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(54) **DISH BRUSHES WITH NOISE REDUCING SWEEPING ELEMENTS**

(57) Dish brushes (1, 10) with noise reducing first and/or second sweeping elements (2, 11) with solid plastic coverings (9, 13). For reasons of removing dirt and weeds, there are two embodiments of dish brushes (1, 10) with environmentally much needed noise reducing

characteristics. The invention represents a safe and economic solution for the existing sweeping dish brushed under sweeping machines. So, a more efficient environmentally friendly sweeping of pavements is made possible.

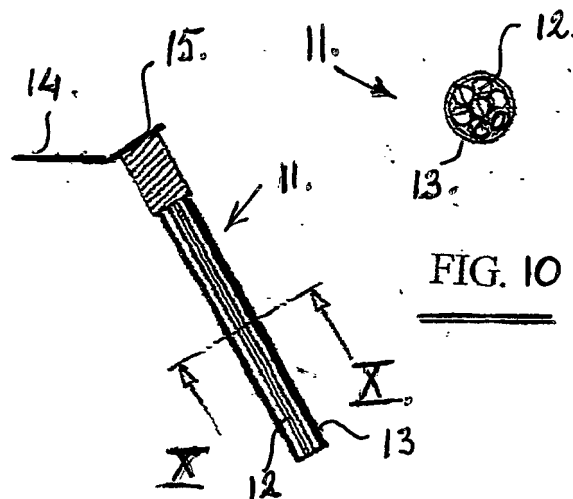


FIG. 10

EP 4 201 253 A1

Description

[0001] The present invention concerns dish brushes with a raised contour brim under angle φ noise reducing first and/or second sweeping elements which dish brush is mounted under a sweeping machine for removing dirt and/or weeds from the surface of all kind of pavements such as cobblestones, concrete paving stones or tiles (i.e. all pavements with joints), wherein said first sweeping elements are built up of bending strength threads or as small strips of all kinds of materials to remove dirt or litter from said pavement and said second sweeping elements are built-up from steel cable plugs, wherein said first and second sweeping elements are mostly covered with a plastic material.

Background of the invention.

[0002] The state-of-the-art shows EP 19075004, filed 01-03-2019; titled: "Dish Brush for Sweeping Machines", published as EP 3560378, dated 30-10-2019, applicant KOTI Onroerend Goed B.V., Celsiusstraat 18, NL-6003 DG WEERT; inventor Michel, Jozef, Rene, Lambert Huybreckx. EPO unitarian patent is asked for. This European Patent Application is based on NL 1042842, filed 25-04-2018, with the same applicant and inventor. There is also an US patent application based on the same Dutch patent application and published as US 10,813,443; dated 27-10-2020. Mentioned patent application concerns a dish brush for mounting at a rotating vertical driving axle under a conventional sweeping machine for brushing, sweeping or cleaning paved surfaces, wherein the dish brush is built-up of a circular plate with a raised contour edge or rim, wherein at this bottom side sweeping elements are fixed at mutual equally tangential distances. First sweeping elements are flat sweeping elements consisting of a layer or bundle of metal strips. Between said bare (uncovered) flat bundle of metal (steel) strips, steel cable plugs are fixed.

[0003] In practice, the use of bundles bare (uncovered) steel strips and steel cable plugs produces a loud noise during the sweeping activities, but at that time a usable plastic covering had not been developed. In environmental situations such a loud and high-pitched noise rate during sweeping activities is not always permitted.

[0004] Nowadays, this is a serious drawback. The welding procedure which is partly robotically and partly normal welding of this dish brush is also a drawback.

[0005] Furthermore, after search a PCT/NL2009/050509 is found, published as WO2010/024670, priority dated 26-08-2008, international filing date 24-08-2009, titled: "Brush Element for Use in a Brush of a Brushing Machine"; inventor and applicant: Clemens, Johannes, Franciscus, Maria Jorissen in Oosterhout, the Netherlands.

[0006] This brush element for use in a brush of a sweeping machine comprises a piece of a steel wire cable, a surrounding layer, which binds said wires and is

made of a plastic material and a tear inhibitor within said layer, which allows substantial tearing of the layer in accordance with the tear of the inside steel wire cable.

[0007] Furthermore, said layer is a plastic material comprising potato starch, biodegradable polyesters etc. Said plastic surrounding layer has some annular thickened portions of the plastic material to prevent tearing and further damaging of said layer.

