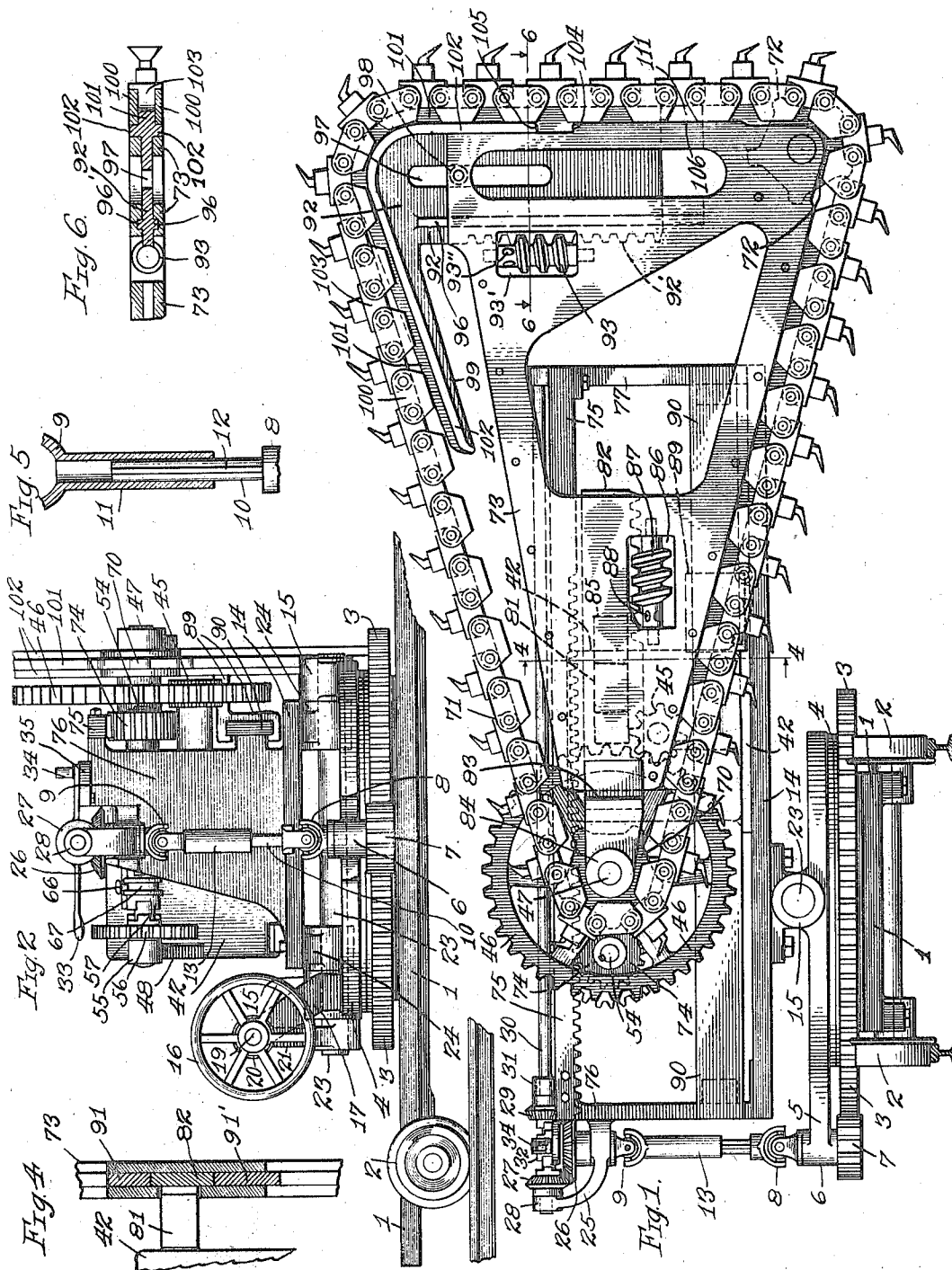


1,233,494.

E. C. MORGAN.
MINING MACHINE.
APPLICATION FILED MAY 1, 1913.

Patented July 17, 1917.

