

March 27, 1945.

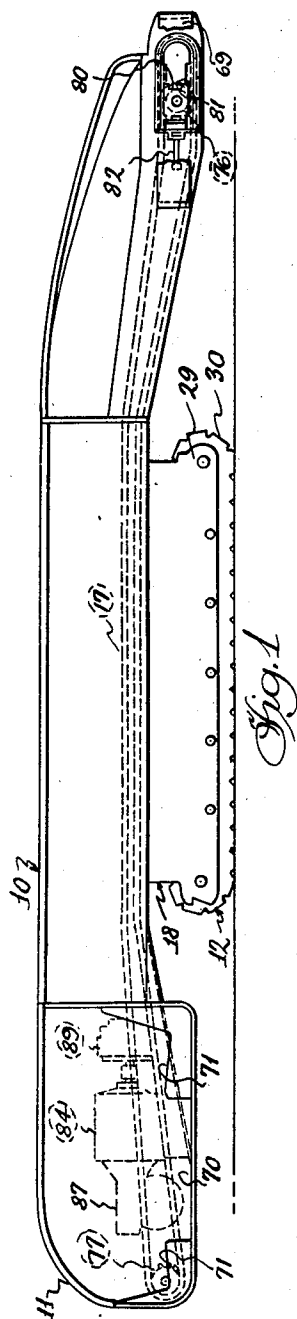
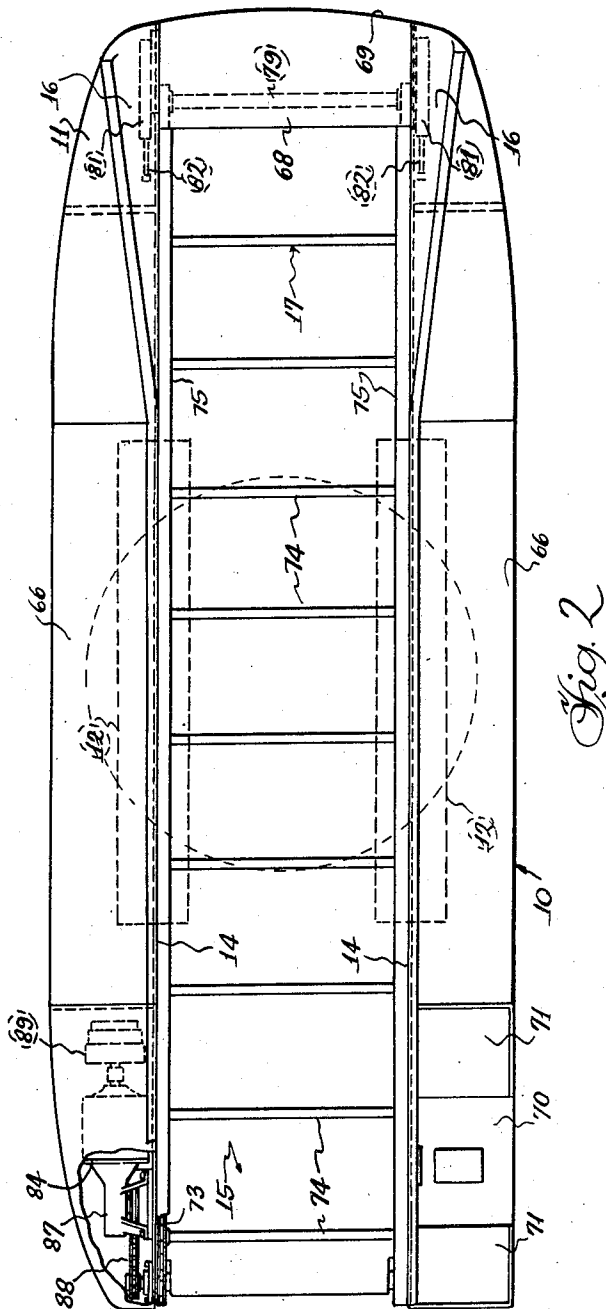
E. J. DOBERSTEIN

