Feb. 23, 1926. 1,573,909

R. BLUMBERG

EMERGENCY APPARATUS FOR DAMAGED SHIPS

Filed March 10, 1921 4 Sheets-Sheet 1

Fig. 1.

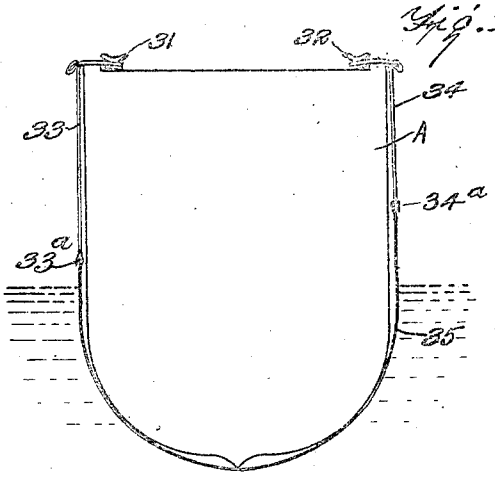


Fig. 2.

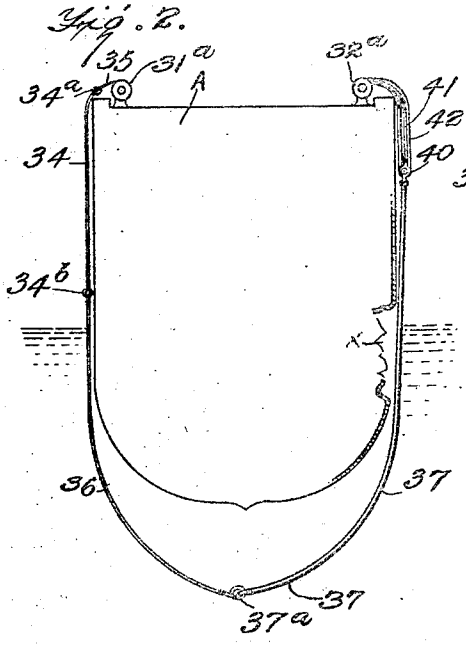
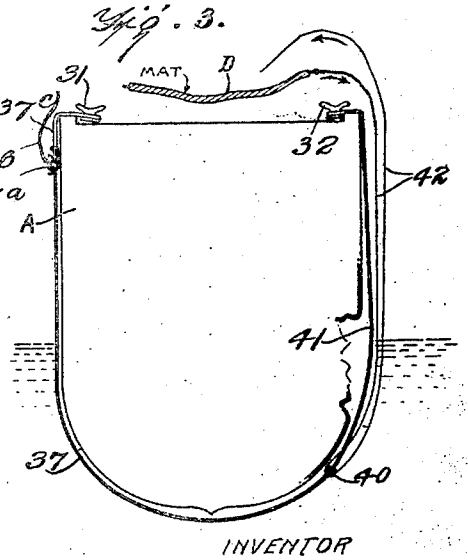


Fig. 3.



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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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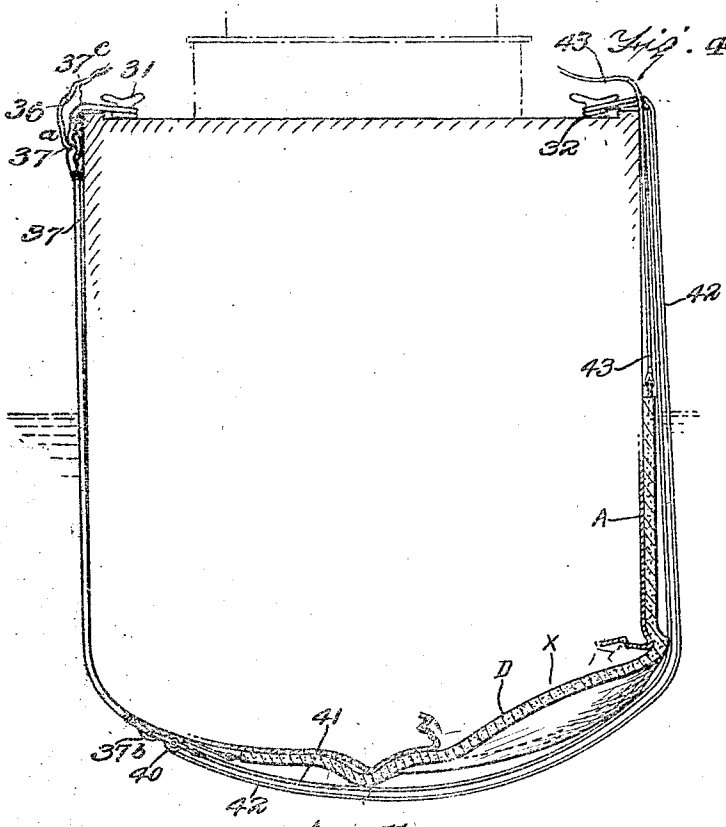


Fig. 4.

