Aug. 18, 1925. 1,550,144

R. BLUMBERG

EMERGENCY APPARATUS FOR DAMAGED SHIPS

Filed Feb. 13, 1920 7 Sheets-Sheet 1

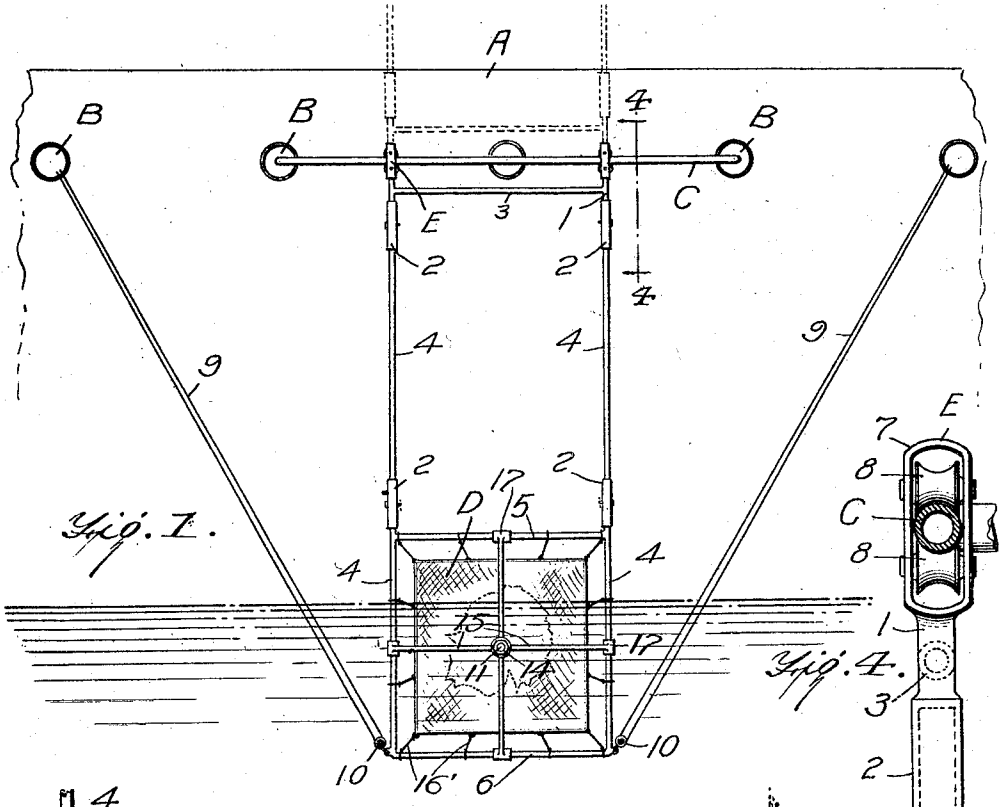


Fig. 1.

Fig. 4.

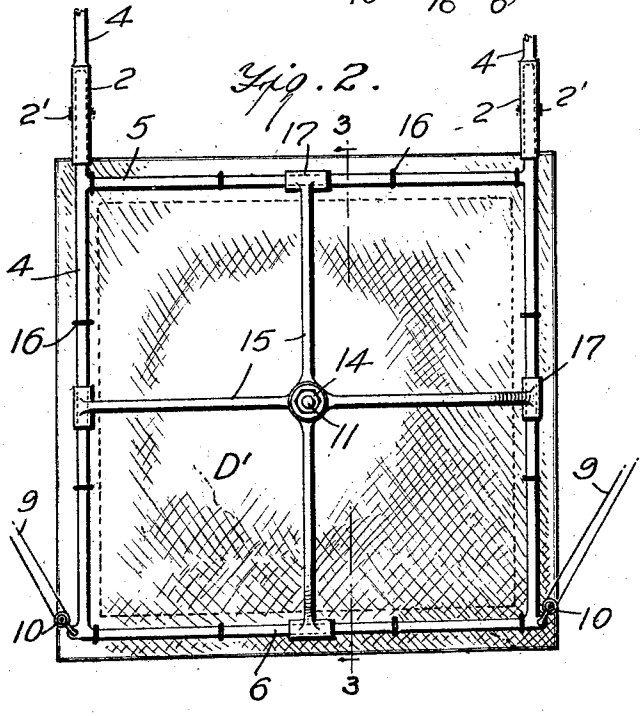


Fig. 2.

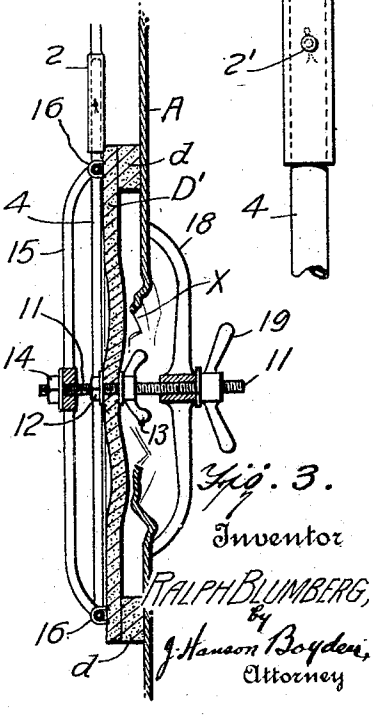


Fig. 3.

