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(54) Title: PROPULSION UNIT AND USES OF THE PROPULSION UNIT

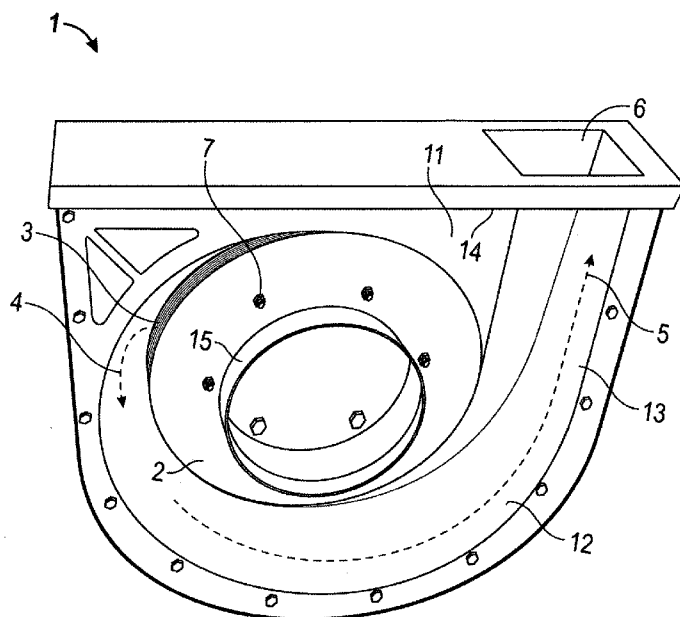


FIG. 1

(57) Abstract: The invention relates to a propulsion unit consisting of a housing having an inlet at the bottom and an outlet at the side on which a motor having a shaft is accommodated. The shaft holds an upper rigid disk that is connected to a motor. To the rigid disk, a plurality of disks, having a gap between each other, and formed as rings with a hole, having an outer diameter R and an inner diameter r, are connected. The disks are fastened to the rigid disk by screws rivets or other fastening means. During operation water is led into the inlet at the bottom of the housing and further through the holes of the disk assembly after which the water is moved horizontally towards the periphery of the housing to the outlet. In this way a silent, highly efficient propulsion unit is provided. The invention also relates to the use of the propulsion unit as a motor for a seagoing-, lake or like vessels, such as a boat, and/or a use as a submersible pump when a hose is connected to the outlet via a nozzle.

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Propulsion unit and uses of the propulsion unit.

The invention relates to a propulsion unit consisting of a housing having an inlet for receiving a fluid and an outlet for delivering the fluid, said housing has a shaft that penetrates the housing on which said shaft a motor is mounted and on said shaft inside the housing a plurality of disks, which are separated by a gap, are mounted, and where the plurality of disks consists of an upper rigid disk on which a plurality of disks are mounted, said disks consisting of rings having an outer radius R and an inner radius r and that the rigid disk is mounted to the shaft, where the inner radius r defines holes in the disks.

The invention also relates to uses of the propulsion unit.

Such a propulsion unit is disclosed in US 2003/0002976 A1.

In this propulsion unit the fluid from the inlet to the outlet is provided via an inlet conduit in which the fluid is deflected such that inlet for the fluid in the conduit is provided perpendicular to the holes in the disk.

A somewhat similar fluid propulsion unit is disclosed in US patent. no. 1061142A.

In this propulsion unit fluid is led into a plurality of separated disks mounted on a shaft, said disks having central openings surrounded by solid material functioning as spokes.

Fluid is forced between the disks powered by a motor, and further delivered to an outlet.

It is now a purpose with the invention to establish a propulsion unit that is more efficient in using the power delivered from the motor to the mechanical force at the outlet of the propulsion unit and further operates with lower noise.

The purpose is fulfilled with a propulsion unit of the type according to the introductory part of claim 1, that is characterized in, that the inlet



for the received fluid entering the propulsion unit is provided axial with said holes.

In this way fluid flows direct to the propulsion unit axial into the holes and between the disks to the outlet giving a lesser friction of the fluid in passing from the inlet to the outlet and further a more efficiency laminar flow is generated.

