



(43) International Publication Date
27 February 2014 (27.02.2014)

- (51) International Patent Classification:
B63H 20/04 (2006.01)
- (21) International Application Number:
PCT/US2013/033426
- (22) International Filing Date:
22 March 2013 (22.03.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
13/594,547 24 August 2012 (24.08.2012) US
- (71) Applicant: **BRUNSWICK CORPORATION** [US/US];
One North Field Court, Lake Forest, IL 60045 (US).
- (72) Inventors: **LITJENS, John, J.**; 4800 Jeanette Court, St.
Cloud, FL 34771 (US). **CLARKSON, Daniel, E.**; 1545
Arboretum Drive, #114, Oshkosh, WI 54901 (US).
- (74) Agents: **HOLSEN, Peter, T.** et al.; Andrus, Scealess,
Starke & Sawall, LLP, 100 East Wisconsin Avenue, Suite
1100, Milwaukee, WI 53202 (US).
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: MARINE PROPULSION SYSTEMS HAVING EXHAUST GAS RELIEF OUTLET

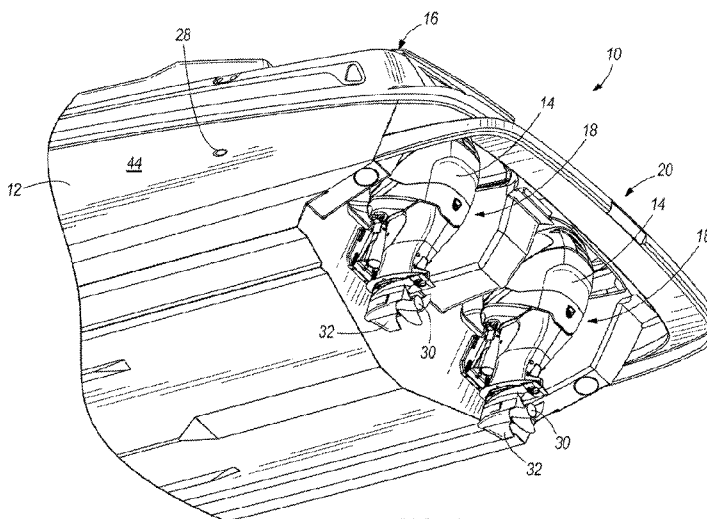


FIG. 1

(57) Abstract: A marine propulsion system is for propelling a marine vessel in water. The system comprises an outboard motor that is coupled to a marine vessel, and that comprises an exhaust gas relief outlet that is located above the water when the outboard motor is at idle speed. A conduit conveys exhaust gas from the exhaust gas relief outlet to a discharge outlet located on the marine vessel.



MARINE PROPULSION SYSTEMS HAVING EXHAUST GAS RELIEF OUTLET

FIELD

[0001] The present disclosure relates to marine propulsion systems and particularly to exhaust systems for marine propulsion systems.

BACKGROUND

[0002] U.S. Patent Application Publication No. 2012/0028517 discloses a marine vessel including an outboard motor mounting portion provided at a stern of a hull, an outboard motor locating hole provided rearward of the outboard motor mounting portion and near the outboard motor mounting portion and penetrating vertically through the stern, a platform provided rearward of the outboard motor locating hole, and an outboard motor located in the outboard motor locating hole and mounted to the outboard motor mounting portion. This structure enables an occupant of the marine vessel to freely move in a space around the outboard motor on the platform and use the space.

SUMMARY

[0003] This summary is provided to introduce a selection of concepts that are further described below in the detailed description. This summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used as an aid in limiting the scope of the claimed subject matter.

[0004] Through research and experimentation, the present inventors have discovered that marine propulsion systems, such as described in the above referenced patent publication wherein the outboard motor is enclosed, have certain drawbacks. For example, the present inventors have found that exhaust gas emitted by idle relief components on the outboard motors are entrapped in the enclosed space of the outboard motor. This has been found to cause problems such as ingestion of carbon monoxide gas by the outboard motor, negatively affecting combustion performance. Further, carbon monoxide buildup within the enclosure can present dangerous situations for the operators of the vessel. Therefore, through research and experimentation the present inventors arrived at the present inventive concepts for overcoming these problems.

[0005] In one example, a marine propulsion system for propelling a marine vessel in water comprises at least one outboard motor coupled to a marine vessel. The outboard motor comprises an exhaust gas relief outlet that is located above the water when the marine vessel is stationary, the outlet relieving exhaust gas, for example when the marine vessel is idling. A conduit conveys exhaust gas from the exhaust gas relief outlet to a discharge outlet located on the marine vessel. The outboard motor also comprises a primary exhaust gas outlet that is located vertically lower than the exhaust gas relief outlet on the outboard motor and that discharges exhaust gas to the water. The noted conduit can be sloped along its length so that water does not stagnate therein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Examples marine propulsion devices and exhaust systems for marine propulsion devices are described with reference to the following figures. The same numbers are used throughout the figures to reference like features and components.

