June 27, 1933. R. C. PIERCE 1,915,758

CAR

Filed March 21, 1932 5 Sheets-Sheet 1

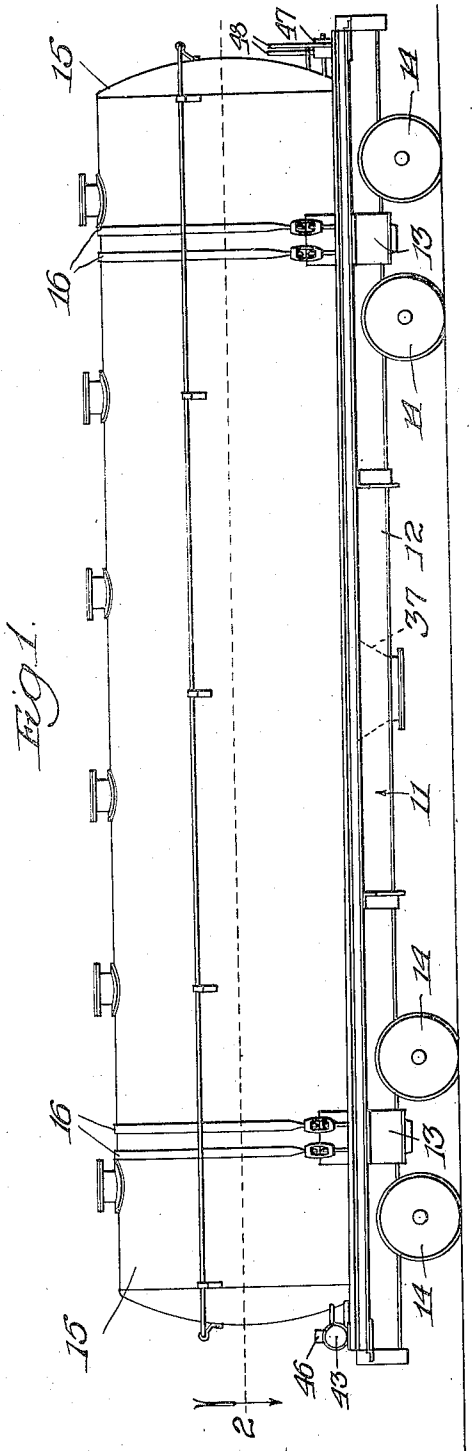


Fig. 1.

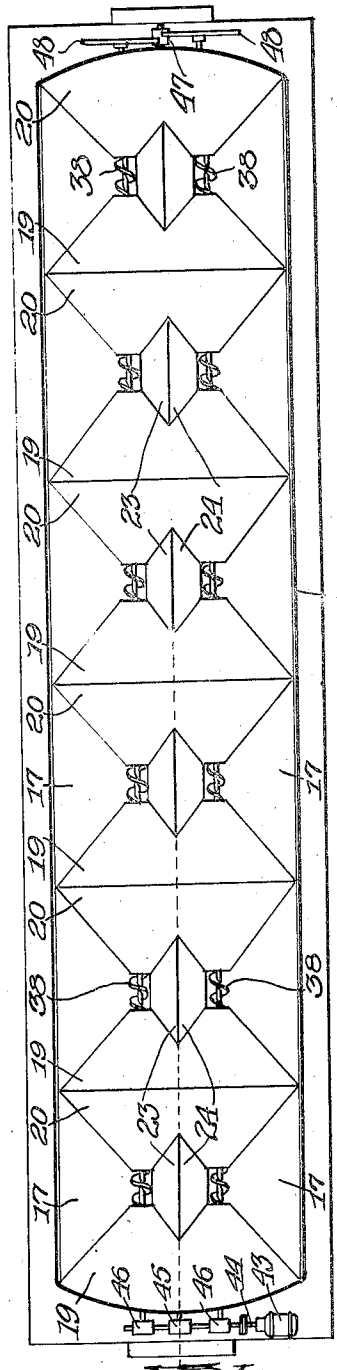


Fig. 2.

