N. D. LEVIN.

MINING MACHINE TRUCK.

APPLICATION FILED NOV. 21, 1916.

1,392,835. Patented Oct. 4, 1921.

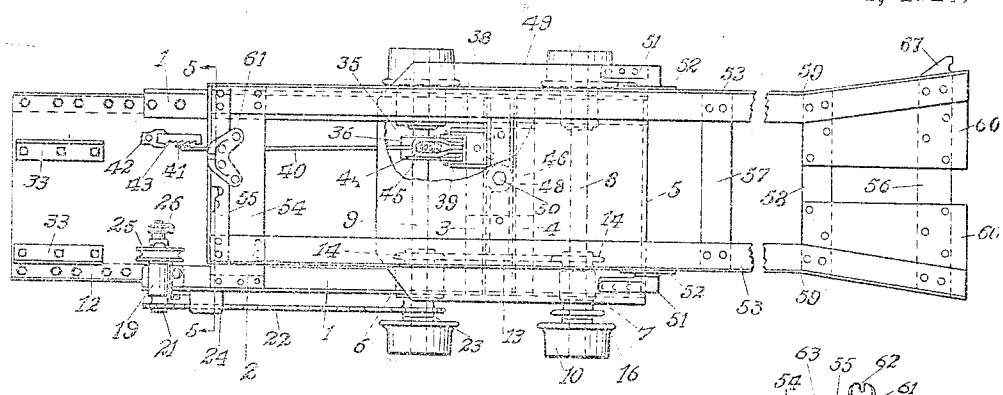


Fig. 1.

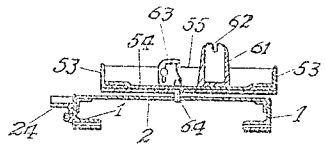


Fig. 5.

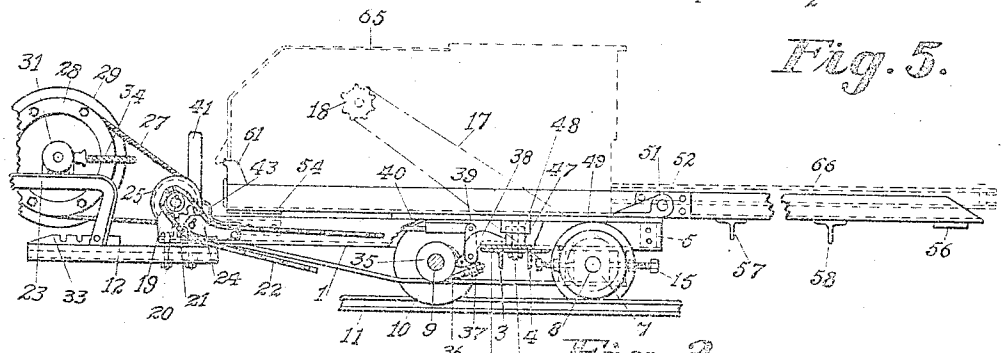


Fig. 2.

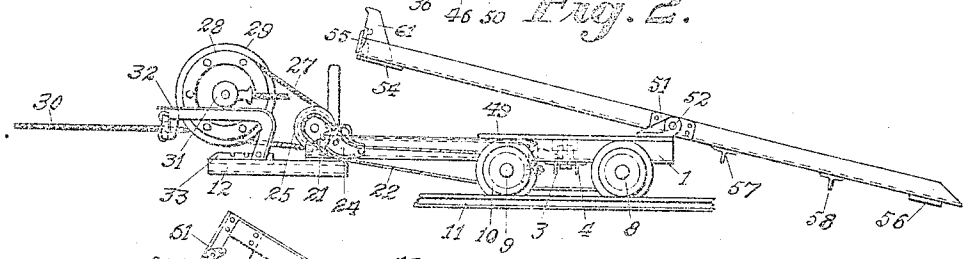


Fig. 3.

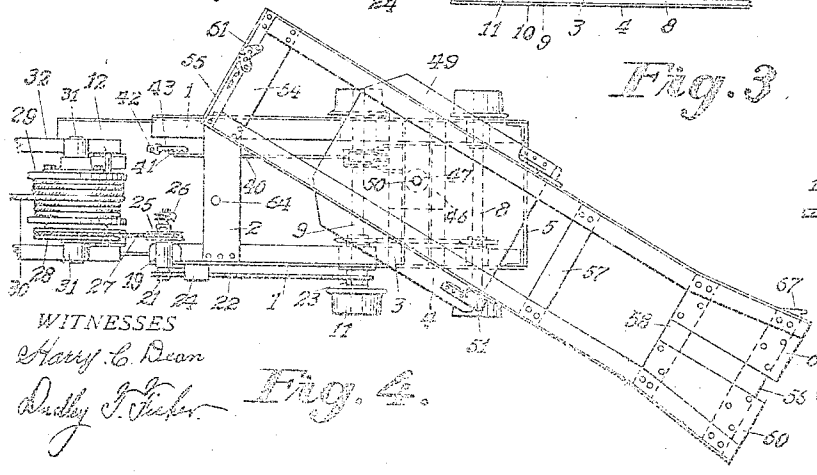


Fig. 4.

