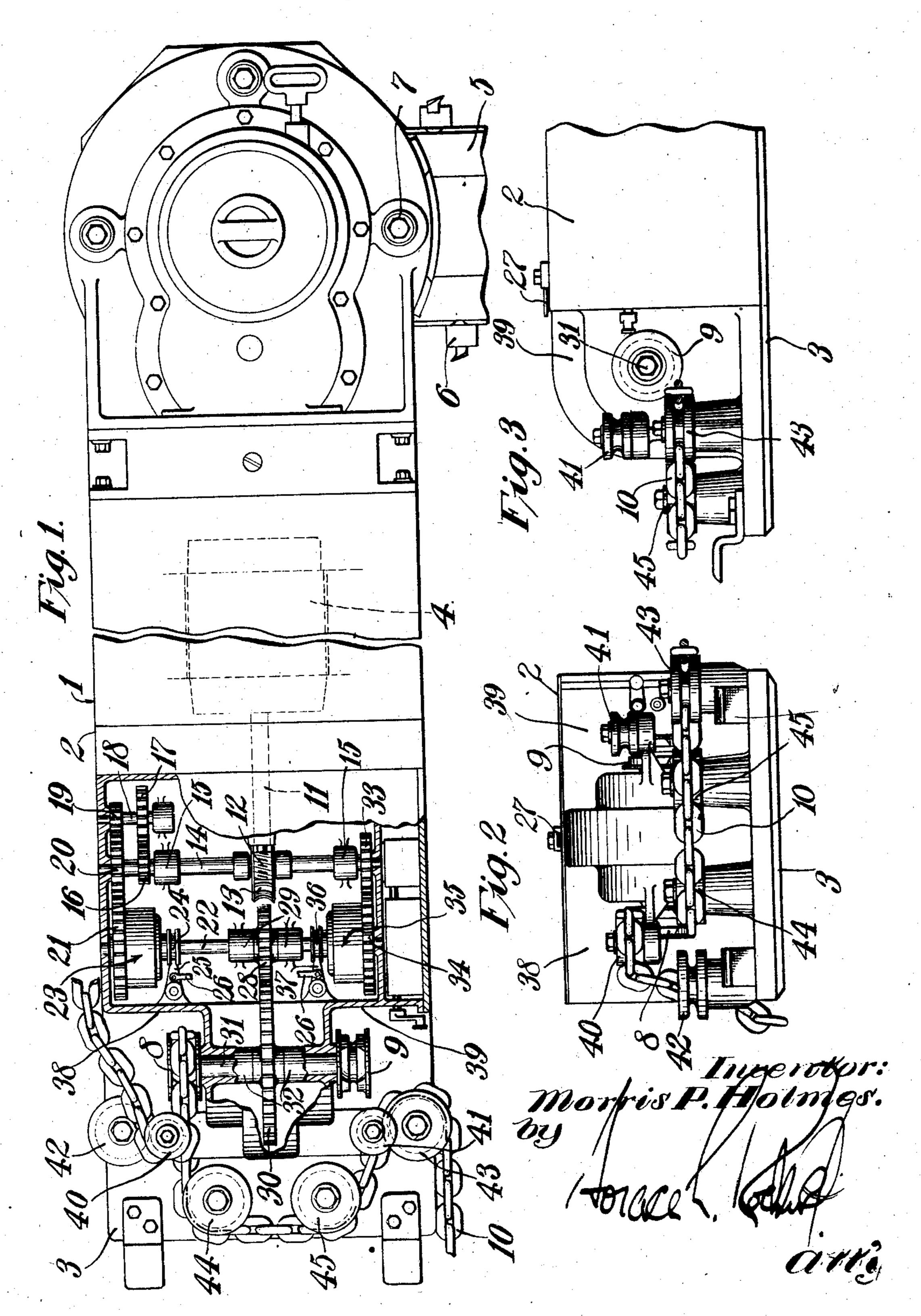
## M. P. HOLMES

MINING MACHINE

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## MINING MACHINE

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My invention relates to mining machines. elongated machine frame 2 mounted upon a so-called longwall type whereby the same is able pin 7, all in a well known manner. rendered better adapted to service conditions. In my improved construction it will be obhereinafter more fully appear.

In these drawings,—

30 within which my improved feeding mecha- front end of the machine frame, and are 75 tially broken away in section.

Fig. 2 is an end elevation of the mining 35 proved arrangement of the chain driving and guide sprockets.

the machine shown in Fig. 1.

40 which is a division of my copending application Ser. No. 301,917, filed June 5, 1919, now operating horizontal driving shaft 14, in matured into Patent No. 1,662,786, patented turn, journaled in suitable bearings 15 on op-March 13, 1928. I have shown a mining machine, generally designated 1, herein of the The shaft 14 is herein connected to the driv-