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Filed March 21, 1932 5 Sheets-Sheet 2

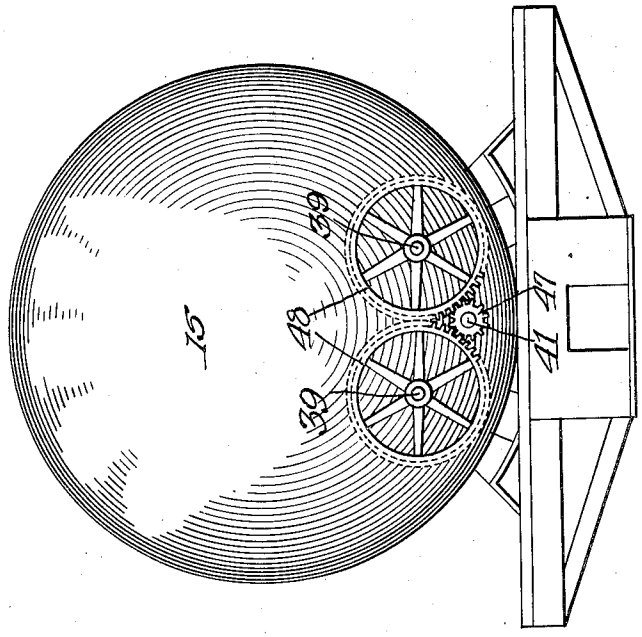



Fig. 4.

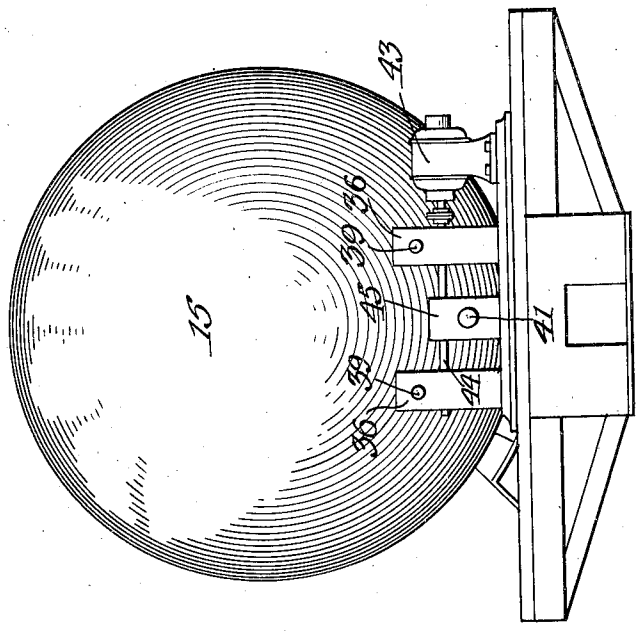



Fig. 3.

Inventor:
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Filed March 21, 1932 5 Sheets-Sheet 3

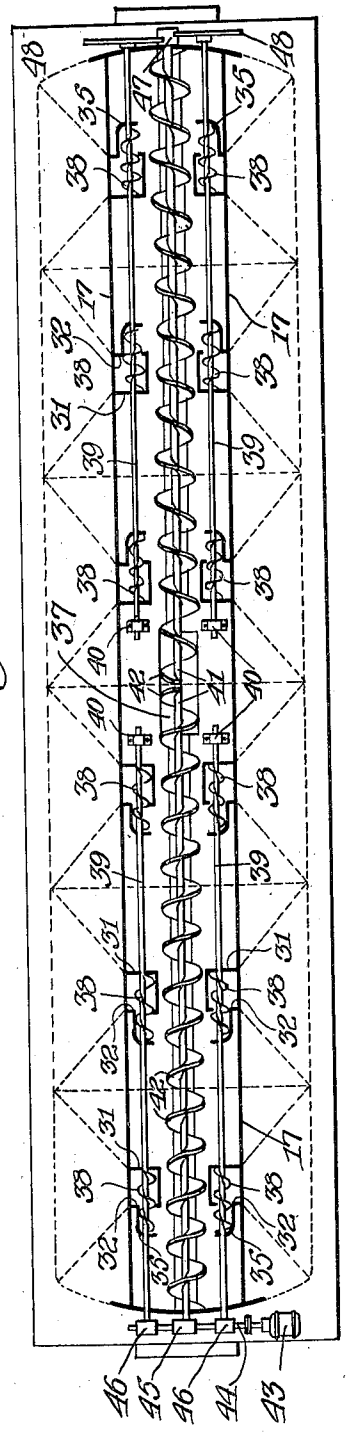


Fig. 5.

