June 4, 1935. J. W. MYERS 2,003,455

LOCOMOTIVE AND TENDER

Original Filed Oct. 28, 1932 3 Sheets-Sheet 1

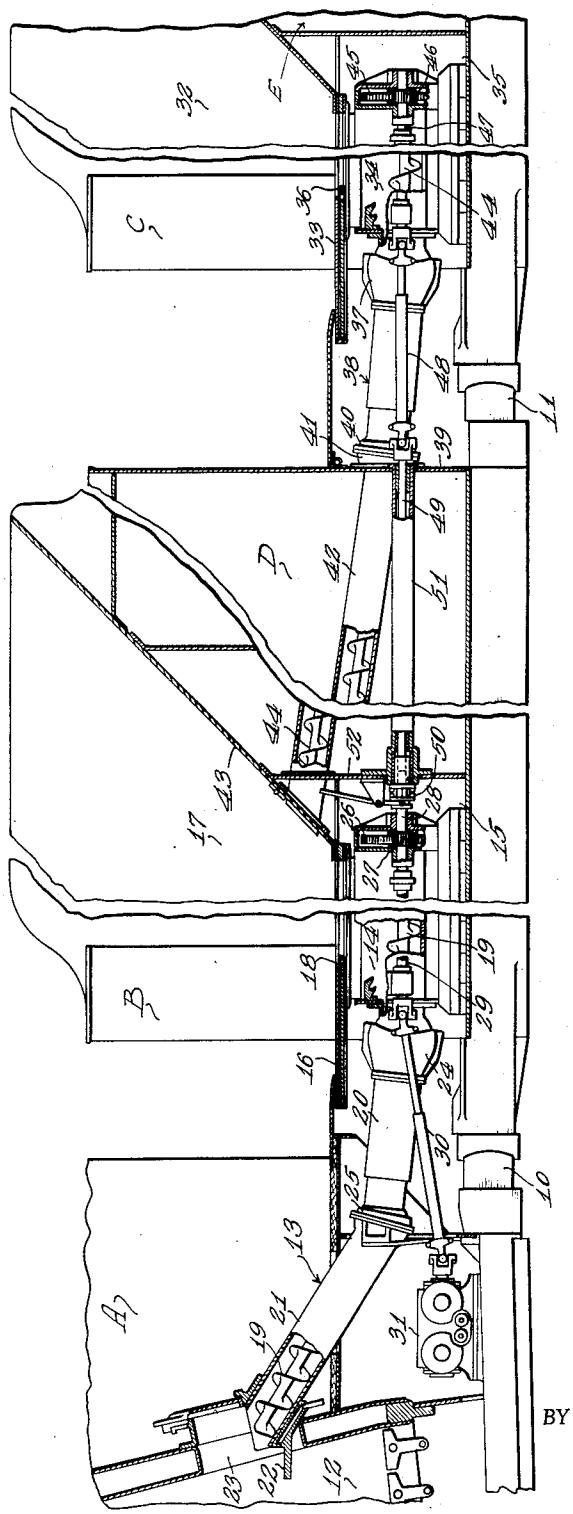

Fig. 1

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LOCOMOTIVE AND TENDER

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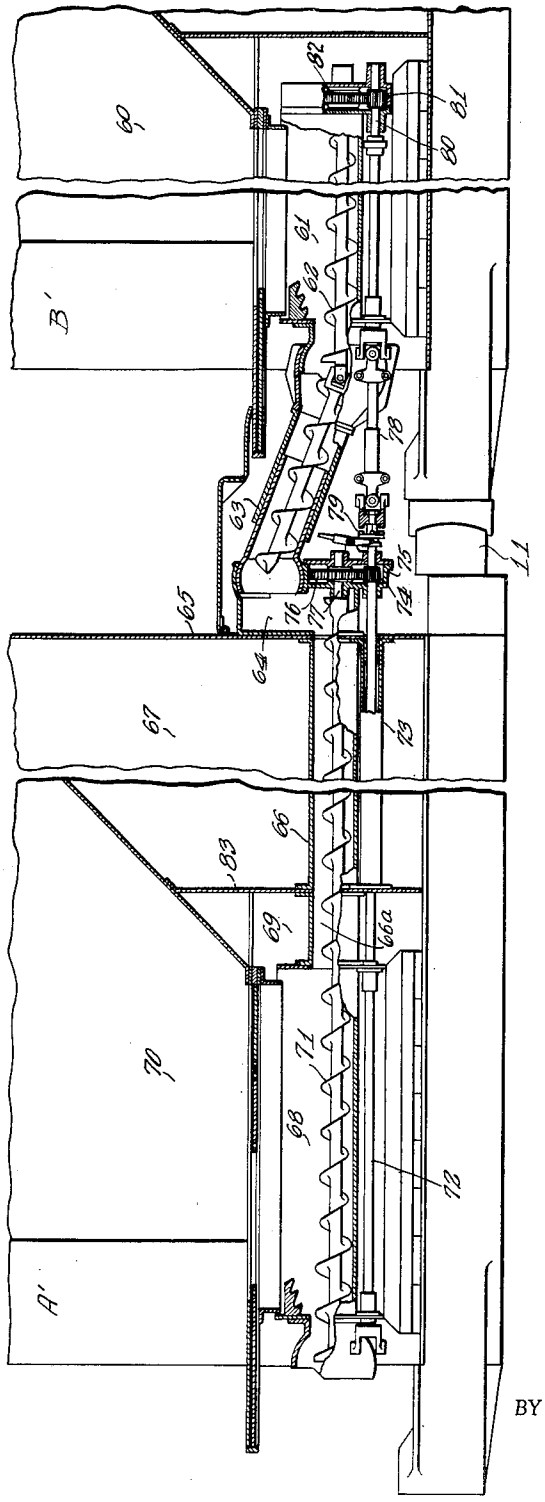

Fig. 2

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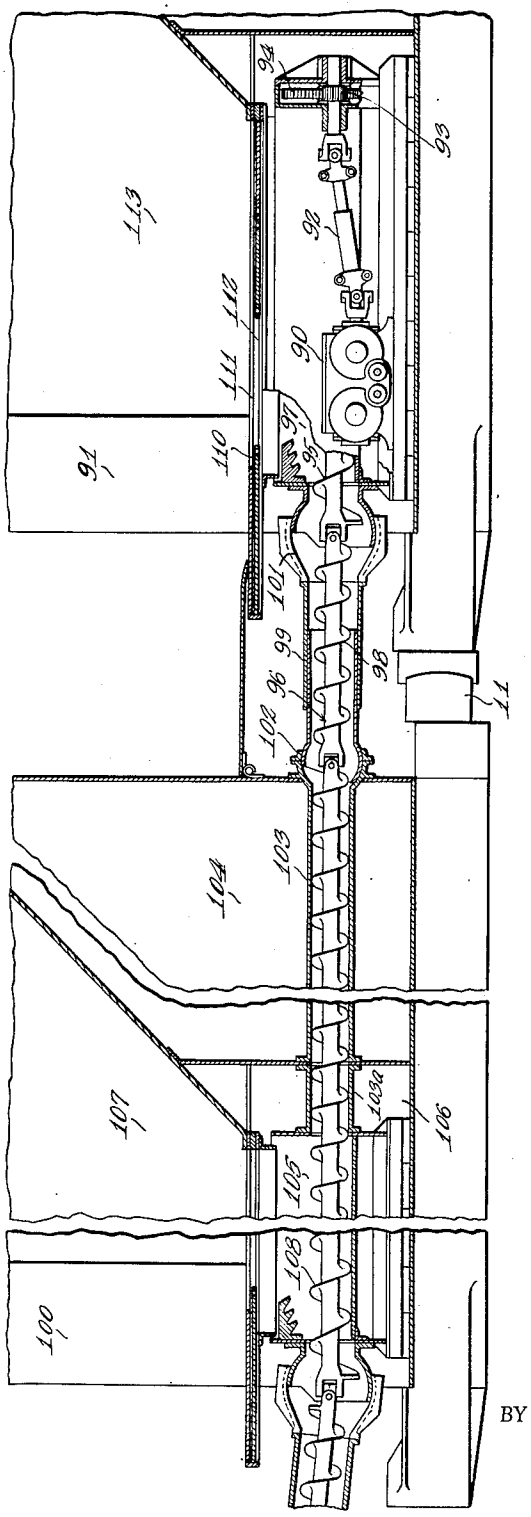

Fig. 3

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LOCOMOTIVE AND TENDER

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Renewed November 3, 1934

25 Claims. (Cl. 105—234)

My present invention relates to railway rolling stock and appertains particularly to locomotives and tenders equipped with mechanical stokers. The main purpose of the invention is the provision of an auxiliary tender behind the usual tender and the provision with such tenders of conveying mechanism for advancing fuel therefrom to the locomotive.

