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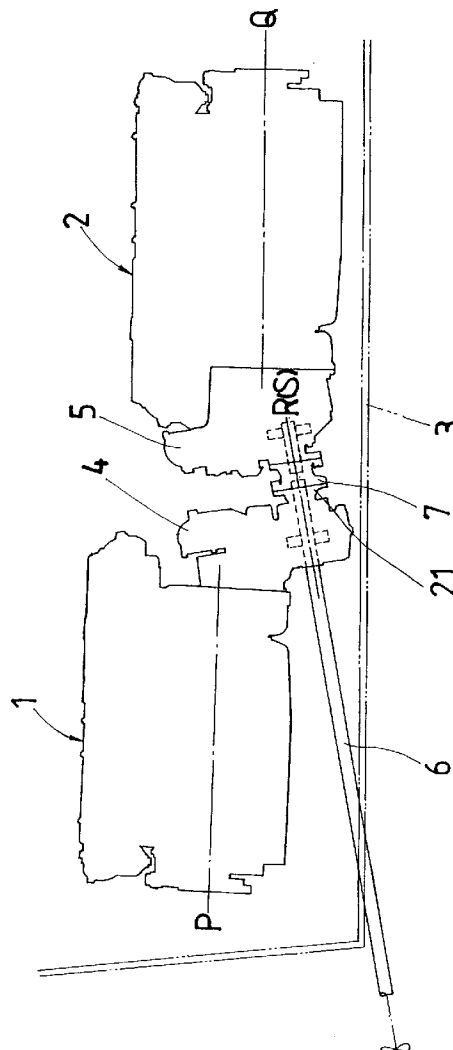
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(54) **Two-engine/one-shaft type vessel.**

(57) A two-engine/one-shaft type vessel characterized in that :
two sets of main engine are arranged in series each other in a longitudinal direction of a hull ; and
output shafts of speed reducers of respective main engines are coupled in series each other and coupled interlockingly with a single propeller driving shaft.

FIG.1



Field of the Invention and Related Art Statement

The present invention relates to a two-engine/one-shaft type vessel in which one propeller driving shaft is driven by means of two sets of main engines.

Conventionally, two sets of main engines have been mounted and the output thereof has been transmitted to one propeller driving shaft through a speed reducer as means for aiming at high speed of a vessel by increasing an output of the main engine. Fig. 5 shows an arrangement structure of main engines of a two-engine/one-shaft type vessel of this sort. On a rear side of hull A, two sets of main engines B, B are arranged in the cross direction of the hull A, and power is transmitted to a propeller driving shaft D through a speed reducer C arranged on the output side of respective main engines B and B. In this case, a speed reducer having such a structure as to receive the power from two main engines B, B and transmit the power to the propeller driving shaft D while collecting it on one output shaft is used for the speed reducer C.

On the other hand, an arrangement in which two sets of main engines are arranged in series instead of parallel arrangement is also had under consideration. One of them is an invention disclosed in Japanese Patent Application Provisional Publication No. 1986/196894. In this invention, a clutch is arranged between main engines arranged in series so that power take off sides face each other, and crank shaft end portions of these respective main engines and a propeller driving shaft on the side of the main engines are connected through this clutch.

Another means for arranging two sets of main engines in series to each other is such that crank shaft ends of two sets of main engines are connected through a clutch and the end portion on an opposite side of one main engine is coupled with a propeller shaft as described in Japanese Patent Application Publication No. 1991/24399 or Japanese Patent Application Provisional Publication No. 1987/31598.

As described above, two sets of main engines B, B have been heretofore arranged in the cross direction of the hull A. Therefore, a wide space is required in the cross direction of the hull for arranging two sets of main engines B, B. As a result, there is such a defect that the hull width has to be widened. Thus, it has been difficult to apply such an arrangement to high speed vessel aiming at high speed by reducing the width of the hull. Further, the space between the main engines B & B becomes very limited, so that maintenance work on the facing sides of these main engines B & B is very difficult. Moreover, in order to have the outputs of the main engines B & B which are parallel to each other collected together on one propeller driving shaft, a special speed reducer for two-engines/one-shaft type as described above is required, and a speed reducer for one-engine/one-shaft type,

which is in use most extensively, cannot be applied as it is, thus bringing about a high cost.

