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(54) **Title:** DEVICE FOR A BOTTOM RING FOR A FISH FARMING NET PEN

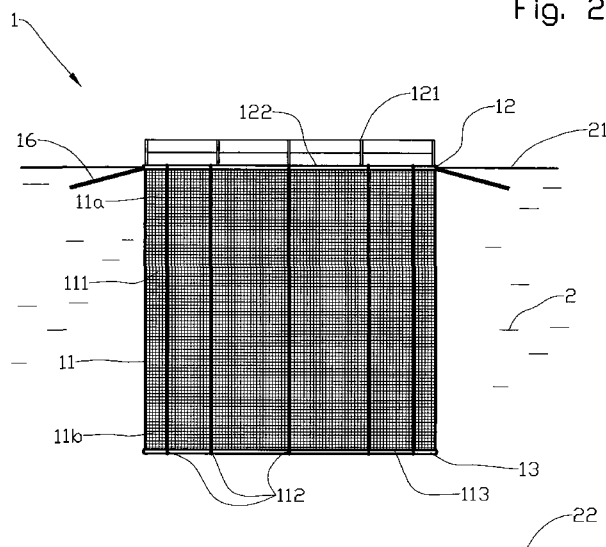


Fig. 2

(57) **Abstract:** There is described a device for a fish-farming net pen (1) including buoyancy means (12) at an upper portion (11a) of the net wall (111) of a net bag (11), shape-stabilizing means (13) connected to a lower portion (11b) of the net bag (11), and suspension means arranged to transmit suspension forces from the shape-stabilizing means (13) to the buoyancy means (12), said suspension means being formed from the net wall (111).

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## DEVICE FOR A BOTTOM RING FOR A FISH FARMING NET PEN

The invention relates to a device for a fish-farming net pen including buoyancy means at an upper portion of the net wall of a net bag, shape-stabilizing means connected to a lower  
5 portion of the net bag and suspension means arranged to transmit suspension forces from the shape-stabilizing means to the buoyancy means, the suspension means being formed from the net wall.

In fish-farming net pens it is known to utilize a bottom ring  
10 which is arranged near the lower portion of the net bag, typically at the lower edge of the net bag and with a circumference somewhat larger than the circumference of the lower portion of the net bag. The bottom ring is suspended from the floating ring by means of chains or other elongated elements  
15 which extend vertically downwards from the floating ring on the outside of the net bag, and the bottom ring is additionally connected to the lower portion of the net bag by means of chains or the like. The bottom ring thereby lies at a certain distance from the net bag. The purpose of the bottom  
20 ring is to keep, together with the floating ring, the net bag spread, to provide, thereby, a largest possible effective volume in the net bag.

By strong currents in the water masses in which the fish-farming net pen is placed, the pen wall could be forced  
25 against the suspension chains, and there may be a risk of the

net material getting damaged, with the consequence that the fish which are in the pen may escape through holes in the pen wall. Escaped farmed fish is not a desired element in the fauna, and there is a great need for measures that may reduce the risk of escapes from fish-farming facilities.

The invention has for its object to remedy or reduce at least one of the drawbacks of the prior art .

The object is achieved through features which are specified in the description below and in the claims that follow.

10 The invention provides a device for a fish-farming net pen including a net bag provided with, *inter alia*, a net wall which extends down towards a net bottom, shape-stabilizing means connected to a lower portion of the net wall, typically a so-called bottom ring, being suspended from buoyancy means, typically a so-called floating ring, at an upper portion of the net wall, by the bottom ring being attached, directly or indirectly, to the net wall in order thereby to eliminate separate suspension means extending upwards, along and adjacent to the net wall, towards the floating ring. The net wall may include integrated reinforcing elements which extend between the bottom ring and the floating ring and are fixed to these, for example in the form of fibre ropes, textile straps or the like, fixed to the net wall for example by having been sewn to or tied into the net material.

25 The invention relates more specifically to a device for a fish-farming net pen including buoyancy means at an upper portion of the net wall of a net bag, shape-stabilizing means connected to a lower portion of the net bag, and suspension means arranged to transmit suspension forces from the shape-stabilizing means to the buoyancy means, characterized by the suspension means being formed from the net wall.

