Oct. 20, 1931. G. W. WINKLER 1,828,694

SALVAGING APPARATUS FOR SUNKEN SHIPS

Filed April 7, 1931 2 Sheets-Sheet 1

Fig. 1.

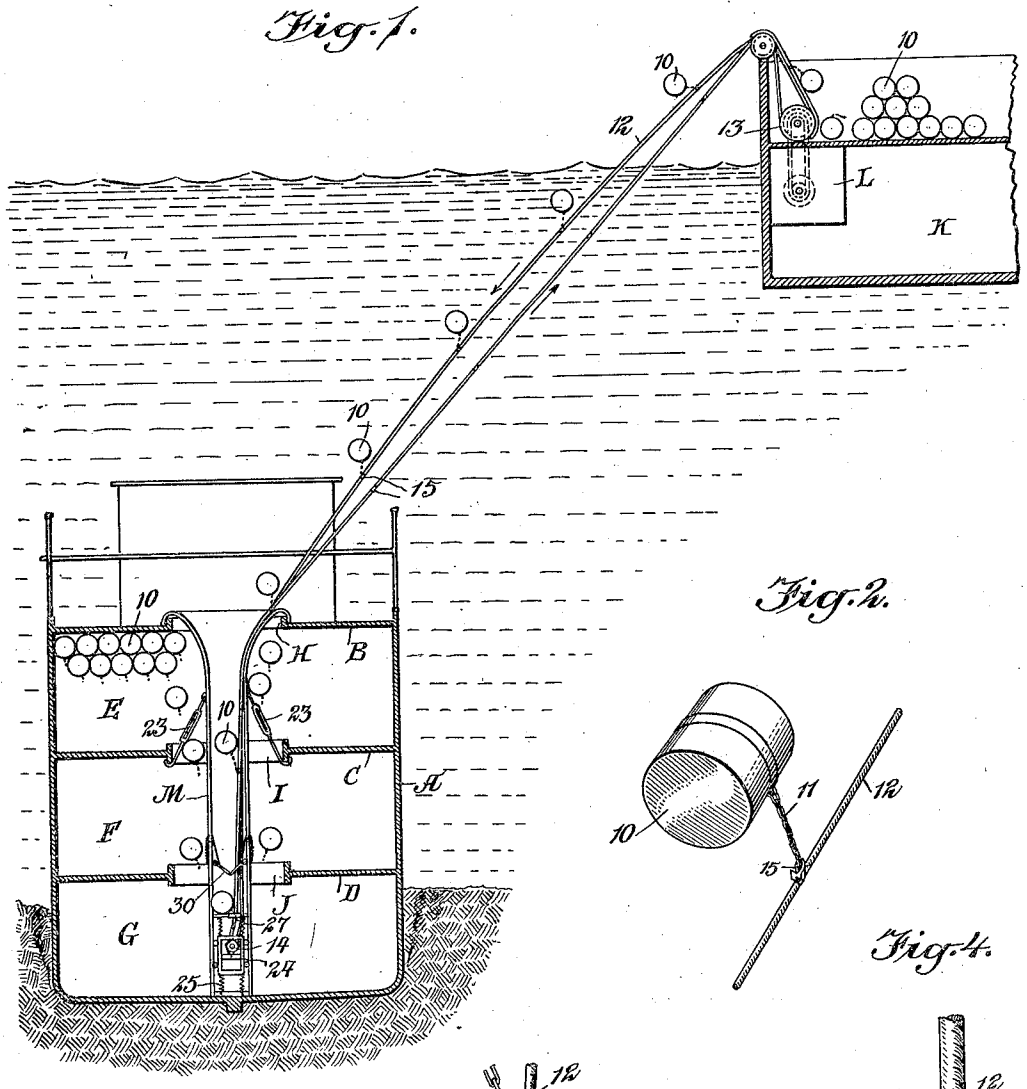


Fig. 2.

Fig. 4.

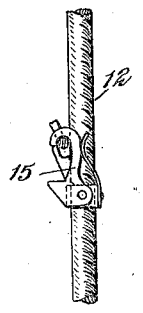
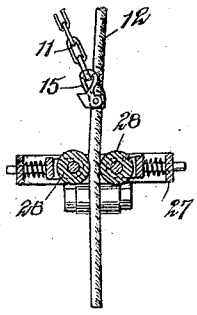


Fig. 3.