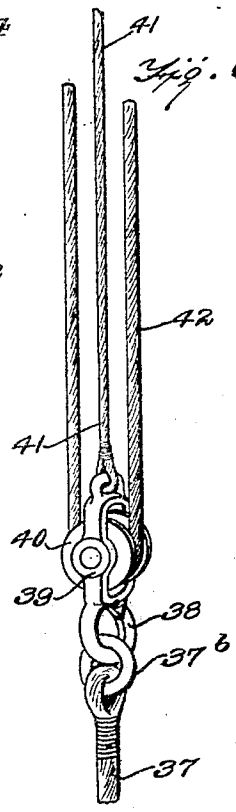


Fig. 6.

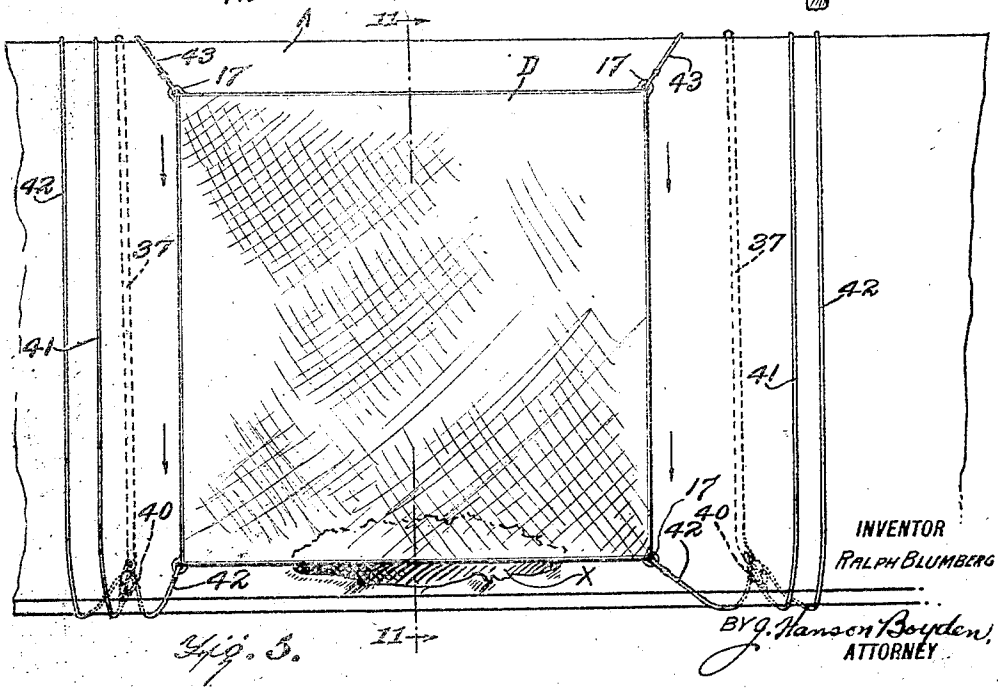


Fig. 5.

