loaded through both the bypass pipe and the loading pipe which may increase loading speed when the requirement that the pressure in an upper end of the loading pipe be maintained at a level above the vapor pressure of liquid cargo is satisfied, and liquid cargo can be loaded through the bypass pipe upon malfunction of the pressure regulator.

【Technical Solution】

[10] In accordance with one aspect of the present invention, there is provided a system for preventing evaporation of liquid cargo in a ship, which prevents generation of boil-off gas when liquid cargo is loaded into a storage tank capable of storing liquid cargo, the system including: a pressure regulator provided to a pipe configured to load liquid cargo into the storage tank; a sensing unit placed apart from the pressure regulator; and a bypass pipe branching off from the pipe to allow liquid cargo to bypass the pressure regulator and to be loaded into the storage tank; wherein a degree of opening of the pressure regulator is controlled to maintain pressure in the pipe at a level above a vapor pressure of liquid cargo based on information sensed by the sensing unit, wherein the bypass pipe is provided with a bypass valve controlling flow of liquid cargo through the bypass pipe, and wherein the bypass valve is opened to allow liquid cargo to be loaded through both the bypass pipe and the pipe, when the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo even though the pressure regulator is fully opened, as liquid cargo is loaded and a level of liquid cargo in the storage tank thus is raised.

[11] The system may further include a bypass pipe branching off from the pipe to allow the liquid cargo to be loaded into the storage tank after bypassing the pressure regulator.

[12] The bypass pipe may have a smaller diameter than the pipe from which the bypass pipe branches off.

[13] The bypass pipe may be provided with a bypass valve controlling flow of liquid cargo through the bypass pipe.

[14] The bypass valve may be opened to allow liquid cargo to be loaded through

both the bypass pipe and the pipe, when the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo even though the pressure regulator is fully opened, as liquid cargo is loaded and a level of liquid cargo in the storage tank thus is raised.

[15] The sensing unit may be a pressure transmitter provided to the pipe at an upstream side of the pressure regulator to measure the pressure in the pipe and controlling the degree of opening of the pressure regulator based on the measured value.

[16] The sensing unit may be a level measurement device provided to the storage tank to measure a level of liquid cargo in the storage tank and controlling the degree of opening of the pressure regulator based on the measured value.

[17] The pipe may include: a feed pipe extending above the storage tank; and a loading pipe extending downwards from the feed pipe towards a bottom of the storage tank, and the pressure regulator may be provided to a lower portion of the loading pipe.

[18] The pipe may further include a dispensing pipe extending horizontally from a lower end of the loading pipe.

[19] The pressure regulator may be a valve or a hydraulic turbine.

[20] In accordance with another aspect of the present invention, there is provided a method for preventing evaporation of liquid cargo in a ship, which prevents generation of boil-off gas when liquid cargo is loaded into a storage tank capable of storing liquid cargo, the method comprising: controlling a degree of opening of a pressure regulator provided to a pipe configured to load liquid cargo into the storage tank based on information measured at a position apart from the position at which the pressure regulator is provided to maintain pressure in the pipe at a level above a vapor pressure of liquid cargo, wherein a bypass pipe branching off from the pipe and a bypass valve opening/closing the bypass pipe are provided, and wherein, upon opening of the bypass valve, liquid cargo can be loaded into the storage tank through the bypass pipe without passing through the pressure regulator while being loaded into the storage tank through the pipe, and wherein the bypass valve is opened to allow liquid cargo to be loaded through both the bypass pipe and the pipe, when the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo even though the pressure regulator is fully opened, as liquid cargo is loaded and a level of liquid cargo in the storage tank thus is raised.

[21] A bypass pipe branching off from the pipe and a bypass valve opening/closing the bypass pipe may be provided, and wherein, upon opening of the bypass valve, liquid cargo can be loaded into the storage tank through the bypass pipe without passing through the pressure regulator while being loaded into the storage tank through the pipe.

