Feb. 14, 1939. D. E. HASKE 2,147,093

LOADING MACHINE

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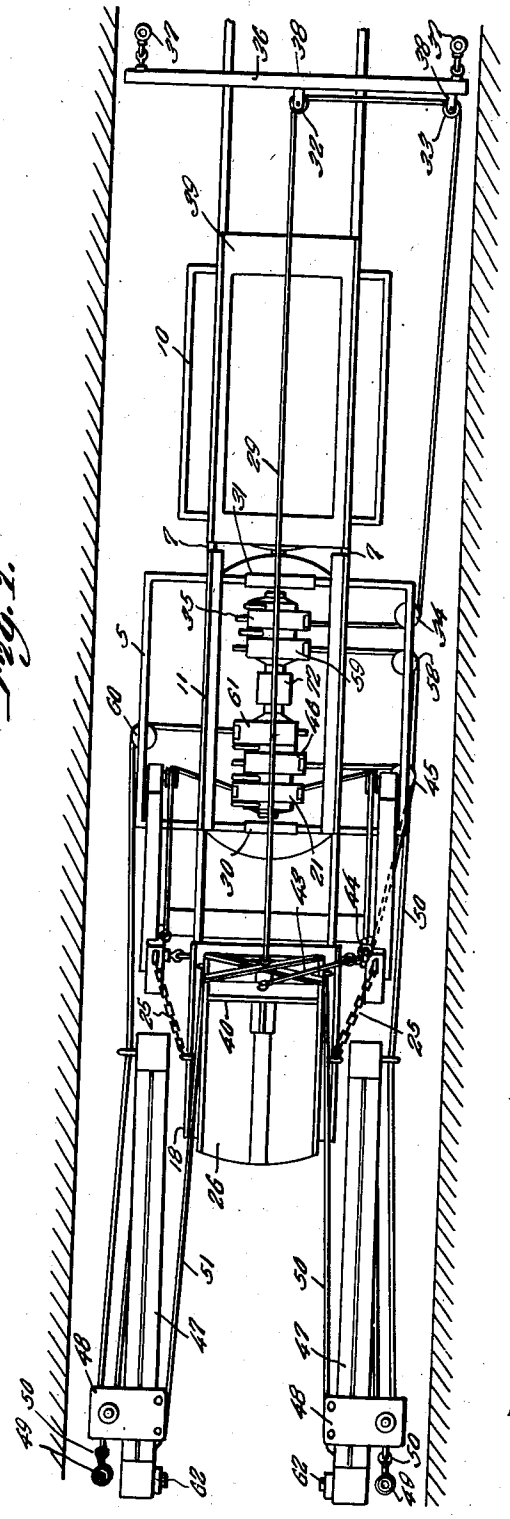


Fig. 1.

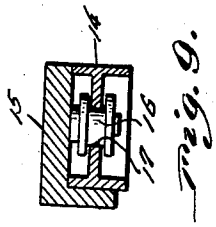


Fig. 9.

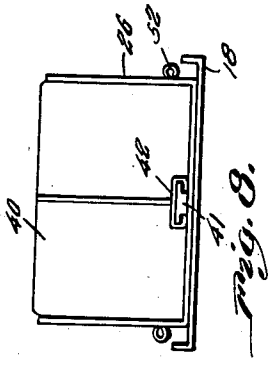


Fig. 8.

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Fig. 2.

