Aug. 12, 1969 K. STATHER 3,460,284

DEVICE FOR OPENING TRAWL NETS

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Fig. 1.

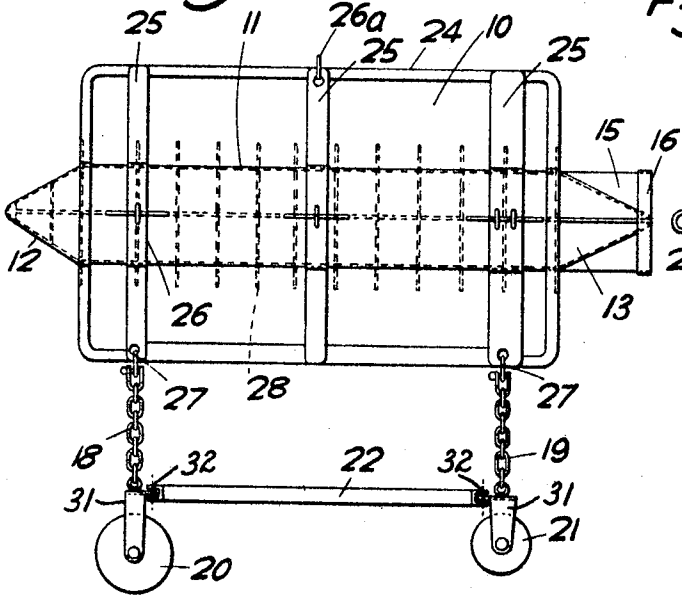


Fig. 2.

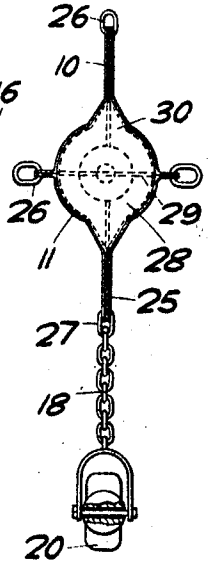
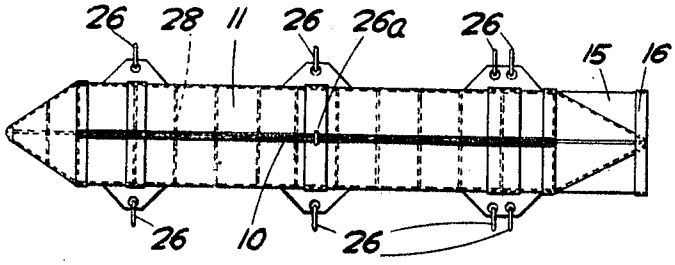


Fig. 3.



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DEVICE FOR OPENING TRAWL NETS

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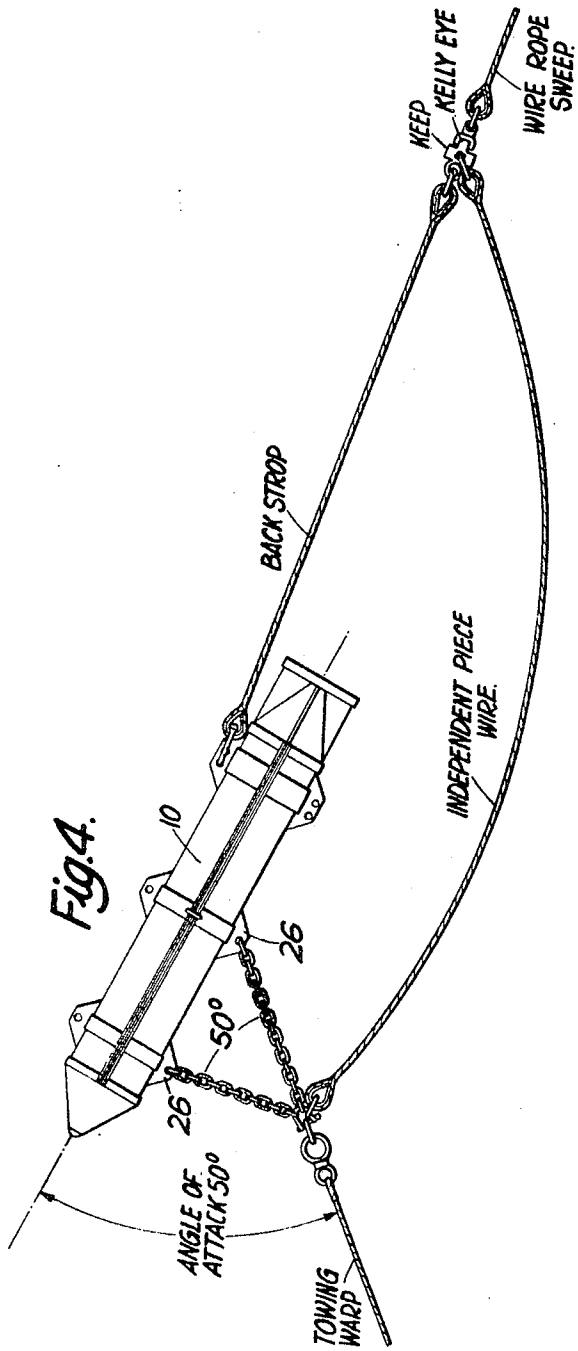

