# United States Patent

**Glosten**

[15] **3,673,973**

[45] **July 4, 1972**


## [54] CONVERTIBLE-FLOAT FLOATING PLATFORM


[72] Inventor: **Lawrence R. Glosten,** 71 Columbia St., Seattle, Wash. 98104



[22] Filed: **March 29, 1971**

[21] Appl. No.: **129,121**

**Related U.S. Application Data**

[63] Continuation of Ser. No. 821,715, May 5, 1969, abandoned.

[52] **U.S. Cl.** .....**114/0.5 D,** 114/43.5
[51] **Int. Cl.** .....**B63b 35/00,** B63b 35/44
[58] **Field of Search** .....114/0.5 D, 43.5; 61/46.5



[56] **References Cited**

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| | | | |
|---|---|---|---|
| 3,306,052 | 2/1967 | Kawasaki | 61/46.5 |
| 3,327,668 | 6/1967 | Von Schultz | 114/0.5 D |
| 3,273,526 | 9/1966 | Glosten | 114/0.5 D |



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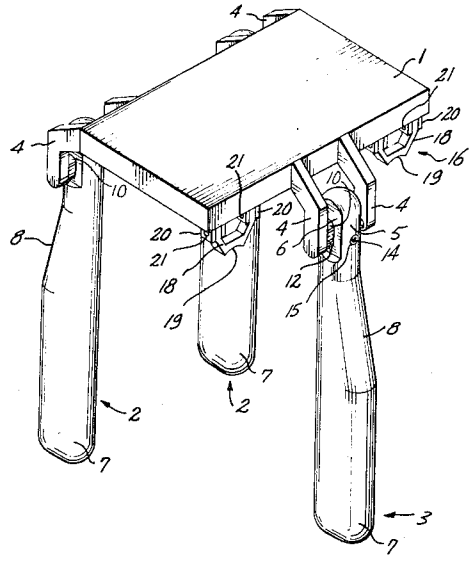
[57] **ABSTRACT**

Elongated floats are connected adjacent to one end to opposite sides respectively of a floating platform with pivotal connections enabling the floats at opposite sides of the platform to jackknife from upright positions into recumbent generally parallel positions with portions of the upper sides of the floats remote from their respective pivotal connections engaging saddles on the underside of the platform.


**1 Claim, 11 Drawing Figures**



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SHEET 1 OF 2

Fig. 1.

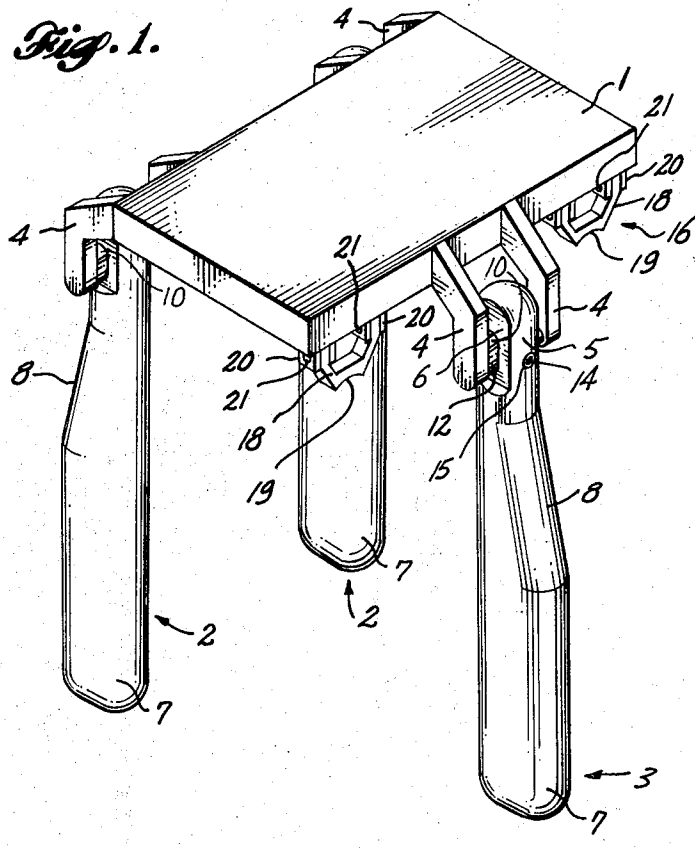
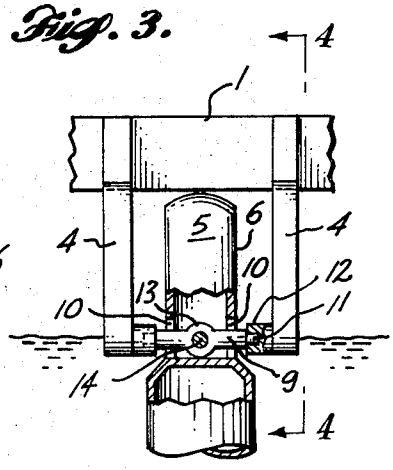