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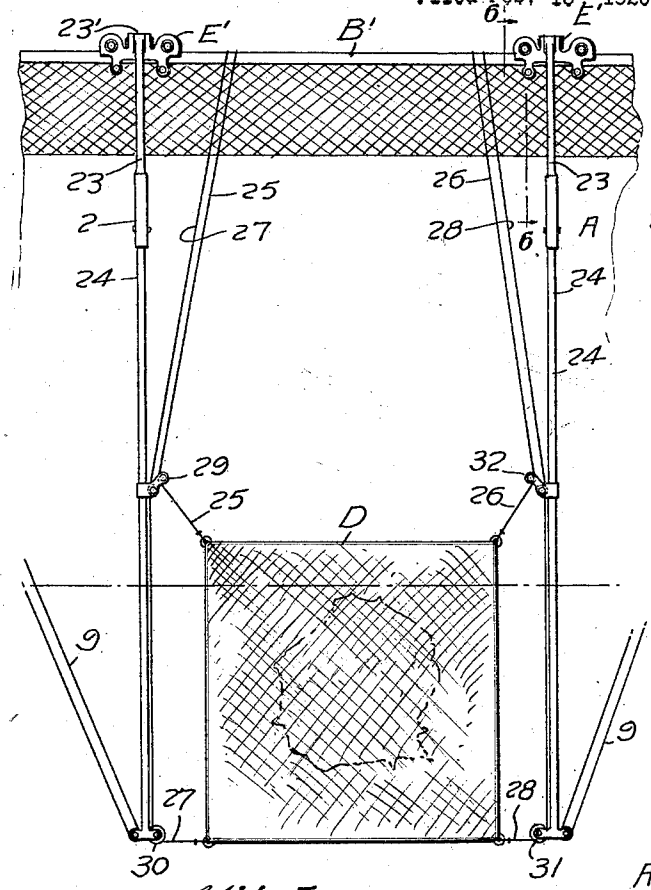


Fig. 5.

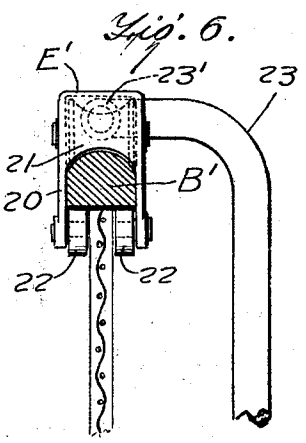


Fig. 6.

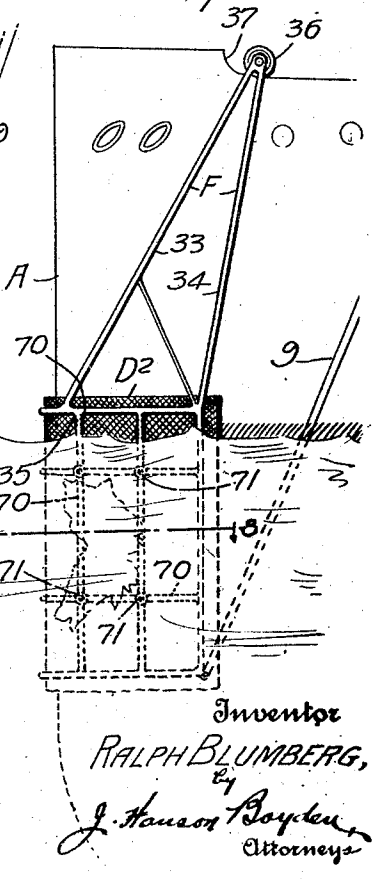


Fig. 7.

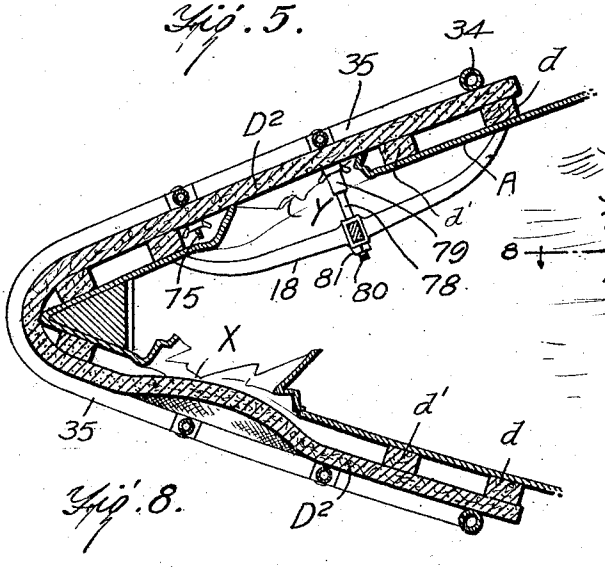


Fig. 8.

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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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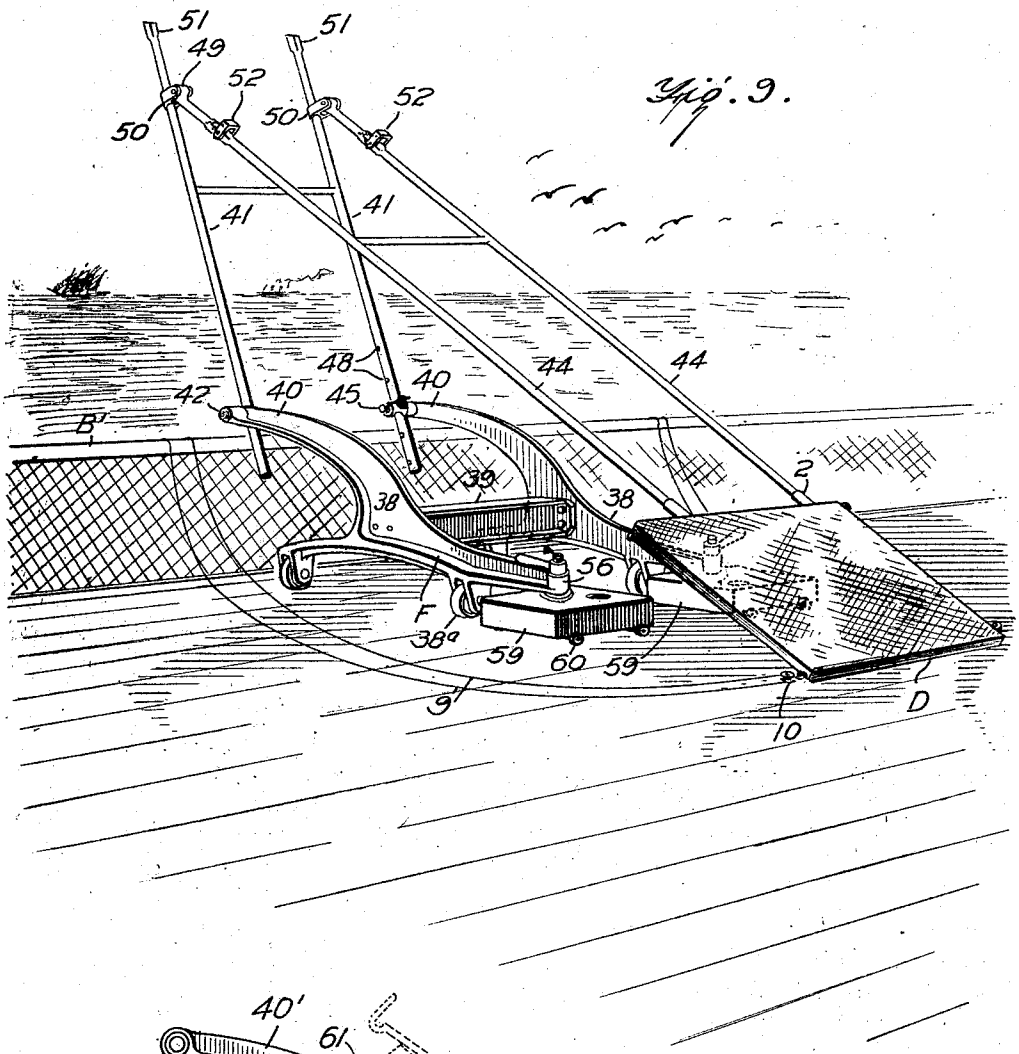


