July 10, 1934. C. F. OSGOOD 1,966,131

MINING APPARATUS

Filed Feb. 15, 1932 2 Sheets-Sheet 1

Fig. 1.

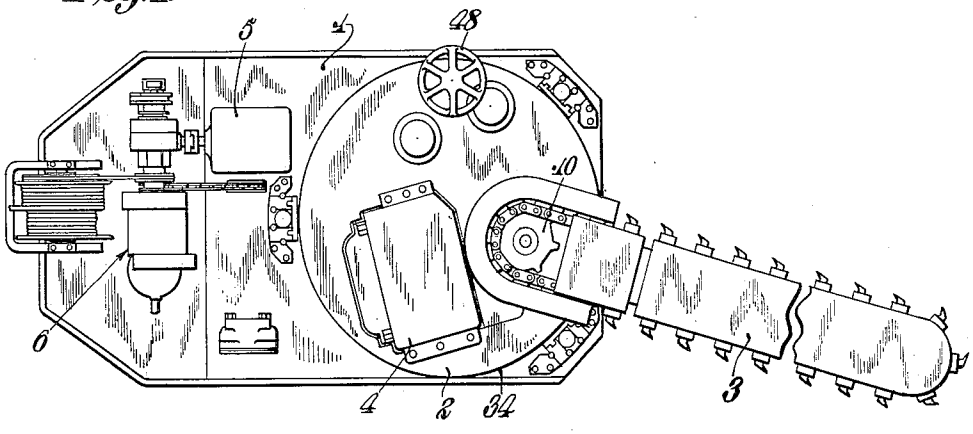
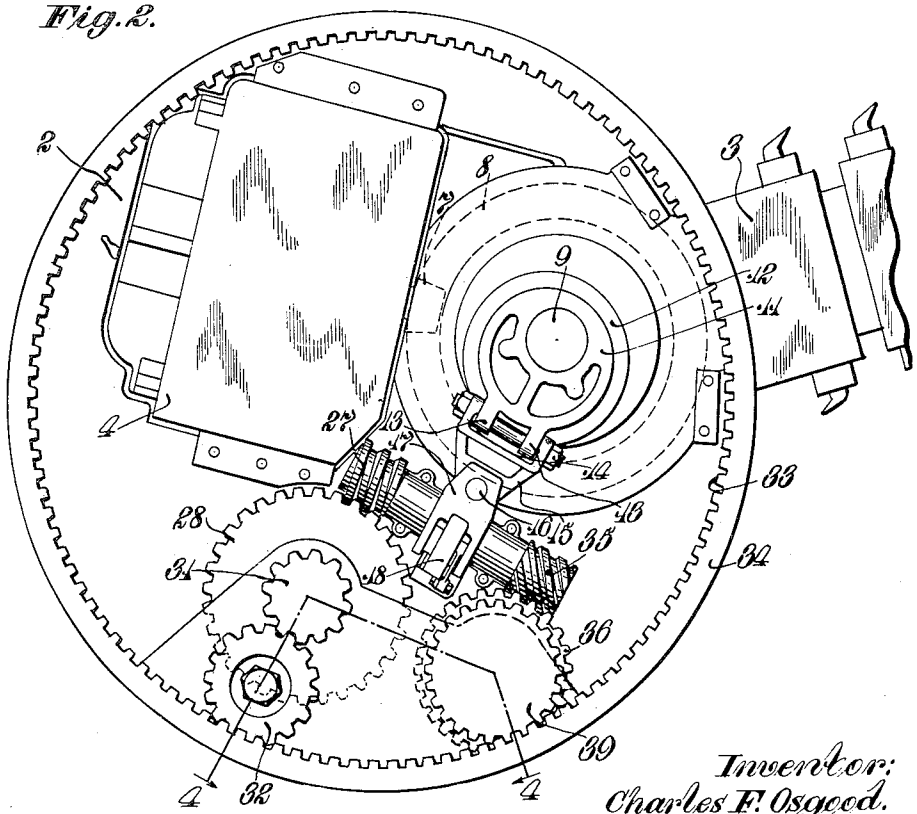


Fig. 2.



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Fig. 3.