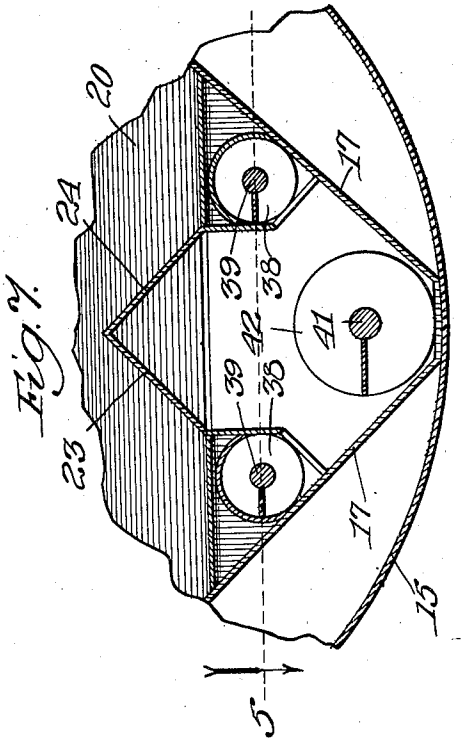


Fig. 7.

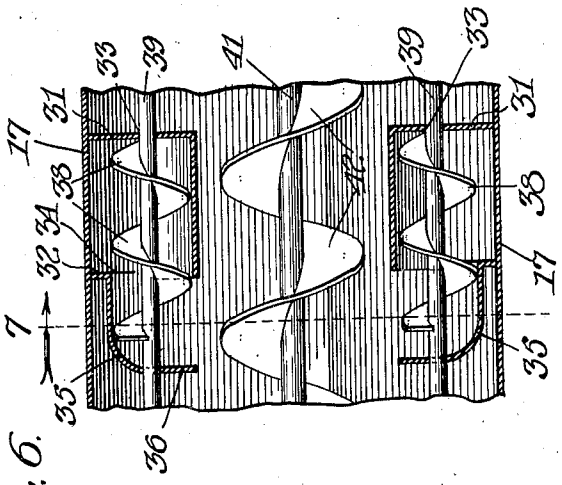


Fig. 6.

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Filed March 21, 1932 5 Sheets-Sheet 4

