Jan. 30, 1962 F. J. LUKETA 3,018,580

CHAFING GEAR FOR TRAWL NETS

Filed May 31, 1960 2 Sheets-Sheet 1

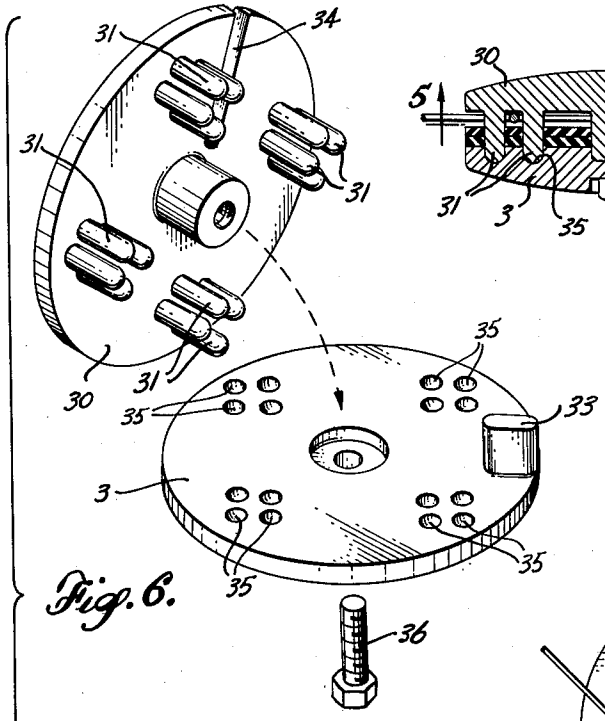


Fig. 6.

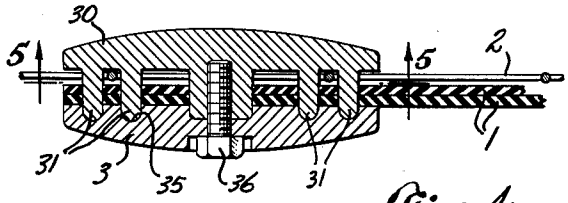
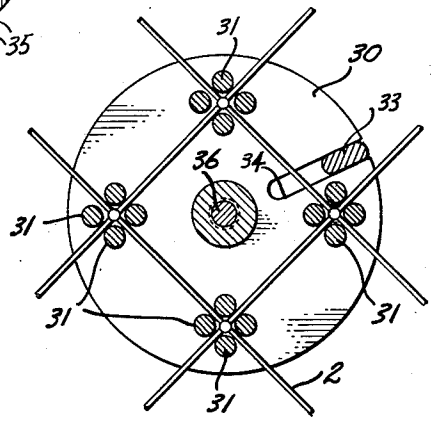


Fig. 4.

Fig. 5.



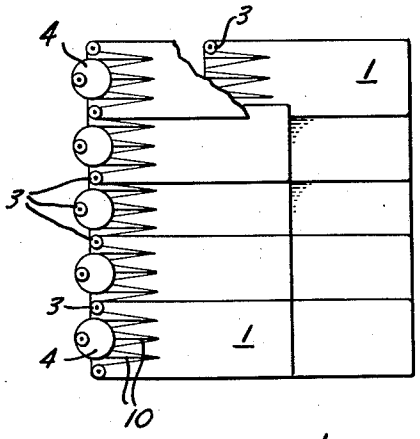


Fig. 1.

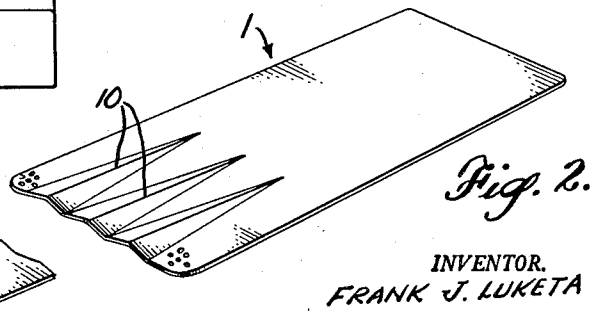


Fig. 2.

