Jan. 2, 1923.

1,440,791

E. C. MORGAN.

MINING AND LOADING MACHINE.

ORIGINAL FILED SEPT. 18, 1915.

6 SHEETS-SHEET 1

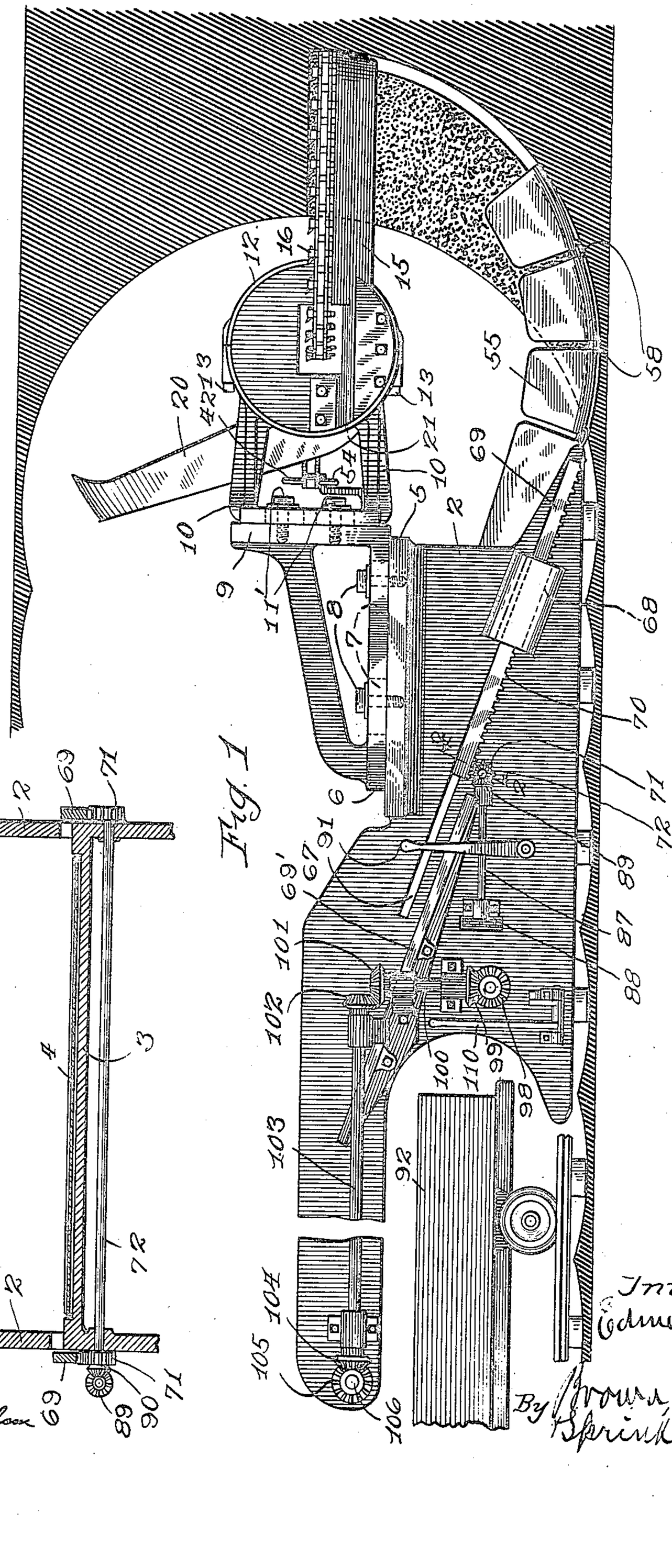

Fig. 1

Fig. 2

Witness.
L. B. Gealow

Inventor:
Edmund C. Morgan

By Brown, Critchlow & Sprinkle, Att'ys

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6 SHEETS-SHEET 2

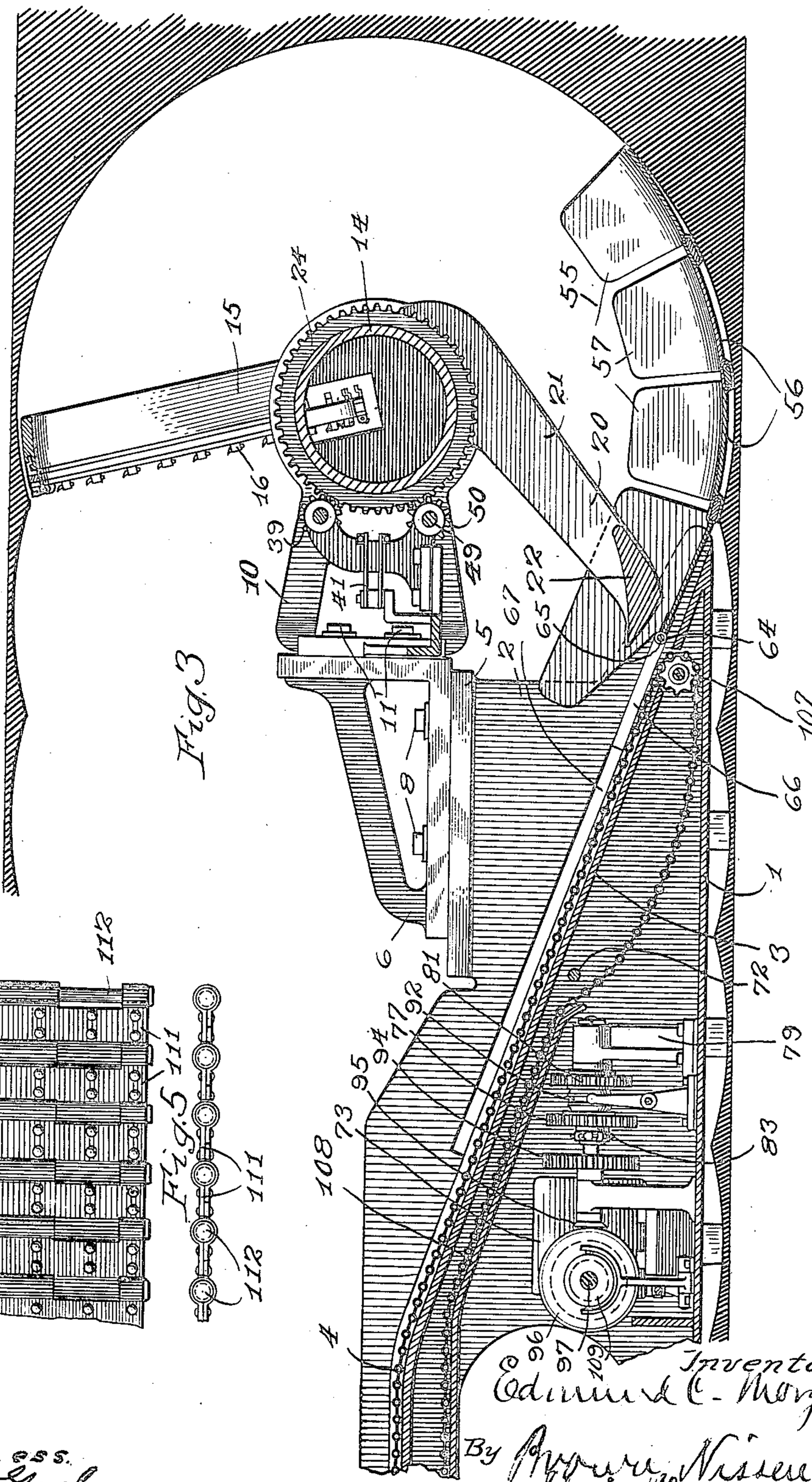

Fig. 3

Fig. 4

Fig. 5

Witness.
L. B. Graham

Inventor:
Edmund C. Morgan
By Byron, Nissen & Sprinkle,
Attys

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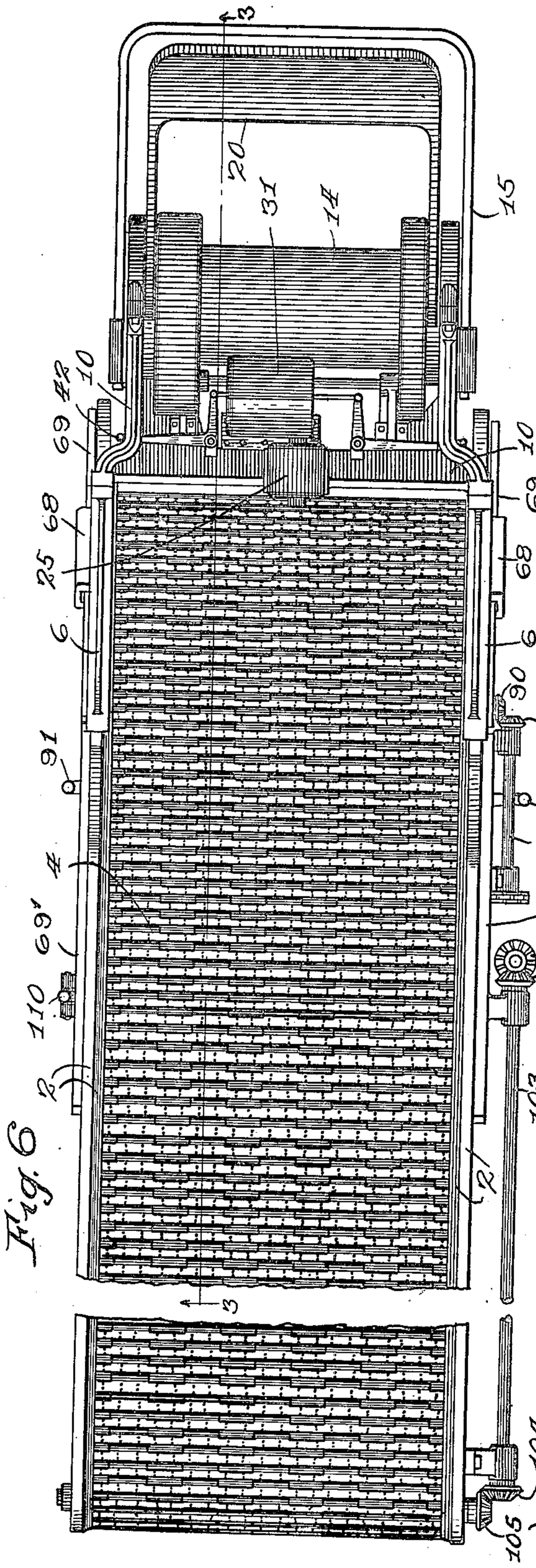
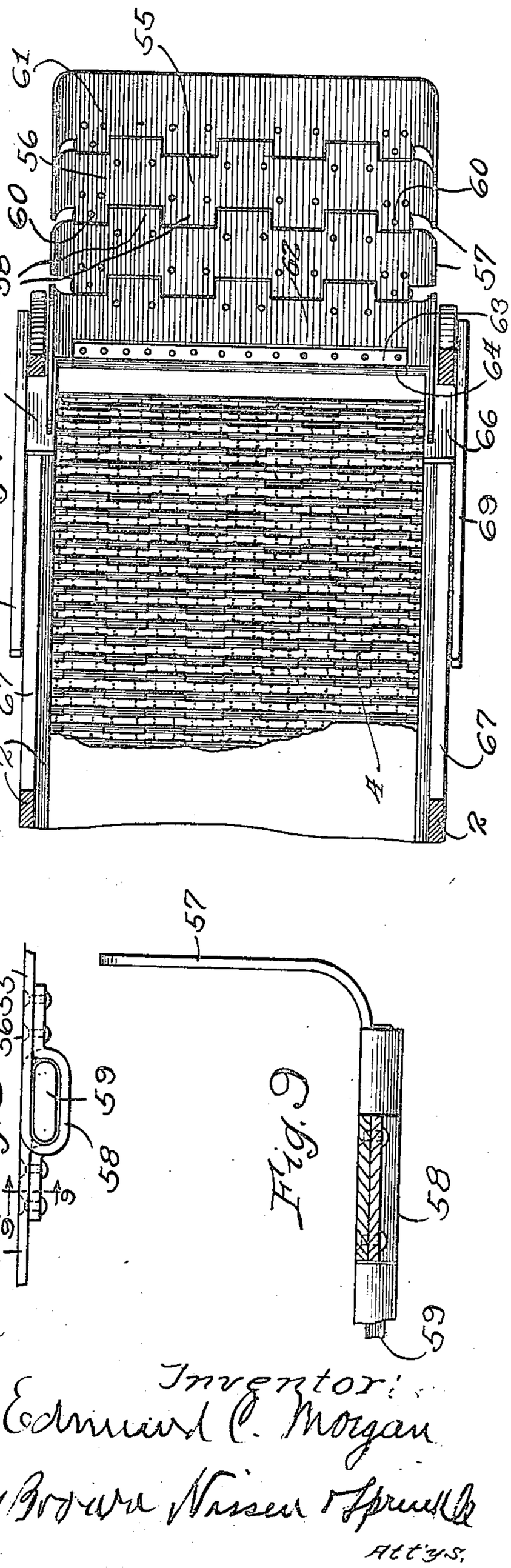
6 SHEETS-SHEET 3





Inventor:
Edmund C. Morgan
By Brown Wilson & Sprunk
Att'ys.

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E. C. MORGAN.

