

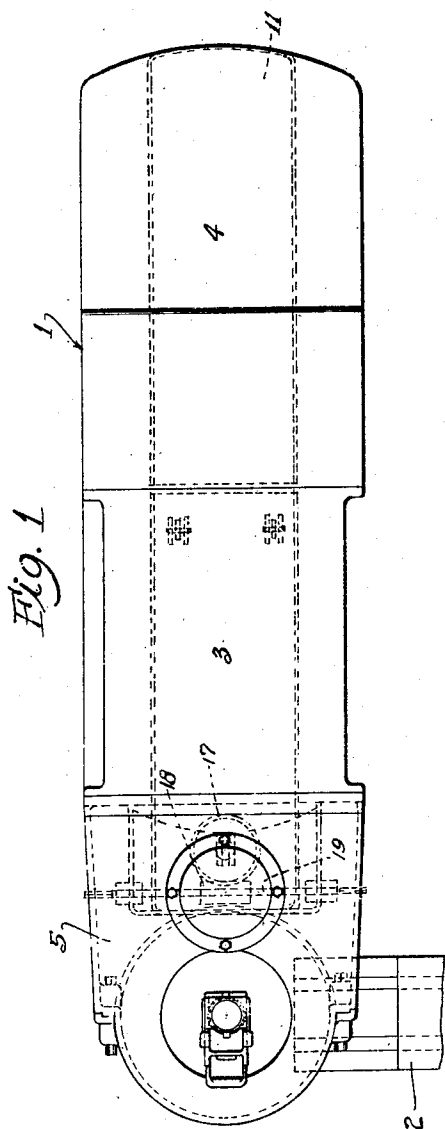
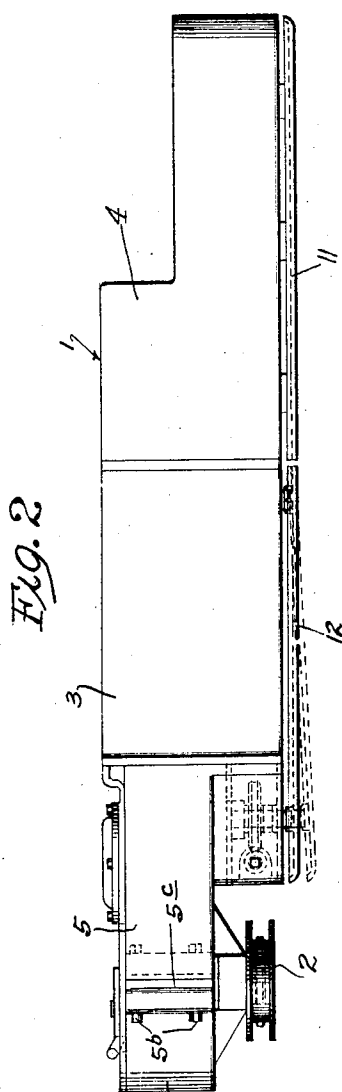
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1,664,703