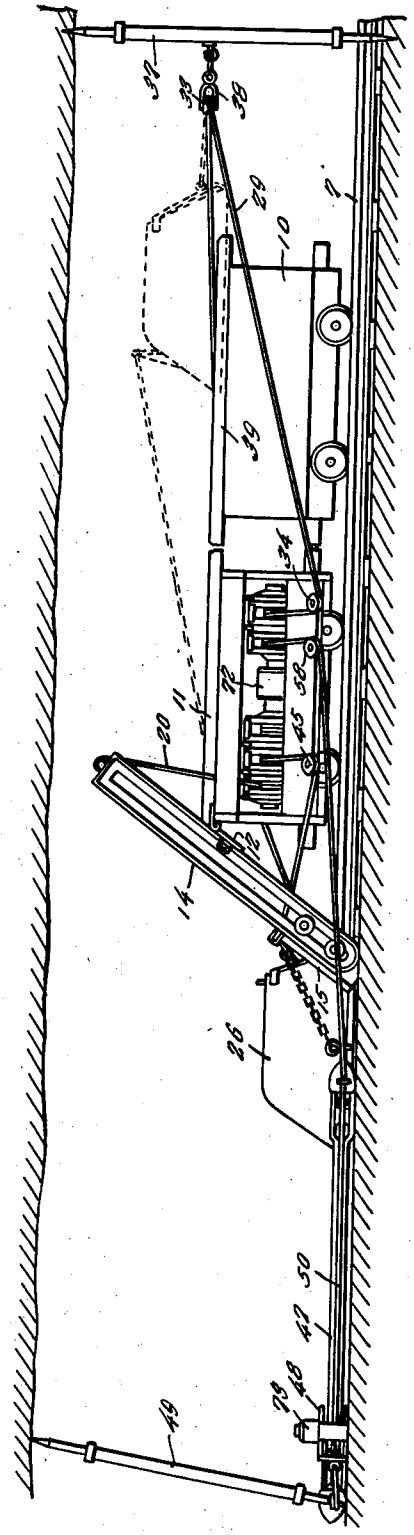
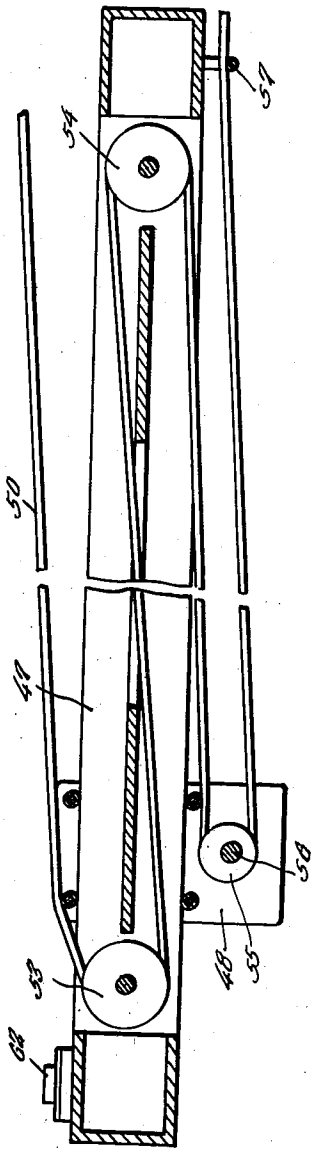


Fig. 3.



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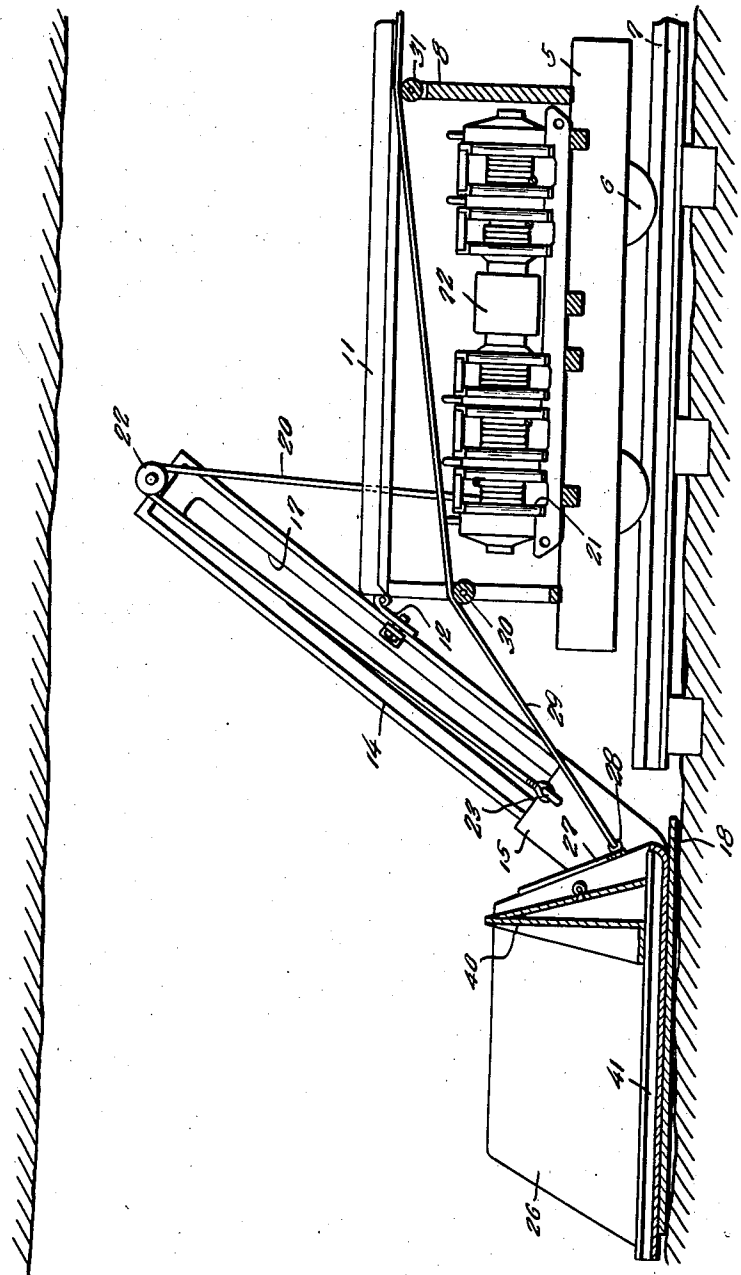
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LOADING MACHINE

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Fig. 5.



