J. M. LONDON.

COAL MINING AND LOADING MACHINE.

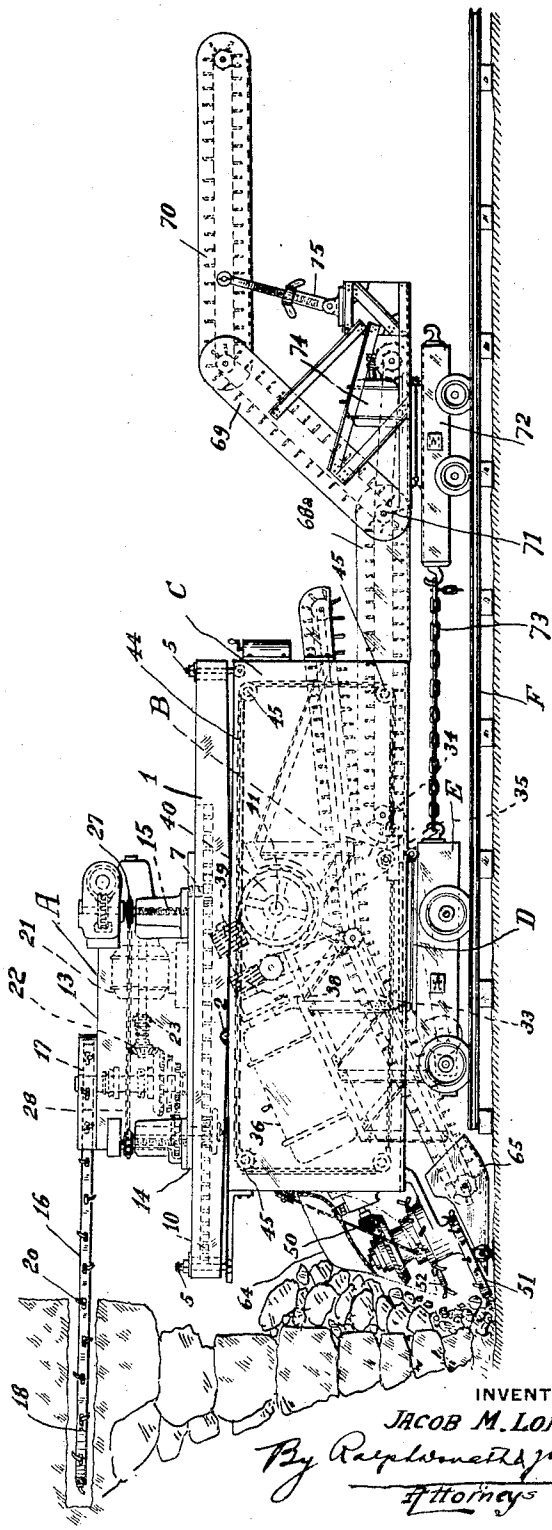
APPLICATION FILED JULY 25, 1917.

1,327,052.

Patented Jan. 6, 1920.

8 SHEETS—SHEET 1.

Fig. 1



INVENTOR

JACOB M. LONDON

By Ralph Lonnell & Snyder

Attorneys

J. M. LONDON.

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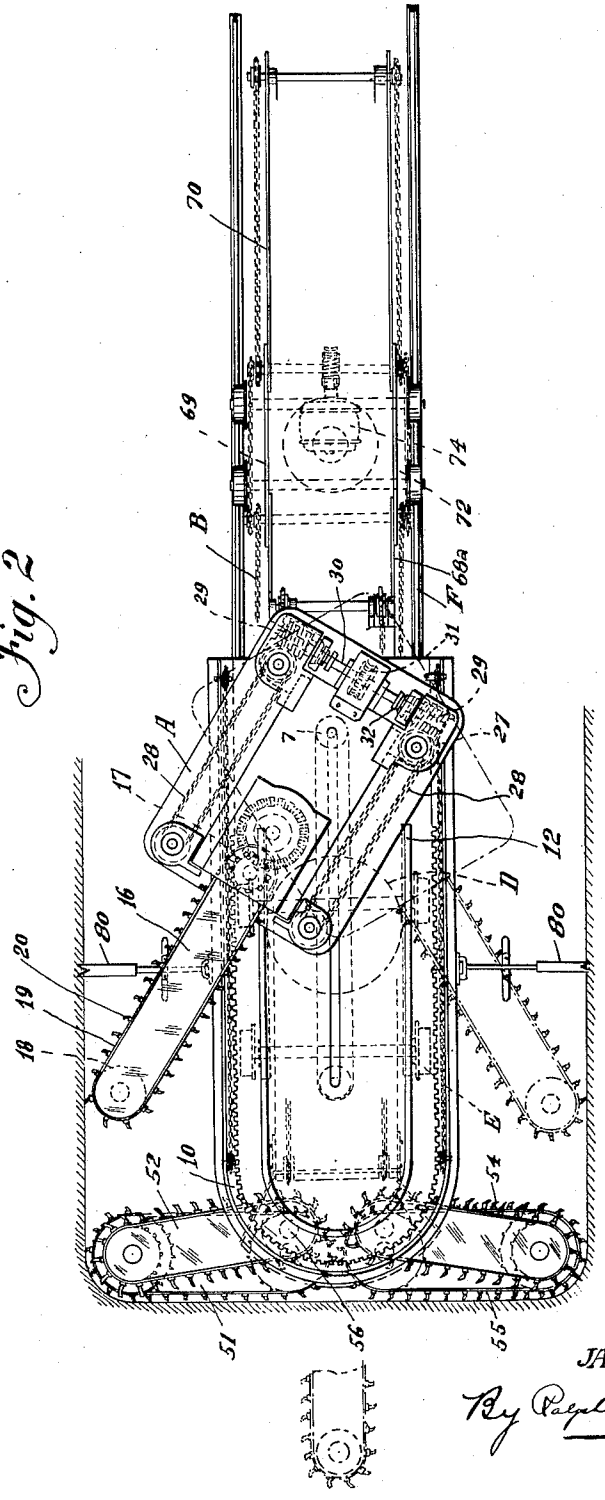
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8 SHEETS—SHEET 2.

