

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 811 550 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

10.12.1997 Bulletin 1997/50(51) Int Cl.⁶: **B63H 23/00**(21) Application number: **97303818.5**(22) Date of filing: **04.06.1997**

(84) Designated Contracting States:

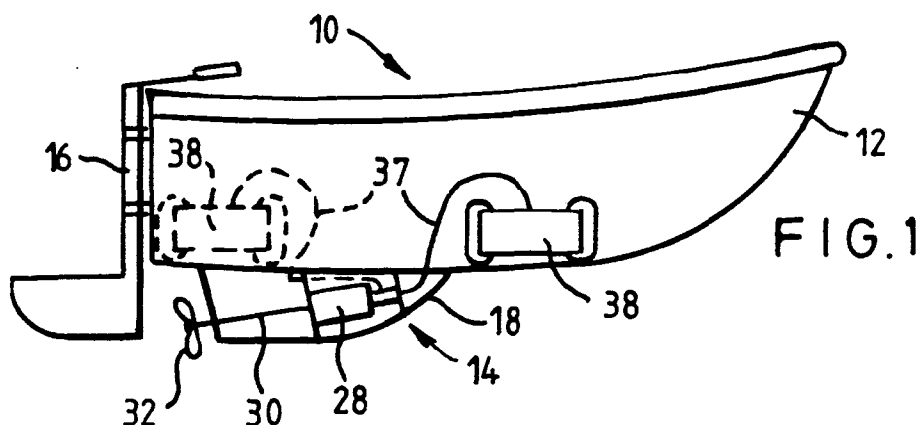
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

Designated Extension States:

AL LT LV RO SI(30) Priority: **04.06.1996 GB 9611586**(71) Applicant: **E.P. Barrus Limited****Bicester Oxfordshire OX6 0UR (GB)**(72) Inventor: **Glen, Robert Duncan****Oxford, Oxfordshire OX9 12EQ (GB)**(74) Representative: **Smith, Gillian Ruth****MARKS & CLERK,****57-60 Lincoln's Inn Fields****London WC2A 3LS (GB)****(54) Drive means and a boat having drive means**

(57) The invention provides drive means for a boat comprising a propeller (32), a propeller shaft (30) and a motor (28) for driving the propeller shaft (30), the motor (28) and at least part of the propeller shaft (30) being housed within a cavity (20) defined by a keel portion (18) attachable to or forming part of the hull of the boat. The motor (28) has flexible connectors (37) for connection to an engine or power pack (38) whose position with respect to the motor (28) can be selected or adjusted whilst remaining connected to the motor (28). The in-

vention also provides a method of converting an existing boat into a boat incorporating such drive means, comprising the steps of forming an aperture in the hull of the boat corresponding to the shape of the keel portion (18), adapting the keel portion (18) to the shape of the hull and attaching the keel portion (18) to the hull so as to close and seal the aperture. The provision of drive means of this type removes at least some of the components of the drive means from the interior of the boat and provides additional directional stability to the boat.

**EP 0 811 550 A2**

Description

The invention relates to drive means for a boat, to a boat having drive means and to a method of installing drive means into an existing boat to replace existing drive means.

Very many boats are specifically designed for use on inland waterways, i.e. rivers and canals. The most common means of propulsion of such boats are outboard motors, inboard motors and stern drives. Both are bulky and inflexible in their positioning so that the weight of the respective propulsion means is concentrated at the stern of the boat. Also, many outboard motors and stern drives are petrol driven and the use of petrol is now discouraged or even banned on many inland waterways. There are thus many existing boats which require to be converted with regard to the fuel they consume before they can be used freely on inland waterways.

One way to convert a boat having an existing petrol-driven outboard motor is to replace that outboard motor with a diesel-driven outboard motor. However, because diesel engines are heavier than petrol engines, this can easily alter the performance of the boat by virtue of the increased loading at the stern. Similarly, a petrol-driven inboard motor or stern drive can be removed and replaced with a diesel-driven drive, but the boat will have been designed for a specific type of drive and an alternative type will not always be adequately accommodated in the respective boat. There is also the same problem of added stern weight.

An object of the invention is to provide drive means for a boat which can replace existing drive means such that the performance of the boat is not impaired whilst allowing it to run on diesel or other economic fuel means. Another object of the invention is to provide drive means which can replace existing drive means such that accommodation of the drive means is optimised.