[0008] In practice, it appears that described layer does not protect the steel wire cable plug during sweeping and so tears off and there is no such thing as a so-called biodegradable layer and all positive effects of this invention have gone.

[0009] Therefore, mentioned solution of this costly protecting layer has serious drawbacks. Moreover, this invention is only a dish brush with steel cable plugs destined for weed removing and not usable for normal sweeping activities.

Object of the invention.

[0010] Therefore, the aim of our invention is to overcome mentioned drawbacks in order to provide a dish brush for sweeping activities and a combi dish brush for sweeping activities in combination with removing weeds from pavements. Our dish brushes also have strong sweeping and noise reduction characteristics. This effect is urgently needed in municipal or urban circumstances.

Summary of the invention.

[0011] The dish brush with noise reducing sweeping elements according to the invention is characterised in that said first sweeping elements are executed as a flat holder, which is folded over 180 degrees into a double squeezed U-form, with two parallel sets in a row with two threads thin highly-graded twisted steel wire covered with a so called plastic material one with a casing thickness t and a working length L and in which said second sweeping elements are executed as usual steel cable plugs also with length L with a so called plastic covering material two with thickness r , wherein said first sweeping elements are fixed under an angle φ at the raised brim and under an angle α of the centre in a first embodiment of said dish brush and under an angle β of the centre in which said first sweeping elements can be replaced by said second sweeping elements to form a so-called combi dish brush, wherein angle β is p times angle α .

[0012] The advantage is to create an uncomplicated dish brush, which can easily be transformed from a normal sweeping brush with first sweeping elements for only removing dirt from paved surfaces into a combi sweeping brush with first and second sweeping elements for removing dirt and weeds in one go from said paved surfaces. All these activities are executed with strongly reduced noise values.

[0013] Furthermore, the dish brush according to the invention is developed in such a way, characterised in

that said plastic material one is a rubber and said plastic material two is a polyethylene, in which said rubber is an SBR-rubber filled with a percentage X of carbon black and in which said percentage X carbon black is between 20% and 40%, preferably 25%.

[0014] The advantages are that during sweeping activities the covering with plastic materials of the first and second sweeping elements are wearing without tearing, which can be seen when executing a test in practice.

[0015] Then the dish brush according to the invention is further developed in such a way, characterised in that said thickness t is between 0,4 mm and 1,2 mm, preferably 0,8 mm, in which said thickness r is between 1 mm and 2 mm, preferably 1,5 mm.

[0016] The advantages are an economical and environmental execution of the first and second sweeping elements.

[0017] Furthermore, the dish brush according to the invention is further developed in a technical way, characterised in that said dish brush is executed only with said first sweeping elements and welded or robotically welded from the top side of the raised contour brim in which said combi dish brush is executed with said first and second sweeping elements and welded or robotically welded from the top side of the raised contour brim, wherein said p is between 2 and 10, in this case preferably 5.

[0018] The advantages are, that a robotically welding of the first and second sweeping elements are possible in a very economic way for a normal dish brush, using only the first sweeping element for removing dirt and using a combi dish brush for removing dirt and weeds from paved surfaces.

Brief description of the drawing.

[0019] A preferred first and second embodiment of the present invention will now be described with reference to the accompanying drawing, in which:

figure 1 shows a view in oblique projection of an embodiment of the dish brush with only first sweeping elements according to the invention;

figure 2 shows a front view of the first sweeping elements, indicated with II in figure 1, according to the invention;

figure 3 shows a side view over the line III-III in figure 2;

figure 4 shows a cross-section over the line IV-IV of figure 3;

figure 5 shows a view in oblique projection of an embodiment of the so-called combi dish brush with first and second sweeping elements according to the invention;

figure 6 shows a top view over the line VI-VI of figure 5;

figure 7 shows a side view of the first sweeping element in a mounted (welded) position to the circular

raised brim of the circular plate for mounting under a usual sweeping machine, over the line VII of figure 6, according to the invention;

figure 8 shows a side view of the second sweeping element also in a mounted (welded) position to the circular raised brim of the circular plate for mounting under a usual sweeping machine, according to the invention;

figure 9 shows a cross-section over the line IX-IX in figure 7; and

figure 10 shows a cross-section over the line X-X in figure 8.

Detailed description.

