FORM 1

608393

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

Blohm + Voss AG, incorporated in The Federal Republic of Germany, of Hermann-Blohm-Strasse 3, 2000 Hamburg 11, FEDERAL REPUBLIC OF GERMANY, hereby apply for the grant of a standard patent for an invention entitled:

An Assembly for Sealing the Propeller Shaft of a Ship

which is described in the accompanying complete specification.

Details of basic application(s):-

Basic Applic. No:	Country:	Application Date:
P 37 42 079.8	DE	11 December 1987

The address for service is:-

Spruson & Ferguson
Patent Attorneys
Level 33 St Martins Tower
31 Market Street
Sydney New South Wales Australia

DATED this SIXTH day of DECEMBER 1988

Blohm + Voss AG

By: M.J. Anderson

Registered Patent Attorney

TO: THE COMMISSIONER OF PATENTS
OUR REF: 79610
S&F CODE: 51610

APPLICATION ACCEPTED AND AMENDMENTS ALLOWED 14-1-91

REPRINT OF RECEIPT
5004105 07/12/88
5845/2

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application made for a patent for an invention entitled:

An Assembly for Sealing the Propeller Shaft of a Ship

We Fritz Brüning and Christian Hilbich

th care ~~I/We~~, Blohm + Voss AG.....
[full name of declarant(s)]

of Hermann-Blohm-Str. 3, 2000 Hamburg 11, (BRD).....
[full address of declarant(s) - not post office box]

Federal Republic of Germany.....

.....

do solemnly and sincerely declare as follows:-

1. ~~I am~~/We are authorised by Blohm + Voss AG, the applicant for the patent to make this declaration on its behalf.

2. The basic application as defined by Section 141 of the Act was made in Federal Republic of Germany on 11 December, 1987 by Blohm + Voss AG

3. GÜNTER PIETSCH, of Wrietkamp 16, 2000 Hamburg 62, Federal Republic of Germany, is the actual inventor of the invention and the facts upon which the applicant is entitled to make the application are as follows: BLOHM + VOSS AG is entitled by Contract of Employment between the inventor as employee and BLOHM + VOSS AG as employer, as a person who would be entitled to have the patent assigned to it if a patent were granted upon an application made by the inventor.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at Hamburg this 05. day of 01. 19 89

BLOHM + VOSS AG
HAMBURG

.....
Signature of Declarant
Fritz Brüning Christian Hilbich

TO: THE COMMISSIONER OF PATENTS
AUSTRALIA

SBR/JS/0024U

(12) PATENT ABRIDGMENT (11) Document No. AU-B-26645/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 608393

(54) Title
AN ASSEMBLY FOR SEALING THE PROPELLER SHAFT OF A SHIP

International Patent Classification(s)
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(21) Application No. : 26645/88 (22) Application Date : 07.12.88

(30) Priority Data

(31) Number (32) Date (33) Country
3742079 11.12.87 DE FEDERAL REPUBLIC OF GERMANY

(43) Publication Date : 15.06.89

(44) Publication Date of Accepted Application : 28.03.91

(71) Applicant(s)
BLOHM + VOSS AG

(72) Inventor(s)
GUNTER PIETSCH

(74) Attorney or Agent
SPRUSON & FERGUSON, GPO Box 3898, SYDNEY NSW 2001

(56) Prior Art Documents
GB 2174150
EP 79480

(57) Claim

1. A multiple seal assembly for a propeller shaft of a ship to impede migration of lubricant and/or sea water therepast, said assembly comprising:

at least two sealing rings located about the propeller shaft, said at least two sealing rings comprising at least one inwardly pointing sealing ring and at least one outwardly pointing sealing ring;

at least one annular chamber located between respective adjacent sealing rings, wherein at least one of said a+ least one annular chambers is adapted to receive pressurised gas;

an inlet line and an outlet line extending from said at least one annular chamber adapted to receive pressurised gas, so as to form a closed line pressurised system therebetween;

a pressure-regulating member inserted into said inlet line and adapted to maintain the pressure in said annular chamber and said closed line pressurised system, said pressure being no higher than prevailing external water pressure or pressure of the lubricant;

a shutoff member being selectively interactable with both said outlet line and a discharge channel so as to allow a discharge of liquid from said

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annular chamber into the interior of the ship;

a stripper member located within and rigidly connected to said annular chamber so that lubricant adhering to the shaft is stripped therefrom and conducted into the lower part of said annular chamber.