In order to optimizing the effect of the propulsion unit, it is advantageous if, as stated in claim 2. That the housing has an inner wall, that is in contact with the fluid leaving the disks, and where the wall has inner dimensions such that the distance from the outer radius R of the disks to the wall is increasing towards the outlet along the whole wall that is in contact with the fluid.

It is expedient, if as stated in claim 3, that the plurality of disks are mounted to the rigid disk by use of screws, rivets or the like fastening means, penetrating the disks near the inner diameter of the disks.

As an alternative to provide a very strong construction, it is advantageous, if as stated in claim 4, that the disks are formed as a cylinder having a plurality of cut outs on the surface of the cylinder.

In order to increase the use of the propulsion unit, it is advantageous if, as stated in claim 5, that a nozzle is connected to the outlet and as stated in claim 6, that the nozzle is shaped quadrangular or circular.

If the propulsion unit is used in connection with a vessel on a sea it is favourable if as stated in claim 7, that the inlet is submerged under the fluid and the outlet is submerged, completely or partly under the fluid or, as stated in claim 8, the inlet is submerged under the fluid, whereas the outlet is completely or partly raised above the fluid.

In order to get control of the output above the fluid level it is advantageous if as stated in claim 9, that a hose is connected to the nozzle.

5 As mentioned the invention also relates to uses of the propulsion unit according to the invention.

These uses are defined in the claims 10 - 12.

10 The invention will now be explained in more details referring to the drawings in which

Fig 1 shows the propulsion unit in a perspective view

15 Fig. 2 shows the propulsion unit in another perspective view, whereas

Fig. 3 shows partly the propulsion unit in perspective how the disks are provided according to fig.1 and fig 2.

20 On the figures, 1 in whole denotes the propulsion unit according to the invention, and depicted as a transparent unit having a back wall 11, a front wall 13, a top wall 14, a side wall 12, and an outlet 6.

2 denotes a rigid disk that is connected to a motor 9 by a shaft, mounted in a holder 15.

25 To the disk 2 is connected a plurality of disks 3, where the disks are mounted on the back side of disk 2 and separated from each other by a gap, as best shown on fig. 3. The disks are fastened to each other by use of screws 7, rivets or the like.

The disks are formed as rings with a hole having an inner radius r , whereas the outer radius of the disks is R .

Alternatively a cylinder having on its outer surface a number of slots could be used instead of the rings and the rigid disk.

The propulsion unit operates in the following manner.

5 When a fluid, such as water, is let to an inlet, shown at arrow 8 on fig. 3, the fluid will, when the motor 9 is started, flow between the gaps of the disks, shown by the arrow 4, and follow the spacing, cf. fig. 1 and 2, located between the disks and the walls 11, 12, 13, 14 of the housing to the outlet 6, provided in the top wall.

10 As it can be seen the distance from the disks to the side wall 12, is increased towards the outlet.

By doing so, and submerge the unit with the inlet under the fluid and the outlet completely or partly under the fluid, then it can operate as a sea vessel with high efficiency, since the flow from the outlet is more uniform and laminar compared to use of a propeller that wipes the fluid in many directions.

15 If a nozzle (not shown on the drawings) is connected to the outlet, then it is possible to connect a hose to the nozzle, which converts the propulsion unit to operate as a submersible pump.

