[0007] FIG. 1 is a diagram of a typical air lubrication system.

[0008] Referring to FIG. 1, the air lubrication system includes an air ejector 11 disposed at the bow of a hull 20, two air compressors 13, 14 disposed adjacent to the air ejector 11, and two motors 15, 16 disposed adjacent to the air ejector 11 to drive the air compressors 13, 14. In addition, the air lubrication system may include a distribution board 17 to drive the motors 15, 16. Further, the air lubrication system includes an air delivery pipe AP connected between the air ejector 11 and the air compressors 13, 14.

[0009] A power generation engine GE is disposed at the stern of the hull. The distribution board 17 receives electricity from the power generation engine GE and distributes the received electricity to the motors 15, 16. In addition, a main engine ME may be disposed at the stern of the hull.

[0010] The power generation engine GE may include multiple power generation engines. Here, a switchboard SB may be provided to manage electricity generated by the power generation engines GE. That is, the switchboard SB may be electrically connected to the distribution board 17.

[0011] Although not shown, the air lubrication system may further include a device for regulating the amount of air discharged from the air ejector 11, as needed.

[0012] <Related Literature>

[0013] <Patent Document>

[0014] (Patent Document 1) Korean Patent Laid-open Publication No. 10-2020-0063398 (2020.06.05.)

SUMMARY

[0015] It is an object of the present disclosure to provide an air lubrication system for ships, which can achieve high energy efficiency, as compared with a typical air lubrication system driven by a power generation engine.

[0016] In accordance with one aspect of the present disclosure, an air lubrication system includes: a speed governor connected to a main propulsion shaft connected to a main engine of a ship, the speed governor changing rpm of the main propulsion shaft and outputting the changed rpm; at least one air compressor connected to the speed governor and rotated at the rpm output from the speed governor to supply compressed air through

compression of air; an air ejector disposed on a bow of the ship and discharging the compressed air supplied from the at least one air compressor to an outside of the ship; and an air delivery pipe through which the compressed air supplied from the at least one air compressor is delivered to the air ejector, wherein the air ejector is provided with an emergency stop valve to stop delivery of air to the air ejector in an emergency.

[0017] The speed governor may include at least one gear train adapted to change the rpm of the main propulsion shaft.

[0018] The speed governor may further include a clutch adapted to block output of the changed rpm.

[0019] The air lubrication system may further include: at least one control valve disposed on the at least one air compressor and regulating an air supply pressure of the at least one air compressor.

[0020] The air lubrication system may further include: a temperature regulator disposed on the air delivery pipe and regulating a temperature of the compressed air supplied from the at least one air compressor.

[0021] In accordance with another aspect of the present disclosure, an air lubrication system includes: a speed governor connected to a main propulsion shaft connected to a main engine of a ship, the speed governor changing rpm of the main propulsion shaft and outputting the changed rpm; at least one rotary compressor connected to the speed governor and rotated at the rpm output from the speed governor to supply compressed air through compression of air; at least one electrically driven compressor driven by electricity supplied from a power generation engine of the ship; an air ejector disposed on a bow of the ship and discharging the compressed air supplied from the at least one rotary compressor and the at least one electrically driven compressor to an outside of the ship; and an air delivery pipe through which the compressed air supplied from the at least one rotary compressor and the at least one electrically driven compressor is delivered to the air ejector, wherein the air ejector is provided with an emergency stop valve to stop delivery of air to the air ejector in an emergency.

[0022] The air delivery pipe may allow the compressed air supplied from the at least one rotary compressor to be joined with the compressed air supplied from the at least one electrically driven compressor before the compressed air is delivered to the air ejector.

[0023] The at least one electrically driven compressor may include a third air compressor and a fourth air compressor disposed at a stern of a hull, wherein the air

lubrication system may further include: a starter controlling current or voltage supplied to the third air compressor and the fourth air compressor.

[0024] According to the present disclosure, the air lubrication system is connected to the main propulsion shaft through the speed governor to be operated without electricity produced by a power generation engine, as in the related art, thereby achieving reduction in fuel consumption.

[0025] In addition, the air lubrication system can operate the air compressors without using a separate distribution board.

[0026] Further, the air lubrication system can provide better utilization of an internal space of a ship and reduction in shipbuilding cost through use of an engine having a relatively low output power, as compared with a typical air lubrication system, and can provide significant reduction in shipbuilding cost through reduction in cost for auxiliary equipment, for example, a fresh water coolant pump, a seawater coolant pump, a cooler, and a fuel oil pump, and an engine room blower fan.

[0027] Furthermore, the air lubrication system can provide reduction in weight of a ship and sufficient cargo space through use of an engine having a relatively low output power, as compared with a typical air lubrication system.

[0028] Furthermore, the air lubrication system can achieve fuel savings at low ship speed, as well as at high ship speed.

DRAWINGS

[0029] The above and other aspects, features, and advantages of the present invention will become apparent from the detailed description of the following embodiments in conjunction with the accompanying drawings:

[0030] FIG. 1 is a diagram of a typical air lubrication system;

[0031] FIG. 2 is a diagram of an air lubrication system for ships according to one embodiment of the present invention;

[0032] FIG. 3 is a diagram of the air lubrication system for ships according to the embodiment of the present invention, illustrating connection between an air compressor and an air ejector through an air delivery pipe;