1,138,109

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,138,109

Inventors: ROMEO ROMANINI and CORRADO EGIDI

Date of Application and filing Complete Specification: 14 Aug., 1967.

No. 37297/67.

Complete Specification Published: 27 Dec., 1968.

Index at acceptance:—B7 A28; **B7** S26

Int. Cl.:—B 60 f 3/00

COMPLETE SPECIFICATION

Amphibious Vehicle

We, LANCIA & C. FABBRICA AUTOMOBILI-TORINO S.P.A., an Italian Company of 27 Via Vincenzo Lancia, Turin, Italy, 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 invention relates to amphibious vehicles of the type wherein the body which forms the hull is so constructed and dimensioned as to provide the buoyancy necessary to support the weight of the vehicle when carrying its maximum admissible load.

An object of the invention is to avoid immersion of the prow when such a vehicle runs down hill to enter the water.

A further object of the invention is to avoid undesired tilting of the vehicle when it is floating in rough water and/or when its loads are unsatisfactorily distributed.

Accordingly, the present invention consists in an amphibious vehicle of the type wherein the body which forms the hull is so constructed and dimensioned as to provide the buoyancy necessary to support the weight of the vehicle and its maximum admissible load, and wherein the vehicle walls are provided with inflatable floats arranged externally of the said walls and above the water line of the vehicle when under the said load.

In order that the invention may be more readily understood reference will now be made to the accompanying drawings which are given by way of example and in which:—

Figure 1 is a perspective view of an amphibious vehicle provided with floats according to the present invention,

Figure 2 is a front view of the vehicle of Figure 1,

and

Figures 3 and 4 are cross sectional views showing respectively a float of the vehicle in its operative condition and in its inoperative condition.

As shown in Figures 1 and 2, the vehicle comprises a body of open box form which constitutes the hull. The said body has a front wall 1, two sidewalls 2, 3, a rear wall 4 and a bottom portion 5. Under full load the vehicle is immersed in water as far as its water line LG (see figures 2 to 4).

In accordance with the invention floats 6, 7, 8, 9 are secured externally of the vehicle to those portions of the walls 1, 2, 3, 4 respectively, which lie above the water line LG. The floats each comprise a sealed bag of resilient material, for instance vulcanized rubber, which is inflatable by known means, e.g. connection of the bag interior to a compressor (not shown) installed in the vehicle.

As shown, each float has associated therewith a protective element in the form of a rectangular plate 10 which has its longitudinal edges 11, 12 so bent that the said elements are each U-shaped in a cross section. The edge 11 of each plate 10 is secured, by means of hinges 13, to the top edge of the associated vehicle wall, and each opposite edge 12 thereof is connected to the vehicle wall via two pairs of levers 14, 15, one said lever pair being arranged at each plate end.

The levers 14, 15 of each said lever pair are articulated to each other, the lever 14 being also pivoted to the edge 12 of the associated plate 10 by means of a pivot 16 and the lever 15 pivoted to the associated adjacent vehicle wall by means of a pivot 17.

The articulation between the two levers 14, 15 of each pair is effected by means of a rod 20 which extends between the two lever pairs associated with a plate 10 parallel to the axis of the hinges 13 and each rod end is slidably mounted in elongated holes 18, 19 bored in the levers 14, 15, respectively, of the lever pair at that end. Hairpin springs 21, 22 are so wound around the pivots 16, 17 respectively as to tend to rotate each lever 14 towards its associated plate 10 and each lever 15 towards its associated vehicle wall.

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Each float is secured to its respective plate 10 and vehicle wall by means of rubber knobs 23 which are externally secured to the float wall and engaged as a push fit by suitably placed co-operating holes bored in the plates 10 and vehicle walls.

In an inoperative condition, with the floats deflated, all the plates 10 hang substantially parallel to their associated adjacent walls of the vehicle. This is the condition shown in Figure 4. On inflation of the floats to achieve an operative condition thereof, each associated plate 10 is automatically lifted and rotated about the axis of 13. This is the condition shown in Figures 1 and 3, and as will be seen therefrom, the raised plates 10 together form an extensive flap which extends to the vehicle exterior from the vehicle walls and protects the top of the floats. This raising of the plates 10 is of course achieved because, by bearing on the associated rod 20, each inflating float rotates the associated levers 14, 15 against the action of the springs 21, 22 thereof and removes the said levers 14, 15 from the adjacent plate 10 and vehicle wall, respectively.