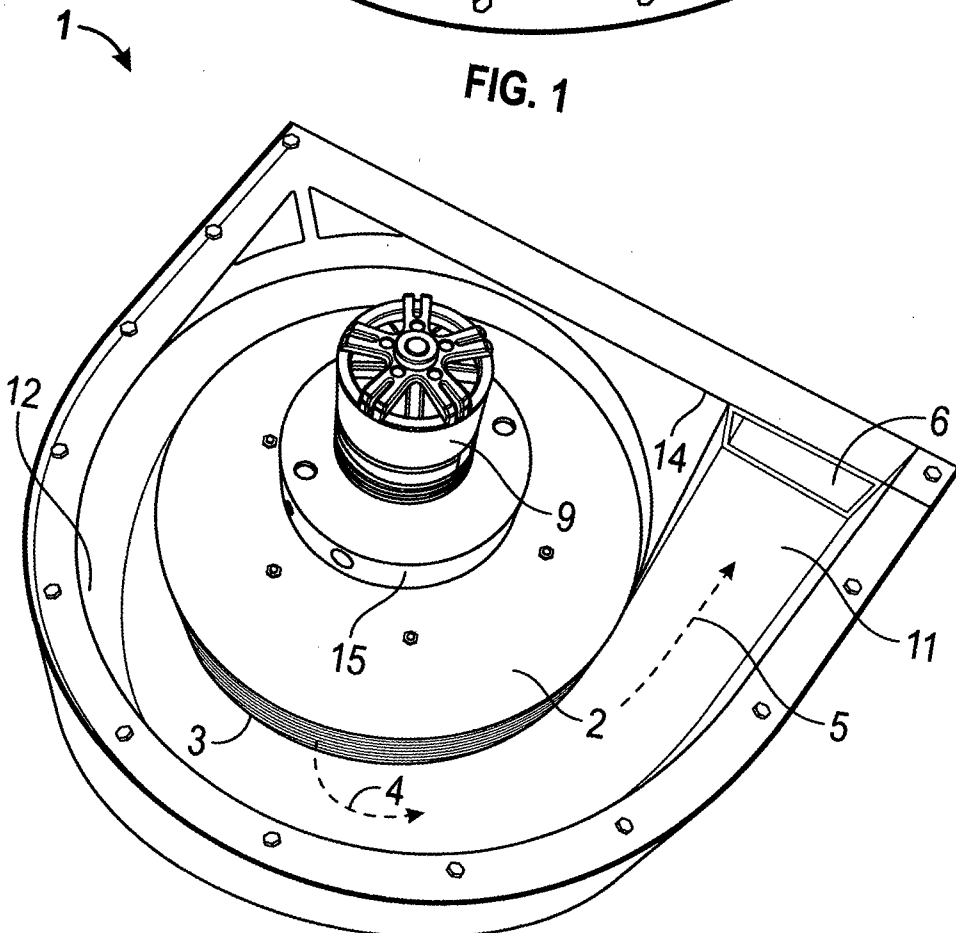
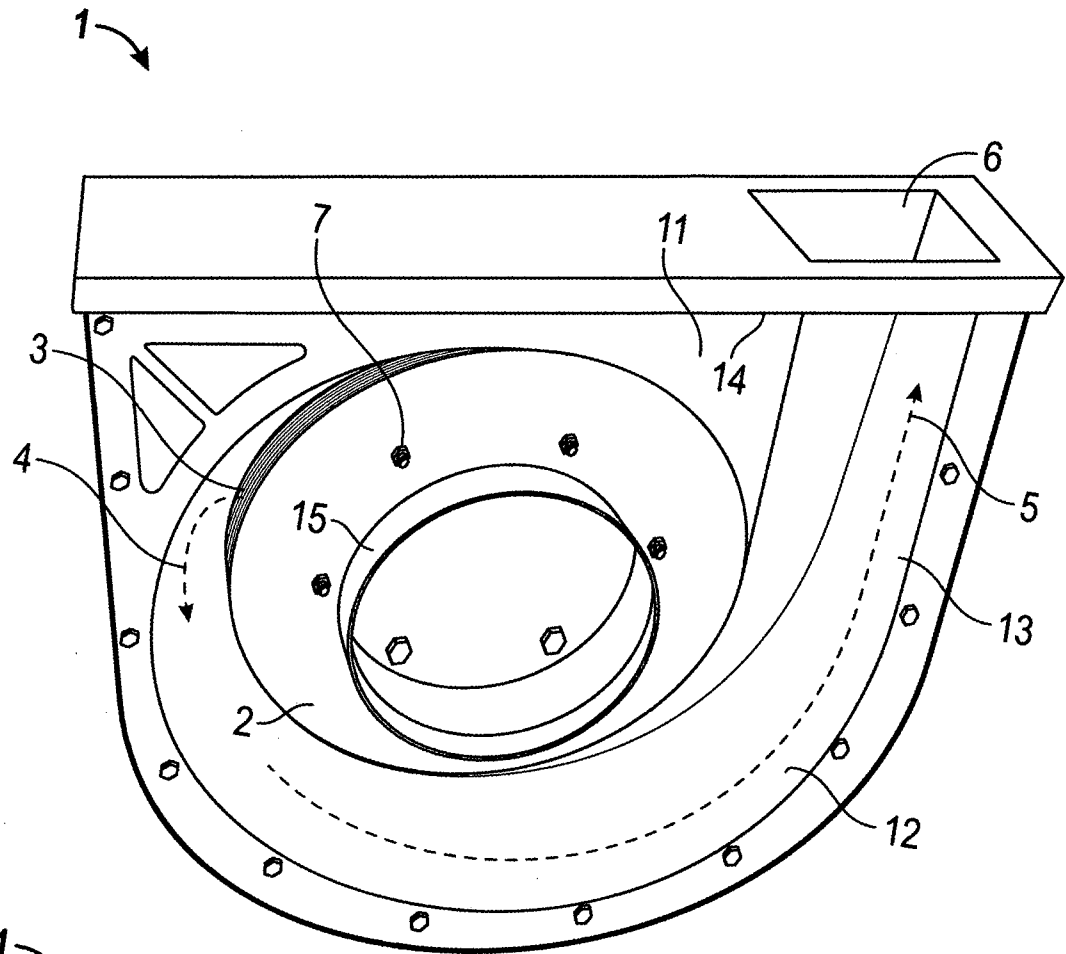
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CLAIMS