Fig. 2



INVENTOR

JACOB M. LONDON

By Paul Winath & J. R. Snyder

Attorneys.

J. M. LONDON.

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8 SHEETS—SHEET 3.

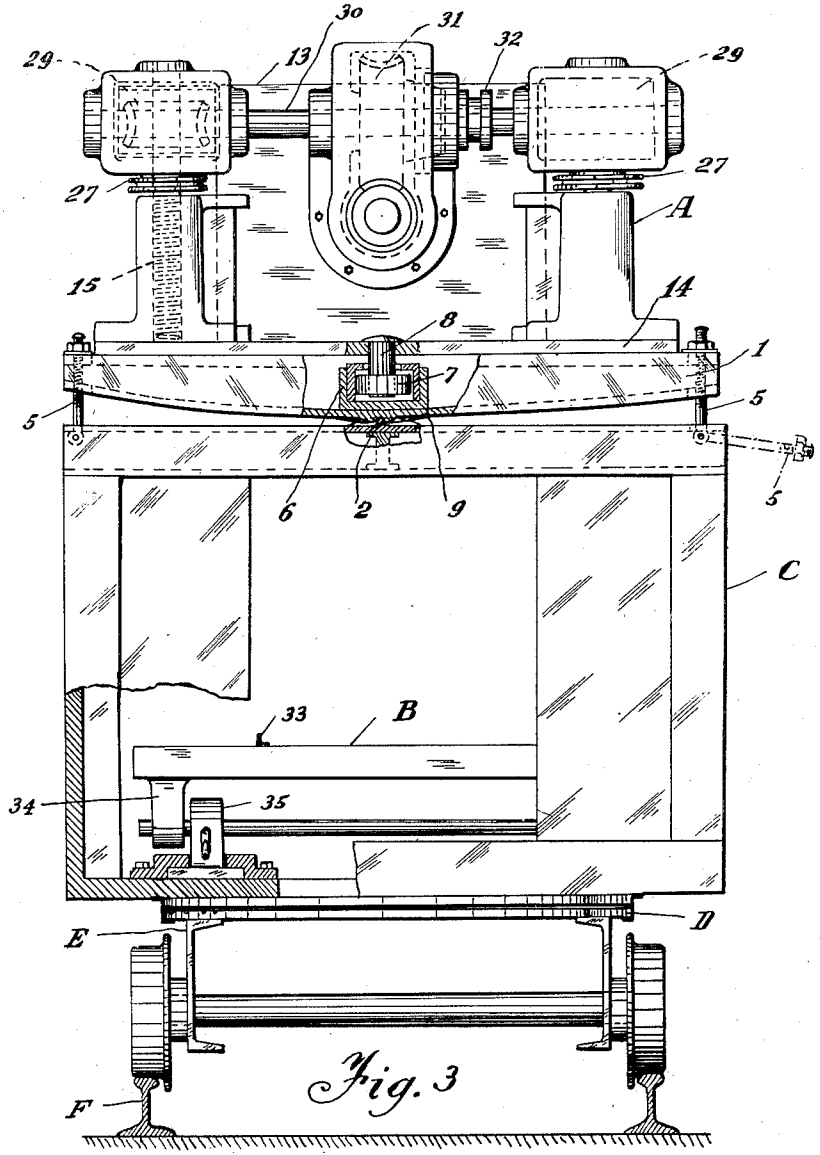


Fig. 3

Fig. 5

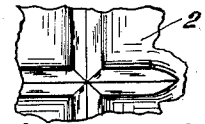
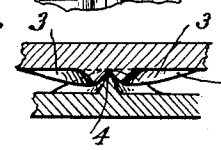


Fig. 6



INVENTOR

JACOB M. LONDON

By Popejoy Smith & Pomeroy

Attorneys

J. M. LONDON.

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8 SHEETS—SHEET 4.

