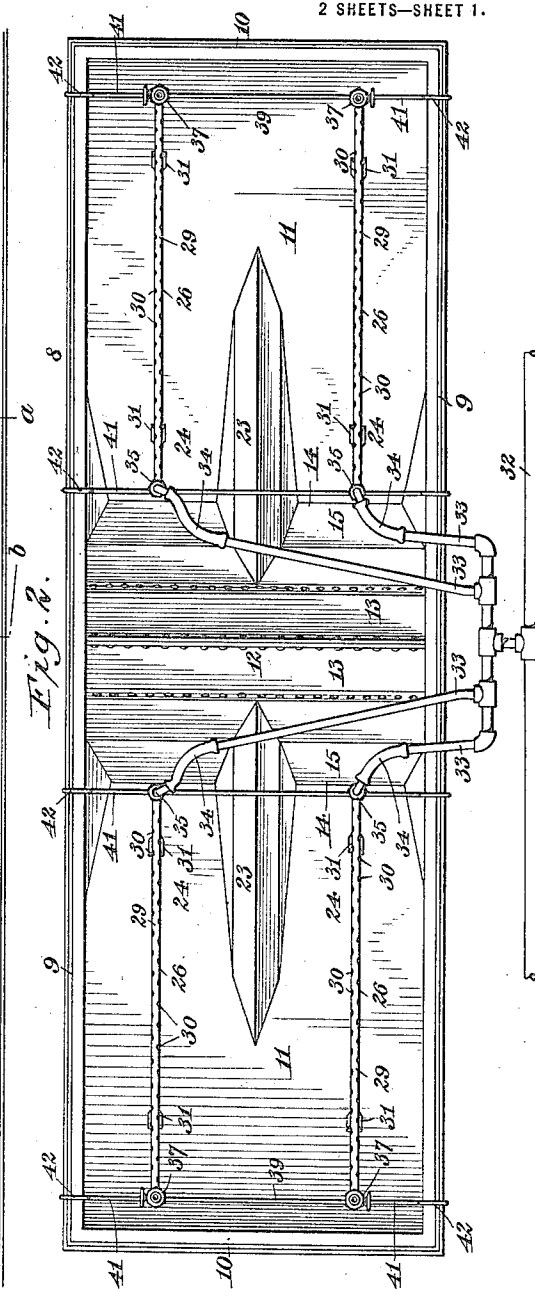
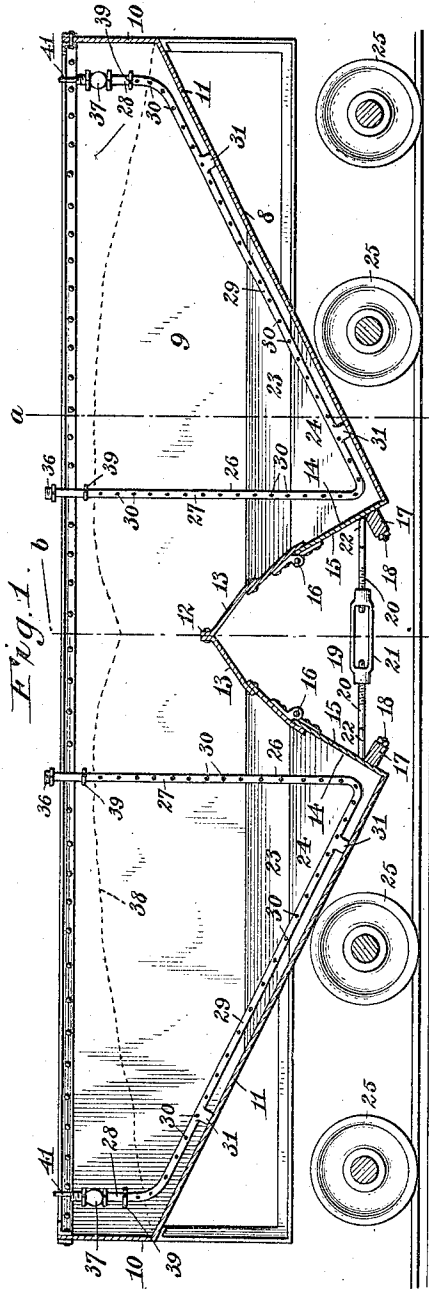


1,302,533.

