May 12, 1964 F. J. LUKETA 3,132,433

CONNECTOR FOR TRAWL NET BAR-CUT EDGES

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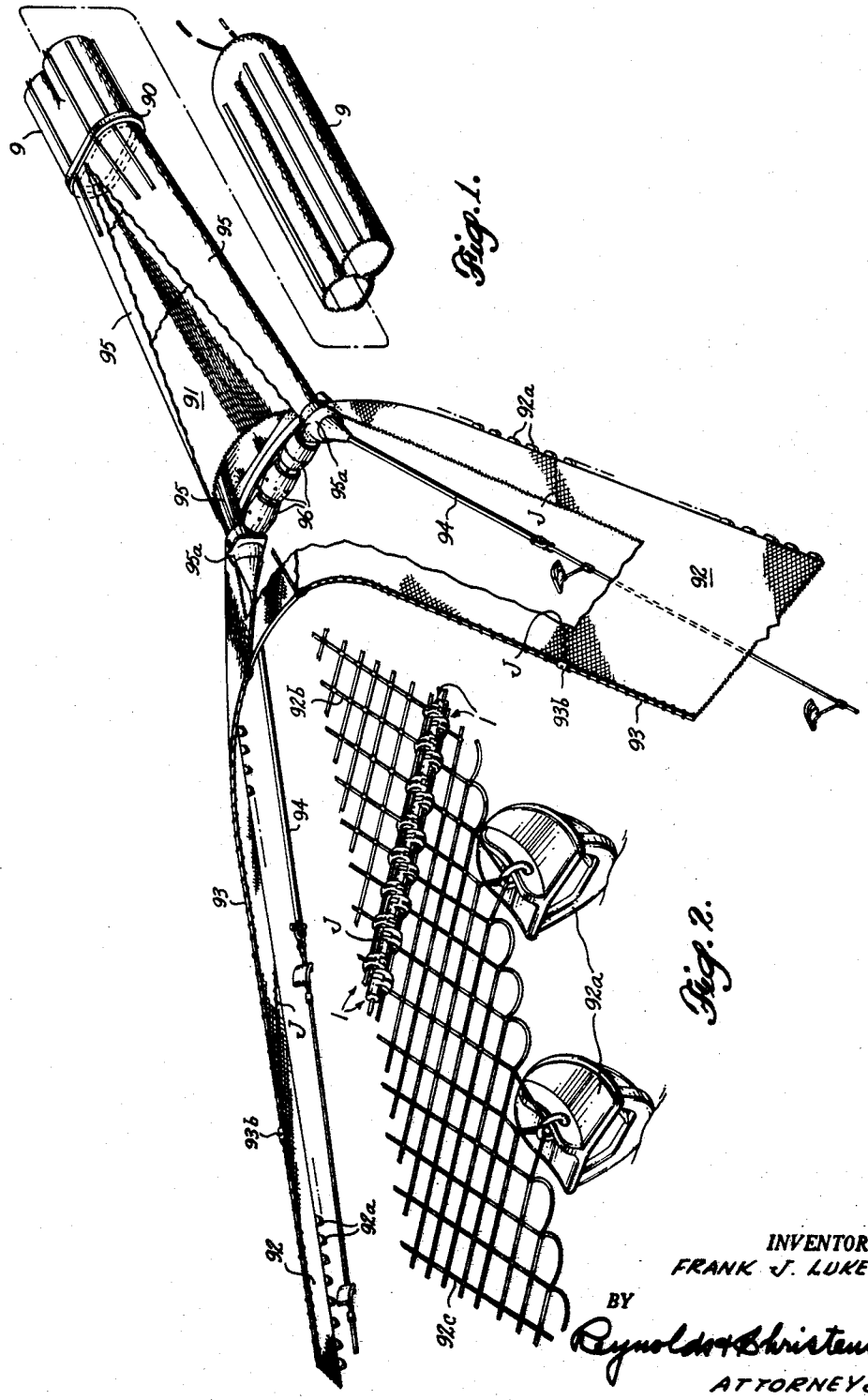


Fig. 1.

Fig. 2.