At least a portion of the surface of the shape-stabilizing means may form a permanent abutment against the net bag.

The shape-stabilizing means may be integrated into the net wall.

5 The shape-stabilizing means may form the transition between the net wall and a net bottom.

The shape-stabilizing means may be attached to elements forming an extension of the net wall.

The shape-stabilizing means may be a bottom ring.

10 At least one elongated net-wall reinforcing element may extend between the shape-stabilizing means and the buoyancy means, the net-wall reinforcing element being fixed to the net wall and to said buoyancy and shape-stabilizing means.

The net-wall reinforcing element may be formed of a fibre  
15 material .

The net wall reinforcing element may be integrated with the net wall.

In what follows, there is described an example of a preferred embodiment which is visualized in the accompanying drawings,  
20 in which:

Figure 1 shows a side view of a fish-farming net pen with a bottom ring suspended according to the prior art ;

Figure 2 shows a side view of a fish-farming net pen with an attachment of the bottom ring according to the  
25 invention;

Figures 3 to 6 show, on a larger scale, a section of a lower portion of a net bag with the bottom ring suspended in various exemplary embodiments of the invention.

In the figures, the reference numeral 1 indicates a fish-farming net pen including a net bag 11 with buoyancy-means 12, shown here as a floating ring, known *per se*, floating on a water surface 21 and being attached to an upper portion 11a of the net bag 11, and shape-stabilizing means 13, shown here as a bottom ring, known *per se*, connected to a lower portion 11b of the net bag 11. In a manner known *per se*, the net bag 11 delimits the fish-farming net pen 1 from the water masses 2 of the surroundings by one or more net walls 111 and a net bottom 113.

The floating ring 12 is provided with a rail 121 defining a walkway 122. The floating ring 12 is further secured to a mooring system 16 which is anchored (not shown) to a seabed 22 or to land attachments (not shown).

The bottom ring 13 is typically provided with ballast (not shown) to help to keep the net bag 11 spread in the water mass 2.

In a prior-art fish-farming net pen (see figure 1), the bottom ring 13 is suspended from the floating ring 12 by means of several suspension chains 14 extending along the outside of the net bag 11. From the bottom ring 13, several fixing chains 15 extend to the lower portion 11b of the net bag 11.

In a first exemplary embodiment of the invention (see figure 3), the connection of the bottom ring 13 to the lower portion 11b of the net bag 11 is provided by the bottom ring 13 being attached directly to the net bag 11. In figure 3, the bottom ring 13 is shown to be attached in the transition between the

net wall 111 and the net bottom 113, but it may also be attached to the net wall 111. The attachment may have been done in a number of ways, for example by the net material having been wrapped around the bottom ring 13 or by it having  
5 been sewn to the bottom ring 13 with thread elements which surround the bottom ring 13 or have been passed through projecting attachment elements (not shown) on the bottom ring 13.

In a second exemplary embodiment of the invention (see figure  
10 4), the net wall 111 is provided with reinforcing elements 112 integrated into the net material, typically in the form of fibre ropes, flat straps or the like which have been sewn to the net wall 111 and extend from the bottom ring 13 to the floating ring 12 and are secured to these.

15 In a third exemplary embodiment of the invention (see figure 5), the bottom ring 13 is arranged at the bottom edge of the net bag 11 as it is secured in a number of suspension elements 112' extending downwards from the net bag 11.

In a fourth exemplary embodiment (see figure 6), the  
20 reinforcing elements 112 integrated into the net wall 111 extend downwards from the net bag 11 and, in the same way as in the preceding exemplary embodiment, the bottom ring 13 is arranged at a distance from the net bag 11.