Fig. 9.

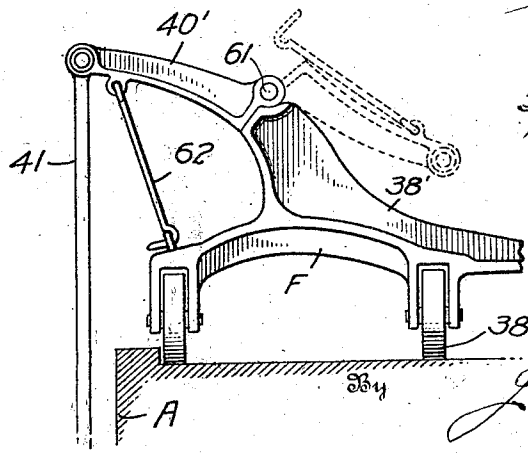


Fig. 14.

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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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Fig. 10.

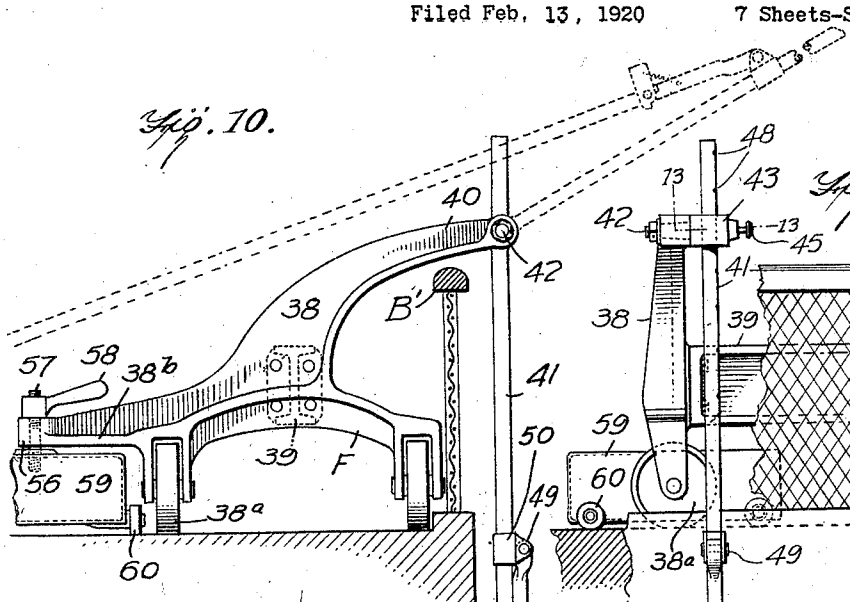


Fig. 11.

