Nov. 11, 1924. 1,515,435

W. G. GLOVER

BILGE BLOCK, KEEL BLOCK, AND THE LIKE

Filed June 30, 1924 3 Sheets-Sheet 1

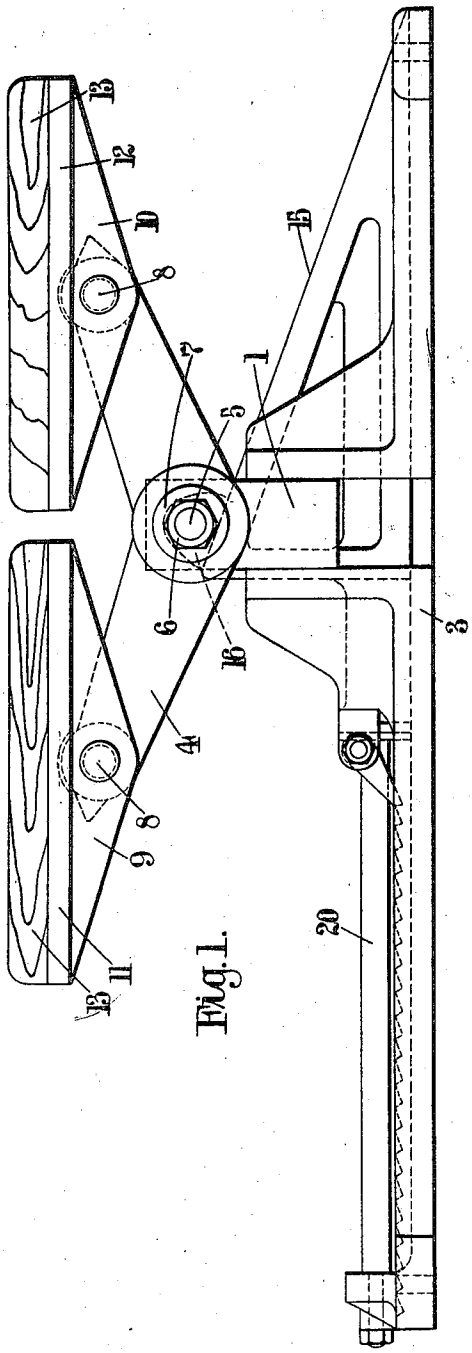


Fig. 1.

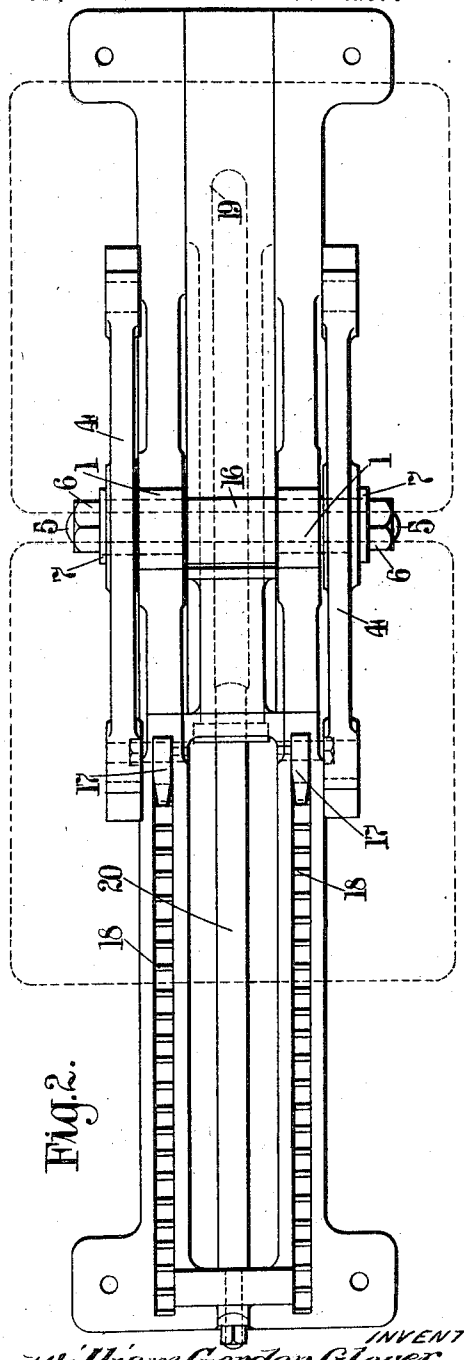


Fig. 2.

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Fig.3.

