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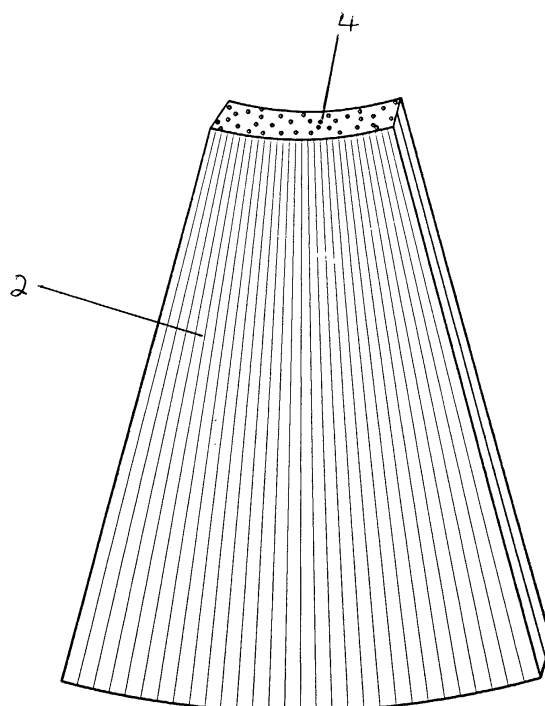
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(54) **Cleaning tool**

(57) There is provided a brush attachment for a mechanical sweeping machine comprising a base plate for linking to a mechanical sweeping machine, and one or more brush segments for removable attachment there-

to. Each of the one or more brush segments consists of a plurality of brush filaments fused or bonded at a first end. In use, the first end of each of the one or more brush segments contacts the base plate.

FIGURE 1



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Description

[0001] The present invention relates to a cleaning tool. In particular, the present invention relates to a rotating sweeping brush for use with a mechanical sweeping machine such as those used for the cleaning of large surfaces.

[0002] Mechanical sweeping machines are used widely by government authorities, environmental agencies and other organisations that have the responsibility for cleaning large public surfaces or transport highways. The rotating sweeping brush used therewith comprises a ring into which flexible sweeping filaments, commonly referred to as bristles, are permanently arranged. This arrangement has the disadvantage that once the flexible sweeping elements have worn down, the entire ring and the remaining sweeping elements must be disposed of as they cannot easily be re-used or separated.

[0003] The arrangement described *supra* has further disadvantages. Once the sweeping elements have worn down to an unusable length they cannot be removed easily to be recycled. Moreover, as the ring used to support the sweeping elements and form the brush must be disposable it is economically necessary to manufacture the ring from an inexpensive material. This often results in a ring that is not durable or fully waterproof and promotes the premature failure of the brush during arduous use. The disposable brush described *supra* also has the disadvantage that it is heavy and bulky and therefore difficult and expensive to transport and store. Brushes made in this fashion cannot easily be stacked more than a few units high as the weight of the brushes above causes distortion of the lower flexible sweeping elements in the brushes below.

[0004] FR-A-2614188 discloses a brush attachment for use on a mechanical sweeper machine that comprises a base plate having slots to insert brush units. Each unit consists of a body having a row of filament *combs*. The combs are slotted into the body before the units are positioned in the base plate. A fixing through the base plate and each unit is required to hold each unit in place.

[0005] It is an object of the present invention to provide a durable re-usable attachment onto which pre-formed brush segments may be inserted. The pre-formed brush units may be manufactured by heat fusing flexible sweeping elements into the shape of a segment of the brush thus forming a brush segment with sufficient strength to be handled easily. It is another object of the invention to provide a simple mechanism of retaining the brush segments in the attachment such that their insertion and removal is facilitated. Thus, sweeping elements that have worn down or broken may be removed and discarded or recycled as appropriate. It is a further object of the invention to provide a brush attachment that can be stacked without distortion or damage to any of the brush filaments or other components.

