Sept. 4, 1928. 1,683,297

E. O'TOOLE

MINING MACHINE

Filed June 14, 1926 6 Sheets-Sheet 1

Fig. 1.

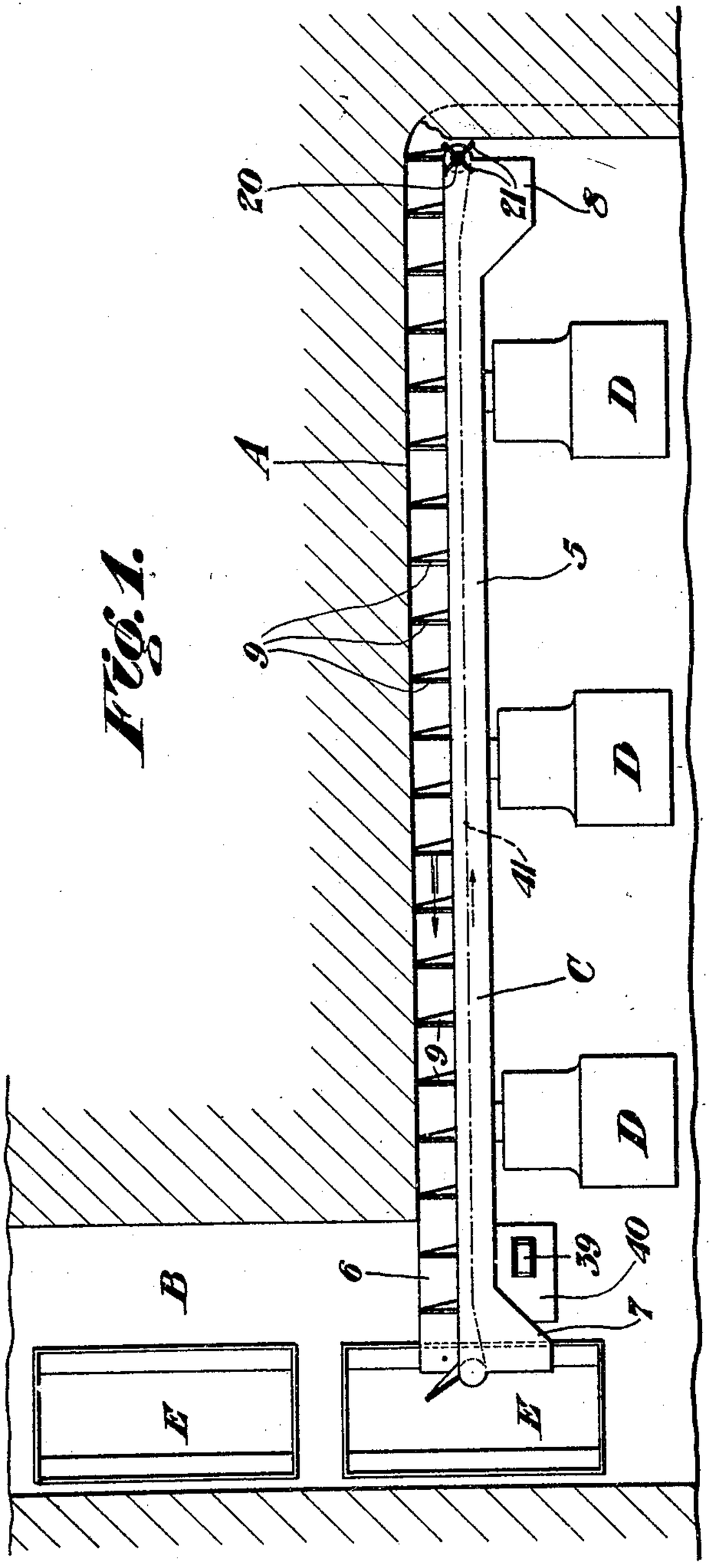
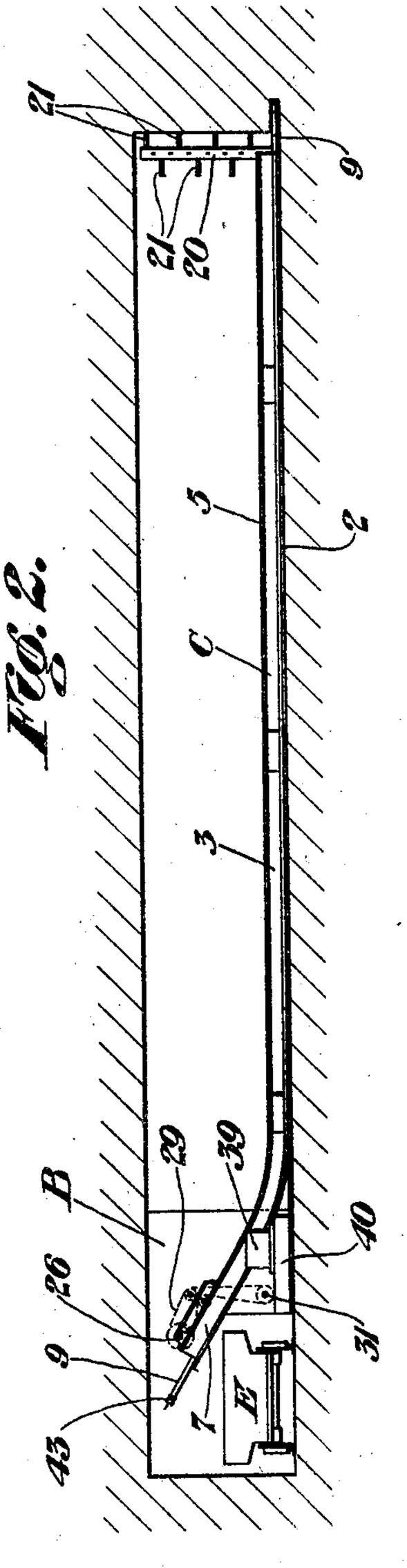


