Feb. 21, 1928. 1,659,889

E. C. MORGAN

MINING MACHINE

Original Filed April 24, 1916 10 Sheets-Sheet 1

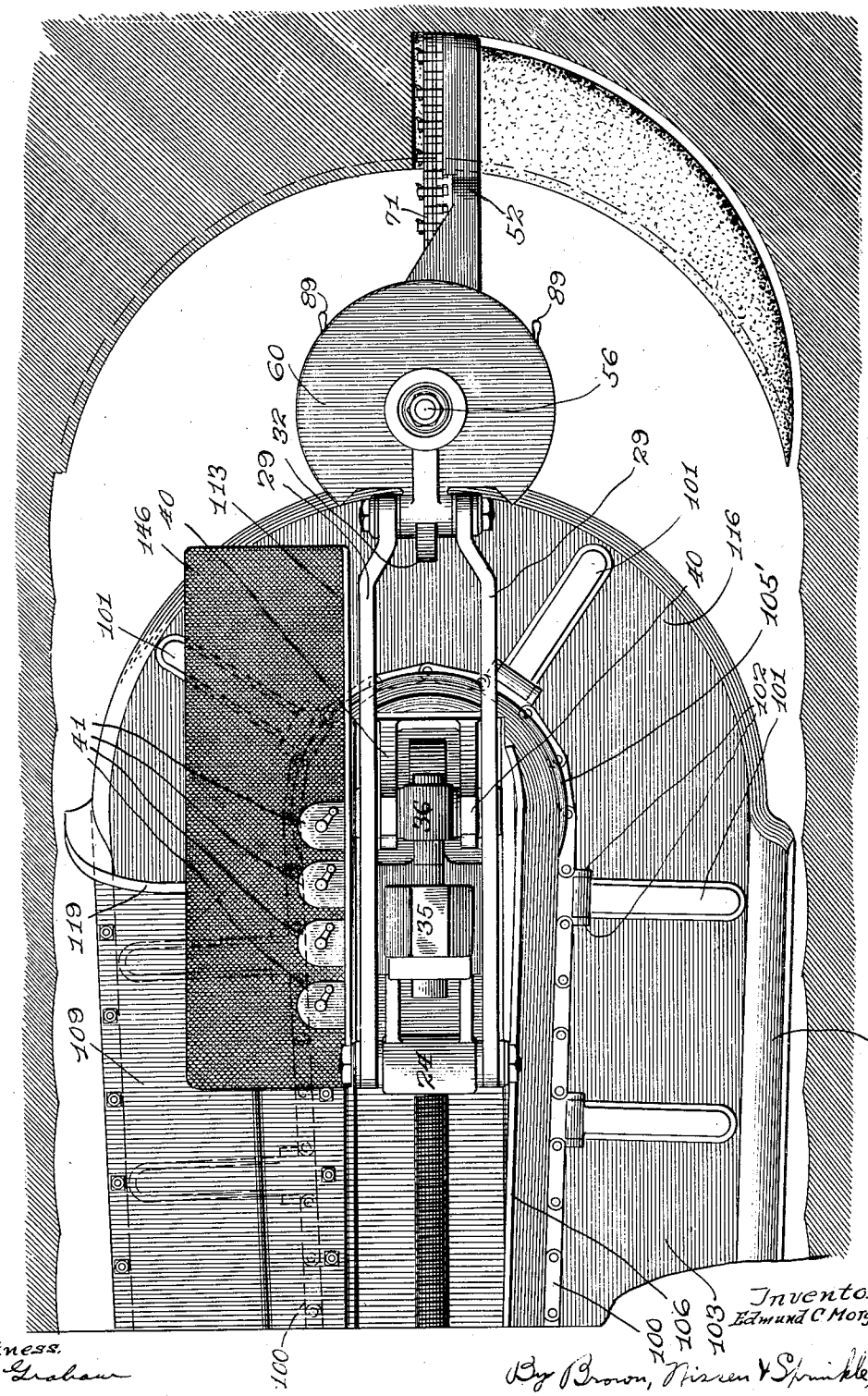

Fig. 1

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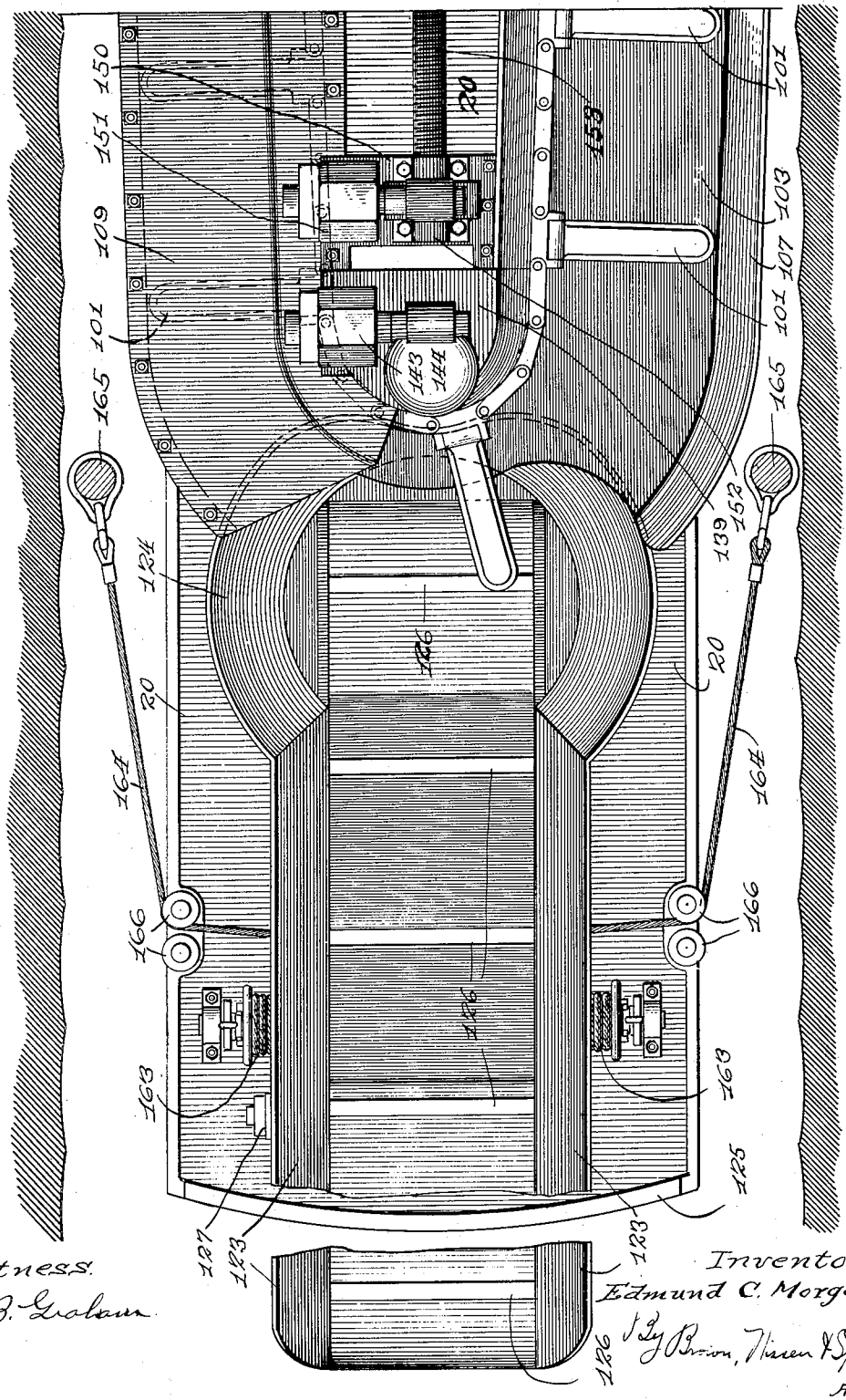

Fig. 2.

Witness:
L. B. Graham

Inventor:
Edmund C. Morgan
by Brown, Thurston & Sprinkle
Attys.

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E. C. MORGAN

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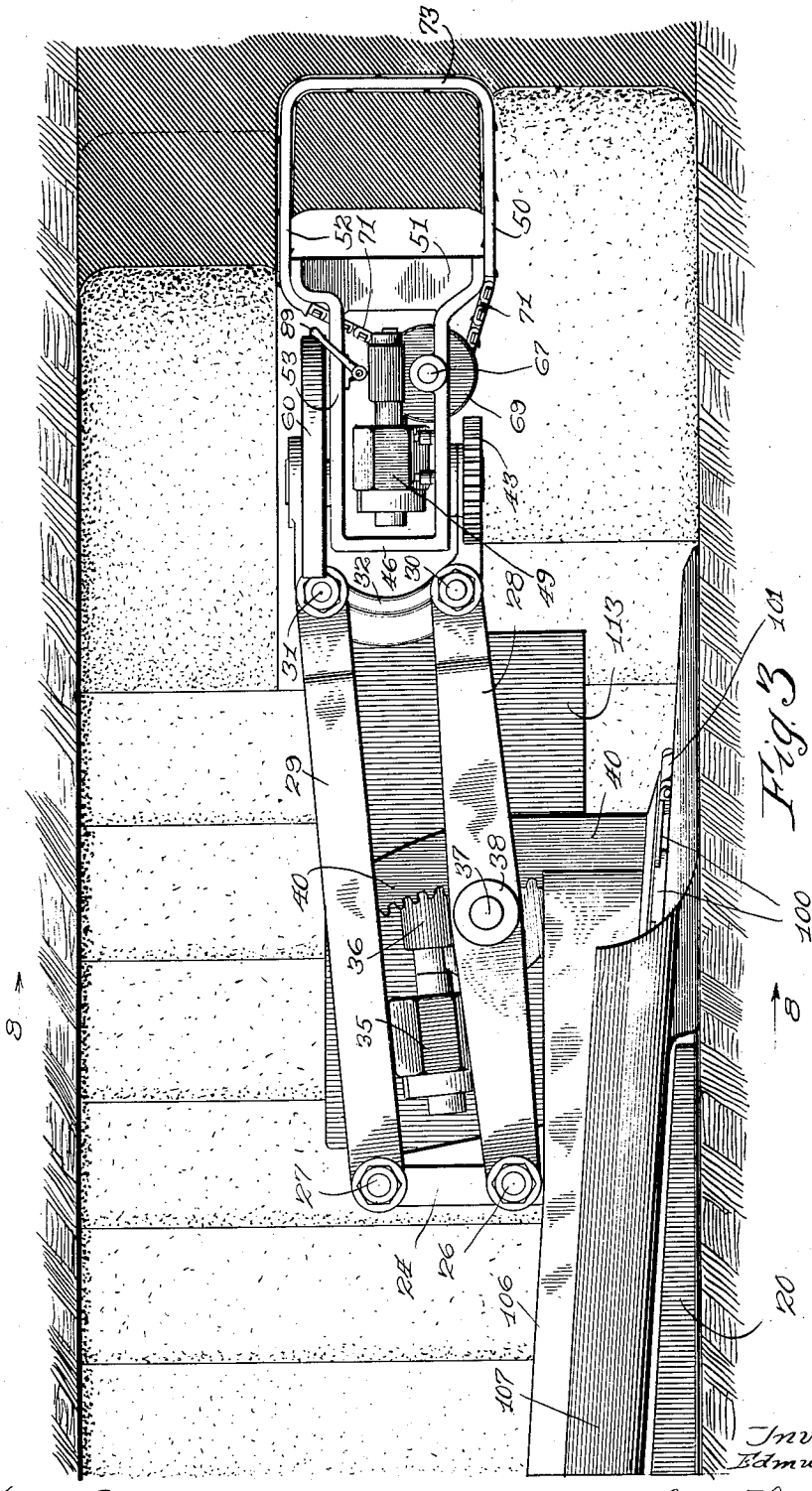

Fig. 3

Witness.
L. B. Graham

Inventor:
Edmund C. Morgan
By Brown, Dissen & Sprinkle
Attys.

Feb. 21, 1928. 1,659,889

E. C. MORGAN

MINING MACHINE

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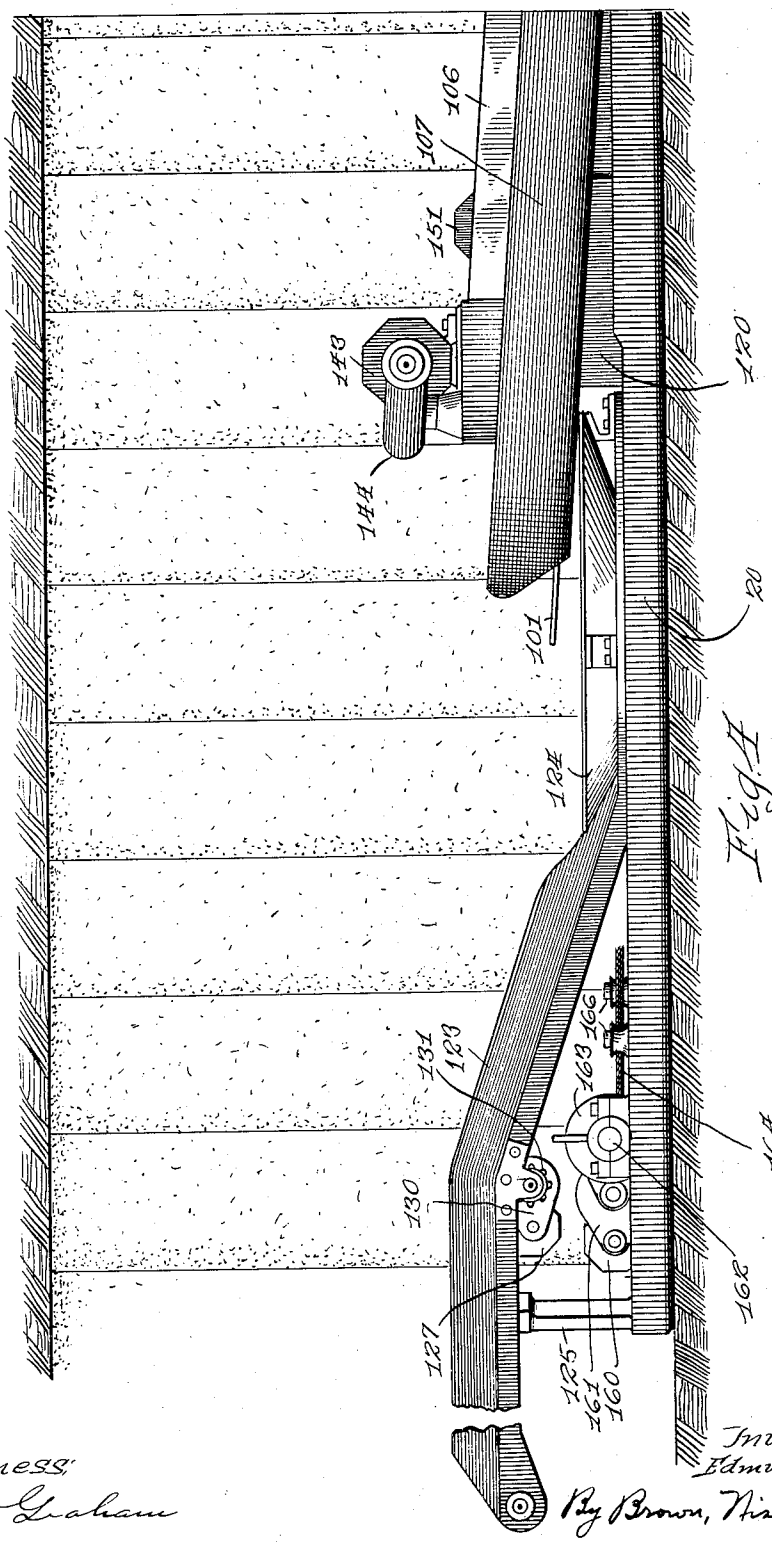