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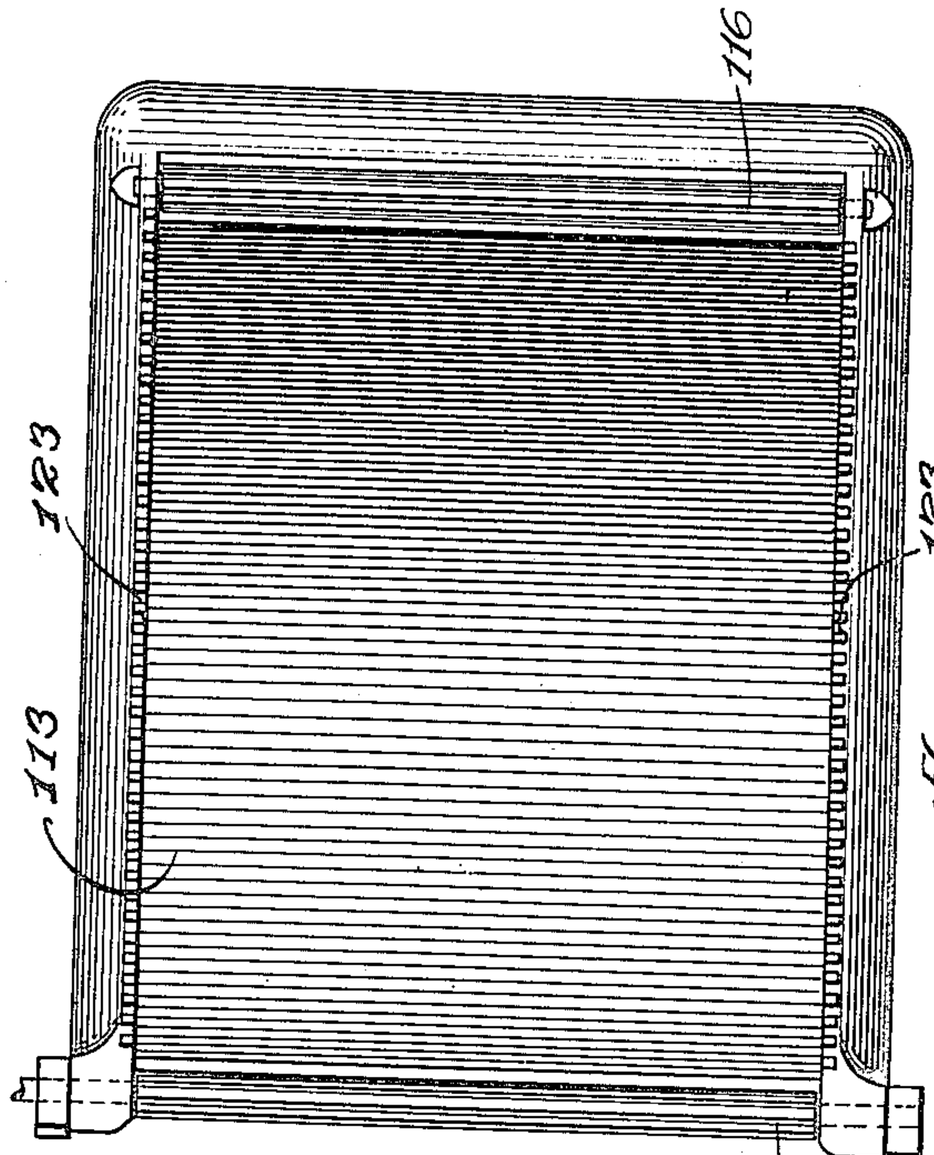

Fig. 12

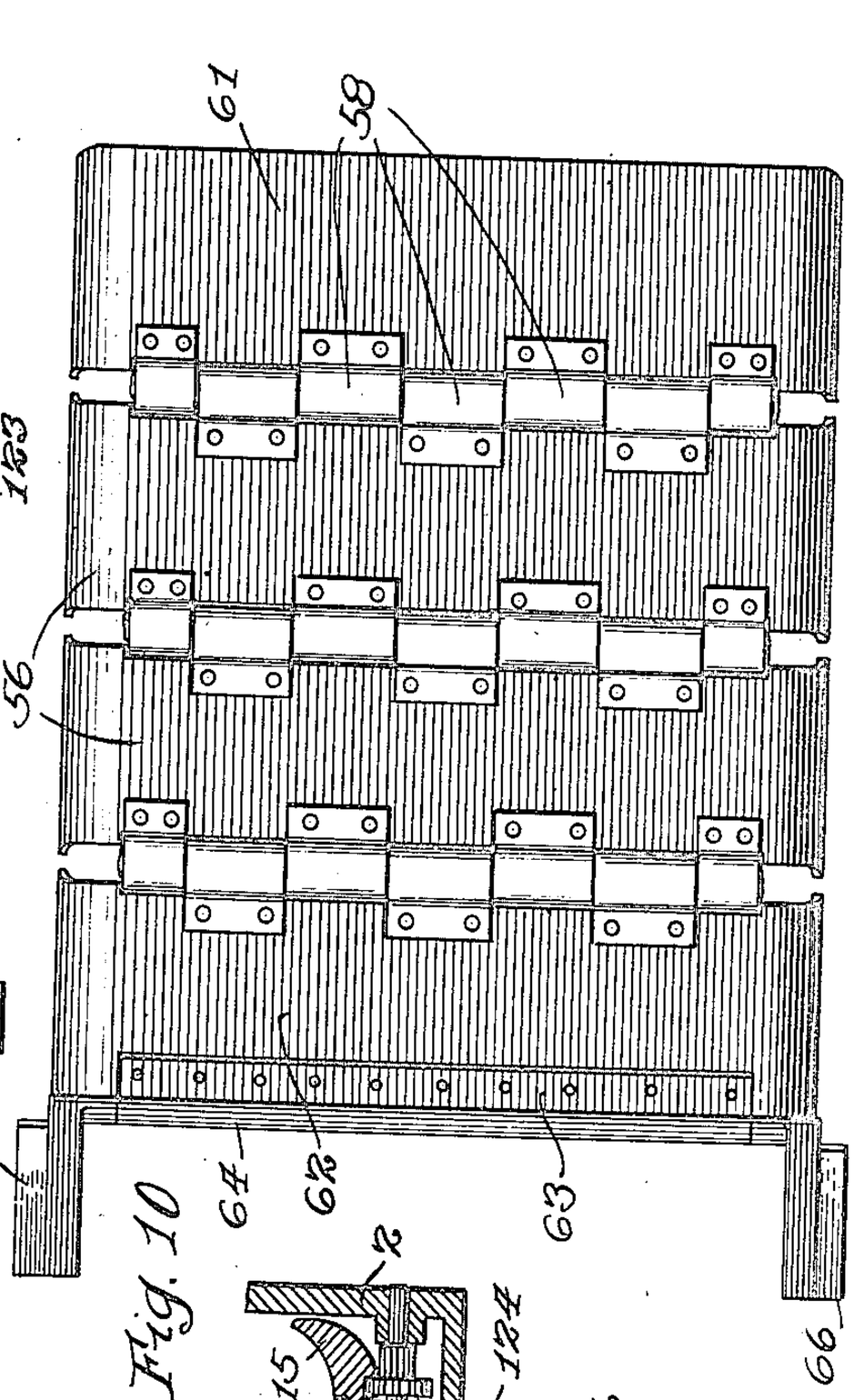

Fig. 10

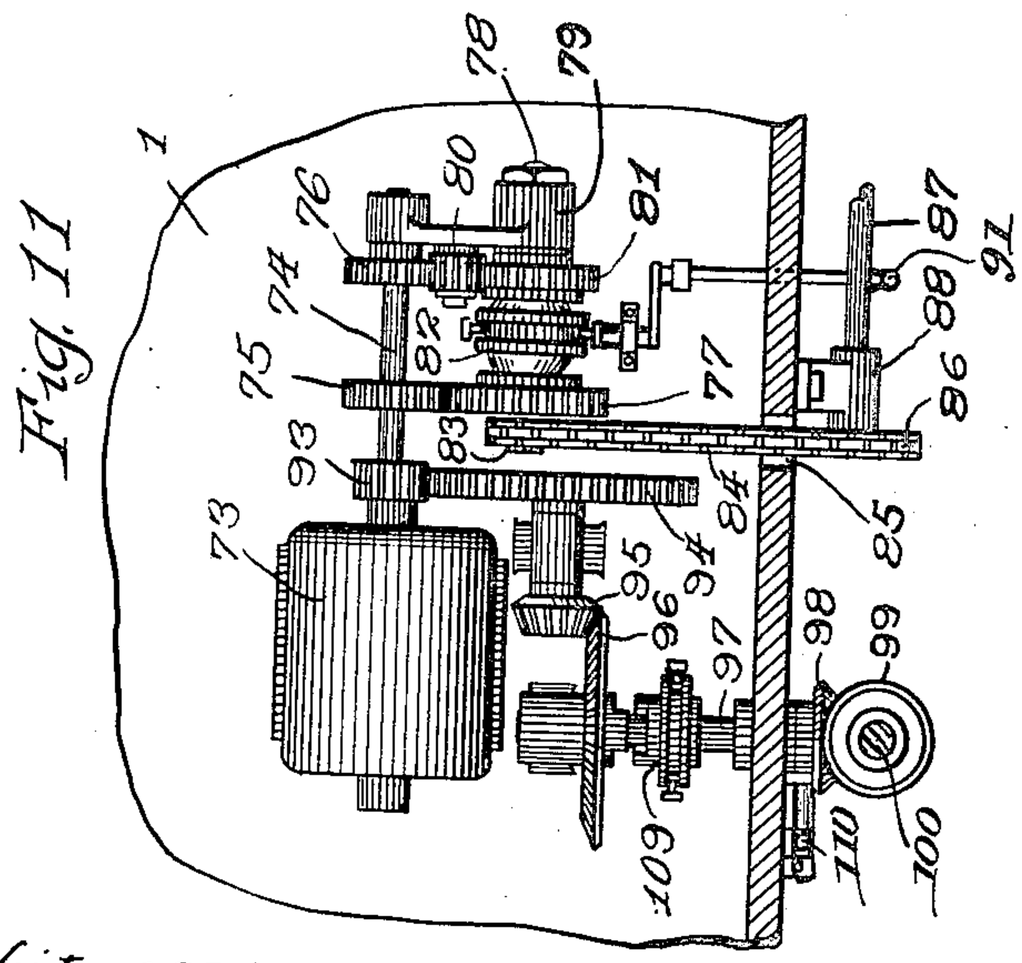

Fig. 11

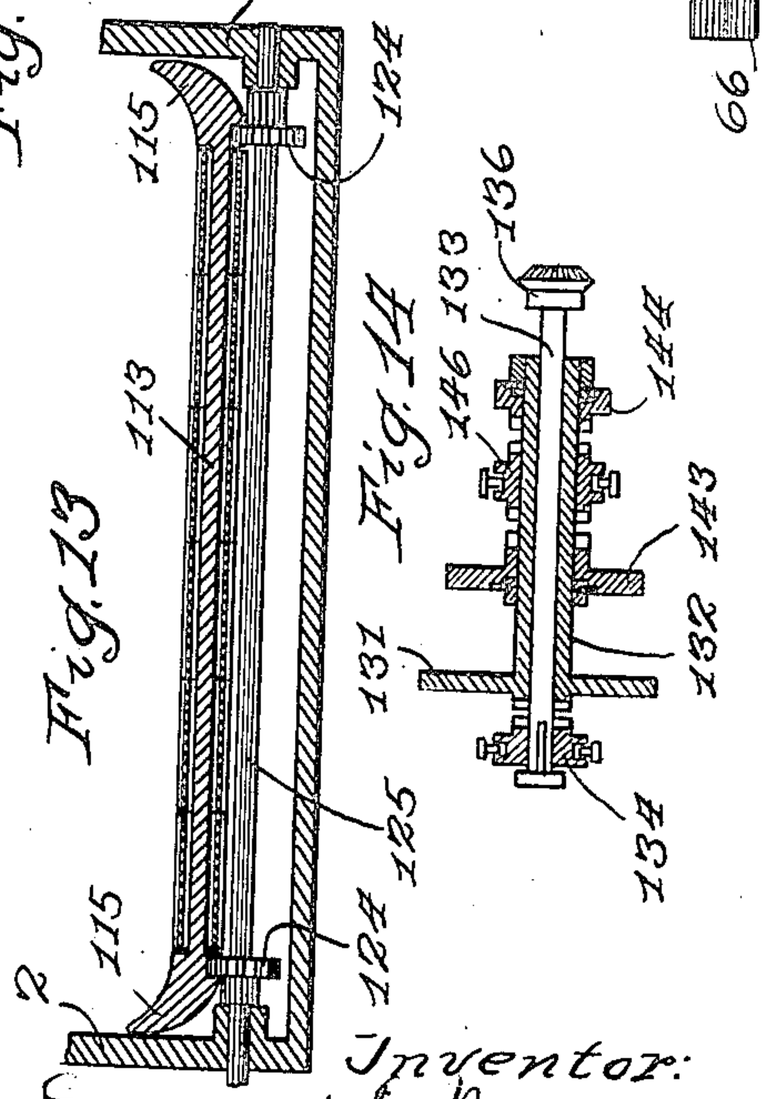

Fig. 13 Fig. 14

Witness
L. B. Graham

Inventor:
Edmund C. Morgan
By Brown, Wilson & Brindle
Attys.

Jan. 2, 1923.