Fig. 2.



Witnesses:
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Inventor:
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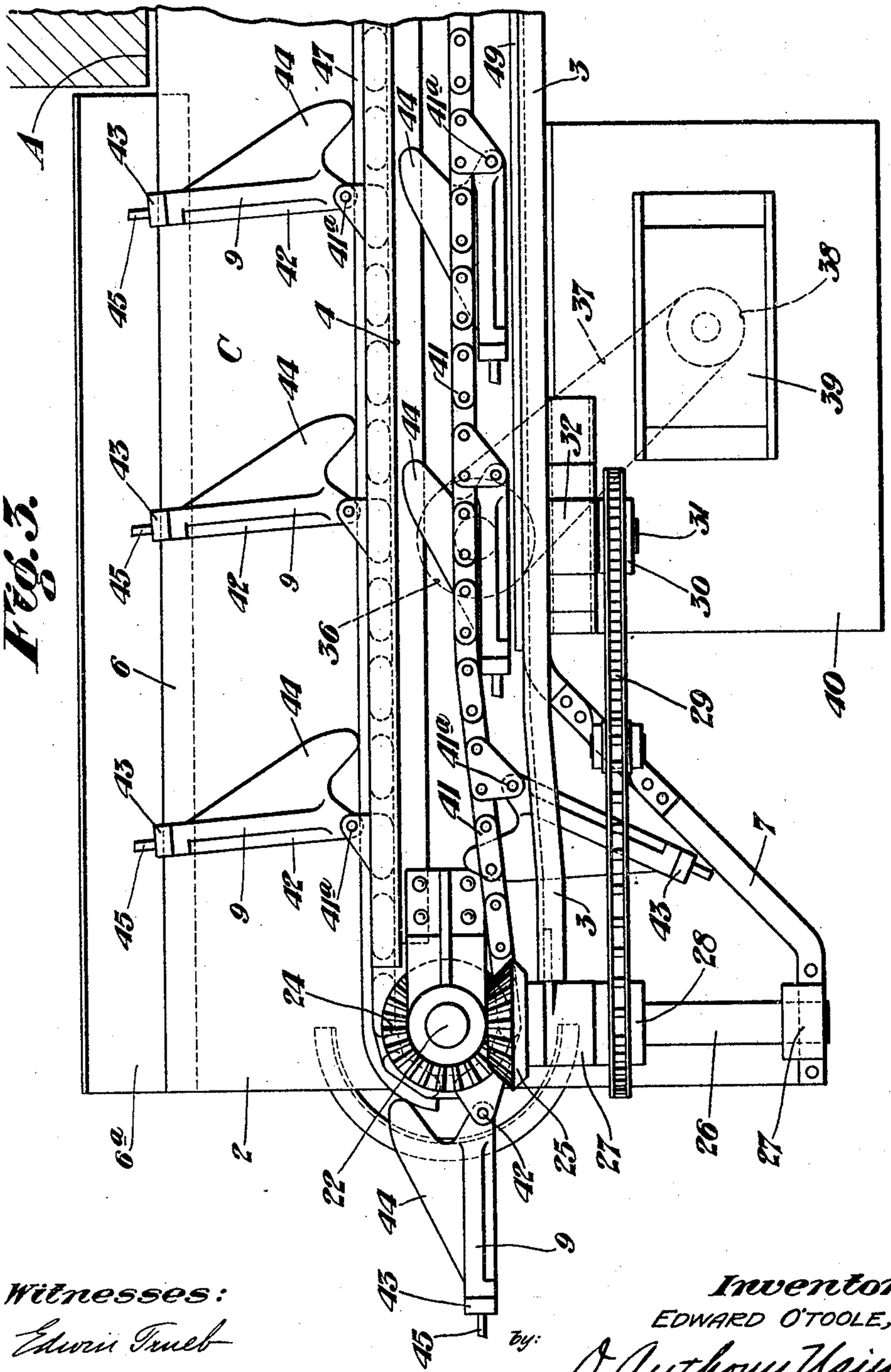
Fig. 3.