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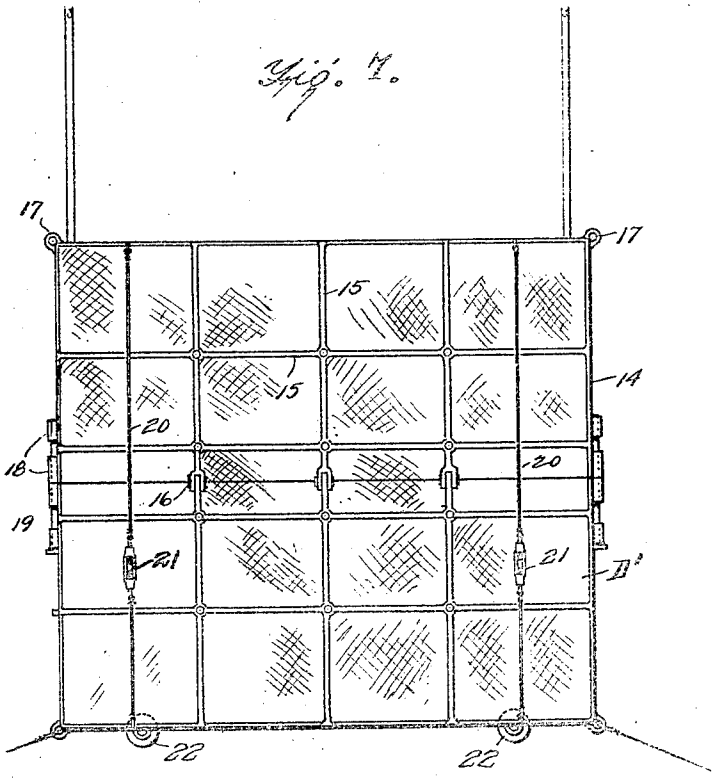
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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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Fig. 7.



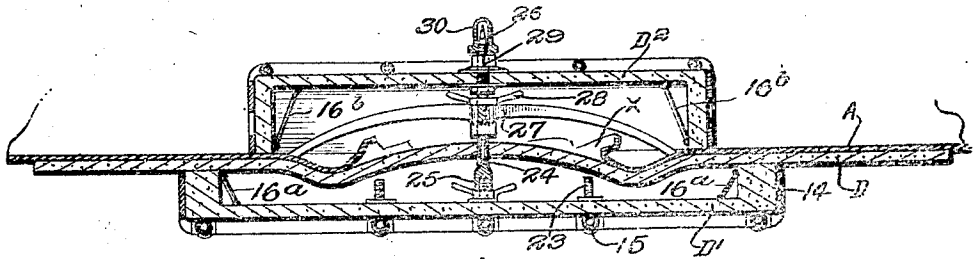
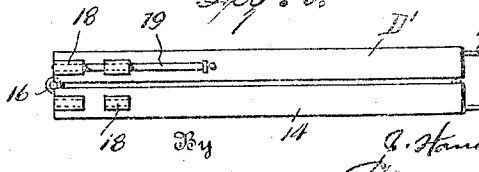


Fig. 8.

Fig. 9.



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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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Fig. 10.

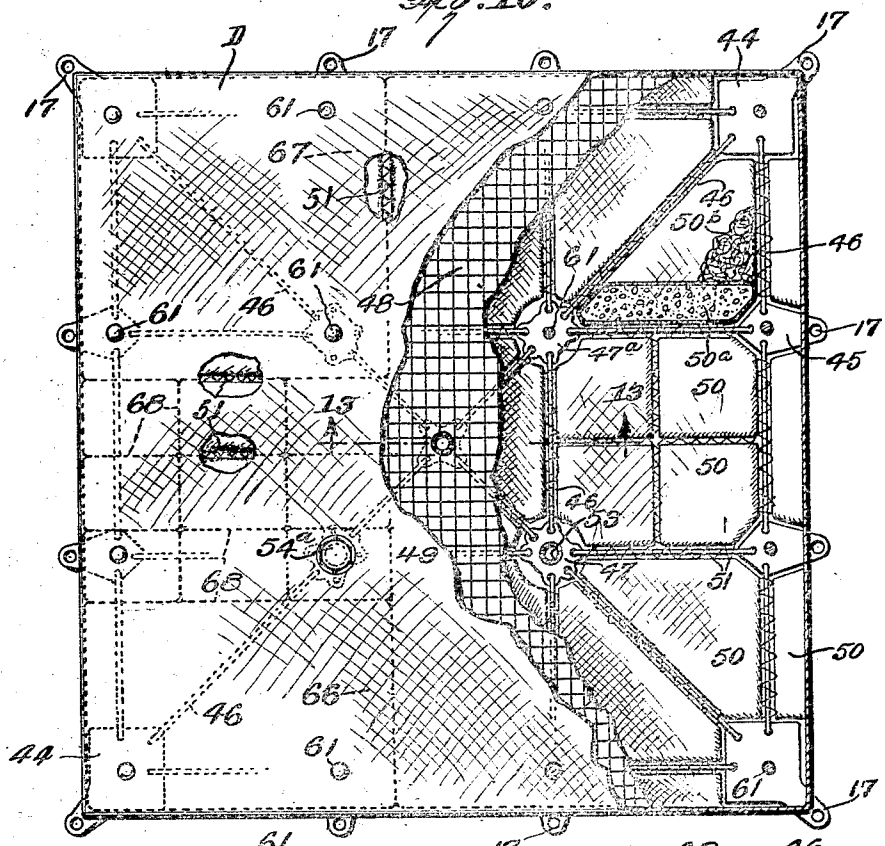


Fig. 14.