An object of my invention is to provide shoe 3 and slidable thereon over the mine an improved mining machine. Another ob- bottom, in a well known manner. The frame ject of my invention is to provide an im- 2 carries a suitable motor 4, herein of the proved flexibly fed mining machine of the usual reversible type, said motor being horiso-called longwall type. Still another ob- zontally and longitudinally disposed and as 50 ject of my invention is to provide a mining usually centrally located between the feed machine having an improved simplified feed-driving mechanism and the cutter chain ing mechanism. A further object of my in- driving mechanism. Inasmuch as the latter vention is to provide an improved flexibly fed mechanism does not enter into the present mining machine having an improved ar- invention it will therefore herein suffice to rangement of its flexible feeding mechanism say that the same includes a cutter bar 5 pivand improved operative connections for actu- otally mounted on one end of the frame 2, ating said mechanism to propel the machine. the bar carrying the usual cutter bit carrying A still further object of my invention is to chain 6 driven from one end of the motor provide an improved and simplified feeding shaft through usual transmission mechanism, arrangement and mechanism for a chain pro- not shown, and being movable angularly into pelled mining machine and more especially a plurality of positions about its pivot and for a chain propelled mining machine of the adapted to be fixed in any position by a suit-

These and other objects and advantages of served that a plurality of feed operating my improved mining machine will, however, members, herein in the form of coaxial driving sprockets 8 and 9, having a cooperating In the accompanying drawings I have flexible feeding means, herein in the form of 70 shown for purposes of illustration one form a feed chain 10, are disposed in an improved which my invention may assume in practice. manner on a transverse horizontal axis at the opposite end of the frame 2 from the cut-Fig. 1 is a plan view of a mining machine ter bar, which, in a longwall machine, is the nism is incorporated, the view being par driven by improved mechanism. As shown, these driving sprockets 8 and 9 are disposed transversely of the front end of the frame machine shown in Fig. 1 illustrating the im- and are rotatable in a vertical plane about a transversely disposed axis. As illustrated, 80 the coaxial driving sprockets are also driven Fig. 3 is a partial side elevational view of from the motor 4, the adjacent end of the motor armature shaft 11 carrying a worm 12 In this illustrative form of my invention, which, in turn, meshes with a worm gear 13 centrally fixed to a transversely disposed co- 85 posite sides and the bottom of the frame. 45 flexibly fed longwall type including a usual ing sprockets 8 and 9 through a plurality of 90

improved operative connections or trains of gearing whereby the sprockets may be rotated

at a plurality of speeds.

Referring to the feed driving mechanism, we will first consider the slow feed mechanism. Herein it will be observed that a small pinion 16 is fixed near one end of the shaft 14 and meshes with a larger pinion 17 carried on the inner end of a stub shaft 18 10 journaled on the frame and disposed parallel to the shaft 14 and between the latter and and a pair of forwardly located cooperating the motor. This stub shaft 18, in turn, car-guide sprockets 44 and 45 having the plane ries a small pinion 19 on its opposite end of their axes disposed parallel to the plane which meshes with a larger pinion 20 freely of the axes of the sprockets 42 and 43. In 15 rotatable on the shaft 14 and disposed be- this construction it will be evident that by 50 tween the pinion 16 and the side of the frame. simply laying the chain around either of the As shown, this pinion 20 in turn meshes with guides 40 or 41 and over either of the chain a still larger pinion or gear 21 which is suit-driving sprockets 8 or 9 and passing the same ably connectible with a rearwardly located around either of the front guide sprockets transversely disposed shaft 22 by means of 44 and 45 and either of the guides 42 or 43, 85 a friction clutch mechanism, generally de- for instance in Fig. 1, the machine may be signated 23, herein of the usual disc type and connected for movement along the face and controlled by a usual clutch shipper 24 mov- that by some rearrangement of the chain able on the shaft 22 and herein operable by relative to the guiding sprockets various controlling mechanism including a lever 25 other movements of the machine or its cutter 50 engageable with the shipper and operatively bar may be obtained as desired. connected to a transverse link 26 and other As a result of my improved construction it mechanism, not shown, with a controlling will be observed that it is possible to elimilever 27 disposed on the top of the machine nate entirely any necessity of threading the 33 casing. A spur gear 28 is suitably secured chain, thereby facilitating and speeding up 95 to the shaft 22 and disposed between suit- the use of the machine under service conable bearings 29 in which the shaft 22 is ditions, at the same time that it is possible to journaled. The gear 28 meshes with a larger utilize the weight or the slack of the slack 35 zontal shaft 31 journaled in bearings 32 formed on the frame and to which shaft said chain driving sprockets 8 and 9 are suitably rigidly secured. In considering the that fixed to the opposite end of the shaft however, be clearly apparent to those skilled 165 14 from the pinion 16 is a suitable small in the art. of the shaft 22 from that carrying the gear may assume in practice, it will be under-45 21 and similarly located. The connection of stood that this form of the same is shown 110 this gear 34 to the shaft 22 is in turn controlled by a suitable friction mechanism, gen-vention may be modified and embodied in erally designated 35, and similar to the friction clutch mechanism 23, and likewise controlled by a shipper 36 through a lever 37, the lever in turn being connected to the link 26 and is likewise controllable by the controlling lever 27. Thus it will be observed slidable on its bottom on the mine bottom durthat when the lever 27 is operated in such ing the cutting operation, a driving motor a manner as to operate the friction clutch carried by said frame, cutting mechanism 120 mechanism 23 the driving sprockets 8 and 9 driven by said driving motor and disposed of will be rotated at a slow speed and if the at one side of the latter, and feeding means lever is operated in an opposite direction operating the friction clutch mechanism 35 the driving sprockets 8 and 9 will be driven at a fast speed. It will herein be noted that suitable pockets 38 and 39 formed in the frame are provided at the opposite ends of the shaft 31 so that the chain driving sprockets 8 and 9 may be disposed within the lines of

