

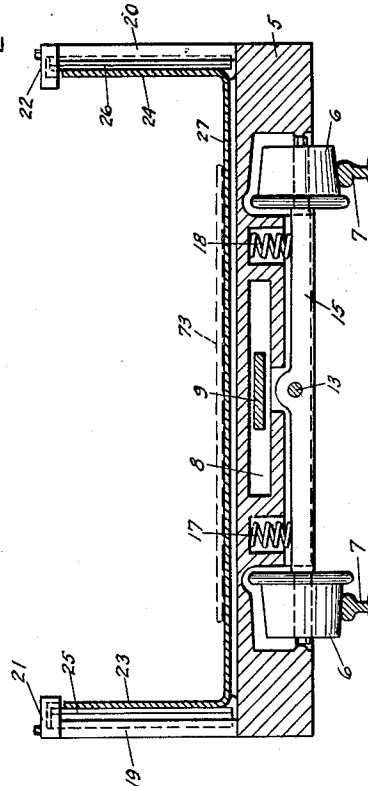
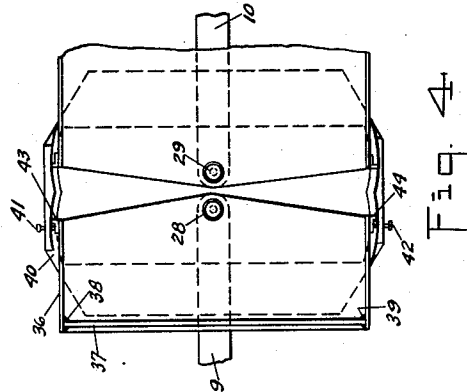
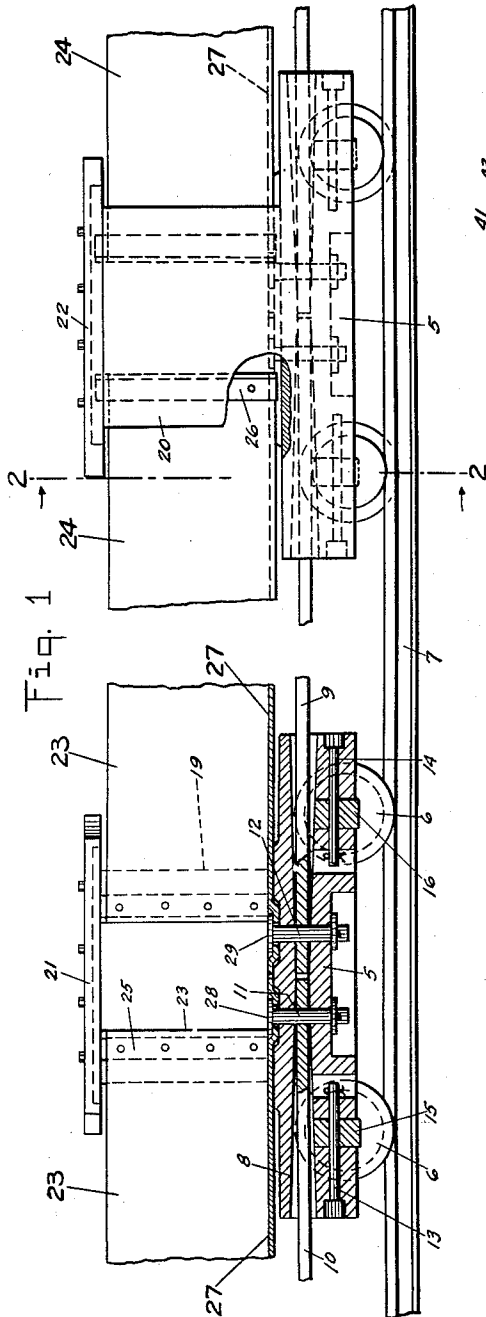
May 28, 1935.

E. C. MORGAN

2,003,007

MATERIAL HANDLING SYSTEM FOR MINES

Original Filed Dec. 9, 1927 4 Sheets-Sheet 1



INVENTOR:
 Edmund C. Morgan - Deceased
 Olive Eugenie Morgan - Executrix
 By
 Chas. M. Nissen,
 ATT'Y

May 28, 1935.