Specific objects of the invention reside in the novel tender structure and in the arrangement of and the relation between the conveying mechanism on the main and the auxiliary tenders as disclosed by the accompanying drawings, in which

Fig. 1 is a longitudinal vertical section on the median line of the locomotive and its main and auxiliary tenders of the invention with the conveying mechanism therefor shown partly in elevation and partly in section;

Fig. 2 is a similar view of the main and auxiliary tenders illustrating a modification of the invention, and Fig. 3 similarly illustrates another modification of the invention.

The preferred embodiment of the invention is illustrated by Fig. 1 of the drawings. Referring to this figure, the locomotive is indicated at A, the main tender at B, and the auxiliary tender at C. As is customary, the locomotive and its main tender are coupled together by the conventional coupling means at 10 and a similar coupling connection is provided at 11 between the main and the auxiliary tenders. Thus, the three units are intercoupled to permit of the necessary articulation between them to meet service conditions.

Fuel is carried from the main tender to the firebox 12 of the locomotive by the stoker conveyor represented generally at 13 which includes a rearward trough section 14 mounted in the conventional stoker trough compartment 15 beneath the apertured floor 16 of the fuel bunker 17.

In the broader aspects of my invention the fuel bunker and the stoker compartment in the preferred and modified constructions constitute a fuel compartment separated by partition plates from the water compartment.

The flow of fuel from the bunker into the trough is controlled by slidable plates 18 which, as is well understood in the art, are shiftable longitudinally in the fuel bunker floor. From the trough the fuel is advanced by the sectional screw 19 forwardly through the intermediate conduit section 20 and thence through the forward conduit section 21 to the distributor 22 disposed at the firebox firing opening 23. In the device shown, the trough and the forward conduit sections are mounted rigidly in any suitable manner and the intermediate conduit section is composed of telescopic portions at their remote ends being universally jointed as at 24 and 25 respectively to the trough and to the forward conduit section. It will be understood that the screw 19 similarly consists of three sections universally connected together in the vicinity of the conduit joints 24 and 25.

The screw 19 at its rearward end is coupled in any known manner to the gear 26 which is driven by the pinion 27 on the pinion shaft 28 which in turn receives power from the rigid drive shaft 29 and the flexible and telescopic shaft 30, the latter being operatively connected to the motor 31 located on the locomotive.

After the fuel has been removed from the fuel bunker 17 of the main tender the locomotive is then fired with fuel stored in the fuel bunker 32 of the auxiliary tender C. The fuel from the auxiliary tender is carried forward to the fuel bunker 17 of the main tender and from there it is advanced to the locomotive by means that now will be described. From the bunker 32 of the auxiliary tender the fuel passes through the apertured floor 33 into the trough 34 disposed thereunder in the water tight compartment 35. The flow of fuel from the bunker 32 into the trough 34 is controlled by the slidable plates 36 which are shiftable as heretofore explained in connection with the slidable plates 18 of the main tender. The trough 34 is universally connected at its forward end as at 37 to one end portion of a two part telescopic conduit 38 extending forwardly to the rear wall 39 of the main tender from which wall it is universally supported by the universal joint construction 40, the member 41 of which is fixed in any suitable manner to the wall 39. A tubular pipe or conduit 42 at its rearward end opens into the conduit 38 and is inclined forwardly and upwardly therefrom to and opens forwardly through the rear slope sheet 43 of the main fuel bunker.