[0006] Accordingly, in one aspect the invention provides a brush attachment for a mechanical sweeping

machine comprising:- a base plate for linking to a mechanical sweeping machine, and one or more brush segments for removable attachment thereto, each of said one or more brush segments consisting of a plurality of brush filaments fused or bonded at a first end, wherein in use, said first end of each of said one or more brush segments contacts said base plate.

[0007] The term brush segment herein is used to mean a segment of brush of any suitable size or shape. In preferred aspects the brush attachment defines a circular brush and the brush is comprised of from four to twelve, preferably six segments. Other embodiments are also envisaged including that in which the circular brush is a single circular (i.e. 360°) segment.

[0008] Preferably, the base plate has a collar and in use, the first end of each of said one or more brush segments contacts said collar.

[0009] Preferably, the brush filaments are heat fused at one end.

[0010] Typically, the one or more brush segments are fan shaped.

[0011] Preferably, the one or more brush segments are formed from fused filaments of steel wire or polypropylene.

[0012] Suitably, the base plate has a collar, and there is also provided a ring member for attaching to said base plate, wherein one or more brush segments is securable between said collar and said ring member.

[0013] In use, at least part of the brush segment may therefore be sandwiched between the collar and the ring member.

[0014] In one aspect, the ring member has an adjustable diameter and the at least one brush segment is securable between said collar and said ring member by adjusting the diameter of the ring member with respect to the collar.

[0015] Preferably, the diameter of the ring member is adjustable by a clamp ring bolt.

[0016] In another aspect, the ring member has a fixed diameter and the at least one brush segment is securable between said collar and said ring member by forcing the ring member against the collar.

[0017] In one embodiment, the collar is a ring attachable to the base plate.

[0018] The collar may be integral with the base plate.

[0019] Typically, the collar and/or the ring member are attachable to the base plate by securing means.

[0020] The securing means may take the form of one or more securing ribs.

[0021] The invention provides that only the sweeping elements, that is, the brush segments, need to be transported from the manufacturer to the user. The base plate and the ring members may be reused many times and can therefore be manufactured in a manner that will be suitable for more arduous duty and incorporate other features that may allow the attachment to be stacked one on top of another without placing a load on the sweeping filaments of the brush below it.

[0022] In another embodiment, the securing ribs are shaped such that a first attachment may be stacked on top of a second attachment without the brush segments of the first attachment contacting the base plate of the second attachment.

[0023] In another aspect, the invention provides a base plate for use in the attachment as defined *supra*.

[0024] In a further aspect, the invention provides a stack of base plates as defined *supra*.

[0025] In still a further aspect, the invention provides a brush segment for use in the attachment as defined *supra*.

[0026] According to another aspect of the present invention there is provided a mechanical sweeping machine comprising a drive motor; and drivable in sweeping fashion thereby, a brush attachment as described herein.

[0027] Suitably, the brush attachment additionally comprises a securing plate to secure the brush attachment to the drive motor of the mechanical sweeping machine. Preferably, the securing plate and brush attachment are secured through a quick-release securing mechanism.

[0028] In yet another aspect, the invention provides a kit of parts for a brush attachment for a mechanical sweeping machine comprising:- a base plate for linking to a mechanical sweeping machine, and one or more brush segments for removable attachment thereto, each of said one or more brush segments consisting of a plurality of brush filaments fused or bonded at a first end, wherein in use, said first end of said one or more brush segments contacts said base plate.

[0029] The invention will now be described further with reference to the accompanying drawings, in which:-

Figure 1 shows a schematic view of a brush segment in accordance with one aspect of the invention the invention;

Figure 2 shows a plan view of a first brush attachment having a base plate and ring assembly in accordance with one aspect of the invention;

Figure 3 shows a sectional view of the attachment shown in Figure 2;

Figure 4 shows a plan view of a second brush attachment having a base plate and ring assembly in accordance with one aspect of the invention;

Figure 5 shows a sectional view of the attachment shown in Figure 4; and

Figure 6 shows a brush attachment and securing plate assembly.

