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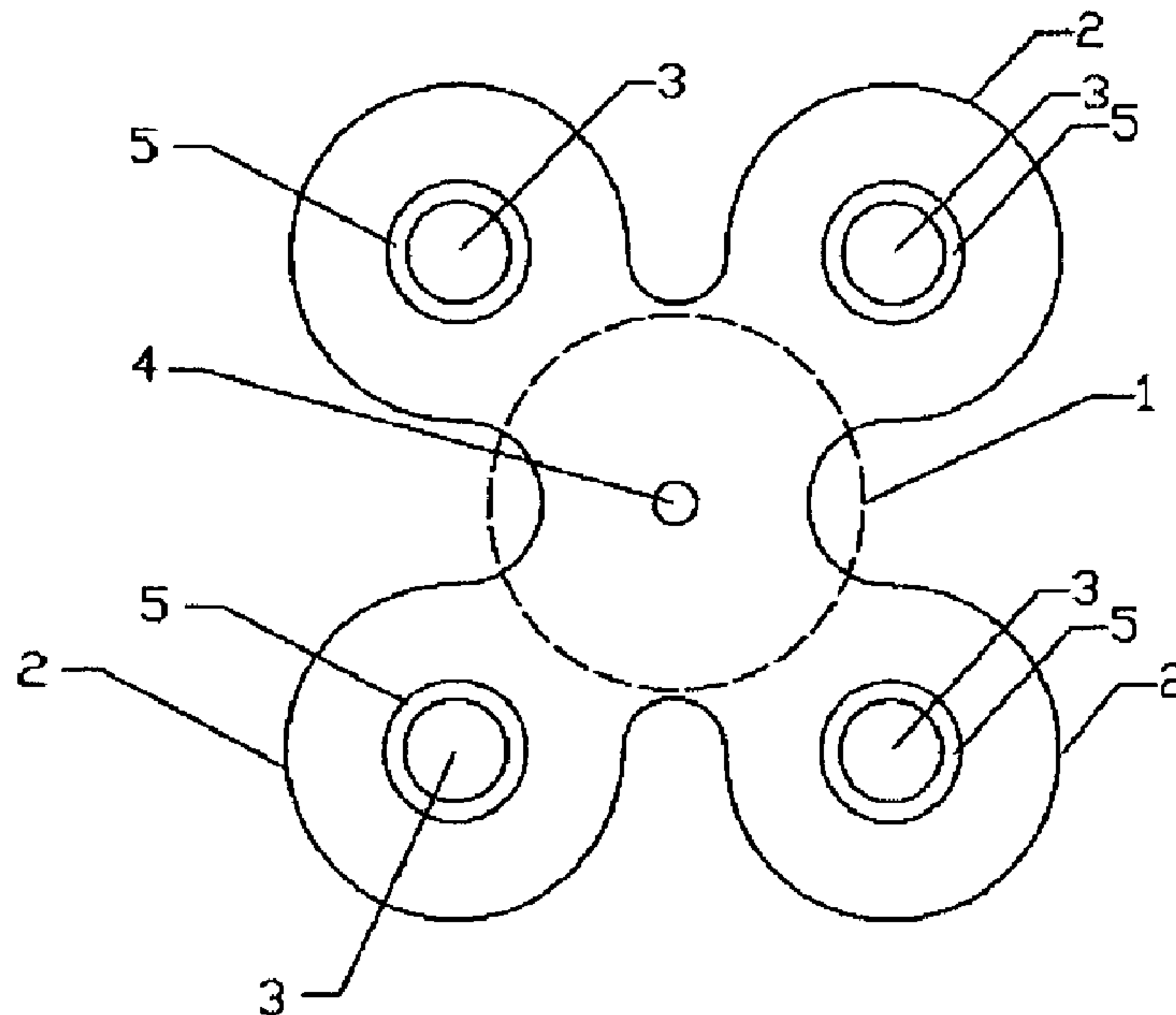
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(54) Titre : PLAQUE DE RETENUE

(54) Title: HOLD PLATE



(57) Abrégé/Abstract:

Hold Plate, as depicted in Fig. 1, is a medical device used for holding abnormal growth of a bone growth plate in children. The hold Plate is composed of a centre section (1) in the centre of which a small hole (4) is located. It has four extensions (2) in which four

(57) **Abrégé(suite)/Abstract(continued):**

holes (3) are located and through which four screws (6) could be inserted. The distances between two holes (3) are different for children under the age of 10 and the adolescents. The four holes (3) are smoothly tapered and bevelled (5) so that the screws (6) could be inserted in multi-directions as decided by a surgeon and as depicted in Fig 3.