FORM 10 608393 S & F Ref: 79610

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

This document contains the amendments made under Section 49 and is correct for printing

FOR OFFICE USE:

Class Int Class

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

Name and Address of Applicant: Blohm + Voss AG
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FEDERAL REPUBLIC OF GERMANY

Address for Service: Spruson & Ferguson, Patent Attorneys
Level 33 St Martins Tower, 31 Market Street
Sydney, New South Wales, 2000, Australia

Complete Specification for the invention entitled:

An Assembly for Sealing the Propeller Shaft of a Ship

The following statement is a full description of this invention, including the best method of performing it known to me/us

5845/3

TECHNICAL FIELD

The invention relates to an assembly for sealing the propeller shaft of a ship.

BACKGROUND OF THE INVENTION

In sealing assemblies of the type described in German Patent Application 2212165, the pressure of the compressed gas is slightly higher than the pressure of the medium to be sealed off so that an escape of small amounts of gas from the annular chamber into the adjacent space occurs. In this way, the release of lubricant into the sea water is precluded but the release of gas into the lubricant is not avoided, and this implies a gradual emulsification of the lubricant, which naturally reduces its lubricating effect. Besides that, in these known sealing assemblies, a continuous adaptation of the gas pressure to the fluctuations of the external water pressure is not provided in the region of the sealing means so that, for instance, when the external water pressures increases while the ship is being loaded, sea water can enter into the annular chamber and from it into the lubricant and further reduce the lubricating effect.

In order to overcome these shortcomings, it has been suggested (German Patent Application 3502395) to adjust the pressure of the gas in the annular chamber so that the pressure is always lower than the pressure of the lubricant in the space of the lubricant but suffices for urging leaked liquid from the annular chamber through a duct into a collecting vessel.

In such sealing assemblies, no provisions are made to keep the pressure of the compressed air always below the respective external water pressure so that it may happen that, when the external water pressure decreases, e.g., while the ship is being unloaded, a pressure differential develops between the annular chamber and the outside water so that leaking liquid can penetrate from the annular chamber into the sea water and cause pollution.

Further, it is a disadvantage of the known configuration that, since the inlet duct and the outlet duct do not form a closed duct system, compressed air is continually lost over the collecting vessel so that a relatively large output power of the source of compressed air is required and large pressure fluctuations cannot be avoided.

Further, there are known sealing systems (German Patent Application 3122407) in which a pressure-free leakage space is provided between the sealing rings and leaking liquid is discharged via a line running into the interior of the ship.

As a consequence of the pressure-free liquid space, the load on the sealing rings is relatively high and, owing to the poor lubrication of the sealing rings, considerable wear of the sealing rings and at the sleeve/shaft occurs within a short time. Failure of the sealing rings can result in extensive pollution of the environment.

Such systems may be considered ecologically sound only to a limited degree because in this case leaking lubricant is carried away from the leakage space as a trail by the rotating shaft and is possibly pumped into the surrounding sea water.

It is an object of this invention to overcome or substantially ameliorate the above disadvantages.

There is disclosed herein a multiple seal assembly for a propeller shaft of a ship to impede migration of lubricant and/or sea water therepast, said assembly comprising:

at least two sealing rings located about the propeller shaft, said at least two sealing rings comprising at least one inwardly pointing sealing ring and at least one outwardly pointing sealing ring;

at least one annular chamber located between respective adjacent sealing rings, wherein at least one of said at least one annular chambers is adapted to receive pressurised gas;

an inlet line and an outlet line extending from said at least one annular chamber adapted to receive pressurised gas, so as to form a closed line pressurised system therebetween;

a pressure-regulating member inserted into said inlet line and adapted to maintain the pressure in said annular chamber and said closed line pressurised system, said pressure being no higher than prevailing external water pressure or pressure of the lubricant;

a shutoff member being selectively interactable with both said outlet line and a discharge channel so as to allow a discharge of liquid from said annular chamber into the interior of the ship;

a stripper member located within and rigidly connected to said annular chamber so that lubricant adhering to the shaft is stripped therefrom and conducted into the lower part of said annular chamber.