Patented May 6, 1919.

2 SHEETS—SHEET 1.



Witness:
E. M. Schweiger

Frank M. Foote, Inventor.
By Emil Neuhaas
Attorney.

F. M. FOOTE.

FREIGHT CAR.

APPLICATION FILED MAY 26, 1917.

1,302,533.

Patented May 6, 1919.

2 SHEETS—SHEET 2.

Fig. 3.

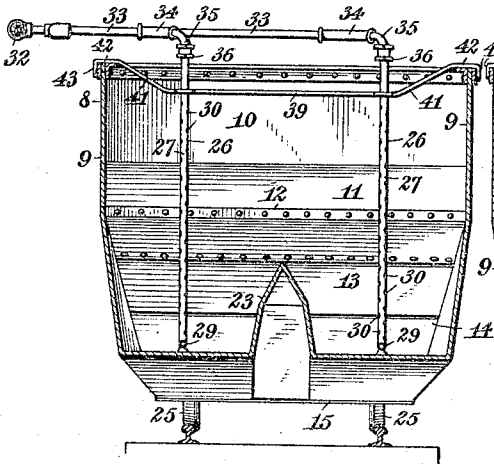


Fig. 4.

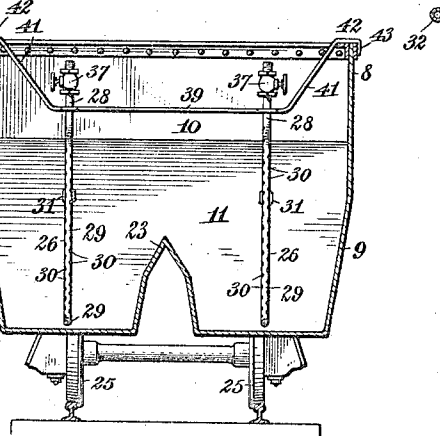


Fig. 5.

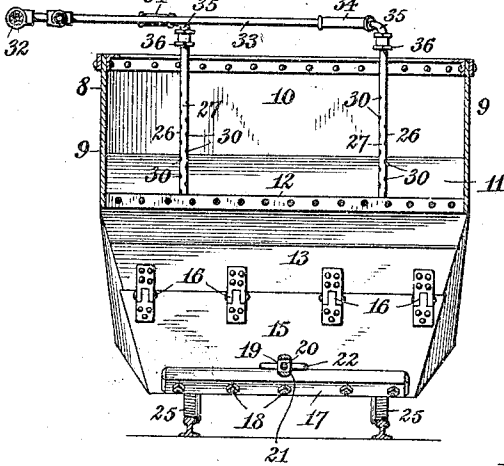


Fig. 6.

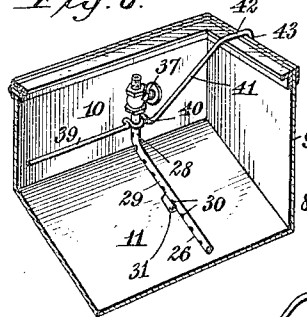


Fig. 7.

