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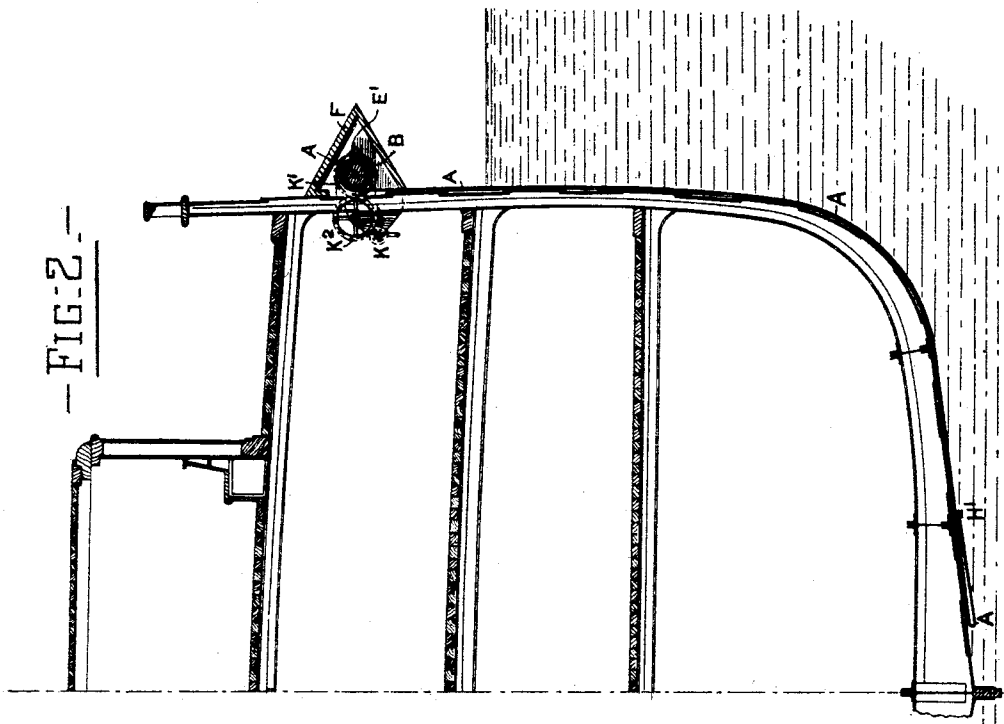
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J. CINAMON.
COVERING FOR SHIPS' BOTTOMS.

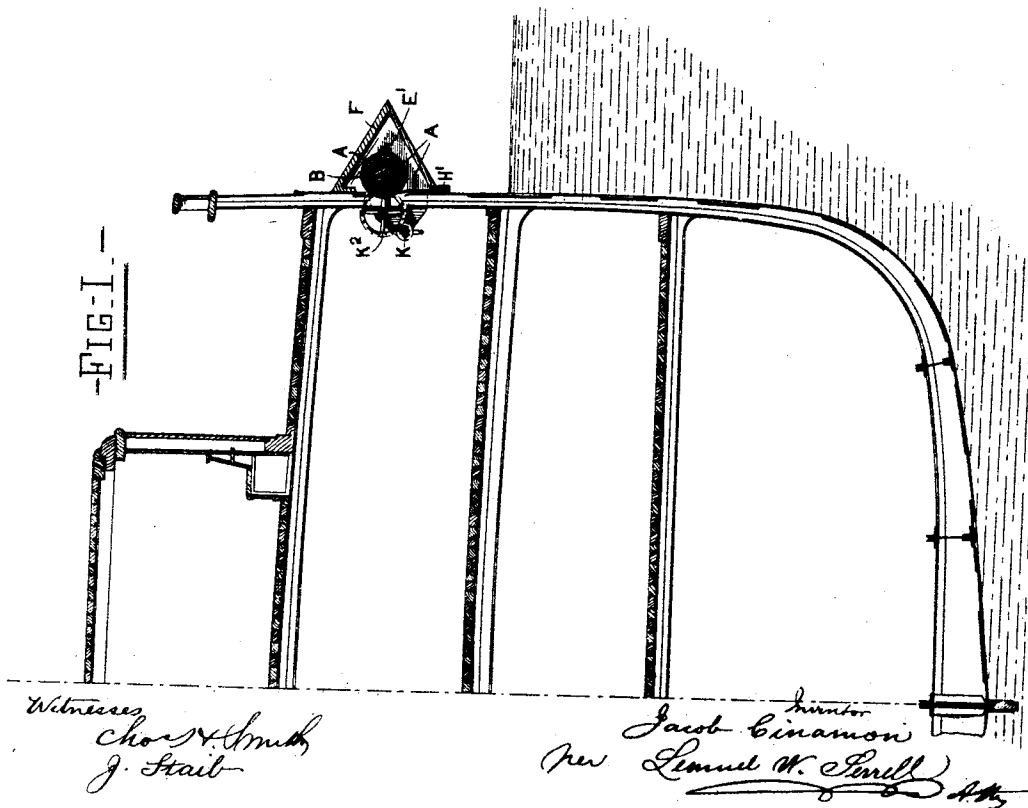
No. 496,598.