1,440,791

E. C. MORGAN.

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Fig. 15

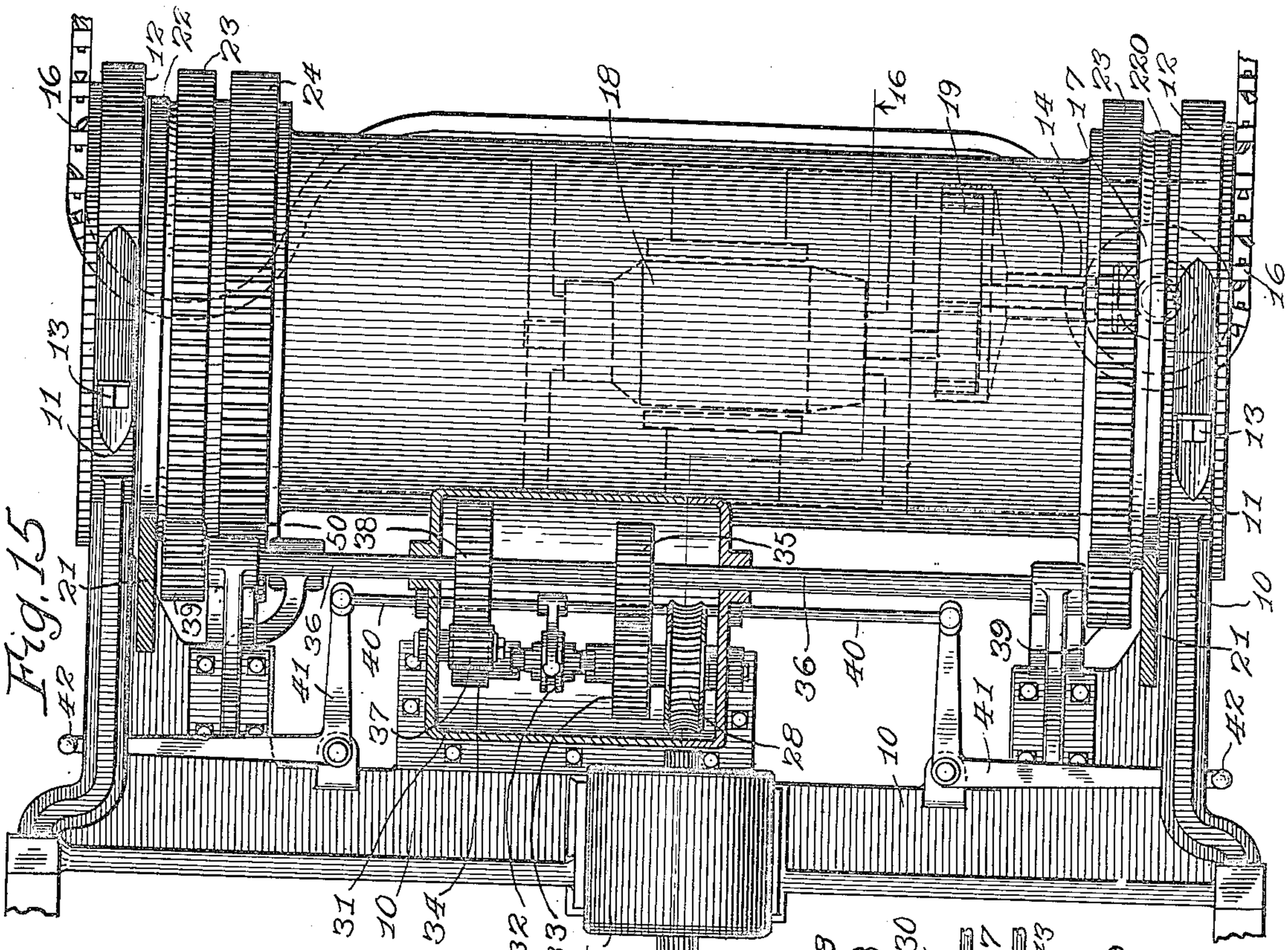


Fig. 16

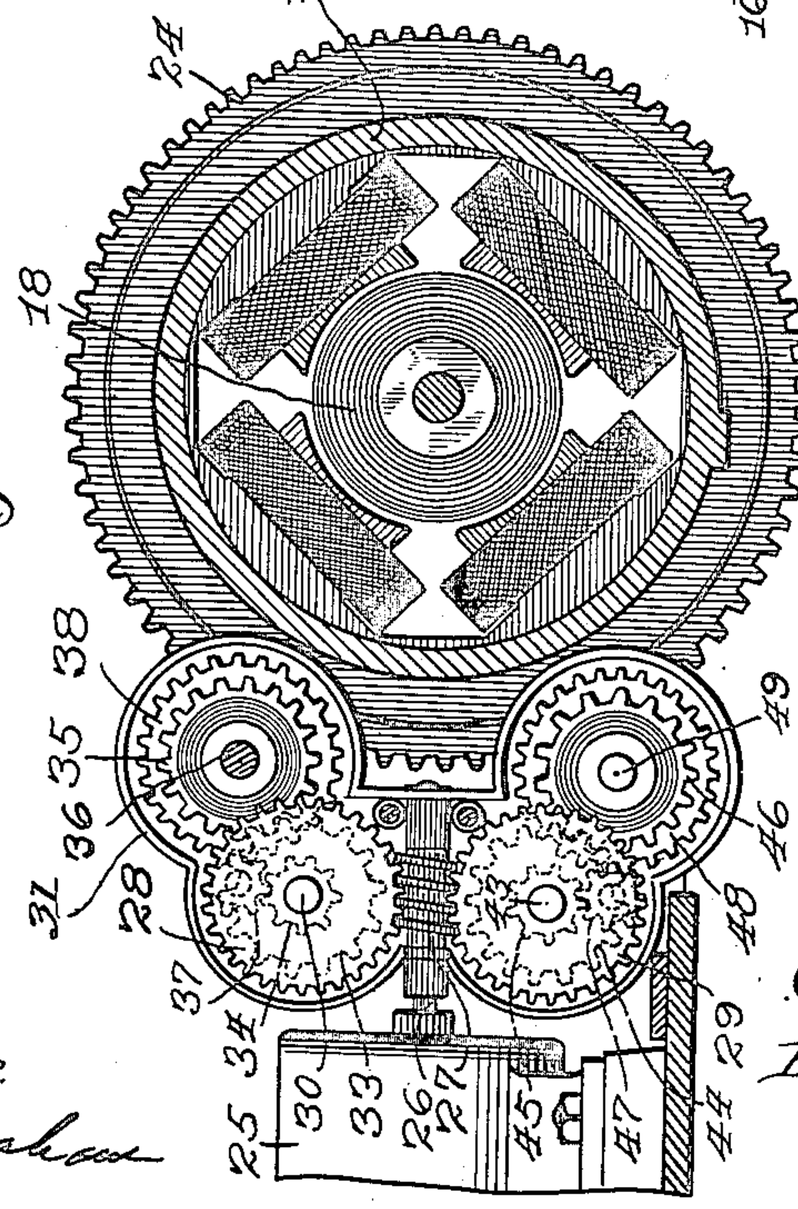
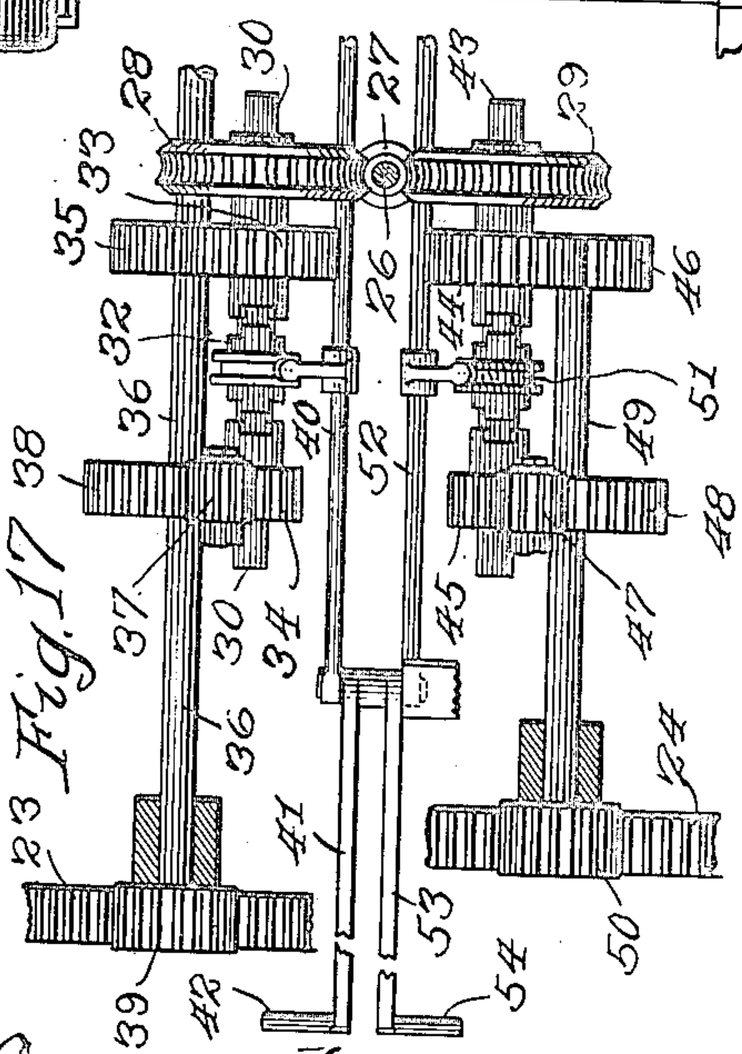


Fig. 17



Witness.

L. B. Graham

Inventor:

Edmund C. Morgan

By Brown Nissen & Spruill

Attys.

Jan. 2, 1923.

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MINING AND LOADING MACHINE.

ORIGINAL FILED SEPT. 18, 1915.

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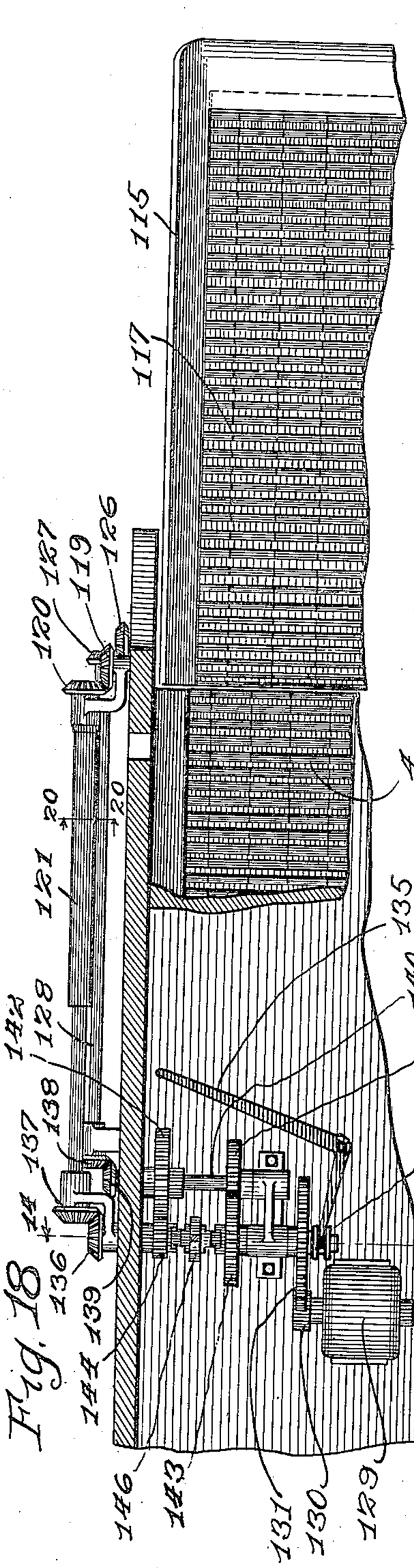

Fig. 18

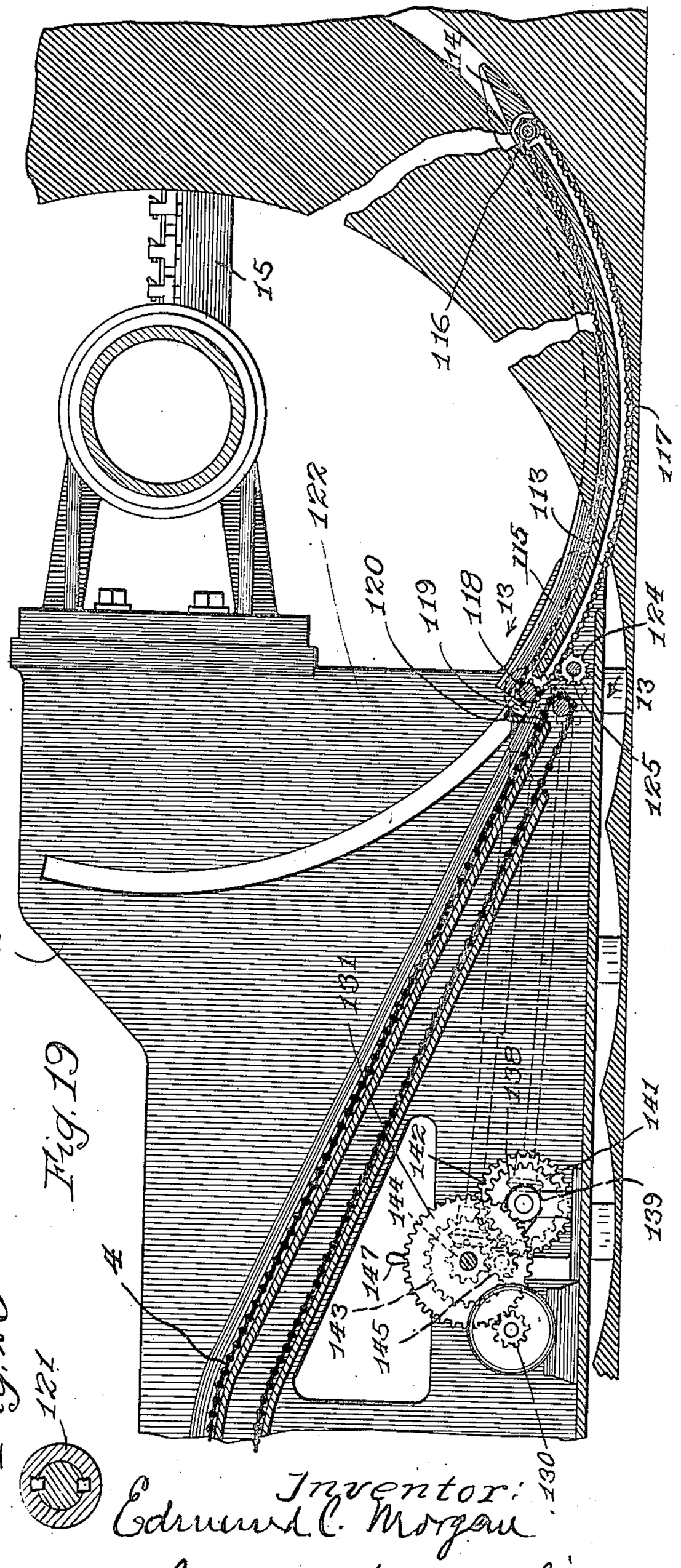

Fig. 19

Witnesses.

L. B. Graham.

Inventor:

Edmund C. Morgan

By Brown Wissen Shinkle

Attys.

Patented Jan. 2, 1923. 1,440,791

UNITED STATES PATENT OFFICE.

EDMUND C. MORGAN, OF NEW YORK, N. Y.

MINING AND LOADING MACHINE.

Application filed September 18, 1915, Serial No. 51,332. Renewed October 15, 1919. Serial No. 330,854.

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Mining and Loading Machines, of which the following is a specification.

This invention relates to mining and loading apparatus, whereby material is completely severed from a mine wall, and then moved backwardly from the mine wall into position to be loaded. One of the objects of my invention is to provide improvements in the mining and loading machines disclosed in my Patents Nos. 1,325,031, dated December 16, 1919; 1,427,118, dated August 29, 1922; 1,427,119, dated August 29, 1922; and 1,430,669, dated October 3, 1922. Other objects of the invention will appear hereinafter.

The invention comprises the combination and arrangement of parts described in the following specification, shown in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings—

Fig. 1 is a side elevation of a mining machine embodying the present invention shown in position in a mine chamber.

Fig. 2 is a fragmentary sectional detail view on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view on line 3—3 of Fig. 6.

Figs. 4 and 5 are details of the conveyer chain.

Fig. 6 is a top plan view partly broken away, of the complete machine.

Fig. 7 is a fragmentary top plan view with parts broken away to show a part of the lower portion of the machine.

Figs. 8 and 9 are details of the flexible receiver for the severed material.

Fig. 10 is a bottom plan view of the flexible material receiver.

Fig. 11 is a fragmentary horizontal sectional view showing the motor and gearing for operating the conveyer and material receiver.

Fig. 12 is a top plan view of the bed plate for a modified form of receiver.

Fig. 13 is a vertical sectional view of the modified form of receiver taken on line 13—13 of Fig. 19.

Fig. 14 is a longitudinal sectional view on line 14—14 of Fig. 18.

Fig. 15 is a top plan view with parts in section, showing the operating head for the cutter frame and connected parts.

Fig. 16 is a vertical sectional view on line 16—16 of Fig. 15.

Fig. 17 is a detail view showing the arrangement of the gearing for moving the cutter frame and co-operating parts.

Fig. 18 is a fragmentary horizontal sectional view showing the application to the mining machine of the modified form of material receiver shown in Figs. 12 and 13.

Fig. 19 is a fragmentary vertical sectional view showing the same modified form of receiver.