E. C. MORGAN

2,003,007

MATERIAL HANDLING SYSTEM FOR MINES

Original Filed Dec. 9, 1927 4 Sheets-Sheet 2

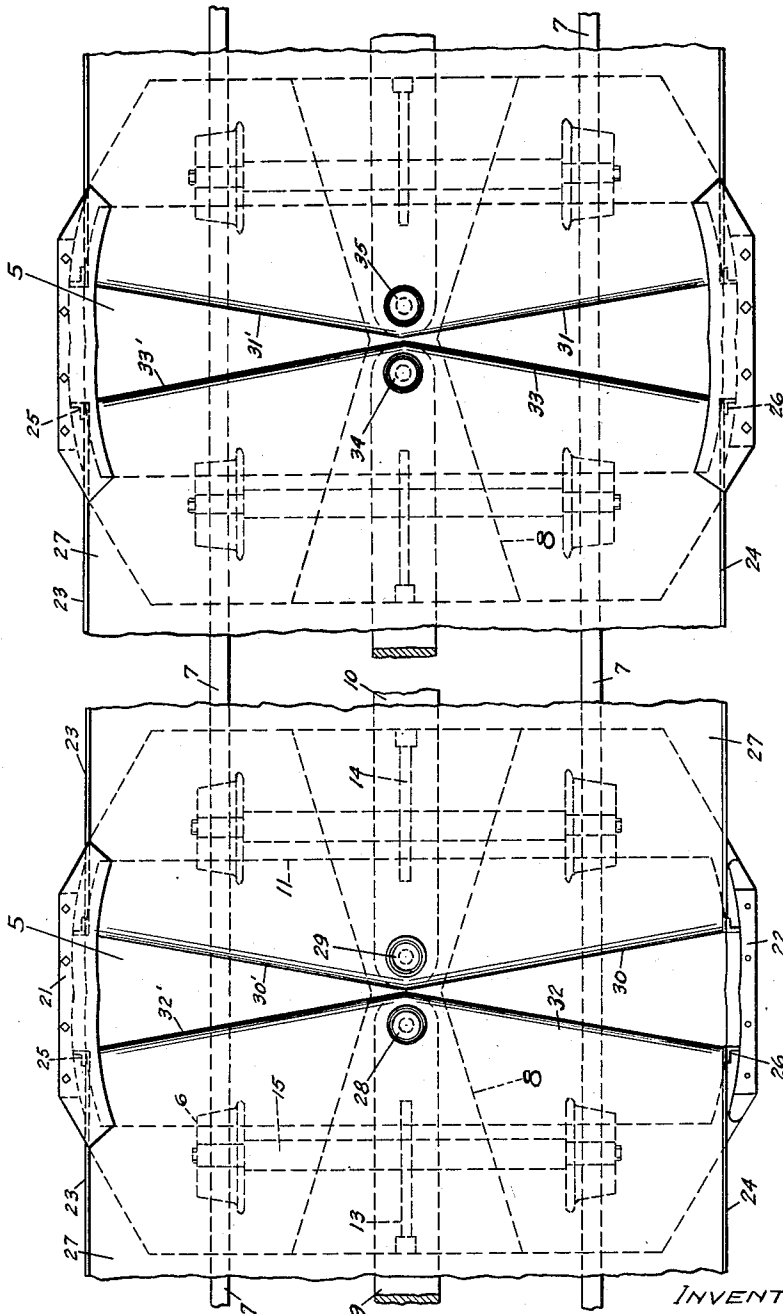


Fig. 2

INVENTOR:
Edmund C. Morgan - Deceased
Olive Eugenie Morgan - Executrix,
By
Char. M. Nissen,
ATT'Y.

May 28, 1935.

E. C. MORGAN

2,003,007

MATERIAL HANDLING SYSTEM FOR MINES

Original Filed Dec. 9, 1927 4 Sheets-Sheet 3

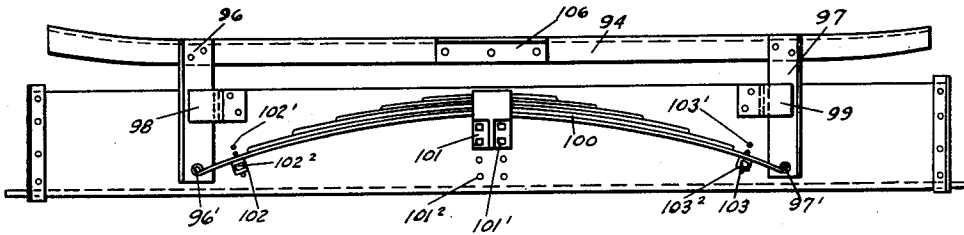


Fig. 5

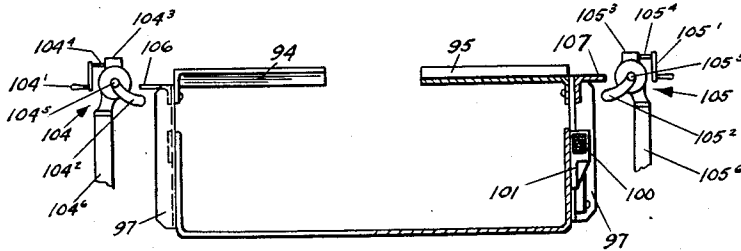


Fig. 6

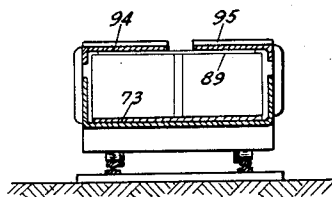


Fig. 9

INVENTOR:

Edmund C. Morgan - Deceased
Olive Eugenie Morgan - Executrix,
By

Chas. M. Nissen,

ATT'Y.

