sea using a mooring gear to conduct an oil drilling operation. In recent years, however, so-called drill ships have been developed and used for offshore drilling. The drill ships are provided with advanced drilling equipments and have structures similar to typical ships such that they can make a voyage using their own power. Since drill ships have to frequently move in order for development of small marginal fields, they are constructed to make a voyage using their own power, without assistance of tugboats.

Meanwhile, a moonpool is formed at the center of a rig ship, a fixed type platform or a drill ship, such that a riser or a drill pipe is vertically movable through the moonpool. In addition, a derrick in which a variety of drilling equipments are integrated is installed on a deck.

SUMMARY OF THE INVENTION

EmbodimentsAn aspect of the present invention seekis directed to provide a system for monitoring temperature and pressure of an enclosed derrick structure, which senses abnormal internal temperature and pressure of the enclosed derrick structure by appropriately monitoring the internal temperature and pressure thereof according to ventilation and influence of waves within a moonpool, thereby improving the safety of equipments, workers, and working conditions inside the enclosed derrick structure.

Meanwhile, in order for drilling of natural resources in extremely cold regions such as arctic regions, arctic rig ships, fixed type arctic platforms, and arctic ships such as arctic drill ships have been built. Such arctic ships may be constructed to have an enclosed area in almost all zones in order to prevent freezing in extremely low temperature environments and ensure the smooth operation of equipments and crews' safety.

In particular, a derrick and a moonpool of an arctic ship are enclosed in order to protect internal equipments and workers. A ventilating system may be installed in the enclosed derrick and the enclosed moonpool in order for protection and ventilation of the inner spaces thereof. In particular, in order to meet a rule and regulation in an

extremely low temperature region, it is preferable that the ventilating system supplies heated air to the derrick and the moonpool, and exhausts cooled air to the exterior through an upper portion of the derrick.

Meanwhile, there is a need for protecting equipments, workers, and working conditions inside the enclosed derrick and the enclosed moonpool by checking an abnormal operation state of a ventilating system and sensing abnormal internal temperature and pressure of the enclosed derrick and the enclosed moonpool.

According to an aspect~~embodiment~~ of the present invention, a system for monitoring temperature and pressure of an enclosed derrick structure communicating with a moonpool includes: one or more temperature sensors installed in the inside of the enclosed derrick to monitor an internal temperature of the enclosed derrick; one or more pressure sensors installed in the inside of the moonpool to monitor an internal pressure difference of the moonpool;~~ and~~ one or more damping units installed in a side of the enclosed derrick to supply air to the inside of the enclosed derrick or exhaust air to the outside of the enclosed derrick in order to cope with an abnormal internal temperature of the enclosed derrick and an abnormal internal pressure variation of the moonpool; a supply unit supplying outside air to the inside of the moonpool; and an exhaust unit exhausting inside air from the enclosed derrick, wherein when the abnormal internal temperature of the enclosed derrick and the abnormal internal pressure of the moonpool are sensed by the monitoring of the temperature sensors and the pressure sensors, the damping units are selectively controlled according to the sensing results.

The~~ system may further include: a supply unit supplying outside air to the inside of the moonpool; and an~~ exhaust unit may be installed at an upper portion of the enclosed derrick~~ to exhaust inside air~~.

The system may further include: a control unit coupled to the temperature sensors and the pressure sensors to control the operations of the supply unit, the exhaust unit, and the damping units, based on temperature and pressure information monitored by the temperature sensors and the pressure sensors.

The temperature sensors may include: a first temperature sensor installed at an

upper portion of the enclosed derrick; a second temperature sensor installed at a middle portion of the enclosed derrick; and a third temperature sensor installed at a lower portion of the enclosed derrick.

According to another aspectembodiment of the present invention, a system for monitoring temperature and pressure of an enclosed derrick structure communicating with a moonpool includes: one or more temperature sensors installed in the inside of the enclosed derrick to monitor an internal temperature of the enclosed derrick; and one or more pressure sensors installed in the inside of the moonpool to monitor an internal pressure difference of the moonpool, wherein the internal temperature of the enclosed derrick and the internal pressure of the moonpool are sensed.

The temperature sensors may include: a first temperature sensor installed at an upper portion of the enclosed derrick; a second temperature sensor installed at a middle portion of the enclosed derrick; and a third temperature sensor installed at a lower portion of the enclosed derrick.

