

PATENT SPECIFICATION

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(54) SPAR-TYPE BUOY FOR MARITIME NAVIGATION

(71) We, RESINEX S.a.S., of Via per Rovato, Iseo, Brescia, Italy; an Italian body corporate, 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 maritime signal means and particularly to so-called spar buoys.

In maritime navigation, buoys are employed to signal the presence of reefs, sunken obstacles and other dangers and to coordinate the navigation of vessels inside channels and harbours. Besides the conventional can buoys, nun buoys and spherical buoys, adapted with lights, bells, whistles, and marked coloured indicia, also spar buoys are generally employed. Spar buoys contrary to the other types, have a rather long iron or wooden spar and are used where ice floes are present or where the current of the water is severe.

The object of the present invention is to provide a spar-type buoy which will not change its position due to water currents and yet will not become a hazard if struck accidentally by a vessel.

According to the present invention there is provided a spar-type buoy for marine navigational purposes having an elongate tubular metal support adapted to be maintained in generally vertical position when in use by means of a floating body of shock-resistant, resilient and light weight plastics material secured to the support at a predetermined height near the upper extremity thereof, and wherein the lower extremity of the support is connected by means of a joint unit to a sinker without any intermediate mooring cable or the like, the joint unit allowing angular displacement of the support, but the support being otherwise unarticulated through out

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its length, the extremities of the support being closed to prevent ingress of water into the tubular support.

Use of the buoy of the present invention obviates loss of signalling means carried on or provided by the buoy itself should the buoy be struck by vessels or be subject to water currents, which loss is frequent in buoys of the prior art.

The buoy of the present invention, while much more rigid than the traditional spar buoys, nun buoys, can buoys, etc. is still affording a degree of resiliency due to the joint at the bottom of the tubular member of the buoy. Consequently, if struck by a passing vessel, the buoy of this invention will effect an angular displacement and return thereafter to its original vertical position.

THE DRAWINGS

These and other advantages of the present invention will become more apparent from a detailed description thereof and from the accompanying drawings, in which:—

Figure 1 is an elevational view of a spar-type buoy of the present invention;

Figure 2 is a perspective view of the joint connecting the buoy to its sinker; and

Figure 3 is a sectional view of a variant of the joint of figure 2.

When comparing the buoy of the present invention with those of the prior art, the following advantages are immediately recognizable a lower production and installation cost than in the case of anchor buoys, chain buoys, buoys with lifting lugs, etc., a far superior positioning of the buoy, which is not subject to deviations due to maritime currents, a possibility of maintenance and inspection "in situ" without the need of hoisting the buoy completely from the water, and the absence of danger that the buoy may damage a striking vessel with its chain or the like.

Referring now to the accompanying drawings, the buoy of the present invention comprises a vertical tubular support 1 which has both extremities closed and water-tight, so as to add to the floating effect of the buoy. At a predetermined height and corresponding with the surface of the water there is fixed to the support 1, by means which are conventional and are not shown in the drawings, at least one floating member 2. This member 2 may or may not be provided with stabilizing means and is made of light, highly resilient and shock-resistant plastics material. The vertical support 1, in order to advantageously afford lower weight and greater resiliency as well as uniform distribution of shock resistance throughout its entire length, is preferably tapered and in sections of upwardly smaller cross-section. Concurrently, the floating member 2 is dimensioned so that the floating effect insures the constantly vertical position of the vertical support 1 and the return thereof to its original position after any angular displacement.

At the bottom extremity of the vertical support 1 there is provided a joint unit, indicated generically at 3, for the mobile 30 4. This unit 3 is ideally suited for angular displacements of the entire support 1 as indicated in phantom in Figure 1.

According to a preferred embodiment of the invention, the unit 3 comprises two U-shaped members 5 and 5', the former connected with its terminals to the vertical support 1 and the latter similarly connected to the sinker 4. The two U-shaped members are linked to each other so as to permit free pendular displacements of the buoy in angular fashion. This arrangement affords the advantage of an accentuated inclination of the entire buoy for purpose of maintenance and/or replacement of the devices mounted on the buoy without the need of climbing thereon as it is the case of buoys which are solidly and rigidly connected to the bottom of the water basin or channel.

Another embodiment using a ball and socket joint between the support 1 and the sinker 4 is illustrated in figure 3. The unit 3 comprises a threaded stem 6 fixed by means of nuts 6' to a plate 7 which is, in turn, fixed to a seat provided on the sinker 4 by means of the anchoring means 8 of the latter.

Stem 6 carries a spherical head or ball 9 which is seated in and retained by socket 10 provided in flange 11 and member 12, that part of the socket within the member 12 being hemispherical. Flange 11 and member 12 are fixed to each other by means of bolts 13, member 12 being furthermore fixed, for example by means

of welding, to the bottom extremity of the support 1.

Between flange 11 and member 12, between ball 9 and corresponding socket 10, and between stem 6 and plate 7 of the unit 3 there are provided suitable water-tight gaskets 15 of material which is resistant to salt-water and to corrosion in general.