Fig. 20 is a detail cross section of the shaft for driving the modified form of receiver.

The mining machine shown in the accompanying drawings, which includes one embodiment of the present invention, belongs to that type of machines which sever material to be mined by repeated arcuate cuts in the mine wall made by a loop cutter having an unobstructed core opening therethrough. In the drawings a mining machine frame is provided, having a base plate 1 and side members 2 extending upwardly from each side of the base plate, An inclined cross plate 3 extends from one side of the machine to the other, and connects the side plates 2, thus bracing these side plates to form a rigid structure, and at the same time providing a bed plate for the conveyer chain 4, by means of which the material is carried upwardly and rearwardly to a loading position. At the forward end of the machine the side plates 2 are provided with enlarged bearing portions 5, having flat upper surfaces on which are mounted angle brackets 6, having slots 7 therein, through which extend set screws 8 for adjustably holding the brackets 6 to the bearing portions 5. The brackets 6 are provided at their forward ends with uprights 9, to which is adjustably secured the cutter head frame 10 by means of screws 11′. In this way an adjustable mounting is provided, by means of which the cutter head frame 10 is capable of adjustment horizontally and vertically relative to the mining machine frame, and by which any combination of these two adjustments may, of course, be secured.

Secured to the front portion of the cutter head frame 10 are two bearings 11, having detachable portions 12 held in place by bolts 13. By this means circular bearings are provided for a cutter head drum 14, one bearing at each end of the drum. The drum 14 is mounted for rotation in the bearings 11 in a manner similar to that shown in my co-pending application No. 49,689 referred to above. This drum has a cutter frame 15 and a chain cutter 16 mounted for rotation with the drum 14, and provided with a sprocket wheel 17, motor 18 and gearing 19, all located within the drum 14 and rotatable therewith, and arranged to drive the chain 16 in a manner fully disclosed in the above mentioned co-pending application Serial No. 46,689. Carried by the drum 14 for independent rotation thereon about a common axis therewith, is an ejector frame 20, comprising two arms 21 and a cross bar 22, Figs. 3 and 15. This frame is for the purpose of forcing the coal backwardly from the position it occupies after it has been severed by the cutter, and may be termed a material follower frame. The ends of the arms 21 next to the drum 14 are provided with bearing rings 220, which surround the drum and have gears 23 secured thereto, by means of which the follower frame is rotated upon the drum. Rigidly secured to the drum 14, at one end thereof, adjacent one of the gears 23, is a third gear 24 for rotating the drum itself in the bearings 11. A motor 25 is mounted on the cutter head frame 16 near the central portion thereof, and is operatively connected with the gears 23 and 24 by a chain of gearing best shown in Figs. 15, 16 and 17. Secured to the motor shaft 26 is a worm 27, which meshes with a pair of worm wheels 28 and 29. The upper worm wheel 28 is rigidly secured to a shaft 30 mounted in the walls of the casing 31, and provided with a sliding clutch 32. Gears 33 and 34 are mounted for free rotation on the shaft 30, but are adapted to be clutched to the shaft by clutch 32. Gear 33 is of larger diameter than the gear 34, and meshes directly with a gear 35 carried on a shaft 36. The gear 34 meshes with an idle pinion 37, which in turn meshes with a gear 38 secured to the shaft 36. In this way the motor 25 may be operatively connected by means of the clutch 32 to drive the shaft 36 in either direction, and it is apparent that the motion in one direction will be more rapid that the motion in the opposite direction. The shaft 36 carries pinions 39 at the ends thereof, which mesh with the gears 23, which rotate the follower frame 20 by means of the chain of gearing just described. The follower frame 20 may be given a slow and powerful rotation in a clockwise direction, as viewed in Fig. 3, and a rapid return movement in the opposite direction. This movement of the follower frame 20 is under control of the clutch 32, which may be operated from either side of the machine by a clutch rod 40 and bell crank levers 41, having handles 42 positioned one on each side of the machine.

The gear 24 secured to the drum 14 is driven from the worm wheel 29 by a chain of gears similar to that described above. The worm wheel 29 is mounted on a shaft 43, which carries gears 44 and 45 mounted for rotation thereon, and which mesh with gear 46 and pinion 47 respectively. The pinion 47 meshes with a gear 48 rigidly secured to a shaft 49, which shaft also rigidly carries the gear 46. Secured to the end of the shaft 49 is a pinion 50, which meshes with the gear 24 on the drum 14. By means of this chain of gearing means is provided for imparting a slow and powerful movement to the cutter frame 15 in a counter-clockwise direction, as viewed in Fig. 3, and for imparting a rapid return movement in the opposite direction to the cutter frame. The movement of the frame is controlled by means of a clutch 51 co-operating with the gears 44 and 45, and operated in turn by clutch rod 52, bell crank levers 53 and handles 54 located at each side of the machine directly beneath the handles 42 for controlling the follower frame.

The movements of the cutter frame and the follower frame are entirely independent of one another, although the two frames rotate about a common axis. Each frame is provided with an independent controller, and movement may be imparted to either at the will of the operator independently of the movement of the other. Ordinarily in practice, the follower frame 20 will be in the position shown in Fig. 1 during the cutting movement of the frame 15, and immediately after the frame 15 has completed its cut the follower 20 will be started to rotate in a clockwise direction, and will carry with it the coal severed by the cutter, and force it onto a device to be described, by means of which it is removed from the mine. As soon as the coal has been forced out of the way by the follower frame, the cutter frame and the follower frame will be returned by the rapid return mechanism previously described, to their original positions, preparatory for a second operation. Since, however, the movements of the two frames are independent of one another, this cycle of operations may be varied at the will of the operator to suit any exigencies that may arise.

The mechanism for receiving the coal as it is forced backwardly by the follower frame 20 is best shown in Figs. 1, 3, 7, 8, 9 and 10. As shown in these views, a flexible receiver or trough 55 is provided, which consists of a series of cross plates 56, each

having up-turned ends 57 to form the sides of the trough. Extending from the edges of the plates 56 are a series of projections 58, which are bent backwardly in the form of loops, as shown in Fig. 8. The projections 58 of adjacent plates are arranged to alternate with one another, as clearly shown in Fig. 7, and a flattened bar 59 is extended through the alternating loops and fits loosely therein, thus forming a somewhat flexible joint between the edges of adjacent plates. The bar is rigidly secured to one of the plates by means of rivets 60 near the ends of the plate, as shown in Fig. 7. By this means a continuous trough having a limited amount of flexibility is provided. The forward cross plate 61 may have its front edge beveled or sharpened if this is found to be desirable. A rear plate 62 has a plate 63 bent around its rear edge to form an elongated eye 64, through which a rod 65 passes, which has slide blocks 66 secured at each end thereof. The blocks 66 are mounted for sliding movement in slots 67 formed in the sides 2 of the mining machine frame, and arranged slightly above the bed plate 3 of the conveyer 4 and extending in a direction parallel with the bed plate. Slidably mounted in extensions or casings 68 at each end of the mining machine frame is a pair of rack bars 69, each bar being rigidly secured at its lower end to one of the slide blocks 66. A guide bar 69′ is bolted to each of the side members 2 of the mining machine frame in position to support the rack bars 69 when these bars are drawn upwardly and rearwardly. The rack bars 69 have teeth 70 along their lower edges, which mesh with pinions 71 secured to a shaft 72 at each end thereof, Figs. 1 and 2. The shaft 72 is driven by a motor 73 through a chain of gearing, best shown in Figs. 3 and 11. The motor 73 is mounted on the base plate 1 of the mining machine, and is provided with a shaft 74, which carries rigidly therewith gears 75 and 76. Gear 75 meshes with a gear 77 loosely mounted on a counter shaft 78 supported by a bearing pedestal 79. Gear 76 meshes with an idle pinion 80, which in turn meshes with a gear 81 loosely carried by the shaft 78. The shaft 78 is free to rotate in the bearing 79, and has a clutch 82 splined thereon, by means of which the gears 77 and 81 may be secured to the shaft for rotation therewith. Rigidly secured to the end of the shaft 78 is a sprocket wheel 83, which is provided with a sprocket chain 84 extending through an opening 85 in the side of the mining machine frame to a sprocket wheel 86 rigid with a shaft 87 mounted in bearings 88 secured to the outer surface of the frame wall. The shaft 87 carries a beveled pinion 89, which meshes with a pinion 90 secured to the end of the shaft 72. By means of this chain of gearing the shaft 72 may be rotated in either direction, and thereby move the rack bars 69 and flexible receiver or trough 55 forwardly or rearwardly relative to the mining machine frame. A lever 91 is connected with the clutch 82 for controlling the forward and rearward movement of the flexible receiver. In operation the receiver is driven by the mechanism just described, into the kerf formed by the cutter frame 15, the receiver being preferably caused to follow closely after the cutter frame until it reaches a position approximately that shown in Fig. 1. In this position the receiving trough is so located that the severed coal will either fall into it or be forced therein by the follower 20. The movement of the follower frame 20 to force the coal from the position it assumes after it has been severed from the wall, slides the coal rearwardly over the receiver 55 onto the conveyer chain 4, where the rearward movement is continued by the operation of this chain. The receiver 55 forms a guide or chute for directing the coal onto the conveyer chain. After all the coal has been forced from the receiver onto the conveyer, and thence moved backwardly into loading position, the lever 91 is operated to move the receiver into retracted position, after which the machine may be moved forwardly into position for another cut. As will be seen from the proportion of the gearing shown in Fig. 11, a rapid return movement of the receiver is provided for.

The conveyer chain 4 which travels over the bed plate 3, and carries the material discharged from the receiver 55 to the rear of the machine, where it is discharged into a car 92 or other means of transportation, is also driven by the motor 73. The conveyer is connected to the motor 73 through a chain of gearing, which comprises pinion 93 mounted on shaft 74, gear 94, beveled gears 95 and 96, shaft 97, beveled gears 98 and 99, shaft 100, beveled gears 101 and 102, shaft 103, beveled gears 104 and 105, and shaft 106. The shaft 106 carries a roller over which the conveyer chain 4 passes, and by which it is driven. The lower end of the conveyer chain passes over a roller 107 located near the lower front portion of the machine. A plate 108 is provided for guiding the lower run of the conveyer chain. The movement of the chain is controlled by a clutch 109 operated by a lever 110, shown in Fig. 1. The conveyer belt itself may be of any suitable construction, one form being shown in Figs. 4 and 5. This form consists of a series of cross plates 111 hinged together by rods 112 extending from one side of the belt to the other. Any form of flexible belt may be substituted for that shown in the drawing.

In Figs. 12, 13, 14, 18, 19 and 20 is shown

a modification of the invention. In the form shown in these views the follower frame is dispensed with, and the receiving trough is provided with a conveyer belt for transferring the coal which falls upon the receiver rearwardly to the elevating conveyer. The receiver employed in this form of the invention includes a bed plate 113, which has a beveled portion 114 at the forward end for guiding it into the kerf formed by the cutter frame, and which has upturned portions 115 at each of its lateral edges for preventing the material being mined from leaving the receiver at its sides. A roller 116 is located near the front edge of the receiver, and a conveyer belt 117 is guided over this roller and over a similar roller 118 at the rear end of the receiver. The roller 118 as shown in Figs. 18 and 19, has a beveled pinion 119 secured in one end thereof, which meshes with the beveled pinion 120 carried on a telescoping shaft 121. The ends of the roller 118 protrude through arcuate slots 122 in the side members 2 of the mining machine frame, and are guided by these slots as the receiver is moved into and out of operative position in a manner to be described. As shown in Fig. 12, the lower surface of the bed plate 113 is provided with a series of teeth 123 forming racks, one at each side of the receiver. These racks are arranged to mesh with pinions 124 carried on a shaft 125 journaled in the side members 2 of the mining machine frame, as shown in Figs. 13 and 19. The shaft 125 has secured to one end thereof a pinion 126, Fig. 18, which meshes with a second pinion 127 secured to a shaft 128. A motor 129 is mounted on the base plate 1 of the mining machine frame, and is arranged to drive through intermediate gearing the shaft 125 and the roller 118. A pinion 130 carried on the shaft of the motor 129, meshes with a gear 131 rigidly secured to a sleeve 132, which is in turn free to rotate on a shaft 133, see Figs. 14 and 18. The gear 131 and sleeve 132 may be clutched to the shaft 133 by a clutch 134 (Fig. 14) operated by a lever 135 (Fig. 18). A beveled pinion 136 is carried on the end of the shaft 133, and meshes with a beveled pinion 137 secured to the telescoping shaft 121. The shaft 121 consists of two parts, as shown in Fig. 20, splined together for movement longitudinally relative to one another, but held for rotation together. By means of the mechanism described, when the shaft 133 is clutched to the gear 131 by means of the clutch 134, the pinion 119 and roller 118 will be caused to rotate, and the conveyer belt 117 will be driven in a direction to move the material thereon rearwardly onto the conveyer belt 4. As the receiver 113, together with its conveyer 117, are moved into and out of operative position, the roller 118 travels in the curved slots 122 and the shaft 121 telescopes, thus maintaining the pinions 119 and 120 always in mesh regardless of the position of the receiver.

The movement of the receiver into and out of operative position is accomplished by the rotation of the shaft 125 and the pinions 124 meshing with the racks 123. The shaft 125 is in turn rotated by the gears 126 and 127 and the shaft 128, which last named shaft carries a beveled pinion 138. The beveled pinion 138 meshes with a pinion 139 carried by counter shaft 140. Secured to the shaft 140 are two gears 141 and 142, which are driven by gears 143 and 144 respectively mounted for free rotation on the sleeve 132. An idle pinion 145 is imposed between the gears 142 and 144, while the gears 141 and 143 mesh directly. The gears 143 and 144 may be clutched to the sleeve 132 by a clutch 146 operated by a lever 147. By means of this mechanism a comparatively slow rotation may be imparted to the shaft 125 for moving the receiver 113 into inoperative position, and a quick return movement may be imparted to the shaft for retracting the receiver into operative position when it is desired to shift the machine forward preparatory to making a new cut.

In operating this form of the device a kerf is made by the cutter frame 15 in the manner described in connection with the other form, and after the cutter frame has entered the material a sufficient distance the receiver 113 is moved forwardly into position to receive the severed material. During the movement of the receiving frame into operative position the driving connection between the motor and the belt 117 may be broken, the belt 117 remaining at rest until the receiver is in operative position. Motion is then imparted to the conveyer chain by operation of the clutch 134, and any material which falls upon the receiver is carried backwardly and deposited on the conveyer belt 4, which transfers the material to the discharge position in the manner previously described. When the material is completely severed by the cutter 15 it will all move by gravity onto the receiver, breaking up to a greater or less extent into smaller divisions and will thence be carried to the rear part of the mining machine. After the discharge in this manner of all of the severed material, the shaft 125 will be rotated to retract the receiver, after which the mining machine is moved forwardly into position to make a second cut.