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May 12, 1964 F. J. LUKETA 3,132,433

CONNECTOR FOR TRAWL NET BAR-CUT EDGES

Filed April 2, 1962 4 Sheets-Sheet 2

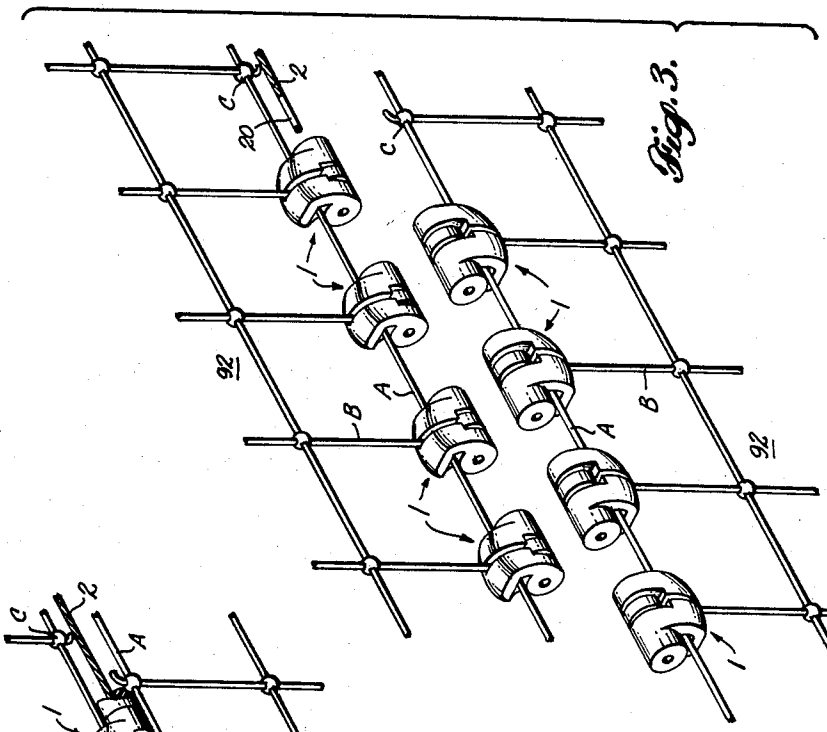


Fig. 3.

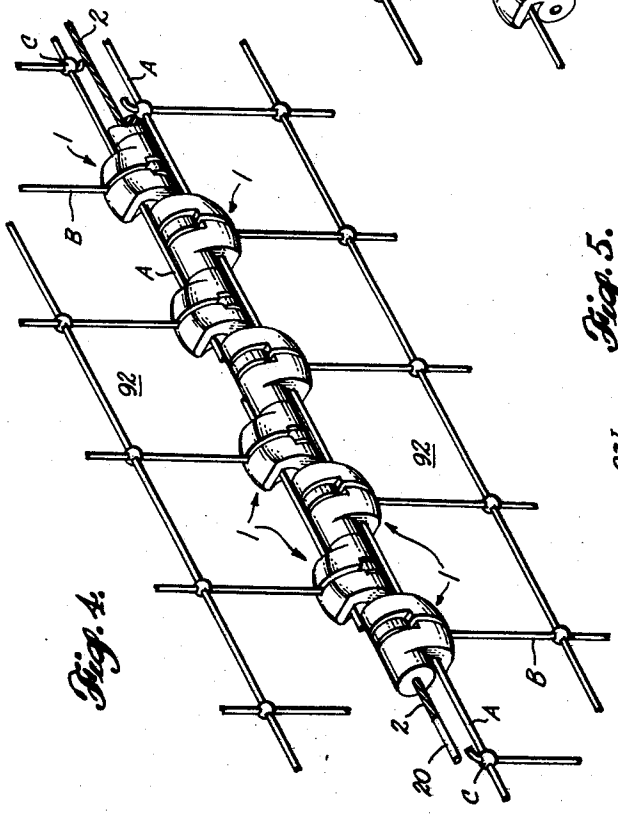


Fig. 4.

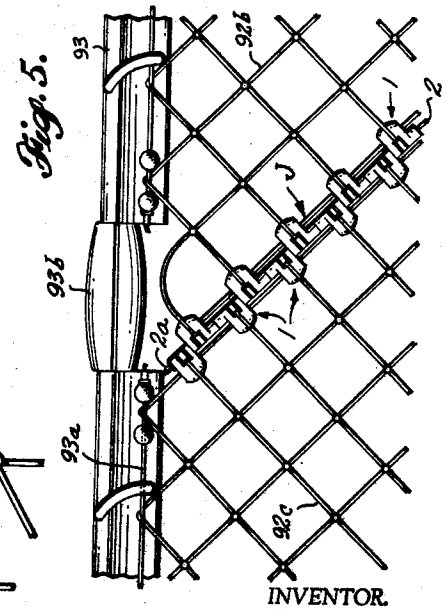


Fig. 5.