3 SHEETS—SHEET 1.



Witnesses:
L. B. Graham
Arthur L. Sprinkle

Inventor:
Edmund C. Morgan
By *Brown & Sprinkle*

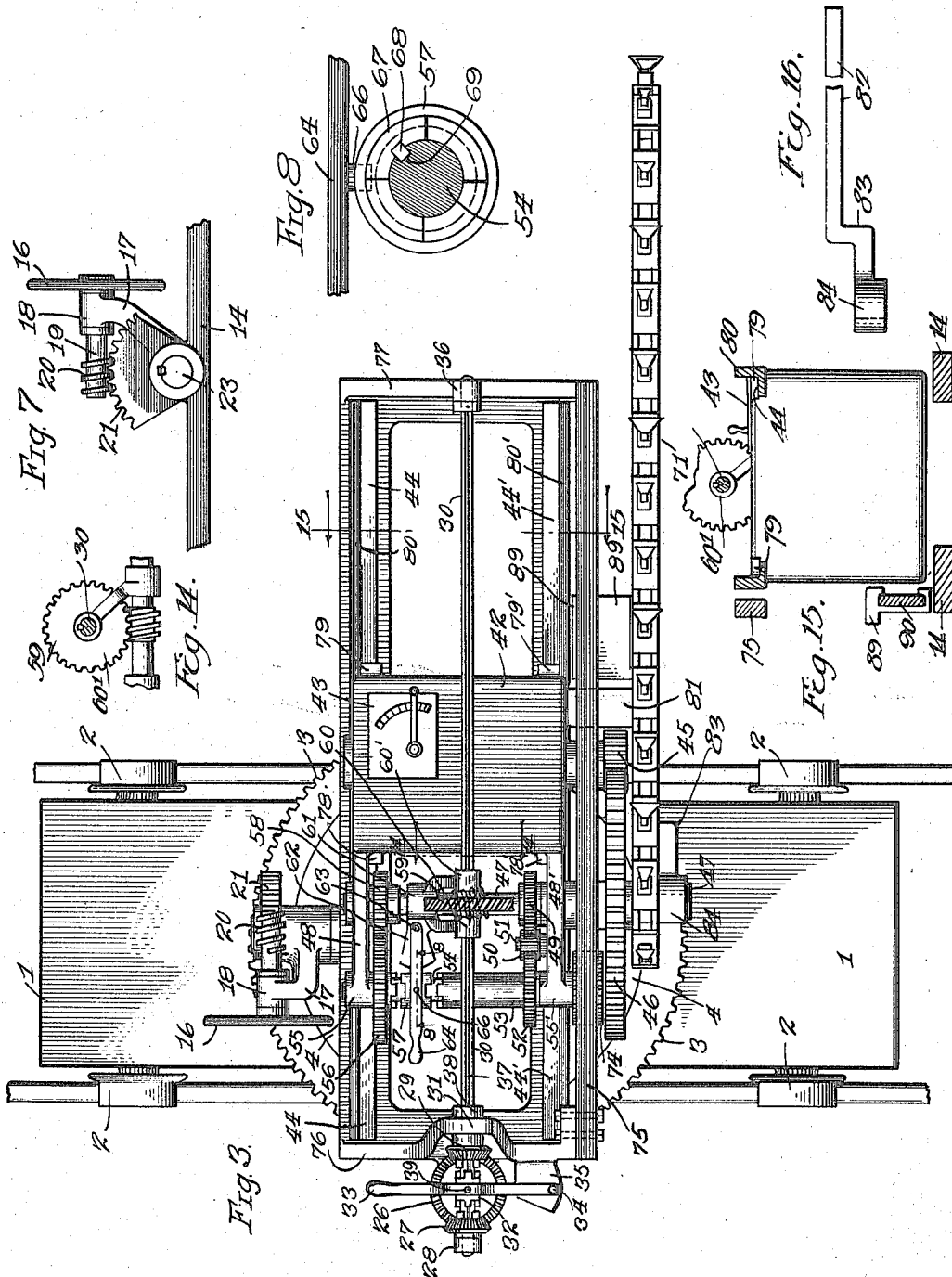
Attys.

1,233,494.

E. C. MORGAN.
MINING MACHINE.
APPLICATION FILED MAY 1, 1913.

Patented July 17, 1917.

3 SHEETS—SHEET 2.



Witnesses:
L. B. Graham
Arthur L. Sprinkle

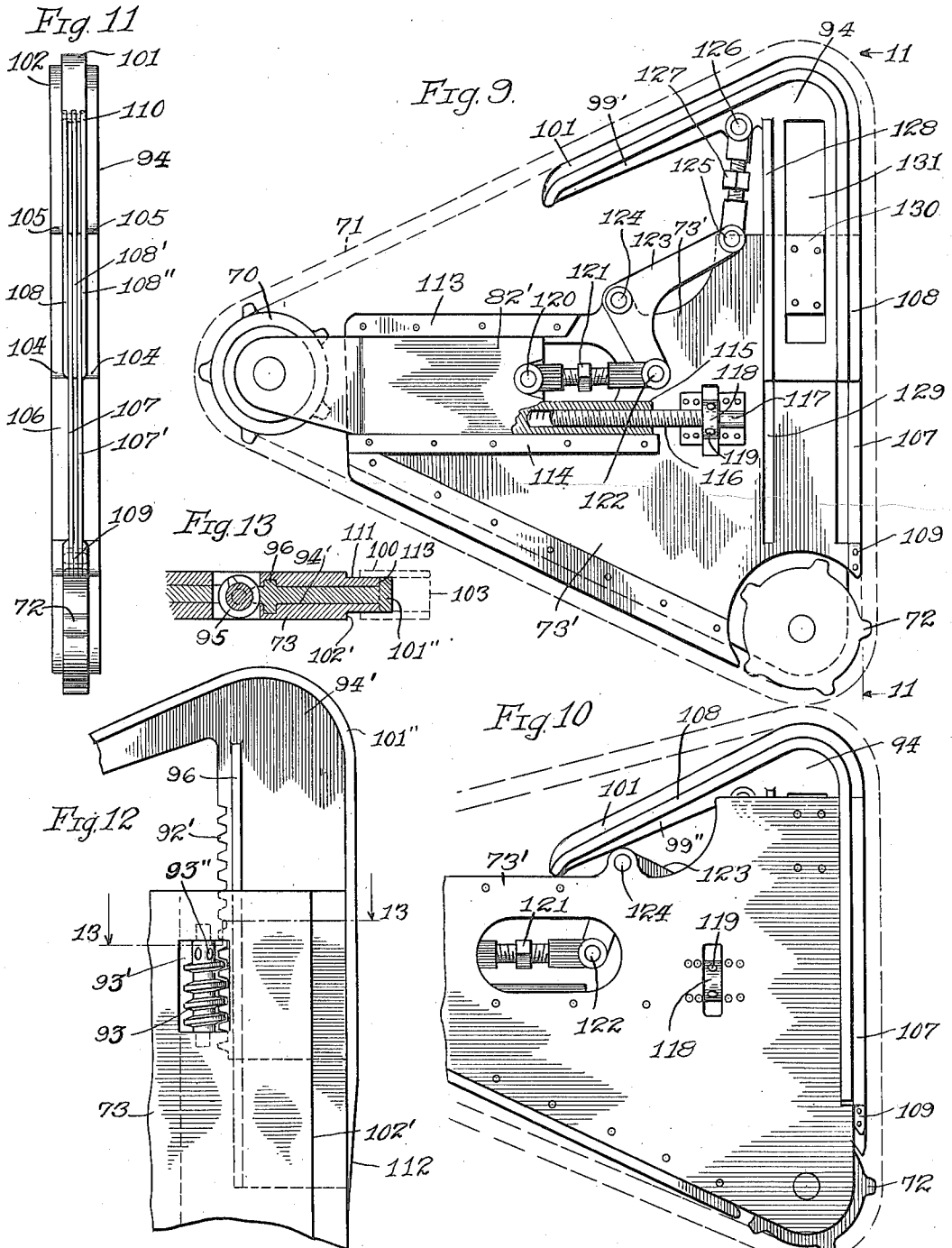
Inventor:
Edmund C. Morgan
By Brown Hopkins & Sprinkle