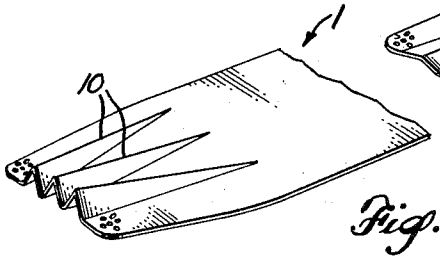


Fig. 3.

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CHAFING GEAR FOR TRAWL NETS

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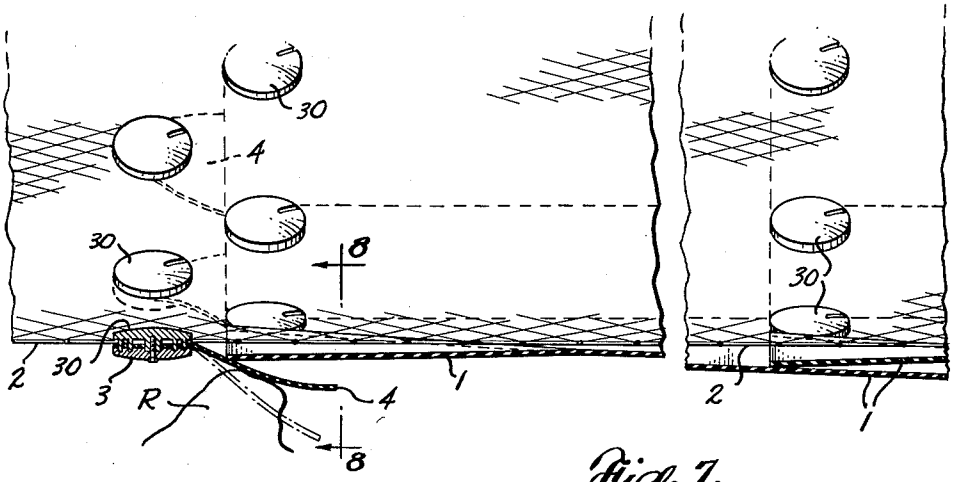


Fig. 7.

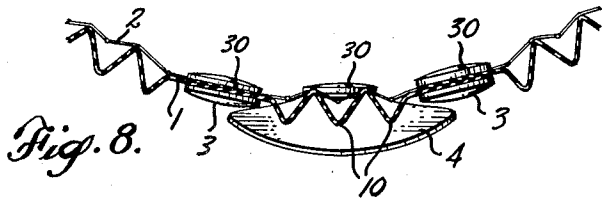


Fig. 8.

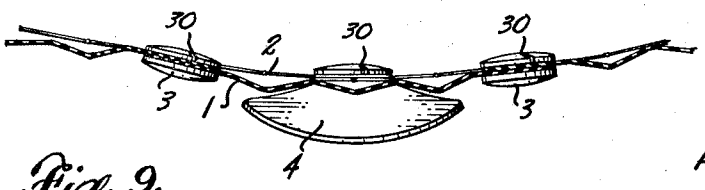


Fig. 9.

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CHAFING GEAR FOR TRAWL NETS

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12 Claims. (Cl. 43—9)

This invention pertains to trawl nets in general, and in particular to chafing gear for application to the bottom of a codend used in bottom trawling, to protect the mesh of the codend from snagging upon bottom obstructions over which it may be dragged, or from wear due to constant dragging. In some respects this invention is similar to that disclosed in my copending application Serial No. 844,556, filed October 5, 1959.

Heretofore one or two large sheets of protective material, usually of rubber or rubber composition, have been applied to the bottom of the codend, being secured to the mesh by lacing through grommets spaced across at least the forward edge of a sheet of sufficient width to cover the bottom half-circumference of the codend, and through the mesh or about numerous riblines secured to and extending lengthwise of the net. Since the codend must be capable of distending laterally with a full catch unit its mesh squares loose their diamond shape, and become substantially square, such points of securement of the chafing gear must be spaced laterally to an extent to permit such distention, but at all other times are more closely spaced. It follows that the forward edges of the protective sheets will belly downwardly between the points of securement, except when the codend is fully distended. Such bellied edges will catch on bottom snags, and are quite likely to tear the net at the points of securement, with consequent loss of fish.