2,372,475

SHUTTLE CAR

Filed Sept. 24, 1943

4 Sheets-Sheet 1



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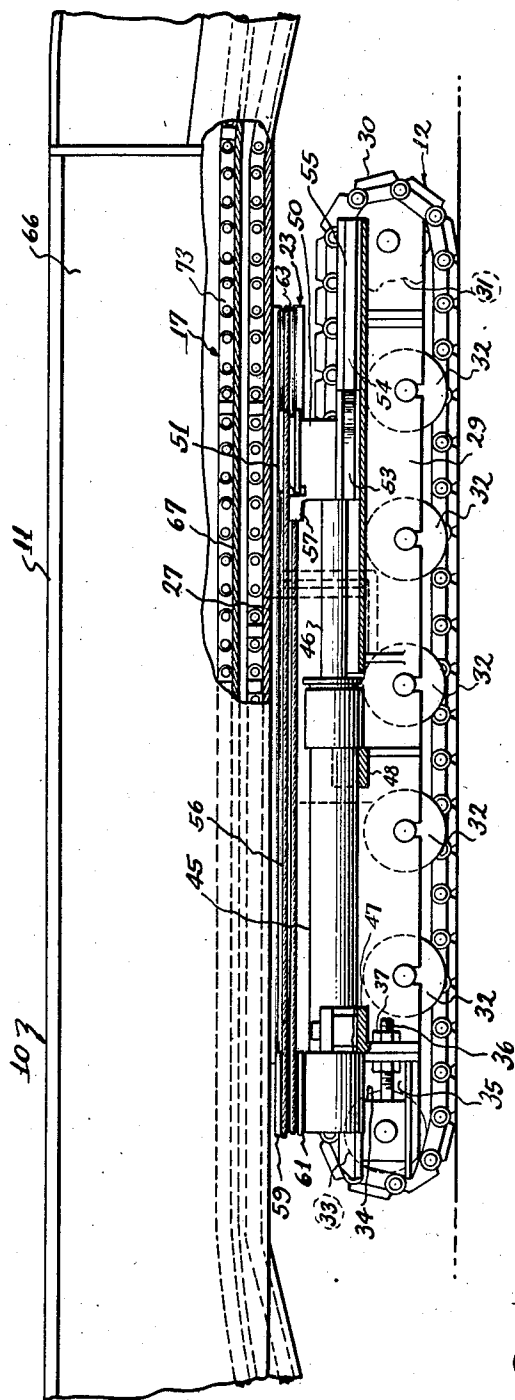


Fig. 3

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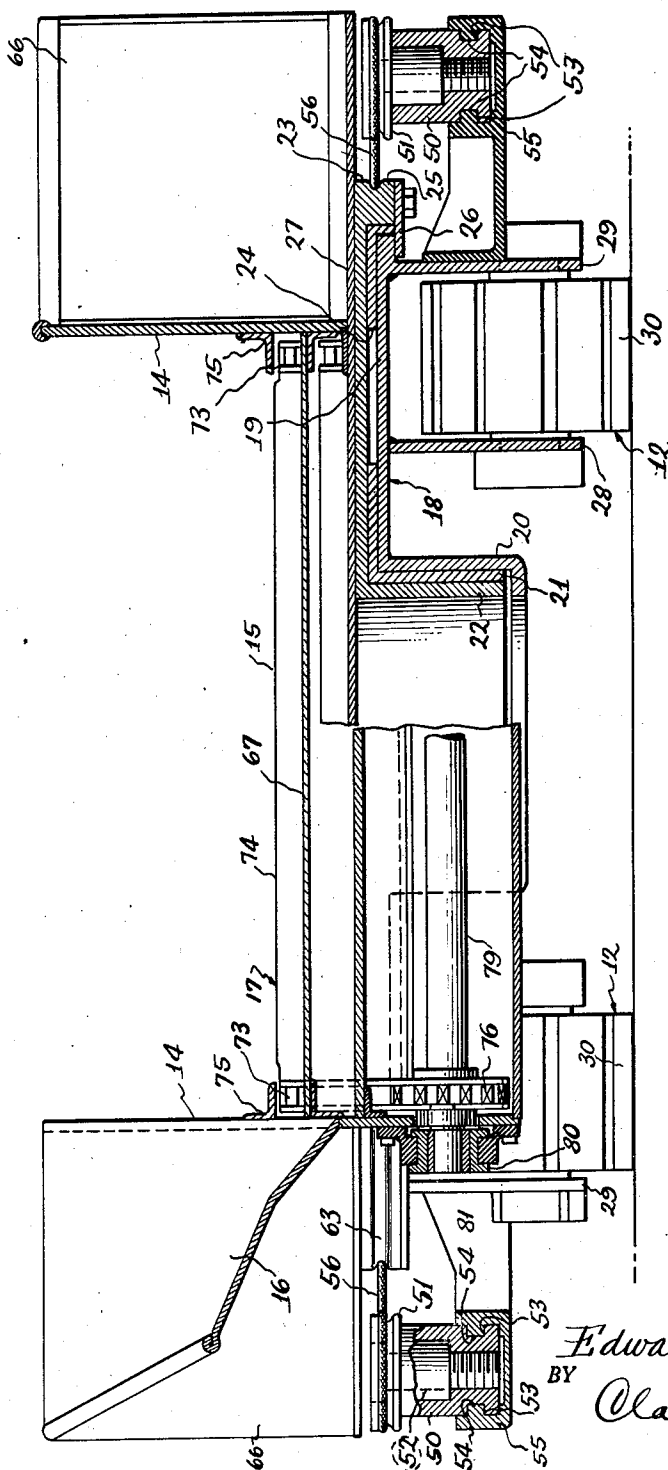