the frame a substantial distance from the sides thereof. Associated with these driving sprockets, either of which may be used when desired, I have also provided guide sprockets 40 and 41 rotatable on vertical axes and 70 adapted to direct the chain from the chain driving sprockets 8 and 9 to slightly forwardly located laterally disposed cooperating guide sprockets 42 and 43 rotatable on vertical axes and extending to the guides 40 and 41 75

gear 30, in turn, carried directly on a hori- chain to hold it upon the feed sprockets and to locate the chain driving mechanism as to 100 interfere in no way with the movement of the machine close to the working face on the one side and the mine roof props on the fast feed mechanism it will herein be noted other. These and other advantages will,

pinion 33 meshing with a considerably While I have in this application specifilarger gear 34 rotatable on the opposite end cally described one form which my invention for purposes of illustration and that the invarious other forms without departing from its spirit or the scope of the appended claims.

What I claim is new and desire to secure by 115

Letters Patent is:

1. In a mining machine, a machine frame for effecting feed of the machine during cutting and driven by said motor, said feeding means including coaxial feeding members 125 each adapted to cooperate directly with flexible feeding means and connected for rotation at equi-angular rates, said feeding members being disposed at the opposite side of said motor from said cutting mechanism.

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2. In a mining machine, a driving motor, means for flexible feeding means including at of the central longitudinal vertical plane of pitch circles lie in a common horizontal plane. 70 the machine, and means for driving said mem- 8. In a mining machine, a frame having bers at a fast and at a slow speed in the same at one end thereof pivotally mounted cutting direction including parallel shafts through mechanism, adjacent the central portion both of which each of said members may be thereof a motor, and at the front end thereof driven.

mutually coaxial feed operating members zontal axes and each adapted to cooperate adapted to cooperate directly with flexible with flexible feeding means, and guiding feeding means and disposed on opposite sides means for flexible feeding means including of the central longitudinal vertical plane of at each side of the central longitudinal verti- so the machine, and means for driving said cal plane of the machine frame three guide members at a fast and at a slow speed in the sheaves. same direction including parallel shafts 9. In a mining machine, a frame having at controlling means.

members at a fast and at a slow speed in the cal plane of the machine frame three guide same direction including parallel shafts sheaves rotating on vertical axes. through both of which each of said members 10. In a mining machine, a frame having 95

necting said shafts.

one end thereof pivotally mounted cutting feeding means comprising a pair of coaxial mechanism, adjacent the central portion feed operating members rotatable on hori- 100 thereof a motor, and at the front end thereof zontal axes and each adapted to cooperate feeding means comprising a pair of coaxial with flexible feeding means, driving means feed operating members rotatable on hori- for said members including a plurality of zontal axes and each adapted to cooperate shafts rotating on axes parallel to a line with flexible feeding means, and guiding parallel to the axes of rotation of said feed 105 means for flexible feeding means including operating members, and guiding means for at each side of the central longitudinal verti-flexible feeding means including at each side cal plane of the machine frame a plurality of of the central longitudinal vertical plane of guide sheaves.

6. In a mining machine, a frame having sheaves. at one end thereof pivotally mounted cutting 11. In a mining machine, a frame having mechanism, adjacent the central portion at one end thereof pivotally mounted cutthereof a motor, and at the front end thereof ting mechanism, adjacent the central portion feeding means comprising a pair of coaxial thereof a motor, and at the front end thereof 50 feed operating members rotatable on hori- feeding means comprising a pair of coaxial 115 zontal axes and each adapted to cooperate feed operating members rotatable on horiwith flexible feeding means, and guiding zontal axes and each adapted to cooperate means for flexible feeding means including with flexible feeding means, driving means at each side of the central longitudinal verti- for said members including a plurality of cal plane of the machine frame a plurality shafts rotating on axes parallel to a line 120 of guide sheaves all rotatable on vertical axes.

7. In a mining machine, a frame having at one end thereof pivotally mounted cutting mechanism, adjacent the central portion thereof a motor, and at the front end thereof sheaves all rotatable on vertical axes. feeding means comprising a pair of coaxial 12. In a mining machine, a frame having feed operating members rotatable on hori- at one end thereof pivotally mounted cutzontal axes and each adapted to cooperate ting mechanism, adjacent the central portion with flexible feeding means, and guiding thereof a motor, and at the front end thereof 130

mutually coaxial feed operating members each side of the central longitudinal vertical adapted to cooperate directly with flexible plane of the machine frame a pair of guide feeding means and disposed on opposite sides sheaves, said sheaves so arranged that their

feeding means comprising a pair of coaxial 75 3. In a mining machine, a driving motor, feed operating members rotatable on hori-

through both of which each of said members one end thereof pivotally mounted cutting may be driven and a plurality of frictional mechanism, adjacent the central portion 85 thereof a motor, and at the front end thereof 4. In a mining machine, a driving motor, feeding means comprising a pair of coaxial mutually coaxial feed operating members feed operating members rotatable on horiadapted to cooperate directly with flexible zontal axes and each adapted to cooperate feeding means and disposed on opposite sides with flexible feeding means, and guiding 90 of the central longitudinal vertical plane of means for flexible feeding means including the machine, and means for driving said at each side of the central longitudinal verti-