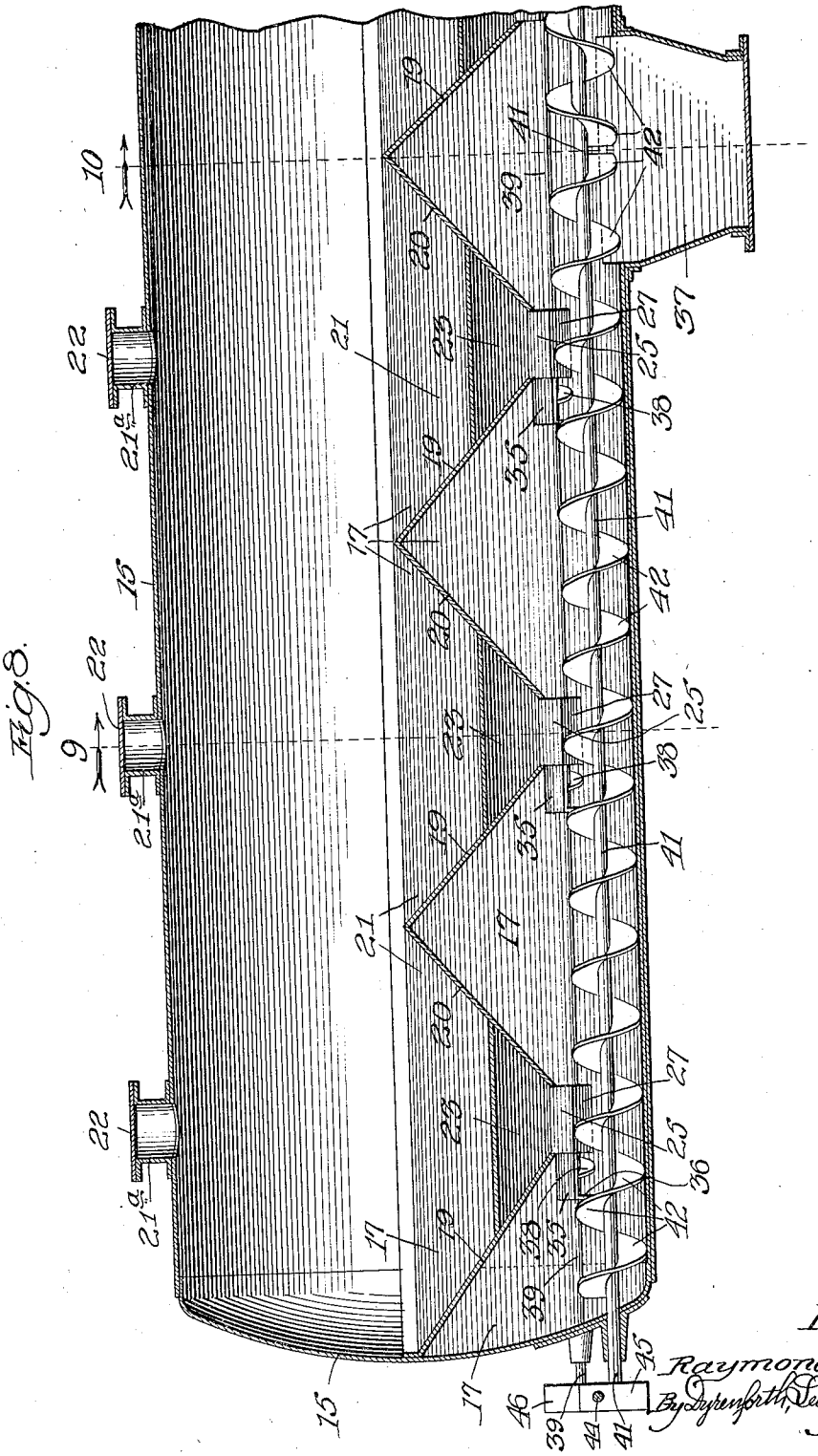



Fig. 8.

Inventor:
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Fig. 10.

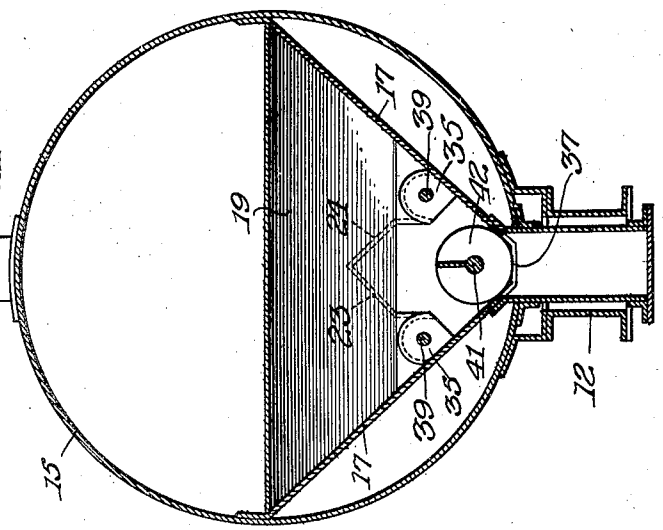
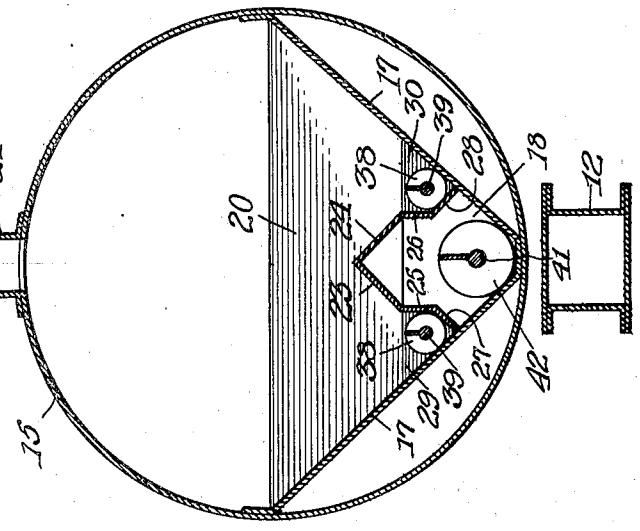



Fig. 9.