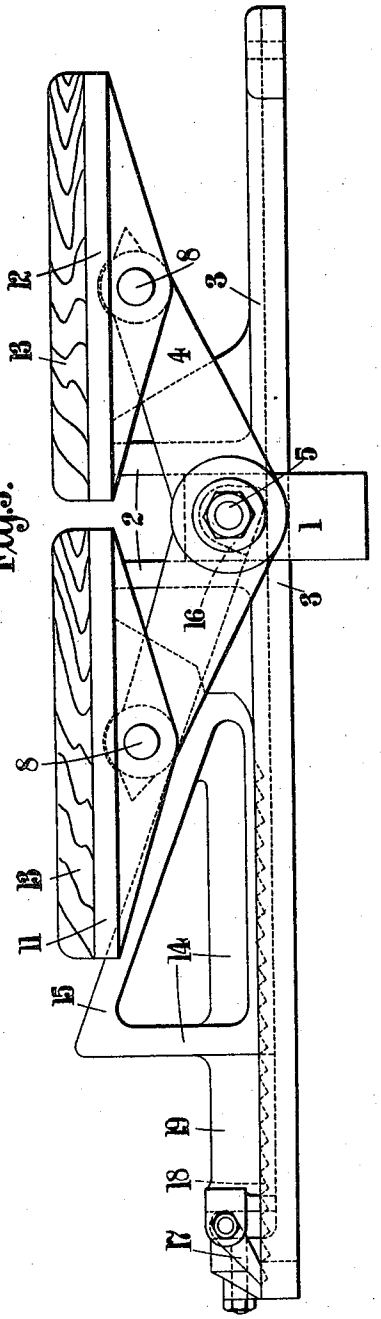


Fig.5.

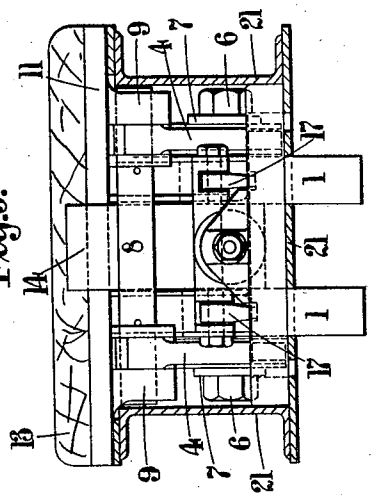
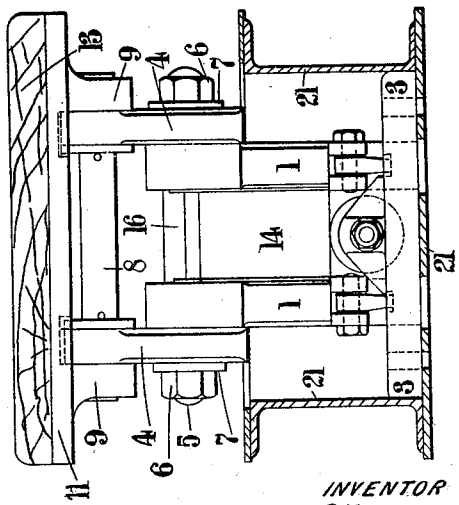


Fig.4.



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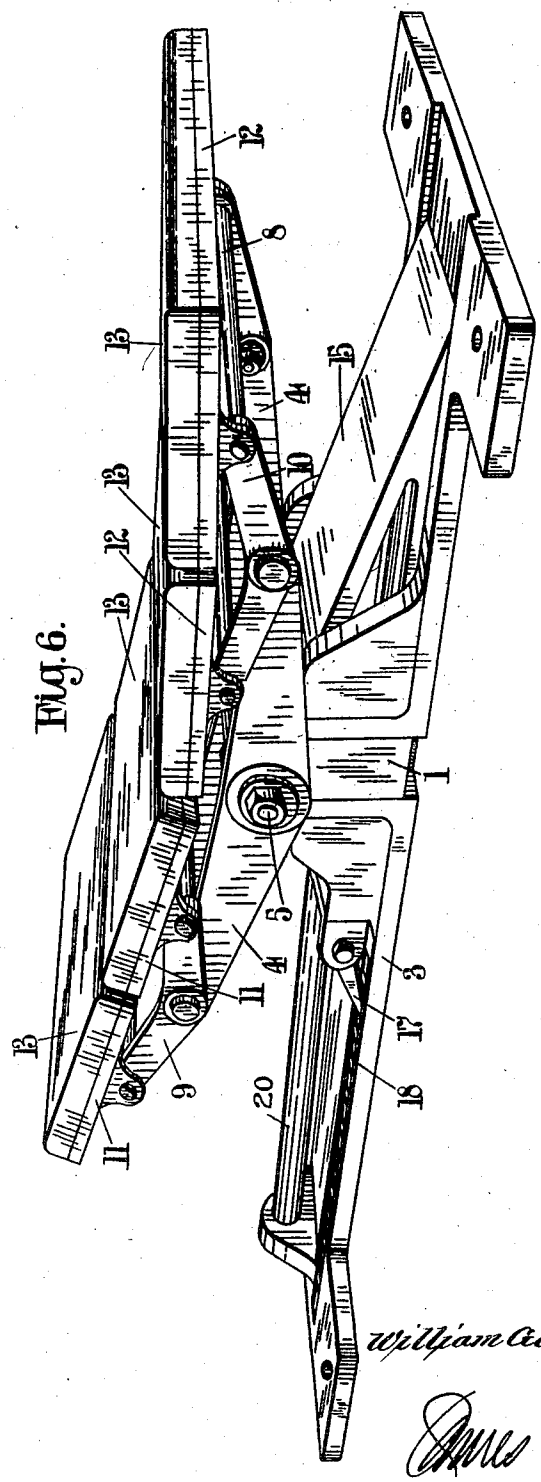