[0020] Figure 1 represents a view in oblique projection of an embodiment of the dish brush 1 with only first sweeping elements 2 according to the invention. The circular plate 3 of the dish brush 1 has a raised contour brim 4 under an angle φ (see figure 7). The circular plate 3 is mounted under a vertical sucking tube of a sweeping machine (not shown). The first sweeping elements 2 are situated at angles α of the centre of the circular plate 3.

[0021] Figure 2 shows a front view of mentioned first sweeping elements 2. The first sweeping elements 2 are formed as a flat holder 5, which is folded over 180 degrees to a double squeezed U-form. So, there are two parallel sets 6, 7 with six in a row with two threads thin highly-graded twisted steel wire. The covering material one 9 is a rubber with a percentage X of black carbon (see also figures 7 and 9).

[0022] Figure 3 shows a side view over the line III-III of figure 2. Same parts always have the same numbers.

[0023] Figure 4 shows a cross-section over the line IV-IV of figure 3. The sets 6, 7 of the first sweeping elements 2 are a set of two threads 8 with a rubber covering 9. Usually, set 6, 7 has six sweeping elements 2.

[0024] Figure 5 shows a view in oblique projection of an embodiment of the so-called combi dish brush 10 with first and second sweeping elements 2 and 11. The second sweeping elements 11 are steel cable plugs 12 with a polyethylene cover 13 (see also figures 8 and 10). For the welding procedure, the circular plate 13 has also the same raised contour brim 15 with two different openings 16, 17 adapted to the steel head covers of the first and second sweeping elements 2, 11. Now, a robotic welding procedure is possible (not shown).

[0025] Figure 6 shows a top view over the line VI-VI of figure 5. The same parts have the same numbers.

[0026] Figure 7 shows a side view of the first sweeping element 2, which has already been described and has the same numbers.

[0027] Figure 9 shows the sweeping elements 6, 7 more in detail.

[0028] Figure 8 also shows a side view of the second sweeping element 11, which has already been described in more detail. The covers 9 and 13 greatly reduce the noise during sweeping activities.

[0029] Figure 10 shows a cross-section over the line X-X of figure 8. The same elements have the same numbers.

[0030] However, it is obvious that more modifications and/or additions to the afore mentioned dish brushed can be made, but these shall remain within the field and scope of the invention.

Claims

1. Dish brush with a raised contour brim under angle φ with noise reducing first and/or second sweeping elements which dish brush is mounted under a sweeping machine for removing dirt and/or weeds from the surface of all kind of pavements such as cobblestones, concrete paving blocks or tiles (usually all pavements with joints), wherein said first sweeping elements are built-up of bending strength threads or as small strips of all kinds of materials to remove dirt or litter from said pavement and said second sweeping elements are built-up from steel cable plugs, wherein said first and second sweeping elements are mostly covered with a plastic material, **characterised in that** said first sweeping elements (2) are executed as a flat holder (5), which is folded over 180 degrees into a double squeezed U-from, with two parallel sets in a row with two threads thin highly-graded twisted steel wire (8) covered with a so called plastic material one (9) with a casing thickness t and a working length L and in which said second sweeping elements (11) are executed as usual steel cable plugs (12) also with length L with a so called plastic covering material two (13) with thickness r , wherein said first sweeping elements (2) are fixed under an angle φ at the raised brim (4) and under an angle α of the centre in a first embodiment of said dish brush (1) and under an angle β of the centre in which said first sweeping elements (2) can be replaced by said second sweeping elements (11) to form a so called combi dish brush (10), wherein angle β is p times angle α .

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2. Dish brush as in claim 1, **wherein** said plastic material one (9) is a rubber and said plastic material two (13) is a polyethylene.

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3. Dish brush as in claim 2, **wherein** said rubber is an SBR-rubber filled with a percentage X of carbon black.

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4. Dish brush as in claim 3, **wherein** said percentage X carbon black is between 20% and 40%, preferably 25%.