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E. O'TOOLE

MINING MACHINE

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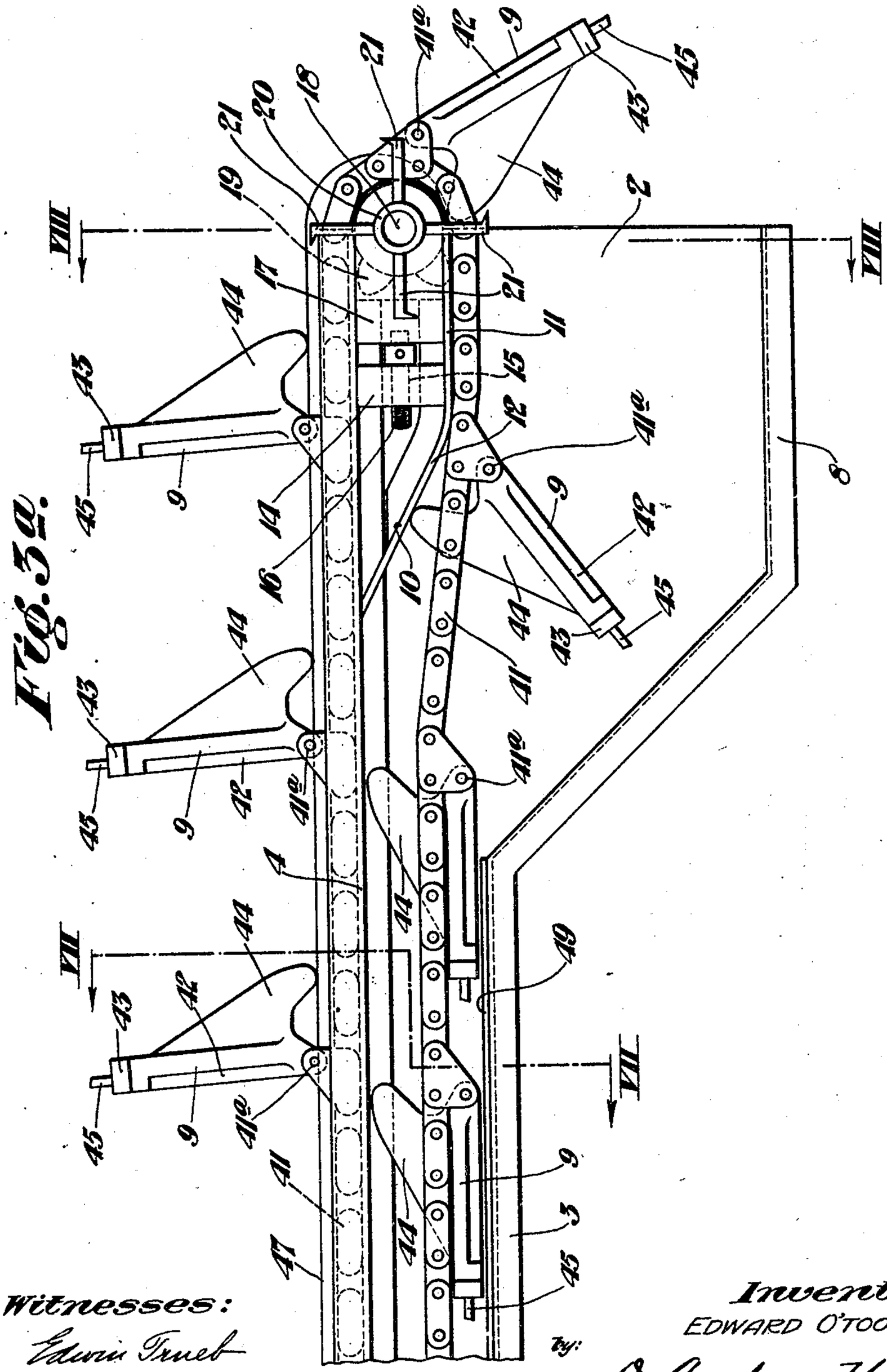
Fig. 3.