May 28, 1935.

E. C. MORGAN

2,003,007

MATERIAL HANDLING SYSTEM FOR MINES

Original Filed Dec. 9, 1927 4 Sheets-Sheet 4

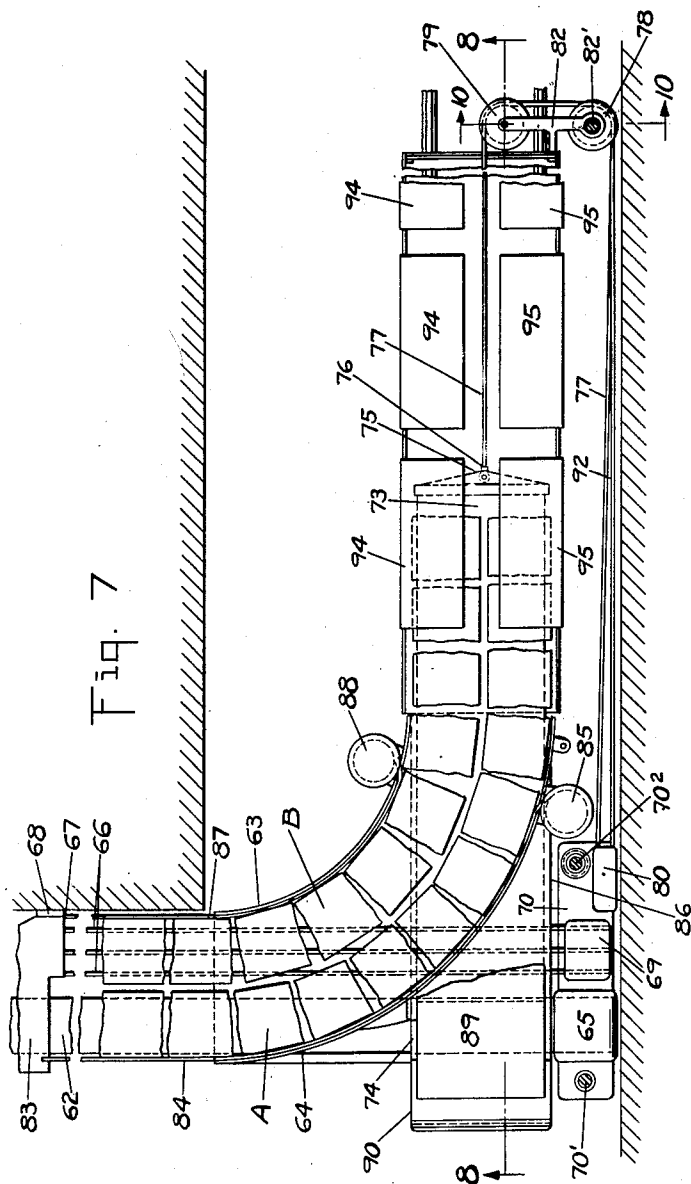


Fig. 7

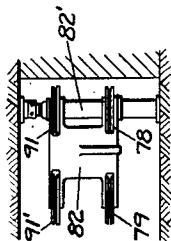
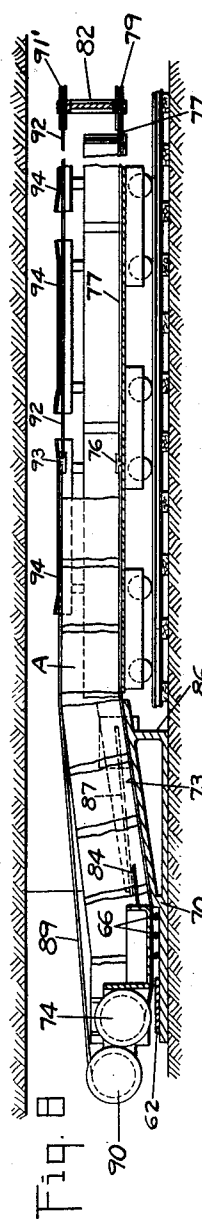


Fig. 10



UNITED STATES PATENT OFFICE

2,003,007

MATERIAL HANDLING SYSTEM FOR MINES

Edmund C. Morgan, deceased, late of New York, N. Y., by Olive Eugenie Morgan, executrix, New York, N. Y., assignor to American Morgan Company, a corporation of Delaware

Original application February 17, 1923, Serial No. 619,588. Divided and application December 9, 1927, Serial No. 238,877. Again divided and this application June 1, 1933, Serial No. 673,868

24 Claims. (Cl. 105—1)

This application is a division of a co-pending application Ser. No. 238,877, filed Dec. 9, 1927, which in turn is a division of co-pending application Serial No. 619,588 originally filed February 17, 1923. Serial No. 238,877 is now Patent No. 1,944,993, granted January 30, 1934, and Serial No. 619,588 is now Patent No. 1,678,821, granted July 31, 1928.