On subsequent deflation of the float, each plate 10 is rotated under the influence of its own weight towards the associated and adjacent vehicle wall and the springs, 21, 22 serve to rotate the levers 14, 15 towards the associated plate 10 and vehicle wall, respectively. In this way each rod 20 is urged towards the axis of the associated hinge 13 and the deflated float is folded as shown in Figure 4 and flattend against the vehicle wall. In this position the float is of course inoperative and is fully enclosed within the space existing between the associated vehicle wall and plate 10. It is thus protected against tearing or perforation.

In use, the floats are inflated before the vehicle enters the water, the float 6 secured to the wall 1 serving to lift the front portion of the vehicle as it enters the water after running downhill or down a bank. In this way there is little or no likelihood of water entering the hull interior over the vehicle front portion on entry into the water.

The floats 6, 7, 8 and 9 are arranged above the water line of the vehicle and do not therefore reduce the speed of the vehicle in water as they do not increase its drag on the water. They do however ensure floating stability of the vehicle in rough water and/or with an unevenly distributed load.

Various modifications of the invention are of course possible within the scope of the appended claims.

WHAT WE CLAIM IS:—

1. An amphibious vehicle of the type wherein the body which forms the hull is so constructed and dimensioned as to provide the buoyancy necessary to support the weight of the vehicle and its maximum admissible load, and wherein the vehicle walls are provided with inflatable floats arranged externally of the said walls and above the water line of the vehicle when under the said load.

2. A vehicle as claimed in Claim 1, wherein each float is associated with a plate hinged to the vehicle wall above the float each plate being held by the then inflated float in a transverse position with respect to the wall, whereas, when the float is deflated the plate lies under its own weight parallel to the wall to define therewith a space dimensioned to enclose the deflated float.

3. A vehicle as claimed in Claim 2 wherein means are provided for folding each float into the space between the plate and vehicle wall on deflation of the float.

4. A vehicle as claim in Claim 3, wherein the means for folding each float each comprise a rod arranged parallel to the hinge for the plate, the rod being fulcrumed at each end to the articulation point of the ends of a pair of levers the other ends of which levers are pivoted to the vehicle wall and plate respectively.

