July 17, 1928. 1,677,824

H. H. HARRISON ET AL

COAL LOADING AND TRACK CLEANING MACHINE

Filed Oct. 27, 1926 3 Sheets-Sheet 1

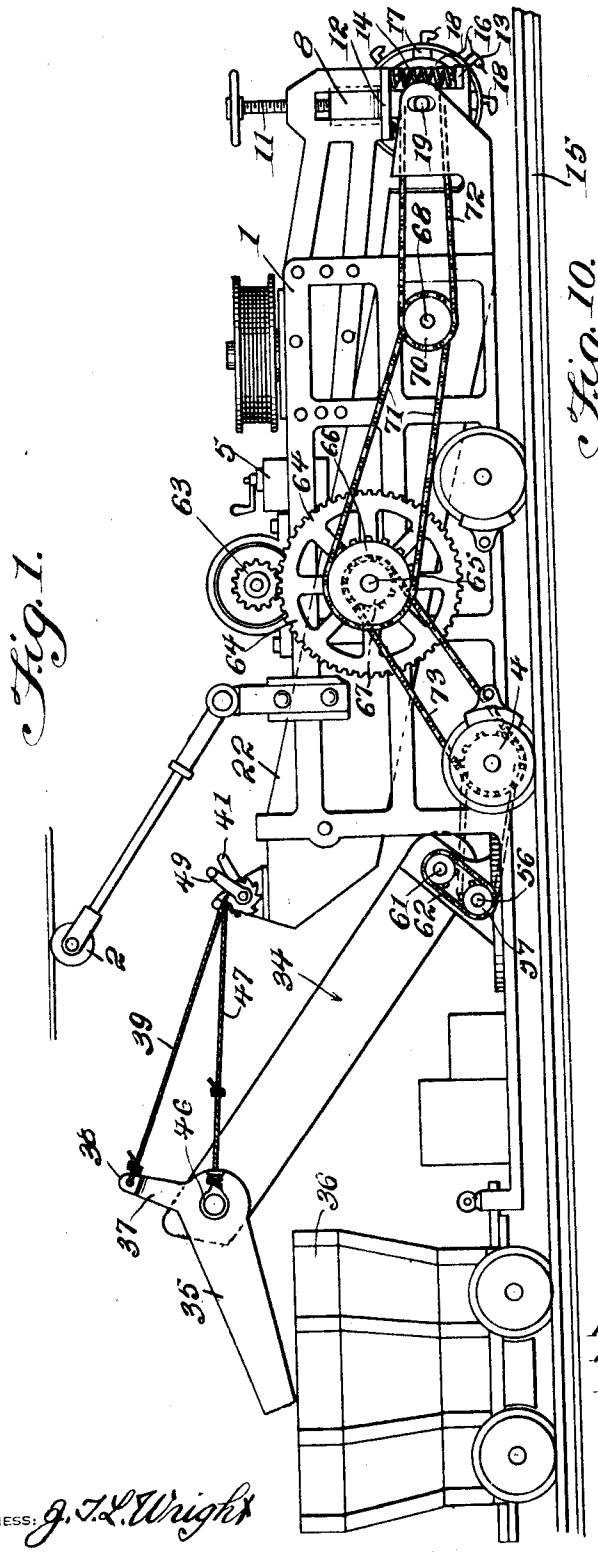


Fig. 1.