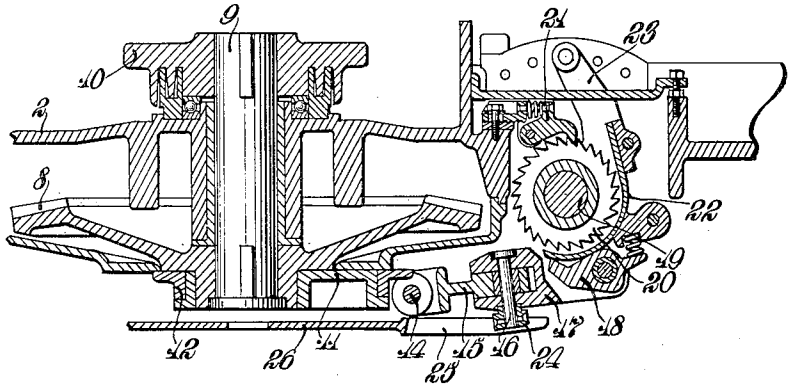


Fig. 4.

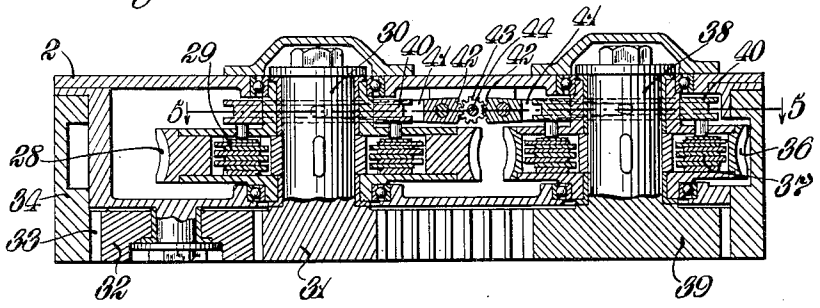
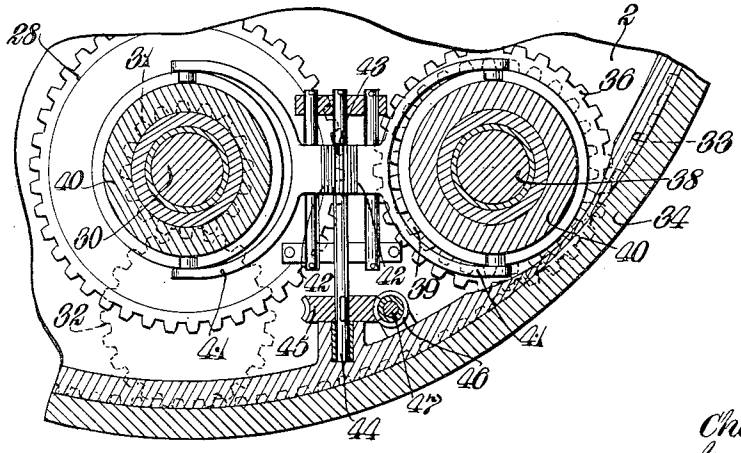


Fig. 5.



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UNITED STATES PATENT OFFICE

1,966,131

MINING APPARATUS

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Application February 15, 1932, Serial No. 593,078

47 Claims. (Cl. 262—28)

This invention relates to mining apparatus and more particularly has reference to improvements in the kerf cutting mechanism of an apparatus for mining coal.

An object of this invention is to provide an improved mining apparatus. Another object is to provide an improved kerf cutting mechanism for an apparatus for mining coal. A further object is to provide an improved swinging mechanism for the kerf cutter of an apparatus for mining coal whereby the kerf cutter may be swung during cutting and during positioning in an improved manner. Another object is to provide an improved kerf cutter swinging mechanism whereby the kerf cutter may be swung at a low cutting speed in one direction and at a relatively high positioning speed in the opposite direction. Yet another object is to provide an improved turntable mounting for the kerf cutting mechanism and improved means for rotating the turntable to swing the kerf cutter about the turntable axis. A still further object is to provide an improved turntable rotation mechanism wherein separate high and low speed gear trains are employed for rotating the turntable to effect swinging of the kerf cutter at either a high or a relatively low speed and in opposite directions. These and other objects and advantages of the invention will, however, hereinafter more fully appear.

In the accompanying drawings there is shown for purposes of illustration one form which the invention may assume in practice.

