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(54) IMPROVEMENTS IN OR RELATING TO CARGO-CARRYING AND/OR PASSENGER CARRYING VESSELS

(71) We, VICKERS LIMITED, a British Company, of Vickers House, Millbank Tower, Millbank, London, S.W.1, and REUBEN MURPHY GAINSLEY, known as REUBEN MURPHY G., a citizen of the United States of America, of 9 Clifford Street, London, W.1, formerly of 45 Matlock Court, Kensington Park Road, London, W.11, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to marine vessels incorporating a cargo and/or passenger carrying hull with a detachable propulsion unit provided at the after end thereof.

According to the present invention there is provided a marine vessel comprising in combination a cargo-carrying and/or passenger carrying hull and a propulsion unit attached or attachable to the after end of the hull, in which the propulsion unit has a forward end that tapers forwardly and inwardly symmetrically towards its centre line and upwardly and forwardly from the bottom in a swim head, the hull having a correspondingly tapered recess providing a seating adapted to enter into wedging engagement with said forward end and the hull at its after end having tongues at each side terminating in tapered shoulders for mating engagement with corresponding cavities in the sides of the propulsion unit, means being provided for locking the swim head in said recess with the shoulders in their respective cavities so as to provide a wedging action in both vertical and lateral planes.

For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a longitudinal section through a marine vessel in accordance with one embodiment of the invention;

Figure 2 is a plan view of the embodiment shown in Figure 1;

Figure 3 is an enlarged section along the line III—III of Figure 2;

Figure 4 is an enlarged section along the line IV—IV of Figure 2;

Figure 5 is an enlarged schematic elevation of a detail of Figure 1;

Figure 6 is a plan view of the detail shown in Figure 5;

Figure 7 is an enlarged section along the line VII—VII indicated in Figures 1 and 8;

Figure 8 is an enlarged view of a detail of Figure 1,

Figure 9 is an enlarged schematic elevation of the after end of a cargo vessel of the invention,

Figure 10 is a part-section taken along the line X—X of Figure 9,

Figure 11 is a section along the line XI—XI indicated in Figures 9 and 10,

Figure 12 shows, on an enlarged scale, a detail of Figure 9,

Figure 13 is a plan view of the detail shown in Figure 12,

Figure 14 is a view similar to Figure 12 showing a modification of a detail of Figure 9,

Figure 15 is a view similar to Figure 12 showing a further modification of a detail of Figure 9, and

Figure 16 shows a modification of a detail of Figure 15.

Referring now to the drawings, Figures 1 and 2 show a marine vessel in the form of an ocean-going barge comprising a cargo-carrying hull 1 with a propulsion unit 2 detach-

ably secured to the after end thereof. The cargo-carrying hull extends aft from the vessel's bows 3 and, as shown in the drawings, defines a plurality of holds 4 having access hatches 5 and loading derricks 6. The propulsion unit 2, which in Figures 1 and 2 is shown attached to (or "plugged-in" to) the after end of the hull 1, is shown in greater detail in Figures 5 and 6. This propulsion unit 2 contains the propulsion machinery (not shown) for the vessel and is provided with a bridge 7 incorporating a wheel house 8, crew's quarters 9, steering gear 10 and all the sundry radio and navigation equipment normally provided in a sea-going vessel. Moreover, since the propulsion unit is capable of making short passages alone, some fuel tanks (not shown) will be incorporated in the unit. However, the main fuel tanks (not shown) of the vessel are provided at convenient locations in the hull 1.

