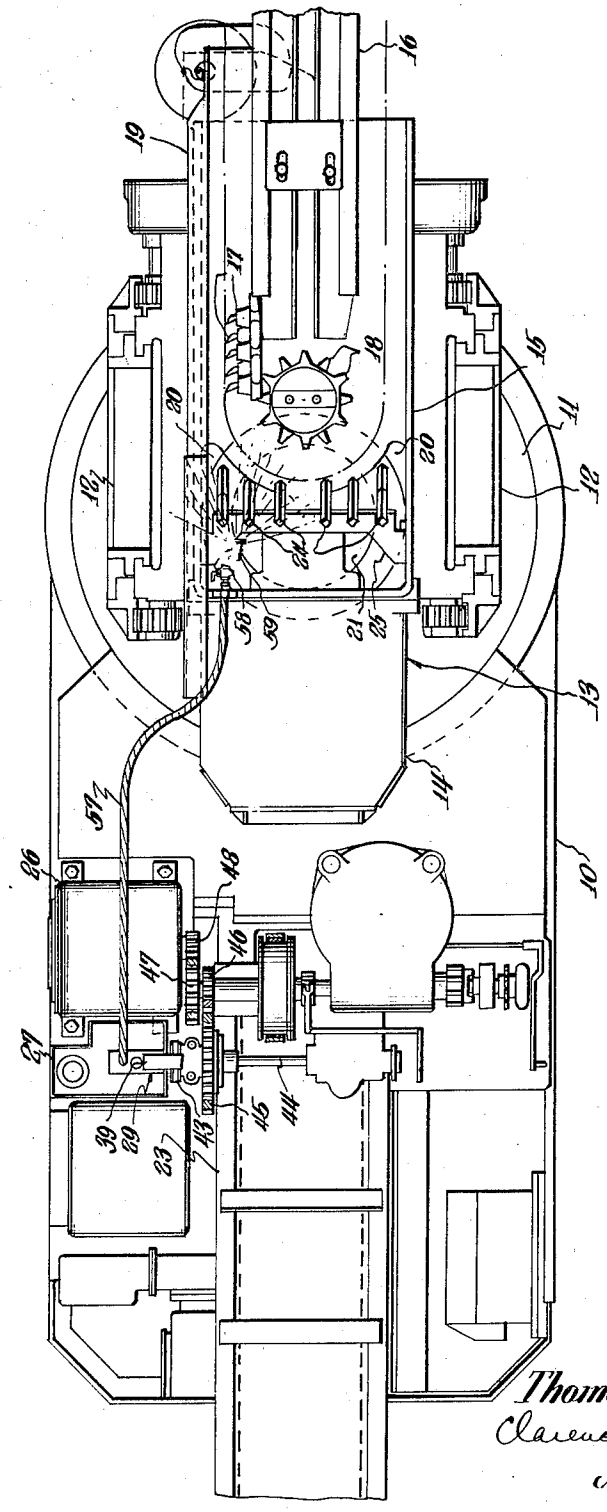
Feb. 16, 1937. T. E. PRAY 2,070,920

MINING MACHINE

Original Filed Sept. 14, 1933 2 Sheets-Sheet 1

Fig. 1



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Fig. 2

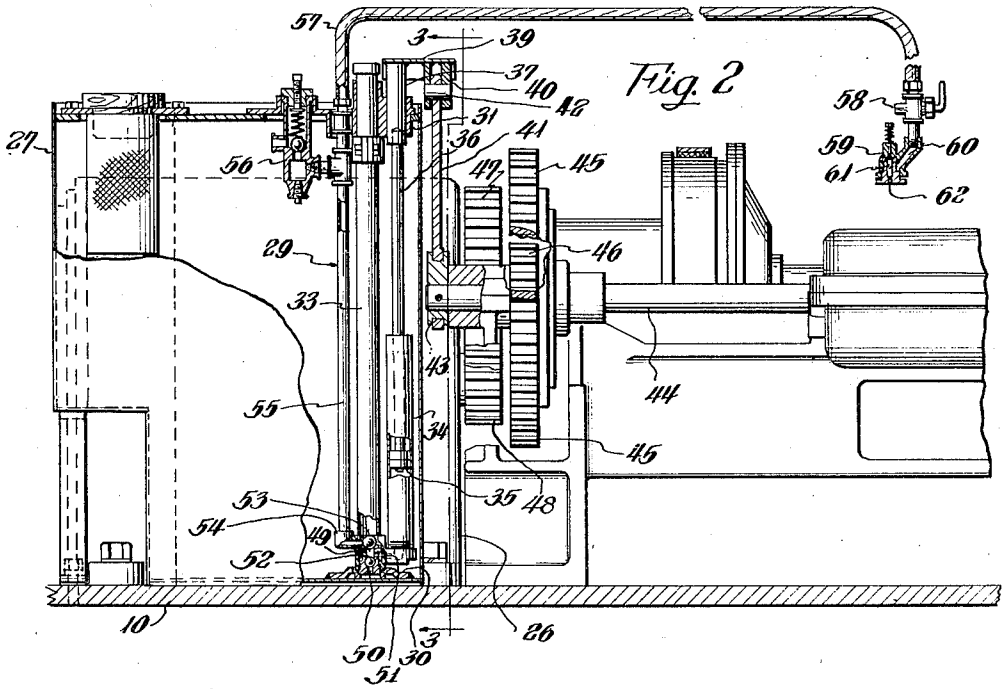
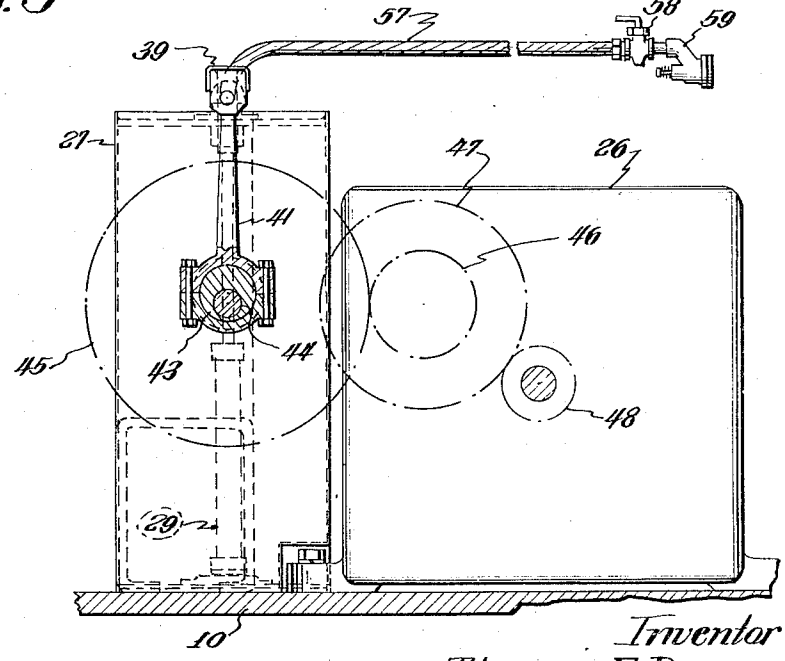


Fig. 3



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UNITED STATES PATENT OFFICE

2,070,920

MINING MACHINE

Thomas E. Pray, Chicago, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application September 14, 1933, Serial No. 689,385
Renewed October 10, 1935

14 Claims. (Cl. 262—28)

My invention relates to improvements in mining machines, and more particularly to track-mounted machines of the type adapted to cut above the mine bottom and collect the cuttings and discharge them at a point remote from the mining machine.

The principal objects of my invention are to provide a new and improved means for laying the dust raised by the cutter chain during the cutting operation, and increasing visibility during the cutting operation and minimizing the dangers of explosions.

Various means have been provided for laying the dust caused by the cutter chain cutting into and along the coal face, especially where a kerf is cut above the mine bottom. Among these means has been the provision of nozzles along the cutter bar for spraying the cutter chain when the cutter bar is sumped into the coal and cutting across the coal face. Such spraying means have taken various forms but have never been satisfactory for the reason that the larger cuttings and water drop to the bottom of the kerf and are expelled by the cutter chain in a mud like form, while the smaller cuttings and dust, not in the immediate vicinity of the spray, do not unite with the water but are expelled as dust. Moreover, such a means for laying the dust has never been practical, because the quantity of water required is so great that it is impractical for operation in mines, except where water is piped directly to the working place.

The device of my invention is so arranged as to eliminate these difficulties and provide a means for efficiently laying the dust, and is so arranged as to use a minimum amount of water so that a small tank on the mining machine proper may be sufficient for many cutting operations.