### **Abstract**

Hold Plate, as depicted in Fig. 1, is a medical device used for holding abnormal growth of a bone growth plate in children. The hold Plate is composed of a centre section (1) in the centre of which a small hole (4) is located. It has four extensions (2) in which four holes (3) are located and through which four screws (6) could be inserted. The distances between two holes (3) are different for children under the age of 10 and the adolescents. The four holes (3) are smoothly tapered and bevelled (5) so that the screws (6) could be inserted in multi-directions as decided by a surgeon and as depicted in Fig 3.

## Description

Field of the Invention: The Hold Plate with its two extensions (2) on each side, which can accept 4mm screws (6) through the holes (3), would provide a temporary physical growth hold in a child's growing bone. By using this Hold Plate, an Orthopaedic surgeon can hold the growth of a hyseal plate.

Background: Interest in mechanical disruption of abnormal physical growth of bone is as old as the concept of permanent surgical of epiphysiodesis. Similar devices and materials, such as Wire by Haas [a], Staples (one to three) by Blount [c], and Trans-Physical Screw by Métaizeau et al [b], have been used to shorten a bone growth or correct its angulations. But, many complications, such as implant failure (wire breakage, staple extrusion or breakage), recurrence of deformity, and inadvertent angular deformity because of eccentric insertion of staples or screws [d-g] have been reported in literatures.

Recently, a new method by using an 8 like plate has been reported by Stevens et al (7). This plate affords only a point like tether on the physics and, if inserted eccentrically, there could be a theoretical risk of undesired guided growth associated with it.

Similarly, the X-Plate by Beutter et al [h] was invented for fracture fixation. It lacks a central hole and since the plate has a slight curvature towards its inside, the screws converge to a single point. This significantly limits an Orthopaedic surgeon's flexibility and makes it very difficult for the surgeon to precisely locate and install the plate.

Summary of the Invention: Unlike the above mentioned similar devices, the described Hold Plate spreads the point area of hold effect to a wider area and eliminates the possibility of some iatrogenic complications. As a result, the same results would be achieved regardless whether the Hold Plate is installed on slightly posterior or anterior aspects of the growth plate.

The central hole (4) provides the surgeon with the ability to precisely locate the Hold Plate over the bone growth plate and the multi-directionality of the holes (3) ensures the screws (6) are inserted parallel to the growth plate, as opposed to converging to a point.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Having thus described the invention, reference will now be made to the attached drawings, which are not necessarily drawn to scale:

Fig 1 shows schematically a top view of the Hold Plate identifying different sections of the Plate.

Fig 2 shows a cross section of the Hold Plate and its different sections.

Fig 3 shows an isometric view of the Hold Plate and its different sections.

### **DETAILED DESCRIPTION OF PREFERRED DRAWING**

The plate is composed of four identical extensions (2), as shown in Fig 1, which are attached to the central body (1). Each extension has a 4mm smoothly tapered and bevelled holes (4-5) via which fixation of the Hold Plate to the bone through four screws (6) could be done(Fig 3). The width of the extensions is 11 mm with a 30° 6 mm radius filleted steep around the hole, as shown in Fig 2. The central body (1) of the Hold Plate is 12 mm in diameter and has a central hole of 1.5 mm. The central hole can take a 0.8 mm guide pin, which can be used to locate the mid antero-posterior point of the growth plate under fluoroscopic control. The center to center vertical distance between two holes (2) is 16 mm for adolescent and 14 mm for children 10 years old and under. The thickness of the plate is 2 mm, as shown in Fig 2.

## References

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### Claims

1. The device is composed of a centre section (1) in the centre of which a small hole (4) is located. It has four extensions (2) in which four holes (3) are located through which four screws (6) could be inserted. The four holes (3) are smoothly tapered and bevelled (5).
2. The device according to Claim 1, wherein the center section (1) has the diameter of 12 mm.
3. The device according to Claim 1, wherein the center section (1) has a central hole (4).
4. The device according to Claim 1, wherein the centre hole (4) has the diameter of 1.5 mm.
5. The device according to Claim 1, wherein the center hole (4) accepts a 0.8 mm temporary guide pin inserted into the growth plate.
6. The device according to Claim 1, wherein there are four extensions (2) diagonally attached to center section (1).
7. The extensions according to Claim 6, wherein said extensions have an outside diameter of 11 mm.
8. The extensions according to Claim 6, wherein said extensions have central holes (3).
9. The Central holes according to Claim 8, wherein said central holes (3) are tapered with the diameter of 6 mm.
10. The Central holes according to Claim 8, wherein said central holes (3) have inside diameter of 4.2 mm.
11. The Central holes according to Claim 8, wherein said central holes (3) are bevelled on the bottom side of the device at 30°.