Because of such reasons, the above-described application, in which main engines are arranged in series each other, is more preferable for a high speed vessel. However, in the former among them, in which the ends of two crank shafts of the main engines arranged so as to face each other, are coupled with the propeller driving shaft through a clutch, there is a disadvantage that an exclusive clutch for coupling such two crank shafts with the propeller driving shaft is required, so it's increasing the cost. Further, in the latter, in which crank shafts of respective main engines, are coupled with each other, the power of one main engine is transmitted to the propeller driving shaft through the crank shaft of the other main engine, and the burden on the crank shaft of the other engine becomes heavy, and the diameter of the crank shaft has to be made larger, thus also causing a defect tied up with the increase in cost.

Object and Summary of the Invention

It is a first object of the present invention to provide a vessel suitable as a high speed vessel by arranging two sets of main engines in series each other so as to reduce the hull width by a large margin.

It is another object of the present invention to provide a two-engine/one-shaft type vessel, in which it is not required to couple with a propeller shaft using a special exclusive clutch in a vessel in which two sets of main engines are arranged in series each other as described above.

It is still another object of the present invention to provide a vessel in which the power of one main engine, is not transmitted to the propeller driving shaft side through a crank shaft of the other main engine, and thus, it is not required to make the diameter of the crank shaft of the other main engine larger in a vessel in with two sets of main engines are arranged in series each other and the power is transmitted to one propeller driving shaft.

In order to solve above-described subjects, the present invention is characterized in that, two main engines are arranged in series each other in a longitudinal direction of a hull, and output shafts of speed reducers of respective main engines are coupled in series each other and coupled interlockingly with a single propeller driving shaft.

Further, it is considered in the foregoing that the speed reducers coupled with the output portion of the hull are arranged so as to face each other, and the outputs of these speed reducers are coupled interlockingly with one propeller driving shaft.

As described above, according to the present invention, the main engines are arranged in series in the longitudinal direction of the hull. Therefore, being different from the past, such effects make it possible to

reduce the hull width, and high speed can be realized by slimming the hull. Further, since allowance is produced on the side portion of the main engine side, maintenance work is easy. Moreover, since the output shafts of respective speed reducing reversers are coupled in series each other and coupled with the propeller driving shaft, it is sufficient that the propeller driving shaft is arranged on this line and respective output portions are coupled directly with each other, and such a structure that the outputs of the main engines, which are parallel to each other, are collected together on one propeller driving shaft as in the past is not required. For example, it is sufficient that an inexpensive speed reducing reverser used for a one-machine one-shaft type is selected according to a propulsion type and the like with a slight modification to such an extent that a hole at a shaft inserting portion of the speed reducing reverser on the stern side through, which is the propeller driving shaft, is penetrated and enlarged according to a propeller driving shaft having a large diameter for the two-engine/one-shaft type.

Furthermore, according to the present invention, the output shafts of speed reducers, which are provided originally in respective main engines, are coupled in series each other. Accordingly, exclusive clutches are not required, it is possible to manufacture the equipment at a low cost. Further, the validity of one main engine is not coupled with the propeller driving shaft through the crank shaft of the other main engine as the same reason in the present invention. Hence, it is not required to make the crank shaft diameter larger.

The present invention's above-described and other objects and features will be understood clearly from the following description and claims based on the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a side view of an arrangement structure of a main engine showing an embodiment of the present invention.

Fig. 2 is a longitudinal sectional view of a principal part showing a detailed example of a speed reducing reverser portion.

Fig. 3 is a side view of an arrangement structure of a main engine showing another embodiment of the present invention.

Fig. 4 is a side view of an arrangement structure of a main engine showing still another embodiment of the present invention.

Fig. 5 is a plan view showing an arrangement structure of a conventional main engine.

