No. 783,276. PATENTED FEB. 21, 1905.

J. C. HUGHES.

SHIP REPAIR MECHANISM.

APPLICATION FILED MAR. 21, 1904.

Fig. 1.

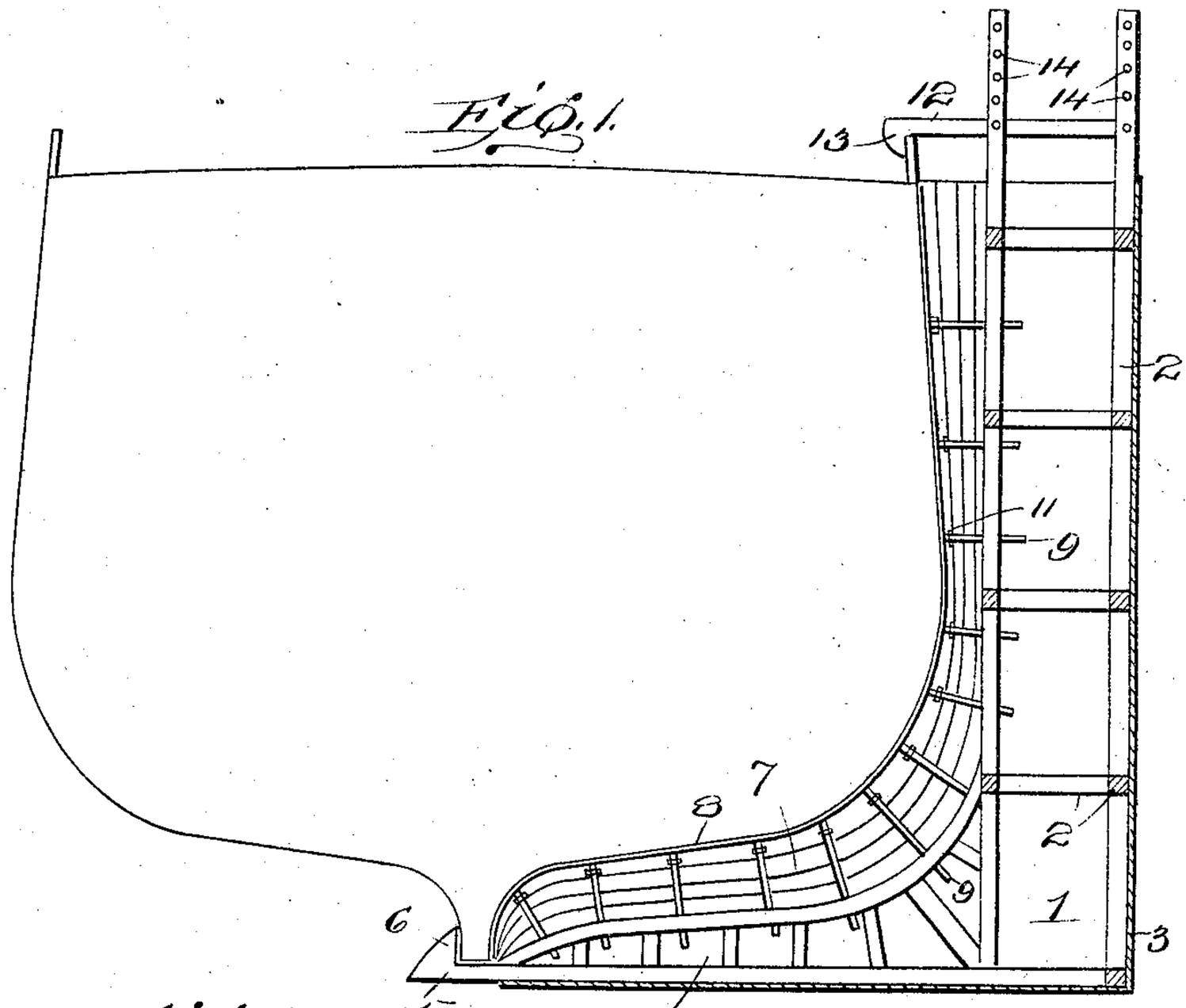


Fig. 2

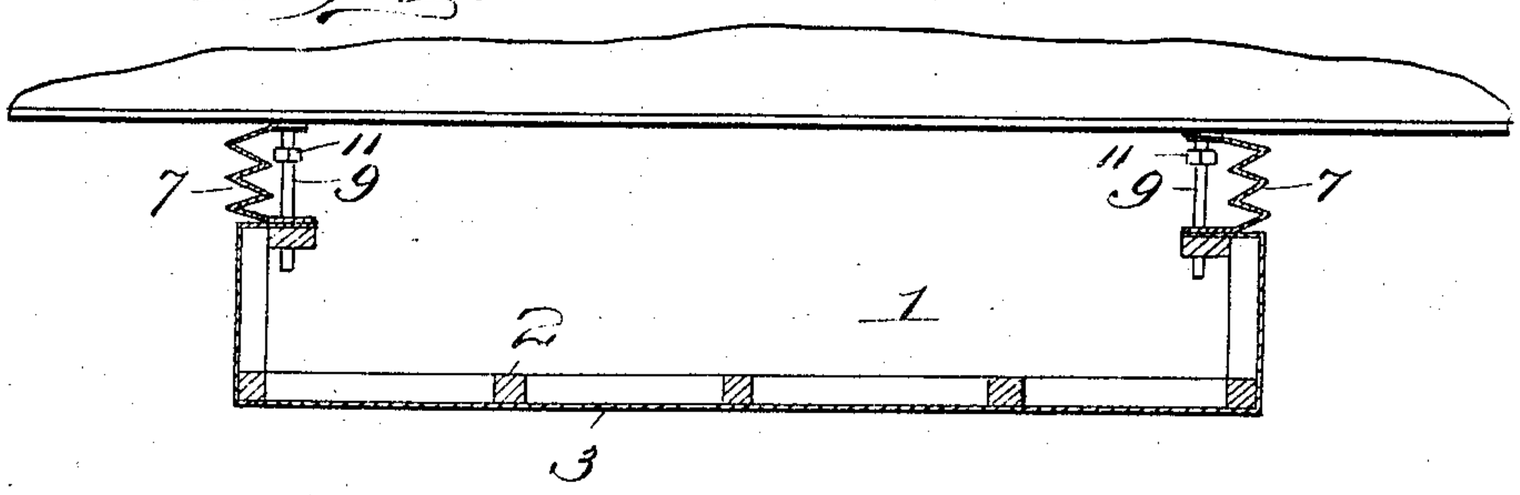
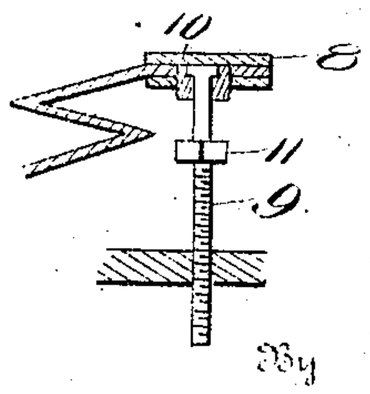


Fig. 3.



Witnesses

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No. 783,276. Patented February 21, 1905.

UNITED STATES PATENT OFFICE.

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SHIP REPAIR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 783,276, dated February 21, 1905.

Application filed March 21, 1904. Serial No. 199,263.

To all whom it may concern:

Be it known that I, JOHN C. HUGHES, a citizen of the United States, residing at South Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Ship Repair Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in ship repair mechanism, and has particular relation to means for permitting access to the sides and bottoms of boats, ships, or vessels of any type without the necessity of removing them from the water.

The invention consists in a caisson or removable closure capable of being attached to the sides and bottom of a vessel and means for forming a water-tight joint between the casing and the vessel, and thus making it possible to remove the water from about that portion of the vessel, so that repairs may be made.

It also consists in a portable caisson adapted to fit upon the sides of a vessel, means for clamping the same thereto, and flexible collapsible means for insuring a tight joint between the caisson and the sides of the vessel.

It further consists in a caisson capable of being removably attached to a portion of a vessel and a collapsible folding section or bellows between the section and the vessel.

It also consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a transverse sectional view through my improved ship repair mechanism, the outlines of a vessel being indicated adjacent thereto. Fig. 2 is a horizontal sectional view through the caisson or closure, illustrating the manner of clamping the folding portion of the caisson to the sides of a vessel. Fig. 3 is an enlarged detail view of one of the clamping screws or bolts.