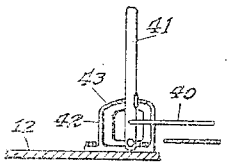


Fig. 6.

WITNESSES

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MINING-MACHINE TRUCK.

1,392,835. Specification of Letters Patent. Patented Oct. 4, 1921.

Application filed November 21, 1916. Serial No. 132,682.

To all whom it may concern:

Be it known that I, NILS D. LEVIN, a citizen of the United States, residing at Columbus, in the county of Franklin and the State of Ohio, have invented certain new and useful Improvements in Mining-Machine Trucks, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to improvements in truck mechanism for transporting a mining machine from place to place in a mine, and particularly to a transporting mechanism which is propelled along the tracks of the mine by power derived from the motor of the mining machine which is being carried by the truck.

My objects are to provide facilities upon the truck for loading and unloading the mining machine; to provide a truck having an electric cable reel with improved means for transmitting power from the motor of the mining machine upon the truck to the track wheels and to the cable reel; and to provide improved means to control the movements of the truck along the tracks of the mine. The foregoing objects, and others more or less ancillary to them, are attained in the structure set forth in the annexed specifications, references being had to the accompanying drawings of which—

Figure 1 is a plan view of the structure embodying my invention.

Fig. 2 is a side elevation of the truck shown in Fig. 1, and of the mining machine (shown in dotted lines) loaded thereon for transportation.

Fig. 3 is a side elevation of the truck showing the machine skid ways tilted to receive the mining machine.

Fig. 4 is a plan view of the truck showing the turn table rotated to the right, as having unloaded the mining machine in that direction.

Fig. 5 is a section taken along the line 5—5 of Fig. 1.

Fig. 6 is a fragmentary detail of certain of the brake operating devices.

Like numerals refer to similar parts in the several figures.

There are several types of mining machines in use for the undercutting of coal to facilitate its being broken down for removal from the mine. One of the most common in use at the present time comprises a base frame, adapted to slide over the floor of the mine, from the forward end of which projects a cutter arm having a cutter chain with renewable bits adapted to cut the coal. Such machines are usually provided with winding drums having ropes adapted to be anchored to suitable abutments, and in operation the machines are propelled and guided along the face of the coal by the winding in and paying out of the ropes. After the entire length of the working face has been undercut it is desirable that the machine shall be loaded upon a truck and transported to another working place where it shall be unloaded and put to work with as little delay as possible.

These mining machines are heavy and though narrow, are relatively elongated, being from ten to twelve feet in length. The cutting apparatus projects forward from six to eight feet, and in the rear thereof are the motor or engine, and the gearing and shafting by which the operative parts are driven.

In my present invention I have produced a truck having a main frame composed of two longitudinal angle bars 1 joined together by the cross members 2, 3, 4 and 5. To the longitudinal angle bars 1 are bolted the axle journal boxes 6 and 7 in which are journaled the axles 8 and 9. To these axles are attached the traction wheels 10 adapted to travel along the rails 11 of the tracks of the mine. Extending rearwardly from the truck frame is a platform 12 upon which the operator may ride when the machine is being transported from one working place to another. The axles 8 and 9 are coupled together by an endless chain 13 which engages the sprocket wheels 14 keyed to the axles. Provision is made for the proper tensioning of the chain 13 in the adjustability of the axle journal box 7 which is movable longitudinally of the truck frame under the control of the adjusting screws 15. A sprocket wheel 16 attached to the axle 8 is connectible through a suitable endless driving chain 17 with the sprocket wheel 18 of the mining machine when in position for traveling to supply power to propel the truck along the mine tracks. As the connection between the sprocket wheel 18, and the motor of the mining machine is fully described in my co-

pending application, Serial No. 132,681, filed Nov. 21, 1916, it is not thought to be necessary to further describe it at this time.