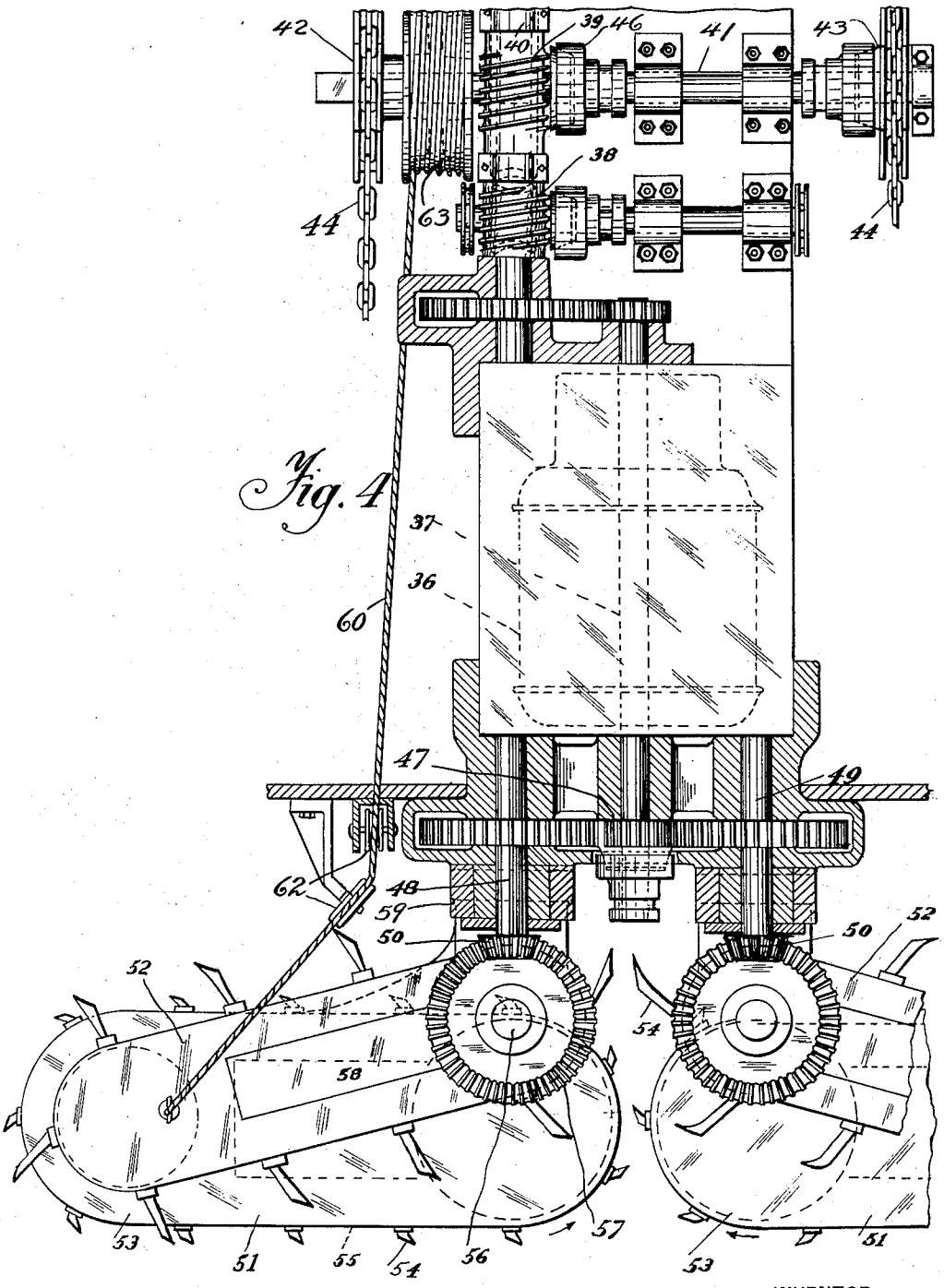


Fig. 4

INVENTOR

JACOB M. LONDON

By Paul Howatt & J. R. Snyder

Attorneys

J. M. LONDON.

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8 SHEETS—SHEET 5.

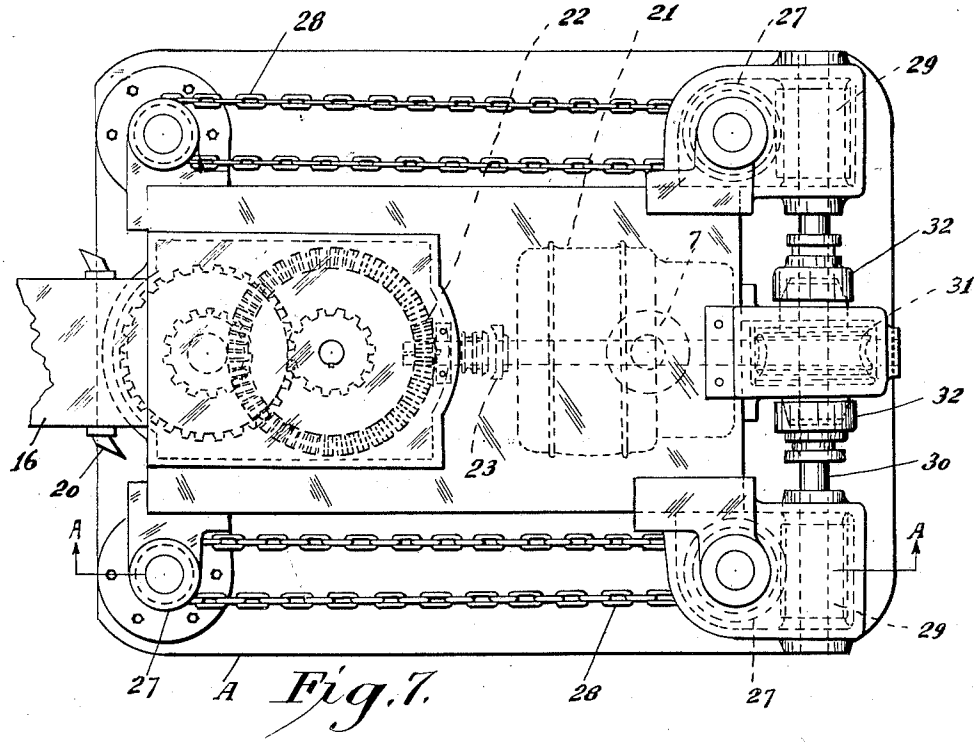
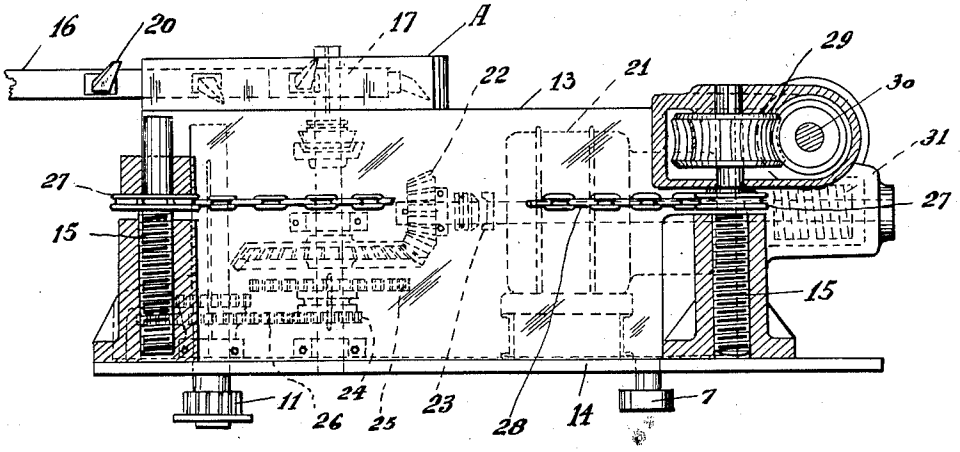