[0007] FIGURE 1 is a perspective view looking up at the stern of a marine vessel having a pair of outboard motors.

[0008] FIGURE 2 is a partial top perspective view of one of the outboard motors.

[0009] FIGURE 3 is a side sectional view of the outboard motor and stern of the marine vessel.

DETAILED DESCRIPTION OF THE DRAWINGS

[00010] In the present description, certain terms have been used for brevity, clearness and understanding. No unnecessary limitations are to be inferred therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes only and are intended to be broadly construed. The different methods and systems described herein may be used alone or in combination with other methods and systems. Various equivalents, alternatives, and modifications are possible within the scope of the appended claims.

[00011] FIGURES 1-3 depict a marine propulsion system 10 for propelling a marine vessel 12 in water. The system 10 includes a pair of outboard motors 14 that are pivotally coupled to the stern 16 of the marine vessel 12, as is conventional. The concepts of

the present disclosure are applicable to other types of marine vessels than what is shown in the FIGURES. Also, the number and configuration of the outboard motors 14 can vary from that which is shown. Each outboard motor 14 is enclosed by a portion of the marine vessel 12. In this example, each outboard motor 14 is enclosed in an engine housing 18 that partially or entirely surrounds all sides of the outboard motor 14 that are located above the waterline 17 when the marine vessel 12 is in the water. In this example, as shown in FIGURE 3, the engine housing 18 is located at the stern 16 of the marine vessel 12 and provides a swimming platform 20 for a swimmer to move about the stern 16 without interference from the outboard motor 14.

[00012] As shown in FIGURE 3, each outboard motor 14 has an internal combustion engine 22 that emits exhaust gases in a conventional manner. Each outboard motor 14 has an exhaust gas relief outlet 24 located above the waterline 17 for relieving exhaust gas when, for example, the engine 22 is at idle. The exhaust gas relief outlet 24 can be located on the back of the engine 22, or other locations. As explained further herein below, a flexible conduit 26 conveys exhaust gas from the exhaust gas relief outlet 24 to a discharge outlet 28 located on the marine vessel 12. Each outboard motor 14 also includes a primary exhaust outlet 30 located in the propeller housing 32, which is positioned vertically lower than the exhaust gas relief outlet 24 and which discharges exhaust gas directly to the water. The location of the respective relief outlet 24 and primary exhaust outlet 30 can vary from that which is shown.

[00013] As shown in FIGURES 1-3, the conduit 26 includes a flexible hose that extends from the exhaust gas relief outlet 24 through the forward side of the outboard motor 14 (at 36) and then extends through an engine well 38 (at 40) and then to the discharge outlet 28 on the hull 44 of the marine vessel 12. The flexible hose can be connected at locations 24, 28, 36 and 40 by quick-connect fittings or fixed fittings such as a barb with a clamp. In the depicted arrangement, the location 40 at which the conduit 26 extends through the engine well 38 is located vertically higher than the exhaust gas relief outlet 24 and vertically higher than the discharge outlet 28. This positional relationship has been found by the present inventors to provide certain advantages. In addition to exhaust gas, water is often exhausted out of the internal combustion engine 22. Positioning the conduit 26 at elevated location 40 helps prevent water from remaining in the flexible conduit 26 where, for example, the water

can freeze in cold environments. Moisture in the conduit 26 can drain either to the discharge outlet 28 or back into the internal combustion engine 22, which is acceptable. Within these concepts, other portions of conduit 26 can be positioned at relative elevations to allow gravity to drain water out of the flexible conduit 26. The location of discharge outlet 28 can vary from that which is shown and can be on either or both of the port or starboard sides of the hull 44. The conduit 26 can be continuously sloped and devoid of low spots along the length of the conduit where water would otherwise stagnate. This avoids the problems discussed above. The flexible nature of the conduit 26 advantageously allows movement of the outboard motor 14 with respect to the engine well 38, for example during tilting, trimming or rotational movement of the outboard motor 14.

[00014] A muffler 46 is located on the engine well 38, internally of the hull 42 and is for decreasing idle relief noise. The muffler 46 can instead, optionally be attached to the outboard motor 14.

