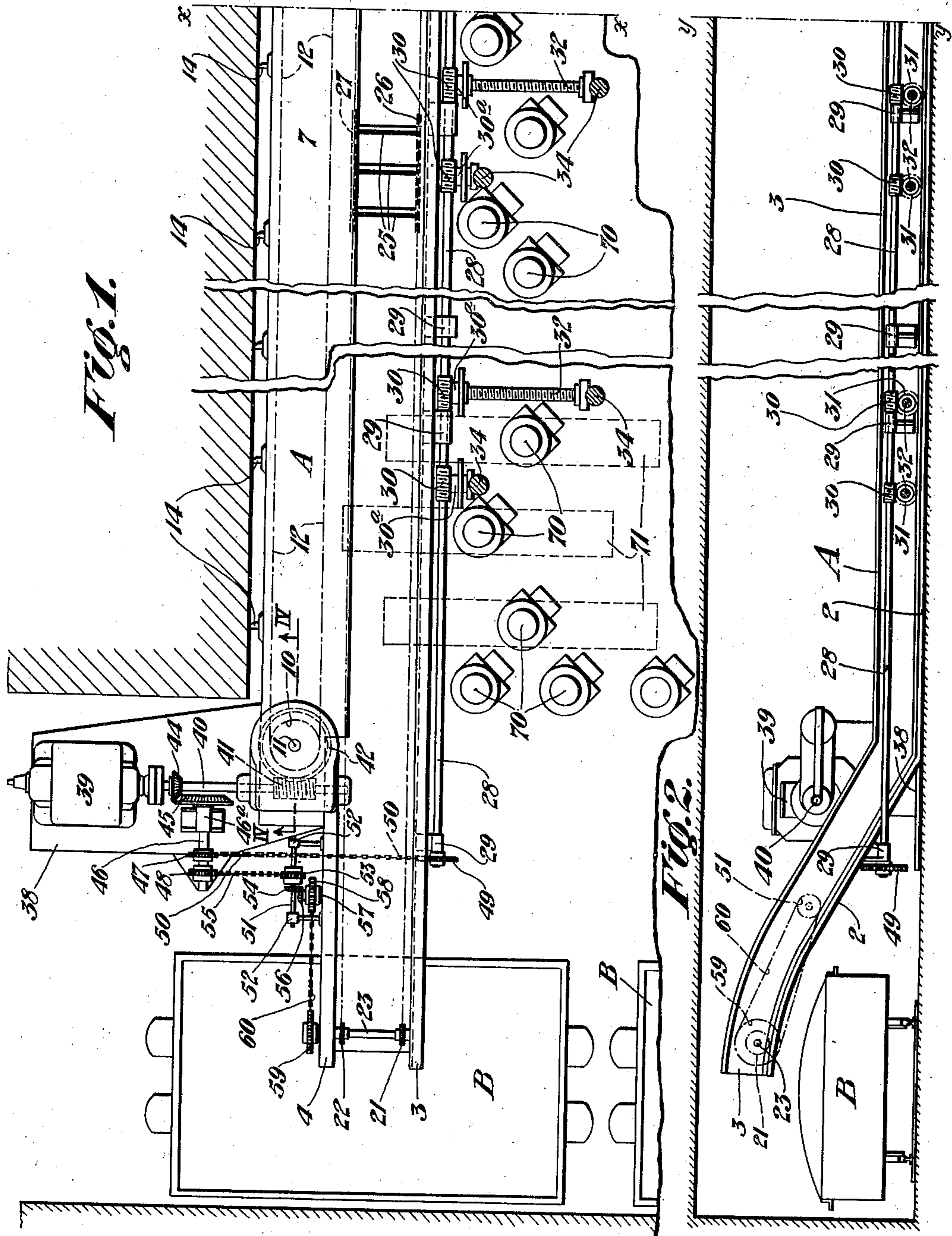


April 21, 1925.