WITNESSES

George W. Naylor

Hugh H. Clay

INVENTOR

George W. Winkler

BY Munn & Co.

ATTORNEYS

Oct. 20, 1931. G. W. WINKLER 1,828,694

SALVAGING APPARATUS FOR SUNKEN SHIPS

Filed April 7, 1931 2 Sheets-Sheet 2

Fig. 5.

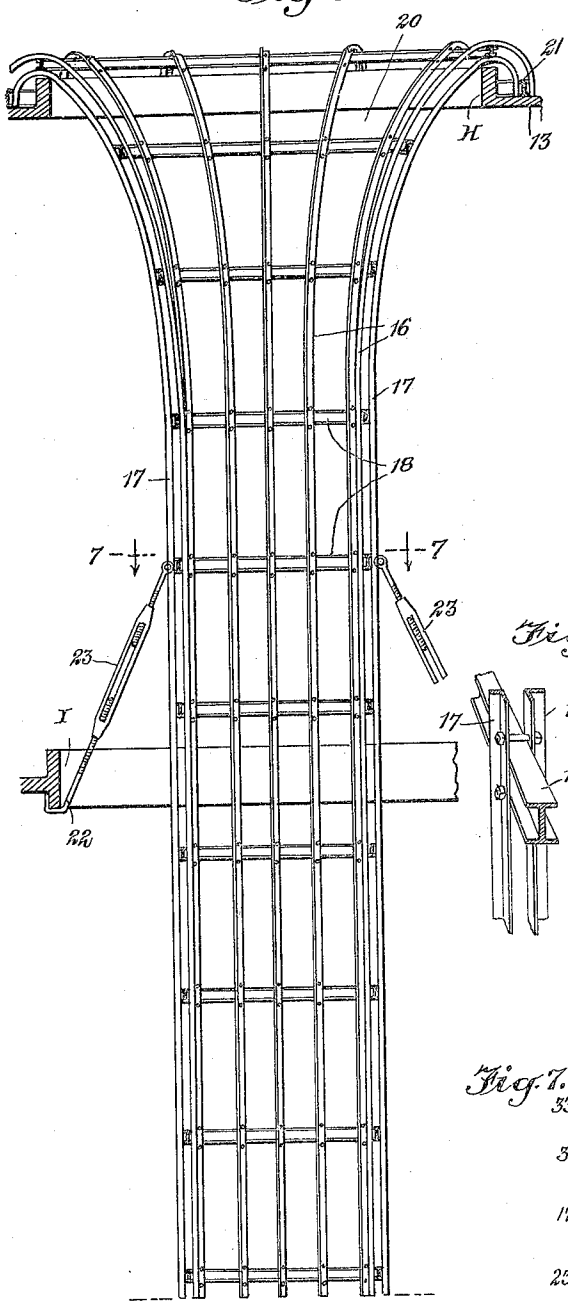


Fig. 8.

Fig. 6

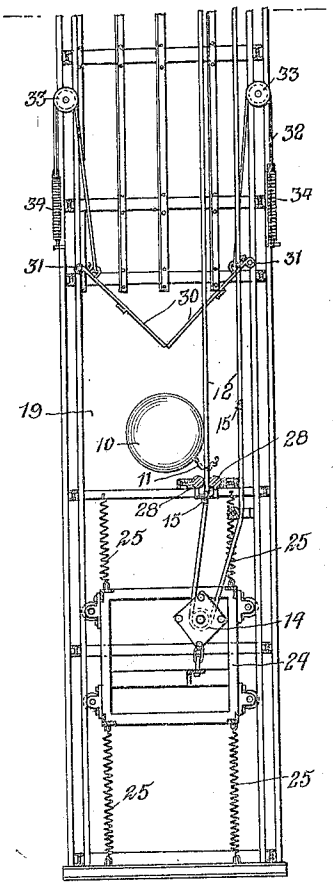
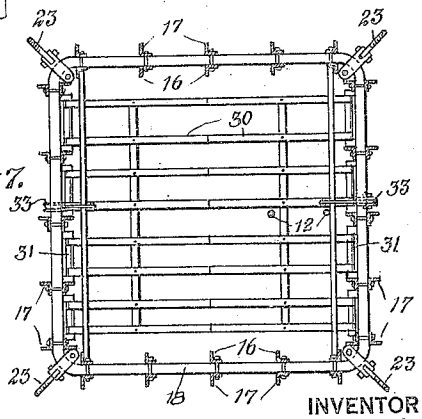


Fig. 7.



