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(54) **CORE CATCHER AND CORER HAVING IT**

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E21B 25/06 (2006.01)

(52) **U.S. Cl.** **175/249**; 175/58

(58) **Field of Classification Search** 175/20, 175/58, 246, 249
See application file for complete search history.

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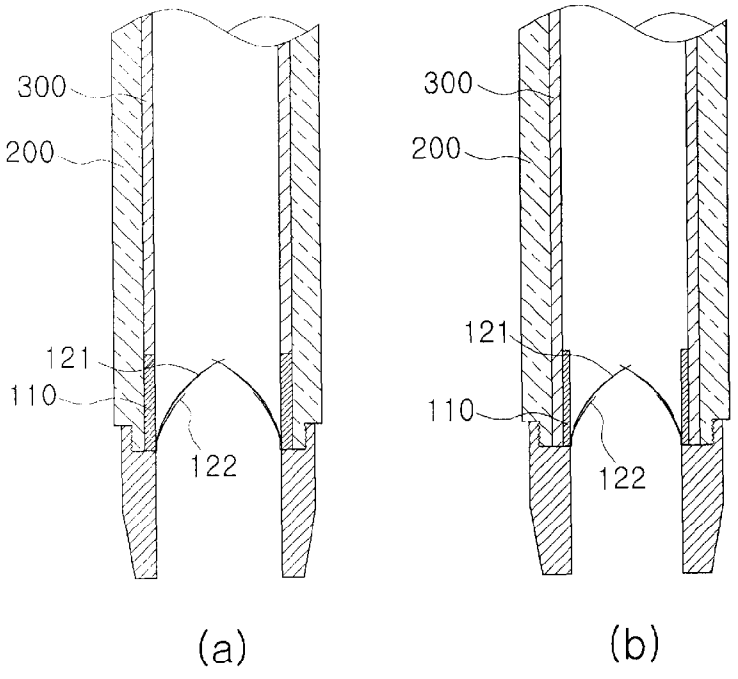
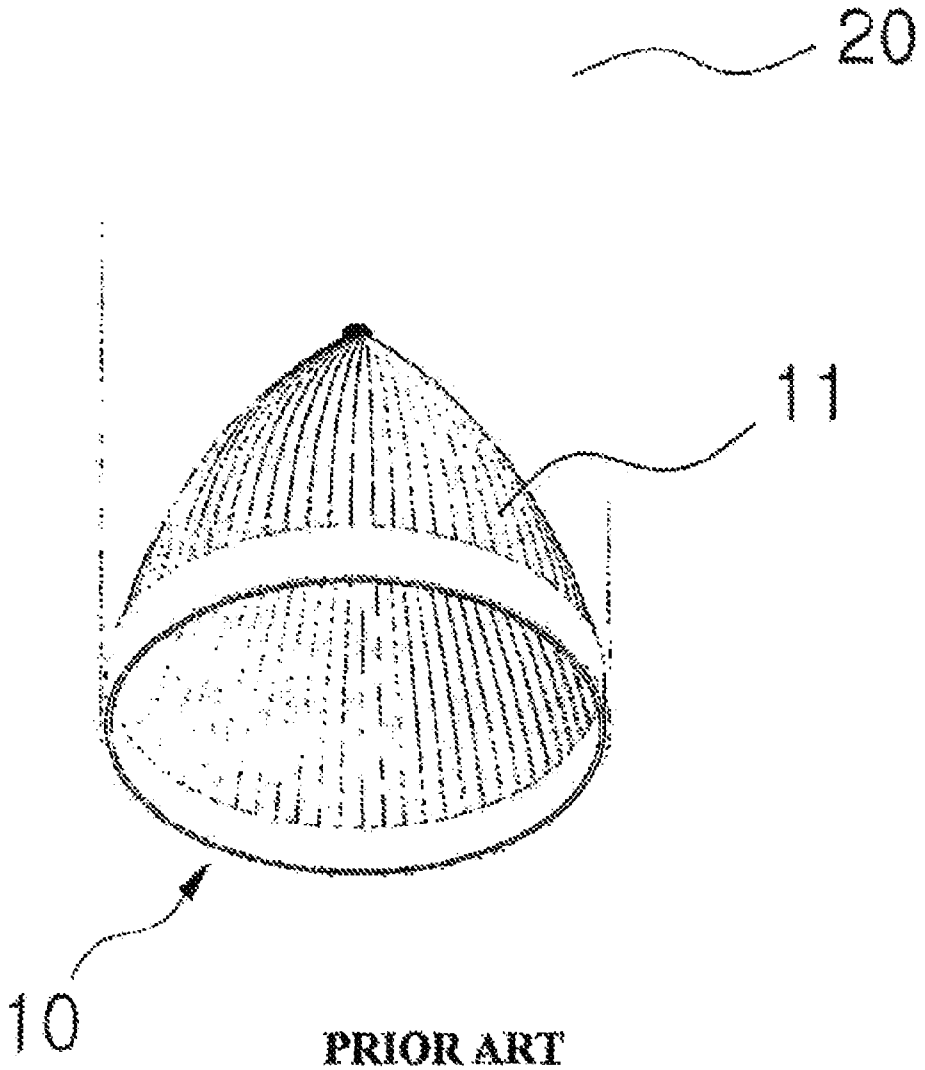
(57) **ABSTRACT**

The present invention relates to a core catcher and a corer having the same, and more particularly, to a core catcher provided with dual blade radial pins for preventing loss of sediments and a corer having the same.

