



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.11.2022 Bulletin 2022/48

(51) International Patent Classification (IPC):
E02B 15/08^(2006.01)

(21) Application number: **22173789.3**

(52) Cooperative Patent Classification (CPC):
E02B 15/0835

(22) Date of filing: **17.05.2022**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Cordasco, Biagio**
22037 Ponte Lambro (CO) (IT)

(72) Inventor: **Cordasco, Biagio**
22037 Ponte Lambro (CO) (IT)

(74) Representative: **Serravalle, Marco**
Marco Serravalle S.L.
Calle Galicia, 18 - Apt. E5
38660 Adeje (ES)

(30) Priority: **28.05.2021 IT 202100014039**

(54) **APPARATUS FOR THE RECOVERY OF FLOATING WASTE FROM WATERWAYS**

(57) The present invention is directed to an apparatus (100) for removing floating wastes from rivers and waterways in general, which apparatus comprises a mouth and a coupling point (130), positioned centrally on one of the horizontal round bars (110, 111) of the mouth, wherein said coupling point (130) allows the mouth an

oscillation around the coupling point itself. Preferably, the apparatus comprising a fixing element adapted to fix the apparatus to a bed of a watercourse, wherein the fixing element comprises an anchor, and a chain or a cable connecting the anchor to the coupling point (130).

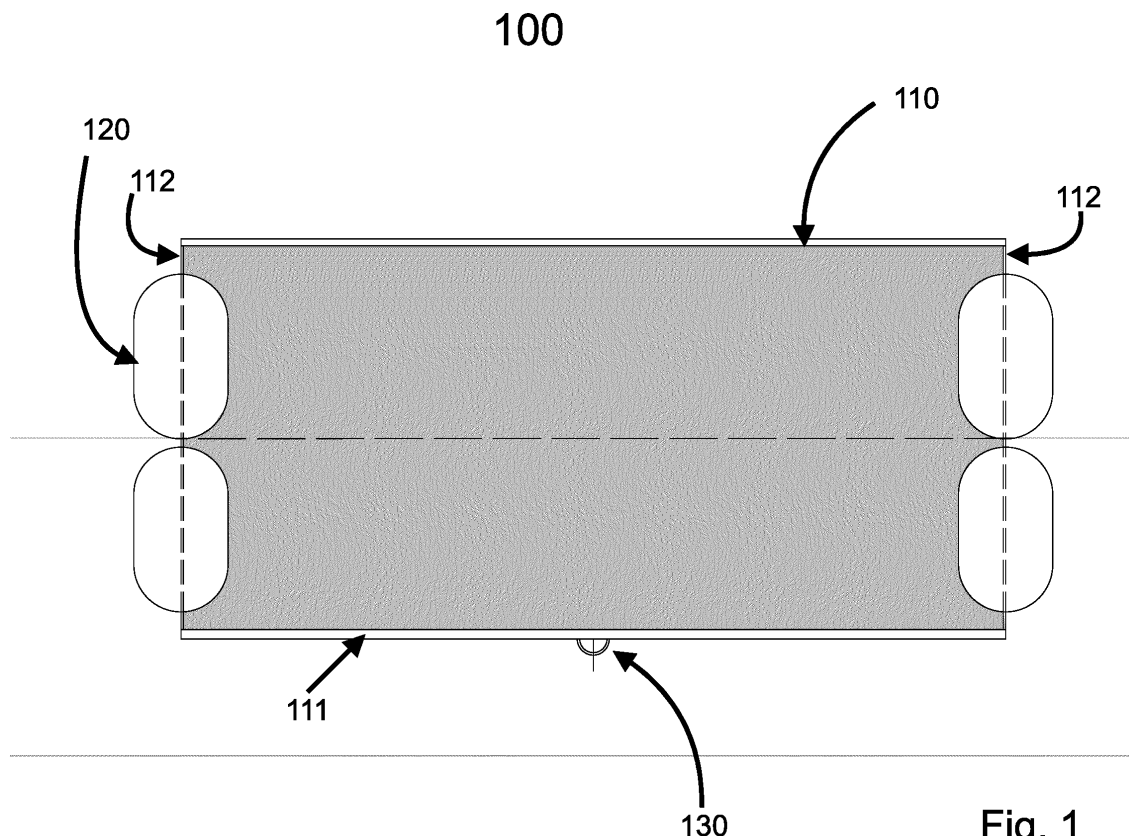


Fig. 1

Description

Field of invention

[0001] . The present invention is directed to an apparatus for the recovery of floating waste such as bottles, cans and bags, from waterways.