As stated hereinbefore, the propulsion unit 2 is attached or "plugged-in" to the after end of the hull 1. For this purpose, the forward end 11 of the unit 2 is tapered symmetrically each side of the vessel's centre line as shown in Figures 2 and 6, tapering inwardly and forwardly in vertical planes and, as shown in Figures 1 and 5, it also inclines upwardly and forwardly from the bottom in a swimhead. The after end 12 of the hull 1 terminates in a mating substantially V-shaped cavity providing a seating 13. The after end 12 of the hull 1 has port and starboard tongues 12′ and 12″ extending after to flank the seating 13 with their inboard surfaces in vertical planes and with under surfaces sloping aft and upwardly. The sides of the propulsion unit 2 have corresponding cavities providing seatings for the tongues, the starboard seating being indicated by 17 in Figure 5. Three tapered shoulders 14, 15 and 16 project from the tongues 12′ and 12″ and from the forward end 11 respectively and mating V-shaped recesses are provided in the cavities to receive them. The shoulders and recesses also have surfaces inclined to the horizontal so that when the hull 1 and the propulsion unit 2 are locked together there are extensive areas spread over a substantial distance longitudinally of the vessel that are wedged together to resist hogging and sagging. It will be seen from Figure 1 that the elevational profile of the forward end 11 and its shoulder 16 is similar, though not identical, to that of the tongues 12′ and 12″ and their shoulders 14 and 15. The inward taper of the forward end 11 is continued by the sides of the shoulder 16 and the central recess 18 in the seating 13 which receives that shoulder is correspondingly shaped. There are power-operated means for drawing the shoulders in to the co-operating seatings and for locking these shoulders in position. These will be described in more detail later.

In order to avoid direct contact between steel plates, which could give rise to dangerous chafe, to prevent distortion of the surfaces in contact by providing some compressibility, to make for an easy wedging action and to enable a rigid interlock to be achieved when the hull 1 and propulsion unit 2 are drawn together by power-operated means, the hull 1 and/or the propulsion unit 2 have linings or facings of a suitable material on each said mating surface. As shown in Figures 7 and 8, a plurality of baulks of greenheart timber 19 or rubber fenders, for example, are secured by bolts or like means (not shown) in longitudinal aligned relationship on each surface of the hull which mates with a co-operating surface of the propulsion unit 2. As shown in Figure 7, each said co-operating surface of the hull 1 is channelled with greenheart baulks secured on the ridges or crests between adjacent channels. In this manner longitudinal gaps or channels 20 are defined at each mating surface and the dimensions of these gaps are such that a skin diver may pass therethrough to determine that no driftwood or other debris interferes with the mating propulsion unit and hull surfaces before said propulsion unit and hull are locked together. The channels also provide means for access to the bearing surfaces to facilitate initial shaping and fit during construction, and similarly when replacing baulks 19 after damage or wear. It will be understood that in an alternative arrangement it is the propulsion unit 2 that is provided with the channels 20 and the greenheart baulks 19.

As diagrammatically shown in Figure 8, a locking device 21 is located at the centre line of the vessel for locking said propulsion unit and hull together and in the remaining Figures these locking devices are shown in more detail. Each device also serves to draw the tapered shoulders into the mating seatings therefor. Each tapered shoulder is extended by a pin or bolt-like element such as is shown in Figures 9 and 12 in which the shoulder 14 has a pin 22 welded or otherwise secured thereto. This pin 22 projects through an aperture 23 defined in the base of the V-shaped seating 17 for accommodating the shoulder 14 and has a slot 24 therein dimensioned to receive a heavy tightening and locking wedge 25. Two cams 26 controllable by hydraulic piston and cylinder assemblies 27 are pivotally mounted within the propulsion unit to control downward tightening and locking movement of the wedge 25 and further piston and cylinder assemblies 28 are similarly carried by the propulsion unit and are arranged one on each side of the wedge 25 in such manner that the pistons thereof engage laterally projecting flanges 29 which are integral with said wedge. These piston and cylinder assemblies 28 are operable to re-

lease the locked co-operating shoulders and seatings when it is desired to separate the propulsion unit 2 from the hull 1. For this purpose it is merely sufficient to retract the pistons of the piston and cylinder assemblies 27 to permit free pivotal movement of the cams 26 and to actuate the piston and cylinder assemblies 28 to cause the pistons thereof to move upwardly and raise the wedge 25 out of the slot 24. When the wedge is clear of this slot to permit longitudinal displacement of the pin 22, a further hydraulically controlled piston and cylinder assembly 30 carried by the propulsion unit is actuated to eject the pin 22 therefrom and hence displace the tapered shoulders 14 and 15 outwardly from mating engagement in the co-operating seatings.