[0030] Referring now to the figures, Figure 1 illustrates a brush segment 2 formed from shaping a mass

of polypropylene filaments 4 into a fan shape suitable for fixing onto the base plate 6 shown in Figures 2 and 3. Other plastic polymeric or metal materials (e.g. steel wire) may also be used as filament material. Once formed into a fan shape, the filaments 4 are fused or bonded together, for example, chemically and/or heat fused and/or bonded with adhesive, at one end. The fused or bonded end is fitted to the base plate 6 while the free ends form the brush.

[0031] Figures 2 and 3 illustrate the attachment 8 with one brush segment 2 in position. The attachment consists of the base plate 6 which is circular and suitably shaped to allow it to be secured to a mechanical sweeping machine motor (not shown). A collar 10 is secured to the base plate 6 by securing ribs 12. A clamp ring 14 fits onto the attachment 8 via a slotted section (not shown) on the securing ribs 12.

[0032] The preformed brush segment 2 slots into the gap between the collar 10 and the clamp ring 14. The brush segment 2 is secured in place by tightening a clamp ring bolt 16 which increases the diameter of the clamp ring 14 and forces it against the collar 10. Once a brush segment has worn out it can be removed and replaced by adjusting the clamp ring bolt 16.

[0033] The brush segment 2 of Figure 1 may also be used in conjunction with the brush attachment of of Figures 4 and 5.

[0034] Figures 4 and 5 illustrate the brush attachment 108 with one brush segment 102 in position. The attachment consists of the base plate 106 which is circular and suitably shaped to allow it to be secured to a mechanical sweeping machine motor (not shown). The base plate 106 has an integral collar 110 which forms a circumferential skirt thereto. Six equidistantly spaced securing ribs 112 are provided to the base plate 106 and collar 110. The ribs 112 are welded to both the base plate 106 and collar to form a bridge therebetween. Solid clamp ring 114 is insertable within the (six) bridges defined by the (six) securing ribs and securable therewithin by clamp ring bolts 116 provided to each securing rib 12.

[0035] The preformed brush segment 102 slots into the gap between the collar 110 and the clamp ring 114. The brush segment 102 is secured in place by tightening a clamp ring bolt 116 which forces the solid clamp ring 114 (which has a uniform diameter, unlike that clamp ring 4 of Figures 1 and 2) against the collar 110. Once a brush segment has worn out it can be removed and replaced by loosening the clamp ring bolt 116.

[0036] The brush attachment of Figures 2 and 3, and Figures 4 and 5 may be provided with a securing plate 220 for securing to a mechanical sweeping machine. Figure 6 shows a top view of a securing plate 220 when secured to a base plate 206. The securing plate 220 has a central fixing head 222 for fixing to a rotary drive mechanism of a mechanical sweeper (not shown). The securing plate 220 is secured to the base plate 206 via three quick-release securing mechanisms (in other embodiments, four to six mechanisms can be used) comprising

shaped access hole 224 and securing bolt 226. It may be appreciated that the quick-release mechanism is enabled by loosening the securing bolt 226 and rotating the securing plate 206 clockwise relative to the base plate until the bolt 226 may fit through the access hole 224. One of the advantages of the quick-release mechanism is that the securing plate 220 and base plate 206 may be separated without the need to fully disengage the bolt 226.