Patented May 2, 1893.

—FIG-2.—



—FIG-1.—



Witnesses

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J. Strait

Inventor
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per Lemuel W. Smith

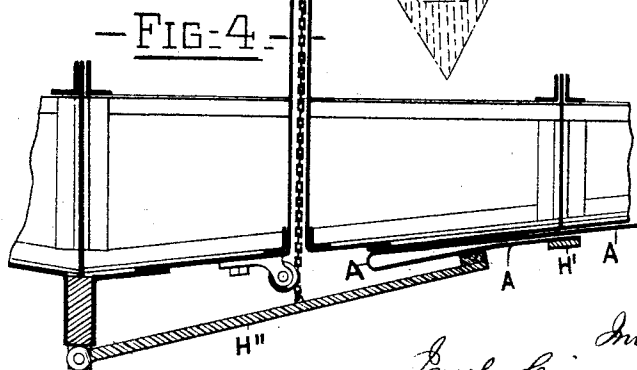
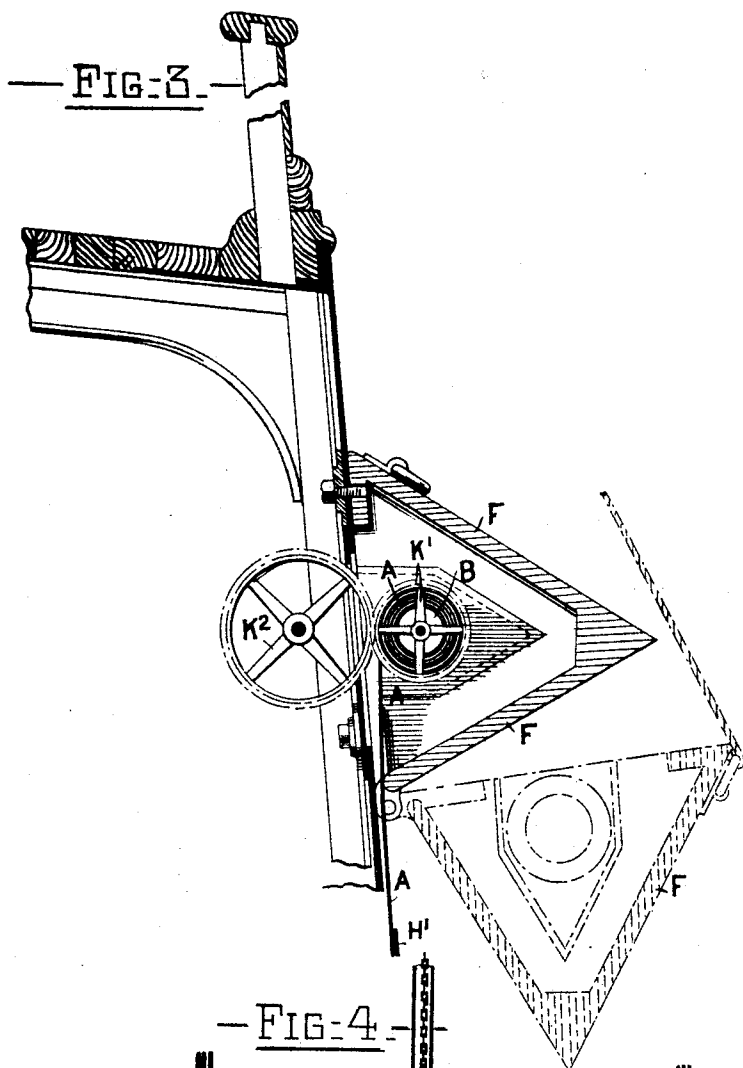