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May 12, 1964 F. J. LUKETA 3,132,433

CONNECTOR FOR TRAWL NET BAR-CUT EDGES

Filed April 2, 1962 4 Sheets-Sheet 3

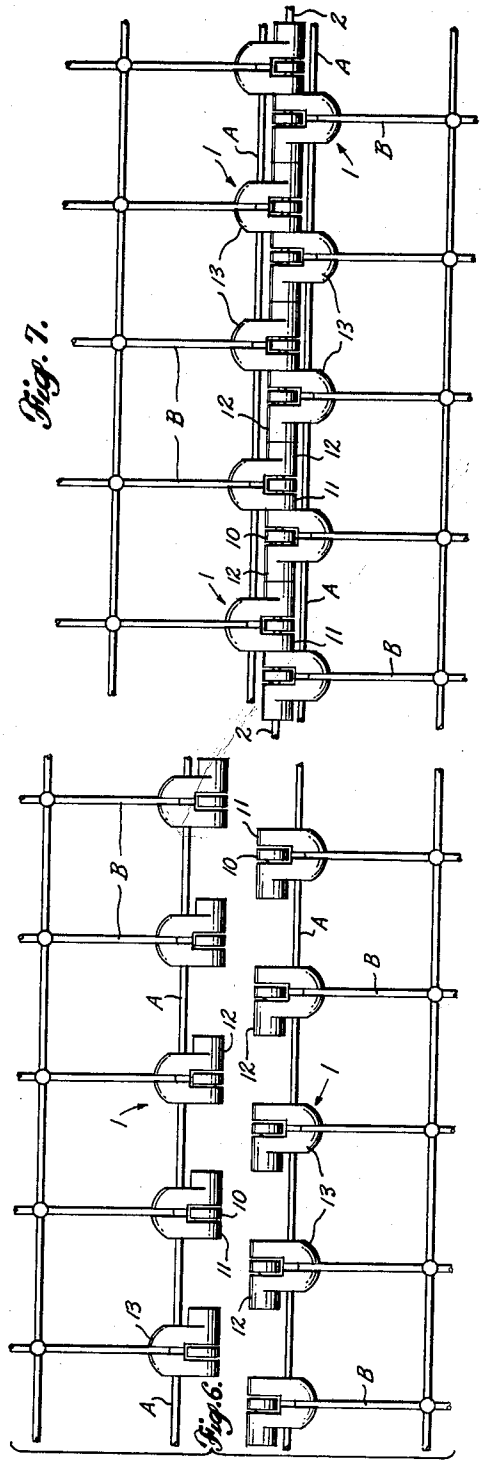


Fig. 7.

Fig. 6.



Fig. 15.

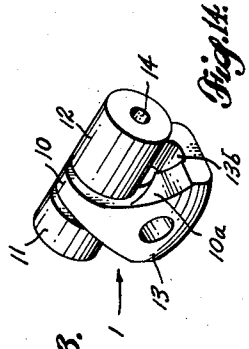


Fig. 14.

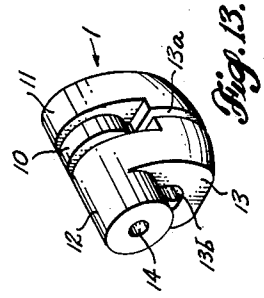


Fig. 13.

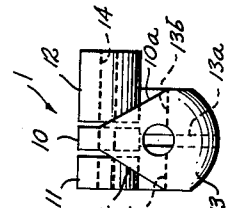


Fig. 10.

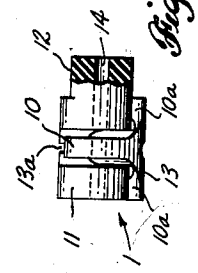


Fig. 12.

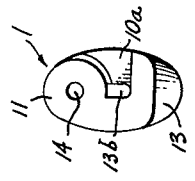


Fig. 9.

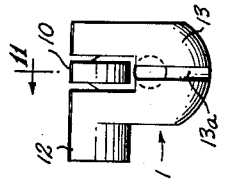


Fig. 8.