In these drawings:

Fig. 1 is a plan view of a coal mining apparatus equipped with the illustrative embodiment of the improved kerf cutter swinging mechanism;

Fig. 2 is a bottom view of the improved turntable mounting showing the improved kerf cutter swinging mechanism in detail;

Fig. 3 is a vertical sectional view of a portion of the mechanism shown in Fig. 2;

Fig. 4 is a developed vertical sectional view taken through the improved swinging mechanism on line 4—4 of Fig. 2 and illustrating the high and low speed gear trains; and

Fig. 5 is a horizontal sectional view taken substantially on line 5—5 of Fig. 4.

In this illustrative embodiment of the invention there is shown a coal mining apparatus of the wheel mounted, track supported and guided "arcwall" type generally comprising a portable base 1, herein a wheel mounted truck, adapted to travel along a mine trackway and having mounted thereon for angular adjustment about a vertical axis a turntable 2. Mounted on this turntable is a kerf cutting mechanism including a horizontally projecting kerf cutter 3 having its cutting elements operatively connected to a motor 4 mounted on the turntable. Mounted on the truck frame at the rear of the turntable is a motor 5 adapted to drive a mechanism generally designated 6 for effecting propulsion of the apparatus along the mine trackway both during the cutting operation and during transport. The motor 4 is operatively connected to the turntable of effect rotation thereof through the improved turntable rotation mechanism.

In the present construction the motor 4, which is herein preferably of the reversible electric type, has fixed to its armature shaft a bevel motor pinion 7 meshing with a large bevel gear 8 keyed to the lower end of a vertical shaft 9 (see Fig. 3) suitably journaled within the turntable casting. Keyed to the upper end of this shaft is a cutter driving sprocket 10 which engages and drives the cutting elements of the kerf cutter 3 in a well known manner.

Now referring to the improved turntable rotation mechanism, it will be noted that fixed to the hub of the bevel gear 8 is an eccentric member 11 surrounded by an eccentric strap 12. This eccentric strap has a pair of integral lugs 13, 13 provided with alined bores having an axis lying at right angles to the axis of the shaft 9. Pivoted to these lugs by means of a bolt 14 is a link 15 to whose other end, through a pin 16 at right angles to the plane of the bolt 14, is pivoted a pawl carrier 17 carrying a spring pressed pawl 18 adapted to be oscillated about the axis of a shaft 19 for cooperation with a ratchet wheel 20 fixed on the shaft 19. A spring pressed pawl 21 pivotally mounted on the turntable casting cooperates with the ratchet wheel to prevent reverse rotation of the latter. A shield 22 manipulatable through a control lever 23 is provided for controlling the effective throw of the pawl 21 under the drive of the eccentric member 11 in a well known manner. To the lower end of the pin 16 is secured a block 24 guided in a slot 25 of a plate 26 which is in fixed connection with the turntable. Secured to one end of the shaft 19 is a worm 27 meshing with a low speed worm wheel 28 arranged on a vertical axis and suitably journaled within the turntable casting as shown in Fig. 4. This worm wheel is connectible by means of a multiple disc clutch 29 to a vertical shaft 30 journaled within the hub of the worm wheel. This shaft has secured thereto at its lower end

and drives a spur gear 31 meshing with an intermediate gear 32 journaled on the turntable, this intermediate gear in turn meshing with the teeth of a large internal gear 33 formed on the internal periphery of an annular frame 34 on which the turntable 2 is rotatably mounted. Also secured to the shaft 19 at its opposite end is a worm 35 meshing with a high speed worm wheel 36 arranged on a vertical axis parallel to the axis of the worm wheel 28 and likewise suitably journaled within the turntable casting. This worm wheel is connectible by a multiple disc clutch 37 to a vertical shaft 38 journaled within the hub of the worm wheel 36, and secured to the lower end of this shaft is a spur gear 39 also meshing with the teeth of the large internal gear 33 as shown in Fig. 4. It will thus be seen that when the clutch 29 controlling the low speed worm gearing 27, 28 is applied, the turntable 2 may be rotated at a low cutting speed in one direction to effect swinging of the kerf cutter 3 from right to left as viewed in Fig. 1, and when this clutch is released and the clutch 37 is applied, the turntable may be rotated at a relatively high positioning speed in the opposite direction to move the kerf cutter from left to right through the high speed worm gearing 35, 36. The worm gearings 27, 28 and 35, 36 are of the self-locking type and lock automatically the turntable against rotation when the latter is disconnected from its drive i. e. when the ratchet wheel is completely shielded to preclude engagement of the driving pawl therewith. It will be evident, however, that a separate turntable lock may be provided if desired. It will also be evident that a reversible ratchet device of any well known design may be used in lieu of the unidirectional ratchet device 18, 20 so that the direction of turntable rotation may be reversed at either speed.