The present invention has for its object the production of means by which ships, boats, or vessels of any kind may be repaired upon the side or bottom of any submerged portion without the necessity of placing the vessel in a dry-dock.

In attaining the objects of the invention I preferably employ a removable casing or receptacle which is practically an easily-manipulated caisson made to fit approximately the usual contour of vessels.

In the accompanying drawings I have illustrated a practical manner of carrying the invention into effect, in which is shown a closure 1, formed with a framing 2, preferably of metal, so that it may be made light and strong, the said framing being covered by a heavy waterproofing material, as 3. The said waterproofing material is stretched tautly over the greater portion of the framing and may be of stiff or flexible material, as desired. The upper portion of the frame may be made approximately vertical, as shown in Fig. 1, while the bottom portion is extended considerably to one side, as at 4, this portion of the frame being intended to project beneath the bottom of the vessel and engage the keel thereof. It is preferable to provide the caisson with means for fastening the same to the keel of the vessel. A practical means of accomplishing the object is shown in Fig. 1, in which a projection 5 is formed upon the lower inner edge of the caisson, the said projection having an upturned rib or flange 6, which when placed against the keel of the vessel will hold the caisson from accidental displacement. The edges of the framing adjacent to the vessel are made approximately like the contour of the vessel in cross-section, and between the said edges and the vessel a flexible portion 7 is placed, which is capable of forming a water-tight joint between the edges of the caisson and the sides of the vessel. The portion 7 may be made in various ways, but an admirable manner of constructing the same is illustrated in the drawings, where said portion is shown as constructed of material folded in a zigzag manner, the whole being somewhat similar to the accordion plaits or bellows of the vestibule attachment of railway-cars. It

can also be made of as heavy or heavier material than the vestibules referred to, and one edge of which folded portion is firmly secured along the inner edge of the framing 2 of the caisson. The free edges of the folding portion are reinforced by making the same thicker than the other portions thereof or by employing thin metallic facing-strips, as 8. The metallic strip should be sufficiently yielding to enable it to conform to the shape of the hull of the vessel. When the caisson is applied to the hull of a vessel, the flexible portion may have their outer reinforced edges forced tightly against the sides of the hull in various ways—as, for instance, by pneumatic or hydraulic or by mechanical pressure, as may be found most desirable, all being contemplated within the scope of the invention. One means of accomplishing the result has been illustrated in the drawings, consisting in a number of clamping-bolts 9. These bolts 9 are screw-threaded for a portion of their length and engage threaded apertures formed in the framing of the caisson. The opposite ends are swiveled in the reinforced edges of the bellows 7, as indicated at 10. A many-sided portion, as 11, may be formed upon the screw-bolts, so that they may be turned. By turning the said screws the reinforced edges of the bellows 7 can be pressed against the sides of the vessel's hull with great pressure. A sufficient number of these bolts are used from top to bottom of the caisson, as indicated in Fig. 1, to completely seal the joint formed between the edges of the caisson and the hull of the vessel.

In using the repair mechanism for reaching the portion of the hull of the vessel which is submerged the casing is lowered at the side of the hull and the projecting portion 4 extended beneath the same until the rib or flange 6 passes beneath the keel of the vessel and is fitted snugly upon the same. One or more clamping-bars 12 may then be applied to the gunwale of the vessel, the said clamps having hooked end portions 13 for engaging the same. The outer ends of the clamps are adjustably attached to the framing of the caisson, the said framing being provided with a series of apertures 14 for this purpose. The clamps may be adjusted by means of bolts engaging the said apertures 14. After the caisson-framing has been thus secured to the hull of the vessel the folding-bellows portion 7 is then forced tightly against the side of the hull, so as to completely seal the spaces between the edges of the framing and said hull. After the caisson has thus been properly secured in place the water within the same may be pumped therefrom, leaving an open-topped closure within which workmen can operate, the caisson affording them an opportunity of making any repairs that may be necessary upon the side of the vessel's hull and this without the delay, expense, and other difficulties attendant upon the placing of a vessel in dry-dock.

It will be understood that I contemplate forming the portable dry-dock or caisson in any desired manner, and differently-shaped caissons may be employed, if desired, upon different portions of the vessel.