WITNESSES

George W. Naylor

Hugh H. Ott

INVENTOR

George W. Winkler

BY Munn & Co

ATTORNEYS

Patented Oct. 20, 1931 1,828,694

UNITED STATES PATENT OFFICE

GEORGE W. WINKLER, OF GRANTWOOD, NEW JERSEY

SALVAGING APPARATUS FOR SUNKEN SHIPS

Application filed April 7, 1931. Serial No. 528,429.

This invention relates to a method of and an apparatus for raising sunken vessels.

The invention broadly comprehends a method and apparatus of the indicated character which consists in successively conveying buoyant elements from a surface craft to the sunken craft and introducing the same to and releasing and retaining the same within the hull of the sunken craft whereby to displace sufficient water from the hull to cause the combined buoyancy of said elements to float the sunken craft to the surface.

More particularly, the invention resides in an apparatus of the character set forth, in which use is made of a mechanism for successively conveying buoyant elements from a surface craft to, introducing the same into and releasing the same within the hull of a sunken vessel, which embodies an endless haul cable trained around a guide adjacent the bottom of the hull of the sunken craft and extending therefrom through the hatch and extending to and trained around a guide attached to a surface craft, together with means for releasably connecting the buoyant elements to the haul cable and means for automatically releasing and deflecting the same into the interior of the hull.

The invention further embodies as part of a mechanism, a member adapted to be emplaced within the hull and extending inwardly from the uppermost hatch to the point adjacent the bottom of the hold and which serves to close the hatch against the escape of the buoyant elements and to act as a means through which the elements may be introduced and through which the haul cable is guided for movement of the leads into and out of the hull.

As a further object, the invention aims to provide in an apparatus of the character set forth and for the purpose specified, means for compensating for the relative movement of the surface craft with respect to the sunken craft in order to relieve the haul cable of undue strain.

The invention further seeks to provide means for facilitating the anchorage of the apparatus within the hold of the sunken vessel by divers.

Other objects of the invention reside in the comparative simplicity of construction and mode of use of the apparatus, the economy with which it may be produced and employed and the general efficiency derived therefrom.

With the above recited and other objects in view, reference is had to the following description and accompanying drawings, in which there is exhibited one example or embodiment of the invention, while the claims define the actual scope of the same.

In the drawings:

Figure 1 is a view illustrating the device in use.

Figure 2 is a perspective view of one of the buoyant elements attached to the haul cable.

Figure 3 is a detail fragmentary sectional view of means for effecting the release of the buoyant elements from the haul cable.

Figure 4 is an enlarged detail view of one of the releasable latches for connecting the buoyant elements to the haul cable.

Figure 5 is an enlarged vertical sectional view of the upper portion of the cage emplaced in the hull of the sunken vessel.

Figure 6 is a similar view of the lower portion thereof.

Figure 7 is a sectional plan view taken approximately on the line indicated at 7—7 in Figure 5.

Figure 8 is an enlarged fragmentary sectional perspective view of the cage structure.

Referring to the drawings by characters of reference, A designates the hull of a sunken vessel having decks B, C and D defining holds E, F and G, to which access is gained through the hatches H, I and J. A surface craft or its equivalent is designated by the reference character K, and said craft is designed to carry a plurality of buoyant elements 10 which constitute a part of the salvaging apparatus and which may be of any desired form or construction which will render them buoyant. For the purposes of the present invention, the elements 10 are preferably in the nature of sealed hollow cylinders, each of which has secured thereto a flexible element, such as a chain section 11.

The underlying idea of the present inven-

tion resides in the method of and means for successively conveying the buoyant elements from the surface craft K to and emplacing and retaining them within the hold of the sunken vessel until a sufficient number have been introduced to the hull A to displace the quantity of water necessary to permit the combined buoyancy of the elements 10 to float the sunken craft or vessel to the surface.