5 Claims, 7 Drawing Sheets

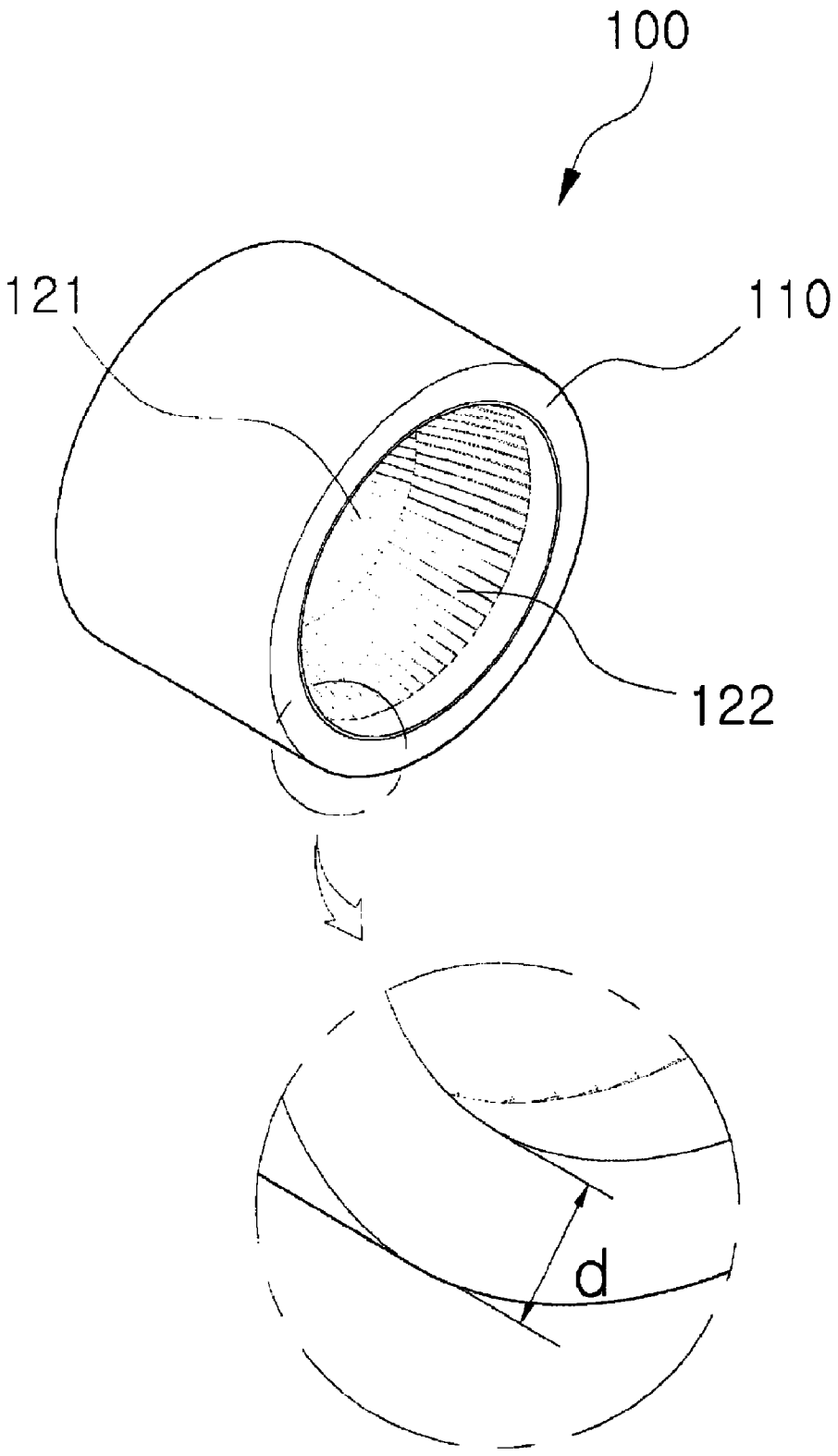


[Figure 1]

