Oct. 11, 1927.

1,644,943

R. C. OSGOOD

MINING MACHINE

Original Filed March 15, 1919 4 Sheets-Sheet 1

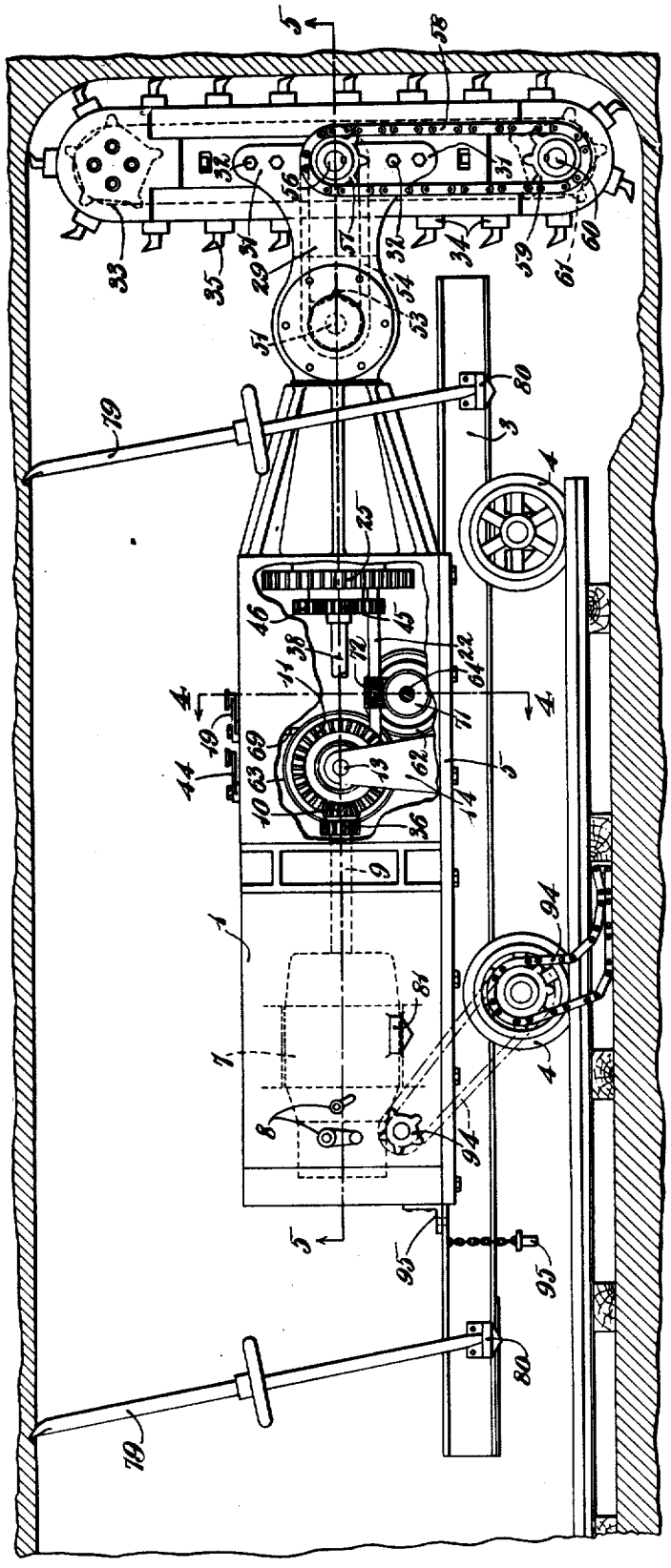


Fig. 1.

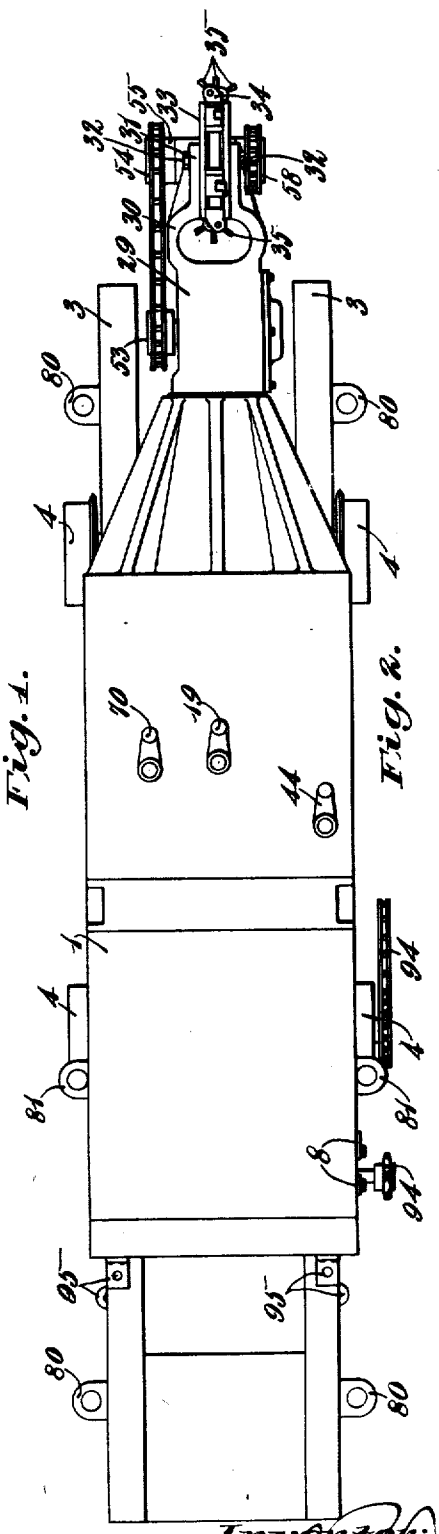


Fig. 2.