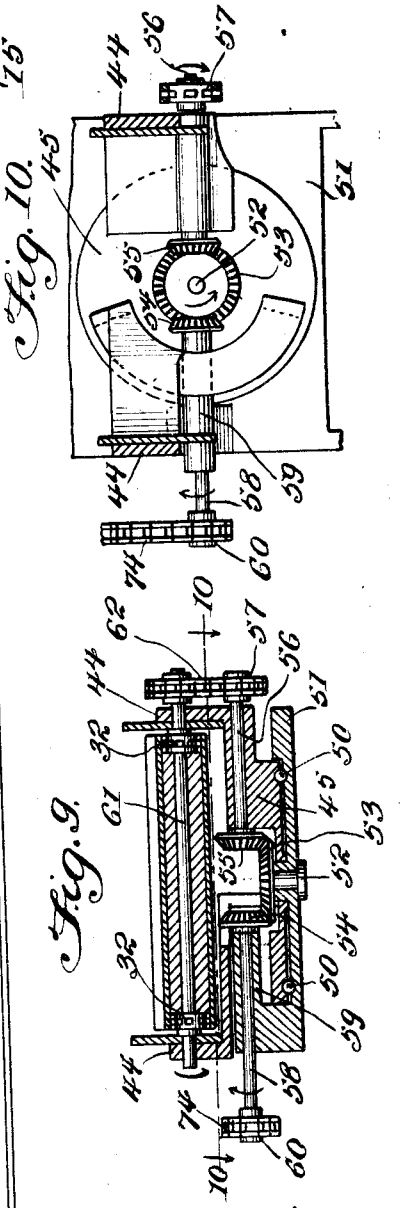


Fig. 10.

Fig. 9.

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COAL LOADING AND TRACK CLEANING MACHINE

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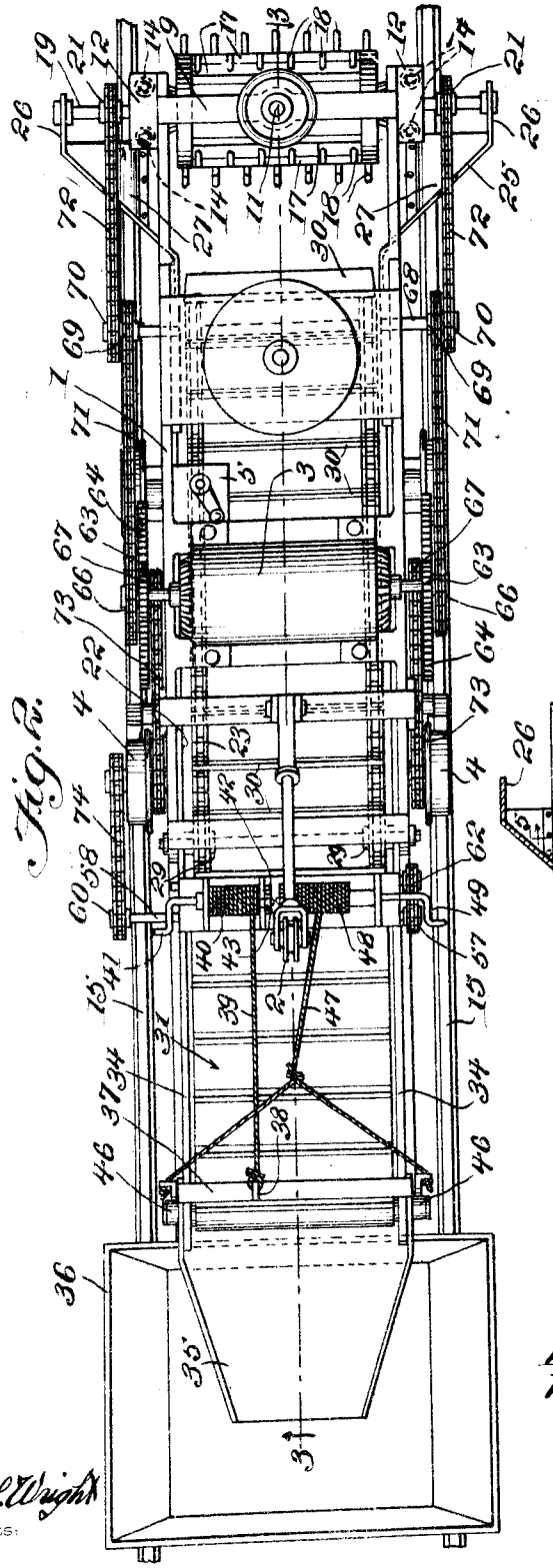


Fig. 2.

