June 9, 1931. A. L. GUILLE 1,809,200

UNLOADING APPARATUS

Filed Nov. 29, 1927 3 Sheets-Sheet 1

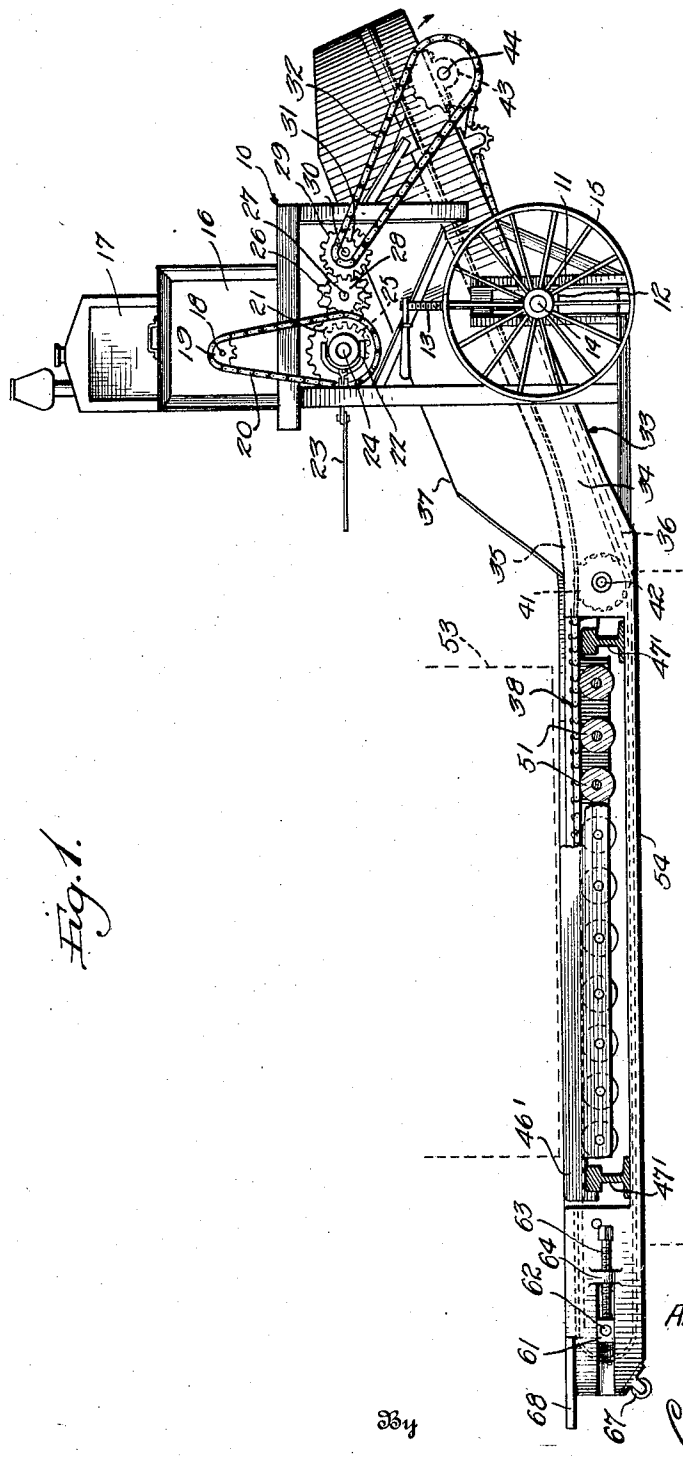


Fig. 1.