Fig. 4

Witness:
L. B. Graham

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

Feb. 21, 1928. 1,659,889

E. C. MORGAN

MINING MACHINE

Original Filed April 24, 1916 10 Sheets-Sheet 5

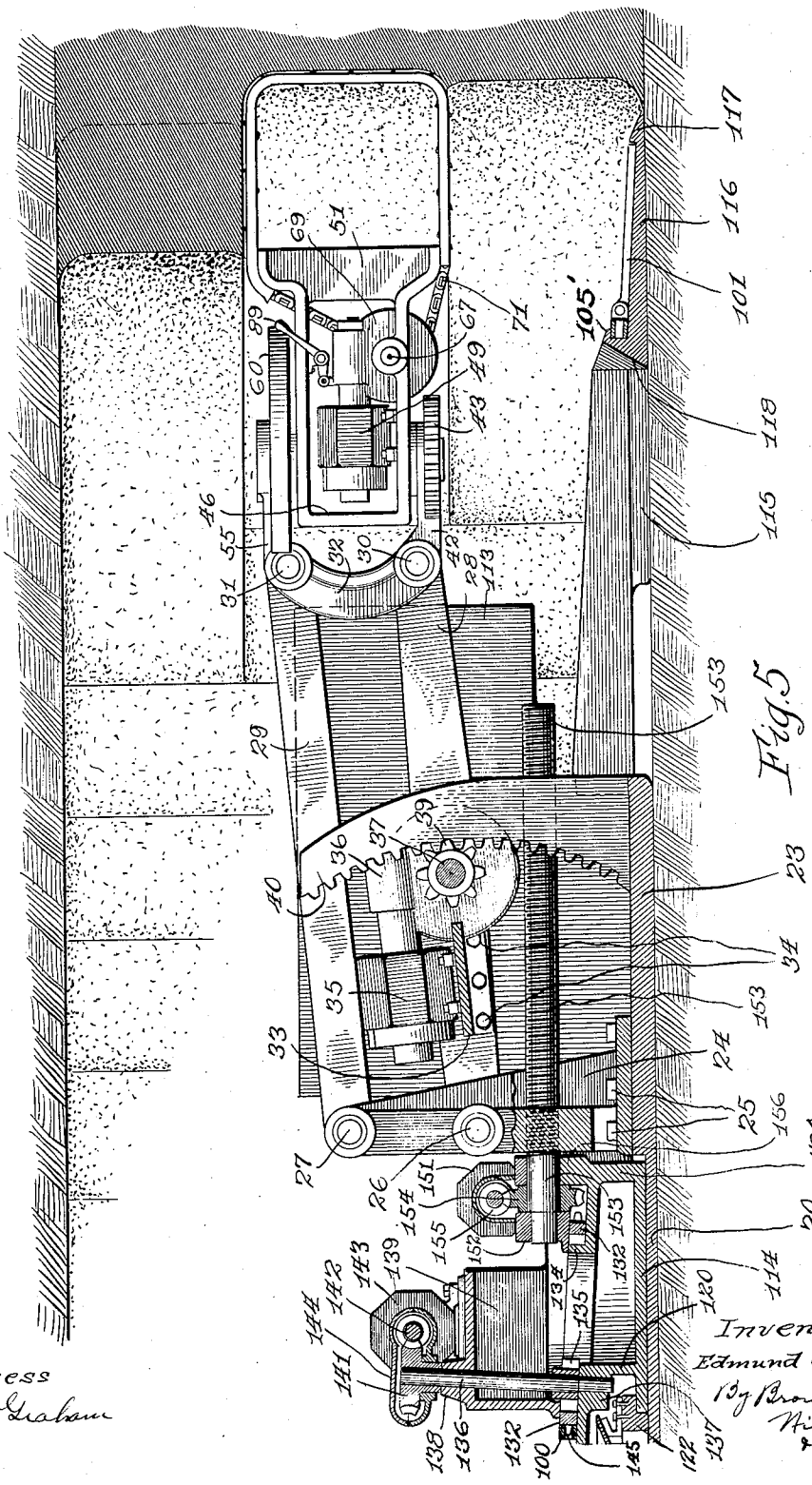

Fig. 5

Witness
L. B. Graham

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

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E. C. MORGAN

MINING MACHINE

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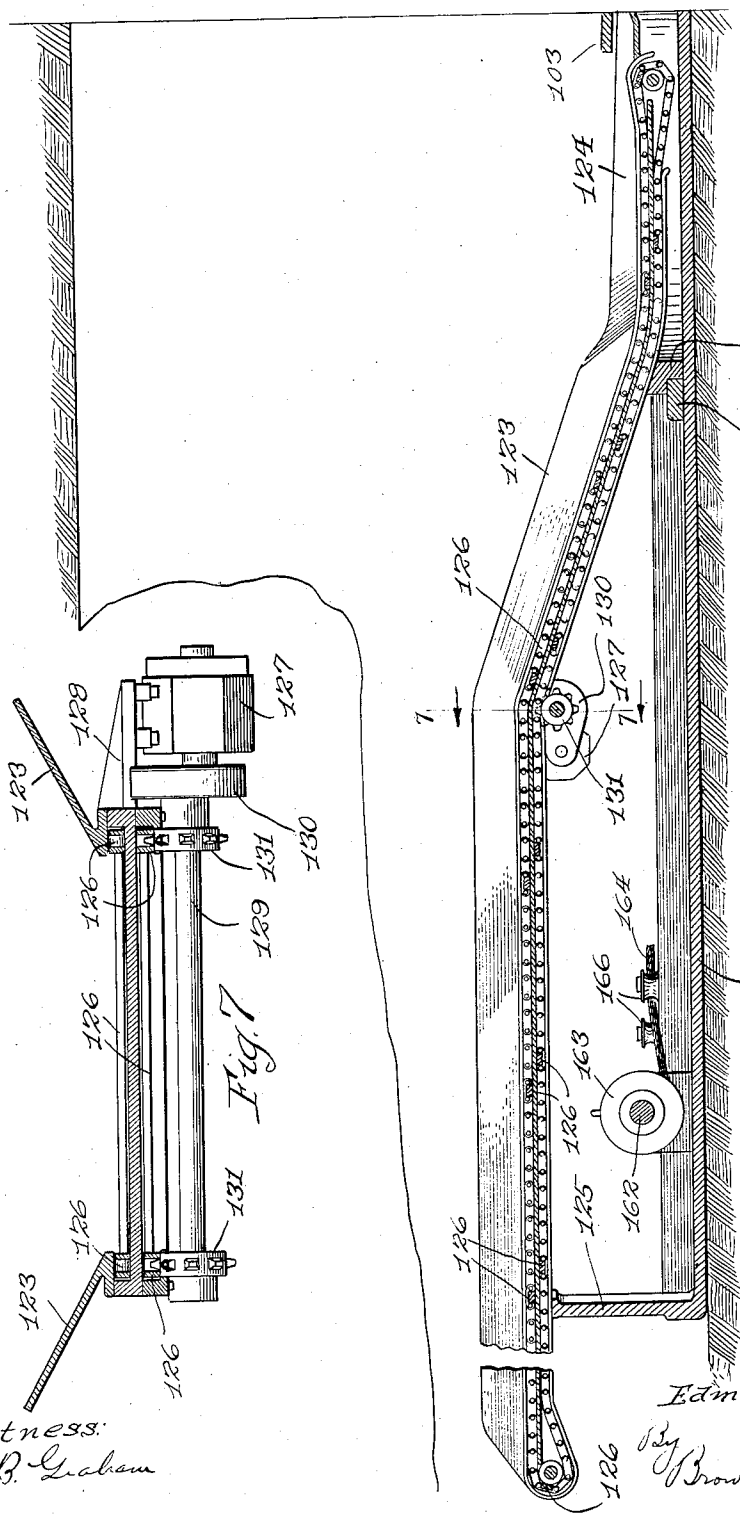

Fig. 6.

Fig. 7.

Witness:
L. B. Graham

Inventor:
Edmund C Morgan
By Brown, Nissen & Sprinkle
Attys

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E. C. MORGAN

MINING MACHINE

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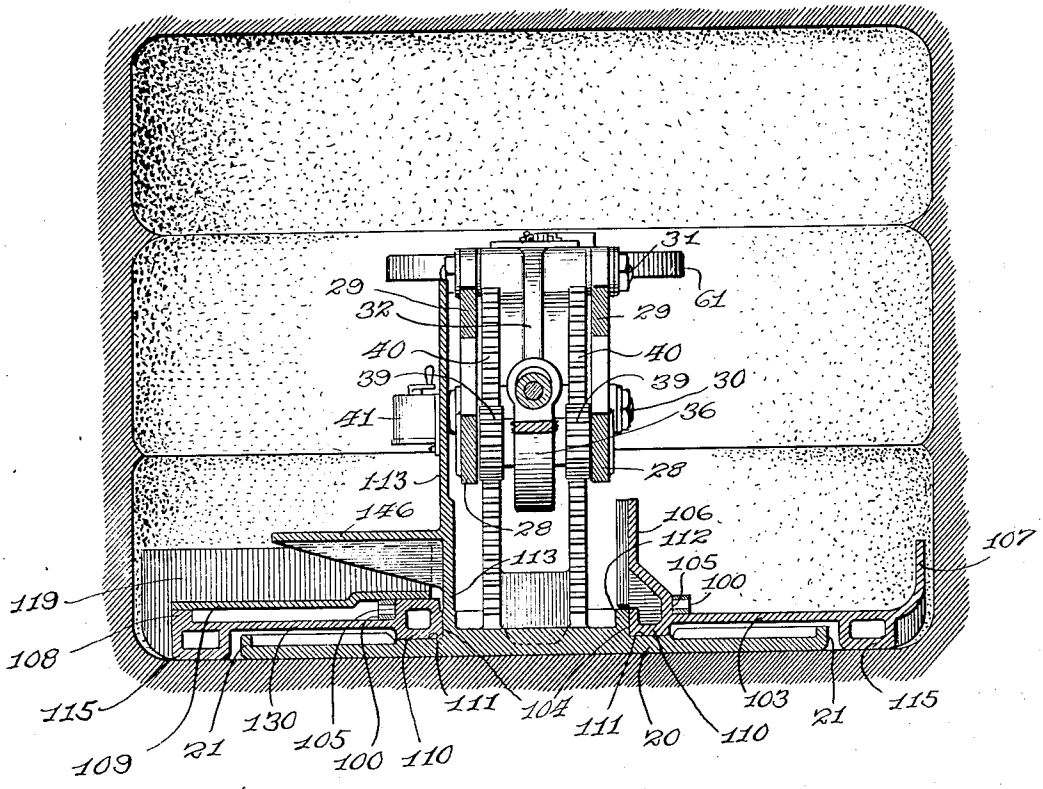
Fig. 8



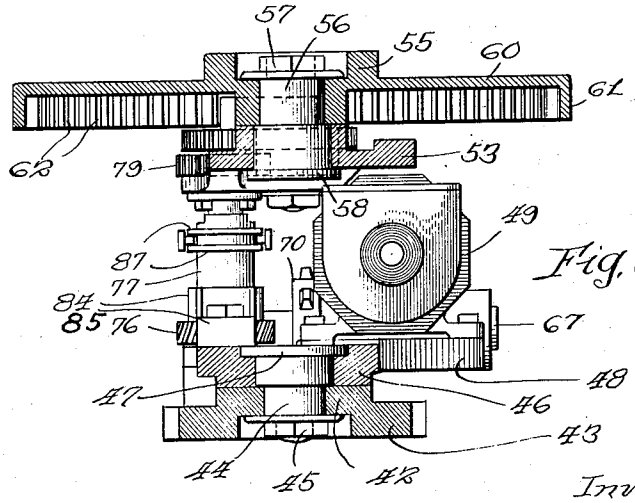


Fig. 9

Witness
L. B. Graham

Inventor:
Edmund C. Morgan

By Brown, Wissen & Sprinkle
Attys.

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E. C. MORGAN

MINING MACHINE

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Fig. 10

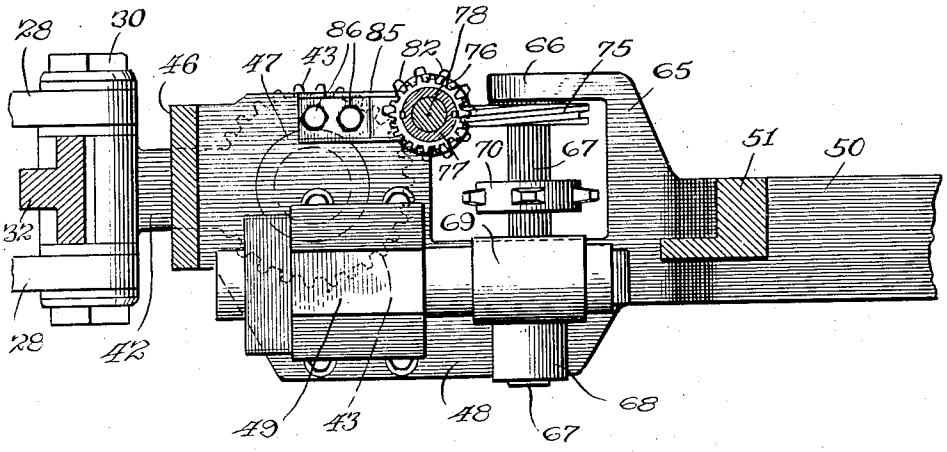
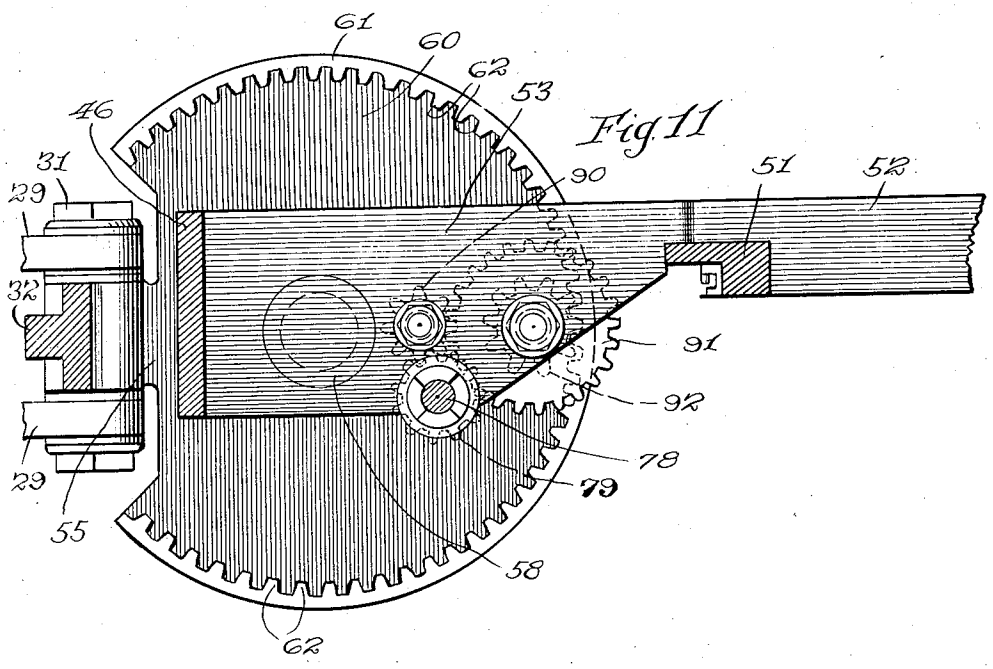


Fig 11



Witness
L. B. Graham

Inventor:
Edmund C. Morgan
By Brown, Wissen & Swinkle
Att'y.