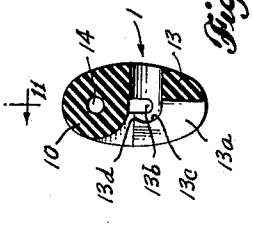


Fig. 11.

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May 12, 1964 F. J. LUKETA 3,132,433

CONNECTOR FOR TRAWL NET BAR-CUT EDGES

Filed April 2, 1962 4 Sheets-Sheet 4

Fig. 16.

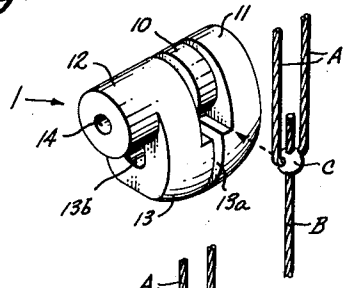


Fig. 17.

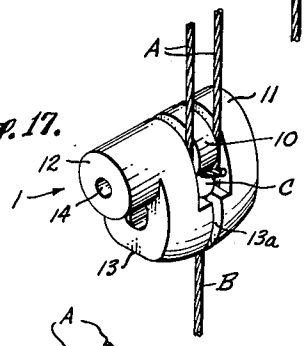


Fig. 18.

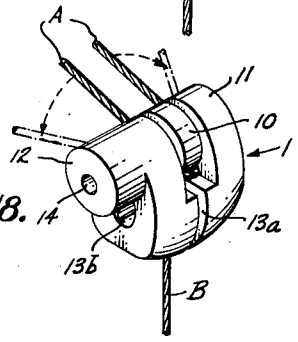


Fig. 19.

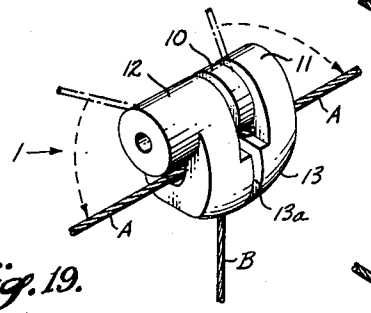


Fig. 20.

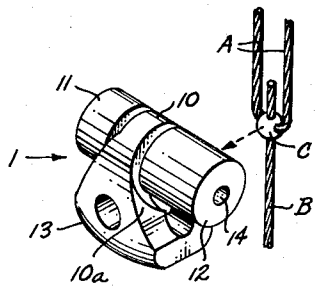


Fig. 21.

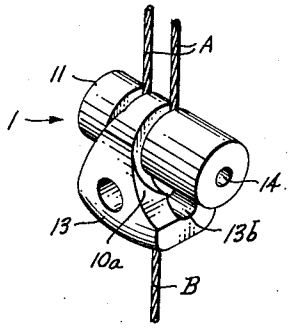


Fig. 22.

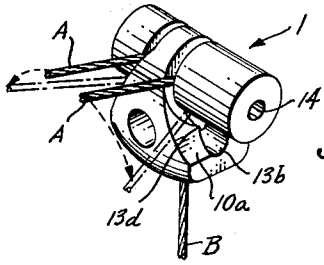
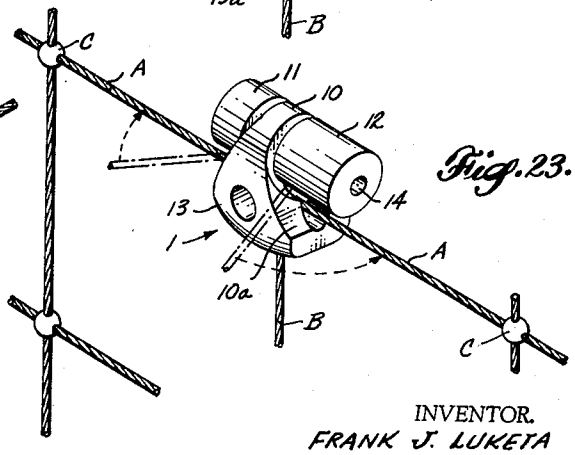


Fig. 23.