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Fig. 10.

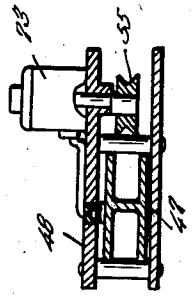


Fig. 11.

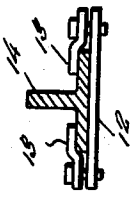
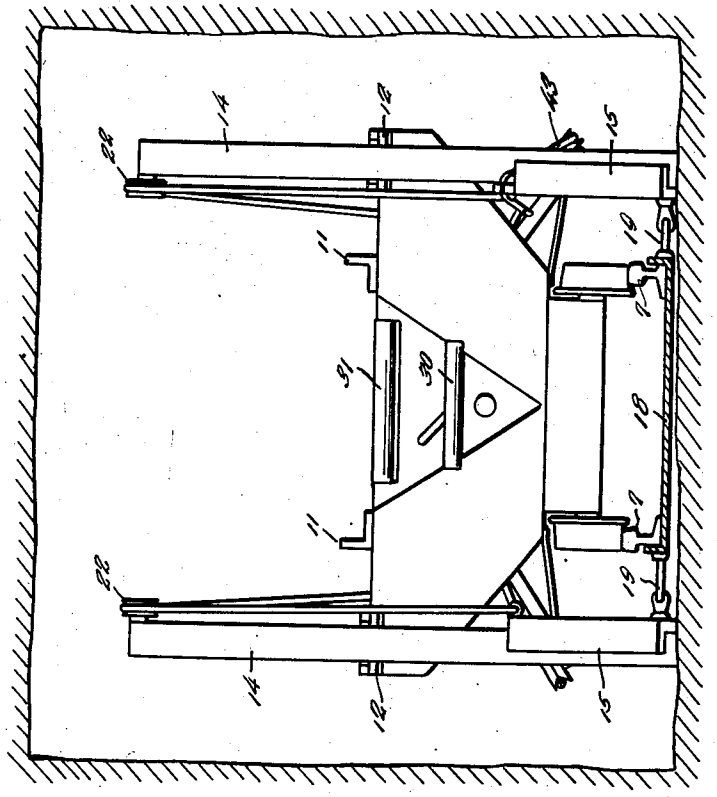


Fig. 9.



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Fig. 6.

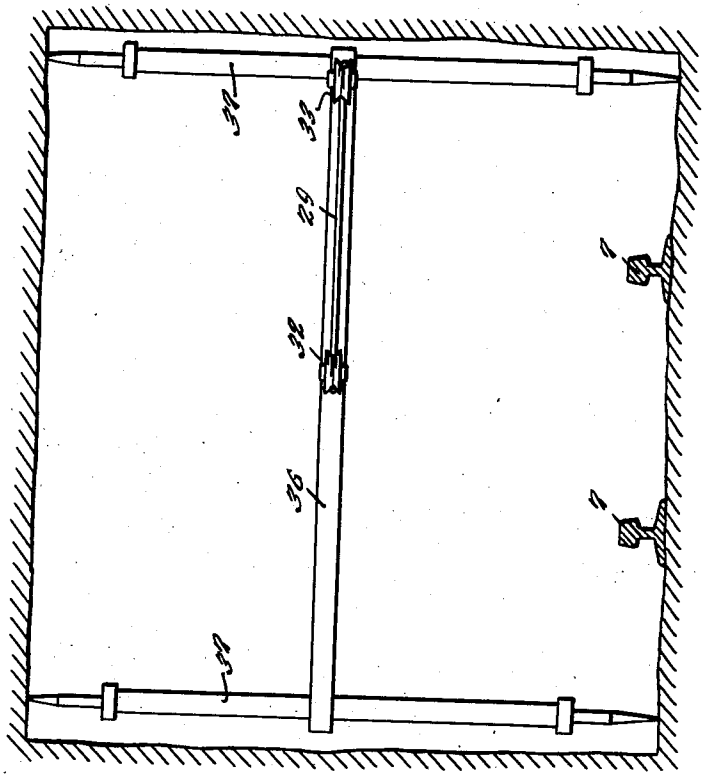


Fig. 5.