It will be observed that the conduit 42 is disposed in the water compartment D of the main tender and therefore, a water tight joint of any suitable construction is formed at its end portions. In other words, the conduit is made water tight and so fitted in the tender that there will be no leakage of water from the water compartment. The fuel is carried forward from the trough 34 through the conduits 38 and 42 by a sectional screw 44 which is coextensive with the conduits and at its forward or delivery end dis-

charges the fuel into the main fuel bunker 17 from whence it falls by gravity or may otherwise be delivered into the trough 14 and from there carried forward to the firebox as heretofore explained. It will be understood, of course, that the screw 44 is universally jointed in the vicinity of the conduit joints 37 and 40.

The screw 44 is operatively connected at its rear end in any desired manner to the drive gear 45 which is driven from the pinion 46 by the rigid drive shaft 47. This last named shaft is operatively connected to the flexible and extensible shaft 48 extending between the main and the auxiliary tenders and the shaft 48 receives its motion from the shaft 49 which may be connected to or disconnected from the pinion shaft 28 by the clutch 50. That portion of the shaft 49 extending between the rear wall 39 of the tender and the rear wall 52 of the stoker compartment 15 is housed in the sleeve 51 which is made water tight at its ends by welding or in any other suitable manner. Hence, it will be understood that by engaging the clutch 50 the screw 44 will be driven through its associate gears and shafting from the motor 31.

When the locomotive with its main and auxiliary tenders is placed in service, the clutch 50 is out of engagement, as shown, and the conveying mechanism is operated to remove all of the fuel from the main fuel bunker 17 after which the clutch 50 is engaged to transmit motion as heretofore described, from the engine 31 to the screw 44 for the purpose of conveying fuel from the auxiliary fuel bunker 32 forwardly into the main fuel bunker 17 from which it is advanced to the locomotive firebox by the stoking mechanism 13.

In this preferred form of my invention the auxiliary tender C is interchangeable with the main tender D. Thus, when at times only one tender is needed, the tender B can be uncoupled from the locomotive and the auxiliary tender C coupled directly to the locomotive and its conduit 38 and drive shaft 48 coupled respectively to the forward conduit section 21 and the motor 31 to constitute a complete mechanism for advancing fuel to the firebox; or if preferred, the auxiliary tender C with its conduit section 28 and its drive shaft section 48 may be uncoupled from the main tender B without impairing the operation of the stoker mechanism of the main tender for moving the fuel forwardly therefrom to the locomotive.

While I have not shown how the water is supplied to the locomotive it will be readily understood that the water may be passed from the water compartment E of the auxiliary tender through a hose connection (not shown) to the water compartment D of the main tender from which it may be pumped or carried forward by an injector as is well known in the art to the locomotive boiler.

In the modification of the invention illustrated in Fig. 2, the structure differs from that of the preferred construction in that the fuel from the auxiliary fuel bunker is carried forward to the locomotive directly by the conveying mechanism without first passing into the main fuel bunker. Referring to Fig. 2 the fuel from the fuel bunker 60 of the auxiliary tender B' passes into the trough 61 the same as described in connection with the preferred form of the invention, and similarly the trough 61 is mounted on the auxiliary tender the same as in the preferred construction. Fuel in the trough 61 is carried forward by the sectional screw 62 through the flexibly mounted extensible and contractible conduit 63 from the end of which it is delivered into a receiving chamber 64 formed rearward of the backwall 65 of the main tender A'. From this chamber the fuel is advanced forwardly by the screw 71 through the water tight conduit 66 disposed in the compartment 67 of the main tender A' and through the conduit extension 66a forwardly into the trough 68 mounted in the water tight stoker compartment 69 positioned beneath the main fuel bunker 70. Any mechanism such as that shown in the preferred construction may be employed to advance the fuel from the trough 68 forwardly to the locomotive.

