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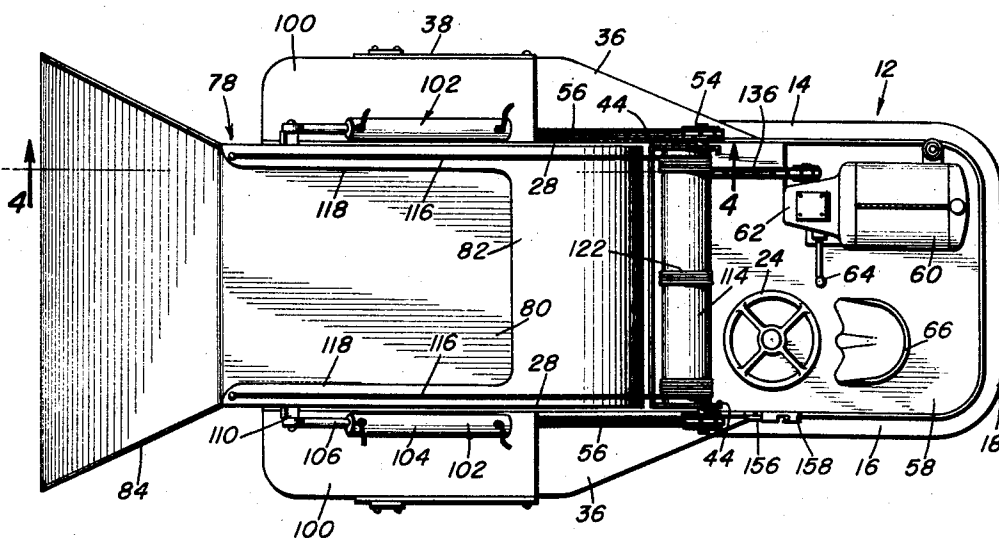
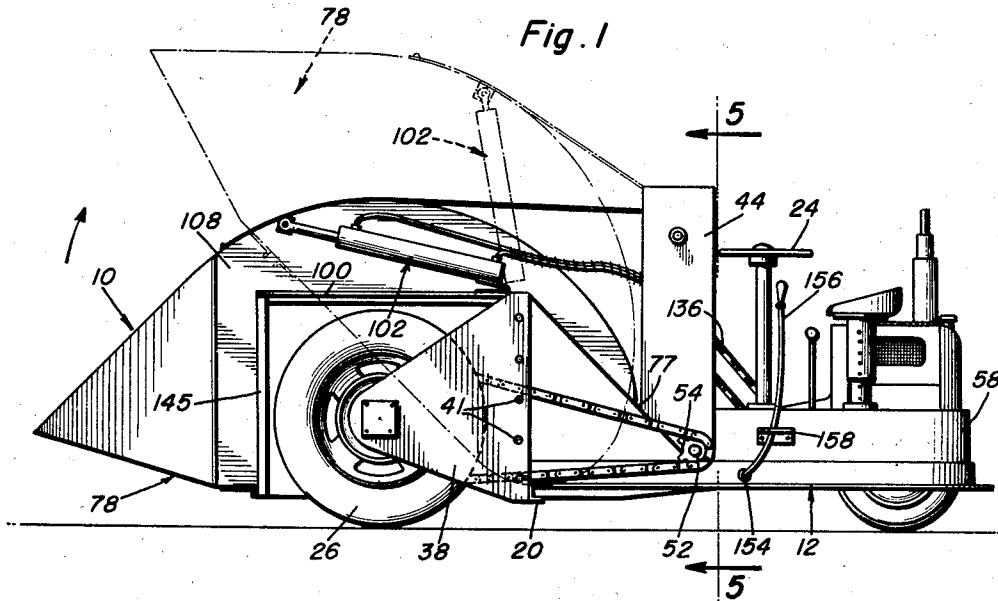
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2,907,125