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Oct. 11, 1927.

1,644,943

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MINING MACHINE

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Fig. 3.

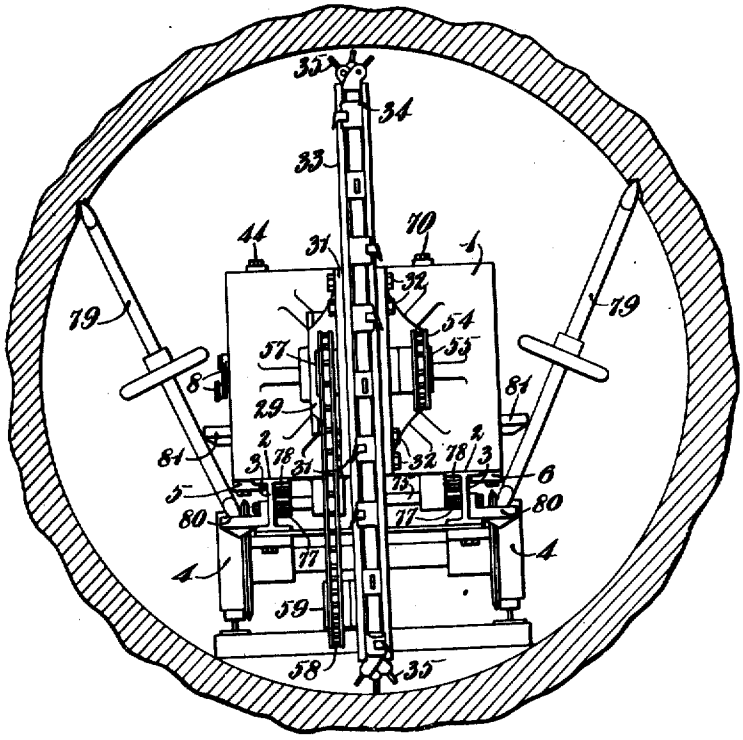
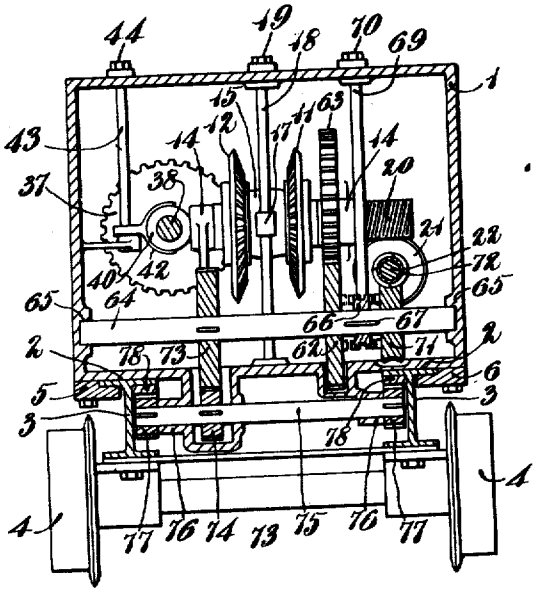


Fig. 4.



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MINING MACHINE

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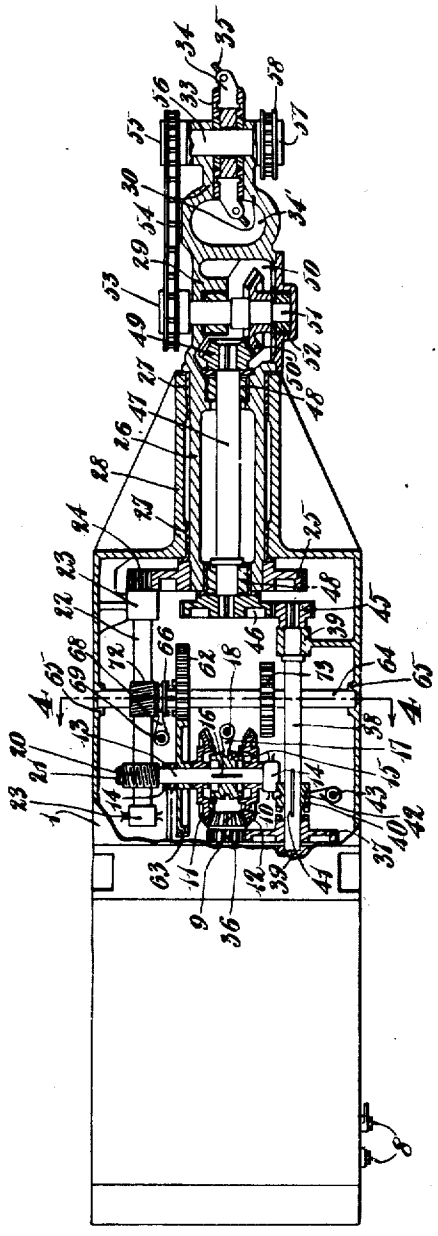


Fig. 5.

