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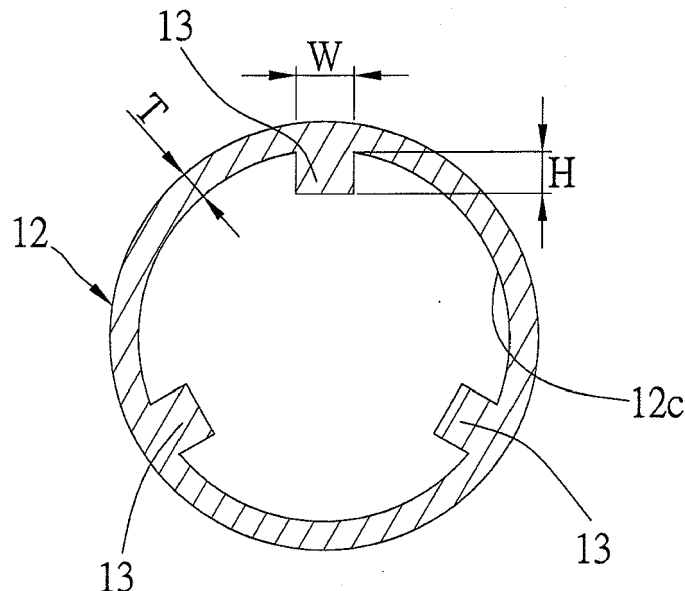
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(54) **Hand-operated stick device and the shaft thereof**

(57) A hand-operated stick device (10) includes a gripping portion (14), a working member (16) and an elongated shaft (12) with opposite ends connecting the gripping portion (14) and the working member (16). The shaft (12) has a wall thickness (T) and at least three ribs (13) projected from an inner side (12c) of the shaft (12). The

ribs (13) extend from an end of the shaft (12) adjacent to the gripping portion (14) to the other end adjacent to the working member (16). The ribs (13) have a width (W) and a height (H) both of which are greater than or equal to the wall thickness (T). Therefore, it may increase the strength of structure and provide a safe use.



**FIG. 2**

## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

[0001] The present invention relates generally to a device used in ordinary life or sport, and more particularly to a hand-operated stick device and the shaft thereof.

#### 2. Description of the Related Art

[0002] In some circumstances, using hand-operated stick device for assistance is common and necessary. For example, the walking stick is a necessary device to help an elder or a disabled person to walk, the trekking pole may help the mountain climber or hiker to stably walk and the ski pole may help the skier to ski forward and turn. Other hand-operated stick devices include golf club, hockey stick and other sport goods.

[0003] There is a common character of the stick devices as described above, which is, they have a hollow shaft. The hollow shaft may reduce the weight to decrease the loading when the user operates it. There are two ways to achieve the purpose. The first way is changing material, such as using carbon to replace metallic tube. The second way is using less material. However, under the specific standard of the device, using less material may cause the shaft having a thin wall thickness. Take the carbon ski pole for example, under the requirement of reduction of the weight of the shaft, the weight of the shaft is reduced from 150 grams per meter to 57 grams per meter that the wall thickness of the shaft is reduced to 0.8mm. Such shaft has an insufficient strength that the shaft is easy to be deformed or broken. This may lead the shaft can't be used anymore and may hurt the user. As the shaft is longer, the strength of the structure is weaker. If the shaft has a bent portion, the wall of the shaft at the bent portion is thinner than the rest portion, and the stress will be concentrated here that the shaft is easier to be broken at the bent portion.

### SUMMARY OF THE INVENTION

[0004] The primary objective of the present invention is to provide a hand-operated stick device and the shaft thereof, which may increase the strength of the structure and provide a safe use.

[0005] According to the objective of the present invention, a hand-operated stick device includes a gripping portion, a working member and a shaft with opposite ends connected to the gripping portion and the working member. The shaft has a wall thickness and at least a rib projected from an inner side thereof. The rib extends from an end of the shaft adjacent to the gripping portion to the other end adjacent to the working member. The rib has a width and a height, and the width and the height are greater than or equal to the wall thickness.