MINING CAR WITH FRONT END LOADING

Filed Jan. 9, 1956

3 Sheets-Sheet 1



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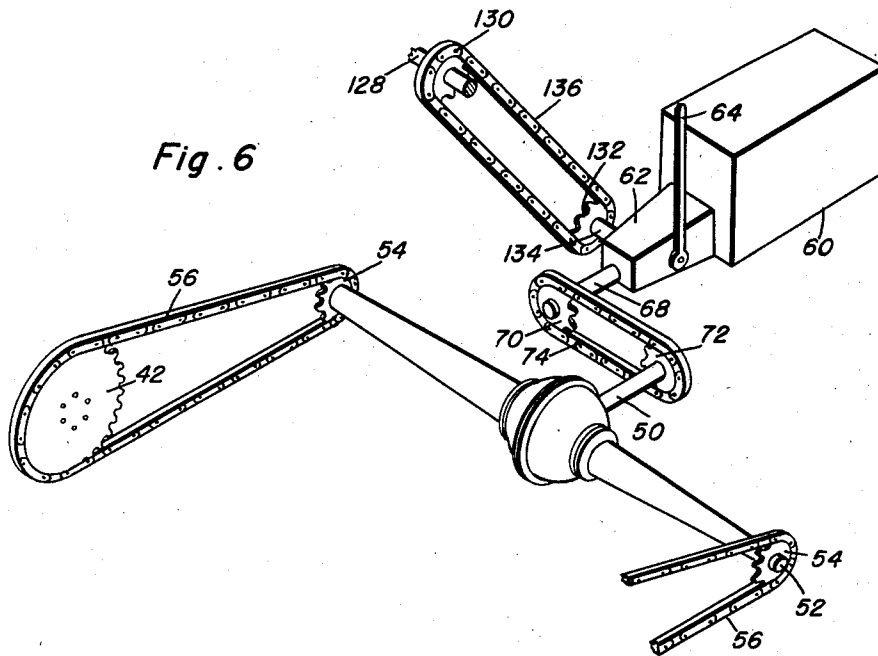
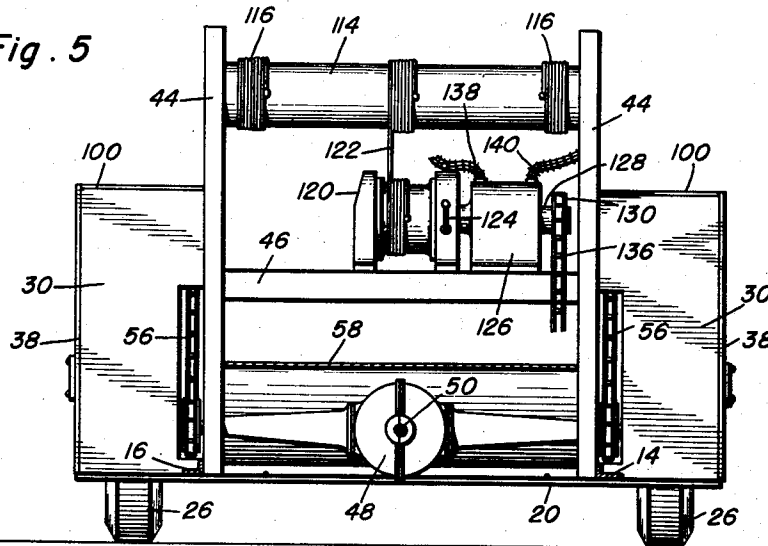


Fig. 5



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MINING CAR WITH FRONT END LOADING

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3 Claims. (Cl. 37—124)

This invention relates in general to new and useful improvements in mining equipment, and more specifically to an improved mining car with front end loading.

The primary object of this invention is to provide an improved mining car which is so constructed whereby it is of the front end loading type, the mining car being able to move into the area being mined and automatically load loose materials which have been broken from the formation.

Another object of this invention is to provide an improved mining car with front end loading, the mining car being of the type including a tricycle wheel assembly having front driving wheels, the mining car having a bucket disposed between the front driving wheels, the bucket being provided with a relatively wide scoop which extends in front of the driving wheels.

Still another object of this invention is to provide an improved mounting means for a bucket of a front end loading mining car, the mounting means being so constructed whereby the bucket is free to slide longitudinally of the mining car and at the same time is mounted for pivotal movement whereby the bucket may be effectively loaded and unloaded.

