er demand. The thruster having the maximum power demand will determine the minimum main engine speed in the electronic gear box.

Fig. 3 shows a simplified drawing of a vessel such as a ship 102 comprised of the Control System(s) 101, mechanical system with Main Engine(s) 103, Main Gearbox(es) 104, Main Propeller(s) 106, Shaft Generator(s) 109, and AC Power Generation and Distribution System 110 which is shown in more detail in fig. 4. Fig. 3 shows a redundant system with two of each major component, but a single, non-redundant system is possible. Further, fig. 3 shows a Main Engine(s) 103 in the ship which Main Engine(s) 103 by a shaft 105 turns the Main Gearbox(es) 104 which turns Main Propeller(s) 106 via shaft 107. The Main Engine(s) 103 further, via shaft 108 drives a Shaft Generator(s) 109. This Shaft Generator(s) 109 is supplying AC power to electric motors for driving Thruster(s) 111. Thruster propellers are shown on the sides of the ship, but they may be any type of AC motor powered thrusters, including, but not limited to, tunnel thrusters and azimuth thrusters.

In operation, the Control System(s) 101 can perform measurement and analysis of the RPM and pitch of all of the propellers used to control the ship. In situations where the ship has to operate at a constant speed, or be kept at a specific position, the engines have to operate, because there will always be a drift on the ship by caused by the wind or the water current. Therefore, in many situations where weather conditions are good, it is possible to reduce the RPM of the Main Engine(s) 103 below the normal lower threshold, and change the pitch of the Main Propeller(s) 106 in order to achieve the same propulsion. This has the desired effect to reduce fuel consumption and thereby reduce pollution.

Fig. 4 shows more details of the components of fig. 3. The Main Engine(s) 103 drive a Main Propeller 106 connected directly mechanically by a shaft and through a Main Gearbox(es) 104 system. These Main Engine(s) 103 also drive the Shaft Generator(s) 109. This Shaft Generator(s) 109 supplies AC electrical power to the Thruster(s) 111 that turn the thruster propellers 111.

Further, fig. 4 shows more details of the AC Power Generation and Distribution System 110 of fig. 3. Said AC Power Generation and Distribution System 110 consists of

CLAIMS

1. A control system which is configured for controlling and optimizing the RPM of at least one main engine of a vessel, which main engine is configured to drive at least one pitch regulated main propeller for propulsion, which main engine is configured to drive at least one main generator in such a way that reducing the speed of the main engine will reduce the frequency output of the main generator, which main generator is configured to drive at least one thruster motor, which thruster motor is configured to drive at least one thruster propeller that is pitch-regulated, wherein the at least one thruster motor is connected to the main generator in such a way that reducing the speed of the main engine will reduce the speed of the thruster propellers because the at least one thruster motor is operating with the frequency of the main generator connected to the main shaft and the control system is configured to perform an analysis of the RPM and pitch of the main shaft propeller, the RPM and the pitch of the thruster propeller, which control system is configured to operate based on said analysis and which control system is configured to receive a plurality of input from other control systems in the vessel, and to perform regulation of

- the RPM of the main engine between a low and a high threshold level during normal operation of the vessel,
- the RPM of the main engine by lowering the RPM of the main engine to a level below the low threshold RPM level during a period when the vessel is maintaining a constant position or a constant low speed, and
- the pitch of at least the main propeller for compensating for the low RPM level of the main engine.

2. The control system according to claim 1, wherein the system is configured to perform compensation of the pitch of the thruster propeller in order to maintain the propulsion power from the thruster propeller.

3. The control system according claim 1, wherein the system is configured to adjust the pitch of at least one thruster propeller and to compensate the pitch to maintain the

propulsion power from the thruster propeller when the RPM of the main engine is optimized.

4. The control system according to claim 1, wherein the system is configured to activate a frequency converter configured to convert the electricity to the correct frequency, for compensating for the lowered RPM level of the main engine.

5. The control system according to claim 1, wherein the control system comprises at least a first algorithm for optimizing of the RPM of the main engine in steps of fixed RPM.

6. The control system according to claim 5, wherein the control system comprises at least a second algorithm for adjusting the RPM of the main engine by dynamic optimizing of RPM.

7. The control system according to claim 6, wherein the control system based on the analysis of the actual behaviour of the vessel, the actual pitch of the main propeller, the pitch of the thruster propeller, and at least one of the first or the second algorithm of the control system is configured to disable the RPM adjustment of the main engine.

8. The control system according to claim 1, wherein the control system is configured to adjust the RPM of the main engine if the pitch of the thruster propeller enters at least one undesired range of pitch.

9. The control system according to claim 1, wherein the control system is configured to adjust the RPM of the main engine if the pitch of the main propeller enters at least one undesired range of pitch.

10. The control system according to claim 1, wherein the control system based on the actual load of one or more generators is configured to perform control of the RPM of the main engine, based on the working conditions of said generator, change in power consumption, need of larger/lower range of power consumption or available power on a bus bar.

11. The control system according to claim 1, wherein the control system is configured to adjust the RPM of the main engine as a function of the actual load of one or more frequency converters connected to the main generator and as a function of one or more frequency converters reaching an upper or lower limit for one or more parameters for the operation of the frequency converters, such parameters being changes in power consumption, need of larger/lower dynamic range of power consumption, or available power on a bus bar.

12. The control system according to claim 1, wherein the control system, based on communication with other systems on board the vessel is configured to perform regulation of the RPM of the main engine.