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## **BREVET D'INVENTION**

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Inventeur(s):  
LI Yusheng – Shenzhen (Chine)

43

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Mandataire(s):  
ZHAOffice SPRL – 5030 GEMBLoux (Belgique)

47

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Titulaire(s):  
Shenzhen Naishidi Technologies Research and  
Development Co., Ltd. – Shenzhen (Chine)

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**SMART SOLAR CUP.**

- 57 The present invention discloses a smart solar cup including a cup body and an inner container embedded in the cup body, where a vacuum chamber is formed between the cup body and the inner container, and the cup body is coated with a solar panel; a heating pipe is wound around the outer surface of the inner container below the middle portion of the inner container; a storage battery is mounted at the bottom of the inner container; and the solar panel, the storage battery and the heating pipe are electrically connected together. The smart solar cup is simple in structure and high in heating efficiency.

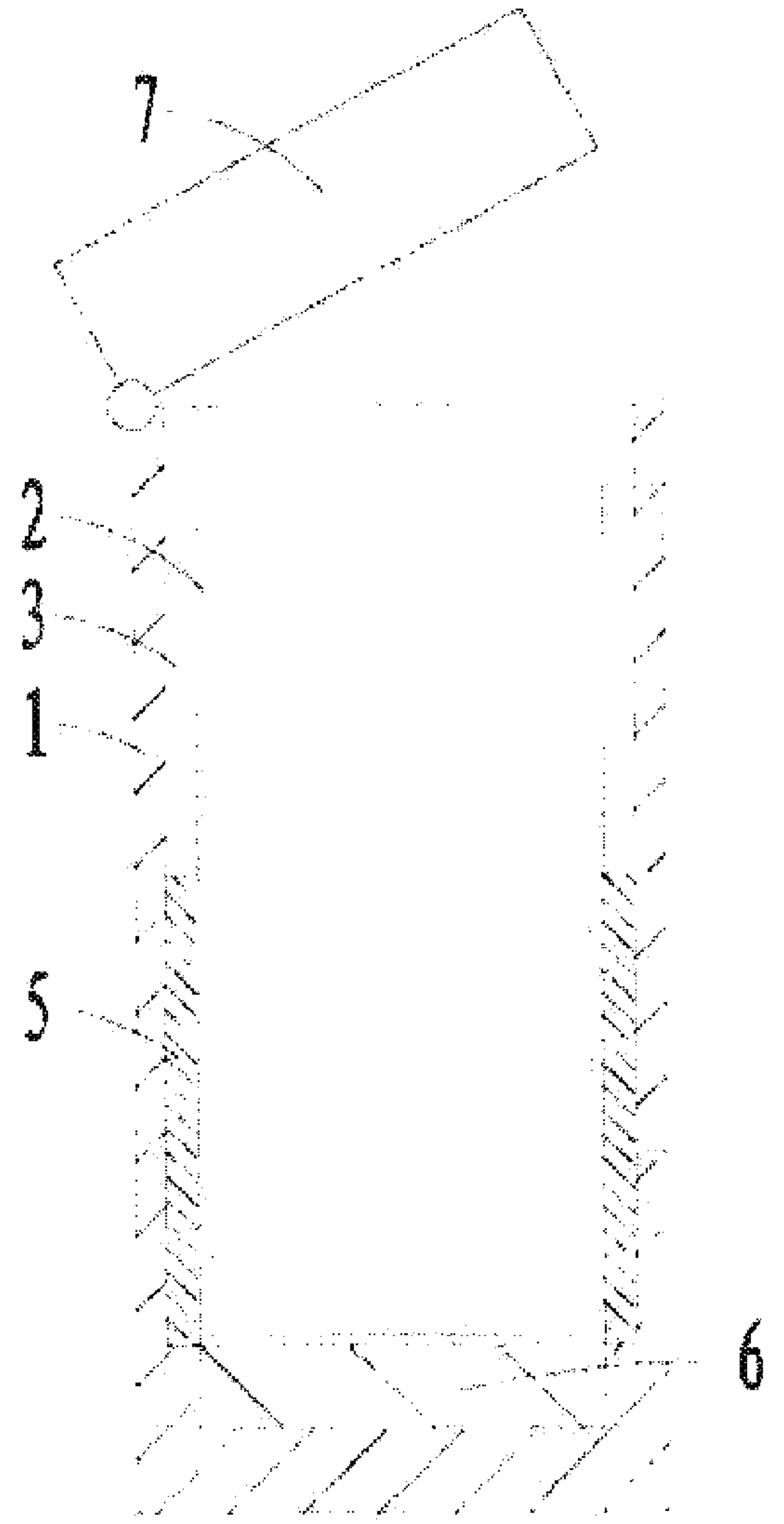


FIG. 2

## BACKGROUND

### 5 **Technical Field**

The present invention relates to a smart solar cup, belonging to the technical field of daily necessities.

### **Related Art**

10 As environmental pollution becomes more and more serious, the importance of clean energy is becoming more and more prominent. Water, wind and solar energy are used as clean energy, and how to make rational use of them has become one of the common problems faced by today's society. At present, the use of solar energy is manifested in many aspects, such as a cup, but its use has great limitations.  
15 Further research is needed to expand its utilization and strive to create more benefits for human beings.

The existing solar cups are each generally provided with a heating device at the bottom of a cup body, and a solar panel disposed on the outer surface of the cup body supplies power to the heating device, and the heating device heats the  
20 water in the cup body. However, since the heating device is located at the bottom of the cup body, the heating area and the heating effect are limited. In addition, the heating efficiency of the solar cup is also relatively low, and the phenomenon of uneven heating is likely to occur.

### 25 **Summary**

Against the aforementioned shortcomings in the prior art, an objective of the present invention is to provide a smart solar cup.

In order to achieve the aforementioned objective, the following technical solution is adopted according to the present invention:

30 A smart solar cup, including a cup body and an inner container embedded in