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United States Patent Office 3,132,433 Patented May 12, 1964

3,132,433

CONNECTOR FOR TRAWL NET BAR-CUT EDGES

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Filed Apr. 2, 1962, Ser. No. 184,229
11 Claims. (Cl. 43—7)

Trawl nets, and the like, are composed of variously shaped mesh panels cut from commercially available netting with the appropriate edges joined together to form the desired configuration. Sometimes the joints are along point-cut edges, in which case the edges are woven together. In other cases the edges are bar-cut, and are laced together along the edge bars.

The weaving or the lacing operation is tedious and time-consuming, as is also the releasing of such a joint. The time employed could often be used to better economic advantage in other tasks. It is the primary object of this invention to provide means which are readily applicable to each edge to be joined, and then are capable of being accurately, quickly, and easily, yet strongly joined to the complemental connecting means of the adjoining panel's edge, and even more readily disconnected therefrom when necessary, all in somewhat the same manner as two edges of a garment are joined or released by slide fasteners.

A companion application, Serial No. 180,545, filed March 19, 1962, discloses connectors for joining two point-cut edges, and claims the same specifically as well as broadly to cover the principles common to that form and to the form shown herein. This application is directed specifically to a form for joining bar-cut edges, but is not to be construed to cover only the specific form illustrated.

Among further objects of the invention are, to use connectors of simple form, easily yet securely applied, and capable of being molded primarily of rubber or plastics, for example, at low cost; to employ connectors which will not allow nor cause appreciable distortion along the bar-cut joint, while allowing distortion as usual in the mesh squares; and to provide a joint of no material bulk. Other objects will appear as this specification progresses.

Whereas the point-cut edges that are joined, as in the companion case, are largely typical of midwater trawl nets, the edges of curtain panels in a bottom trawl net characteristically are bar-cut edges, and the net chosen to illustrate the present invention is a bottom trawl net, more specifically the curtain thereof. However, no restriction to such nets nor to curtains is intended.

FIGURE 1 is an isometric view, partly broken away, of such a bottom trawl net.

FIGURE 2 is an enlarged isometric view of a portion of a curtain of a bottom trawl net, incorporating the present invention.

FIGURE 3 is an isometric view of two separated mesh panels to be joined, with connectors in place along the edge bars of each, and FIGURE 4 is a like view of the panels, joined.

FIGURE 5 is an elevational view of the two joined panels, illustrating their orientation and relation to the curtain line.

FIGURE 6 is an elevational view corresponding to FIGURE 3, and FIGURE 7 a like view corresponding to FIGURE 4.

FIGURES 8, 9, and 10 are orthographic elevational views from different viewpoints of an individual connector; FIGURE 11 is a cross-section at the line 11—11 of FIGURE 8; and FIGURE 12 is a view from above as seen in FIGURES 8 to 11.

FIGURES 13, 14 and 15 are isometric views of such a connector, FIGURES 13 and 14 showing it as viewed from opposite sides, and FIGURE 15 showng it inverted.

FIGURES 16 to 19 and 20 to 23 are isometric views

illustrating the sequence of operations in applying a connector to a mesh square; the first series, FIGURES 16 to 19, showing sequential steps from one side of the connector, and the second series, FIGURES 20 to 23, showing the same steps from the opposite side.

The bottom trawl net used to illustrate the invention comprises a codend **9** closed during use at its after end, and held open at its forward end by a rigid expander ring **90**. A funnel **91** diverges forwardly from the ring **90**, to which it leads fish, and curtains **92** spread forwardly from opposite sides of the funnel, to sweep fish into the latter. These curtains are suspended each from a curtain line **93**, and are stressed but slightly; their lower edge sweeps the bottom because of the attached water reacting weights **92***a* that drag over the bottom. The body and codend of the net are dragged forwardly by buoyed up sweep lines **94** diverging forwardly from suspender connectors **95***a* to which the forward end of mesh suspenders are connected; the after end of each suspender **95** is distributed about and joined to the expander ring **90**. Bobbins **96** across the lower bosom of the net roll over the bottom and hold the bosom off the bottom, to avoid snagging. The net is dragged forwardly by doors (not shown) to which the forward ends of the sweep lines **94** and of the curtain lines **93** are anchored, the doors being towed by towing warps from the trawler, as is conventional.

To attain the configuration required, trawl nets are made up of variously shaped panels cut from strips of commercially available netting with the appropriate edges joined together. Some such joints are along bar-cut edges, and while joints of this type are not confined to the curtains, they are quite commonly employed in joining curtain panels of bottom trawl nets, and it is because of this that the invention will be illustrated by reference to such a curtain and such a joint for the mesh panels thereof.