Fig. 7.

Fig. 8



INVENTOR

JACOB M. LONDON

By Paul Smith & J. R. Snyder

Attorneys

J. M. LONDON.

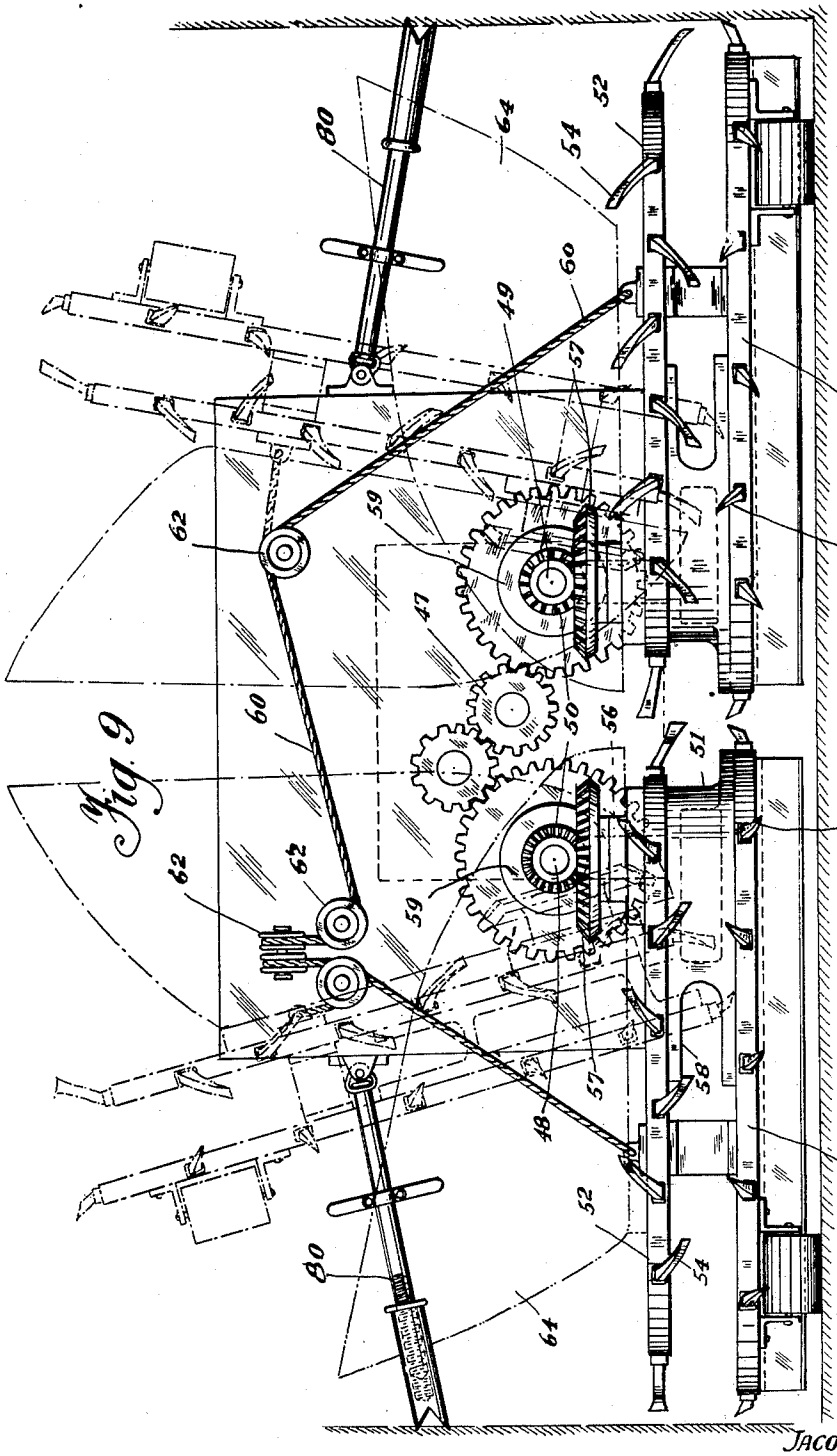
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1,327,052.

Patented Jan. 6, 1920.