may be driven and change speed gearing con- at one end thereof pivotally mounted cutting mechanism, adjacent the central portion 5. In a mining machine, a frame having at thereof a motor, and at the front end thereof the machine frame a plurality of guide

parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at each side of the central longitudinal vertical plane of the machine frame a plurality of guide 125

feeding means comprising a pair of coaxial feed operating members rotatable on horizontal axes and each adapted to cooperate with flexible feeding means, driving means for said members including a plurality of shafts rotating on axes parallel to a line parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at each side each side of the central longitudinal vertical of the central longitudinal vertical plane of plane of the machine frame a plurality of 75 the machine frame a pair of guide sheaves, guide sheaves all rotatable on vertical axes. said sheaves so arranged that their pitch circles lie in a common horizontal plane.

13. In a mining machine, a frame having at one end thereof pivotally mounted cutting mechanism, adjacent the central portion zontal axes and each adapted to cooperate speed driving means for said members in- 85 for said members including a plurality of shafts rotating on axes parallel to a line parallel to the axes of rotation of said feed 25 operating members, and guiding means for flexible feeding means including at each side of the central longitudinal vertical plane of the machine frame three guide sheaves.

14. In a mining machine, a frame having horizontal plane. mechanism, adjacent the central portion with flexible feeding means, driving means for said members including a plurality of shafts rotating on axes parallel to a line parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at each side of the central longitudinal vertical plane of the machine frame three guide sheaves rotating on vertical axes.

15. In a mining machine, a frame having at one end thereof pivotally mounted cutting mechanism, adjacent the central portion thereof a motor, and at the front end thereof feeding means comprising a pair of coaxial feed operating members rotatable on horizontal axes and each adapted to cooperate with flexible feeding means, plural speed driving means for said members including a plurality of shafts rotating on axes parallel to a line parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at each side of the central longitudinal vertical plane of the machine frame a plurality 60 of guide sheaves.

16. In a mining machine, a frame having at one end thereof pivotally mounted cutting mechanism, adjacent the central portion. 65 feeding means comprising a pair of coaxial tion thereof a motor, and at the front end 130

feed operating members rotatable on horizontal axes and each adapted to cooperate with flexible feeding means, plural speed driving means for said members including a plurality of shafts rotating on axes parallel 70 to a line parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at

17. In a mining machine, a frame having at one end thereof pivotally mounted cutting mechanism, adjacent the central portion thereof a motor, and at the front end 80 thereof feeding means comprising a pair of thereof a motor, and at the front end thereof coaxial feed operating members rotatable on feeding means comprising a pair of coaxial horizontal axes and each adapted to coopfeed operating members rotatable on hori- erate with flexible feeding means, plural with flexible feeding means, driving means cluding a plurality of shafts rotating on axes parallel to a line parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at each side of the central longitudi- so nal vertical plane of the machine frame a pair of guide sheaves, said sheaves so arranged that their pitch circles lie in a common

30 at one end thereof pivotally mounted cutting 18. In a mining machine, a frame having 95 at one end thereof pivotally mounted cutting thereof a motor, and at the front end thereof mechanism, adjacent the central portion feeding means comprising a pair of coaxial thereof a motor, and at the front end therefeed operating members rotatable on hori- of feeding means comprising a pair of co-35 zontal axes and each adapted to cooperate axial feed operating members rotatable on 100 horizontal axes and each adapted to cooperate with flexible feeding means, plural speed driving means for said members including a plurality of shafts rotating on axes parallel to a line parallel to the axes of rotation of 105 said feed operating members, and guiding means for flexible feeding means including at each side of the central longitudinal vertical plane of the machine frame three guide sheaves.

19. In a mining machine, a frame having at one end thereof pivotally mounted cutting mechanism, adajacent the central portion thereof a motor, and at the front end thereof feeding means comprising a pair of coaxial 115 feed operating members rotatable on horizontal axes and each adapted to cooperate with flexible feeding means, plural speed driving means for said members including a plurality of shafts rotating on axes parallel 120 to a line parallel to the axes of rotation of said feed operating members, and guiding means for flexible feeding means including at each side of the central longitudinal vertical plane of the machine frame three guide 195 sheaves rotating on vertical axes.

20. In a mining machine, a frame having at one end thereof pivotally mounted cutthereof a motor, and at the front end thereof ting mechanism, adjacent the central por-

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thereof feeding means comprising a pair of and speed controlling clutches comprising on horizontal axes and each adapted to co- of said shafts, and guiding means for flexoperate with flexible feeding means, plural ible feeding means including at each side of 5 speed driving means for said members including a plurality of shafts rotating on axes the machine frame three guide sheaves. parallel to a line parallel to the axes of rota- 24. In a mining machine, a frame having tion of said feed operating means and speed controlling clutches comprising elements ting mechanism, adjacent the central por-10 movable in directions longitudinal of said tion thereof a motor, and at the front end 75 shafts, and guiding means for flexible feeding thereof feeding means comprising a pair of means including at each side of the central coaxial feed operating members rotatable longitudinal vertical plane of the machine on horizontal axes and each adapted to co-