As in the preferred embodiment of the invention the screw conveyors are driven from a prime mover located on the locomotive as shown in Fig. 1, but not disclosed in Fig. 2. The motor is suitably connected to the drive shaft 72 in the modified construction which shaft extends rearwardly from the compartment 69 through the water compartment 67, wherein it is protected by the water tight sleeve 73, to the pinion 74 suitably journalled in the housing 75 formed with the chamber 64. Motion is imparted from the pinion 74 to the gear 76, the shaft 77 of which is connected to and drives the screw conveyor 71. Power transmitted by the shaft 72 is passed to the flexible shaft 78 of the auxiliary tender B' through the clutch 79 and from the shaft 78 to the pinion shaft 80 which carries the pinion 81 in turn driving the gear 82 for imparting motion to the sectional screw conveyor 62. Like in the preferred construction the conveying mechanism of the main tender A' may be operated independently of the conveying mechanism of the auxiliary tender B' because of the clutch 79. When it is desired to use the fuel in the auxiliary bunker 60 this may be done by engaging the clutch 79 and thus causing the fuel to be carried forward by the screw conveyor 62 in to the chamber 64 on to the screw conveyor 71 which functions to advance the fuel to the mechanism for carrying it forwardly to the locomotive firebox. It will be recognized that the conduit 66 and the sleeve 73 are formed water tight with the rear wall 65 of the tender and the rear wall 83 of the stoker compartment 69.

A still further modification of my invention is illustrated in Fig. 3. In this construction the engine for driving the conveying mechanism is mounted on the auxiliary tender and the screw conveyor sections are disposed in end to end relation throughout and are driven from the rearward end of the rear section. For this purpose the motor 90 is disposed in any desired location on the auxiliary tender 91 and is connected by the shaft 92 to the pinion 93 which drives the gear 94 connected in any desired manner to the rearward section 95 of the sectional screw conveyor indicated as a whole at 96. The screw section 95 is disposed in the trough 97 positioned the same as the troughs of the auxiliary tenders heretofore described. From the trough 97 the fuel from the auxiliary tender is carried forward by the screw section 98 through the extensible and contractible conduit 99 extending between the auxiliary tender 91 and the main tender 100. The conduit 99 is universally attached at 101 to the trough 97 and is attached similarly at 102 to the rear end of the conduit 103. This last named conduit is water tight and is disposed in the water compartment 104 of the main tender. It communicates through the extension 103a with the trough 105

disposed in the stoker compartment 106 beneath the main fuel bunker 107. The screw section 108 is universally connected to the screw section 98 and serves to advance the fuel through the conduit 103, its extension 103a, and into and through the trough 105. Mechanism such as employed in the preferred embodiment of the invention may be used to carry the fuel to the locomotive from the trough 105.

In operation of this embodiment of the invention the slidable plates 110 of the auxiliary tender 91 are positioned to close the aperture of the floor 111 until all of the fuel has been removed from the main fuel bunker 107. When the main fuel bunker has been emptied the fireman then shifts the plates 110 of the auxiliary tender to form an opening as at 112 to permit the flow of fuel from the auxiliary fuel bunker 113 into the trough 97. With this construction the main tender can not be used independently of the auxiliary tender, although, the auxiliary tender may be coupled to the locomotive in place of the main tender 100 as will be observed from the described construction.

From the foregoing description it is believed apparent that in each form of the invention the conveying means of the auxiliary tender cooperates with the conveying means of the main tender to constitute a fuel conveying system extending between the fuel bunkers for advancing fuel from the bunkers to the stoking means on the locomotive; or from another aspect the invention provides a fuel conveying system extending from the auxiliary tender to the locomotive firebox for transferring fuel from the main and auxiliary bunkers to the firebox.

Those familiar with the operation of railway locomotives will recognize that my invention makes it possible to operate a locomotive for a greater distance and with less delay than is possible with the locomotive and tenders of past practice. It will be recognized too that my invention is particularly useful where locomotives are used in pusher service and when so employed it is possible to use the same locomotive for a greater period of time with less frequent delays for refueling.

While I have illustrated a number of embodiments of my invention still others may be utilized without departing from the scope and spirit of the appended claims.

I claim:

1. A locomotive tender provided with a fuel bunker and a stoker compartment constituting a fuel compartment and including a water compartment separated from the fuel compartment and a water tight conveyor conduit disposed in said water compartment at one end opening into the fuel compartment and at the other opening through the rear wall of the tender.

2. A locomotive tender provided with a fuel bunker and a stoker compartment constituting a fuel compartment and including a water compartment separated from the fuel compartment, a water tight conveyor conduit disposed in said water compartment at one end opening into the fuel compartment and at the other opening through the rear wall of the tender and a water tight sleeve for housing a drive shaft likewise disposed in the water compartment at one end opening into the fuel compartment and at the other opening through the rear wall of the tender.