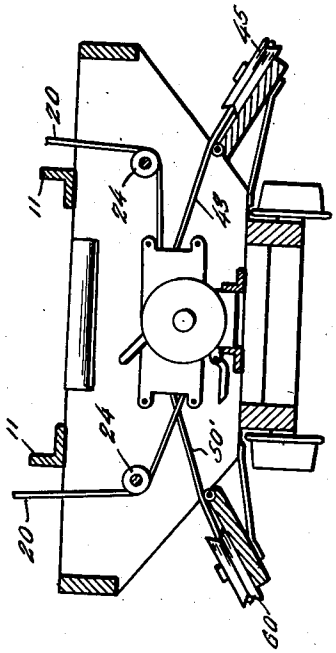
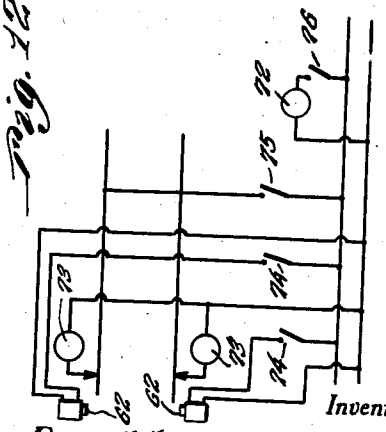


Fig. 12.



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LOADING MACHINE

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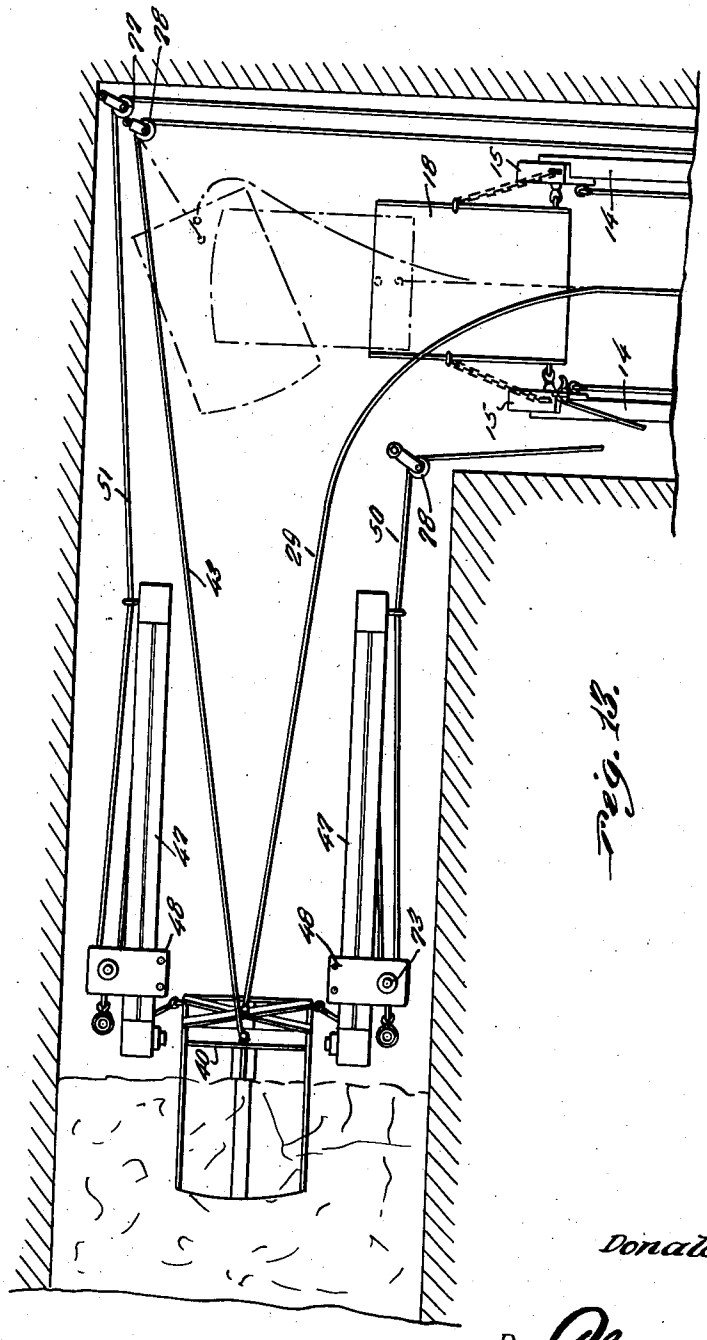


Fig. 6.