Att'y's

1,233,494.

Patented July 17, 1917.

3 SHEETS—SHEET 3.



Witnesses:
L. B. Graham
Arthur L. Franklin

Inventor:
Edmund C. Morgan
By: Brown & Hopkins, Patent Attorneys

Att'y's.

UNITED STATES PATENT OFFICE.

EDMUND C. MORGAN, OF CHICAGO, ILLINOIS.

MINING-MACHINE.

1,233,494.

Specification of Letters Patent.

Patented July 17, 1917.

Application filed May 1, 1913. Serial No. 764,755.

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Mining-Machines, of which the following is a specification.

My invention relates to mining machines and one of its objects is the provision of adjusting apparatus for the cutting mechanism to secure various lengths or heights of kerfs in the mine wall.

Another object of the invention is the provision of adjusting mechanism for the cutter frame of a mining machine whereby the cut produced may be varied in length or height and a cutter chain maintained substantially taut on such frame.

Other objects of the invention will appear hereinafter, the novel features and combination being set forth in the appended claims.

In my co-pending application Ser. No. 763,962, filed April 28, 1913, for an improvement in apparatus for mining purposes, I have disclosed and covered by claims, a turn-table mounted on a truck on which turn-table is pivoted a vertical frame, on which in turn is mounted kerf-cutting apparatus comprising a kerf-cutter operating in a vertical plane, a motor, etc., as shown in Figs. 1, 2 and 3.

In the accompanying drawings: Figure 1 is an elevational view of a mining machine embodying my invention; Fig. 2 is a rear elevation of said machine with the upper portions of the chain cutter broken away; Fig. 3 is a plan view of the mining machine mounted on a truck standing on rails; Fig. 4 is a cross sectional view on the line 4—4 of Fig. 1 looking in the direction of the arrows; Fig. 5 is a detail view illustrating the sliding connection between universal couplings at the rear end of the machine; Fig. 6 is a sectional plan view of Fig. 1 on the line 6—6; Fig. 7 is a view showing in side elevation the means for tilting the mining machine vertically; Fig. 8 is an enlarged sectional view taken on the line 8—8 of Fig. 3 looking in the direction of the arrows; Fig. 9 is an elevational view of a modified form of adjusting mechanism for the chain cutter; Fig. 10 is a view similar to Fig. 9 but showing the face plate in position and also indicating a modified form of guide track for the links of the chain; Fig. 11 is

a right-hand elevational view of Fig. 9 illustrating a modified form of continuous track for the links of the cutter chain; Fig. 12 illustrates the preferred form of adjusting the vertical cut of the cutting mechanism; Fig. 13 is a sectional view of Fig. 12 on the line 13—13 looking in the direction of the arrows and illustrating the preferred form of continuous wide track surface for the links of the cutter chain, where the cutting pressure is exerted; Fig. 14 is a sectional elevation of a portion of Fig. 3 on the line 14—14; Fig. 15 is a sectional elevation of Fig. 3 on the line 15—15; and Fig. 16 is a plan view of the rack bar 82 shown in Fig. 1.

Referring to Figs. 1, 2 and 3, it will be seen that the truck 1, which is provided with wheels 2, is secured to the fixed gear 3 of turn-table mechanism. The turn-table 4 is suitably pivoted on the truck concentrically with respect to the gear 3 and in such a manner as to securely hold the mining machine on the truck while permitting it to rotate through 360 degrees; the length of the truck is such that it will not interfere with the lower portion of the cutting mechanism when the machine is swung from one side of the truck to the other.

Extending from one side of the turn table 4 is a bracket arm 5 which supports a vertical bearing 6 in which is journaled a short shaft carrying in its lower end a pinion 7, shown in Figs. 1 and 2, in mesh with the gear 3. To the upper end of the shaft that is journaled in the bearing 6 is connected a universal coupling 8, this in turn being connected to another universal coupling 9. Between these universal couplings is a sliding connection shown more clearly in Fig. 5 and comprising a bar 10 fitting into a sleeve 11. The bar 10 is provided with a rib 12 which fits into a corresponding recess in the sleeve 11. Therefore, rotation of the sleeve 11 will be transmitted to the bar 10. If desired, the rod 10 may be square or triangular in cross section and the sleeve recessed in a similar manner so that rotary motion of either will be transmitted to the other and either may be extended with respect to the other by sliding engagement.