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E. C. MORGAN

MINING MACHINE

Original Filed April 24, 1916 10 Sheets-Sheet 9

Fig. 14

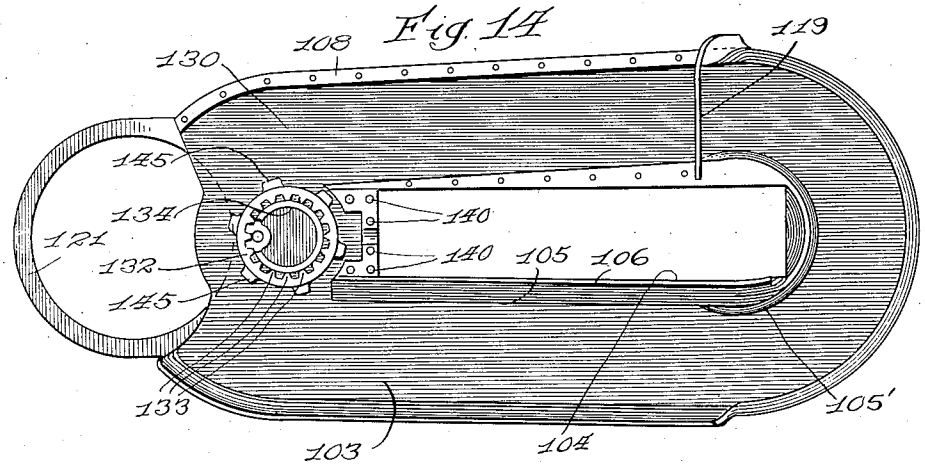


Fig. 13

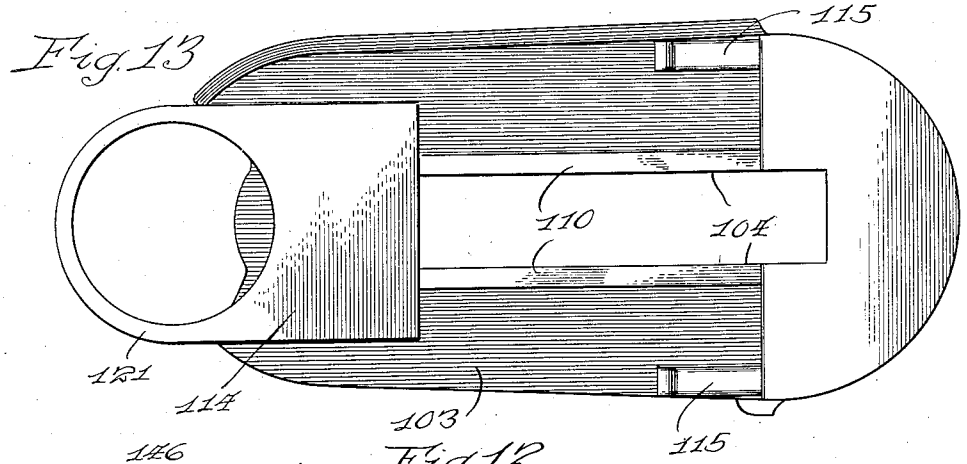
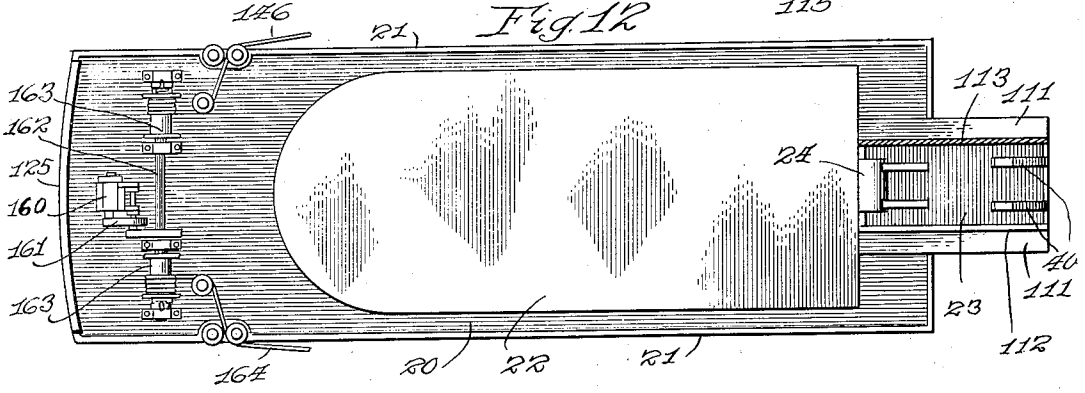


Fig. 12



Witness
L. B. Graham

Inventor
Edmund C Morgan
By Brown, Nissen & Sprinkle
Attys

Feb. 21, 1928. 1,659,889

E. C. MORGAN

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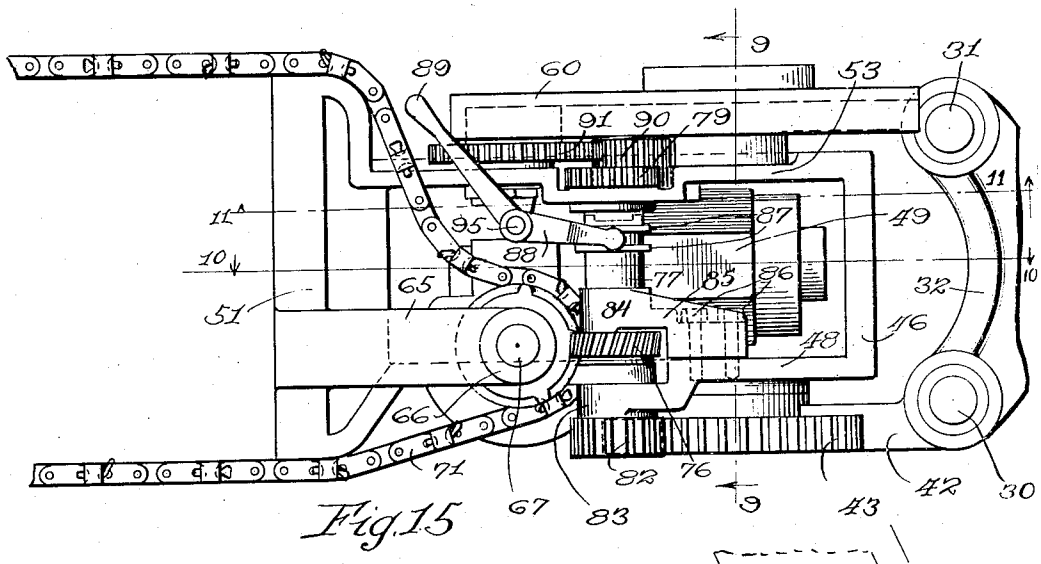

Fig. 15

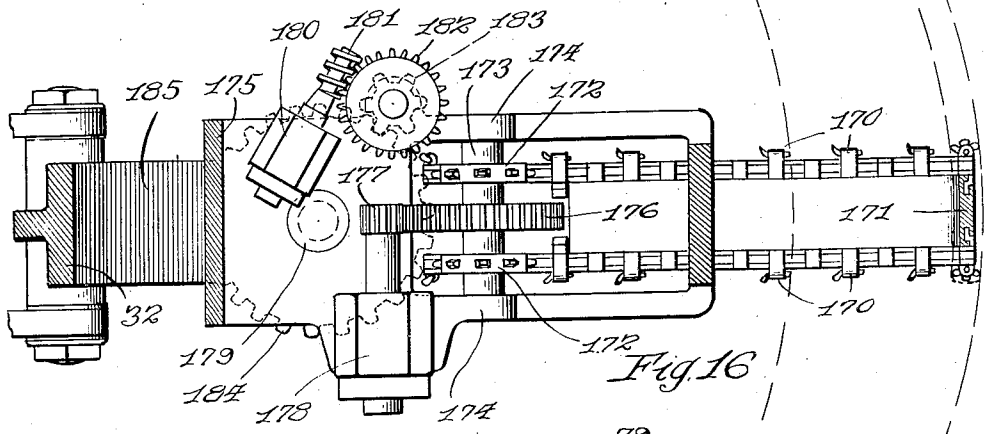

Fig. 16

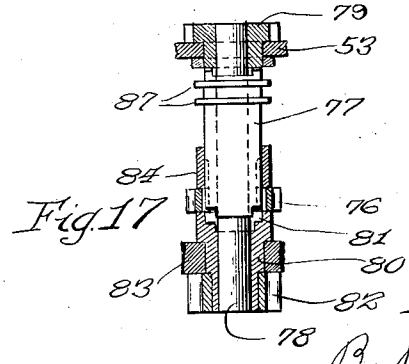

Fig. 17

Witness.
L. B. Graham

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

Patented Feb. 21, 1928. 1,659,889

UNITED STATES PATENT OFFICE.

EDMUND C. MORGAN, OF NEW YORK, N. Y; OLIVE EUGENIE MORGAN EXECUTRIX OF SAID EDMUND C. MORGAN, DECEASED.

MINING MACHINE.

Application filed April 24, 1916, Serial No. 93,048. Renewed February 26, 1923.

This invention relates to machines for mining coal and other similar substances, and has for its object, the provision of a device of the character named, which shall be of improved construction, and more efficient and economical in operation than devices of the character previously made.

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

In the drawings—

Figs. 1 and 2 taken together constitute a complete top plan view of the machine shown in operative position in a mine chamber.

Figs. 3 and 4 taken together constitute a side elevation of the machine shown in Figs. 1 and 2.

Figs. 5 and 6 taken together constitute a longitudinal vertical sectional view of the machine shown in Figs. 1 to 4.

Fig. 7 is a vertical sectional view on line 7—7 of Fig. 6.

Fig. 8 is a vertical sectional view substantially on line 8—8 of Fig. 3.

Fig. 9 is a vertical sectional view substantially on line 9—9 of Fig. 15.

Fig. 10 is a horizontal sectional view substantially on line 10—10 of Fig. 15.

Fig. 11 is a horizontal sectional view substantially on line 11—11 of Fig. 15.

Fig. 12 is a top plan view of the main base plate of the machine.

Fig. 13 is a bottom plan view of a movable scoop and conveyor forming a part of the mining machine.

Fig. 14 is a top plan view of the device shown in Fig. 13.

Fig. 15 is a fragmentary elevational view of the driving mechanism for the cutter-head.

Fig. 16 is a horizontal sectional view showing a modified form of cutter-head; and,

Fig. 17 is a vertical sectional view of a detail of construction.

In the drawings, the numeral 20 designates the main base plate on which the greater part of the apparatus constituting the present invention is mounted. This plate is provided with an upturned flange 21 extending around the edges thereof, for the purpose of strengthening the plate. The central portion of the plate is provided with a somewhat extended flat supporting surface 22 on which parts of the machine to be described slidably rest. The plate 20 is provided at its forward end with an extension 23, having a standard 24 projecting upwardly therefrom and secured to the plate by lag screws 25, (Fig. 5). The standard 24 carries a pair of pivot bolts 26 and 27, which project from the standard at opposite sides thereof to form pivotal supports for the swinging arms 28 and 29, there being a pair of arms 28 supported on the lower bolt 26, and a second pair of arms 29 supported on the upper bolt 27. The arms 28 and 29 are pivoted at the forward ends on pivot bolts 30 and 31 respectively, which are carried by a link 32 extending between the pivot bolts 30 and 31 and holding them in fixed relation to one another. By this construction, a vertically swinging arm is provided which constitutes a parallel motion device arranged to hold the link 32 in a vertical position, regardless of the angle of the swinging arm.

The arms 28 are connected near the pivot 26 by a plate 33 (Fig. 5), secured to the inner side of the arms by means of lag screws 34. The plate 33 constitutes a platform on which a motor 35 is mounted, connected by a worm and worm wheel enclosed in a casing 36, with a shaft 37 mounted in journals 38, carried by the arms 28. The shaft 37 has secured thereto a pair of pinions 39, which mesh with the teeth of arcuate racks 40, secured to the base 23 and projecting upwardly therefrom. The rotation of the motor 35, drives the pinions 39, and thus swings the arms 28 and 29 upwardly or downwardly about their pivots 26 and 27, the direction of the pivotal movement of the arms 28 and 29 depending upon the direction of rotation of the motor 35. The motor 35 is governed by one of a series of controllers 41, which controllers are connected with the various motors for driving the different parts of the machine, and are arranged to govern both the

speed and direction of the motors which they control.

The cutter-head for severing the material from a mine vein is carried by the link 32, and is best shown in Figs. 1, 3, 5, 9, 10, 11, 15 and 17. Projecting forwardly in a horizontal direction on a line with the lower portion of the arm 28 is a supporting bracket 42, which is extended laterally, as shown in Figs. 9, 10 and 15, to form a circular rack 43, which is rigid with the bracket 42. At the center of the rack 43, the bracket 42 is provided with an opening in which a bolt 44 is journaled for rotation. The bolt 44 is held in place by a nut 45, and the upper end of the bolt passes through a yoke member 45, which is arranged to rotate with the bolt 44 about the axis formed by the bearing of the bolt in the bracket 42. The bolt 44 is provided with a rim or head 47, which securely holds the yoke 46 in place. The lower member of the yoke 48 is extended laterally, as shown in Figs. 9 and 10, to form a supporting platform or table 48, on which is mounted a motor 49 for operating the mechanism in the cutter-head. At the forward end of the platform 48, the yoke 46 is continued forwardly to form the lower arm 50 of a loop core cutter frame. The arm 50 of the cutter frame is offset downwardly from the level of the platform 48, as shown in Figs. 3 and 15. A connecting bar 51 projects upwardly from the arm 50, and is connected at its upper end with the upper cutter frame bar 52. As shown in Figs. 9 and 11, the bar member 53, of the yoke 46, is secured to a bracket 55, which projects forwardly from the upper end of the link 32. The arm 53 is held for pivotal movement, relative to the bracket 55, by means of a bolt 56, which is journaled in the bracket, and held in place by a nut 57. The lower end of the bolt 56 is provided with a flange or head 58, which holds the arm 53 in position, relative to the bracket 55. The bolts 44 and 56 are in axial alignment with one another, and together constitute a pivot about which the yoke 42 swings horizontally. The bracket 55 is extended laterally, as shown in Figs. 1, 3, 5, 9, 11 and 15, to form a circular plate 60, having a downturned flange 61 at its periphery, provided with internal rack teeth 62, forming a circular rack, for a purpose to be explained.

As shown in Fig. 10, the supporting plate 48, of the yoke 46, is provided with an arm 65, which carries a bearing 66, in which one end of a shaft 67 is journaled. The shaft 67 extends transversely of the cutter-head, and has its end opposite that, journaled in the bearings 66, carried by a second journal 68, supported on the platform 48. The shaft 67 is connected with the motor 49 by means of a worm and worm wheel enclosed in the casing 69, (Figs. 5 and 10). Rigidly secured to the shaft 67, is a sprocket wheel 70, which drives a cutter chain 71, which is guided by the arms 50 and 52 of the cutter frame. The arms 50 and 52 of the cutter frame are connected at the outer end by an upright portion 73, over which the chain 71 also passes, the three arms combining to form a loop-shaped guide for the cutter chain, said guide having an unobstructed core opening therethrough.