Background of the invention

[0002] . A very important aspect of the pollution of the waters of rivers, lakes and the sea is represented by solid waste (bottles, bottles, cans and bags) that float in them. Most of the plastic and other solid waste that we find in our seas and lakes is not thrown there directly, but arrives through rivers, which in turn receive it from minor sources such as streams or canals. The removal of floating waste from watercourses can therefore be an important contribution to the solution of water pollution from solid waste.

[0003] . In addition, the removal of plastic floating waste from watercourses is an important contribution to the reduction of microplastics in the oceans. Microplastics are tiny pieces of plastic, usually less than 5 millimetres. According to a study by the European Parliament, according to their origin, they can be divided into two main categories: 1) primary microplastics, released directly into the environment in the form of small particles. It is estimated that this category of microplastics accounts for 15-31% of microplastics in the ocean. Their main source is synthetic garment washing (35% of primary microplastics), tyre abrasion while driving (28%), microplastics intentionally added in body care products (for example, facial scrub micro-particles, 2%). 2) Secondary microplastics, produced by the degradation of larger plastic objects, such as plastic bags, bottles or fishing nets. They account for about 68-81% of microplastics in the ocean. During its journey to the sea, which may take months or years, the waste of plastic material undergoes various transformations, both mechanical and chemical degradation, the latter due to exposure to sunlight, and gradually decreases in size by releasing fragments that fall within the definition of microplastics. The collection of plastic waste in watercourses can therefore be an important contribution to the reduction of microplastics in the seas and oceans.

[0004] . CN 105621599 discloses a real dam to stop all objects floating on a river. This system has a significant aesthetic impact and presents the problem of requiring considerable maintenance. In fact, the dam blocks not only plastic objects, but also other objects such as branches, which would obstruct or block the dam.

[0005] . US 2007/158253 discloses a mobile system for the collection of waste in the waters of rivers, lakes and seas. The system is remarkably complex, therefore also expensive, and does not fit in small courses.

[0006] . There is therefore a need for a new apparatus for the removal of floating waste from rivers and streams, which is simple, economical, and easy to manage.

Summary of the invention

[0007] . The present invention is directed to an apparatus for the removal of floating waste from rivers and watercourses in general, which includes a mouth to which a network is connected, which mouth has a fixing point positioned centrally that allows the mouth itself, and the whole apparatus, an oscillation. Thanks to this possibility of oscillation, large objects floating on the river (for example branches) do not remain in front of the mouth of the appliance but are able to slide over the appliance itself.

Brief description of the drawings

[0008]

. Figure 1 is a frontal view of a mode of realization of the apparatus without the fixing system.

. Figure 2 is a side view of the apparatus of Figure 1.

. Figure 3 is a top view of the apparatus of Figure 1.

. Figure 4 is a view from behind the apparatus of Figure 1.

Detailed description of the invention

[0009] . Figure 1 shows a frontal view of an apparatus 100 according to invention. The figure shows round bars 110, 111, and 112 which form the mouth, buoys 120 for the flotation of the apparatus and coupling point 130, positioned centrally on the lower round bar 111, which allows the mouth to swing around the coupling point 130. The device of figure 1 is suitable for fixing on the bottom of the watercourse, being the attachment point on the lower submerged bar 111. If it is intended to fix the appliance to an external element, it is necessary to place the attachment point on upper rod 110 of the mouth. The diameter of the iron rods used to form the mouth of the appliance is between 6 and 10 mm. In the specific case, stainless steel rods of 6 mm diameter were used except for the lower 111 rod to which hook point 130 is fixed, which is 8 mm in diameter.