20 feed operating members rotatable on hori- ments movable in directions longitudinal of 85 zontal axes and each adapted to cooperate said shafts, and guiding means for flexible driving means for said members including a central longitudinal vertical plane of the plurality of shafts rotating on axes parallel machine frame three guide sheaves rotating 25 to a line parallel to the axes of rotation of said on vertical axes. feed operating means and speed controlling 25. In a mining machine, a frame slidable clutches comprising elements movable in di- on its bottom directly on the mine bottom. rections longitudinal of said shafts, and guid-during cutting and having projecting from ing means for flexible feeding means includ- one end thereof cutting mechanism, a motor, 30 ing at each side of the central longitudinal and at the side of the motor remote from the 95 vertical plane of the machine frame a plu- end of the frame at which said cutting rality of guide sheaves all rotatable on ver- mechanism projects feeding means compristical axes.

at one end thereof pivotally mounted cut- cooperate with flexible feeding means and 100 coaxial feed operating members rotatable on rotating at different speeds on axes paralhorizontal axes and each adapted to cooper- lel to a common straight line. ate with flexible feeding means, plural speed 26. In a mining machine, a frame slida plurality of shafts rotating on axes parallel to a line parallel to the axes of rota-45 tion of said feed operating means and speed controlling clutches comprising elements movable in directions longitudinal of said shafts, and guiding means for flexible feeding means including at each side of the 50 central longitudinal vertical plane of the to cooperate with flexible feeding means and 115 machine frame a pair of guide sheaves, said lie in a common horizontal plane.

55 at one end thereof pivotally mounted cut- to a common straight line and clutch means 120 thereof a motor, and at the front end there- operate as the driving element. of feeding means comprising a pair of co- 27. In a mining machine, a frame slidaxial feed operating members rotatable on able on its bottom directly on the mine bot-60 horizontal axes and each adapted to coop- tom during cutting and having projecting 125 erate with flexible feeding means, plural from one end thereof cutting mechanism, a speed driving means for said members in- motor, and at the side of the motor remote cluding a plurality of shafts rotating on from the end of the frame at which said cutaxes parallel to a line parallel to the axes ting mechanism projects feeding means com-

coaxial feed operating members rotatable elements movable in directions longitudinal the central longitudinal vertical plane of 70

at one end thereof pivotally mounted cutframe a plurality of guide sheaves. operate with flexible feeding means, plural 21. In a mining machine, a frame having speed driving means for said members in- 80 at one end thereof pivotally mounted cutting cluding a plurality of shafts rotating on axes mechanism, adjacent the central portion parallel to a line parallel to the axes of rothereof a motor, and at the front end thereof tation of said feed operating means and feeding means comprising a pair of coaxial speed controlling clutches comprising elewith flexible feeding means, plural speed feeding means including at each side of the

ing a pair of feed operating members rotat-22. In a mining machine, a frame having able on horizontal axes and each adapted to ting mechanism, adjacent the central por- driving means for said members including tion thereof a motor, and at the front end a pair of driving elements each adapted to thereof feeding means comprising a pair of drive each of said members and respectively

driving means for said members including able on its bottom directly on the mine bottom during cutting and having projecting from one end thereof cutting mechanism, a motor, and at the side of the motor remote 110 from the end of the frame at which said cutting mechanism projects feeding means comprising a pair of feed operating members rotatable on horizontal axes and each adapted driving means for said members including sheaves so arranged that their pitch circles a pair of driving elements each adapted to drive each of said members and respectively 23. In a mining machine, a frame having rotating at different speeds on axes parallel ting mechanism, adjacent the central portion operable to cause either of said elements to

of rotation of said feed operating means prising a pair of feed operating members 130

to cooperate with flexible feeding means and driving means for said members include end of the frame at which said cutting meching a pair of driving elements each adapted to drive each of said members and respectively rotating at different speeds on axes

lying in a common vertical plane.

28. In a mining machine, a frame slidable on its bottom directly on the mine bot- driving elements each adapted to drive each 10 tom during cutting and having projecting from one end thereof cutting mechanism, a motor, and at the side of the motor remote vertical plane, and flexible feeding means from the end of the frame at which said guiding sheaves at opposite sides of the cencutting mechanism projects feeding means tral longitudinal vertical plane of the ma-15 comprising a pair of feed operating members chine frame. rotatable on horizontal axes and each adapted to cooperate with flexible feeding means and driving means for said members including a pair of driving elements each adapted to 20 drive each of said members and respectively rotating at different speeds on axes lying in a common vertical plane and clutch means operable to cause either of said elements to pair of feed operating members rotatable on operate as the driving element.

30 end of the frame at which said cutting mech-vertical plane and clutch means operable to 95 35 means for said members including a pair of machine frame. ing sheaves at opposite sides of the central members at the front end of said frame 105

frame. on its bottom directly on the mine bottom 45 during cutting and having projecting from one end thereof cutting mechanism, a motor, and at the side of the motor remote from the end of the frame at which said cutting mechanism projects feeding means comprising a pair of feed operating members rotatable on horizontal axes and each adapted to cooperate with flexible feeding means and driving means for said members including a pair of driving elements each adapted to drive each 55 of said members and respectively rotating at different speeds on axes parallel to a common straight line and clutch means operable to cause either of said elements to operate as the driving element, and flexible feeding 60 means guiding sheaves at opposite sides of the central longitudinal vertical plane of the machine frame.

