H. B. NEWHALL, Jr. & E. N. HESCOCK.

PROTECTION AGAINST TORPEDOES, &c.

APPLICATION FILED APR. 10, 1915.

1,151,607.

Patented Aug. 31, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

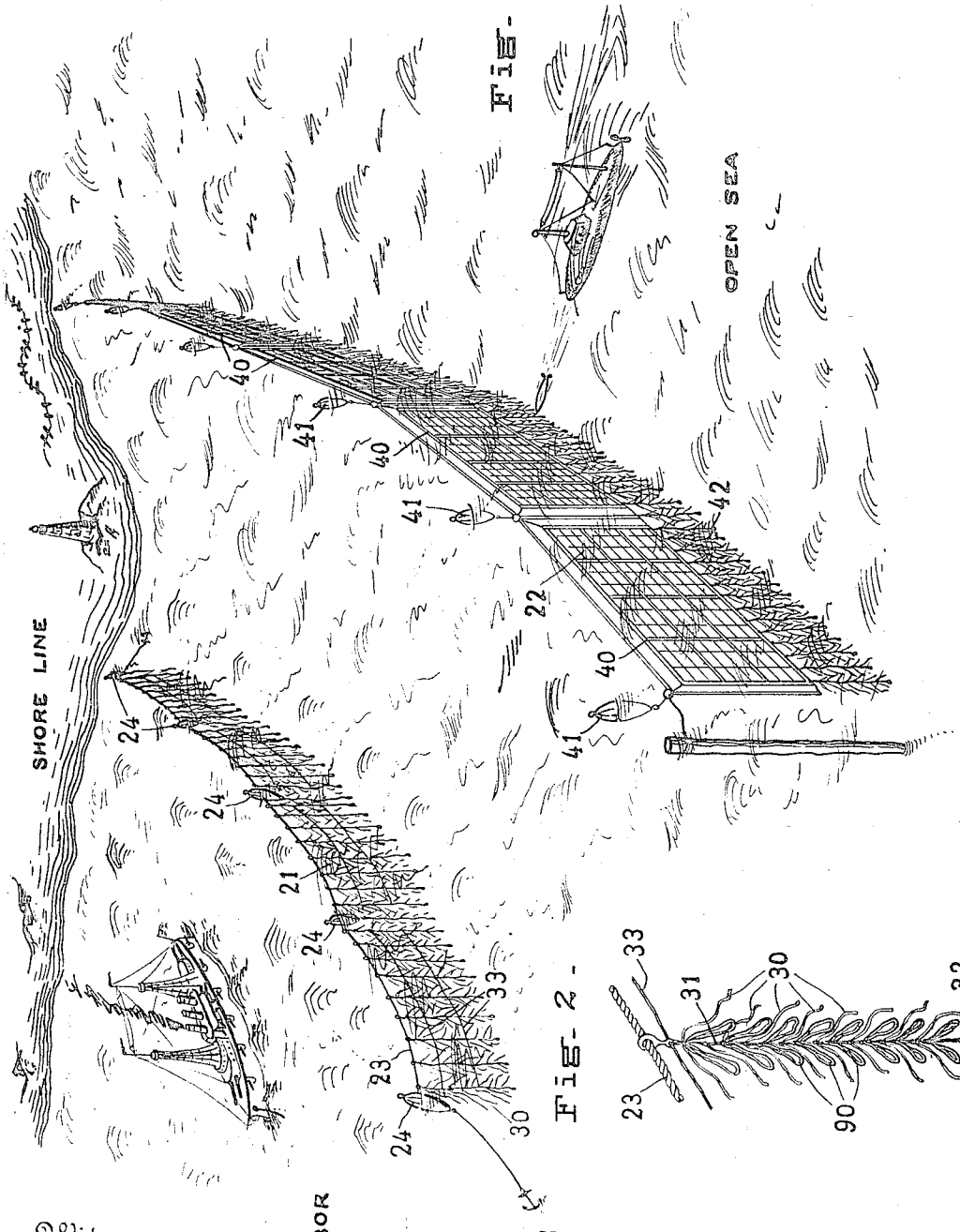

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

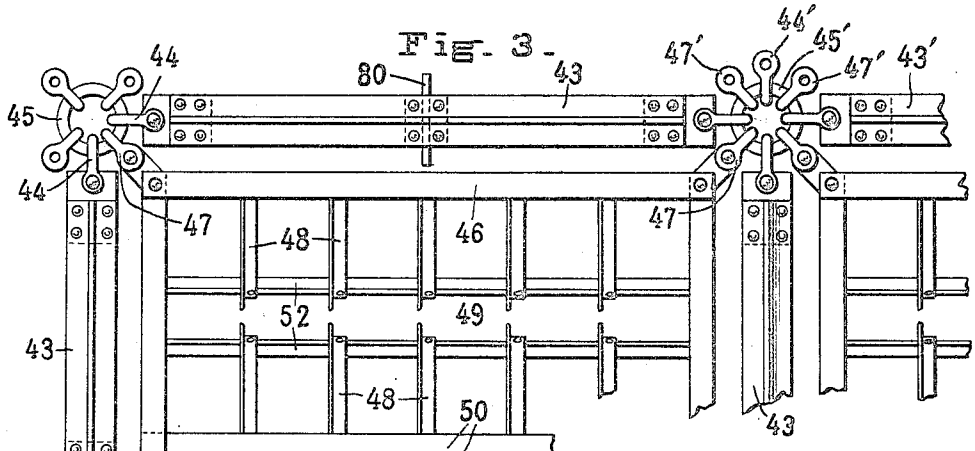


Fig. 5.

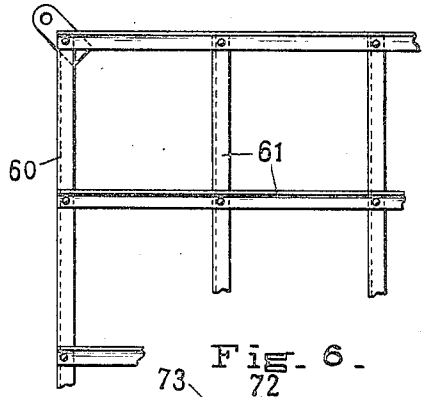


Fig. 4.

