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(54) Fast multiple hull vessel with variable relative hull position

(57) Multiple modular fast hull, including a central hull and two lateral hulls, connected to said central hull by means of movable constraint means, said constraint means allowing the variation in the relative position of the lateral hulls in relation to the central hull.

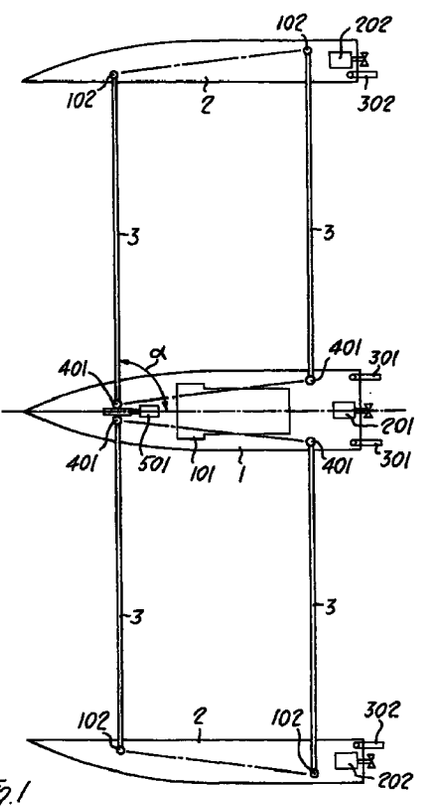

Fig.1

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Description

[0001] The present invention relates to hulls for all kinds of crafts, and particularly relates to a multiple modular fast hull.

[0002] In the planning of fast hulls, it often happens that the most suitable bottom shapes and the best distribution of loads and propellers for the development of the highest speed, contrast with the common requirements of stability and seakeeping of boats.

[0003] The boats which are able to resist the highest speeds have been conceived for long with two- or three-point hulls, that is, the structures designated as catamaran or trimaran. Among the three-point boats, those with the two lateral points towards the prow are usually preferred, thanks to their greater stability, whereas the structures with lateral points astern allow higher speed. Generally speaking, both the structures result from a mediation between needs of stability, manoeuvrability and comfort for the crew on one side, and high performances from the point of view of speed on the other; the obtained result is seldom optimal from both points of view.

[0004] A further disadvantage for such crafts is constituted by the difficult road-transportability, substantially due to the bulky transverse dimensions of said multiple hulls, which have to face the rather strict limits imposed for the transport; as a matter of fact, the maximum width tolerated is about 3.2m. It is evident that such limitation makes the planning of such multiple hulls even more difficult, reducing, moreover, the possibility of fitting for propulsion engines.

[0005] The present invention aims at planning a multiple modular fast hull which can give the best performances in the most varied navigation conditions and, moreover, which occupies a relatively limited space, above all as far as the road transport operations are concerned.

[0006] The object of the present invention, therefore, is a multiple modular fast hull, characterised in that it includes a central hull and two lateral hulls, which are connected to said central hull by means of movable constraint means, said constraint means being able to allow the variation in the relative positioning of the lateral hulls in relation to the central hull.

[0007] In an unique execution form of the invention, said constraint means include an articulated parallelogram connection for each of said lateral hulls, including two arms connected to their own ends by means of pivot pins, which are placed on each of said lateral hulls and on the central hull, some adjustment means of the angle formed between said arms and the longitudinal axis of the central hull being provided.

[0008] In another execution form said lateral hulls are asymmetrical planing hulls, while said central hull is a symmetrical planing hull. Furthermore, the propulsion of the multiple hull can be distributed only in the central hull, only in the lateral. hulls or, preferably, in the three hulls. The crew and the navigation equipment are housed in the superstructure placed in the central hull, whereas the steering systems can be positioned both in the central hull and on the three hulls.