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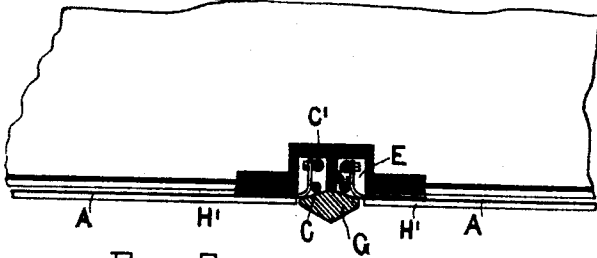
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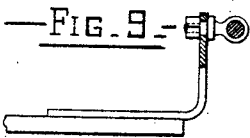
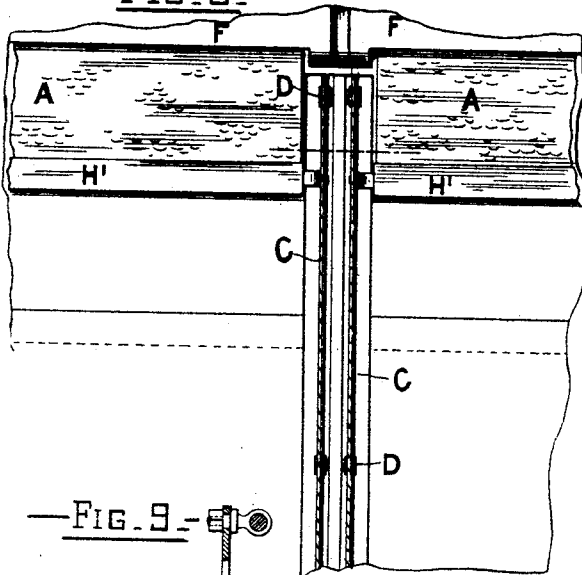
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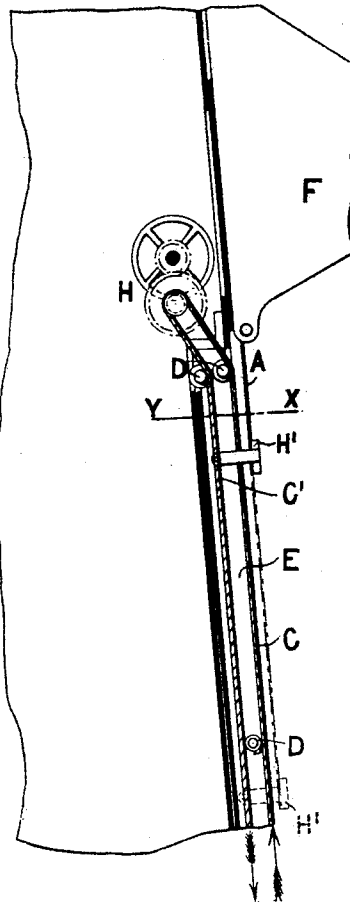
—FIG-7—