[0006] In an embodiment, the rib includes a plurality of separated rib sections.

[0007] In another embodiment, there are three ribs on the inner side of the shaft with the same interval therebetween. Furthermore, the ribs have their distal ends connected together at a center of the shaft. It may provide any numbers of the ribs on the inner side of the shaft, and the ribs may extend in an axis of the shaft or spirally.

[0008] In addition, the shaft of the hand-operated stick device of the present invention is characterized in that the shaft has a wall thickness and at least three ribs projected from an inner wall thereof. Each rib has a width and a height, both of which are greater than or equal to the wall thickness.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a perspective view of the hand-operated stick device of a preferred embodiment of the present invention;

FIG. 2 is a sectional view along the 2-2 line of FIG. 1;

FIG. 3 is an enlarged sectional view of the shaft of the preferred embodiment of the present invention, showing the ribs extending along the axis of the shaft; FIG 4 is similar to FIG. 2, showing the ribs having curved cross section.

FIG 5 is similar to FIG. 3, showing the spiral ribs;

FIG. 6 is similar to FIG. 3, showing the rib having separated rib sections;

FIG. 7 is similar to FIG. 2, showing four ribs on the shaft; and

FIG. 8 is similar to FIG. 2, showing the ribs having their distal ends connected together at the center of the shaft.

### DETAILED DESCRIPTION OF THE INVENTION

[0010] The hand-operated stick device of the present invention may be a walking stick, trekking pole, ski pole, golf club, hockey stick and so on. These devices have a common structure including a gripping portion, a working member and a shaft connecting the gripping portion and the working member. It is noted that the shape and structure of the working member is various according to the purpose of the stick device. For example, when the stick device is a walking pole, the working member will be a tip for against the ground. When the stick device is a golf club, the working member is the golf club head. When the stick device is a hockey stick, the working member is the blade. We take the walking pole for example to describe the hand-operated stick device and the shaft of the present invention in the following description.

[0011] As shown in FIG. 1, a hand-operated stick device of the preferred embodiment of the present invention is a walking pole 10, which includes an elongated shaft 12, a gripping portion and a working member. The shaft

12 is a tapered tubular member. The gripping portion is a handle 14 fitted to a top end 12a of the shaft 12 to be held by user's hand. The working member is a tip 16 fixed to a bottom end 12b of the shaft 12 for against the ground.

**[0012]** As shown in FIG. 2 and FIG. 3, the entire shaft 12 has the same wall thickness T. The shaft 12 has a plurality of ribs 13 projected from an inner side 12c thereof. In the present embodiment, the ribs 13 extend in an axis of the shaft 12 from the top end 12a to the bottom end 12b, and there are three ribs 13 with the same interval therebetween.

**[0013]** As shown in FIG. 2, each rib 13 has a width W and a height H. The width W is a distance between two points of the rib 13 connecting the inner side 12c of the shaft 12, and the height H is the shortest distance between the highest point of the rib 12 and the inner wall 12c. Under the basis of above, the cross section of the rib 13 may be rectangular as shown in FIG. 2 or curved shaped as shown in FIG. 4. No matter what kind of the shape the ribs 13 are, the width W of the rib 13 must be greater than or equal to the wall thickness T of the shaft 12, and the height H is greater than or equal to a wall thickness T as well. Under the specific standard and reduction of material, the ribs 13 may increase a toughness of the shaft 12 to resist deformation that the shaft 12 will not be broken easily and have a high safety, furthermore, it may achieve the purpose of reducing the loading of user and easy to operate. In the same principle, the shaft 12 of the hand-operated stick device of the present invention may be applied in walking stick, trekking pole, alpenstock, golf club or hockey stick that may provide the same function.

