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(11) Publication number:

0 478 520 B1

(12)

EUROPEAN PATENT SPECIFICATION

(49) Date of publication of patent specification: **07.12.94** (51) Int. Cl.⁵: **B63H 23/26**

(21) Application number: **91830395.9**

(22) Date of filing: **25.09.91**

(54) **Hydraulic stern drive for boats.**

(30) Priority: **25.09.90 IT 2156090**

(43) Date of publication of application:
01.04.92 Bulletin 92/14

(45) Publication of the grant of the patent:
07.12.94 Bulletin 94/49

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR LI LU NL SE

(56) References cited:
EP-A- 0 251 995
GB-A- 961 740
US-A- 3 847 107
US-A- 4 878 864

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Description

BACKGROUND OF THE INVENTION

The present invention relates to a stern drive for boats, said drive being of a hydraulic operated type.

As is known, conventional stern drives transfer mechanical power from the primary motor or engine to the boat propeller, by exclusively using mechanical elements, such as cardanic joints, shafts, resilient joints or couplings, motion reversing units, gear wheels and the like.

Because of inherent limitations of conventional cardanic joints, however, these drives are not devoid of drawbacks, for example with respect to the movements for raising the drive assembly and for turning the boat.

In fact, the above mentioned prior drives allow a maximum turning angle of about 60-65° related to a horizontal axis and of about $\pm 35^\circ$ with respect to a vertical axis.

Thus, under great angle turning conditions, the power which can be transmitted to the propeller is severely limited.

US-A-3 847 107 shows a stern drive according to the preamble of claim 1. The connection between the fixed portion and the movable portion of the known drive is performed by an intermediate member which is pivoted to the fixed portion about a horizontal axis and to the movable portion about a vertical axis. The known drive is disadvantageous in that it is of increased size due to the axes not intersecting each other.

SUMMARY OF THE INVENTION

Accordingly, the main object of the present invention is to overcome the above mentioned drawback, by providing a stern drive for boats which allows a greater turning range of the drive assembly both about a vertical axis and about a horizontal axis.

Another object of the present invention is to provide such a drive which can transmit to the boat propeller a power as great as possible, even under great angle turning conditions.

Yet another object of the present invention is to provide such a stern drive for boat which is very reliable in operation.

According to the present invention, the above mentioned objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by the features of claim 1

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent from the following detailed description of a preferred embodiment thereof, which is illustrated, by way of an indicative but not limitative example, in the figures of the accompanying drawings, where:

figure 1 is a schematic view illustrating a stern drive provided with a hydraulic motor according to the present invention;

figs. 1a and 1b are respectively a front view and a top plan view illustrating a cross journal forming a main portion of the stern drive according to the present invention;

and

Figs. 2 and 3 illustrate two possible methods for supplying the hydraulic motor.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures of the accompanying drawings, the stern drive for boats according to the present invention essentially comprises a fixed portion indicated generally at 1, flange coupled to the stern board or transom 2 of the boat, and a movable portion 3 including a hydraulic motor assembly 4 driving a propeller 5.

The fixed portion is moreover provided with hydraulic fixtures 6, either of the threaded or flanged type, for supplying the hydraulic motor with a pressurized hydraulic fluid delivered from a pump 7 in turn driven by a primary motor or engine 8.

Said movable portion 3 substantially comprises the drive assembly proper and a mechanism 9 for allowing the bottom or foot of the drive assembly to be raised off water, by a movement about a suitable horizontal axis, and the boat to turn, by a movement about a suitable vertical axis.

In this connection it should be apparent to those skilled in the art that both the weight of the movable portion of the drive and the driving force of the boat propeller, as well as the side force generated during a turning movement of the boat, will be 'discharged' onto the boat by means of the above disclosed mechanism, which practically constitutes a suspension system.

This suspension system, in particular, comprises a cross journal 10 which, in addition to allowing the movable portion 3 to be displaced about the mentioned axes, is also adapted to transfer the several forces or stresses from the movable to the fixed portion of the drive and, hence, to the boat hull.

The cross journal, moreover, will transmit from the fixed portion to the movable portion, by means of suitable ducts 11, the hydraulic power fluid re-

quired for driving the boat.

To that end it is possible to use both several perforations inside the cross journal (not shown) and bushes 12 applied at the end portions of the cross journal and mounted so as to perform a rotary movement with respect to the end portions.