3. A locomotive tender having a fuel bunker and a water compartment and including a stoker compartment formed without the water compartment in communication with the fuel bunker and a water tight conveyor conduit disposed in the water compartment at one end opening into the stoker compartment and at the other opening through the rear wall of the tender.

4. A locomotive tender having a fuel bunker and a water compartment and including a stoker compartment formed without the water compartment in communication with the fuel bunker, a water tight conveyor conduit disposed in the water compartment at one end opening into the stoker compartment and at the other opening through the rear wall of the tender, and a water tight sleeve for housing a drive shaft likewise disposed in the water compartment at one end opening into the stoker compartment and at the other opening through the rear wall of the tender.

5. In a locomotive tender, in combination, a fuel bunker, a water compartment, a stoker compartment without the water compartment in communication with the fuel bunker, a stoker trough in said stoker compartment, and a conveyor conduit extending from the rearward end of said trough rearwardly into the water compartment to the rear wall of the tender.

6. In a locomotive tender, in combination, a water compartment, a fuel receiving chamber at the rear of the tender outside the water compartment, and means for advancing fuel from the chamber to the front end portion of the tender including a water tight conveyor conduit disposed in said water compartment.

7. In combination, a main tender, an auxiliary tender, said main tender being provided with a fuel receiving chamber at the rearward end thereof, conveying means on the auxiliary tender for transferring fuel therefrom to said chamber, and conveying means on the main tender for advancing fuel forwardly from said chamber.

8. In combination, a main tender, an auxiliary tender, said main tender being provided with a fuel receiving chamber at the rearward end thereof, conveying means on the auxiliary tender for transferring fuel therefrom to said chamber, conveying means on the main tender for advancing fuel forwardly from said chamber, and drive means for each of said conveying means including a clutch operable to permit operation of the second named conveying means independent of the first named conveying means.

9. In combination, a main tender, an auxiliary tender, each tender having a fuel bunker and the main tender including a water compartment, a feed conduit system extending between the fuel bunkers and including a trough portion in communication with the fuel bunker of the auxiliary tender and a trough portion in communication with the fuel bunker of the main tender, that portion of the conduit system intermediate the trough portions including a flexibly mounted section extending between the tenders and a water tight section disposed in the water compartment of the main tender.

10. In combination, a main tender, an auxiliary tender, each tender having a fuel bunker and the main tender including a water compartment, a feed conduit system comprising a plurality of conduit sections arranged in end to end relation throughout its length extending between the fuel bunkers and including a trough portion in communication with the fuel bunker of the auxiliary tender and a trough portion in communication with the fuel bunker of the main

tender, that portion of the conduit system intermediate the trough portions including a flexibly mounted section extending between the tenders and a water tight section disposed in the water compartment of the main tender.

11. In combination, a main tender, an auxiliary tender, each tender having a fuel bunker and the main tender including a water compartment, partition plates on the main tender separating the fuel bunker thereof from the water compartment, said main tender being provided with a stoker compartment disposed without the water compartment but being in communication with the fuel bunker, a stoker trough mounted in said stoker compartment, a screw conveyor in said trough, gearing at the rear of said trough for driving said screw including a pinion shaft, a power shaft connected to said pinion shaft, a second stoker trough rigidly mounted on the auxiliary tender in communication with the fuel bunker thereof, an extensible and contractible conduit extending between said last named trough and the rear wall of the main tender, said conduit being universally jointed to said trough and being universally mounted at its opposite end on the main tender, a fixed water tight conduit disposed in the water compartment of the main tender at one end communicating with the extensible and contractible conduit and at the other opening into the fuel bunker of the main tender through a partition wall thereof, a sectional screw conveyor mounted in and extending substantially coextensive with the second named trough and the aforesaid conduits, gearing at the rearward end of said sectional screw, a drive shaft extending from said last named gearing forwardly to a point adjacent the rear wall of the main tender, a connecting shaft extending through the water compartment of the main tender and at its rearward end being operatively connected to the last named drive shaft and at its forward end terminating adjacent said pinion shaft, a clutch between said connecting shaft and said pinion shaft, and a water tight sleeve for that portion of said connecting shaft disposed in the main tender water compartment.