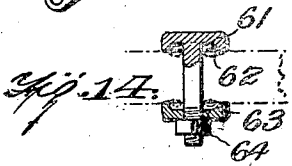


Fig. 11.

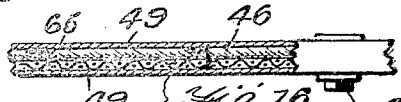


Fig. 16.



Fig. 12.

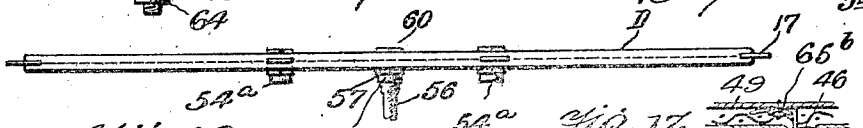
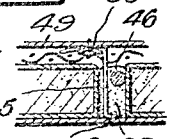


Fig. 17.



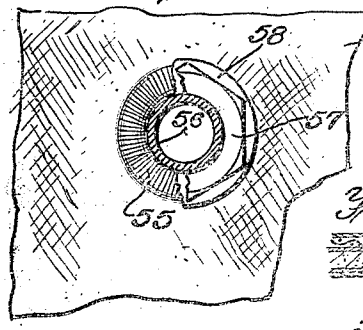


Fig. 13.

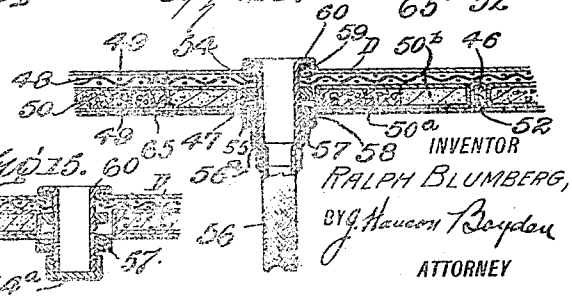


Fig. 15.

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UNITED STATES PATENT OFFICE.

RALPH BLUMBERG, OF BALTIMORE, MARYLAND.

EMERGENCY APPARATUS FOR DAMAGED SHIPS.

Application filed March 10, 1921. Serial No. 451,178.

To all whom it may concern:

Be it known that I, RALPH BLUMBERG, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Emergency Apparatus for Damaged Ships, of which the following is a specification.

This invention relates to emergency safety apparatus for temporarily stopping a rent in the hull of a ship caused by torpedo, collision, or other accident. More specifically the present invention is in the nature of a further development of the apparatus shown in my two prior copending applications, Serial No. 224,827, filed March 26, 1918, and Serial No. 252,197, filed August 31, 1918, the former of which has matured into a Patent No. 1,511,155.

Among the objects of the invention are to provide improved means for lowering a mattress into position; to devise improvements in the structure of the mattress itself and in the method of securing the same over the rent; to produce a mattress having all of the advantages of the mattresses shown in my prior applications and having the further feature of possessing very little weight when submerged; and to provide improved means for inserting a pipe or hose through the mattress for the purpose of pumping the water out of the hull.

In order that my invention may be readily understood, reference is had to the accompanying drawings forming a part of this specification and in which,

Figs. 1, 2 and 3 are diagrammatic or conventional views illustrating the successive steps in my improved method of positioning a mat over the rent;

Fig. 4 is a similar view, but on a larger and more detailed scale, showing the final step of such method, the break being shown as further under the bottom of the ship;

Fig. 5 is a side elevation of the parts shown in Fig. 4, but illustrating the mattress as it appears just before reaching its final or operative position;

Fig. 6 is a perspective view on an enlarged scale of the pulley block and connected cables which I prefer to employ in connection with Figs. 1 to 5, inclusive;

Fig. 7 is an elevation of one construction of mattress, formed of two pivotally connected sections;

Fig. 8 is a horizontal section showing the method in which three separate mattresses can be assembled to effectively close a rent;

Fig. 9 is an edge elevation of the mattress shown in Fig. 7, but illustrating the same in its closed or folded position;

Fig. 10 is a sectional elevation of an improved mattress containing buoyant material;