[0010] . Figure 2 shows a lateral view of the apparatus 100, showing the presence of 6 buoys 120 arranged vertically on both sides and at the centre of the lateral part. In addition, there are 6 buoys arranged in the centre in a horizontal direction. The presence of these 6 buoys along the median line of the apparatus, causes the waterline of the apparatus to be close to the midline. In a preferred embodiment, the emerged part of the structure corresponds to about 40-60% of the total height of the structure itself. For example, if a mouth is 30 cm tall, the buoys should be sized so as to leave emerged about 12 to about 18 cm of the mouth. In this way, the emerged part of the solid waste will enter the mouth effortlessly. In addition, this sizing allows to maintain a perfectly perpendicular position of the plane of the mouth with respect to the plane of the free surface of the water of the water-

course. Nella figura si può anche notare il tondino superiore 114 e inferiore 113 che conferiscono rigidità alla struttura. La figura evidenzia anche la presenza di una rete 140 per fermare gli oggetti galleggianti. In un modo di realizzazione preferito, la rete è una rete di nylon avente preferibilmente una maglia compresa tra 20x20mm e 40x40 mm, ancor più preferibilmente 30x30 mm. Il filo di nylon garantisce una buona resistenza meccanica assieme ad una buona flessibilità della rete stessa, la qual cosa facilita le operazioni di svuotamento degli oggetti raccolti. Preferibilmente il filo di nylon ha uno spessore compreso tra 1,5 e 3 mm, preferibilmente circa 2 mm. **In un modo di realizzazione preferito, sono presenti dei ganci 170 per l'apertura della rete al fine di uno svuotamento più agevole dell'apparecchio 100.**

[0011] . In the figure you can also notice upper bar 114 and lower bar 113 that impart rigidity to the structure. The figure also highlights the presence of net 140 to stop floating objects. In a preferred embodiment, the net is a nylon net having preferably a mesh between 20x20mm and 40x40 mm, even more preferably about 30x30 mm. The nylon thread guarantees a good mechanical resistance together with a good flexibility of the net itself, which facilitates the operations of emptying the collected objects. Preferably the nylon thread has a thickness between 1,5 and 3 mm, preferably about 2 mm. In a preferred way, there are hooks 170 for opening the net in order to facilitate emptying of the device 100.

[0012] . Figure 3 represents a top view of the apparatus 100 according to the preferred embodiment of Figure 1. It has to be noted round bar 118 arranged centrally in a parallel direction to the mouth, which serves to increase the rigidity of the device when the length of the same exceeds 60 cm. In the way of realization shown in the figures, the apparatus has dimensions 100 cm (length) x 70 cm (mouth width) x 34 cm (height).

[0013] . Figure 4 is a back view of the apparatus in which it is evidenced that also in the back there is a rectangular structure made with the side bars 115, upper bars 116 and lower bars 117. Stabilising chains may be attached to the lower part of the mouth, and preferably of the net. In the case of the net, the presence of buoys and stabilising chains allows to keep the net in an extended position, facilitating the entry of objects collected by the apparatus.

[0014] . The apparatus can be fixed to the river bed in various ways. A type of fixation uses an external element to the river, such as a tree, a shore or a bridge. The fixing device includes a fixing plate, connected to a fixing bar. At the end of the fixing bar there is a joint with an arm that reaches the central point of the mouth of the appliance. In this arm, there are preferably additional joints, which allow greater mobility in the watercourse to the apparatus, and a tensile spring to allow the extension of the arm in the presence of a tensile force. The arm ends with an additional joint to which is attached a hook or anchor that allows the link of the mouth of the appliance.

The length of the arm must take into account the variation of the level of the stream with the seasons. In fact, in the case of a river, it will be necessary to take into account the minimum and maximum level of the river during the year and make sure that the length of the arm is such as to guarantee a correct positioning of the structure during the 12 months. It follows that the location of the structure will be more downstream when the river level is high, and more upstream when the river level is low.

[0015] . Preferably, the apparatus can be attached to the bottom of the watercourse by means of an anchor, fixed to a rock of adequate size, or anchored to a mooring "dead body" made according to the need. In this case, the anchor is bound to the central joint of the mouth by a chain or rope. Also in this case, the chain or rope must be of such a length as to allow the operation of the apparatus to vary the level of the watercourse, and the positioning of the "operating" structure is more upstream with a high level and more downstream with a low level.