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Patented June 27, 1933 1,915,758

# UNITED STATES PATENT OFFICE

RAYMOND C. PIERCE, OF CHICAGO, ILLINOIS, ASSIGNOR TO GENERAL AMERICAN TANK CAR CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF WEST VIRGINIA

## CAR

Application filed March 21, 1932. Serial No. 600,300.

My invention relates to cars for transporting in bulk relatively fine material, and of the type employing screw conveyor mechanism at the bottom of the car for conveying the lading to the point of discharge, and more especially to cars of the type referred to for transporting material of such character, as for example cement, that it becomes packed around the conveyor so firmly as to greatly militate against the proper operation of the conveyor, oftentimes preventing the starting of the conveyor into operation.

My primary object is to provide improvements in cars of the type above referred to to the end that the objection presented by such cars as hitherto provided will be overcome and the conveyor mechanism be adapted for starting with comparative ease and properly function to convey the material, and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a view in side elevation of a car of the type above referred to constructed in accordance with my invention.

Figure 2 is a plan sectional view of the car, the section being taken at the line 2 on Fig. 1 and viewed in the direction of the arrow.

Figure 3 is an end view of the car viewing the car from one end.

Figure 4 is a similar view viewing the car from its opposite end.

Figure 5 is a plan sectional view taken through the car at the plane of the feeder-screws forming elements of the car, the section being taken at the line 5 on Fig. 7 and viewed in the direction of the arrow.

Figure 6 is an enlarged broken plan sectional view of portions of the car shown in Fig. 5.

Figure 7 is a vertical cross-sectional view of the car, the section being taken at the line 7 on Fig. 6 and viewed in the direction of the arrow.

Figure 8 is an enlarged longitudinal sectional view in elevation of one end of the car, the section being taken at the line 8 on Fig. 2 and viewed in the direction of the arrow.

Figure 9 is a sectional view taken at the line 9 on Fig. 8 and viewed in the direction of the arrow; and

Figure 10, a sectional view taken at the line 10 on Fig. 8 and viewed in the direction of the arrow.

Referring to the particular construction shown 11 represents the underframe of the car which may be of any desirable construction, that shown being of the common center sill type comprising, generally stated, a center sill 12 suitably supported at its ends on bolsters 13 which, in turn, are supported on trucks in accordance with common practice, the wheels of the trucks being represented at 14.

The car also comprises a cylindrical tank represented at 15 supported on its side on the bolsters 13 and extending lengthwise of the underframe, the wall of the tank being constructed of sheet metal in accordance with the common practice of manufacturing tank cars as commonly provided.

The tank 15 may be held on the underframe against shifting thereon in any desirable manner, as is well known in the art, the ends of the tank, free to slide on the bolsters 13, being shown as engaged by tank-bands 16 anchored to the underframe and extending over the tank on its opposite ends.

The interior of the tank 15 contains slope sheets 17 extending lengthwise thereof throughout its length and disposed at opposite sides of the median line of the tank, these sheets being united at their lower edges and forming a trough 18. At intervals along the tank and above the slope sheets 17 is a series of slope sheets extending crosswise of the tank and comprising alternately disposed oppositely inclining sheets 19 and 20, respectively, which meet at their adjacent upper edges but are spaced apart at their lower edges as shown. The sheets 19 and 20, in combination with the sheets 17, cause the bottom of the lading-space in the tank to be in the form of a series of hoppers 21 extending lengthwise of the car, the top of the tank 15 along its center line being provided with inlets 21[a] disposed in vertical alinement with the hoppers 21 and having removable closures 22, and through which the lading is introduced into the car.

Located at the bottoms of the hoppers 21 are slope sheets 23 and 24 which incline outwardly and downwardly from the median line of the tank and fit, at their edges, the slope sheets 19 and 20 as shown, the sheets 23 and 24 being narrower than the lower edges of the sheets 19 and 20 and provided at their lateral edges with vertical sheet-portions 25 and 26, respectively, below which the sheets 23 and 24 incline outwardly and downwardly as represented at 27 and 28, respectively, extending at their lower edges to the slope sheets 17 (Fig. 9).

The slope sheets 23 and 24, in combination with the slope sheets 17, form troughs 29 and 30 extending lengthwise of the car and located at opposite sides of the median line thereof and of the trough 18, the troughs 29 and 30 being open to the lading-compartment only at the spaces between the adjacent sheets 19 and 20 and the trough 18 being closed to this compartment except through the spaces just referred to which open into the trough 18 only through lateral openings, whereby the trough 18 is covered against access thereto of the lading except as delivered to it through said lateral openings, as hereinafter described.