the cup body, where a vacuum chamber is formed between the cup body and the inner container, and the cup body is coated with a solar panel; a heating pipe is wound around the outer surface of the inner container below the middle portion of the inner container; a storage battery is mounted at the bottom of the inner container; the solar panel, the storage battery and the heating pipe are electrically connected together; a cup lid is hinged to the position of a cup opening of the cup body, a charging interface is mounted on the outer surface of the cup body, and the charging interface is electrically connected with storage battery; a USB port is mounted on the outer surface of the cup body, the USB port is electrically connected with the storage battery, and an outer layer of the solar panel is provided with a transparent glass casing.

Preferably, a switch is mounted on the outer surface of the cup body, and the switch is electrically connected with the solar panel, the storage battery and the heating pipe.

Preferably, an indicating lamp is mounted on the outer surface of the cup body. Preferably, the inner container is made of a thermal insulation material.

Due to the adoption of the aforementioned solution, the solar cup according to the present invention has at least the following advantages: first, the heating efficiency is improved since the heating area is increased; second, the occurrence of uneven heating can be reduced due to the increase of the heating area, thereby improving the heating effect; third, if the heating pipe is wound completely around the outer surface of the inner container, the inner container needs to be filled with water every time and then the water can be heated, or else the energy waste phenomenon occurs easily; if the heating pipe is wound only around the outer surface of the bottom of the inner container, the aforementioned problems of low heating efficiency and uneven heating occur; however, the heating pipe of the present invention is located on the outer surface below the middle portion of the inner container, so the balance between the two can be achieved, and there is no waste of energy while the heating efficiency and heating effect are improved.



### **Brief Description of Drawings**

FIG. 1 is a stereoscopic view of a solar cup according to an embodiment;

FIG. 2 is a schematic structural view of a solar cup according to an embodiment;

and

5 FIG. 3 is a schematic view showing the assembly of an inner container and a heating pipe according to an embodiment.

### **Description of Embodiments**

10 The embodiments of the present invention are described in detail below with reference to the accompanying drawings. However, the present invention can be implemented in various different ways as defined and covered by the claims.