1,534,461

E. O'TOOLE
MINING MACHINE

Original Filed Feb. 20, 1923 5 Sheets-Sheet 1



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MINING MACHINE

Original Filed Feb. 20, 1923

5 Sheets-Sheet 2

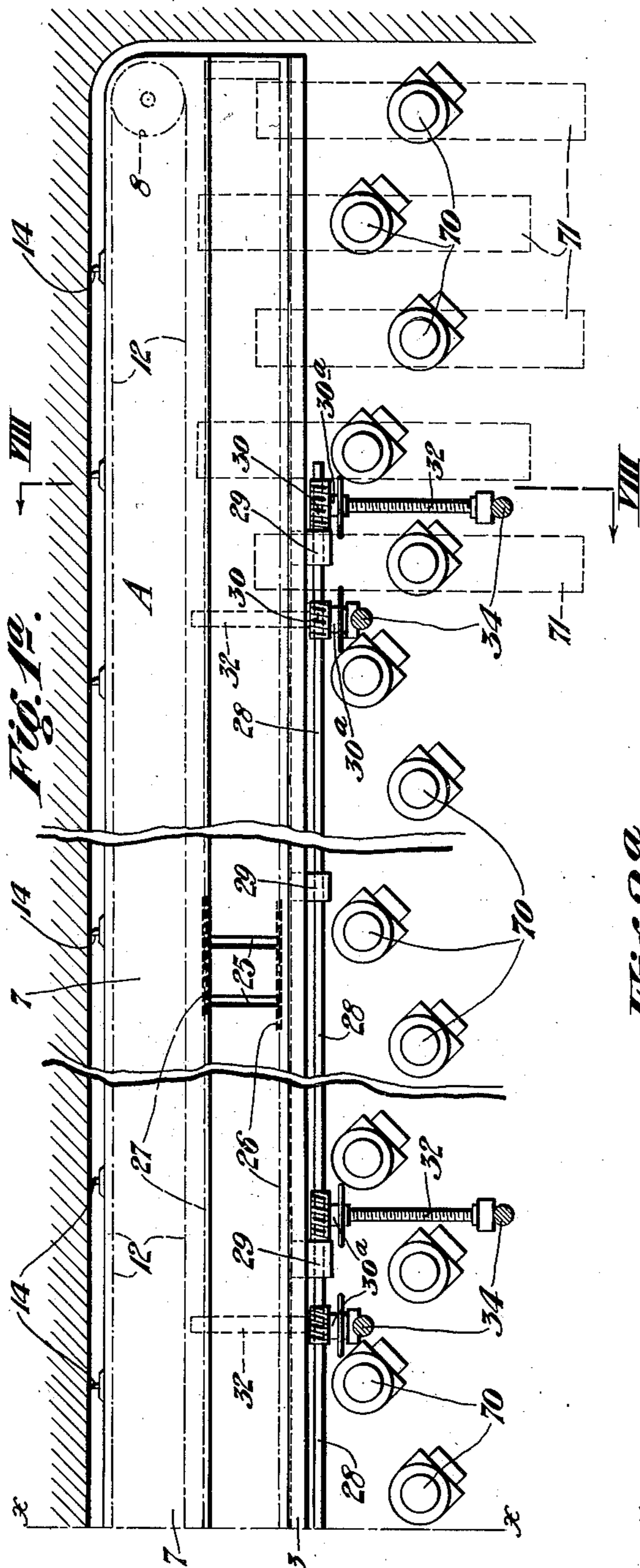
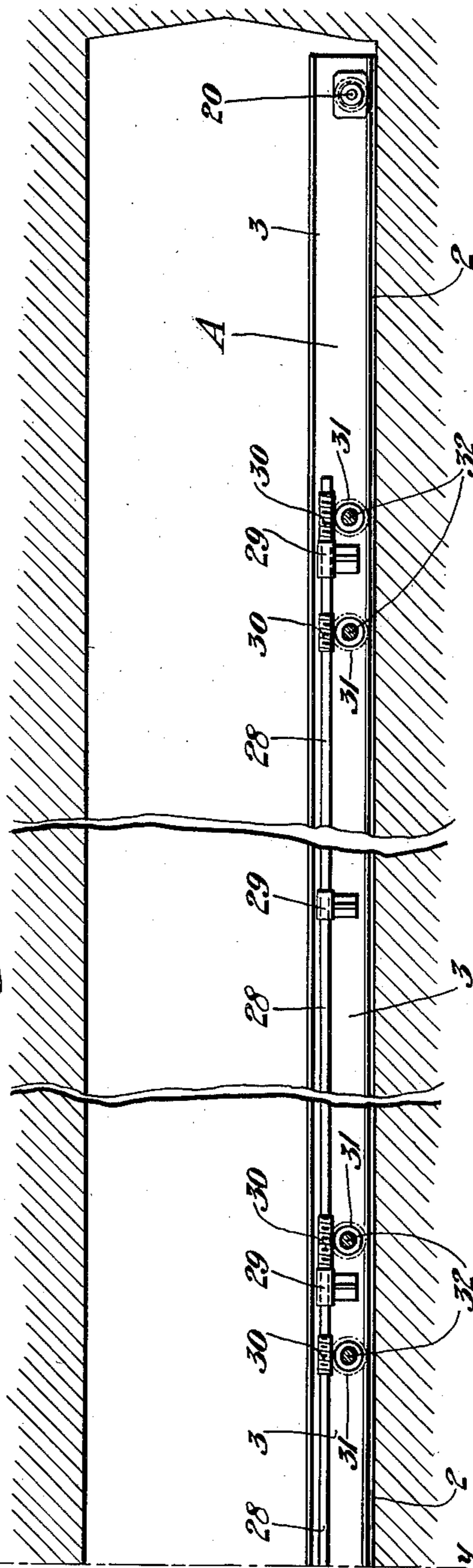


Fig. 19.

