Title: SYSTEM FOR CONNECTING SHORE POWER TO A SHIP WHILE DOCKED

Abstract: The invention concerns a ship comprising a plurality of electrical consumers such as e.g. a bow thruster (7). The electrical consumers (devices) are connected to an electrical distributor (20) by means of respective supply lines. These supply lines deliver electrical power. The ship comprises a connector device (2, 3, 4, 5) for connecting a shore cable (3) with a selected one of said supply lines, e.g. the supply line (6) for a bow thruster (7) for delivering electrical power towards said electrical distributor (20) by said selected supply line.
The invention relates to a ship comprising a plurality of electrical consumers connected to an electrical distributor by means of respective supply lines for delivering electrical power.

Ships in ports normally use their diesel engines to supply electricity while docked. Especially cargo ships need an uninterrupted supply of electricity to supply the refrigeration units while docking at port. The power is normally generated by diesel generators and is known as "Hotelling Power". The use of diesel generators to produce power while docked in harbors results in exhaust emission affecting the local area. Therefore, "hotelling power" may be delivered by systems capable of supplying/receiving shore based electrical power to ships docking at ports.

The technology to supply ships with shore based electrical power has been used by the US military as well as private yachts. There are also known facilities in Alaska for cruise ships and a known facility for cargo ships in Los Angeles harbor.

A problem associated with prior art systems is the need for new cables and cable ways and installation of the necessary electrical board to receive the electricity from shore.

According to an aspect of the invention a ship is provided, said ship is prepared to receive electricity from shore in a simpler manner than hitherto known, said ship comprising a connector device for connecting a shore cable with a selected one of said supply lines for delivering electrical power towards said electrical distributor by said selected supply line.
By providing the ship with a connection to a supply line for an onboard electrical consumer, the existing supply line and switch gear and other already existing equipment in the distributor can then serve as both a supply for the consumer and, when in port, feed back of shore power.

The invention in another embodiment is to provide an electrical supply system for a ship of the kind mentioned in the opening paragraph, said electrical supply system comprising a connector device for connecting a shore cable with a selected one of said supply lines for delivering electrical power towards said electrical distributor by said selected supply line.

Another problem associated with the prior art methods for delivering electricity to especially cargo ships or cargo handling ships is that the shore cable passes from the dock to the ship either by the side or by the stern. In both situations the cable passes through the cargo or container handling area and is therefore in danger of interfering with operations such as loading and discharging of containers or cargo. There is also a danger of interference with persons present in this area.

The invention in another aspect is to provide a ship comprising at least one electrical consumer arranged in a forward end of said ship and connected to an electrical distributor (preferably being arranged remotely from said forward end) by means of respective consumer supply lines, for delivering electrical power to said at least one consumer, said ship further comprising a connector device for connecting a shore cable with a shore power supply line running along said consumer supply lines, for delivering electrical power towards said electrical distributor by said shore power supply line.

The invention in another embodiment provide a connector device for connecting a shore cable with a shore power supply line running along said
consumer supply lines, for delivering electrical power towards said electrical
distributor by said shore power supply line.

By providing the ship with a connector device for connecting a shore cable
with a shore power supply line running along said consumer supply lines it is
possible to use the already existing cable ways for electrical consumers
arranged in a forward end of the ship. This also give rise to an entrance of
the shore cable at the fore end of the ship, thereby arranging the shore cable
away from the normal cargo handling area.

By further providing the ship with shore cable receiving means at the forward
end of the ship with a connector to a supply line to at least one bow thruster
the existing supply line and switch gear and other existing equipment in the
electrical distributor can then serve a dual purpose as both supply for the
large consumer and, when in port, feed back of shore power.

It should be emphasized that the term "comprises/comprising" when used in
this specification is taken to specify the presence of stated features, integers,
steps or components but does not preclude the presence or addition of one
or more other features, integers, steps, components or groups thereof.

The term "electrical distributor" includes the main board. The term "shore
cable", includes all cables that deliver electrical power produced on the shore
to a docking ship. The shore cable doesn’t necessarily have to go from the
shore, but could come from e.g. a barge or barges having thereon placed
cable management systems, which may include a motorized reel to store the
cable, transformer (s) and a distribution board (s).

Description of the drawings
The invention will be described in detail in the following with reference to the drawings in which:

Fig. 1 is a principal diagram showing the new installation,

Fig. 2 is a perspective drawing of a container ship.