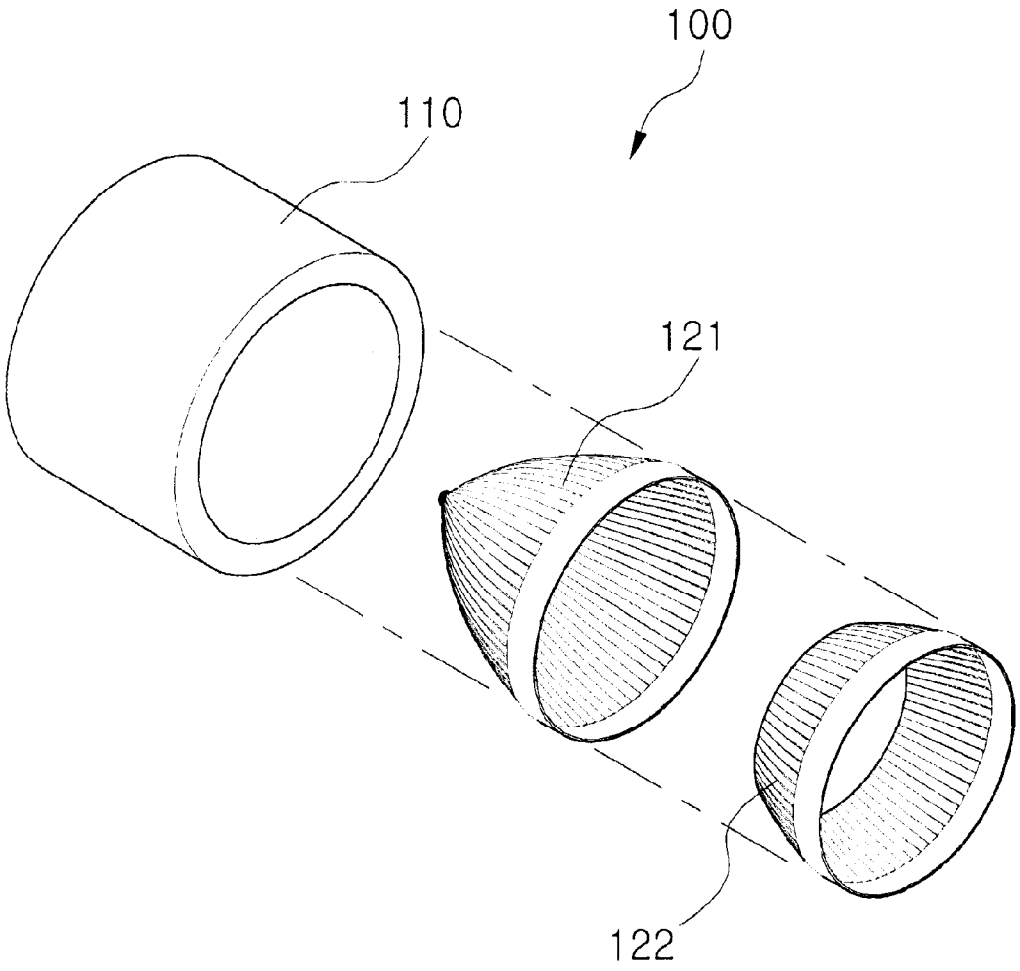


PRIOR ART

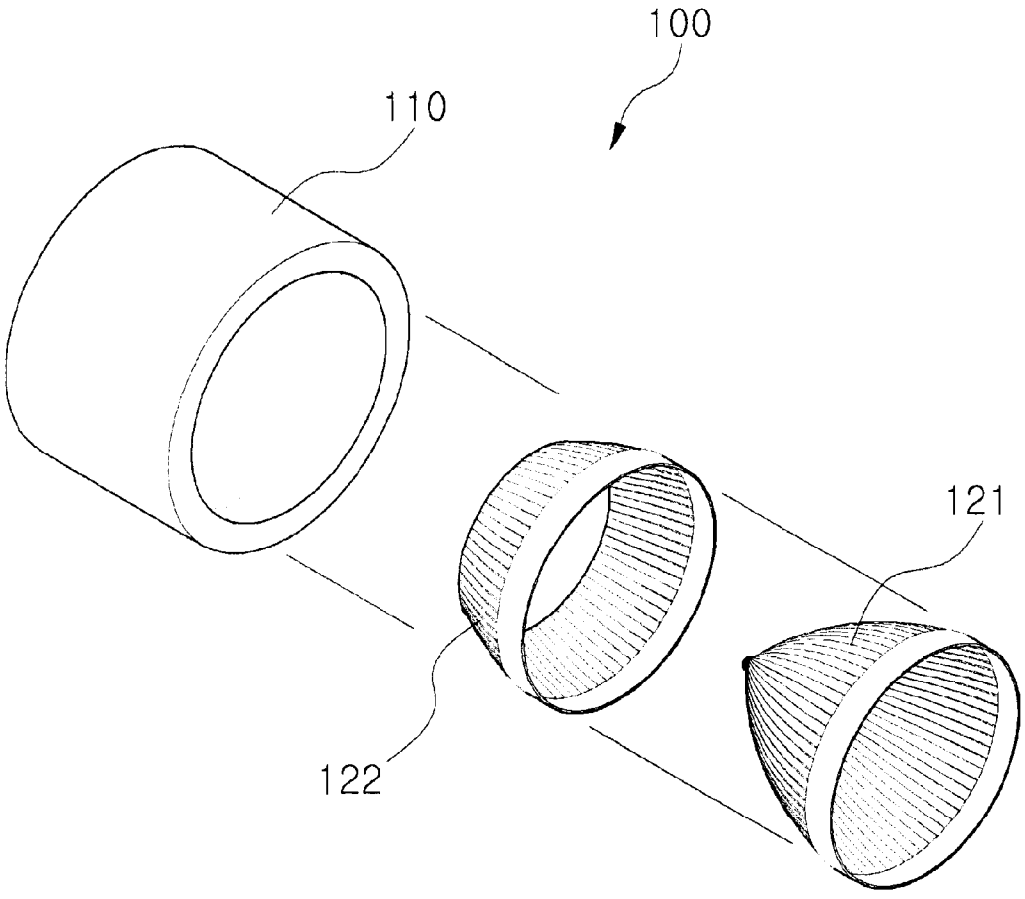
【Figure 2】



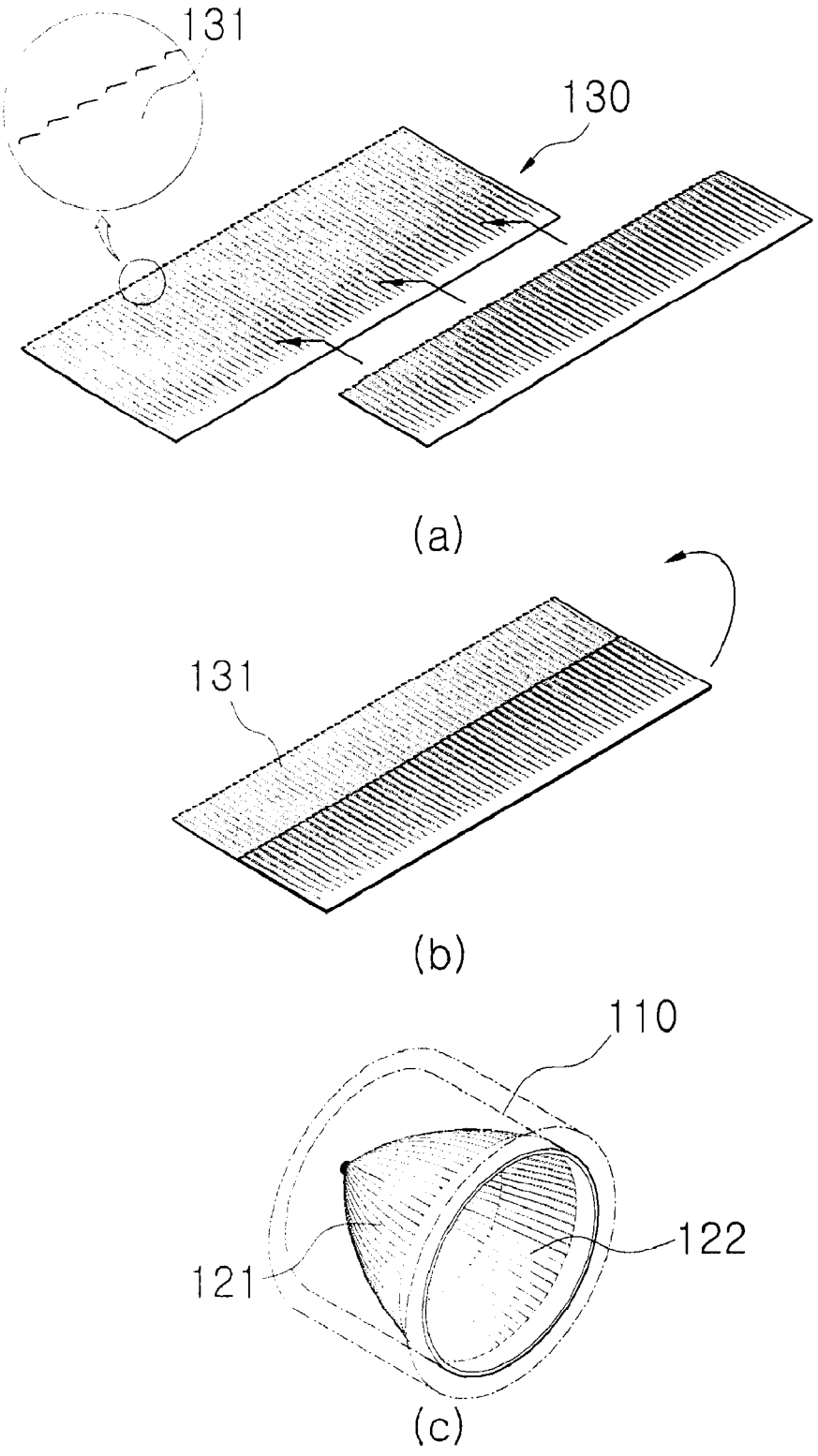
【Figure 3】



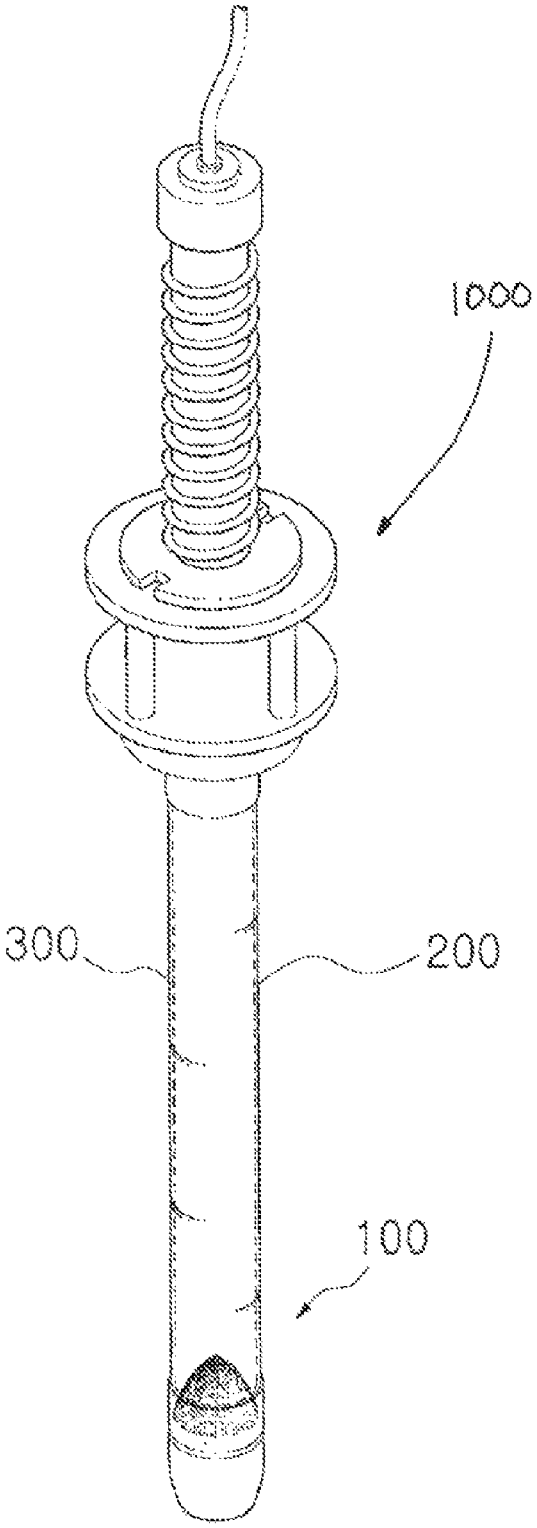