Fig.4.

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DEVICE FOR OPENING TRAWL NETS

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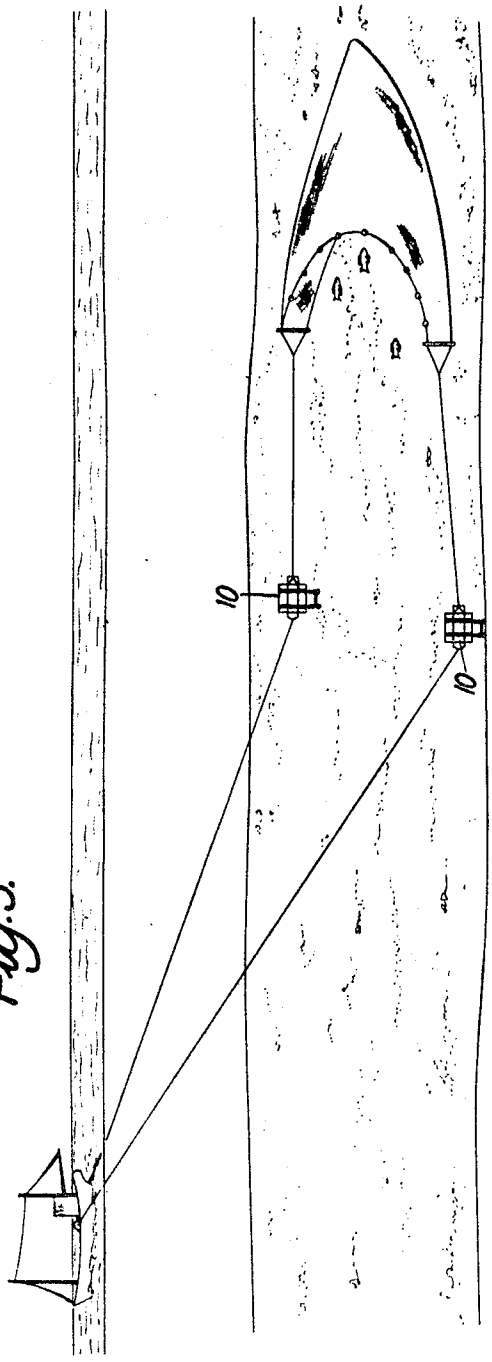

Fig. 5.

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DEVICE FOR OPENING TRAWL NETS