Fig. 3.



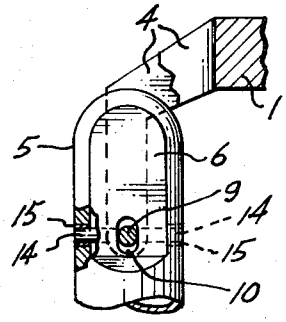




Fig. 4.

Fig. 2.

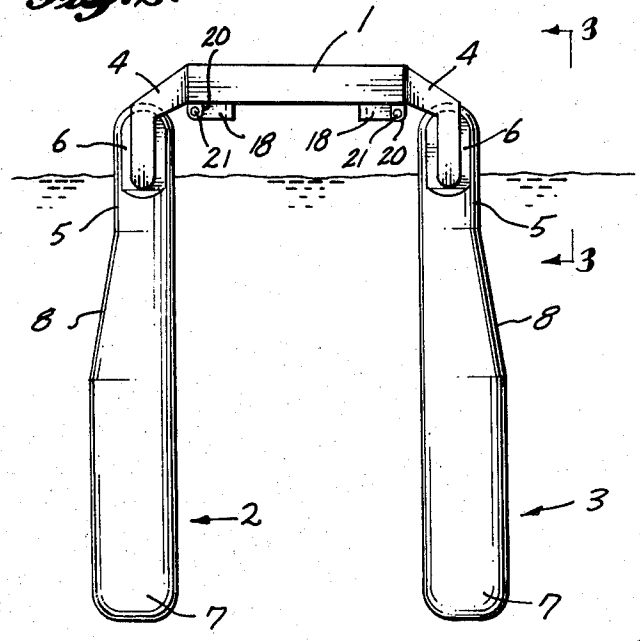



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Fig. 5.

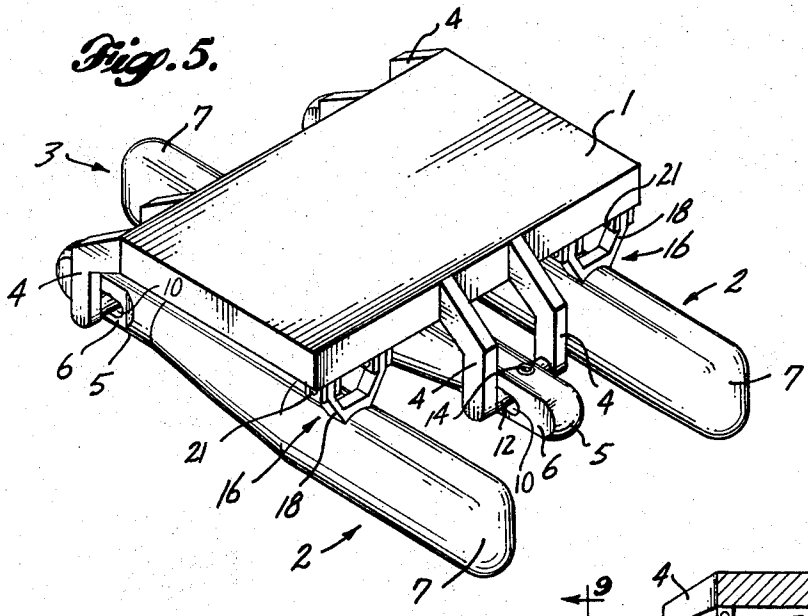



Fig. 9.

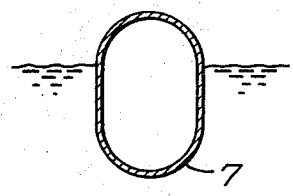



Fig. 8.