Fig. 6.

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Patented Nov. 11, 1924. 1,515,435

UNITED STATES PATENT OFFICE.

WILLIAM G. GLOVER, OF LONDON, ENGLAND.

BILGE BLOCK, KEEL BLOCK, AND THE LIKE.

Application filed June 30, 1924. Serial No. 723,367.

To all whom it may concern:

Be it known that WILLIAM GORDON GLOVER, a subject of the King of Great Britain, residing at 91 Victoria Street, London, S. W. 1, England, has invented certain new and useful Improvements in Bilge Blocks, Keel Blocks, and the like, of which the following is a specification.

This invention relates to the docking of vessels, and more particularly to bilge-blocks and keel-blocks such as are used on slip-ways, in floating docks and graving docks; and the invention has for its primary objects to reduce the time and labour involved in docking vessels and to eliminate faults in making up bilge-blocks and keel-blocks also to secure greater accuracy in the support offered thereby to a vessel; while it has also for object to improve upon and render more compact as well as more positive in action, apparatus such as has already been proposed for the purpose of achieving these primary or general objects.

According to the present invention a bilge-block is constructed with a plurality of self-adjusting abutment members articulated above a carriage or other equivalent supporting and traveling means relatively to which they are elevated positively and simultaneously, in a vertical direction only, against a ship's bottom to the contour of which they conform by contact therewith.

The means for elevating said plurality of self-adjusting abutment members may be either mechanical, hydraulic, pneumatic or electrical, or any appropriate combination thereof.

Two or more abutment members may be articulated directly or indirectly to a vertically movable support by means of one or more beams, arms, levers, or by a linkage, or otherwise, whereby said abutment members may be free to take up positions conforming to the contour of the hull of the vessel into contact with which they are raised.

The invention is illustrated by way of example in the accompanying drawings in which Figure 1 is a side view of a bilge-block in the position of maximum elevation. Figure 2 is a plan view of Figure 1 but with the abutment members omitted for the sake of clearness. Figure 3 is a side view of the bilge-block in its normal or lowermost position. Figures 4 and 5 are end views of the block in the positions shown in Figures 1 and 3 respectively but with the addition of a bilge arm of the channelled or open type upon which the bilge-block is supported.

Figure 6 is a perspective view of a bilge-block constructed with an increased number of abutment members; the block being shewn in the position of maximum elevation.

Referring to the example illustrated in Figures 1 to 5 inclusive.

Upon two vertically slidable pillars 1, 1, disposed in a central vertical guideway 2 formed in a suitable base or carriage 3 of solid metal construction are mounted pivotally, a pair of angle beams 4, 4, the centre of each of which is apertured to take over a transverse spindle 5 supported in apertures in said pillars 1, 1, and upon the ends of which spindle said angle beams 4, 4, are retained by nuts 6, 6, and washers 7, 7.

The corresponding extremities of the angle beams 4, 4, are apertured and receive transverse spindles 8, 8, to each of which is articulated a pair of smaller or auxiliary angle beams 9, 9, and 10, 10, formed in one with, as shewn, or connected pivotally to plates 11 and 12, respectively, each of which carries a facing or pad 13 of wood, rubber or other suitable material, which pads are adapted to make contact with the hull of a vessel and with the plates 11 and 12, constitute the aforesaid self-adjusting abutment members.

Normally these main angle beams 4, 4, and auxiliary angle beams 9, 9, and 10, 10, and the abutment members 11, 12, and 13, carried thereby occupy a horizontal or substantially horizontal plane, but any or all is or are freely capable of angular movement in a vertical plane for the purpose of taking up automatically any necessary position of adjustment.