My invention may be more clearly understood with reference to the accompanying drawings, wherein:

Figure 1 is a top plan view of a mining machine illustrating one embodiment of my invention;

Figure 2 is a partial fragmentary vertical sectional view taken transversely of the machine looking toward the forward end thereof, and showing the details of the pumping mechanism; and

Figure 3 is a sectional view taken substantially along line 3—3 of Figure 2.

With reference now in particular to the drawings, the main elements of the embodiment of my invention illustrated are similar to those shown in a prior application, Serial No. 666,838, filed by me on April 19, 1933, and include a track-mounted truck 10 having a turntable 11 mounted thereon adjacent the forward end thereof, which turntable in turn is provided with a pair of parallel spaced upstanding guides 12, 12 adjacent opposite sides thereof for supporting a cutting element 13 for vertical adjustment with respect to said turntable.

The cutting element 13 includes a motor 14 and a frame section 15 disposed forwardly of said motor and having a pair of parallel spaced horizontally disposed cutter bars 16, 16 projecting forwardly therefrom. One cutter bar 16 is disposed above and in alignment with the other and each of said cutter bars has a cutter chain 17 movable thereabout, which cutter chains are driven from sprockets 18. The sprockets 18 are in turn driven from the motor 14, in a manner which need not herein be described in detail since it has been fully described in my aforementioned prior application and is no portion of my present invention.

A suitable cuttings collecting means is provided for yieldably engaging the face of the mine wall and cooperating with the cutter chains 17, 17 for collecting the cuttings so they may be discharged and loaded at a point remote from the truck 10, which is herein shown as being an extensible cuttings collecting chute 19 carried in the frame section 15 adjacent the advance side of the cutter bars 16 for slidable movement with respect to said cutter bars. The frame section 15 is provided with discharge openings 20, 20 rearwardly of the sprockets 18 on each side thereof for discharging the cuttings through a central discharge opening 21 formed in the turntable 11, on to a conveyor 23 extending longitudinally of the truck 10 beneath the discharge opening 21 and upwardly beyond the rearward end of said truck.

A suitable breaking means, cooperating with the cutter chains 17, 17, is provided for breaking up the large lumps of coal, or rock, cut out by said cutter chains which comprise a plurality of parallel spaced breaker bars 24, 24 extending across the discharge openings 20, 20 in the frame section 15 adjacent but rearwardly of the path of the cutter chains 17, 17. The breaker bars 24 are secured to a support member 25 extending across the frame section 15 above the discharge openings 20, 20 and are arranged in a plane perpendicular to the plane of the path of travel of the cutter chains 17, 17. The description and operation of the breaker bars 24 have been fully set forth in a prior application, Serial No. 689,386, filed by me on September 14,

1933, which matured into Patent No. 2,025,306 on December 24, 1935, so are only herein described insofar as is necessary to clearly set forth my present invention.

Referring now in particular to the details of the means for laying the dust during the cutting operation, and several of the novel features of my invention, a motor 26 is provided on the truck 10 rearwardly of the turntable 11 on the left hand side of the machine when looking toward the cutter bars 16, 16. A storage tank 27 is secured to the truck 10 rearwardly of the motor 26 and has a pump 29 carried therein.

The pump 29 is of an ordinary construction and includes a base 30 supported on the bottom of the storage tank 27. Said base has suitable openings formed therein, which openings form an inlet for said pump (see Fig. 2). A pressure chamber 33 extends upwardly from the base 30 adjacent the central portion thereof, and has its upper end extending above and carried by a support member 31 which is secured to the upper side of the tank 27. The pressure chamber 33 is of a usual type and serves as a means to equalize pressure in the pressure line, in a manner well known to those skilled in the art. A pressure cylinder 34 is disposed to one side of the pressure chamber 33 and extends upwardly from the base 30 in parallel relation with respect to said pressure chamber. A piston 35 is carried in the pressure cylinder 34 on the lower end of a piston rod 36.

The upper end of the piston rod 36 is secured to a plunger 37 slidably movable in the member 31. A member 39 is secured to the upper end of the plunger 37 and extends inwardly therefrom away from the storage tank 27 and has a depending forked inner end 40 to which is pivoted a connecting rod 41 on a pivotal pin 42. The opposite end of the connecting rod 41 is journaled on an eccentric 43 secured to the outer end of a shaft 44 extending transversely of the truck 10. The shaft 44 forms a drive means for the conveyor 23 and is driven from the motor 14 by means of a suitable gear train, which includes a spur gear 45, spur pinion 46, spur gear 47, and an armature pinion 48.