As shown in FIGs. 1-3, a smart solar cup provided by an embodiment of the present invention includes a cup body 1 and an inner container 2 embedded in the cup body 1, wherein a vacuum chamber 3 is formed between the cup body 1 and the inner container 2, and the cup body 1 is coated with a solar panel 4; a heating pipe 5 is wound around the outer surface of the inner container 2 and below the middle portion of the inner container 2; a storage battery 6 is mounted at the bottom of the inner container 2; the solar panel 4, the storage battery 6 and the heating pipe 5 are electrically connected together; a cup lid 7 is hinged to the position of a cup opening of the cup body 1, a charging interface 9 is mounted on the outer surface of the cup body 1, and the charging interface 9 is electrically connected with storage battery 6; a USB port 10 is mounted on the outer surface of the cup body 1, the USB port 10 is electrically connected with the storage battery 6, and an outer layer of the solar panel 4 is provided with a transparent glass casing.

25 Based on the above structure, the vacuum chamber 3 is formed between the cup body 1 and the inner container 2. The vacuum chamber 3 has a good thermal insulation effect, and effectively reduces the heat dissipation of the inner container 2. The cup body 1 is coated with the solar panel 4, the heating pipe 5 is wound around the outer surface of the inner container 2 and below the middle portion of the inner container 2, and the storage battery 6 is mounted at the bottom of the inner

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container 2; the solar panel 4, the storage battery 6 and the heating pipe 5 are electrically connected together. The solar cup according to the embodiment effectively increases the heating area of the inner container, thereby improving heating efficiency; the occurrence of uneven heating can be reduced, and the heating effect is improved.

The cup lid 7 is hinged to the position of the cup opening of the cup body 1. Preferably, the cup opening of the cup body 1 is hinged to the cup lid 7 through a hinged shaft. The hinged connection greatly facilitates the user's opening or closing the cup lid 7 described above.

A switch 8 is mounted on the outer surface of the cup body 1, and the switch 8 is electrically connected with the solar panel 4, the storage battery 6 and the heating pipe 5. In the case of sufficient sunlight, the solar panel 4 performs photoelectric conversion to convert solar energy into electrical energy and store the electrical energy in the storage battery 6. When the water in the inner container 2 needs to be heated, the storage battery 6 is turned on through the switch 8, and the storage battery 6 supplies power to the heating pipe 5 for operating, the heating pipe 5 operates and heats the water in the inner container 2, the water in the inner container 2 preferably accounts for at least a half of the volume of the inner container 2, and when the water in the inner container 2 reaches the temperature required by the user, the switch 8 is turned off immediately.

The charging interface 9 is mounted on the outer surface of the cup body 1, and the charging interface 9 is electrically connected with the storage battery 6. In the case of weather that does not have solar energy available, such as rainy days or nights, the storage battery 6 can be charged through the charging interface 9 to facilitate the user's carrying and use.

In addition, the USB port 10 is mounted on the outer surface of the cup body 1, and the USB port 10 is electrically connected with the storage battery 6. Similarly, in the case of weather that does not have solar energy available, such as rainy days or nights, the storage battery 6 can be charged through the USB port 10 to facilitate the user's carrying and use. In addition, another function of the USB port 10 is that



the storage battery in the solar cup can be used as a mobile power supply to charge a mobile tool such as a mobile phone.

The outer layer of the solar panel 4 is provided with the transparent glass casing. Internal components can be protected while the solar panel 4 is not prevented from receiving solar energy.