Claims

1. A brush attachment for a mechanical sweeping machine comprising:- a base plate for linking to a mechanical sweeping machine, and one or more brush segments for removable attachment thereto, each of said one or more brush segments consisting of a plurality of brush filaments fused or bonded at a first end, wherein in use, said first end of each of said one or more brush segments contacts said base plate. 5
2. A brush attachment according to claim 1, wherein said base plate has a collar and in use, the first end of each of said one or more brush segments contacts said collar. 10
3. A brush attachment according to claim 2, wherein the brush filaments are heat fused at one end. 15
4. A brush attachment according to any one of claims 1 to 3, wherein the one or more brush segments are fan shaped. 20
5. A brush attachment according to any one of claims 2 to 4, additionally comprising a ring member for attaching to the base plate, wherein said one or more brush segments are securable between said collar and said ring member. 25
6. A brush attachment according to claim 5, wherein the collar and/or said ring member is attachable to the base plate by securing means. 30
7. A brush attachment according to claim 6, wherein the securing means are shaped such that a first brush attachment can be stacked on top of a second brush attachment without the brush segments of the first brush attachment contacting the base plate of the second brush attachment. 35
8. A brush attachment according to any one of claims 5 to 7, wherein the ring member has an adjustable diameter. 40
9. A brush segment for use with the brush attachment according to any one of claims 1 to 8, said brush 45

segment consisting of a plurality of brush filaments fused or bonded at one end, wherein in use, said first end of each of said one or more brush segments contacts the base plate of the brush attachment.

10. A kit of parts for a brush attachment for a mechanical sweeping machine comprising:- a base plate for linking to a mechanical sweeping machine, and one or more brush segments for removable attachment thereto, each of said one or more brush segments consisting of a plurality of brush filaments fused or bonded at a first end, wherein in use, said first end of said one or more brush segments contacts said base plate. 50