The shaft 67 also carries a worm 75, which meshes with a worm wheel 76, as shown in Figs. 10 and 15. As shown in Fig. 17, the worm wheel 76 is splined to a clutch sleeve 77, which is mounted to move freely on a vertical shaft 78, rigidly secured at its upper end to a pinion 79. The pinion 79 is journaled, as shown in Figs. 15 and 17, in the upper plate 53, of the yoke 46. The lower end of the shaft 78 is carried for rotation in a sleeve 80, which is provided with a clutch member 81, arranged to co-operate with the clutch sleeve 77, and at the opposite end, with a pinion 82. The sleeve 80 is journaled in a bearing 83, which is secured to the lower member 48, of the yoke 46, at a point adjacent the bearing member 66. The lower end of the clutch sleeve 77 is journaled in a bearing 84, supported in axial alignment with the bearing 83 by a bracket 85, secured to the member 48, by lag screws 86. The clutch sleeve 77 is provided with flanges 87, which cooperate with a lever 88, having a handle 89, by means of which the sleeve 77 may be moved vertically along the shaft 78. When the sleeve 77 is in its uppermost position, the pinion 79 is clutched to the worm wheel 76, and is thus connected to be driven by the motor 49 through the shaft 67 and the worm in the casing 69. When the clutch sleeve 77 is in its lowermost position, the pinion 82 will be clutched to the worm wheel 76, by means of the sleeve 80, to be driven by the motor 49. The clutch 77 may also be moved to an intermediate neutral position.

As shown in Figs. 11 and 15, the pinion 79 meshes with an idler 90, which in turn meshes with a gear 91, which is formed rigidly with a pinion 92, meshing with the teeth 62 of the circular rack 61. In this way, the pinion 79 is connected by means of a train of reduction gearing with the rack 61, so that when the pinion 79 is driven by the motor 49, the pinion 92 will travel around the interior of the rack 61, and thus carry the yoke 46 and the parts supported thereby in a horizontal direction about the bolts 44 and 56, which constitute a vertical pivotal axis for this movement. It will be seen that this motion will be a slow and powerful one, and it is used for feeding the cutter frame forwardly while making a cut in the material to be mined. The pinion 82, as shown in Figs. 10 and 15, meshes with the rack 43 directly, so that

when this pinion is driven by the worm wheel 76, the yoke 46 will be rotated about its vertical axis much more rapidly, than when the motion is transmited through the pinion 79. For this reason, the pinion 82 and rack 43 are used when it is desired to impart a rapid movement to the cutter bar, as when the bar is being returned to a position to begin a new cut. In order that the clutch 77 may be controlled from either side of the machine, the clutch member 88 is mounted on a shaft 95, which carries handles 89, located one at each side of the cutter-head, as shown in Fig. 1.

It will be seen from Fig. 1, that the rotation of the cutter bar about its vertical axis, will form a kerf when the machine is properly positioned in the face of a mine vein, which will sever a crescent-shaped section of material from a mine vein. As will be seen from Fig. 5, a number of cuts may be taken, one above the other, for each position of the machine, the upper and lower kerfs always being formed in a horizontal plane, regardless of the height to which the cutter-head is adjusted by the arms 28 and 29. By this arrangement, the cutter will cleave the material from the floor and roof of the mine, flush with the floor and roof, thus making a perfectly clean smooth surface at both top and bottom of the mine chamber, and severing all of the material from the floor and roof of the mine. Because of this arrangement, it is possible to construct the machine to swing through a much larger vertical angle, than would be practical if the loop cutter were tilted at the same angle as the supporting arm, because if the cutter were tilted with the arm, and the arm raised to a considerable height, the cutter would be so displaced that the upper cuts would only form great notches in the roof of the mine, leaving a considerable part of the material adhering to the roof.

It should be noted that the cutting mechanism shown in Fig. 3 is adjustable in elevation independently of the gathering mechanism comprising the widely expanded plate 116 shown in Fig. 1 and the traveling conveyer comprising the flights 101. The forward arcuate edge of the plate 116 is beveled, as shown at 117 in Fig. 5, so as to have a scraping action over the floor of the mine chamber and direct material onto the conveyer. The platform is therefore wedged under the material and the latter holds the platform against the floor and prevents the tendency of the platform to ride up on the material. It should be noted that the upper surface of the platform is sloped gradually toward the rear at an angle much less than the angle of repose of such material as coal on a metal surface. The gathering mechanism may be advanced and retracted independently of the adjustment in elevation of the kerf-cutting mechanism. Therefore the cutting operation may be proceeded with while material is broken down, gathered by the scooping plate or conveyer pan and transferred by flight coveyer to the mine car at the rear end of the machine. The gathering mechanism in a machine constructed as a loading machine is described and claimed in the divisional application, Serial No. 630,831, filed April 9, 1923, for an Improvement in loading machines.

By referring to Figs. 3 and 5 of the accompanying drawings it will be seen that the parallel bars 28 and 29 constitute link-form members between the main or supporting frame and the supplemental frame 32. The connections between the main and supplemental frames comprise a plurality of articulations, including the hinges at 26, 27 and 30, 31. These hinges or pivots are on axes which are parallel to each other and the plane extending through the pair of axes at 26, 27 is parallel to the plane extending through the axes at 30, 31. The operator-controlled power-operated mechanism for adjusting the elevation of the cutting mechanism is applied to one of the link-form members 28, as shown in Figs. 3 and 5, whereas the supplemental frame 32 carries operator-controlled power-operated mechanism for swinging or arcuately feeding the cutting mechanism to cut upper and lower spaced-apart kerfs in planes which are parallel to the path of the machine or to the longitudinal center line extending through the whole machine, as viewed by placing Figs. 3 and 4 end to end, or as viewed by placing Figs. 1 and 2 end to end. The group of supporting members between the main and supplemental frames are foldable but so arranged as to maintain the planes of the kerfs cut by the upper and lower runs parallel to the floor and roof of the mine chamber, thereby assuring the cutting of kerfs along the roof and along the floor to leave surfaces which are substantially parallel to each other. This is particularly desirable along the floor so as to facilitate movement of the entire machine along its forward path of travel.

In order to remove the material severed by the cutting mechanism described, a conveyor is provided which may be moved into and out of position beneath the cutter-head. This conveyor, shown in Fig. 1, consists of an endless chain 100, provided with outwardly extending flights 101, pivotally secured at their inner ends to lugs 102, secured at intervals along the chain 100 to links of the chain. The chain is mounted to travel on a movable bed plate 103, which is oblong in shape, as shown in Fig. 1, and which is provided at opposite sides with runways for the forward and return runs of the conveyor chain 100. The plate 103, as shown in Figs.

13 and 14, has a longitudinally extending slot 104, extending through the central portion thereof, and the chain is guided around the slot by upwardly extending guide flanges or shoulders 105, shown most clearly in Fig. 8. At the forward end of the run of the chain 100, an overhanging flange 105', projects from the shoulder 105, in position to extend over the chain 100, and hold the chain from upward movement. At the side of the plate over which the coal is carried, on the return run of the conveyor, the shoulder 105 is continued upwardly to form a flange or guard wall 106, to prevent material being carried by the conveyor, from escaping at the inner edge of the bed plate. A similar wall 107, is provided at the outer edge of the plate. At the side of the plate, along which the conveyor moves forwardly toward the cutter-head, the outer edge of the plate is provided with a peripheral flange 108, which supports the outer edge of a cover plate 109, secured to the bed plate and spaced above the plate a sufficient distance to permit the travel of the chain 100 and the flights carried thereby, between the bed plate and cover plate. This cover plate, as will be understood from Fig. 1, forms a running board on which the operator may stand, and along which he may walk, in moving from one end of the machine to the other.

As shown in Fig. 13, the plate 103 is provided on its lower side with supporting slides or runners 110, which extend along the edges of the opening of slot 104, at the central portion of the plate. These slides 110, as shown in Fig. 8, rest upon guideways 111, formed on the projections 23, of the main base plate 20. An upwardly extending flange 112, is positioned along the inner edge of one of the guideways 111, while a guard plate 113, extends upwardly at the inner edge of the other guideway 111. As the plate 103, is moved longitudinally on the base plate 20, in a manner to be described, it is guided in its movement by the flange 112 and the upwardly extending plate 113. The rear portion of the plate 103, as shown in Fig. 13, is provided with a bearing surface 114, which slides over the surface 22, as the plate 103, is moved along the base plate 20. A pair of shoes 115, are secured to the under surface of the plate 103, near their forward end in position to bear on the mine floor, at opposite sides of the base plate 20, as shown in Figs. 8 and 13.

The plate 103 carries at its forward end, an arcuate-shaped platform 116. This platform, as shown in Fig. 5, is provided with a beveled edge 117, forming a recess in which the flights 101 travel, and also forming a guide for directing material onto the platform 116. At the forward end of the slot 104, the platform 116 is beveled, as shown at 117, so that any material resting on the mine floor in the rear of the beveled portion, will be forced upwardly on the return movement of the platform, and onto the upper surface of the conveyor, when the platform is brought back to a position adjacent the base plate 20. The scoop 116 is given the same radius of curvature as the radius of the cutter frame, in order that its front edge may fit closely to the cut formed by the loop cutter. At the forward end of the running board 109, at the point where the conveyor passes from beneath the running board onto the platform 116, a guard arm 119 is positioned for preventing coal from being moved backwardly onto the running board, when the platform is moved forwardly. As will be seen from Fig. 5, the bearing plate 114, which supports the rear end of the conveyor bed plate 103, is spaced downwardly from the plane of the bed plate, and carried on downwardly extending flanges or walls 120. This gives the conveyor bed plate 103 a slight upward inclination rearwardly, so as to raise the rear end of the conveyor a sufficient height to permit it to discharge onto a supplementary conveyor, as will be described. The bearing plate 114 is continued rearwardly to form a ring 121, as shown in Figs. 6, 13 and 14. The ring 121 receives a downwardly extending bearing ring 122, attached to the forward end of the supplementary conveyor 123. This supplementary conveyor 123 is provided with a hopper-shaped wall 124, the hopper formed by the wall being located beneath the rear or discharge end of the conveyor 103, as will be seen from Fig. 2. The conveyor 123 is free to rotate horizontally within the ring 121 to various angular positions, relative to the machine, and is supported in its various positions at its discharge end on a flange 125, carried at the rear end of the base plate 20. The conveyor 123 is provided with an endless flight conveyor 126, which is driven by a motor 127, supported by a bracket 128, secured to the under side of the conveyor. The motor 127 drives a shaft 129, (Fig. 7), through gearing 130, carrying sprocket wheels 131, which engage the conveyor 126 to drive the same.

Carried at the rear of the conveyor bed 103, in a position directly over the supporting plate 114, is a sprocket wheel 132, (Figs. 5 and 14). The sprocket wheel 132 is provided with internal gear teeth 133. The points of the teeth 133 bear on the outer periphery of a circular flange 134, which extends upwardly from the upper surface of the rear portion of the bed plate 103. In this way, the circular flange 134 forms a journal about which the sprocket wheel 132 rotates. The sprocket wheel is driven by a pinion 135, carried on a shaft 136, which has its lower end journaled in a bear-

ing 137, formed in the rear portion of the plate 103. The upper end of the shaft 136 is journaled at 138, in a casting 139, supported at the rear portion of the conveyor plate 103 by lag screws, which enter threaded openings 140 in the plate. The shaft 138 is driven by a worm wheel 141, which meshes with a worm 142, driven by a motor 143, mounted on the upper portion of the casting 139. A casing 144 encloses the worm and worm wheel. The conveyor chain 100 passes around the sprocket wheel 132, and is driven thereby, by means of teeth 145, carried on the outer periphery of the sprocket wheel. The motor 143 for driving the conveyor chain through the mechanism described, is governed by one of the controllers 41, shown in Fig. 1. These controllers 41 are secured to the guard wall or plate 113, which guard wall also carries a foot board or platform 146, on which the operator may stand.

As shown in Fig. 2, the casting 139, which carries the motor 143, has a forwardly projecting portion 150, which carries a second motor 151, and a bearing 152, in which is journaled one end of a threaded shaft 153. The shaft 153 has secured thereto a worm wheel 154 (Fig. 5), which meshes with a worm 155, driven by the motor 151. A second bearing 156 is provided for the shaft 153, on the side of the worm wheel 154, opposite the bearing 152. In this way, the shaft 153 is held from moving longitudinally, relative to the conveyor plate 103, but is journaled for rotation in the bearings described. The shaft is threaded, as shown in Fig. 5, in the standard 24, supported on the extension 23, of the base plate 20. When the motor 151 is driven, the shaft 153 is rotated in its threaded engagement with the standard 24, and thus the conveyor 103 and the platform 116 are caused to slide longitudinally, relative to the main frame of the machine, the direction of movement being controlled by the direction of rotation of the motor 151, which in turn is governed by one of the controllers 41.

The main base plate 20, as shown in Figs. 2, 4, 6 and 12, is provided with a motor 160 for positioning the machine in the mine chamber. The motor 160 is connected through gearing 161, with a shaft 162, which carries a pair of drums 163, on which are wound cables 164, secured at their outer ends to anchors 165, which may be fastened in any suitable manner in the mine chamber. The cables 164 are each provided with a pair of guide pulleys 166, so that the cables may be conducted in either direction from the machine frame, to enable the frame to be moved either into or out of the mine chamber. The frame may also be shifted laterally by drawing in on one cable, while the other cable is paid out.

In operation, the machine may be located in a mine chamber, as shown in the figures of the drawings, and the lower cut will be taken with the platform 116 retracted, as shown in Figs. 1 and 3. With the platform in this position, the cutter-head will be placed in its lowermost position, with the lower arm of the loop cutter 50, on a level with the lower surface of the mine vein. With the cutter-head in this position, the cutter chain will be driven and the loop cutter frame will be rotated about its vertical axis to cause the loop cutter to sever a crescent-shaped section of material from the face of the mine vein. After the loop cutter has completely severed a section of material from the wall of a mine, it will move away from the material into a position just in front of the edge of the platform 116, as viewed in Fig. 1. The cutter-head may then be slightly raised, so that it will clear the platform, and the platform may then be moved forwardly by means of the motor 151 and the threaded shaft 153, forcing the forward edge of the platform beneath the severed material. As the platform moves forwardly, the conveyor chain 100 will be driven by the motor 143, and the severed material will be carried backwardly over the bed plate 103 and discharged onto the conveyor 126, which in turn discharges the material at its rear end onto a car, or other transporting medium. After the material severed by the first cut has all been removed, the platform 116 is again retracted, and the cutter-head lowered to its original position. After this has been done, the cutter bar may be rapidly swung backwardly to its starting position, and the cutter-head then raised to the proper level for making the second cut. Before the second cut is begun, the platform 116 may again be moved forwardly beneath the cutter-head, so that as the material is severed by the loop cutter, it will fall upon the platform and be carried back to the car. It is not necessary that this be done however, as the material may again be completely severed from the mine wall, and the platform forced beneath it, as was done in the case of the first cut. Either method of operation may be employed. The cutting operation may be repeated as many times as is necessary to work the entire thickness of the mine vein. After all the material has been removed that can be reached from one position of the machine, the machine is moved forwardly in the chamber, and a second series of cuts taken in the manner described.

It should be noted that by means of the rope gearing shown in Figs. 2 and 12 the main frame 20 may be anchored against rearward movement when the forward scooping edge 117 (Fig. 5) is moved forward to scoop up a load from the mine floor. When the ropes 164 are connected to the an-

chorages at 165, as shown in Fig. 2, the main frame 20 may be held against rearward movement; the rope gearing thus affords an abutment for the main frame against rearward movement when the supplemental frame is forcibly moved forward to gather a load.