An indicating lamp 11 is mounted on the outer surface of the cup body 1. The indicating lamp 11 is used to keep flashing to remind the user to pay attention to power consumption and charging when the remaining power of the storage battery 6 is insufficient. In addition, when the charging interface 9 or the USB port 10 is used to charge the storage battery 6, the indicating lamp 11 keeps flashing to remind the user that the storage battery 6 is not full, while the indicating lamp is always on to remind the user that the storage battery 6 is full and it needs to stop charging to avoid the shortening of the service life of the storage battery 6 caused by the storage battery 6 being full but continuing to be charged.

The inner container 2 is made of a thermal insulation material, such as stainless steel or a hard glass material.

The above are only the preferred embodiments of the present invention, and are not intended to limit the patent scope of the present invention, and the equivalent structure or equivalent process transformations made by using the content of the specification and the accompanying drawings of the present invention may be directly or indirectly applied to other related technical fields, and shall be included in a similar way in the patent protection scope of the present invention.

**CLAIMS**

1. A smart solar cup, comprising a cup body (1) and an inner container (2) embedded in the cup body (1), wherein a vacuum chamber (3) is formed between the cup body (1) and the inner container (2), and the cup body (1) is coated with a solar panel (4); a heating pipe (5) is wound around the outer surface of the inner container (2) and below the middle portion of the inner container (2); a storage battery (6) is mounted at the bottom of the inner container (2); the solar panel (4), the storage battery (6) and the heating pipe (5) are electrically connected together; a cup lid (7) is hinged to the position of a cup opening of the cup body (1), a charging interface (9) is mounted on the outer surface of the cup body (1), and the charging interface (9) is electrically connected with storage battery (6); a USB port (10) is mounted on the outer surface of the cup body (1), the USB port (10) is electrically connected with the storage battery (6), and an outer layer of the solar panel (4) is provided with a transparent glass casing.

2. The smart solar cup according to claim 1, wherein a switch (8) is mounted on the outer surface of the cup body (1), and the switch (8) is electrically connected with the solar panel (4), the storage battery (6) and the heating pipe (5).

3. The smart solar cup according to claim 1, wherein an indicating lamp (11) is mounted on the outer surface of the cup body (1).

4. The solar cup according to claim 1, wherein the inner container (2) is made of a thermal insulation material.



## REVENDEICATIONS

1. Gobelet solaire intelligent, comprenant un corps de gobelet (1) et un  
5 récipient intérieur (2) noyé dans le corps de gobelet (1), dans lequel une chambre à  
vide (3) est formée entre le corps de gobelet (1) et le récipient intérieur (2), et le  
corps de godet (1) est revêtu d'un panneau solaire (4) ; un tuyau de chauffage (5)  
est enroulé autour de la surface extérieure du récipient intérieur (2) et sous la partie  
centrale du récipient intérieur (2) ; une batterie de stockage (6) est montée au fond  
10 du récipient intérieur (2) ; le panneau solaire (4), la batterie de stockage (6) et le  
tuyau de chauffage (5) sont connectés électriquement ensemble ; un couvercle de  
godet (7) est articulé sur la position d'une ouverture de godet du corps de godet (1),  
une interface de chargement (9) est montée sur la surface extérieure du corps de  
godet (1), et l'interface de chargement (9) est reliée électriquement à une batterie  
15 de stockage (6) ; un port USB (10) est monté sur la surface extérieure du corps de  
godet (1), le port USB (10) est relié électriquement avec la batterie de stockage (6)  
et une couche extérieure du panneau solaire (4) est munie d'une enveloppe en  
verre transparent.

2. Gobelet solaire intelligent selon la revendication 1, dans lequel un interrupteur (8)  
20 est monté sur la surface extérieure du corps de gobelet (1) et l'interrupteur (8) est  
relié électriquement au panneau solaire (4), à la batterie de stockage (6) et à la  
conduite de chauffage (5).

3. Gobelet solaire intelligent selon la revendication 1, dans lequel une lampe  
témoin (11) est montée sur la surface extérieure du corps du gobelet (1).

25 4. Gobelet solaire selon la revendication 1, dans lequel le récipient intérieur (2)  
est constitué d'un matériau d'isolation thermique.