[00015] Although only a few example embodiments have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the example embodiments without materially departing from this invention. Accordingly, all such modifications are intended to be included within the scope of this disclosure as defined in the following claims. In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents, but also equivalent structures. Thus, although a nail and a screw may not be structural equivalents in that a nail employs a cylindrical surface to secure wooden parts together, whereas a screw employs a helical surface, in the environment of fastening wooden parts, a nail and a screw may be equivalent structures. It is the express intention of the applicant not to invoke 35 U.S.C. §112, paragraph 6 for any limitations of any of the claims herein, except for those in which the claim expressly uses the words “means for” together with an associated function.

CLAIMS

What is claimed is:

1. A marine propulsion system for propelling a marine vessel in water, the system comprising: an outboard motor coupled to a marine vessel, the outboard motor having an exhaust gas relief outlet that is located above the water when the outboard motor is at idle speed; and a conduit conveying exhaust gas from the exhaust gas relief outlet to a discharge outlet located on the marine vessel.
2. The system according to claim 1, comprising a primary exhaust gas outlet that is located lower than the exhaust gas relief outlet on the outboard motor and that discharges exhaust gas to the water.
3. The system according to claim 1, wherein the marine vessel comprises a hull and wherein the discharge outlet is on the hull.
4. The system according to claim 3, wherein the conduit extends through one of a port and starboard side of the hull.
5. The system according to claim 3, comprising a muffler receiving exhaust gas from the conduit.
6. The system according to claim 5, wherein the muffler is located on the hull.
7. The system according to claim 1, wherein the outboard motor is enclosed by a portion of the marine vessel.
8. The system according to claim 7, wherein the portion of the marine vessel is an engine housing that at least partially surrounds all sides of the outboard motor that are above the water.

9. The system according to claim 1, wherein the conduit comprises a flexible hose.
10. A marine propulsion system for propelling a marine vessel in water, the system comprising:
 - an outboard motor coupled to a marine vessel, the outboard motor comprising an exhaust gas relief outlet and a primary exhaust gas outlet that is located lower than the exhaust gas relief outlet on the outboard motor and that discharges exhaust gas to the water; and
 - a conduit conveying exhaust gas from the exhaust gas relief outlet to a discharge outlet located on the marine vessel;wherein the conduit is sloped along its length so that water does not stagnate therein.
11. The system according to claim 10, wherein the conduit extends through the marine vessel at a location that is higher than the exhaust gas relief outlet and higher than the discharge outlet.
12. The system according to claim 10, wherein the marine vessel comprises a hull and wherein the discharge outlet is on the hull.
13. The system according to claim 12, wherein the conduit extends through one of a port and starboard side of the hull.
14. The system according to claim 12, comprising a muffler receiving exhaust gas relief from the conduit.
15. The system according to claim 14, wherein the muffler is located on the hull.
16. The system according to claim 10, wherein the outboard motor is at least partially enclosed by a portion of the marine vessel.

17. The system according to claim 16, wherein the portion of the marine vessel is an engine housing that surrounds all sides of the outboard motor that are above the water.

18. The system according to claim 10, wherein the conduit comprises a flexible hose.

19. In a marine propulsion system having an outboard motor coupled to a marine vessel for propelling the marine vessel in water, an exhaust gas system comprising an exhaust gas relief outlet that is located above the water when the outboard motor is at idle speed and a conduit conveying exhaust gas from the exhaust gas relief outlet to a discharge outlet located on the marine vessel.

20. The system according to claim 19, wherein the marine vessel comprises a hull and wherein the discharge outlet is on the hull.