These universal couplings 8 and 9 with a sliding connection 13 therebetween permit the main frame 14 of the mining machine to be tilted on the trunnions 15, 15. This tilting is effected by operating a wheel 16 shown in Figs. 3 and 7. A bracket 17 is

secured to one side of the turn table 4 and supports at its upper end a bearing 18 in which is journaled a shaft 19 of the wheel 16. At the other end of the shaft 19 is secured a worm 20 which meshes with a segmental worm gear 21. The segmental gear 21 is keyed to a rock shaft 23, as shown in Fig. 7. This rock shaft is keyed or otherwise firmly secured to depending brackets 24 of the main frame 14. The rock shaft 23 is journaled or trunnioned in the bearings 15. It will therefore be seen that when the wheel 16 is operated to move the segmental gear in one direction or the other the shaft 23 will be rocked in the bearings 15, 15 and this will transmit an oscillating motion to the main frame 14 of the mining machine. The rear portion of the main frame will therefore be moved up or down but the sliding connection 13 between the universal couplings 8 and 9 will maintain the rotary transmitting connection between the pinion 7 and the source of power to which it is connected.

The mechanism for effecting the operation of the turn-table will now be described. To the rear end of the main frame 14 is secured a bracket arm 25 which forms a bearing at its lower portion for the shaft extending upwardly from the universal coupling 9. This shaft is connected to a bevel gear 26 meshing with a bevel gear 27. The latter is journaled in a bearing 28 at the upper end of the bracket arm 25, as shown in Fig. 1. Also meshing with the bevel gear 26 is another bevel gear 29 on the rear end of a shaft 30 which is journaled in a bearing 31 at the rear portion of the main frame at its upper side, as shown in Fig. 3. Between the bevel gears 27 and 29 is located a clutch 32 which may be operated by means of a lever 33 which is pivoted at 34 to a bracket 35 extending from the rear end of the main frame of the machine, as shown in Fig. 3. The bevel gears 27 and 29 are mounted loosely on the shaft 30. When the lever 33 is actuated to move the clutch 32 into engagement with the clutch teeth on the bevel gear 27 or on the bevel gear 29, motion will be transmitted from shaft 30 to the bevel gear 26 provided the shaft 30 is rotated.

The shaft 30 extends between the bearing 28 at the upper end of the bracket arm 25 and the bearing 36 at the front end of the machine. The shaft 30 is provided with a slot 37 throughout its entire length. The shaft 30 is therefore free to rotate in the bearings 28 and 36, and the gears 27 and 29 are mounted loosely on the shaft 30 so as to be free to rotate thereon. The clutch member 32, however, is splined to the shaft 30 so as to rotate therewith, although it may have a sliding motion thereon in either direction.

An electric motor 42, which may be oper-

ated by any suitable controlling apparatus 43, is supported on the tracks 44, 44' of the main frame 14. The motor frame is properly guided in the main frame 14 so as to have a longitudinal movement thereon in either direction. Connected to the motor shaft is a pinion 45 which is in mesh with a large gear wheel 46. The gear wheel 46 is keyed to a shaft 47 which is mounted in bearings supported by brackets 48, 48'. These brackets are rigidly connected to rear portions of the sides of the motor, as indicated in Figs. 2 and 3.

Keyed to the shaft 47 inside of the bracket 48' is a gear 49 which meshes with a small idler gear 50 mounted on a short shaft 51 extending laterally from the bracket 48'. The idler gear 50 meshes with a gear 52 which is connected to a sleeve 53. The latter is mounted loosely on a shaft 54 which is journaled at its ends in the bearings 55, 55' at the outer ends of the brackets 48 and 48', respectively. A gear wheel 56 is mounted loosely on the shaft 54 between bearing 55 and the clutch member 57. The gear 56 meshes with a gear 58 which is keyed to the shaft 47. On the shaft 47 is a worm which meshes with a worm gear 59, the latter being held directly above and in mesh with the worm on the shaft 47 by bearing arms 60, 60'. Mounted loosely on the shaft 47 is a sleeve 61 to which the bearing arms 60, 60' are attached. Extending rearwardly from the sleeve 61 is a bracket 62 to which is pivoted at 63 a lever 64 for operating the clutch member 57 to effect rotation of the gear 56 or the sleeve 53, depending upon which direction the lever 64 is thrown.

Fig. 8 is a cross sectional view on the line 8-8 of Fig. 3, looking in the direction of the arrows, and shows the lever 64 with a depending pin 66 fitting into a circumferential groove 67 in the clutch member 57. 68 designates a spline fixed to the clutch member 57 and slidable in a slot 69 of the shaft 54.

It will now be seen that when the motor is operated the motion of the pinion 45 will be transmitted to the gears 46, 49, 50 and 52 and this will effect the rotation of the sleeve 53. The sleeve 53 is mounted loosely on the shaft 54, however, and therefore the latter will not be rotated so long as the lever 64 remains in central position. The shaft 47 will be rotated and this will cause the gears 53 and 56 to rotate, but the latter is also mounted loosely on the shaft 54 and therefore it will not be rotated while the lever 64 remains in central position.