Claims

1. An apparatus (100) for removing floating wastes from rivers and waterways in general, which apparatus comprises a mouth and a coupling point (130), positioned centrally on one of the horizontal round bars (110, 111) of the mouth, wherein said coupling point (130) allows the mouth an oscillation around the coupling point itself.
2. The apparatus according to claim 1, wherein the oscillation of the mouth takes place essentially around a vertical axis.
3. The apparatus according to claims 1-2, wherein the mouth has a rectangular shape.
4. The apparatus according to claims 1-3, wherein the longest side of the rectangle, parallel to the water surface has a length comprised between 40 cm and 120 cm, and the shortest size perpendicular to the water surface has a length comprised between 24 cm and 60 cm.
5. The apparatus according to claims 1-4, further comprising a fixing element adapted to fix the apparatus to a bed of a watercourse.
6. The apparatus of claim 5, wherein the fixing element comprises an anchor, and a chain or a cable connecting the anchor to the coupling point (130).
7. The apparatus according to claims 1-4, further comprising a fixing element adapted to fix the apparatus to a surface that is external with respect to the watercourse.

8. The apparatus according to claims 1-7, wherein the mouth is made by a steel rod, preferably a stainless-steel rod.
9. The apparatus according to claim 8, wherein the rod has a diameter comprised between 6 mm and 10 mm. 5
10. The apparatus of claim 9, wherein the rod has a diameter of from 6 mm to 8 mm. 10

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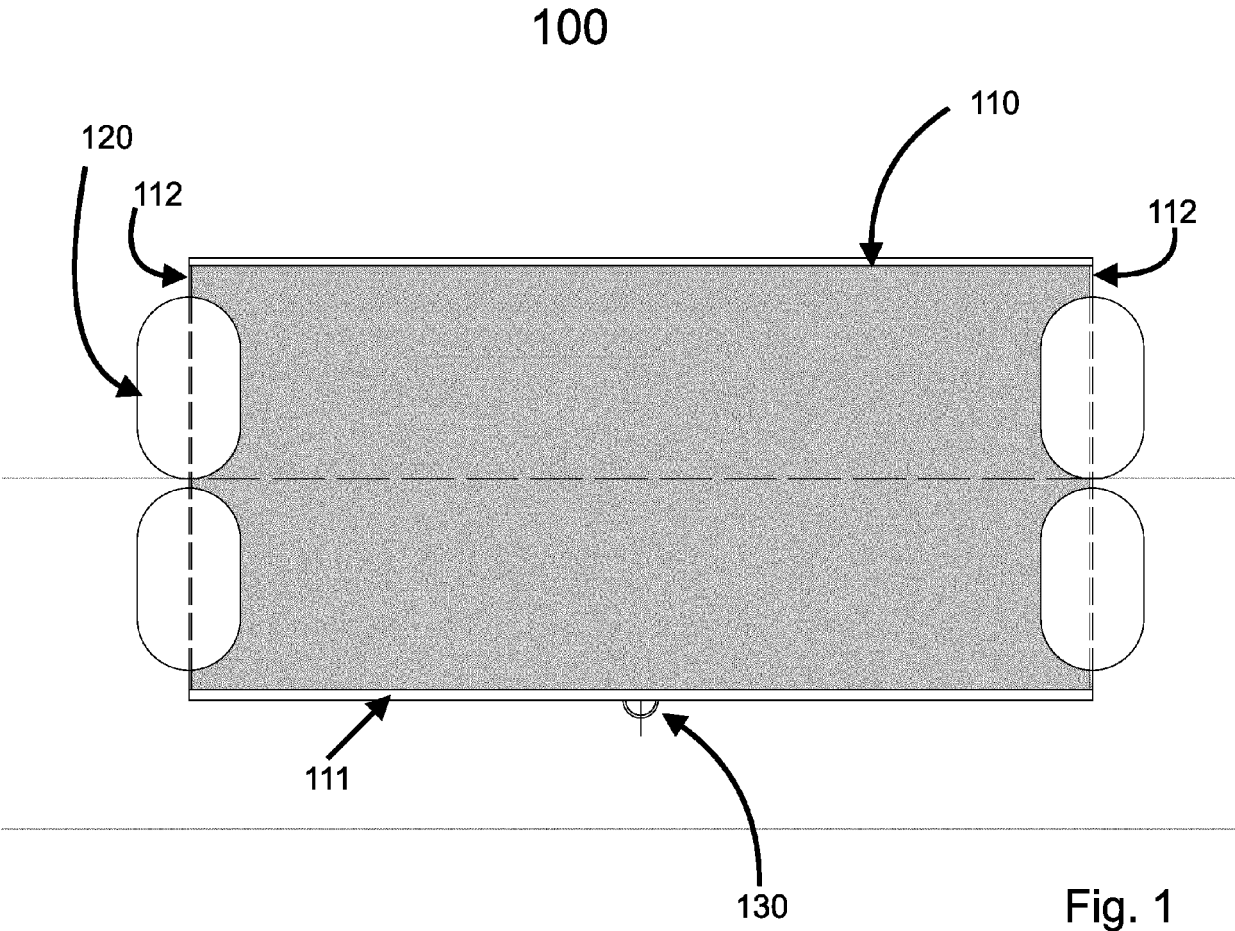