Operating means is provided for the disc clutches 29 and 37 so that when one is applied the other is released. This operating means may assume various forms, but herein comprises a shipper plate 40 for each clutch with which pivoted shipper yokes 41 respectively cooperate. Formed on these shipper yokes are gear segments 42 with which a gear 43 meshes. This gear is fixed to an operating shaft 44 to which there is also fixed a worm wheel 45. Meshing with this worm wheel is a worm 46 fixed to a vertical operating shaft 47 journaled within the turntable casting. Fixed to the upper end of this shaft is a hand wheel 48. It will thus be seen that when the hand wheel 48 is turned in one direction, one shipper yoke 41 is swung upwardly while the other is swung downwardly, thereby to effect application of one clutch and release of the other.

As a result of this invention, it will be noted that an improved kerf cutter swinging mechanism is provided whereby the kerf cutter may be swung at different speeds in opposite directions in an improved manner. It will further be noted that an improved geared turntable swinging mechanism is provided whereby the kerf cutter may be swung at a low cutting speed in one direction and at a relatively high positioning speed in the opposite direction. It will still further be noted that an improved turntable rotation mechanism is provided which is of an extremely rugged and compact design and which may be applied to a mining apparatus of a standard design with a minimum change. These and other uses and advantages of the improved kerf cutter swinging mechanism will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which this invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be 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 apparatus, kerf cutting mechanism including a swingable kerf cutter, and mechanism for swinging said kerf cutter at either a high or a relatively low speed including a step by step transmission mechanism and separate fast and slow speed gear trains driven through said transmission mechanism.

2. In a mining apparatus, kerf cutting mechanism including a swingable kerf cutter, and mechanism for swinging said kerf cutter at either a high or a relatively low speed including an intermittent grip device, a shaft driven thereby and separate fast and slow speed gear trains driven by said shaft.

3. In a mining apparatus, kerf cutting mechanism including a swingable kerf cutter, and mechanism for swinging said kerf cutter at either a high or a relatively low speed including an eccentric member, means for driving said eccentric member, an intermittent grip device having its driving element driven from said eccentric member, and high and low speed driving means driven through said device and including separate fast and slow speed geared transmission means.

4. In a mining apparatus, kerf cutting mechanism including a swingable kerf cutter, and mechanism for swinging said kerf cutter at either a high or a relatively low speed including an eccentric member, means for driving said eccentric member, an intermittent grip device having its driving element driven from said eccentric member, and high and low speed driving means driven through said device and including separate fast and slow speed geared transmission means, said transmission means including separate gear trains each including intermeshing gearing.

5. In a mining apparatus, kerf cutting mechanism including a swingable kerf cutter, and mechanism for swinging said kerf cutter at either a high or a relatively low speed including an eccentric member, means for driving said eccentric member, an intermittent grip device having its driving element driven from said eccentric member, and high and low speed driving means driven through said device and including separate fast and slow speed geared transmission means, said transmission means including separate gear trains each including intermeshing gearing and each gearing including a final driving gear and a gear with which said final driving gears mesh.

6. In a mining apparatus, kerf cutting mechanism including a swingable kerf cutter, and mechanism for swinging said kerf cutter at either a high or a relatively low speed including an eccentric member, means for driving said eccentric member, an intermittent grip device having its driving element driven from said eccentric member, and high and low speed driving means driven through said device and including separate fast and slow speed geared transmission means, said transmission means including separate gear trains each including intermeshing

gearing and each gearing including a final driving gear and a gear with which said final driving gears mesh, said latter gear being fixed against rotation.

7. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, and mechanism for rotating said turntable to swing said kerf cutter at either a high or a relatively low speed including fast and slow speed gear trains and automatic intermittent driving means for said gear trains.

8. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism mounted on said turntable, and mechanism for rotating said turntable to effect swinging of said cutting mechanism at either a high or a relatively low speed including a gear secured against rotation relative to said base, fast and slow speed gear trains mounted on said turntable and each including a final driving gear individual thereto meshing with said first mentioned gear.

9. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism mounted on said turntable, and mechanism for rotating said turntable to effect swinging of said cutting mechanism at either a high or a relatively low speed including a gear secured to said base, fast and slow speed gear trains mounted on said turntable and each including a final driving gear individual thereto meshing with said first mentioned gear and means including a ratchet and pawl transmission device through which said gear trains are driven.

10. In a mining apparatus, a base frame, a vertical rotatable shaft on said frame, means for rotating said shaft, a kerf cutter swingably mounted on said base frame, an eccentric member on said shaft and rotatable therewith, an intermittent grip device having its driving element driven by said eccentric member, a gear train driven by said device for swinging said kerf cutter at a relatively low cutting speed, and a gear train driven by said device for swinging said kerf cutter at a relatively high positioning speed.

11. In a mining apparatus, a base frame, a kerf cutter mounted on said frame to swing relative thereto, a gear concentric with the pivotal axis of said kerf cutter, fast and slow speed transmission gearing having geared connection with said first mentioned gear, and means including a ratchet and pawl device for driving said transmission mechanism.

12. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable, and mechanism for rotating said turntable to effect swinging of said kerf cutting mechanism at either a high or a relatively low speed including a ratchet and pawl device, means for actuating said device and high and low speed transmission means driven through said ratchet and pawl device and including intermeshing-gear type, fast and slow speed transmission devices.

13. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable, and mechanism for rotating said turntable to swing said cutting mechanism at either a high or a relatively low speed including a gear fixed to said base concentric with the turntable axis, fast and slow speed gear trains each having a final driving gear individual thereto meshing with said first mentioned gear and means including an eccentric member for actuating said gear trains.

14. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable, and mechanism for rotating said turntable to swing said cutting mechanism at either a high or a relatively low speed including a gear fixed to said base concentric with the turntable axis, fast and slow speed gear trains each having a final driving gear individual thereto meshing with said first mentioned gear and means including an eccentric member and an intermittent driving device actuated thereby for actuating said gear trains.

15. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable, and mechanism for rotating said turntable to swing said cutting mechanism at either a high or a relatively low speed including an eccentric member, a ratchet and pawl device driven thereby and separate fast and slow speed worm gear trains driven through said ratchet and pawl device.

16. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable, and mechanism for rotating said turntable to swing said cutting mechanism at either a high or a relatively low speed including an eccentric member, a ratchet and pawl device driven thereby and separate fast and slow speed worm gear trains driven through said ratchet and pawl device, each gear train having a separate friction controlling clutch.

17. In a mining apparatus, a base frame, a transmission element journaled on said base frame for rotation about a vertical axis, a kerf cutter mounted on said base frame and having cutting elements actuated by said transmission element, and means for swinging said kerf cutter including an eccentric member driven by said transmission element, a ratchet and pawl device actuated by said eccentric member, a shaft driven through said ratchet and pawl device, a high speed transmission mechanism operatively connected to one end of said shaft and a low speed transmission mechanism operatively connected to the other end of said shaft.

18. In a mining apparatus, a base frame, a transmission element journaled on said base frame for rotation about a vertical axis, a kerf cutter mounted on said base frame and having cutting elements actuated by said transmission element, and means for swinging said kerf cutter including an eccentric driven by said transmission element, a ratchet and pawl device actuated by said eccentric, a shaft driven through said ratchet and pawl device, gears fixed to the opposite ends of said shaft and fast and slow speed transmission gearings actuated by said gears respectively.

19. In a mining apparatus, a base frame, a transmission element journaled on said base frame for rotation about a vertical axis, a kerf cutter mounted on said base frame and having cutting elements actuated by said transmission element, and means for swinging said kerf cutter including an eccentric driven by said transmission element, a ratchet and pawl device actuated by said eccentric, a shaft driven through said ratchet and pawl device, gears fixed to the opposite ends of said last mentioned shaft, fast and slow speed transmission gearings actuated by said gears respectively and friction clutches for respectively controlling said gearings.