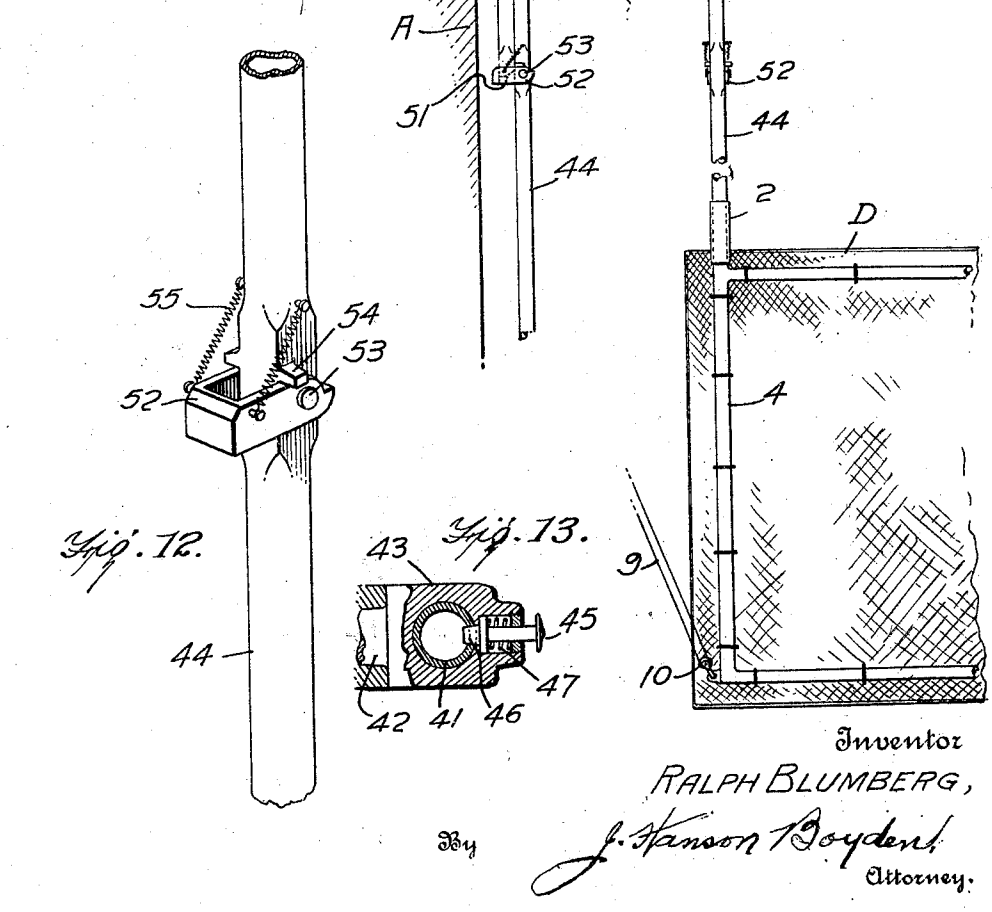


Fig. 12.

Fig. 13.

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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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Fig. 15.

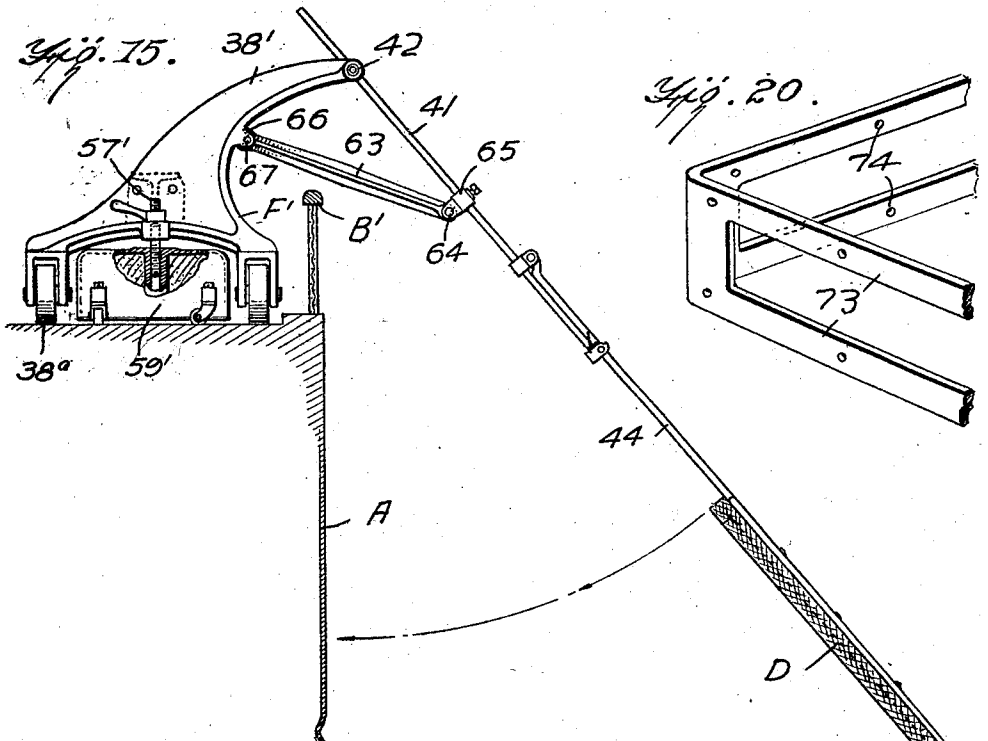


Fig. 20.

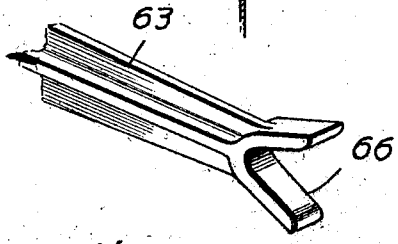


Fig. 17.

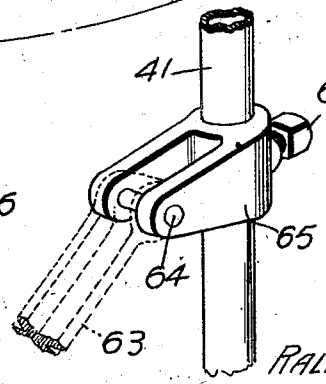


Fig. 16.

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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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Fig. 18.