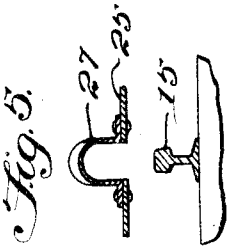


Fig. 5.

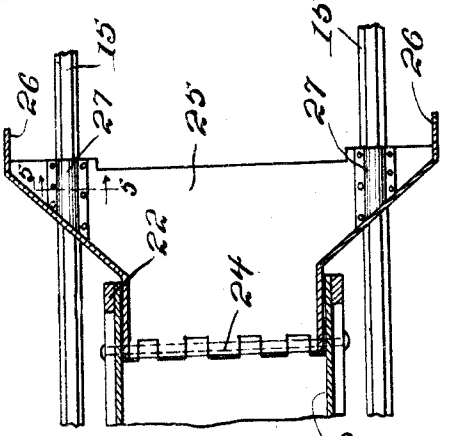


Fig. 4.

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COAL LOADING AND TRACK CLEANING MACHINE

Filed Oct. 27, 1926 3 Sheets-Sheet 3

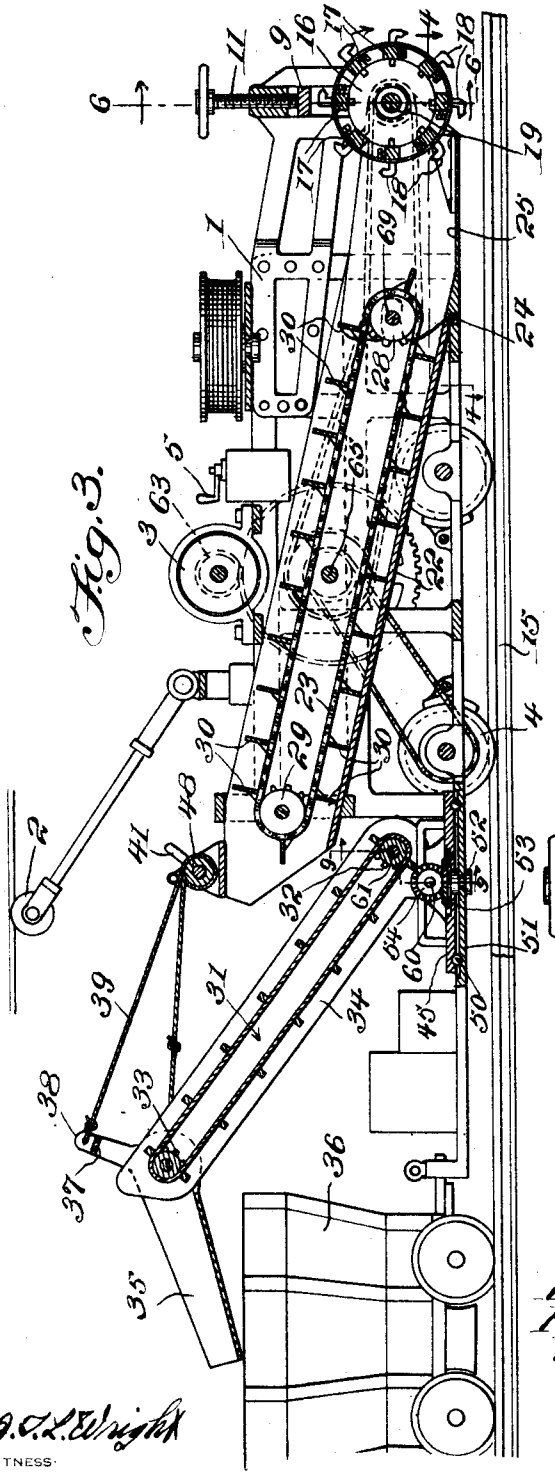


Fig. 3.