Attached to the longitudinal angles 1 of the truck frame is a journal bearing 19 in which is journaled a short transverse shaft 20 having at its outer end a sprocket wheel 21 connected through an endless chain 22 with the sprocket wheel 23 fixed to the axle 9. This chain is arranged to slidably engage the flanges of a guide casting 24 which is adjustably attached to the truck frame to afford means for adjusting the tension of the chain 22. This adjusting member 24 serves the secondary purpose of deflecting the chain 22 to allow free movement of the rotatable part of the truck as will presently appear. Mounted upon the inner end of the shaft 20 is a sheave pulley 25 which is connectible to the said shaft by a jaw clutch member 26 in a manner common with such clutches. The sheave pulley 25 is connected by an endless rope belt 27 to drive the sheave 28 attached to the side of the removable reel 29. The cable reel is adapted to wind the conductor cable 30 through which electric currents may be supplied from the wiring system of the mines to actuate the motor of the mining machine. The cable reel 29 is mounted upon spindles which are journaled in the bearing boxes 31 carried by the U-shaped frame 32 the lower ends of which bear in notches of the angle bars 33 secured to the platform 12 of the truck. The center of gravity of the reel 29 is disposed to one side of the pivotal support of the frame 32 so that a part of the weight of the cable reel 29 is carried by the rope 27 and a sufficient tension is maintained therein to properly drive the reel to wind the cable 30. A plurality of notches are provided in the angle irons 33 to allow a measure of adjustment of such tension. One of the boxes 31 has within it the mechanism for gathering the positive current from the positive conductor of the cable 29, and the other box is similarly adapted to collect current from the negative conductor of the cable 29. 34 is a flexible cable having suitable conductors to lead respectively from the terminals of the two boxes 31 to the corresponding terminals of the mining machine motor.

Mounted upon the axle 9 is a brake drum 35 adapted to be gripped by the brake band 36 to retard the rotation of the axle and thereby retard the movement of the truck. The ends of the brake bands 36 are connected to the toggle lever 37 supported in the bracket 38 attached to the cross angle bar 3 of the truck frame. The upstanding arm 39 of the toggle lever is connected through the brake rod 40 with the hand lever 41 at the rear end of the truck convenient to the hand of the operator to apply the brake to check the movement of the truck. The hand lever is pivotally supported in the support casting 42 upon which is formed a notched arc 43 having notches adapted to engage the edge of the lever 41 to maintain tension upon the brake. Interposed between the arm 39 and the brake rod 40 is a clevis 44 having a compression spring 45 which contributes the degree of elasticity to the system necessary to the successful operation of the brake.

Attached to the cross members 3 and 4 of the truck frame is a plate 46 from which rises the pivot post 47. Rotatably mounted upon the pivot post is a center bearing 48 attached to the under side of the plate 49, forming a broad turn table which extends beyond and bears upon the edges of the upstanding flanges of the longitudinal angle bars 1. A bolt 50 passes through the plate 49, the center bearing 48 and the pivot post 47 to prevent the accidental disarrangement of these parts. Secured to the plate 49 at its forward corners are two trunnion bearings 51 in which are journaled the trunnions 52 attached to the side angles 53 of the skid frame upon which the mining machine rides. The skid angles 53 are joined together at their rearward ends by a cross plate 54 along the edge of which is secured the stiffening angle 55, and at their forward ends by the cross plates 56 while two intermediate T bars 57 and 58 give additional rigidity to the structure. At 59, near their forward ends, the skid angles 53 are bent to flare outward forming a wide mouth to the frame to facilitate the entrance of the machine when loading. Plates 60 attached to the cross members 56 and 58 afford a bottom over which the machine may slide. An upstanding bracket 61 having a notch 62 adapted to engage the handling rope of the mining machine to pull said machine onto the truck, is secured to the rear cross plate 54, and a latch member 63 attached to the stiffening angle 55 is adapted to engage the aperture 64 of the plate 2 of the truck frame to prevent rotation of the turn table.

The operation of the truck is as follows: The truck, with the mining machine 65 loaded upon it, advances along the tracks of the mine and enters the room with the cutter arm 66 of the mining machine in advance. When it has arrived at the working place, the brake lever 41 is manipulated to set the brake to prevent the movement of the truck along the rails. The driving chain 17 is removed from the sprocket wheels 16 and 18, the latch 63 disengaged and the turn table rotated so that the cutter arm 66 will extend toward the point at which the cutting is to begin. The feed rope of the mining machine is then attached to the lug 67. formed of the projected end of the cross

plate 56, and wound up to draw the mining machine forward along the skids 53. As the center of gravity of the mining machine passes forward of the trunnions 52 the skids 53 will tip to contact with the floor of the mine, when the mining machine may be readily slid from the truck.