Fig. 4

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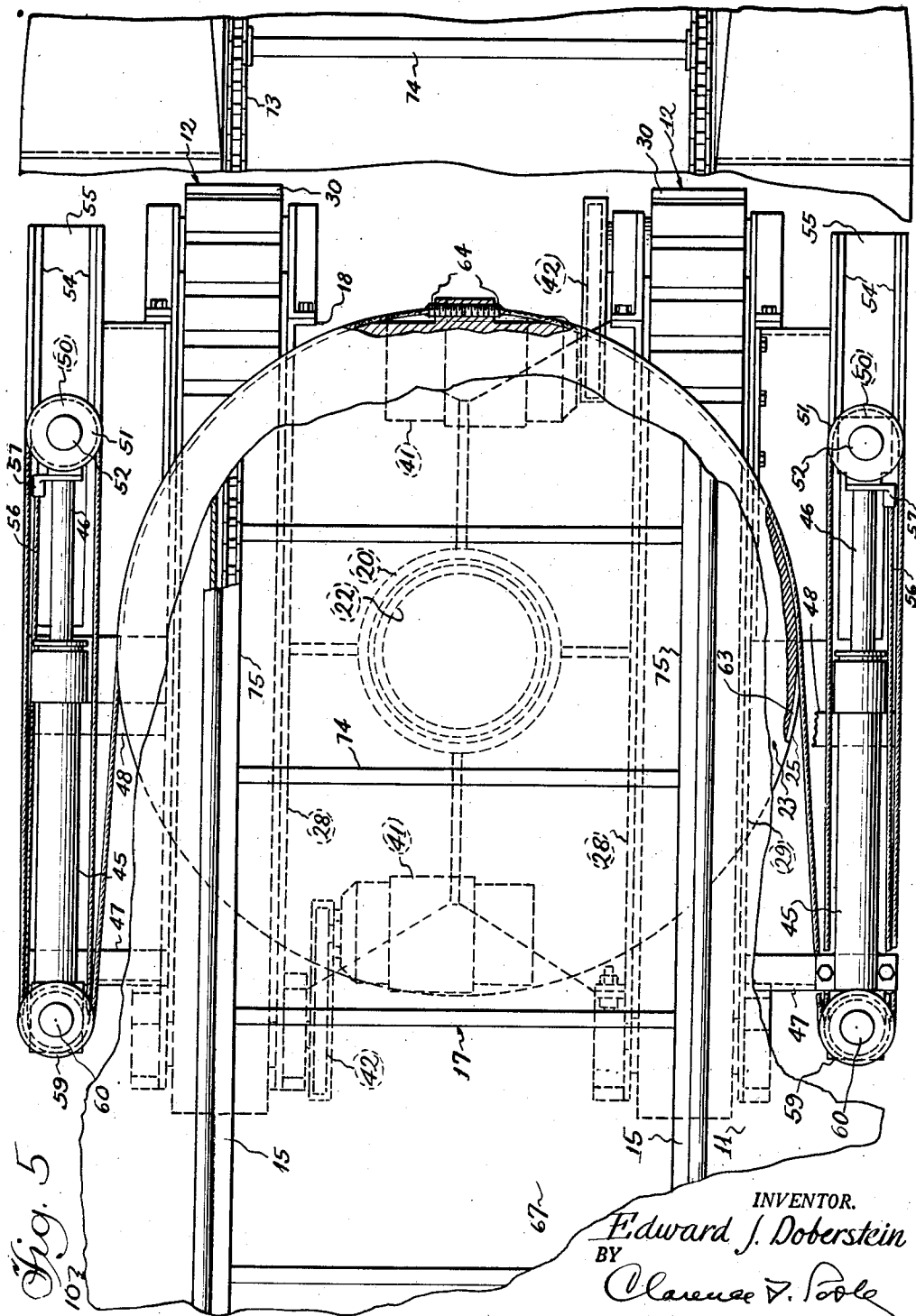
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4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

2,372,475

SHUTTLE CAR

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4 Claims. (Cl. 214—83)

This invention relates to improvements in shuttle cars adapted to transport coal or other materials from the working places of mines underground.