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UNITED STATES PATENT OFFICE

2,147,093

LOADING MACHINE

Donald E. Haske, Mount Harris, Colo.

Application February 4, 1938, Serial No. 188,779

7 Claims. (Cl. 214—110)

This invention relates to loading machines and more particularly to machines for loading coal into mine cars within the mine.

An object of the present invention is to provide a loading machine which will facilitate to a great degree the loading of coal into mine cars and which embodies an improved shovel construction, means for feeding the shovel, elevating the shovel, and retracting the shovel, together with means for guiding the shovel to a position to discharge the load thereof into the car being loaded as well as improved means for discharging the contents of the shovel therefrom; and the invention together with its objects and advantages will be best understood from a study of the following description taken in connection with the accompanying drawings wherein:—

Figure 1 is a top plan view showing the loading machine and with the shovel retracted and in a lowered position,

Figure 2 is a side elevational view of the machine,

Figure 3 is an enlarged detail view partly in section and partly in elevation showing the shovel and elevator means therefor as well as the power device,

Figure 4 is a view showing in front elevation the shovel elevator with certain parts shown in section,

Figure 5 is a transverse sectional view through the power device,

Figure 6 is a detail view illustrating a pulley mounting hereinafter more fully referred to,

Figure 7 is a detail view partly in section and partly in elevation of a shovel feeding slide and associated cable and pulley assembly,

Figure 8 is an end elevational view of the shovel,

Figures 9, 10 and 11 are detail sectional views illustrating certain details of construction hereinafter more fully referred to,

Figure 12 is a wiring diagram, and

Figure 13 is a plan view illustrating the manner of using the device when loading coal at a corner of the tunnel.

Referring to the drawings by reference numerals it will be seen that in accordance with the present invention there is provided a carriage **5** suitably equipped with wheels **6** to ride on the usual mine track rails **7**. Mounted on the carriage **5** is a super-structure **8** which supports a pair of opposed parallel angle iron rails **11**.

Hinged to the forward end of the rails **11** are plates **12** equipped, as shown in Figure 11, with clamps **13** for securing thereto at the desired position of adjustment substantially I-beam-elevator rails **14**.

Movable along the elevator rails **14** are elevator blocks **15** equipped with rollers **16**, as shown in Figure 9, and which rollers operate in slots **17** provided therefor in the rails **14** whereby to guide the blocks **15** in their movement lengthwise of the rails **14** and also to retain the blocks **15** in sliding engagement with the rails **14**.

Carried by the elevator slide blocks **15** is an elevator platform **18** that adjacent one end thereof is swivelly connected with the blocks **15** as at **19**. (See Figure 4.)

Manifestly the blocks **15** will move downwardly along the rails **14** by gravity and under their own weight. For moving the blocks **15** upwardly on the rails **14** there is provided a cable **20** an intermediate portion of which is suitably windable on a drum **21** mounted on the truck **5** and opposite end portions of which are suitably journaled over suitably positioned sheaths or pulleys **22** provided at the upper ends of the elevator rails **14** and at their terminals are secured to the blocks **15** as at **23**. The ends of the cables are also journaled over suitable pulleys **24** suitably provided therefor as suggested in Figure 5. It will thus be seen that when the cable **20** is caused to wind on the drum **21** blocks **15** will move upwardly on the rails **14** carrying with them the elevator **18** and the shovel hereinafter more fully mentioned, resting on the elevator platform **18**. Also, and as best shown in Figure 1, the elevator platform **18** is retained in a substantially horizontal position at all times through the medium of flexible elements **25** secured at one end to the blocks **15** and at a relatively opposite end to the sides of the platform **18** intermediate the front and rear ends of the platform.

The shovel is indicated by the reference numeral **26** and at its rear end is provided with crossed bars **27** to which is secured as at **28** one end of a cable **29**.

Cable **29** is trained over rollers **30, 31** provided on the super-structure **8** of the truck **5**, and is also trained over pulleys **32, 33**, hereinafter more fully referred to, as well as over a pulley **34** suitably mounted at one side of the truck **5**; the cable **29** being windable on a drum **35**.

For supporting the cables **32, 33** there is provided, as best shown in Figure 6, a cross-bar **36** that is supported between a pair of mine jacks **37** suitably positioned within the mine rearwardly of the innermost ends of the mine track rails **7** and these pulleys **32, 33** are suitably mounted, one at about the center, and one adja-

cent one end of the cross-bar 36 through the medium of brackets 38. It will thus be seen that cable 29 will serve to retract the shovel 26, that is to say, for example, after the coal has been mounted on the shovel, to draw the shovel rearwardly onto the platform 18; and after the platform 18 has been raised to a position substantially aligning with the tracks 11 to draw the shovel 26 from off the platform 18 onto the tracks 11, and from the tracks 11 rearwardly onto an apertured platform or loading table 39 mounted on the mine car 10 to be filled.