Ships in ports normally use their engines to supply electricity while docked. Especially cargo ships need an uninterrupted supply of electricity to supply the refrigeration units while docking at port. The power is normally generated by diesel generators and is commonly known as "Hotelling Power". However, the use of internal diesel generators to produce power while docked has disadvantages because of the pollution. Therefore, "hotelling power" may be delivered by systems capable of supplying shore based electrical power to ships docking at ports.

The technology to supply ships with shore based electrical power has been used by the US military as well as private yachts. There are also known facilities in Alaska for cruise ships, however the delivery of shore based electrical power to cargo or container ships involves other challenges due to the fact that a harbor visit normally involves loading and unloading of cargo and/or containers which requires – due to safety reasons – that the area wherein these operations takes place to be free. Therefore, the shore power connection cable is preferably connected the fore end or the forecastle of these ships, which again requires considerable ship modifications mainly due to the necessary establishment of a new main board (electrical distributor), new cables and new cable ways inside the ships.

The electrical distributor (main board – via thruster supply section), cables and cable ways (cable ducts) already established for the delivering of electrical power towards electrical consumers onboard, as e.g. the thrusters
or the bow thrusters or other large electrical consumers, are according to the
invention used in the reversed direction to provide an electrical supply
system for the ship.

The principal diagram in figure 1 shows an embodiment of the invention
comprising a tension wheel 2 for storing the cable 3 and a shore supply
socket 4. The cable 3 has an interface 5 to the supply line 6 to a bow thruster
7 which is connected to the electrical distributor 20 at 8. However, it should
be understood that other electrical device line (s) could be used, and
therefore the connection point doesn’t necessary have to be on the supply
lines to a bow thruster.

Turning now to figure 2 showing a container ship having a shore cable
connection at the fore end thereby bringing the cable 3 out of the area A
(illustrated by being hatched) wherein cargo or container handling normally
takes place.

Space is a valuable commodity upon ships and therefore the cable managing
system is normally accommodated on the harbor. Using the forefront
(forescape) of the ship to pass over the shore cable entails utilization of the
normally unused space in the fore end (forescape) of the ship to
accommodate the cable managing system. There is even room for
accommodating a motorized reel, cable, and a transformer in the forefront. It
is thereby possible to establish a system onboard, by which a ship can
connect directly to e.g. a 6.6 kV outlet located on the wharf without sacrificing
precious (cargo) space onboard.

The electrical system onboard the ship (not described in detail) may
comprise any manual or automatic power transfer mechanism including
automatic and software driven computerized power transfer mechanism.
Claims

1. A ship comprising a plurality of electrical consumers connected to an electrical distributor by means of respective supply lines for delivering electrical power, said ship comprising a connector device for connecting a shore cable with a selected one of said supply lines for delivering electrical power towards said electrical distributor by said selected supply line.

2. A ship according to claim 1, wherein said selected supply line being the supply line to a thruster.

3. An electrical supply system for a ship, said ship comprising a plurality of electrical consumers connected to an electrical distributor of said electrical supply system by means of respective supply lines of said electrical supply system, for delivering electrical power to said electrical consumers, said electrical supply system comprising a connector device for connecting a shore cable with a selected one of said supply lines for delivering electrical power towards said electrical distributor by said selected supply line.

4. An electrical supply system for a ship according to claim 3 wherein said selected supply line being the supply line to a thruster.

5. A ship comprising at least one electrical consumer arranged in a forward end of said ship and connected to an electrical distributor by means of respective consumer supply lines, for delivering electrical power to said at least one consumer, said ship comprising a connector device for connecting a shore cable with a shore power supply line running along said consumer supply lines, for delivering electrical power towards said electrical distributor by said shore power supply line.
6. A ship according to claim 5 wherein said electrical consumer being a bow thruster.

7. A ship comprising at least one electrical consumer arranged in a forward end of said ship and connected to an electrical distributor preferably being arranged remotely from said forward end by means of respective consumer supply lines, for delivering electrical power to said at least one consumer, said ship comprising a connector device for connecting a shore cable with a shore power supply line running along said consumer supply lines, for delivering electrical power towards said electrical distributor by said shore power supply line.

8. A ship according to claim 7 wherein said electrical consumer being a bow thruster.

9. A ship according to claim 8 wherein said ship being a container ship.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV: B63J3/04 H02J4/00
ADD: H02G11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02J H02G B63J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>8 April 2004 (2004-04-08) figure 1, page 4, line 6 - line 9 page 5, line 13 - line 32</td>
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Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search: 7 July 2006

Date of mailing of the international search report: 20/07/2006

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2230 MV Rijswijk
Tel. (+31-70) 340-2040, Tx: 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Häusler, F.U.
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