[0009] More advantages and features of the present invention will become evident from the following description of an execution form of the same, which is carried out as a mere, non-limiting example, with reference to the enclosed drawings, where:

Figure 1 is a schematic plan view of a multiple hull according to the present invention, in one of the possible configurations which said hull can be shaped into;

Figure 2 shows a schematic plan of a second configuration which said multiple hull can be shaped into;

Figures 3 to 6 are schematic plan views of other possible configurations the hull can be shaped into according to the present invention; and

Figure 7 is a plane view of a detail of the central hull of the multiple hull according to the present invention.

[0010] Figure 1 shows a boat equipped with the multiple hull according to the invention; the numeral 1 indicates the central hull. The aforesaid central hull is a symmetrical planing hull, which can be carried out in different shapes and with different materials. On said hull the superstructure 101 is placed, whose purpose is the housing of the instruments necessary to the navigation and for the crew of the boat. The hull 1, moreover, is equipped with the propeller 201 and of the steering means of the boat, in the present case the two helms 301. The central hull 1 is connected to the two lateral hulls 2, which are asymmetrical planing hulls, and, in particular, they are formed in such a way that the dimensions of each of them correspond to one half, on the longitudinal axis, of the central hull 1. The lateral hulls 2, moreover, are equipped with propellers 202 and with helms 302 as well.

[0011] The means which connect the two lateral hulls 2 to the central hull 1 include two pairs of arms 3, placed so as to form an articulated parallelogram connection between the central hull 1 and each of the lateral hulls 2. As a matter of fact, the arms 3 of the two pairs are parallel each other, and each arm is connected to its ends by means of two pivot pins, 401 on the central hull and 102 on the lateral hulls, said pivot pins being placed so as to define the articulated parallelogram system. One can notice that the line connecting the pins 401, turned towards each of the two lateral hulls, is parallel to the line connecting the two pins 102 of the respective lateral hull 2.

[0012] In Figure 1 the lateral hulls 2 are placed in the position where the angle a between the arms 3 and the longitudinal axis of the central hull equals 90°C, and, therefore, the width of the multiple hull is at its maxi-

mum. In the same position of the two pins 401 placed towards the prow, the adjustment means of the angle α are provided, said means including a hydraulic jack 501.

[0013] Figure 2 shows a particular configuration, which can be used during the road transport and which the hull can be shaped into according to the invention; In this case, the two lateral hulls 2 are substantially brought into reciprocal contact and the angle a is therefore of 180°. Figures 3 to 6 show, as an example, several configurations the hull can take according to the invention; such configurations substantially include the cases in which the two lateral hulls 2 are placed towards the prow in relation to the central hull 1, or astern of the same, more or less near the latter.

[0014] Figure 7 finally shows an enlarged detail of the central hull 1. The hydraulic jack 501 is equipped on its stem 511 with a rack 521 coupled with two cogwheels 411 fitted onto the pins 401 onto which the arms 3 are fitted. On its free end, the stem 511 of the jack 501 is supported by a stand 531.

[0015] The working of the multiple hull according to the present invention will become evident from what follows. The connection established between the lateral hulls 2 and the central hull by means of the arms 3, placed so as to form with the hulls mentioned before an articulated parallelogram coupling, makes it possible to modify the geometry of the hull. This possibility of variation of geometry makes it possible to face variations in the navigation conditions, such as variations in the sea and wind strength. Such variations can be carried out during the navigation, thanks to the adjustment means making it possible to change the angle between said arms 3 and the longitudinal axis of the central hull 1.

[0016] It will be then possible to go on with a configuration like the one shown in Figure 3, with the lateral hulls on the prow in relation to the central hull, such configuration being regarded as more stable and better manoeuvrable. Then it will be possible to change the structure in order to reach the position shown in figure 4, which makes it possible to achieve higher speeds. The two configurations shown in Figures 5 and 6 are substantially the same as in Figures 3 and 4, except that in both cases the distance between the central hull 1 and the lateral hulls 2 has been reduced. This type of device allows a higher speed of the craft but does not improve its stability. Such stability is actually at its highest in the configuration shown in Figure 1, however, such a structure is too sensitive to the rolling, thus making the navigation extremely unpleasant.