It is an important feature of the invention to be able to reach and perform work upon any submerged portion of a vessel, the water being effectually kept away from such portion until the proper repairs have been made.

The minor details of construction may be altered and various flexible sealing means may be employed for closing the gap between the edges of the caisson-framing and the vessel operated upon without departing from the spirit of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A repair mechanism for ships, boats or other vessels, comprising a removable caisson approximately fitting the contour thereof, means for holding the caisson to the vessel, a continuous edge strip secured along one of its edges to the caisson, and means for pressing its other edge against the sides of the ship for forming a tight joint between the said caisson and ship.

2. A ship repair mechanism comprising a removable caisson having an edge contour approximately fitting a portion of the keel of a vessel, means for holding the caisson against the sides of the vessel, a continuous yielding folding means secured along one of its edges to the edge of the caisson, and clamping means engaging its other edge and forcing it against the ship for tightly closing the space between the edges of the caisson and ship.

3. A ship repair mechanism comprising a removable caisson having an edge contour approximately like that of the hull of the vessel to be repaired and an expanding, contracting folding portion for filling the space between the edges of the caisson and the vessel, and a clamping-strip for holding the edges of the folding portions against the vessel.

4. A ship repair mechanism comprising a portable caisson having an edge flange for engaging the keel of the vessel, means for clamping the caisson to the upper edge of the vessel, and means for sealing the joints between the caisson and the vessel.

5. A ship repair mechanism comprising a hollow caisson made up of a framing and a covering of waterproofing, means for attaching the caisson to a vessel and a folding-bellows portion secured at one edge to the edge of the caisson, and a clamping-strip for forcing the opposite edge thereof tightly against the hull of the vessel.

6. A ship repair mechanism comprising a hollow casing forming a caisson, the said cais-

son having a lower extension for projecting beneath a vessel, a keel-engaging flange carried thereby and adjustable clamps at the upper edge of the caisson for engaging the gunwale of the vessel.

7. A ship repair mechanism comprising a hollow caisson and a folding flexible material secured to the edge of the caisson, a stiffening edge strip carried by the said flexible material, and adjustable bolts arranged at suitable intervals for forcing the edge strip against the vessel, and forming a water-tight joint therewith.

8. A repair-caisson for vessels comprising a hollow closure having edge portions approximately fitting the contour of a vessel, a folding-bellows portion secured to said edges, a continuous reinforcing-strip at the free edges of said bellows, and expansible means interposed between the edge of the casing and the said strip for making a tight joint between the casing and the vessel.

9. A repair-caisson for vessels comprising a hollow casing, open upon one side, a folding water-excluding bellows secured to the edges of the open portion of the caisson, a continuous edge strip secured to the bellows, expanding-bolts having a swivel engagement with the said edge strip of the bellows and provided with threaded portions for engaging threaded apertures in the casing the said bolts being also provided with means by which they may be turned for forcing the bellows against the hull of the vessel.

10. A caisson for repairing ships comprising a frame having a vertical portion and a horizontal portion, means carried by the horizontal portion for engaging the keel of a ship, means at the upper edge of the vertical portion for engaging the gunwale of the ship, and continuous flexible folding means interposed between the vertical and horizontal portions of the frame for forming a tight joint between the caisson and the ship.

11. A repairing-caisson for vessels comprising a frame having a vertical portion and a horizontal portion, means carried by the horizontal portion for engaging the bottom of the vessel, and adjustable means carried by the vertical portion of the caisson for engaging the upper edge of the vessel, the adjustment of said means making it possible to fit the caisson to vessels of different sizes and a continuous flexible collapsible means carried at the edges of the caisson and arranged between the horizontal and vertical portions of the frame.

12. A ship repair mechanism comprising a caisson for application to the portion of a vessel's side comprising a frame having an edge approximately fitting the side and keel of a vessel, means for holding the lower edge of the caisson upon the keel, means for holding the upper edge of the caisson against the side of the vessel, and a folding yielding means interposed between the edges of the caisson and the vessel, and means for clamping said yielding means at intervals to the sides of the vessel.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

JOHN C. HUGHES.

Witnesses:
A. F. Rees,
E. L. Chambers.