Fig. 11 is an edge view thereof;

Fig. 12 is a fragmentary detail on an enlarged scale illustrating an opening through the mattress for the reception of a hose;

Fig. 13 is a fragmentary sectional view on an enlarged scale substantially on the line 13—13 of Fig. 10;

Fig. 14 is a sectional view of a bolt or rivet used for securing the parts of the mattress together;

Fig. 15 is a sectional view of the hose connection, similar to Fig. 13, but showing the same closed by a cap;

Fig. 16 is a fragmentary sectional view of a mat somewhat similar to Fig. 13, but showing a modified construction; and

Fig. 17 is an enlarged fragmentary detailed section showing more clearly one of the features illustrated in Fig. 13.

Referring to the drawings in detail, and particularly to Figs. 1 to 6 thereof, I will first describe my improved system of cables for properly positioning a mattress over a rent.

This cable system comprises a series of comparatively thin and light cables or pilot lines 35, distributed at different points along the length of the ship, and extending entirely underneath the hull, from one side to the other, as shown in Fig. 1. The ends of the cables or pilot lines 35 are connected by rings 33ª and 34ª respectively, at points slightly above the water line, to the lower ends of relatively short and heavy cables 33 and 34. These cables extend down along the side of the hull, and are secured to a series of cleats, 31, 32, or the like, fixed adjacent each edge of the ship, on the deck or other suitable support. The pilot cables 35 thus normally remain in the position shown in Fig. 1, but, being relatively small, interpose but a very slight resistance to the travel of the ship through the water. When a rent occurs on one side of the hull as indicated for example at X in Figure 2, a winding drum is brought up to the opposite edge of the ship, as indicated at 31ª in

Figure 2 and the cable 33 disconnected from the cleat 31 and connected to this winding drum. At the same time a second winding drum 32^a, is brought up to the same side of the ship on which the rent occurs. This winding drum 32^a has already wound upon it a cable 36, of the same size as cables 33 and 34, and connected with a relatively heavier cable 37. This intermediate cable 36 is heavier than the pilot cable 35, and lighter than the cable 37. It is strong enough to carry the cable 37 and its associated parts, and at the same time light enough to avoid danger of breaking the pilot cable. The cable 37 is connected with a cable system, as shown in Figure 6, and comprising a pulley block 39, a pulley 40, a cable 42 looped around said pulley, and a guy rope 41 secured to the block. The cable 37 may be attached to the block by means of a ring 37^b and snap hook 38 as clearly shown by Figure 6. As above stated, this entire cable system, including the cables 36, 37, 41, 42 and associated parts, is normally would upon the drum 32^a and stored at some convenient point aboard the ship. When an emergency arises this winding drum 32^a is brought into position and the cable 34 disconnected from the cleat 32 and connected by means of ring 34^b with the free end of the cable 36 carried by the winding drum. The winding drum 31^a is then operated so as to wind up the cables 33, 35, 34 and 36, the cable system 37, 41 and 42 at the same time unwinding from the drum 32^a and passing down over the side of the ship, so as to bring the block 39 around to a point below or beyond the rent. Figure 2 illustrates the position of the parts during the winding operation, after the cable 33 has been entirely, and the cable 35 nearly all wound upon the drum 31^a. The object of providing separate cables 33 and 34, as shown, instead of having the line 35 come entirely up to the deck, is to save cable and time of winding, when an emergency arises. The line 35, as previously stated, is not strong enough to carry the heavy cable 37. Therefore, the heavier intermediate cable system 33, 34, 36 is necessary. By having the cable sections 33, 34 already in place and extending nearly to the water line, all that is necessary is to attach 36, and thus the time required to wind up cable equal to the length of 33 or 34, as the case may be, is saved.

The cables 36 and 37 are connected by means of a ring 37^a, and when the drum 31^a has been operated sufficiently to bring this ring almost up to the deck as shown in Figure 3, an anchoring cable 37^c having a hook at its end, may be engaged with the ring 37^a and then made fast to the cleat 31. The cable 36 is then no longer needed and may be released, as indicated in Figs. 3 and 4. At the same time the end of the guy rope 41 is disconnected from the winding drum 32^a and made fast to the cleat 32. Thus both ends of the cable system are firmly secured to the cleats, thereby forming a strong unyielding continuous girth or semi-belt, extending from one side of the ship to the other, underneath the same.