In the preferred form of the present invention, even with upward or downward fluctuations of the external water pressure, the pressure in the annular chamber is always the same or slightly below the ambient external water pressure and the pressure in the lubricant space so that under the influence of pumping or the like, lubricant or sea water may leak into the annular chamber and be kept therein for a short time without discharge into the external water or the lubricant space and may be discharged afterwards by pressure reduction through lines running into the interior of the ship. In this system, one can do without the normally required leakage space and can adjust the lubricant pressure so that the pressure of the lubricant is equal to the water pressure.

In accordance with a preferred embodiment a shutoff member is provided in the form of a magnetic valve. In this way, a simple remote control is obtained. Other preferred embodiments are characterised in that the control of the shutoff member is effected by a sensor or a floating member situated in the lower part of the annular chamber or in that the control is effected via a periodically acting time switch.

The former embodiment intends to evacuate the annular chamber in dependence upon the degree to which the annular chamber is filled with leaked liquid and is suitable particularly for operation involving large fluctuations, whereas the latter embodiment effects stepwise evacuation which is suitable under more or less non-varying conditions.

Finally, the amount by which the pressure of the gas is lower than the pressure of the media to be sealed off is 0.1 - 0.4 bar. This differential pressure range proved to be especially advantageous.

Other details will be described with reference to the appended drawing which only schematically shows the seal assembly and the lines connected thereto.

The drawing shows the section of seal 1 with three sealing rings 2 forming two annular chambers 3 which provide a sealing effect in direction of the sea water W, on the one hand, and in direction of the lubricant, in the present case lubricating oil S, on the other. One of the annular chambers is provided with an inlet channel 4 and a discharge channel 5, which channels are interconnected (dashed lines, line portion) and form a closed system of pressurised lines.

Discharge channel 5 has a branch channel 5a which discharges into the interior of the ship (bilges) and which at the branch point is controlled by a three-way valve with a magnetic valve 6 actuated by a clock device so that the discharge channel is periodically opened at predetermined time intervals and the discharge of the liquid from the annular chamber is facilitated.

Discharge of the leaked medium can be effected by control with a floating member or a sensor. Inlet channel 4 comprises a simple regulating unit 8 controlling the pressure in the chamber system so that the pressure of the compressed air in the system of lines is always lower than the pressure of the two media to be sealed off by 0.1 - 0.4 bar.

In one of annular chambers 3 there is incorporated a stripper member 7 stripping in the lower part of the annular chamber than lubricating oil which adheres to sleeve B and which, despite the above-cited measures, leaks into the annular chamber due to the pumping effect of the sleeve.

The claims defining the invention are as follows:

1. A multiple seal assembly for a propeller shaft of a ship to impede migration of lubricant and/or sea water therepast, said assembly comprising:

at least two sealing rings located about the propeller shaft, said at least two sealing rings comprising at least one inwardly pointing sealing ring and at least one outwardly pointing sealing ring;

at least one annular chamber located between respective adjacent sealing rings, wherein at least one of said at least one annular chambers is adapted to receive pressurised gas;

an inlet line and an outlet line extending from said at least one annular chamber adapted to receive pressurised gas, so as to form a closed line pressurised system therebetween;

a pressure-regulating member inserted into said inlet line and adapted to maintain the pressure in said annular chamber and said closed line pressurised system, said pressure being no higher than prevailing external water pressure or pressure of the lubricant;

a shutoff member being selectively interactable with both said outlet line and a discharge channel so as to allow a discharge of liquid from said annular chamber into the interior of the ship;

a stripper member located within and rigidly connected to said annular chamber so that lubricant adhering to the shaft is stripped therefrom and conducted into the lower part of said annular chamber.