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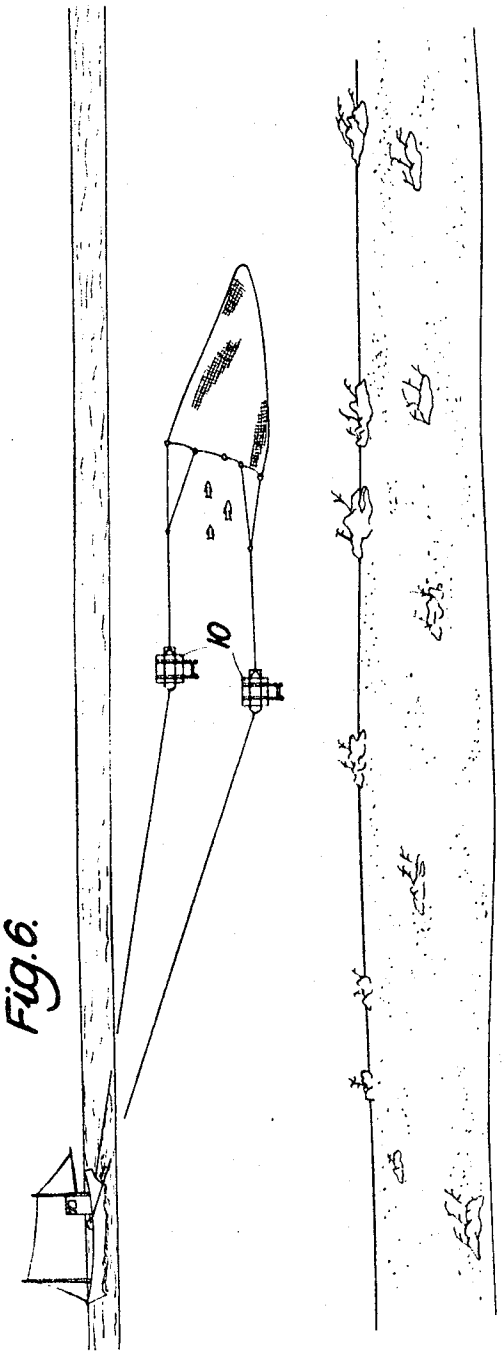

Fig. 6.

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DEVICE FOR OPENING TRAWL NETS

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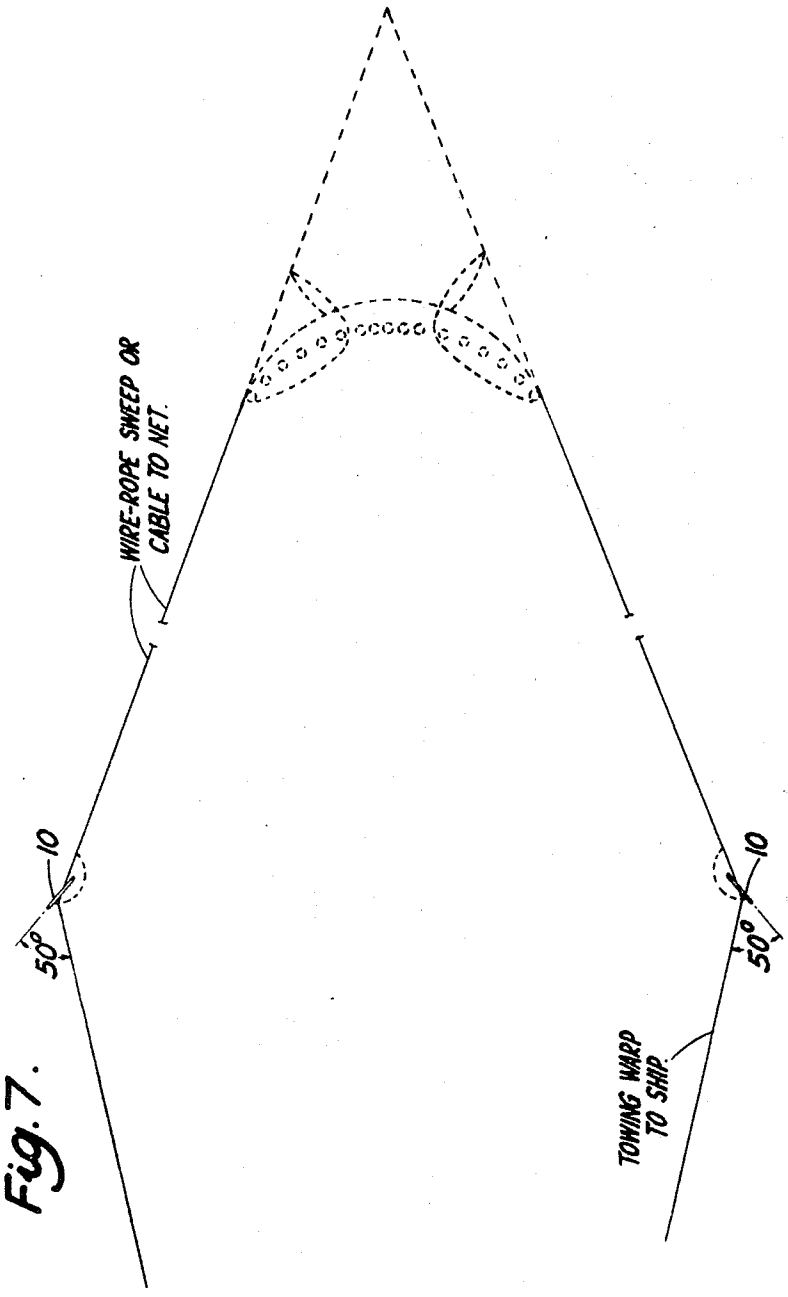