FIGURE 1

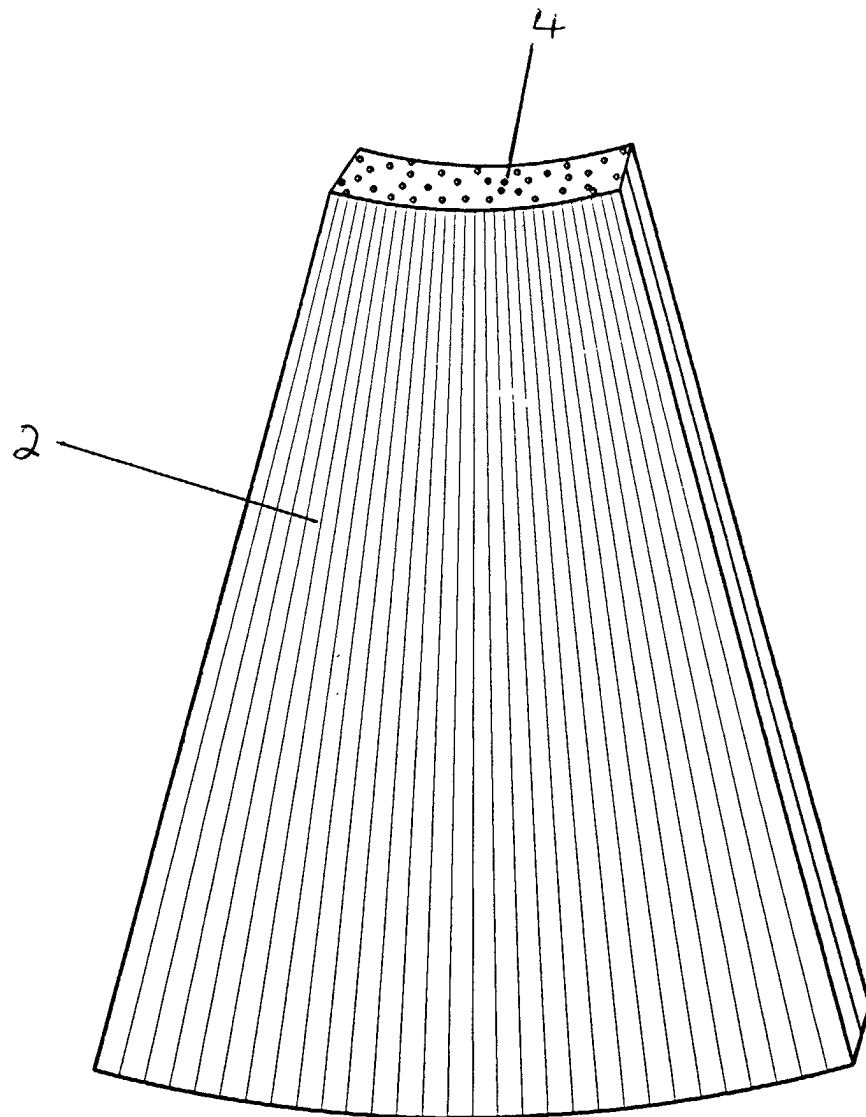


FIGURE 2