When the motor is operated to effect rotation of the shaft 47 the worm on this shaft will cause the gear wheel 59 to rotate. The gear wheel 59 is splined to the shaft 30 in the manner in which the clutch member 57 is splined to the shaft 54, as represented in

Fig. 8. The worm gear wheel 59 can therefore have a sliding motion longitudinally of the shaft 30 but it must rotate therewith. When the shaft 47 is rotated, rotary motion will be transmitted through the gear 59 to the shaft 30. When the lever 33 is moved in one direction the rotary motion of the shaft 30 will be transmitted by the clutch member 32 to the bevel gear 29 and this will cause the horizontal bevel gear 26 to rotate in a certain direction and transmit motion through the universal couplings to the turn table gearing. The entire mining machine may therefore be rotated in a certain direction. When the lever 33 is thrown back to central position the rotary motion of the entire mining machine will cease. When the lever 33 is thrown in the opposite direction the rotary motion of the shaft 30 will be transmitted to the gear 27 and the bevel gear 26 will be rotated in the opposite direction from what it did before. This will cause the turn table gearing to effect the return of the mining machine. It will therefore be seen that when the motor is operating the entire mining machine may be shifted through any desired arc of a circle by simply throwing in the clutch by means of the lever 33. The mining machine may be stopped wherever desired by moving the lever 33 to central position, and the mining machine may be rotated in the opposite direction by reversing the clutch. By means of this apparatus the mining machine may be rotated or oscillated, as desired, through any angle desired as the gear 3 is circular or continuous and the mining mechanism may be so constructed that the entire machine may be moved through an angle of 360 degrees. When the entire mining machine has been rotated to the desired position it may be tilted up or down by operating the wheel 16 in the manner before described.

Keyed to the outer end of the shaft 47 is a sprocket 70 over which runs a sprocket chain cutter 71, the forward portion of which is supported by a chain cutter frame as shown in Fig. 1. It will be noticed that a sprocket 72 is located at the lower forward portion of the chain cutter frame 73 but that there is no such sprocket at the upper portion of the said frame.

Keyed to the outer end of the shaft 54 is a gear 74 which meshes with a rack bar 75 extending between the heads 76 and 77 of the main frame 14. When the lever 64 is thrown so as to cause the sleeve 53 to be connected to the shaft 54 the gear 74 will be rotated in one direction, and when the lever 64 is thrown so as to cause the gear 56 to be connected to the shaft 54 then the gear 74 will be rotated in the opposite direction. The mechanism operated by the lever 64 is therefore a reversing apparatus

for the feed of the chain cutter forwardly or rearwardly. When the gear 74 is rotated it will cause the entire motor and the parts supported therefrom, including the chain cutter, to be moved forwardly or rearwardly, the motor sliding on the tracks 44 and 44', the shoes 78, 78' and 79, 79' being in direct engagement with the said tracks and being confined by the vertical strips 80, 80' on the main frame 14 to longitudinal paths.

Fixed to and extending laterally from the frame of the motor 42 is a horizontal bracket 81 which is fixed at its outer end to a rack bar 82, the forward portion of which extends through a central longitudinal slot in the frame 73 and the rear end of which is bent laterally at 83 and then is mounted at 84 on the outer end of the shaft 47, as shown in Fig. 1. In this way the rack bar 82 is held rigidly in place and will move longitudinally when the motor 42 slides on the tracks 44 and 44'. The frame 73, however, may be moved longitudinally with respect to the rack bar 82, there being provided a slot 85 in the side of the frame 73 so as to prevent the bracket arm 81 from interfering with such movement of the frame 73.

Journalled in bearings in an opening 86 is a worm 87 which may be turned manually by placing bars into openings 88. The worm 87 meshes with the rack on the rack bar 82 and when the worm is turned the frame 73 may be thrust forwardly or rearwardly. The frame 73 is supported on the main frame 14 by means of a bracket 89, which is fixed to the inner lateral face of the frame 73 and extends over a vertical longitudinal slide bar 90. The inner ends of the bracket 89, which is fixed to the inner plate of the frame 73, is C-shaped, as illustrated in Fig. 2, and thereby forms an interlocking connection with the longitudinal slide bar 90. The bar 90 is fixed at its ends to the front and rear faces 77 and 76 of the main frame 14, as shown in Fig. 1. The rack bar 82 fitting into the slot of the frame 73 and the bracket 89 connected to the bar 90, as shown in Fig. 2, maintain the frame 73 in vertical position or in the plane of the cutter chain 71. The view shown in Fig. 4, which is taken on the line 4-4 of Fig. 1 looking in the direction of the arrows, shows the bracket 81 connected to the motor frame 42 at one end and at its other end to the rack bar 82. The frame 73 may comprise two plates connected together securely and spaced apart, in which event the slot for the rack bar 82 may be definitely located by filling strips 91 and 91' rigidly secured in proper position to the plates forming the frame 73.

At the forward portion or outer end of the frame 73 is located a supplemental frame 92,

which is vertically adjustable so as to vary the vertical dimension of the kerf cutter. This supplemental frame comprises a rack 92', which meshes with the worm 93 mounted vertically in the opening 93', as shown in Fig. 1, by being journaled at its ends. Openings or recesses 93'' may be provided for receiving a bar or other tool for turning the worm 93 to effect the lifting or lowering of the supplemental cutter frame 92.

On the lateral faces of the supplemental cutter frame 92 are located vertical guiding strips 96, 96', which fit into corresponding grooves in the frame 73, as shown in Figs. 1 and 6. If desired, a slot 97 may also be provided in the central vertical portion of the supplemental frame 92, through which extends the guide roller 98. This construction may be used in addition to the tongue and groove guiding mechanism, but it may be omitted if desired.