**[0014]** It is noted that the ribs 13 have the same interval therebetween to evenly disperse the force exerted on the shaft 12 and to avoid the concentration of the force to break the shaft 12. In the present embodiment, three ribs 13 with the same interval are the best design. The main reason is that the strengths in all directions will be the same when the handle 14 or the tip 16 engaging the shaft 12 in any angle.

**[0015]** There are several equivalent structures that may achieve the same purpose of the present invention.

**[0016]** In FIG. 5, it shows a shaft 20 having spiral ribs 22.

**[0017]** In FIG. 6, a shaft 30 has several ribs 32 extending in the axis of the shaft 30. Each rib 32 has several separated rib sections 32a. The region having the rib sections 32a is defined as an enhanced region, and the region without the rib section 32a is defined as flexible region. The flexible regions may provide the shaft 30 a flexibility. Take the golf club for example, the flexible regions of the shaft 30 may cause the shaft 30 to flex and absorb the shake when a golfer swings the golf club to hit a ball.

**[0018]** FIG. 7 shows a shaft 40 having four ribs 42 with the same interval therebetween. The ribs 42 may extend in the axis or in the spiral direction, or the ribs 42 may be constructed by separated rib sections.

**[0019]** FIG. 8 shows a shaft 50 having several ribs 52 with their distal ends connected together at a center of the shaft 50.

**[0020]** Finally, under the requirement of a light shaft, the present invention provides the shaft having the ribs with the width W greater than or equal to the wall thickness T, and the height greater than or equal to the wall thickness T also that the shaft will have a great toughness and compressive strength in the same time. The best design of the present invention is to provide three ribs with the same interval therebetween that shaft will have the same strength in all directions no matter the handle and the tip engage the shaft in any angle.

**[0021]** The description above is a few preferred embodiments of the present invention and the equivalence of the present invention is still in the scope of the claim of the present invention.

## Claims

1. A hand-operated stick device (10), comprising:

a gripping portion (14);  
a working member (16); and  
an elongated shaft (12) having opposite ends connected to the gripping portion (14) and the working member (16); the shaft (12) having a wall thickness (T) and a plurality of ribs (13) projected from an inner side (12c) thereof, wherein each of the ribs (13) has a width (W) and a height (H), and the width (W) and the height (H) are greater than or equal to the wall thickness (T).

2. The hand-operated stick device (10) as defined in claim 1, wherein the rib (32) has a plurality of separated rib sections (32a).

3. The hand-operated stick device as defined in claim 1 or claim 2, wherein the shaft (12) has three ribs (13) on the inner side (12c) thereof with the same interval therebetween.

4. The hand-operated stick device (10) as defined in claim 3, wherein distal ends of the ribs (52) are connected together at a center of the shaft (50).

5. The hand-operated stick device (10) as defined in claim 3, wherein the ribs (13) extend in an axis of the shaft (12).

6. The hand-operated stick device as defined in claim 3, wherein the ribs (22) are spiral.

7. A shaft (12) of a hand-operated stick device (10), **characterized in that** the shaft (12) has a wall thickness (T) and at least three ribs (13) projected from an inner side (12c) thereof, and each of the ribs (13)

has a width (W) and a height (H) greater than or equal to the wall thickness (T).

8. The hand-operated stick device as defined in claim 7, wherein the rib (32) has a plurality of separated rib sections (32a). 5
9. The hand-operated stick device as defined in claim 7 or claim 8, wherein the shaft (12) has three ribs (13) on the inner side (12c) thereof with the same interval therebetween. 10
10. The hand-operated stick device as defined in claim 7, wherein distal ends of the ribs (52) are connected together at a center of the shaft (50). 15