20. In a mining apparatus, kerf cutting mech-

anism including a swingable kerf cutter, a motor mounted to swing with said kerf cutter, and means driven by said motor for actuating the cutting elements of the kerf cutter including a vertical sprocket supporting and driving shaft, and mechanism for swinging said kerf cutter at a high positioning speed in one direction and at a relatively low cutting speed in the opposite direction including a fast speed gear train and a slow speed gear train, each gear train including intermeshing transmission gears and means for driving said gear trains including a rotatable driving element coaxial with said driving shaft.

21. In a mining apparatus, a portable base, a turntable on said base, a motor on said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, and devices driven by said motor for rotating said turntable at different speeds including a large gear fixed against rotation relative to said base and arranged concentric with the turntable, and plural speed transmission mechanism including a fast speed gear train and a slow speed gear train, each gear train having a final driving gear individual thereto meshing with said large gear.

22. In a mining apparatus, a portable base, a turntable on said base, a motor on said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, devices driven by said motor for actuating said kerf cutter including a driving element rotating about a vertical axis, and a cutter drive sprocket coaxial therewith and driven thereby and journaled on the top of the turntable, and devices driven by said driving element for rotating said turntable at different speeds including a fast speed gear train and a slow speed gear train, each gear train including intermeshing gearing.

23. In a mining apparatus, a portable base, a turntable on said base, a motor on said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, devices driven by said motor for actuating said kerf cutter including a driving element rotating about a vertical axis and a cutter drive sprocket coaxial therewith and driven thereby and journaled on the top of the turntable, devices driven by said driving element for rotating said turntable at different speeds including a fast speed gear train and a slow speed gear train, each gear train including intermeshing gearing, and a large spur gear fixed against rotation relative to said base and with which said gearing engages.

24. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor, on said turntable, and devices driven by said motor including a vertical kerf cutter actuating sprocket supporting and driving shaft and devices for rotating said turntable at different speeds relative to said base including an element rotatable with said vertical shaft and a fast and slow speed transmission mechanism driven by said element, said transmission mechanism including a fast speed gear train and a slow speed gear train.

25. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor on said turntable, and devices driven by said motor including a vertical kerf cutter actuating sprocket supporting and driving shaft and devices for rotating said turntable at different speeds relative to said base including an element rotatable with said vertical shaft and a fast and slow speed transmission mechanism driven by said element, said transmission mechanism including a fast speed gear train and a slow speed gear train, and a large internal gear fixed against rotation relative to said base and with which said transmission mechanism engages.

26. In a mining apparatus, a portable base having an annular supporting frame thereon, a horizontal turntable rotatably mounted on said annular supporting frame, kerf cutting mechanism on said turntable including a projecting kerf cutter overlying at its rear and rigidly fixed to said turntable in radial relation thereto, a motor on said turntable for actuating said kerf cutter, and devices driven by said motor for rotating said turntable at different speeds relative to said base including a plural predetermined speed transmission mechanism on said turntable beneath the top of the latter and below said kerf cutter for effecting turntable rotation at a slow cutting speed in one direction and at a high cutter positioning speed in the opposite direction while said motor operates continuously in the same direction, said turntable rotating devices including terminal driving gear means on the turntable meshing with a large stationary gear secured to said annular supporting frame.

27. In a mining apparatus, a portable base, a horizontal turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter overlying at its rear and rigidly fixed to said turntable in radial relation thereto, a motor on said turntable for actuating said kerf cutter, and devices driven by said motor for rotating said turntable relative to said base at different speeds including a plural predetermined speed transmission mechanism on said turntable beneath the top of the latter and below said kerf cutter including a frictionally controlled fast speed gear train and a frictionally controlled slow speed gear train.

28. In a mining apparatus, a horizontal turntable, a mounting therefor including an annular frame for rotatably receiving said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, a horizontal motor on said turntable having a horizontal power shaft, devices driven by said motor for actuating said kerf cutter including a bevel pinion fixed to said motor power shaft, a large bevel gear disposed beneath the turntable and driven by said pinion, a vertical shaft rotatable with said bevel gear and projecting upwardly through the top of the turntable and a cutter driving sprocket disposed above the turntable and coaxial with and rotatable with said shaft, and devices driven by said bevel gear and connected thereto beneath the turntable for rotating said turntable at different speeds relative to said annular frame and including a fast speed gear train and a slow speed gear train.

