PATENT SPECIFICATION 677,286

Inventors :—FRED VERNON INGRAM and SIDNEY JOHN SMITH.

Date of filing Complete Specification : Dec. 14, 1950.

Application Date : Jan. 26, 1950. No. 2121/50.

Complete Specification Published : Aug. 13, 1952.

Index at Acceptance :—Class 113(i), D3.

COMPLETE SPECIFICATION.

Stabilising Floating Structures.

We, PRIESTMAN BROTHERS LIMITED, a British Company, of Holderness Engineering Works, Hull, in the County of York, 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 :—

Vessels or floats of shallow draught for work in narrow waterways have, by reason of their small beam, a low metacentre which gives poor transverse stability unless special arrangements are made, for instance by ballasting, to increase it. This is particularly true where a floating structure carries a high superstructure which can be swung from side to side above the vessel, causing an appreciable transfer of weight across the vessel at a considerable height above the water line. Such conditions arise in floating cranes and excavators in which the jib may be traversed from the centre line to either side to deposit its load or pick it up from the bank, lighters or other vessels.

The present invention provides a simple method of improving the stability of such a vessel or floating structure when stationary, especially when in narrow channels or shallow water, which can be readily adjusted to suit changing conditions. The apparatus can be easily rigged and dismantled, and can be added to an existing structure or built as part of a new vessel.

According to the invention, with the aim of increasing the transverse stability of a stationary vessel or other floating structure, weights are suspended over either side of the vessel so that as soon as the vessel heels to a predetermined angle to one side or the other, the weight at that side rests on a support independent of the vessel, the means by which the weights are suspended being such that the weight on the side to which the vessel heels no longer exerts any vertical force on the vessel, while the weight on the opposite side acts on the vessel, to exert a righting moment on the vessel. The effectiveness of the weights may be increased by suspending them from the outbound ends of arms projecting overside, and means may be provided to adjust the distance the arms project.

It is preferred that when the vessel is on an even keel, the weights on either side rest on the support, but when the vessel heels to one side, the weight on the opposite side is raised clear of that support to exert a righting moment. However, the desired result may also be achieved by suspending the weights so that when the vessel is on an even keel, both weights hang just clear of the support, and when the vessel heels to one side, the weight on that side grounds on the support.

The arms may be pivoted about fore and aft axes on the vessel and may be drawn inboard, and supported when outboard, by luffing tackle. The weights are conveniently suspended from the ends of the arms by lifting tackle which may be adjusted either from the vessel or from the shore. The weights may find support on the bottom, or on the banks of the channel or on other floating structures alongside, or they may themselves be small pontoons floating alongside but heavy enough to exert an appreciable righting moment when lifted out of the water.

One form of the invention is illustrated in the accompanying drawings, in which :—

Figure 1 is a side elevation of the complete structure ;

Figure 2 is an end elevation of the structure as seen from the left in Figure 1 ; and

Figure 3 is a plan view of the structure.

The structure comprises a floating pontoon 1 on one end of which a crane comprising a cab 2 for the motor and winchgear and a jib 3 is rotatably mounted on the traversing gear 4.

At either side of the pontoon, derrick arms 5 are pivoted at or about the deck level at 5^1

[*Price* 2*s*. 8*d*.]

so that they can be lowered outboard. The arms 5 are maintained at any desired angle by luffing ropes 6 connected to a windlass 7 amidships. The outboard end of each arm carries a tackle 8 by means of which a weight 9 may be raised or lowered.

For working in a narrow cut, as indicated in Figure 2, the beam of the pontoon is insufficient to provide adequate transverse stability when the jib 3 is carrying a load and is traversed to any considerable extent on either side of the fore and aft centre line. To prevent the pontoon healing dangerously, therefore, the weights 9 are lowered by adjusting the luffing ropes 6 and the tackles 8 until they rest on the banks 9 when the vessel is on an even keel. The windlass and tackle are now made fast so that when the pontoon 1 heels to one side, the arm 5 on the opposite side is raised by the heeling of the pontoon, and the tackle 8 on that side exerts an upward force on the weight 9. Thus a restoring moment is exerted on the pontoon 1 which will increase until the weight 9 is lifted completely off the bank. The length of the arms 5 and the mass of the weights 9 are calculated to give a sufficient righting moment for the maximum weight which the crane is capable of lifting and traversing.