A chamber 49 is provided above the base 30 in alignment with the pressure chamber 33, but beneath said pressure chamber. Said chamber has an opening 50 communicating with the base 30 and the tank 27. Suitable openings 51, 51 are provided in the chamber 49 and communicate with the pressure cylinder 34. A ball 52 is provided in the lower portion of the chamber 49 for closing the opening 50. A ball 53 is provided to close the upper end of the chamber 49. A pipe 54 communicates with the pressure chamber 33 above the chamber 49 and leads to a vertical pipe 55 extending upwardly through the storage tank 27. A pressure responsive by-pass valve 56 communicates with the vertical pipe 55 and forms a means for releasing pressure from the pump 29, when the pressures therein become excessive.

On the intake stroke of the piston 35, the ball 52 is raised by suction to permit fluid to enter the chamber 49 through the opening 50 and enter the cylinder 34 through the openings 51, 51. Upon the pressure stroke of the piston 35, the ball 52 will close the opening 50 and the ball 53 will be unseated by the fluid under pressure which will open the chamber 49 and permit fluid under pressure to enter the pipe 54 and vertical pipe 55.

A suitable means is provided for conducting fluid under pressure from the pump 29, which means is herein preferably shown as being a flexible conductor 57 connected to the upper end of the pipe 55 and adapted to extend forwardly therefrom toward the cutter bars 16, 16. The flexible conductor 57 extends forwardly from the storage tank 27 to the rearward end of the frame section 15 and is secured thereto in a suitable manner at a position disposed adjacent the discharge opening 20 on the advance side of the cutter bars 16 adjacent the upper end thereof and rearwardly of the breaker bars 24, 24. A pet cock 58 is secured to the forward end of the flexible conductor 57 and an atomizing nozzle 59 is secured to the opposite end of said pet cock in a suitable manner. The atomizing nozzle 59 is of an ordinary construction and includes an inlet opening 60, needle valve 61, and outlet opening 62, and is so arranged as to atomize fluid under pressure to such an extent as to humidify the air in the path of the cutter chain 17 so said humidified air will combine with the coal dust.

As herein shown, the atomizing nozzle 59 is positioned at a point where the cutter chains 17, 17 discharge the cuttings through the discharge openings 20, 20 in the frame section 15, and said nozzle is so arranged as to humidify the air adjacent the discharge end of the cutter chains 17, 17 so that this humidified air will unite with the coal, or rock dust in such a manner that said dust will drop to the ground.

It may now be seen that a new and improved means, of a simplified construction, has been provided for laying the dust raised by the mining machine cutter chain during the cutting operation, which operates in an improved manner over dust laying devices heretofore employed and lays the dust by the combining of the humidified air therewith instead of by the attempted saturation of the cuttings in the kerf.

It may also be seen that with such an arrangement, a minimum amount of fluid is necessary and that, accordingly, the device is practical to be incorporated with and carried on a mining machine, and may be efficiently operated in places remote from a source of water supply.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction and arrangement of the parts may be altered without departing from the spirit and scope of my invention. I do not, therefore, wish to be understood as limiting myself to the specific construction illustrated herein, excepting as specifically limited in the appended claims.

I claim as my invention:

1. In a track-mounted mining machine, a truck having a turntable thereon, a cutting element on said turntable including a frame and a cutter bar having a cutter chain movable thereabout projecting forwardly therefrom, cuttings collecting means associated with said cutter bar, a discharge opening extending across said frame rearwardly of said cutter bar, and means disposed above said discharge opening for laying the dust during the cutting operation comprising means self-contained on said mining machine for humidifying the air in the path of and above said cutter chain.

2. A mining machine in accordance with claim 1 wherein the means for humidifying the air in the path of the cutter chain comprises a fluid pressure pump on said truck and an atomizing nozzle disposed above said discharge opening.

3. A mining machine in accordance with claim 1 wherein the means for humidifying the air in the path of the cutter chain comprises a fluid pressure pump on said truck and an atomizing nozzle disposed above the rearward side of said discharge opening and directed towards the forward end of said cutter bar.

4. In a track-mounted mining machine, a truck, a cutting element on said truck including a frame and a forwardly projecting cutter bar having a cutter chain movable thereabout, a discharge opening in said frame rearwardly of said cutter bar, means associated with said cutter bar and communicating with said discharge opening for discharging cuttings through the latter, means cooperating with said cutter bar and associated with said discharge opening for breaking up large lumps of material, and means disposed above said discharge opening and adjacent said breaking means for humidifying the air in the path of said cutter chain.