Detailed Description of Preferred Embodiments

Fig. 1 shows an example, in which speed reducers of respective main engines, are arranged so as to

oppose to each other. In Fig. 1, main engines 1 and 2 are arranged in series in the longitudinal direction of a hull 3, and speed reducing reversers 4 and 5, coupled directly with respective output sides of the main engines 1 and 2, are reversely. In the present embodiment, a V drive type, in which an output shaft axis R of a speed reducing reverser 4, is bent into a V-shape with respect to a crank shaft center P, which is an output shaft axis of the main engine 1, is used for the speed reducing reverser 4 coupled with the main engine 1 on a stern side. On the other hand, a speed reducing reverser of an angle drive type, in which an output shaft center S of a speed reducing reverser 5, is tilted slightly with respect to a crank shaft center Q, is used for the speed reducing reverser 5, coupled directly with the main engine 2 on a front side. Further, the output shaft centers R and S of these speed reducing reversers 4 and 5 are arranged on the same line, and respective outputs are coupled interlockingly with a propeller driving shaft 6, arranged on the same line as the output shaft centers R and S. In this case, a front end of the propeller driving shaft 6 on the opposite to the propeller penetrates through the speed reducing reverser 4 of the main engine 1, on the stern side and projects forward, and couples directly with a shaft coupling 7, which is coupled directly with an output shaft coupling 21 of the speed reducing reverser 4, and coupled with the speed reducing reverser 5 on the front side through the shaft coupling 7.

Fig. 2 shows a concrete structure of the above-described speed reducing reversers 4 and 5. It is possible to use well-known machines, which have been heretofore used, both for the V drive type speed reducing reverser 4 and the angle drive type speed reducing reverser 5. The outlines thereof will be explained. First, in the speed reducing reverser 4 on the rear side which is V-type drive, an input shaft 8 and a clutch shaft 9 are installed in a case, the input shaft 8 is coupled directly with a flywheel 12 on the output side of the main engine 1 on the stern side, and power is transmitted onto the clutch shaft 9 from the input shaft 8 through a clutch 10. Further, the power of the clutch shaft 9 is transmitted to a speed reducing gear 11 on the output side, and then the power is transmitted to another shaft coupling 7 through as shaft 20 and a shaft coupling 21 rotating a one body with the output gear 11. On the other hand, in the angle drive type speed reducing reverser 5 on the front side, an input shaft 13 coupled directly with the flywheel 12, which is the output side of the main engine 2, is supported on a shaft at the central portion at the front portion, and the power of the input shaft 13 is transmitted to the side of a clutch shaft 14 supported on a shaft at the upper part thereof. Then, the power switched by a clutch 15 on the clutch shaft 14 is transmitted to a gear 17 on an output shaft 16 arranged below the clutch 15, the power is transmitted to the shaft coupling 7 from the output shaft 16, and the power of both

main engines 1 and 2 is transmitted to the propeller driving shaft 6 in a state that the power of both main engines 1 and 2 is collected in the portion of the shaft coupling 7.

Fig. 3 shows an embodiment when an ordinary parallel drive type speed reducing reverser is installed in a vessel provided with stern drive instead of using a V-type drive or angle drive type speed reducing reverser, in which the output shaft is tilted as described above. In the present embodiment, speed reducing reversers 4 and 5, coupled directly with respective main engines 1 and 2, are arranged oppositely to each other, and coupled with one propeller driving shaft 6 by arranging output shaft axes R and S on the same line. In this case, the speed reducing reverser 4, coupled directly with the main engine 1 on the stern side, is arranged at such a position that the output shaft center R thereof projects downward than the main engine 1, the front end of the propeller driving shaft 6 arranged below the main engine 1 is fitted penetrating through on the output axis center R of the speed reducing reverser 4, and the front end thereof is coupled with the speed reducing reverser 5 on the front side through a shaft coupling 7 similarly to the foregoing. Furthermore, the rear end portion of the propeller driving shaft 6 is coupled with the input side of the stern drive equipment 20, fitted to a transom of the hull 3.

In Fig. 4, both the output sides of respective main engines 1, 2 and the speed reducing reversers 4, 5 are arranged toward the stern direction without having them oppose to each other. In the present embodiment, respective main engines 1 and 2 are installed while tilting them in accordance with the inclination of the propeller driving shaft 6. Also, the intermediate portion of the propeller driving shaft 6 is made to penetrate through along the output shaft axis R of the speed reducing reverser 4 of the main engine 1 on the stern side and coupled with the speed reducing reverser 4, and the front end thereof is extended forward through under the main engine 4 on the stern side, and coupled directly with the output portion of the speed reducing reverser 5 on the front side.