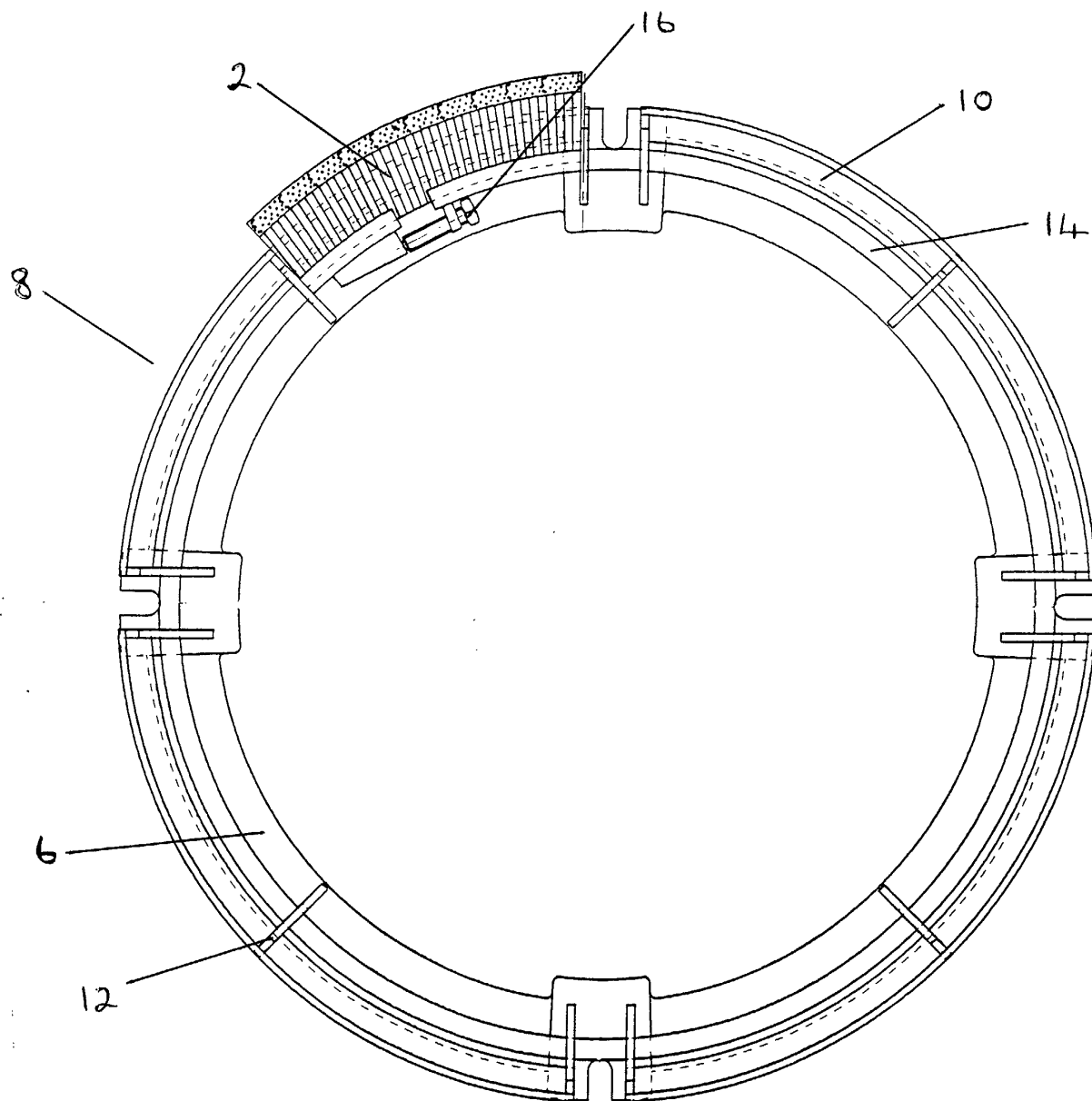


FIGURE 3

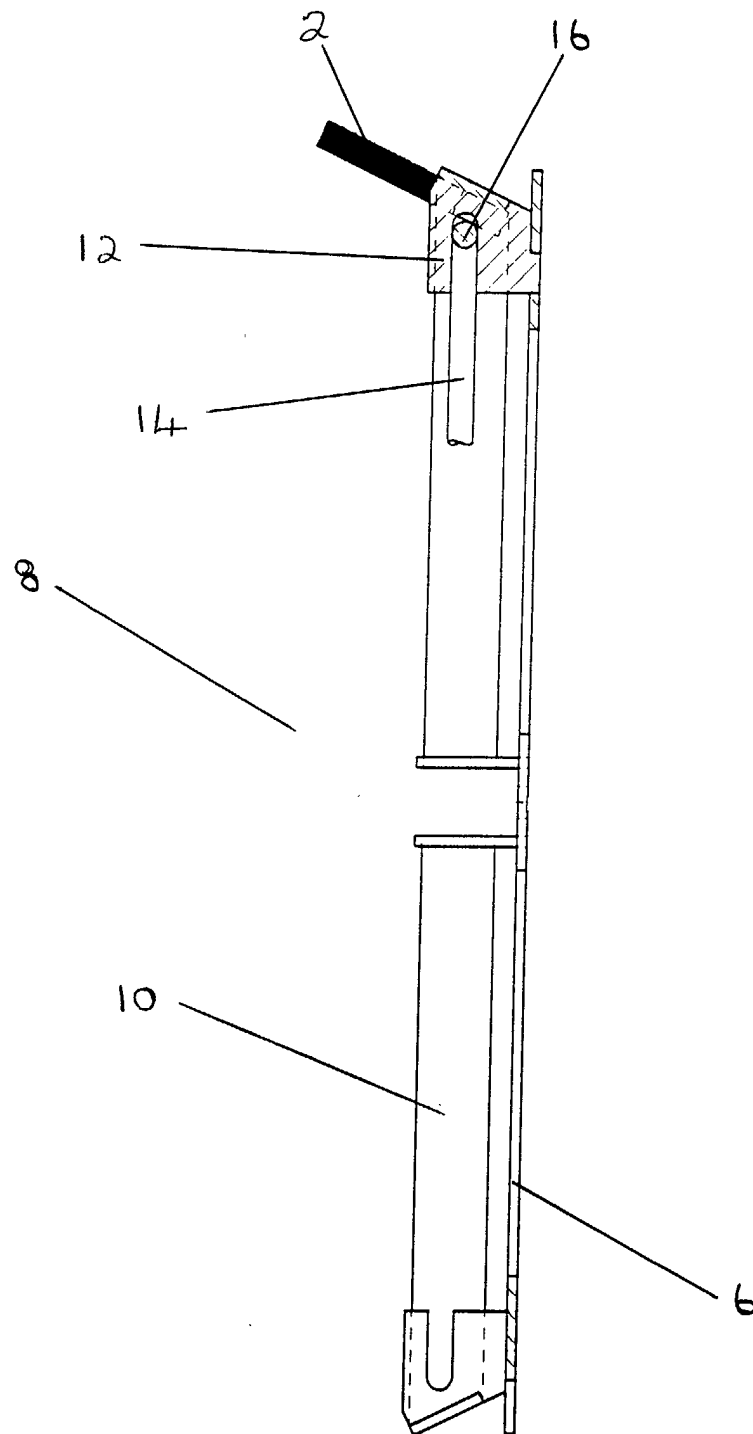