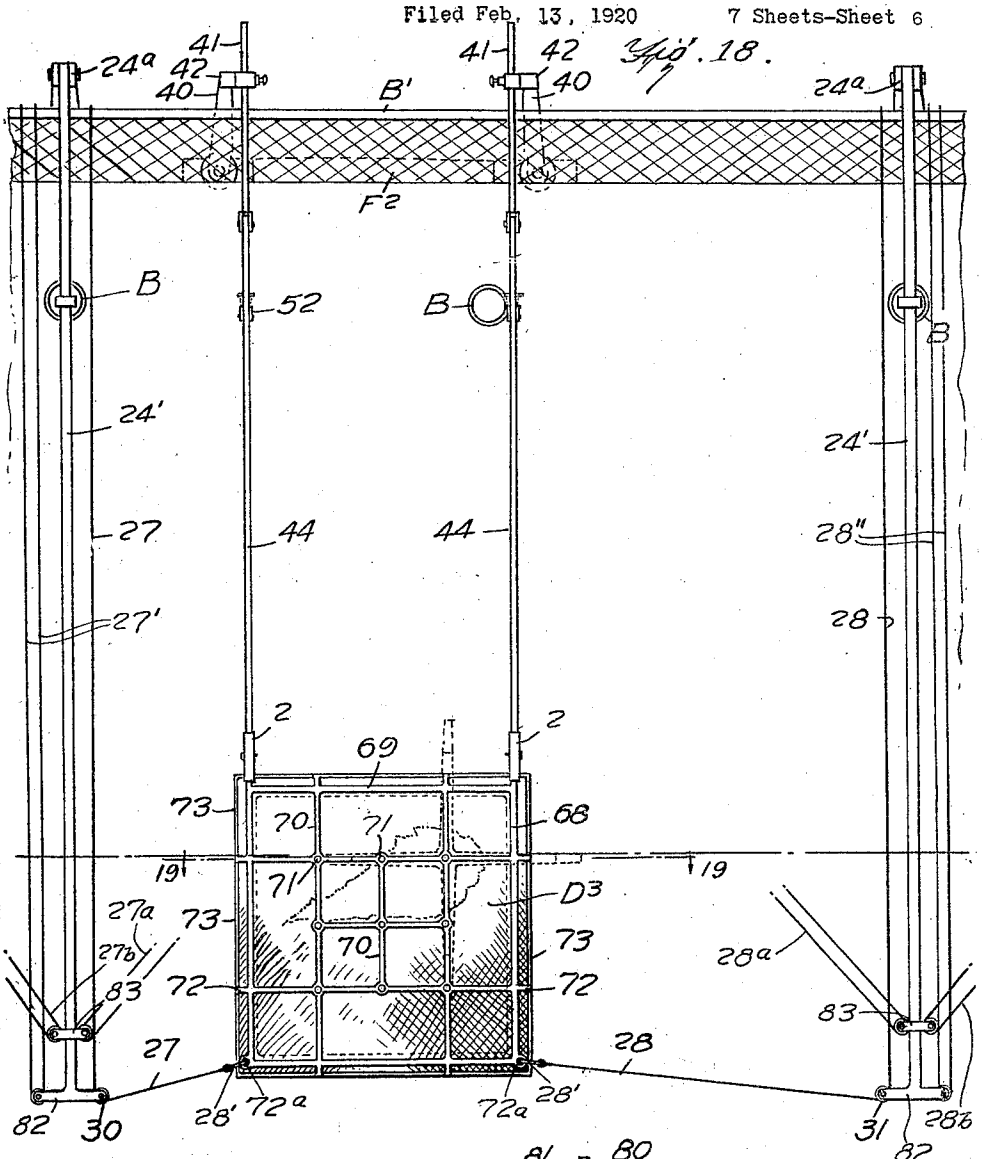
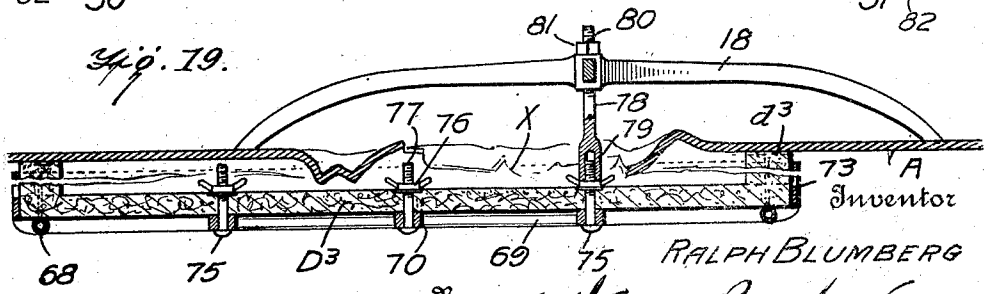


Fig. 19.



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EMERGENCY APPARATUS FOR DAMAGED SHIPS

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Fig. 23.

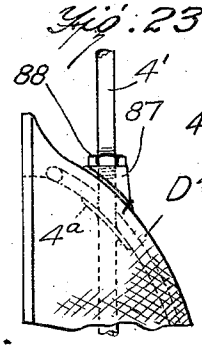
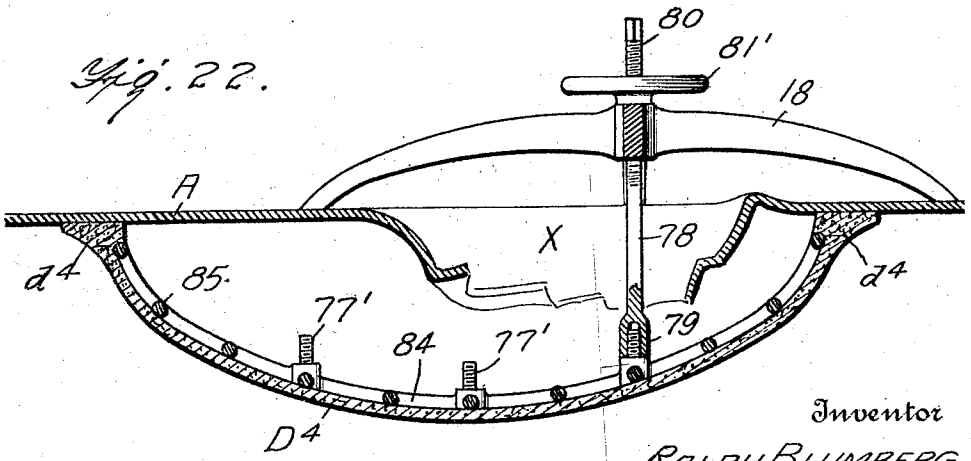


Fig. 21.

Fig. 22.



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Patented Aug. 18, 1925. 1,550,144

UNITED STATES PATENT OFFICE.

RALPH BLUMBERG, OF BALTIMORE, MARYLAND.

EMERGENCY APPARATUS FOR DAMAGED SHIPS.

Application filed February 13, 1920. Serial No. 358,480½.

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 a further development of the apparatus disclosed in my prior co-pending application Serial No. 224,827, filed March 26, 1918.

Among the objects of the invention are to provide means for positively securing the mattress in position over the rent; to devise improved apparatus for more conveniently lowering and positioning the mattress; and to provide special means for supporting a mattress for use at the extreme bow of a ship; all without changing in any way the structural features of the usual existing types of ships in common use.