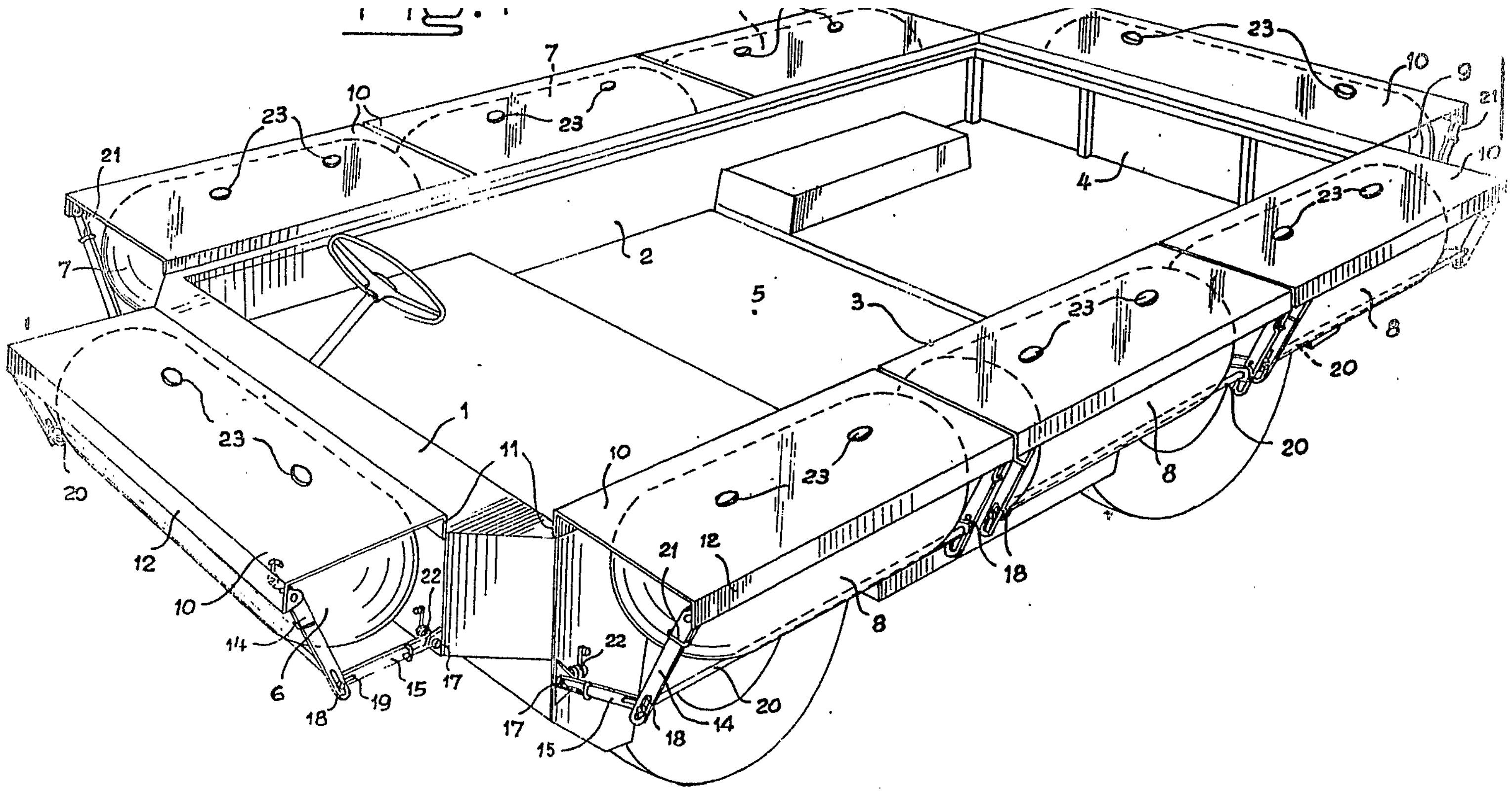
5. A vehicle as claimed in Claim 4, wherein the levers are so resiliently biased as to press the rod against the float and towards the hinge for the plate.

6. A vehicle as claimed in any of the preceding claims, wherein each float is secured both to the associated vehicle wall and to the associated plate.

7. An amphibious vehicle substantially as described herein with reference to and as shown in the accompanying drawings.

FORRESTER, KETLEY & CO.,
Chartered Patent Agents,
Jessel Chambers, 88—90 Chancery Lane,
London, W.C.2, and at
148 Edmund Street, Birmingham, 3.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1968.
Published by the Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.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Sheets 1 & 2