Figure 4

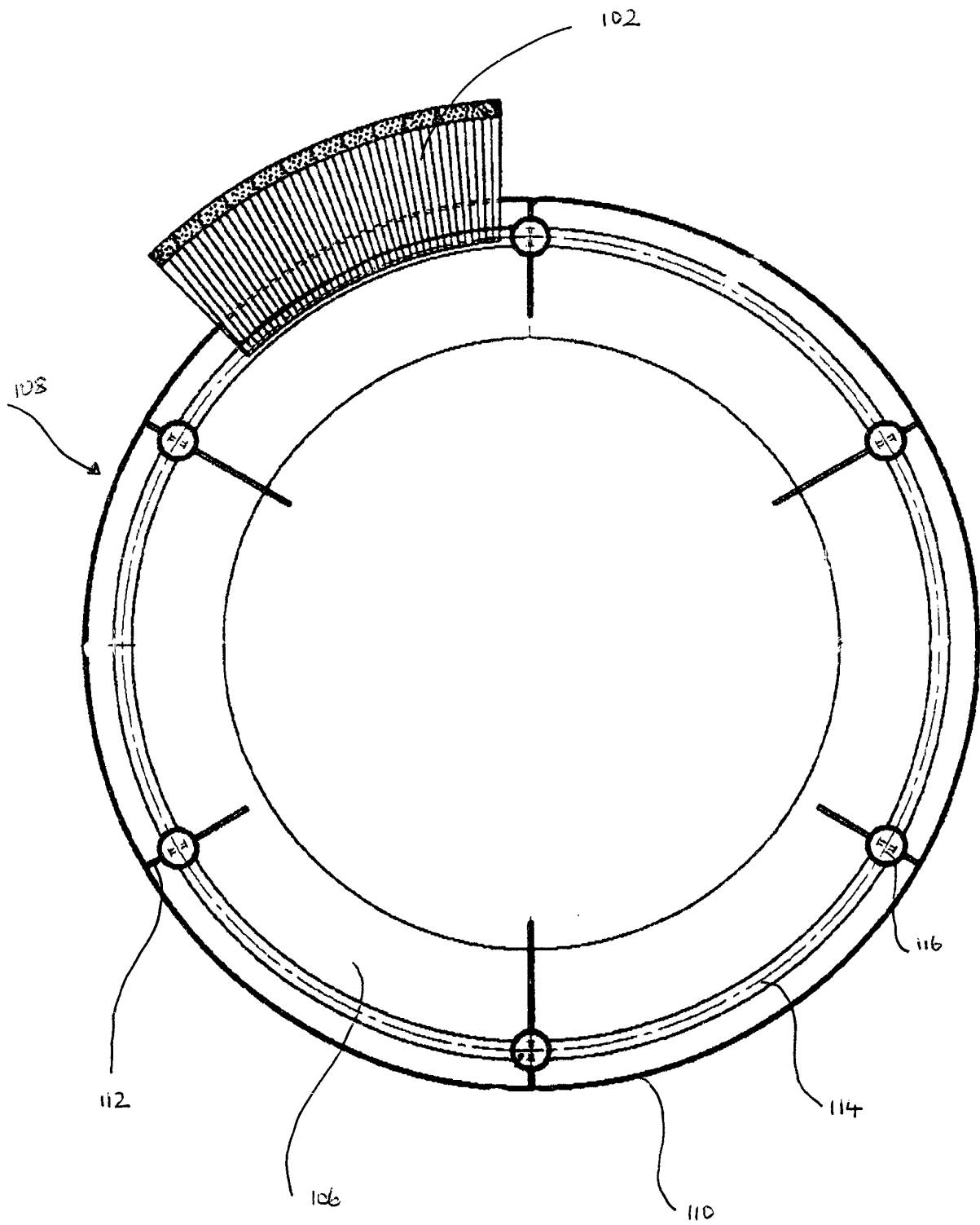