A further object of this invention is to provide an improved mining car with front end loading, the mining car being of the type which includes a bucket freely carried by a wheeled frame, there being provided suitable controls for positioning and tilting the bucket as necessary in the operation of the mining car.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view of the mining car showing the bucket in a normal carrying position, the bucket being shown in an elevated position by broken lines;

Figure 2 is a top plan view of the mining car of Figure 1 and shows further the details thereof;

Figure 3 is a bottom plan view of the mining car and shows both the arrangement of the wheels thereof and the means for resiliently restraining the bucket against longitudinal sliding movement with respect to the frame of the mining car;

Figure 4 is an enlarged fragmentary longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of Figure 2 and shows the specific details of the bucket and the manner in which it is mounted on the frame of the mining car, the bucket being shown in a lowered loading position by broken lines;

Figure 5 is an enlarged transverse vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of Figure 1 and shows the specific details of the drive for the mining car; and

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Figure 6 is an exploded diagrammatic perspective view of the drive train of the mining car.

Referring now to the drawings in detail, it will be seen that there is illustrated a mining car, which is the subject of this invention, the mining car being referred to in general by the reference numeral 10. The mining car 10 includes a frame which is referred to in general by the reference numeral 12. The frame 12 is primarily formed of a pair of frame rails 14 and 16 which are connected together at their rear ends by a rear transverse frame member 18. The forward portions of the frame rails 14 and 16 are also connected together by a suitable transverse frame member 20.

The rear of the frame 12 is supported by a rear steerable wheel 22 which is centrally located and which is steered by means of a steering wheel 24. The frame 12 is supported at the front portion thereof by suitable front drive wheels 26.

In order that the front drive wheels may be properly supported, the front portion of the frame 12 is provided with vertically extending side plates 28 which extend upwardly from the frame rails 14 and 16. The side plates 28 extend to the front of the frame 12 and terminate at their rear ends in outwardly directed flanges 30 which in turn terminate in forwardly directed flanges 32. The flanges 30 are connected together by the transverse frame member 20. The flanges 30 are braced by horizontal braces 36 which are secured to the frame rails 14 and 16, as is best illustrated in Figure 2.

Each of the drive wheels 26 is supported by means of a stub axle 40 welded to one of the side plates 28. The outer portion of each stub axle 40 is supported by a triangular plate 38 which is removably secured to its associated flange 32 by means of suitable fasteners 41. Carried by each plate 38 is a stub axle 40 on which there is mounted the respective one of the drive wheels 26. Connected to the drive wheel 26 for driving the same is a drive sprocket 42.

Extending upwardly from the frame rails 14 and 16 rearwardly of the center of the frame 12 is a pair of upright channel members 44 which are disposed in opposed relation, as is best illustrated in Figure 2. The channel members 44 are connected together intermediate their ends by a horizontally disposed channel member 46 which is downwardly opened, as is best illustrated in Figure 4.

Extending between and secured to the lower portions of the channel members 44 is a conventional type of automobile rear end assembly 48. The rear end assembly 48 includes an input shaft 50 and a pair of output shafts 52. Carried by each output shaft 52 exterior of its associated upright channel member 44 is a sprocket 54 which is aligned with a respective one of the sprockets 42. Entrained over the sprockets 42 and 54 and drivingly connecting the same together are drive chains 56.

Carried by the rear part of the frame 12 is a platform 58 which overlies the steerable wheel 22. Projecting upwardly through the right rear portion of the platform 58 and suitably mounted on the frame 12 is an internal combustion engine 60 which includes a transmission 62 provided with a control lever 64. The control lever 64 is mounted adjacent the steering wheel 24 and a suitable operator's seat 66 mounted on the platform 58.

Disposed beneath the platform 58 is a drive shaft 68 from the transmission 62. The drive shaft 68 is in parallel relation with respect to the input shaft 50 and is provided at the forward end thereof with a sprocket 70 which is aligned with a sprocket 72 on the input shaft 50. Entrained over the sprockets 70 and 72 and drivingly connecting the two together is a drive chain 74 whereby the wheels 26 are drivingly connected to the internal combustion engine 60.

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As is best illustrated in Figure 3, the side plates 28 have secured to the inner surfaces thereof inwardly opposed mounting plates 76 which terminate in rear upwardly curved portions 77. Resting upon the mounting plates 76 is a bucket which is referred to in general by the reference numeral 78. The bucket 78 includes a bottom wall 80, a continuously curved rear and partial top wall 82 and an open front including a relatively wide scoop 84, the scoop increasing in width towards the front of the bucket 78. The bucket 78 is seated between the side plates 28 and is guidingly engaged thereby. Further, the bucket 78 is separated from the remainder of the mining car 10 by a transverse plate 86 which extends between the forward portions of the upright channel members 44, as is viewed in Figure 4.

