said endless chain, a horizontal shaft, gearing connecting said horizontal and vertical shafts, a ratchet-wheel fixedly mounted on said horizontal shaft, a pawl adapted to engage and rotate said ratchet-wheel, a horizontal power shaft, a crank on said power shaft, a lever on which said pawl is pivotally mounted, and a connecting-rod connecting said lever and said crank on said power shaft.

In testimony whereof, I have hereunto set my hand.

EDWARD O'TOOLE.