Fig. 20



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E. O'TOOLE
MINING MACHINE

Original Filed Feb. 20, 1923 5 Sheets-Sheet 3

Fig. 3.

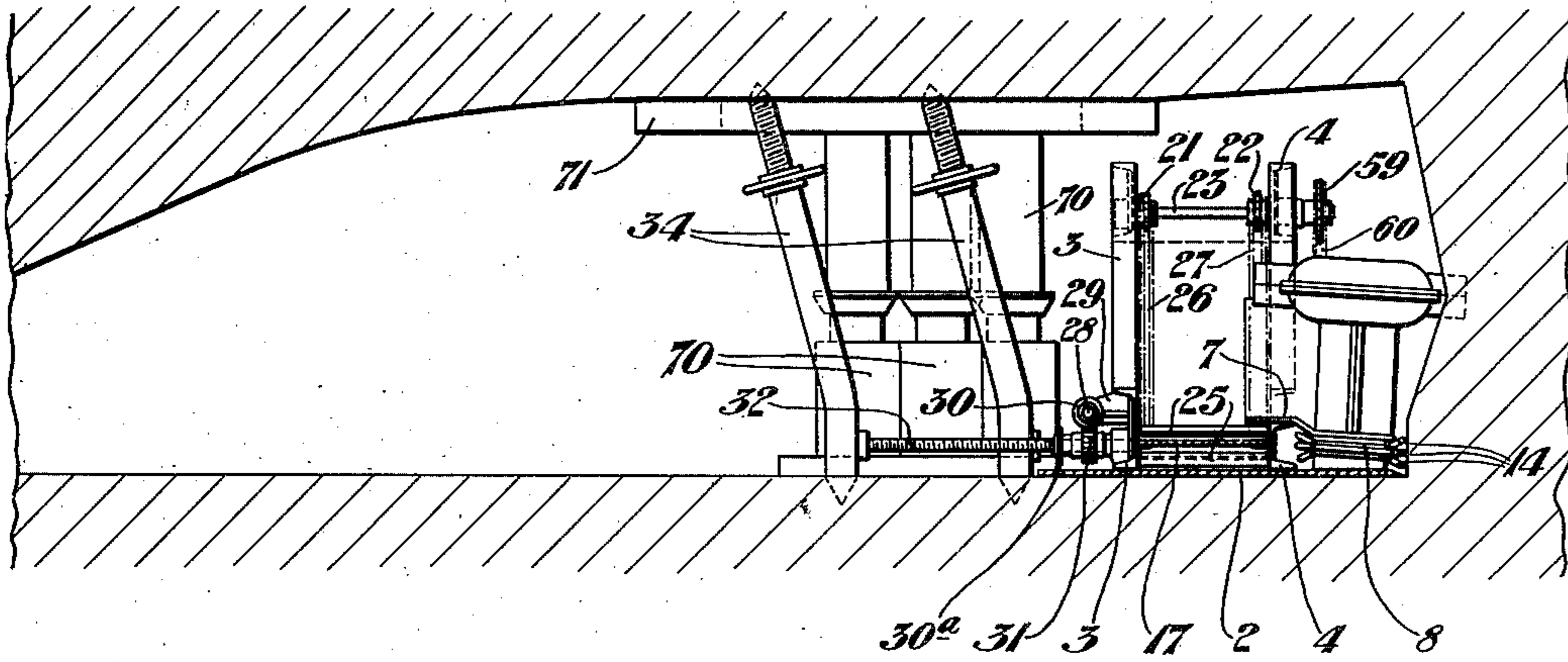
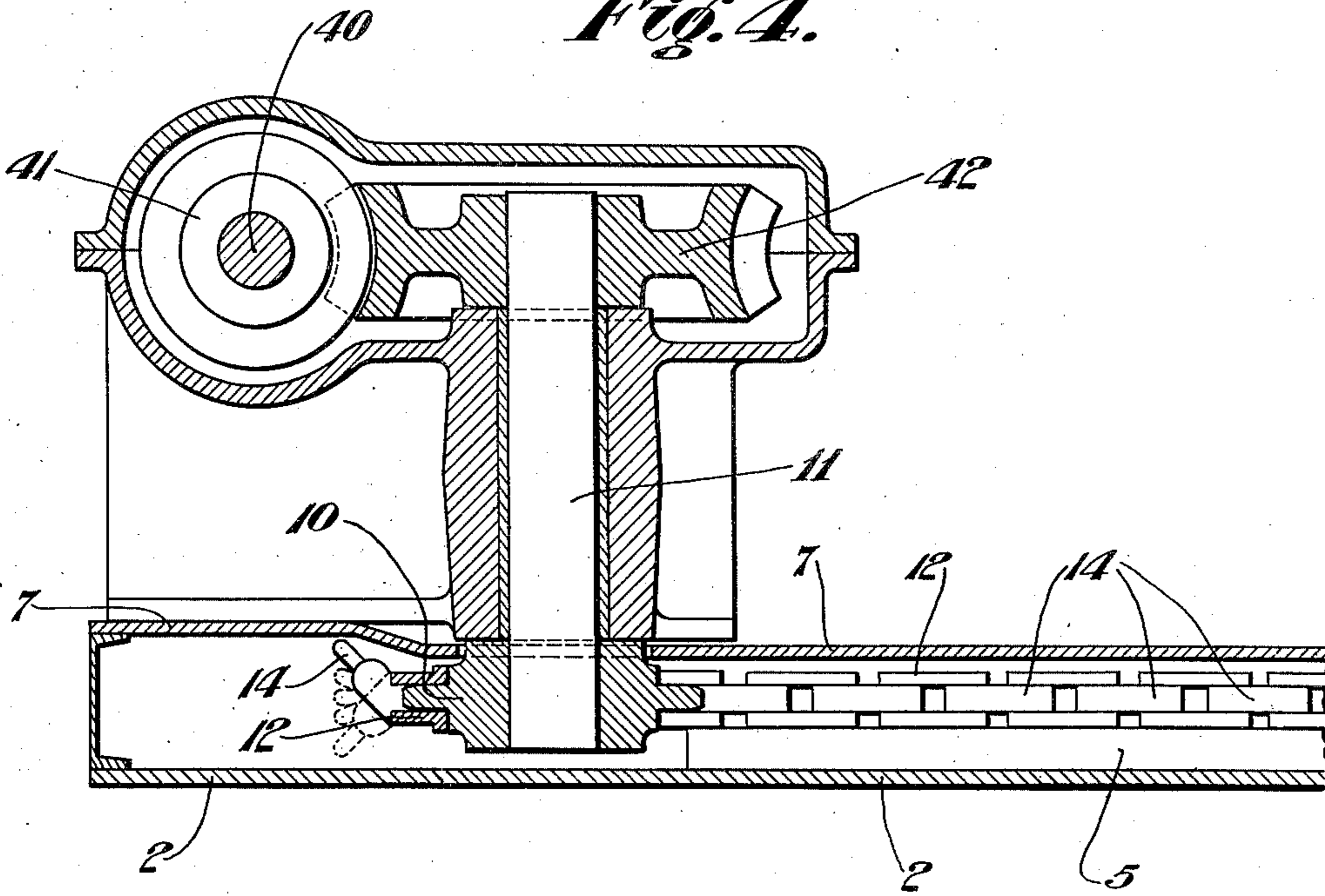