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MINING MACHINE

Filed June 14, 1926 6 Sheets-Sheet 4

Fig. 4.

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Fig. 5.

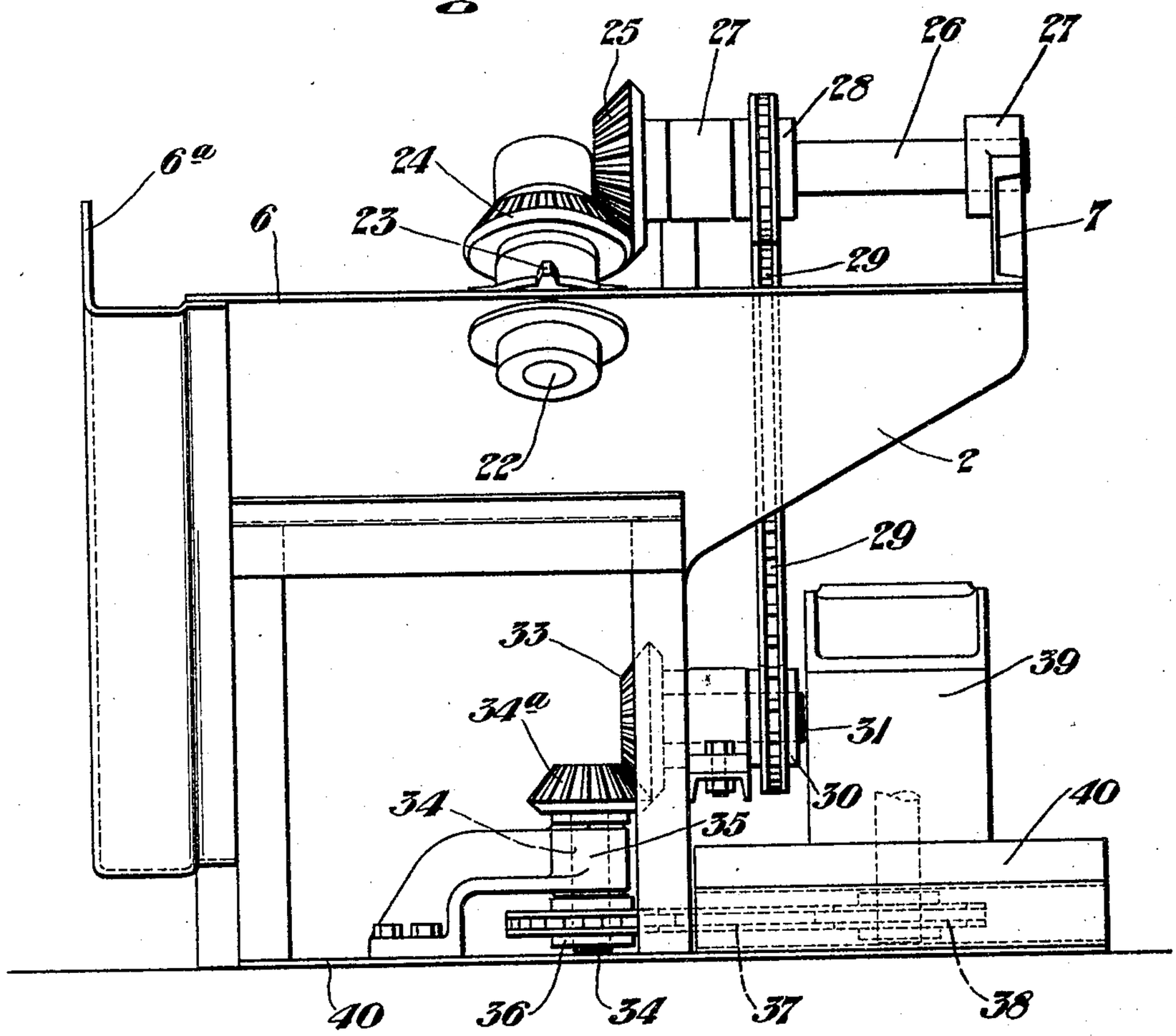
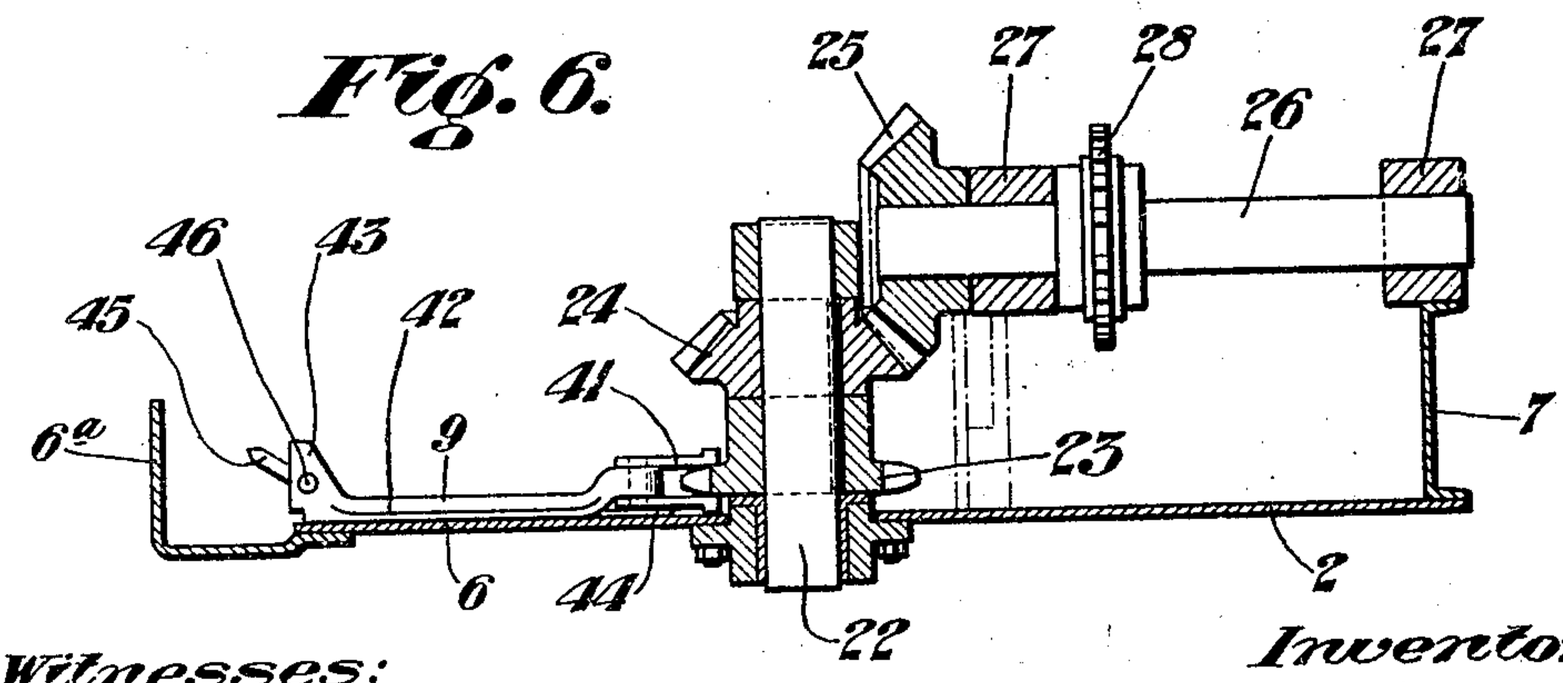