It will be observed that the adjustable frame 92 is provided in the rear with an extending guiding arm 99, which is inclined somewhat below the direct line of the cutter chain when the latter is taut. The pull on the chain is such that the lower length is held taut while the upper portion is somewhat slack, and therefore will gradually ride up the incline of the guiding arm 99. The cutter sockets of the chain are connected by links 100 which are spaced to fit over the vertical rib 101 and slide on the laterally extending tracks 102. The vertical guiding rib 101 extends along the upper surface of the guiding arm 99 and also downwardly at the front portion of the supplemental frame 92, as shown in Fig. 6. It will also be seen that the cutter sockets 103 bear on their under sides on the ribs 101. The links 100 may, therefore, ride on the lateral tracks 102 and at the same time the cutter links 103 may run on the vertical rib 101. If desired, the vertical rib 101 may take substantially all the wear, but it is preferable to distribute the pressure of the cutter chain over a larger surface. The vertical rib track 101 should, however, be made comparatively wide, so as to correspond in width to the thickness of the socket links 103.

When the worm 93 is turned in one direction, the supplemental chain cutter frame 92 may be moved upwardly to increase the vertical dimension of the kerf cutter. By turning the worm 93 in the opposite direction, the supplemental chain cutter frame 92 may be lowered, thus decreasing the vertical dimension of the kerf cutter. The downward movement of the supplemental frame 92 may be limited by the shoulder 104, against which the lower end of the track 102 will abut. The vertical track 101 should, however, continue to a lower position, so as to maintain in continuity the track for the cutter chain at this portion of the appa-

ratus. The vertical track 101 would then be engaged by the cutter socket links 103 when the links 100 passed the open space between the shoulder 104 and the lower end 105 of the lateral tracks 102. And when the socket links passed an open space, the links 100 would bear against the lateral tracks 106 at the outer end of the main chain cutter frame 73.

In Figs. 9, 10 and 11, I have shown a construction wherein all of the links of the cutter chain may engage the tracks, whether the supplemental frame 94 occupies its lowermost or uppermost position. The front face of the cutter frame 73' is provided with two vertical strips 107, 107', which dovetail into three similar strips 108, 108' and 108'', as shown in Fig. 11. The vertical strips 107, 107' may be riveted at 109 to the frame 73', as shown in Figs. 9, 10 and 11. The upper ends of the strips 108, 108' and 108'' may be riveted at 110 to the wide track 101'. It will now be evident that when the supplemental cutter frame 94 is moved upwardly or downwardly, the continuity of the track for the socket links is always maintained.

In the arrangement shown in Fig. 1, when the links 100 pass over the open space between the ends 104 and 105 the cutter links 103 will bear on the vertical track 100, and when the cutter links pass over the open space 111 the side links 100 will bear on the tracks 106. In the arrangement shown in Fig. 11, however, the central track takes the entire thrust when the open space between the ends 104 and 105 is passed over by the side links 100. If desired, the central track comprising the vertical dovetailing strips may take the entire thrust of the cutter chain so that the side links 100 will always be out of contact with the lateral tracks, this being, in fact, the preferred manner of supporting the outer portion of the chain. The preferred construction for this is shown in Figs. 12 and 13. The supplemental cutter frame 94', shown in Fig. 12, is provided with a wide track 101'' extending over its entire outer surface. It will be seen, from Fig. 13, that the central portion of the frame 94' is in the shape of a plate provided with vertical guiding ribs 96 which fit into corresponding grooves in the main cutter frame 73. The track 101'' is made as wide as the thickness of the cutter links, and the shoulders 102'' are farther from the outermost edges, the lateral faces 111 acting merely as guides for the side links 100. The thrust of the chain is taken by the wide track 101'' against which the cutter links 103 bear directly. It will be seen that the lower end of the track 101'' of the supplemental frame 94' is inclined at 112 so as to merge into the surface of the outer edge surface of the frame 73, which

edges or surfaces are designated 113 in Fig. 13, the track 101'' being of a width equal to the width of the edge or track surfaces 113. It will also be noted that the tapered or inclined end portion 112 projects below the lower end of the supplemental frame 94' so as to overlap and cover the slot in the main cutter frame 73 in which the supplemental frame operates, thereby preventing dust and grit from entering this slot. It will be seen that when the cutter links 103 run down the incline 112 and off the same they will engage the outer edges 113 and still be held in proper position because the lateral links 100 engage the faces 111 without touching the shoulders 102'. By means of this construction the continuity of the track for the cutter chain may be maintained, although the supplemental chain cutter frame 94' may be moved to various positions. In Fig. 12 the supplemental frame 94' has been moved nearly to its uppermost limit but the continuity of the track for the cutter chain is maintained in the manner above described. By this construction, considerable latitude of movement of the supplemental frame 94' is permitted without interfering with proper thrust bearing surface for the cutter chain.

In Figs. 9 and 10 I have shown mechanism by which the vertical dimension of the cutter may be varied by a single operation and the cutter chain maintained in taut position. At the same time that the supplemental cutter frame 94 is moved upwardly the main chain cutter frame 73' is moved inwardly so that the periphery of the entire support for the cutter chain remains substantially the same. At the inner end of the frame 73' are guides 113 and 114 for the vertical plate 82' at the inner end of which is pivoted the sprocket 70. The forward end of the plate 82' is provided with a tubular extension 115 which is internally screw-threaded to receive the screw-threaded rod 116, the latter being journaled in the bearing 117 at its outer end and provided with a nut 118 which is provided with openings 119 to receive a rod by means of which the screw-threaded bar 116 may be turned.

Pivoted at 120 to the plate 82' is a link which comprises a right and left handed screw-threaded rod provided with an intermediate nut 121. This link is pivoted at its outer end at 122 to a bell crank lever 123 which is fulcrumed at 124 to the frame 73'. The upper end of the bell crank 123 is pivoted at 125 to a link which is pivoted at 126 to the supplemental chain cutter frame 94. This link is also provided with a right and left handed screw threaded rod which is provided with an intermediate nut 127. By actuating the nuts 121 and 127 to the proper positions the frames 73' and 94 may be adjusted.