Figure 5

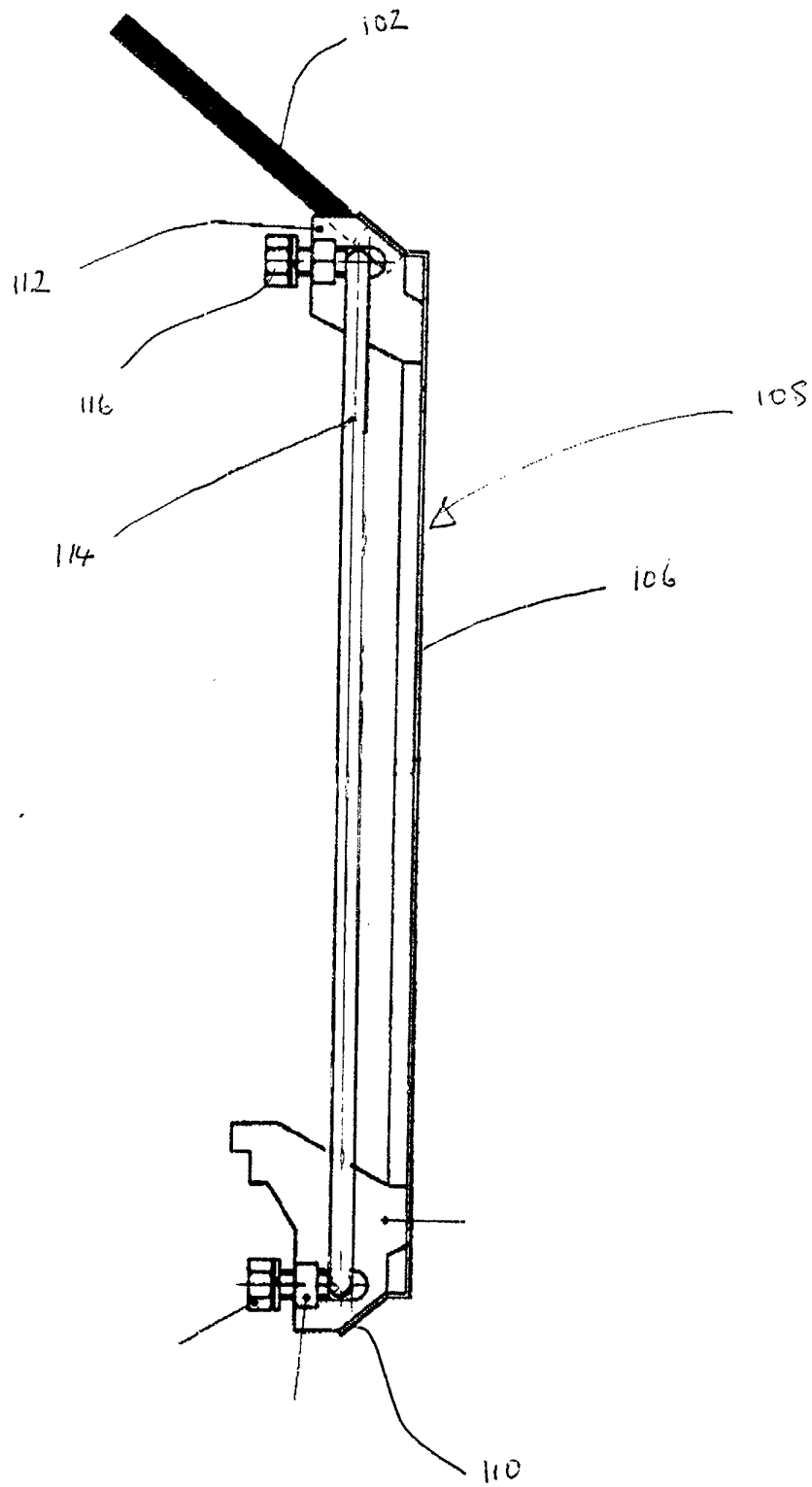


Figure 6