2. The multiple seal assembly according to Claim 1, wherein said shutoff member is a magnetic valve.

3. The multiple seal assembly according to Claim 1 or Claim 2, wherein said shutoff member is controlled by a sensor or a floating member mounted in the lower part of said annular chamber.

4. The multiple seal assembly according to Claim 1 or Claim 2, wherein said shutoff member is controlled by a periodically acting time switch.

5. The multiple seal assembly according to any one of Claims 1 to 3, wherein the pressure of the compressed gas is kept below the pressure of the medium to be sealed off by 0.1 - 0.4 bar.

6. A multiple seal assembly substantially as hereinbefore described with reference to the accompanying drawing.

DATED this THIRD day of JANUARY 1991
Blohm + Voss AG

Patent Attorneys for the Applicant
SPRUSON & FERGUSON

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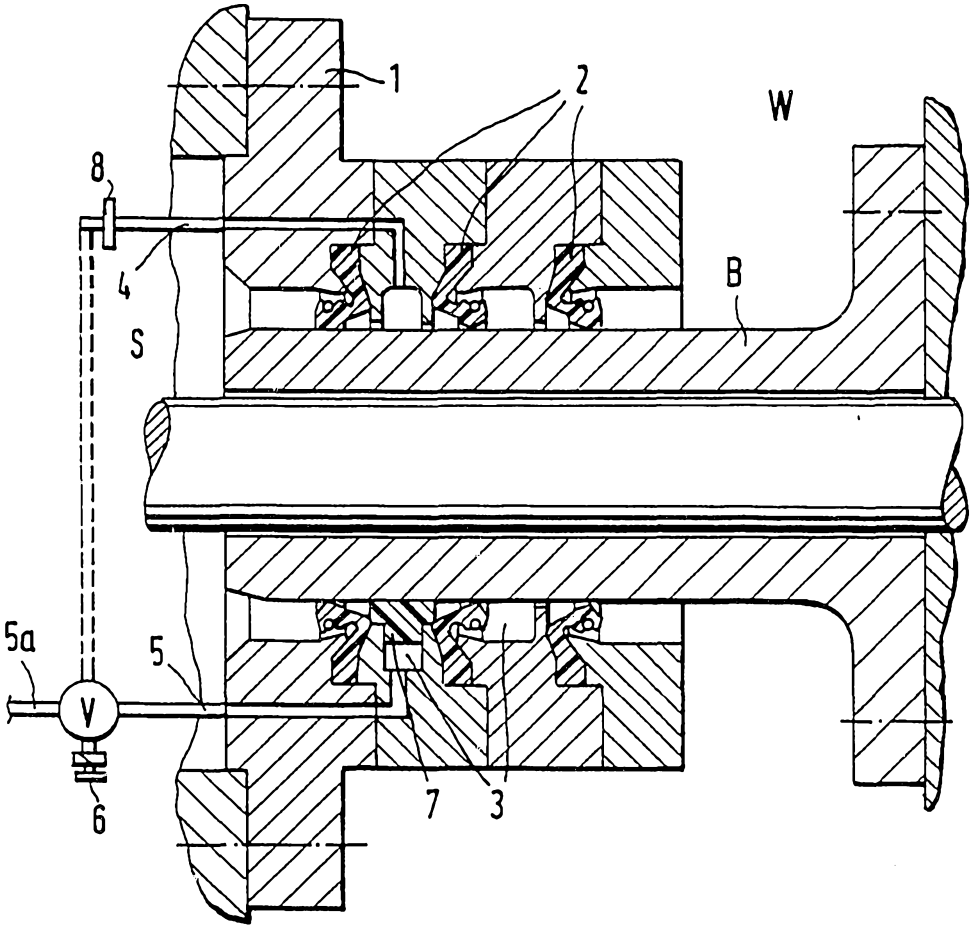
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