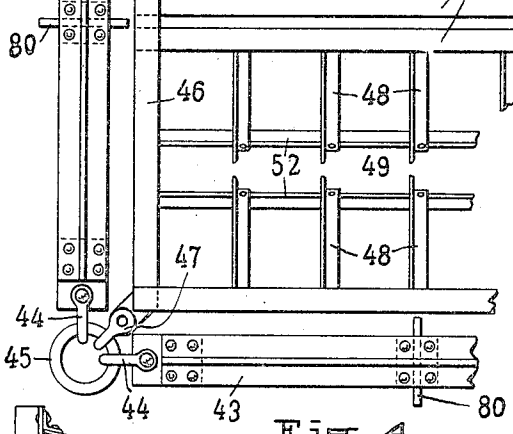
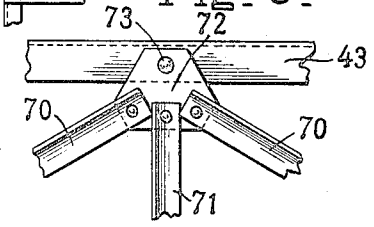


Fig. 6.



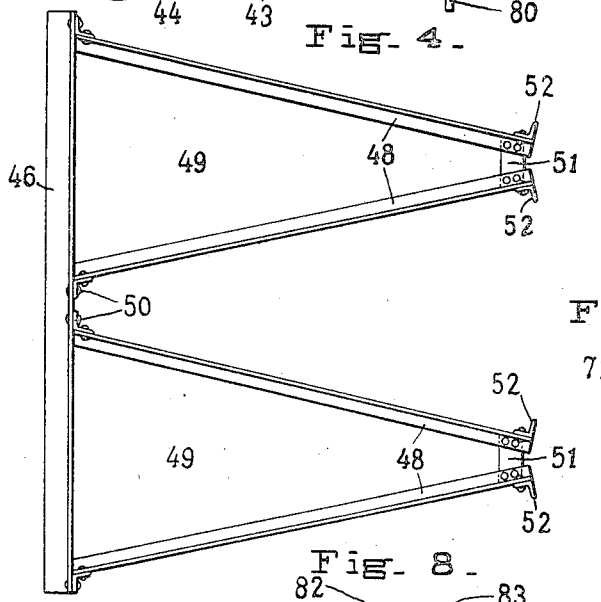


Fig. 7.

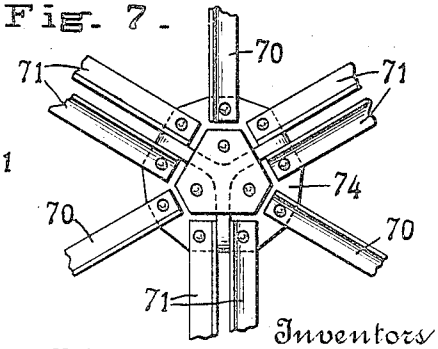
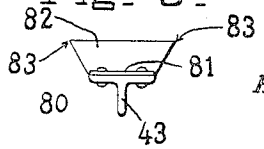


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PROTECTION AGAINST TORPEDOES, &c.

1,151,607. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed April 10, 1915. Serial No. 20,494.