31. In a mining machine, a frame slidable on its bottom directly on the mine bottom 65 during cutting and having projecting from

rotatable on horizontal axes and each adapted one end thereof cutting mechanism, a motor, and at the side of the motor remote from the anism projects feeding means comprising a pair of feed operating members rotatable on 70 horizontal axes and each adapted to cooperate with flexible feeding means and driving means for said members including a pair of of said members and respectively rotating at 75 different speeds on axes lying in a common

32. In a mining machine, a frame slidable on its bottom directly on the mine bottom during cutting and having projecting from one end thereof cutting mechanism, a motor, and at the side of the motor remote from the 85 end of the frame at which said cutting mechanism projects feeding means comprising a horizontal axes and each adapted to cooperate 29. In a mining machine, a frame slidable with flexible feeding means and driving 90 on its bottom directly on the mine bottom means for said members including a pair of during cutting and having projecting from driving elements each adapted to drive each one end thereof cutting mechanism, a motor, of said members and respectively rotating at and at the side of the motor remote from the different speeds on axes lying in a common anism projects feeding means comprising a cause either of said elements to operate as pair of feed operating members rotatable on the driving element, and flexible feeding horizontal axes and each adapted to cooperate means guiding sheaves at opposite sides of with flexible feeding means and driving the central longitudinal vertical plane of the

driving elements each adapted to drive each 33. In a mining machine comrpising a of said members and respectively rotating at frame slidable over a mine bottom during different speeds on axes parallel to a common cutting and having at its rear end a pivoted straight line and flexible feeding means guid- cutter bar, a plurality of feed operating longitudinal vertical plane of the machine rotatable on a horizontal axis, a flexible feed member, and cooperating guiding means 30. In a mining machine, a frame slidable therefor for directing said feed member selectively around said feed operating members and forwardly from the front end of said 110 machine.

34. In a mining machine comprising a frame slidable over a mine bottom during cutting and having at its rear end a pivoted cutter bar, a plurality of feed operating 115 members at the front end of said frame and rotatable on a horizontal axis, a flexible feed member, and cooperating guiding means therefor for selectively directing said feed members around said feed operating mem- 120 bers and either forwardly or rearwardly from the front end of said machine.

35. The combination with a mining machine, of a plurality of feed driving mem- 125 bers at the front end thereof disposed on a horizontal axis. a flexible feed member selectively engageable therewith, and guiding means including a plurality of simultaneously operative cooperating guiding mem- 130

bers disposed on opposite sides of said driv- mechanisms operatively connected between

ing members.

chine, of a plurality of transverse shafts, for selectively connecting said last mendriving mechanism for one of the same, fast tioned shaft with either of said feed mechanand slow feed mechanisms between said nisms, and a plurality of feed sprockets carshafts, a horizontal shaft on the front end of ried on said last mentioned shaft, each of said machine, means operatively connecting said feed sprockets being adapted to cooperthe same to either feed mechanism, and a ate with flexible feeding means anchored at plurality of feed sprockets on said horizon- a point extraneous of the machine. tal shaft, each of said feed sprockets being 42. A mining machine slidable over a mine adapted to cooperate with flexible feeding bottom on its bottom including a frame havmeans anchored at a point extraneous of the ing at one end thereof a cutter bar having machine.

chine, fast and slow feed mechanisms on the mechanism associated therewith oppositely front end thereof, a horizontally disposed to cut and clear kerfs in opposite directions shaft extending in front of said mechanisms, when the machine frame is oppositely promeans for selectively connecting the same pelled, and means for feeding said machine and said feed mechanisms, and a plurality in opposite directions during cutting includ- 85 of feed sprockets on said shaft rotatable on ing a plurality of feed operating members axes in a vertical plane, each of said feed adjacent the other end of said frame and rosprockets being adapted to cooperate with tatable upon a horizontal axis extending flexible feeding means anchored at a point transversely of said frame, flexible feeding 25 extraneous of the machine.

shaft extending in front of said mechanisms, arranged on vertical axes on opposite sides means for selectively connecting the same of the end of said frame remote from said 95 and said feed mechanisms, and a plurality cutting mechanism. of feed sprockets on said shaft rotatable in vertical planes, each of said feed sprockets slidable on its bottom directly on the mine being adapted to cooperate with flexible bottom during cutting and supporting at one 35 feeding means anchored at a point extrane- end thereof cutting mechanism, and means 100 ous of the machine.

chine, of a plurality of transverse shafts, dimensions of said frame including at the fast and slow feed mechanisms connected be- end of said frame remote from said cutting 40 tween the same, driving mechanism opera- mechanism a plurality of driving members 105 tively connected with one of said shafts be- rotatable upon a horizontal axis extending tween the ends of the same, a horizontally transversely of said frame, and driving disposed feed shaft carrying a plurality of means for said cutting mechanism and said feed sprockets, each of said feed sprockets members including a motor disposed between 45 being adapted to cooperate with flexible said cutting mechanism and said members 110 feeding means anchored at a point extrane- on said frame and having a power shaft disous of the machine, and driving connections posed in a plane perpendicular to the axis therefor between the ends of the other trans- of rotation of said members, the driving verse shaft.