When the bilge-blocks are not in use the position of the parts is as indicated in Figures 3 and 5, but when brought into use to support the hull of a vessel the aforesaid abutment members must be elevated into the position shown in Figures 1 and 4, or any intermediate position, for which purpose there is slidably mounted on said base or carriage 3 a wedge member 14 upon the inclined surface 15 of which rides a slide block 16 carried by the spindle 5; said wedge member 14 being displaceable horizontally by appropriate means (not shown)

and carrying pawls 17, 17, adapted to engage rack surfaces 18, 18, formed on or attached to the base or carriage 3. Any other convenient non-return mechanism may be employed instead of said pawls and racks.

The wedge member 14 may be actuated hydraulically, in which case the body of the member 14 may be formed hollow as at 19 and may constitute a cylinder into which there projects a ram or piston, such as 20, which is fixed horizontally on the aforesaid base or carriage 3, or on an extension thereof; suitable connections and controlling means (not shown) being provided for the admission into and exhaust from said cylinder of the operating fluid.

The whole of the above described apparatus, constituting a bilge-block, may be mounted suitably on a channelled or open type bilge arm such as 21, see Figures 4 and 5, said bilge-block and its accessories being accommodated therein when in the lowermost position of adjustment, so that normally the upper surface of the pads 13 of the abutment members are flush with the line of the cap-pieces of the keel blocks of the slip-way or dock upon or in which the bilge-blocks are in use.

Instead of being operated hydraulically the wedges or other elevating means may be actuated mechanically, as by screw gear connected to a line of shafting driven mechanically or electrically. Or, the elevating means may be actuated pneumatically if desired.

The number of abutment members may be increased. For example in Figure 6 each pair of auxiliary angle beams 9, 9, and 10, 10, carries two abutment members 11, 11, and 12, 12, respectively, articulated thereto and provided as before with facing pads 13.

Each bilge-block (which term includes the wedge or other elevating means) may be operated independently, or the arrangement may be such that the bilge-blocks are operated in pairs, in groups, or all simultaneously.

It will be manifest that the faults now often made in making up bilge-blocks as at present employed can be entirely eliminated, and the time and labour now spent in docking vessels can be considerably reduced owing to the facility with which the bilge-blocks described above can be positioned.

A modification of the invention described above renders it applicable not only to bilge-blocks but also to keel-blocks whereby to ensure a uniform distribution of the weight of a vessel by securing greater accuracy in the support offered to the keel than is now possible, especially in cases where a vessel has received damage to the keel or the keel-plate.

To secure the desired results a keel-block is constructed with one or more self-adjusting abutment members as already described and illustrated and arranged so as to be elevated into contact with a ship's keel or keel-plate and to conform to the configuration thereof by engagement therewith.

These keel-blocks may be arranged at suitable intervals along the keel-block line of a graving dock, slip-way, or floating dock with their abutment surfaces disposed so as to be normally in the same plane as the surfaces of the usual solid or immovable keel-blocks among which they are interposed and in conjunction with which they function in the ordinary manner unless the keel or keel-plate is distorted, indented or otherwise damaged.

The aforesaid self-adjusting abutment member or members is or are preferably borne upon a base, similar to that already described and illustrated, or may be borne upon a carriage or other equivalent supporting or travelling means whereby the keel-block may be positioned preparatory to being brought home, and means, preferably of a positive nature, are provided for elevating the abutment members, when necessary, into contact with the ship's keel or keel-plate; said elevating means being operated either mechanically, hydraulically, pneumatically or electrically, or any appropriate combination thereof.

One or more abutment members may be articulated directly or indirectly to a vertically movable support similar to the supports already described and illustrated and in such a manner as to be free to take up a position or positions conforming to the configuration or contour of the keel or keel-plate of the vessel into contact with which it or they may be raised.

The whole of the above described apparatus, constituting a keel-block, may be mounted suitably in the keel-block line of a graving dock, slip-way or floating dock so that normally the upper surfaces of the pads on the abutment members are flush with the line of the cap-pieces of the ordinary keel blocks on the slip-way or in the dock among which the adjustable keel-blocks are interposed.

Each keel-block (which term includes its elevating means) may be operated independently, or the arrangement may be such that the keel-blocks are operated in pairs, in groups, or all simultaneously, exactly as described with reference to the bilge-blocks.

An advantage arising out of the above described modification is that infallible proof of the exact amount of set-up of the keel or keel-plate due to damage or other causes can be ascertained, since after undocking the vessel a comparison can be made between the relative heights of the aforesaid abutment members and the permanent keel blocks whereby the desired indication is se-

cured by sighting. The ability thus to determine the extent of any set-up bears an important relation to the question of settling insurance claims.