8 SHEETS—SHEET 6.



INVENTOR:

JACOB M. LONDON

By Ralph Wyatt & J. P. Snyder

Attorneys

J. M. LONDON.

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1,327,052.

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8 SHEETS—SHEET 7.

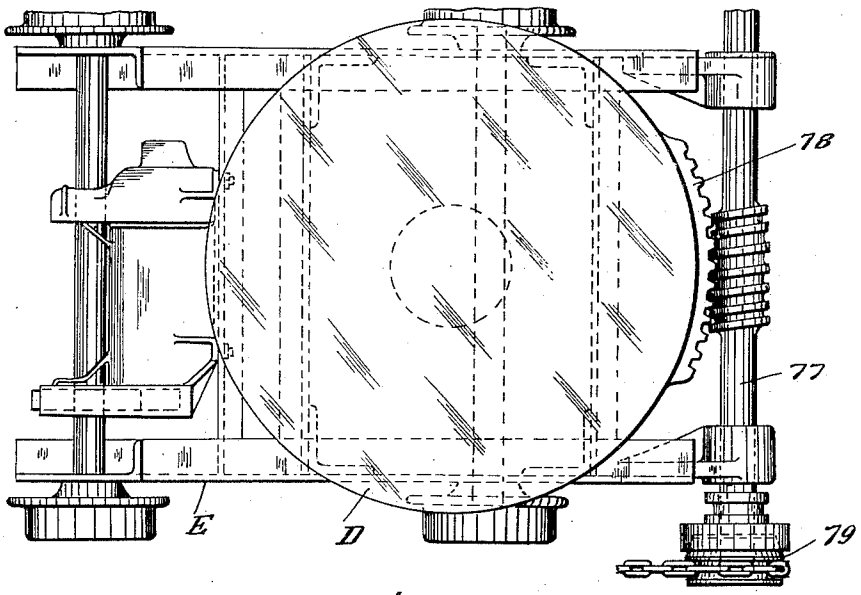
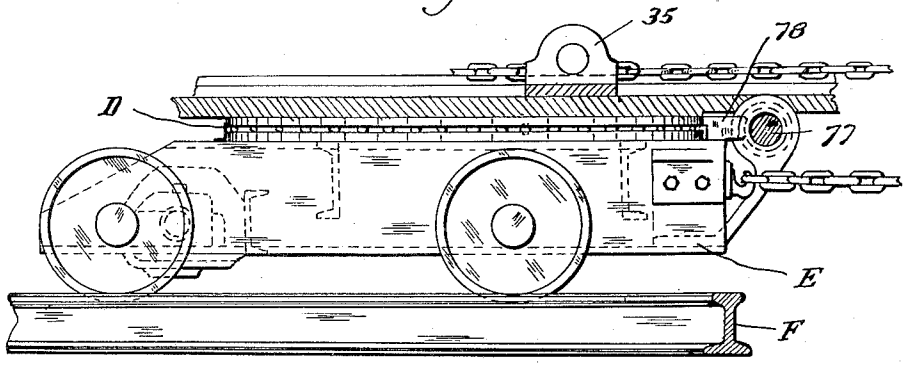


Fig. 10.

Fig. 11



INVENTOR

JACOB M. LONDON

By Raymond & Snyder

Attorneys

J. M. LONDON.

COAL MINING AND LOADING MACHINE.

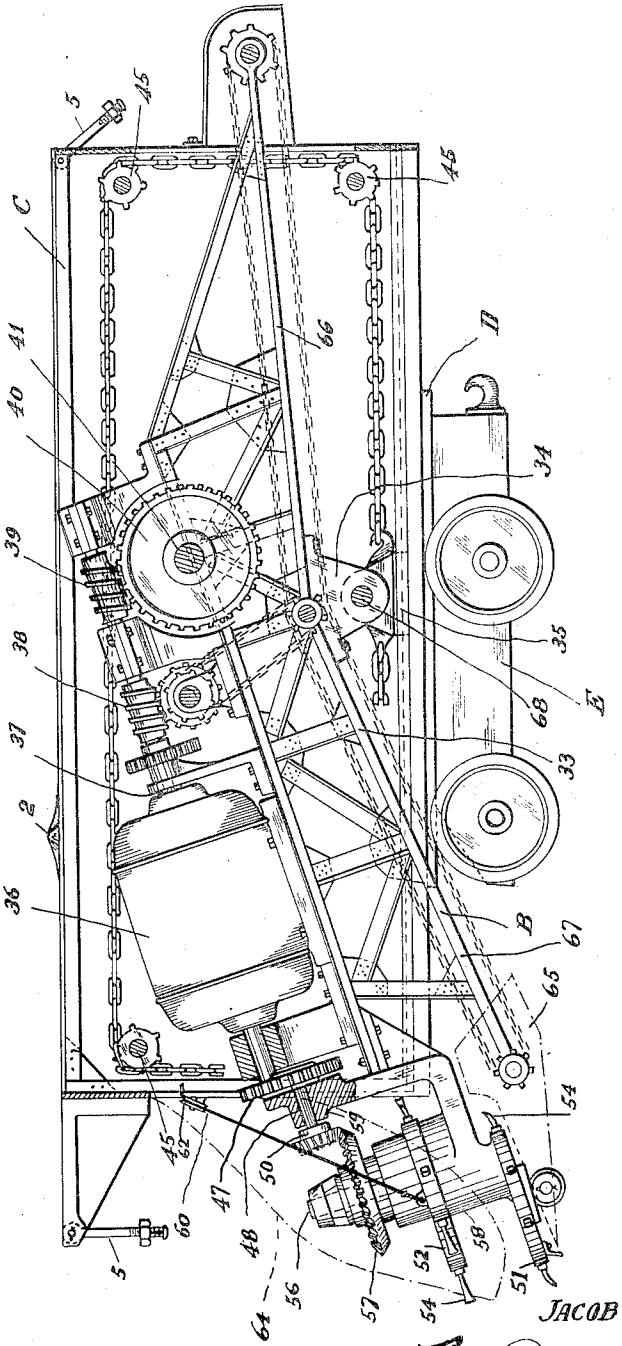
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1,327,052.