T. E. PRAY

MINING MACHINE

Original Filed Aug. 3, 1921 2 Sheets-Sheet 1



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Fig. 3

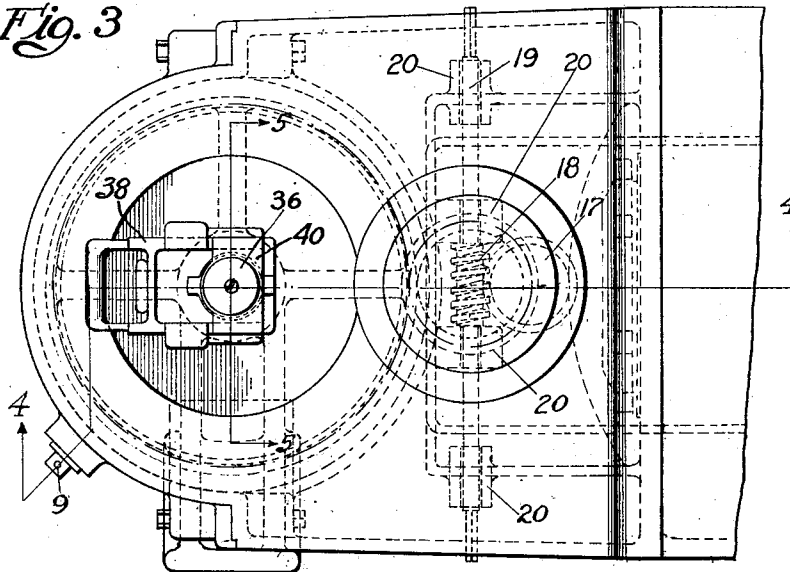


Fig. 4

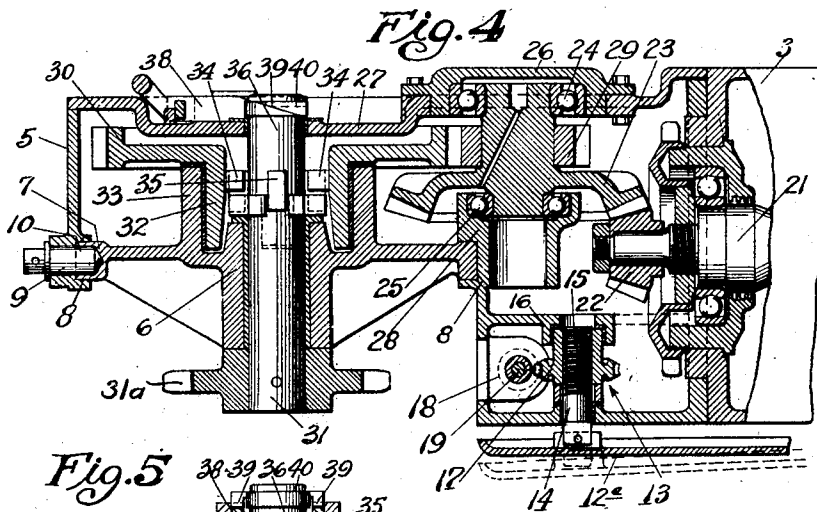
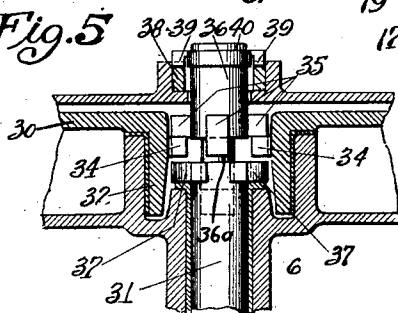


Fig. 5



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UNITED STATES PATENT OFFICE.

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MINING MACHINE.

Application filed August 3, 1921, Serial No. 489,518. Renewed September 1, 1927.

This invention relates to mining machines and more particularly to that type of machine commonly known as the longwall coal cutting machine.

5 The principal object of my invention is to provide an improved construction for machines of the class above described.

The invention consists in the combination, construction, and arrangement of parts as 10 will hereinafter be described in connection with the accompanying drawings, and more particularly defined in the appended claims.

Figure 1 is a top plan view of a mining machine constructed in accordance with my 15 invention.

Figure 2 is a view of the side elevation of the same machine.

Figure 3 is an enlarged top plan view of the rear or cutting end of the machine showing the clutch mechanism in one position. 20

Figure 4 is a cross section taken on line 4-4 of Figure 3.

Figure 5 is a detailed cross section taken on line 5-5 of Figure 3 showing the clutch 25 mechanism in a second position.

Coal cutting machines of the longwall type usually comprise a body portion having a cutting element extended from one side thereof. The machine is dragged bodily 30 along the mine floor by means of suitable draft ropes, the cutting element extending into the wall of the mine so as to cut a substantially horizontal kerf. During the cutting operation the mining machine must often be moved over a rolling bottom and under such conditions it is desirable to provide means whereby the cutter arm may be deflected upwardly or downwardly to follow the rolling bottom. Furthermore, it will be 40 understood that mining machines are required to be operated in very limited spaces so that all mechanism including that for tilting the cutter bar must be very compact so as to be contained in the limited space 45 available for the machine.

In the embodiment of my invention illustrated in the drawings, a long wall mining machine comprises an elongated body portion 1 having a cutter arm 2 extending 50 laterally therefrom at one end of the frame. Said cutter arm is provided with an endless chain of an approved design. In the preferred form illustrated, said body portion includes a central unit 3 which contains the 55 motor (not shown), a detachable forward

unit 4 carrying the draft operating mechanism, and a second detachable unit 5 at the rear end of the machine, which forms a housing for the gearing mechanism intermediate the cutter chain and the motor. The 60 cutter arm 2 is supported at its inner end on a stud 6 having an annular horizontally disposed flange 7 retained in a groove 8 formed in the housing 5 so as to allow the cutter arm to swing in a horizontal plane and cut 65 from either side of the machine. The rear end of housing 5 is preferably provided with a semi-circular end plate 5^a to conform substantially with the annular flange 7 and carrying a portion of the retaining groove 8. 70 Said end plate is detachably connected to the housing by suitable means such as bolts 5^b, 5^b, extending through vertical flanges 5^c, 5^c. By means of this arrangement the 75 cutter arm is readily accessible for removal from the machine in a horizontal plane, by first removing the end plate 5^a so that repairs may be made on the cutter arm under conditions where head room is limited, as for instance when the machine is in cutting position in a mine. Means for locking the 80 cutter arm in the desired cutting position may comprise a suitable locking pin 9, extending through the end plate 5^a and adapted to engage with a recess 10 formed in the periphery of the flange 7. It will be understood that a plurality of such recesses are provided at predetermined points. 85