The shovel 26 is also equipped with a follower or ejector 40 that is constrained to move longitudinally of the shovel through the medium of a fixed guide rib 41 on the bottom of the shovel and a complementarily formed notch 42 provided in the lower edge of the follower 40 as will be clear from a study of Figure 8.

Secured to the rear side of the follower 40 is one end of a cable 43 that extends laterally therefrom and is trained over suitable pulleys 44, 45. The cable 43 is windable on a drum 46. In this connection, it will be understood that cable 43 will be free to pay out from the drum 46 while the shovel 26 is being moved to a discharging position onto the platform 39. However, when the shovel 26 is in such a position on the platform 39 a braking action will be applied to the drum 46 preventing further paying out of the cable 43. At the same time the shovel cable 29 will continue to wind on its drum 35 so that the shovel 26 will move rearwardly relative to the follower 40 as a consequence of which the coal will be forced from the shovel through the opening in the platform 39 and into the mine car 10.

Further in accordance with the present invention there are provided, to be laid in advance of the forward ends of the mine track rails 7 a pair of opposed parallel shovel feeding arms 47 that are adapted to slide through guides 48 of any suitable construction. The guides 48 are anchored in position within the mine through the medium of mine jacks 49. The guides 48 are connected with the jacks 49 at at 50.

For feeding the shovel 26 forwardly there is provided a pair of cables 50, 51. There is one cable 50, 51 for each arm 47 and a description of the manner in which one cable 50, 51 is associated with the shovel 26 and arm 47 will teach the manner of associating the cable with the shovel and its arm 47. Thus, referring, for example, to cable 50, it will be seen that the same at one end thereof is suitably secured to one side of the shovel 26 through the medium of an eye 52. Cable 50 is trained over a pulley 53 mounted adjacent the forward end of an arm 47 as shown in Figure 7, and as also shown in said figure cable 50 is trained rearwardly over a pulley 54 mounted adjacent the rear end of the arm 47 and then extended forwardly where it is trained over an eccentrically mounted pulley 55 the shaft 56 for which is suitably journaled vertically in a guide 48. From the pulley 56 the cable 50 extends rearwardly through a guide 57 provided laterally of the arm 47 adjacent the rear end of said arm and then is trained over a pulley 58 mounted at one side of the truck 5, cable 50 being windable on a drum 59. In this connection it will be noted that cable 51 is trained over a pulley 60 suitably mounted on the truck 5 at the side thereof opposite to the pulley 58 and is windable on a drum 61. It will thus be seen that by simultaneously winding the cable 51 on drum 61 and cable 50 on drum 59 shovel 26 will be forced forwardly to a position between the forwardmost ends of the arms 47, the shovel 26 moving to this position relative to the arms 47.

At the forwardmost ends thereof, arms 47 are provided with electro-magnets 62 which attract and hold the shovel 26 at this position so that, as the cables 50, 51 continue to wind on their respective drums 59, 61 arms 47 together with the shovel 26 move forwardly, arms 47 passing through the guides 48 and the shovel 26 being in this manner forced into the pile of coal.

In retracting the shovel 26 after coal has been loaded thereon the operation is substantially the reverse of that just described.

With the coal-loaded shovel 26 on the platform 18 cable 22 then winds on its drum 21 to raise the platform 18 to a position aligning with the rails 11. When this has been accomplished cable 29 again goes into operation, that is to say is again further wound on its drum 35 for drawing the coal-loaded shovel from off of the elevator platform 18 onto the rails 11 and from the rails 11 onto the loading platform 39.

As before set out when the coal-loaded shovel 26 is properly positioned on the platform 39 further paying out of the follower cable 43 is stopped by applying a braking action to the drum 46 while cable 29 will continue to wind on its drum 35 thus causing the shovel 26 to move rearwardly relative to the follower 40 with the result that the coal will be forced from the shovel through the opening in the platform 39 and into the mine car 10.

The beforementioned drums 21, 35, 46, 59 and 61 form part of a well-known type of a multiple-drum electric hoist which embodies in addition to these drums an electric motor 62 that drives the shaft on which these drums, together with suitable clutches and brake mechanisms, are mounted.

Since such a device is no part of my invention and is of a type clearly disclosed in a 1937 catalogue published by the Ingersoll-Rand Company, further detailed description thereof is deemed unnecessary.