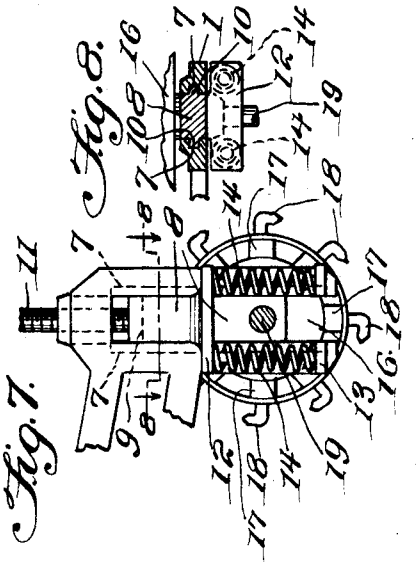


Fig. 8.

Fig. 7.

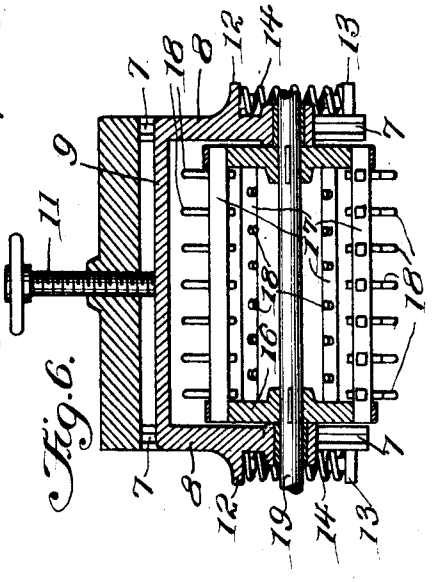


Fig. 6.

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UNITED STATES PATENT OFFICE.

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COAL-LOADING AND TRACK-CLEANING MACHINE.

Application filed October 27, 1926. Serial No. 144,517.

Our present invention has reference to a coal loading and track cleaning machine for use in mines.

An object is the provision of an electrically operated truck, propelled by a trolley wire in the mine, and having at its forward end a vertically adjustable revoluble digger designed to dig the coal from between the rails of the track and to deliver said coal onto a scoop from whence the said coal is raised by an endless conveyor and delivered onto an elevator into a chute which directs the coal into a car attached to the truck, all of the revolving parts of the device being operated by the motor of the truck.

A further object is the provision of a machine for this purpose in which a revoluble digger of a novel and peculiar construction is employed, in which the elevator of the device is pivotally supported upon a turn-table so that the elevator may be swung to different vertical angles and turned to either side of the truck and in which the chute, associated with the elevator, may be swung and sustained at desired vertical angles with respect to said elevator.

A still further object is the provision of an apparatus for this purpose which shall be of a comparatively simple construction, and wherein all of the parts constituting the same may be conveniently adjusted to meet different necessary conditions.

To the attainment of the above broadly stated objects and many others which will present themselves as the nature of the improvement is better understood, the invention also resides in certain other novel features of construction, combination and operative association of parts, one satisfactory embodiment of which is disclosed by the accompanying drawings.

In the drawings:

Figure 1 is a side elevation of the improvement.

Figure 2 is a top plan view thereof.

Figure 3 is a sectional view approximately on the line 3—3 of Figure 2.

Figure 4 is a sectional view on the line 4—4 of Figure 3, parts being removed.

Figure 5 is a detail sectional view on the line 5—5 of Figure 4.

Figure 6 is a sectional view on the line 6—6 of Figure 3.

Figure 7 is a fragmentary elevation to illustrate the mount for the digger wheel.

Figure 8 is a sectional view on the line 8—8 of Figure 7.

Figure 9 is a sectional view on the line 9—9 of Figure 3.

Figure 10 is a detail sectional view on the line 10—10 of Figure 9.