Referring now to the means for tilting the cutter arm it will be seen that the machine is adapted to rest on an elongated shoe attached longitudinally along the bottom of body portion 1. In the preferred form shown this shoe comprises a member 11 fixed to the forward unit 4 of the machine, and a second 95 portion 12 forming a continuation thereof, but having its forward end pivotally connected to the motor casing 3 adjacent the forward end of the latter. The rear end of the shoe member 12 is connected to the supporting frame by means of an adjusting device indicated at 13. This adjusting device 100 comprises a vertically disposed pin 14 pivotally connected at its lower end to the shoe member 12 and having an upper portion 15 threaded in a sleeve 16 carrying a worm gear 17 thereon. The worm gear 17 has bearing 105 in the housing 5, and is meshed with a horizontally disposed worm 18, carried on a transverse shaft 19 extending laterally 110

through bearings 20, 20 to both sides of the machine so as to be readily accessible from either side thereof, as desired.

By means of the arrangement just described the shoe member 12 may be tilted above or below its normal horizontal position by turning the shaft 19 so as to raise or lower the rear or cutting end of the machine with respect to the mine floor. It will be understood that the tilting shoe member 12 might be extended further toward the front end of the machine to replace the fixed member 11, but the form illustrated is preferable inasmuch as the motor casing 3 and the end unit 4 are separable and the parts are more readily assembled when constructed as shown.

The operative mechanism interposed between the cutter chain and the motor preferably comprises a reduced speed mechanism and a clutch for disengaging the cutter chain. In the present construction I have provided a compact and simple arrangement of operating mechanism as follows:

The motor shaft 21 is provided with a bevelled pinion 22 which meshes with a bevelled gear 23 mounted on a vertical axis by means of suitable anti-friction bearing members 24 and 25. The upper anti-friction bearing member 24 is carried in a plate 26 mounted on a cover plate 27 which forms an enclosure for the mechanism carried by the housing 5. The lower anti-friction member 25 is mounted on a stud 28 formed integral with the housing 5. A pinion 29 is carried by the bevelled gear 23 and is meshed with a gear 30 mounted concentrically with a vertically disposed sprocket shaft 31 journaled in the cutter bar support 6, and carrying a sprocket 31^a thereon for operating the cutter chain. The gear 30 is provided with a hollow bearing hub 32 having exterior bearing in a sleeve 33 formed integral with the cutter bar support 6. A clutch is provided within the annular hub 32 of the gear 30 to form a connection between said gear and sprocket shaft 31, said clutch comprising a plurality of clutch teeth 34, 34, extending inwardly from the gear hub 32 and engaging radially extending clutch teeth 35, 35, carried by a vertically movable shaft 36 mounted concentrically with the sprocket shaft 31 but movable vertically with respect thereto. The upper end of the sprocket shaft 31 is provided with a plurality of radially extending clutch jaws 37, 37, with which the jaw members 35, 35, carried by the clutch shaft 36 become en-

gaged when said shaft is in its lowermost position as shown in Figure 4. In this position the clutch members 35 are also engaged with the clutch members 34, 34, associated with the gear hub 32 thereby forming a driving connection between the gear 30 and the sprocket shaft 31. When the clutch shaft 36 is raised as shown in Figure 5 the clutch members 35, 35 are disengaged from the jaws 37, 37 carried by the sprocket shaft 31. A pilot member 36^a on the lower end of clutch shaft 36 extends in a suitable recess in the upper end of sprocket shaft 31 to maintain the two members in alignment. Means for operating the clutch shaft 36 comprises a forked member 38 mounted to slide horizontally above cover plate 26 and having a pair of cam surfaces 39, 39 which engage a suitable clutch ring 40 carried on the upper end of the shaft. The clutch shaft 36 is raised or lowered by moving the forked members toward or away from said clutch shaft. In Fig. 3 said clutch shaft is in lowered, or operative position, and in Fig. 4, is in raised, or inoperative position.

Having described my invention, what I claim as new and desire to cover by Letters Patent, is:—

1. In a mining machine, an elongated body portion having a cutting element extending laterally therefrom, a centrally disposed shoe extending longitudinally of the body portion and forming the base plate upon which the machine is supported, and means for tilting said shoe longitudinally with respect to the body portion, comprising a vertically-disposed spindle connected with said shoe, a gear carried by the machine frame and threaded on said spindle, and a shaft arranged transversely of the machine having operative connection with said gear.

2. A mining machine having a frame, a motor, a cutter arm extending laterally from said frame and pivotally supported between two frame sections readily detachable from each other by movement in a substantially horizontal plane, driving mechanism mounted on said frame, and a cutting device on said cutter arm including an operating member longitudinally movable into and out of operative connection with said driving mechanism during removal and replacement of said cutter arm.

Signed at Chicago, Illinois, this 1st day of August, 1921.

THOMAS E. PRAY.