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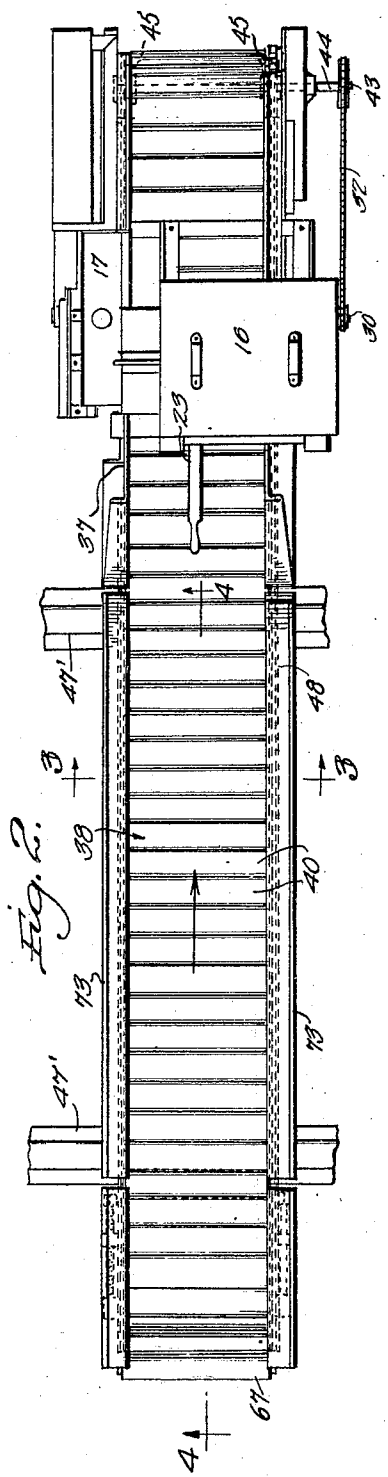


Fig. 2.

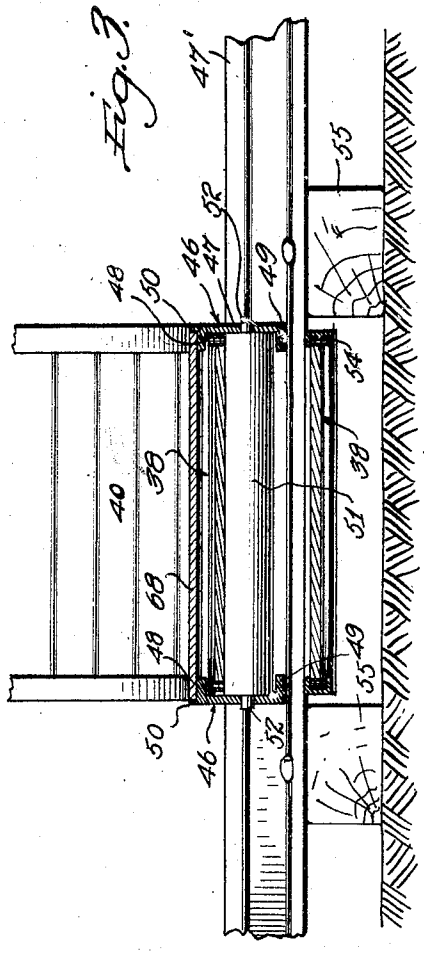


Fig. 3.

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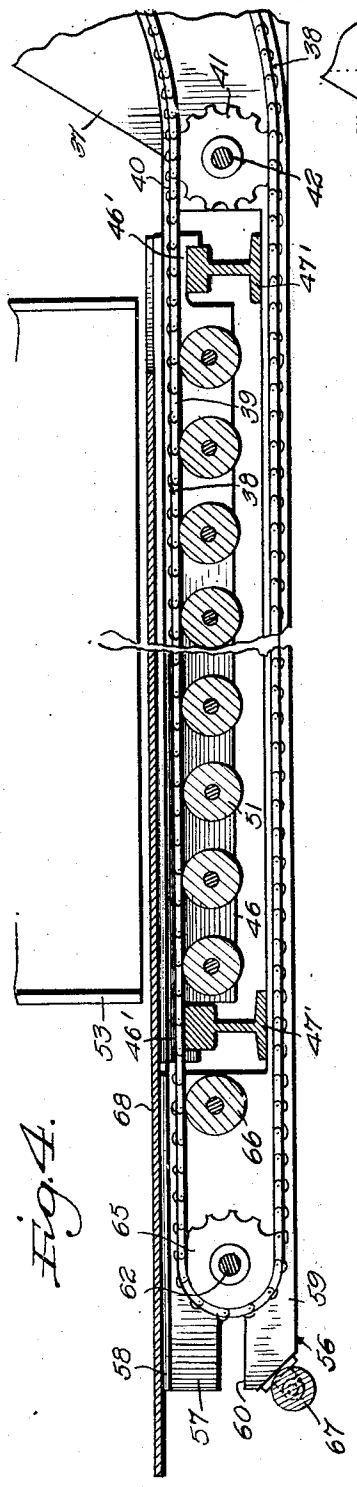


Fig. 4.