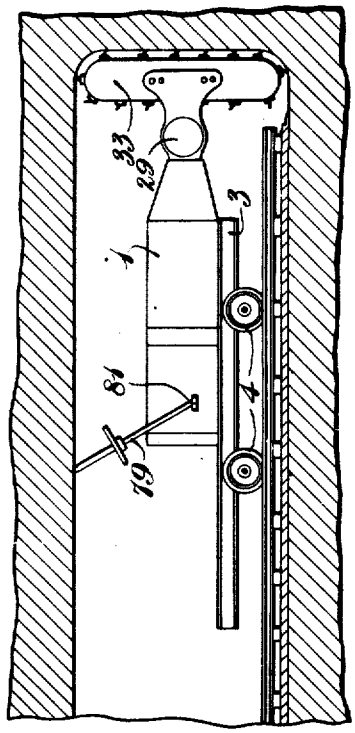


Fig. 6.

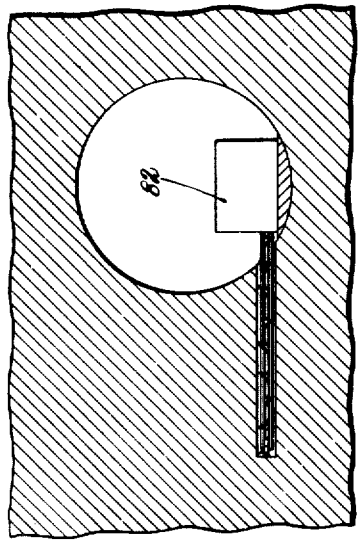


Fig. 7.

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MINING MACHINE

Original Filed March 15, 1919 4 Sheets-Sheet 4

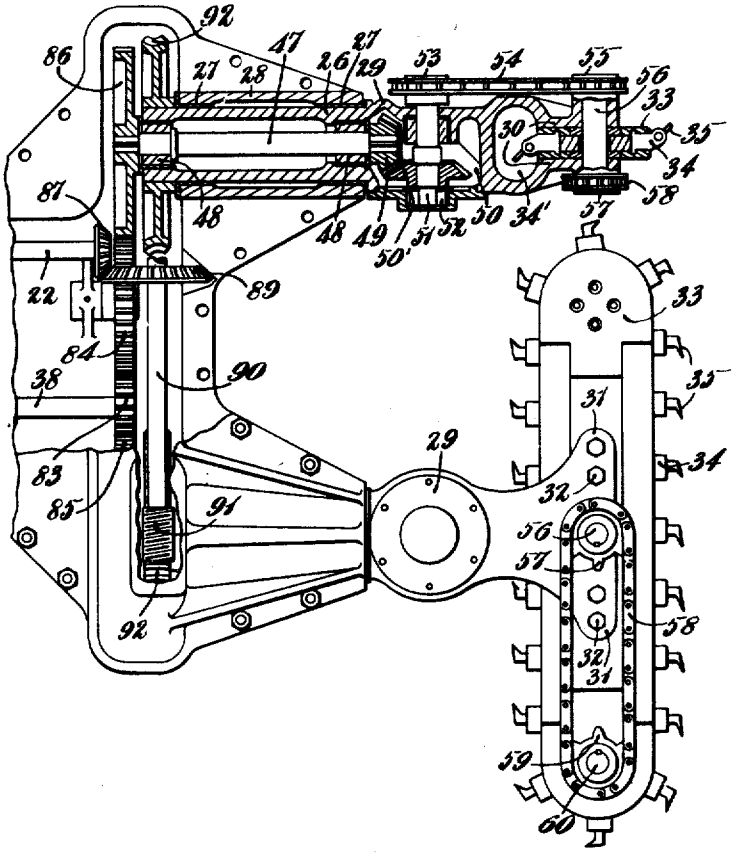


Fig. 8.