The rear portion of the bucket 78 is supported by a pair of transversely spaced, endless chain members 88. The chain members 88 pass over suitable rollers 90 and 92, the roller 90 being carried by an associated one of the plates 76 and the roller 92 being carried by a respective one of the frame rails 14 and 16. Each of the endless chains 88 is also carried by a sprocket 94 disposed generally vertically above its associated roller 92 and mounted on a shaft 94. The shaft 94 is vertically adjustably mounted on one of the upright channel members 44 and extends through a vertical slot 96 formed therein for purposes of adjustment. The plate 86 is provided with suitable openings 98 to permit the passage of the endless chain 88. It is to be noted that the endless chain 88 is sufficiently slack to conform to the contour of the rear portion of the bucket 78, as is best illustrated in Figure 4.

Secured to the upper edge of each of the plates 28 and reinforcing the plates 28 and the flanges 30 and 32 thereof is a cover plate 100 which also functions as a wheel guard for each of the drive wheels 26. Hinged mounted on the cover plate 100 and connected to the associate side plate 28 is an extensible fluid motor which is referred to in general by the reference numeral 102. The fluid motor 102 includes a cylinder 104 having mounted therein a piston (not shown) to which there is connected a piston rod 106. The forward end of each piston rod 106 is connected to a side 108 of the bucket 78 by means of a pivotal connection 110.

Extending between the upper portions of the upright channel members 44 is a shaft 112 carrying a suitable drum 114. Entrained over the outer portions of the drum 114 are cables 116 which extend over the narrow top wall portions 118 of the bucket 78 and are terminally secured to the forward portions thereof, as is best illustrated in Figure 2.

In order to rotate the drum 114, there is carried by the channel member 46 a suitable winch 120. The winch 120 has reeled thereon a cable 122 whose opposite end is reeled on the drum 114. The winch 120 is provided with a suitable control lever 124 to effect the selective operation thereof. The winch 120, of course, has a released position wherein the cable 122 is free to pay out.

Also mounted on the channel member 46 is a fluid motor 126. The fluid motor 126 is provided with a through drive shaft 128 which is connected to the winch 120 for operating the same. Mounted on one end of the drive shaft 128 remote from the winch 120 is a sprocket 130. The sprocket 130 is aligned with a sprocket 132 on a power take-off shaft 134 of the transmission 62. Entrained over the sprockets 130 and 132 and drivingly connecting the two together is a drive chain 136.

Connected to the fluid pump 126 are suitable fluid lines 138 and 140 which are connected to the fluid motors 102, there being provided suitable controls (not shown) adjacent the seat 66 for controlling the operation of the fluid motors 102.

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In order that the bucket 78 may be restrained against longitudinal sliding movement out of the forward end of the mining car 10, there is secured to the underside of the bottom wall 80 adjacent the forward end thereof a pair of longitudinally spaced transverse members 142 and 143. The transverse members 142 and 143 are disposed on opposite sides of a U-shaped front frame member 145 which connects together the forward ends of the side plates 28. Connected to the transverse member 143 are transversely spaced cables 144 which extend rearwardly from the transverse member 142 and have their rear ends connected to tension springs 146 by means of suitable fittings 148. The tension springs 146 are in turn anchored to the rear transverse frame member 18. It will be thus seen that the bucket 78 is normally resiliently restrained against forward movement, even when tilted to a position whereby the transverse members 142 and 143 move out of contact with said frame member 145.

In order that the bucket 78 may be locked against forward movement, each of the cables 144 is provided adjacent its fitting 148 with a stop collar 150. Selectively engaged with the stop collars 150 is a transverse lock member 152. The lock member 152 is carried by a control shaft 154 which extends between the frame rails 14 and 16 and is suitably journaled therein. The control shaft 154 has connected to an outer end thereof a control lever 156 which is positioned adjacent the operator's seat 66. A suitable guide 158 for the control lever 156 is carried by the platform 58, as is best illustrated in Figure 1.

In order to limit upward and rearward tilting of the bucket 78, the bottom wall 80 is provided with a stop 160. The stop 160 engages the transverse frame member 20 to limit movement of the bucket 78.