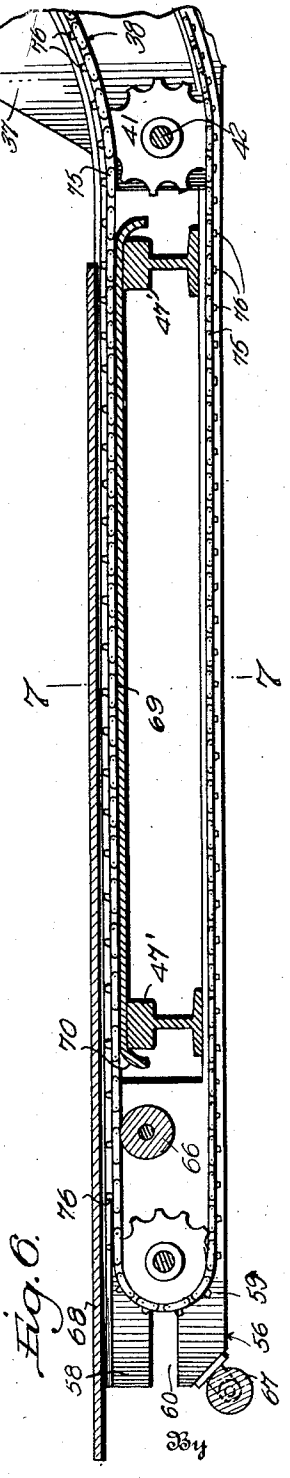


Fig. 6.

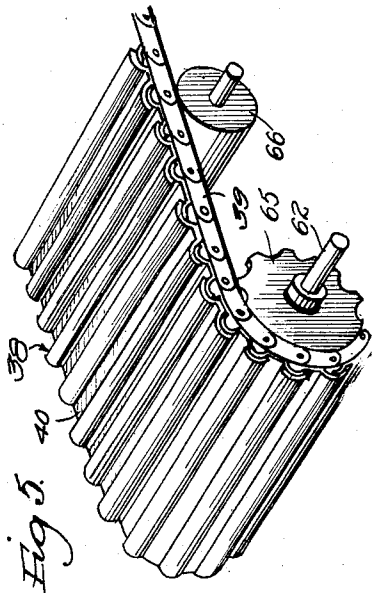


Fig. 5.

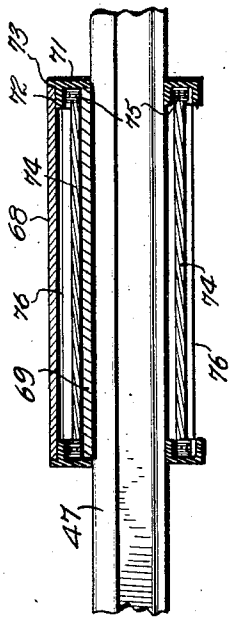


Fig. 7.

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UNITED STATES PATENT OFFICE

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UNLOADING APPARATUS

Application filed November 29, 1927. Serial No. 236,510.

This invention relates to unloading apparatus, and more particularly to an apparatus for unloading coal cars and transferring the coal to vehicles, bins, etc.