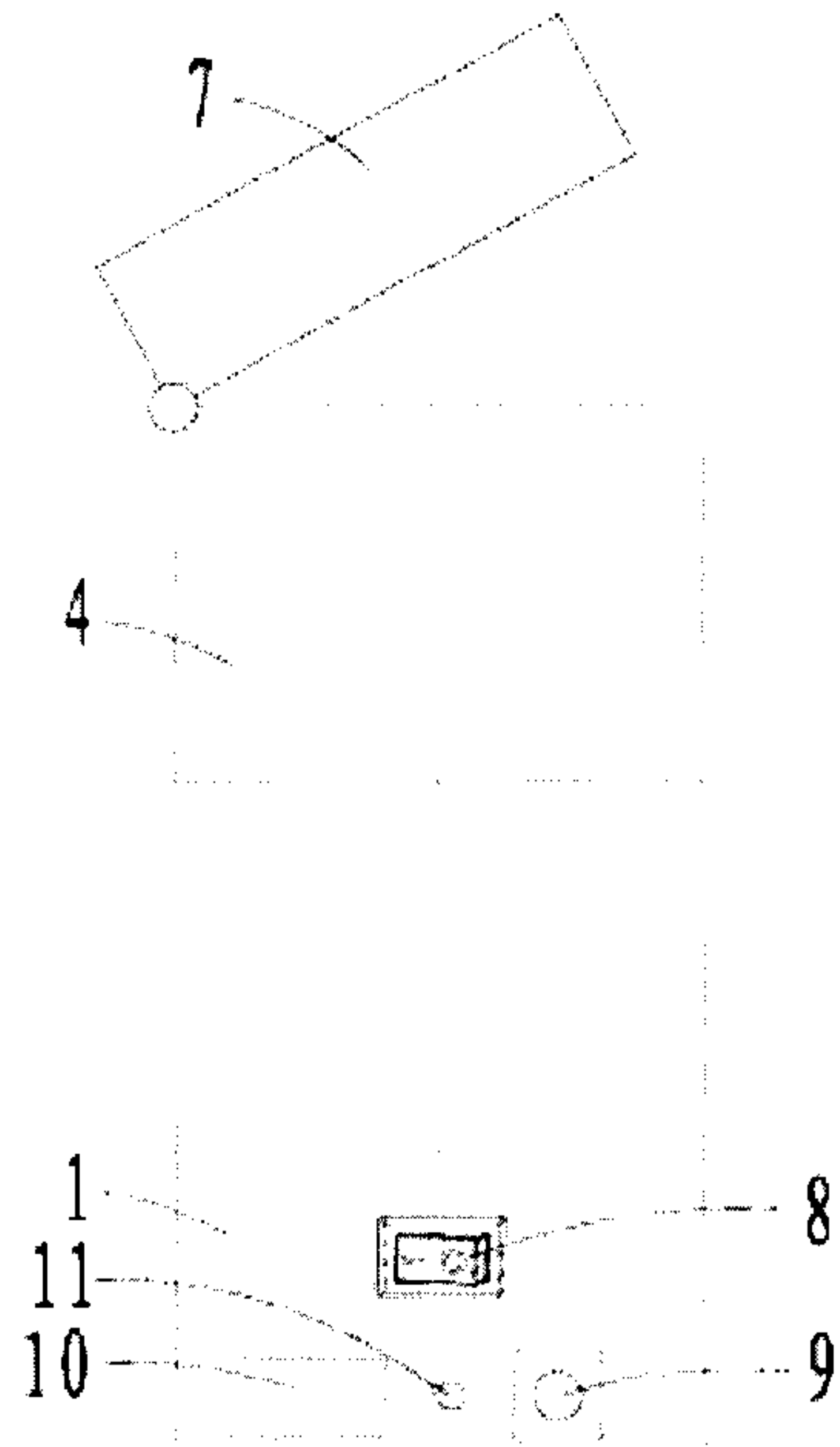


FIG. 1