The present invention relates to an improved mine car construction, and has for one of its objects the provision of mine cars particularly adapted for use in connection with extensible conveyor and loading mechanism.

Another object of the invention is the provision of means on mine cars adapted to receive and retain blocks of coal transferred up-grade to such mine cars.

A further object of the invention is the provision of means for flexibly connecting a train of these improved mine cars with flexible connecting means, permitting the cars to be hauled over the track system of the mine, either empty or loaded, in a most efficient and satisfactory manner.

A further object of the invention is the provision of means on mine cars for blocking the ends thereof when the cars are hauled up or down grade, thus preventing the coal from slipping.

Still another object of the invention is the provision of means on mine cars whereby the trough of each car in a train will be relieved of all pulling strain.

Another object of the invention is the provision of means on mine cars whereby the troughs of a train of such cars may pivot in both directions relatively of their respective trucks so as to facilitate the hauling of the train around curves or onto and off from switch tracks.

A still further object of the invention is the provision of a non-fouling pivotal connection between the trough of a mine car and the trucks thereof.

Other objects of the invention will appear hereinafter, the novel features and combinations being pointed out in the claims hereto appended.

In the accompanying drawings,

Fig. 1 is a sectional elevation of the mine car train, the left hand portion being shown partly in section.

Fig. 2 is a transverse sectional elevation of the truck mechanism of the mine car, the section being taken on the line 2—2 of Fig. 1.

Fig. 3 is a plan view of the mine cars shown in Fig. 1.

Fig. 4 illustrates one of the ends of the mine car train shown in Figs. 1 to 3.

Fig. 5 is an elevational view of mechanism adapted to be added to the sides of the mine cars shown in Figs. 1 to 3 to hold the blocks of coal in place.

Fig. 6 is an end view of mechanism shown in Fig. 5, with the addition of mechanism for releasing the devices which hold the blocks of coal in place.

Fig. 7 is a plan view of a loading apparatus with which the mine cars may be used.

Fig. 8 is a sectional elevation of Fig. 7 on line 8—8 of Fig. 7, looking in the direction of the arrows.

Fig. 9 is a transverse sectional elevation of one of the mine cars, with belts both above and below the blocks of coal.

Fig. 10 is a view taken on the line 10—10 of Fig. 7 looking in the direction of the arrows.

Referring more particularly to the drawings, and especially first to Fig. 1, a truck frame 5 is mounted on wheels 6, which are adapted to travel on rails 7 of a mine track. The truck frame 5 is provided with longitudinal passage ways or recesses 8 to receive the coupling bars 9 and 10, respectively, pivoted at their inner ends at 11 and 12 to the central portion of the truck frame 5. As shown in Fig. 2, the truck frame 5 may be made comparatively heavy so as to enable the wheels 6 to have sufficient traction on the rails to stay on the track. The truck frame 5 may be pivoted at 13 and 14 to the axles 15 and 16, respectively. Springs may also be provided as shown at 17 and 18 in Fig. 2.

Extending upwardly from the lateral central portion of the truck frame 5 are vertical side plates 19 and 20, at the upper ends of which are located longitudinal guides 21 and 22. Between the central portion of one truck frame and the central portion of the next adjacent truck frame is connected a trough having spaced apart side walls 23 and 24, the ends of which are provided with vertical strips 25 and 26 which extend upwardly into the guides 21 and 22, as shown in Fig. 3.

The bottom 27 of the trough is extended from the central portion of one truck frame 5 to the central portion of the next adjacent truck frame. The bottom 27 of the trough having the walls 23 and 24, has its ends pivoted at 28 and 29 to the truck frame 5. While the coupling bars 9 and 10 are pivoted at their ends to the same bolts that the ends of the bottom 27 are pivoted, it should be noted that the pulling strain between the trucks

is taken by the coupling bars 9 and 10, because the ends of the coupling bars fit closely on the pivot bolts 11 and 12, while the ends of the bottom 27 have a loose fit, as shown in Fig. 1. This enables the trough to have an endwise movement relatively to the truck frame 5, thereby relieving the trough from pulling strain between the trucks.

Referring to Fig. 3, it will be seen that the ends of the bottom 27 of the trough having the walls 23 and 24 are provided with edges 30, 30' and 32, 32', which extend angularly from the pivots 28 and 29 toward the ends of the truck that are adjacent each other. The adjacent ends of the bottoms of the troughs are therefore provided with angular faces between them so that the train of troughs may pivot in both directions relatively to the trucks. This arrangement enables the train of wheel mounted troughs to move around curves in the mine track. For instance, if the train is hauled by a locomotive onto an angular switch-track the ends shown at 30 and 31 in Fig. 3 are free to approach the ends 32 and 33 respectively, while the guides 21, 22 at the sides of the truck frame cooperate with the pivots 28, 29, 34 and 35 to hold the troughs in the desired relation to the truck frames. Meanwhile the blocks of coal are carried in continuous series extending along the train of trough sections. If desired the ends of the bottoms of the troughs may be beveled at their edges 30, 30', 32, 32' so as to facilitate the movement of the troughs by scraping up from the floor of the truck frame any small particles of coal which may have become lodged thereon.