Fig. 4.



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MINING MACHINE

Original Filed Feb. 20, 1923

5 Sheets-Sheet 4

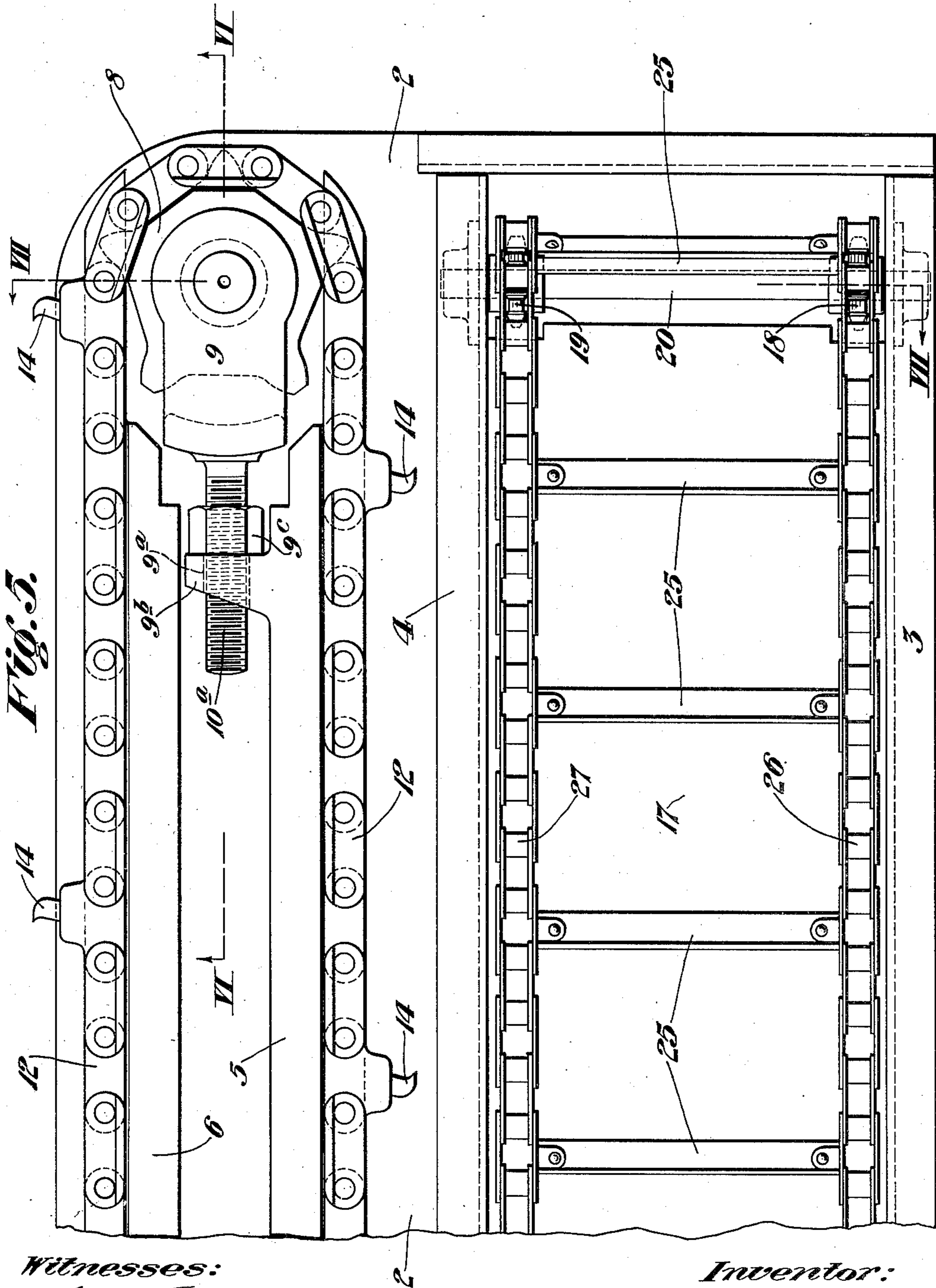


FIG. 5.

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MINING MACHINE

Original Filed Feb. 20, 1923

5 Sheets-Sheet 5

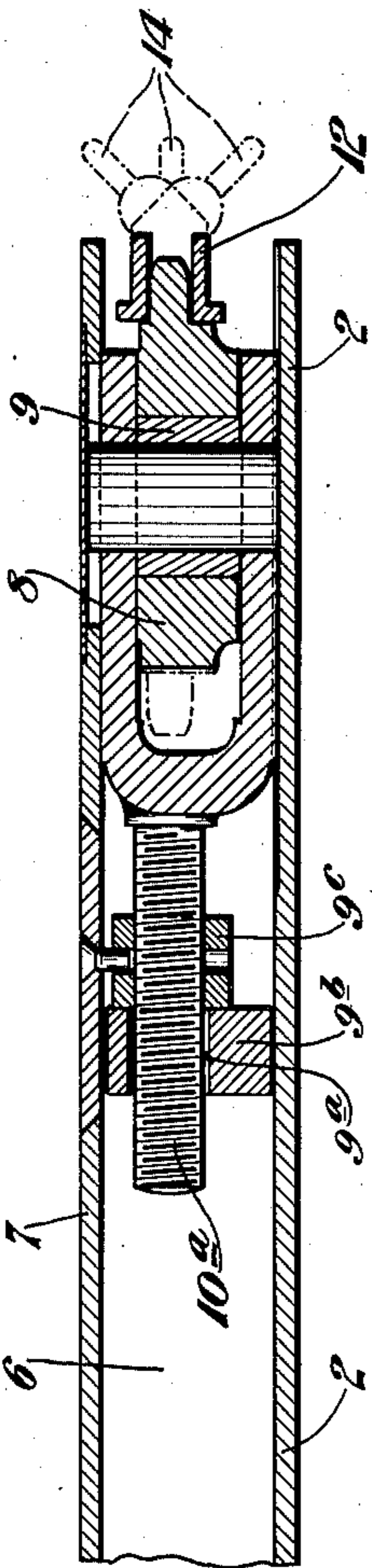


FIG. 6.