Manufacturers of new boats also have a choice of which type of drive to install. Because the accommodation space inside a boat suitable for use on inland waterways is relatively limited, the drive should ideally take up as little space as possible without creating too much loading at the stern. It would also be advantageous if the position of at least some of the weight associated with the drive means could be adjustable so that the versatility of the boat could be improved without causing any detriment to its performance under different conditions.

It is therefore an object of the invention to provide a boat having drive means whose accommodation is optimised. It is a further object of the invention to provide a boat having drive means whose centre of gravity can be adjusted within the boat. It is another object of the invention to allow a boat previously designed to run on petrol to be converted to run on diesel, which is far more economical than petrol.

The invention provides drive means for a boat as claimed in claim 1, a boat as claimed in claims 16 and

19 and a method of converting an existing boat as claimed in claim 25. Further and advantageous features are set out in the subsidiary claims.

Positioning the propeller shaft and motor in a cavity in a keel portion removes these integers of the drive means from the interior of the boat. Also, the keel portion will be positioned beneath the hull and forward of the stern which will reduce the stern weight of the boat. Furthermore, the motor can be adapted for use with any appropriate engine, power pack or battery pack, such as diesel, hydraulic, electric or diesel-electric. The engine or power pack can be positioned at any convenient point within the boat so as to allow the position of the overall centre of gravity to be adjusted to suit the particular task to which the boat is put. This arrangement means that less deckspace is taken up by the drive means and the deckspace that remains can be used as desired with great flexibility.

Existing boats can be fitted with the drive means of the invention quickly and easily. The existing drive means can be removed and an aperture can be cut in the hull such that a new keel portion can be affixed to the hull so as to close and seal the aperture. The drive means can be provided in the form of a sealed keel portion ready to be attached to the hull of the existing boat, together with a portable power pack which can be placed inside the boat ready for immediate use. The other advantage of making use of a portable power pack, apart from its versatility in adjusting the centre of gravity of the boat, is that it can be easily be replaced in the event of a breakdown or when servicing is required.

An embodiment of the invention will now be described with reference to the accompanying drawings, wherein:

Figure 1 is a schematic side view of a boat incorporating drive means according to the invention; Figure 2 is a schematic side view of the drive means of the boat of Figure 1; and Figures 3a and 3b are schematic illustrations of a method of converting an existing boat into a boat according to the invention.

Figure 1 illustrates a boat 10 essentially comprising a hull 12, drive means 14 and directional steering apparatus 16. Further features such as a cabin, seating, storage compartments, etc. may of course be provided but are not illustrated here for the sake of clarity. The directional steering apparatus 16 are illustrated here as a rudder. The rudder 16 can of course be replaced by other conventional steering devices.

The drive means 14 is illustrated in Figure 2. The drive means 14 comprises a keel portion 18 which incorporates an upper keel portion 18a and a rear keel portion 18b. The keel portion 18, 18a, 18b is preferably manufactured from fibreglass although other materials such as, for example, stainless steel can also be used. The keel portion 18, 18a, 18b defines a cavity 20 which

is separated into three compartments 20a,20b,20c by means of two bulkheads 22a,22b. The bulkheads 22a, 22b are preferably manufactured from the same material as the keel portion 18, 18a, 18b. An upper sealing member 24 extends substantially horizontally between the walls of the keel portion 18 so as to enclose the cavity 20 and to provide a delimiting boundary between the upper keel portion 18a and the remainder of the keel portion 18. Sealable access ports 26 are preferably provided in the sealing member 24 so as to provide access to each of the individual compartments 20a,20b,20c. It will be appreciated that any or all of these access ports 26 can be omitted if desired.

A motor 28 is securely mounted on the bulkhead 22a. The drive shaft 30 of the motor 28 forms a propeller shaft for the propeller 32. The drive shaft 30 is arranged to pass through the bulkhead 22a and through the rear keel portion 18b so as to support the propeller 32 in clear water immediately behind the keel portion 18. The keel portion 18 provides protection for the propeller 32 to prevent the propeller blades from coming into contact with the waterway bed or anything lying thereon. The propeller shaft 30 incorporates thrust bearings and seals such that the ingress of water into the compartment 20a is minimised and the ingress of water into the compartment 20b is eliminated. In order to minimise the effect of any water seeping into compartment 20a, water extracting means in the form of a pump 34 are placed in the lowermost region of the compartment 20a with its outlet 35 connected to a port (not shown) located above the waterline of the boat 10. In order to further minimise the effects of water on the propeller shaft 30 and motor 28, the shaft 30 and motor 28 can be completely encased in a water-repellent, corrosion-preventative coating.