The train of flexibly-connected troughs, as above stated, may be hauled along the mine track by a locomotive or some other means suitable for the purpose. The flexible connections on the upright axes between the train units readily permit the cars to pass around curves or onto and off from switch tracks. Furthermore, if there are any irregularities on the tracks, tending to cause the train units to sway sidewise, the sides of the trough will bend to permit this. The troughs are made preferably of sufficiently thin plates of steel so as to be strong enough to handle the coal and at the same time have sufficient flexibility to permit lateral swaying of the cars without undue strain on the trucks and the connections thereto.

In Fig. 4 is illustrated the form of the troughs at the ends of the train. The end troughs 36 are merely shorter in length but are otherwise constructed and arranged as above described in connection with Figs. 1 to 3, inclusive. The train of troughs may be open at its ends, but where the train is transported up grade in the mine, removable vertical end gates 37 should be provided. These may be added by sliding them down along the vertical guideways 38 and 39. In order to hold the short troughs 36 in fixed relation to the frame 40, set screws 41 and 42 are mounted in position in the sides of the frame 40, to be engaged by the vertical angle iron strips 43 and 44 which are secured to the sides of the end trough 36.

As previously mentioned, the mine cars are particularly adapted for use in connection with extensible conveyor and loading mechanism, and this use is illustrated in Figs. 7 to 9 inclusive, but more fully set forth in the Morgan Patent 1,678,821, July 31, 1928.

The extensible conveyor and loading mechanism illustrated in Figs. 7 to 10 inclusive, has been selected from one of the forms of such mechanism originally shown in the above-identified patent. This extensible conveyor and load-

ing mechanism when in use is connected to a mining machine in such a manner as to extend around the corner of a coal pillar into an entry at right angles to the path of the mining machine. The dislodged column of coal is broken up into blocks and directed onto the conveyor and loading mechanism by which it is transported to the train of flexibly connected mine cars and deposited within the troughs for transportation over the track system of the mine.

Referring now in detail to the extensible conveyor and loading mechanism illustrated in Figs. 7 to 10 inclusive, part 62 is a flexible traveling belt for the reception of dislodged blocks of coal A. This belt 62 is adapted to lie on and slide along the mine floor and carry the blocks of coal into the curved chute 63 so as to impinge against the vertical arcuate wall 64 thereof, as shown in Fig. 7. The belt 62 is preferably composed of steel, and is thin, flexible, hard and durable.

The belt 62 extends rearwardly to the winding mechanism 65, which may be operated whenever desired to convey some of the blocks of dislodged coal into the loading apparatus.

The adjacent sectional columns of coal B have extending under them a conveyor comprising a plurality of spaced apart wire ropes or cables 66 which are paid out from a winding mechanism not shown. An additional rope may be attached at 67 to the vertical extension 68. The purpose of this rope will be referred to more particularly in a later part of the description.

It will be seen that the ropes 66 extend to a winding mechanism 69 mounted on the base plate 70. This base plate may be suitably anchored by roof jacks 70' and 70". During the operation of the mining machine the ropes are paid out but at such time the winding mechanism 69 is not operated except to maintain the ropes 66 taut. In this respect the operation of the winding mechanism 69 is similar to that of the winding mechanism 65, in keeping the ropes and belt conveyor taut and keeping the blocks of coal in alignment in readiness to be loaded into the train of mine cars, after the mining operation has been completed.

From the chute 63 the blocks of coal are delivered upon a belt 73, which in turn is paid out from a winding mechanism 74. Attached to the free end of the belt 73 is a cross piece 75 to which a hook is adapted to be connected as at 76, the hook in turn being connected to the free end of a rope 77. The rope 77 is directed around pulleys 78 and 79 to the winding mechanism 80 mounted on the base plate 70. The direction pulleys 78 and 79 are pivoted on a frame 82, which may be held in fixed position by means of a roof jack 82'. When the blocks of coal have been loaded upon the mine cars by the belt 73, the belt is retracted from under the blocks by the winding mechanism 74 after the hook on the free end of the rope 77 is detached from the cross piece 75.

When the operations are being carried on so that the blocks of coal will have to be moved upwardly along a steep grade, additions will have to be made as follows: From the frame 83 extends a belt or rope 84 to a winding mechanism 85 mounted on the frame 86. The belt or rope 84 passes along the inner surface of one arcuate wall of the chute 63. In a similar manner, the rope or belt 87 extends to the winding mechanism 88 along the inner surface of the opposite arcuate wall of the chute. When the blocks of coal are being loaded the winding devices 85 and 88 are

operated simultaneously with the winding devices 65 and 69 to move the coal around the curved chute and up grade onto the belt 73 and into the train of troughs above described.