To all whom it may concern:

Be it known that we, HENRY B. NEWHALL, Jr., and ETHAN N. HESCOCK, citizens of the United States of America, and residing at Plainfield, Union county, New Jersey, and Brooklyn, Kings county, New York, respectively, have invented new and useful Improvements in Protection Against Torpedoes, &c., of which the following is a specification.

This invention relates particularly to the protection of ships, harbors, fortifications, etc., against submarine torpedo attack.

The objects of the invention are to provide a simple and effective protection which can be readily handled and suited to various requirements, which is inexpensive and which can be readily made up as required.

A special object is to provide protective means which will stop attacking submarines as well as torpedoes.

In the carrying out of the invention we provide a barrier which may be in one or two parts which may be used alone or in combination. One part is in the form of a network constructed to first yield to the impact of a torpedo or submarine and to then hold the same or else entangle it to such an extent as to destroy its efficiency. This barrier may be made up of flexible strands of material freely suspended so as to act as tentacle-like streamers and intertwining to such an extent or close enough together to constitute a practical network. These streamers may be made of strands of hemp or Manila rope or marline, wire or the like and they serve by entanglement with the propeller, rudders, etc., of a torpedo or submarine to disable the same to the extent of stopping it or at least throwing it so far off its course as to render it ineffective.

In conjunction with the entanglement network we may employ, as disclosed herein, a network made up of flexible connected frame sections of a size and sufficient strength to stop a submarine and carrying grillework of a size and strength to stop a torpedo. The entanglement may be suspended from the heavier frame network or be used separately. In some cases double protection may be provided by placing one barrier in front of another. For instance a network of the entanglement elements may be provided as an inner defense and a frame network or combination frame and entanglement network as an outer defense.

Various other features and details of construction will appear as the specification proceeds.

The accompanying drawings illustrate a preferred construction and application of our invention but it will be understood that changes and modifications may be made without departure from the true spirit and scope of the invention.

Figure 1, is a diagrammatic perspective view illustrating the application of the invention to the defense of a harbor. Fig. 2, is a detail enlarged view of one of the entangling devices. Fig. 3, is an enlarged broken front view of two of the frame sections of the net. Fig. 4, is a side view of the inner grillework section of one of the frames. Fig. 5, is a broken front elevation of a somewhat simpler form of inner grille. Fig. 6, is a broken detail view of a joint between a frame bar and a hexagonal form of grille. Fig. 7, is a similar view of a joint for the meeting corners of three hexagonal units in this form of grillework. Fig. 8, is a detail view of a form of hull-piercing lug which may be used with the net.

In the general view, Fig. 1, 20 designates a harbor protected by our invention. 21 designates an inner entanglement constituting an inner line of defense and 22 an outer network constituting an outer line of defense. The inner entanglement here comprises a series of devices suspended in spaced apart relation from a horizontal cable 23 which may be suitably supported at the proper height, as by means of buoys 24. The entanglement devices each consist of a multitude of outstanding flexible strands 30 of rope, wire, or the like carried by a core or hanger 31 connected at its upper end to the cable 23 or other support. These hangers may be weighted as indicated at 32 to cause them to stand substantially vertical with the strands standing out thereon like streamers or tentacles. The hangers may be connected together by connections such as indicated at 33. These connections hold the entanglement elements properly spaced and form in conjunction with the hangers, a meshwork or network providing further means of entanglement. The outer network shown, is made up of connected frame sections 40, sup-

ported at the proper height as by means of buoys 41 and entanglements 42 similar to those described, suspended from the lower edges of such frame sections. The frame construction of network is preferably more or less flexible and yielding in character. This is accomplished in the illustration by making up each frame section of a series of four bars 43 forming the sides of a rectangular frame, said bars being flexibly connected at the corners by means of shackles 44 to corner rings 45. The frame so provided is preferably made large enough and strong enough to receive and stop a sumarine and within such frame there is preferably suspended a grillework capable of stopping torpedoes, mines and the like. In Figs. 3 and 4 this grillework consists of an inner rectangular frame 46 connected to the corner rings by shackles 47 and carrying rearwardly extending converging bars 48 which form between them tapering pockets or cells 49. The number of cells thus provided will depend upon the size of the structure and the size of the cells determined upon. In some cases there may be only a single cell to each frame. In the illustration there are two cells to each frame, the frame being divided into upper and lower halves by transverse bars 50 to which the lower bars 48 of the upper pocket and the upper bars of the lower pocket are attached. The converging bars forming the pockets may be braced by connecting together the rearward ends of a pair of the oppositely disposed bars as at 51 and by connecting the upper and the lower rows of bars together by cross braces 52. The framework may be built up section by section to meet various requirements as to length and depth, one section being added to another for instance by shackling the corner rings together or as indicated in Fig. 3, by using one ring as a common connection for adjoining sections. Thus the corner ring 45′ in this case serves as a common center to which is connected the frame bar 43′, and the grillework of an adjoining section and shackles 44′ and 47′ are shown by which the frame bars and grillework of the upper frame sections may be joined.