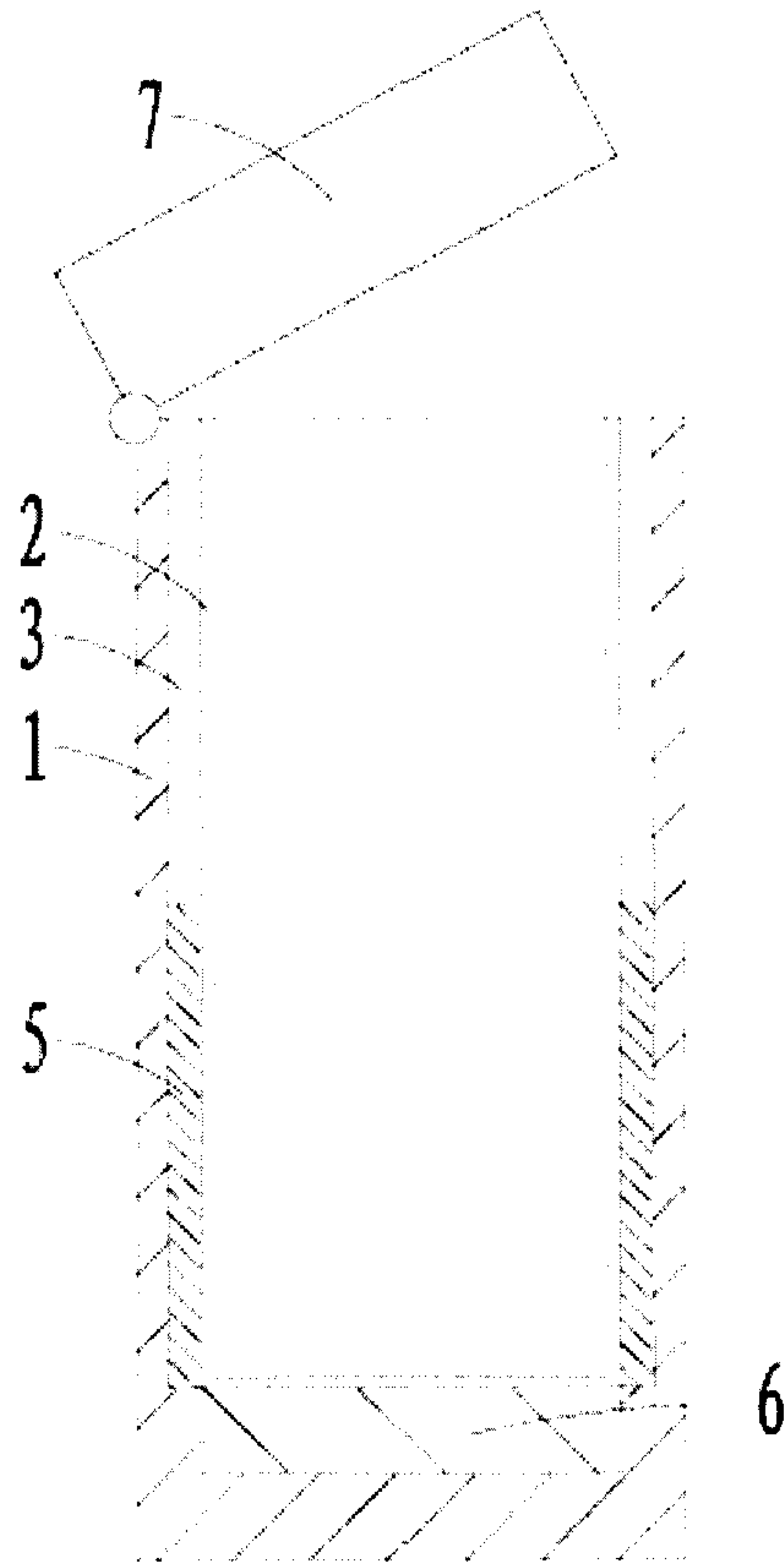


FIG. 2