When the crane is not working close in to a bank, the weights 9 may be submerged and rest on the bottom, in shallow water, or other vessels may be moved alongside to support them. Alternatively the weights may themselves be pontoons or floats in which case the water supports them directly, but in all cases the stabilising action is exactly the same as in the example shown.

What we claim is :—

1. A method of increasing the stability of a vessel or other floating structure, in which weights are suspended over either side of the vessel so that, as soon as the vessel heels to a predetermined angle to one side or the other, the weight at that side rests on a support independent of the vessel, the means by which the weights are suspended being such that the weight on the side to which the vessel heels no longer exerts any vertical force on the vessel, while the weight on the opposite side acts on the vessel to exert a righting moment on the vessel.

2. A method of increasing the stability of a vessel or other floating structure according to Claim 1, in which the weights are suspended from arms projecting over either side of the vessel.

3. A method of increasing the stability of a vessel or other floating structure according to Claim 2, in which the amount the arms project over the sides of the vessel may be adjusted.

4. A method according to any one of the preceding claims, in which when the vessel is on an even keel, the weights on either side rest on the support, but when the vessel heels to one side, the weight on the opposite side is raised clear of that support to exert the righting moment.

5. A method according to any of the preceding claims, in which the weights, when not supported by the vessel, are supported by the medium in which the vessel floats.

6. A method according to Claim 5, in which the weights are supported by independent floating structures alongside the vessel.

7. A vessel or other floating structure in which the transverse stability is increased in accordance with any one of Claims 1 to 6.

8. A vessel according to Claim 7, substantially as described with reference to the accompanying drawings.

For the Applicants :—
GILL, JENNINGS & EVERY,
Chartered Patent Agents,
51/52, Chancery Lane, London, W.C.2.

PROVISIONAL SPECIFICATION.

Stabilising Floating Structures.

We, PRIESTMAN BROTHERS LIMITED, a British Company, of Holderness Engineering Works, Hull, in the County of York, do hereby declare this invention to be described in the following statement :—

Vessels or floats of shallow draught for work in narrow waterways have, by reason of their small beam, a low metacentre which gives poor lateral stability unless special arrangements are made, such as by ballasting, to increase it. This is particularly so where a floating structure carries a high superstructure which can be swung from side to side above the vessel, causing an appreciable transfer of weight across the vessel at a considerable height above the water line. Such conditions arise in floating cranes and excavators when working, in which the jib with its load may be traversed from the centre line to either side to deposit on or pick up from the bank, lighters or other vessels.

The present invention provides a simple method of improving the stability of such a vessel or floating structure when stationary, which can be readily adjusted to suit changing conditions. The apparatus can be easily

so that they can be lowered outboard. The arms 5 are maintained at any desired angle by luffing ropes 6 connected to a windlass 7 amidships. The outboard end of each arm carries a tackle 8 by means of which a weight 9 may be raised or lowered.

For working in a narrow cut, as indicated in Figure 2, the beam of the pontoon is insufficient to provide adequate transverse stability when the jib 3 is carrying a load and is traversed to any considerable extent on either side of the fore and aft centre line. To prevent the pontoon healing dangerously, therefore, the weights 9 are lowered by adjusting the luffing ropes 6 and the tackles 8 until they rest on the banks 9 when the vessel is on an even keel. The windlass and tackle are now made fast so that when the pontoon 1 heels to one side, the arm 5 on the opposite side is raised by the heeling of the pontoon, and the tackle 8 on that side exerts an upward force on the weight 9. Thus a restoring moment is exerted on the pontoon 1 which will increase until the weight 9 is lifted completely off the bank. The length of the arms 5 and the mass of the weights 9 are calculated to give a sufficient righting moment for the maximum weight which the crane is capable of lifting and traversing.

When the crane is not working close in to a bank, the weights 9 may be submerged and rest on the bottom, in shallow water, or other vessels may be moved alongside to support them. Alternatively the weights may themselves be pontoons or floats in which case the water supports them directly, but in all cases the stabilising action is exactly the same as in the example shown.

What we claim is :—

1. A method of increasing the stability of a vessel or other floating structure, in which weights are suspended over either side of the vessel so that, as soon as the vessel heels to a predetermined angle to one side or the other, the weight at that side rests on a support independent of the vessel, the means by which the weights are suspended being such that the weight on the side to which the vessel heels no longer exerts any vertical force on the vessel, while the weight on the opposite side acts on the vessel to exert a righting moment on the vessel.

2. A method of increasing the stability of a vessel or other floating structure according to Claim 1, in which the weights are suspended from arms projecting over either side of the vessel.