Further in accordance with the present invention there is connected with the shaft 56 of each sheave or pulley 55 an electric motor 73 so that in the event it becomes difficult to force the shovel into the coal pile motors 73 may be set in operation. The resultant hammer effect of the sheave wheels or pulleys 55 on the respective cables 50, 51 will finally result in the shovel being forced into the coal pile.

In Figure 12 there are shown the electromagnets 62 previously referred to, as well as the motor 73, and the power motor 72. The control switches for the magnets 62 are also shown in Figure 12 and indicated by the reference numeral 74 while the switch for the motors 73 is indicated by the reference numeral 75 and the switch for the motor 72 is indicated by the reference numeral 76. It will thus be seen that whenever it is desired, as of course will be the case each time the shovel 26 moves outwardly to a position between the magnet 62, to complete the circuit through the magnets 62, switches 74 will be moved to a closed position. Upon retraction of the arms 47 and to release shovel 26 to permit the latter to further retract relative to the arms 47 switches 74 are moved to open position whereby the magnets 62 will become de-energized.

Whenever it is desired to bring the motors 73 in operation switch 75 is closed; while when it is desired to bring the motor 72 in operation, switch 76 is closed.

In Figure 13 is illustrated the manner in which the device may be used when it is necessary, for the purpose of loading coal into mine cars, to cause the shovel to move around or negotiate a corner in the mine tunnel. Where such is necessary guides 48, arms 47, and associated parts are placed in the arm of the tunnel in which the pile of coal is located; and at the corner of the tunnel, for the purpose of accommodating the cables 50, 51 there are suitably mounted pulleys 77, 78, respectively. When retracting the shovel 26 the cable 43 connected with the follower 40, and trained over a suitably arranged pulley 79, is made use of to draw the shovel from the coal pile to approximately the corner of the tunnel after which the pull of cable 43 is released and cable 29 is then made use of for turning the shovel into a position substantially aligning with the elevator platform 18 and also for drawing the shovel onto the elevator platform as clearly suggested in Figure 13. Obviously, after the shovel has once been placed on the platform 18 the operation of unloading the shovel is identical with that hereinbefore fully described.

It is thought that a clear understanding of the construction, utility, operation and advantages of a loading machine of this character will be had without a more detailed description.

Having thus described the invention what is claimed as new is:—

1. In a device for loading material into mine cars and analogous vehicles, a mobile truck and a mine car platform, an elevator mounted on the truck and including a pair of opposed elevator rails swingably mounted at the forward end of the truck to be positioned at a suitable incline to the perpendicular and to extend upwardly from the ground when in an inclined position, blocks slidably engaged with the elevator rails, a platform mounted between and carried by said blocks, means connected with said blocks for sliding the latter upwardly along said elevator rails, and transfer mechanism for transferring the material to be loaded from the elevator platform to the mine car platform.

2. In a device for loading material into mine cars and analogous vehicles, a mobile truck and a mine car platform, an elevator mounted on the truck and including a pair of opposed elevator rails swingably mounted at the forward end of the truck to be positioned at a suitable incline to the perpendicular and to extend upwardly from the ground when in an inclined position, blocks slidably engaged with the elevator rails, a platform mounted between and carried by said blocks, means connected with said blocks for sliding the latter upwardly along said elevator rails, a shovel, drum and cable means mounted on said truck and connected with said shovel for drawing the latter onto the elevator platform and also for transferring the shovel from the elevator platform to the first mentioned platform, rails mounted on said truck at the top of the latter in alignment with the first mentioned platform for guiding the shovel in its movement from the elevator platform to the first mentioned platform.

3. In a device for loading material into mine cars and analogous vehicles, a mobile truck and a mine car platform, an elevator mounted on the truck and including a pair of opposed elevator rails swingably mounted at the forward end of the truck to be positioned at a suitable incline to the perpendicular and to extend upwardly from the ground when in an inclined position, blocks slidably engaged with the elevator rails, a platform mounted between and carried by said blocks, means connected with said blocks for sliding the latter upwardly along said elevator rails, a shovel, drum and cable means mounted on said truck and connected with said shovel for drawing the latter onto the elevator platform and also for transferring the shovel from the elevator platform to the first mentioned platform, rails mounted on said truck at the top of the latter in alignment with the first mentioned platform for guiding the shovel in its movement from the elevator platform to the first mentioned platform, a follower slidably mounted on said shovel for ejecting the contents of the shovel into the vehicle to be loaded, and drum and cable means mounted on said truck and connected with said follower and operable to hold the follower in a fixed position relative to the shovel to the end that upon movement of the shovel relative to the follower the contents of the shovel will be forced from the latter.