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

Figure 1 is a fragmentary side elevation of the hull of a ship showing one method of supporting a mattress holding frame therefrom;

Figure 2 is an outside elevation on an enlarged scale showing a portion of the supporting frame and my improved means for securing the mattress in position;

Figure 3 is a vertical transverse section substantially on the line 3—3 of Figure 2;

Figure 4 is an enlarged fragmentary sectional elevation taken on the line 4—4 of Figure 1;

Figure 5 is a side elevation showing a modified construction of mattress lowering and positioning means;

Figure 6 is an enlarged fragmentary sectional elevation on the line 6—6 of Figure 5;

Figure 7 is a side elevation of the bow of a ship showing my improved bow protecting means mounted thereon;

Figure 8 is a horizontal sectional plan taken on the line 8—8 of Figure 7;

Figure 9 is a perspective view of a still further modified arrangement of apparatus for controlling and positioning the mattress;

Figure 10 is a side elevation of such apparatus, parts of the ship being in section, and one position of the frame members being shown in dotted lines;

Figure 11 is a fragmentary front elevation of the same, parts being broken away;

Figure 12 is an enlarged perspective view of a spring latch which I employ;

Figure 13 is an enlarged sectional plan of a structural detail, the section being taken substantially on the line 13—13 of Figure 11;

Figure 14 is a side elevation showing a slightly different construction of supporting truck;

Figure 15 is a side elevation, similar to Fig. 10, but showing a slightly modified construction;

Figures 16 and 17 are enlarged fragmentary details in perspective, showing structural features embodied in the apparatus illustrated in Figure 15;

Figure 18 is a side elevation similar to Fig. 1, but showing a still further modified arrangement;

Figure 19 is a sectional view of the mattress and securing means therefor, similar to Figure 3, but showing a different construction;

Figure 20 is a fragmentary perspective view on an enlarged scale showing a detail of construction embodied in Figure 19;

Figure 21 is a front elevation, similar to Figure 2, showing a still further modified construction of mattress, parts being broken away;

Figure 22 is a transverse section substantially on the line 22—22 of Figure 21, the hull of a ship being also shown in section; and

Figure 23 is a fragmentary side elevation, on an enlarged scale, of the upper part of the mattress shown in Figure 21.

Referring to the drawings in detail and more particularly to Figure 1 thereof, A represents the hull of a ship and B port holes therein. A rail C is mounted longitudinally of the hull and spaced therefrom, the ends of this rail entering two port holes and being secured therein in any suitable manner. It will be understood that the rail C may be positioned at any desired point along the length of the hull by inserting its ends into any two desired port holes.

The mattress carrying frame is supported from the rail C by means of a pair of car-

riages E. Each of these carriages comprises a yoke 7 in which are mounted a pair of concave rollers 8 adapted to engage both above and below the rail C.

The frame itself consists of members 1 secured to the yokes 7 and united by a cross bar 3. Below this bar extend vertically a pair of side members 4, such members being preferably formed in sections united by means of couplings 2. These couplings are preferably of a detachable character and may comprise telescoping members held together by transverse pins 2′.

At the lower portion of the frame is a rectangular structure formed by side members 4 and top and bottom cross bars 5 and 6 and within this rectangular structure is secured the mattress D in any suitable manner, as by short cables 16′. At the lower end of the side members are mounted pulleys 10 over which pass controlling cables 9 for the purpose of steadying the frame in proper position. These may conveniently enter certain of the port holes B.

In practice the mattress and lower part of the frame may be stored on board the ship in any convenient location. When occasion requires the upper part of the frame including the members 1 and 3 is swung upwardly into vertical position, as indicated by dotted lines in Figure 1 and the lower part of the frame carrying the mattress is then attached to the upper part by means of the couplings 2. The whole is then swung outwardly and downwardly into position and can be adjusted longitudinally of the rail C so as to properly cover the damaged portion of the hull.

In order to positively secure the mattress in place over the rent, I provide the construction shown in detail in Figures 2 and 3. Referring to these figures, it will be seen that a screw 11 passes through the center of the mattress and is tightly secured thereto by means of washers and lock nuts 12 and 13. The outer end of the screw is engaged with the center of a four-armed spider 15, to which it is secured by means of the nut 14. In the present embodiment, the mattress is preferably secured to the framework 4, 5 and 6, by means of staples 16 as shown, or other fastening devices, and the ends of the spider arms terminate in suitably shaped sockets 17 which are adapted to embrace the frame members.

As in my former application, the mattress D′ shown in Figures 2 and 3 is preferably provided with a marginal flange or rim *d*. This is for the purpose of engaging the hull around the rent and making a tight joint, and to space the mattress from the ragged edges. In order to make the mattress conform more closely to the shape of the hull I propose to pack the rim with the fibrous filling more tightly at the corners than at the center of the sides. In other words, the stuffing will be softest and loosest at the middle of the sides, and increase in hardness and tightness toward the corners.

In order to repair the ship hurriedly and put it in sea-going condition, when the hull has been punctured, I propose that after the mattress has been swung into position over the rent *a*, as above described, with the screw 11 projecting through such rent, a second spider 18 is to be slipped over the inner end of the screw and clamped in position by means of a wing nut 19. It will be understood that the ends of the spider 18 bear against the inside of the hull so as to securely hold the mattress in position. After it has been clamped, as just described, the lower couplings 2 may be disconnected and the rest of the frame detached.

Referring now to Figures 5 and 6, I have shown a slightly modified arrangement in which instead of a rigid frame, only a pair of side members is employed. These side members are preferably formed in sections united by couplings 2, as above described. Each side member consists of portions 23 and 24 each of the portions 23 being pivotally connected at 23′ to a carriage E′ adapted to travel along on the usual rail B′. These carriages are similar to that shown in my former application and consist of a frame 20 carrying a pair of rollers 21 adapted to fit the top of the rail and two pairs of rollers 22 adapted to engage underneath the same. It will be noted that the members 23 are bent at right angles, as shown in Figure 6, so as to space the mattress and associated parts a short distance from the side of the hull.

The members 24 carry pulleys 29, 30, 31 and 32 around which pass controlling cables 25, 26, 27 and 28 by means of which the position of the mattress D may be adjusted as desired.

The arrangement shown in Figures 5 and 6, above described, is well suited for use at the extreme bow of the ship. In this case one of the members 24, and associated parts, would be on one side and one on the other, with the mattress extending around the bow after the manner indicated in Figure 8.