With the above-described tightening and locking arrangement, when it is desired to attach the propulsion unit 2 to the after end of the hull 1, said propulsion unit is aligned with the V-shaped recess 13, and is moved slowly in towards the assembled operative position. When the unit 2 and hull 1 are correctly aligned and any interposed undesirable driftwood or debris has been removed by sending a skin diver down the channels 20, the wedges 25 are dropped into the slots 24 in the pins 22. As stated hereinbefore, each of the tapered shoulders 14 and 15 is provided with a wedge controlled locking device and, if desired, the tapered shoulder 16 may also be provided with a similar locking device incorporating a pin carried by the propulsion unit 2 to co-operate with wedges and hydraulic control piston and cylinder assemblies mounted within and carried by the hull 1.

Referring now specifically to Figure 12, which shows the locking device associated with the shoulder 14, the piston and cylinder assemblies 27 are then actuated to displace the pistons outwardly forcibly to rotate the cams 26 and urge the wedge 25 downwards into the slot 24. This, in turn, will draw the shoulder into the co-operating seating until the desired optimum position is attained. By maintaining pressure in the piston and cylinder assemblies 27, the cams 26 are firmly held in position and the wedge 25 is thus locked with the drawn-in propulsion unit and hull in the operative ocean-going position. The locking devices associated with the other shoulders are simultaneously similarly operated.

When it is desired to separate the propulsion unit from the hull 1, it is simply necessary to relieve the pressure from the piston and cylinder assemblies 27 of each locking devices, to actuate the piston and cylinder assemblies 28 until the wedges 25 are lifted clear of the slots 24 in the pins 22, and then to actuate the piston and cylinder assemblies 30 to eject said pins 22 in the manner described hereinabove. It is always necessary forcibly to eject the tapered shoulders from the seatings therefore since after a long sea voyage, during which the vessel has probably travelled several thousand miles, said shoulders are jammed and firmly wedged in the seatings.

Figure 14 shows an alternative device for drawing the tapered shoulder 16 in to the seating 18 therefor and for locking this shoulder in the desired operative position. Similar alternative devices may also be arranged to draw and lock the shoulders 14 and 15 in the respective associated seatings. In Figure 14, a screw-threaded shaft 31 is longitudinally displaceable within the shoulder and projects through an aperture in the leading end thereof. This shaft 31 is guidedly carried by a bearing in the form of a trolley 32 displaceable by rollers 33 along rails 34 carried by support means 35 within the shoulder 16. The end of the shaft 31 remote from the trolley 32 has a slot 36 extending therethrough to receive a cotter pin 37 and the shaft is slidably supported intermediate the ends thereof in bearings 40 mounted in the leading end wall of the shoulder.

When this alternative device is employed to draw the shoulder 16 into the seating 18 therefor, the propulsion unit 2 is manoeuvred into position astern of the hull 1 and advances to enter the shoulder into the seating. On advance of this shoulder into the seating the slotted end of the shaft 31 projects through an aperture in the bottom of the seating 18 and the cotter pin 37 is dropped into the slot 36 behind the seating bottom. A stop 38 is provided to prevent movement of said cotter pin right through the slot 36 and fixed surfaces 38a are provided for the cotter pin 37 to bear against during the separating of the propulsion unit and hull, as described in more detail below. Thereafter, aligned clamping of the shoulder within the seating is effected by moving the shaft 31 rearwardly to draw the retained cotter pin into locking engagement with the underside of the seating bottom. This rearward movement of the shaft 31 is effected by rotating a nut 39 which is screw-threadedly mounted thereon and for this purpose a driving pinion 41 meshes with said nut 39. During rearward movement of the shaft 31 as aforesaid, the nut 39 bears against the leading end wall of the shoulder and remains bearing against this end wall to lock the shoulder in the seating. In Figure 14 a gap has been left between the nut and end wall for clarity. During forward movement of the shaft 31, the nut bears against an annular bearing surface 41a rigidly supported within the shoulder 16.