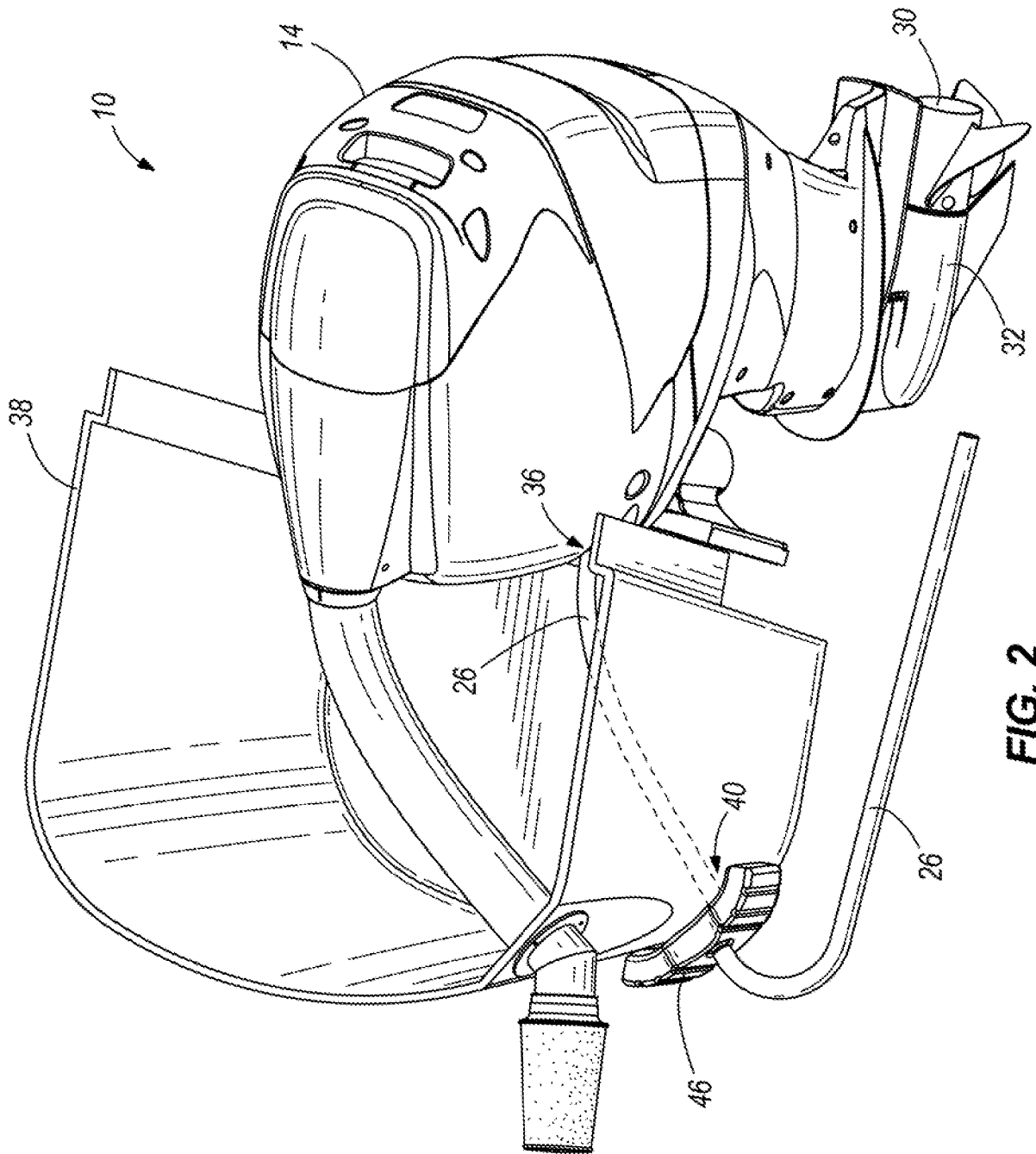


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2013/033426

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B63H 20/04 (2013.01)

USPC - 440/89R

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)

IPC(8) - B63H 20/00, 20/02, 20/04, 20/06, 20/12, 20/14, 20/24, 20/32, 20/34, 21/00, 21/30, 21/32, 23/00, 25/00, 25/06, 25/38 (2013.01)
USPC - 60/324; 114/55.51, 239, 289; 123/65PE; 440/51, 53, 63, 75, 75P, 76, 76P, 88C, 88M, 89, 89B, 89BP, 89C, 89F, 89FS, 89G, 89R

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

CPC - B01D 53/9431; B63B 2770/00, 35/731; B63H 5/08, 5/10, 5/125, 11/08, 20/007, 20/06, 20/08, 20/10, 20/106, 20/12, 20/14, 20/20, 20/22, 20/245, 20/32, 20/34, 21/14, 21/22, 21/24, 21/26, 21/32, 23/04, 23/08, 23/26, 23/30, 25/38, 25/42, 2001/185, 2020/003 (2013.01)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Patbase, Google Patent, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,452,704 A (WATKINS) 01 July 1969 (01.07.1969) entire document	1-20
Y	US 5,505,644 A (OUSLEY II et al) 09 April 1996 (09.04.1996) entire document	1-20
A	Sea Ray Venture (2013-) (w/currently no test numbers). BoatTEST.com. 12 August 2012. [retrieved on 15 May 2012]. Retrieved from internet: <URL: http://web.archive.org/web/20120812044100/http://www.boattest.com/boats/boat_video.aspx?id=2752 > entire document	1-20
A	US 2008/0026654 A1 (KONAKAWA et al) 31 January 2008 (31.01.2008) entire document	1-20
A	US 5,833,502 A (ANDERSON) 10 November 1998 (10.11.1998) entire document	1-20

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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 May 2013

Date of mailing of the international search report

07 JUN 2013

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774