## C l a i m s

1. A device for a fish-farming net pen (1) including buoyancy means (12) at an upper portion (11a) of the net wall (111) of a net bag (11), shape-stabilizing  
5 means (13) connected to a lower portion (11b) of the net bag (11) and suspension means arranged to transmit suspension forces from the shape-stabilizing means (13) to the buoyancy means (12), c h a r a c t e r i - z e d i n that the suspension means are formed from  
10 the net wall (111) .
2. The device in accordance with claim 1, c h a r a c - t e r i z e d i n that at least a portion of the surface of the shape-stabilizing means (13) forms a permanent abutment against the net bag (11) .
- 15 3. The device in accordance with claim 1, c h a r a c - t e r i z e d i n that the shape-stabilizing means (13) are integrated into the net wall (111) .
4. The device in accordance with claim 1, c h a r a c - t e r i z e d i n that the shape-stabilizing means  
20 (13) form the transition between the net wall (111) and a net bottom (113) .
5. The device in accordance with claim 1, c h a r a c - t e r i z e d i n that the shape-stabilizing means (13) are secured to elements (112, 112') which form an  
25 extension of the net wall (111) .
6. The device in accordance with claim 1, c h a r a c - t e r i z e d i n that the shape-stabilizing means (13) are a bottom ring.

7. The device in accordance with claim 1, characterized in that at least one elongated net-wall reinforcing element (112) extends between the shape-stabilizing means (13) and the buoyancy means (12), the net-wall reinforcing element (112) being fixed to the net wall (111) and to said buoyancy and shape-stabilizing means (12, 13).

8. The device in accordance with claim 7, characterized in that the net-wall reinforcing element (112) is formed of a fibre material.

9. The device in accordance with claim 7, characterized in that the net-wall reinforcing element (112) is integrated into the net wall (111).



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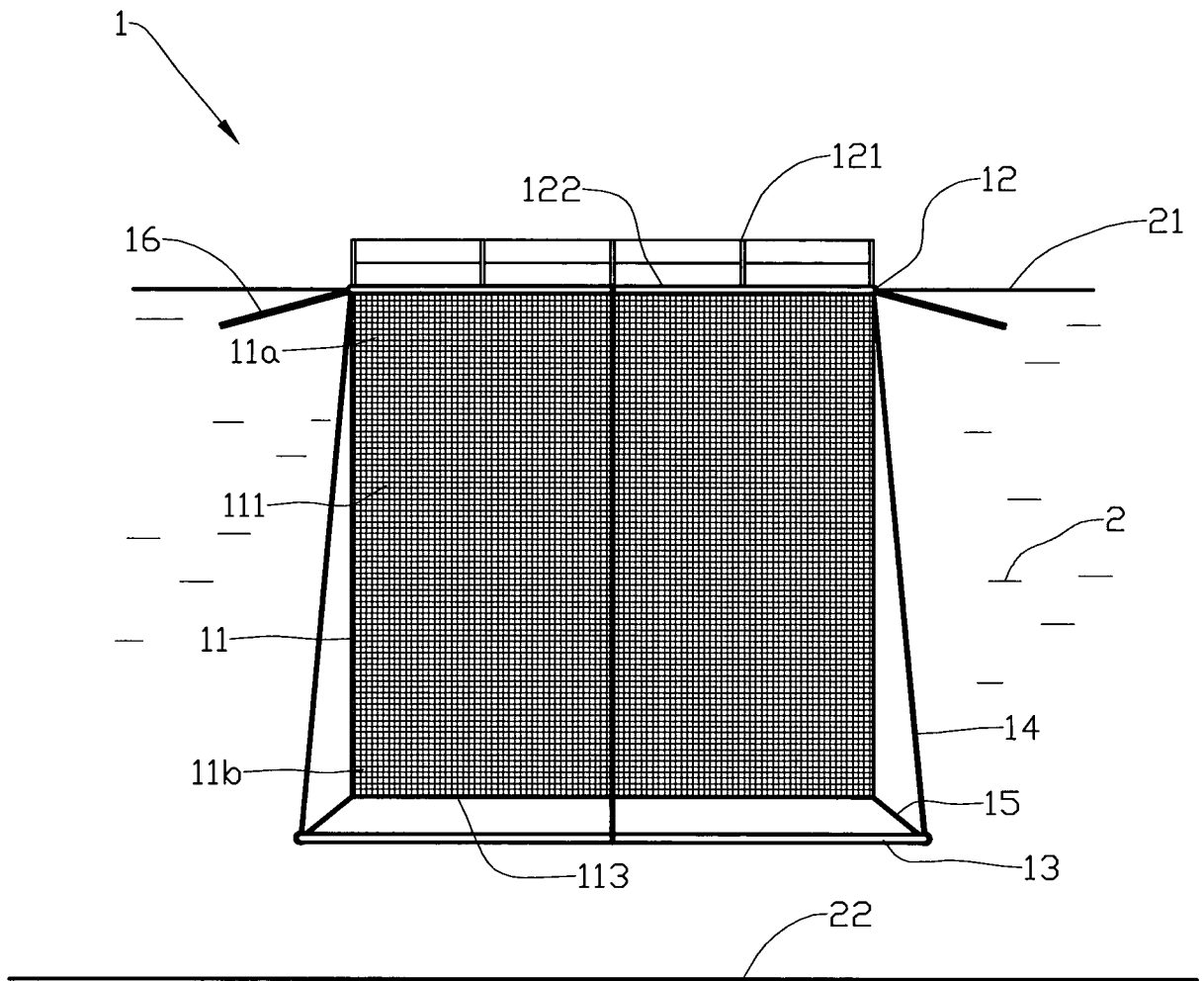