When it is desired to separate the propulsion unit from the hull 1 the pinion 41 is simply rotated in the opposite direction,

which causes the nut 39 to move a very short distance along the shaft 31, still meshing with the pinion 41, until it meets the annular bearing surface 41a. Continued rotation of the pinion 41 in this opposite direction will move the pin 31 further out from the leading end wall of the shoulder until the cotter pin 37 bears against the fixed surfaces 38a, and still further rotation will cause the shoulder 16 to be forced away from the seating 18. Instead of having fixed surfaces 38a for the cotter pin 37 to bear against, the end of the shaft 31 itself could bear on a fixed surface below the seating 18.

In the devices described with reference to Figures 9 to 14, the or each wedge 25 and cotter pin 37 are necessarily both large and very heavy. It is therefore necessary to provide a block and tackle arrangement and/or hydraulically operated means for initially raising and lowering the or each said wedge and cotter pin into and out of aligned engagement with the slots therefor.

Figure 15 shows a further device for drawing the tapered shoulder 16 into the seating 18 and, like the arrangement shown in Figure 14, incorporates a screw - threaded shaft. In the device shown in Figure 15, however, a shaft 42 is journalled in a bearing 47 and is additionally supported by spring-loaded bearings 49. This shaft 42, which has a screw-threaded portion 43 at one end thereof and a splined portion 44 at the opposite end, is rotatable by a pinion 45 keyed on said splined portion 44 and meshing with a worm 46. The splined portion 44 of the shaft 42 permits longitudinal displacement of said shaft whilst still retaining the pinion in mesh with the worm 46.

As shown in Figure 15, the screw-threaded portion 43 of the shaft 42 engages in a non-rotatable spherical seating 50 which is held against longitudinal movement in a bearing 48. With this arrangement rotation of the shaft 42 will displace the bearing 47, which accommodates said shaft 42 through the intermediary of a part-spherical collar 51 secured thereto, either towards or away from the bearing 48 depending upon the direction of rotation of said shaft 42. For this purpose, the bearing 47 is slidably mounted on rails 52 and can be clamped thereto to prevent relative displacement therebetween at any desired location and, with the bearing 47 clamped in this manner to said rails 52 (which rails are, in turn, rigidly supported within the shoulder 16), rotation of the shaft 42 will move the shoulder 16 into or out of a locked position within the seating 18. Thus, in order to attach the propulsion unit to the hull part the shoulder 16 is introduced into the seating 18 with the shaft 42 withdrawn completely within said shoulder 16 and supported at one end by the bearing 47 and at the other end by the bearing 49. The shaft is then advanced towards the threaded seating 50 by moving the bearing 47 to the right along the rails 52. During this advance, the right-hand end of the shaft 42 will align itself with the seating 50 by virtue of the conical end of said shaft 42 locating within seating 50, the spring-loading of the bearings 49 and the spherical housing within the bearing 47 permitting the necessary degree of lateral movement. Thereafter, the shaft 42 is rotated a few turns by means of the worm and pinion gearing 45, 46 to engage the screw-threaded portion 43 within the seating 50, whereupon the bearing 47 is clamped to the rails 52 and further rotation of the shaft 42 pulls the tapered shoulder 16 into firmly bedded contact with seating 18.