Fig. 1

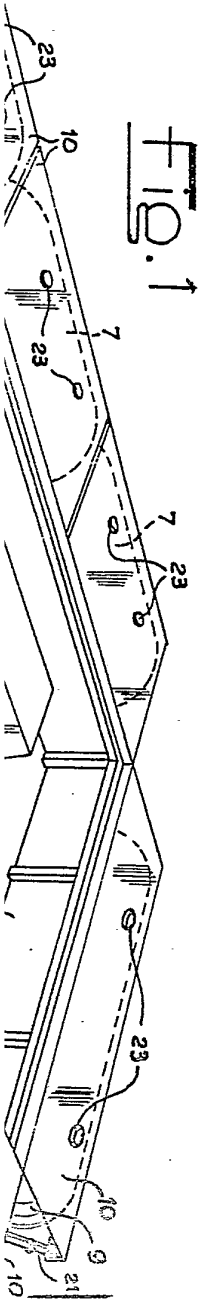


Fig. 2

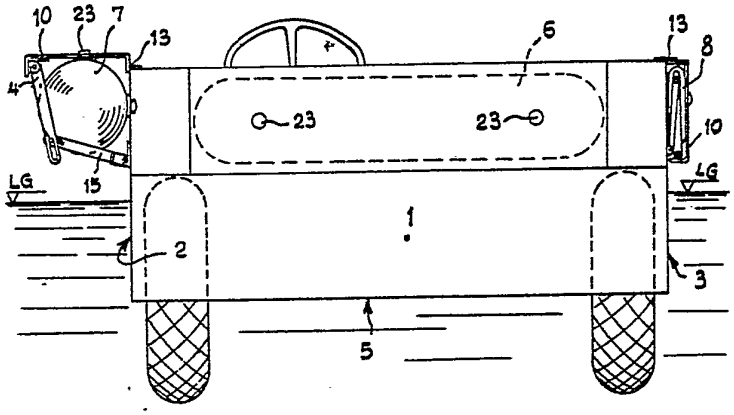


Fig. 3

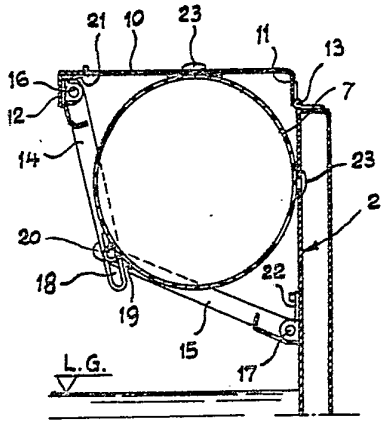
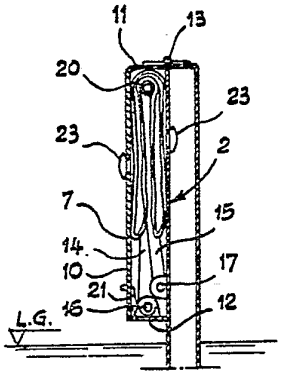


Fig. 4



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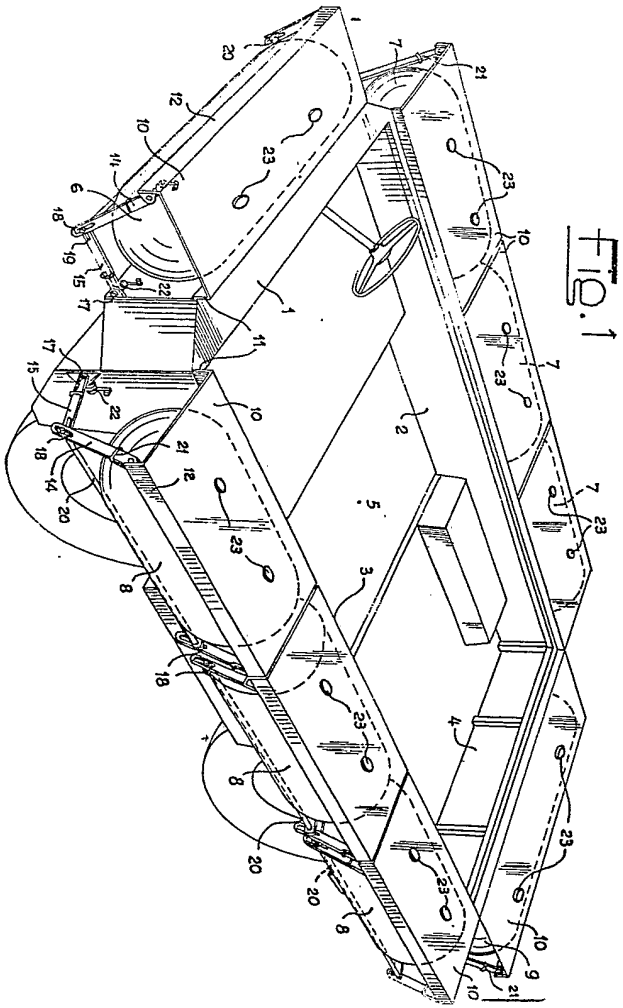

Fig. 1

Fig. 2

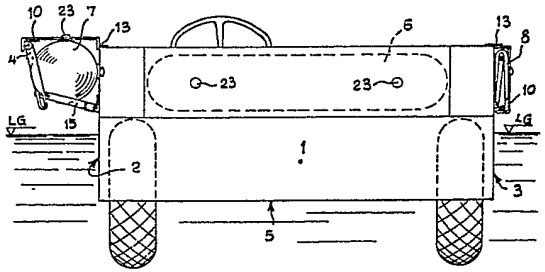

Fig. 3

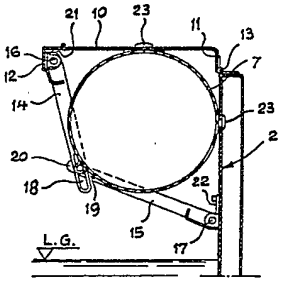

Fig. 4