After the completion of the cut the turn table is rotated to bring the skid frame in line with the mining machine and the handling rope of the mining machine is engaged in the notch 62 of the bracket 61. The rope is then wound to draw the machine to and upon the skids 53. As the center of gravity of the mining machine passes to the rear of the trunnions 52, the skids 53 resume the horizontal position, the turn table is then rotated to the central position and the latch engaged. As the machine moves rearwardly upon the skids 53 the chain 17 is replaced upon the sprocket wheels 16 and 18 and as soon as the mining machine is in place the truck is ready to travel.

The body frame in my construction is approximately of the length of the mining machine. It tilts from end to end, that is to say, that part of the body frame which lies under the mining machine, when the latter is in its rearmost position, tilts with the machine, all the parts of the body being rigidly secured together. The devices for fastening the cable or equivalent by which the machine is drawn up on to the body frame are carried by the latter, so that they are ready for use even when the body is turned to an angular position in relation to the truck frame.

It will be seen that the truck mechanism, as an entirety, can be regarded as comprising a rear section which includes a lower element (namely, the base frame on the axles and wheels) and an upper horizontally rotary element, together with a second section hinged to the rotary element and adapted to be inclined relatively to the truck. The rotary part of the mechanism, as above described, is provided with two power transmitting elements or abutments alternately co-acting with the power device of the mining machine, one for pulling the machine forward and the other for pulling it backward to its transportation position. And all of these power devices for moving the machine are on the horizontally rotary element of the mechanism so that the machine can pull itself in either direction independently of the power parts on the base frame, no matter what the angle of the body frame to the lines of the track.

What I claim is:

1. In a truck for holding and transporting an elongated mining machine of the class described, the combination with a wheel supported truck frame, of a body frame hinged to said truck frame and having longitudinally arranged guiding members adapted to engage said mining machine to guide it into traveling position upon said truck, and to prevent its lateral displacement therefrom, said body frame wholly underlying said machine while in said position and arranged to tilt with said mining machine when its center of gravity passes said hinge.

2. In a truck for holding and transporting an elongated mining machine of the class described, the combination with a wheel supported truck frame, of a body frame hinged to said truck frame and having continuous longitudinal guides arranged to engage said mining machine to guide it into traveling position upon said truck, said body frame wholly underlying said machine when in said position and being arranged to tilt with said mining machine when its center of gravity passes said hinge.

3. In a truck for holding and transporting an elongated mining machine of the class described, the combination of a wheeled truck frame, a relatively elongated vertically tilting and horizontally rotatable body frame of approximately the length of the mining machine and rigid from end to end, said body frame being provided with devices for longitudinally guiding a mining machine while it is sliding endwise thereon.

4. In a truck for holding and transporting an elongated mining machine of the class described, the combination of a wheel supported truck frame, a horizontally swinging turntable upon the frame, and a relatively elongated body frame horizontally hinged to the turn table and provided with longitudinally arranged devices for retaining a mining machine in proper relative position while it is sliding endwise relatively to the body frame.

5. In a truck for holding and transporting an elongated mining machine of the class described, the combination of a wheel supported truck frame, the horizontally rotating turn table upon the frame, a relatively elongated body frame provided with devices for guiding and retaining a mining machine in place while it is sliding endwise along said body frame, the latter being horizontally hinged to the turn table, and means for locking the body frame against movement relative to the truck frame.

6. In a truck for holding and transporting an elongated mining machine of the class described, the combination with a wheel supported truck frame, of an elongated horizontally rotatable body frame provided with guiding and retaining devices adapted to positively engage with a mining machine and hold it in predetermined positions while it is sliding endwise on to or from said body frame, and hinging devices interposed between the body frame and the truck frame.

adapted to permit the body frame to tilt from end to end with the mining machine when the latter is in its rearmost position on the body frame, and when the body frame is in an angular position relative to the truck frame.

7. In a truck of the class described, the combination of a truck body mounted upon wheel supported axles and adapted to receive a mining machine and support it for transportation, a conductor cable through which electric current may be supplied to the motor of the mining machine upon the truck, a cable reel adapted to wind the cable, means to transmit power from the motor of the mining machine to the axles to propel the truck, and means to rotatively connect the axles with the cable reel to actuate it.

8. In a truck of the class described, the combination of a substantially horizontal frame mounted upon the wheel supported axles, a body hinged to the frame adapted to be tilted to receive a mining machine and to support said machine for transportation, means to transmit power from the motor of the mining machine upon the truck to the axles to propel the truck, a conductor cable through which electric current may be supplied to the motor of the mining machine upon the truck, a cable reel adapted to wind the cable and means to rotatively connect the axles with the cable reel to actuate it.