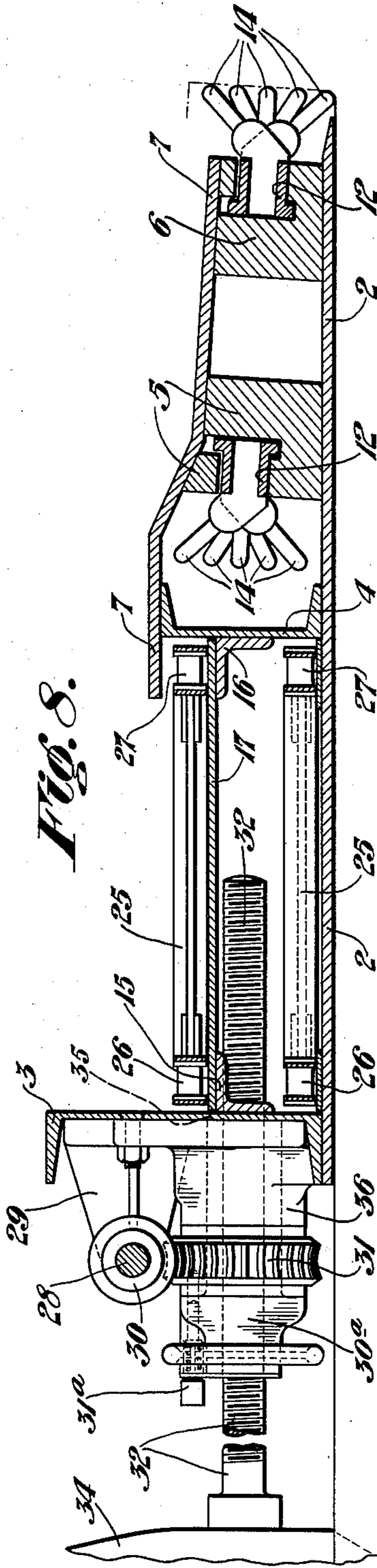


FIG. 8.

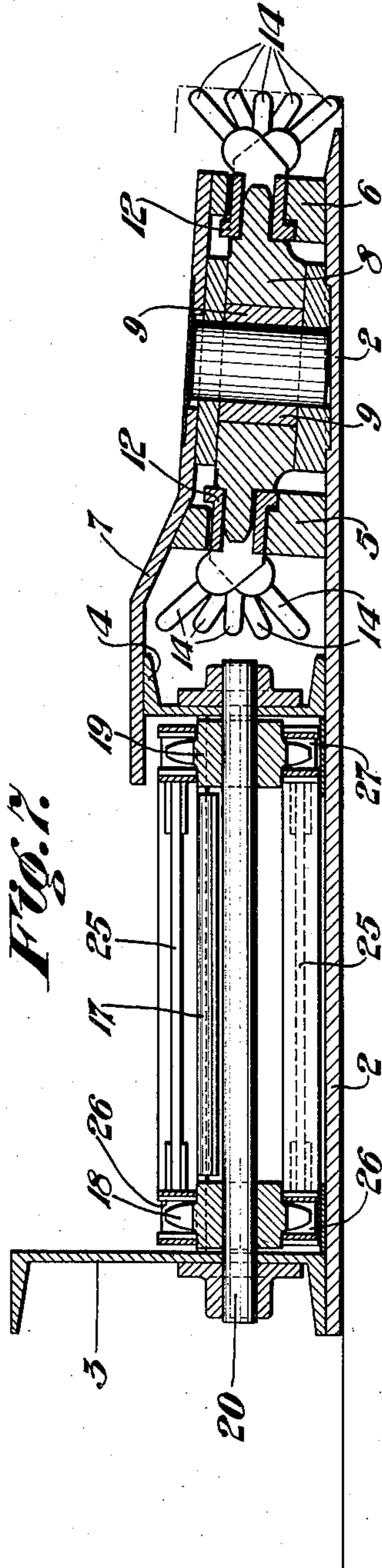


FIG. 7.

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UNITED STATES PATENT OFFICE.

EDWARD O'TOOLE, OF GARY, WEST VIRGINIA.

MINING MACHINE.

Application filed February 20, 1923, Serial No. 620,246. Renewed October 8, 1924.

To all whom it may concern:

Be it known that I, EDWARD O'TOOLE, a citizen of the United States, and resident of Gary, in the county of McDowell and State of West Virginia, have invented certain new and useful Improvements in Mining Machines, of which the following is a specification.

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 one of its objects the provision of a machine of this type that will both mine and load the mined material, with a minimum of labor.

Another object of this invention is the provision of a machine of this type that will be capable of producing more mined material in a given time and at a less cost than the machines of the prior art.

A further object of this invention is to provide a machine of the type described having the novel construction, design, and combination of parts described in the following specification and illustrated in the accompanying drawings.

In the drawings, Figure 1 is a partial top plan of the machine in working position.

Figure 1^a is a continuation of the plan of Figure 1 from the line X—X.

Figure 2 is a partial rear elevation of the machine.

Figure 2^a is a continuation of the elevation of Figure 2 from the line Y—Y.

Figure 3 is an end elevation of the machine.

Figure 4 is an enlarged detail sectional elevation on the line IV—IV of Figure 1 showing the cutting chain drive gears.

Figure 5 is an enlarged plan of the butt end of the machine with housing and other enclosing parts removed for clearness.

Figure 6 is a sectional elevation on the line VI—VI of Figure 5.

Figure 7 is a sectional elevation on the line VII—VII of Figure 5.

Figure 8 is an enlarged sectional elevation on the line VIII—VIII of Figure 1^a.

Referring more particularly to the drawings, the letter A designates the frame of the machine as a whole, which is composed of a base or bottom plate 2, rear and front

channel members 3 and 4, respectively, cutter chain guides 5 and 6, and housing or cover plate 7.

A cutter chain idler sprocket 8 is mounted on a forwardly inclined bearing 9 slidably mounted between the base plate 2 and cover plate 7 at the butt end of the machine. The bearing 9 is provided with a screw threaded adjusting arm 10^a which extends through an aperture 9^a in a transverse supporting bar 9^b and is locked in position by a nut 9^c. A cutter chain drive sprocket 10 is mounted on a drive shaft 11 adjacent the delivery end of the machine and is inclined forwardly in the same plane as the sprocket 8.