On the mutual sliding surfaces of the bushes and cross journal, in particular, seals will be applied for preventing any leakage of the pressurized oil circulating in the inside.

Thus, owing to the provision of the cross journal/bush assembly, from the fixed portion to the movable portion of the drive (and vice versa) it will be possible to transmit both the pressurized oil and the oil returning from the hydraulic motor, which will transform again the hydraulic power into mechanical power for driving the propeller 5.

A main feature of the present invention is that a broad raising and turning angle range is provided thereby.

In fact the provision of the cross journal provides raising and turning angles which are much greater than those provided by conventional prior mechanical driving assemblies.

In particular, as is shown in figure 2, a primary driving or motor 8-pump 7 assembly can be provided cooperating with a like emergency assembly, indicated generally at 13.

The operation of these two assemblies, in order to operate the driving assembly 14, can be either simultaneous or not, depending on requirements, and this can be obtained by switching on and off either one or the other of said assemblies by operating corresponding taps 15 and 16.

As shown in figure 3, it is also possible to supply, by the same primary motor 8 and a pair of pumps 7, two driving assemblies 14, separated from one another, with great advantages from a reliable operation standpoint.

In this connection it should be also apparent that the latter approach, using a single primary motor and a double driving assembly, can be integrated by an auxiliary or emergency assembly supplying either one or both said driving assemblies.

Claims

1. A stern drive for boats, comprising a fixed portion (1) to be connected to the stern transom (2) of a boat, a movable portion (3) connected to said fixed portion (1) and having a drive assembly (14) of said boat including a hydraulic motor assembly (4) driving a propeller (5) supported by said movable portion (3), said fixed portion (1) including hydraulic fixtures (6) for supplying said hydraulic motor assembly (4) with a pressurized hydraulic fluid,

said movable portion (3) including hydraulic fluid supplying ducts (11) for said hydraulic motor assembly (4), characterized in that said stern drive further comprises a cross journal (10) coupling said movable portion (3) to said fixed portion (1) and defining a substantially vertical rotation axis and a horizontal rotation axis for said movable portion (3) with respect to said fixed portion (1), said vertical and horizontal axes being mutually coplanar, said cross journal (10) further including connecting ducts connecting said hydraulic fixtures (6) of said fixed portion (1) with said hydraulic fluid supplying ducts (11) of said movable portion (3).

2. A stern drive according to Claim 1, characterized in that said hydraulic motor assembly (4) is arranged in said movable portion (3) at a portion substantially coaxial with said propeller (5).
3. A stern drive according to Claim 1, wherein said cross journal (10) is assembled so as to allow the boat drive assembly (14) to be raised, by displacement about a horizontal axis, by an angle greater than 60°.
4. A stern drive according to Claim 1, wherein said cross journal (10) is so assembled as to allow the boat drive assembly (14) to be turned about a vertical axis by an angle greater than $\pm 35^\circ$.
5. A stern drive according to Claim 1, wherein a pressurized hydraulic fluid is supplied either in parallel or by one or more assemblies including a primary motor (8) and a pump (7).
6. A stern drive according to Claim 1, wherein said drive comprises at least two drive assemblies driven by a primary motor (8) operating corresponding pumps (7).
7. A stern drive according to Claim 1, wherein said drive comprises a plurality of primary motors (8), operating as auxiliary or emergency motors, and adapted to be coupled to said drive assemblies through switching tap elements (15, 16).

Patentansprüche

1. Ein Heckantrieb für Boote, umfassend ein festes Teil (1), zur Verbindung mit dem Heckspiegel (2) eines Bootes, ein bewegliches Teil (3), verbunden mit diesem festen Teil (1) und besitzend eine Antriebsvorrichtung (14) dieses Bootes, einschließend eine hydraulische Motor-