The form shown in Fig. 19 is covered by claims in my co-pending application, Serial No. 85,243, filed March 20, 1916, for an improvement in mining machines.

It will be understood by those skilled in

the art that many changes may be made in minor details of the invention as described without departing from the spirit thereof. I therefore do not wish to restrict myself to exact details, but what I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a mining machine, in combination, means for severing material to be mined, a flexible receiving trough for said material, and means for positioning said flexible trough beneath the severed material.

2. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted on said frame in position for feeding movement relatively thereto to cut a curved kerf in the material to be mined, means for operating said cutting mechanism including feeding movement thereof relative to said supporting frame to cut such curved kerf, a receiving trough mounted on said frame in position to extend forwardly therefrom, and means for moving said trough relatively to said frame into the curved kerf under the cut material to receive the latter and support the same freely by gravity.

3. In a mining machine, the combination with a supporting frame, of means mounted thereon for severing material to be mined, a receiving trough for said material and connected to said frame to occupy a curved position, and means for exerting pressure on the rear portion of said trough to force said trough along a curved path to receive the severed material.

4. In a mining machine, the combination with a supporting frame, of mechanism for cutting an arcuate kerf extending upwardly from a lower position in advance of said frame, means for operating said kerf cutting mechanism including arcuate feeding movement thereof on an approximately horizontal axis at the forward end of said frame, a receiving trough mounted on said frame and extending in advance thereof from its forward end in position to enter said arcuate kerf, the forward edge of said receiving trough being unobstructed, and means for exerting pressure on the rear portion of said trough for moving the latter into said arcuate kerf below the cut material.

5. In a mining machine, the combination with a supporting frame, of means mounted thereon in position to dislodge an arcuate core of material, a trough connected to said frame and extending therefrom along a curved path in position for receiving the severed material, said trough having a forward edge thereof entirely free and unobstructed, and means for moving said trough into position to receive the severed material.

6. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted thereon for arcuate feeding movement relative to said supporting frame, a flexible receiving trough mounted on said supporting frame in position to receive severed material directly from the mine wall, and means for exerting force on the rear portion of said trough for moving the flexible forward portions thereof along the arcuate kerf made by said kerf cutting mechanism.

7. In a mining machine, the combination with a supporting frame, of core cutting mechanism mounted thereon, means for operating said core cutting mechanism, means mounted on said supporting frame in position to receive cut material, and means independent of said core cutting mechanism and its operating means for moving said receiving means forwardly in advance of said supporting frame and relatively thereto into position to receive material cut by said core cutting mechanism.

8. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted on said supporting frame to swing on a horizontal axis, means for operating said kerf cutting mechanism including arcuate feed thereof on such horizontal axis, a receiver mounted on said frame, and means independent of said kerf cutting mechanism for moving said receiver into the kerf formed by said kerf cutting mechanism.

9. In a mining machine, a U-shaped cutter arranged to form an arcuate kerf in the material to be mined, a flexible receiver, and means independent of said cutter for moving said receiver into the arcuate kerf formed by said cutter for receiving the material severed by said cutter.

10. In a mining machine, an arcuate core cutter, a flexible receiver for the severed material, and means for exerting force on the rear portion of said receiver for moving said receiver in an arc into position to receive material severed by said cutter.

11. In a mining machine, a device for forming an arcuate kerf in the material to be mined, a flexible receiver having an unobstructed forward edge, and means independent of said kerf-forming means for exerting pressure on the rear portion of said receiver for moving said receiver into the said kerf.

12. In a mining machine, a cutter bar arranged to move about a pivotal axis for forming an arcuate kerf in the material to be mined, a flexible receiving trough having an unobstructed forward edge, and means independent of said cutter for exerting pressure on the rear portion of said trough to force said trough into the kerf formed by said cutter.

13. In a mining machine, the combination

with a supporting frame, of a cutter mounted thereon in position for forming an arcuate kerf in the material to be mined, a receiver connected to said frame and extending therefrom in a curved position, and means for imparting movement to said receiver along the arcuate kerf formed by said cutter and independently of movement of the latter.

14. In a mining machine, a U-shaped cutter bar arranged for pivotal movement about an axis for forming an arcuate kerf in the material to be mined to sever said material from the mine wall, a flexible receiver, and means for moving said receiver into the kerf formed by said cutter, the movement of said receiver in said kerf being independent of the movement of said cutter.

15. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted on said frame for swinging movement on a substantially horizontal axis, means for operating said kerf cutting mechanism including arcuate feed thereof on such horizontal axis, a receiver connected to said supporting frame, and means for actuating said receiver to move the same partially into the mine wall along the kerf cut by said kerf cutting mechanism, and permit said receiver to remain in such position independently of the arcuate feeding movement of said kerf cutting mechanism.

16. In a mining machine, the combination with a supporting frame, of a cutter mounted thereon in position to cut an arcuate kerf in the material to be mined to sever said material from the mine wall, a receiver connected to said frame and extending therefrom to occupy an arcuate position, and means for causing said receiver to move along a portion of the way into said arcuate kerf, said means being arranged to permit said receiver to remain in the arcuate position thus assumed while the cutter continues its feeding movement.

17. In a mining machine, a cutter mounted for pivotal movement about an axis for forming an arcuate kerf in the material to be mined to sever said material from the mine wall, a flexible receiver, actuating means for said receiver arranged to move said receiver a portion of the way into the kerf formed by said cutter and to permit said receiver to remain in the position thus assumed independently of the movement of said cutter.

18. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon for feeding movement relatively thereto, a receiver mounted on said frame for movement relatively thereto and adapted to follow said kerf-cutting mechanism along the first portion of the kerf cut thereby, means for actuating said receiver relatively to said supporting frame to move said receiver along the first portion of the path of said kerf-cutting mechanism to move said receiver part way into the kerf cut by said kerf-cutting mechanism, and means for operating said kerf-cutting mechanism including feeding movement thereof relatively to said supporting frame while said receiver remains in receiving position.

19. In a mining machine, the combination with a supporting frame, of a kerf-cutter mounted thereon for movement about a pivotal axis to form an arcuate kerf in the material to be mined to sever said material from the mine wall, a receiver for the severed material, said receiver being connected to said frame, means for moving said receiver relatively to said frame into the lower portion only of the arcuate kerf in arcuate alinement with the path of said kerf-cutter in position for receiving the severed material, and means for operating said kerf-cutter including arcuate feeding thereof relatively to said frame while said receiver remains in such projected receiving position.

20. A mining machine comprising a supporting frame, a material-receiving trough mounted on said frame for movement relatively thereto in advance of said frame to extend forwardly from said frame in position to receive material from an upright mine wall, means independent of the forward movement of said trough in advance of said frame but mounted on said frame in position for forcing material from an upright mine wall into said trough, and mechanism for operating said forcing means to cause the same to engage dislodged material and positively move the same downwardly from the mine wall into said trough while the latter extends forwardly in advance of said frame in its adjusted position.

21. A mining machine comprising a supporting frame, a flexible material receiving trough adapted to extend into an arcuate upwardly extending kerf in an upright mine wall, and a follower mounted on said frame in position for forcing material from the mine wall into said trough.

22. A mining machine comprising a supporting frame, a material-receiving trough mounted on said frame and extending forwardly therefrom into position for receiving material directly from an upright mine wall, and a device mounted on the forward end of said frame to swing on a transverse axis from an upright position toward said trough to positively force material from the upright mine wall into said trough.

23. In a mining machine, the combination with a supporting frame, of a material-receiving trough adapted to enter an arcuate kerf in a mine wall, means for moving said trough forwardly into such arcuate kerf in

position to receive material, and a swinging device for forcing the material into said trough.

24. A mining machine comprising a supporting frame, a flexible material-receiving trough, means for exerting pressure on the rear portion of said trough for forcing the same forwardly relatively to said supporting frame into position to receive material to be mined, a follower mounted on said frame for pivotal movement about a horizontal axis in position to act on an upright mine wall, and means for swinging said follower about said axis for forcing material from an upright mine wall onto said trough.

25. A mining machine comprising a supporting frame, cutting mechanism mounted on said frame for completely cutting a section of material from a mine wall, a pushing follower mounted on said frame for movement relatively thereto, and means for operating said follower to cause the same to engage the cut-out body of material in the position assumed thereby after being cut, and pushing such cut material away from such position.

26. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted thereon for feeding movement relatively to said supporting frame about a transverse axis for severing material from an upright mine wall, a follower mounted on said supporting frame for pivotal movement about the said transverse axis independently of said cutting mechanism, and means for operating said follower by swinging it downwardly on said transverse axis to cause it to engage the cut material and positively move it downwardly and backwardly from the unmined mass.

27. In a mining machine, the combination with a supporting frame, of core-cutting mechanism having an unobstructed core-opening therethrough and mounted on the forward end of said frame for swinging feeding movement on a transverse axis to cut out completely from an upright mine wall a crescent-shaped core of material, means for operating said core-cutting mechanism including swinging feeding movement thereof on such transverse axis, a follower mounted on said frame for swinging movement relatively thereto independently of the swinging feeding movement of said core-cutting mechanism, and means for operating said follower to cause the same to engage the upper end of said crescent-shaped core of material and positively move such core of material downwardly and backwardly from the unmined mass.

28. In a mining machine, the combination with a supporting frame, of core cutting mechanism mounted thereon and having an unobstructed core opening therethrough, a follower mounted on said frame in position for engaging the cut core of material, and means for operating said follower to force the core of material from its cut position while moving said follower through said unobstructed core opening independently of movement of said core cutting mechanism.

29. In a mining machine, the combination with a loop core-cutter having an unobstructed core-opening therethrough, of means for operating said loop core-cutter to cut a core of material in an upright mine wall, a follower for removing the core material, and means for supporting said follower and said loop core-cutter for independent pivoted movement about a common axis, with the follower adapted to pass through the unobstructed core-opening of said loop core-cutter to occupy a position on either side of said core-cutter.

30. In a mining machine, a pivotally mounted U-shaped cutter frame, a loop cutter carried by said cutter frame, a follower for removing material severed by said cutter, said cutter and follower being arranged for pivotal movement about a common axis, means for rotating said cutter about said axis, and means for imparting movement to said follower about said axis independent of the movement of said cutter.

31. In a mining machine, the combination with a supporting frame, of core-cutting mechanism mounted thereon and having an unobstructed core opening therethrough, a device for engaging the cut material from above and pushing it downwardly and rearwardly from the mine wall, and mechanism in position for receiving the dislodged material.

32. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon for feeding movement relatively thereto on a transverse axis, a receiver connected to said frame for movement relatively thereto to positions in advance thereof, means for moving said receiver relatively to said frame into the kerf formed by said kerf-cutting mechanism independently of movement of the latter, and a device mounted on said frame in position for sliding the severed material from its position in the mine wall onto said receiver.

33. In a mining machine, a pivoted U-shaped cutter for forming a kerf in material to be mined, a flexible receiver, means for moving said receiver into the kerf formed by said cutter, and a pivotally mounted follower arranged to contact with the material severed by said cutter and to force said material onto and over said receiver.

34. In a mining machine, the combination with a cutter for severing material to be mined, of a receiving trough for the severed material, a conveyer, and a device contacting with the severed material to push the same over said trough onto said conveyer.

35. In a mining machine, a U-shaped cutter frame, a loop cutter carried by said cutter frame, means for moving said cutter and cutter frame about a pivotal axis to form a kerf in the material to be mined for severing said material from the mine wall, a receiving trough for the severed material, means independent of said cutter frame for moving said trough into the kerf formed by said cutter, and a follower for contacting with the material severed by said cutter and for forcing said material onto said receiving trough.

36. In a mining machine, a pivotally mounted U-shaped frame, a loop cutter carried by said frame, means for rotating said frame and cutter about their axis to form a kerf in the material to be mined, a flexible receiving trough, means independent of said cutter frame for moving said trough into the kerf formed by said cutter, a follower mounted for pivotal movement about the axis of said cutter frame, and means for moving said follower independently of the movement of said cutter frame for contacting with the material severed by said cutter to force said material onto said receiving trough.

37. In a mining machine, a pivotally mounted U-shaped cutter frame, a loop cutter carried by said cutter frame, means for moving said cutter frame and cutter about their axis to form a kerf in the material to be mined, a flexible receiving trough, means independent of said cutter frame for moving said trough into the kerf formed by said cutter, a conveyor, a follower mounted for pivotal movement about the axis of said cutter frame, and means for moving said follower about said axis independently of the movement of said cutter frame for contacting with the material severed by said cutter to force said material over said receiver onto said conveyer.

38. A mining machine comprising a supporting frame, a receiving trough connected to said frame in position to enter an arcuate upwardly extending kerf in a mine wall, said trough comprising a series of transverse plates pivotally connected to render said trough flexible for entering such kerf, and means at the lateral edges of said plates for limiting pivotal movement relatively to one another without interfering with free movement of said trough along said arcuate kerf.

39. A mining machine comprising a supporting frame, a receiving trough connected to said frame and extending in advance thereof in position for entering an arcuate upwardly extending kerf in a mine wall, said trough comprising a series of transverse plates having upturned ends to form the sides of said trough, and means connecting the adjacent lateral edges of said plates for limited pivotal movement relatively to one another to render said trough flexible for movement along such arcuate kerf.

40. A receiving trough for a mining machine, comprising a plurality of plates extending transversely of said trough and having upturned ends for forming sides to said trough, elongated loops secured to the lateral edges of said plates and flattened bars extending through the loops of contiguous edges of adjacent plates and fitting loosely therein to provide a limited pivotal movement of adjacent plates relative to one another.

41. A mining machine comprising a supporting frame, a flexible receiving device positioned at one end of said frame for entrance freely into an arcuate kerf in a mine wall, and means for exerting pressure on the rear portion of said receiving device to force the same forwardly relatively to said frame into such arcuate kerf in position to receive dislodged material adjacent such kerf.

42. In a mining and loading machine, the combination with a supporting frame, of a conveyer mounted thereon and extending longitudinally thereof from a forward receiving position rearwardly toward loading position, a flexible receiver carried at the forward portion of said frame and adapted to extend beyond said conveyer along a curved path, and means for moving said flexible receiver bodily forwardly longitudinally of said frame and arcuately along said curved path and for moving said receiver rearwardly longitudinally of said frame, to effect the gathering of a load and the movement thereof into position for delivery onto said conveyer.

43. In a mining and loading machine, the combination with a supporting frame, of a receiving device connected at its rear end to the forward portion of said frame, the forward portion of said receiving device being adapted to move over the floor of a mine chamber at the base of an upright mine wall in advance of said frame, a conveyer mounted on said frame and extending longitudinally thereof from a forward receiving position adjacent said receiving device, and means for moving said receiving device bodily forward and rearward relatively to said supporting frame and longitudinally thereof to cause the forward projecting portion of said receiving device to move freely over said floor under dislodged material at the base of a mine wall to gather a load of such dislodged material and move it rearwardly along said frame into position for delivery to said conveyer.