In the normal operation of the mining car 10, the mining car 10 is driven to the desired mine. When it is positioned in alignment with the loose material to be loaded in the bucket 78, the scoop 84 of the bucket 78 is lowered into engagement with the floor of the mine through the extension of the fluid cylinders 102 which results in the pivoting of the bucket 78 to the broken line position shown in Figure 4. The mining car 10 is then advanced into the material to be loaded which results in the material passing up over the scoop 84. After a certain amount of the material to be loaded has passed into the scoop 84, the winch 120 is actuated to reel in the cable 116 whereby the bucket 78 may be pivoted to the upright broken line position of Figure 1 thus forcing the materials initially loaded into the scoop 84 back into the rear portion of the bucket 78. This process is repeated until such time as the bucket 78 is fully loaded. The bucket 78 is then returned to its solid line position of Figure 4 and the cables 116 are located against movement thereby firmly anchoring the bucket 78 with respect to the frame 12.

After the bucket 78 has been properly loaded, the mining car 10 is then driven to the dumping point. When the mining car 10 reaches the dumping point, the bucket 78 is tilted forwardly utilizing the fluid cylinders 102 so that the materials carried by the bucket 78 will be dumped therefrom.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a mining car of a front end loading type having a wheeled frame with a front portion and a rear portion, a bucket carried by said front portion, said bucket having an open front end and a rear portion, mounting

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means carried with said frame supporting said bucket for raising and lowering movement, power means carried by said frame and connected to said bucket for selectively raising and lowering said bucket, the improvement comprising: said mounting means including a generally U-shaped support mounted on said frame for supporting said bucket, and means carried by said frame mounting endless support members in engagement with said bucket rear portion whereby said endless support members support said bucket when it is in the raised position, the power means including a pair of fluid motors carried by said mounting means for lowering said bucket to a lowered position and a reel drum having a cable wound thereon, one end of the cable being connected to a forward upper portion of said bucket for raising said front end upwardly.

2. In a mining car of a front end loading type having a wheeled frame with a front portion and a rear portion, a bucket carried by said front portion, said bucket having an open front end and a rear portion, mounting means carried with said frame supporting said bucket for raising and lowering movement, power means carried by said frame and connected to said bucket for selectively raising and lowering said bucket, the improvement comprising: said mounting means including a generally U-shaped support mounted on said frame for supporting said bucket, and means carried by said frame mounting endless support members in engagement with said bucket rear portion whereby said endless support members support said bucket when it is in the raised position, the power means including a pair of fluid motors carried by said mounting means for lowering said bucket to a lowered position and a reel drum having a cable wound thereon, one end of the cable being connected to a forward upper portion of said bucket for raising said front end upwardly, restraining means carried by said frame and connected to said bucket resiliently resisting forward movement of said bucket, and lock means selectively engaged with said restraining means to lock said restraining means in a positive bucket restraining position.

3. A mining car of the front end loading type having a wheeled frame with a front portion and a rear portion, a bucket carried by said front portion, said bucket having an open front end and a rear portion, mounting

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means carried by said frame supporting said bucket for raising and lowering movement, power means carried by said frame and connected to said bucket for selectively raising and lowering said bucket, the improvement comprising: said mounting means including a generally U-shaped support mounted on said frame for supporting said bucket, with the legs of the U facing vertically upward, said frame being supported by a pair of front drive wheels disposed on opposite sides of said bucket, a scoop extending in front of said drive wheels, said front end including a relatively wide scoop being at least as wide as the distance between the outer extremities of the drive wheels so as to clean a clear path for the drive wheels, said mounting means including side plates carried by said frame each intermediate one drive wheel and a wall of the bucket and cover plates overlying the side plates, means carried by said frame mounting endless support members in engagement with said bucket rear portion whereby said endless support members support said bucket when it is in the raised position, said power means including a pair of fluid motors carried by said side plates for lowering said front end downwardly to a bucket loading position, a reel drum having a cable wound thereon, one end of the cable being connected to a forward upper portion of said bucket for raising said front end upwardly, spaced transverse members mounted on the bottom of said bucket for selectively engaging with said U-shaped support when said bucket is in the lowered or rest position, and restraining means carried by said frame and connected to said bucket resiliently resisting forward movement of said bucket, and lock means selectively engaged with said restraining means to lock said restraining means in a positive bucket restraining position.

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