It is the present practice to ship coal and similar material in cars having discharge hoppers in the bottom thereof, and the hoppers have such slight clearance above the rails upon which the car travels that it has been found difficult to provide means for unloading the cars other than by placing them on trestles above bins into which the material is to be discharged. Unloading apparatus employing endless belts for conveying the material discharged from the hopper to a suitable discharge point have been employed for several years, and such apparatus may be divided into two general classes, namely those in which the horizontal conveyor portion to receive the discharged material is arranged wholly above the rails, and those in which the horizontal conveyor portion is arranged wholly beneath the rails. The former type must be made extremely thin owing to the slight clearance of the bottoms of the hoppers, and such an apparatus is wholly useless with some types of cars, and particularly cars the hopper doors of which have become warped or otherwise distorted so as reduce the normal clearance. It is safe to say that this form of apparatus cannot be employed in connection with more than 25 per cent. of the ordinary run of cars to be unloaded. With the form of apparatus wherein the horizontal conveyor portion is arranged wholly beneath the rails, it is necessary to dig a pit of substantial depth beneath the rails to accommodate the apparatus. Railroad companies exercise control over the sidings upon which cars usually are unloaded and it is difficult to secure permission from them to dig the necessary pits to accommodate the apparatus. Such pits when employed, must be dug at the expense of the user of the apparatus, and they present difficulties in operation such as the necessity for providing drainage therefor.

The present apparatus has for its principal object the overcoming of the inherent disadvantages of the types of apparatus referred to above.

A further object is to provide a novel form of apparatus employing an endless conveyor the top and bottom runs of which travel above and below the rails respectively, transversely thereof, thus providing ample clearance for the car hoppers and eliminating the necessity of providing a permanent pit of material depth beneath the rails.

A further object is to provide an apparatus of the character referred to which includes means for supporting the upper run of the endless conveyor during its travel between the rails, transversely thereof, during which travel it receives the coal or other material being discharged from the car.

A further object is to provide means for regulating the rate of discharge of the material from the car so as to feed to the conveyor only such quantities of material as conveniently can be conveyed by the endless conveyor employed, so as to prevent overloading the conveyor and breaking either the material or portions of the apparatus.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings I have shown several embodiments of the invention. In this showing,

Figure 1 is a side elevation,

Figure 2 is a plan view,

Figure 3 is a section on line 3—3 of Figure 2,

Figure 4 is a vertical longitudinal sectional view on line 4—4 of Figure 2,

Figure 5 is a detail view of a portion of the conveyor and associated elements,

Figure 6 is a view similar to Figure 4 showing a modified form of apparatus, and,

Figure 7 is a detail section on line 7—7 of Figure 6.

Referring to the drawings the numeral 10 designates a supporting frame as a whole which forms, in itself, no part of the present invention and may be of any suitable type. The frame includes a pair of spaced vertically arranged guides 11 arranged at each side of the frame and between each pair of which is arranged a block 12 adapted to be ver-

tically adjusted by a screw 13. Each block 12 is provided with a stub shaft 14 rotatably supporting a wheel 15 by means of which the apparatus may be moved from place to place, and by means of which the adjacent end of the apparatus may be supported when in operative position.

The frame is provided with a suitable housing 16 in which any suitable source of power (not shown) may be mounted, such as an internal combustion engine or an electric motor. If an internal combustion engine is employed, a suitable radiator 17 for the cooling system thereof may be employed. The power source is provided with a power take-off shaft 18 arranged outwardly of the housing 16 and suitable means may be connected between this shaft and the operating elements of the apparatus to be described, to furnish drive means for the latter. In the present instance the shaft 18 is shown as being provided with a sprocket 19 about which the chain 20 passes, the lower end of the chain also passing around a lower and preferably larger sprocket wheel 21 to provide speed reducing means. A clutch 22, operable by a suitable lever 23, is adapted to operatively connect the sprocket 21 to a shaft 24 upon which is mounted a gear 25. This gear meshes with a larger gear 26 mounted upon a shaft 27 and a pinion 28 also is mounted upon this shaft. A gear 29 mounted upon a shaft 30 meshes with the pinion 28 to be driven thereby, and the shaft 30 carries a sprocket 31 about which passes a chain 32.

A pair of side channel members indicated as a whole by the numeral 33 is supported at opposite sides of the frame 10 and is inclined downwardly toward one end as shown in Figure 1. Each channel member includes a side base portion 34 and upper and lower flanges 35 and 36, these flanges curving adjacent their lower ends and terminating substantially horizontally for a purpose to be described. Substantially vertical side guide plates 37 extend upwardly from the channels 33 and pass through the frame 10, as will be apparent.