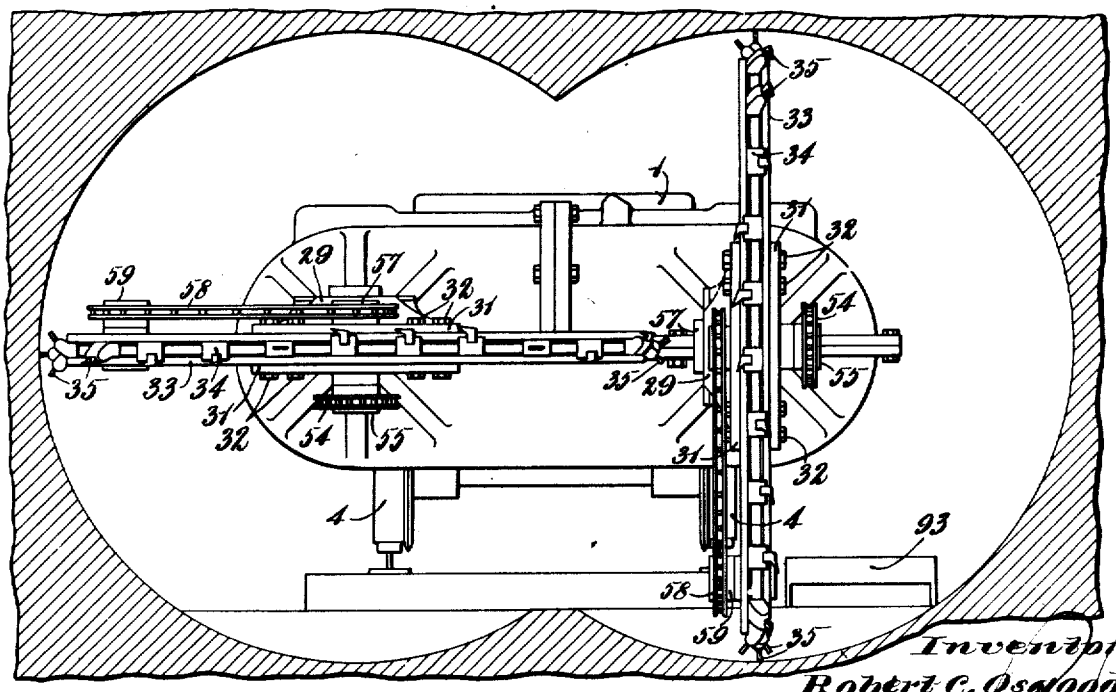


Fig. 9.

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Patented Oct. 11, 1927. 1,644,943

UNITED STATES PATENT OFFICE.

ROBERT C. OSGOOD, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

MINING MACHINE.

Application filed March 15, 1919, Serial No. 282,951. Renewed September 28, 1926.

My invention relates to mining machines.

It has for its object to provide an improved mining machine which, while not limited thereto, is especially adapted to use in entry driving. A further object of my invention is to provide an improved mining machine wherein the material to be mined is progressively cut in an improved manner in advance of the machine, preferably through the use of an improved cutter chain carrying head, the face of the entry in entry work, for example, being rapidly cut over its entire surface as the machine moves forward. A still further object of my invention is to provide an improved cutting mechanism and improved cooperating driving and feeding mechanism therefor, which is of a simple, rugged, yet light construction and adapted to rapid work and to be handled with increased facility during the mining operation. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawings I have shown for purposes of illustration two embodiments which my invention may assume in practice.

In these drawings,—

Fig. 1 is a side elevation showing one embodiment of my invention in use in an entry, parts being broken away.

Fig. 2 is a plan view of the machine.

Fig. 3 is an end elevation of the machine when disposed as shown in Fig. 1.

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a longitudinal sectional view taken on line 5—5 of Fig. 1.

Fig. 6 is a diagrammatic view showing the means for moving the truck forward.

Fig. 7 is a diagrammatic view showing one means of enlarging the entry formed by this form of my invention.

Fig. 8 is a fragmentary plan view, partially in section, of a modified form of my invention.

Fig. 9 is an end elevation of the construction shown in Fig. 8.

In this illustrative construction it will be observed that I have shown a mining machine frame 1 slidably mounted longitudinally on a horizontally disposed support, herein in the form of a flanged guiding means 2 formed on longitudinally disposed upstanding I-beam members 3, which are in turn supported upon wheels 4 and connected in such a manner as to form a truck, the ends of which herein extend beyond the wheels. As shown, the frame 1 is provided with cooperating guide flanges 5 and 6 adapted to maintain the frame 1 in the desired relation to its supports 3 during the several operations hereinafter described.

Carried within the machine frame 1, herein housed within its rear end, is a usual motor 7 adapted to be controlled by the usual controller mechanism 8. The armature shaft 9 of this motor is longitudinally disposed and carries on its front end a bevel pinion 10 which meshes constantly with a plurality of spaced bevel gears 11 and 12 loosely mounted on a transverse shaft 13 suitably journaled on the frame 1, as in supports 14, the gears 11 and 12 being adapted to be operatively connected to the shaft upon suitable movement of a clutch member 15 splined to the shaft at 16 and adapted to be operated by suitable clutch shipping mechanism including a clutch shipper 17, a rod 18, and a controlling member 19 carried on the top of the frame 1. Thus, it will be observed that it is possible to rotate the transverse shaft 13 in either direction by simply adjusting the clutch member 15 to connect the desired bevel gears 11, 12 to the shaft.

Operatively connected to the motor, herein through the shaft 13, is my improved cutter head rotating mechanism. As shown, this mechanism includes a worm 20 on one end of the shaft 13 and meshing with a worm gear 21 in turn fixed near the rear end of a longitudinally disposed shaft 22 journaled in bearings 23 at one side of the frame 1. As shown, this shaft 22 has fixed to its front end a pinion 24 meshing with a larger gear 25 disposed coaxially with the motor and in turn fixed to a coaxially disposed sleeve 26 rotatable in suitable spaced bearings 27 formed in a rigid extension or sleeve 28 on the front of the frame 1, and herein cast integral therewith. As shown, the front end of the sleeve 28 is fixed to a transversely disposed, substantially flat member 29, herein bifurcated at its front end at 30 and provided with lateral extensions 31 having rigidly attached thereto, as by bolts 32, a transversely disposed flat cutter bar 33 disposed edgewise to the face and carrying a rotary cutter chain 34 movable through a transverse chamber 34′ in the member 29

and having offset or staggered bits 35 engageable with the face when on the front half of the bar. Thus, it will be observed that when the shaft 13 is suitably connected through movement of the controlling member 19, the head 29 and the cutter bar 33 may be rotated by the motor 7 in either direction.