The frame 94 may be guided vertically by the strip or flange 128 fitting into the slot 129. It may be further guided by the rectangular lock 130 fitting into the slot 131.

It is evident that when the nut 118 is turned in one direction the frame 73' will be moved inwardly. The plate 82' will remain stationary. The inward movement of the frame 73' would cause the fulcrum 124 to move inwardly also and therefore the pivotal point 122 would be moved upwardly. The bell crank 123 would therefore be in a clock like direction and the upper end thereof at 125 would be moved to a higher position and this would cause the frame 94 to be moved upwardly. Therefore, as the frame 73' moves inwardly the frame 94 would be moved upwardly. The vertical dimension of the cutter would thus be increased and the entire cutter shortened to compensate for the tendency to make the chain taut. When the nut 118 is moved in the opposite direction the frame 73' may be moved outwardly. This would cause the fulcrum 124 to be moved outwardly and the pivotal point 122 to be moved downwardly. The bell crank 123 would then be moved in a clock-like direction, the pivotal point 125 moving downwardly and carrying with it supplemental frame 94. In this way the vertical dimension of the cutter apparatus would be shortened.

In some cases the cutter chain may have considerable slack, in which event it would be preferable to provide the supplemental frame 94 with a rearwardly extending arm 99' which would be inclined below the path that the chain would take if the latter were taut. The pull on the chain being such that the upper portion thereof will be slack, the vertical guiding track will receive the cutter chain and properly guide it up the incline. The apparatus for the simultaneous operation of the cutter chain frames may, in some cases, not be properly adjusted and at times taut and at other times have considerable slack. The greater inclination of the rearwardly extending arm 99' would then be of particular advantage as it could be relied upon to properly guide the chain both when taut and when slack. In other words, the greater inclination of the arm 99', as shown in Fig. 10, precludes the necessity of the maintenance of accurate adjustment of the links by means of the nuts 121 and 127. It will be evident that if these do not happen to be nicely adjusted the chain may at times be taut and at other times slack but the difference would not be of practical importance and in both cases the chain would be properly guided as it passes on to the tracks. The pull on the chain is exerted by means of the sprocket 70 which is transmitted to the sprocket 72 through the chain. The pull is resisted

by the cutters during the cutting operation and the thrust of the chain against the forward edge of the cutter frames is taken by wide tracks. Therefore, I have omitted
 5 the sprocket wheel from the upper portion of the frame and substituted therefor guide ways over which the chain simply slides without undue wearing.

Obviously those skilled in the art may
 10 make various changes in the details and arrangements of parts without departing from the spirit and scope of my invention as defined by the claims. I desire, therefore, not to be restricted to the precise construction herein disclosed.

What I claim and wish to have secured by Letters Patent of the United States is:

1. In a mining machine, the combination
 20 with a frame, of a chain cutter mounted on the periphery of said frame in the plane of the latter for cutting a plane kerf in a mine wall, and means for varying the dimensions of said frame to effect corresponding lengths of plane cuts by said chain cutter without
 25 varying the length of the latter.

2. In a mining machine, the combination with a frame, of a driving sprocket connected thereto, an idler sprocket connected to one corner of said frame, a guiding track
 30 on said frame at another corner thereof, a chain cutter extending around said driving sprocket, said idler sprocket, said frame, and said guiding track, in the plane of said frame, means on said frame for varying the
 35 position of said guiding track to vary the cutting length of said chain cutter, and means for adjusting the position of said frame relatively to said driving sprocket to compensate for the adjustment of said guid-
 40 ing track to maintain the length of the path of travel of said chain cutter substantially the same.

3. In a mining machine, the combination with a main supporting frame, of a driving
 45 sprocket, a cutter head slidably mounted on said main supporting frame, said cutter head comprising two parts relatively movable, a cutter chain mounted on said cutter head and meshing with said sprocket, means for
 50 positively adjusting the position of said cutter head on said main supporting frame, and means for adjusting the relatively movable parts of said cutter head in accordance with the adjustment of the cutter head on said
 55 main supporting frame to vary the length of that portion of the cutter frame producing the cut in a mine wall without substantially varying the length of the path of travel of said chain cutter.

4. In a mining machine, the combination with a chain cutter frame comprising an ad-
 60 justable portion, means for moving said adjustable portions to vary the lengths of the said frame at one end thereof, a driving de-
 65 vice, means for supporting said frame and

driving device, a chain cutter mounted on said driving device and on said frame, and means for moving the entire frame to or from said driving device.

5. In a mining machine, the combination
 70 with a main frame, of a sprocket wheel, a supplemental frame, means for supporting said main and supplemental frames and said sprocket, means for adjusting the position of said supplemental frame with respect to said
 75 main frame, a chain cutter mounted on said sprocket and said frames to cut a kerf in a plane passing through said frames, and means for adjusting the position of the main frame relatively to said sprocket.

6. In a mining machine, the combination with a cutter head comprising a main frame and a supplemental frame, of a sprocket,
 80 means for supporting said cutter head and said sprocket, a chain cutter mounted on said sprocket and said cutter head to cut a kerf in a plane extending through said cutter head, worm gearing for changing the po-
 85 sition of said supplemental frame relatively to said main frame, and separate worm gear-
 90 ing for changing the position of said main frame relatively to said sprocket.

7. In a mining machine, the combination with a triangular frame, of guides thereon
 95 for a cutter chain to cut a kerf in a plane extending through said frame, and adjust-
 100 ing means for lengthening or shortening the cutting dimension of the forward end of said frame while maintaining the length of travel of the chain substantially the same
 for all such variations.