Fig. 6.



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MINING MACHINE

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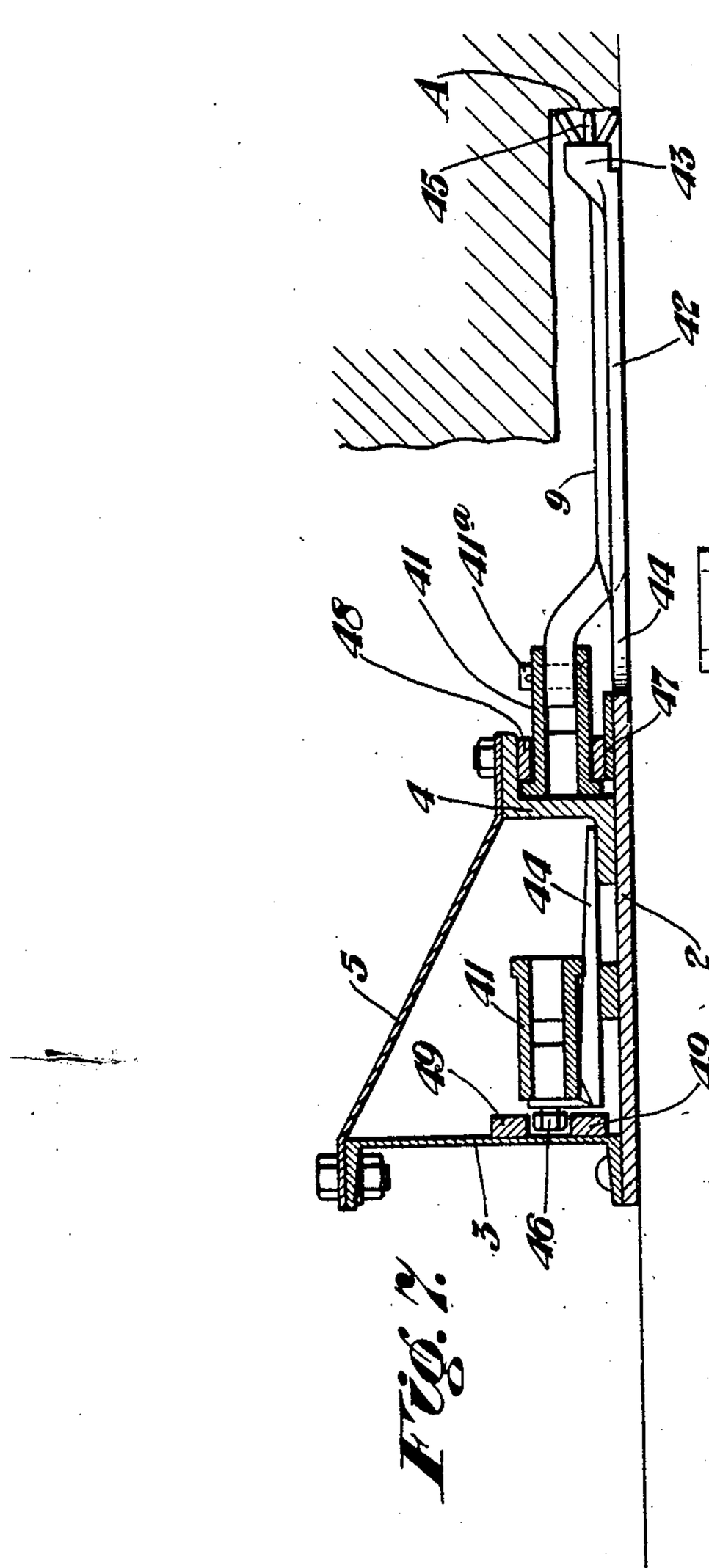

Fig. 7.