Finally, Figure 16 shows a modification of a detail of Figure 15 in which the shaft 42 is freely rotatable within the collar 51. In this modification, the bearing 47 is firmly held within the shoulder 16 and rails for this bearing are unnecessary. Furthermore the collar 51 can be clamped by means (not shown) to the shaft 42 when it is desired to draw the shoulder 16 into the seating 18 therefor by rotation of said shaft 42.

In the device illustrated in Figures 15 and 16, the assembly incorporating the bearing 47, rails 52 (where appropriate) and driving pinion 45 is advantageously immersed in an oil bath to facilitate operation thereof. Moreover, these devices could equally well be employed to draw the tapered shoulders 14 and 15 into their respective seatings.

If the cargo vessel hull 1 and propulsion unit 2 are of standard dimensions, one such propulsion unit may be used in conjunction with any number of correspondingly dimensioned hull units. Thus, ideally, whilst one hull unit is being loaded in a first port, a second similar hull unit can be being unloaded in a second port whilst the propulsion unit is ferrying a third hull unit either loaded or unloaded between the two ports. This considerably reduces the turn-round time of a loaded vessel since, for example, the propulsion unit on arriving at the second port with a loaded hull can, either before or during unloading of said hull, relatively quickly be detached therefrom and attached to an already unloaded hull immediately to ferry this unloaded hull back to the first port. For this purpose the propulsion unit can, as stated hereinbefore, make short passages without a hull between docks in order that having been detached from one hull it may travel to a further dock to be attached to another.

The shoulders 14, 15 and 16 are tapered not only to facilitate introduction into the respective seatings but also to transmit both thrust and shear forces between an attached hull and propulsion unit.

Although a cargo vessel of the invention is primarily intended for transporting bulk cargo and aims at reducing the turn-round time of such a vessel in port, it may, of course, be used to transport liquid cargo in which case the holds 4 are replaced by liquid-carrying tanks.

It will be understood that instead of a single cargo-carrying hull there could be a number of hull sections interlockable end-to-end with only the foremost hull section formed with a normally shaped bow. The other sections would be formed with shoulders and seatings as described above. Thus on arrival at a port the vessel could unplug one or more sections to be loaded or unloaded at that port, be re-plugged together as necessary with or without the addition of new hull sections from that port, and continue to a further port.

It will also be understood that although the specification refers to cargo vessels throughout, it is intended to embrace exclusively passenger or mixed passenger and cargo carrying vessels, for example car ferries.

WHAT WE CLAIM IS:—

1. A marine vessel comprising in combination a cargo-carrying and/or passenger carrying hull and a propulsion unit attached or attachable to the after end of the hull, in which the propulsion unit has a forward end that tapers forwardly and inwardly symmetrically towards its centre line and upwardly and forwardly from the bottom in a swim head, the hull having a correspondingly tapered recess providing a seating adapted to enter into wedging engagement with said forward end and the hull at its after end having tongues at each side terminating in tapered shoulders for mating engagement with corresponding cavities in the sides of the propulsion unit, means being provided for locking the swim head in said recess with the shoulders in their respective cavities so as to provide a wedging action in both vertical and lateral planes.

2. A marine vessel as claimed in claim 1 wherein a shoulder on the forward extremity of the forward end of the propulsion unit continues the lateral taper of said forward end and also tapers in planes inclined to the horizontal, the hull being formed with a corresponding seating.

3. A marine vessel as claimed in either one of claims 1 and 2 wherein the mating surfaces of the propulsion unit and the cargo-carrying hull are ribbed to provide access channels therebetween.

4. A marine vessel as claimed in claim 3 wherein the ribs include baulks of greenheart timber.

5. A marine vessel as claimed in any preceding claim wherein there are co-operating means on or projecting from corresponding shoulders and seatings for engaging and drawing the hull and propulsion unit together.

6. A marine vessel as claimed in any preceding claim wherein the locking means are located at the extremities of the shoulders and at the bottoms of the corresponding seatings.

7. A marine vessel as claimed in claim 6 as appendant to claim 5 wherein the locking means are combined with the means for drawing the hull and the propulsion unit together.