In the illustrated embodiment of our improvement, we make use of an open frame truck 1 having a trolley wheel 2 to engage with the trolley wire in a mine, a motor 3 for operating the wheels 4, and a control 5 for the motor. At the forward end of the truck frame 1 there is the vertically adjustable mount for the digger wheel which provides an important part of the invention. The forward end of the frame 1 has its sides provided with vertical openings, and the side walls provided by these openings are grooved, as at 7. In the openings there are received the parallel arms 8 of the mount, the said arms having an upper connecting element 9. The arms 8 are formed with tongues 10 that are received in the said grooves 7. The forward end of the frame is substantially U-shaped in front elevation and threaded through the top portion of the said frame there is a hand operated screw 11 which contacts with the central member 9 of the substantially U-shaped mount. The arms 8 of the mount are formed with outstanding flanges 12, and the lower portion of the said end of the frame 1, at the opposite sides of the opening therethrough have outstanding ledges 13. Between these ledges and the flanges 12 there are arranged helical springs 14. The springs force the mount upwardly, while the adjustable screw 11 resists such upward movement of the mount, and the adjustment of the said screw regulates the tension of the said spring and the position of the digger wheel with respect to the floor of the mount.

It is, of course, to be understood that the wheels 4 of the truck 1 travel on rails 15, and the digger wheel is designed to be arranged between said wheels. In the showing of the drawings, the digger wheel includes spaced side discs 16, connected at desired intervals by slats 17, the said slats being formed with equidistantly spaced hook-like digger blades 18. The shaft 19 is fixed to the discs 16 and extend through suitable bearings in the arms of the U-shaped mount. While not shown, suitable cover plates are provided for protecting the

springs 14, and on one or each end of the shaft 19 there is secured a sprocket wheel 21 through the medium of which the shaft of the digger wheel is revolved in a manner as will hereinafter be explained.

At a suitable distance to the rear of the digger wheel there is the cross sectionally U-shaped frame 22 for an endless conveyor 23. The frame is disposed at an upward inclination and is suitably supported in the truck frame. Hingedly secured, as at 24, to the outer and lower end of the conveyor frame 22 there is the inner and reduced end of the scoop 25. The scoop has its widened outer end extending a suitable distance beyond the sides of the track rails 15, and the sides of the scoop, at this said end thereof are projected, as indicated by the numerals 26, (Figure 4). The bottom of the scoop, at the portions thereof disposed directly over the track rails, is cut away, but these cut away portions are covered by substantially cross sectionally U-shaped plates 27. This arrangement permits of the scoop 25 being lowered so that the outer or active end thereof will contact with the floor of the mine, both between and at the opposite sides of the track rails. The projected ends 26 of the scoop are pivotally supported on the shaft 19 of the digger wheel so that the scoop is adjusted simultaneously with the adjustment of the mount for the digger wheel.

The endless conveyor 23 has endless sprocket chains on the sides thereof, the said sprocket chains traveling over sprocket wheels 28 and 29, and the chains have secured thereto transverse flights 30. The lower lead of the conveyor travels in an upward direction in a manner which will presently be described.

The conveyor delivers onto an upwardly inclined elevator 31, the same also including endless side chains provided with transverse flights and traveling over sprocket wheels 32 and 33. The frame for the elevator 31 is indicated by the numeral 34, and the upper sprocket wheel 32 projects through the sides of the frame 34 and has pivotally connected thereto the inner side members of a chute 35. This chute is arranged over the open top of a mine car 36 which is hitched to the truck 1. The sides of the chute, above the pivot thereof have a substantially U-shaped bail portion 37, the same being centrally formed with a finger 38 to which is attached a cable 39 that is wound around a drum 40 whose shaft is journaled in suitable bearings on the top of the truck. The shaft has a cranked end 41 and has fixed thereon a ratchet wheel 42 that is engaged by a pawl 43. By this arrangement it will be noted that the chute may be swung to desired vertical positions on and with respect to the elevator frame.