Connectors 36 which allow the motor 28 to be connected to an engine or power pack are provided on the bulkhead 22b with suitable connections running between the connectors 36 and the motor 28. The connectors 36 are accessed through the compartment 20c. If desired, the connectors 36 can be connected to further connectors (not shown) located on the upper surface of the sealing member 24 so that access into the compartment 20c is unnecessary. However, it is preferred that the connectors 36 are housed within the separate compartment 20c and protected from possible damage during the installation of the drive means 14 in a boat by means of the sealing member 24. Alternatively, the connectors can be located on the bulkhead 22a or connected to further connectors located towards the rear of the upper sealing member 34, as illustrated in dotted lines in Figure 2.

The connectors 36 are used to connect the motor 28 to an engine or power pack 38 via flexible connectors 37 as illustrated in Figure 1. The nature of the engine or power pack 38 will depend upon the type of motor 28 which is installed in the cavity 20b. The engine or power pack 38 must be matched to the motor 28. Thus, if the

motor 28 is an hydraulic motor, the engine or power pack must consist of a diesel-hydraulic engine. It will be appreciated that a diesel engine can be used to power a diesel motor and an electric power pack can be used to power an electric motor. All these types of motor and power pack are suitable for use in this field. It is preferred that the engine or power pack has diesel as a suitable fuel.

It is preferred that the engine or power pack 38 is completely self contained and portable. For example, an hydraulic power pack 38 will include a diesel engine, a pump and an hydraulic reservoir. Similarly, a diesel power pack will incorporate a diesel engine, a pump and a fuel tank. All of the components will be mounted within a casing or framework, preferably in a vibration-resistant manner and in sufficiently close proximity to enable the combination of components to be manoeuvred between different locations. This allows the power pack 38 to be positioned at any convenient location within the boat 10 so as to optimise the position of the centre of gravity and thereby improve the performance of the boat as a whole. Utilisation of the available deckspace can therefore be optimised. If additional weight is required at the bow, the power pack 38 can be placed forwardly, as illustrated in Figure 1. If the performance of the boat 10 would be improved by placing the power pack 38 towards the stern, as shown in dotted lines in Figure 1, this can also be achieved. The only constraint would be the length of the flexible connectors 37 which are used to connect the power pack 38 to the connectors 36. However, the required length of the flexible connectors 37 can be reduced by providing alternative positions of the connectors 36 as described above.

The keel portion 18 can, if required, be formed integrally with the hull 12 of the boat 10 during initial manufacture. In this case, the upper portion 18a is effectively dispensed with by being incorporated into the material of the hull 12. Alternatively, drive means as described above can replace existing drive means in an existing boat. In such circumstances, the existing drive means can be removed from the exiting boat and drive means 14 can then be added in the following manner.

Initially, the position of the drive means 14 must be determined. An aperture 40 is then cut in the appropriate position in the hull 42 of the existing boat as shown in Figure 3a. Next, the upper portion 18a of the keel portion 18 is shaped so as to exactly match the lip of the aperture 40 by cutting away unwanted areas of the upper portion 18a. The upper portion 18a is essentially expendable and can be trimmed and shaped such that the lip of the aperture 40 is matched exactly. The keel portion 18 is then fixedly attached to the hull 42 so as to close and seal the aperture 40. If the hull 42 and keel portion 18 are made from fibreglass, then a fibreglass connection is used. If the hull 42 and keel portion 18 are manufactured from weldable metals, then a welded connection is made. The connection could also be made by bolting the relevant parts together with a seal member

clamped therebetween. In any event, the connection between the upper portion 18a of the keel portion 18 and the lip of the aperture 40 in the hull 42 must be completely water-tight. An appropriate power pack is then introduced to the interior of the hull 42 and connected to the connectors 36 via flexible connectors 37 (not shown in Figure 3) and the drive means are then ready for use.

If, in removing the existing drive means from the existing boat, the directional steering facility has also been removed (for example, if the existing drive means was an outboard motor), then directional steering means must also be added to the existing boat. As illustrated in Figure 1, this can be in the form of a rudder 16. However, alternative directional steering means can also be used, such as nozzles. Nozzles will be known to the skilled reader who will also appreciate that nozzles incorporating a reverse-thrust facility are particularly advantageous. The fixed position of the propeller 32 allows a nozzle of this type to be utilised and incorporated in the drive means of the invention fitted to the rear of the keel portion 18.