Patented Jan. 6, 1920.

8 SHEETS—SHEET 8.

Fig. 12



INVENTOR:

JACOB M. LONDON

By Popplewell & Ryder

Attorneys

UNITED STATES PATENT OFFICE.

JACOB M. LONDON, OF TUNNELTON, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-FOURTH TO GEORGE M. CRAWFORD AND ONE-HALF TO EMIL M. REFIOR, BOTH OF PITTSBURGH, PENNSYLVANIA.

COAL MINING AND LOADING MACHINE.

1,327,052. Specification of Letters Patent. Patented Jan. 6, 1920.

Application filed July 25, 1917. Serial No. 182,658.

To all whom it may concern:

Be it known that I, JACOB M. LONDON, a citizen of the United States, residing at Tunnelton, in the county of Indiana and State of Pennsylvania, have invented certain new and useful Improvements in Coal Mining and Loading Machines, of which the following is a specification.

This invention relates to coal cutting machinery and has for its primary object to provide coal cutting mechanism in which the parts are so shaped and associated and mounted on a traveling frame that the cutters may operate at any angle necessary in coal cutting operations.

An object of the invention is the novel manner of mounting the cutting mechanism for movement so that a cut may be made of a width equal to the width of the mine and of any depth necessary.

Another object of the invention is the use of means for supporting the cutters at different heights so as to accommodate varying width of the vein of coal.

Besides the above my invention is distinguished in the construction of the mounting for the cutters so that the cutters may be quickly adjusted to a plurality of different positions and vibration thereof prevented.

With these and other objects in view the invention will be better understood from the following detailed description taken in connection with the accompanying drawings wherein:—

Figure 1 is a side elevation of the machine.

Fig. 2 is a top plan view thereof.

Fig. 3 is a rear elevation of the machine.

Fig. 4 is an enlarged sectional view through the coal conveying mechanism.

Figs. 5 and 6 are detail views of the saddle.

Fig. 7 is a plan view of the coal cutting carriage.

Fig. 8 is a sectional view therethrough.

Fig. 9 is a front elevation of the machine showing the coal feeders in an inoperative position in dotted lines.

Figs. 10 and 11 are views of the turn table.

Fig. 12 is a side elevation of a portion of the coal loading apparatus.

My invention consists in its entirety of coal cutting mechanism "A", coal loading apparatus "B" and a frame "C" supporting the coal cutting mechanism and the loading mechanism for the necessary movements, the latter having a turn table connection "D" with a truck "E" movable on suitably arranged rails "F" in the mine.

The coal cutting mechanism consists of a platform 1, mounted for rocking movement upon the frame by means of a saddle 2, that forms a connection between the platform and the frame "C". In this particular instance the saddle as shown in Figs. 5 and 6 consists of arcuate shaped ribs 3 carried by the frame and platform and having interlocking engagement with each other as indicated at 4.

From this arrangement it will be seen that with very little exertion the platform may be rocked to a position whereby the upper surface of the platform may be arranged at an angle extending in any direction.

After the platform has been moved to the proper position it is held in this position by bolts 5 that have a swinging connection with the frame "C" and clamp to the platform by tightening the nuts thereof.

Mounted within the platform is a guide 6 with which coöperates the roller 7 on a guide pin 8 that is in turn rigidly connected to the coal cutting carriage 9. The purpose of this latter construction is to form a pivotal as well as a slidable connection between the carriage 9 and the platform, for a purpose hereinafter described.

Also mounted within the platform 1, is a toothed track 10 of a configuration identical with that of the cut that is made by the coal cutting mechanism and at this point I wish to call attention to the fact that this track 10 may be of any other suitable outline depending entirely upon the shape of the cut to be made.

A gear 11 that has a slidable connection with the cutter drive mechanism to be described later engages the track 10 and is held against dislocation therefrom by a guide flange 12 upstanding from the bottom of the platform "C" and abutting a portion of the gear 11. From this arrangement it will be seen that the movement of the carriage 9 along the platform 1, is confined to the outline of the cut made by the cutting mechanism and in such a manner that the number of parts necessary is reduced and wear minimized.

The carriage 9 consists of an upper part

or section 13 and a lower section 14 that slides upon the platform 1. These parts are connected and mounted for adjustment relative to each other by means of the screws 15, shown in this particular instance as four in number, one at each corner of the carriage and each having screw threaded engagement with one part and non-threaded engagement with the other part.

At this point I wish to call attention to the fact that although screws 15 are shown because of the power that can be accomplished thereby other suitable devices may be used for separating the parts for giving adjustments to the cutting mechanism now to be described.

This cutting mechanism consists of a bar 16 extending horizontally from the carriage with one end rigidly connected to the section 13. Mounted within the fixed end of the bar is a sprocket wheel 17 coöperating with the sprocket wheel 18 at the free end of the bar for giving the proper movement to the chain 19 to which is secured at suitably spaced intervals the cutters 20.