Fig. 1

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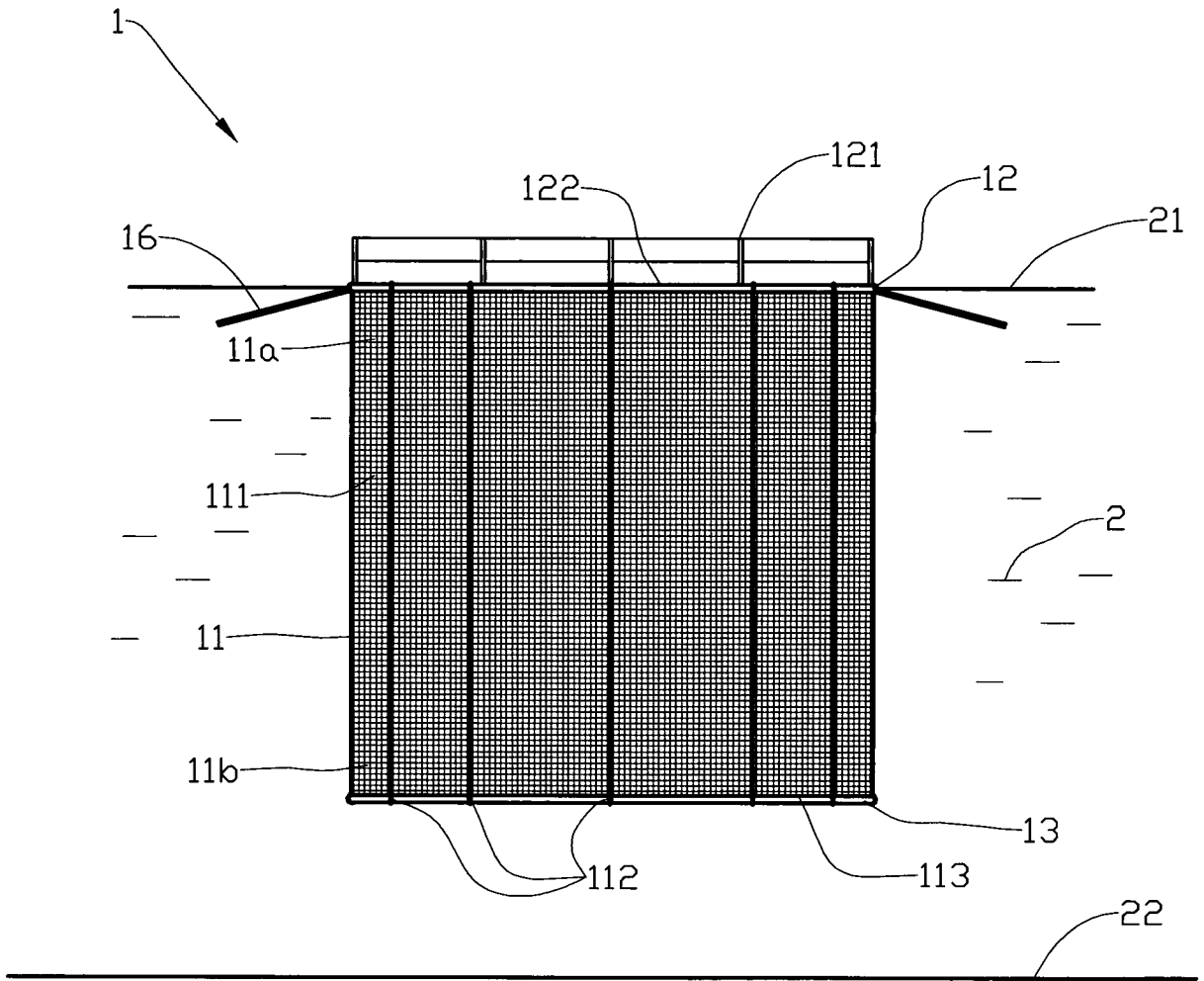