Without departing from the scope of the invention, it is to be understood that variants are possible in the construction of the joint unit 3. For example, one may employ universal joints or equivalent ones, as it is known in the art.

In any event, the joint unit 3 must be such as to prevent axial displacements of the vertical support 1, which displacements would cause wearing and continuous impacts of the lower portion of the support 1 against the sinker. However, the joint unit 3 must allow the angular displacements of the vertical support and the return of the floating member of the buoy to its vertical original position after any such displacement.

WHAT WE CLAIM IS:—

1. A spar-type buoy for marine navigational purposes having an elongate tubular metal support adapted to be maintained in generally vertical position when in use by means of a floating body of shock-resistant, resilient and light weight plastics material secured to the support at a predetermined height near the upper extremity thereof, and wherein the lower extremity of the support is connected by means of a joint unit to a sinker without any intermediate mooring cable or the like, the joint unit allowing angular displacement of the support, but the support being otherwise unarticulated throughout its length, the extremities of the support being closed to prevent ingress of water into the tubular support.

2. A buoy as claimed in claim 1, wherein the said support is tapered with its cross-section decreasing from a maximum at its lower extremity to a minimum at its upper extremity.

3. A buoy as claimed in claim 1 or 2, wherein the said joint unit includes a first U-shaped member fixed to the lower extremity of the said support and a second U-shaped member fixed to the sinker, the two U-shaped members being freely linked to each other.

4. A buoy as claimed in claim 1 or 2, wherein the said joint unit is of the ball and socket type and includes a plate and a seat fixed on the sinker and bolted together, a flange and member having a hemispherical seating fixedly provided in the lower extremity of the support being bolted together to form the socket part of the joint, and a connecting element having

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At the bottom extremity of the vertical support 1 there is provided a joint unit, indicated generically at 3, for the mobile 4. This unit 3 is ideally suited for angular displacements of the entire support 1 as indicated in phantom in Figure 1.

According to a preferred embodiment of the invention, the unit 3 comprises two U-shaped members 5 and 5', the former connected with its terminals to the vertical support 1 and the latter similarly connected to the sinker 4. The two U-shaped members are linked to each other so as to permit free pendular displacements of the buoy in angular fashion. This arrangement affords the advantage of an accentuated inclination of the entire buoy for purpose of maintenance and/or replacement of the devices mounted on the buoy without the need of climbing thereon as it is the case of buoys which are solidly and rigidly connected to the bottom of the water basin or channel.

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of welding, to the bottom extremity of the support 1.

Between flange 11 and member 12, between ball 9 and corresponding socket 10, and between stem 6 and plate 7 of the unit 3 there are provided suitable water-tight gaskets 15 of material which is resistant to salt-water and to corrosion in general.

Without departing from the scope of the invention, it is to be understood that variants are possible in the construction of the joint unit 3. For example, one may employ universal joints or equivalent ones, as it is known in the art.

In any event, the joint unit 3 must be such as to prevent axial displacements of the vertical support 1, which displacements would cause wearing and continuous impacts of the lower portion of the support 1 against the sinker. However, the joint unit 3 must allow the angular displacements of the vertical support and the return of the floating member of the buoy to its vertical original position after any such displacement.

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1. A spar-type buoy for marine navigational purposes having an elongate tubular metal support adapted to be maintained in generally vertical position when in use by means of a floating body of shock-resistant, resilient and light weight plastics material secured to the support at a predetermined height near the upper extremity thereof, and wherein the lower extremity of the support is connected by means of a joint unit to a sinker without any intermediate mooring cable or the like, the joint unit allowing angular displacement of the support, but the support being otherwise unarticulated throughout its length, the extremities of the support being closed to prevent ingress of water into the tubular support.

2. A buoy as claimed in claim 1, wherein the said support is tapered with its cross-section decreasing from a maximum at its lower extremity to a minimum at its upper extremity.

3. A buoy as claimed in claim 1 or 2, wherein the said joint unit includes a first U-shaped member fixed to the lower extremity of the said support and a second U-shaped member fixed to the sinker, the two U-shaped members being freely linked to each other.

4. A buoy as claimed in claim 1 or 2, wherein the said joint unit is of the ball and socket type and includes a plate and a seat fixed on the sinker and bolted together, a flange and member having a hemispherical seating fixedly provided in the lower extremity of the support being bolted together to form the socket part of the joint, and a connecting element having



a spherical head and a stem, the stem being secured to the said plate and the spherical head being lodged in the said socket, a water-sealing gasket being provided between the socket and the spherical head to prevent ingress of water to the ball-joint.

5. A spar-type buoy substantially as

hereinbefore described and as illustrated in Figs. 1 and 2 of the accompanying drawings. 10

6. The modification of the buoy claimed in claim 5 substantially as hereinbefore described and as illustrated in Fig. 3 of the accompanying drawings. 15

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