【Figure 4】



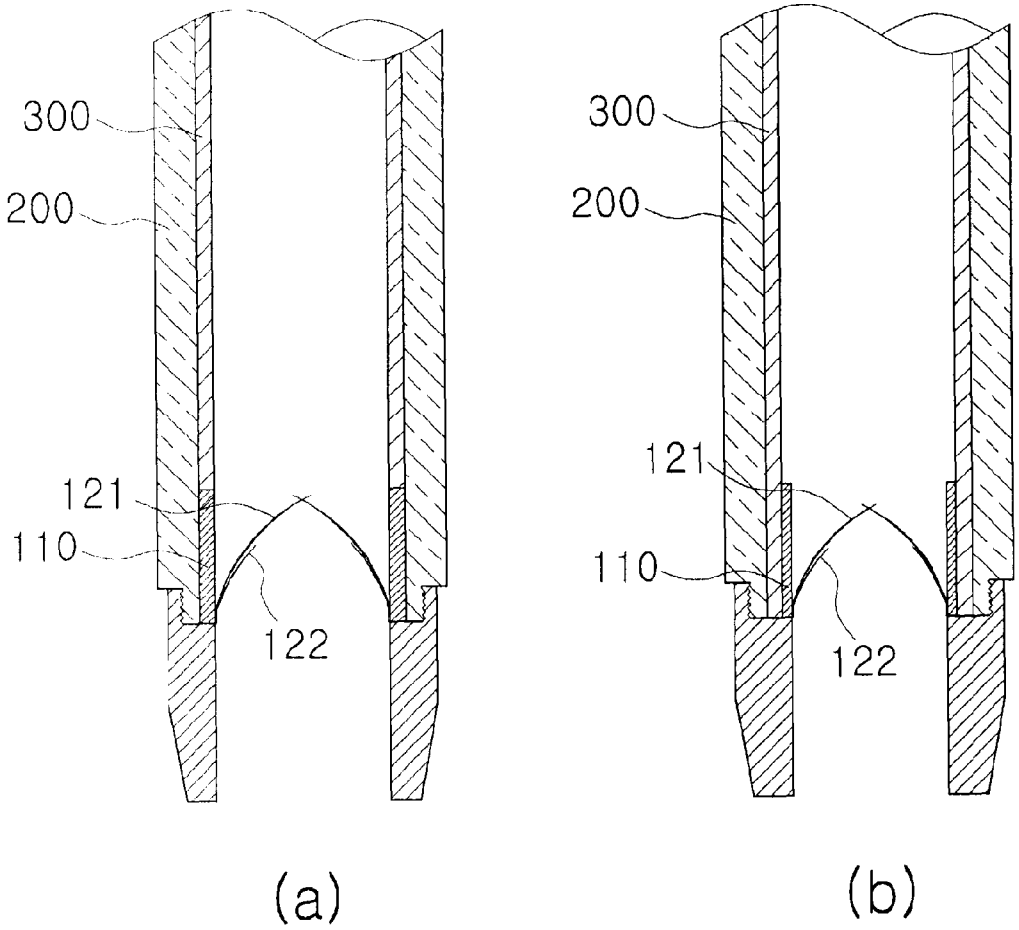
【Figure 5】



[Figure 6]



【Figure 7】



CORE CATCHER AND CORER HAVING IT

TECHNICAL FIELD

The present invention relates to a core catcher and a corer having the same, and more particularly, to a core catcher provided with dual blade radial pins for preventing loss of sediments and a corer having the same.