Referring to Figure 5, the numeral 38 designates an endless conveyor as a whole which may be of any suitable type, for accomplishing the desired results, as will become apparent. In the present instance, the conveyor is illustrated as comprising an endless link-belt 39, and for a purpose to be described, one or more joints of the belt is adapted to be disconnected. The belt is preferably provided with a plurality of overlapping transverse flights 40 having upwardly projecting portions, as shown in Figure 5, to engage and move the material to be unloaded. The upper and lower runs of the conveyor, intermediate its ends, pass over and under a sprocket wheel 41 which engages the links of the belt 39. The sprocket wheel is mounted upon a shaft 42 journalled in the channels 33. Bearings 43 are mounted beneath the channels 33 adjacent their upper ends and rotatably support a shaft 44 carrying a wheel 45 similar to the wheel 41 previously described. The chain 39 also passes around the wheel 45, as will be apparent, and the upper run of the conveyor between the wheels 41 and 45 contacts with the lower faces of the flanges 35 to be guided thereby. Portions, at least, of the conveyor are or may be supported upon the upper faces of the flanges 36, as will be apparent.

Referring to Figures 3 and 4, the numeral 46 designates a pair of supports in the form of channels which extend transversely of the rails 47′ upon which the car to be unloaded is arranged. The supports 46 include side bases 47, and upper and lower inwardly extending flanges 48 and 49, each support being extended upwardly beyond the flange 48 thereof to form a guide flange 50, for a purpose to be described. Rollers 51 are arranged between the supports 46 and are provided at their ends with stub shafts 52 journalled in the bases 47. These rollers obviously extend transversely of the conveyor 38, and support the latter between the rails 47′, and during its passage beneath the hopper 53 of a coal or similar car supported on the rails 47′. Any suitable means may be employed for securing the supports 46 in position, and in Figure 4 of the drawings these elements have been shown as being provided with overhanging extensions 46′ adapted to rest upon the rails 47′.

A pair of extensions or connecting members 54 is arranged beneath the rails 47′, as shown in Figures 1 and 3, and these extensions may be formed integral with, or separate from, the channels 33. The extensions 54 themselves, may be formed as channels, if desired, as shown in Figure 3, and serve as guiding and supporting means for the lower run of the conveyor 38 in its travel beneath the rails. In connection with the extensions 54, and the lower run of the conveyor, it will be noted that the rails 47′ are arranged upon suitable ties 55, only one of which need be removed to permit the insertion of the extensions 54. The ties of most railroad sidings lie upon the surface of the surrounding ground, thus making it very easy to place the extensions 54 in position. In cases where the ties are embedded in the ground, it merely is necessary temporarily to dig a shallow trench to permit the elements referred to to be inserted beneath the rails.

A pair of channels 56 is arranged beyond the outer rail 47′, each channel 56 being connected to or formed integral with one of the extensions 54. Each channel 56 includes a side base 57 and upper and lower flanges 58 and 59, the upper flange being provided with a vertical flange similar to the flange 50 pre-

viously described (see Figure 3) and arranged in alinement therewith. Each side base 57 is provided with a longitudinal slot 60 in which is slidably arranged a bearing block 61, and a transverse shaft 62 is journalled in these blocks. A screw 63 contacts with each block 61 and is threaded in a lateral boss 64 carried by the adjacent channel 56. The screws referred to are operable to move the bearings 61 outwardly to tension the conveyor, the latter passing around a sprocket 65 carried by the shaft 62. A roller 66, similar to the rollers 51 previously described, is preferably arranged adjacent the outer rail 47′ and is journalled between the channels 56. The roller 66 also acts as supporting means for the upper run of the conveyor. If desired, small wheels 67 may be carried by the outer ends of the channels 56 to facilitate inserting the horizontal portion of the apparatus beneath the rails.

When a conveyor of the type described passes beneath a discharge hopper of a coal or similar car, it ordinarily is necessary for portions of the material to be conveyed entirely across the width of the hopper, thus resulting in breakage of the material and often damaging the conveyor. In the present instance, a plate 68 is supported on the flanges 48 and 58 and is guided between the flanges 50 of the supports 46 and the corresponding flanges of the channels 56. This plate is slidable and normally occupies the position shown in Figure 4 whereby the material in the hopper will be fed from only one side thereof to the conveyor, at a point where the latter passes from beneath the hopper, and thus it will be apparent that the necessity for conveying the material entirely across the hopper is obviated. Of course, as the car becomes emptied, the plate 68 may be moved outwardly to release the material.