Fig. 2

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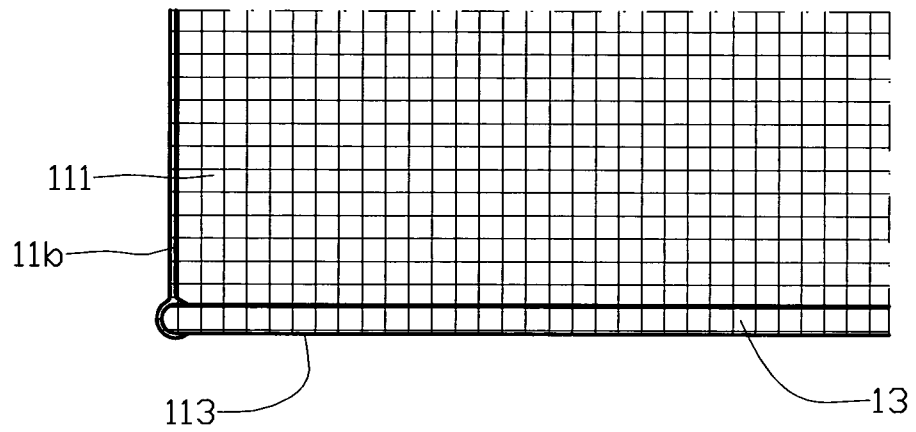