[0017] An advantage is that the hull can be shaped into the configuration shown in Figure 1, which does not show any efficiency as far as the navigation is concerned, but is extremely advantageous as far as the road transport of the hull is concerned, the latter thus occupying very little lateral space in comparison to its possibilities. Anyway, one has to bear in mind that the arms 3 can at any moment be disassembled and that the hulls can be carried separately one from the other.

[0018] As said before, the angle α between the arms 3 connecting the lateral hulls 2 to the central hull 1 can be adjusted with suitable adjustment means. Figure 7 shows one of the possible adjustment means; the rack 521 placed on the stem 511 of the hydraulic jack 501 makes it possible to change the position of the arms 3, said rack being coupled with the cogwheels 411 fitted onto the pins 401. As a principle, one just ought to operate one pair of pins, though adjustment systems where all the pins can be operated, if necessary, can also be provided. The jack can be operated directly from the pilot's seat on the craft. Moreover, though we have shown here the case which considers the simultaneous variation of the position of the two lateral hulls 2, the present invention may also consider the independent variation in the position of the two hulls, by using for instance two jacks, similarly to the one shown for operation respectively of the two pins 401. The advantage arising from this would consist in the possibility of compensation of any propulsive asymmetries due to possible breakdowns.

[0019] The arms 3 should preferably be made of a material elastic enough to absorb the vibrations endured by the lateral hulls as much as possible, so as to reduce the stresses in case of wavy sea.

[0020] As drawn schematically in Figure 1, the propellers can be favourably placed on the three hulls, thus saving space and increasing the manoeuvrability and the stability of the hull.

[0021] The steering devices 301 and 302 are shown in Figure 1 as they are placed on the three hulls, though they can also be provided only on the central hull.

[0022] The craft displacement can be almost equally distributed for the three hulls; preferably, about 50% of the displacement is left to the central hull, and the remaining part is equally divided between the lateral hulls. This kind of solution is particularly suitable for structures like those shown in the figures of the enclosed drawings, where the lateral hulls are essentially like the two halves of the longitudinally sectioned hull. The multiple hull so conceived allows the craft a greater adaptability to the environmental conditions, ensuring a stability which can be constantly checked and improved, also allowing the choice of shapes which are more suitable for high speeds. Moreover, with such a hull as the one according to the invention, the problem of road transport, which usually concerns multiple hulls, is very simply solved.

Claims

1. Multiple modular fast hull, characterised by the fact that it includes a central hull (1) and two lateral hulls (2), which are connected to said central hull by means of movable constraint means (3), said constraint means being able to allow the variation in the relative position of the lateral hulls in relation to the central hull.

2. Hull according to claim 1, characterised in that said constraint means include an articulated parallelogram connection for each of said lateral hulls (2), including two arms (3) connected to their own ends by means of pivot pins (401, 102) placed on each of said lateral hulls (2) and on the central hull (1), some adjustment means (501) of the angle (α) between said arms (3) and the longitudinal axis of the central hull (1) being provided.

3. Hull according to claim 2, where said adjustment means simultaneously operate on the arms (3) of both lateral hulls (2).

4. Hull according to claim 2, where said adjustment means independently operate on the arms (3) of each of the lateral hulls (2).

5. Hull according to claim 3, where said adjustment means include a jack (501) on whose stem a rack (521) is placed, coupled with two cogwheels (411) fitted onto the pivot pins (401) placed on the central hull and connected to said arms (3).

6. Hull according to any of the previous claims, characterised by the fact that the propulsive means (201, 202) are placed in the central hull (1) and in the lateral hulls (2).

7. Hull according to any of the previous claims, where the steering means are placed on the central hull (1) and on the lateral hulls (2).

8. Hull according to any of the previous claims, where the displacement is equally divided between the central hull (1) and the lateral hulls (2).

9. Hull according to any of the previous claims, where 50% of the displacement is left to the central hull (1) and the remaining part is divided between the two lateral hulls (2).