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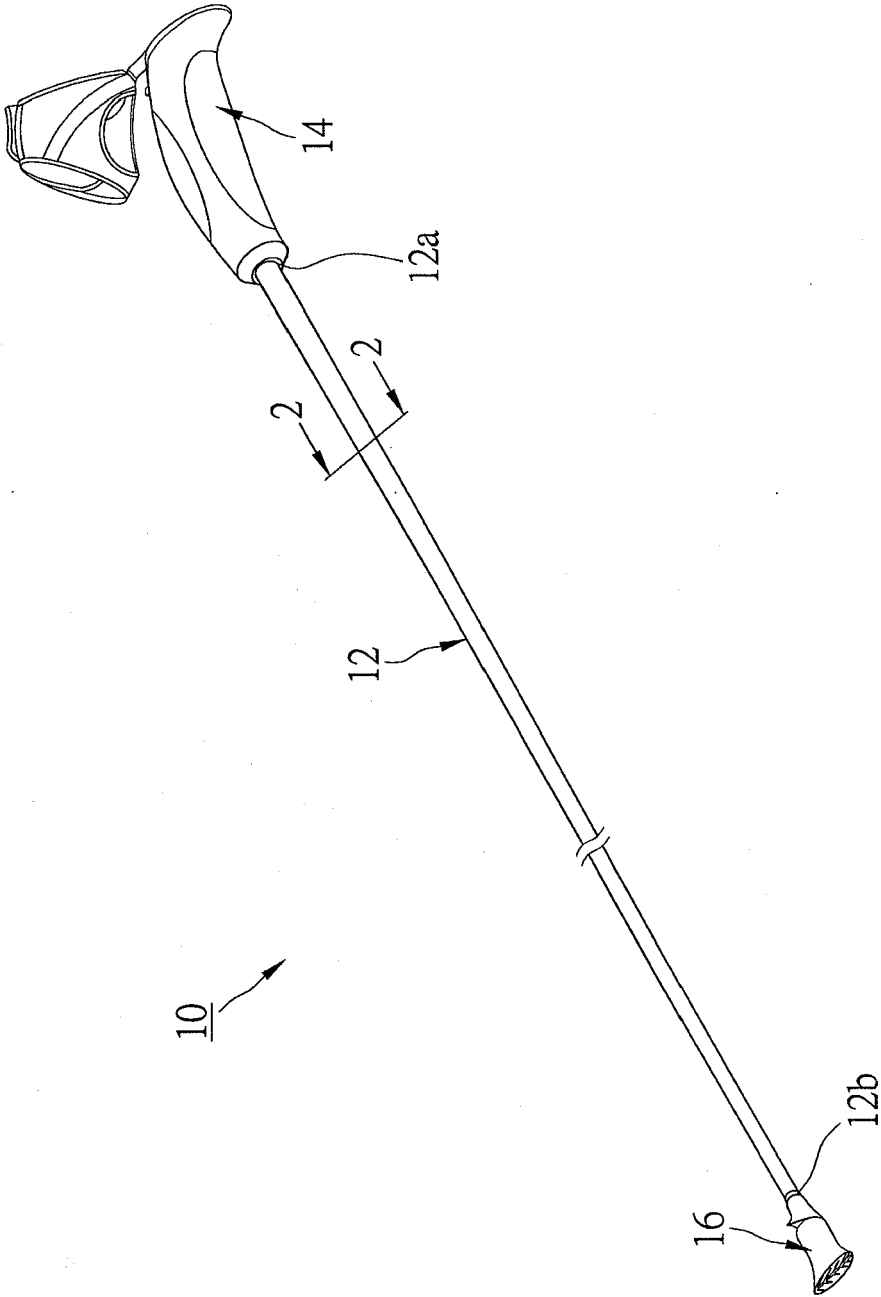