Having secured the cables 41 and 37 as shown in Fig. 3, the mattress D is then attached to one end of the looped cable 42, it being understood, of course, that one such cable is provided at each side of the mattress. By pulling upon the free end of the cables 42, therefore, so indicated by the arrows in Fig. 3, the mattress can be drawn down along the side of the hull, until it finally reaches the position shown in Fig. 4, in which it completely covers the rent far below the water-line. It will, of course, be understood that holding or steadying lines or cables 43, are also attached to the mattress at the uper edge thereof, to properly hold the same.

From the above it will be apparent that the small cable or pilot line 35 remains always under the ship so that a winding drum may be attached to either the cable 33 or 34 as occasion demands to position the mattress manipulating cables at one side or the other of the hull according to the location of the rent.

Figs. 7 and 9 of the present disclosure illustrate a modified construction of mattress, which I may employ in certain cases and which is in the nature of a further development of the mattress shown in general in Figs. 9 to 20 of my prior application Serial No. 252,197 and particularly Fig. 18 thereof.

This mattress, which is designated by the reference numeral D′, comprises a metallic frame 14 and a series of cross bars 15 with which is associated suitable impervious packing material. This packing material is divided into two sections and the cross bars 15 are hingedly connected as at 16, whereby the entire mattress may be folded upon itself as shown in Fig. 9. Eyes 17 are provided, at the corners, or elsewhere, to receive cables. In order to hold the mattress in its flat or extended condition, locking bolts 19, working through aligned sockets 18, are provided at each edge of the mattress adjacent the hinge thereof. In order to further strengthen the mattress and hold it tight when extended, I preferably provide brace wires or rods 20 extending across the back thereof, and provided with turnbuckles 21. In order to facilitate moving the mattress from place to place along the deck or other part of the ship, I preferably provide a pair of wheels or castors 22 mounted upon the frame 14 at the lower edge of the mattress as shown in Fig. 7.

In Fig. 8, I have illustrated how three separate mattresses may be combined so as

to effectively close a leak or rent. In this figure, D designates any suitable mattress of soft flexible material, while D′ and D² designate auxiliary mattresses having metallic frames and provided with upstanding marginal flanges as described in my former application, Serial No. 252,197, above mentioned. In order to hold these flanges rigid, suitable brace rods 16ª and 16ᵇ are preferably arranged to extend diagonally from the edge of the flanges to a point within the body of the mattress, these braces being preferably connected with the metallic frame work of the mattress. The mattress D′ is provided with a plurality of inwardly projecting screw studs 23 and an anchor bolt or rod 24 is provided having a screw threaded socket 25 adapted to engage over any one of the studs 23. After the mattress D has been placed in position, as above described, or as shown in Figure 4 (for example) the anchor bolt 24 is mounted upon a suitable one of the studs 23 and the mattress D′ is lowered into such position that the anchor bolt 24 is opposite the rent X. Then by pressing this mattress toward the ship the anchor bolt 24 which has a sharpened point 26, is caused to pierce through the mattress D and project into the inside of the hull. A suitable spider 27 is then slipped over the projecting end of the bolt 24 and is secured in position by means of a nut 28. If water has meanwhile entered a watertight compartment through the rent, it might be difficult to adjust the spider, and the water should first be pumped out. If the compartment is not watertight, the water will flow away in all directions. After the fastening of spider 27 has been accomplished, the third mattress D² may be adjusted from the inside of the ship so as to cover the rent and enclose the spider, and is then seated against the inside of the hull so as to cause the bolt 24 to pierce and extend through the mattress. A clamping nut 29 is then placed upon the projecting end of the bolt so as to hold the mattress in position, and finally the point of the bolt is covered by means of a cap 30 which is screwed onto the bolt outside of the nut 29.

In Figs. 10 to 17, I have illustrated the improved construction of mattress which I prefer to employ. Referring to these figures, it will be seen that the eyes 17 heretofore mentioned are formed integral with corner plates 44 and intermediate plates 45. These edge and corner plates, as well as a suitable number of central plates 47 and 47ª, are connected by metal rods or links 46, or the like, as in my prior application above referred to. Instead, however, of making the mattress in one continuous sheet, as in my former applications, I now propose to form the same of a number of separate and independent pads 50. These pads may be covered with canvas or other suitable material and may contain either fibrous filling material or stuffing, or some buoyant material such as cork. The fibrous and buoyant material may be mixed throughout each pad or some of the pads, such as indicated at 50ª may consist wholly of buoyant material, such as cork of some kind, while others of the pads may be filled entirely with fibrous material, as indicated at 50ᵇ. In any event the object and purpose of the buoyant material is to neutralize the weight of the metal link work and reinforcement, so that, when the mattress is submerged it will have very little weight, or will, in other words, be of almost the same specific gravity as water. It is obvious that by slightly varying the proportion of buoyant material in the mattress, it is possible to produce a mattress which will be either the same weight as water or slightly heavier, so as to sink properly when lowered. By causing the mattress to have only slight weight when submerged it becomes much easier to manipulate the same, and causes less strain on the cables.