- vorrichtung (4), betreibend einen Propeller (5), getragen durch dieses bewegliche Teil (3), dieses feste Teil (1) einschließend hydraulische Vorrichtungen (6) zum Beliefern dieser hydraulischen Motorvorrichtung (4) mit einer unter inneren Überdruck gesetzten hydraulischen Flüssigkeit, dieses bewegliche Teil (3) einschließend Belieferungsrohrleitungen (11) für die hydraulische Flüssigkeit für diese hydraulische Motorvorrichtung (4), dadurch gekennzeichnet, daß dieser Heckantrieb weiterhin einen transversalen Kippzapfen (10) umfaßt, dieses bewegliche Teil (3) mit diesem festen Teil (1) verbindend und festlegend eine vertikale Rotationsachse und eine horizontale Rotationsachse für dieses bewegliche Teil (3) bezüglich dieses festen Teils (1), diese vertikalen und horizontalen Achsen sind im wesentlichen wechselseitig coplanar, dieser transversalen Kippzapfen (10) weiter einschließend Verbindungsrohrleitungen, diese hydraulischen Vorrichtungen (6) dieses festen Teils (1) mit diesen Belieferungsrohrleitungen (11) für die hydraulische Flüssigkeit dieses beweglichen Teils (3) verbindend.
2. Ein Heckantrieb gemäß Anspruch 1, dadurch gekennzeichnet, daß diese hydraulische Motorvorrichtung (4) in diesem beweglichen Teil (3) an einem Teil, das im wesentlichen coaxial zu diesem Propeller (5) ist, angebracht ist.
3. Ein Heckantrieb gemäß Anspruch 1, worin dieser transversalen Kippzapfen (10) so montiert ist, um der Bootantriebsvorrichtung (14) zu erlauben, durch Verschiebung um eine horizontale Achse, um einem Winkel größer 60° , aufgerichtet zu werden.
4. Ein Heckantrieb gemäß Anspruch 1, worin dieser transversalen Kippzapfen (10) so montiert ist, um der Bootantriebsvorrichtung (14) zu erlauben, um eine vertikale Achse, um einem Winkel größer als $\pm 35^\circ$, gedreht zu werden.
5. Ein Heckantrieb gemäß Anspruch 1, worin eine unter inneren Überdruck gesetzte hydraulische Flüssigkeit zugeführt wird, entweder parallel, oder von einer oder mehreren Vorrichtungen, einschließend einen Hauptmotor (8) und eine Pumpe (7).
6. Ein Heckantrieb gemäß Anspruch 1, worin dieser Antrieb mindestens zwei Antriebsvorrichtungen umfaßt, betrieben von einem Hauptmotor (8), entsprechende Pumpen (7) in Gang bringend.

7. Ein Heckantrieb gemäß Anspruch 1, worin dieser Antrieb eine Vielzahl von Hauptmotoren (8) umfaßt, arbeitend als Hilfs- oder Notfallmotoren, und angepaßt, mit diesen Antriebsvorrichtungen durch Tippschalterteile (15, 16) verbunden zu werden.

Revendications

1. Un propulseur à l'arrière pour bateaux, comportant une partie fixe (1) pour l'attachage au tableau arrière (2) d'un bateau, une partie mobile (3) attachée à ladite partie fixe (1), et ayant un assemblage de commande (14) dudit bateau incluant un assemblage moteur hydraulique (4) actionnant une hélice de propulsion (5) supportée par ladite partie mobile (3), ladite partie fixe (1) incluant des armatures hydrauliques (6) pour alimenter ledit assemblage moteur hydraulique (4) avec un fluide hydraulique sous pression, ladite partie mobile (3) incluant des conduits (11) d'alimentation en fluide hydraulique pour ledit assemblage moteur hydraulique (4), caractérisé en ce que ledit propulseur à l'arrière comporte ultérieurement un tourillon transversal (10) accouplant ladite partie mobile (3) à ladite partie fixe (1) et définant un axe de rotation vertical et un axe de rotation horizontal pour ladite partie mobile (3) par rapport à ladite partie fixe (1), lesdits axes vertical et horizontal étant substantiellement coplanaires l'un par rapport à l'autre, ledit tourillon transversal (10) incluant ultérieurement des conduits jointifs réunissant lesdites armatures hydrauliques (6) de ladite partie fixe (1) auxdits conduits (11) d'alimentation en fluide hydraulique de ladite partie mobile (3).
2. Un propulseur à l'arrière pour bateaux selon la Revendication 1, caractérisé en ce que ledit assemblage moteur hydraulique (4) est arrangé dans ladite partie mobile (3), en correspondance d'une partie qui est substantiellement coaxiale avec ladite hélice (5).
3. Un propulseur à l'arrière pour bateaux selon la Revendication 1, caractérisé en ce que ledit tourillon transversal (10) est monté de manière à permettre l'élévation de l'assemblage de commande (14) du bateau, par déplacement autour d'un axe horizontal, d'un angle supérieur à 60° .
4. Un propulseur à l'arrière pour bateaux selon la Revendication 1, caractérisé en ce que ledit tourillon transversal (10) est monté de manière à permettre l'élévation de l'assemblage de commande (14) du bateau, par déplacement

autour d'un axe vertical, d'un angle supérieur $\pm 35^\circ$.