When the coal is being moved up-grade it is also desirable to add a belt 89 and extend the same from the winding mechanism 80 over the top of the coal so as to cooperate with the belt 73 below the coal and thus move the latter up-grade into the train on which the coal is to be loaded. For this purpose the frame 82 is provided with two pairs of pulleys. The pulleys 78 and 79 are located in position to direct the rope 77, whereas the pulleys 91 and 91' are in position to direct the rope 92. Both of the ropes 77 and 92 are operated by the winding mechanism 80 and these ropes are connected, respectively, at 76 and 93 to the belts 73 and 89. When the winding mechanism 80 is operated, the belts 73 and 89 are pulled forwardly simultaneously while being paid out by their respective winding devices 74 and 90.

In order to hold the coal more effectively in the train of troughs after the belts 73 and 89 have been uncoupled from their respective ropes 77 and 92 and retracted from the train by their respective winding mechanisms 74 and 90, longitudinal lateral pressure devices shown at 94 and 95 may be employed. By referring to Figs. 5, 6 and 7 it will be seen that these pressure devices may be in the form of plates 94 and 95 extending almost to the center of the truck, or the longitudinal center line thereof, and also extending almost the full length of one of the trough units. These plates 94 and 95 may be connected to angles including the vertical strips or bars 96 and 97, on both sides of the train, see Figs. 5 and 6, which are adapted to slide vertically along the guides 98 and 99. The upper ends of vertical bars 96 and 97 are rigidly secured to the friction plate 94 on one side of the train and the bars 96 and 97 on the opposite side of the train are secured to the plate 95. The lower ends of the bars 96 and 97 are connected at 96' and 97' to a leaf spring 100, which is mounted in turn on the knee plate 101 so as to exert a downward pull on the friction plate 94. The same arrangement is provided for the plate 95 on the opposite side.

The ends of the plates 94 and 95 are curved upwardly so that the coal may be moved under the plates with the upward lifting action against the downward pressure exerted by the leaf springs 100 on opposite sides of the train. The tension of the leaf springs may be adjusted by raising or lowering the knee plates 101 which support the springs on opposite sides of the troughs. To raise or lower these plates 101, the nuts 101' are removed from the bolt ends and the bolts then inserted through upper or lower sets of the openings 101². Adjustable stops are shown at 102 and 103 to limit the downward movement or lower the position of the plates 94 and 95. By means of the adjustable stops 102 and 103, the plates 94 and 95 may be adjusted to a higher initial position than the position shown in Fig. 5. In this manner the initial height of the friction plates 94 and 95 may be adjusted in accordance with the thickness of the blocks of coal. The adjustments of the stops 102 and 103 are made by providing a series of vertically spaced openings 102' and 103' in the trough sides and with the stops secured by bolts 102² and 103², engaging in selective ones of said openings. The bolts may be transferred into different ones of the

openings so as to raise or lower the stops as desired.

As shown in Fig. 6, manually operated releasing devices 104 and 105 may be provided at the sides of the trucks in position to engage the laterally extending flanges 106 and 107 to lift the friction plates 94 and 95 off the blocks of coal in the train of troughs when it is desired to unload the coal from the train. These releasing devices 104 and 105 comprise manually operated crank handles 104' and 105' which rotate the curved lifting arms 104² and 105² against the under side of the flanges 106 and 107 and continued rotation of the cranks will lift the plates 94 and 95 to the desired elevation. The crank handles 104' and 105' are connected to the lifting arms 104² and 105² through the medium of worm gears housed as at 104³ and 105³ and mounted on the crank handle shafts 104⁴ and 105⁴. These worm gears mesh with pinions on the shafts 104⁵ and 105⁵ and the arms 104² and 105² are mounted on these shafts.

The mechanism of the manually operated releasing devices may be supported upon the end of standards 104⁶ and 105⁶ which in turn may be conveniently mounted from the trough sides or on the truck frame.

The use of worm gearing in the manually operated releasing devices 104 and 105 enables these devices to hold the plates 94 and 95 elevated above the coal without the aid of other holding means since the worm will not rotate in a reverse direction in response to the tension of the spring 100. The cranks therefore will have to be rotated in reverse to lower the plates.

These retaining devices 104 and 105 also serve the purpose of relieving the adjustable stops 102 and 103 of the tension of the spring 100 so that the stops may be easily transferred from one of the openings 102' and 103' to another.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention defined by the claims here-to appended and it is desired therefore not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of the invention what is desired to secure by Letters Patent of the United States is:

1. In apparatus of the class described, flexibly coupled truck frames forming a train, a trough between the truck frames, into which trough is adapted to receive material loaded upon the train, and spring-pressed friction devices cooperating with the trough and adapted to bear upon the top of the material in the trough for facilitating the holding of the material in the trough.

2. In apparatus of the class described, flexibly coupled truck frames forming a train, a trough between the truck frames having its respective ends pivoted to the said frames, and friction devices mounted on the trough in position to hold material therein.