A completed joint is shown at J in FIGURES 2 and 5. The mesh panels **92***b* and **92***c* are suspended by points along their upper edge from a hanging line **93***a* (FIGURE 5) supported by the curtain line **93**. The weights **92***a* are suspended from points at intervals in the lower edge of the mesh (FIGURE 2). The mesh is not materially stressed during use, the mesh squares remain open, and the bars are oriented diagonally. Usually the curtain line **93** is formed of sections each of a length corresponding to the length of its mesh panel, and couplers **93***b* join the sections of curtain line at the upper end of each joint J.

The joint proper is made up of a series of connectors **1**, each so constructed as to fit upon two or more (in this case three) legs of a mesh square, and defining a loop or loops adjacent the point defined by the engaged legs of the mesh square, in which connectors a lacing line is received. The corresponding edges of the two panels to be joined each have connectors applied to it, normally at each mesh point along its edge bar, after which the respective connectors' loops are brought into alignment and the lacing twine **2** (FIGURE 7) is passed through the aligned loops, and its ends are secured by the swaged-on sleeves **2***a*. Release along the joint only requires withdrawal of the lacing twine after first cutting off one of the securing sleeves.

Each connector **1** includes an apertured ear **10** interposed between and spaced, in the direction lengthwise of the edge bar of the mesh, from an apertured boss **11** and an apertured sleeve **12**; all these are supported from a base **13** which is slit at **13***a* in the general plane of the ear **10**. The base **13** is also slit at **13***b*, beneath the ear **10**, boss **11**, and sleeve **12**, and in the general plane of, but offset from the apertures **14** in the ear, boss, and sleeve, through which apertures the lacing twine is passed.

The overall length along the line of the apertures **14** is preferably just one-half of the length of that leg of the mesh that lies in its edge bar A. An enlargement at **13***c* affords a chamber large enough to receive a knot at the mesh's point.

The manner of applying the connectors to the mesh's edge bar is shown in FIGURES 16 to 23. In these views the edge bar is designated A, and a bar at right angles thereto is designated B, the knot joining them being C. Holding the bar B, and pulling the bar A at opposite sides of knot C into parallelism (FIGURES 16 and 20) the connector **1**, with the slot **13***a* leading, is advanced towards the mesh, and the two parallel portions of bar A straddle the ear **10**; the bar B enters the slot **13***a*, so that the opposite end portions of the connector straddle the bar B, and knot C slips beneath ear **10**; see FIGURES 17 and 21. Now the two portions of bar A are deflected as they ride over the inclined surfaces **10***a* to pull the knot C into the enlargement or chamber **13***c* (FIGURES 18 and 22), and the two portions of bar A are swung outwardly, under the boss **11** and the sleeve **12**, respectively, as in the dot-dash lines of FIGURES 18 and 22, until they slip past the nose **13***d* (FIGURE 11) and are straightened out within the slot **13***b*, as in FIGURES 19 and 23. Now the connector **1** is affixed to each of the bars A and B which lie at right angles, and the apertures **14** are positioned just outside the bar A.

The two bar-cut edges to be joined, each with connectors **1** applied to them, are disposed alongside one another, as in FIGURE 6, but with interspersed connectors on the respective bars aligned, and a lacing twine **2** (usually having a stiff tip **20**, FIGURE 4) is threaded through the apertures **14** of successively alternating connectors along the opposite edges of the two panels. The ends of lacing twine **2** are suitably secured, and the joint is complete. When the panels **92***b* and **92***c* are to be separated, all that is required is to withdraw the lacing twine along the joint J. If the connectors are to be removed, this is done by reversing the procedure described above for engaging them with their bars A.

As in the companion application, Serial No. 180,545, each connector is located at a point of the mesh, and is located by being affixed to at least two legs of bars directed at right angles. In the example illustrated the affixation is to three legs. When so affixed a loop is defined at the point—in this case the aperture through ear **10**, or through this ear and through boss **11** and sleeve **12**, for reception of a lacing twine. There is also a spacer sleeve **12**, half of which is part of one connector and half part of the complemental connector, together equaling the length of a bar.

The entire joint is flexible, since the connectors are molded of rubber, for example, and as they are individually of small bulk, the joint itself is not of material bulk. To the extent necessary the meshes may be distorted or collapsed (even completely) without hindrance from the connectors.