The construction and shape of the grillework may vary, that shown in Fig. 5 taking the form simply of an inner frame 60 carrying intersecting bars 61 forming a meshwork of a size and strength to intercept and hold torpedoes and the like.

The grillework may be made up in circular or in various angular forms. Thus in Figs. 6 and 7 there is indicated a hexagonal type of construction. Here the side bars 70 and radius bars 71 of a hexagonal shaped unit are connected together by a plate 72 which is connected by a bolt 73 to one of the main frame bars 43. Several of such hexagonal units may be joined together at a common center by the joint shown in Fig. 7. This joint is provided by a plate 74 to which the sides 70 and radius bars 71 of three hexagonal shaped units are bolted or otherwise suitably secured.

Means for further disabling an attacking vessel may be provided in the form of hull-puncturing devices such as indicated at 80. These are shown constructed from short pieces of T-beam stock having flat base portions 81 suitably secured to the frame bars and flanges 82 outstanding and sharpened at opposite ends as indicated at 83. These puncturing lugs are preferably secured on the frame bars with the pointed flanges thereof extending transversely of the bars and projecting within the outline of the frame so as to scrape against and puncture the hull of a vessel entering the frame.

In the illustration a submarine is indicated discharging a torpedo at a vessel located behind the inner network defense. This torpedo will ordinarily become caught either in the frame network or in the entanglement network of the outer defense, depending upon the course and the level at which the projectile is fired. If the torpedo is fired at a relatively shallow depth it will drive into the frame network, the grillage yielding under the impact, slowing down the torpedo and holding it in its meshes. The grillage is made of a large enough mesh, consistent with the holding of the torpedo, to reduce the possibility of the torpedo striking head-on and exploding and the frame will ordinarily be so yieldable as to prevent an impact sufficient for exploding. If the torpedo is fired low, it encounters the entanglement. The outstanding strands or streamers of this entanglement, being freely suspended automatically wrap themselves about the propeller, rudders and other parts of the torpedo and either bring it to a full stop or else disable it to such an extent as to throw it off its course. If, in the case illustrated, the torpedo should get through the outer defense it will practically always be stopped by the inner network for considerable energy will have been dissipated before it freed itself from the first network and but comparatively slight resistance will then be necessary to stop it entirely. The disabling effect of the entanglement devices is increased by making the strands in looped form as indicated at 90 in Fig. 2, these looped or doubled strands having a much greater catching and holding effect than the single strands. If the submarine should attempt to penetrate the network the effect will be practically the same as with the torpedo. In this case though the grillework might be carried away by the force of the submarine, allowing it to bring up into the main or outer frame. The yielding charac-

ter of the network causes it to slow down and then hold the submarine and by the time the submarine has fully brought up into the frame, one or more of the puncturing lugs will probably have penetrated the hull. By pointing these lugs toward the rear as indicated, they may be caused to trap and hold the hull which they have punctured. If the submarine should attempt to penetrate the entanglement network the strands thereof will become entangled with the propeller, rudders, periscope and other parts of the vessel and either stop it entirely or disable it.

The invention is simply constructed and is of such a nature that it can be quickly made up as the demand arises from materials at hand and to any desired shapes and sizes.

What we claim is:—

1. A torpedo guard comprising, a flexible frame of a size and strength to stop a submarine, grillework flexibly supported in said frame of a size and strength to stop a torpedo and a flexible network of streamer-like torpedo stopping entanglements suspended from said frame.

2. A torpedo guard comprising, a network entanglement made up of freely suspended relatively closely adjoining streamers.

3. A torpedo guard comprising, an entanglement made up of substantially vertical hangers and flexible streamers dependent therefrom.

4. A torpedo guard comprising, a relatively horizontal support, spaced hangers dependent therefrom and streamers dependent from said spaced hangers.

5. A torpedo guard comprising, a relatively horizontal support, spaced hangers dependent therefrom, streamers dependent from said spaced hangers and means tying said hangers together.

6. A torpedo guard comprising, a relatively horizontal support, spaced hangers dependent therefrom, streamers dependent from said spaced hangers and weights holding said hangers substantially vertical.

7. A torpedo guard comprising, a relatively horizontal support, spaced hangers dependent therefrom and looped strands dependent from said hangers and constituting streamers.

8. A torpedo guard comprising, a series of flexibly connected and yieldingly supported vessel-stopping frames and grillework carried by said frames.

9. A torpedo guard comprising, a flexible frame and grillework flexibly suspended in said frame.

10. A torpedo guard comprising, corner rings, frame bars shackled to said rings and a grille received within the frame provided by said frame bars and shackled to said corner rings.

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