The object of constructing the mattress of a plurality of independent water-proof pads is to prevent the entire mattress from becoming soaked, should a leak occur at one or more points, and thus avoid excessive weight.

The reinforcing bars or links 46 extend between the pads 50 and are imbedded in suitable packing 52 (see Figure 17), the pads themselves being preferably held together by means of suitable lacing or stitching 51. Superposed upon the pads and link work is a sheet 48 of netting of woven wire or other suitable material, and the whole is enclosed in a casing or covering 49 of canvas or any suitable material. In use, the woven wire is placed on the side of the mat adjacent the hull, so as to support the pressure on the pads and carry the strain.

While in the right-hand portion of Figure 10, I have shown the separate pads as of triangular or irregular shape, adapted to fit between the rods, constituting the metal link work, I also propose to employ square or rectangular pads as indicated at 66 and 67 at the left-hand side of Figure 10, in dotted lines. It is obvious that if a pad as large as that indicated at 66 or 67, were filled with granulated cork, for example, it would be impossible to hold the material in position. I, therefore, propose to build up each of the large rectangular pads from a number of small, separate blocks or packages such as indicated at 68. Each of these blocks will comprise a bag or package of canvas or the like filled with granulated cork or other suitable material. These blocks are then assembled as by lacing or

stitching 51 so as to form large pads and these are enclosed within a second covering or casing of canvas or the like. These large casings 66, 67 are then also laced together to form one continuous pad. In this way the filling material is held securely in position and shifting thereof prevented. In the case of rectangular pads as described, grooves or channels will be formed therein to accommodate the link work.

The parts of the entire mattress are firmly held together by means of bolts or rivets 61 which pass through the plates 44, and 45, etc. The heads of these bolts are concave on the under side as shown at 62, in Fig. 14, and under the nut 64 are employed concave washers 63. The purpose of this construction will hereinafter appear.

In order to facilitate the discharge of water from the flooded hull, I provide means whereby one or more hose 56 may be connected with passages extending through the mattress at different points. To this end a screw threaded hole 53 is formed in a number of the central plates 47 and a corresponding hole in each side of the canvas covering 49. The edge of these holes in the canvas, as well as the holes through which the bolts 61 pass, are preferably reinforced with thread or cord after the manner of working button-holes. This is indicated at 55 in Figure 12.

The plates 47 are provided with smaller holes to receive bolts 61, as described in connection with plates 44 and 45. Through each of such plates having the larger hole 53, therein, however, extends a ferrule 54, provided with an annular head or flange 60. The body of the ferrule is also externally screw-threaded to engage the threaded hole 53 and to receive a nut 57, suitable concave washers 58 and 59 being placed under the nut and head respectively. It will be understood that these washers co-operate with the reinforced edges 55 of the holes in the canvas forming a water-tight joint. In the same way, the concave bolt heads and washers shown in Figure 14 co-operate with the reinforced edges 55 surrounding them to prevent slipping and to form water-tight joints.

The opening through the ferrule 54 is normally closed by means of a cap 54^a, as shown in Fig. 15, screwed on to the projecting threaded end of the ferrule 54. When, however, it is desired to connect a water hose to any of the ferrules, the corresponding cap is removed and a threaded hose coupling 56^a to which a hose 56 is attached, screwed on instead. It will be understood that the hose are connected before the mattress is lowered into the water, or they may remain permanently attached to the mattress.

As shown in Fig. 16, I may, in some cases, omit the fibrous or other filling entirely, and form a mattress consisting only of the link work 46, netting 48, and canvas case 49, together with the other features shown in Figs. 10 to 15.

While I have shown the link work 46 as having comparatively large meshes, it will, of course, be understood that such meshes can be made as small as desired.