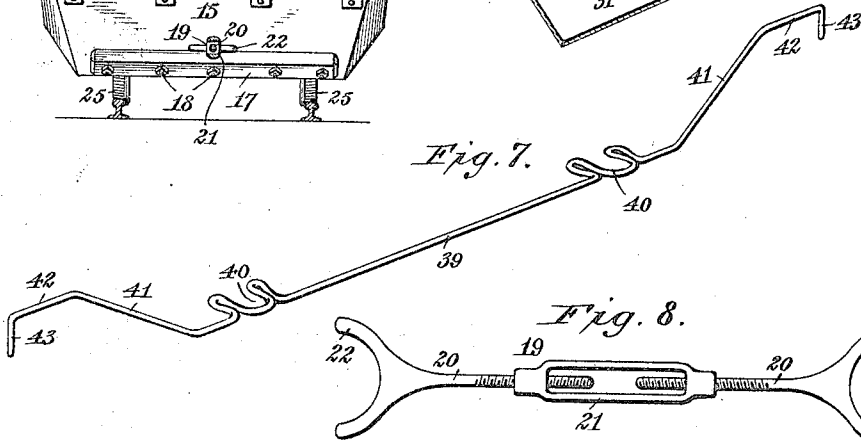
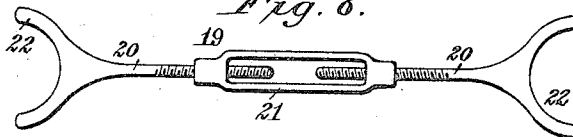


Fig. 8.



Witness:
E. M. Schweiger.

Frank M. Foote, Inventor.
By Emil Neuhark
Attorney.

UNITED STATES PATENT OFFICE.

FRANK M. FOOTE, OF ARCADE, NEW YORK.

FREIGHT-CAR.

1,302,533.

Specification of Letters Patent.

Patented May 6, 1919.

Application filed May 26, 1917. Serial No. 171,145.

To all whom it may concern:

Be it known that I, FRANK M. FOOTE, a citizen of the United States, residing at Arcade, in the county of Wyoming and State of New York, have invented certain new and useful Improvements in Freight-Cars, of which the following is a specification.

My invention relates to freight cars, and more particularly to means for heating the contents of the cars and for controlling the discharge of the contents therefrom.

In the transportation of amiesite or other bituminous concrete, also in the transportation of other commodities, it has been extremely difficult in cold weather to remove the contents of the car, due to the same becoming set and formed into a solid mass, or due to the freezing of the contents into a solid mass, depending upon the particular commodity transported and also upon the temperature of the weather.

In some instances the commodity transported, such for instance as amiesite or other bituminous concrete, does not require cold weather in order to solidify, particularly when transported a considerable distance, as is invariably found necessary when using the material in road constructions. The plant at which the material is prepared is oftentimes several hundred miles distant from the place at which the material is to be delivered and consequently such material becomes set in transportation and solidifies regardless of the temperature, with the result that when it arrives at its destination, the use of picks, crow-bars, and other tools must be resorted to in order to loosen the material and permit of removing the same from the car. Such methods are extremely slow and expensive and delay the return of the cars, which is a source of considerable expense and annoyance to transportation companies.

The primary object of my invention is the provision of means for heating the contents of a car and associating such means with controlling mechanism whereby the discharge of the contents from the car may be controlled.

It also has for its object the provision of detachable heating devices to the car which may be set in places at the plant at which the car is loaded and which is so constructed that it may be readily connected with a heat-

ing system at the point of destination for thoroughly heating the contents of the car and causing the same to be converted into a fluid mass.

A further object is the provision of a heating device for the purpose mentioned which will slowly heat the contents of the car so as not to impair the plastic or adhesive qualities of the material, and so that it will not, in a bituminous material, burn the asphalt or like binding ingredient thereof.

It further has for its object to control the discharge of the material from the car so that it may be delivered into wheelbarrows or other containers in the desired quantities, without loss of the material by reason of its overflowing the containers and dropping onto the ground.

It further has for its object the provision of a heating device to which the source of heat may be applied at either end thereof and so that the water of condensation will be utilized in aiding the free discharge of the material from the car; also to so construct the heating device that the water of condensation may be easily disposed of while heating the contents of the car.

With these and other objects to appear hereinafter, the invention consists in a freight car having a removable heating device therein and being provided with a low point discharge opening and means for controlling the discharge of the material through said opening.