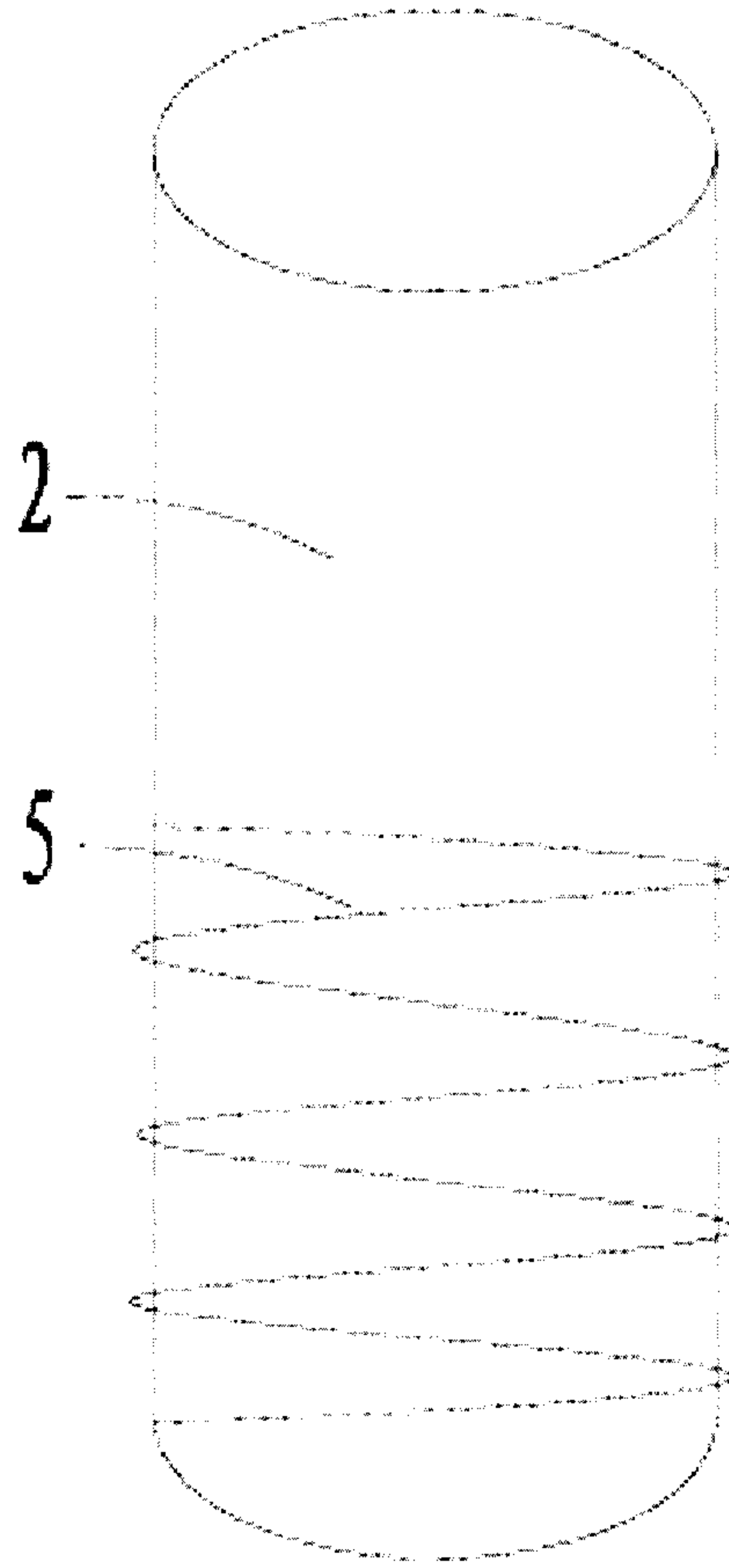


FIG. 3