A cutter chain 12 having the usual cutting bits 14 is trained over the sprockets 8 and 10 and serves to cut a kerf in the material being mined.

Angle brackets 15 and 16 are secured to the rear and front channel members 3 and 4, respectively, and serve as a support for a conveyer plate 17.

A pair of idler sprockets 18 and 19 are mounted on a shaft 20 journaled in the channel members 3 and 4 adjacent the butt end of the machine, and a pair of drive sprockets 21 and 22 are mounted on a shaft 23 journaled in the channel members 3 and 4 at the delivery end of the machines. The channel frame members 3 and 4 are inclined upwardly on an angle and extend beyond the main body of the machine for a short distance at the delivery end of the machine to provide for delivery of the material into the cars B or other conveying devices.

A flight conveyer composed of T-shaped flight members 25 secured to conveyer chain members 26 and 27 is trained over the sprockets 18—19 and 21—22 so that it rides on the upper side of the conveyer plate 17 and serves to pull or convey the mined material along said plate.

A drive shaft 28 is journaled in bearings 29 mounted on the base 2 along the rear side of the machine, and carries a plurality of worm gears 30 adapted to mesh with worm wheels 31 freely movable on feed-in or advancing bars 32. The worm gears 30 and feed-in bars 32 are arranged in pairs so that one bar may be advancing while the other bar is being moved in a forward posi-

tion. The bars 32 are screw threaded and are provided with nuts 30^a adapted to be locked to the worm wheels 31 by locking pins 31^a. The bars 32 are adapted to have their rear ends engaged against suitable removable jacks or posts 34 mounted between the roof and bottom of the mine and their forward ends projected through suitable openings or apertures 35 in the rear channel member 3.

The worm wheels 31 on the bars 32 bear against suitable bearing collars 36 around the apertures 35. The operation of these feed-in or advancing bars is as follows— one bar of each pair is positioned against one of the jacks 34 and its nut 30^a is locked to the worm wheel 31 thereon. The shaft 28 is then rotated and feeds the worm wheels and nuts along the bars thus forcing the machine forward. As the nuts approach the forward end of the bars 32 a second series of posts or jacks 34 are positioned and the second bar of each pair is arranged as described for the first series. As these second named bars begin to feed, the first bars are removed and made ready to reposition in advance of the second set of bars.

The main frame of the machine is provided with a motor base 38 on which is mounted the single drive motor 39 for the machine. The motor 39 is coupled to a counter-shaft 40 which carries a worm gear 41 meshed with a worm wheel 42 secured on the upper end of and adapted to drive the sprocket shaft 11 of the cutter chain drive.

The shaft 40 is provided intermediate its ends with a beveled gear 44 in mesh with a beveled gear 45 on a stub shaft 46 journaled in bearings 46^a on the base 38. The shaft 46 is provided with drive sprockets 47 and 48. The sprocket 47 is in line with a sprocket 49 on the drive shaft 28 and a sprocket drive chain 50 is trained over the sprockets 47 and 49 to drive the shaft 28. A stub shaft 51 is journaled in bearing 52 on the base 38 and is provided on one end with a sprocket 53 and the other end with a beveled gear 54. A sprocket chain 55 is trained over the sprocket 48 on the shaft 46 and sprocket 53 on shaft 51 so as to drive the shaft 51 and gear 54.

The gear 54 is in mesh with a second beveled gear 56 on a stub shaft 57 journaled in the forward channel member of the frame. The shaft 57 carries a sprocket 58 which is in line with a drive sprocket 59 on the conveyer drive shaft 23 and a sprocket chain 60 is trained over the sprockets 58 and 59 so that the conveyer is also driven from the motor 39.

In operation the motor 39 is started and the cutter chain is driven through its drive sprocket 10 by the shaft 40, worm 41, worm wheel 42 and shaft 11. Simultaneous with the operation of the cutter chain the feed-in

bars are operated by shaft 28 which shaft receives its power from the motor 39 through shaft 40, gears 44, 45, shaft 46, sprockets 47 and 49 and sprocket chain 50. Also simultaneous with the above operations the conveyer is operated from the motor 39 through shaft 40, gears 44, 45, sprocket 48, chain 55, sprocket 53, shaft 51, gears 54, 56, shaft 57, sprocket 58, chain 60 and sprocket 59.

As the machine cuts under the coal, the machine is fed forward into the kerf formed by the cutting chain, and the coal breaks down onto the housing plate 7 and is pushed onto the conveyer portion of the machine.