The axle 61 for the drive sprockets of the elevator has its ends journaled in bearing openings in the upstanding flanges 44 of a turn table 45 that is suitably mounted on the bottom of the truck 1, as will hereinafter be described. The shaft for the sprocket wheels 33 of the elevator 31 is extended beyond the sides of the chute 35 and has journaled thereon ring members 46 having arms to which are connected the angle strands of a cable 47. This cable is wound around a drum 48 disposed opposite the first mentioned drum, the last mentioned drum 48 having its shaft merging into a crank handle 49, the said shaft having a ratchet wheel thereon engaged by a suitable pawl. In this manner it will be seen that the elevator may be swung to desired vertical angles on the truck frame.

The turn-table has its base portion provided with a race-way for anti-frictional balls 50, the second element of the race-way being provided in a circular depression in the bottom of the truck or in a plate 51 which is fixed on the bottom of the truck. A pivot 52 connects the turn-table to the plate 51, and this pivot is in the nature of a shaft having on its inner or upper end a bevel gear 53. The gear 53 is in the nature of an idler and has meshing therewith oppositely disposed bevel gears 54 and 55. The shaft 56 for the gear 55 is journaled in a bearing in the turn-table and has secured on its outer end a sprocket 57. The shaft 58 for the gear 54 is journaled through a bearing provided by projecting and extending inwardly a part of the base or plate 51, and a portion of the turn-table is cut-away for the reception of this bearing. For distinction the bearing is indicated by the numeral 59 and the shaft 58 has on its outer end a sprocket wheel 60.

The sprocket wheel 57 is disposed opposite a sprocket wheel on the shaft 61 for the lower sprocket wheels 32 of the elevator, and trained around these last mentioned sprocket wheels there is a drive chain 62.

The motor 3 has on one end of its shaft a gear 63 that is in mesh with a toothed wheel 64 whose shaft 65 is arranged transversely with respect to the truck and journaled in suitable bearings carried by the said truck.

On the ends of the shaft 65 there are toothed sprocket wheels 66 and 67, respectively. On the ends of the shaft 68 for the lower and drive shaft for the conveyor there are sprocket wheels 69 and 70, and trained around the sprocket wheels 66 and 69 there are sprocket chains 71. Trained around the sprocket wheels 70, and the sprocket wheels 21 on the shaft 20 for the digger wheel there are sprocket chains 72. On the shaft or axle for the rear wheels 4 of the truck 1 there are sprocket wheels, and around these sprocket wheels and around the sprocket wheels 67

these are trained sprocket chains 73. The shaft or axle of the said rear truck wheels is provided with an additional sprocket wheel over which is trained a sprocket chain 74 that is also trained around the sprocket wheel 60 on the end of the shaft 58. By this arrangement it will be noted that the digger wheel is turned in the direction of the arrow in Figure 3 of the drawings, that the lower lead of the conveyor travels in an upward direction, while the upper lead of the elevator travels in a downward direction, and that all of these parts are simultaneously operated. The turning of these parts is regulated by the control 5 for the motor 3. It is, of course, to be also noted that the turning of the shaft 58, through the medium of the idler gear 53 will impart a like turning to the shaft 56 so that the elevator is properly operated. It will be further noted that the turn-table may be revolved without interfering with the operation of the elevator. This, together with the swingable chute are very important features of the invention, because the coal gathered from the track and adjacent to the rails thereof may be properly directed to fill all parts of the mine car 36, it being apparent that the vertical swinging of the elevator and the like swinging of the chute on the elevator frame will cause the coal to be delivered to either the front, rear or sides of the mine car.

It is believed that the construction of our invention and the advantages thereof will be perfectly apparent to those skilled in the art to which the invention relates when the foregoing description has been carefully read in connection with the accompanying drawings so that a further detail description is not thought necessary. It is, of course, to be understood that we have herein set forth only one satisfactory embodiment of our improvement and we do not wish to be limited to the precise structural details as set forth. Therefore, we hold ourselves entitled to make such changes and modifications as fairly fall within the scope of what we claim, providing we do not depart from the spirit of our invention or sacrifice any of the advantages thereof.