Operatively connected to the motor, herein also through the shaft 13, is improved mechanism for driving the cutter chain 34 while the cutter bar 33 is so rotated. As shown, a pinion 36 carried on the armature shaft 9, behind the bevel pinion 10, meshes with a larger gear 37 carried on the rear end of a longitudinally disposed shaft 38 journaled in bearings 39 on the frame 1 and oppositely located with respect to the shaft 22. This gear 37 is connectible with the shaft 38 through clutch mechanism including a movable clutch member 40 splined to the shaft 38 at 41 and operable through a clutch shipper 42, an upstanding rod 43, and a controlling member 44 carried on the top of the casing 1. As shown, the shaft 38 also carries on its front end a pinion 45 meshing with a larger gear 46, which is in turn fixed to the end of a shaft 47 disposed coaxially with the sleeve 26 and journaled therein in suitable bearings 48, herein of the roller type, located in the opposite ends thereof. The front end of this shaft 46 in turn has fixed thereto a bevel gear 49 disposed in a chamber 50 in the member 29 and meshing with a larger bevel gear 50′ fixed to a transverse shaft 51, which is in turn journaled in suitable bearings 52, herein of the roller type, carried on the member 29. Carried on one end of the shaft 51 is a sprocket 53 having a cooperating chain 54, which in turn extends around a sprocket 55 on one end of another transverse shaft 56 journaled in the extremity of the member 29 and midway between the ends of the bar 33. As shown, the opposite end of this shaft 56 is also provided with a sprocket 57 carrying a chain 58 which in turn cooperates with a sprocket 59 connected through a shaft 60 with the chain driving sprocket 61 of the cutter chain 34. Thus it will be observed that through control of the controlling member 44 the cutter chain may be operated during the rotation of the cutter bar, or thrown out of operation, as desired.

Cooperating with the mechanism described and also preferably operatively connected to the motor, is improved mechanism for producing a relative feeding movement between the frame 1 and the truck during cutting, and also during the hereinafter described feeding movement. This mechanism, as shown, includes a gear 62, constantly meshing with a gear 63 fixed to and rotatable with the bevel gear 11. As shown, this gear 62 is freely rotatable on a transverse shaft 64 disposed in front of the shaft 13 and journaled in suitable bearings 65 on the frame 1, and is connectible with that shaft through suitable clutch mechanism including a clutch member 66 splined at 67 to the shaft, a clutch shipper 68, an upstanding rod 69, and a controlling member 70 carried on the top of the frame 1. This clutch mechanism is also adapted to connect the shaft to a freely rotatable worm gear 71 carried on the shaft and meshing with a worm 72 fixed to the shaft 22. It will also be noted that this shaft 64 carries a gear 73 constantly meshing with a pinion 74 on a lower transverse shaft 75 journaled in suitable bearings 76 beneath the frame 1 and disposed within the truck girders 3. This shaft 75 in turn is also provided with pinions 77 on its opposite ends meshing with longitudinally disposed racks 78 fixed to the upper inside flanges of the girders 3. Thus it will be observed that through manipulation of the clutch controlling member 70 to connect either the worm gear 71 or the gear 62 to the shaft, and frame 1 may be fed slowly forward on the truck as the cutter bar is rotated or fed more rapidly backward thereon when the cutter bar is not rotating. Also it will be noted that the direction of movement may be reversed or the movement interrupted, through manipulation of the clutch controlling member 19.

In the operation of my improved construction, the machine is preferably carried into the place to be cut, on its truck, until its cutter bar is closely adjacent the face. Then the truck is suitably fixed, herein relatively to the roof, by means of one or more adjustable jacks 79 engaging the roof and one or more jack supports 80 preferably formed on the opposite ends and sides of the girders 3. After this has been done, the motor is started, and through the manipulation of the clutch controlling member 19 and the clutch controlling member 44, the cutter bar and cutter chain are started in operation. Then, through the control of the clutch controlling member 70, the frame 1 is fed forward relative to the face so that the cutter bits 35 on the front half of the cutter chain 34 may continuously engage and cut the face as shown in Fig. 1, as the bar is rotated and fed forward. As soon as the machine has reached a predetermined forward position relative to the truck, the latter is then fed forward relative to the machine, herein also through the use of my improved feeding mechanism. This is preferably done while the cuttings are being loaded out, the machine then being shut down. By then removing the jacks 79 and placing the same between the roof and other jack supports 81 formed on the opposite sides and preferably at the rear end of the machine frame 1, the latter may be locked in position so that when,

through the control of the clutch controlling member 70, the pinions 77 are rotated, the truck will be caused to feed forward relative to the machine on the new section of track. Obviously, as soon as the truck has been thus advanced, the jacks 79 may be again replaced in their cutting positions and the cutting operation resumed.

In the use of a machine constructed in accordance with my improvement, it will be observed that a cut of cylindrical cross section is produced, the diameter of the cut being the same as the length of the bar. Under many conditions this cut may satisfactorily serve as an entry. However, if it is desired to provide a wider entry, the same may be readily widened by the use of a kerf cutting machine 82 of any desired type, preferably an undercutter, as shown in Fig. 7, the bar or cutter of the machine preferably being inserted substantially on the level with the bottom of the entry so that one or both side walls thereof may be undercut and shot to widen the entry as desired.