At the opposite ends of the vertical and inclined portions 25—28 of the slope plates 23 and 24 are vertical plates 31 and 32, the plates 31 containing openings 33 for shafts hereinafter described and the plates 32 relatively large openings 34 forming outlets, the plates 31 and 32 being so disposed as shown that the openings 34 of the plates 32 open to the trough 18 to the left as to those of the hoppers at the left-hand end of the car in Fig. 5 and to the right as to those of the hoppers at the right-hand end of the car.

The plates 32 have associated therewith deflector plates 35 which extend lengthwise of the tank and curve inwardly toward the median line of the tank as shown at 36, the plates 35 operating to deflect toward the median line of the tank the material discharged against them, as hereinafter described.

In accordance with the preferred illustrated embodiment of my invention, I provide at each side of the car and in a position to engage the lading which gravitates through the spaces between the lower edges of the sheets 19 and 20, feeder-screw devices which force the lading engaged thereby into the trough 18; and provide in the trough 18 screw conveyor means which operate on the lading delivered thereto by the feeder-screws and convey it from opposite ends of the car to the center thereof for discharge through an opening 37 in the bottom of the tank.

The feeder-screw means referred to comprise screw elements 38 rigid on shafts 39 located at opposite sides of the car and its opposite ends, these shafts being journaled in the ends of the car, and in bearings 40. The screw elements 38 extend into the spaces the end walls of which are formed of the plates 31 and 32 and project through the openings 34 in the plates 32 into the spaces within the deflectors 35.

Thus when the shafts 39 are rotated as hereinafter described the lading is fed thereby to the trough 18.

The screw conveyor referred to comprises a shaft 41 located in, and extending longitudinally of, the trough 18 and journaled in the ends of the tank, and screw elements 42 rigid on the shaft 41 and terminating at their adjacent ends at a point coincident with the outlet 37, these screw elements being reversely disposed as shown whereby rotation of the shaft 41 operates to force the lading delivered to the trough 18 as stated, to the outlet 37 from opposite ends of the car.

The feeder screws and screw conveyor may be driven in any suitable way. In the construction shown, a single power device, such as the motor 43, being used for this purpose. The shaft 44 of the motor is geared to the adjacent ends of the screw conveyor shaft 41 and those of the shafts 39 at the left-hand end of the car as represented at 45 and 46, the drive for the other two of the shafts 39 being through gears 47 meshing with a pinion 48 on the shaft 41.

The feeder screws preferably are of such small diameter and operate at such a slow speed relative to the speed of rotation of the screw conveyor 41—42, that the rate of feed of the lading to the trough 18 is sufficient only to maintain this trough from 30% to 40% full.

As will be understood from the foregoing description, the feeder screws 38 which operate to break up the lading are protected by the sheets above them except at the relatively short spaces between the lower ends of adjacent plates 19 and 20 exposing these screws to only such an extent as to permit them to pick up the lading and transfer it to the trough 18 and thus a relatively small part of the length of the feeders is exposed to the lading. Furthermore, the screw conveyor in trough 18 being covered by the plates above it, the lading cannot pack therein and the screw conveyor never being more than partially full of the lading fed to it, the lading is easily handled thereby, with a minimum of power consumption.

While I have illustrated and described a particular construction embodying my invention, I do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is:

1. A car having a container portion, a trough extending along said container por-

tion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, and means exposed to the lading in said container portion at spaced apart intervals therealong for feeding the lading to said trough at different points along the trough.

2. A car having a container portion, a trough extending along said container portion beneath the bottom of the latter, a screw conveyor operating in said trough and unexposed to the lading in said container portion, and means exposed to the lading in said container portion at spaced apart intervals therealong for feeding the lading to said trough at different points along the trough.

3. A car having a container portion, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, and screw feeders exposed to the lading in said container portion at spaced apart intervals therealong for feeding the lading to said trough at different points along the trough.

4. A car having a container portion, a trough extending along said container portion beneath the bottom of the latter, a screw conveyor operating in said trough and unexposed to the lading in said container portion, and screw feeders exposed to the lading in said container portion at spaced apart intervals therealong for feeding the lading to said trough at different points along the trough.