40. The combination with a mining ma-effecting plural predetermined speed driv- 115 chine, of a feed mechanism including a plu- ing thereof. rality of transverse shafts, fast and slow 44. The combination with a mining mathe machine.

the opposite ends of the same, a horizontally 36. The combination with a mining ma- disposed transversely extending shaft, means

cutting mechanism associated therewith and 37. The combination with a mining ma- operative upon actuation of the cutting 80 means cooperating therewith, and guiding 90 38. The combination with a mining ma- members adapted to cooperate with said flexchine, fast and slow feed mechanisms on the ible feeding means and selectively operative front end thereof, a horizontally disposed dependent upon the direction of feed and

43. A mining apparatus including a frame for effecting propulsion of said frame dur-39. The combination with a mining ma- ing cutting in a path parallel to the major means for the members including means for

feed mechanisms operatively connected be- chine, a plurality of feed operating members tween the same, a horizontally disposed each rotatable on a horizontal axis, each of shaft on the front end of said machine, means said feed operating members being adapted 120 for selectively connecting the latter with to cooperate with flexible feeding means aneither of said feed mechanisms, and a plu- chored at a point extraneous of the machine, rality of feed sprockets carried on said hori- and common means for driving said memzontal shaft, each of said feed sprockets be- bers including a plurality of horizontal ing adapted to cooperate with flexible feed- shafts disposed parallel with the axes of 125 ing means anchored at a point extraneous of said members and a plurality of friction clutches.

41. The combination with a mining ma- 45. The combination with a mining machine, of feeding mechanism including a plu-chine, a plurality of feed operating memrality of transverse shafts, fast and slow feed bers each rotatable on a horizontal axis, each 130 of said members, and a plurality of friction clutches.

46. In a mining machine, a cutter sup-10 porting frame, a motor thereon, feeding mechanism thereon including a plurality of plural predetermined speed feed operating on its bottom directly on the mine bottom members, and cooperating feeding and guid-during cutting and having projecting from ing means including a single flexible feeding one end thereof cutting mechanism, a motor, 15 member alternatively engageable with dif- and at the side of the motor remote from 80 ferent operating members to feed said frame the end of the frame at which said cutting

on its bottom directly on the mine bottom adapted to cooperate with flexible feeding 20 during cutting and supporting cutting mech- means, and driving means for said members 85 anism, and feeding mechanism on said frame including a pair of driving elements each comprising a feed operating member rotatable on a horizontal axis and adapted to cooperate directly with flexible feeding mech-25 anism and guiding means for said flexible feeding mechanism including a plurality of guide sheaves rotatable on vertical axes and arranged with their pitch circles in horizontal planes tangent to the top and bottom 30 of the pitch circle of said feed operating member.

ating members each adapted to cooperate 40 with flexible feeding means, and cooperating guiding means for said flexible feeding means whereby the latter may be extended from 53. In a mining machine, a frame slidable either of said members from opposite sides on its bottom directly on the mine bottom of the machine.

able on its bottom directly on the mine bot- and at the side of the motor remote from tom during cutting and having at one end the end of the frame at which said cutting thereof pivotally mounted cutting mecha- mechanism projects feeding means comprisnism, adjacent the central portion thereof a ing a pair of feed operating members each 50 motor, and at the opposite end thereof feed- adapted to cooperate with flexible feeding 1:3 ing means comprising a pair of feed operat- means, and driving means for said members ing members rotatable on horizontal axes including a pair of driving elements each and each adapted to cooperate with flexible adapted to drive each of said members and means for said flexible feeding means where- axes lying in a common vertical plane. by the latter may be extended from either 54. In a mining machine, a frame slidable machine.

60 on its bottom directly on the mine bottom and at the side of the motor remote from the 125 65 means comprising a pair of feed operating and driving means for said members includ- 130

of said feed operating members being adapt- members rotatable on horizontal axes and ed to cooperate with flexible feeding means each adapted to cooperate with flexible feedanchored at a point extraneous of the ma- ing means, and cooperating guiding means chine, and common means for driving said for said flexible feeding means whereby the members including worm gearing, a plural-latter may be extended from either of said ity of shafts disposed parallel with the axes members from opposite sides of the machine, said flexible feeding means being adapted to swing said cutting mechanism in opposite directions and to feed the machine in opposite directions during cutting.

51. In a mining machine, a frame slidable at a plurality of speeds in either direction. mechanism projects feeding means compris-47. In a mining machine, a frame slidable ing a pair of feed operating members each adapted to drive each of said members and respectively rotating at different speeds on axes parallel to a common straight line.

52. In a mining machine, a frame slid- 20 able on its bottom directly on the mine bottom during cutting and having projecting from one end thereof cutting mechanism, a motor, and at the side of the motor remote from the end of the frame at which said cut- 95 ting mechanism projects feeding means com-48. In a mining machine, a frame slid- prising a pair of feed operating members able on its bottom directly on the mine bot- each adapted to cooperate with flexible feedtom during cutting and having at one end ing means, and driving means for said mem-35 thereof pivotally mounted cutting mecha- bers including a pair of driving elements 1/3 nism, adjacent the central portion thereof a each adapted to drive each of said members motor, and at the opposite end thereof feed- and respectively rotating at different speeds ing means comprising a pair of feed oper- on axes parallel to a common straight line, and clutch means operable to cause either of said elements to operate as the driving ele- 105 ment.