It also consists in providing the car with a simple and efficient heating device whereby amiesite or other bituminous concrete transported therein can be uniformly heated to facilitate its unloading, without impairing the adhesive or plastic qualities of the material and without the possibility of calcining or disintegrating the stone forming part of the material; also to enable the material to be unloaded in any desired quantities.

It further consists in the novel features of construction and in the arrangement and combination of parts to be hereinafter described and more particularly pointed out in the subjoined claims.

In the drawings,—

Figure 1 is a longitudinal section through a car embodying my invention in its preferred form.

Fig. 2 is a plan view of the same, show-

ing the means for furnishing the heating device of the car with steam or some other suitable heating medium.

Fig. 3 is a transverse section taken on line *a-a*, Fig. 1, looking toward the left.

Fig. 4 is a transverse section taken on line *a-a*, Fig. 1, looking toward the right.

Fig. 5 is a transverse section taken on line *b-b*, Fig. 1, looking toward the left.

Fig. 6 is a sectional perspective view of a portion of the car showing one end of the heating elements and the means of supporting the same preparatory to and while charging the car with the material to be transported.

Fig. 7 is a detached perspective view of one of the devices for temporarily supporting or retaining the heating elements in position preparatory to and while charging the car with the material to be transported.

Fig. 8 is a side elevation of the device controlling the discharge of the material from the car.

In the drawings I have shown what is generally termed a "hopper" car, as a car of this type is best adapted for transporting amiesite or other bituminous material, since the material can be discharged from the car at a low point through discharge openings closed by doors; no shoveling of the material being therefore required. But since the range of use of my invention extends beyond the transportation of such materials, it may be applied to flat bottom freight cars or any other type of cars for transporting other minerals, or ores and other commodities, such as could not readily be shoveled from the cars unless in a plastic or a loose condition, as the case may be, such material often-times freezing into a solid mass in extremely cold weather, at which times the use of my invention would be particularly desirable.

The hopper car illustrated in the drawings comprises a body 8 having side walls 9, end walls 10, and inclined bottom walls 11 inclining from the end walls downwardly toward the center of the car. A cross bridge wall 12 having two oppositely-inclined portions 13 is arranged centrally between the ends of the car, the lower ends of said inclined portions 13 being separated from the inner or lowermost ends of the inclined bottom walls 11 by discharge openings 14, each opening 14 being closed by a door 15. Said doors are hinged to the lower ends of the two oppositely-inclined portions 13 of the cross or bridge wall 12, as at 16, and may therefore be swung toward the transverse center of the car for opening the discharge openings 14. Owing to the inclination of said doors when closed, they automatically swing into a vertical position and consequently open the discharge openings 14, unless some means are provided for keeping such doors closed. Each door is provided

with a transverse beam 17 near its lower end, said beam being bolted to the door, as at 18, or otherwise suitably secured thereto.

19 designates a controlling device in the form of a spanner which comprises two rods 20 and a turn buckle 21 having the rods 20 threaded therein from opposite ends, the threads of said rods being respectively right and left hand threads so that upon rotating said turn buckle, said rods are moved toward or from each other, depending on the direction in which the turn buckle is rotated. The outer ends of the rods 20 are forked, as at 22, so that they engage the doors 15 at two points, and these forked ends lie in contact with said doors at the points where the upper faces of the beam 17 meet the outer faces of the doors, thus the beams in addition to serving as reinforcements for the door also serve as retainers for the controlling device or spanner. Moreover, by providing the rods 20 with forked ends, the pressure exerted thereby against the doors is distributed and assures a tight closing of the door against the lower or innermost edges of the inclined bottom walls.

At each side of the transverse bridge wall 12, the car is provided with a longitudinal wall 23 which is bridge-like in cross section, as shown in Figs. 3 and 4, and these longitudinal walls divide the car into four hopper-like receptacles 24. The construction of hopper-like receptacles may of course be varied, as this forms no part of my invention, or a single hopper may be employed at each side of the transverse center or bridge wall, if desired.