BACKGROUND ART

In general, continuously deposited sedimentary layers are formed on the base of river, lake or sea, and an inspection of sediments in the sedimentary layers aids to understand the ecosystem of the corresponding era and thus analogize the history and environment of the earth.

As such, it is important to take the sediments of the continuous sedimentary layers for studying the sedimentary layers, and a corer is generally used to take a sample of the continuous sedimentary layers.

The corer is divided into a vibracorer that uses vibration, a free-fall gravity corer that uses free-fall, a piston corer, a box corer and so on.

The vibracorer is mainly used to take the sediments in coast such as a lake, a marshy land and a foreshore, and the coring depth is generally about 5 m though it is variable as particles in the sediments.

The free-fall gravity corer is provided with a weight for applying a predetermined load and thus takes the sediments not using an external power but by a self-load of the weight. However, since the weight should also be pulled up when the sediment is pulled up after the sediment is taken, a large power is needed for the pulling up operation.

The piston corer is of a type that is used to take sedimentary layers having a large depth in a sea floor, and the sedimentary layers having maximum depth of 38 m Marion survey vessel in France has been reportedly taken.

The box corer is that is designed to prevent an error resulted from agitation or removal of the upper part of the sedimentary layers, and is able to take the sedimentary layers having about 50 cm.

Although the corer is formed in various forms according to its objective, the corer is generally formed with a sediment taking part at a lower portion thereof and the sediment taking part is provided with a chuck for allowing a corer body to be inserted deep into the sedimentary layers, a sample case connected to the chuck and taking the sediment therein, and a core catcher for preventing the loss of the sediments taken in the sample case.

FIG. **1** is a partial perspective view illustrating the sediment taking part of the conventional corer.

The conventional core catcher **10** as shown in FIG. **1** is provided a plurality of radial pins **11** that extend radially to the inside of the sample case **20** and made of elastic material, and the radial pins **11** allow the sediment to be easily inputted into the sample case when the corer is inserted into the sedimentary layers and prevent the loss of the sediments when the corer is pulled up.

However, since the sample case is not always filled full although the core catcher having the radial pins, the sediments at the lower side is apt to be lost and thus the sedimentary layers are apt to be deformed when the corer is pulled up. Particularly, fine-grained sand or the like is apt to be flowed down. Therefore, the corer is generally provided with a pressure regulating part for properly maintaining the pressure inside the sample case.

However, in the case that the core catcher is formed in the single blade type, some sediment is caught between the radial pins when the corer is inserted into the sedimentary layers, and a gap is formed by the fine-grained sand and causes loss of the sediments therebetween. Therefore, the problem resulted from the loss of the sediments has not yet been solved.

Particularly, the problem is largely generated when coring the sediments with particles larger than the fine-grained sands or when the depth of the sedimentary layer to be taken is deep, and the sediment is caught between the pins to generate the gap at the periphery of the radial pins and areas adjacent thereto than at the center of the radial pins.

Also, since the core catcher is not a separate component and is adhered to the lower portion of the sample case, a predetermined lower area of the sample case cannot be used to take the sediments. Therefore, a separate corer may be required according to the coring environment.

DISCLOSURE

Technical Problem

An object of the present invention is to provide a core catcher that is provided with first radial pins and second radial pins to prevent loss of sediments taken in the inside of a sample case, thereby raising accuracy of study to the sediments, and a corer having the same.

Another object of the present invention is to provide a core catcher that is removably attachable to a liner provided in the inside of the sample case thereby allowing various sizes and shapes of core catchers to be attachable according to material to be taken and that prevents removal of an area of the sample case due to the formation of the core catcher thereby capable of easily adjusting the height of the sedimentary layers to be taken, and a corer having the same.

Technical Solution

In an aspect of the present invention, there is provided a core catcher provided at a lower end of a sample case in the inside of a corer to prevent loss of sediments taken in the inside of the sample case, wherein the core catcher includes: a body having a hollows inside; and first radial pins adhered to an inner periphery of the body and having a plurality of the elastic pins projected toward upper inner side of the body to allow introduction of the sediments toward the inside of the sample case and to be closed to prevent the loss of the sediments taken in the inside of the sample case, and second radial pins adhered to the inner periphery of the body and blocking a predetermined area of the first radial pins.

Preferably, the second radial pins are formed at an upper portion or a lower portion of the first radial pins.

Preferably, the second radial pins block **20** to 40% of total area of the first radial pins from the side at which the first radial pins are adhered.

Preferably, the body is formed in a thickness of 1 to 5 mm.

Preferably, the first radial pins and the second radial pins are respectively formed using a board formed with a plurality of cut parts except at the area to be adhered to the body.

In another aspect of the present invention, there is provided a corer including the core catcher as described above which is removably attached to a liner provided in a sample case.

Preferably, the core catcher is fitted into the lower side or the inner side of the liner.

Preferably, the corer is any one selected from a free-fall gravity corer, a vibracorer or a piston corer.