In Figs. 8 and 9 it will be noted, moreover, that I have illustrated a modified form of my invention adapted initially to cut a wider entry, herein consisting of a dual mechanism of the general type described above adapted to cut a plurality of overlapping bores. Inasmuch as the mechanism shown in Figs. 1 to 6 has been specifically described and substantially the same mechanism is used in this embodiment of my invention, a second detail description of that mechanism seems unnecessary. In this construction, however, it will be observed that a plurality of rotating members 29 are provided disposed at right angles to each other, and that operatively connected in each of these members is a cutter bar 33 carrying a cutter chain 34, the construction being so arranged that the paths of the bars overlap, one of the bars always being at right angles to the other and preferably, as herein, extending close to the axis thereof. This dual mechanism is driven from the motor and controlled substantially as hereinabove described, save for the fact that the shaft 38 carries a gear 83 on its front end meshing with an idler gear 84 and a driving gear 85, which rotates the rotating shaft 47 of the lower head 29 shown in Fig. 8, while the idler gear 84 drives a gear 86 which rotates the shaft 47 of the upper head shown in that figure. It will also be observed that the shaft 22 carries a bevel pinion 87 on its front end which in turn meshes with a bevel gear 89 carried on a transverse shaft 90 suitably journaled on the frame and carrying on its opposite ends worms 91 meshing with worm gears 92 driving the two sleeves 26. Obviously, the operation of this construction will be substantially the same as that described above, save as above indicated, and the several elements may be controlled through the same controlling mechanism as that set forth above.

In the use of my improved construction, it will be observed that a cutting mechanism is produced in which the cutter bit act upon the face as the bar is rotated to cut the coal from the face through successive engagement of the bits with different portions of the face as the bars rotate and the cutter chain moves around the bar. It will also be observed that due to my improved construction utilizing a standard cutter chain a very rugged cutting mechanism is provided which, as demonstrated in the successful use of room and pillar and longwall machines, has heretofore proved amply sufficient to cut even the hardest coal. Through the provision of my improved mechanism for moving the cutting mechanism longitudinally relative to the work, it will also be observed that means are provided whereby the cutting mechanism may be conveniently moved to and from cutting position and fed forward continuously and slowly during the cutting operation. Also, it will be noted that through the use of this mechanism and my improved controlling mechanism, the cutting mechanism may be withdrawn and returned to the face with the bar at any desired angle, as when it is desired to remove an obstruction such as a sulphur ball or the like which it is impossible otherwise to dislodge. Through the provision of my improved dual head machine, attention is also directed to the fact that I have produced a mechanism which is enabled initially to produce a wider cut which may be of especial value in wider entries, and the cutter bits of which also act oppositely upon the face in such a manner as to facilitate the cutting of the same and the removal of obstructions therefrom.

Obviously, in the use of my improvement any well known means may be utilized to remove the cuttings as the machine advances. As this means per se, however, does not form a part of my present invention, I have not illustrated the same more specifically herein than to show a conveyor 93 at one side of the track. Also, it will be evident that although in the use of this type of machine in entry work it is ordinarily not desirable to move the same to another place until an entry has been driven to its outer limit, perhaps for a mile or more, this may be readily accomplished in other work or at that time by connecting any well known motor driven truck driving mechanism, as for instance a removable chain and sprocket connection 94, between the motor and the truck wheels 4 so that when the bar or bars have been removed and the machine locked, as by a suitable lug and pin connection 95, the mechanism preferably with the cutter bar or bars loaded on top of the same, may be transported under

its own power to a new place. It will of course also be understood that under certain conditions the machine may be moved without first removing the bar or bars, the head then being rotated into such a position as to dispose the bar or bars above the level of the track. These and other advantages of my improvement will, however, be clearly apparent to those skilled in the art.

While I have in this application specifically described two embodiments which my invention may assume in practice, it is to be understood that the same is not limited to use in connection with these illustrative embodiments, but that the invention may be further modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a mining machine, a cutter bar supported on an axis intersecting it at a point substantially midway between its ends, and cutting mechanism movable along said bar.

2. In a mining machine, a rotary cutter bar supported at a point substantially midway between its ends, and cutting mechanism movable along said bar.

3. In a mining machine, a plane cutter bar supported on an axis parallel to a line parallel to the plane of the bar and intersecting its edge at a point between its ends, and cutting mechanism movable along said bar.

4. In a mining machine, a rotary cutter bar supported from the direction of its edge and at a point between its ends whereby on rotation of said bar its edges trace spaced surfaces, and cutting mechanism movable along said bar.

5. In a mining machine, a cutter carrying element journaled midway between its ends on an axis extending longitudinally of the machine, and cutting means movable from end to end thereof.

6. In a mining machine, a cutter carrying member movable during cutting in a plane parallel to the face being cut, a cutter chain movable transversely of said member, means for driving said cutter carrying element, and means operatively connected thereto for driving said chain.

7. In a mining machine, a cutter carrying element movable during cutting in a plane parallel to the face being cut, a cutter chain movable transversely of said element, and means for simultaneously operating said element and driving said chain.