The apparatus for accomplishing the conveyance, introduction and release of the buoyant elements within the hull A of a sunken vessel includes an endless flexible cable rope or equivalent member 12 which is trained around a guide or sheave 13 mounted on the surface vessel K and which may be hand driven or driven by power as illustrated, by a prime mover L which is operatively connected with the sheave 13. A second guide sheave or pulley 14 is designed to be suitably mounted within the hold of the sunken vessel, preferably adjacent the bottom of the hull, and the cable 12 carries at longitudinally spaced points suitable means 15 for attaching the free ends of the elements 11 to the cable 12, which means is releasable under a predetermined pulling strain.

In order to provide means for supporting the guide sheave or pulley 14 within the hull of the sunken vessel and to admit the buoyant elements 10 to the hold thereof while preventing their escape therefrom, a device designated generally by the reference character M is employed, which is adapted to be emplaced in the hatch of the sunken craft by divers. The device M is of tubular construction and is preferably made up of a plurality of pairs of inner and outer longitudinally extending rails 16 and 17 which are connected to each other by framing members 18, in the present instance disclosed as approximately square. The frames 18 are spaced longitudinally throughout the leng h of the device M and are interposed between the inner and outer longitudinal rails. The pairs of rails 16 and 17 are spaced apart sufficiently close to prevent passage of the buoyant elements 10 therebetween, while adjacent the lower end of the device M certain of the rails 16 and 17 are omitted to afford outlets 19 through which the buoyant elements may escape. At the upper end, the rails 16 and 17 are bent outwardly away from each other to provide a flared or funnel shaped entrance mouth 20 with an outwardly and reversely bent margin 21 of a size to engage with the uppermost deck B outside of the hatch H. It is obvious that the device M may be secured in position within the hull A in various ways, but for the purposes of illustration, the device is disclosed as provided with anchoring hooks 22 which are adjustable in length by means of turnbuckles 23. After the device M has been inserted as shown in Figures 1 and 5, the anchoring hooks 22 are engaged with one of the inner hatches, such as the hatch I, and the turnbuckles are adjusted to draw the rim 21 into engagement with the deck to clamp the device M in place. The lowermost portion of the device M below the outlets 19 supports a carriage 24 which is mounted for guided movement longitudinally and tensioned against movement by means of springs 25. The carriage 24 carries the guide sheave or pulley 14 and due to its yieldable mounting, compensates for relative movement of the surface craft with respect to the sunken craft and prevents undue strain on the cable 12. Obviously, both leads of the cable 12 extend through the flared upper end of the device M downwardly to the guide sheave or pulley 14 and the downwardly moving lead is trained through an embracing member which, as illustrated, consists of a frame 27, in which are yieldably mounted tensioned rollers 28 normally urged into engagement with diametrically opposite sides of the downwardly moving lead of the cable 12. This arrangement is such that he cable, the attaching devices 15 and the connecting elements 11 are freely movable between the rollers, while the buoyant elements 10 are precluded from passage therebetween so that a pulling strain exerted on the cable effects the release of the attaching devices 15 and consequent release of the buoyant elements at a point adjacent the outlets 19. In order to permit of the passage of the buoyant elements downwardly through the device M to their point of release and to prevent escape of the same back through the device M after being released, a pair of inwardly opening outwardly closing gates 30 are provided which are pivoted as at 31 within the device M immediately above the outlet 19. The gates are normally moved to cooperating closed relation in any desired manner, such as by the pull cords 32 which are connected with the gates, trained around sheaves 33 and attached to springs 34. The gates are disposed when closed at a downwardly and inwardly inclined position so that in addition to constituting means for admitting the passage of the buoyant elements therethrough and preventing their escape when released, they serve to deflect the buoyant elements outwardly through the opening 19.