The protective gear of my application referred to above improved upon that just described in that the chafing gear is formed of a plurality of edge-lapping elongated sheets each anchored to the netting at a single point at its forward edge or point, and of an aggregate width to cover the bottom half-circumference. When the codend contracted circumferentially these sheets interleaved laterally. However, since each sheet was connected to the codend at a single point only, which receives all the stress, each sheet was necessarily narrow, a large number were required to cover the bottom half-circumference, and the installation was somewhat more bulky and expensive than it would have been if all sheets used could have been larger.

According to the present invention fewer protective sheets each of somewhat larger individual size are used, are supported from the mesh of the codend at two or more points laterally spaced at their forward edge, thereby lessening the stress at the individual points of securement, yet in various ways are protected against the likelihood of snagging even though the codend is not fully distended. They still edge-lap adjoining sheets for full protection at all times.

In addition, protective flaps are employed in advance of each leading sheet, overlapping and protecting its forward edge, just as each leading sheet overlaps and protects the forward edge of a following sheet.

The invention includes special anchorage means for anchoring the sheet to the mesh, formed and related to the squares of the codend mesh.

Moreover, the leading edge of each sheet is so formed that it will contract laterally in regular fashion when not held distended by the mesh; to do this such leading edges may be fan-folded.

The invention is shown in an illustrative form, such as is presently preferred by me.

FIGURE 1 is a bottom plan view of the chafing gear as it would appear when fully distended.

FIGURE 2 is an isometric view of a single sheet, distended, and FIGURE 3 is a similar view but with the sheet laterally contracted.

FIGURE 4 is a sectional view through an anchorage means, engaged with the mesh and with the sheets.

FIGURE 5 is a sectional view at the line 5—5 of FIGURE 4.

FIGURE 6 is an exploded isometric view of the anchorage means.

FIGURE 7 is a longitudinal sectional view through the codend bottom, with the chafing gear carried thereby.

FIGURE 8 is a sectional view at the line 8—8 of FIGURE 7, showing the codend meshes contracted laterally and FIGURE 9 is a similar view but with the codend distended.

The chafing gear of this invention comprises a plurality of sheets 1 of protective material, such as abrasion resistant rubber or rubber composition, each elongated but generally rectangular in shape. Each is of a width to cover a material portion of the bottom half-circumference of the codend. At the forward or leading edge, and there only, each sheet is secured to the mesh 2 of the codend at a plurality of laterally spaced points, two points of securement being shown for each sheet 1. The manner of securement will be explained later. Intermediate the points of securement each sheet 1 is so formed at its forward edge that it will contact laterally with contraction of the mesh squares, and expand with distention of the latter. To this end the sheet 1 is shown as fan-folded at 10 across its leading edge, between the two points of securement.

Anchorage means for securing the sheet 1 to the mesh 2 include two disks for application to the opposite faces (inside and outside) of the mesh, and to the sheets. Since two laterally adjoining sheets should edge-lap, the anchorage means at the outside edges of each sheet—and preferably there are none intermediate such outside edges—are applied in common to the lapped sheets. One such disk 3 is the outside disk, and the complemental disk 30 is the inside disk. They should be of a size to overlie one mesh square and the angles exterior to the interior angles of the squares, as FIGURE 5 shows. The inside disk 30 has four sets of four pins 31 projecting from its face to straddle the four knots of a mesh square as shown in FIGURE 5.

An additional flattened pin 33 on the disk 3 extends to the periphery of its disk, in alignment with a radial slot 34 in the opposite disk 30 and of a length to enter such slot. The purpose of the slot 34 is to enable passage of the inside disk, of larger diameter than the mesh squares, through such squares. The flattened pin 33 prevents mesh entering or hanging up in the end of slot 34. Each pin, other than that which is in registry with the slot 34, enters a depression 35 in the complementary disk, after passing through the mesh and through holes provided in the sheets 1. A clamping bolt 36 passes through one disk and screws into the other disk, to clamp the anchorage means, the mesh, and the sheets 1 securely together.

It will be noted that the straddling pins 31 require distention of a mesh square to its fully square shape, consonant with full distention of the codend. The several pins distribute the stress between the sheets and the mesh, and it is not concentrated at a single point.

In codends of normal length it will be convenient to end-lap sheets, as shown in FIGURE 1. Thereby individual sheets are less bulky and expensive, and if one is damaged it is readily replaceable. The foremost sheets are desirably protected at their leading edges by short flaps 4 which lap the leading edges of such sheets, and which can be secured to the mesh by a single anchorage means 3, 30. FIGURE 7 illustrates how such a flap will

protect the following sheet 1 from engagement by a snag R.