5. A mining machine in accordance with claim 4 wherein the means for humidifying the air in the path of the cutter chain comprises a fluid pressure pump and an atomizing nozzle directed toward said cutter bar and disposed above said breaking means.

6. A mining machine in accordance with claim 4 wherein the means for humidifying the air in the path of the cutter chain comprises a fluid pressure pump and an atomizing nozzle directed toward said cutter bar and disposed above and rearwardly of said breaking means.

7. In a track-mounted mining machine, a truck having a turntable thereon, a cutting element on said turntable including a frame and a cutter bar having a cutter chain movable thereabout projecting forwardly therefrom, a discharge opening in said frame rearwardly of said cutter bar, and means self-contained on said mining machine disposed above said discharge opening for laying the dust during the cutting operation comprising means for humidifying the air in the path of and above said cutter chain comprising an atomizing nozzle disposed adjacent the upper side of said discharge opening and a tank on said truck having a pump therein for supplying fluid under pressure to said atomizing nozzle.

8. In a track-mounted mining machine, a truck having a turntable thereon, a cutting element on said turntable including a frame carrying a pair of horizontally disposed cutter bars spaced in parallel relation with respect to each other in the same vertical plane, means associated with said cutter bars for collecting the cuttings discharged therefrom and means associated with said cuttings collecting means for laying the dust raised during cutting comprising means for humidifying the air at a point where the cuttings are discharged from said cuttings collecting means and rearwardly of and adjacent the top cutter bar.

9. A mining machine in accordance with claim 8 wherein the means for humidifying the air at the point where the cuttings are discharged by said cuttings collecting means comprises a fluid pressure pump on said truck and an atomizing nozzle disposed rearwardly of and adjacent the top cutter bar.

10. A mining machine in accordance with claim 8 wherein the means for humidifying the air at the point where the cuttings are discharged by said cuttings collecting means comprises a tank on said truck having a fluid pressure pump associated therewith and an atomizing nozzle connected with said pump and disposed rearwardly of and adjacent the top cutter bar.

11. In a mining machine, a track-mounted truck having a turntable thereon, a cutting element on said turntable including a frame and a pair of parallel disposed horizontal cutter bars having cutter chains movable thereabout, said cutter bars being so arranged that one cutter bar is above and in alignment with the other cutter bar, a discharge opening in said frame rearwardly of said cutter bars, means associated with said cutter bars and communicating with said discharge opening for discharging cuttings through the latter, means cooperating with said cutter chains and associated with said discharge opening for breaking up large lumps of material, and means disposed above said discharge opening and adjacent said breaking means for humidifying the air in the path of said cutter chains.

12. A mining machine in accordance with claim 11 wherein the means for humidifying the air in the path of the cutter chains comprises a fluid pressure pump on said truck and an atomizing nozzle directed towards the forward end of the machine and disposed adjacent the uppermost cutter bar.

13. In a mining machine, a track mounted truck having a turntable thereon, a cutting element on said turntable including a projecting cutter bar having a cutter chain movable thereabout, a conveyer extending along said truck for conveying the cuttings rearwardly therefrom, an opening in said turntable rearwardly of said cutter bar leading to said conveyer, cuttings collecting means associated with said cutter bar for conducting the cuttings to said opening to be discharged therethrough onto said conveyer, and means self-contained on said mining machine for laying the dust raised by said cutter chain comprising a tank on said truck having a pump associated therewith, a conductor leading from said pump to a point disposed adjacent but rearwardly of the rear end of said cutter chain, and an atomizing nozzle on the end of said conductor above said opening and cutter chain to humidify the air as the cuttings are discharged through said opening.

14. In a mining machine, a base, a frame mounted on said base, a cutter bar projecting from said frame and having a cutter chain movable thereabout, a cuttings discharge opening in said frame rearwardly of said cutter bar, and cuttings collecting means associated with said cutter bar for conducting the cuttings to said opening for discharge therethrough, and means supported by said base for laying the dust raised by said cutter chain comprising a fluid storage tank on said base, a power driven pump connected with said tank, and an atomizing nozzle connected with said pump and disposed rearwardly of but adjacent the rearward end to said cutter bar and above said discharge opening and directed towards the forward end of said cutter bar.

THOMAS E. PRAY.