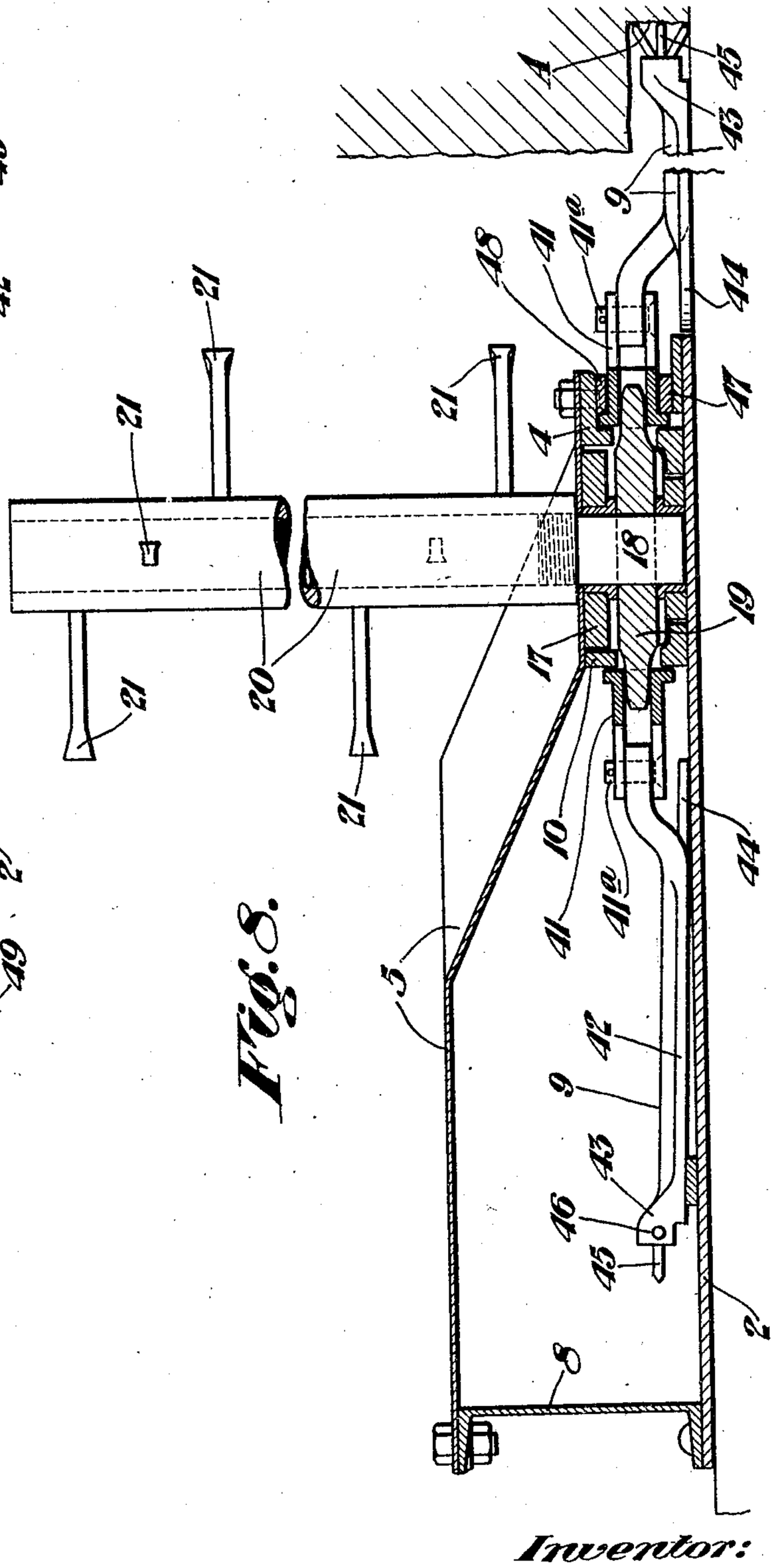

Fig. 8.

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Patented Sept. 4, 1928. 1,683,297

UNITED STATES PATENT OFFICE.

EDWARD O'TOOLE, OF GARY, WEST VIRGINIA.

MINING MACHINE.

Application filed June 14, 1926. Serial No. 115,908.

This invention relates to mining machines and, while not limited thereto, relates more particularly to longwall type mining and loading machines, and has for its object the provision of a machine of this type in which a single chain is used to undercut and convey the mined coal, thereby materially simplifying the machine construction.

Another object is to provide a machine having the novel design, construction and combination of parts hereinafter described in detail and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a plan showing the machine in operative position along a longwall face.

Figure 2 is a rear elevation of the machine positioned as in Figure 1 with the roof supporting machines removed.

Figures 3 and 3ª show an enlarged detail plan of the machine with the top or cover plate removed.

Figure 4 is a rear elevation of the head or delivery end of the machine.

Figure 5 is an end elevation of the head or delivery end of the machine.

Figure 6 is a sectional view taken on the line VI—VI of Figure 4.

Figure 7 is a sectional view taken on the line VII—VII of Figure 3ª.

Figure 8 is a sectional view taken on the line VIII—VIII of Figure 3ª.

Referring more particularly to the drawings, the letter A designates the longwall face being mined, and the letter B designates the heading along one end of the face. The letter C designates the mining and loading machine of this invention as a whole, which is positioned along and extends parallel with the coal face. A plurality of roof machines D which are self-propelling and serve to support the roof of the mine and also to push or feed the mining machine C forward into the coal face being mined are shown positioned in back of the machine C.

The roof machines D are not shown in detail since they form no part of the present invention.

The machine C is adapted to extend beyond the longwall face A into the heading B so as to deliver the mined coal into cars E of standard design.

The machine C has a main frame composed of a base plate 2, a channel beam 3 secured along the rear edge of the plate 2, a Z-beam 4 secured adjacent the forward edge of the plate 2, and a cover plate 5 secured across the top of the beams 3 and 4. The head or delivery end of the main frame of the machine C is inclined upwardly to elevate the mined coal above and into the cars E in the heading B.

The base plate 2 is projected materially beyond the Z-beam 4 along the elevated or upwardly inclined portion of the machine frame to form a conveyer plate portion 6, an upwardly projecting front wall or retaining plate 6ª is also provided along the portion 6. The base plate 2 also projects rearwardly at each end of the frame, and the beam 3 is inclined outwardly as at 7 and 8 at the head and tail ends of the frame to follow the widened base plate, to form clearance at the head end of the frame, to receive and fold the overhanging conveyer flights 9, and at the tail end to permit the flights 9 to be extended.

An angle guide-bar 10 is secured to the base plate 2 adjacent its forward end and extends parallel with and in spaced relation to the Z-beam 4 for an appreciable distance as at 11, and is inclined toward said beam as at 12.

