

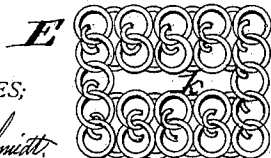
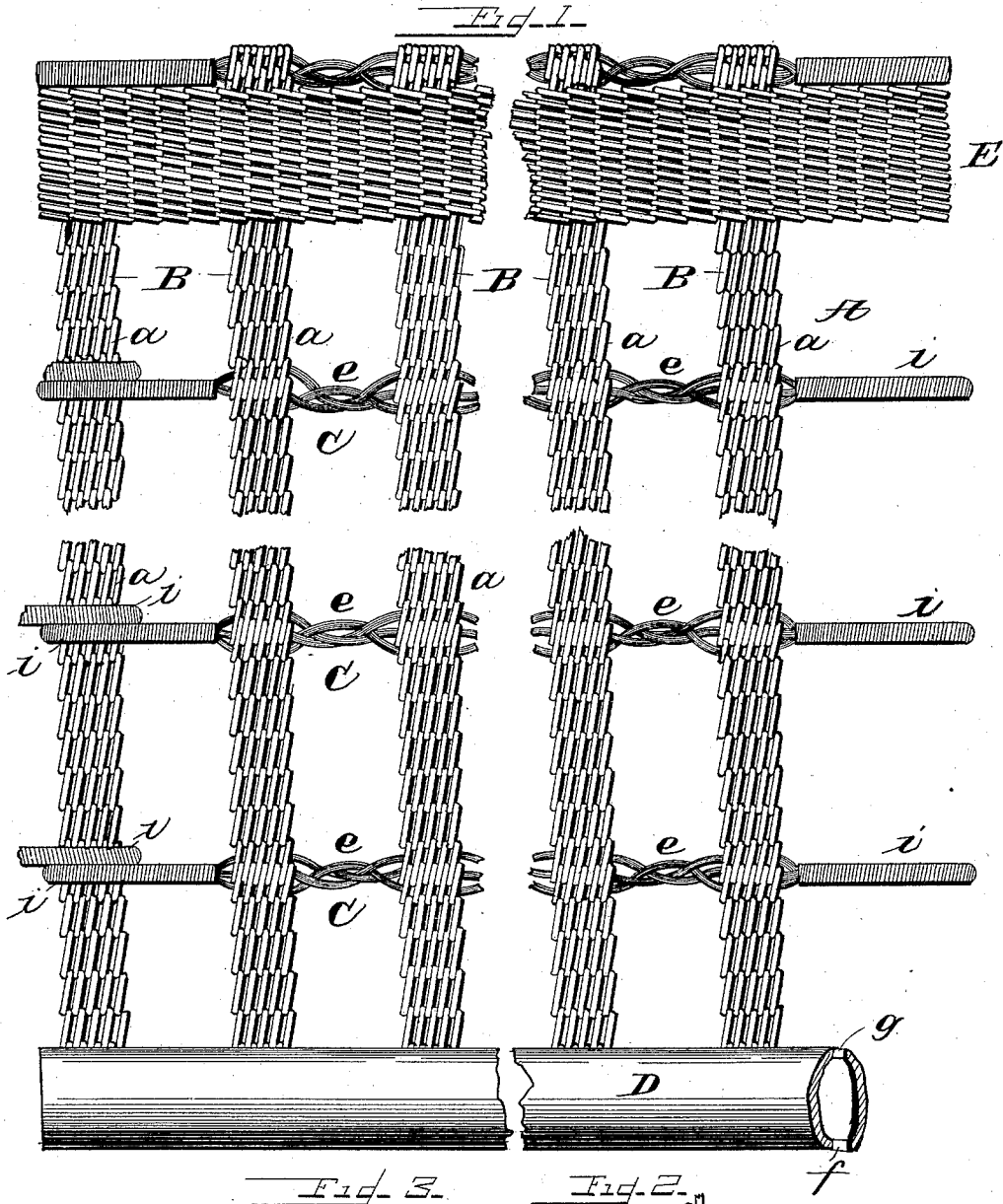
(No Model.)

2 Sheets—Sheet 1.

J. LYNCH & T. MIDGLEY.
TORPEDO GUARD.

No. 463,262.

Patented Nov. 17, 1891.