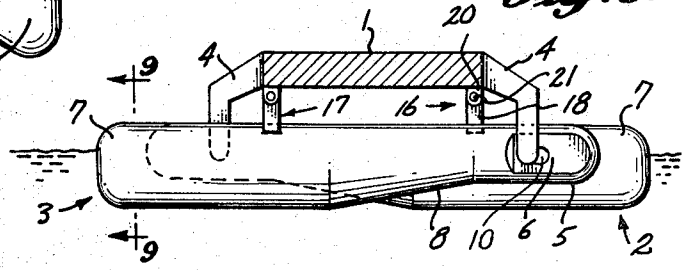
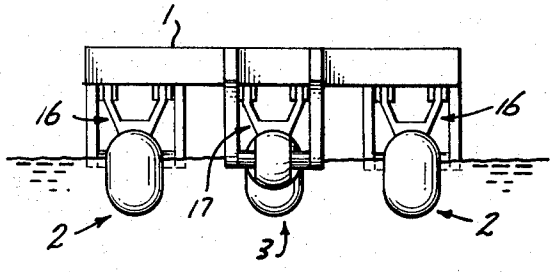



Fig. 6.



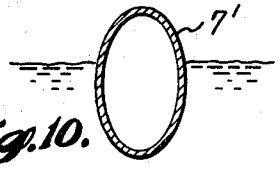




Fig. 10.

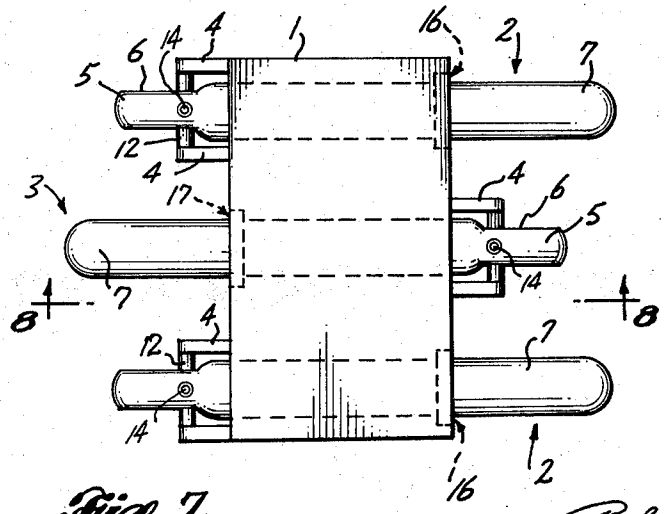



Fig. 7.

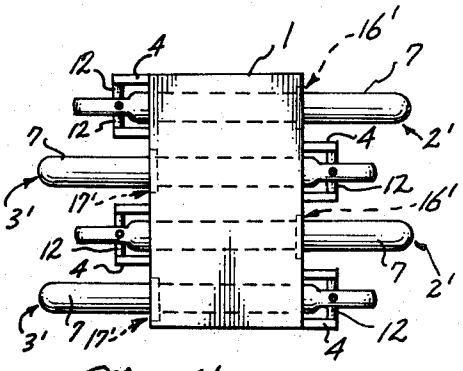



Fig. 11.

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# CONVERTIBLE-FLOAT FLOATING PLATFORM

This application is a continuation of application Ser. No. 821,715, filed May 5, 1969 and now abandoned.

The floating platform of the present invention constitutes an improvement of the stable ocean platform of U.S. Pat. No. 3,273,526.

A principal object of the present invention is to provide a floating platform which will be very stable in rough water and will enable the platform to be supported in a position elevated above the crests of the highest waves that can be expected.

Another important object is to provide a float arrangement which will support the platform stably while minimizing resistence to its movement through the water during travel from one location to another.

Still another object is to provide a float structure which can be converted from a condition for supporting the platform on location to a condition for travel of the platform from one location to another with minimum alteration in elevation of the platform above the water surface.

FIG. 1 is a top perspective of the floating platform according to the present invention in which the floats are arranged to support the platform in moored condition and FIG. 2 is an elevation of such floating platform in the same condition.

FIG. 3 is an enlarged detail elevation of a portion of the floating platform viewed from line 3—3 of FIG. 2 with parts broken away and FIG. 4 is a section through such structure taken on line 4—4 of FIG. 3 with parts broken away.