Fig. 7.

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DEVICE FOR OPENING TRAWL NETS

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Claims priority, application Great Britain, July 12, 1966, 31,301/66
Int. Cl. A01k 73/02
U.S. Cl. 43—9 8 Claims

ABSTRACT OF THE DISCLOSURE

A trawl net opening device comprises a buoyant fin positioned upright in use, and two rollers hanging below the fin on chains or other flexible members to roll on the sea bed, the device as a whole having negative buoyancy.

The invention relates to a device for use in opening trawl nets and provides an alternative to or improvements in, the commonly used otter boards or doors.

The invention provides a net opening device comprising a buoyant fin positioned upright in use, and two (or more) rollers below the fin for rolling on the sea bed at least when bottom trawling, the device as a whole having negative buoyancy.

Preferably the rollers hang below the fin on chains, cables or like tension members offering little or no resistance to compressive force whereby the rollers may ride over bumps on the sea bed without transmitting substantial upward forces to the fin.

It is also preferred that one of the rollers is near the front of the fin and that the second hanging roller is behind the first. The front roller may be heavier than the second roller, e.g. twice as heavy. The arrangement may be that, in normal operation, the second roller is at a level above that of the first roller and is held off the bed. Preferably the two rollers are held apart by a rigid spacer bar.

The buoyancy of the fin may be provided, wholly or partly, by a buoyancy member or float attached thereto or built as an integral part thereof and the resultant negative buoyancy may be due solely to the weight of the rollers and their attachment means or additional weight may be provided, preferably on the attachment means.

The device may be provided with stabilizing vanes in horizontal and/or vertical planes and preferably at the rear of the buoyancy member.

The buoyancy member may be of cylindrical form with its axis extending fore and aft in a generally horizontal plane and it may carry links for towing chains or cables. Preferably the said axis lies in the plane of the fin and at the centre of the depth of the fin.

A specific embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIGURE 1 is an elevation of the device,

FIGURE 2 is an end view of the device,

FIGURE 3 is a plan view of the device,

FIGURE 4 is a plan view of the device showing the various connections thereto,

FIGURE 5 shows the use of the device for bottom trawling,

FIGURE 6 shows the use of the device for mid-water trawling, and

FIGURE 7 is a plan showing the device in use.

Referring first to FIGURES 1–3, the device comprises a combined fin **10** and buoyancy cylinder **11**, the cylinder having conical ends **12**, **13**. The fin and cylinder are constructed of two metal sheets secured together and to bulkheads as later described. At the rear end the cylinder has four iron stabilizing vanes **15** at 90° spacings. The outer ends of these fins are supported and protected by a ring **16**.

Hanging from the fin there are two chains **18**, **19** carrying heavy rollers **20**, **21** held apart by a rigid spacer bar **22**. The front roller **20** hangs below the roller **21** and has about twice the weight thereof. The rollers are carried in brackets **31** freely pivoted to the bar **22** preferably for universal pivotal movement by means of universal joints **32** at both ends of spacer bar **22**. In normal use for bottom trawling only the roller **20** contacts the sea bed.