In Figures 7 and 8, however, I have shown another form of mattress supporting device, also adapted especially for use at the extreme bow or stern, where either one or two rents, X, Y, are likely to occur. In this case I have provided a somewhat larger mattress D^2, adapted to extend around on both sides of the hull, as shown in Figure 8. This mattress also has ribs or rims *d d′* which may extend around the edges or be located at other suitable points. The frame F for supporting this mattress preferably consists of two pairs of upwardly converging members 33 and 34 suitably braced and connected at

their lower ends with upper and lower horizontal members 35 of such shape as to conform with and snugly embrace the bow of the hull. At their upper ends the members 33 and 34 are united and pivotally mounted in any suitable way. In the embodiment shown they are illustrated as attached to a pulley 36 which is adapted to roll along a suitable track having a stop 37 at its end to limit the forward movement of the device. Any desired means for raising and lowering the frame and mat for swinging them upwardly about their pivotal support may be provided. In Figure 7 also I have illustrated the mattress supporting frame as comprising a plurality of cross bars 70, having bolt holes 71 at their points of intersection, for a purpose more fully hereinafter explained and in connection with Figures 18 and 19.

In Figures 9 to 14, inclusive, I have shown a further modified arrangement for supporting and manipulating the mattress. Referring to these figures, the mattress frame is supported on a truck F which is mounted on rollers 38^a so as to be freely movable over the deck. This truck preferably comprises two side members 38 shaped as shown in Figure 10 and spaced apart and united by an I-beam 39. The members 38 have forwardly projecting arms 40 which extend over the railing B. Pivoted by means of bolts 42 to the ends of the arms 40 are side members 41 constituting part of the frame by which the mattress is manipulated. These members 41 are preferably vertically adjustable and to this end they are shown in Figures 11 and 13 as held in rotatable blocks 43, secured to the bolts 42. The members 41 are preferably provided with holes or notches 48 in which the end 46 of a plunger 45 is adapted to engage, such plunger being urged inwardly by a spring 47, as clearly illustrated in Figure 13.

The mattress D is secured to a frame 4 in the manner above described in connection with the other figures and this frame is united by means of coupling members 2 to side members 44. The side members 44 are pivotally connected at their ends, as indicated at 49, to brackets 50 secured to the members 41. The members 41 project beyond the brackets 50 so as to act as a stop to limit the movement of the members 44, such an arrangement constituting what is known as an elbow joint. In order to lock the members 41 and 44 in alined position, I provide latch members 52 pivoted to the members 44 at 53 and associated with lugs 54 arranged to limit the movement of the swinging latch members. Springs 55 normally hold the latch members against the lugs 54 (see Figure 12). The extreme ends of the members 41 are beveled, as indicated at 51 and, when the members 44 are swung into alinement with the members 41 these beveled ends 51 engage under the swinging latch members 52 and thus lock the two members 41 and 44 together in substantial alinement, as shown in Figure 10.

The side members 38 of the truck F are extended rearwardly to form tail pieces 38^b at the ends of which are provided circular bosses 56 through which pass bolts 57 secured by hand nuts 58. To these bolts, underneath the tail pieces 38^b, are attached weight boxes 59, mounted on rollers 60. These weight boxes may be filled with sand or other suitable heavy material and are for the purpose of counter balancing the weight of the mattress and associated parts so as to prevent the truck from tilting.

In other modifications, I have described how, when an emergency arose, it was necessary to couple together the various frame sections before the mattress could be lowered. In the present arrangement, in order to save time and secure quick movement, I propose to have the parts normally all united, so that the complete equipment, comprising the mattress, and the frame members 41 and 44, and associated parts, is always ready for instant use. The apparatus will be stored in some such relation as shown in Figure 9, with the mattress lying at a low elevation and at an angle, thus not interfering with navigation.

The method of manipulating the apparatus just described will be apparent. With the parts in the position shown in Figure 9, the mattress and attached frame are so moved as to first cause the side members 41 to rotate about the pivots 42 until the members 44 rest upon the blocks 43 in a substantially horizontal position. The mat is then lifted so as to cause both the members 41 and 44 to continue their swinging movement around the pivots 42 until a vertical position is reached. The mat and attached side members 44 are then swung outwardly over the side of the ship, turning about the pivots 49 and when the members 44 reach a vertical position, the latch members 51 will engage the swinging latches 52 and lock the parts rigidly in position, as shown in Figure 10. During this lowering operation, the cables 9 are used to steady the mattress and control its movement.

The location of the mattress longitudinally of the ship can then be determined by rolling the truck and attached weight box along the deck, as well as by manipulating the cables 9, as described in connection with Figure 1.

In some cases it may be desirable to form the side members of the truck as indicated in Figure 14, in which figure the side members 38′ have the arms 40′ pivotally connected thereto by means of a rule joint 61 so that the arms 40′ may be swung back

out of the way, as indicated in dotted lines. A hook or the like, 62, may be employed for holding the arms 40′ in extended position.

In order to effect the proper operation of the joint connecting the members 41 and 44, and to insure the locking of these members rigidly together before the mattress reaches the water, I may employ the slightly modified arrangement shown in Figure 15. In this figure F′ designates the truck, 59′ the weight box, attached by a bolt 57′, and 38′ designates the truck arms. To each of the members 41 is secured by means of a set screw 65^a a bifurcated bracket 65, to which is pivotally connected at 64 one end of a brace bar 63. The free end of this brace bar terminates in a pair of flaring jaws 66, adapted to engage a pin 67 carried by one of the arms 38′ of the truck. When lowering the mattress as described, these brace bars are used to arrest the swinging movement of the members 41 in the position shown in Figure 15 until the members 44 and associated parts have also reached the position indicated in this figure, and have become rigidly locked to the members 41. Then, by slightly raising the connected frame 41, 44, the brace bars 63 will be released from the pins 67, and the entire frame and mat can swing downwardly into place, as indicated by the dotted lines.

In Figure 18 I have shown a plurality of fixed spaced frame members 24′ pivotally mounted at their upper ends 24^a to a suitable support. These members may be anchored at the port holes B as shown. The mattress is carried by members 41—44, as above, and these are mounted on a truck F^2.