44. In a mining machine, the combination with a supporting frame, of a receiving trough, guideways on said frame for guiding said receiving trough along said frame

into a position extending from the lower forward end of said frame in advance thereof, said trough being adapted to be retracted rearwardly along said frame to occupy a position above the forward portion of said frame with the forward end of said receiving trough adjacent the forward end of said frame and extending rearwardly from the forward end of said frame, a motor mounted on said frame, and connections between said motor and said trough for transmitting power to the latter to move the same along said guideways into a receiving position in advance of the lower forward end of said frame, and to move said trough rearwardly along said guideways into a retracted position with the forward end of said trough adjacent the lower forward end of said frame and extending rearwardly from said lower forward end of said frame.

45. In combination, a mining machine frame, guideways in said frame, a flexible receiving trough, guides carried by the rear end of said receiving trough for cooperation with said guideways, rack bars secured to said guides, and means for moving said rack bars to exert pressure on the rear end of said receiving trough to move said receiving trough forwardly into operating position.

46. In a mining machine, the combination with a supporting frame, of an angle bracket carried by the upper forward portion of said supporting frame and adjustable horizontally thereon, a cutter head carried by said angle bracket and adjustable vertically and rectilinearly relatively to said bracket while the latter and said supporting frame remain stationary, and mechanism carried by said cutter head for cutting a core of material in an upright mine wall in accordance with the adjustment in elevation of said cutter head relatively to said angle bracket and in accordance with the adjustment of said angle bracket horizontally relatively to said supporting frame.

47. In a mining machine, the combination with a supporting frame having a forward upper horizontal bearing surface of an angle bracket having a horizontal bearing surface adjustably supported on the first named bearing surface, said angle bracket having a vertical supporting bar with a bearing surface facing forward, a cutter head carried by said vertical supporting bar for rectilinear adjustment vertically, and core cutting mechanism mounted on said cutter head for cutting an upright crescent-shaped core of material in accordance with the adjustment of said bracket relatively to said supporting frame and in accordance with the vertical adjustment of said cutter head relatively to said bracket.

48. In a mining machine, the combination with a supporting frame having a pair of spaced apart longitudinal upper bearing surfaces near the forward portion thereof, of a pair of angle brackets adjustably secured longitudinally of said bearing surfaces, said angle brackets having spaced apart vertical supporting bars at the forward portions thereof with forwardly extending bearing surfaces, loop chain core cutting mechanism having an unobstructed core opening therethrough for the passage of an upright crescent-shaped core, and means for adjustably mounting said core cutting mechanism on said vertical supporting bars, whereby the horizontal axis of rotation of said loop chain core cutting mechanism may be held at adjusted elevations approximately midway between the floor and the roof of a mine chamber, and whereby said horizontal axis of rotation may be held in adjusted position forward of said supporting frame.

49. In a mining machine, the combination with a cutter frame, of an axle on which said cutter frame is mounted for pivotal movement, a gear rigidly secured to said axle, an additional gear mounted for rotation relatively to said axle, an ejector connected to said additional gear, separate power transmission mechanisms connected to said gears, and means for independently controlling said power transmission mechanisms.

50. In a mining machine, the combination with a supporting frame, of an axle journalled on said frame, a cutter frame connected to said axle to rotate bodily therewith, a cutter, an ejector frame journalled on said supporting frame and associated with said cutter frame in position to eject material cut by said cutter, and means for effecting the rotation of said cutter frame and said ejector frame relatively to said supporting frame and independently of each other.

51. In a mining machine, an axle, a cutter frame rigidly secured to said axle, a material moving frame pivotally mounted on said axle, means for rotating said axle and cutter frame, means for rotating said material moving frame about said axle, and means for independently controlling the movement of said frames.

52. In a mining machine, an axle, a cutter frame mounted on said axle, a material moving frame mounted on said axle, means for producing a relatively slow movement of said cutter frame in one direction and a relatively rapid movement of said cutter frame in the opposite direction, means for producing a relatively slow movement of said material moving frame in one direction and a relatively rapid movement of said ma-

terial moving frame in the opposite direction, and means for independently controlling the movements of said frames.

53. In a mining machine, a hollow axle, a cutter frame carried by said axle, a cutter carried by said cutter frame, means located within said axle for operating said cutter, and means located exteriorly of said axle for rotating said cutter frame.

54. In a mining machine, a hollow axle, a cutter frame carried by said axle, a cutter mounted on said cutter frame, means located within said axle for operating said cutter, a material moving frame carried by said axle, and mechanism located exteriorly of said axle for independently rotating said cutter frame and said material moving frame.

55. In a mining machine, an axle, a cutter frame rigidly secured to said axle, a gear rigidly secured to said axle, a second gear rotatably mounted on said axle, a material moving follower rotatably mounted on said axle and secured to said second-mentioned gear, and mechanism for rotating said gears independently of one another.

56. In a mining machine, a cutter frame, a rotary axle on which said cutter frame is carried, a material moving follower rotatably mounted on said axle, a gear secured to said axle for rotating said axle and said cutter frame, a second gear rotatably mounted on said axle and secured to said follower for rotating said follower about said axle, a motor, means for connecting said gears to said motor, and means for independently controlling the movement imparted by said motor to said gears.

57. In a mining machine, a cutter frame and a material moving follower frame having a common axis of rotation, means for independently imparting relatively slow movement to said frames in opposite directions, and means for independently imparting rapid return movement to said frames.

58. In a mining machine, a cutter head, an axle mounted for rotation in said head, a cutter frame carried by said axle for rotation therewith, a material moving follower carried by said axle for rotation thereon, a motor, two sets of gearing driven by said motor each set of gearing being arranged for producing different speeds of rotation in opposite directions, means for connecting said rotary axle with one of said sets of gearing to be driven thereby, means for connecting said material moving follower with the other of said sets of gearing to be driven thereby, and independent means for controlling said sets of gearing.

59. In a mining machine, a U-shaped cutter frame, a hollow axle on which said frame is mounted for rotation therewith, a cutter chain carried by said frame, a motor positioned within said axle for driving said cutter chain, a gear rigidly secured to said axle, a material moving follower rotatably mounted on said axle, a gear secured to said follower for rotating said follower relative to said axle, a motor located exteriorly of said axle, a train of gearing connecting said motor with said first mentioned gear and provided with mechanism for driving said gear at different rates of speed in opposite directions, and a second set of gearing for connecting said second mentioned gear and material moving follower with said motor, and provided with mechanism for driving said second gear independently of the first gear at different rates of speed in opposite directions.

60. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted thereon, means for operating said kerf cutting mechanism to form an arcuate kerf in the material to be mined, a receiver adapted to occupy a position having a radius of curvature substantially equal to the radius of curvature of the kerf formed by said kerf cutting mechanism, guides for said receiver arranged to direct said receiver relatively to said frame into the said arcuate kerf, means for moving said receiver relatively to said frame into and out of receiving position, and conveyer mechanism associated with said receiver for moving dislodged material toward loading position.

61. In a mining machine, the combination with a supporting frame, of means for dislodging material to be mined, a device for receiving severed material, a conveyer mounted on said supporting frame and extending longitudinally thereof rearwardly from a forward receiving position near said receiving device, mechanism for moving said receiving device from above the forward end of said supporting frame into operative position in advance of the lower forward end of said supporting frame over the floor of the mine chamber, driving mechanism for said conveyer, and means for controlling the operation of said dislodging means and of said conveyer and of said receiving device moving means independently of each other.

62. In a mining machine, the combination with a supporting frame, of a receiver connected thereto and adapted to extend in advance thereof along an upwardly extending curved kerf, upturned portions at the sides of said receiver to form an arcuate trough when said receiver extends in advance of said frame into said curved kerf, means for moving the receiver into and out of operative position, mechanism mounted on said frame for dislodging material from an upright mine wall into said trough, and a conveyer extending longitudinally of said sup-

porting frame in approximate alinement with said trough and in position to transfer toward loading position material received from said trough.

63. In a mining machine, the combination with a supporting frame, of core cutting mechanism mounted on said frame and having an unobstructed core opening therethrough, and an ejector mounted on said frame for movement relatively thereto through such unobstructed core opening to move the core of material from its position at the mine wall.

64. In a mining machine, the combination with a supporting frame, of core cutting mechanism mounted thereon, an ejector pivoted to said frame on a substantially horizontal axis for movement relatively to said frame in an upright arc, and means for operating said ejector to move the cut material from the position assumed thereby immediately after being entirely cut from the mine wall.

65. In a mining machine, the combination with a supporting frame, of loop chain core cutting mechanism mounted on said frame and having an unobstructed core opening therethrough, of means for operating said core cutting mechanism, ejector mechanism mounted on said supporting frame in position to extend along the entire mass of cut material in the position assumed thereby immediately after being cut, and means for operating said ejector mechanism independently of the operation of said core cutting mechanism to move the severed material back from the mine wall by acting on the same in the position assumed thereby after being cut.

66. In a mining machine, the combination with a frame, of loop chain core cutting mechanism mounted on said frame, means for operating said core cutting mechanism to cut an upright crescent shaped section of material from its native bed, and ejector mechanism mounted on said frame for engaging the cut section of material and pushing it from its position assumed after being severed.

67. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted on said frame for swinging feeding movement relatively thereto, means for operating said kerf-cutting mechanism, and a receiver mounted on said frame for movement relatively thereto independently of movement of said kerf-cutting mechanism and adapted to extend forwardly in advance of said frame in position to move along the kerf cut by said kerf-cutting mechanism and in position to receive material dislodged above such kerf.

68. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted thereon, means for operating said kerf cutting mechanism to cut an arcuate kerf, a receiver connected to said frame and adapted to extend therefrom along such arcuate kerf, and means for exerting pressure on the rear portion of said receiver to force the same along said arcuate kerf into receiving position.

69. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon in position for feeding movement relatively thereto to cut an upwardly extending curved kerf in the material to be mined, means for supporting said cutting mechanism including upward feeding movement thereof relatively to said supporting frame to cut such curved kerf while said supporting frame remains stationary, a receiver mounted on said frame in position to extend forwardly from the lower forward end of said frame, means for confining said receiver to positions adjacent the lower forward end of said frame, and means for moving said receiver relatively to said frame into said curved kerf under the cut material to receive the latter.

70. In a mining machine, the combination with a supporting frame, of mechanism for cutting an arcuate kerf extending upwardly from a lower position in advance of said frame, means for operating said kerf cutting mechanism including arcuate feed thereof, a receiver mounted on said frame and extending in advance thereof from its forward lower portion in position to enter said arcuate kerf, and means for exerting pressure on the rear portion of said receiver for moving the latter longitudinally of itself into said arcuate kerf below the cut material.

71. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon for feeding movement relatively thereto and in position to cut a kerf in a mine wall extending forwardly from a position substantially at the base of the mine wall, means for operating said kerf-cutting mechanism while said supporting frame remains stationary, and means mounted on said supporting frame separately from said kerf-cutting mechanism in position to extend along the kerf cut by said kerf-cutting mechanism below the cut material to receive the latter as soon as dislodged.

72. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted for swinging feeding movement on a horizontal transverse axis on the upper forward end of said frame in position for cutting an arcuate kerf extending forwardly into a mine wall from the base toward the roof, a receiver connected to said frame and movable relatively thereto to extend forwardly in advance of the lower forward end of said frame into such kerf, and means for actuating said receiver inde-

pendently of said kerf-cutting mechanism to extend said receiver into such kerf by causing said receiver to follow said kerf-cutting mechanism into receiving position under the material already cut by said kerf-cutting mechanism.

73. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted thereon, means for operating said kerf cutting mechanism including arcuate feed thereof to cut an arcuate kerf in the material to be mined, a receiver connected to said frame and having an unobstructed forward edge and adapted to assume an arcuate shape, and means for operating said receiver to move the same into said arcuate kerf in arcuate position to receive cut material when dislodged.

74. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism pivotally mounted on said frame, means for operating said kerf cutting mechanism including arcuate feed thereof, to cut an arcuate kerf in the material to be mined, a flexible receiver connected to said frame and having an unobstructed forward edge, and means for exerting pressure on the rear portion of said receiver to force the same into arcuate position in the kerf formed by said kerf cutting mechanism.

75. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon, means for operating said kerf cutting mechanism including arcuate feed thereof to cut an arcuate kerf in the material to be mined, a receiver mounted on said frame in position to extend arcuately into such arcuate kerf under the cut material while the latter remains integral with the unmined mass, and a conveyer mounted on said supporting frame with its forward portion in receiving position at the rear end of said receiver.

76. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon for feeding movement relatively thereto, means for operating said kerf-cutting mechanism to cut a kerf extending forwardly into the mine wall, a receiver mounted on said frame for movement relatively thereto independently of any movement of said kerf-cutting mechanism and adapted to occupy a position to receive cut material, and a conveyer mounted on said supporting frame in position to receive dislodged material from said receiver.

77. In a mining machine, the combination with a supporting frame, of kerf cutting mechanism mounted thereon, means for operating said kerf cutting mechanism, a receiver connected to said supporting frame, inclined guides for said receiver arranged to direct said receiver into the kerf formed by said kerf cutting mechanism, means for moving the receiver into and out of receiving position, and conveyer mechanism in position on said frame to receive dislodged material from said receiver and move such dislodged material toward loading position.

78. In a mining and loading machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon, a receiver connected to said frame and movable relatively thereto to receive position in advance of said frame and to retracted position on the forward portion of said frame, a conveyer mounted on said supporting frame and extending from a forwardly receiving position adjacent said receiver toward the rear end of said supporting frame, and means for guiding said receiver toward its retracted position above the forward portion of said conveyer.

79. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted thereon, a receiver connected to said frame and movable relatively thereto so as to extend beyond said frame into receiving position in advance of said frame, a conveyer extending longitudinally of said supporting frame from a forward receiving position adjacent the rear end of said receiver when the latter is in its forward receiving position, and guideways on said supporting frame for guiding said receiver relatively to said supporting frame to a retracted position above said conveyer while the rear end of said receiver remains in communication with said conveyer back of the forward end of the latter.