The foregoing shows an embodiment of the present invention, and the present invention is not limited thereto, but it is to be noted that various modifications can be made within the scope of claims which will be described later.

Claims

1. A two-engine/one-shaft type vessel characterized in that:

two sets of main engine are arranged in series each other in a longitudinal direction of a hull; and

output shafts of speed reducers of respec-

tive main engines are coupled in series each other and coupled interlockingly with a single propeller driving shaft.

2. A two-engine/one-shaft type vessel according to Claim 1, characterized in that speed reducers fitted on the output sides of respective main engines, are arranged so as to oppose to each other.

FIG.1

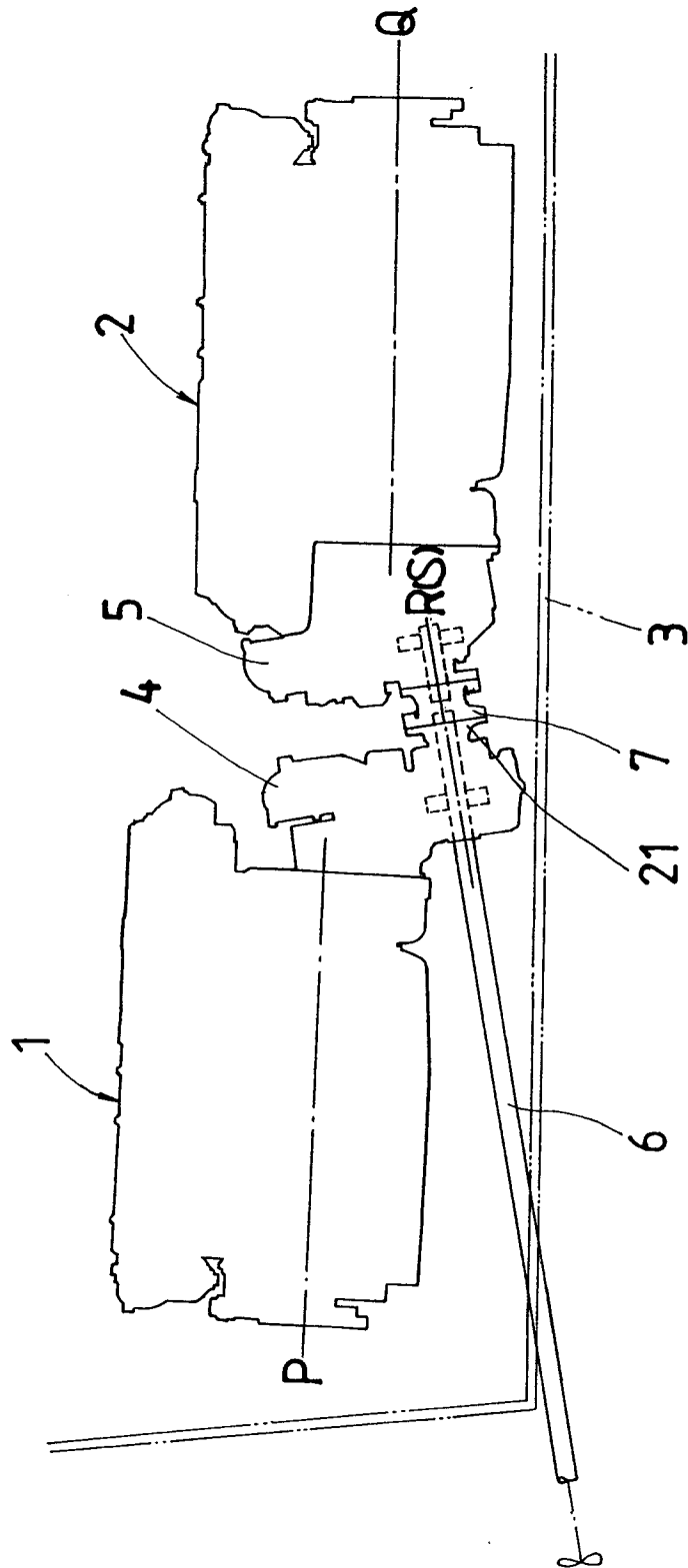


FIG. 2

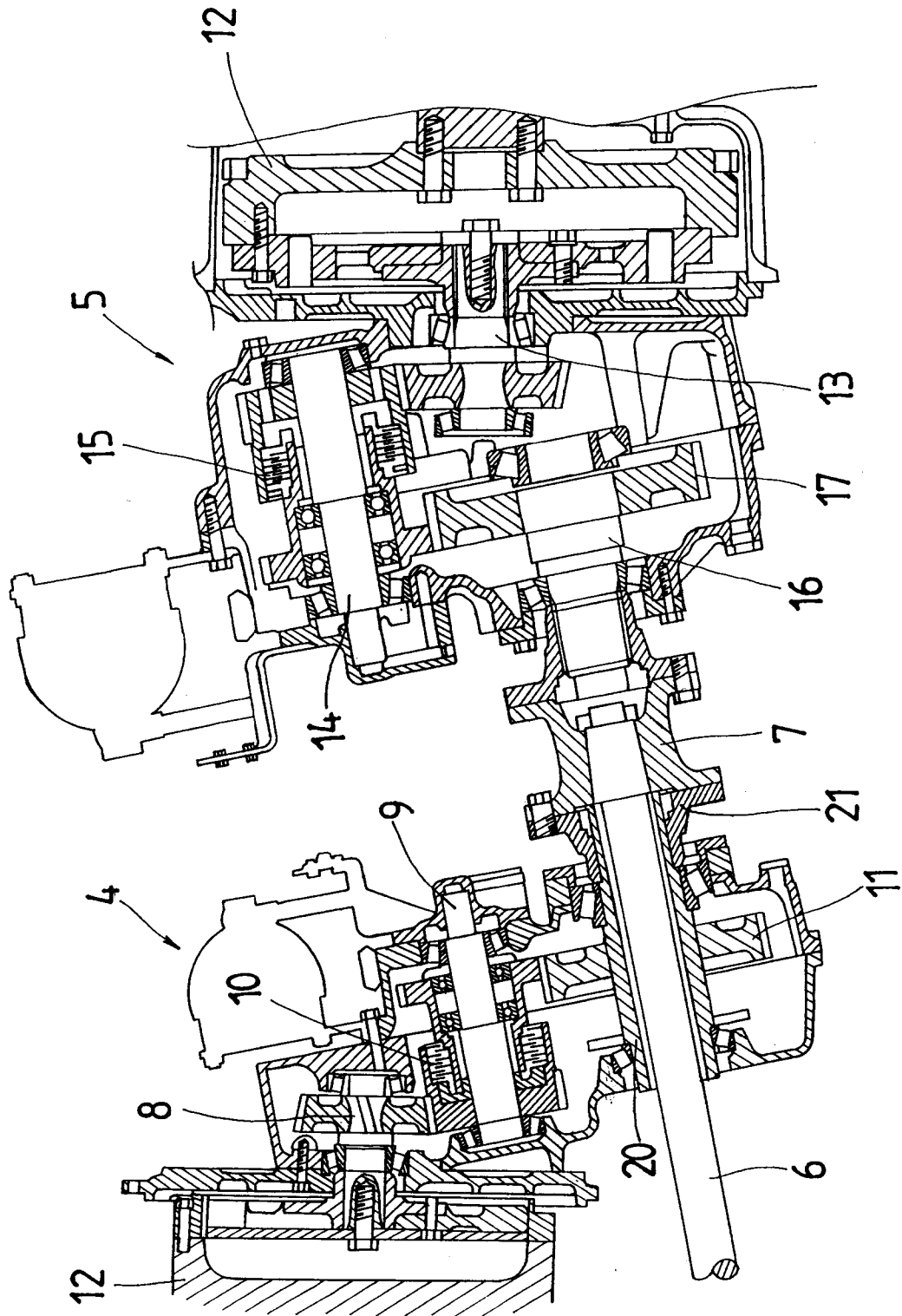