Fig. 3

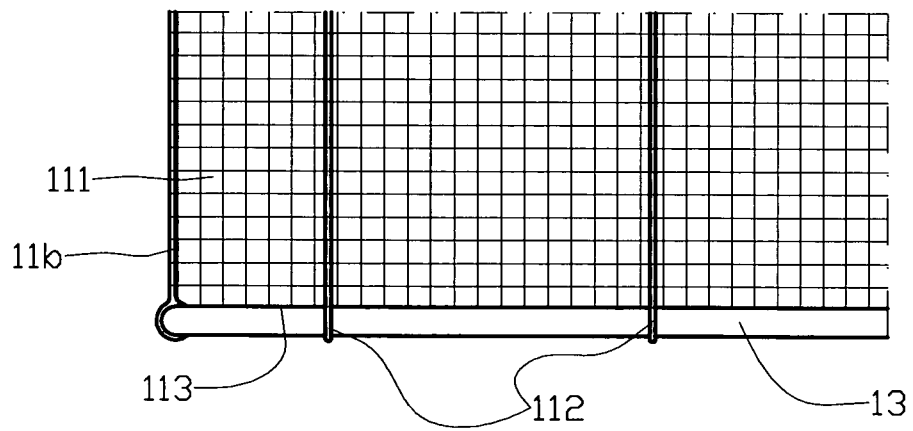


Fig. 4

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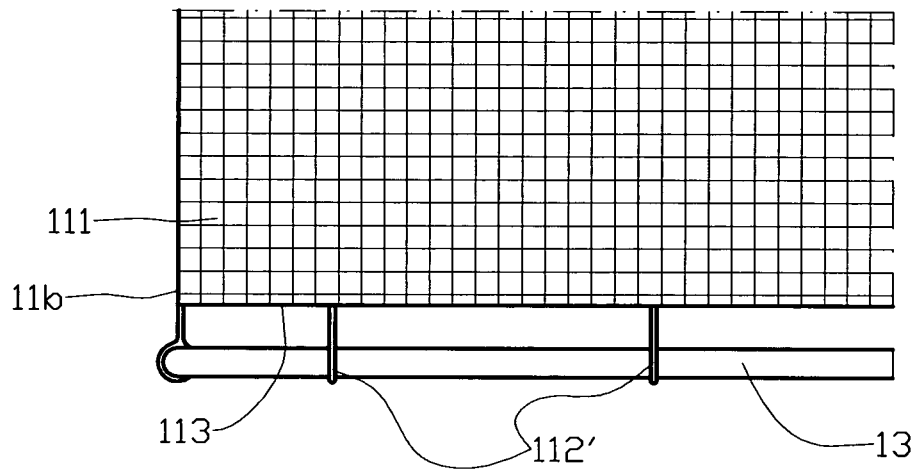


Fig. 5

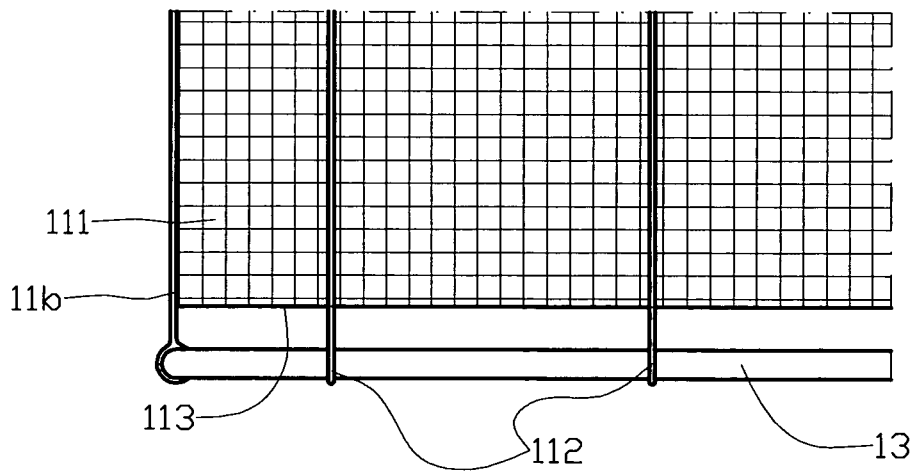


Fig. 6

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet  
According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: AOIK

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 20080088200 A, HONG SOON JIN St al, 2008-10-02: (abstract) Retrieved from: EPODOC database; Original document: Figure 1  --	1-9
A	DE 202006010420 U1 (SCHIFFEL, BERNHARD), 21 December 2006 (21.12.2006), abstract, paragraphs [0005]-[0010]  --	1-9
A	FR 2339338 A1 (CAUBERE, JEAN-LOUIS), 26 August 1977 (26.08.1977), the whole document  --	1-9

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
<b>A</b>	WO 2006137128 A1 (ASHIMORI INDUSTRY CO., LTD.). 28 December 2006 (28.12.2006), figures I <sub>1</sub> 2 , abstract  -- -----	1-9

**International patent classification (IPC)**  
**A01K 61/00** (2006.01)

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Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85) .

Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.  
**PCT/N02010/000025**

<b>DE</b>	202006010420	<b>U1</b>	21/12/2006	<b>NONE</b>
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<b>FR</b>	2339338	<b>A1</b>	26/08/1977	<b>NONE</b>
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<b>WO</b>	2006137128	<b>A1</b>	28/12/2006	<b>NONE</b>
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