[22] The bypass valve may be opened to allow liquid cargo to be loaded through both the bypass pipe and the pipe, when the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo even though the pressure regulator is fully opened, as liquid cargo is loaded and a level of liquid cargo in the storage tank thus is raised.

[23] Upon malfunction of the pressure regulator, liquid cargo may be loaded without interruption through the bypass pipe by opening the bypass valve, and the bypass pipe may have a smaller diameter than the pipe such that the pressure in the

【CLAIMS】

【Claim 1】

A system for preventing evaporation of liquid cargo in a ship, which prevents generation of boil-off gas when liquid cargo is loaded into a storage tank capable of storing liquid cargo, the system comprising:

a pressure regulator provided to a pipe configured to load liquid cargo into the storage tank;

a sensing unit placed apart from the pressure regulator; and

a bypass pipe branching off from the pipe to allow liquid cargo to bypass the pressure regulator and to be loaded into the storage tank;

wherein a degree of opening of the pressure regulator is controlled to maintain pressure in the pipe at a level above a vapor pressure of liquid cargo based on information sensed by the sensing unit,

wherein the bypass pipe is provided with a bypass valve controlling flow of liquid cargo through the bypass pipe, and

wherein the bypass valve is opened to allow liquid cargo to be loaded through both the bypass pipe and the pipe, when the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo even though the pressure regulator is fully opened, as liquid cargo is loaded and a level of liquid cargo in the storage tank thus is raised.

【Claim 2】

The system according to claim 1, wherein the bypass pipe has a smaller diameter than the pipe from which the bypass pipe branches off.

【Claim 3】

The system according to claim 1, wherein the sensing unit is a pressure transmitter provided to the pipe at an upstream side of the pressure regulator to measure the pressure in the pipe and controlling the degree of opening of the pressure regulator based on a sensed value.

【Claim 4】

The system according to claim 1, wherein the sensing unit is a level measurement device provided to the storage tank to measure a level of liquid cargo in the storage tank and controlling the degree of opening of the pressure regulator based on a sensed value.

【Claim 5】

The system according to claim 1, wherein the pipe comprises a feed pipe extending above the storage tank; and a loading pipe extending downwards from the feed pipe towards a bottom of the storage tank, and wherein the pressure regulator is provided to a lower portion of the loading pipe.

【Claim 6】

The system according to claim 5, wherein the pipe further comprises a dispensing pipe extending horizontally from a lower end of the loading pipe.

【Claim 7】

The system according to claim 1, wherein the pressure regulator is a valve or a hydraulic turbine.

【Claim 8】

A method for preventing evaporation of liquid cargo in a ship, which prevents generation of boil-off gas when liquid cargo is loaded into a storage tank

capable of storing liquid cargo, the method comprising:

controlling a degree of opening of a pressure regulator provided to a pipe configured to load liquid cargo into the storage tank based on information measured at a position apart from the position at which the pressure regulator is provided to maintain pressure in the pipe at a level above a vapor pressure of liquid cargo,

wherein a bypass pipe branching off from the pipe and a bypass valve opening/closing the bypass pipe are provided, and wherein, upon opening of the bypass valve, liquid cargo can be loaded into the storage tank through the bypass pipe without passing through the pressure regulator while being loaded into the storage tank through the pipe, and

wherein the bypass valve is opened to allow liquid cargo to be loaded through both the bypass pipe and the pipe, when the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo even though the pressure regulator is fully opened, as liquid cargo is loaded and a level of liquid cargo in the storage tank thus is raised.

【Claim 9】

The method according to claim 8, wherein, upon malfunction of the pressure regulator, liquid cargo can be loaded without interruption through the bypass pipe by opening the bypass valve, and wherein the bypass pipe has a smaller diameter than the pipe such that the pressure in the pipe can be maintained at a level above the vapor pressure of liquid cargo.

【Claim 10】

The method according to claim 8, wherein the information is the pressure in the pipe measured by a pressure transmitter provided to the pipe at an upstream side of the pressure regulator.

【Claim 11】

The method according to claim 8, wherein the information is a level of liquid cargo in the storage tank measured by a level measurement device provided to the storage tank.