8. A vessel as claimed in claim 7 wherein a drawing and locking means includes a pin with a slot near its free end secured to and projecting from the extremity of the associated shoulder, the bottom of the corresponding seating having an aperture for receiving said pin, a wedge arranged beyond the aperture, means for forcing the wedge into said slot when the propulsion unit is mated with the hull, the wedging action being to draw said unit and said hull tightly together, and means for locking the wedge in position in the slot.

9. A marine vessel as claimed in claim 8 wherein said means for forcing the wedge into said said slot are hydraulic.

10. A machine vessel as claimed in either one of claims 8 and 9 wherein the locking means include hydraulically actuated cam means that co-operate with said wedge.

11. A marine vessel as claimed in claim 8, 9 or 10 and further comprising hydraulic means for acting on the end of said pin to assist separating the hull and the propulsion unit when the drawing and locking means are disengaged.

12. A marine vessel as claimed in claim 7 wherein a drawing and locking means includes a pin movably mounted in the associated shoulder to project a controlled amount from the extremity of that shoulder, the bottom of the corresponding seating having an aperture for receiving said pin, means beyond said aperture for holding the free end of said pin, and means for moving the pin outwardly, to project through the associated aperture when the propulsion unit is mated with the hull, and inwardly, to withdraw the pin and hence draw the propulsion unit and the hull tightly together when the end of the pin is held.

13. A marine vessel as claimed in claim 12 wherein the means for moving the pin includes a nut mounted on a screw-threaded portion of the pin, means for rotating the nut and stops for preventing axial movement of the nut.

14. A marine vessel as claimed in either one of claims 12 and 13 wherein the holding means includes a cotter pin engageable in a slot near the end of the movable pin.

15. A marine vessel as claimed in claim 7 wherein a drawing and locking means includes a shaft movably mounted in the asso-

Although a cargo vessel of the invention is primarily intended for transporting bulk cargo and aims at reducing the turn-round time of such a vessel in port, it may, of course, be used to transport liquid cargo in which case the holds 4 are replaced by liquid-carrying tanks.

It will be understood that instead of a single cargo-carrying hull there could be a number of hull sections interlockable end-to-end with only the foremost hull section formed with a normally shaped bow. The other sections would be formed with shoulders and seatings as described above. Thus on arrival at a port the vessel could unplug one or more sections to be loaded or unloaded at that port, be re-plugged together as necessary with or without the addition of new hull sections from that port, and continue to a further port.

It will also be understood that although the specification refers to cargo vessels throughout, it is intended to embrace exclusively passenger or mixed passenger and cargo carrying vessels, for example car ferries.

WHAT WE CLAIM IS:—

1. A marine vessel comprising in combination a cargo-carrying and/or passenger carrying hull and a propulsion unit attached or attachable to the after end of the hull, in which the propulsion unit has a forward end that tapers forwardly and inwardly symmetrically towards its centre line and upwardly and forwardly from the bottom in a swim head, the hull having a correspondingly tapered recess providing a seating adapted to enter into wedging engagement with said forward end and the hull at its after end having tongues at each side terminating in tapered shoulders for mating engagement with corresponding cavities in the sides of the propulsion unit, means being provided for locking the swim head in said recess with the shoulders in their respective cavities so as to provide a wedging action in both vertical and lateral planes.

2. A marine vessel as claimed in claim 1 wherein a shoulder on the forward extremity of the forward end of the propulsion unit continues the lateral taper of said forward end and also tapers in planes inclined to the horizontal, the hull being formed with a corresponding seating.

3. A marine vessel as claimed in either one of claims 1 and 2 wherein the mating surfaces of the propulsion unit and the cargo-carrying hull are ribbed to provide access channels therebetween.