The enclosed derrick may include an exhaust unit disposed on an upper inner side, and a fingerboard disposed across a middle inner portion. The first temperature sensor may be disposed adjacent to the exhaust unit of the enclosed derrick. The second temperature sensor may be disposed above the fingerboard of the enclosed derrick. The third temperature sensor may be disposed under the fingerboard of the enclosed derrick.

According to another aspectembodiment of the present invention, a system for monitoring temperature and pressure of an enclosed derrick structure communicating with a moonpool is characterized in that an internal temperature of the enclosed derrick or an internal pressure of the moonpool is sensed, and the inside of the enclosed derrick is ventilated with the outside of the enclosed derrick according to a variation in the internal temperature of the enclosed derrick or the internal pressure of the moonpool, wherein outside air is supplied to the inside of the moonpool with a supply unit and inside air is exhausted from the inside of the moonpool with an exhaust unit.

BRIEF DESCRIPTION OF THE DRAWINGS

WHAT IS CLAIMED IS:

1. A system for monitoring temperature and pressure of an enclosed derrick structure communicating with a moonpool, the system comprising:

one or more temperature sensors installed in the inside of the enclosed derrick to monitor an internal temperature of the enclosed derrick;

one or more pressure sensors installed in the inside of the moonpool to monitor an internal pressure difference of the moonpool;

one or more damper units installed in a side of the enclosed derrick to supply air to the inside of the enclosed derrick or exhaust air to the outside of the enclosed derrick in order to cope with an abnormal internal temperature of the enclosed derrick and an abnormal internal pressure variation of the moonpool;

a supply unit supplying outside air to the inside of the moonpool; and

an exhaust unit exhausting inside air from the enclosed derrick,

wherein when the abnormal internal temperature of the enclosed derrick and the abnormal internal pressure of the moonpool are sensed by the monitoring of the temperature sensors and the pressure sensors, the damper units are selectively controlled according to the sensing results.

2. The system according to claim 1,

wherein the exhaust unit installed at an upper portion of the enclosed derrick.

3. The system according to claim 2, further comprising:

a control unit coupled to the temperature sensors and the pressure sensors to control the operations of the supply unit, the exhaust unit, and the damper units, based on temperature and pressure information monitored by the temperature sensors and the pressure sensors.

4. The system according to claim 1, wherein the temperature sensors comprise:

a first temperature sensor installed at an upper portion of the enclosed derrick;

a second temperature sensor installed at a middle portion of the enclosed derrick; and

a third temperature sensor installed at a lower portion of the enclosed derrick.

5. A system for monitoring temperature and pressure of an enclosed derrick structure communicating with a moonpool, the system comprising:

one or more temperature sensors installed in the inside of the enclosed derrick to monitor an internal temperature of the enclosed derrick; and

one or more pressure sensors installed in the inside of the moonpool to monitor an internal pressure difference of the moonpool,

wherein the internal temperature of the enclosed derrick and the internal pressure of the moonpool are sensed,

wherein the temperature sensors comprise: a first temperature sensor installed at an upper portion of the enclosed derrick; a second temperature sensor installed at a middle portion of the enclosed derrick; and a third temperature sensor installed at a lower portion of the enclosed derrick, and

the enclosed derrick comprises an exhaust unit disposed on an upper inner side, and a fingerboard disposed across a middle inner portion,

wherein the first temperature sensor is disposed adjacent to the exhaust unit of the enclosed derrick, the second temperature sensor is disposed above the fingerboard of the enclosed derrick, and the third temperature sensor is disposed under the fingerboard of the enclosed derrick.

6. A system for monitoring temperature and pressure of an enclosed derrick structure communicating with a moonpool, characterized in that an internal temperature

of the enclosed derrick or an internal pressure of the moonpool is sensed, and the inside of the enclosed derrick is ventilated with the outside of the enclosed derrick according to a variation in the internal temperature of the enclosed derrick or the internal pressure of the moonpool,

wherein outside air is supplied to the inside of the moonpool with a supply unit and inside air is exhausted from the inside of the moonpool with an exhaust unit.

7. The system according to claim 6, wherein the exhaust unit installed at an upper portion of the enclosed derrick.