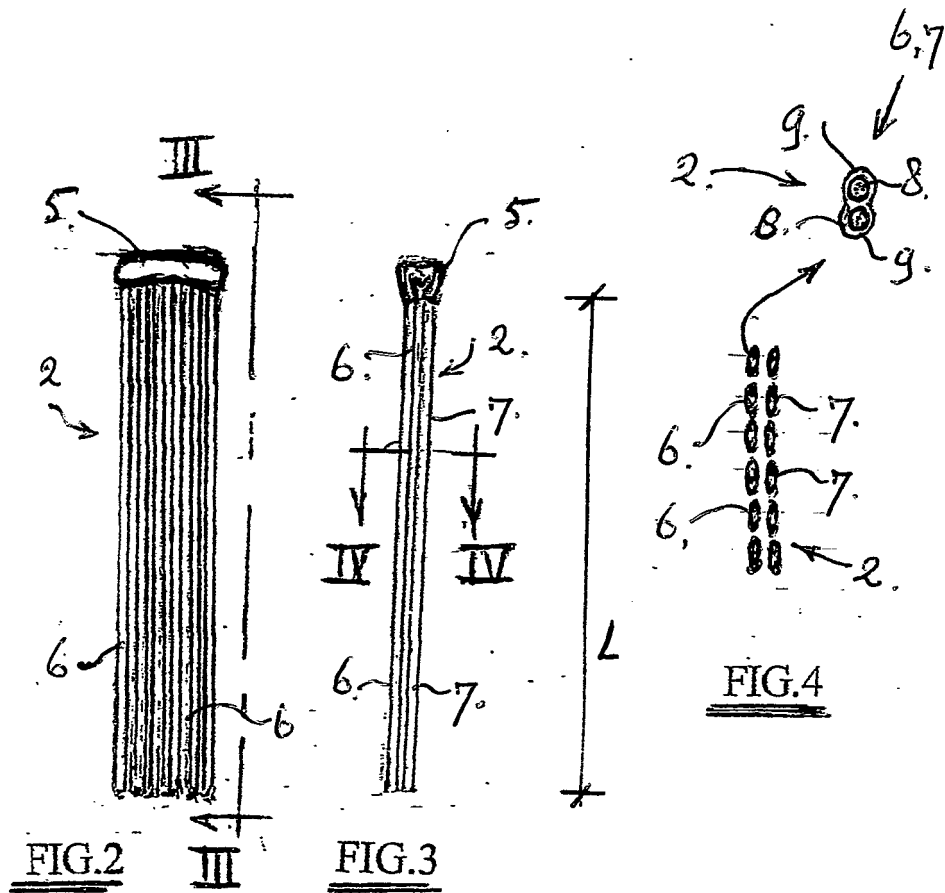
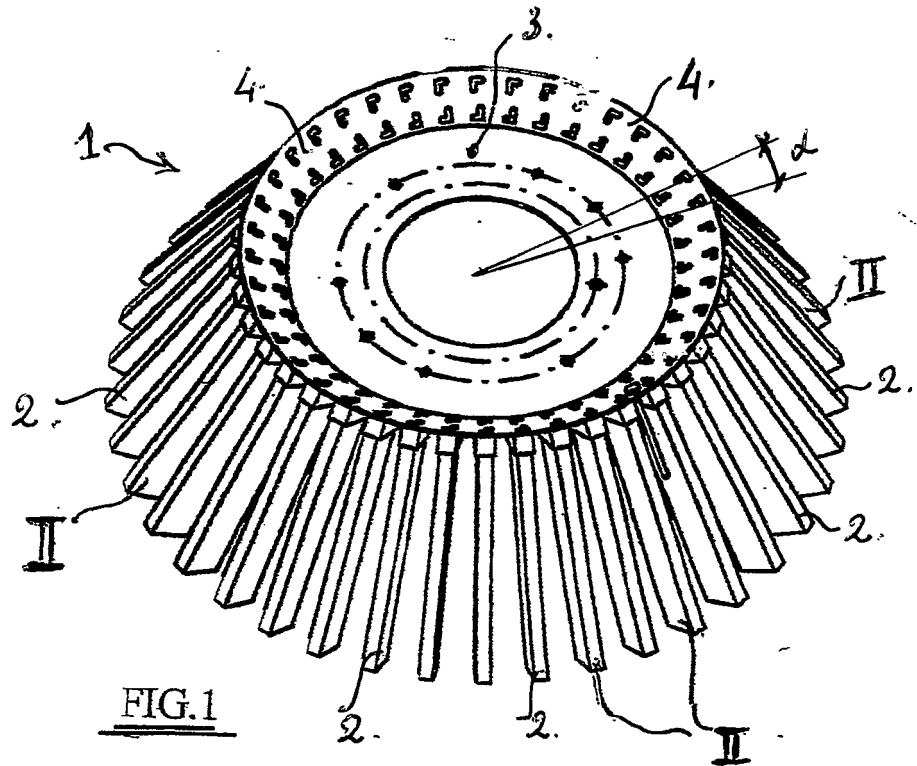
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5. Dish brush as in claim 1, **wherein** said thickness t is between 0,4 mm and 1,2 mm, preferably 0,8 mm.