8. In a mining machine, a cutter carrying member movable in a plane parallel to the face being cut, a cutter chain movable transversely of said member, and means for simultaneously operating said member, driving said chain, and feeding said member toward the face.

9. In a mining machine, a cutter carrying element movable during cutting in a plane parallel to the face being cut, a cutter chain movable transversely of said element, propelling mechanism therefor, a support, and means for feeding each of said elements relative to the other.

10. In a mining machine, a cutter carrying element movable in a plane parallel to the face being cut, a cutter chain movable transversely of said element, propelling mechanism therefor, a support, and means for holding said propelling mechanism stationary and feeding said support relative thereto.

11. In a mining machine, cutting means including a cutter carrying element disposed transversely of the face, a cutter chain movable transversely thereof, and means for moving said element in a transverse plane parallel to the face being cut including a member fixed thereto at a point between the ends of said element.

12. In a mining machine, cutting means including a cutter bar disposed transversely of the face, a cutter chain movable transversely thereof, and means for moving said bar in a transverse plane parallel to the face being cut including a member having a bifurcated portion fixed thereto at a point between the ends of said element.

13. In an entry driver, a rotary cutter bar disposable transversely of an entry, a cutter chain movable transversely thereof, and means for moving said bar in a transverse plane parallel to the face during cutting of the latter including a member having a bifurcated portion fixed to said bar and presenting a passageway for said chain.

14. In a mining machine, cutting means including a cutter carrying element disposed transversely of the face, a cutter chain movable transversely thereof, means for moving said element in a plane parallel to a plane face during cutting of the latter including a member fixed to said element at a point between the ends of said element, and means for reversing the movement of said element.

15. In a mining machine, cutting means including a cutter carrying element disposed transversely of the face, a cutter chain movable transversely thereof, means for moving said element in a plane parallel to a plane face during cutting of the latter, including a member fixed to said element at a point between the ends of said element, a support, and means for moving said member longitudinally thereof at different speeds.

16. In a mining machine, cutting means including a cutter carrying element disposed transversely of the face, a cutter chain movable transversely thereof, means for moving said element transversely of the face being cut in a plane parallel to the latter including a member fixed to said element at a point between the ends of said element, a sup-

port, and means for moving said member longitudinally thereof in opposite directions at different speeds.

17. In a mining machine, cutting means including a cutter carrying element disposed transversely of the face, a cutter chain movable transversely thereof, means for moving said element transversely of the face being cut in a plane parallel to the latter including a member fixed to said element at a point between the ends of said element, a support, means for moving said member longitudinally thereof in opposite directions at different speeds, and independent means for controlling the movement of said cutter chain.

18. Entry driving mechanism including a plurality of rotary cutter carrying elements rotatable in intersecting circles, and cutter chains movable transversely of each of said elements as the same are rotated.

19. Entry driving mechanism including a plurality of cutter carrying elements movable parallel to the face being cut and disposed angularly relative to one another, and a cutter chain movable transversely of each of said elements as the same are operated.

20. Entry driving mechanism including a plurality of relatively movable cutter carrying elements movable parallel to the face being cut and disposed angularly relative to one another, a cutter chain movable transversely of each of said elements as the same are operated, and means for simultaneously rotating said elements and driving said cutter chains.

21. Entry driving mechanism comprising a plurality of rotating cutter carrying elements rotatable in intersecting circles, a cutter chain movable transversely of each of the cams during its rotation, means for rotating said cutter carrying elements, means for driving said cutter chains, and means for feeding said cutter carrying elements to the work.

22. Entry driving mechanism comprising a plurality of cutter carrying members each having a surface disposed parallel to a plane face and movable during cutting in a plane so as to bring different portions of its surface opposite vertically separated transverse portions of the face, and movable cutting means carried on each of said surfaces.

23. Entry driving mechanism comprising a plurality of cutter carrying members each having a surface disposed parallel to a plane face and movable during cutting in a plane so as to bring different portions of its surface opposite transversely separated portions of the face, and movable cutting means carried on each of said surfaces, said members being movable in intersecting paths.

24. In an entry driver, the combination of a plurality of rotary cutter carrying elements rotatable in intersecting circles, a motor, and means driven by said motor for simultaneously rotating said elements comprising a worm gear alined with the axis of rotation of each of said elements and connected thereto, a transverse shaft, worms carried thereby and meshing with said worm gears, and driving means for said transverse shaft.

25. In an entry driver, the combination of a plurality of rotary cutter carrying elements rotatable in intersecting circles, a motor, and means driven by said motor for rotating said elements including parallel shafts to which said rotary elements are secured, worm gears secured to said shafts, a transverse shaft, worms carried thereby and meshing with said worm gears, and driving means for said transverse shaft.

26. In an entry driver, the combination of a plurality of rotary cutter carrying elements rotatable in intersecting circles, a motor, and means driven by said motor for rotating said elements in opposite directions comprising parallel shafts to which said rotary elements are secured, worm gears secured to said shafts, a transverse shaft, worms carried thereby and meshing with said worm gears, and means for effecting rotation of said transverse shaft in opposite directions.

27. In a mining machine, a machine body, a motor carried thereby, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said body for rotation on a horizontal axis and carrying, and moving during cutting, in a plane parallel to the face being cut, a cutter bar, and means driven by said motor for rotating said head in opposite directions comprising a worm gear alined with the axis of rotation of said head and connected thereto, a worm meshing therewith, and a reversing mechanism between said worm and said motor.