The principal objects of my invention are to provide a new and improved form of shuttle car adapted for operation in mines underground, of a low, compact construction, and so arranged that the material carrying body of the car can be turned at various angles with respect to the chassis thereof to facilitate loading and unloading of the car in confined places.

Other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a view in side elevation of a shuttle car constructed in accordance with my invention;

Figure 2 is a plan view of the shuttle car shown in Figure 1;

Figure 3 is an enlarged fragmentary view in side elevation of the central part of the car, with certain parts broken away and certain other parts shown in substantially longitudinal section;

Figure 4 is an enlarged partial fragmentary transverse sectional view taken through the shuttle car; and

Figure 5 is an enlarged fragmentary plan view of the central part of the shuttle car, with certain parts broken away and certain other parts shown in horizontal section.

Referring now to the embodiment of my invention illustrated in the drawings, a coal haulage vehicle or shuttle car is indicated generally at 10. Said vehicle consists of an elongated material carrying body 11 pivotally mounted on a pair of laterally spaced continuous tread devices 12, 12, for movement about a vertical axis. Said body has a pair of vertically spaced side walls 14, 14 extending its full length and forming the side walls of a coal carrying compartment 15 thereof. Said side walls are flared outwardly at the receiving end of the car, as indicated by reference characters 16, 16 to provide a widened receiving hopper and to facilitate loading by the boom of a loading machine. The bottom of the material carrying compartment of the car is defined by a conveyor indicated generally by reference character 17.

The mounting of the body 11 on the continuous tread devices 12, 12 includes a frame 18 mounted on said tread devices. Said frame has an upper portion 19 of a circular formation in plan. A central boss 20 depends from said upper portion (see Figure 4). A flanged bearing 21 is mounted

in said boss and forms a bearing for a depending central cylindrical portion 22 of a turntable 23. A flanged bearing 24 extends around the periphery of said circular frame 18 and forms a bearing for the outer portion of said turntable. A flange 25 is herein shown as being formed integral with and depending from the periphery of said turntable. The inner periphery of said flange abuts the outer periphery of the flanged bearing 24. A retaining member 26 is secured to the underside of said flange 25 and extends inwardly therefrom and slidably abuts the under side of the circular frame 18, to prevent tilting movement of said turntable with respect to said frame 19. A bottom plate 27 of the body 11 is suitably mounted on and secured to said turntable, so the material carrying compartment of the car may pivot about the frame 18 about a fixed vertical axis, to position the conveyor 17 in any desired angular position with respect to the continuous tread devices 12, 12.

Two parallel spaced longitudinally extending supporting plates 28 and 29 depend from each side of the frame 18 and extend therealong beyond the ends thereof. Said supporting plates are adapted to have a continuous tread 30 of a continuous tread device 12, mounted therebetween. A drive sprocket 31 is mounted between said plates, adjacent one end thereof, and meshes with the continuous tread 30 for driving said tread. A plurality of intermediate bogie wheels 32, 32 are mounted between said plates and engage the upper side of the lower run of said tread, to form an anti-friction support therefor (see Figure 3). An idler 33 is mounted at the ends of said plates, opposite from said drive sprocket, on bearing blocks 34, 34. Said bearing blocks are slidably mounted in longitudinal guides 35, 35, which are herein shown as being secured to the ends of said plates and as forming a continuation thereof. Threaded rods 36, 36 having nuts 37, 37 thereon, are provided to adjustably move said bearing blocks along said guides, to adjust the tension of the associated continuous tread, in a manner well known to those skilled in the art.