3. A method of increasing the stability of a vessel or other floating structure according to Claim 2, in which the amount the arms project over the sides of the vessel may be adjusted.

4. A method according to any one of the preceding claims, in which when the vessel is on an even keel, the weights on either side rest on the support, but when the vessel heels to one side, the weight on the opposite side is raised clear of that support to exert the righting moment.

5. A method according to any of the preceding claims, in which the weights, when not supported by the vessel, are supported by the medium in which the vessel floats.

6. A method according to Claim 5, in which the weights are supported by independent floating structures alongside the vessel.

7. A vessel or other floating structure in which the transverse stability is increased in accordance with any one of Claims 1 to 6.

8. A vessel according to Claim 7, substantially as described with reference to the accompanying drawings.

For the Applicants :—
GILL, JENNINGS & EVERY,
Chartered Patent Agents,
51/52, Chancery Lane, London, W.C.2.

PROVISIONAL SPECIFICATION.

Stabilising Floating Structures.

We, PRIESTMAN BROTHERS LIMITED, a British Company, of Holderness Engineering Works, Hull, in the County of York, do hereby declare this invention to be described in the following statement :—

Vessels or floats of shallow draught for work in narrow waterways have, by reason of their small beam, a low metacentre which gives poor lateral stability unless special arrangements are made, such as by ballasting, to increase it. This is particularly so where a floating structure carries a high superstructure which can be swung from side to side above the vessel, causing an appreciable transfer of weight across the vessel at a considerable height above the water line. Such conditions arise in floating cranes and excavators when working, in which the jib with its load may be traversed from the centre line to either side to deposit on or pick up from the bank, lighters or other vessels.

The present invention provides a simple method of improving the stability of such a vessel or floating structure when stationary, which can be readily adjusted to suit changing conditions. The apparatus can be easily

* C L M S *

rigged and dismantled, and can be added to an existing structure or built as part of a new vessel.

According to the invention, with the aim of increasing the lateral stability of a stationary vessel or floating structure in narrow channels or when in shallow water, arms are employed projecting over the sides of the vessel with weights adjustably suspended from their outboard ends so that as soon as the vessel heels to a pre-determined angle to one side or the other, the weight on that side rests on a support independent of the vessel, while the weight on the opposite side is supported by its arm or arms, thereby exerting a righting moment on the vessel.

It is preferred that when the vessel is on an even keel, the weights on either side rest on the support, but when the vessel heels to one side the weight on the opposite side is raised clear of that support to exert a righting moment. The arms may be pivoted about fore and aft axes on the vessel and may be drawn inboard, and supported when outboard, by luffing tackle. The weights are conveniently suspended from the ends of the arms by lifting tackle which may be adjusted either from the vessel or from the shore. The weights may find support on the bottom, or on the banks of the channel or on other floating structures alongside, or they may themselves be small pontoons floating alongside but heavy enough to exert an appreciable righting moment when lifted out of the water.

In one form of the invention, a pontoon has a grab dredging crane mounted at one end so that its jib projects over the end of the pontoon to dig. The jib can be traversed to project over either side to discharge, and if the jib is slewed to one side with the grab loaded a considerable upsetting moment is exerted on the pontoon, particularly if the jib is luffed out.

To counteract this, derrick arms are pivoted to the deck of the pontoon near either gunwale and reaching outboard. The outer ends of these arms are supported by ropes led to a winch mounted on the deck, and the ropes are so attached to the winch that all are taken in or paid out equally as the winch is worked. Blocks and tackle are suspended from the outer end of each arm from which cast iron weights hang, and the tackles are adjusted independently in use so that when the crane jib is amidships the weights just rest on firm support, either on the banks of the channel in which the dredger is working, or on the bottom in shallow water or on an adjacent pontoon. If the crane is now slewed to one side, the pontoon on which it is carried will heel towards this side and the weight at the other side will be raised off its support, thus exerting a righting moment on the pontoon to help counteract the effect of the weight of the crane.

To prevent the weights from swinging when clear of the ground, struts, such as telescopic struts, may be fitted, when conditions permit to connect the weights to the base of their supporting arms or to some other part of the vessel so as to steady them.

For the Applicants:
GILL, JENNINGS & EVERY,
Chartered Patent Agents,
51/52, Chancery Lane, London, W.C.2.

Abingdon: Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1952.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2,
from which copies may be obtained.

M.E.