The chafing gear is applied to the mesh 2 by slipping a slotted disk 30 through the mesh, using the slot to permit this, and then clamping together the disks 3, 30 with the sheets 1 and mesh 2 between them. In use the sheets 1 extend freely aft of their anchorages. The sheets 1 interleave laterally, and the anchorage points at their opposite edges approach, the leading edge fan-folding at 10. All this excess bulk is covered and protected either by flaps 4 as in FIGURE 8 or by the trailing end of the sheet ahead. When the codend fills, the points of anchorage separate, the fan-folds flatten as in FIGURES 2 and 9.

I claim as my invention:

1. Chafing gear for a trawl net codend such as is distensible circumferentially or contractible, comprising a plurality of sheets of protective material of an aggregate width to cover the bottom of the codend when the latter is substantially fully distended circumferentially, a plurality of laterally spaced anchorage means interengageable between the net and the forward edge of each sheet, at intervals permitting full lateral distention, but to approach upon lateral contraction, and a flap similarly engageable with the net ahead of such sheets, and underlapping the forward edges of the sheets at all times, to retain those edges against bellying while the codend is contracted and the laterally spaced anchorage means are in positions of close approach.

2. Chafing gear as in claim 1, wherein the forward end portion of each sheet is fan-folded, to contract with approach of the anchorage means of such sheet.

3. Chafing gear as in claim 1, wherein a separate flap is arranged for cooperation with each separate sheet.

4. Chafing gear for a trawl net codend made of mesh, comprising a plurality of sheets of protective material of an aggregate width to cover the bottom of the codend when the latter is fully distended circumferentially, a plurality of anchorage means interengageable between the net and the forward edge of the several sheets, at intervals permitting full cricumferential distention or contraction from such distended form, each anchorage means comprising an inner disk of an area exceeding that of a mesh square, and applied to the inner surface of the codend and a complemental outer disk applied exteriorly of the codend and engaging at least one protective sheet, pins extending between the disks and through the sheet, arranged in a pattern to straddle the four knots at the corners of a mesh square, and means to clamp the disks together with the sheet and net therebtween.

5. Chafing gear as in claim 4, the inner disk having a slit disposed inwardly of its circumference, for passage through a mesh square, the outer disk being of like area and shape, to overlie said slit when the disks are clamped together.

6. Chafing gear as in claim 5, including a pin projecting from the outer disk towards the inner disk and received within the outer end of the slit in the latter disk, when the disks are clamped together.

7. Chafing gear as in claim 4, wherein the pins are arranged in groups of four, located to engage within the angles defined by the crossing mesh lines of a square, in the distended condition of the codend.

8. Chafing gear as in claim 7, wherein all said pins are carried by the inner disk, and the outer disk is recessed in its inner face to receive the ends of the pins.

9. In a chafing gear for a trawl net codend formed of mesh squares, a protective sheet secured to the net at its forward end only, an inner disk applicable to the inner face of the mesh, a cooperating outer disk applicable to the outer face of the protective sheet, pins projecting from at least one such disk towards the other, in a pattern to locate a pin within each interior angle of a given mesh square, and to locate a pin within each exterior angle of such square, the disks and the protective sheet being complementally apertured to receive all such pins, and means interengageable between the disks for releasably securing them in a clamped condition upon the mesh.

10. In a chafing gear as in claim 9, the inner disk having a slit disposed inwardly from its periphery to a point adjacent its center.

11. Chafing gear for a trawl net codend made of mesh, which is circumferentially distensible and contractible, comprising at least one sheet of protective material underlying at least part of the bottom of the codend, a plurality of anchorage means interengageable between such part of the net and the forward edge of said sheet, at lateral intervals such as will permit full circumferential distention of the codend, the forward edge portion of said protective sheet being fan-folded, to contact with lateral contraction of the codend and consequent approach of the laterally spaced anchorage means, or to separate without stressing of the codend mesh upon lateral distention of the codend and separation of said anchorage means.

12. Chafing gear as in claim 11, including a plurality of such protective, fan-folded sheets, laterally arranged to protect adjoining but different areas of the codend, and each of a width to interleave with sheets at its edges at full distention or less of the codend.

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