80. In a mining machine, the combination with a supporting frame, of an endless conveyer having superposed portions travelling in opposite directions and adapted to convey material from the forward portion of said frame toward the rear end thereof, core cutting mechanism having an unobstructed core opening therethrough and mounted to swing on a horizontal axis on the forward end of said frame, means for operating said core cutting mechanism to cut an upright crescent-shaped core in a mine wall in advance of said frame, a flexible receiving trough connected to said frame and adapted to extend in advance thereof in an arc under the lower portion of said core during continuation of feeding movement of said core cutting mechanism, means for advancing and retracting said receiving trough relatively to said supporting frame, substantially straight guideways on said frame for guiding the rear end of said receiving trough along said frame while confining such rear end of said receiving trough to positions above said conveyer and closely adjacent thereto for continual communication between said receiving trough and said conveyer, an ejector frame mounted on the horizontal axis to move in an arc through the unobstructed core opening of said core

cutting mechanism to engage the core and move the same along said receiving trough onto said conveyer, and means for operating said ejector frame independently of the operation of said core cutting mechanism.

81. In a mining machine, the combination with a supporting frame, of a material-receiving device connected to said frame and adapted to extend forwardly therefrom into a previously cut upwardly extending arcuate kerf below a core of material still intact and still integral with the unmined mass and means for dislodging such core onto said receiving device and moving said core along said receiving device away from the mine wall.

82. A mining machine comprising a supporting frame, a flexible receiving device connected to said frame and adapted to extend into an arcuate upwardly extending kerf in an upright mine wall, and a follower mounted on said frame in position for forcing material from a mine wall along said receiving device.

83. A mining machine comprising a supporting frame, a material-receiver mounted on said frame and adapted to extend forwardly therefrom into position for receiving material directly from an upright mine wall, and mechanism mounted on said frame and adapted to occupy a position above its swinging axis to move in an arc from such position forwardly and downwardly to force material from the mine wall into said receiver.

84. A mining machine comprising a supporting frame, a material-receiving device adapted to occupy an arcuate position, means for exerting a pressure on the rear portion of said device for forcing the same forwardly relatively to said supporting frame into position to receive material to be mined, a follower pivoted on a horizontal axis at the forward end of said frame for movement from a position above said axis forwardly and downwardly along an arc to act on material at an upright mine wall, and means for swinging such follower about said axis and along said arc for forcing material from the mine wall into said receiving device and along the same.

85. In a mining machine, the combination with a supporting frame, of a material-receiving device adapted to extend in advance of said supporting frame and along an arcuate kerf in a mine wall, means for moving said receiving device forwardly relatively to said frame into such arcuate kerf in position to receive material, and means mounted on said frame to move material downwardly from the mine wall into said receiving device.

86. In a mining machine, the combination with a supporting frame, of a flexible receiving device adapted to extend in advance of said frame into an arcuate kerf extending upwardly from the base of a mine wall, a conveyer extending longitudinally of said frame from a forward receiving position adjacent the rear end of said receiving device when the latter is extended forward into receiving position in said kerf, and means for guiding the rear end of said receiving device along said frame to retracted position with the rear end of said receiving device continually in communication with the said conveyer.

87. A mining machine comprising a supporting frame, a receiver connected to said frame in position to enter an arcuate upwardly extending kerf in a mine wall, said receiver comprising a series of transverse plates, and means at the lateral transverse edges of said plates for pivotally connecting them together for relative limited movement without interfering with the free movement of said receiver along said arcuate kerf.

88. A mining machine comprising a supporting frame, a receiver connected to said frame and extending in advance thereof in position for entering an arcuate upwardly extending kerf in a mine wall, said receiver comprising a plurality of plates pivotally connected at their transverse edges for limited movement relatively to one another to render said receiver flexible for movement along said arcuate kerf, and means for dislodging material from a mine wall onto such receiver.

89. In a mining and loading machine, the combination with a supporting frame, of a conveyer comprising superposed portions traveling in opposite directions and extending longitudinally of said frame from a forward receiving position at the lower forward portion of said frame on an upward incline toward the rear end of said frame, a receiver connected to said frame for bodily movement relatively thereto to positions extending over the floor of the mine chamber in advance of said frame in approximate longitudinal alinement with said conveyer, and means for moving said receiver bodily forward longitudinually of said frame and relatively thereto in advance thereof over such mine floor under dislodged material for receiving a load of such material, said moving means being also capable of moving said receiver rearwardly along said conveyer into position for delivery of such load from said receiver onto said conveyer.

90. In a mining machine, the combination with a supporting frame, of an axle journalled on said frame, a cutter frame rigidly connected to said axle to rotate bodily therewith and having an unobstructed core opening therethrough, an endless chain cutter mounted on said cutter-frame, means

carried wholly by said axle for actuating said chain cutter, an ejector frame mounted to swing on the axis of said axle and associated with said cutter-frame in position to move through the same to eject material cut by said chain cutter, means for swinging said cutter-frame to effect arcuate feeding movement of said chain cutter during the actuation of the latter, and means for independently swinging said ejector frame to act on the core cut by said cutter to move the core away from the mine wall.

91. In a mining machine, the combination with a supporting frame having two forwardly extending spaced-apart arms, of a hollow axle drum journalled at its end portions in said arms, a cutter frame having an unobstructed core opening and connected to said axle to rotate bodily therewith, a chain cutter mounted on said cutter frame, means located within said axle for driving said chain cutter, a gear mounted on said axle concentrically therewith, means mounted on said supporting frame for transmitting rotary feeding movement to said gear and said axle to secure arcuate feeding movement of said chain cutter to cut an upright crescent-shaped core of material in a mine wall, an ejector frame mounted for swinging movement between said arms on the axis of said axle and in position for movement through the unobstructed core opening of said cutter frame, spaced apart gears connected to said ejector frame concentrically with said axle, and means mounted on said supporting frame for transmitting power to said spaced apart gears to effect arcuate movement of said ejector frame to cause the latter to engage such crescent-shaped core of material and move the same away from the mine wall after the completion of the feeding stroke of said chain cutter.

92. In a mining machine, the combination with a supporting frame having spaced apart forwardly projecting arms at the upper forward portion thereof, of a hollow axle drum journalled in said arms for swinging movement on a substantially horizontal transverse axis, a chain cutter frame connected to said axle to move bodily therewith, said frame having an unobstructed core opening therethrough, a chain cutter mounted on said cutter frame, means mounted within said axle for driving said chain cutter, a gear concentric with said axle and connected thereto to rotate therewith, means mounted on said supporting frame intermediate said arms for transmitting power to said gear to effect arcuate feeding movement of said chain cutter from the base of a mine wall in an upward direction to effect the cutting of an upright crescent-shaped core of material, an ejector frame journalled for swinging movement between said arms on the axis of said axle and in position to move through the unobstructed core opening of said cutter frame, gearing connected to said ejector frame concentrically with the axis of said axle, and means mounted between said arms for transmitting power to said gearing independently of the feeding movement of said cutter to effect movement of said ejector frame in a downward direction after the completion of said core, to engage the latter and move the same away from the mine wall and from the position which it assumes after being cut.

93. In a mining machine, the combination with a supporting frame, of core cutting mechanism having an unobstructed core opening therethrough and mounted for swinging movement on a substantially horizontal transverse axis in advance of said frame, means for permitting the adjustment of said horizontal axis in a direction longitudinal of the supporting frame and to and from the forward lower end thereof, means for permitting the adjustment of said horizontal axis in elevation, and means for adjusting the radial length of said core cutting mechanism in accordance with the horizontal and vertical adjustments of said axis.

94. In a mining machine, the combination with a supporting frame, of core cutting mechanism comprising a U-shaped cutter frame having an unobstructed core opening therethrough, a supplemental frame mounted on said supporting frame for horizontal forward and rearward adjustment longitudinally of said supporting frame, a cutter-head mounted on said supplemental frame for vertical adjustment in elevation and supporting said core cutting mechanism for swinging feeding movement on a substantially horizontal axis, and means for permitting adjustment of said U-shaped frame in accordance with the position of said horizontal axis.

95. In a mining machine, the combination with an elongated supporting frame, of a chute extending longitudinally of said frame from a forward receiving position near the lower forward end of said frame on an upward incline toward the rear of said frame, an endless conveyer having superposed portions travelling in opposite directions, core cutting mechanism mounted on the upper forward end of said frame for swinging movement on a substantially horizontal axis, means for operating said core cutting mechanism to cut an upright crescent-shaped core of material in a mine wall in advance of the forward end of said frame, ejector mechanism operable independently of said core cutting mechanism to act in a downwardly extending arc on the cut material to move

the same from the mine wall into the forward end of said chute and onto said conveyer, and means for operating said conveyer to move the material rearwardly along said inclined chute toward loading position.

96. In a mining machine, the combination with a supporting frame, of a chute extending longitudinally thereof, a conveyer extending along said chute, core cutting mechanism mounted for swinging movement on a substantially horizontal axis at the upper forward end of said frame, means for operating said core cutting mechanism to cut an upright crescent-shaped core of material in a mine wall, and ejector mechanism comprising a frame movable through the unobstructed core opening of said core cutting mechanism to engage the core and move the same from the mine wall onto said conveyer for transfer by the latter to the rear end of said frame.

97. In a mining machine, the combination with a supporting frame, of an axle journaled on said frame, loop chain core-cutting mechanism having an unobstructed core-opening therethrough and connected to said axle to rotate bodily therewith, an ejector frame journaled on said supporting frame and associated with said core-cutting mechanism in position to eject core material cut by said core-cutting mechanism, means for driving the cutter chain, and means for effecting rotation of said core-cutting mechanism and said ejector frame relatively to said supporting frame and independently of each other.

98. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted on said frame for swinging movement relatively thereto, means for driving said cutting mechanism, a motor mounted on said supporting frame, power transmitting mechanism connected between said motor and said cutting mechanism, a clutch for connecting said motor to said power transmitting mechanism to effect swinging feeding movement of said cutting mechanism relatively to said supporting frame, an ejector mounted for swinging movement on said supporting frame, power transmitting mechanism connected to said ejector, and an additional clutch connecting said motor to said last-named power transmitting mechanism to effect the swinging movement of said ejector.

99. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted thereon for swinging feeding movement relatively to said supporting frame, means for driving said cutting mechanism, an ejector frame mounted on said supporting frame for swinging movement relatively thereto in position to act on the material cut by said cutting mechanism, and means for effecting swinging movement of said cutting mechanism and said ejector frame relatively to said supporting frame and independently of each other.

100. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted thereon for swinging movement relatively thereto, means for driving said cutting mechanism, an ejector frame mounted on said supporting frame for swinging movement relatively thereto in position to act on the material cut by said cutting mechanism, a single motor mounted on said supporting frame, power transmission mechanism connected to said cutting mechanism, a clutch for connecting said motor to said power transmission mechanism, additional power transmitting mechanism connected to said ejector frame, and an additional clutch for connecting said motor to said additional power transmission mechanism to effect swinging movement of said ejector frame independently of the swinging feeding movement of said cutting mechanism.

101. In a mining machine, the combination with a supporting frame, of an axle journaled on said frame, a loop chain core-cutter having an unobstructed core-opening therethrough and mounted on said axle to rotate therewith relatively to said supporting frame, means comprising a motor on said axle for driving said loop chain core-cutter, an ejector frame journaled on said supporting frame for swinging movement on the axis of said axle, a single motor mounted on said supporting frame, power transmission gearing connected between said motor and said axle, a clutch for controlling said power transmission gearing to control the swinging movements of said core-cutter, additional power transmission gearing connected between said single motor and said ejector frame, and an additional clutch for controlling said additional power transmission gearing to control the swinging movements of said ejector frame.

102. In a mining machine, the combination with a supporting frame, of an axle journaled on said frame, cutting mechanism comprising a cutter frame connected to said axle to rotate bodily therewith, an ejector frame journaled on said supporting frame and associated with said cutter frame in position to eject material cut by said cutting mechanism, means for driving said cutting mechanism, power transmission gearing for effecting slow feeding movement of said cutting mechanism in one direction and a quick restoring movement in the opposite direction, a clutch for controlling said power transmission gearing, additional power transmission gearing connected to said ejector frame for moving the same slowly in one direction and quickly in the opposite direction, an additional clutch for controlling

said additional power transmission gearing, and a single motor connected to both of said power transmission gearings.

103. In a mining machine, the combination with a supporting frame having forwardly extending spaced-apart bracket arms, of a hollow axle journaled in said arms for swinging movement on a substantially horizontal axis, loop chain core-cutting mechanism having an unobstructed core-opening therethrough and comprising a cutter frame connected to said axle to move bodily therewith on said horizontal axis, means comprising a motor within said hollow axle for driving said core-cutting mechanism, power transmission gearing connected between said supporting frame and the ends of said axle for effecting slow upward feeding movement of said core-cutting mechanism and a quick downward restoring movement thereof, a clutch for controlling said power transmission gearing, an ejector frame journaled for arcuate movement on said axis in position to act on the core material cut by said core-cutting mechanism to move the same from the unmined mass, additional power transmission gearing between said supporting frame and said ejector frame for effecting slow downward movement of said ejector frame and a quick upward restoring movement thereof, an additional clutch for controlling said additional power transmission gearing, and means for operating said power transmission gearings.

104. In a mining machine, the combination with a supporting frame, of core-cutting mechanism mounted thereon and having an unobstructed core-opening therethrough, and a rigid ejector plate mounted on said frame for movement relatively thereto along a path substantially parallel to the path of said core-cutting mechanism in position to act on the cut material to move the same from its position at the mine wall.

105. In a mining machine, the combination with a supporting frame, of core-cutting mechanism mounted on said frame and having an unobstructed core-opening therethrough, a rigid ejector plate mounted on said frame for movement relatively thereto in position to act on the core material to move the same from its position at the mine wall, and means for operating said ejector by moving the same relatively to said supporting frame against the core material to move the latter from its position at the mine wall relatively to said supporting frame.

106. In a mining machine, the combination with a supporting frame, of dislodging mechanism mounted on the upper forward end of said supporting frame, a receiver mounted to be confined to the lower forward end of said frame for movement relatively to said frame in advance thereof, means for projecting said receiver beyond the lower forward end of said frame and in advance thereof in position to receive material dislodged by said dislodging mechanism, and means for retracting said receiver over the same path traveled thereby during its advancing movement.

107. In a mining machine, the combination with a supporting frame, of a receiver mounted thereon for movement relatively thereto to a receiving position extending in advance of said frame and to a retracted position on the forward portion of said frame for transportation, and means for confining said receiver to substantially the same path of travel into retracted position as taken by said receiver during movement to advanced receiving position.

108. In a mining machine, the combination with a supporting frame, of a flexible receiver mounted on said frame for movement relatively thereto and in advance thereof into receiving position while accommodating itself to the shape of the surface on which supported while in such advanced position, and means for directing said receiver along said frame to retracted position on the forward portion of said frame to facilitate transportation of the machine.

109. In a mining and loading machine, the combination with a supporting frame, of a conveyer mounted thereon and extending longitudinally thereof from a forward receiving position rearwardly toward loading position, a flexible receiver carried at the forward portion of said frame and adapted to extend beyond said conveyer and beyond the forward end of said supporting frame over a mine floor in advance of said frame, and means for moving said flexible receiver bodily forward longitudinally of said frame and along the surface of the mine floor in advance of said frame and for moving such receiver rearwardly along substantially the same path taken thereby during its advancing movement.

