This invention relates to a loading assembly for use in filling diesel locomotive fuel tanks. It has been heretofore impossible to use conventional automatic shut-off nozzles for filling the fuel tanks of diesel locomotives, since all such nozzles at present on the market depend upon a long filling spout which must be inserted into the fuel tank so that the fuel level therein will rise above the spout to automatically close the filling valve when the tank is full. Due to the construction and position of the fuel tanks in a diesel locomotive, it is impossible to insert these long filling spouts into the tanks so that the fuel level therein will rise to operate the automatic shut-off valve. As a result, the tanks are overfilled and fuel oil is wasted through the overflow pipes and flame arresters with which such tanks are provided.

The principal object of this invention is to provide means upon a diesel locomotive fuel tank which will cooperate with means upon an automatic shut-off nozzle whereby the nozzle will be closed when the fuel level in the tank reaches a predetermined point without it being necessary to insert a long filling spout of an automatic fuel nozzle into the tank so as to completely eliminate overfilling and the resulting fuel oil wastage.

Another object of the invention is to so construct the loading assembly that it will not in any way interfere with the use of the standard connectors with which the locomotive and the loading stations are at present equipped and so that it will not interfere with or disturb the fuel screens and flame arresters with which the filling throats of diesel locomotive tanks are provided.

A further object of the invention is to so construct the improved loading assembly that it can be adapted to the many different types of conventional locomotives and fuel tanks without change in the construction of or position of the tanks or the tank filler tube and so that a filling hose can be quickly and easily connected to and disconnected from the tank.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawings:

Fig. 1 is a fragmentary front end view of a conventional diesel electric locomotive fuel tank illustrating the invention applied thereto.

Fig. 2 is a fragmentary plan view of the tank of Fig. 1; Fig. 3 is an enlarged detail section taken on the line 3—3, Fig. 2 through a filler tube with which such tanks are provided;

Fig. 4 is a similarly enlarged detail view of a "quick-connect" coupling with which the fuel tanks are conventionally provided;

Fig. 5 is a side view partially broken away of an automatic shut-off nozzle designed for use with the invention;
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when fuel is flowing through the discharge spout 21 and to which air is constantly admitted to replace the air being withdrawn therefrom through an air hose 37 communicating with the chamber 35. Thus, the diaphragm 33 cannot be drawn downwardly to release the fulcrum rod 28 unless air is prevented from entering the hose 27 to allow a vacuum to form in the vacuum chamber 35.

To adapt the tank 12 to the uses of this invention, the tank is provided with a vent nipple 39 extending through the front wall of the tank at the desired maximum, liquid fuel level therein, as shown in Fig. 9. A vent tube 40 extends outwardly from each side of the vent nipple 39 through the apron plates 14 at each side of the undercarriage 11. Each vent tube 40 terminates in a terminal elbow 41 extending through its respective apron plate 14 and each elbow 41 is provided with a conventional quick-detachable coupling nipple 43 of any suitable type such as commercially known as “Snap-Tite” coupling. In each a coupling, a coupler 44 slips over the extremity of the nipple 43 and is locked in place thereof by means of locking balls 46 which are in turn locked in place by means of a locking sleeve 45. Such a coupling is provided with a check valve 47 in the nipple 43 and a similar check valve 48 is provided in the coupler 44. When the coupler is in place on the nipple 43, both check valves are forced open by contact with each other. For the purpose of this invention, the coupler 44 is threaded onto a male terminal nipple 49 on the air hose 37.

When the locomotive is in transit all of the fuel terminal nipples 16 are closed by their respective closure caps 18 which accommodate temperature expansion through their expansion check valves 19. All of the vent tubes 40 are similarly closed by means of the check valves 47 at their terminal extremities. At fuel loading stations along the right of way, the loaders remove the most convenient closure cap 18 and insert the discharge spout 21 of their nozzles into the open terminal nipples 16 and secure the nozzle in place thereof by a quarter turn of the coupler 38. They then push the coupler 44 of the air hose 37 over the adjacent vent tube nipple 43 to open the check valves 47 and 48. The finger grip lever 26 of the nozzle is then pulled rearwardly and locked behind the latching abutment 31. Fuel then flows past the shut-off valve 24 and into the tank 12.

As the fuel level in the tank 12 rises, the air will be expelled from the tank through the check valve 19 in the closure cap 18 at the opposite side of the tank. A slight air pressure will be created in the vent tubes 40, the air hose 37, and the vacuum chamber 35 to maintain the locking rollers 29 in their locked position in the fulcrum rod 28. When the fuel level in the tank reaches the vent nipple 39, however, the supply of air to the vacuum chamber 35 will be cut off. The suction created through the suction ports 36 by the venturi action of the incoming fuel will instantly create a vacuum in the vacuum chamber 35, causing the diaphragm 33 to be forced downwardly by atmospheric pressure to release the locking rollers 29 from the fulcrum rod 28 to allow the

valve spring 30 to snap the shut-off valve 24 to the closed position to instantaneously shut-off the incoming fuel at the preset fuel level in the tank.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A fuel loading assembly for a diesel locomotive comprising: a fuel tank; a tank filling hose; a tank filler tube opening through the top of said tank at each side thereof; a removable check valve closing each filler tube; a vent nipple communicating through the wall of said tank at the desired maximum liquid level therein; a vent tube extending outwardly from each side of said vent nipple to a terminal adjacent each of the said tank filler tubes; an inwardly opening check valve closing the outer extremity of each vent tube; an automatic shut-off nozzle on the extremity of said tank filling hose; means for connecting said nozzle with one of said tank filler tubes after the removal of the removable check valve therefrom; a shut-off valve in said nozzle; means urging said shut-off valve to a seat to stop the flow through said nozzle; a vacuum chamber in said nozzle; means for allowing said shut-off valve to be urged to its seat in consequence of the creation of a vacuum in said vacuum chamber; an air tube extending from said vacuum chamber and acting to admit air to the latter to prevent the formation of a vacuum therein; check valve opening means on said air tube; and means for detachably connecting said air tube to the outer extremity of either one of said vent tubes so that the opening means will open the check valve in the outer extremity of that vent tube to place the latter in communication with said vacuum chamber to allow air to flow to said chamber until the liquid level in said tank rises above said vent nipple.

2. A loading assembly for filling diesel locomotive fuel tanks as described in claim 1 in which the removable check valves closing the tank filler tubes are of the outwardly opening variety so that when the shut-off nozzle is connected with one of the tank filler tubes the air compressed by the rising fuel in the tank will be forced outwardly through the check valve of the tank filler tube at the opposite side of said tank.

3. A loading assembly for filling diesel locomotive fuel tanks as described in claim 2 in which the check-valve-opening means comprises an inwardly-opening check valve in the extremity of said air hose positioned to contact the inwardly opening check valve in the extremity of a vent tube so that both check valves will open simultaneously when the air hose is connected with the extremity of a vent tube.

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