Fig. 1

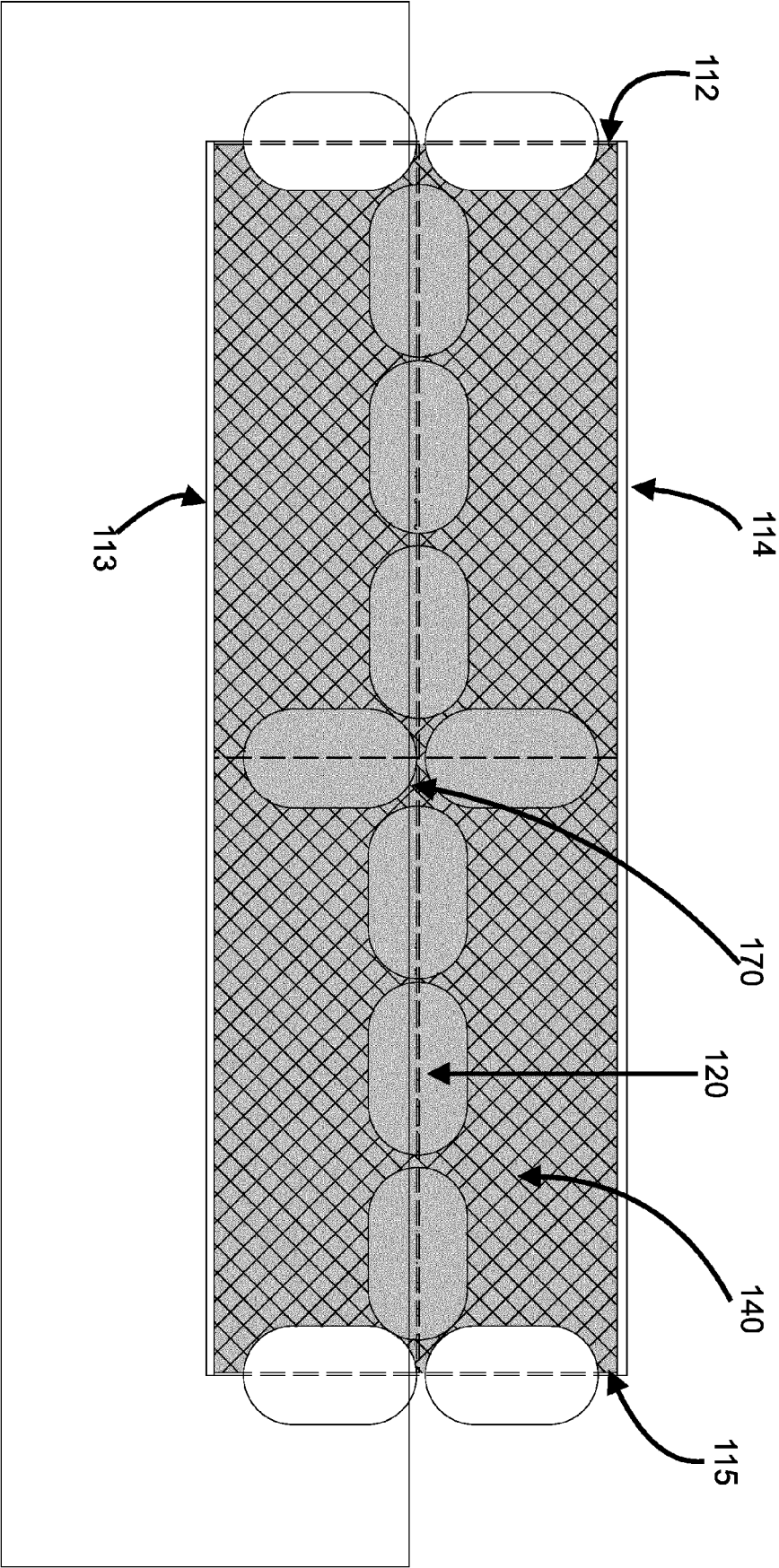


Fig. 2

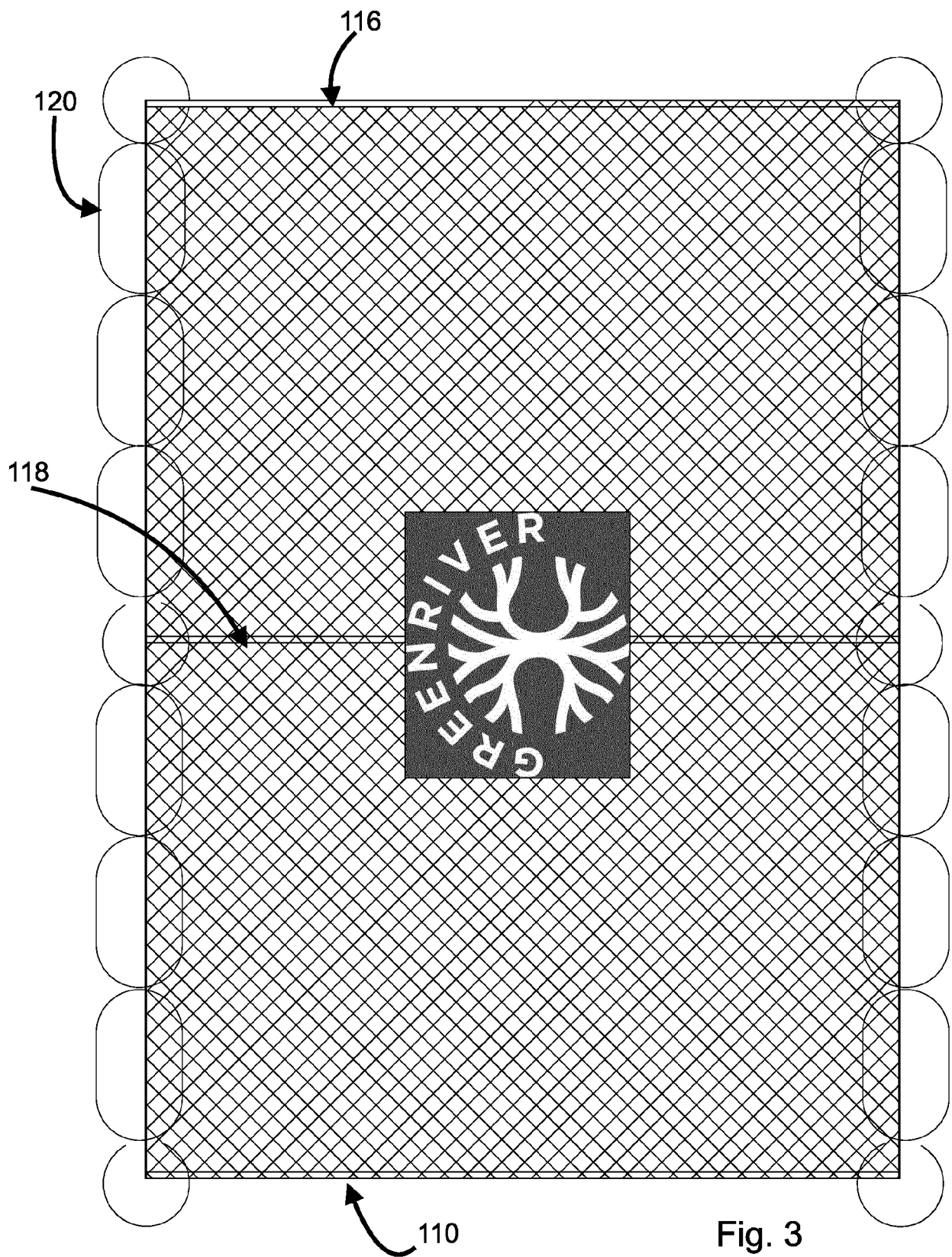


Fig. 3

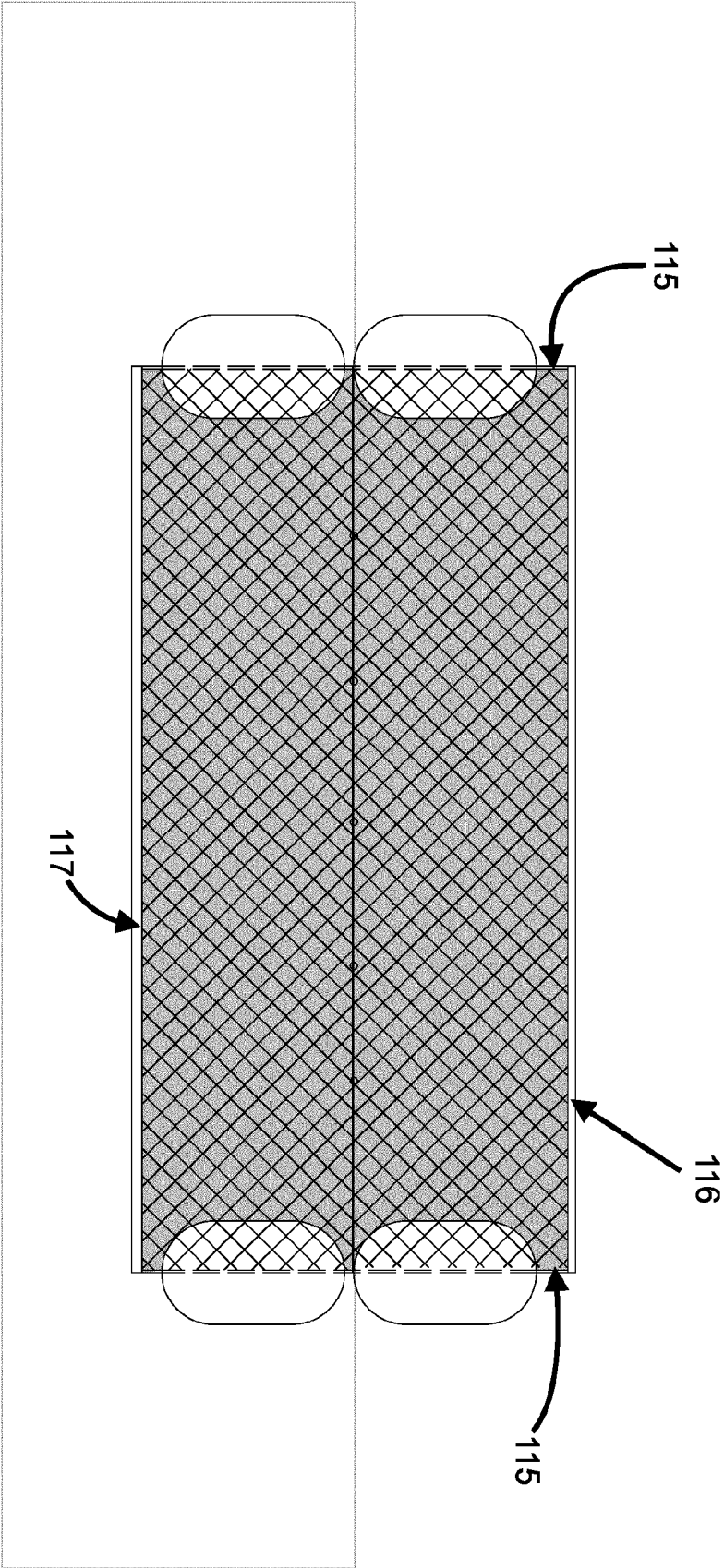


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 3789

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP S52 123182 U ([UNKNOWN]) 19 September 1977 (1977-09-19) * the whole document *	1-5, 7-10	INV. E02B15/08
X	GB 290 143 A (FREDERICK MOWBRAY DAVIS) 10 May 1928 (1928-05-10) * the whole document *	1-3, 5, 7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E02B A01K E02C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 September 2022	Examiner Fordham, Alan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 22 17 3789

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21-09-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP S52123182 U	19-09-1977	JP S5554306 Y2	16-12-1980
		JP S52123182 U	19-09-1977
GB 290143 A	10-05-1928	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 105621599 [0004]
- US 2007158253 A [0005]