10. Hull according to any of the previous claims, where on the central hull (1) a superstructure (101) is placed, whose purpose is to house the crew and the navigation instruments.

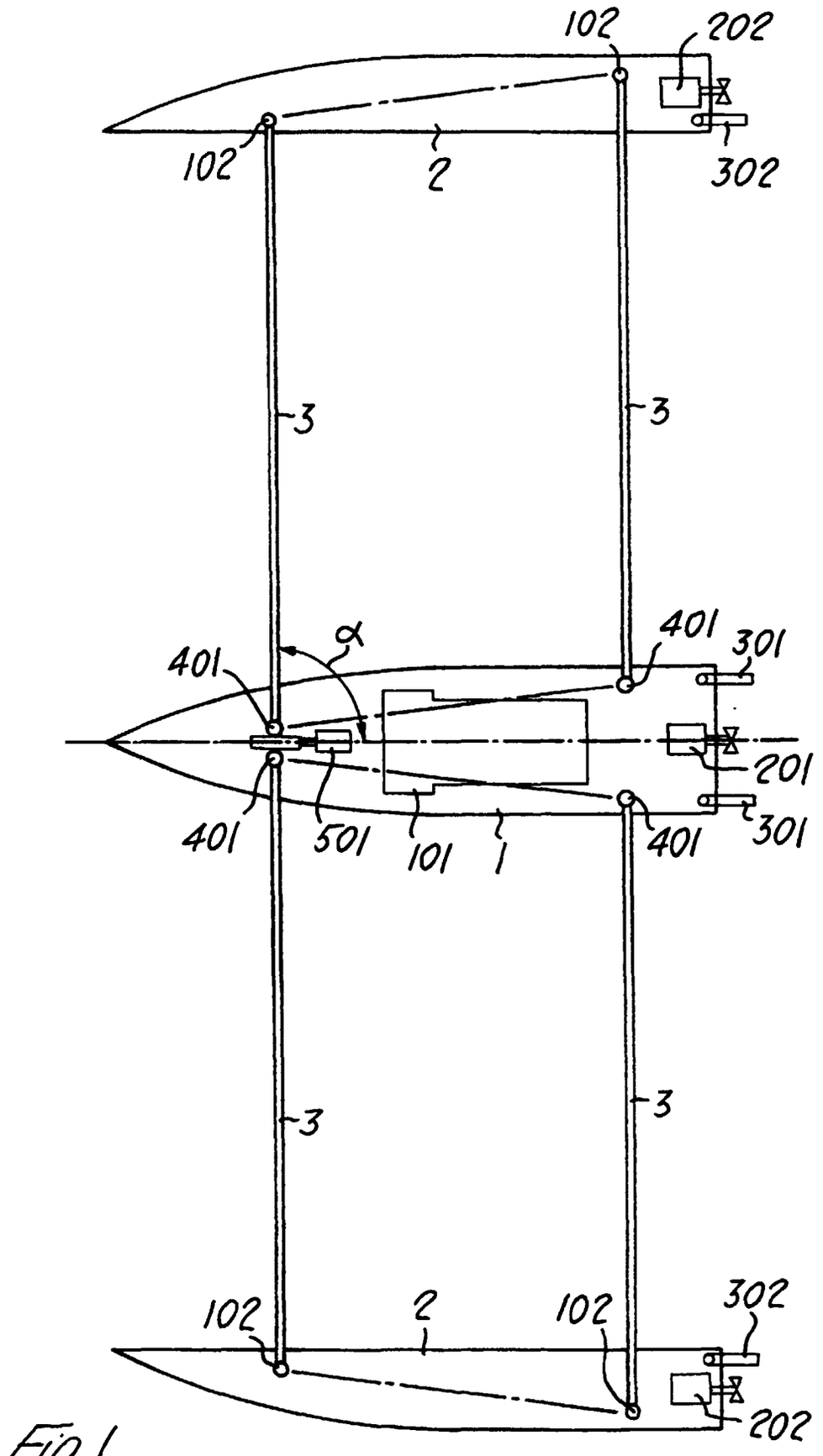
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Fig. 1