ADVANTAGEOUS EFFECTS

As described above, in the core catcher and the corer having the same, the first radial pins and the second radial pins are formed in two blade structure to prevent loss of sediments taken in the inside of a sample case, thereby raising accuracy of study to the sediments, and a separate pressure regulating part can be removed thereby simplifying the structure of the corer.

Also, in the core catcher and the corer having the same, the body having a predetermined thickness is removably attached to the liner provided in the inside of the sample case thereby capable of attaching various sizes and shapes of core catchers according to material to be taken and removal of an area of the sample case due to the formation of the core catcher is prevented thereby capable of easily adjusting the height of the sedimentary layers to be taken.

DESCRIPTION OF DRAWINGS

The above and other objects, features and advantages of the present invention will become apparent from the following description of preferred embodiments given in conjunction with the accompanying drawings, in which:

FIG. **1** is a perspective view illustrating a conventional core catcher.

FIG. **2** is a perspective view illustrating a core catcher according to an embodiment of the present invention.

FIG. **3** is an exploded perspective view illustrating the core catcher of FIG. **2**.

FIG. **4** is an exploded perspective view illustrating a core catcher according to another embodiment of the present invention.

FIG. **5** is a view illustrating a method for manufacturing a core catcher according to an embodiment of the present invention.

FIG. **6** is a perspective view illustrating a corer according to an embodiment of the present invention.

FIG. **7** is a partial sectional view illustrating the corer according to an embodiment of the present invention.

DETAILED DESCRIPTION OF MAIN ELEMENTS

100:	core catcher according to an embodiment of the present invention
110:	body
d:	thickness of body
121:	first radial pins
122:	second radial pins
130:	board
131:	cut part
200:	sample case
300:	liner
1000:	corer according to an embodiment of the present invention

BEST MODE

Hereinafter, a core catcher **100** and a corer **1000** having the core catcher **100** according to the present invention will be described in detail with reference to accompanying drawings.

FIG. **2** is a perspective view illustrating a core catcher **100** according to an embodiment of the present invention, and FIG. **3** is an exploded perspective view illustrating the core catcher **100** of FIG. **2**.

As shown in FIGS. **2** and **3**, the core catcher **100** according to an embodiment of the present invention is provided at a lower end of a sample case **200** in the inside of a corer **1000** and prevents the loss of sediments taken in the inside of the sample case **200**, wherein the core catcher **100** includes a body **110** having a hollowed inside; and first radial pins **121** adhered to an inner periphery of the body **110** and having a plurality of the pins for closing the lower portion of the sample case **200** and second radial pins **122** adhered to the inner periphery of the body **110** and blocking a predetermined area of the first radial pins.

The body **110** that is a component constituting a main body of the core catcher **100** according to an embodiment of the present invention has a predetermined thickness d and is formed with a hollowed inside to allow the sediments to be introduced into the inside of the sample case **200**.

Although the body **110** of the core catcher **100** in FIGS. **2** and **3** is formed in a cylindrical shape with the hollowed inside, the body **110** may be formed in various shapes and sizes according to the shape of the sample case **200** of the corer **1000**.

The body **110** is preferably formed with the thickness d of through 5 mm so that the body **110** of the core catcher **100** according to an embodiment of the present invention has strength enough to support the first radial pins **121** and the second radial pins **122**.

The first radial pins **121** and the second radial pins **122** are adhered to the inner periphery of the body **110** to allow introduction of the sediments toward the inside of the sample case **200** by the plurality of the pins and to prevent the loss of the sediments taken in the inside of the sample case **200** by the elastic pins.

First, the first radial pins **121** form a layer for primarily preventing the loss of the sediments, and the radial pins are projected toward upper inner side of the body **110** to be opened by an upward force and closed by a downward force.

However, in the case that the first radial pins **121** is formed alone, the pins are closely engaged together at the center side of the body **110** but gaps are formed between the plurality of the elastic pins as goes from the center side of the body **110** to the side adhered to the inner periphery of the body **110**. Further, the gaps become larger when the sediments such as sands are caught between the elastic pins. Therefore, the sediments taken in the inside of the sample case may be lost when the corer **1000** is pulled up.

The second radial pins **122** are formed, to solve the problem in the case that the first radial pins **121** are formed alone, at an upper portion or a lower portion of the first radial pins **121** so as to block a predetermined area of the first radial pins **121**.

The second radial pins **122** are adhered, like the first radial pins **121**, to the inner periphery of the body **110**, and block the area in that gaps are frequently generated between the elastic pins of the first radial pins **121**.

The second radial pins **122** are preferably formed so as to block **20** to 40% of total area of the first radial pins **121** from the side at which the first radial pins **121** are adhered.

When the second radial pins **122** are formed in less than 20% of the total area of the first radial pins **121**, effect of preventing the loss of the sediments by the second radial pins **122** is insufficient. On the contrary, when the second radial pins **122** are formed in more than 40% of the total area of the first radial pins **121**, the second radial pins **122** may rather

obstruct the function that the first radial pins **121** are closed by the second radial pins **122** to prevent the loss of the taken sediments. Therefore, the second radial pins **122** are formed so as to block **20** to 40% of the total area of the first radial pins **121** from the side at which the first radial pins **121** are adhered.