In use and operation, after the sunken craft has been located, a surface craft lowers the device M downwardly to the sunken vessel and divers are employed for emplacing and attaching the device M in the manner illustrated and previously described. The buoyant elements 10 are successively attached to one lead of the cable and during the downward movement of said elements with said lead of the cable, the elements function to float said cable lead and maintain the cable in a taut condition irrespective of the roll or pitch of the surface vessel. The buoy-

ant elements 10 also operate to prevent intertwisting or tangling of the cable leads as the downwardly moving lead to which the elements are attached is drawn away from the upwardly moving lead. The buoyant elements are introduced to the hold of the sunken vessel in sufficient numbers to displace the necessary quantity of water therefrom whereby to float and eventually raise the hull of the sunken craft to the surface. It is obvious that the buoyant elements 10 as they are released and deflected outwardly through the outlet 19 of the device M, float, due to their buoyancy, to the uppermost position possible, being prevented by the device M and the gates 30 from escaping. After the ship has been salvaged, it is apparent that the device M may be removed and the buoyant elements recovered and re-employed.

The method consists in introducing to the hull of a sunken craft, a requisite number of buoyant elements to displace a sufficient quantity of water therefrom to float the vessel to the surface. More particularly, the method includes the steps of arranging means in the hatchway of a sunken craft to provide a passageway having an outlet near the bottom of the hold of the vessel which admits buoyant elements thereto but prevents their escape therefrom, conveying buoyant elements successively from a surface craft downwardly to and through the passageway thus provided, then releasing said elements at the outlet and causing the same to be diverted through the outlet into the hull until a sufficient number have been emplaced within the hull to float the sunken craft to the surface.

While there has been illustrated and described a single and preferred embodiment of the invention, no limitation is intended to the precise structural details, as it is to be understood that variations and modifications which properly fall within the scope of the appended claims may be resorted to when desired.

What is claimed is:

1. A salvaging apparatus for sunken craft including a plurality of buoyant elements, a device emplaceable in the hatch of the sunken craft for admitting said elements therethrough to the hold of the sunken craft and for preventing their escape therefrom, an endless conveyor extending from a surface craft to the sunken craft and through said device, means for connecting said elements to said conveyor and means carried by said device for releasing the elements from the conveyor within the hold of the sunken craft.

2. A salvaging apparatus for sunken craft including a plurality of buoyant elements, a device emplaceable in the hatch of the sunken craft having means for admitting the elements therethrough to the hold of the sunken craft and for preventing their escape therefrom, an endless conveyor to which said elements are detachably connected, said conveyor extending from a surface craft to the sunken craft and through said device and means carried by said device for releasing the elements from the conveyor within the hold of the sunken craft.

3. A salvaging apparatus for sunken craft including a plurality of buoyant elements, a device emplaceable in the hatch of the sunken craft having means for admitting the elements therethrough to the hold of the sunken craft and for preventing their escape therefrom, an endless conveyor to which said elements are detachably connected, said conveyor extending from a surface craft to the sunken craft and through said device and means carried by said device for releasing the elements from the conveyor within the hold of the sunken craft, said device comprising a tubular cage-like body and means for attaching the same within the hold of the sunken craft.

4. An apparatus for raising sunken ships including a plurality of buoyant elements and means for successively conveying said elements from a surface craft, introducing them to and releasing them within the hull of the sunken ship, said means including an endless haul cable extending from the surface craft to the sunken ship and trained around guides disposed respectively on the surface craft and within the hull of the sunken ship, releasable connections between said elements and the cable and means within the hull of the sunken ship cooperating with the buoyant elements to effect the release of said releasable connections.

5. An apparatus for raising sunken ships including a plurality of buoyant elements and means for successively conveying said elements from a surface craft, introducing them to and releasing them within the hull of the sunken ship, said means including an endless haul cable extending from the surface craft to the sunken ship and trained around guides disposed respectively on the surface craft and within the hull of the sunken ship, releasable connections between said elements and the cable, means within the hull of the sunken ship cooperating with the buoyant elements to effect the release of said releasable connection and a device emplaceable in the hatch of the sunken ship having means for admitting the elements therethrough into the hold of the sunken ship and for preventing their escape therefrom.

6. An apparatus for raising sunken ships including a plurality of buoyant elements and means for successively conveying said elements from a surface craft, introducing them to and releasing them within the hull of the sunken ship, said means including an endless haul cable extending from the surface craft to the sunken ship and trained around guides

disposed respectively on the surface craft and within the hull of the sunken ship, releasable connections between said elements and the cable, means within the hull of the sunken ship cooperating with the buoyant elements to effect the release of said releasable connections and a tubular cage emplaceable within the hull extending downwardly through the hatch, provided with an outlet adjacent its lower end, through which the cable extends and about the lower end of which the guide and release means are supported.