5. Un propulseur à l'arrière pour bateaux selon la Revendication 1, dans lequel un fluide hydraulique sous pression est alimenté ou bien en parallèle ou bien au moyen d'un ou de deux assemblages incluant un moteur primaire (8) et une pompe (7). 5
- 10
6. Un propulseur à l'arrière pour bateaux selon la Revendication 1, dans lequel ledit propulseur comprend au moins deux assemblages de propulsion commandés par un moteur primaire (8) actionnant des pompes (7) correspondantes. 15
7. Un propulseur à l'arrière pour bateaux selon la Revendication 1, dans lequel ledit propulseur comprend une multiplicité de moteurs primaires, opérant comme moteurs auxiliaires ou de secours, et adaptés à être coupés auxdits assemblages propulseurs par l'intermédiaire d'éléments-boutons de coupure (15, 16). 20

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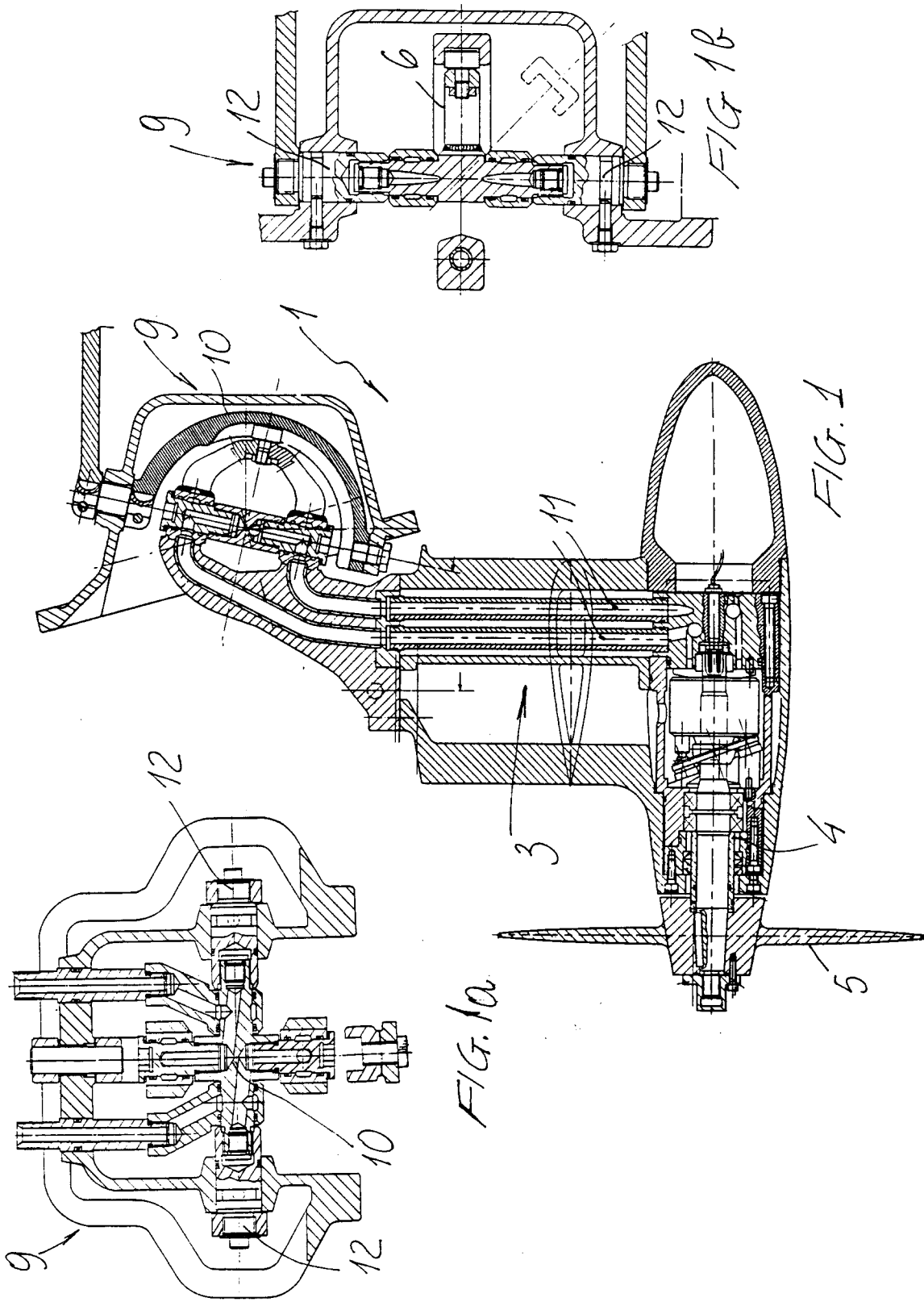
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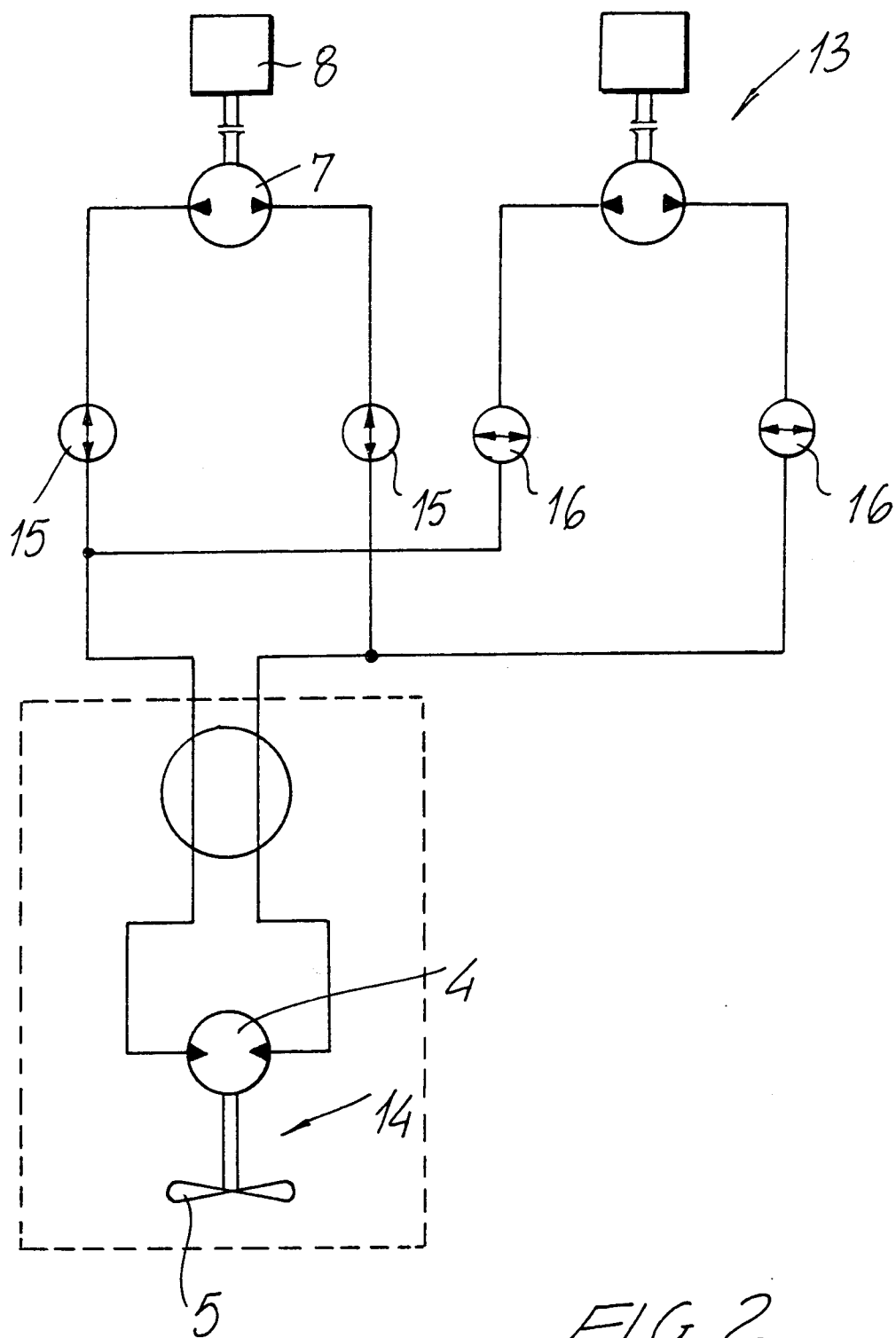