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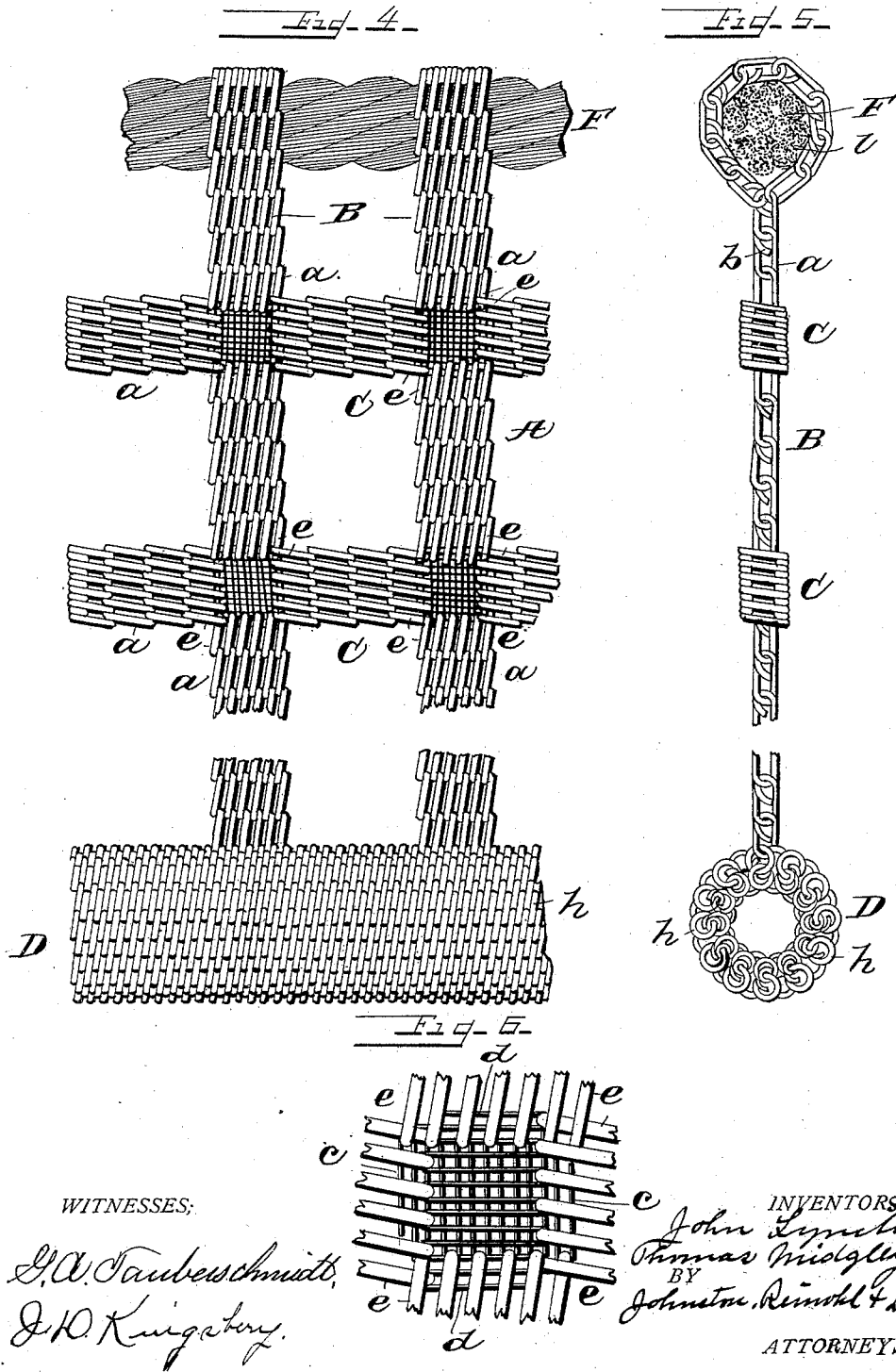
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UNITED STATES PATENT OFFICE.

JOHN LYNCH, OF WASHINGTON, DISTRICT OF COLUMBIA, AND THOMAS
MIDGLEY, OF BEAVER FALLS, PENNSYLVANIA.

TORPEDO-GUARD.

SPECIFICATION forming part of Letters Patent No. 463,262, dated November 17, 1891.

Application filed January 30, 1891. Serial No. 379,716. (No model.)

To all whom it may concern:

Be it known that we, JOHN LYNCH, a citizen of the United States, residing at Washington, in the District of Columbia, and THOMAS MIDGLEY, a citizen of the United States, residing at Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Torpedo-Guards; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to war-vessels and has for its object the construction of metallic netting to surround a vessel and form a guard against submerged torpedoes.

The invention will be hereinafter described and more particularly pointed out in the claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a side elevation of a section of our improved torpedo-guard to be applied to the sides of a vessel; Fig. 2, an end view showing part of the section rolled from the lower end; Fig. 3, an edge view of a section of the supporting piece or bar on the upper end of the section; Fig. 4, a side elevation of a section to be applied around the bow and stern of a vessel; Fig. 5, an edge view of the same, and Fig. 6 an enlarged plan of the coupling for the bars at their points of intersection.

Reference being had to the drawings and the letters thereon, A indicates a section of our improved torpedo guard or netting, which is composed of parallel bars B, formed of intertwined helices *a*, having their ends secured by being bent back into or upon the helix, as at *b*. The length of the bars may be varied for use upon vessels of different dimensions and are preferably made about two inches wide. In constructing the bars B sections of cylindrical helices are screwed into each other to form a sheet of any convenient length and width, the length of the sheet preferably being equal to the length required for the bars B. The sheet is then passed through a suitable machine and the helices *a* flattened or elongated, the sheet being held or kept under longitudinal tension while the helices

are being flattened to make them equal in length and seat each helix in the adjacent helices with which it is intertwined, and form a compact and flexible fabric which can be readily rolled upon itself. The sheet is then cut transversely of the helices into bars B of any suitable width and the ends of the helices secured on both edges of the bars. The bars B are then placed in position parallel with each other upon a flat surface—such as a table—and the bars C interwoven with the bars B, as shown, to form meshes about six inches square. The bars C may be made of strands of wire passed through the helices *a* and braided or twisted between the bars B as at *e*, thus securely holding the bars B in proper position in the netting or guard.