In the modified form of the cutter-head, shown in Fig. 16, a pair of cutter chains 170 is provided, one at each side of the cutter frame 171. These chains are operated by sprocket wheels 172, mounted on a shaft 173, journaled in bearings 174, supported on the lower arm of a yoke member 175, similar to the yoke member 46, of the form previously described. The shaft 173 is driven by a spur gear 176, which meshes with a pinion 177, driven by a motor 178, mounted on the lower arm of the yoke member 175. The yoke 175 is rotated about its vertical axis 179 by a motor 180, also supported on the lower arm of the yoke, and arranged to drive a worm 181, which meshes with a worm wheel 182. The worm wheel 182 is rigid with a pinion 183, meshing with a fixed circular rack 184, secured to the lower bracket 185, of the link 32. By the construction described, since the rotation of the cutter frame is accomplished by a motor independent of the motor which drives the chains, it is evident that the relative speed of the drive and of the cutter chains may be varied to comply with various conditions of operation. Also the cutter may be made to operate, while the cutter frame is being fed in either direction. This may be an advantage under some conditions, since it enables the operator to make a cut during both the forward and return movement of the cutter frame. In this way, a cut may be made at one level, while the cutter frame is being fed in one direction, and the cutter-head may be raised or lowered to a different level, and a second cut made during the return movement of the cutter frame.

The modification shown in Fig. 16 is described and claimed in the divisional application, Serial No. 596,214, filed October 23, 1922, for an improvement in mining machines.

Claims:—

1. In a mining machine, a support, a pair of arms having one end of each pivotally connected with said support in spaced relation to one another, a link pivotally connected with the opposite ends of said arms, to form therewith a parallel motion device, and a cutter carried by said link, and movable horizontally relative thereto.

2. In a mining machine, a support, a pair of arms pivotally carried by said support, a link pivotally connected with said arms at points removed from said support, to form therewith a parallel motion device, and a loop chain core cutter carried by said link, and movable horizontally, relative thereto.

3. In a mining machine, a support, a parallel motion device carried by said support for up and down movement thereon, and a loop core cutter carried by said parallel motion device, and movable thereon about an upright axis.

4. In a mining machine, a support, a parallel motion device carried by said support, a core cutter-head carried by said parallel motion device, and movable thereby into different vertical positions, and a loop chain core-cutter carried by said cutter-head, and arranged to rotate thereon about an upright axis.

5. In a mining machine, a support, a pair of arms carried on separate pivots on said support, a cutter-head frame carried by said arms, and co-operating therewith to form a parallel motion device, a horizontally swinging cutter carried by said cutter-head, and means for moving said arms and cutter-head to adjust said cutter vertically.

6. In a mining machine, a base, a standard supported by said base, a pair of arms having one end of each pivotally connected with said standard in spaced relation thereon, a link pivotally connected to the opposite end of each of said arms, and holding said ends in spaced relation with one another to form with said arms a parallel motion device, a horizontally swinging cutter-head secured to said link, and a motor for moving said arms vertically to adjust the position of said cutter-head.

7. In a mining machine, a base, a standard supported on said base, a pair of arms having one end of each pivotally connected with said standard in spaced relation thereon, a link pivotally connected to the opposite end of each of said arms, to form with said arms a parallel motion device, a horizontally swinging cutter carried by said link, a rack and pinion mechanism for moving said arms vertically, and a motor mounted to move with said arms for operating said rack and pinion mechanism.

8. In a mining machine, a cutter-head frame, a parallel motion device for carrying said frame, means for actuating said device to adjust said frame vertically, and for holding said frame from tilting during said adjustment, a yoke carried by said frame for rotation about an upright axis, a cutter carried by said yoke for rotation therewith, and a motor secured to said yoke for operating said cutter.

9. In a mining machine, a cutter-head frame, a parallel motion device for carrying said frame, means for vertically adjusting said frame, a yoke carried by said frame, and movable thereon about an upright axis, a loop chain core cutter secured to said yoke, and movable therewith, and a motor carried by said yoke for operating said loop cutter.

10. In a mining machine, a supporting

frame, a cutter-head frame, a pair of vertically swinging arms pivotally connected with said cutter-head frame for supporting said cutter-head frame in various vertical positions, a loop cutter mounted for movement on said cutter-head frame about an upright axis, connections between said arms and said supporting frame and means carried by said cutter-head frame for rotating said cutter about said axis.

11. In a mining machine, a main frame, a loop chain cutter, a platform, means for moving said platform relatively to said main frame into a position beneath said cutter during the operation thereof, and means carried by said platform for removing material severed by said cutter.

12. In a mining machine, a loop chain cutter, means for adjusting said cutter to different vertical positions, a platform, a conveyor carried by said platform, and means for moving said platform and conveyor into and out of position beneath said cutter.

13. In a mining machine, a loop cutter, means for rotating said cutter about an upright axis for severing material from a mine vein, a platform out of position for receiving the material so severed, a conveyor carried by said platform for transferring material received thereon, and means for moving said platform in a horizontal direction, to a position beneath said loop cutter.

14. In a mining machine, a kerf cutter, a parallel motion device for holding said kerf cutter at various elevations in parallel planes, means for rotating said kerf cutter about an upright axis for cutting a kerf in a mine vein, a platform for receiving the material so severed, and means for moving said platform in a horizontal direction, into position to receive dislodged material.

15. In combination, a mining machine frame, severing mechanism carried by said frame at one end thereof, a platform slidably mounted on said frame, a slideway extending around said platform, an endless conveyor movable on said slideway, a motor mounted on said platform for driving said conveyor, and means for moving said platform to bring the front portion thereof, into and out of position beneath said severing mechanism.

16. In a mining machine, a base plate, a standard carried by said base plate, and extending upwardly therefrom, severing mechanism carried by said standard, a platform guided on said base plate, and having a slot therein, through which said standard projects, and means for moving said platform longitudinally of said base plate, to bring the forward end of said platform into and out of position beneath said severing mechanism.

17. In a mining machine, a base plate, standards extending upwardly from said base plate, severing mechanism carried by said standards for vertical adjustment, relative to said base plate, a platform having a longitudinal central slot therein, through which said standards project, a shaft carried by said platform, and threaded into one of said standards, and means for rotating said shaft to move said platform into and out of position beneath said severing mechanism.

18. In a mining machine, a base plate, a standard mounted on said base plate, severing mechanism mounted on said standard and extending upwardly therefrom, a platform slidably guided on said base plate, and having a longitudinally extending slot therein, through which said standard projects, a shaft rotatably mounted on said platform, and having threaded engagement with said standard, and a motor mounted on said platform, and arranged to rotate said shaft to move said platform into position to receive the material disconnected by said severing mechanism.

19. In mining apparatus, the combination with a supporting frame, of dislodging mechanism mounted on the upper portion of said supporting frame, and loading apparatus comprising a flight conveyor traveling in an approximately horizontal plane and mounted on the lower portion of said supporting frame and capable of reaching forward to various positions to gather dislodged material from the mine floor and move it toward loading position.

20. In mining apparatus, the combination with mechanism for dislodging material from a mine wall, of loading apparatus for gradually removing material from the base of a mine wall toward loading position by acting on the dislodged material on the floor of the mine chamber, said loading apparatus comprising a scooping frame and an endless flight conveyor traveling around the forward portion thereof, and separately controllable means for operating said dislodging mechanism and said loading apparatus.

21. A mining and loading machine comprising loop chain core-cutting mechanism, means for operating the same including the feeding thereof in an arc, a receiving conveyor in position to receive material from said cutter, means for operating said conveyor to take the material back from the mine wall as fast as dislodged, a hopper for receiving the material from said conveyor, and an additional conveyor for taking the material from said hopper to loading position.

22. A mining and loading machine comprising loop chain core cutting mechanism, means for operating the same including arcuate feed thereof, means for adjusting the height of said core cutter, a conveyor in a position to receive material from said cutter, means for operating said conveyor to remove the dislodged material continuously and

piece-meal as soon as it breaks from the mine wall, an additional conveyor for receiving the dislodged material from the rear end of said first-named conveyor, said additional conveyor being pivoted at such receiving end, and means for operating said additional conveyor.

23. In a mining machine, the combination with a cutter-head frame, comprising upper and lower arms spaced from one another, of means for pivotally supporting said cutter head, a cutter frame pivoted between said arms on an upright axis and having an unobstructed core-opening therethru, an endless chain cutter mounted on said cutter frame to travel about said unobstructed core-opening, means for driving said chain cutter, and means comprising gearing for arcuately moving said cutter frame to effect arcuate feeding movement of said chain cutter while being driven.

24. In a mining machine, the combination with a supporting frame movable to various elevations, of core-cutting mechanism mounted on said frame for arcuate movement about an upright axis, a parallel motion device for supporting said frame together with said core-cutting mechanism at various elevations while maintaining said axis in upright position, and means for operating said core-cutting mechanism including arcuate feed thereof about said upright axis at such various elevations.

25. In a mining machine, the combination with a supporting frame movable to various elevations, of cutting mechanism carried by said frame for arcuate movement about a vertical axis, a pivotally supported arm pivotally connected to said frame, and means for cooperating with said arm for adjusting the elevation of said frame while maintaining said axis in vertical position.

26. In a mining machine, the combination with a supporting frame adjustable to various elevations, of core-cutting mechanism having upper and lower straight runs extending in horizontal spaced-apart planes and having an unobstructed core-opening therethru, means for supporting said core-cutting mechanism on said frame for arcuate movement on a vertical axis, means for operating said core-cutting mechanism including arcuate movement thereof about said vertical axis, a main frame, and parallel motion mechanism between said main frame and said supporting frame for holding the latter and said core-cutting mechanism at various elevations while maintaining said axis in vertical position.

27. In a mining machine, the combination with a main frame, of a supplemental frame, kerf cutting mechanism mounted on said supplemental frame for arcuate movement about an upright axis in position for cutting spaced-apart kerfs simultaneously in generally horizontal planes, a parallel motion device for maintaining said axis upright and said kerf cutting mechanism in position for making such kerfs, mechanism for actuating said parallel motion device to adjust the elevation of said supplemental frame and said kerf cutting mechanism, and means for operating said kerf cutting mechanism at the various elevations to which it is adjusted.

28. In a mining machine, the combination with a main frame of a pair of supporting arms, separate pivotal supports for adjacent ends of said arms on said main frame, a yoke pivotally connected to the opposite ends of said arm, and cutting mechanism mounted between the forwardly extended arms of said yoke for arcuate movement between the last named arms and about an upright axis between the arms of said yoke.

29. In a mining machine, the combination with a supporting frame, of arms pivotally connected to said supporting frame in spaced relation to one another, a link pivotally connected to said arms to form therewith a parallel motion device, spaced apart forwardly extending arms rigidly connected to the ends of said link, core-cutting mechanism mounted between said last named arms for arcuate movement relatively thereto on an upright axis, means connected between said parallel motion device and said supporting frame to adjust the elevation of said core-cutting mechanism while said axis is maintained in upright position by said parallel motion device, and means for operating said core-cutting mechanism at the various elevations to which it is adjusted.

30. In a mining machine, the combination with a supporting frame, of a pair of arms pivotally connected to said supporting frame for up and down movement, a supplemental frame pivotally connected to said arms and movable up and down therewith, core-cutting mechanism mounted on said supplemental frame to swing thereon about an upright axis, and means connected between one of said arms and said supporting frame for adjusting the elevation of said core-cutting mechanism while said axis is maintained in upright position by said arms.

31. In a mining machine, the combination with a base frame adapted to rest on the floor of a mine chamber, of a standard supported by said base, a pair of arms pivotally connected to said standard in spaced-apart relation and extending forwardly from said standard, a yoke having spaced-apart forwardly extending supporting members and an intermediate link portion pivotally connected to the forward end of said arms to hold the latter in spaced-apart relation and to form with said arms a parallel motion device, core-cutting mechanism supported by said spaced-apart forwardly extending mem-

bers for arcuate movement about an upright axis means for operating said core-cutting mechanism including arcuate feeding movement thereof about said upright axis, and rack and pinion mechanism for moving said arms vertically about their pivotal supports on said standard to adjust the elevation of said core-cutting mechanism while said parallel motion device maintains said axis in upright position.

32. In a mining machine, the combination with kerf cutting mechanism, of means for supporting said kerf cutting mechanism for movement about an upright axis, a pivotally supported apparatus for carrying said supporting means and said cutting mechanism while maintaining said axis upright for the various positions to which said cutting mechanism is adjusted in elevation, mechanism applied to said pivotally supported apparatus at only one portion thereof for adjusting the elevation of said cutting mechanism, and means for operating said cutting mechanism in substantial horizontal planes independently of the elevation of said cutting mechanism.

33. In a mining machine, the combination with a main frame, of cutting apparatus mounted on said frame, means for adjusting the elevation of said cutting apparatus between the floor and roof of a mine chamber, a platform movable forwardly and rearwardly in advance of said frame, means for retracting said frame when said cutting apparatus operates at the floor of the mine chamber, a conveyor carried by said platform, and means for moving said platform and said conveyor forwardly in advance of said main frame to a receiving position beneath said cutting apparatus when the latter is adjusted to a position above the floor of the mine chamber.

34. In a mining machine, the combination with a main frame, of cutting apparatus mounted on said main frame and extending to cutting positions in advance thereof and across an upright mine wall, a conveyor frame movable forwardly and rearwardly in advance of said main frame, a conveyor carried by said conveyor frame, means for adjusting said cutting apparatus to a position for making a cut across the mine wall at the floor of the mine chamber and to positions for making cuts across the mine wall above said floor, and means for retracting said conveyor frame while said cutting apparatus is making the floor cut and for advancing said conveyor frame to place said conveyor beneath said cutting apparatus while making cuts across the mine wall above the floor thereof.

35. In a mining machine, the combination with dislodging mechanism, means for adjusting said dislodging mechanism for operation at the base of a mine wall along the floor of the mine chamber, a receiving platform, a flight conveyor mounted on said platform for operation in a substantially horizontal plane at the forward end of said platform, means for retracting said platform and said conveyor while said dislodging mechanism is operating at the base of the mine wall and along the floor of the mine chamber and for advancing said platform and conveyor into receiving position when said dislodging mechanism is operating at a higher elevation, means for adjusting the elevation of said dislodging mechanism, and means for operating said conveyor for transferring material from said platform.

36. In a mining machine, the combination with a main frame, of cutting apparatus mounted in said main frame and extending in advance thereof in position for arcuate movement across the mine wall at various elevations including the floor base of the mine wall, means for operating said cutting apparatus at such elevations, means for adjusting the elevation of said cutting apparatus, and arcuate platform conforming to the curvature of the arcuate feeding movement of said cutting apparatus and connected to said main frame to extend in advance thereof along the floor of the mine chamber to the base of the mine wall, and means for moving said platform to retracted position adjacent the forward end of said main frame while said cutting apparatus is operating along the base of the mine wall and for moving said platform to forward position beneath the cutting apparatus when the latter is operating at a higher elevation.

37. In a mining machine, the combination with a main frame, of dislodging apparatus mounted thereon and capable of dislodging material from an upright mine wall at the base thereof onto the floor of the mine chamber, a comparatively wide closed platform connected to said main frame and extending in advance thereof along the floor of the mine chamber toward the base of the mine wall, and means for imparting rectilinear movement to said platform relatively to said main frame beneath the dislodged material and leaving said platform in stationary receiving position below the range of operation of said dislodging apparatus.