In Figs. 16 and 17, I have shown an improved means for holding the canvas on opposite sides of the mattress together. This consists of a plurality of straps 65, suitably distributed through-out the mattress. One end of each strap is attached to the canvas casing on one side, as indicated at 65^a, in Fig. 17, while the other end is secured in a buckle 65^b, carried by the canvas at the other side of the mattress.

A mattress of the same general construction can also be employed for caisson work, or, in connection with a suitable skeleton frame, used to form a boat or raft.

What I claim is:

1. The combination with a ship, of a comparatively light cable normally passing around under the same, heavier cables secured to the ends of said light cable and normally anchored to the ship, a pulley block adapted to be secured to one of said heavier cables, a mattress carrying cable passing through said pulley block, and means operating through said heavier cables for shifting said pulley block to a point below the water line.

2. The herein described method of positioning a mattress over a rent in the hull of a ship which consists, first, in providing a thin pilot line normally running underneath the ship from one side to the other, and attached at its ends to heavy cables; second, letting out one of such heavy cables and drawing in the other and said pilot line until the first heavy cable has been drawn entirely under the ship, with one end extending to the opposite side thereof, and a ring or pulley with a second line looped therethrough attached to the other end; third, drawing said first cable until its end carrying the said ring or pulley has been positioned below the rent; and fourth, attaching a mattress to one end of said second line, and pulling on the other end until the mattress reaches the desired point.

3. The herein described method of positioning a mattress over a rent in the hull of a ship which consists in, first, providing a thin pilot line normally running underneath the ship from one side to the other and attached at its end to heavy cables; second, attaching an empty winding drum to one of said heavy cables and attaching to the other heavy cable one end of a cable system wound upon a second winding drum, such cable system, including a pulley with a line looped therearound; third, operating the first wind-

ing drum until the pilot line and heavy cable attached thereto have been wound up sufficiently to position the said pulley at a point below the rent; fourth, making fast the ends of the belt of cable passing under the ship, and including the pulley; and fifth, attaching a mattress to one end of the line looped around the pulley and pulling on the other end thereof to draw the mattress down into position.

4. A mattress comprising a rigid frame and a body of suitable impervious material, said frame being formed of a pair of pivotally connected sections, capable of folding, and bolts on the outside edges of the mattress for locking said sections in operative position.

5. Means for stopping a rent in the hull of a vessel comprising a first mattress overlying the rent outside of the hull, a second mattress superposed upon the first, and a tie rod or anchor carried by the second mattress and extending through the first at the point where it covers the rent.

6. Means for stopping a rent in the hull of a vessel comprising intermediate, inner and outer mattresses, and an anchor rod attached to the outer mattress and extending through the other two at the point where they overlie the rent, so as to hold all three firmly together.

7. A metal re-enforced mattress composed partly of buoyant material, so that the specific gravity of the whole will be approximately equal to that of water.

8. A metal re-enforced mattress having in its makeup sufficient buoyant material to substantially compensate for the weight of the metal, so that the weight of the whole, when submerged, will be comparatively small.

9. A mattress comprising link work, and separate canvas covered pads between the links, some of said pads containing buoyant material.

10. A mattress comprising a woven wire backing, re-enforcing link-work, separate pads between the links, and a canvas covering over all.

11. A mattress comprising metallic re-enforcing members and buoyant pads associated therewith, each pad comprising a casing containing a plurality of individual packages of such material.

12. The combination with a mattress having a plurality of openings therethrough, of means for normally closing said openings, and a hose having means for connecting it with any of said openings when the closing means is removed.

13. The combination with a mattress comprising link work and connecting plates, one of said plates having an opening, a threaded ferrule fitting in said opening and extending through the mattress, and a hose having means for attachment to said ferrule.

14. The combination with a mattress having a canvas cover, and provided with an opening, the edges of the canvas adjacent the opening being reinforced by stitching, of a ferrule passing through said opening, and locking washers on said ferrule bearing against such reinforced edges of the canvas to form a water-tight joint.

15. The combination with a mattress having a canvas cover, of bolts passing through the mattress from one side to the other, the holes in the canvas cover through which the bolts pass having edges reinforced by stitching, and the bolts having concave heads cooperating with such reinforced edges to form a water-tight joint.

16. A mattress comprising a canvas casing and an enclosed body, and anchor straps extending through said body and attached at their ends to the canvas casing, whereby the sides of said casing are held together and prevented from separating.

17. A mattress consisting only of a reinforcing frame of link work, netting overlying the same, and a canvas covering on both sides.

In testimony whereof I affix my signature.

RALPH BLUMBERG.