A cross-bar 14 is secured between the angle guide-bar 10 and the Z-beam 4 and is provided with a threaded aperture 15 to receive the threaded adjusting rod 16 of a bearing block 17 which is slidably mounted in the space between the bar 10 and beam 4. A short vertical shaft 18 is journaled in the block 17 and carries a chain sprocket 19 which is keyed thereto.

The upper end of the shaft 18 is threaded and a shearing post 20 is threaded thereon. The post 20 is provided with a plurality of cutter bits 21 adapted to cut or shear the end coal face.

A shaft 22 is journaled in suitable bearings at the head end of the frame and has a chain sprocket 23 keyed thereto. A bevel gear 24 is also keyed to the shaft 22 and meshes with a gear 25 on a horizontal shaft 26 journaled in bearings 27 and having a sprocket 28 keyed thereon.

The sprocket 28 is connected by a drive chain 29 to a sprocket 30 on the short horizontal shaft 31 journaled in a bearing 32 and having a beveled gear 33 keyed thereon which is in mesh with a beveled gear 34ª on a vertical shaft 34. The shaft 34 is journaled in a bearing 35 and has a sprocket 36 keyed thereon which is connected by a

drive chain 37 to a sprocket 38 on the armature shaft of a vertical motor 39. The shafts 31 and 34 and motor 39 are all mounted or supported on a sub-frame 40 below the elevated head end of the main frame of the machine.

A combined cutting and conveying or loading chain 41 is trained around the sprockets 19 and 23. Overhanging conveyer flights 9 are pivotally secured at intervals, as at 41a, to the chain 41 and comprise a shank or bar portion 42, a tool-head portion 43 at their outer free ends and a supporting wing 44.

The tool-head portions 43 of the flights 9 are apertured to receive cutting tools 45 which are locked in position by a set-screw 46.

As the flights 9 pass around the sprocket 19 and along the front of the machine, the wing portions 44 engage the edge of the base plate and hold the flights in extended position, until they move onto the inclined portion 6 of the base plate when they will engage and ride against a guide and wear-bar or plate 47, which is secured to the top of the base plate 2. A second guide and wear-bar or plate 48 is secured to the top overhanging flange of the beam 4 and cooperates with the plate 47 to guide the chain 41 during its travel along the front of the machine.

As the flights 9 pass around the head or power sprocket 23 their outer or tool ends will engage the inclined portion 7 of the beam 3 which will force the flights 9 to move about their pivotal connection with the chain 41 so as to fold back into a position substantially parallel with the chain.

As the flights approach the tail end of the machine the wing portions 44 will engage the guide-bar 10 and thus force the flights to move about their pivotal mounting with the chain 41 into an extended position.

A pair of guide-bars 49 are secured to the inside of the channel beam 3 and are adapted to receive the head of the set-screw 46 during the return travel of the chain 41 when the flights 9 are in folded position so as to guide the flights and prevent excessive chattering.

In operation the machine C is positioned along the longwall coal face A with the roof machines D positioned along the rear of the machine C to support the roof and advance the machine C. The machine C and roof machines are then set in motion and as the chain 41 moves the flights 9 along the coal face the cutting tools 45 will undercut the coal, the tools being forced into the coal by the advance of the machine. After the undercut has progressed a sufficient distance the coal will break down due to the roof pressure and be conveyed by the flights 9 along the machine and discharged at the head end into the cars E in the heading B.

While I have shown and described one specific embodiment of my invention particularly adapted for use in mining coal on the longwall system, it will be understood that I do not wish to be limited to the specific construction shown nor to the specific use described, since various modifications may be made and the machine may be used to mine other substances than coal, and may be used in carrying out various systems of mining, all without departing from the scope of my invention as defined in the appended claim.

I claim:

A longwall combined mining and loading machine comprising an elongated main frame composed of a base plate, rear and front beam members secured along the longitudinal edges of said base plate for the major part of the length of said frame, a link chain trained over sprockets at each end of said frame and adapted to travel longitudinally thereof, conveyor flights having their rear ends on a materially higher plane than their body portion and said rear ends being pivotally secured to said chain, said conveyer flights having the forward ends of their body portions projecting beyond the forward edge of said machine frame and overlying the floor of the mine, cutter bits removably mounted in the forward free ends of said conveyer flights, and an integral supporting wing on the body portion of each of said conveyer flights adapted to engage the forward edge of said base plate to support said flights in extended position during their cutting and conveying operation and to underlie said chain on the return travel of said chain.

In testimony whereof, I have hereunto set my hand.

EDWARD O'TOOLE.