12. A locomotive tender having a fuel bunker and a water compartment separated by partition plates, and including a stoker compartment without the water compartment but in communication with the fuel bunker, a water tight sleeve disposed in the water compartment at one end opening in to the stoker compartment and at the other opening through the rear wall of the tender, and a water tight conveyor conduit likewise disposed in said water compartment at one end opening through the rear wall of the tender and at the other opening into the fuel bunker.

13. A locomotive tender having a fuel bunker and a water compartment separated by partition plates and including a water tight conveyor conduit disposed in said water compartment and extending between a partition plate and the rear wall of the tender, the conduit at one end opening through the rear wall of the tender and at the other end opening into the fuel bunker.

14. In combination, a main tender, an auxiliary tender coupled behind the main tender, the main tender having a fuel bunker and a water compartment, partition plates separating the bunker from the compartment, a stoker conduit on the main tender positioned to receive fuel from the bunker thereof, a fuel bunker on the auxiliary tender, and a feed conduit extending between the fuel bunkers and including a portion disposed in the water compartment of the main tender, said feed conduit opening into the first named fuel bunker through one of said partition plates.

15. In combination, a main tender, an auxiliary tender coupled behind the main tender, the main tender having a fuel bunker and a water compartment and the auxiliary tender having a fuel bunker, and a feed conduit system mounted on said tenders for advancing the fuel forwardly from said bunkers, said system including a water tight conduit section disposed in the water compartment of the main tender.

16. In combination, a locomotive having a plurality of intercoupled tenders, each tender provided with a fuel bunker, and conveying means for transferring the fuel from the bunkers to the locomotive.

17. In combination, a locomotive having an intercoupled main tender and an auxiliary tender coupled to the main tender, each tender having a fuel bunker, and conveying means for transferring fuel from the bunkers to the locomotive.

18. In combination, a locomotive having an intercoupled main tender and an auxiliary tender coupled to the main tender, each tender being provided with a fuel bunker, conveying means for advancing fuel from the main fuel bunker to the locomotive, and conveying means for advancing fuel from the bunker of the auxiliary tender to the conveying means of the main tender.

19. In combination, a locomotive having intercoupled main and auxiliary tenders, a fuel bunker on each tender, conveying mechanism for advancing fuel from the bunker of the main tender to the locomotive, and conveying means for advancing fuel from the bunker of the auxiliary tender into the bunker of the main tender.

20. In combination, a locomotive having intercoupled main and auxiliary tenders, a fuel bunker on each tender, conveying means for advancing fuel from the bunker of the main tender to the locomotive, and conveying means for advancing fuel from the bunker of the auxiliary tender into the bunker of the main tender, the first named conveying means being operable independently of the second named conveying means.

21. In combination, a plurality of intercoupled tenders each provided with a fuel bunker, conveying means on the foremost tender for advancing fuel forwardly from the fuel bunker thereof, and conveying means for advancing fuel from the fuel bunkers of the rearward tenders to the foremost tender.

22. In combination, a plurality of intercoupled tenders each provided with a fuel bunker, conveying means on the foremost tender for advancing fuel forwardly from the fuel bunker thereof, and conveying means for advancing fuel from the fuel bunkers of the rearward tenders to the conveying means of the foremost tender.

23. In combination, a plurality of intercoupled tenders each provided with a fuel bunker, conveying means on the foremost tender for advancing fuel forwardly from the fuel bunker thereof, and conveying means for advancing fuel from the fuel bunkers of the rearward tenders into the fuel bunker of the foremost bunker.

24. In combination, a main tender having a fuel bunker, an auxiliary tender coupled behind the main tender and having a fuel bunker, and a feed conduit system mounted on said tenders for advancing the fuel forwardly from said bunkers, said system including a trough section

on each tender in communication with the fuel bunker thereof and an enclosed conduit extending between said trough sections.

25. In combination, a main tender having a fuel bunker and a water compartment rearward thereof, an auxiliary tender coupled behind the main tender and having a fuel bunker, and a feed conduit system mounted on said tenders for advancing the fuel forwardly from said bunkers, said system including a trough section on each tender in communication with the fuel bunker thereof and an enclosed conduit extending between said trough sections and having a portion thereof extending through the water compartment of the main tender.

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