The body of the car is of course mounted by the usual supporting means, including truck frames upon the wheels 25, and as the trucks including the wheels 25 may be of the usual form employed, I have not considered it necessary to illustrate the same, nor other parts intermediate the car body and wheels.

As it is not my intention to construct a special form of car for the purpose of transporting amiesite or other bituminous material, or any other commodity that it might be desirable to heat in order to facilitate the delivery of the removal of the material from the car, I have designed my invention with a view of applying the same to any form of car body, the particular shape of which may of course, under the principle involved, be changed to conform to the shape of the body in or with which it is intended to be used, and for this reason my improved heating device is made removable so that it may be retained at the plant from which delivery is to be made until required for use, or be shipped to such plant to be installed into the car or cars to be used for transporting material. After the cars have reached their destinations and have been unloaded, it may

be found necessary to use the same for other purposes, in which case the heating device may be removed from the car and shipped to the plant to be used in other cars for transporting the material.

My heating device comprises one or more steam pipes 26, four being preferably used in a four hopper car. In preferred form each of these pipes comprises a long vertical member 27, a short vertical member 28, and an inclined member 29 connecting the inner or lower ends of the long and short members 27, 28, respectively. In this form one of the steam pipes is adapted to be placed within each of the hoppers, the long member 27 being arranged vertically within the hopper near the center of the car or in close relation to the discharge opening 14 of the hopper, the short member 28 being arranged near one end of the car and the inclined member 29 supported on and arranged in close proximity to or, if desired, in contact with the inclined bottom wall of the hopper or car body. Each of these steam pipes is provided with numerous steam escape openings 30 which are preferably directed laterally in opposite directions. I have provided each of the inclined members 29 of each steam pipe with one or more feet or lugs 31, which are welded to the pipe and rest upon the inclined bottom wall of the hopper or car to hold the pipe spaced from such wall throughout its length. There are therefore arranged within the car four of these steam pipes, which constitute my complete device in a four hopper car. This arrangement, however, may be varied, depending upon the material transported or the dimensions or formation of the car, but since hopper bottom cars are found to be the most practicable for transporting and delivering amiesite or other bituminous material, the construction shown and described is preferred.

At the point of destination where delivery of the material is to be made, a steam plant is located and includes a steam supply pipe 32 which may extend lengthwise along the track at the points of delivery of the material from the cars, and at one or more points of said supply pipe 32, steam connecting pipes 33 may be provided. For a car having four steam pipes 26 a connection like that shown in Fig. 2 is provided, each connection comprising four of said connecting steam pipes 33 which are connected by suitable fittings to the steam supply pipe 32, and each of said connecting steam pipes has a flexible portion 34 and a suitable coupling portion 35 whereby the connecting pipes may be coupled onto the long members 27 of the steam pipes 26, the upper end of each of said long members being provided with a threaded fitting 36 onto which part of the coupling portion 35 is threaded. It is of course to be understood that this coupling

portion may be of any suitable construction whereby connection may be made between the steam pipes 26 and the connecting pipes 33.

At the end of the short member 28 of each steam pipe a globe or other valve 37 is provided so that the steam entering the pipes 26 will be compelled to escape through the perforations 30 of said pipes.