FIG.3

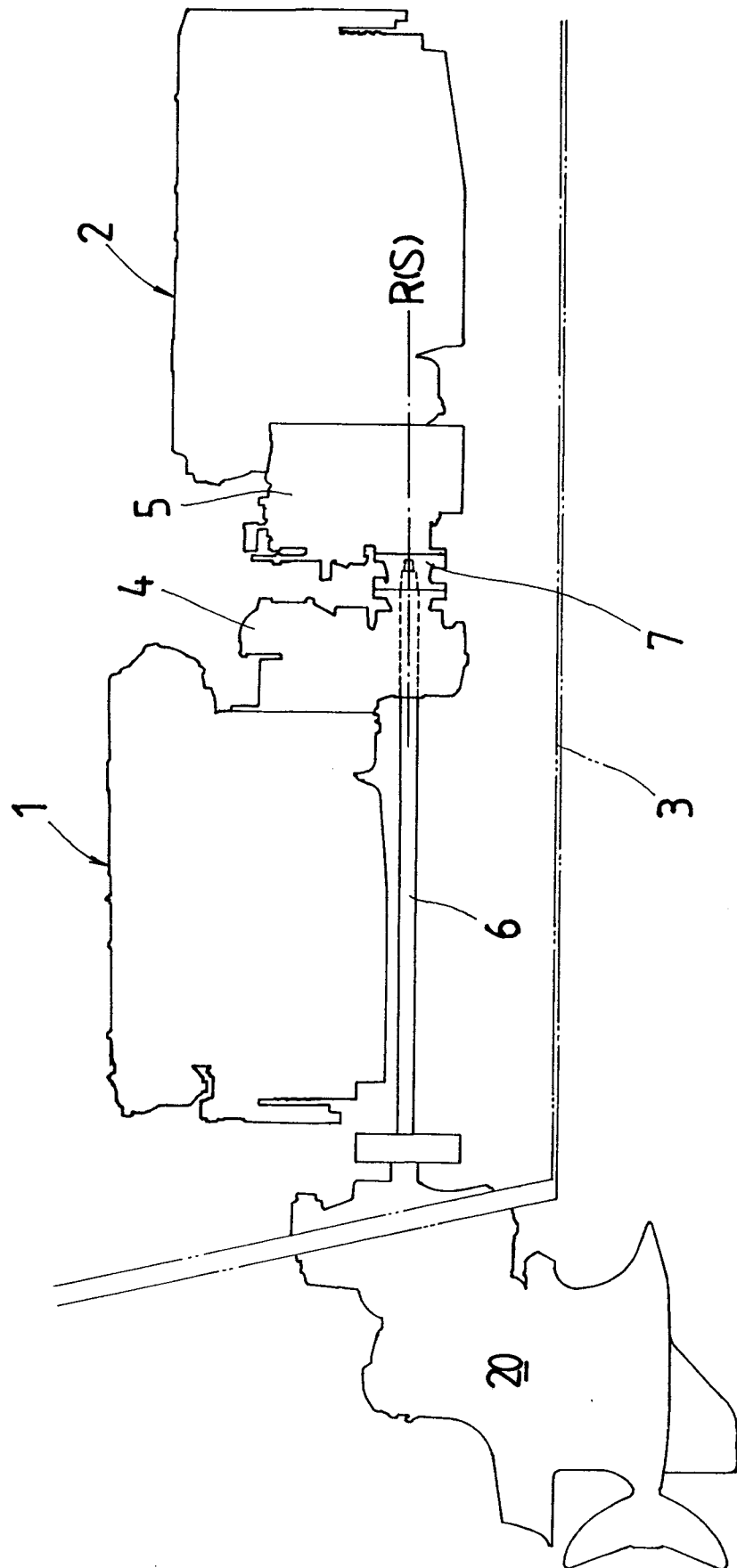


FIG. 4

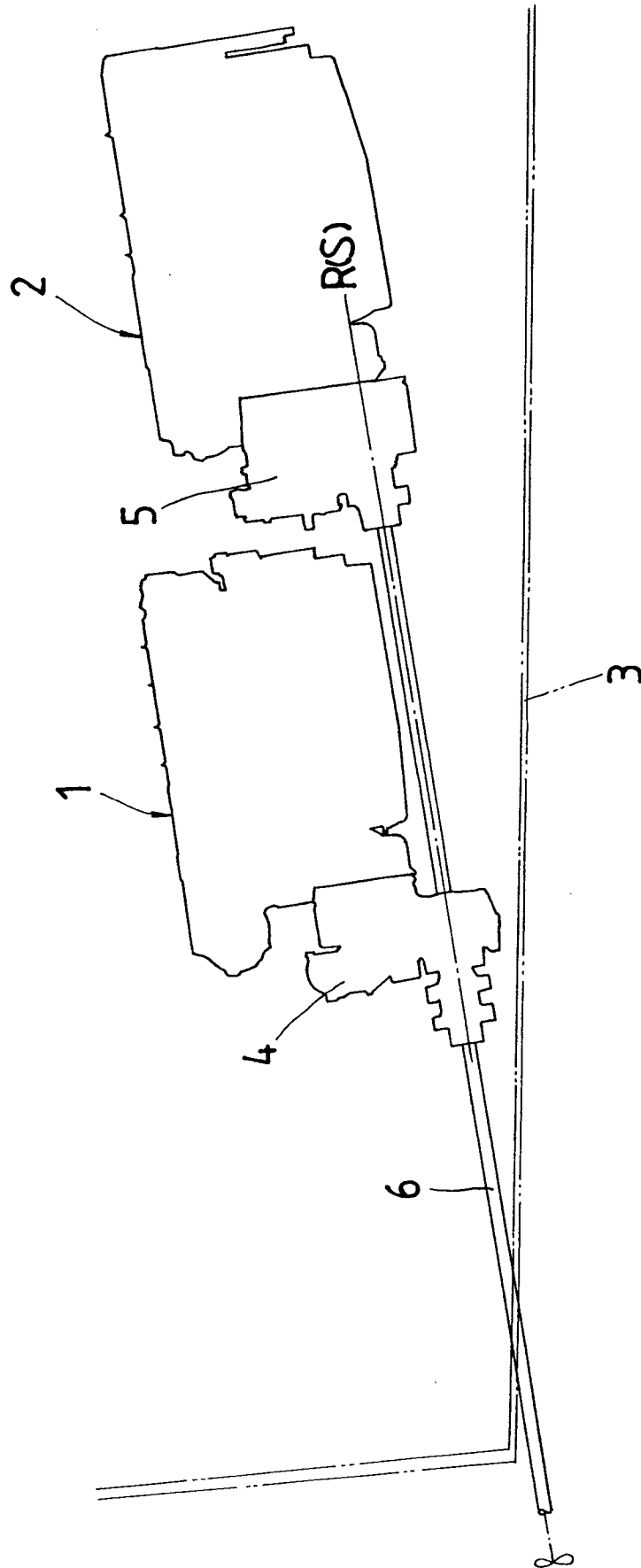
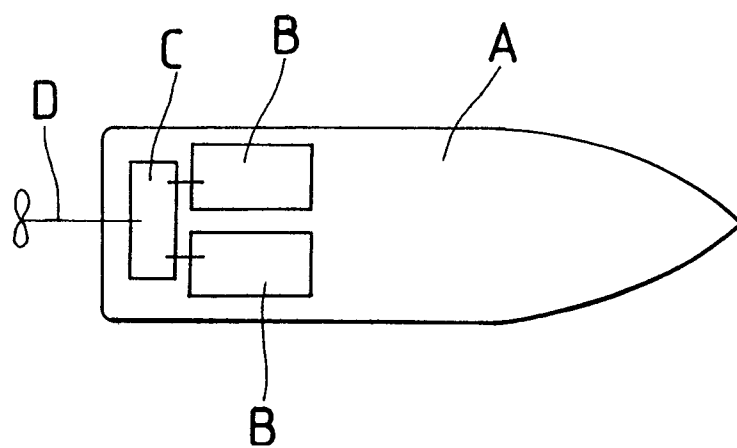


FIG. 5





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 92 30 3130

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 146 353 (THE ENGLISH ELECTRIC COMPANY) * claims; figures *	1,2	B63H23/10
X	GB-A-2 028 747 (BAYERISCHE BERGHÜTTEN UND SALZWERKE AG.) * abstract; figure 2 * * page 3, line 6 - line 14 *	1,2	
X	EP-A-0 184 082 (F.TACKE AG.) * abstract; figure 1 *	1,2	
X,D	& JP-A-61 196 894		
X	SHIP & BOAT INTERNATIONAL no. 1, January 1991, LONDON page 29; 'An unusual drive train for a fast catamaran'	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B63H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01 JULY 1992	Examiner STIERMAN E.J.
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