The members 24′ are provided at or near their lower ends with one or more transversely extending brackets, two of such brackets 82, 83 being shown. Each bracket carries a pair of pulleys 31, as illustrated, and around these pulleys pass pairs of cables 27, 28, 27′, 28′, 27^a, 28^a, and 27^b, 28^b. One end of each of these cables, as, for example, the cables 27, 28, is equipped with snap hooks 28″. The cables are normally passed around the pulleys, and both ends carried up to the deck. When an emergency arises, and it is desired to lower a mattress, the snap hooks of a pair of cables are quickly engaged with rings or eyes 72^a formed at the lower corners of the mattress and the cables may then be employed to pull the mattress rapidly down through the water and properly position the same.

It will be understood that the members 24′ may be placed any desired distance apart, and are permanently anchored, as shown. A plurality of mattresses may be located between each pair of such members, and positioned by means of the various pairs of cables above described.

The mattress D^3 shown in Figures 18 and 19, is of special construction. In addition to the marginal frame members 68 and 69, there are provided a number of intermediate or cross-bars or members 70. Preferably also a peripheral frame 73 surrounds the edge of the mattress and is rigidly united to the frame 68—69 by means of connecting arms 72. This frame 73, which is clearly shown in Figure 20, is for the purpose of reinforcing the marginal flange d^3, and is provided with holes 74 by means of which it may be bolted to such flange. It will be noted that this mattress and frame, with the upstanding marginal flange, which in some instances may be several feet in height, is well adapted for use as a life raft, in case of necessity.

At the intersections of the cross bars 70 holes 71 are formed, adapted to receive bolts 75. These bolts pass through the mattress and are held in place by wing nuts 76. Each of the bolts terminates on the inside of the mattress in a screw threaded end 77, as clearly shown in Figure 19, adapted to receive a similarly threaded socket 79 formed in the end of a bolt 78. This bolt 78 has a screw threaded end 80 which passes through the center of a spider 18, as in Figure 3, and is secured by a nut 81.

By reason of the fact that a plurality of the stub bolts 75 are carried by the mattress, at least one of such bolts will necessarily project through any rent over which the mattress is placed, and the spider can readily be attached to it by means of the socket bolt 78, thus clamping the mattress in position. This method of securing the mattress is also illustrated in Figure 8.

In connection with this method of clamping the mattress over the rent, it may be pointed out that such method permits of the positioning truck such as F, and frame such as 41—44, being imediately detached from the mattress, and removed, thus keeping the deck clear. In naval use, for example, the truck and mat would be stored in some unobtrusive place, and, when an emergency arose, run out onto the deck. As soon as the mattress had been placed in position, and secured, as described, the truck and frame would be at once disconnected, and moved back out of the way, thus keeping the deck cleared for action, as required. Thus any desired number of mattresses might be employed, and a number of succesive rents stopped, and the water pumped out, thereby keeping the shift afloat indefinitely.

In Figures 21 to 23 I have shown a somewhat different construction of mattress which possesses certain advantages. In the other figures I have illustrated the mattress as substantially flat, with the frame on the outside. In the present construction, however, the mat D^4 is arranged outside of the supporting frame, and such frame is prefer-

ably dished so as to form an arch in all directions. This results in great structural strength, enabling the mattress to better withstand the water pressure, and to offer less resistance to movement through the water. It also enables the mattress to easily clear any projecting ragged edges of the rent X. The frame is shown as having a square shape, but may, of course, be made in any desired form. For example, it may be fashioned after the manner of a boat, and so constructed as to be capable of carrying a number of passengers, if emergency requires. In fact, the form shown in the drawings could be used as a boat.

As illustrated, the arched frame comprises horizontal members 84, vertical members 85, and diagonal or corner members 86. At the intersections of some or all of these members are set inwardly projecting stub bolts 77′, any suitable one of which is adapted to be engaged by a socket bolt 78, as described in connection with the previous figures. This bolt 78 passes through a spider 18, hereinbefore described, and may be secured in position by means of a nut in the form of a hand wheel 81′. The edge of the mattress, where it engages the hull, may be provided with a thickened portion or rim d^4.

The supporting members such as 4′ pass through the mattress, and join the interior framework. In order to form a watertight joint, the members 4′ may be threaded where they pass through the mattress, and washers 4^a and 87 placed on the inside and outside of the mattress, respectively, the latter being secured by means of a nut 88.

What is claimed is:—

1. In apparatus of the character described, the combination with the hull of a ship, of a mattress, a frame for positioning the mattress over a rent in the hull, said frame being detachable from the mattress, and means for holding the mattress in position after the frame has been detached.

2. In apparatus of the character described, the combination with a ship, of a truck movable along the deck thereof, a mattress, and a pair of frame members secured at one end to said mattress and at the other end to said truck, each of said members comprising two pivotally connected sections.

3. In apparatus of the character described, the combination with a ship, of a truck movable along the deck thereof, a mattress, and a pair of frame members secured at one end to said mattress and at the other end to said truck, each of said members comprising two sections pivotally united by means of an elbow joint.

4. In apparatus of the character described, the combination with a ship, of a truck movable along the deck thereof, a mattress, and a pair of frame members secured at one end to said mattress and at the other end to said truck, each of said members comprising two sections pivotally united by means of a self-locking elbow joint.

5. In apparatus of the character described, the combination with the hull of a ship, of a mattress adapted to be positioned over a rent in such hull, a plurality of stub screws passing through said mattress, a spider on the inside of said hull, and a socket bolt passing through said spider and adapted to engage any one of said screws to clamp the mattress in position.

6. In apparatus of the character described, a mattress comprising a body and a marginal flange, and a peripheral reinforcing frame surrounding and secured to said flange.

7. In apparatus of the character described, the combination with a ship, of a truck supported wholly by and movable along the deck thereof, said truck having laterally extending arms, a mattress supporting frame pivotally carried by said arms, and a counterweight secured to said truck to balance the weight of said frame.

In testimony whereof I affix my signature.

RALPH BLUMBERG.