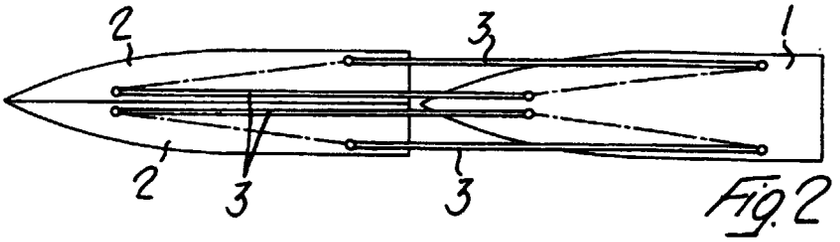

Fig.2

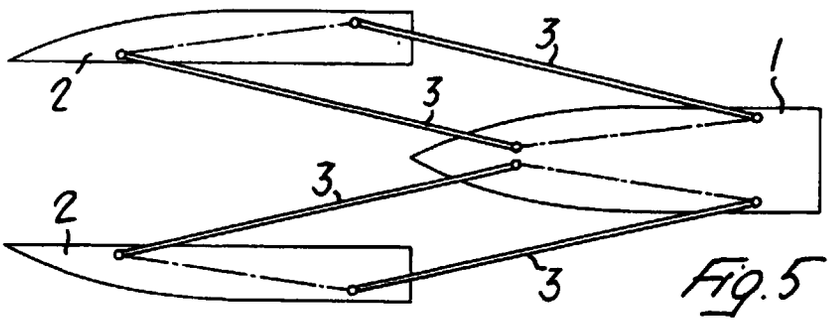

Fig.5

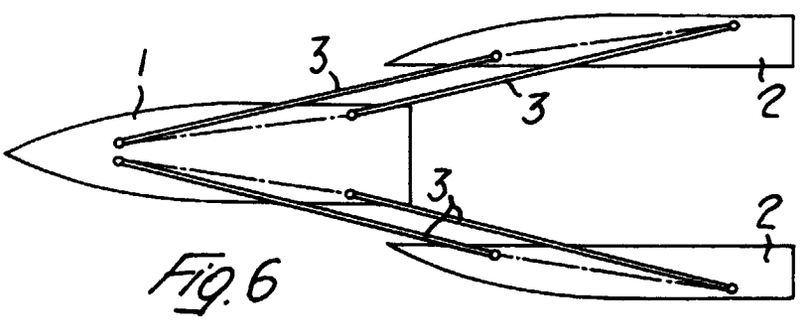

Fig.6