3. In apparatus of the class described, flexibly coupled truck frames, a trough between the truck frames which trough is adapted to the loading of material thereinto, and spring-pressed friction devices cooperating with the trough and adapted to bear upon the top of the material in the trough for facilitating the holding of the material in the trough.

4. A trough train comprising a truck frame, side plates extending upwardly from the sides of said truck frame and carried thereby, trough

sections pivotally connected at their adjacent ends to said truck frame, and means at the upper ends of said side plates for affording guideways for the end portions of the side walls of said trough sections.

5 5. A trough train comprising a truck having a platform with an upper horizontal surface, trough sections having horizontal bottoms with V-shaped ends, spaced-apart pivotal connections located at the apices of the said V-shaped ends to flexibly connect said trough sections with the central portion of said platform with the edges of said V-shaped ends of said bottoms at the upper horizontal surfaces of said platform, vertical spaced-apart plates at the sides of said platform, and means on said plates affording guideways between the same and the ends of the side walls of said trough sections.

6. A trough train comprising flexibly connected truck frames, trough sections pivotally connected at their ends to said frames, vertical spaced apart side frames on the truck frames, and arcuate guides on the side frames concentric with the pivots between the trough sections and the truck frames, said arcuate guides being located between the ends of the side walls of adjacent trough sections and said side frames.

7. A trough train comprising a plurality of flexibly coupled truck frames, a continuous trough comprising a plurality of sections each flexibly connected at its ends to said truck frames, longitudinally disposed friction devices for engaging the upper surfaces of the material in the trough to retain it in carrying position, and springs located at the sides of the trough for urging downwardly the said friction devices against the upper surfaces of such material.

8. A mine car comprising vertical side members between which material is adapted to be loaded upon the car, spaced apart longitudinal friction devices mounted on said side members in position to permit the material to slide under said friction devices and in contact with the under surfaces thereof, and spring pressed means mounted on the said side members for urging downwardly against the material said friction devices after such material has been slid under the same.

9. The combination with a mine car having vertical side members, friction means for holding the material upon the car, mechanism for lifting said friction means relative to the bottom of the car to permit said material to slide along such bottom to a position under said friction means, and spring operated mechanism for urging downwardly said friction devices on top of said material when said lifting means is released.

10. The combination with a mine car having side members between which the material is adapted to be placed, spring pressed friction devices for holding the material upon the car, and manually operated releasing means for lifting said friction devices for passage of such material beneath the same, said spring pressed friction devices acting automatically to engage the top of said material when in place under the same and after said manually operated means has been restored to initial position.

11. A trough train comprising a truck frame, trough sections pivotally connected at their ends to said frame, vertical plates secured rigidly to the sides of said frame with the ends of the side walls of said trough sections overlapping the inner walls of said side plates, and means for guiding the upper corners of the side walls of said

trough sections along the upper ends of said side plates.

12. A trough train comprising a truck frame, an end trough section secured to said frame and having spaced apart side walls adjacent to the sides of said frame, a transverse abutment connecting said side walls, vertical plates at the sides of said frame, and means between said side plates and said side walls for preventing movement of said trough section relative to said truck frame.

13. A trough train comprising a plurality of trucks connected by drawbars, pivotally connected at their ends to said trucks, trough sections pivotally connected at their ends to said trucks, the trough sections being closed at the bottom between side walls equally spaced from each other throughout their lengths to afford a sectional trough of uniform dimensions for free and unobstructed movement of material therealong, and means on each truck for connecting the adjacent ends of the side walls of the trough sections to maintain a continuity of the side walls of the trough and equi-lateral spacing thereof for a free and unobstructed communication between each trough section and the next adjacent trough section while the top of the trough remains open throughout its length.

14. A trough train comprising a plurality of trucks coupled together in a train, a plurality of trough sections each open at the top and having a closed bottom between side walls equally spaced from end to end of the section, each trough section being flexibly connected at its ends to said trucks, and means on the trucks for connecting the ends of the side walls of the trough sections to form a continuous trough extending throughout the length of the train with the side walls equally spaced laterally throughout the length of the train.

15. A trough train comprising a plurality of flexibly connected truck frames, trough sections pivotally connected at their ends to said truck frames on vertical axes, each trough section having a closed bottom between side walls equally spaced from end to end of the section, the side walls on one section being in alignment with those on the next adjacent sections and the bottom of one trough section being in alignment with the bottoms of the next adjacent trough sections, and means on each truck for connecting the adjacent ends of said side walls to maintain the continuity of the side walls of the trough and to provide a continuous trough having substantially the same cross-sectional area from end to end of the train to adapt the same to receive material at one end of the train for free and unobstructed transfer along the bottom of said trough between the uniformly spaced side walls to the other end of the train.