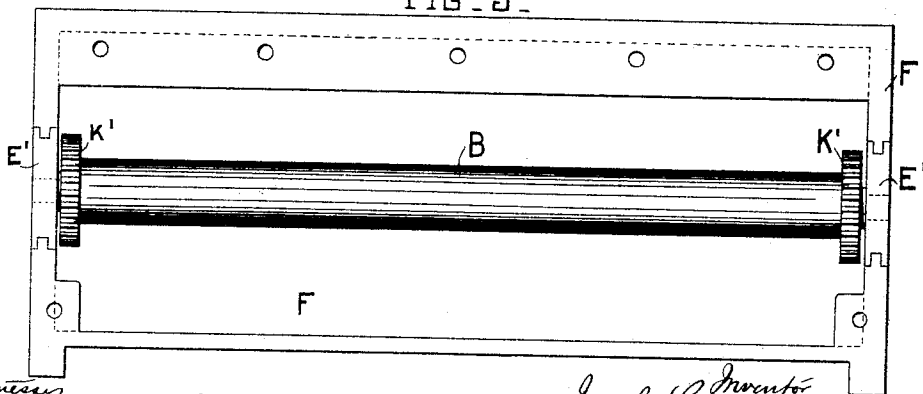
—FIG-8—



—FIG-6—



—FIG-5—



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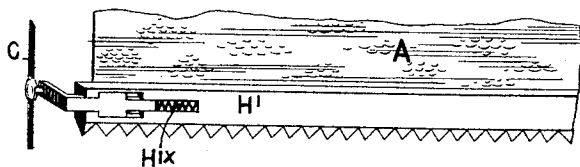
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J. CINAMON.
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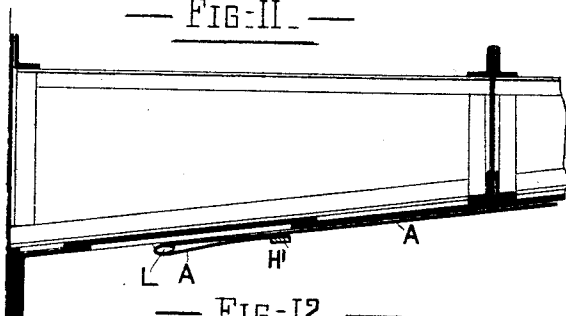
No. 496,598.

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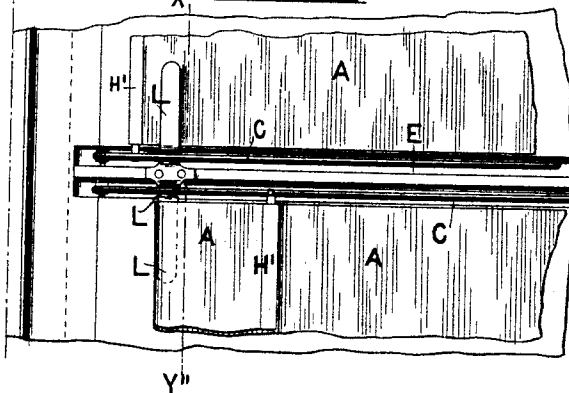
—FIG-10—