The invention is applicable to aircraft of the seaplane type as well as to ships.

What I claim is:—

1. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a plurality of self-adjusting abutment members for raising into supporting contact with a vessel over a plurality of distributed points, a base having vertical guideways, pillars slidable vertically in the guideways of said base, beams articulated to said pillars, said self-adjusting abutment members being articulated upon said beams, means carried by said base to elevate positively said plurality of abutment members simultaneously into operative position, said abutment members conforming to the contour of the vessel on contact therewith, and means to hold said elevating means positively against returning.

2. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a plurality of self-adjusting abutment members for raising into supporting contact with a vessel over a plurality of distributed points, a base having vertical guideways, pillars slidable vertically in the guideways of said base, beams articulated to said pillars, auxiliary beams articulated to said beams, said self-adjusting abutment members being articulated to said auxiliary beams, a horizontally displaceable wedge member carried slidably by said base to elevate positively said plurality of abutment members simultaneously into operative position, said abutment members conforming to the contour of the vessel on contact therewith, a spindle connecting said beams, a slide block carried by said spindle, said slide block riding on said horizontally displaceable wedge member, and means to hold said horizontally displaceable wedge member positively against return movement.

3. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a base, a plurality of self-adjusting abutment members, movable means supporting said abutment members, said abutment members being articulated upon said movable supporting means and offering support over a plurality of distributed points, and hydraulically operated means to elevate positively said plurality of abutment members simultaneously into operative position, said abutment members conforming to the local contour of the vessel on contact therewith.

4. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a base, a plurality of self-adjusting abutment members, members slidable vertically in said base and carrying said abutment members, said abutment members being articulated upon said vertically slidable members and offering distributed support, and hydraulically operated means carried by said base to elevate positively said plurality of abutment members simultaneously into operative position, said abutment members conforming to the local contour of the vessel on contact therewith.

5. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a base having vertical guideways, a plurality of self-adjusting abutment members for raising into distributed supporting contact with a vessel, pillars slidable vertically in the guideways of said base, beams articulated to said pillars, said self-adjusting abutment members being articulated upon said beams, and hydraulically operated means carried by said base to elevate positively said plurality of abutment members simultaneously into operative position, said abutment members conforming to the local contour of the vessel on contact therewith.

6. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a base having vertical guideways, a plurality of self-adjusting abutment members for raising into distributed supporting contact with a vessel, pillars slidable vertically in the guideways of said base, beams articulated to said pillars, auxiliary beams articulated to said beams, said self-adjusting abutment members being articulated to said auxiliary beams, horizontally displaceable hydraulically operated means carried by said base to elevate positively said plurality of abutment members simultaneously into operative position, said abutment members conforming to the local contour of the vessel on contact therewith, and means to hold said horizontally displaceable hydraulically operated elevating means positively against returning.

7. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a base having vertical guideways, a plurality of self-adjusting abutment members for raising into distributed supporting contact with a vessel, pillars slidable vertically in the guideways of said base, beams articulated to said pillars, auxiliary beams articulated to said beams, said self-adjusting abutment members being articulated to said auxiliary beams, a horizontally displaceable hydraulically operated wedge member carried slidably by said base to elevate positively said plurality of abutment members simultane-

ously into operative position, said abutment members conforming to the local contour of the vessel on contact therewith, a spindle connecting said beams, a slide block carried by said spindle, said slide block riding on said horizontally displaceable hydraulically operated wedge member, and means to hold said horizontally displaceable wedge member positively against return movement.

8. A bilge or analogous block for supporting vessels in slip-ways, floating docks, graving docks and the like, comprising a base having vertical guideways, a plurality of self-adjusting abutment members for raising into distributed supporting contact with a vessel, pillars slidable vertically in the guideways of said base, beams articulated to said pillars, auxiliary beams articulated to said beams, said self-adjusting abutment members being articulated to said auxiliary beams, a horizontally displaceable hollow wedge member carried slidably by said base to elevate positively said plurality of abutment members simultaneously into operative position each abutment member conforming to the local contour of the vessel on contact therewith, a hydraulic ram projecting into said hollow wedge member, said ram being fixed horizontally on said base, a spindle connecting said first-named beams, a slide block carried by said spindle, said slide block riding on said horizontally displaceable hollow hydraulically operated wedge member, and rack and pawl mechanism to hold said wedge member positively against return movement.

In testimony whereof he affixes his signature.

WILLIAM G. GLOVER.