1. Propulsion unit consisting of a housing having an inlet for receiving a fluid and an outlet for delivering the fluid, said housing has a shaft that penetrates the housing on which said shaft a motor is mounted and on said shaft inside the housing a plurality of disks, which are separated by a gap, are mounted, and where the plurality of disks consists of an upper rigid disk on which a plurality of disks are mounted, said disks consisting of rings having an outer radius R and an inner radius r and that the rigid disk is mounted to the shaft, where the inner radius r defines holes in the disks, **characterized in**, that the inlet for the received fluid entering the propulsion unit is provided axial with said holes.
2. Propulsion unit according to claim 1, **characterized in**, that the housing has an inner wall, that is in contact with the fluid leaving the disks, and where the wall has inner dimensions such that the distance from the outer radius R of the disks to the wall is increasing towards the outlet along the whole wall that is in contact with the fluid.
3. Propulsion unit according to claim 1 - 2, **characterized in**, that the plurality of disks are mounted to the rigid disk by use of screws, rivets or the like fastening means, penetrating the disks near the inner diameter of the disks.
4. Propulsion unit according to claim 1 -3, **characterized in**, that the disks are formed as a cylinder having a plurality of cut outs on the surface of the cylinder.

5. Propulsion unit according to claims 1 - 4, **characterized in**, that a nozzle is connected to the outlet.
6. Propulsion unit according to claim 5, **characterized in**, that the
5 nozzle is shaped quadrangular or circular.
7. Propulsion unit according to claim 1 - 6, **characterized in**, that that the inlet is submerged under the fluid and the outlet is submerged, completely or partly under the fluid.
- 10 8. Propulsion unit according to claim 1 - 6, **characterized in**, that the inlet is submerged under the fluid, whereas the outlet is completely or partly raised above the fluid.
- 15 9. Propulsion unit according to claim 7 - 8, **characterized in**, that a hose is connected to the nozzle.
10. Use of a propulsion unit according to claim 1 – 9, as a motor for a sea-, lake-, river-or like going like vessel.
- 20 11. Use of a propulsion unit according to claim 1 –9, as an outboard motor for a boat.
12. Use of a propulsion unit according to claim 1 – 9, as a pump,
25 such as a submersible pump.