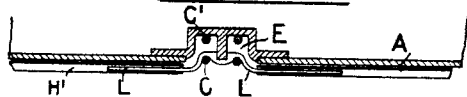
—FIG-11—



—FIG-12—



—FIG-13—



Witness

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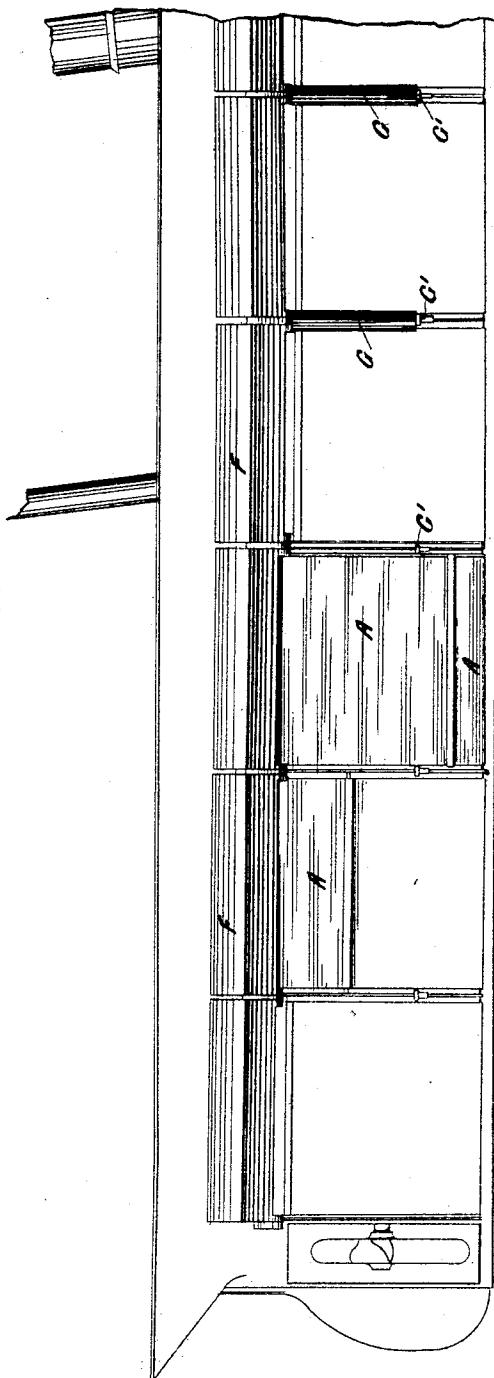
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Patented May 2, 1893.

FIG. 14.



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UNITED STATES PATENT OFFICE.

JACOB CINAMON, OF BARBERTON, SOUTH AFRICAN REPUBLIC.

COVERING FOR SHIPS' BOTTOMS.

SPECIFICATION forming part of Letters Patent No. 496,598, dated May 2, 1893.

Application filed September 10, 1892. Serial No. 445,521. (No model.) Patented in England March 11, 1892, No. 4,839.

To all whom it may concern:

Be it known that I, JACOB CINAMON, merchant, a subject of the Queen of Great Britain, residing at Barberton, in the South African Republic, but at present of London, England, have invented certain new and useful Improvements in Protecting Ships from Sinking in Case of Collision or from the Action of Projectiles or the Like, (for which a patent has been granted to me in Great Britain bearing date March 11, 1892, No. 4,839,) of which the following is a specification.

The object of my invention is to provide protection for ships whereby they are practically rendered unsinkable, the means therefor being easily applied and always ready for use when required; and my invention primarily consists in providing for the ship a sort of movable armor substantially as hereinafter described, which is ready to be put in position with very great facility when required for use; and the invention also comprises shield protectors triangular in section, extending round the ship above the water-line, for affording protection to the mechanism for working the movable armor, as well as acting as a protecting medium in the event of collision.

My invention will be best understood by further describing same with reference to the accompanying drawings.

Figure 1 is a vertical cross section of a ship fitted with my improved armor, showing the same in the position it would occupy when hauled up or hoisted in board, but ready for immediate use in case of necessity. Fig. 2 is a similar view of the same ship showing the movable flexible armor lowered into position for the protection of the vessel. Fig. 3 is a transverse sectional view on a larger scale of the upper portion of the ship, showing a protecting casing, triangular in section, which extends (in sections) completely round the ship for protecting the mechanism for operating the movable flexible armor, and for affording protection also to the men on board and to the ship itself from the effects of collision. Fig. 4 shows on a similar scale to the previous figure, the keel portion of the ship with the flexible armor coating (after having been lowered) secured in position, when this securing means is considered necessary.

Fig. 5 is a side elevation showing the interior face of one section of the triangular protectors. Fig. 6 shows in transverse section the arrangement of mechanism for governing and effecting the downward and upward travel of the armor. Fig. 7 is a horizontal section of same on or about the line *xy* of Fig. 6. Fig. 8 is an external elevation of the part shown at Fig. 6. Fig. 9 shows the connection with the guiding ropes or chains of a boom on the lower part of the flexible armor. Fig. 10 shows a similar attachment provided with a spring device. Figs. 11, 12 and 13 show a modified means for holding the flexible movable armor when lowered should it be so desired. Fig. 14 shows in elevation a part of a vessel having my improved protecting appliances fitted thereto, two divisions of the movable armor being in use or about to be brought into use.