While we have described our improvement as a coal loading and track cleaning machine for use in mines, it is obvious that the same may be employed with equal efficiency in excavating, grading and for removing snow.

Having described the invention, we claim:—

1. In a device for the purpose set forth, an electrically operated wheeled truck designed to travel on a mine track and to have a mine car coupled thereto, a digger wheel at the forward end of the truck and between the sides thereof, said wheel having a longitudinal series of spaced hook-shaped blades, a substantially U-shaped mount for the shaft of the digger wheel, guided in a bearing opening in the sides of truck frame, spring means influencing the mount in one direction, hand operated means between the truck and mount for influencing the latter in a second direction, a hingedly supported scoop at the rear of the mount having an outer widened portion and projecting ends which are received on the ends of the shaft for the digger wheel, said scoop having openings in the outer portion thereof disposed opposite the rails of the track, cross sectionally U-shaped guards covering said openings, an upwardly inclined endless conveyor at the rear of the scoop, an outwardly inclined endless elevator at the delivery end of the conveyor, a chute at the delivery end of the elevator arranged over the mine car, and means actuated by the motor for simultaneously imparting motion to the digger wheel, the conveyor and the elevator.

2. In a device for the purpose set forth, a wheeled truck designed to travel on the rails of a mine track and to have a mine car coupled thereto, a vertically adjustable spring influenced digger wheel at the forward end of the truck, a hingedly supported vertically adjustable scoop at the rear of the digger wheel, an upwardly inclined endless conveyor at the rear of the scoop, an upwardly inclined elevator at the delivery end of the conveyor, a mount pivotally supporting the elevator on the truck, means connected with the elevator and operable from the truck for swinging the elevator to vertical adjusted positions, a pivotally supported chute at the delivery end of the elevator, said chute being arranged over the car, means connected with the chute and operable from the truck for swinging and retaining the truck in vertical positions with respect to the elevator, and means actuated by the motor for simultaneously imparting motion to the digger wheel, the conveyor and the elevator.

3. In a device for the purpose set forth, an electrically operated wheeled truck designed to travel on a mine track, a digger wheel at the forward end of the truck, a scoop to the rear of the digger wheel, an upwardly inclined endless conveyor at the inner end of the scoop, an upwardly inclined endless elevator at the delivery end of the conveyor, a turn-table on the truck to which the lower end of the elevator frame is pivoted, a beveled gear on the pivot, a gear in mesh with the first mentioned gear and having its shaft journaled through the elevator, means operated by the turning of said shaft for actuating the elevator, a second gear in mesh with the first mentioned gear, a shaft therefor, a bearing for the shaft supported on the

truck, means actuated by the motor of the truck for simultaneously imparting motion to the digger wheel, the conveyor and the last mentioned shaft, a chute pivotally supported at the delivery end of the conveyor and arranged over the car, spaced handle operated drums at the top of the truck, means for normally preventing the turning of the drums in one direction and flexible elements connected respectively to the elevator frame, and to the chute and wound around the respective drums.

4. In a device for the purpose set forth, an electrically operated truck designed to travel on the rails of a mine track and having a mine car coupled thereto, a digger wheel at the forward end of the truck, a yieldable mount for the digger wheel, adjusting means for the mount, a hinged scoop having its outer end below the digger wheel and supported on the mount for said digger wheel, said scoop having inwardly depressed portions disposed over the rails of the track, an upwardly inclined endless conveyor at the rear end of the scoop, an upwardly inclined elevator onto which the conveyor delivers, a chute at the outlet end of the elevator disposed over the mine car, and means actuated by the motor of the truck to simultaneously impart a motion to the digger wheel, the conveyor and the elevator.

In testimony whereof we affix our signatures.

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HOWARD W. ALLENDER.
RICHARD L. FOUT.