12. The device according to Claim 1, wherein the heads of the screws (6) are tapered.
13. The device according to Claims 9 and 12, wherein the screws (6) could be inserted in holes (3) in multi directions so that the center axis of each screw (6) is not fixed.
14. The device according to Claim 13, wherein central axis of the four screws (6) do not converge to a single point.
15. The device according to Claims 2 through 14, wherein the device would bend according to the shape of the bone's surface and remains fixed via four screws (6).
16. The device according to Claim 1, wherein the vertical distance between each two holes (3) 14 mm for children under the age of 10 years.
17. The device according to Claim 1, wherein the vertical distance between each two holes (3) is 16 mm for adolescent.
18. The device according to Claim 1, wherein the thickness of the plate is 2 mm.
19. The device according to Claims 1 through 18, wherein provides a uniform tether effect on a wider area and the shape of the bone's growth plate.
20. The device according to Claim 19, wherein prevents asymmetric growth inhibition even when the device is installed slightly eccentric in the horizontal direction.

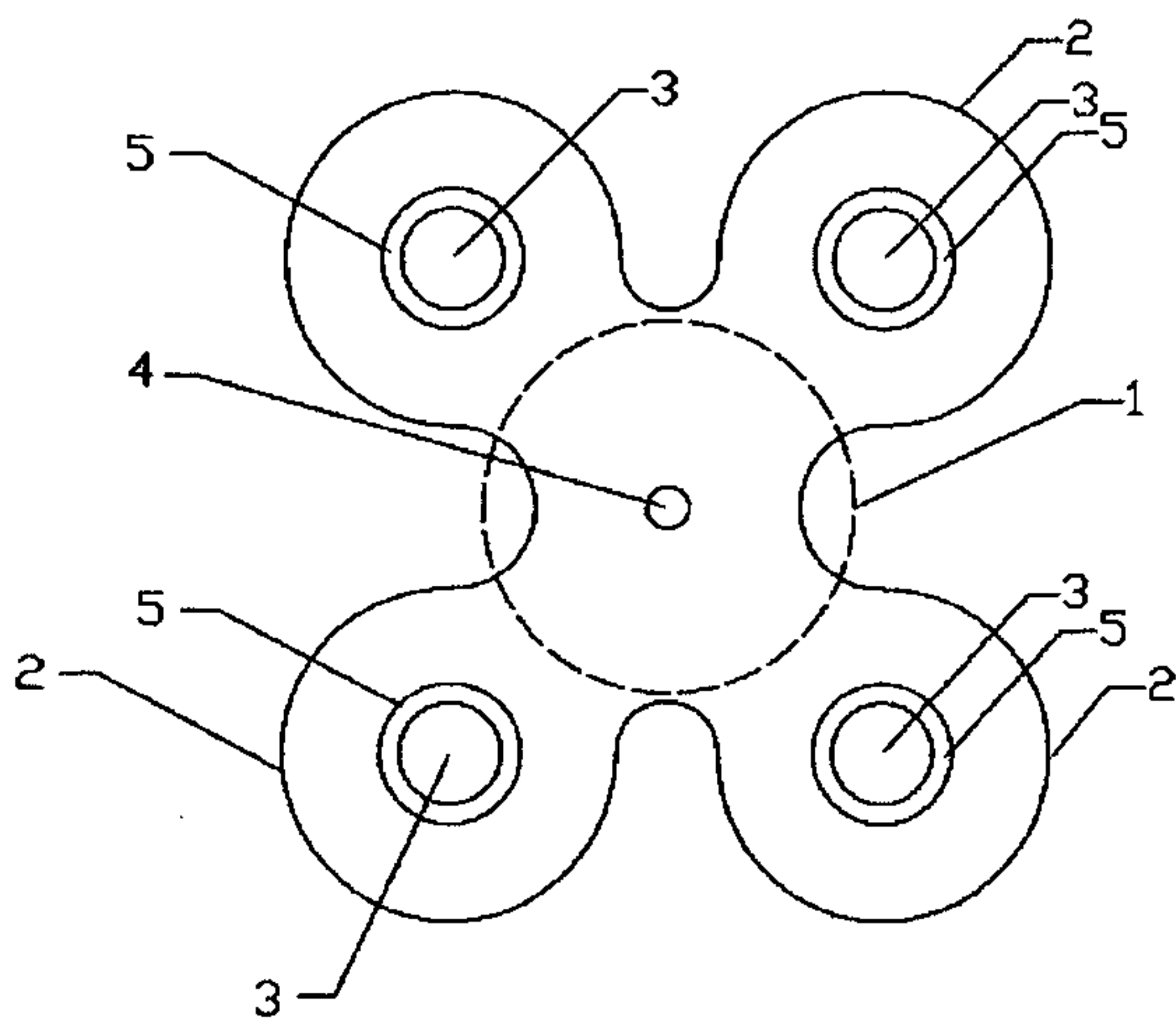


Fig 1

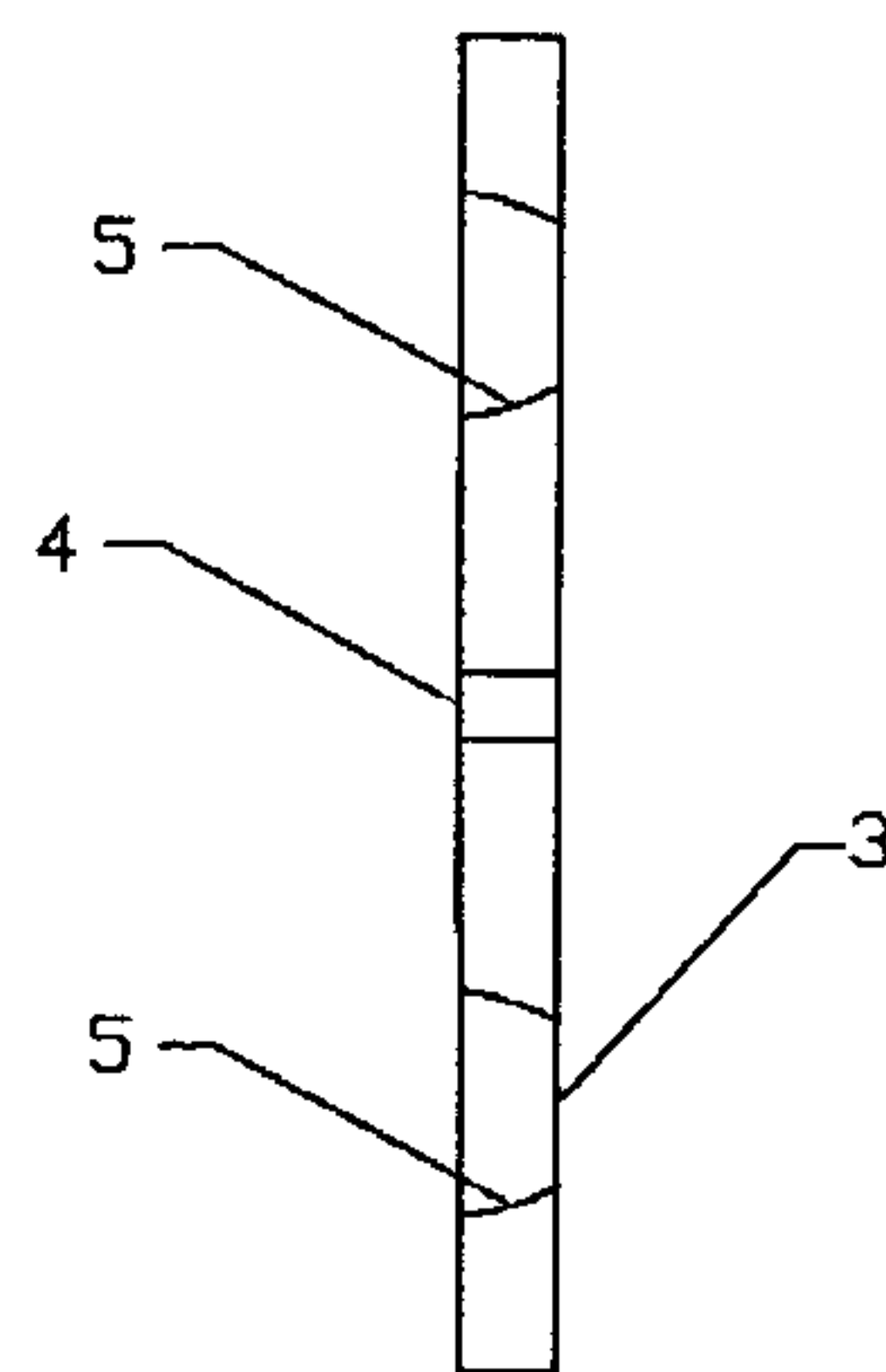


Fig 2

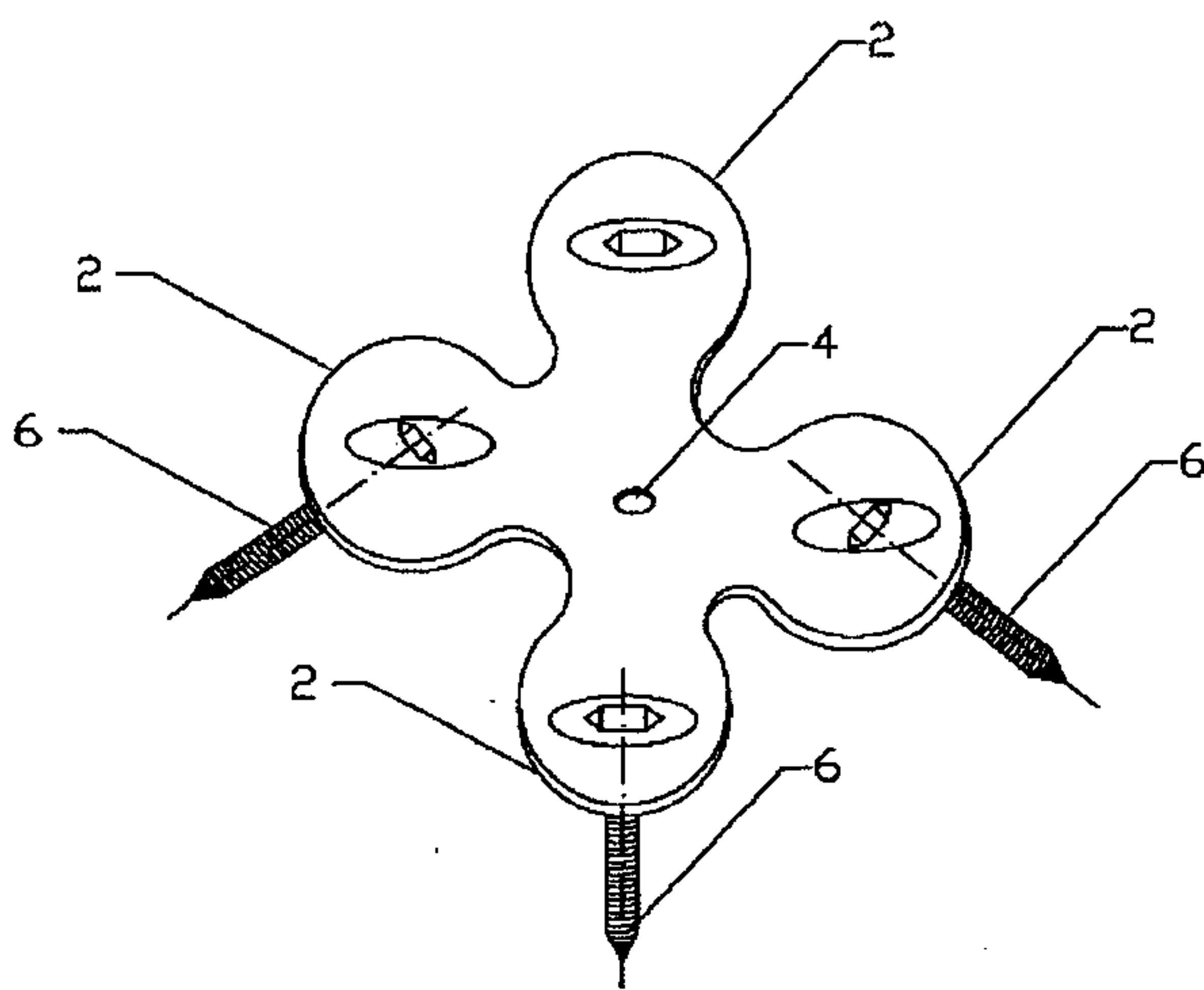


Fig 3