A separate motor 41 is provided to drive each traction device. As herein shown, said motors depend from and are mounted beneath and at opposite ends of the frame 18. Said motors may be of any well known form but are herein shown as being electric motors having a standard form of speed reducing means contained in the end casing therefor (not shown). A chain and sprocket drive 42 is provided to operatively con-

nect each speed reducing means and motor with an associated drive sprocket 31. Independent control means of any well known form may be provided to control operation of said motors so the two treads may operate together, for propelling the vehicle in a straight line or so said tracks may be operated independently either in forward or reverse directions, for manipulating the vehicle around corners. Said control means for said motors is not herein shown or described since it is no part of my present invention.

The means for turning the turntable 23 and body 11 includes a pair of laterally spaced longitudinally extending fluid cylinders 45, 45, having piston rods 46, 46 extensible therefrom. As herein shown, each of said cylinders is mounted on a pair of longitudinally spaced bracket members 47, 48 extending laterally from the outer supporting plate 29. A sheave supporting block 50 is mounted on the outer end of each piston rod 46 and has a sheave 51 mounted on the upper side thereof on a pin 52 threaded in said block. Said sheave supporting block, as herein shown, is provided with opposite facing channelled guides 53, 53, adjacent its lower ends, which are adapted to register with a pair of inwardly facing gibs 54, 54 of a longitudinal guide member 55. Said guide member extends parallel with and is secured to and spaced laterally from the outer plate 29.

A flexible cable 56 is secured at one of its ends to the sheave supporting block 50 by means of a clamping member 57, in a well known manner (see Figure 5). Said cable extends from said clamping member in a direction away from the sheave 51, to and around a sheave 59 mounted just rearwardly of the head end of the cylinder 45, on a vertical pivotal pin 60. Said cable extends around said sheave and along the cylinder 45 and piston rod 46, to and around the sheave 51. From thence said cable extends along said piston rod and cylinder, to and around a sheave 61, mounted on the pivotal pin 60, just beneath the sheave 59. Said cable extends from said last mentioned sheave to a groove 63, formed in the outer periphery of the depending circular flange 25 of the turntable 23, and around said groove to a clamping member 64 adjacent the longitudinal center of said turntable and the body 11. Suitable fluid valves and connections are provided to independently control the passage of fluid under pressure to and from the head ends of said fluid cylinders 45, 45, so one of said cylinders may be used to turn said body 11 in one direction, while the opposite cylinder may be used to turn said body in the opposite direction, in an obvious manner.

The plate 27, mounted on the turntable 23, extends laterally beyond opposite sides of the side walls 14, 14 and forms the bottom for suitable compartments 66, 66 for storage batteries or an electric cable reel, and the electrical control equipment for the car of the usual kind.

The side walls 14, 14 extend a substantial distance beyond opposite ends of the traction treads 30, 30, and the overhanging portions of said side walls also slope downwardly from the turntable 23, beneath the tops of said treads, to increase the carrying capacity of the car without increasing the vertical height thereof. A plate 67 is spaced above the plate 27 and connects said side walls together and forms a bottom for the material carrying compartment of the car. Said plate, as herein shown, is substantially horizontal at the central portion of the body and its

ends slope downwardly to conform to the downwardly sloping ends of the side walls 14, 14, to form a continuous conveyor bottom having oppositely sloping ends. The lower ends of said side walls 14, 14 are connected together by means of the bottom plate 27, which extends along and conforms to the slope of the lower ends of said side walls.

A shield 68 extends horizontally across the rear of the material carrying compartment 15 and conveyor 17, between the side walls 14, 14. Said shield is arched upwardly at a level somewhat above the level of the conveyor, and terminates into a rear bumper 69. This shield and bumper serve to protect the conveyor from the loading boom of a loading machine, when said loading boom is extended directly into the rear end of the shuttle car during loading.

An operator's compartment 70 is provided at the forward end of the left-hand side wall 14, and projects laterally therefrom and includes a pair of facing seats 71, 71 so arranged that the operator may face in the direction the car is moving, when the direction of travel of the car is reversed. The control means for the car and conveyor are carried in said operator's compartment and are not herein shown or described since they form no part of the present invention.

The conveyor 17 includes a pair of laterally spaced endless chains 73, 73 connected together by means of a plurality of spaced flights 74, 74. Said chains and flights extend along the inner sides of the side walls 14, 14 and are movable along the top of the plate 67, to progress material therealong. Hold-down guides 75, 75 are secured to the inner sides of said side walls 14, 14 and extend inwardly therefrom over said chains to form a hold-down means therefor. Said chains extend from idlers 76, 76 at the receiving end of the body 11 along the top of the plate 67, to and around drive sprockets 77, 77 at the discharge end of said body. From thence said chains extend along the top of the bottom plate 27 to the receiving end of the body, to and around the idlers 76, 76.