FIG. 1

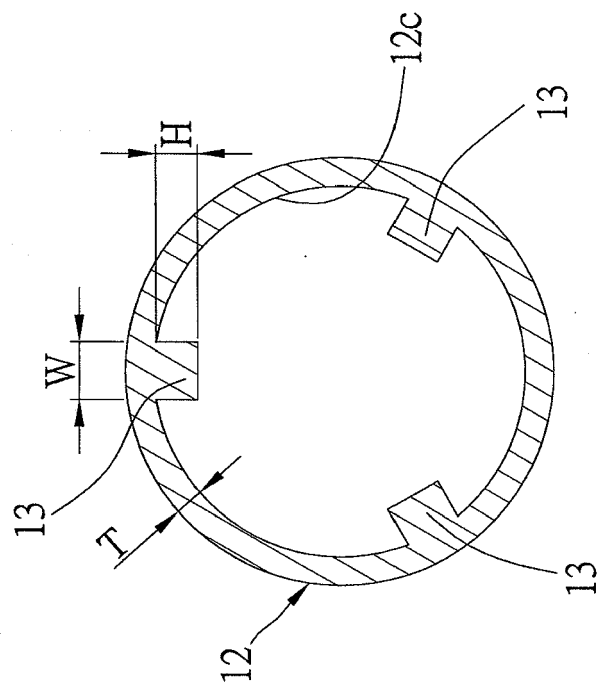


FIG. 2

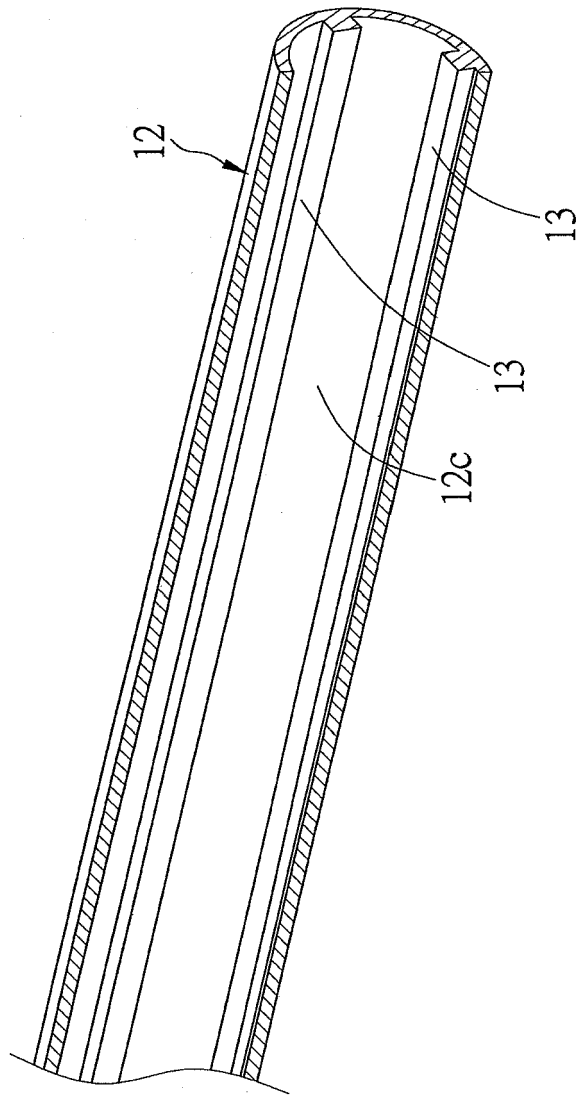


FIG. 3

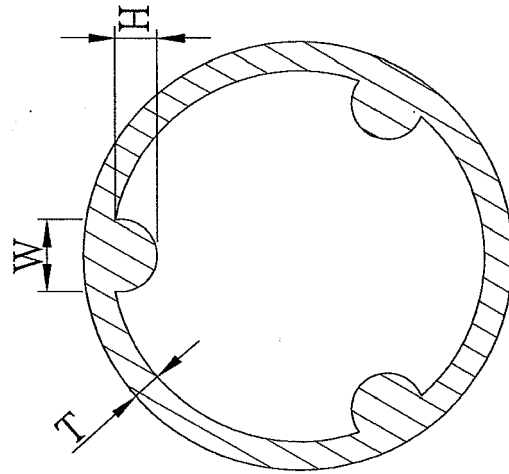


FIG. 4



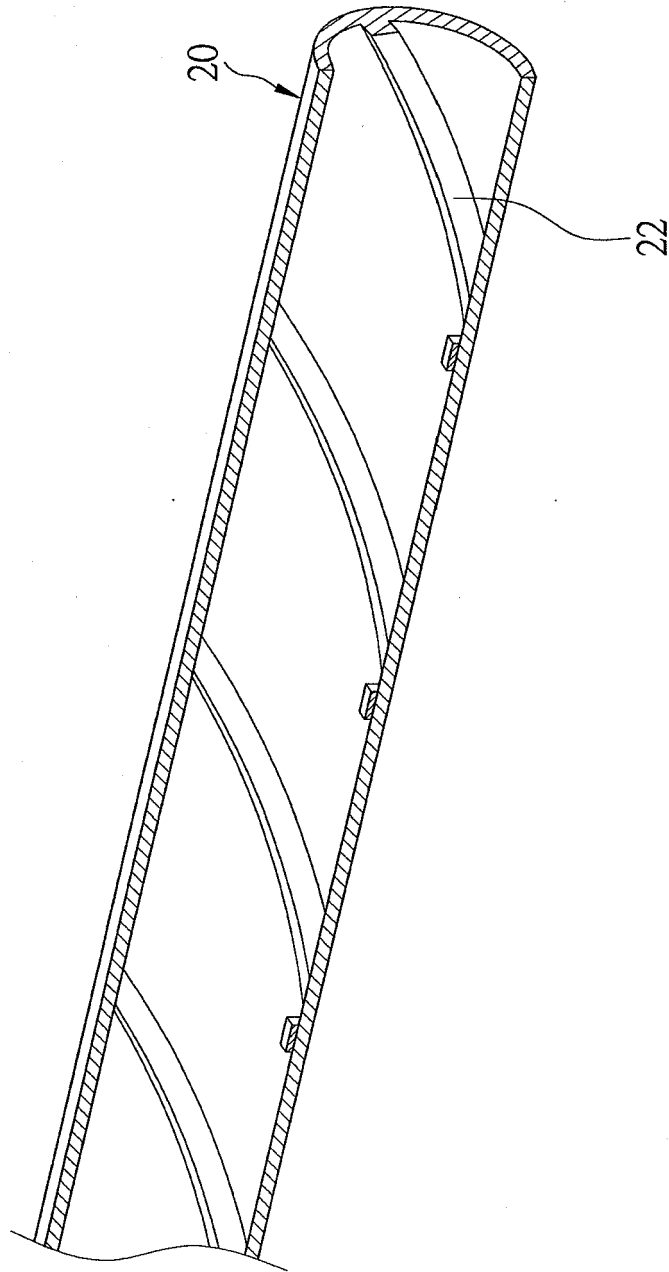


FIG. 5

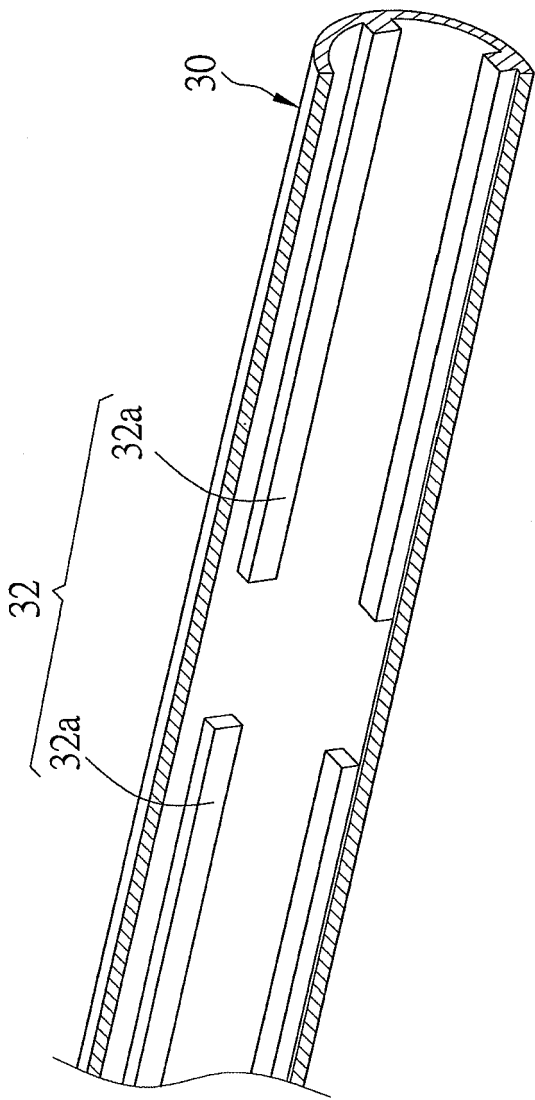


FIG. 6

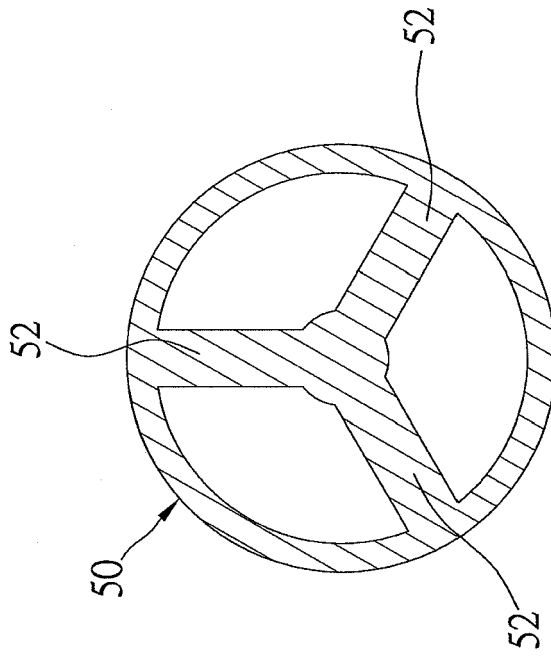


FIG. 8