5. A car having a container portion, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, the bottom of said container portion having openings at intervals therealong communicating with said trough, at different points along the trough and means for feeding the lading at said openings to said trough.

6. A car having a container portion, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, the bottom of said container portion having openings at intervals therealong communicating with said trough at different points along the trough, and screw feeders for feeding the lading at said openings to said trough.

7. A car having a container portion the bottom of which comprises a series of hopper shaped portions, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, said hopper shaped portions having openings communicating with said trough at different points along the trough, and means for feeding the lading at said openings to said trough.

8. A car having a container portion the bottom of which comprises a series of hopper shaped portions, a trough extending along said container portion beneath the bottom thereof, a screw conveyor operating in said trough and unexposed to the lading in said container portion, said hopper shaped portions having openings communicating with said trough at different points along the trough, and means for feeding the lading at said openings to said trough.

9. A car having a container portion the bottom of which comprises a series of hopper shaped portions, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, said hopper shaped portions having openings communicating with said trough at different points along the trough, and screw feeders for feeding the lading at said openings to said trough.

10. A car having a container portion the bottom of which comprises a series of hopper shaped portions, a trough extending along said container portion beneath the bottom thereof, a screw conveyor operating in said trough and unexposed to the lading in said container portion, said hopper shaped portions having openings communicating with said trough at different points along the trough, and screw feeders for feeding the lading at said openings to said trough.

11. A car having a container portion the bottom of which comprises a series of hopper-shaped portions having slope sheets which, with sides of said hopper shaped portions, form troughs into which the lading in said container portion extends, a trough beneath the bottoms of said hopper shaped portions and between said first-referred-to troughs, a screw conveyor operating in said second-referred-to trough, said first-referred-to troughs having openings communicating with said second-named trough, and means for feeding the lading from said first-referred-to troughs to said second-named trough.

12. A car having a container portion the bottom of which comprises a series of hopper-shaped portions having slope sheets which, with sides of said hopper shaped portions, form troughs into which the lading in said container portion extends, a trough beneath the bottoms of said hopper shaped portions and between said first-referred-to troughs, a screw conveyor operating in said second-referred-to trough, said first-referred-to troughs having openings communicating with said second-named trough, and screw feeders for feeding the lading from said first-named troughs to said second-named trough.

13. A car having a container portion comprising downwardly converging slope sheets extending lengthwise of the car and forming

a trough, pairs of downwardly diverging slope sheets extending crosswise of the car between said first-named slope sheets and forming with the latter hopper shaped portions disposed above said trough and open to the latter, pairs of downwardly diverging slope sheets extending lengthwise of the car and located in the bottoms of said hopper and with said first-named slope sheets forming troughs at opposite sides of, and above, said first-named trough, a screw conveyor in said first-named trough and means in said last-named troughs for feeding the lading to said first-named trough.

14. A car having a container portion comprising downwardly converging slope sheets extending lengthwise of the car and forming a trough, pairs of downwardly diverging slope sheets extending crosswise of the car between said first-named slope sheets and forming with the latter hopper shaped portions disposed above said trough and open to the latter, pairs of downwardly diverging slope sheets extending lengthwise of the car and located in the bottoms of said hoppers and having depending portions which with said first-named slope sheets form troughs at opposite sides of, and above, said first-named trough, a screw conveyor in said first-named trough and means in said last-named troughs for feeding the lading to said first-named trough.

15. A car having a container portion, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, the bottom of said container portion having openings at intervals therealong communicating with said trough at different points along the trough, and screw feeders located at said openings and exposed in part only to the lading in said container portion and operating to feed the lading at said openings to said trough.

16. A car having a container portion, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, the bottom of said container portion having openings at intervals therealong, housings communicating with said openings, respectively, and having openings at their ends communicating with said trough at different points along the trough, and screw feeders in said housings for feeding the lading therefrom to the trough.

17. A car having a container portion, a trough extending along said container portion, a screw conveyor operating in said trough and unexposed to the lading in said container portion, the bottom of said container portion having openings at intervals therealong, housings communicating with said openings, respectively, and having openings at their ends communicating with said trough at different points along the trough, screw feeders in said housings for feeding the lading therefrom to the trough, and deflectors associated with said housings for deflecting the lading discharged from the latter toward said trough.

RAYMOND C. PIERCE.