The idlers 76, 76 are mounted on a transverse shaft 79, journaled at its ends in bearing blocks 80, 80, which are slidably mounted in longitudinal guides 81, 81, formed in the lower ends of opposite side plates 14, 14. Threaded screws 82, 82 serve to adjustably move said bearing blocks in said guides, to take up slack in the chains 73, 73, in a manner well known to those skilled in the art.

The drive to said conveyor includes an electric motor 84 herein shown as being mounted on the outer side of the side wall 14, opposite from the operator's platform 70. Said motor is suitably connected to a drive shaft 85, having the drive sprockets 77, 77 mounted thereon, through a worm and worm gear reduction, in a casing indicated generally at 87, and a chain and sprocket drive 88, driven by the worm gear of said worm and worm gear reduction. A fluid pump 89 is driven from the opposite end of said motor, to supply fluid under pressure to the cylinders 45, 45.

It may be seen from the foregoing that a novel form of shuttle car of a low and compact construction has been provided, which is so arranged that the material receiving compartment of the car may be pivotally moved from side to side, to facilitate loading and discharge of the car, and that this arrangement is attained by mounting the body of the car on continuous tread devices of a low overall height. It may further be seen

that with the arrangement of shuttle car shown, the usual wells for the wheels in the side walls of the car are eliminated, increasing the capacity of the car and the space for compartments for storage batteries or a cable reel and the electrical control equipment for the car, thus making it possible to provide a car of greater power and capacity which may travel longer distances than former shuttle cars of the wheel mounted type.

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

I claim as my invention:

1. In a mine haulage vehicle of the character described, a pair of laterally spaced continuous tread devices for supporting and propelling the vehicle, a material carrying body mounted on said continuous tread devices for pivotal movement about a vertical axis, said body being open at its ends and having a pair of parallel spaced side walls with a conveyer extending therebetween for the entire length thereof, and opposite ends of said body extending a substantial distance beyond the ends of said continuous tread devices and the bottom thereof extending over said tread devices and being inclined downwardly from the opposite ends of said tread devices at a relatively flat angle so the receiving and discharge ends of the bottom of said conveyer are disposed beneath the upper run of said continuous tread devices, to increase the material carrying capacity of the vehicle without increasing the height thereof.

2. In a mine haulage vehicle of the character described, a pair of laterally spaced continuous tread devices for supporting and propelling the vehicle, a turntable mounted on said continuous tread devices, a material carrying body mounted on said turntable for movement therewith about a vertical axis, said body being open at its ends and having a pair of parallel spaced side walls with a conveyer extending therebetween for the entire length thereof, and opposite ends of said body extending a substantial distance beyond the

ends of said turntable and tread devices and the bottom thereof being inclined downwardly from the ends of said tread devices toward the ground at a relatively flat angle, to dispose the receiving and discharge ends of the bottom of said conveyer beneath the top of said turntable, to increase the carrying capacity of the vehicle without increasing the height thereof.

3. In a mine haulage vehicle of the character described, a pair of laterally spaced continuous tread devices for supporting and propelling the vehicle, a material carrying body mounted on said continuous tread devices for pivotal movement about a vertical axis, power means selectively operable to turn said body with respect to said continuous tread devices, said body extending beyond the ends of said tread devices a substantial distance and being open at its ends and having a pair of parallel spaced side walls extending for the entire length thereof with a conveyer extending therebetween and defining the bottom of the material carrying compartment thereof, and opposite ends of the bottom of said conveyer being inclined downwardly from the central portion of said body, to dispose the receiving and discharge ends of said conveyer beneath the upper run of said continuous tread devices, to increase the material carrying capacity of the vehicle without increasing the height thereof.

4. In a mine haulage vehicle of the character described, a frame open at its ends and having a pair of laterally spaced side walls extending for substantially its entire length, a conveyer extending between said side walls, a pair of laterally spaced continuous tread devices for supporting and propelling said frame, the mounting of said frame on said tread devices including a turntable, means selectively operable for turning said turntable and conveyer by power, and the ends of said frame and conveyer extending a substantial distance beyond the ends of said turntable, and the bottom of said conveyer being inclined downwardly from the ends of said turntable at a relatively flat angle, to dispose the receiving and discharge ends of said conveyer beneath the top of said turntable, to increase the material carrying capacity of the vehicle without increasing the height thereof.

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