Before the material is delivered into the car the perforated steam pipes 26 are placed in position, one in each pocket with the ends thereof extending up to a suitable height, preferably above the material when the car is loaded, the material being indicated by the dotted line 38 in Fig. 1. For the purpose of retaining these steam pipes in position before and while loading the car, retainers 39 are provided, each being constructed of a length of wire bent upon itself, as at 40, to form pipe-holding portions, such portions being spaced apart the distance which it is intended the steam pipes of adjoining pockets shall be spaced apart. From points near these pipe-holding portions the wires are directed upwardly and outwardly in opposite directions, as at 41, thence horizontally parallel with the medial portion between the pipe-holding portions 40, as at 42, and thence downwardly, as at 43, the horizontal portions 42 being adapted to rest upon the upper edge of the side walls of the car while the depending portions serve as terminals which lie outside of and in contact with the side walls of the car at their upper edges. One of these retainers is provided for each pair of short members 28 of adjoining steam pipes, and a somewhat similar retainer is provided for each pair of long members 27 of adjoining steam pipes. It, however, will be noted that the drop of the central portion of the retainer holding the long members is less than the drop of the retainers holding the short members of the steam pipes, this being due to the fact that the car so loaded with the material therein reaches a higher point at points where these long members are located than at the points where the short members are located, as clearly shown in Fig. 1. It is the purpose of this invention that these retainers be so positioned that they are at all times above the material in the car so that when the car is loaded they may be removed therefrom, for the reason that the material within the car will prevent tipping of the steam pipes and will under all conditions retain such pipes in proper position. In fact, such pipes, with the exception of their extremities, are entirely embedded within the material. Said retainers 39 are therefore only employed at the point of loading the cars, and enough only are required to hold the steam pipes of all the cars that will be heated at the same time. It is, of course,

understood that said retainers may be used until the heating device is removed from the car, as it may be found of advantage for keeping the steam pipes in position when unloading the contents of a car.

It might here be stated that for some kinds of materials which it is desirable to heat before unloading the same, hot air or any other suitable heating medium may be employed, but for amiesite and other like bituminous material I find in practice that steam is most desirable.

When the car arrives at its destination and it is found that the amiesite or other bituminous concrete has solidified so that it will not discharge through the openings 14 of the car, the steam supply pipe 32 is connected to the ends of the long members 27 of the steam pipes 26 by the steam connecting pipes 33 and the valves 37 of said pipes are closed. When the steam is turned on, it passes down into the steam pipes 26 and through the perforations 30 thereof, it being diffused through the solidified mass and a gradual softening of the same takes place. The diffusion of the steam through this mass acts to soften or practically liquefy the asphalt or other binder of the concrete material so that it will discharge through the openings 14 of the car hoppers when the doors 15 are opened. The quantity of material to be discharged at a time is regulated by rotation of the turn buckle 21 of the door controller or spanner, either or both doors being opened to any extent desired, depending on whether additional locking means are provided to keep the doors closed.

If additional locking means are provided and the controller or spanner is shortened, only the door released from said additional locking means will be opened to permit the discharge of the material from the two hoppers at one end of the car. If both additional locking means are released from the doors, or if no additional means are employed, the shortening of the controller or spanner will permit both doors to open and the material to discharge from the hopper at both ends of the car. If desired, two such controllers or spanners may be employed on each car and separate doors used for each hopper, all of which is fully within the scope of this invention. After the required quantity of material has been discharged from the hoppers, the doors may be closed by rotating the turn buckle and lengthening the controller or spanner so as to force the doors against their seats.

The water of condensation escapes from the escape openings 30 of the several steam pipes of the several hoppers when the material in the car reaches points beneath said perforations, and acts as a lubricant so as to assist in the ready removal of the material

along the inclined bottom walls of said hoppers. Moreover, the heating of the material in the manner described causes such a thorough diffusion of the steam through the material that no portion thereof will remain adhering to the walls of the car, and when the car is unloaded the heating device may be removed therefrom and the car used to transport other material which does not consolidate or solidify in the same manner as amiesite or other similar material.

By closing the upper end of the long members 27 of the steam pipes with suitable caps or otherwise and opening the valves 37 at the outer ends of the short members of said steam pipes and then connecting hot water supply pipes to said short members, the entire bottom walls of the cars may be thoroughly cleansed by the hot water escaping through the openings 30 of the steam pipes, or hot water may be thus supplied to the material while the last portion of the same is being discharged from the car, such hot water acting as a lubricant to assist in removing all of the material, with the exception of such as may adhere to the walls as a coating; but primarily said valves are provided so that when opened and the steam supply pipe is connected to the upper ends of the long members of the steam pipes 26, the water of condensation within the pipes when accumulating beyond what is believed to be desirable as a lubricant, may be forced out of the steam pipes through the outer ends or upper ends of the short members 28 of said pipes. When undue accumulation of the water of condensation is thus discharged, the valves 37 may again be closed.