The fin is stiffened by an iron or steel rim **24** and straps **25**, the latter carrying cable-attachment brackets and links **26** as well as the attachment links **27** for the chains **18**, **19**. The links and brackets **26** are duplicated at each side of the fin so that the device is suitable for port or starboard use. The two front links **26** at either side are for attachment of a chain towing pennant and the rear links or brackets are for attachment of the net gear. The link **26***a* is for lifting purposes.

The buoyancy cylinder is filled with expanded polyurethane rigid foam divided by stiffening bulkheads **28**, and tow longitudinal stiffeners **29**, **30**.

The devices are used in pairs as seen in FIGURES 5 to 7 and it is to be noted that when bottom trawling the rollers **20** run on the bottom and that when mid-water trawling the devices are raised from the bottom. The depth of trawl can be determined and ascertained by the length of warp paid out and the angle of the warp to the horizontal.

In the operation of the device the front roller **20** tends to hold the front of the fin down, against upward pull from the towing cable and, when bottom trawling, the front roller **20** runs on the sea bed. The rear roller **21** normally rides clear of the bottom because of the disparity in length between chains **18** and **19**. Thus, with the assistance of the horizontal rear stabilizing fins **15**, the device rides horizontally in the water. Because fin **10** is bouyant, the tendency will be for it to hold the chains **18** and **19** taut with the rollers upright. As the fin is travelling through the water, there will be a slight tendency for chain **18** and roller **20** to have a combined rolling and slidng action, but the measure of sliding of front roller **20** has been found to be immaterial, and, indeed it may be beneficial in that it tends to increase the angle of divergence of the boards. If for any reason the rear portion of the fin **10** tends to sink or the front portion to rise, the rear roller **21** will contact the sea bed taking its weight off the fin so that the rear end will sink no further, thus, insuring vertical stability. Horizontal stability is maintained by the combination of the front roller **20** riding on the sea bed and the action of horizontal fins **15**.

In the specific device forming the subject of this particular example the area of the fin (including the projected area of the bouyancy chamber)is 15 sq. ft., the fin and buoyancy cylinder together have a positive buoyancy (in sea water) of 43 lbs. and the rollers together with their suspension means have a negative buoyancy of 169 lbs. Thus the net negative buoyancy is 126 lbs. but the device stays upright in the water and the static load on the sea bed is only 126 lbs.

Among the advantages of the invention are that it resists capsizing, it rides relatively easily over varying sea-bed contours, and it is less likely than known otter boards to damage underwater cables or to sink into soft muddy sea beds.

I claim:

1. A trawl net opening device having as a whole a negative buoyancy comprising a buoyant fin adapted to be maintained in an upright position as said fin is caused to travel through water, a first roller and a second roller suspended beneath said fin for rolling on a sea bed, a first flexible tension element having an end attached to said first roller and another end attached to the front, with respect to the direction of travel of said fin, portion of said fin, a second flexible tension element having an end attached to said second roller and another end attached to the rear portion of said fin, said first tension element being of a greater length than said second tension element, and a rigid spacer member interconnecting said first and second rollers and operable to hold said rollers separated at a fixed distance.

2. A trawl net opening device as claimed in claim 1 in which said first roller is heavier than said second roller.

3. A trawl net opening device as claimed in claim 1 in which universal joints are provided for connecting said rollers to said spacer member.

4. A trawl net opening device as claimed in claim 1 having at least one laterally extending stabilizer vane mounted on the rear portion of said fin.

5. A trawl net opening device as claimed in claim 1 in which the structure of said device is symmetrical in relation to a vertical fore and aft central plane and in which towing attachments are provided on both sides of said fin.

6. A trawl net opening device as claimed in claim 1 in which the fin is constructed of two metal sheets secured together face to face at the upper and lower parts of said fin and spaced apart intermediate in the height of said fin and having in addition end caps for covering the spaced apart portions of said fin thereby providing a buoyancy chamber intermediate in the height of said fin.

7. A trawl net opening device as claimed in claim 6 in which said buoyancy chamber is filled with a buoyant material.

8. A trawl net opening device as claimed in claim 1 in which said fin is constructed to have four stabilizing vanes extending outwardly from the rear end thereof and spaced one from the other at an angle of substantially 90°.

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