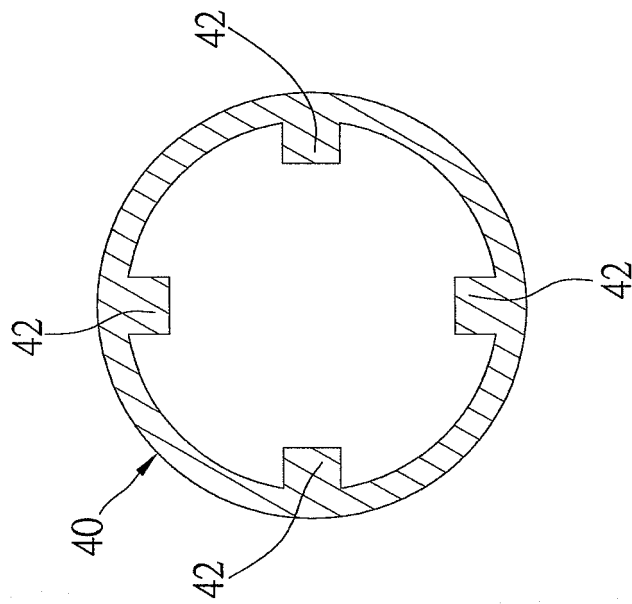


FIG. 7



## EUROPEAN SEARCH REPORT

Application Number  
EP 11 17 7762

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X	US 2011/073244 A1 (KUMAMOTO TOMIO [JP]) 31 March 2011 (2011-03-31) * paragraph [0006] - paragraph [0099]; figures 4-7 *	1-5,7-10	INV. A45B9/00 A45B1/00 A45B3/00 A45B5/00
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 March 2012	Examiner Ehram, Sabine
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 &amp; : member of the same patent family, corresponding document</p>			

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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