110. In a mining and loading machine, the combination with a supporting frame, of a receiving device mounted on said frame for movement relatively thereto, the forward portion of said receiving device being free and unobstructed and adapted to move over the floor of a mine chamber at the base of an upright mine wall in advance of said frame, a conveyer mounted on said frame and extending longitudinally thereof from a forward receiving position adjacent said receiving device, means for moving said receiving device bodily forward and rearward relatively to said supporting frame and longitudinally thereof to cause the forward projecting portion of said receiving device to move freely over said floor under dislodged material at the base of a mine wall to gather a load of such dislodged material and move it rearwardly along said frame into posi-

tion for delivery to said conveyer, and means for guiding said receiving device along said frame to cause said receiving device to move over substantially the same path of travel on said frame both forwardly and rearwardly.

111. A mining machine comprising a supporting frame, a flexible material-receiving device mounted thereon for movement relatively thereto, means for exerting pressure on the rear portion of said receiving device for forcing the same forwardly relatively to said supporting frame and in advance thereof over the floor in advance of said frame to gather a load of material, means for retracting said receiving device back onto said frame with the load, and guiding mechanism on said frame for directing said receiving device over substantially the same path of travel during its forward and rearward movements along said frame.

112. A mining machine comprising a supporting frame, a material-receiving device mounted on said frame for movement relatively thereto along arcuate paths, means for projecting said material-receiving device forwardly in advance of said frame into an arcuate position to receive dislodged material, and means mounted on said frame in position to act on the material on said receiving device and move such material along said receiving device rearwardly toward said frame.

113. A mining machine comprising a supporting frame, a material-receiving device mounted on said frame for movement relatively thereto, means for moving said receiving device forwardly and rearwardly over substantially the same path of travel, the forward movement being to a receiving position in advance of said frame and the rearward movement being to a retracted position on the forward portion of said frame, an ejector mounted on said frame in position to act on the material on said device and move such material rearwardly along said device toward said frame, and a conveyer mounted on said frame in position to receive the material moved by such ejector along said device.

114. In a mining and loading machine, the combination with a supporting frame, of a receiver mounted on said frame for movement relatively thereto into receiving position in advance of said frame and to retracted position on the forward portion of said frame, a conveyer on said frame in delivery communication with said receiver when the latter is in its advanced position, and means mounted on said frame in position to act on the material on said frame to push the same along said receiver onto said conveyer.

115. In a mining machine, the combination with a main frame, of a supplemental frame pivoted thereto and adapted to engage one end of a solid block of material, a chute mounted on said main frame in a position separated from said supplemental frame but having a receiving opening facing said supplemental frame, and means for moving said supplemental frame toward the receiving opening of said chute to force said block of material into said chute while maintaining said block intact.

116. In a mining machine, the combination with a main frame, of a supplemental frame movable relatively thereto and adapted to engage one end of a large arcuate shaped block of material, of a curved chute in arcuate alinement with said block of material, and means for moving said supplemental frame in an arc to cause said block of material to enter the receiving end of said chute.

117. In a mining machine, the combination with a supporting frame, of an arcuate chute mounted thereon in stationary position for receiving large solid blocks of material directly from their positions in the mine wall, and means for delivering said blocks of material intact into said chute for movement along the latter over a direct path to the delivery end thereof while said chute remains stationary.

118. In a mining machine, the combination with a frame, of a receiving chute disposed on an arc and extending substantially from the forward to the rear end of said frame, core-cutting mechanism operable adjacent the forward end of said chute and bodily movable in an arc the center of which is coincident with the center of the arc of said chute, means for operating said core-cutting mechanism to cut a core on its forward stroke in the mass of material being mined, and means for delivering the dislodged core into said chute.

119. In a mining machine, the combination of an arcuate chute mounted in position for receiving blocks of material directly from their positions in the mine wall, and means for cutting an arcuate core of material in the mine wall in arcuate alinement with said chute.

120. In a mining machine, the combination with a supporting frame, of core-cutting mechanism mounted thereon and having an unobstructed core-opening therethrough, and an ejector mounted on said frame for movement relatively thereto along a path substantially parallel to the path of said core-cutting mechanism in position to act on the cut material to move the same from its position at the mine wall.

121. In a mining machine, the combination with a supporting frame, of core-cutting mechanism mounted on said frame and having an unobstructed core opening therethrough, an ejector mounted on said frame

for movement relatively thereto in position to act on the core material to move the same from its position at the mine wall, and means for operating said ejector by moving the same relatively to said supporting frame against the core material to move the latter from its position at the mine wall relatively to said supporting frame.

122. In a mining machine, the combination with a supporting frame, of a chute in position on said frame to receive a solid block of material directly from its position in the mine wall, and cutting mechanism mounted on said frame in position for cutting a core of material in the mine wall spaced from the open receiving end of said chute but in alinement with said chute and directly in front of such receiving end of said chute.

123. In a mining machine, the combination with a supporting frame, of a receiving structure mounted thereon, core-cutting mechanism mounted at one end of said receiving structure, means for guiding said core-cutting mechanism along a path of travel enclosing a space in alinement with said chute, and means for operating said core-cutting mechanism including the feed thereof along such path of travel to cut a core of material in one feeding operation in a mine wall in alinement with said chute.

124. In a mining machine, the combination with a supporting frame, of a receiving structure mounted thereon, core-cutting mechanism, means for guiding said core-cutting mechanism back and forth in approximate alinement with said receiving structure, means for operating said core-cutting mechanism to cut in one operation a core of material in a mine wall in alinement with said chute, and means for bodily moving said core-cutting mechanism relatively to said receiving structure in a direction opposite to the feeding direction.

125. In a mining machine, the combination with a supporting frame, of cutting apparatus mounted thereon, a material-moving frame mounted on said supporting frame and confined to an arcuate path of movement in close proximity to the path of movement of said cutting apparatus, said material-moving frame extending radially from its axis of arcuate movement at all times, and means for operating said material-moving frame to move the cut material from the mine wall.

126. In a mining machine, the combination with a supporting frame, of a loop chain core-cutter mounted thereon for movement relatively thereto, of means for operating said loop chain core-cutter, a contact member movable relatively to said loop chain core-cutter and relatively to said frame, means for moving said contact member to force the core of material away from its native position, and means for confining the bottom and opposite sides of said core to direct the core toward a predetermined position when moved by said contact member relatively to said frame.

127. In a mining machine, the combination with a supporting frame, of two relatively movable supplemental frames concentrically mounted on said supporting frame, severing mechanism carried by one of said supplemental frames, material-moving means carried by the other of said supplemental frames, and means within the confine of said supplemental frames for operating both the material-moving means and the severing mechanism.

128. In a mining machine, the combination of mechanism for cutting an upright core in a mine wall, said core-cutting mechanism having an unobstructed core opening therethrough, and means associated with said core-cutter and comprising a pocket in position adjacent the mine wall where the core is cut for receiving the dislodged material directly into such pocket from the native position of such material in the mine wall.

129. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon, means for operating said kerf-cutting mechanism including arcuate feed thereof, and a flexible apron adapted to move in an arc along the space originally occupied by the cut material, said apron comprising a plurality of movably connected apron sections having upturned ends for forming upturned edges on said apron to confine the dislodged material to said apron when received thereby from the mine wall.

130. In a mining machine, the combination with a supporting frame, of a core-cutter mounted on said frame for operation in advance thereof to cut a core of material in an upright mine wall in advance of said frame, and a flexible apron mounted on said frame and extending from a receiving position adjacent said core-cutter along said frame toward loading position, said apron comprising sections consisting of narrow metallic plates extending transversely of said apron and having their adjacent edges pivoted together and their ends upturned to form upturned edges on said apron to adapt said apron for arcuate movement along the core space in the mine wall to receive dislodged material directly therefrom while such upturned ends confine the material on said apron.

131. In a mining and loading machine, the combination with a supporting frame having a conveyer bed plate thereon extending on an incline frowardly toward the floor of a mine chamber in advance of said frame, of an adjustable extension for said bed plate

adapted to move relatively to said bed plate and longitudinally thereof into a receiving position substantially at the floor of the mine chamber, means for retracting said extension to permit free transportation of the machine, cutting mechanism mounted on the forward portion of said frame, and conveyer mechanism extending along said bed plate into position for receiving the material cut by said cutting mechanism.

132. In a mining and loading machine, the combination with a supporting frame, of a bed plate carried by said frame, cutting mechanism mounted on said frame, an apron movable over said bed plate for transferring material from the position where cut by said cutting mechanism toward loading position, an adjustable extension for said bed plate movable relatively to said bed plate and longitudinally thereof into receiving position during the operation of the machine, and means for retracting said bed plate extension relatively to said supporting frame to permit free transportation of said machine into and out of operating position.

133. In a mining and loading machine, the combination with a supporting frame, of an inclined bed plate mounted on said frame, an adjustable extension for said bed plate, means for moving said extension longitudinally of said inclined bed plate and relatively thereto to bring the forward portion thereof substantially into contact with the base of a mine chamber, cutting mechanism mounted on the forward portion of said supporting frame, means for operating said cutting mechanism, a conveyer extending from a receiving position at the forward portion of said frame adjacent the cutting mechanism longitudinally along said inclined bed plate toward loading position, and means for operating said conveyer over said bed plate including the extension thereof to move the material cut by said cutting mechanism toward loading position, the moving means for said extension being also capable of retracting said extension to permit transportation of the machine into and out of operating position.

134. In a mining machine, the combination with loop chain core-cutting mechanism having an unobstructed core opening therethrough, of a frame for supporting said core-cutting mechanism, means for operating said core-cutting mechanism to cut an upright core in a mine wall, and means associated with said loop chain core-cutting mechanism and comprising a pocket in position below the same for receiving dislodged material from its native position in the mine wall.

135. In a mining and loading machine, the combination with a supporting frame, of core-cutting mechanism mounted thereon and having an unobstructed core-opening therethrough, means for operating said core-cutting mechanism to cut a core entirely from a mine wall, and loading apparatus for moving the core through such unobstructed core-opening toward loading position after said core has been completely severed.

136. In a mining and loading machine, the combination with a supporting frame, of loop chain core-cutting mechanism having an unobstructed core-opening therethrough and suspended from the forward end of said frame for upright movement on a substantially horizontal axis, means for operating said core-cutting mechanism to cut an upright crescent-shaped core in a mine wall in advance of said frame, and loading apparatus for moving the dislodged material from the space originally occupied thereby in its native bed through said core-cutting mechanism when the latter is in its upper position to effect the transfer of the dislodged material rearwardly toward loading position.

137. In a mining machine, the combination with a supporting frame, of a supplemental frame mounted for rotation on said supporting frame, cutting mechanism carried by said supplemental frame and movable bodily therewith, an auxiliary frame journaled on said supplemental frame for rotation relatively thereto on the axis of said supplemental frame, a material-moving device carried by said auxiliary frame for movement bodily therewith, and means carried by said supplemental frame for independently operating said cutting mechanism and said material-moving means.

138. In a mining machine, the combination with a supporting frame, of cutting apparatus having a predetermined path of travel relatively to said supporting frame, means for operating said cutting apparatus to completely cut out from a mine wall a body of material from a predetermined space, a material-moving device mounted on said supporting frame in position to have a path of travel along substantially the entire space occupied by the completely cut out material, and means for operating said material moving device to engage the cut material by movement along such space to move the cut material from the mine wall.

139. In a mining machine, the combination with a supporting frame, of core-cutting mechanism having an unobstructed core-opening therethrough and mounted on said frame for arcuate feeding movement relatively thereto, means for operating said core-cutting mechanism to cut a core in a mine wall, a material-moving device mounted on said frame in position to extend transversely of the path of said core-cutting mechanism to abut against one end of said core, and means for operating said mate-

rial-moving device to engage one end of said core and push the latter to slide the same from its native position in the mine wall.

140. In a mining machine, the combination with a kerf-cutter, of a receiver, means for moving said receiver into the kerf formed by said kerf-cutter, a device in position to engage one end of the mass of dislodged material and slide the latter along said receiver away from the position it occupied before dislodged by said kerf-cutter, and means for operating said device.

141. In a mining machine, a loop chain core-cutter, means for moving said cutter to sever a section of material from a mine vein, a contact member, means for moving said member in the path of movement of said cutter to force the material severed thereby away from its native position, and means for enclosing the material on a plurality of sides during the movement thereof caused by said contact member.

142. In a mining machine, a loop cutter, means for moving said cutter in an arc to sever a section of material from a mine vein, a contact member, means for moving said contact member in an arc in the path of movement of said cutter to force the material severed thereby away from its native position, and a supporting plate arranged to be positioned beneath said material during the movement thereof.

143. In a mining machine, the combination with a supporting frame, of mechanism for dislodging a section of material from a mine vein, a support movable relatively to said frame in position beneath the dislodged material, means movable relatively to said frame for contacting the dislodged material at one end of the mass thereof, mechanism for moving said contacting means relatively to said frame to transfer the dislodged material away from its native position, and spaced-apart upright members co-acting with said support for directing the dislodged material toward a predetermined position on said frame when moved thereto by said contacting means.

144. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon for feeding movement relatively thereto, said kerf-cutting mechanism comprising a cutter frame and an endless chain mounted thereon, a motor connected to said cutter frame to effect feeding movement of said kerf-cutting mechanism relatively to said supporting frame, an additional motor separate from and independent of said feeding motor for driving said kerf-cutting mechanism, said additional motor being connected to said cutter frame to move bodily therewith, and means for controlling said feeding motor independently of the operation of said driving motor.

145. In a mining machine, the combination with a supporting frame, of core-cutting mechanism comprising a cutter chain and a cutter frame having an unobstructed core-opening therethrough mounted on said supporting frame for swinging movement relatively thereto, a motor for swinging said cutter frame relatively to said supporting frame to effect arcuate feeding movement of said chain cutter, a motor for driving said cutter chain, said driving motor being separate from and independent of said feeding motor, and means for controlling said feeding motor independently of the operation of said driving motor.

146. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon and comprising a cutter arm with a cutter chain removably mounted thereon, a motor for driving said cutter chain, a separate motor for giving said cutter arm an angular movement to feed the cutter chain independently of the driving thereof, and means for controlling said feeding motor independently of the operation of said driving motor.

147. In a mining machine, the combination with a supporting frame, of core-cutting mechanism comprising a cutter chain and a cutter frame having an unobstructed core-opening therethrough, a motor for effecting feeding movement of said core-cutting mechanism, a separate motor for driving said cutter chain, and means for controlling said feeding motor independently of the operation of said driving motor.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 16th day of September, A. D. 1915.

EDMUND C. MORGAN.

Witnesses:

A. J. CRANE,

CHARLES H. SEEM.