38. In a mining machine, the combination with a main frame, of dislodging apparatus mounted thereon and extending in advance thereof for operation on an upright mine wall, a platform having a forward bevelled edge, means for moving said platform forwardly relatively to said main frame to force said platform beneath the dislodged material, and endless traveling conveyor mechanism on said platform for moving the

dislodged material toward loading position while said platform remains in stationary receiving position.

39. In a mining machine, the combination with a main frame, of core-cutting mechanism mounted on said frame for operation on a mine wall in advance of said frame, a platform connected to said frame and extending in advance thereof for movement relatively to said frame into and out of receiving position beneath said core-cutting mechanism, and endless conveyor mechanism, mounted on said platform to travel relatively thereto while said platform remains in stationary receiving position.

40. A mining and loading machine, comprising a main frame, severing mechanism carried by said frame and extending in advance thereof for operation on an upright mine wall, a platform slidably mounted on said frame, a conveyor carried by said platform, means for sliding said platform relatively to said main frame to bring the forward end of said platform into and out of receiving position beneath said severing mechanism, additional conveyor mechanism at the rear end of said main frame, and mechanism for maintaining communication between said first named conveyor and said additional conveyor mechanism while said platform is in its various positions.

41. A mining and loading machine, comprising a stationary supporting frame, dislodging apparatus mounted on said frame for operation across an upright mine wall at the base thereof and at higher elevations, a platform connected to said frame and having a portion of the periphery thereof bevelled, said platform being movable relatively to said frame and in advance thereof while said frame remains stationary, and mechanism comprising a screw connected to said stationary frame for forcing the beveled portion of said periphery beneath the dislodged material and into receiving position beneath said dislodging apparatus.

42. A mining and loading machine, comprising a stationary supporting frame, dislodging apparatus mounted on said frame for operation on an upright mine wall along the base thereof in advance of said frame and at higher elevations, a platform connected to said frame for movement relatively thereto in advance thereof, a conveyor mounted on said platform for transferring toward loading position material received by said platform, mechanism comprising a screw connected to said stationary frame for forcing said platform together with said conveyor beneath the material dislodged at the base of the mine wall and into receiving position under the dislodging apparatus while the latter is operating at its higher positions, and a motor for operating said screw.

43. A mining and loading machine, comprising a stationary frame, dislodging apparatus mounted on said frame for operation along the base of a mine wall and at positions above such base, a platform movably mounted on said frame and having a slideway extending around the forward portion thereof, a conveyor mounted on said platform to travel along said slideway, a motor connected to said conveyor to operate the same and mechanism comprising a motor connected to a screw on said stationary frame for forcing said platform and conveyor forwardly relatively to said frame while said frame remains stationary to move said platform under the material dislodged at the base of the mine wall and leave said platform in receiving position beneath the dislodging apparatus during the operation of the latter above such base.

44. A mining and loading machine comprising supporting frame-work, dislodging mechanism mounted thereon a platform connected to said frame-work and movable forwardly to a receiving position under said dislodging mechanism, a conveyor movable on said platform for transferring dislodged material toward loading position, a cover plate for that run of the conveyor extending toward loading position to form a chute to cooperate with said conveyor in directing dislodged material toward loading position, means for forcing said platform and conveyor under dislodged material and into receiving position beneath said dislodging mechanism, and a guard plate at the forward end of said cover plate in position for preventing material from being deposited on said cover plate by causing the material to pile up against said guard plate while being gradually removed by said conveyor into and along said chute.

45. A mining and loading machine, comprising a main frame, means mounted thereon for dislodging material from the solid mass of a mine wall, loading apparatus comprising a scooping frame and a traveling conveyor mounted thereon, said loading apparatus having an initial position spaced back from the solid mass of the mine wall, and means for extending said loading apparatus into the position occupied by such solid mass after such dislodging mechanism has operated and leaving it in such position while said conveyor operates to gradually remove such dislodged material toward loading position.

46. In a mining machine, the combination with a supporting frame, of a supplemental frame, core-cutting mechanism having upper and lower runs in spaced-apart parallel horizontal planes and an unobstructed core-opening therethrough, a third frame for supporting said core-cutting mechanism, an electric motor mounted on said third frame

for operating said core-cutting mechanism and movable bodily therewith, means for supporting said third frame on said supplemental frame for arcuate movement on an upright axis, and mechanism comprising spaced-apart arms pivotally connected at their ends to said supporting frame and to said supplemental frame to form a parallel motion device to hold said axis upright at various elevations of said core-cutting mechanism.

47. In a mining machine, the combination with a main frame, of a forward conveyor projecting in advance of said main frame, a rear conveyor connected to said forward conveyor to move bodily therewith on said main frame and having a rearward extension adapted to overhang a mine car back of the machine, loop chain core-cutting mechanism having an unobstructed core-opening therethrough and upper and lower runs for cutting kerfs in substantially horizontal planes at the floor and roof of a mine chamber, means for adjusting the elevation of core-cutting mechanism while maintaining such runs for movement in horizontal planes, and means for moving the forward conveyor under material dislodged at the base of the mine wall and into receiving position for dislodged material from higher elevations.

48. In a mining machine, the combination with severing mechanism, of a main frame, means connected between said main frame and said severing mechanism for supporting said severing mechanism in positions at various elevations to form cuts in horizontal planes including a cut in substantially the plane of the floor of the mine chamber and in position to form a cut in substantially the plane of the roof of the mine chamber and for permanently confining such severing mechanism to positions for cutting horizontal planes by limiting adjustments of said severing mechanism to such positions in elevation, and self-acting power mechanism for bodily swinging said severing mechanism to various elevations while being confined to positions for the cutting of the mine vein in parallel planes.

49. In a mining machine, the combination with a pivotally supported arm, of means for swinging said arm about its pivotal support into various positions, core-cutting mechanism carried by said arm and comprising a run in position to cut a kerf in a substantially horizontal plane, and means comprising parallel motion mechanism for maintaining said core-cutting mechanism in position to make substantially horizontal cuts including a kerf in a substantially horizontal plane at the various adjusted positions of said core-cutting mechanism.

50. In a mining machine, the combination with a pivotally supported arm, of cutting mechanism carried by said arm, self-acting power mechanism for moving said arm on its pivot to swing said cutting mechanism bodily in upright directions, and means coacting with said arm for maintaining said cutting mechanism in position during operation to sever material from a mine vein by plane cuts substantially parallel with the planes of the roof and floor of the mine chamber at the various elevations of said cutting mechanism.

51. In a mining machine, the combination with a main frame, of dislodging mechanism mounted on said main frame in position to dislodge material from an upright mine wall in advance of said frame over an area having a width greater than the width of such frame, a receiving platform of approximately the same width as the width of said main frame and connected to the latter, said receiving platform having a forward arcuate edge adapted to extend from one side of the mine entry to the other rearwardly of the base of the upright mine wall on which said dislodging mechanism is adapted to operate, and means for forcing said platform forwardly relatively to said main frame and along the floor of the mine chamber adjacent the mine wall to gather material dislodged onto such floor from said mine wall by said dislodging mechanism.

52. In a mining machine, the combination with a main frame, of dislodging apparatus mounted thereon and extending in advance thereof for operation on an upright mine wall, a platform connected to said frame and extending in advance thereof, said frame having a free and unobstructed forward scooping edge, means for imparting rectilinear movement to said platform in advance of said main frame beneath the dislodged material to position said platform beneath the range of operation of said dislodging apparatus, and an endless traveling conveyer extending along said platform adjacent the forward edge thereof throughout substantially the entire width of said platform in position for transferring rearwardly the material received by said platform from said dislodging apparatus.

53. In a mining machine, the combination with means for severing material from a mine vein, of a platform for receiving the material so severed, said platform having a forward edge arcuate in plan on a radius substantially equal to half the width of said platform, such forward edge being beveled upwardly toward the rear and having a shoulder extending along the forward arcuate end portion of said platform, a conveyer on said platform in position to be protected by said shoulder, means for forcing said beveled edge beneath the material dislodged by said severing means, and

means for operating said conveyer while said platform occupies a stationary position below the range of operation of said severing means.

54. In a mining machine, the combination with a main frame, of severing mechanism carried thereby, a platform movable relatively to said frame and having a forward free and unobstructed scooping edge, a slideway extending around said platform rearwardly of said scooping edge and adjacent thereto, an endless conveyer movable along said slideway and adjacent said forward edge, and means for moving said platform together with said conveyer relatively to said main frame to gather dislodged material onto said slideway for transfer by said conveyer along said slideway toward loading position.

55. A mining and loading machine comprising a supporting frame, dislodging apparatus mounted on said frame and extending in advance thereof for operation on an upright mine wall, a platform connected to said supporting frame for movement relatively thereto along a flat floor into position for receiving dislodged material under said dislodging apparatus at the base of the mine wall, means for operating said dislodging apparatus to dislodge material first at the base of the mine wall, means for adjusting the elevation of said dislodging apparatus to dislodge material above the floor of the mine chamber, means for forcing said platform forwardly relatively to said frame beneath the material where left by said dislodging apparatus after dislodging material along the base of the mine wall, and means on said platform for transferring toward loading position the dislodged material first received on said platform and also the material dislodged by said dislodging apparatus in its elevated positions.

56. A mining and loading machine comprising supporting framework, a platform having a forward free and unobstructed scooping edge and connected to said framework for movement relatively thereto and in advance thereof, dislodging mechanism mounted on said framework for operation along an upright mine wall from the base thereof to the roof of the mine chamber, means for retracting said platform relatively to said framework while said dislodging mechanism is operating at the base of the mine wall and for advancing said platform beneath the dislodged material at the base of the mine wall when said dislodging mechanism is operating at the upper portions of said mine wall, and a conveyer movable along said platform to move toward loading position the material received on such platform.

57. A mining and loading machine comprising supporting framework, dislodging mechanism mounted thereon, a platform having a free and unobstruced forward edge and connected to said framework to extend therefrom in position for receiving material from the dislodging mechanism about said platform, a conveyer movable over said platform toward loading position, means for forcing said platform and conveyer beneath the material dislodged by said dislodging mechanism, and a guard rearwardly of the forward edge of said platform and secured to the latter in fixed relation thereto in position for abutting against the dislodged material when said platform is moved under such material and to confine the dislodged material to said platform while said conveyer gradually removes the material piled up against said guard.

58. In a mining and loading machine, the combination with a supporting frame, means mounted thereon for dislodging material from a mine wall, a conveyer frame having a forward free and unobstructed scooping edge, an endless traveling conveyer on said conveyer frame, means for moving said conveyer frame together with said conveyer bodily relatively to said supporting frame and for retracting said conveyer frame together with said conveyer during the initial operation of said dislodging means, and means for driving said conveyor to move dislodged material toward loading position as received on said conveyor frame.

59. In a mining and loading machine, the combination with supporting framework, of dislodging mechanism mounted thereon for adjustment in elevation and for operation along the mine wall between the floor and roof of the mine chamber, a receiving frame connected to said supporting framework, a conveyer mounted on said receiving frame, means for retracting said receiving frame and said conveyer while said dislodging mechanism is operating at the base of the mine wall and along the floor and for advancing said receiving frame and conveyer into receiving position when said dislodging mechanism is operating at a higher elevation, means for adjusting the elevation of said dislodging mechanism, and means for operating said conveyer for transferring material from the receiving end of said receiving frame toward loading position.

60. In a mining and loading machine, the combination with a base plate adapted to rest on the floor of a mine chamber and having an upper platform, an upright standard on said base plate in advance of said platform, spaced-apart arcuate racks at the forward end of said base frame spaced in advance of said upright standard, a conveyer frame slidably mounted at its rear end on said platform and adapted to rest on the ground at its forward end, said conveyer frame having a longitudinal central open-

ing surrounding said standard and said arcuate racks, loading apparatus connected to said conveyer frame, means mounted on said conveyer frame and connected to said standard for moving said conveyer frame and said loading apparatus relatively to said base frame while said standard and said arcuate racks remain stationary, parallel spaced-apart supporting arms pivoted to said standard, dislodging mechanism mounted on said arms, and means mounted on one of said arms and connected to said arcuate racks for adjusting the elevation of said dislodging mechanism.

61. In a mining and loading machine, the combination with a supporting frame, of a conveyer frame having a longitudinal opening therein and mounted with its rear end slidable on said supporting frame and with its forward end slidable over the mine floor in advance of said supporting frame, spaced-apart lateral shoes at the sides of said conveyer frame in position to ride over the mine floor, a conveyer mounted on said conveyer frame, dislodging mechanism, means projecting upwardly through said longitudinal opening from said supporting frame for supporting said dislodging mechanism at adjusted elevations, and means for moving said conveyer frame and said conveyer relatively to said supporting frame as permitted by said longitudinal opening.

62. In a mining and loading machine, the combination with a supporting frame, of a supplemental frame slidably connected thereto, a conveyer mounted on said supplemental frame, upright supporting mechanism secured to said supporting frame and projecting upwardly through a longitudinal opennig in said supplemental frame, dislodging mechanism carried by said upright supporting mechanism, and means for sliding said supplemental frame along said supporting frame to position the conveyer mechanism beneath said dislodging mechanism.

63. In a mining and loading machine, the combination with a main frame, of a supplemental frame having a longitudinal opening therein and mounted on said main frame for movement relatively thereto and longitudinally thereof, supporting mechanism projecting upwardly through said opening from said main frame, dislodging apparatus carried by said supporting mechanism, conveyer mechanism carried by said supplemental frame, and means for moving said supplemental frame and said conveyer mechanism forwardly relatively to said main frame while the latter remains stationary and said supporting mechanism projects upwardly through said opening.

64. In a mining and loading machine, the combination with a main frame, of a supplemental frame having a longitudinal opening therein forming a guideway for relative movement between said supplemental and main frames, supporting mechanism projecting upwardly through said opening from said main frame, mining apparatus carried by said supporting mechanism and comprising an operating motor, a vertical plate extending upwardly from said main frame, a motor controller mounted on said plate, and a platform extending laterally from said vertical plate to support the operator in convenient position to actuate said controller.

65. In a mining and loading machine, the combination with a main frame, of a supplemental frame having a longitudinal guideway opening therethrough intermediate its ends and a circular opening at its rear end, supporting mechanism projecting from said main frame upwardly through the longitudinal opening of said supplemental frame, mining mechanism carried by said upright supporting mechanism, a conveyer mounted on said supplemental frame, and a supplemental conveyer comprising a hopper pivotally connected to said supplemental frame at said circular opening.

66. In a mining and loading machine, the combination with a main frame, of a supplemental frame having a longitudinal opening between its ends, supporting mechanism projecting upwardly from said main frame through said longitudinal opening, mining apparatus carried by said supporting mechanism, an endless conveyer mounted on said supplemental frame, a covering for that portion of said conveyer traveling toward the mine wall, an upright guard plate at the forward end of said covering, and means for moving said supplemental frame and said conveyer forward relatively to said main frame while the latter and said supporting mechanism remain stationary.

67. In a mining and loading machine, the combination with a main frame, of a supplemental frame comprising a longitudinal opening between its ends and a circular opening at its rear end and also comprising a runway for a flight conveyer all embodied in one rigid structure mounted on said main frame for movement relatively thereto, means for driving said flight conveyer, supporting mechanism projecting upwardly through said longitudinal opening from said main frame, mining mechanism carried by said supporting mechanism, means for moving said supplemental frame and flight conveyer relatively to said main frame, and a supplemental conveyer pivotally connected to said supplemental frame at said circular opening and movable bodily with said supplemental frame.