8. In a mining machine, the combination of a frame comprising two portions movable
 105 relative to each other, of guides on said frame for a cutter chain to cut a kerf in a
 110 plane extending through said frame, an arm longitudinally extending from said frame, and means for adjusting the position of said frame and of one of said portions to change the cutting dimension of said frame
 without changing the length of travel of said chain.

9. In a mining machine, the combination with a main frame, of guides thereon for a
 115 chain cutter, a driving sprocket, connections between said main frame and said sprocket
 120 for adjusting the position of said main frame, a supplemental frame connected to said main frame and guided thereon, cutter chain guides on said supplemental frame
 125 in alinement with the cutter chain guides on the main frame in a plane extending through said frames to enable said chain
 cutter to cut a kerf in the plane of said frames, a rearwardly extending cutter chain
 130 guide arm connected to said supplemental frame, and gearing for moving said supple-
 mental frame relatively to said main frame to change the dimensions of the cut capable
 of being produced by the chain cutter.

10. In a mining machine, the combination with a frame, of chain cutter guides thereon, a supplemental frame guided on said first named frame at one corner thereof, cutter chain guides on said supplemental frame to enable said cutter to cut a kerf in a plane extending through said frames, a rearwardly extending guide arm connected to said supplemental frame, means for varying the length of the cut capable of being produced by said chain cutter, a sprocket wheel connected to the apex of said first named frame, a driving sprocket and a chain cutter meshing with said sprocket wheel and said driving sprocket and extending over the guides on said first named frame, supplemental frame and guide arm.
11. In a mining machine, the combination with a main frame, of chain cutter guides thereon, a chain cutter capable of cutting a kerf in the plane of said main frame, a supplemental frame guided on said main frame, a driving sprocket, connections between said driving sprocket and said main frame, and means for varying the position of both the main frame and the supplemental frame to change the length of cut capable of being produced without substantially changing the length of the path of travel of said chain cutter.
12. In a mining machine, the combination with a main frame, of a supplemental frame guided thereon at one corner thereof, cutter chain guides connected between said main frame and said supplemental frame to secure uninterrupted bearings for said chain, a driving sprocket wheel, a chain cutter meshing with said sprocket wheel and extending over said guides around the main frame and supplemental frame to enable said cutter to cut a kerf in the plane of said frames, and means for varying the cutting dimension of the main and supplemental frames without materially varying the length of the path of travel of said chain cutter.
13. In a mining machine, the combination with a main frame, of a supplemental frame guided thereon, cutter chain guides on said main frame and said supplemental frame, a sprocket idler at one corner of said main frame, a driving sprocket, a chain cutter meshing with said driving sprocket and said idler sprocket and extending over the guides on said main frame and said supplemental frame, a plate slidably connected to said main frame, and pivotally connected to said driving sprocket, and means mounted on the main frame to adjust the path of travel of said chain cutter by effecting the inward movement of the main frame and the outward movement of the supplemental frame or vice versa.
14. In a mining machine, the combination with a main frame, of a supplemental frame at the upper forward corner of said main frame, cutter chain guides at the forward portion of said main and supplemental frame, a sprocket at the lower forward corner of said main frame, a plate mounted on said main frame to slide therein, a driving sprocket at the rear end of said plate, and means for adjusting the path of travel of said chain cutter by effecting outward movement of the supplemental frame and inward movement of the main frame or inward movement of the supplemental frame and outward movement of the main frame.
15. A mining machine comprising a cutter chain for producing a plane kerf and having a channel formed on one side thereof, an extensible supporting frame in the plane of said chain and in the plane of the kerf produced thereby, and relatively overlapping track portions on said frame forming a continuous bearing surface for said chain throughout the entire length of said track portion.
16. A mining machine comprising a cutter chain composed of intermediate cutter links and projecting side links forming a continuous channel, a frame for supporting said chain cutter on the periphery thereof and in the plane thereof to produce a plane kerf, said frame comprising members relatively movable longitudinally of the channel and track portions on said members fitting said channel, one of said track portions overlapping the other to form a continuous bearing surface for the said chain irrespective of the relative positions of said frame members, the projecting side links being in engagement with track portions where the intermediate links are out of contact therewith, and the intermediate links engaging track portions where the side links are out of contact therewith.
17. A mining machine comprising an extensible frame, an endless cutting chain mounted to travel around the periphery of said frame to cut a kerf in a plane extending through said frame, a driving sprocket for the chain mounted at one corner of said frame, a roller guide for the chain mounted at another corner of said frame, a stationary guide for the chain mounted at the third corner of said frame, and means for adjusting the position of said guide to vary the cutting dimension of said cutting chain to cut said kerf while maintaining the length of travel of said cutting chain substantially the same.
18. A mining machine comprising a triangular frame including an extensible member for varying the length of one of the sides of said frame, a continuous cutter chain mounted to travel around the periphery of said frame, a curved fixed guide on said extensible member for the chain formed at one end of the variable length side of said frame, means for adjusting the

position of said extensible member, a rotary guide for the chain at the other end of said side, driving means for the chain at another corner of said triangular frame, and means
5 for adjusting the position of said frame relatively to said driving means.

19. In a mining machine, the combination with a cutter head, of a cutter chain
10 head, means for adjusting the cutting length of the cutter chain without substantially varying the length of its path of travel, means for operating said cutter

chain, a main frame for supporting said cutter head, and a supplemental sliding bearing connected to said cutter head to reinforce the support thereof. 15

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 29th
20 day of April, A. D. 1913.

EDMUND C. MORGAN.

Witnesses:

CHARLES H. SEEM,
M. HARTY.