The area is determined based on how much the second radial pins **122** blocks the first radial pins **121** in height when unfolding the first radial pins **121** and the second radial pins **122** on a plane.

Although the second radial pins **122** are formed at the lower portion of the first radial pins **121** in FIGS. **2** and **3**, the second radial pins **122** may be formed at the upper portion of the first radial pins **121** as shown in FIG. **4**.

In the case that the second radial pins **122** are formed at the lower portion of the first radial pins **121**, the phenomenon that the sediments are caught in the first radial pins **121** when taking the sediments i.e. when the corer is moved down can be prevented. In the case that the second radial pins **122** may be formed at the upper portion of the first radial pins **121**, the loss of the sediments can be prevented by the second radial pins **122** even though the sediments are caught in the first radial pins **121** when taking the sediments.

FIG. **5** is a view illustrating a method for manufacturing a core catcher according to an embodiment of the present invention. The core catcher **100** according to an embodiment of the present invention may be manufactured through a forming a plurality of elastic pins by forming a plurality of cut parts **131** on a board except at the side portion to be adhered; b forming base material for the first radial pins **121** and the second radial pins **122** by bending the plurality of elastic pins formed by the cut parts **131** in a predetermined direction; and c adhering the first radial pins **121** and the second radial pins **122** to the inside of the hollowed body having the predetermined thickness d.

At this time, the board **130** for forming the first radial pins **121** is formed larger in height than the board **130** for forming the second radial pins **122**. The method shown in FIG. **5** is only an example and is not limited thereto provided that the method can form the first radial pins **121** and the second radial pins **122** for blocking a predetermined area of the first radial pins **121** in two blade structure.

FIG. **6** is a perspective view illustrating a corer according to an embodiment of the present invention. In the corer **1000** according to an embodiment of the present invention, the core catcher **100** having two blade structure of the first radial pins **121** and the second radial pins **122** is removably attached to the liner **300** provided in the inside of the sample case **200**.

Since the corer **1000** can be generally applied to various types of corer **1000** according to properties and height of the sedimentary layers to be taken, the corer **1000** may be actually applied to any one selected from a free-fall gravity corer **1000**, a vibracorer **1000** or a piston corer.

Also, since the sample case **200** is made using material such as hard stainless steel and thus the sample case should be cut to inspect the cored sedimentary layers, the liner **300** is provided in the inside of the sample case **200** to facilitate the inspection of the sedimentary layers and allow recycle of the sample case **200**.

FIG. **7** is a partial sectional view illustrating the corer **1000** according to an embodiment of the present invention. The corer **1000** shown in a of FIG. **7** is of a type that the core catcher **100** is provided at the lower side of the liner **300** and the corer **1000** shown in b of FIG. **7** is of a type that the core catcher **100** is provided at the inner side of the liner **300**.

In the corer **1000** of the type shown in a of FIG. **7**, the thickness d of the body **110** of the core catcher **100** is preferably determined as same level as the thickness of the liner **300**. In the corer **1000** of the type shown in b of FIG. **7**, the thickness d of the body **110** of the core catcher **100** should be determined so that the core catcher **100** does not obstruct the introduction of the sediments.

The core catcher **100** may be fitly attached to the liner **300**, but any other attaching method such as rotational attachment may be used provided that the core catcher **100** can be removably attached to the liner **300**.

Since the corer **1000** according to an embodiment of the present invention is provided with a core catcher **100** capable of preventing the sediments from being lost downwardly, the corer **1000** can be applied to the piston corer **1000** in which a height of the sedimentary layers to be taken is large and a structure of a separate pressure regulating part can be reduced or be removed.

Also, since the core catcher **100** is fitly mounted into the lower side or inner side of the liner **300**, a variety of the core catchers **100** can be used according to various coring conditions.

Although specific embodiments of the present invention have been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and the spirit of the invention as disclosed in the accompanying claims.

The invention claimed is:

1. A core catcher provided at a lower end of a sample case in the inside of a corer to prevent loss of sediments taken in the inside of the sample case,

wherein the core catcher includes:

a body having an inside that is hollow; and

first radial pins adhered to an inner periphery of the body and having a plurality of elastic pins projected toward an upper inner side of the body to allow introduction of the sediments toward the inside of the sample case and to be closed to prevent the loss of the sediments taken in the inside of the sample case, and second radial pins adhered to the inner periphery of the body to block a predetermined area of an upper or lower portion of the first radial pins, and

wherein the second radial pins block **20** to 40% of a total area of the first radial pins from the side at which the first radial pins are adhered, and

wherein the first radial pins and the second radial pins are respectively formed using a board with a plurality of cut parts, except at the area to be adhered to the body, the respective first and second radial pins having a constant width in a longitudinal direction of the respective first and second radial pins.

2. The core catcher as set forth in claim **1**, wherein the body is formed in a thickness of 1 to 5 mm.

3. A corer, comprising the core catcher as set forth in claim **1**, the core catcher removably attached to a liner provided in a sample case.

4. The corer as set forth in claim **3**, wherein the core catcher is fitted into the lower side or the inner side of the liner.

5. The corer as set forth in claim **4**, the corer is any one selected from a free-fall gravity corer, a vibracorer or a piston corer.

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