The form of the invention illustrated in Figures 6 and 7, is substantially the same as that previously described, and need not be referred to in detail. In place of the rollers 51 and their supports, a transverse plate 69 may be placed upon the rails 47′, and the extremities of the plate are preferably turned downwardly as at 70 to prevent the conveyor from contacting with the ends of the plate. This plate is adapted to support the conveyor during its travel beneath the hopper and is preferably polished to reduce friction. The plate 69 may be provided at its edges with upstanding flanges 71 terminating in upper inwardly extending horizontal flanges 72, each flange 71 being provided with an upwardly extending portion 73 serving to guide the plate 68 previously described. In place of the conveyor 38 previously described, a belt conveyor 74 may be employed, and may be connected at its edges to endless chains 75. Cleats 76, or other outwardly projecting members may be connected to the belt 74 at spaced intervals.

The operation of the apparatus is as follows:

As previously stated, one or more links of the conveyor 38 may be disconnected to permit the belt to be placed around the rails 47′, as shown in Figure 4. With the belt thus disconnected, the horizontal elements of the apparatus including the extensions 54 and channels 56 and the elements carried thereby, may be inserted beneath the rails. It ordinarily is necessary to remove one of the ties 55 and it also may be necessary temporarily to dig a shallow trench to permit the insertion of the elements referred to. After the elements are in position, any trench which it was found necessary to excavate, may be filled to the normal level of the earth. The wheels 67 are adapted to facilitate the placing of the parts in position. After a car is arranged in position to be unloaded, the supports 46 are placed in position on the rails, being supported thereon by the overhanging projections 46′. The rollers 51 are carried by the supports 46, and the latter elements are moved on the rails until they are in alinement with the channels 33 and 56. The ends of the conveyor are then brought together and secured to each other, whereupon the plate 68 may be arranged beneath the hopper to govern the flow of material therefrom in the manner referred to. The screws 63 may be operated properly to tension the conveyor, as will be apparent. The apparatus is then ready for operation.

As previously stated, any suitable source of power may be employed for operating the apparatus, such as an electric motor or internal combustion engine. Power is transmitted from the source to the chain 20 through shaft 18 and sprocket 19, the chain serving to drive the sprocket 21 which may be connected to the shaft 24 by operating the clutch lever 23. Thus power may be delivered to the shaft 44 of the conveyor through the gear train and through the chain 32 and its associated sprocket wheels. Rotation of the shaft 44 drives the conveyor in the direction of the arrow shown in Figure 2, the upper run of the conveyor moving toward the channels 33. The conveyor is supported during this movement between the rails by the rollers 51, and contacts with the flanges 35 to be guided thereby as it travels between the channels 33. The flights 40 pick up the coal or other material discharged from the hopper between the inner side thereof, and the adjacent end of the plate 68, and the material thus will be conveyed outwardly and upwardly between the plates 37 which prevent the material from spilling from the sides of the conveyor. At the upper end of the conveyor, the material may be discharged into a vehicle, upon a second conveyor of any

desired type, or otherwise may be disposed of as desired. The lower run of the conveyor will be supported between the flanges of the extensions 54 and upon the lower flanges 59 of the channels 56.

The operation of the form of the apparatus shown in Figures 6 and 7 is substantially the same as the operation just described. In place of the supports 46 and rollers 51, the plate 69 may be employed, the conveyor being adapted to slide over the plate in its travel beneath the hopper. The projections or cleats 76 serve to engage the material and assist in moving it with the conveyor.