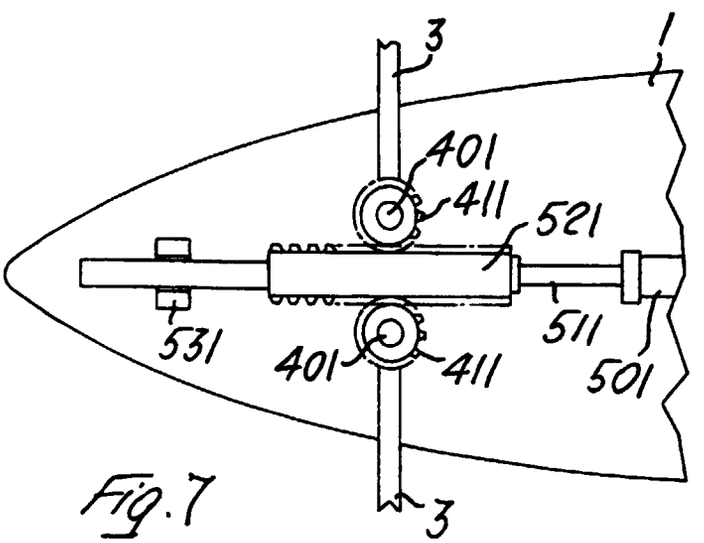

Fig.7

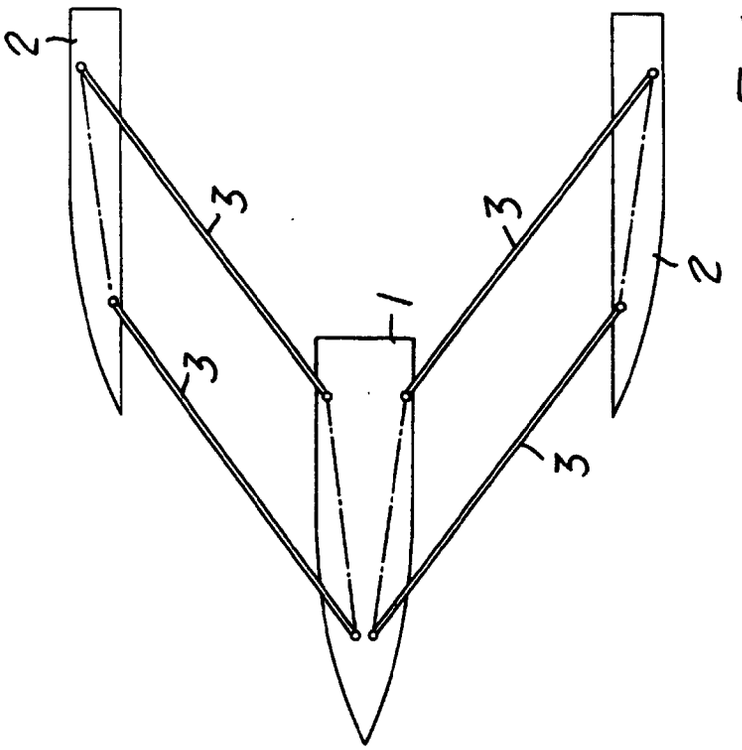

Fig.4

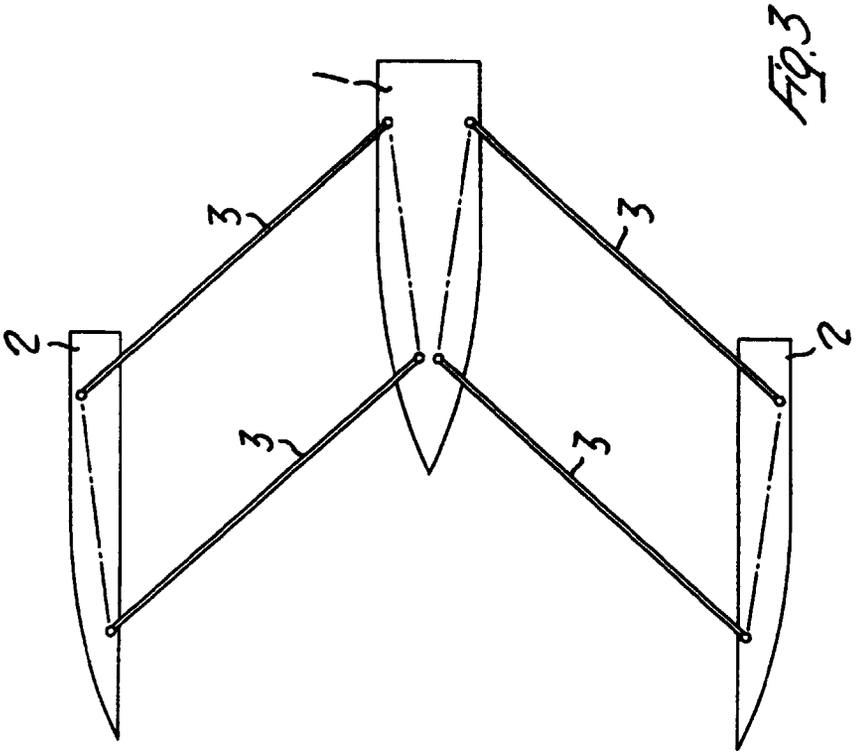

Fig.3