28. In a mining machine, a machine frame, a motor carried thereby, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said frame for rotation on a horizontal axis, and means driven by said motor for rotating said head in opposite directions comprising a worm gear alined with the axis of rotation of said head and connected thereto, a transverse horizontal shaft, a worm secured to said shaft and meshing with said worm gear, and a reversing mechanism between said shaft and said motor.

29. In a mining machine, a machine frame, a motor carried thereby, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said frame for rotation on a substantially horizontal axis, and means driven by said motor for rotating said head in opposite directions comprising a worm gear alined with the axis of rotation of said head and con-

nected thereto, a transverse horizontal shaft, a worm secured to said shaft and meshing with said worm gear, and a reversing mechanism between said shaft and said motor, said reversing mechanism including a transverse shaft operatively connected to said transverse shaft, reversing gears coaxial therewith, and means for alternatively connecting said gears to said shaft.

30. In a mining machine, a wheeled truck frame having longitudinal guideways thereon, a machine frame slidably mounted on said truck frame, a motor carried by said machine frame, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said machine frame for rotation upon a substantially horizontal axis and carrying and moving during cutting, in a plane parallel to the working face, a cutter bar, and self-contained mechanism driven by said motor for moving said machine frame relative to said truck frame.

31. In a mining machine, a wheeled truck frame having longitudinal guideways thereon, a machine frame slidably mounted on said truck frame, a motor carried by said machine frame, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said machine frame for rotation upon a substantially horizontal axis and carrying and moving during cutting, in a plane parallel to the working face, a cutter bar, and self-contained mechanism driven by said motor for moving said machine frame relative to said truck frame at different speeds in opposite directions.

32. In a mining machine, a wheeled truck frame having longitudinally extending guideways, a machine body slidably mounted in said guideways, a motor in said body, a cutter carrying head rotatably mounted on the forward end of said body for rotation upon a substantially horizontal axis, and mechanisms driven by said motor for rotating said head, for actuating the cutters on said head, for moving the body relative to the truck frame, and for driving the wheels of said truck.

33. In a mining machine, a wheeled truck frame having longitudinally extending guideways, a machine body slidably mounted in said guideways, a motor in said body, a cutter carrying head rotatably mounted on the forward end of said body for rotation upon a substantially horizontal axis, and mechanisms driven by said motor for rotating said head in opposite directions, for moving the body relative to the truck frame at different speeds in opposite directions, and for driving the wheels of said truck.

In testimony whereof I affix my signature.

ROBERT C. OSGOOD.

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nected thereto, a transverse horizontal shaft, a worm secured to said shaft and meshing with said worm gear, and a reversing mechanism between said shaft and said motor, said reversing mechanism including a transverse shaft operatively connected to said transverse shaft, reversing gears coaxial therewith, and means for alternatively connecting said gears to said shaft.

30. In a mining machine, a wheeled truck frame having longitudinal guideways thereon, a machine frame slidably mounted on said truck frame, a motor carried by said machine frame, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said machine frame for rotation upon a substantially horizontal axis and carrying and moving during cutting, in a plane parallel to the working face, a cutter bar, and self-contained mechanism driven by said motor for moving said machine frame relative to said truck frame.

31. In a mining machine, a wheeled truck frame having longitudinal guideways thereon, a machine frame slidably mounted on said truck frame, a motor carried by said machine frame, cutting mechanism driven by said motor including a cutter carrying head rotatably mounted on said machine frame for rotation upon a substantially horizontal axis and carrying and moving during cutting, in a plane parallel to the working face, a cutter bar, and self-contained mechanism driven by said motor for moving said machine frame relative to said truck frame at different speeds in opposite directions.

32. In a mining machine, a wheeled truck frame having longitudinally extending guideways, a machine body slidably mounted in said guideways, a motor in said body, a cutter carrying head rotatably mounted on the forward end of said body for rotation upon a substantially horizontal axis, and mechanisms driven by said motor for rotating said head, for actuating the cutters on said head, for moving the body relative to the truck frame, and for driving the wheels of said truck.

33. In a mining machine, a wheeled truck frame having longitudinally extending guideways, a machine body slidably mounted in said guideways, a motor in said body, a cutter carrying head rotatably mounted on the forward end of said body for rotation upon a substantially horizontal axis, and mechanisms driven by said motor for rotating said head in opposite directions, for moving the body relative to the truck frame at different speeds in opposite directions, and for driving the wheels of said truck.

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ROBERT C. OSGOOD.

CERTIFICATE OF CORRECTION.

Patent No. 1,644,943. **Granted October 11, 1927, to**

ROBERT C. OSGOOD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 90, for the word "and" read "the"; **page 3, line 70, for the word "bit" read "bits"; and that the said Letters Patent should be read with these corrections therein** that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of January, A. D. 1928.

M. J. Moore,
Acting Commissioner of Patents.

Seal.

CERTIFICATE OF CORRECTION.

Patent No. 1,644,943. Granted October 11, 1927, to

ROBERT C. OSGOOD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 90, for the word "and" read "the"; page 3, line 70, for the word "bit" read "bits"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of January, A. D. 1928.

M. J. Moore,
Acting Commissioner of Patents.

Seal.