I claim as my invention:

1. Means for joining the bar-cut edges of two mesh panels such as are used in trawl nets and the like, comprising a plurality of connectors distributed along the edges to be joined, each connector including means for affixing the connector to the edge bar of the mesh at successive points of the bar-cut edge, and straddling a transverse bar at each such point, a sleeve formed on the connector and apertured in parallelism to the mesh's edge when so affixed, and a lacing twine threaded through the apertures of successively alternating connector sleeves along the opposite edges of the two panels.

2. Means as and for the purpose specified in claim 1, wherein the overall length of each connector, along the line of the apertured sleeves, is approximately half the length of the edge bar of the mesh, between points.

3. Means for joining the bar-cut edges of two mesh panels such as are used in trawl nets and the like, comprising a plurality of connectors distributed along the edges of the panels to be joined, each connector including means to straddle the edge bar of the panel at opposite sides of each point, means to straddle the bar of the panel at right angles to the edge bar of the panel at each such point, a sleeve disposed outside of the edge bar when the connector is mounted upon the mesh by said straddling means, and a lacing twine threaded through the apertures of successively alternating sleeves along the opposite edges of the two panels.

4. A connector for application to the edge bar of a bar-cut mesh panel, for the purpose herein specified, comprising a body having a first slot extending lengthwise for the reception of the edge bar, and having a second slot directed at right angles to and communicating with the first slot for reception of a bar extending at right angles to the edge bar from a point, means for retaining the connector with the mesh bars in the respective slots, sleeve-like means carried by the body and projecting beyond the edge bar when the connector is so retained, said sleeve-like means being apertured lengthwise for the reception of a lacing twine.

5. A connector as in claim 4, including an ear extending from the body and constituting part of the sleeve-like means, a boss also extending from the body spaced from one side of the ear and constituting part of the sleeve-like means, and a sleeve also extending from the body and spaced from the opposite side of the ear, and constituting part of the sleeve-like means, the spaces between the boss and the sleeve, respectively, and the ear communicating with the first slot of the body as an entrance for the edge bar legs at opposite sides of the point.

6. A connector as in claim 5, wherein the ear extends from the body at the side opposite the second slot, and the boss and sleeve extend from the body at the same side as the second slot.

7. A connector as in claim 5, wherein the body is formed with an enlarged chamber at the junction of the two slots, for reception of a knot at the mesh's point.

8. A connector as in claim 7, wherein the body is provided with an aperture directed towards the knot-receiving chamber from its side opposite the entrance thereto.

9. A connector as in claim 6, including a nose outstanding at the entrance to the first slot.

10. Means for joining the edge bars of two mesh panels such as are used in trawl nets and the like, comprising a series of connectors spaced apart along the edge bar of each such mesh panel, each connector including a middle element and two terminal elements at its respectively opposite sides, all having apertures which are aligned when in position of use, a base offset to one side of and integral with said three elements, the three elements being separated by slots extending transversely across the line defined by their apertures, for passage of the edge bar of the mesh at opposite sides of a transverse bar, the connector also having a slit perpendicular to and communicating with said slots, located intermediate the base and each of said elements, for reception of the edge bar of the mesh after its passage through said slots, and a twine threaded through the apertures of succesively interspersed connectors on the edge bars of the respective mesh panels, to join them, and to block reverse passage of the edge bars through the slots of their respective connectors.

11. Means for joining the edge bars of two mesh panels such as are used in trawl nets and the like, comprising a series of connectors spaced apart along the edge bar of each such mesh panel, each connector including a middle element and two terminal elements at its respectively opposite sides, all having apertures which are aligned when in position of use, a base offset to one side of and integral with said three elements, the three elements being separated by slots extending transversely across the line defined by their apertures, for passage of the edge bar of

the mesh at opposite sides of a transverse bar, the connector also having a slit perpendicular to and communicating with said slots, located intermediate the base and each of said elements, for reception of the edge bar of the mesh after its passage through said slots, the connector also having a third slot in its base parallel to and intermediate the two first-mentioned slots, and opening at the side opposite the opening of the slit, for reception of a mesh bar perpendicular to the edge bar, and a twine threaded through the apertures of successively interspersed connectors on the edge bars of the respective mesh panels,

to join them, and to block reverse passage of the edge bars through the slots whereby they entered.

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