In most instances, an existing boat designed for use on inland waterways will not have a keel. The provision of a keel on the hull of such a boat provides additional directional stability which is advantageous when navigating narrow waterways. Also, because boats of this type are necessarily relatively small, the location of the majority of the components of the drive means beneath the hull of the boat means that less accommodation space is taken up by drive means. Nevertheless, the components of the drive means are easily accessible for servicing and maintenance. The provision of a portable power pack which is easily connectable and disconnectable from the motor also allows the power pack to be removed and replaced periodically which leads to the boat being out of service for routine maintenance for shorter periods of time.

It is envisaged that drive means according to the invention can also be fitted to an existing boat already incorporating a keel. The keel portion 18 would normally then be fitted rearwardly of the existing keel. The provision of an additional keel will not normally detract from the performance of the boat.

The invention is not limited to the features of the embodiments described above. Alternative arrangements and features will be apparent to a reader skilled in the art. Specifically, the adaptation of the invention described above to operate an impeller, as opposed to a propeller, is intended to be included within the scope of the invention. This will allow the same principles to be applied to a jet unit, thus achieving the same objects and advantages.

Claims

1. Drive means for a boat comprising a propeller, a

propeller shaft and a motor for driving the propeller shaft, the motor and at least part of the propeller shaft being housed within a cavity defined by a keel portion attachable to or forming part of the hull of the boat, wherein the motor has flexible connectors for connection to an engine or power pack whose position with respect to the motor can be selected or adjusted whilst remaining connected to the motor.

2. Drive means as claimed in claim 1, wherein the motor is directly connected to the propeller shaft.

3. Drive means as claimed in claim 1 or 2, wherein the cavity is divided into a plurality of compartments.

4. Drive means as claimed in claim 3, wherein the motor is housed within a compartment which is at least partially sealed against the ingress of water.

5. Drive means as claimed in claim 4, wherein water extraction means are located in the compartment housing the motor.

6. Drive means as claimed in claim 3, 4 or 5, wherein the part of the propeller shaft housed within the cavity extends through a compartment in which water extraction means are located.

7. Drive means as claimed in any one of the preceding claims, wherein the motor and/or propeller shaft are coated with a corrosion - resistant material.

8. Drive means as claimed in any one of the preceding claims, further comprising an engine or power pack connected or connectable to the motor.

9. Drive means as claimed in any one of the preceding claims, further comprising steering means.

10. Drive means as claimed in any one of the preceding claims, further comprising means for causing the propeller to provide reverse thrust.

11. Drive means as claimed in any one of the preceding claims, wherein the keel portion is made from fibre-glass.

12. Drive means as claimed in any one of the preceding claims, wherein the keel portion has an upper keel portion which can be adapted to the shape of the hull of the boat to facilitate attachment thereto.

13. Drive means as claimed in claim 12, wherein a transverse sealing member is provided inside the cavity below the upper portion and above the motor and propeller shaft.

14. Drive means as claimed in claim 13, wherein at least one sealable access port is provided in the transverse sealing member.
15. Drive means for a boat substantially as hereinbefore described with reference to the accompanying drawings. 5
16. A boat incorporating drive means according to any one of the preceding claims. 10
17. A boat as claimed in claim 16, wherein the said keel portion is the only keel portion provided.
18. A boat as claimed in claim 16, wherein the said keel portion is provided in addition to at least one further keel portion. 15
19. A boat having a hull, a keel portion, a propeller, a propeller shaft and a motor for driving the propeller shaft, the keel portion defining a cavity and the motor and at least part of the propeller shaft being housed within the cavity, wherein the motor has flexible connectors for connection to an engine or power pack whose position with respect to the motor can be selected or adjusted within the hull whilst remaining connected to the motor. 20 25
20. A boat as claimed in claim 19, wherein the keel portion is formed integrally with the hull of the boat. 30
21. A boat as claimed in claim 19 or 20, further incorporating one or more of the features of claims 2 to 10. 35
22. A boat as claimed in any one of claims 19 to 21, wherein a transverse sealing member is provided inside the cavity above the motor and propeller shaft. 40
23. A boat as claimed in claim 22, wherein at least one sealable access port is provided in the transverse sealing member.
24. A boat substantially as hereinbefore described with reference to the accompanying drawings. 45
25. A method of converting an existing boat into a boat according to any one of claims 16 to 18, comprising the steps of forming an aperture in the hull of the boat corresponding to the shape of the keel portion, adapting the keel portion to the shape of the hull, and attaching the keel portion to the hull so as to close and seal the aperture. 50 55
26. A method substantially as hereinbefore described with reference to the accompanying drawings.