during cutting and having projecting from 49. In a mining machine, a frame slid- one end thereof cutting mechanism, a motor, 110 feeding means, and cooperating guiding respectively rotating at different speeds on

of said members from opposite sides of the on its bottom directly on the mine bottom during cutting and having projecting from 50. In a mining machine, a frame slidable one end thereof cutting mechanism, a motor, during cutting and having at one end there- end of the frame at which said cutting mechof pivotally mounted cutting mechanism, anism projects feeding means comprising a adjacent the central portion thereof a motor, pair of feed operating members each adaptand at the opposite end thereof feeding ed to cooperate with flexible feeding means,

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ing a pair of driving elements each adapted motor, and at the side of the motor remote to drive each of said members and respec- from the end of the frame at which said tively rotating at different speeds on axes cutting mechanism projects feeding means lying in a common vertical plane, and clutch comprising a pair of feed operating memmeans operable to cause either of said ele- bers each adapted to cooperate with flexible 70

10 from one end thereof cutting mechanism, a ferent speeds on axes lying in a common 75 15 each adapted to cooperate with flexible feed- the central longitudinal vertical plane of the 80 ing means, and driving means for said mem- machine frame. bers including a pair of driving elements 59. In a mining machine, a frame slid-20 on axes parallel to a common straight line, thereof cutting mechanism, adjacent the cen-

able on its bottom directly on the mine bot-means, and cooperating guiding means for 90 motor, and at the side of the motor remote bers from opposite sides of the machine. from the end of the frame at which said cut- 60. In a mining machine, a frame slidting mechanism projects feeding means com-able on its bottom directly on the mine bot- 95 each adapted to drive each of said members a pair of feed operating members rotatable 100 ment, and flexible feeding means guiding extended from either of said members from 105 sheaves at opposite sides of the central lon- opposite sides of the machine. gitudinal vertical plane of the machine 61. In a mining machine, a frame slidable frame.

able on its bottom directly on the mine bot- of cutting mechanism, adjacent the central 50 cutting mechanism projects feeding means with flexible feeding means, and cooperating fin as ments each adapted to drive each of said members and respectively rotating at different speeds on axes lying in a common vertical plane, and flexible feeding means guiding sheaves at opposite sides of the central so longitudinal vertical plane of the machine frame.

58. In a mining machine, a frame slidable on its bottom directly on the mine bottom during cutting and having projecting 65 from one end thereof cutting mechanism, a

ments to operate as the driving element. feeding means, and driving means for said 55. In a mining machine, a frame slid- members including a pair of driving eleable on its bottom directly on the mine bot- ments each adapted to drive each of said tom during cutting and having projecting members and respectively rotating at difmotor, and at the side of the motor remote vertical plane, and clutch means operable from the end of the frame at which said cut- to cause either of said elements to operate ting mechanism projects feeding means com- as the driving element, and flexible feeding prising a pair of feed operating members means guiding sheaves at opposite sides of

each adapted to drive each of said members able on its bottom directly on the mine bot and respectively rotating at different speeds tom during cutting and having at one end and flexible feeding means guiding sheaves tral portion thereof a motor, and at the opat opposite sides of the central longitudinal posite end thereof feeding means comprising vertical plane of the machine frame.

a pair of feed operating members each 56. In a mining machine, a frame slid- adapted to cooperate with flexible feeding tom during cutting and having projecting said flexible feeding means whereby the latfrom one end thereof cutting mechanism, a termay be extended from either of said mem-

prising a pair of feed operating members tom during cutting and having at one end each adapted to cooperate with flexible feed- thereof cutting mechanism, adjacent the cening means, and driving means for said mem-tral portion thereof a motor, and at the oppobers including a pair of driving elements site end thereof feeding means comprising and respectively rotating at different speeds on horizontal axes and each adapted to coon axes parallel to a common straight line, operate with flexible feeding means, and coand clutch means operable to cause either of operating guiding means for said flexible said elements to operate as the driving ele-feeding means whereby the latter may be

on its bottom directly on the mine bottom 57. In a mining machine, a frame slid-during cutting and having at one end theretom during cutting and having projecting portion thereof a motor, and at the opposite from one end thereof cutting mechanism, a end thereof feeding means comprising a pair motor, and at the side of the motor remote of feed operating members rotatable on horifrom the end of the frame at which said zontal axes and each adapted to cooperate comprising a pair of feed operating mem-guiding means for said flexible feeding bers each adapted to cooperate with flexible means whereby the latter may be extended feeding means, and driving means for said from either of said members from opposite members including a pair of driving ele-sides of the machine, said flexible feeding means having free end portions engageable 120 with different feed operating members to feed the machine in opposite directions during cutting in opposite directions.

> 62. In a mining machine, a frame slidable on its bottom directly on the mine bottom dur- 125 ing cutting and having at one end thereof pivoted cutting mechanism, adjacent the central portion thereof a motor, and at the opposite end thereof feeding means comprising a pair of feed operating members each adapted 130

to cooperate with flexible feeding means, and cooperating guiding means for said flexible feeding means whereby the latter may be extended from either of said members from opposite sides of the machine, said flexible feeding means being adapted to swing said cutting mechanism in opposite directions and to feed the machine in opposite directions during cutting.

In testimony whereof I affix my signa-

ture.

MORRIS P. HOLMES.