The advantages of my invention are many and are apparent from the foregoing description taken in connection with the accompanying drawings, and it is to be understood that changes in the construction of the same may be resorted to without departing from the spirit of my invention or sacrificing any of the advantages thereof.

Having thus described my invention, what I claim is,—

1. The combination with a hopper bottom car, of a removable heating device comprising a steam pipe having a long member, a short member and an inclined member connecting said long and short members, said long members and said inclined members having steam escape openings therein.

2. The combination with a hopper bottom car having a plurality of hoppers and a discharge opening for each hopper, a steam pipe in each hopper, each of said pipes having two vertical members and an inclined member adapted to be supported by the inclined bottom of one of each hoppers, each steam pipe having steam escape openings, the angle formed by one of said vertical

members and said inclined member of each steam pipe being in close proximity to one of the discharge openings of the car.

3. The combination with a hopper bottom car having a transverse bridge wall, discharge openings in said bridge walls and doors closing said openings, of a steam pipe at each side of said bridge wall comprising a long vertical member, a short vertical member and an inclined member connecting said long and short members, each of said steam pipes being provided with steam escape openings and having its long vertical member connecting with the inclined member thereof in close proximity to one of said escape openings.

4. The combination with a hopper bottom car having an inclined bottom, of a removable heating device comprising a steam pipe having an inclined member arranged parallel with the inclined bottom of the car and provided with legs in contact with said bottom and spacing said inclined member from said bottom, said steam pipe having upwardly directed members at opposite ends of said inclined member adapted to terminate above the material loaded into the car, said pipe having escape openings and being adapted for connection at either end with a supply for directing a heating medium into the pipe to be issued through said perforations.

5. A removable heating device for cars adapted to be loosely positioned within the car to be retained in position by the material loaded into the car, and detachable means for holding said heating device in position preparatory to and while loading the material into the car.

6. A heating device for cars adapted to be loosely positioned within the car and be retained in position by the material loaded into the car, and a retainer spanning opposite walls of the car and removably secured to said walls and to said heating device.

7. A heating device adapted to be loosely positioned within the car and to be retained in position by the material within the car, and a retainer device adapted to detachably

engage said heating device and also detachably engage the walls of the car to retain said heating device in position preparatory to and while loading the car.

8. A heating device for cars adapted to be loosely positioned within the car and be retained in position by the material loaded into the car, and a retainer device comprising a wire having an engaging portion adapted to detachably engage the heating device and provided at opposite ends with engaging portions adapted to engage opposite walls of a car.

9. The combination with a car, of a perforated heating pipe arranged loosely within the car, and a retainer having a pipe-holding portion and provided with wall engaging portions to position said heating pipes preparatory to and while loading the car, said retainer device being detachable from said heating pipe and from the walls of the car.

10. The combination with a car, of a heating pipe, and a retainer device constructed of wire bent upon itself to provide a pipe-holding portion adapted to detachably engage the pipe and having upwardly and outwardly inclined portions and depending extremities, said depending extremities engaging opposite walls of the car.

11. The combination with a car, of a removable heating device contained therein, means for connecting said device to a supply for a heating medium, said device having perforations for the escape of the heating medium and being equipped with means for reducing and drawing off the water of condensation therefrom.

12. The combination with a car having a heating device comprising a plurality of heating elements, each element consisting of a perforated pipe removably situated within the car, a steam supply pipe, steam connecting pipes secured to said steam supply pipes and having a flexible portion, and means for coupling said steam connecting pipes to the several elements of said heating device.

In testimony whereof I affix my signature.

FRANK M. FOOTE.