In Figures 1, 1^a and 3 I have shown a plurality of hydraulic jack members 70 arranged in two rows to the rear of the machine, the jacks of one row being in staggered relation to the jacks of the other row. The jacks 70 serve to support cap pieces 71 against the roof to support the same. As the machine advances the jacks in the rearmost row are loosened and advanced to a position forward of the front row, and so on as the machine progresses. As the jacks 70 and cap pieces 71 are advanced a gob forms immediately behind the supports. By forming the gob immediately behind the supports and in such close proximity to the machine the shearing forces on the undercut coal are sufficient to break down the coal on the machine as it is undercut.

It will be understood that various changes in design and construction of details may be made without departing from the scope of my invention as defined in the appended claims.

I claim:—

1. A mining machine comprising in combination a frame, a cutter chain having cutter bits thereon mounted on said frame and movable longitudinally thereof adapted to undercut and form a kerf in the material to be mined, a housing over said cutter chain, said housing having its forward edge below the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bits, a conveyer mounted to the rear of and extending parallel with said cutter chain, means for simultaneously driving said cutter chain and said conveyer, and means for advancing said machine into the material being mined.

2. A mining machine comprising in combination a frame, a cutter chain having cutter bits thereon mounted on said frame and movable longitudinally thereof adapted to undercut and form a kerf in the material to be mined, a housing over said cutter chain, said housing having its forward edge below

the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bit, a conveyer mounted to the rear of and extending parallel with said cutter chain, means for advancing said machine into the material being mined, and power means for simultaneously operating said cutter chain conveyer and feeding means.

3. A mining machine comprising in combination a frame, a cutter chain having cutter bits thereon mounted on said frame and movable longitudinally thereof adapted to undercut and form a kerf in the material to be mined, an inclined housing over said cutter chain, said housing having its forward edge below the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bits, a conveyer mounted to the rear of and extending parallel with said cutter chain adapted to receive the material mined from said housing and to convey it longitudinally of said machine, a plurality of screw advancing bars adapted to engage the rear side of said machine frame and a support in the mine for advancing said machine into the material being mined, and power means carried by said machine for operating said cutter chain, conveyer, and advancing bars.

4. A mining machine comprising in combination a frame, a cutter chain having cutter bits thereon mounted on said frame and movable longitudinally thereof adapted to undercut and form a kerf in the material to be mined, an inclined housing over said cutter chain, said housing having its forward edge below the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bits, a conveyer mounted to the rear of and extending parallel with said cutter chain adapted to receive the material mined from said housing and to convey it longitudinally of said machine, a plurality of screw advancing bars adapted to engage the rear side of said machine frame and a support in the mine for advancing said machine into the material being mined, and a single power means carried by said machine for simultaneously operating said cutter chain, conveyer and advancing bars.

5. A mining machine comprising in combination a frame, a cutter chain having cutter bits thereon mounted on said frame and movable longitudinally thereof adapted to undercut and form a kerf in the material to be mined, a housing over said cutter chain

said housing having its forward edge below the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bits, a conveyer mounted to the rear of and extending parallel with said cutter chain adapted to receive the material mined from said housing and to convey it longitudinally of said machine, a plurality of screw advancing bars adapted to engage the rear side of said machine frame and a support in the mine for advancing said machine into the material being mined, worm nuts on each of said advancing bars, a worm shaft journaled on said frame, worms mounted on said shaft and meshing with said worm nuts on said bars, and a single power means carried by said machine for simultaneously operating said cutter chain, conveyer and worm shaft, whereby material is continuously mined and conveyed and the machine is bodily advanced into the material being mined.

6. A mining machine comprising in combination a frame, a cutter chain having a plurality of cutter bits thereon mounted on said frame and movable longitudinally thereof and adapted to undercut and form a kerf in the material to be mined, a housing over said cutter chain, said housing having its forward edge below the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bits, a conveyer mounted to the rear of and extending parallel with said cutter chain adapted to receive the material mined from said housing and to convey it longitudinally of said machine, said conveyer having its delivery end inclined upwardly so as to deliver the mined material directly into cars, means for advancing said machine into the material being mined, and a single power means for simultaneously operating said cutter chain, conveyer and feeding means.

7. A mining machine comprising in combination a frame, a cutter chain having a plurality of cutter bits thereon mounted on said frame and movable longitudinally thereof and adapted to undercut and form a kerf in the material to be mined, a housing over said cutter chain, said housing having its forward edge below the upper ends of the uppermost cutter bits in the forward or material engaging portion of said cutter chain so as to permit the entrance of the forward portion of said machine into the kerf formed by said cutter bits, a conveyer mounted to the rear of and extending parallel with said cutter chain adapted to receive the material mined from said housing and to convey it

longitudinally of said machine, said conveyer having its delivery end inclined upwardly so as to deliver the mined material directly into cars, a plurality of screw advancing bars adapted to engage the rear side of said machine frame and a support in the mine for advancing the said machine into the material being mined, and a single power means carried by said machine for simultaneously operating said cutter chain, conveyer, and advancing bars. ¹⁰

In testimony whereof I have hereunto set my hand.

EDWARD O'TOOLE.