68. In a mining and loading machine, the combination with a main frame, of a sup-

plemental frame having a longitudinal opening between its ends and a circular opening at its rear end, a conveyer mounted on said supplemental frame, a supplemental conveyer pivotally connected to said supplemental frame at said circular opening for bodily movement with said supplemental frame relatively to said main frame, supporting mechanism projecting upwardly through said longitudinal opening from said main frame, cutting mechanism carried by said supporting mechanism, and means for moving said supplemental frame together with both of said conveyers relatively to said main frame while the latter and said upwardly projecting supporting mechanism remain stationary.

69. In a mining and loading machine, the combination with a main frame, of a supplemental frame having a longitudinal opening between its ends, a conveyer mounted on said supplemental frame, means comprising an electric motor for driving said conveyer, upright standard supporting mechanism projecting upwardly through said longitudinal opening from said main frame, mechanism comprising an electric motor connected between said supplemental frame and said upright supporting mechanism for moving said supplemental frame together with the conveyer thereon relatively to said main frame, cutting mechanism carried by said upright standard supporting mechanism, means comprising an electric motor for operating said cutting mechanism, and means comprising an electric motor for adjusting the elevation of said cutting mechanism relatively to said main frame, each of said electric motors being independent of the others in its operation.

70. In a mining and loading machine, the combination with an elongated main frame, of a laterally spreading supplemental frame having a forward arcuate contour in advance of said main frame and having a longitudinal opening between the ends of said supplemental frame, a flight conveyer mounted on said supplemental frame, a supplemental conveyer with a hopper at its rear end connected to a circular opening in the rear end of said supplemental frame for swinging movement relatively to said frames while said flight conveyer remains in delivery communication with said hopper, upright standards projecting from said main frame through said opening in said supplemental frame, means connected between said supplemental frame and the rear standard for moving the supplemental frame together with both of said conveyers longitudinally of said main frame to adjust the position of the forward arcuate portion of said supplemental frame, cutting mechanism, means for operating said cutting mechanism, and means for supporting said cutting mechanism at various elevations on said standards.

71. In a mining and loading machine, the combination with a main frame, of a supplemental frame having a central longitudinal opening therein, upright supporting mechanism projecting upwardly from the forward end of said main frame through the said longitudinal opening, cutting mechanism, means comprising an electric motor for operating said cutting mechanism, means for supporting said cutting mechanism at adjusted elevation, means comprising an electric motor for adjusting the elevation of said cutting mechanism, means comprising an electric motor for moving said supplemental frame in advance of said main frame and retracting said supplemental frame, a conveyer mounted on said supplemental frame, means comprising an electric motor for operating said conveyer, an additional support projecting upwardly through said opening and comprising an operator's platform, and separate controllers, one for each of said electric motors mounted on said additional support in position for actuation by the operator on said platform.

72. In a mining machine, the combination with a main frame, of mechanism mounted on said frame in position to dislodge material from an upright mine wall along an arcuate space above the plane of the floor of the mine chamber, means having a forward arcuate contour conforming to the curvature of the upright mine wall in which material is dislodged, said means being movable relatively to said frame and in the plane of the floor of the mine chamber into a position in advance of said main frame beneath the dislodging mechanism for receiving the dislodged material, and means mounted on said main frame for moving said receiving means forward in the plane of the floor relatively to said main frame into receiving position.

73. In a mining machine, the combination with a main frame, of a receiving frame having a horizontal flat bottom adapted to slide over the plane floor of a mine chamber in advance of said main frame, means mounted on said main frame for moving said receiving frame to a receiving position in advance of said main frame and to retract said receiving frame away from its receiving position toward said main frame, means on said main frame for dislodging material in an upright mine wall in advance of said main frame, and traveling conveyer mechanism mounted on said receiving frame in a fixed relation thereto for movement bodily therewith and for transferring dislodged material toward loading position.

74. In a mining machine, the combination with a core-cutter having an unobstructed core-opening therethrough, of means for operating said core-cutter for dislodging ma-

terial from a mine vein, and mechanism comprising a traveling conveyer arranged in position beneath substantially the entire range of cutting movement of said core-cutter for removing material dislodged thereby during the operation of said core-cutter.

75. In a mining machine, the combination with a loop chain core-cutter having an unobstructed core-opening therethrough, of means for adjusting the elevation of said loop chain core-cutter, a platform mounted independently of the adjustments in elevation of said core-cutter, and means for moving said platform into and out of position beneath said core-cutter.

76. In a mining machine, the combination with a loop chain core-cutter having an unobstructed core-opening therethrough, of means for operating said core-cutter including feeding movement thereof on an upright axis to sever material from a mine vein, means for adjusting the core-cutter in elevation, a platform having its forward edge curved to conform to the curvature of the cut made by said cutter, and means for moving said platform along a predetermined path irrespective of the elevation of said cutter into position beneath the cutter to receive material dislodged by the latter.

77. In a mining machine, the combination with a core-cutter having an unobstructed core-opening therethrough, of means for operating said core-cutter including arcuate movement thereof about an upright axis to sever material from a mine vein, means for adjusting the elevation of said core-cutter including a position to cut along the floor of the mine chamber, a platform out of position when said cutter is operating along such floor, and means for sliding said platform in a horizontal direction along the floor into position to receive material while said cutter is in an elevated position.

78. In a mining machine, the combination with a stationary main frame, of a supplemental frame having a comparatively wide platform with a forward scooping edge arcuate in plan, dislodging mechanism mounted on said main frame, means for moving the forward scooping edge of said platform beneath the material severed by said dislodging mechanism, and mechanism carried by said platform back of the forward edge thereof for transferring dislodged material from said platform toward loading position.

79. In a mining machine, the combination with a stationary main frame, of dislodging mechanism, a supplemental frame having a comparatively wide platform with a forward arcuate scooping edge having a radius equal to approximately half the width of the platform, means for moving said supplemental frame relatively to said main frame to secure movement of said platform over the floor of the mine chamber at the base of the mine wall to gather dislodged material, and a flight conveyer traveling laterally on said platform back of the forward arcuate edge thereof but in position for transferring material from said platform toward loading position.

80. In a mining machine, the combination with a supporting frame, of mechanism for cutting plane kerfs, parallel motion mechanism comprising parallel links for confining said kerf-cutting mechanism to positions in planes approximately perpendicular to an upright working face and locking the same in such positions during operation, means for adjusting the position of said kerf-cutting mechanism while thus confined to such cutting positions, and means for operating said kerf-cutting mechanism.

81. In a mining machine, the combination with a supporting frame, of cutting mechanism for cutting plane kerfs horizontally across an upright mine wall, parallel motion mechanism for confining the kerf-cutting mechanism to positions in planes perpendicular to the upright working face, and means for operating said kerf-cutting mechanism including swinging feeding movement thereof on an upright axis.

82. In a mining machine, the combination with a main frame, of a receiving frame adapted to move over the mine floor in advance of said main frame, means mounted on said main frame for dislodging material from an upright mine wall in advance of said main frame onto the mine floor in advance of said receiving frame, means on said main frame for moving said receiving frame forwardly to gather material dislodged from the upright mine wall and lying on the floor at the base thereof, such moving means also retracting said receiving frame from its receiving position toward said main frame, and traveling conveyer mechanism mounted on said receiving frame in fixed relation thereto for movement bodily therewith and for transferring dislodged material toward loading position.

83. In a mining machine, the combination with a main frame, of dislodging mechanism mounted thereon and adapted to operate at various elevations on an upright mine wall from the base to the roof thereof, a supplemental receiving frame adapted to occupy a retracted position relative to said main frame while said dislodging mechanism is operating at the base of the mine wall, means for moving said supplemental frame forwardly to receiving position adjacent the base of the mine wall, and traveling conveyer mechanism mounted on said supplemental frame in fixed relation thereto for movement bodily therewith and for transferring dislodged material toward loading position.

84. In a mining machine, the combination with a stationary elongated main frame

adapted to extend longitudinally of a mine chamber, of dislodging mechanism, a supplemental frame having a comparatively wide platform with its forward scooping edge curved in plan, means for mounting said supplemental frame on said main frame to be confined to rectilinear forward and backward movements relatively to said main frame, means for moving said platform rectilinearly beneath the material dislodged by said dislodging mechanism, and a laterally traveling conveyer on said platform back of the forward scooping edge thereof for transferring dislodged material from said platform toward loading position independently of movement of said platform.

85. In a mining machine, the combination with a main frame adapted to occupy a stationary position in a mine chamber, of a supplemental frame mounted thereon to move relatively thereto and having a forward free and unobstructed scooping edge adapted to be moved under dislodged material, means for moving said supplemental frame relatively to said main frame to secure operation of said scooping edge, a traveling conveyer mounted on said supplemental frame to move bodily therewith into position to act on the scooped up material to remove the same, and dislodging mechanism mounted on said main frame in position to dislodge material from an upright mine wall for removal by said conveyer.

86. In mining apparatus, the combination with a supporting frame, of a supplemental frame, kerf-cutting mechanism mounted on said supplemental frame for arcuate movement on an upright axis, and means for swinging said supplemental frame relatively to said main frame to adjust the elevation of said kerf-cutting mechanism while maintaining such upright axis along lines which are always in parallelism to each other.

87. In a mining machine, the combination with a supporting frame, of a cutter-frame mounted on said supporting frame for adjustment in elevation relative thereto, said cutter-frame having an unobstructed core-opening between spaced-apart runs each adapted to cut a plane kerf, cutting mechanism mounted on said cutter-frame, means for operating said cutting mechanism, and means for adjusting the elevation of said cutter-frame and said cutting mechanism relatively to said supporting frame while maintaining operating connections for said cutting mechanism and while maintaining the upper and lower spaced-apart runs in parallel horizontal planes.

88. In a mining machine, the combination with a main supporting frame, of a supplemental frame, core-cutting mechanism having an unobstructed core-opening therethrough between spaced-apart runs each rectilinear in elevation and mounted on said supplemental frame for arcuate feeding movement on an upright axis and for adjustment as a whole in elevation relatively to said main supporting frame, connections between said supporting frame and said supplemental frame for maintaining said axis in upright positions for various elevations of said core-cutting mechanism, and means for operating said core-cutting mechanism including arcuate feeding movement thereof on such upright axis at the various elevations of said core-cutting mehanism.

89. In a mining machine, the combination with a main frame, of a core-cutter having spaced-apart upper and lower runs each rectilinear in elevation for the purpose of cutting plane kerfs, means for supporting said core-cutter on said main frame for adjustment in elevation relatively thereto, apparatus for lifting and lowering said supporting means relatively to said main frame to adjust the height of said core-cutter in its entirety while maintaining vertical a plane tangent to the outer extremity of the core-cutter at a given position relative thereto, and means for operating said core-cutter including feed thereof in the various positions to which adjusted in elevation.

90. In a mining and loading machine, the combination with kerf-cutting mechanism mounted for feeding movement in an arc about an upright axis, means for operating said kerf-cutting mechanism including arcuate feeding movement thereof about said upright axis, means for collecting dislodged material from the base of the mine wall and transferring such dislodged material toward loading position, and means for adjusting the elevation of said kerf-cutting mechanism independently of said collecting and transferring means.

91. In a mining machine, the combination with a core-cutter having an unobstructed core-opening therethrough, of a supporting frame therefor, means for swinging said core-cutter relatively to said supporting frame up or down while maintaining in parallelism a horizontal plane tangent to a given point on the core-cutter thereby adjusting the height of said core-cutter, and means for operating said core-cutter including feed thereof in its various positions to which it has been adjusted.

92. In a mining machine, the combination with mechanism for entirely cutting out a section of material from the wall of a mine, of means independent of adjustment of said cutting mechanism for collecting and transferring toward loading position the material cut by said cutting mechanism, said collecting means extending under the core in position to receive the severed section of material directly from its original position in the mine wall, and apparatus for operating said collecting and transferring means.

93. In a mining machine, the combination with supporting framework, of core-cutting mechanism having an unobstructed core-opening therethrough and mounted on said framework to swing on an upright axis, means mounted on said framework and movable relatively thereto in position to move along the floor of a mine chamber under the cut core and receive the same, said receiving means being independent of adjustment of said core-cutting mechanism and capable of transferring the dislodged material away from the mine wall toward loading position, and means for operating said core-cutting mechanism including arcuate feeding movement thereof by swinging on said upright axis relatively to said framework while said receiving means remains at the floor.

94. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism mounted thereon to extend forwardly therefrom in position to operate on an upright mine wall in advance of said frame, means for adjusting the elevation of said dislodging mechanism, means mounted on said frame in position to receive the dislodged material, said receiving means being mounted independently of adjustments of said dislodging mechanism, and apparatus for moving said receiving means horizontally to transfer material thereon rearwardly from the mine wall toward loading position.

95. A mining and loading machine comprising a supporting frame, mining mechanism mounted thereon and comprising chain kerf-cutting mechanism in position to operate on an upright mine wall, means for adjusting the elevation of said mining mechanism relatively to said frame, gathering mechanism mounted on said frame independently of said mining mechanism and the adjustments in elevation thereof, and means for operating said gathering mechanism below the range of operation of said mining means.

96. In a mining machine, the combination with a core-cutter having an unobstructed core-opening therethrough, of means for supporting said core-cutter to permanently confine the same to positions where planes extending through a given portion of the core-cutter will remain in parallelism for different positions of said core-cutter, means for operating said core-cutter including arcuate feeding movement thereof while thus confined, and means for swinging said core-cutter to adjust the same in elevation while such planes remain in parallelism.

97. In a mining machine, the combination with a main frame, of a core-cutter having an unobstructed core-opening therethrough, a supplemental frame for carrying said core-cutter for arcuate feeding movement on an upright axis, means comprising a plurality of swinging parallel bars connected between said main and supplemental frames for supporting the latter at adjusted elevations while being so permanently confined that a plane extending horizontally through any given portion of the core-cutter will remain in parallelism at various elevations of the core-cutter, and means for operating said core-cutter at the adjusted elevation on such upright axis.

98. In a mining machine, the combination with supporting framework, of kerf-cutting mechanism, a supplemental frame for carrying said kerf-cutting mechanism, mechanism comprising a plurality of swinging parallel bars between said supporting framework and said supplemental frame for adjusting the elevation of said kerf-cutting mechanism while maintaining the latter in positions to cut kerfs in parallel planes, means co-acting with said bars for confining the kerf-cutting mechanism against bodily movement either up or down, and means for operating said kerf-cutting mechanism.

99. In a mining machine, the combination with a supporting frame, of a cutter-head, a kerf-cutter mounted on said cutter-head, connections comprising worm gearing between said cutter-head and said supporting frame for maintaining and confining said kerf-cutter in position to cut kerfs in planes parallel to each other at various elevations, means for swinging said connections together with said cutter-head and said kerf-cutter to adjust the latter in elevation while position of the same is maintained to cut in planes parallel to each other, and means for operating said kerf-cutter to cut a kerf at adjusted elevation.

100. In a mining machine, the combination with a main frame, of dislodging mechanism mounted thereon in position to extend in advance thereof for operation on an upright mine wall, gathering mechanism mounted on said main frame for movement relatively thereto along the floor of the mine chamber independently of said dislodging mechanism, and means for operating said gathering mechanism to act on the material dislodged by said dislodging mechanism.

101. In a mining machine, the combination with a main frame, of dislodging mechanism mounted thereon and comprising loop chain core-cutting, means for adjusting said core-cutting mechanism in elevation relatively to said frame, and gathering mechanism connected to said frame in position to extend along the floor of a mine chamber beneath the range of operation of said dislodging mechanism independently of adjustments in elevation of the latter.