4. In a device for loading material into mine cars and analogous vehicles, a mobile truck and a mine car platform, an elevator mounted on the truck and including a pair of opposed elevator rails swingably mounted at the forward end of the truck to be positioned at a suitable incline to the perpendicular and to extend upwardly from the ground when in an inclined position, blocks slidably engaged with the elevator rails, a platform mounted between and carried by said blocks, means connected with said blocks for sliding the latter upwardly along said elevator rails, a shovel, drum and cable means mounted on said truck and connected with said shovel for drawing the latter onto the elevator platform and also for transferring the shovel from the elevator platform to the first mentioned platform, rails mounted on said truck at the top of the latter in alignment with the first mentioned platform for guiding the shovel in its movement from the elevator platform to the first mentioned platform, a follower slidably mounted on said shovel for ejecting the contents of the shovel into the vehicle to be loaded, drum and cable means mounted on said truck and connected with said follower and operable to hold the follower in a fixed position relative to the shovel to the end that upon movement of the shovel relative to the follower the contents of the shovel will be forced from the latter, and mechanism for feeding the shovel forwardly relative to the elevator platform.

5. In a device for loading material into mine cars and analogous vehicles, a mobile truck and a mine car platform, an elevator mounted on the truck and including a pair of opposed elevator rails swingably mounted at the forward end of the truck to be positioned at a suitable incline to the perpendicular and to extend upwardly from the ground when in an inclined position, blocks slidably engaged with the elevator rails, a platform mounted between and carried by said blocks, means connected with said blocks for sliding the latter upwardly along said elevator rails, a shovel, drum and cable means mounted on said truck and connected with said shovel for drawing the latter onto the elevator platform and also for transferring the shovel from the elevator platform to the first mentioned platform, rails

mounted on said truck at the top of the latter in alignment with the first mentioned platform for guiding the shovel in its movement from the elevator platform to the first mentioned platform, a follower slidably mounted on said shovel for ejecting the contents of the shovel into the vehicle to be loaded, drum and cable means mounted on said truck and connected with said follower and operable to hold the follower in a fixed position relative to the shovel to the end that upon movement of the shovel relative to the follower the contents of the shovel will be forced from the latter, a pair of opposed guide members adapted to be anchored at a point forwardly remote from said truck, arms slidable through said guides, and drum and pulley means mounted on said truck and connected with said shovel and arms for shifting said shovel longitudinally relative to the arms for substantially the length of the arms and also for shifting said shovel and arms as a unit, together with means on said arms and cooperable with the shovel for substantially connecting the shovel with the arms at one end of the latter upon movement of the shovel relative to the arms to a position adjacent said one end of the arms.

6. In a device for loading material into mine cars and analogous vehicles, a mobile truck and a mine car platform, an elevator mounted on the truck and including a pair of opposed elevator rails swingably mounted at the forward end of the truck to be positioned at a suitable incline to the perpendicular and to extend upwardly from the ground when in an inclined position, blocks slidably engaged with the elevator rails, a platform mounted between and carried by said blocks, means connected with said blocks for sliding the latter upwardly along said elevator rails, a shovel, drum and cable means mounted on said truck and connected with said shovel for drawing the latter onto the elevator platform and also for transferring the shovel from the elevator platform to the first mentioned platform, rails mounted on said truck at the top of the latter in alignment with the first mentioned platform for guiding the shovel in its movement from the elevator platform to the first mentioned platform, a follower slidably mounted on said shovel for ejecting the contents of the shovel into the vehicle to be loaded, drum and cable means mounted on said truck and connected with said follower and operable to hold the follower in a fixed position relative to the shovel to the end that upon movement of the shovel relative to the follower the contents of the shovel will be forced from the latter, a pair of opposed guide members adapted to be anchored at a point forwardly remote from said truck, arms slidable through said guides, and drum and pulley means mounted on said truck and connected with said shovel and arms for shifting said shovel longitudinally relative to the arms for substantially the length of the arms and also for shifting said shovel and arms as a unit, together with means on said arms and cooperable with the shovel for substantially connecting the shovel with the arms at one end of the latter upon movement of the shovel relative to the arms to a position adjacent said one end of the arms, said last named means including electro-magnets mounted on the arms at said one end thereof and adapted to be energized for attracting said shovel and holding the latter in a fixed position relative to said arms.

7. In a loading device of the character described, a pair of fixed guides, elongated arms movable in parallelism through said guides, a shovel mounted to move in a path between said arms, mechanism connected with said shovel and said arms for shifting the shovel longitudinally in two directions relative to said arms and also for shifting said arms longitudinally in two directions with the shovel as a unit, and means on one end of said arms cooperable with the shovel for holding the latter in a fixed position relative to said arms upon positioning of said shovel between said one end of the arms.

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