Mounted within the carriage is an electric motor 21 having drive connection 22 with the sprocket 17 and this drive mechanism may include a clutch 23 for reasons well known. This drive mechanism includes a pair of gears 24 and 25 coöperating with a gear 26 slidably mounted on the shaft of the gear 11 whereby the latter may be driven at two different speeds for a purpose hereinafter described.

To complete the coal cutting mechanism I connect the screws 15 in pairs by means of chains 28 passing over sheave wheels 27 one of which is fixedly mounted on each of the screws 15. If found necessary in practice this shaft may be formed in sections connected together by friction clutches as illustrated at 32 for obvious reasons.

From the foregoing description it will be seen that by constructing and associating the parts as described the coal cutters 20 and bar 16 may be arranged at a multiplicity of angles and elevations; that is to say by adjusting the parts 13 and 14 relative to each other for raising and lowering the cutting mechanism or rocking the platform, 1, upon the saddle 2, and rigidly securing the same in either of its four inclined positions by bolts 5.

A very important feature of my coal cutting apparatus is that one source of power is capable of simultaneously feeding the carriage in the proper direction and operating the cutting mechanism and in such a manner that the cutting apparatus may be quickly removed from the frame "C" by simply removing the pin 8 and raising the cutting apparatus as a unit vertically. The advantage of driving the gear 11 at two speeds is now obvious as during the cutting operation the carriage may be fed at the proper speed but when it is desired to return the carriage to its original position the gear 11 may be driven at a faster speed for quickening the return travel of the carriage.

The coal loading apparatus is connected to the frame directly below the cutter mechanism in such a manner as to have arcuate as well as longitudinal movement so that the apparatus may work under a pile of coal and feed the same to the rear of the machine. This apparatus consists of a carriage 33 including a bearing 34 pivotally connected to a block 35 slidably mounted upon the frame 1 and automatically moved in a manner to be described later.

Fixed to the carriage 33 is an electric motor or other suitable prime mover 36, the armature shaft 37 of which has one end associated with a pair of worms 38 and 39 the former driving the conveying means to be described later, and the latter coöperating with a gear 40 fixed upon a shaft 41 that also has fixed thereon sheave wheels 42 and 43 around which pass chains 44 directed around idlers 45 and connected to the block 35. From this arrangement it will be seen that when the clutch 46 arranged on the shaft 41 is operated, movement will be transmitted through the chains 44 to the block 35 and as a result the carriage 33 and the conveying means now to be described thereon will be moved toward and away from the pile of coal depending entirely upon the direction of rotation of the motor.

The remaining end of the armature shaft has a gear connection 47 with a pair of parallel shafts 48 and 49 each supporting a bevel gear 50. Associated with each of the beveled gears 50 is a coal feeder 51 consisting of an upper rake device 52 and a lower rake device 53, the upper having the larger capacity. Each rake device consists of a plurality of teeth or scrapers 54 carried on an endless belt or chain 55 driven in any suitable manner by the shaft 56 that receives its motion through a beveled gear 57 rigidly secured thereto and engaging the beveled gear 50.

The frame 58 of each of the feeders is provided with a bearing 59 supported for rotation upon one of the heretofore mentioned parallel shafts so as to swing vertically in the arc of a circle as shown in dotted lines in Fig. 9. For the purpose of swinging the feeders to this dotted position, a cable 60 is provided for each feeder having one end connected directly to the feeder and trained around suitable idlers 62 and then passed around a drum 63 that has a clutch connection with the shaft 41; thus it will be seen that the machine may be readily moved into and out of a mine and quickly arranged in an operative position.

At this point I wish to call attention to

the fact that by the use of this swinging connection of the feeders, the cable 60, and the pivotal connection between the carriage 33 and the frame 1, the feeders may be arranged in a plurality of positions so as to insure the proper coöperating of the feeders and the lowermost particles of a dislodged pile of coal.

This manner of acting upon the pile of coal by the feeders causes the major portion of the pile of coal to fall by gravity as the feeders only excavate a certain amount of coal from under the pile of coal and gravity is relied on for the major portion of the pile to gravitate upon the conveying means now to be described.

Arranged directly over the feeders is a shield 64 for preventing the falling coal from interfering with the operation of the feeders. Working directly under the feeders is a scoop 65 that is carried by the front end of a series of conveyers, two of which, 66 and 67 are pivotally supported at 68 upon the carriage 33. The remaining conveyers 68^a, 69, and 70 are pivotally connected to each other as indicated at 71 and mounted upon a second truck 72 also traveling on the rails "F". This truck 72 is connected to "E" by the chain 73 and the conveyers 68^a, 69 and 70 may be associated with or removed from the conveying means carried by the carriage 33.

The conveyers of this portable conveying apparatus are adapted to be operated by an electric motor 74 while an adjusting device 75 is provided to raise and lower the conveyer 70 for regulating the feed of coal therefrom into a coal car in the rear. The conveyers 66 and 67 have a drive connection 76 with the worm 38.

If found advantageous in practice the turn table "D" may be mechanically operated by a worm shaft 77 that engages the rack bar 78 secured to one of the disks of the turn table, and this worm shaft 77 is driven in any suitable manner as shown diagrammatically at 79.

To complete the invention I arrange at suitable points jacks 80 pivotally connected to the frame and adjustably engaging the wall of the mine.

It is to be understood that while all of the several features of my improved coal cutting and loading apparatus have special coöperation with one another and together constitute a particularly effective machine for the purpose in view certain of these features may be applied in other relations and I therefore desire to cover the combinations present in the several parts of my machine whether employed in the general organization shown or elsewhere.