A is the movable armor, which must be to a certain extent flexible, because each portion of such armor should be capable of being wound round rollers B. This flexible movable armor A is made in pieces of convenient widths, and may consist of chain mail, jointed plates of metal, or jointed laths, and is or may be lined with a material such as leather, or a combination of it with some other suitable or equivalent material, although I do not limit myself to any particular manufacture of such flexible armor. A suitable number of such rollers B, arranged with their ends adjacent to one another extend entirely round the ship, say at or about the deck level, and outside the vessel, and the said rollers are protected and work inside what I may call gear protectors or a protected casing F of triangular section (best seen at Fig. 3). Each of the pieces of flexible movable armor A is connected at base as hereinafter described to endless ropes or chains C, Figs. 6, 7, and 8, which pass round guide pulleys or rollers D near to the ship's keel, and these ropes or chains C are then returned upward again, being operated by a winch pulley, for communicating motion to a train of wheels, indicated by the letter H at Fig. 6, and in such manner that the lower end of the movable armor A is carried down to the lower pulley and up again toward top protected roller B, the latter roller B being provided at

each end with a spur pinion K' K' and revolved as required by a winch K Figs. 1 and 2 one of which may be provided at either end of the rollers B and one or both used as required.

At Figs. 6, 7, 8 I have more clearly indicated the endless chains C for working the flexible armor up and down the sides of the ship, and for this purpose the boom or stretcher H' with which the end of each piece of flexible armor A is provided is held to the ropes or chains C by eye bolts, as at Fig. 9, carried from the ends of the boom H' and entering the grooves E in which the chains C lie, the inner sides C' of the chains being connected to the said boom H'. The connections of the booms H' with the chains C may be allowed a certain amount of resiliency if desired, by applying a spring connection as is shown at Fig. 10, where the spring H' allows the arm carrying the eye bolt a lateral play. The boom H' on having arrived in position at or near the keel, and the side of the ship being then covered with the movable armor A, the movement of the endless chain is continued, thereby bringing the boom H' back on the outer sides of chains C, and forming a fold in the armor as shown at Fig. 4. The endless chains during the movement just described travel in the direction shown by the arrows Fig. 6. When the flexible movable armor has arrived into the position shown at Fig. 4, and the fold has been formed, it may be trapped or held up against the bottom of the vessel should such fixture be considered necessary by one of the flaps H'' which are hinged to the keel, one of such flaps being shown at Fig. 4, this flap being operated from the inside of the ship by a chain, passing through a tube, up to the same deck as that from which the lowering, raising and adjusting of the flexible armor is worked, or the flaps may be worked by rods going through stuffing boxes. These flaps, or what I term "trapping mechanism," may be entirely dispensed with; or I may employ an equivalent but somewhat modified form of securing device, such as is shown at Fig. 11 in section transversely of the vessel, at Fig. 12 in inverted plan, and at Fig. 13 in section on line X'' Y'' of Fig. 12. A represents portions of two adjacent sheets of the flexible armor. H' H' are the two adjacent booms attached to the lower edges of same. L is a bar which may be made of spring steel, fixed to the central web, and extends on both sides of the grooves or channels E in which the cords or chains C are situated. On either side of the central web aforesaid the bar L is bent and dips into the channels E to allow the outer side of the endless chain C to come on the outside of the bar L. When the movable armor is brought down, the booms H' pass under the arms of the bar L, and when returning upward as before described, the same booms H' pass over the arms of bar L and the loops or bends

formed in the flexible armor are held by the said arms of the bar L.