102. In a mining machine, the combination with a supporting frame, of dislodging mechanism mounted thereon in position to extend in advance thereof to operate on an upright mine wall, means for adjusting the

elevation of said dislodging mechanism, gathering means comprising a depressed forward beveled nose portion connected to said supporting frame and movable along the mine floor independently of the adjustment in elevation of said dislodging mechanism, and means for operating said gathering means relatively to said supporting frame to act on the material dislodged by said dislodging mechanism.

103. In a mining machine, the combination with a portable base unit, of dislodging mechanism mounted thereon in position to dislodge coal from an upright face of a mine vein in advance of said base unit, a conveyer pan having a depressed forward nose portion independent of said dislodging mechanism and arranged to operate in advance of said base unit and below the said dislodging mechanism, the forward edge of said pan being free and unobstructed, and a flight conveyer mounted on said pan in position to travel around the forward periphery thereof to remove the dislodged material gathered thereon.

104. In a mining machine, the combination with a portable base unit, of dislodging mechanism mounted thereon in position to dislodge coal from an upright mine wall in advance of said base unit, a conveyer pan including a depressed forward nose portion of widely expanded area and comparatively thin to lie close to the mine floor under said dislodging mechanism, a connection between said base unit and said pan and serving to permit back and forth movement of said nose portion relatively to said base unit and over the mine floor, and a conveyer on said pan to remove the dislodged coal gathered thereon.

105. In a mining machine, the combination with a main frame, of kerf-cutting mechanism, a supplemental frame for supporting said kerf-cutting mechanism for arcuate feeding movement on an upright axis, means for operating said kerf-cutting mechanism including the arcuate feed thereof on such upright axis, and mechanism between said main and supplemental frames and comprising a plurality of parallel swinging bars for supporting said kerf-cutting mechanism at various elevations relative to said main frame while maintaining said axis in parallel upright positions and while said main frame remains in stationary position.

106. In a mining machine, the combination with a portable base unit comprising a supporting frame, of dislodging mechanism mounted thereon in position to operate on a mine wall in advance of said base unit, a gathering device mounted on said frame for rectilinear movement relative thereto to advanced position along the floor of the mine chamber under the range of operation of said dislodging mechanism, and means for advancing and retracting said gathering device relatively to said base unit while the latter remains stationary.

107. In a mining machine, the combination with a supporting frame, of a conveyer pan having a depressed forward nose portion, dislodging mechanism mounted on said frame to operate in advance thereof above the forward position of said pan, and means for reciprocating said pan relatively to said frame along straight lines to reach out from the frame to gather loads of dislodged material.

108. In a mining machine, the combination with a supporting frame, of a supplemental frame having a comparatively wide platform with its upper forward surface gradually sloping rearwardly on a grade substantially less than the angle of respose, dislodging mechanism mounted on said frame in position to dislodge material from the mine wall into the range of said platform, and means for moving said platform relatively to said frame to gather the dislodged material by reaching forward from said frame.

109. In a mining machine, the combination with a supporting frame, of dislodging mechanism mounted thereon for operation in advance thereof on an upright mine wall, a supplemental frame comprising a conveyer pan mounted on said frame for movement relatively thereto while occupying a position close to the mine floor over a wide area, means for moving said frame to a position under said dislodging mechanism, and a laterally traveling conveyer on said pan for transferring material from the latter toward loading position independently of said dislodging mechanism.

110. In a mining machine, the combination with a supporting frame, of dislodging mechanism mounted thereon to extend in advance thereof for operation on an upright mine wall, means for adjusting said dislodging mechanism in elevation, a wide platform having a forward free and unobstructed edge arcuate in plan and having an upper substantially flat surface over a wide area beneath the range of operation of said dislodging mechanism, and a traveling conveyer operable laterally around the forward portion of said platform immediately back of the said edge of said platform to remove the material collected thereon from said dislodging mechanism.

111. In a mining machine, the combination with cutting mechanism, of a supporting frame, of foldable means for supporting said cutting mechanism on said frame, said foldable means being operable on spaced-apart hinges, means comprising worm gearing for locking said foldable means in predetermined relation to said frame, and means for operating said cutting mechanism

in its adjusted positions relative to said frame.

112. In a mining machine, the combination with a supporting frame, of loop chain core-cutting mechanism, link form members connected to said frame for support and supporting said cutting mechanism for movement toward and from a longitudinal horizontal line extending through the length of said frame, operator-controlled power-driven mechanism for effecting said movements, means comprising worm gearing for locking said members in adjusted position and means for driving said cutting mechanism in its adjusted position.

113. In a mining machine, the combination with a supporting frame, of cutting mechanism, link-form members connected to said frame and supporting said cutting mechanism for movement toward and from the machine path and for swinging in a plane which is parallel to such path, means for locking such members against both up and down movement during the operation of said cutting mechanism, and means for operating said cutting mechanism including the feed thereof.

114. In a mining machine, the combination with a supporting frame, of cutting mechanism, members connected to said frame and supporting said cutting mechanism at varying distances from the longitudinal axis of the machine and to swing in a plane which is parallel to said axis, self-contained power-operated mechanism under the control of the operator for varying said distance and for holding the cutting mechanism parallel to said axial line, and means for operating said cutting mechanism including feed thereof along planes parallel to said axial line.

115. In a mining machine, the combination with a supporting frame, of cutting mechanism, a group of members supporting said cutting mechanism from said frame, said group being foldable on spaced-apart parallel hinge lines which are between said cutting mechanism and said frame and are parallel to each other, said group of members maintaining said cutting mechanism in position to cut in parallel planes when said group is folded and unfolded along said parallel hinge lines, and operator-controlled power mechanism for actuating said group of members to adjust the position of said cutting mechanism and locking the latter in adjusted position.

116. In a mining machine, the combination with a supporting frame, of cutting mechanism, means comprising link-form members between said cutting mechanism and said supporting frame for adjustably supporting said cutting mechanism to cut along lines parallel to the path of the machine, means for swinging said cutting mechanism in the plane parallel to such path to effect feeding of the cutting mechanism, and means for driving the cutting mechanism.

117. In a mining machine, the combination with a supporting frame, of cutting mechanism, a pair of link-form members having the connections at their ends to said frame and to said cutting mechanism by means of two pairs of vertically spaced parallel hinge lines, mechanism acting directly on one of said link-form members to adjust the position of said cutting mechanism, and means for operating said cutting mechanism in its adjusted position.

118. In a mining machine, the combination with a supporting frame, of a supplemental frame, cutting mechanism mounted on said supplemental frame, a pair of link-form members having spaced-apart pivotal connections at their ends to said frames, the axes of the pivotal connections being parallel to each other, means connected between said suppporting frame and one of said link-form members for moving both link-form members on said pivotal connections to adjust the position of said supplemental frame and the cutting mechanism mounted thereon, and operator-controlled power-operated mechanism for operating said cutting mechanism in its adjusted position.

119. In a mining machine, the combination with a supporting frame, of a supplemental frame, cutting mechanism mounted on said supplemental frame, spaced-apart links connecting said supplemental frame to said supporting frame, said links having pivotal connections to said frames on parallel axes, the plane through the axes of the pivotal connections to the supplemental frame being parallel to the plane through the axes of the pivotal connections to said supporting frame, power-operated mechanism on said supporting frame for actuating link-form members to adjust the position of said supplemental frame together with the cutting mechanism mounted thereon, and power-operated mechanism for operating said cutting mechanism in its adjusted position.

120. In a mining machine, the combination with a supporting frame, of cutting mechanism, means for supporting said cutting mechanism on said frame to cut kerfs in planes parallel to the longitudinal center line of the machine, and mechanism for actuating said supporting means to adjust the position of said cutting mechanism while maintaining it in position to cut kerfs in planes parallel to said center line, said mechanism comprising gearing to prevent bodily movement of said supporting means relatively to said frame during operation of said cutting mechanism.

121. In a mining machine, the combina-

tion with a supporting frame, cutting mechanism mounted on said supplemental frame for swinging feeding movement relatively thereto, flexible supporting connections between said supplemental frame and said supporting frame to maintain said mechanism in position to cut kerfs in planes parallel to the longitudinal center line of the machine, means for actuating said connections to adjust the position of said cutting mechanism while the latter is maintained in position to cut a kerf in such parallel planes, and means for operating said cutting mechanism including swinging feeding movement thereof in planes parallel to such longitudinal center line.

122. In a mining machine, the combination with the cutter-head frame having upper and lower members spaced from each other, of a loop cutter having an unobstructed core opening therethrough and carried by said members for movement relatively thereto on an upright axis, a circular rack carried by one of said members, a pinion co-operating with said rack for rotating said loop core cutter about its vertical axis in opposite directions, and means for adjusting the elevation of said cutter-head frame while said pinion remains in co-operative relation with said rack.

123. In a mining machine, a support, a cutter-head frame, a pair of pivotally mounted arms mounted on said support and connected with said frame and forming therewith a parallel motion device, a yoke carried by said frame for movement thereon about an upright axis, a loop cutter secured to said yoke and movable therewith, a motor carried by said yoke and arranged to operate said cutter, and mechanism for rotating said yoke in opposite directions about said axis.

124. In a mining machine, a support, a cutter-head frame, a pair of pivotally mounted arms mounted on said support and connected with said frame and constituting therewith a parallel motion device, a motor connected with said arms, rack and pinion mechanism arranged to be driven by said motor to swing said arms vertically to adjust the position of said cutter-head frame, a yoke mounted on said frame for movement in substantially horizontal planes about an upright axis, a loop cutter secured to said yoke and movable therewith, a motor carried by said yoke for driving said cutter, and mechanism for swinging said yoke and loop cutter about said upright axis in opposite directions.

125. In a mining machine, the combination with a supporting frame, of a core-cutter frame having an unobstructed core opening therethrough and upper and lower runs for cutting kerfs in spaced-apart horizontal planes, an endless chain-cutter mounted on said core-cutter frame, means comprising an electric motor mounted on the rear portion of said core-cutter frame for driving said chain-cutter, said motor being movable bodily with said core-cutter frame and said chain-cutter, a yoke for pivotally supporting said core-cutter frame for arcuate movement about an upright axis, means comprising gearing for effecting arcuate feeding movement of said chain-cutter when said cutter is driven to cut a crescent-shaped core from an upright mine wall in a general horizontal direction, parallel motion mechanism connected between said supporting frame and said yoke for holding said axis upright to maintain said upper and lower runs in substantially horizontal planes for various elevations of said core-cutter frame and said chain-cutter, an additional electric motor mounted on said parallel motion mechanism, and gearing connected between said additional electric motor and said supporting frame for effecting adjustment in elevation of said chain-cutter to enable a plurality of cores to be cut across the mine wall between the floor and roof thereof and providing continuations of the floor and roof respectively in substantially horizontal planes.

126. In a mining machine, the combination with a frame rigid throughout with a forward portion constituting a core-cutter frame having an unobstructed core-opening therethrough, a chain-cutter mounted on said forward portion of said frame, driving mechanism for said chain-cutter and mounted on said frame, an electric motor mounted on said frame for operating said driving mechanism, a supporting frame for carrying said first named frame for arcuate movement about an upright axis, means for securing such arcuate movement, and frame-work adapted to rest on the floor of a mine chamber and comprising forwardly projecting supporting mechanism for carrying said supporting frame and the parts mounted thereon at various elevations while maintaining said axis in upright position.

127. In a mining machine, the combination with a supporting frame, of a standard thereon, a bracket having spaced-apart forwardly projecting members, a pair of substantially parallel arms pivotally connected at spaced-apart points on said standard at their rear ends and pivotally connected at their forward ends to the intermediate upright portion of said bracket at spaced-apart points thereon, an arcuate rack mounted in upright position on said supporting frame, driving gearing mounted on one of said links and connected to said arcuate rack, an electric motor mounted on the last named link and connected to said driving gearing, core-cutting mechanism comprising a core-cutter frame having an unobstructed core-opening therethrough and

a chain cutter and driving mechanism and an electric motor connected to the latter, said core-cutting mechanism being mounted between said forwardly projecting members for arcuate movement on an upright axis, and gearing connected between said last named motor and said bracket for effecting arcuate movement of said core-cutting mechanism.

128. In a mining machine, the combination with a supporting frame, of a supplemental frame mounted thereon for angular movement in planes substantially parallel with the surface on which the machine is supported, a loop chain core-cutter having an unobstructed core-opening therethrough and mounted on said supplemental frame for bodily movement therewith, means comprising a motor for driving the chain of said core-cutter, and separate means comprising a separate motor for imparting such angular movement to said supplemental frame to a secure feeding movement of said core-cutter relatively to said supporting frame independently of the driving of said chain.

129. In a mining machine, the combination with supporting framework, of a supplemental frame mounted thereon for angular movement on an upright axis, self-contained power-operated mechanism for adjusting the elevation of said supplemental frame, a chain kerf-cutter on said supplemental frame, means co-acting with said adjusting mechanism for maintaining the various positions of said chain kerf-cutter in parallelism, and a separate motor for driving said chain kerf-cutter and feeding the same independently.

130. In a mining machine, the combination with a supporting frame, of mechanism for cutting a core with the kerfs above and below in parallel planes, means for confining said kerf-cutting mechanism to positions in planes approximately perpendicular to an upright working face, means for adjusting the elevation of said kerf-cutting mechanism as a whole while thus confined to such cutting positions, a motor for driving said kerf-cutting mechanism, and a separate motor for independently feeding said kerf-cutting mechanism.

131. In a mining machine, the combination with severing mechanism, of a main frame, means connected between said main frame and said severing mechanism for supporting said severing mechanism in positions at various elevations to form cuts in horizontal planes including a cut in substantially the plane of the floor of the mine chamber and in position to form a cut in substantially the plane of the roof of the mine chamber and for permanently confining such severing mechanism to positions for cutting in horizontal planes by limiting adjustments of said severing mechanism to such positions in elevation, power-operated mechanism contained by said severing mechanism for bodily moving it horizontally while being confined to positions for cutting of the mine vein in parallel planes, and separate motors operable independently to drive said severing mechanism and to feed the same.

132. In a mining machine, the combination with a pivotally supported arm, of means comprising a motor for swinging said arm about its pivotal support into various positions, core-cutting mechanism carried by said arm and comprising a length in position to cut a kerf in a substantially horizontal plane, means co-operating with said arm for maintaining said core-cutting mechanism in position to make substantially horizontal cuts including a kerf in a substantially horizontal plane at the various adjusted positions of said core-cutting mechanism, and separate additional motors for driving said core-cutting mechanism and for feeding the same.

133. In a mining machine, the combination with a cutter-head frame comprising upper and lower arms spaced from one another, of a cutter frame pivoted between said arms on an upright axis, an endless chain cutter mounted on said cutter frame, means comprising a motor on said cutter frame for driving said chain cutter, and means comprising an additional motor on said cutter frame connected to gearing on said cutter head frame for arcuately moving said cutter frame to effect arcuate feeding movement of said chain cutter while being driven.

134. In a mining machine, the combination with a supporting frame adjustable to various elevations, of core-cutting mechanism having upper and lower runs each in position to cut a kerf in a horizontal plane, such core-cutting mechanism having an unobstructed core-opening therethrough, means for supporting said core-cutting mechanism on said frame for arcuate movement on a vertical axis, means comprising a motor for driving said core-cutting mechanism, means comprising another motor for effecting arcuate feeding movement of said core-cutting mechanism on such upright axis, a main frame, and parallel motion mechanism between said main frame and said supporting frame for holding the latter and said core-cutting mechanism at various elevations while maintaining said axis in vertical position.

In testimony whereof I have signed my name to this specification, on this 20th day of April, A. D. 1916.

EDMUND C. MORGAN.