FIG. 5 is a top perspective of the floating platform with the floats arranged for travelling of the platform and FIG. 6 is an elevation of the platform in the same condition. FIG. 7 is a plan of the platform with the floats again arranged for travelling and FIG. 8 is a vertical section taken on line 8—8 of FIG. 7.

FIG. 9 is an enlarged detail section through a float taken on line 9—9 of FIG. 8 and FIG. 10 is a similar section showing a float having a modified shape of cross section.

FIG. 11 is a plan of a floating platform according to the present invention having an alternative type of construction.

The floating platform of the present invention is intended to be quite large. Thus, the dimensions of the rectangular platform 1 itself may be 125 feet by 250 feet, for example. Floats 2 connected to one of the longer sides of the platform 1 may be spaced apart approximately 200 feet and each of these floats may be spaced from a third float 3 at the center of the opposite side of the platform a distance of approximately 200 feet so that when the floats are disposed in upright positions as shown in FIGS. 1 and 2 they will be located at the apexes of an equilateral triangle having sides approximately 200 feet in length. The length of each float 2 and 3 may be in the neighborhood of 350 feet. In such case, the platform 1 would be supported above the water a distance exceeding 50 feet. The platform itself may include several stories and be 25 or 30 feet in height. The particular shape, size and construction of the platform will depend upon the purpose for which the platform is to be used.

The floats 2 and 3 are connected to the platform 1 by brackets 4 spaced apart a distance greater than the thickness of the upper end or tip portion 5 of each float. In order to reduce the spacing required between the brackets 4, the opposite sides 6 of the upper end of the float can be flattened. It is preferred that the lower end portions 7 of each float not be cylindrical, but that the cross section be of a shape having major and minor axes as illustrated, for example, in FIGS. 9 and 10. The cross section shown in FIG. 9 has opposite semicylindrical portions joined by an intermediate portion having flat sides, whereas the cross section of FIG. 10 is elliptical.

Immediately below the tip portion of each float having flat sides 6, the cross section of the float may be substantially circular and this portion of the float can be joined to the lower end portion 7 of constant cross section by a nonsymmetrical tapered transition portion 8. The lower portion of the float of constant cross section may approach one-half the length of the float, such as being 150 to 175 feet in length while the transition portion 8 of the float may be of the order of 100 feet in length and the portion of the float above the transition portion may be 85 to 90 feet in length. The size and shape of cross section of the float generally and at various locations along its length and the length of the float and of its several sections will depend upon the hydrodynamic qualities and characteristics of the float desired.



In order to eliminate bending stresses between the floats 2 and 3 and the brackets 4 by which the platform 1 is supported from the floats, the pivotal connection between each float and the brackets 4 on opposite sides of it is flexible and preferably is of the universal joint type. Conveniently, each such connection may be in the form of gimbals. Such gimbals may include a horizontal shaft 9 near but spaced a substantial distance from the upper end of the float and extending through slots 10 in the opposite flat walls 6 of the float tip so as to afford ample clearance for tilting of the float relative to the shaft about an axis extending transversely of the shaft. The opposite ends 11 of such shaft are journaled in bearings 12 carried by the lower ends of the brackets 4. Through an enlarged central portion 13 of shaft 9 extends the cross shaft 14. Opposite ends of this shaft are journaled in bearings 15 in the opposite walls of the float tip 5 at the ends of its major axis.

It will be evident that the gimbals provided by the shafts 9 and 14 will enable the float 2 or 3 to tilt universally relative to the brackets 4 and platform 1. Rotation of bearings 15 relative to shaft 14 will enable the float to tilt relative to the brackets and platform about the axis of shaft 14. Rotation of shaft 9 in bearings 12 will enable the float to swing relative to brackets 4 and platform 1 about the axis of shaft 9. Any combination of such tilting movements is possible within limits. Consequently, when the floats 2 and 3 are upright as shown in FIGS. 1 and 2, wave action may rock any one or all of the floats without tilting the platform 1 or imposing a bending stress on the connections between the floats and the brackets 4.