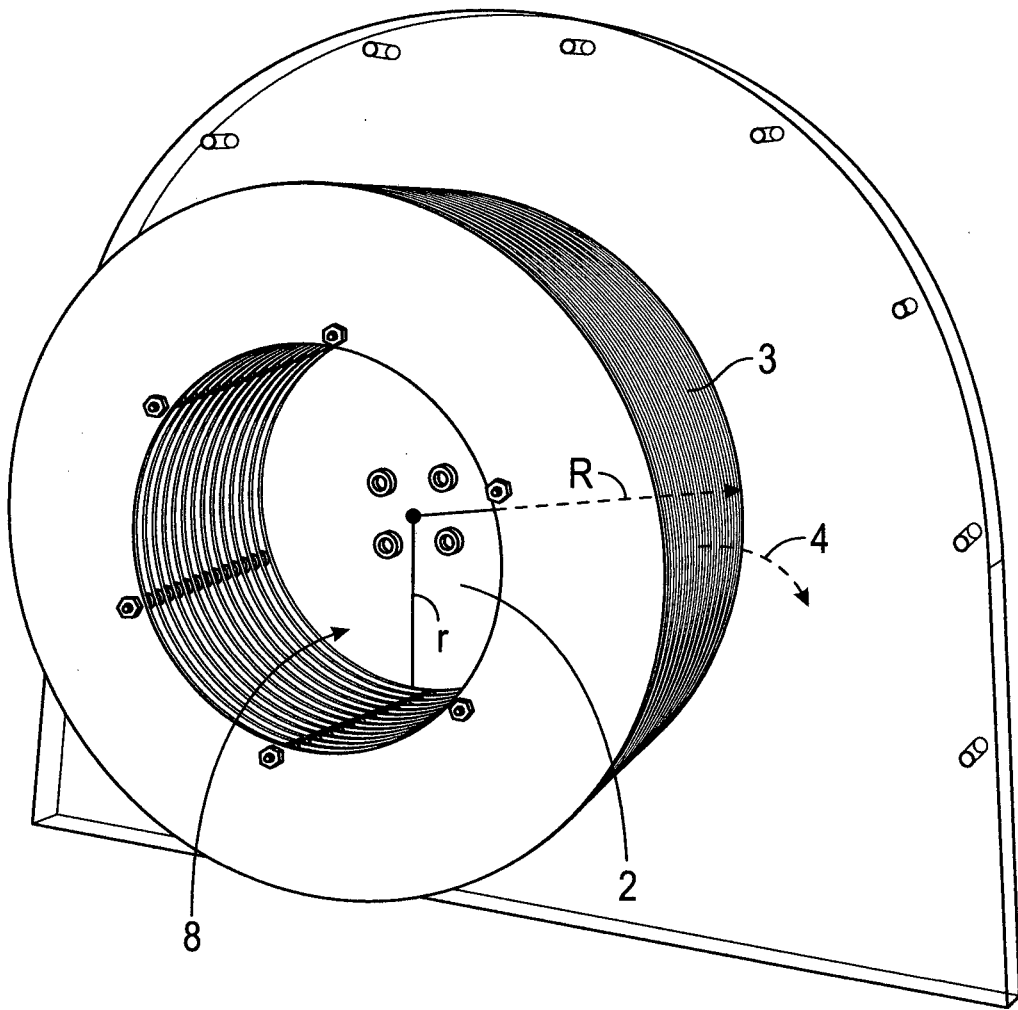


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/DK2014/000045

A. CLASSIFICATION OF SUBJECT MATTER
INV. F04D5/00
ADD. F04D29/42

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)
F04D

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 practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/317271 A1 (GILL BRIJESH [US] ET AL) 24 December 2009 (2009-12-24) the whole document paragraphs [0028] - [0033] figures 2a-2d, 3, 4d, 9b, 9c -----	1-7,9,12
X	WO 2004/077639 A2 (TENDRIS SOLUTIONS BV [NL]; NEEB TACO WIJNAND [NL]; SCHREUDER JOHANN HE) 10 September 2004 (2004-09-10) the whole document page 4, line 20 - page 5, line 21 page 8, lines 5-20 figures 1A, 1B, 3, 4B, 6A, 6D ----- -/--	1-7, 10-12

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 15 January 2015	Date of mailing of the international search report 21/01/2015
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Gombert, Ralf

INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 773 819 A (GURTH MAX I [US]) 27 September 1988 (1988-09-27) the whole document column 2, lines 16-41 column 3, lines 8-65 figures 1-4	1,3-9,12
X	----- US 3 017 848 A (BISHOP CHARLES R) 23 January 1962 (1962-01-23) the whole document column 1, line 62 - column 2, line 57 figures 1, 2, 4, 5 -----	1-4,7,8, 10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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