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6. Dish brush as in claim 1, **wherein** said thickness r is between 1 mm and 2 mm, preferably 1,5 mm.

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7. Dish brush as in claim 1, **wherein** said dish brush (1) is executed only with said first sweeping elements (2) and welded or robotically welded from the top side of the raised contour brim (4, 15).

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8. Dish brush as in claim 1, **wherein** said combi dish brush (10) is executed with said first and second sweeping elements (2, 11) and welded or robotically welded from the top side of the raised contour brim (15), wherein said p is between 2 and 10, preferably 5 in this case.

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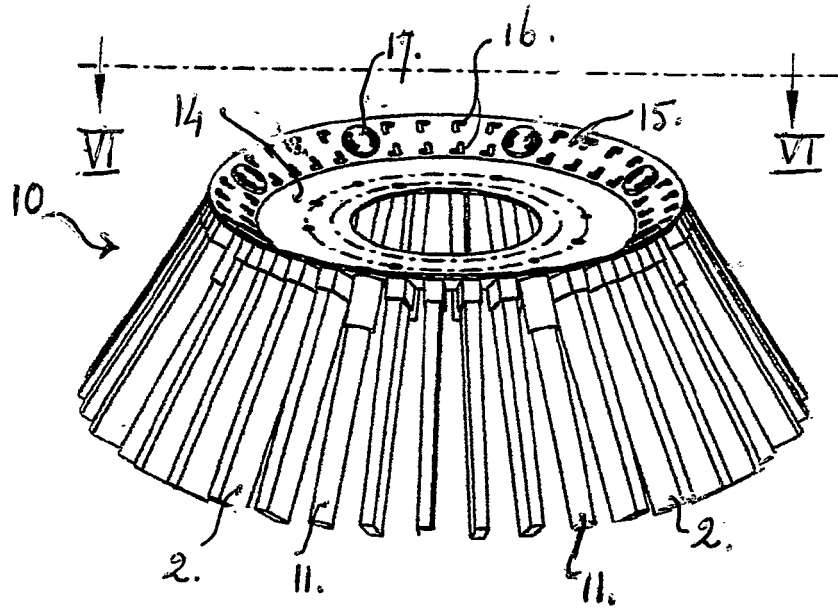