The floats 2 and 3 are disposed in the upright positions shown in FIGS. 1 and 2 when the floating platform is moored on location. When it is desired to transport such platform from one location to another, however, the floats in their upright positions would produce excessive resistance to movement through the water. Consequently, the floats are swung from their upright attitudes of FIGS. 1 and 2 about the axes of shafts 9 into their recumbent positions shown in FIGS. 5, 6, 7 and 8. In swinging into such positions the floats 2 at one side of the platform and the float 3 at the opposite side of the platform will jackknife relatively to place the floats in the substantially horizontal parallel relationship shown in FIGS. 5 to 8. In such recumbent positions saddles will engage portions of the floats spaced lengthwise from their shafts 9 about which the floats swing between upright and recumbent positions. FIGS. 8 and 11 show that the pivot shafts for the floats at opposite sides of the platform 1, respectively, are spaced apart a distance greater than half the length of each float.

Buoyancy of the floats is transmitted through the saddles to the platform 1. In FIGS. 5 to 8, inclusive, the side floats 2 are shown as engaging saddles 16 beneath the edge portion of the platform opposite the pivot shafts of such floats and FIGS. 6, 7 and 8 show the intermediate float 3 as engaging the saddle 17 beneath the edge portion of platform 1 opposite that carrying the pivot support of float 3. Each of these saddles includes a bracket 18 having a concave recess 19 curved complementally to the curvature of the float engaged with the saddle. Each end of each saddle bracket fits between the ears of a yoke 20 and is connected to such yoke by a pivot 21. Such pivot mounting enables the saddle bracket 18 to be swung from a downwardly projecting operative position shown in FIGS. 1, 5, 6 and 8 into a stored position beneath the platform as shown in FIG. 2.

The downward projection of each saddle should be sufficient with respect to the location of the pivot shaft 9 for the float and its design so that the buoyancy of the float will maintain it in engagement with its saddle when the float is in its recumbent position irrespective of wave action which may be encountered while the float is travelling. As shown best in

FIGS. 6 and 8, the float pivots are located a substantial distance below the bottom of the platform 1 and the saddles 17 project downward a substantial distance below the bottom of such platform so as to be engaged by the float in recumbent position and maintain its upper side spaced a substantial distance below the platform and disposed in a substantially horizontal position. Also, the relationship between the location of the saddle and the center of buoyancy of the float should be such that at least as much buoyant force is applied to the saddle as to the pivot shaft by a particular float. Disposition of the floats in the jackknifed relationship shown in FIGS. 5, 7 and 8 will tend to produce generally equalized lift forces at two locations on the platform for each float. It is preferred that the float be asymmetrical about a plane parallel to the axis of its pivot shaft 9 so that the lower side of the float remote from its pivot axis will bulge downward substantially to provide increased buoyancy. Also, it is preferred that the location of the pivot shaft lengthwise of each float and with respect to the platform be such that the shaft will be approximately at the water surface whether the floats are in their upright positions or in their recumbent positions. As shown best in FIG. 8, when each float is in its recumbent position and its upper side is engaged with its saddle 17, the upper side of the float will be horizontal and the major portion of the volume of the float will be located below a horizontal plane passing through the axis of the float pivot shaft 9. During the operation of converting the platform from mooring condition to travelling condition by swinging of the floats about their pivot axes, therefore, the height of the platform 1 above the water would be maintained substantially constant.



While three floats as shown in FIGS. 1 to 8 inclusive can support a platform stably, more floats may be provided if desired. In the alternative construction shown in FIG. 11 four floats are utilized to support the platform 1, one pair of floats 2' being located at one side of the platform and the other two floats 3' being located at the opposite side of the platform. When in recumbent position the floats 2' engage saddles 16' beneath the platform and floats 3' engage saddles 17'. Each of such floats can be constructed and connected to the platform 1 by connections such as described with reference to the float connections shown in FIGS. 1 to 8 inclusive.

Each of the floats would probably have in it some permanent ballast and also some displaceable ballast located in various compartments generally in accordance with the disclosure of U.S. Pat. No. 3,273,526. Such ballast can be altered as may be required to effect swinging of the floats between their upright and recumbent positions.

I claim:

1. A convertible-float floating platform comprising a plurality of elongated floats, a platform supported by said floats, pivot means connecting each of said floats to said platform for swinging of such float between an upright position and a recumbent position, saddle means carried by said platform and engageable with a portion of each of said floats spaced from its pivot means when such float is in recumbent position, and means supporting said saddle means for movement between a downwardly projecting operative position and an upper stored position.

* * * * *