7. An apparatus for raising sunken ships including a plurality of buoyant elements and means for successively conveying said elements from a surface craft, introducing them to and releasing them within the hull of the sunken ship, said means including an endless haul cable extending from the surface craft to the sunken ship and trained around guides disposed respectively on the surface craft and within the hull of the sunken ship, releasable connections between said elements and the cable, means within the hull of the sunken ship cooperating with the buoyant elements to effect the release of said releasable connections, a tubular cage emplaceable within the hull extending downwardly through the hatch, provided with an outlet adjacent its lower end, through which the cable extends and about the lower end of which the guide and release means are supported and means within the cage at the upper end of the outlet for permitting of the passage of the elements downwardly therethrough and preventing their upward movement therefrom.

8. In an apparatus for raising sunken ships, buoyant elements and mechanism for conveying the same from a surface craft to, introducing the same to and releasing the same within the hull of the sunken ship, said mechanism including a tubular cage emplaceable in the hatch of the sunken ship and having an outlet adjacent its lower end, an endless haul cable extending from the surface craft to the sunken ship and into said cage, a guide adjacent the lower end of the cage around which said cable is trained, a guide on the surface craft around which the cable is trained, releasable connections between the buoyant elements and the cable, means within the cage adjacent the outlet to cooperate with the buoyant elements to release the same and means adjacent the upper end of said outlet for diverting the released elements from the cage through the outlet into the hull of the sunken ship.

9. A salvaging apparatus for sunken craft comprising in combination a plurality of buoyant elements and mechanism for successively conveying the same from a surface craft to and for causing the release and retention of the same within the hull of the sunken craft including an endless conveyor trained around a guide on the surface craft and to which the buoyant elements are attached, a device emplaceable in the hatch of the sunken craft for admitting the elements therethrough to the hold and for preventing their escape therefrom, a guide carried by said member around which the conveyor cable is trained and means carried by said device for releasing the elements from the conveyor to permit of their entrance into the hull of the sunken craft.

10. A salvaging apparatus for sunken craft comprising in combination a plurality of buoyant elements and mechanism for successively conveying the same from a surface craft to and for causing the release and retention of the same within the hull of the sunken craft including an endless conveyor trained around a guide on the surface craft and to which the buoyant elements are attached, a tubular member insertable through and closing the hatch of the sunken craft and extending downwardly into the hold and having a side outlet adjacent its lower end, a guide for said conveyor cable mounted within said member below said side outlet and around which guide, said cable is trained to convey the buoyant elements through said member into the hull of the sunken craft, means adjacent the outlet for releasing the buoyant elements from the cable and means thereabove for preventing the released elements from escaping through the member and for diverting the same therefrom through the outlet into the hold.

11. A salvaging apparatus for sunken craft comprising in combination a plurality of buoyant elements and mechanism for successively conveying the same from a surface craft to and for causing the release and retention of the same within the hull of the sunken craft including a tubular cage-like member insertable through and closing the hatch of the sunken craft around the member, said member extending downwardly into the hold of the sunken craft and having an outlet above its lowermost end, an endless conveyor means to which the buoyant elements are attached, said conveyor means extending from a surface craft downwardly and through said member to a point below the outlet, means for effecting the release of said elements adjacent said outlet and means in the said member immediately above the outlet for permitting of the passage of the elements downwardly through the member and for preventing their reverse movement and serving to deflect the elements when released through the outlet into the hold of the sunken vessel.

12. A salvaging apparatus for sunken craft comprising in combination a plurality of buoyant elements and mechanism for successively conveying the same from a surface craft to and for causing the release and retention of the same within the hull of the sunken

craft including an endless conveyor trained around a guide on the surface craft and to which the buoyant elements are attached, a device emplaceable in the hatch of the sunken craft for admitting the elements therethrough to the hold and for preventing their escape therefrom, a guide carried by said member around which the conveyor cable is trained and means carried by said device for releasing the elements from the conveyor to permit of their entrance into the hull of the sunken craft, said guide being mounted in said member for tensioned relative longitudinal movement with respect thereto.

GEORGE W. WINKLER.