Instead of using the strands of wire to form the bars C, as shown in Figs. 1 and 2, they may be made of the same material as the bars B, as shown in Figs. 4 and 5. In this latter construction the bars are coupled or connected at the points where they intersect by two sections *c d* of wire bent in serpentine form. These sections are laid across each other and each bar connected to both sections by a section *e* of cylindrical helices being screwed into the end of each bar B and C, and into both of the sections *c d*, as shown in Fig. 6. The connecting-section *e* may then be flattened to conform to the length and appearance of the body of the bars, and their ends properly secured by bending, as on the edges of the bars B and C. This latter construction produces an exceedingly flexible guard, admirably adapted for use at the bow and stern of a vessel, where the sections of a guard must be bent or curved to conform to the contour of the vessel.

At the lower end of the section A is a tubular bar D, to which the bars B are secured and upon which the section is rolled when the guard is taken out of the water, and may then be readily stored for future use. In Figs. 1 and 2 the tubular bar D is shown made of ordinary iron pipe, and in practice is from two to two and a half inches in diameter. This bar is provided at the bottom with a longitudinal slot *f*, of a width equal to the thickness of the bars C, and on its top with a series of rectangular slots *g*, through which the

bars B pass, as shown in Figs. 1 and 2. To apply this bar D to a section of the guard or netting, the bars B are passed through the slots *g* and *f* and the bar pushed back upon said bars, when the lower bar C is inserted through the bars B and the bar D then pushed down until it rests upon the bar C. It is obvious, however, that instead of using the bar C of many strands of wire, one bar of metal may be used.

In Figs. 4 and 5 the tubular bar D is made of intertwined coiled wire helices *h*, and the bars B secured thereto by being intertwined therewith. This construction of the bar is especially adapted to the sections, which must necessarily be curved in their application to a vessel, and is exceedingly flexible. At the ends of the bars C are formed loops *i*, which are made to overlap the loops of an adjacent section and a bar B passed through the loops to connect the sections. The sections are supported from the upper end, and for this purpose a bar E, Figs. 1 and 2, of intertwined coiled wire helices, is attached to each section. This bar is made five-ply thick, and at the points where the bars B come the middle or center ply is removed, thus forming a series of passages *k* through the bar E, and through which passages the bars B pass. The supporting-bar may, however, be made of wire rope or cable, as F in Figs. 4 and 5, and passed through loops *l* in bars B.

For the purpose of handling or transporting the netting, it may be rolled from either the upper or lower end of the sections. The guard thus constructed is comparatively light by reason of the large meshes, and when applied to a vessel it may be readily suspended upon booms or guard-arms in the usual manner.

Having thus fully described our invention, what we claim is—

1. A torpedo-guard consisting of metallic sections composed of crossed flexible bars intersected at their points of crossing.

2. A torpedo-guard consisting of metallic sections composed of parallel flexible bars of intertwined helices and transverse intersecting bars.

3. A torpedo-guard consisting of metallic sections composed of parallel flexible bars of

intertwined elongated helices and transverse intersecting flexible bars.

4. A torpedo-guard consisting of metallic sections composed of parallel bars of intertwined helices and transverse bars of strands of wire.

5. A torpedo-guard consisting of metallic sections composed of parallel bars of intertwined elongated helices and transverse bars of braided strands of wire.

6. A torpedo-guard consisting of metallic sections composed of parallel and transverse intersecting flexible bars and a cylindrical bar at one end of the section.

7. A torpedo-guard consisting of metallic sections composed of crossed flexible bars and a tubular bar at one end of the section.

8. A torpedo-guard consisting of metallic sections composed of crossed flexible bars and a flexible bar of intertwined helices at one end of the section.

9. A torpedo-guard consisting of metallic sections composed of parallel bars of intertwined helices, intersecting-bars, and a flexible bar of intertwined helices at one end of the section.

10. A torpedo-guard consisting of metallic sections composed of vertical and horizontal flexible bars and a flexible tubular bar of intertwined helices at one end of the section.

11. A torpedo-guard consisting of metallic sections composed of crossed flexible bars and a supporting-bar.

12. A torpedo-guard consisting of metallic sections composed of crossed and intersected flexible bars and a flexible supporting-bar.

13. A torpedo-guard consisting of metallic sections composed of vertical and horizontal intersected flexible bars and means for coupling or connecting adjacent sections.

14. A torpedo-guard consisting of metallic sections composed of crossed and intersected flexible bars and the horizontal bars provided with loops at their ends.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN LYNCH.
THOMAS MIDGLEY.

Witnesses:

L. P. WHITAKER,
D. C. REINOHLE.