29. In a mining apparatus, a horizontal turntable, a mounting therefor including an annular frame for rotatably receiving said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, a horizontal motor on said turntable having a horizontal power shaft, devices driven by said motor for actuating said kerf cutter including a bevel pinion fixed to said motor power shaft, a large bevel gear disposed beneath the turntable and driven by said pinion, a vertical shaft rotatable with said bevel gear and projecting upwardly through the top of the turntable and a cutter driving sprocket disposed

above the turntable and coaxial with and rotatable with said shaft, devices driven by said bevel gear and connected thereto beneath the turntable for rotating said turntable at different speeds relative to said annular frame and including a fast speed gear train and a slow speed gear train, and a large internal gear secured to said annular frame and with which said gear trains engage.

30. In a mining apparatus, a horizontal turntable, an annular supporting frame for said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable, devices driven by said motor for actuating said kerf cutter including a horizontal gear disposed beneath the turntable, a vertical shaft driven by said gear and projecting upwardly through the turntable, and a cutter driving sprocket disposed above the turntable and coaxial with and driven by said vertical shaft, and devices driven by said horizontal gear and arranged beneath the turntable for rotating said turntable at different speeds relative to said annular frame and including fast and slow predetermined speed gear trains.

31. In a mining apparatus, a horizontal turntable, an annular supporting frame for said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable, devices driven by said motor for actuating said kerf cutter including a horizontal gear disposed beneath the turntable, a vertical shaft driven by said gear and projecting upwardly through the turntable, and a cutter driving sprocket disposed above the turntable and coaxial with and driven by said vertical shaft, and devices driven by said horizontal gear and arranged beneath the turntable for rotating said turntable at different speeds relative to said annular frame and including fast and slow predetermined speed gear trains, each gear train including intermeshing worm gearing.

32. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable for actuating said kerf cutter, and devices driven by said motor for rotating said turntable at different speeds relative to said annular frame including a variable speed device, and fast and slow speed gear trains both driven through said variable speed device.

33. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable for actuating said kerf cutter, devices driven by said motor for rotating said turntable at different speeds relative to said annular frame including a variable speed device, fast and slow speed gear trains both driven through said variable speed device, and a large internal gear fixed to said annular frame and with which said gear trains engage.

34. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable, devices driven by said motor for actuating said kerf cutter including a gear disposed beneath the turntable, a vertical shaft driven by said gear and projecting upwardly through the turntable and a cutter chain sprocket disposed above the turntable and driven by said vertical shaft, and devices beneath the turntable for rotating the latter relative to said annular frame including a variable speed device driven by said gear, and fast and slow speed gear trains both driven through said variable speed device.

35. In a mining apparatus, a horizontal turntable, a mounting therefor including an annular frame for rotatably receiving said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, a horizontal motor on said turntable having a horizontal power shaft, devices driven by said motor for actuating said kerf cutter including a pinion fixed to said motor power shaft, a gear disposed beneath the turntable and driven by said pinion, a vertical shaft rotatable with said gear and projecting upwardly through the top of the turntable and a cutter driving sprocket disposed above the turntable and within the circumference of said annular frame and rotatable with said shaft, and devices driven by said gear and connected thereto beneath the turntable for rotating said turntable at different speeds relative to said annular frame and including a fast speed gear train and a slow speed gear train.

36. In a mining apparatus, a horizontal turntable, a mounting therefor including an annular frame for rotatably receiving said turntable, kerf cutting mechanism on said turntable including a projecting kerf cutter, a horizontal motor on said turntable having a horizontal power shaft, devices driven by said motor for actuating said kerf cutter including a pinion fixed to said motor power shaft, a gear disposed beneath the turntable and driven by said pinion, a vertical shaft rotatable with said gear and projecting upwardly through the top of the turntable and a cutter driving sprocket disposed above the turntable and within the circumference of said annular frame and rotatable with said shaft, devices driven by said gear and connected thereto beneath the turntable for rotating said turntable at different speeds relative to said annular frame and including a fast speed gear train and a slow speed gear train, and a large internal gear secured to said annular frame and with which said gear trains engage.

37. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable for actuating said kerf cutter, and devices driven by said motor for rotating said turntable at different speeds relative to said annular frame including a step by step variable speed device, and fast and slow speed gear trains driven through said variable speed device.

38. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable for actuating said kerf cutter, devices driven by said motor for rotating said turntable at different speeds relative to said annular frame including a step by step variable speed device, fast and slow speed gear trains driven through said variable speed device, and a large internal gear fixed to said annular frame and with which said gear trains engage.

39. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable, devices driven by said motor for actuating said kerf cutter including a gear disposed beneath the turntable, a vertical shaft driven by

said gear and projecting upwardly through the turntable and a cutter chain sprocket disposed above the turntable and driven by said vertical shaft, and devices beneath the turntable for rotating the latter relative to said annular frame including a step by step variable speed device driven by said gear, and fast and slow speed gear trains driven through said variable speed device.

40. In a mining apparatus, a horizontal turntable, an annular supporting frame thereof, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable for actuating said kerf cutter, and devices driven by said motor for rotating said turntable at different speeds relative to said annular frame including an eccentric, and fast and slow speed gear trains driven through said eccentric.

41. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable for actuating said kerf cutter, devices driven by said motor for rotating said turntable at different speeds relative to said annular frame including an eccentric, fast and slow speed gear trains driven through said eccentric, and a large internal gear fixed to said annular frame and with which said gear trains engage.

42. In a mining apparatus, a horizontal turntable, an annular supporting frame therefor, kerf cutting mechanism on said turntable including a projecting kerf cutter, a motor on said turntable, devices driven by said motor for actuating said kerf cutter including a gear disposed beneath the turntable, a vertical shaft driven by said gear and projecting upwardly through the turntable and a cutter chain sprocket disposed above the turntable and driven by said vertical shaft, and devices beneath the turntable for rotating the latter relative to said annular frame including an eccentric driven by said gear, and fast and slow speed gear trains driven through said eccentric.

43. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor on said turntable and devices driven by said motor including a vertical kerf cutter actuating shaft, and devices for rotating said turntable at different speeds including an element rotatable with said vertical shaft, a shaft extending transversely of the turntable and journaled thereon, a variable speed device between said element and said transverse shaft, a fast speed gear train driven from one end of said transverse shaft and a slow speed gear train driven from the opposite end of said transverse shaft.

44. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor on said turntable and devices driven by said motor including a vertical kerf cutter actuating shaft, and devices for rotating said turntable at different speeds including an element rotatable with said vertical shaft, a shaft extending transversely of the turntable and journaled thereon, an intermittent grip device between said element and said transverse shaft, a fast speed gear train driven from one end of said transverse shaft and a slow speed gear train driven from the opposite end of said transverse shaft.

45. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor on said turntable and devices driven by said motor including a vertical kerf cutter actuating shaft, devices for rotating said turntable at different speeds including an element rotatable with said vertical shaft, a shaft extending transversely of the turntable and journaled thereon, a variable speed device between said element and said transverse shaft, a fast speed gear train driven from one end of said transverse shaft and a slow speed gear train driven from the opposite end of said transverse shaft, and a terminal turntable swinging gear surrounding the outer periphery of the turntable and fixed against rotation relative to and arranged concentric with said turntable.

46. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor on said turntable and devices driven by said motor including a vertical kerf cutter actuating shaft, and devices for rotating said turntable at different speeds including an element rotatable with said vertical shaft, a shaft extending transversely of the turntable and journaled thereon, a variable speed device between said element and said transverse shaft, worms fixed to said transverse shaft, and meshing respectively with fast and slow speed worm wheels.

47. In a mining apparatus, a portable base, a turntable on said base, kerf cutting mechanism on said turntable including a projecting kerf cutter, kerf cutter actuating means including a motor on said turntable and devices driven by said motor including a vertical kerf cutter actuating shaft, and devices for rotating said turntable at different speeds including an element rotatable with said vertical shaft, a shaft extending transversely of the turntable and journaled thereon, an intermittent grip device between said element and said transverse shaft, worms fixed to said transverse shaft and meshing respectively with fast and slow speed worm wheels.

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