FIG. 2

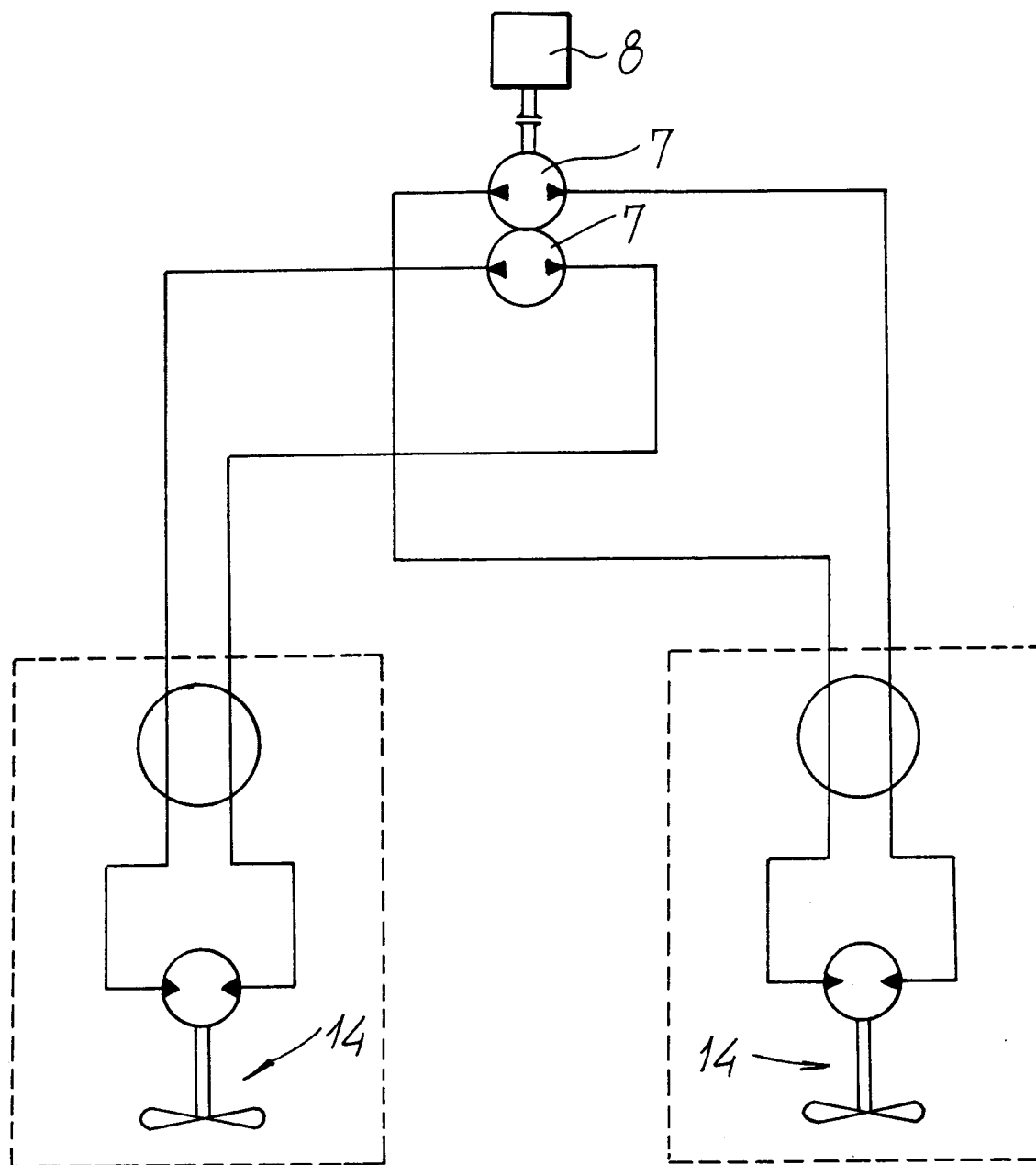


FIG. 3