It is further to be understood that the structural embodiment of the invention as a whole and its various features as shown is merely illustrative and not restrictive since I am well aware that many of the details of construction can be widely varied without departing from the spirit of the invention. I therefore do not desire to be limited in this construction or in any other except as set forth in the appended claims.

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

1. In a coal cutting machine, a platform, a carriage mounted on said platform composed of two parts, one of said parts having a slidable connection with said platform, a coal cutting mechanism secured to the other of said parts, power means for driving and guiding said carriage upon said platform, means operated by said first named means for adjusting the parts relative to each other, said means comprising screw members having screw-threaded engagement with said first named part of said carriage and mounted for free movement in the other of said parts.

2. A coal cutting machine comprising a frame, a platform on said frame adapted to be inclined in various directions, coal cutting mechanism mounted on said platform, said mechanism comprising a two-part carriage, one of said parts having a sliding pivotal connection with said platform and the other of said parts being adjustable vertically with relation to said first named part, a cutting bar secured on said second named part of the carriage, and means for simultaneously driving said mechanism and moving said carriage along said platform in a predetermined path, said means including a gear engaging a rack bar secured to said platform.

3. A coal cutting machine comprising a movable frame, a platform having a movable connection with said frame, coal cutting mechanism, a carriage consisting of two parts, one part being connected to said mechanism and being vertically adjustable and the other part having a sliding pivotal connection with said platform so as to allow of longitudinal as well as annular movement, means for moving the said carriage along said platform in a predetermined path, and other means for adjusting said first named part of said carriage vertically.

4. In a coal cutting machine a platform mounted for rocking movement, a carriage composed of two parts mounted upon said platform, one of said parts having a slidable pivotal connection with said platform and the other of said parts being adjustable vertically with relation to said first named part, a coal cutting mechanism rigidly mounted on said last named part, and means for moving said carriage upon said platform in a predetermined path.

5. In a coal cutting machine, a platform, a

carriage composed of two parts, one of said parts being mounted for longitudinal movement on said platform, and the other of said parts being adjustable vertically with relation to said first named part, cutting mechanism mounted on said carriage, driving mechanism for said cutting mechanism, means for moving said carriage in a predetermined path on said platform, said means including a gear having sliding connection with said mechanism, and a single U-shaped track mounted on the platform and coöperating with the gear whereby said carriage will be driven and guided along the platform.

6. In a coal cutting machine, a supporting frame, a platform mounted for rocking movement on said frame, a carriage composed of two parts, one of said parts being mounted for longitudinal movement on said platform and the other of said parts being adjustable vertically with relation to said first named part, cutting mechanism mounted on said second named part of said carriage, means for driving said cutting mechanism, means for moving said carriage in a predetermined path on said platform, said means including a gear having a slidable connection with said driving means, and means mounted on said platform and associated with said gear whereby the carriage will be driven and guided along said platform.

7. A machine of the class described comprising a supporting frame, a platform mounted on said frame and adapted to have a rocking movement thereon, a two-part carriage mounted on said platform, one of said parts being vertically adjustable with relation to the other of said parts, the other of said parts having a sliding pivotal mounting on said platform to provide for rectilinear and annular movement thereon, a cutting bar rigidly secured to said carriage and adapted to support a flexible cutting member thereon, and means for moving said carriage in a predetermined path on said platform.

8. A coal cutting machine comprising a supporting frame, a platform mounted on said frame and adapted to have a rocking movement thereon, a carriage composed of two parts adjustably connected together, one of said parts having sliding pivotal connection with said platform, a coal cutting device mounted on said carriage, means for simultaneously operating said coal cutting mechanism and moving said carriage along said platform, and means coöperating with said last named means for adjusting the parts of said carriage relative to each other.

9. A coal cutting machine comprising a frame, a platform having movable connection with said frame, a carriage mounted on said platform, said carriage comprising two parts adjustably connected together, one of said parts having a sliding pivotal connection with said platform thereby providing a longitudinal slidable and circular movement upon said platform, a cutting mechanism supporting bar secured to the other of said parts, a flexible cutting member mounted on said bar, and means for operating said cutting member and said carriage.

10. In a coal cutting machine, a tiltable platform, an adjustable carriage having a sliding pivotal connection with said platform, a coal cutting mechanism rigidly secured to said carriage, a gear connection between said carriage and said platform adapted to move said carriage longitudinally and transversely of said platform, and means for operating said cutting mechanism and moving said carriage.

11. In a coal cutting machine, a platform, a carriage mounted upon said platform, said carriage adapted to have sliding pivotal connection with said platform, a coal cutting mechanism rigidly secured to said carriage, and means for driving and guiding said carriage longitudinally along the sides and transversely at the forward end of said platform, said means comprising a U-shaped toothed track, and a gear connection between said carriage and said track.

12. In a coal cutting machine, a platform, a single U-shaped toothed track supported thereby, a carriage slidably and pivotally mounted on the platform and adapted to travel around said track, driving mechanism including a gear meshing with said toothed track, and a member for preventing disengagement between the gear and track, a cutter bar secured on said carriage, and a flexible cutting member mounted on said bar.

13. In a coal cutting machine, the combination with a main frame having a saddle formed thereon and a platform mounted on said saddle and adapted to have a rocking movement in all directions, of a carriage having a sliding and pivotal connection with said platform, a single U-shaped toothed track on said platform, and a gear on said carriage coöperating with said track to move said carriage longitudinally and angularly of said platform.

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

JACOB M. LONDON.

Witnesses:
J. R. SNYDER,
R. CLEMENT WEBER.