9. In a truck of the class described, the combination of a substantially horizontal frame mounted upon wheel supported axles, a body pivotally mounted for horizontal rotation upon the frame and adapted when in any angular relation therewith to be tilted to receive a mining machine, means to transmit power from the motor of the mining machine when in position for traveling to the axles of the truck, a conductor cable through which electric current may be supplied to the motor of the mining machine upon the truck, a cable reel adapted to wind the cable and means to rotatively connect the axles with the cable reel to actuate it.

10. In a truck for holding and transporting an elongated mining machine of the class described, the combination of the wheeled truck frame, the elongated body frame arranged to be tilted to or from a horizontal position, and when in horizontal planes above the wheeled truck to be rotated horizontally, said body frame being elongated to be of a length approximately equal to that of a mining machine, and means at the rear end of the tilting body frame for attaching a draft device to draw the mining machine upon it.

11. In an apparatus of the class described, the combination of a truck frame mounted upon supporting wheels adapted to travel along the tracks of a mine, a tilting body frame hinged to said truck frame and adapted to receive and support a mining machine, means to transmit power from the motor of the mining machine upon the tilting body frame to the axles of said wheels to propel the truck, and means upon the truck to control its movement along said track.

12. In an apparatus of the class described, the combination of the wheeled truck frame, the body frame above the truck frame and mounted thereon to rotate horizontally and to tilt vertically, means on the body frame for drawing the mining machine thereon while in any of several positions angular to the position of the truck frame, and means on the truck frame for securing it against movement.

13. In a truck for holding and transporting an elongated mining machine of the class described, the combination with a wheel supported truck frame, of a horizontally rotatable support pivoted to said truck frame, a body frame attached to said support by a horizontal hinge and having continuous longitudinal guides arranged to engage said mining machine and guide it to its normal traveling position upon the truck, and means to lock all three elements in traveling position.

14. In a truck for holding and transporting an elongated mining machine of the class described, the combination with a wheel supported truck frame, of a horizontally rotatable support pivoted to said truck frame, a body frame attached to said support by a horizontal hinge and having continuous longitudinal guides arranged to engage said mining machine to guide it to its normal position upon the truck said body frame being arranged to tilt with said mining machine when its center of gravity passes said hinge.

15. In a mining machine truck mechanism, the combination with the truck wheels, the base frame mounted thereon, and power transmitting devices mounted on said frame for rotating the truck wheels, of a body frame adapted to tilt vertically at its rear end and receive, and hold in transportation position thereon, an elongated longitudinally moving mining machine, said tilting frame being provided with power transmitting means adapted to co-act with power means on the mining machine for longitudinally moving said machine along the tilting frame, independently of the base frame, when the tilting frame is in any of several positions relatively to the base frame.

16. In a truck for holding and transporting an elongated mining machine, the combination with a rigid truck frame supported on wheels adapted to travel over the mine tracks, of a supplemental elongated tiltable body frame with which the mining machine has lateral engagement and which is adapt-

ed to support said machine in traveling position upon the truck or to guide it to or from positions on the mine floor at either side of said tracks.

17. In a truck for holding and transporting a mining machine of the class described, the combination with a rigid truck frame supported upon wheels adapted to travel over the mine tracks, of a supplemental elongated body frame adapted to support said mining machine in traveling position upon said truck, to be tilted to guide said machine to or from the mine floor, and to be horizontally rotated to deliver said mining machine to any preferred position relative to the longitudinal lines of the tracks.

18. In a truck mechanism of the class described, the combination of the rear section, the second section hinged thereto, the holder at the forward end of the second section for separably connecting a flexible draft device, and a supplemental holder on the rear section for separably connecting said draft device thereto.

19. In a truck mechanism of the class described, the combination of the first section having a wheeled support and an element rotatable horizontally on said support, and the second section hinged to the first section and adapted to be positioned at an inclination in relation thereto, and to have its front end bear against the floor, while the load is being moved over said end and means for locking the wheeled support against longitudinal movement.

20. In a truck mechanism of the class described, the combination of the first section having a horizontally rotating element, and the second section connected to the said element and adapted to swing downward to have its front end bear upon the floor when said section is in any of its angular positions and support one end of the load while the other end is being supported on the ground.

21. In a truck mechanism of the class described, the combination of the first section having a lower wheeled element, power transmitting devices thereon for propelling said element, and having an upper element rotatable horizontally relatively to the lower element, and a second section connected, and vertically adjustable in relation, to the said first section.

In testimony whereof I affix my signature, in the presence of two witnesses.

NILS D. LEVIN.

Witnesses:
DUDLEY T. FISHER,
HARRY C. DEAN.