FIG. 5

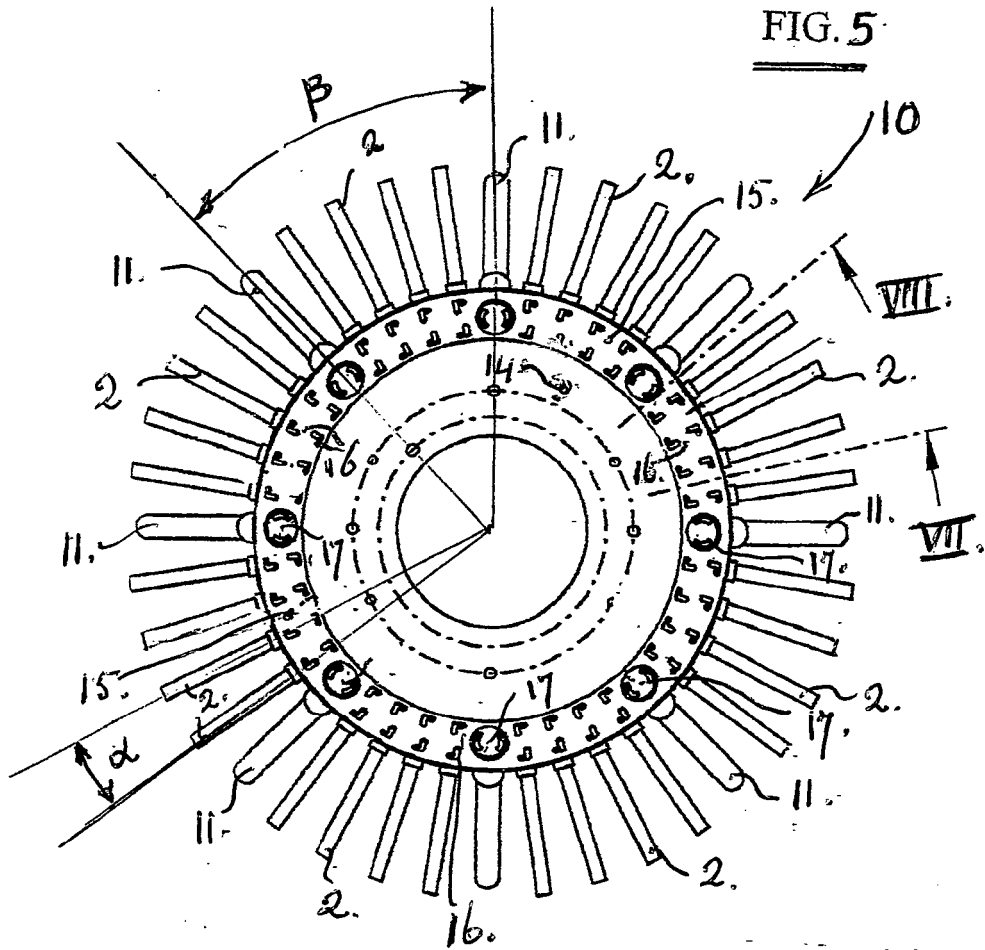
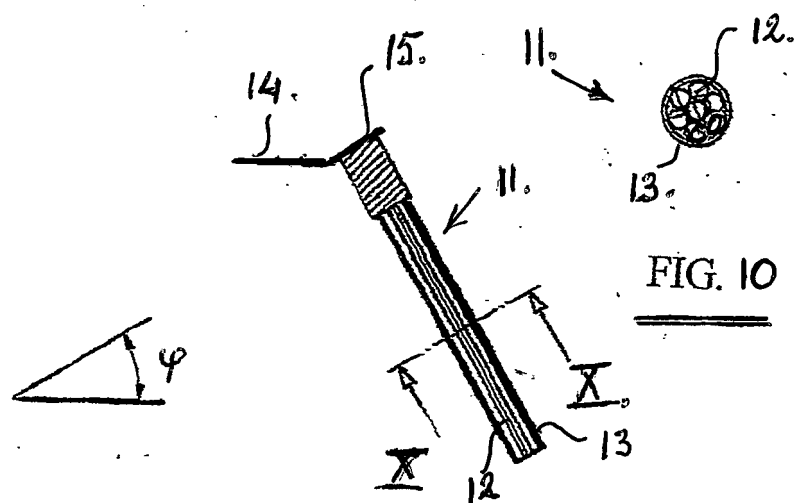
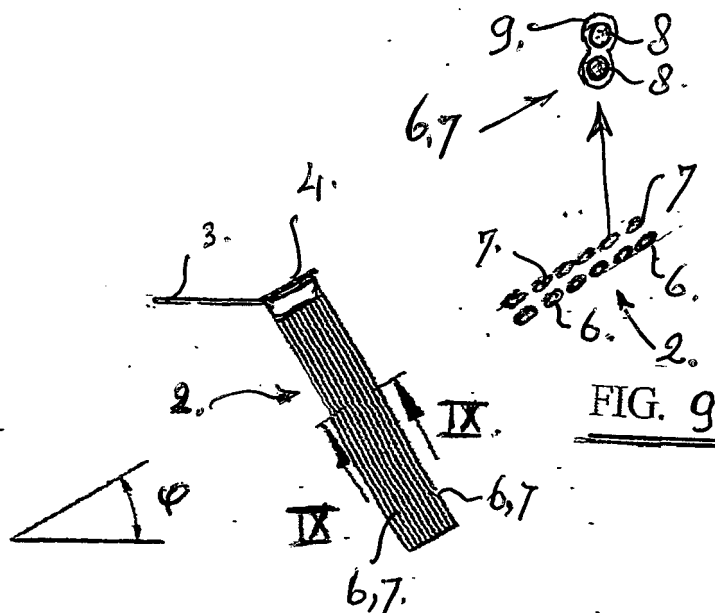


FIG. 6





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Application Number

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CATEGORY OF CITED DOCUMENTS 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		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 & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
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