After the car has been completely unloaded, operation of the apparatus may be stopped, and two adjacent sets of the links of the conveyor are disconnected, preferably in the top run of the conveyor inwardly of the hopper, and the outer free end of the chain is withdrawn from beneath the hopper and from its position above the rails. It is necessary of course, to remove the plates 68 to disconnect the conveyor, and after the conveyor has been removed from its position above the rails, the supports 46 and their associated rollers may be removed. The car then may be withdrawn from the siding and a full car placed in position whereupon the parts of the apparatus may be restored to their normal positions whereupon the apparatus again is ready for operation. It will be apparent that only the movable parts last referred to need be disturbed when a car is to be removed or placed in position on the rails, the frame 10 and associated elements, the extensions 54 and channels 56 remaining in position beneath the rails. The apparatus described is of such a character as to permit the use of a conveyor properly designed to convey heavy material, and ample clearance is provided to permit the apparatus properly to operate even when the hoppers or their doors have become bent or distorted. It is not necessary to provide a permanent pit beneath the apparatus, and thus it will be apparent that the objections to the use of a pit are fully eliminated.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. Apparatus of the character described comprising an endless conveyor having a substantially horizontal portion the upper and lower runs of which are adapted to be arranged respectively above and below a pair of vehicle rails, the upper run of the conveyor being adapted to receive material discharged from a hopper of a car arranged on the rails, said conveyor having detachable portions to permit it to be removed from above the rails, a pair of spaced supports extending transversely of the rails and resting thereon, and a plurality of rollers journalled at their ends in said supports and adapted to support the upper run of the conveyor for movement across the rails, said rollers being arranged at least partially below the plane of the tops of the rails.

2. Apparatus of the character described comprising a pair of beams adapted to be arranged on each side of a pair of vehicle rails and extending transversely thereof, extensions arranged beneath the rails and connecting said beams, sprockets rotatably supported between said beams, an endless conveyor passing over said sprockets, the upper and lower runs of said conveyor between said sprockets being arranged respectively above and below the rails, the upper run of the conveyor being adapted to receive material discharged from a hopper of a car arranged on the rails, said conveyor having detachable portions to permit it to be removed from above the rails, and detachable means for supporting the upper run of the conveyor for movement across the rails.

3. Apparatus constructed in accordance with claim 2 wherein said detachable means comprises a support having end portions overhanging and adapted to rest upon the rails to be supported thereby.

4. Apparatus constructed in accordance with claim 2 wherein said detachable means comprises a pair of transverse supports having end portions overhanging and adapted to rest upon the rails to be supported thereby, and rollers journalled between said transverse supports and over which the upper run of said conveyor is adapted to travel.

5. Apparatus constructed in accordance with claim 2 wherein said detachable means comprises a pair of transverse supports having end portions overhanging and adapted to rest upon the rails to be supported thereby, and rollers journalled between said transverse supports and over which the upper run of said conveyor is adapted to travel, said supports being provided at their upper edges with channels through which the edge portions of the upper run of said conveyor are adapted to travel.

6. Apparatus of the character described comprising a pair of beams adapted to be arranged on each side of a pair of vehicle rails and extending transversely thereof, extensions arranged beneath the rails and connecting said beams, sprockets rotatably supported between said beams, an endless conveyor passing over said sprockets, the upper and lower runs of said conveyor between said sprockets being arranged respectively above and below the rails, the upper run of the conveyor being adapted to receive material discharged from a hopper of a car arranged on the rails,

said conveyor having detachable portions to permit it to be removed from above the rails, detachable means for supporting the upper run of the conveyor for movement across the rails, said detachable means including guides in which the edge portions of the upper run of said conveyor are adapted to travel, and guides carried by said extensions and in which the edge portions of the lower run of said conveyor are adapted to travel.

7. Apparatus of the character described comprising an endless conveyor having a substantially horizontal portion the upper and lower runs of which are adapted to be arranged respectively above and below a pair of vehicle rails, the upper run of the conveyor being adapted to receive material discharged from a hopper of a car arranged on the rails, said conveyor having detachable portions to permit it to be removed from above the rails, and means carried by the rails and detachable therefrom for supporting the upper run of the conveyor for movement across the rails substantially parallel to the plane of the tops thereof, said means including a plurality of supporting rollers arranged at least partially below the plane of the tops of the rails.

In testimony whereof I affix my signature.

ARTHUR L. GUILLE.