16. A trough train comprising flexibly coupled spaced-apart truck frames, trough sections pivotally connected at their ends to the central portions of said truck frames, the adjacent ends of the bottoms of said troughs at the upper surfaces of the truck frame being V-shaped, each section being open at its top and having a closed bottom between side walls equally spaced from end to end of the section, and means between the adjacent ends of the side walls of the trough sections for alining said side walls and maintaining the continuity thereof to co-act with such side walls to form a continuous trough of uniform dimensions from end to end with an open top and a continuous closed bottom from one end of the train to the other.

17. A trough train comprising a plurality of wheeled trucks adapted to travel on a mine track, couplings between said trucks, a series of trough sections each flexibly connected at its ends to said trucks and each being open at its top and having a closed bottom between side walls equally spaced from end to end of the section with the side walls of one section in alinement with the side walls of the next adjacent sections but spaced therefrom, and means at the sides of the trucks between the spaced ends of the side walls of said trough sections for establishing continuity of such side walls during movement of the train on curves of a mine track as well as the straight portions thereof to afford a continuous trough from one end of the train to the other along the free and unobstructed space having uniform cross-sectional area throughout the length of the train.

18. A trough train having a continuous trough open at its top and closed at its bottom between side walls spaced equally from end to end of the train to afford a free and unobstructed space having substantially the same cross-sectional area throughout the length of the train, comprising a plurality of trucks, a plurality of trough sections pivotally connected to said trucks, and means carried by the trucks flexibly connected to the adjacent ends of the side walls of the trough sections to maintain alinement thereof and the continuity of such trough when the train travels along curves of a mine track.

19. A trough train having a continuous closed bottom and an open top between side walls equally spaced from end to end, comprising a series of flexibly connected trucks, a series of trough sections each pivotally connected at its ends to said trucks, means on each truck at the sides thereof to form connecting walls having a lateral spacing equal to the spacing between the side walls of the adjacent sections and associated with the ends of the side walls of the trough sections, and means for guiding the adjacent ends of the side walls of the adjacent trough sections toward or from each other when the train travels around curves of a mine track.

20. A trough train comprising a mine car truck frame, a pair of trough sections pivotally connected at their ends to the central portion of said frame, each trough section having side walls equally spaced from end to end of the section and mounted in alinement with the side walls of the next adjacent section, the adjacent ends of the bottoms of the trough sections being substantially V-shaped with the pivot points at the apices of the ends, vertical closure members mounted on the truck frame to have a lateral spacing equal to that of the spacing between the side walls of the adjacent sections, and means for guiding the adjacent ends of the side walls of the adjacent trough sections along said vertical closure members during movement of the train along curves of a mine track.

21. A trough train comprising a plurality of flexibly coupled truck frames, a plurality of trough sections each pivotally connected at its ends to said truck frames, each trough section

having an open top and a closed bottom between side walls equally spaced from end to end of the section and in alinement with the side walls of the next adjacent section, means on the truck frames and stationary relative thereto between the ends of the side walls of said adjacent trough sections to connect said side walls in the formation of a continuous trough having a closed bottom and an open top with the cross-sectional area of the space for movement of the material substantially the same throughout the length of the train, and means for guiding the ends of the side walls of said trough sections to maintain continuity of alinement of said side walls when the trough train travels along curves in a mine track.

22. A trough train comprising a truck frame adapted to receive coupling bars for connecting the truck frame to adjacent truck frames to form a train, coupling bars pivoted to the said truck frames, and a continuous material receiving trough having a closed bottom and alined side walls, the trough train being open at its top and with its material receiving portion uniform in cross-sectional area from end to end, said trough comprising sections pivotally connected at their ends to the truck frames on the axes of the pivots of the coupling bars.

23. A trough train comprising a truck frame adapted to receive coupling bars for connecting the truck frame to adjacent truck frames to form a train, pivot means on the frame, coupling bars mounted on the pivot means, a continuous material receiving trough having a closed bottom and alined side walls, the trough train being open at its top and with its material receiving portion uniform in cross-sectional area from end to end, said trough comprising sections each movable relatively to said truck frame, and means at the ends of the trough sections to permit the said pivot means to also serve to pivot the ends of said sections to said truck frame, the said coupling bars taking the pulling strain between the truck frames.

24. A trough train comprising a wheeled truck adapted to travel on a mine track, spaced-apart pivotal connections between the truck and oppositely extending coupling bars, oppositely extending trough sections having open tops and closed bottoms connecting spaced-apart side walls with the transverse distance between the walls the same throughout the lengths of both sections to afford a trough train having its material receiving portion uniform in cross-sectional area for free and unobstructed passage of material from one section to the next section, pivotal connections between the ends of said sections and the truck, and means on the truck between the ends of the side walls of the adjacent trough sections for maintaining alinement of the side walls of one section with those of the other with consequent continuity of communication between trough sections when the latter move laterally on their pivots relatively to the truck.

OLIVE EUGENIE MORGAN,
Executrix, Estate of Edmund C. Morgan, Deceased.