The casing F, Fig. 3, which, as before stated, is preferably made triangular in section, with the apex outward, is firmly hinged to the ship's side, so that a section may be lowered down into the position shown in the dotted lines of Fig. 3 for the purpose of removing the rollers, or for repairs. When raised into its normal position, it is firmly secured to the ship's side.

Fig. 5 shows the bearings E' in the ends of the casing F, which bearings can be removed from the casing when it is required to remove or change a roller B.

The movable armor is worked from the ship by a winch as shown or other convenient way, and so that this protecting movable armor surface may not only be pulled down to the keel, but it may also when in position be gradually moved upward or downward as may be required; thus if a shot strikes a ship protected according to my invention, and goes through the movable armor A and the skin of the ship, by moving the armor A down, the hole or holes so made in the ship is or are covered and closed, owing to the flexible armor, presenting a new and close or water-tight surface, which is not in a line with the aperture made in the ship, and which latter is consequently closed by the said movable armor. The number of the rollers B may vary as aforesaid according to the length and size of the ship.

It will be evident that the mechanism for operating the various rollers B may be connected together or all operated through one driving shaft by suitable belts or pulleys or other well known connections and operated or set in motion from one point.

Provision should be made to protect the chains and operating mechanism of the movable armor. Such protecting means are illustrated at Figs. 6, 7 and 14, where E E indicate guide grooves shown in horizontal section Fig. 7 extending from the casing F down the ship's side so far as it is intended the movable armor shall be capable of traveling to, and preferably down close to the keel, as shown at Fig. 2 it being in these grooves that the chains C are carried; G G Figs. 7 and 14, are wedge shaped pieces of metal (gear protectors) to cover and afford protection to the chains C and roller D. These wedge pieces G can be hoisted up when the ship is under way, so as not to impede her course through the water; but when down in position for protecting the grooves in which the ropes or chains C travel, they rest on projections G' Fig. 14. The triangular casing F not only acts as a covering for the rollers and the movable armor but it also serves as a protection in the event of a collision taking place, and would be the means, in such cases, of preventing a ship being cut in half, or at any rate rent open with no provision at hand to stop the aperture so made; whereas by my invention

I not only provide means for arresting the shock of the collision but when that collision takes place there are means ready at hand for stopping the apertures by the lowering of the flexible movable armor before described.

I claim—

1. In devices for preventing ships sinking from the effects of collisions, projectiles or the like, the pieces or lengths of flexible armor or mail A, provided with a lining of leather or other material, and mounted upon rollers B located outside of and extending around the vessel, gearing for revolving the said rollers, booms or rods H' fixed to depending end of mail A, controlling chains C C' and guiding grooves E E, whereby all or any single piece of the mail A may be lowered to or near the ship's keel and so cover the side of the vessel together with any injury thereon and thereby prevent the entry of water as set forth.

2. In devices for preventing ships sinking from the effects of collisions, projectiles or the like, the combination with pieces of flexible leather-lined mail A mounted on rollers B located outside and extending around the vessel, the operating gear for rollers B, booms H' on said mail A, boom operating chains C C' and grooves E, of the hinged flaps or trapping arms H'', whereby the flexible mail A is secured at or near the keel of the ship or vessel as set forth.

3. In devices for preventing ships sinking from the effects of collisions, projectiles, or the like, the combination with pieces of flexible leather-lined mail A mounted on rollers B located outside and extending around the vessel, the operating gear for rollers B, booms H' on said mail A, boom operating chains C C' and grooves E, of spring steel arms L located outside the vessel between the pieces of flexible mail A, under and over which arms L the booms H' of the flexible mail A pass, leaving loops of the latter held by the said arms L, as set forth.

4. In devices for preventing ships sinking from the effects of collisions, projectiles or the like, the combination with pieces of flexible mail A lined with leather or other material, rollers B carrying the mail A located outside and extending around the vessel, operating gear for revolving the said rollers, guiding appliances and lowering mechanism for controlling the lower edges of the mail A, of protecting triangular casings F made in sections and extending all around the ship above the water line, and incasing the said rollers B and mail A, as set forth.

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