4. A marine vessel as claimed in claim 3 wherein the ribs include baulks of greenheart timber.

5. A marine vessel as claimed in any preceding claim wherein there are co-operating means on or projecting from corresponding shoulders and seatings for engaging and drawing the hull and propulsion unit together.

6. A marine vessel as claimed in any preceding claim wherein the locking means are located at the extremities of the shoulders and at the bottoms of the corresponding seatings.

7. A marine vessel as claimed in claim 6 as appendant to claim 5 wherein the locking means are combined with the means for drawing the hull and the propulsion unit together.

8. A vessel as claimed in claim 7 wherein a drawing and locking means includes a pin with a slot near its free end secured to and projecting from the extremity of the associated shoulder, the bottom of the corresponding seating having an aperture for receiving said pin, a wedge arranged beyond the aperture, means for forcing the wedge into said slot when the propulsion unit is mated with the hull, the wedging action being to draw said unit and said hull tightly together, and means for locking the wedge in position in the slot.

9. A marine vessel as claimed in claim 8 wherein said means for forcing the wedge into said said slot are hydraulic.

10. A machine vessel as claimed in either one of claims 8 and 9 wherein the locking means include hydraulically actuated cam means that co-operate with said wedge.

11. A marine vessel as claimed in claim 8, 9 or 10 and further comprising hydraulic means for acting on the end of said pin to assist separating the hull and the propulsion unit when the drawing and locking means are disengaged.

12. A marine vessel as claimed in claim 7 wherein a drawing and locking means includes a pin movably mounted in the associated shoulder to project a controlled amount from the extremity of that shoulder, the bottom of the corresponding seating having an aperture for receiving said pin, means beyond said aperture for holding the free end of said pin, and means for moving the pin outwardly, to project through the associated aperture when the propulsion unit is mated with the hull, and inwardly, to withdraw the pin and hence draw the propulsion unit and the hull tightly together when the end of the pin is held.

13. A marine vessel as claimed in claim 12 wherein the means for moving the pin includes a nut mounted on a screw-threaded portion of the pin, means for rotating the nut and stops for preventing axial movement of the nut.

14. A marine vessel as claimed in either one of claims 12 and 13 wherein the holding means includes a cotter pin engageable in a slot near the end of the movable pin.

15. A marine vessel as claimed in claim 7 wherein a drawing and locking means includes a shaft movably mounted in the asso-

ciated shoulder to project a controlled amount from the extremity of that shoulder, the bottom of the corresponding seating having a screw-threaded aperture for receiving a corresponding screw-threaded portion on the free end of said shaft, there being means for rotating said shaft and means for holding said shaft in an axially stationary position projecting from said shoulder, rotation of the shaft in this position when the propulsion unit is mated with the hull and with the screwthreaded portions engaged drawing the propulsion unit and the hull tightly together.

16. A marine vessel as claimed in claim 15 wherein the shaft is mounted in an axially movable and lockable bearing, which when locked will hold the shaft axially stationary while permitting rotation.

17. A marine vessel as claimed in claim 16 wherein the shaft has a collar lockable thereon, the collar being mounted in a fixed bear ing whereby when the collar is not locked to the shaft the latter can be moved axially and when the collar is locked to the shaft axial movement, but not rotational movement, of the shaft is prevented.

18. A marine vessel as claimed in claim 15, 16 or 17 wherein the rotating means includes a gear mounted on splines on said shaft to permit axial movement of the latter with respect to the gears.

19. A marine vessel as claimed in any preceding claim wherein the forward end of the hull is formed in the same manner as the forward end of the propulsion unit, whereby further similar hulls can be interlocked ent-to-end forward of the propulsion unit.

20. A marine vessel as claimed in claim 19 wherein there is a plurality of interlockable hulls, the foremost one being formed with a conventional bow.

21. A cargo-carrying and/or passenger carrying marine vessel substantially as hereinbefore described with reference to Figures 1—8 with Figures 9—13 or with Figure 14, 15 or 16 of the accompanying drawings.

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