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Amended claims in accordance with Rule 86 (2) EPC.

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(54) **Rotating disc-shaped brush for sweeping machines**

(57) The invention relates to an improved gutter brush for sweeping machines, in which the gutter brush is constructed of a circle shaped base plate (11) with diameter D with along the circumference, at equal mutual distances, specially constructed easy to change gutter brush strips (19), in which these can be put into and re-

moved from recesses with slots in a radial manner from the outside, in which the gutter brush strips (19) are provided with welded strips at an angle α of 30 degrees with uneven leg width for radial locking, in which the top plate (23) and the base plate (11) can be provided with a sound insulating coating or layer.

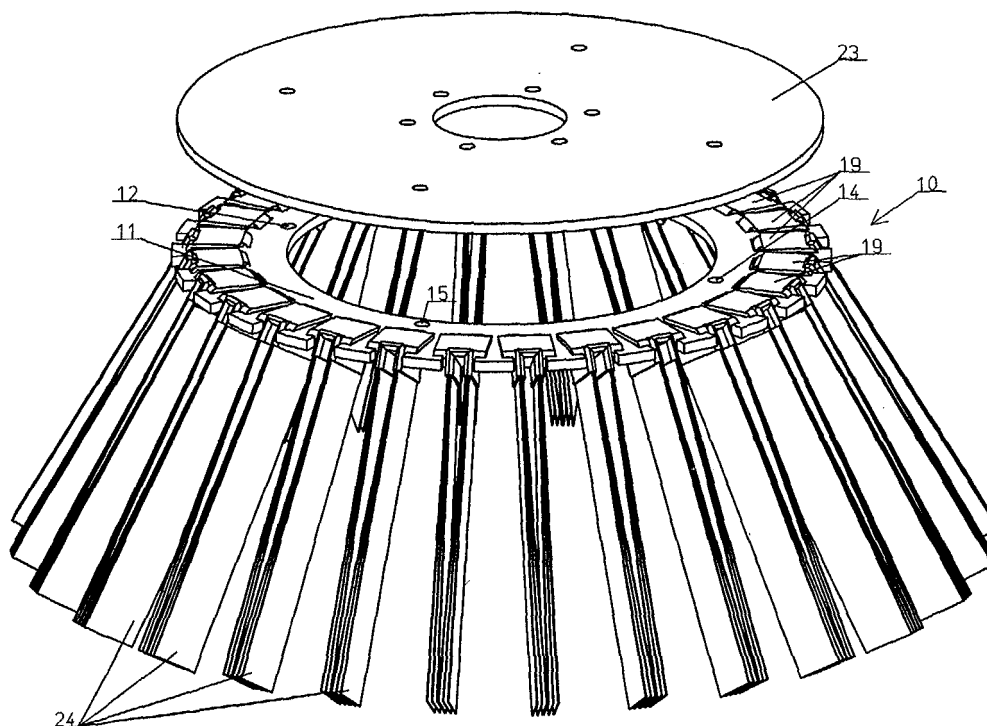


FIG. 3

Description

[0001] The present invention relates to a device constructed as a rotating brush disk for sweeping machines, in which along the circumference of the base plate with diameter D a multiple of gutter brush strips are fixed, which gutter brush strips stand with their longitudinal axis perpendicular to the rotating sweeping direction of the brush disc, in which the fibres, strips or wires of the brush strips are applied in special steel clamped U-shaped holders with suitable width and length.

[0002] A somewhat similar gutter brush is known from the delivery range of KOTI Industrieel en Technisch Borstelwerk B.V., Celsiusstraat 18, 6003 DG WEERT, the Netherlands.

[0003] Here, it concerns a gutter brush developed after years of experience, which is constructed as a disposable brush, meaning that the circle shaped base plate with the gutter brush strips welded onto that, after being mainly worn out, must be processed by the municipal waste, and a whole new basic disc with the gutter brush strips welded along the circumference must be mounted onto the sweeping machine.

[0004] Here, it concerns gutter brushes with quite a large diameter, mostly about 800 mm and more. The transport of the gutter brush to be delivered is quite expensive due to the volume needed. Besides, it requires a lot of the sweeping machine users' stock space due to the enormous space volume needed for gutter brushes. Due to the robust construction, the gutter brushes are suitable for heavy duty. The steel construction of the gutter brushes, such as the base plate and the brush strips with sweeping strips, have led to the possibility of welding everything together as a whole. It is a pity that after the brush strips are worn, also the connected base plate must be thrown away. To immediately solve this problem, one have welded holders onto the base plate along the circumference of the mentioned base plate transverse on the rotating sweeping direction, which base plate was provided with a raised edge at an angle of approximately 30 degrees with the surface of the remaining base plate. In the mentioned holders one can radially hammer in the brush elements from the outside to get sufficient cohesion between holder and brush element. The brush strips were therefore also called hammer strips. Further, it must be mentioned that after wear of the brush strips, these were difficult to remove from the holders, so that in practice delivering separate steel brush strips is far from ideal, because the worn brush strips could hardly be removed from the holders.

[0005] In practice, it appears that the separate delivery of brush strips compactly packed in boxes is by far the most preferable and due to the compact packing of the brush strips in boxes, also regarding transport and storage, big advantages are reached because sweeping machines use large amounts of brush strips.

[0006] It is the aim of the present invention to provide such an improved gutter brush, in which, in a simple way,

the brush strips can be replaced by hand along the circumference of and preferably a flat circle shaped base plate.

[0007] For this, in an inventive way, a circle shaped base plate is developed with facilities along the circumference for receiving the surprisingly further developed brush strips, characterized in that the mentioned circle shaped base plate with diameter D is a flat plate with along the circumference at equal mutual distances open rectangular recesses directed radially outward with width B with centrifugal locking facilities, in which on mentioned steel clamped U-shaped holders of the brush strips, a strip provided with bent legs is welded at an angle α for immediate manual placement of the gutter brush strips in the rectangular recesses of the circle shaped base plate and further the brush strips are locked by means of a circle shaped counter plate.

[0008] The advantage is, that the base plate can be reused again and that the brush strips can be slid in radially from the outside and when arriving in place be pulled down and remain fixed in this position (so no tilting and such). Removing the worn brush strips is done in the reverse order. The further locking, which is perpendicular to the base plate of the brush disc, can now be done with an also flat circle shaped top or counter plate. Further advantages are, that the stacked brush strips in boxes take little space during transport to and during storage at the user.

[0009] Further, the device according to the invention is further developed in such a way, that the mentioned strip provided with bent legs has a receding width B and B plus approximately 13 mm, so preferably 25 and 38 mm, through which one bent leg is then 25 mm wide and the other bent leg and the body are 38 mm wide and the mentioned bent leg can be put into the transverse slots, in which the angle α is approximately 30 degrees, in which the sweeping angle β is approximately 60 degrees, and that the mentioned centrifugal locking facilities consist of mentioned transverse slots in the side walls of the open rectangular recesses of the circle shaped plate, in which the depth of the mentioned transverse slots is approximately 7,5 mm.

[0010] The advantages are, that the strip rests on the side edges of the rectangular recess and is also secured against tilting and centrifugally sliding by the receding width of the one leg of the strip in the mentioned transverse slots of the recess.

[0011] Furthermore, the device according to the invention is further developed in such a way, that the mentioned circle shaped base plate and counter plate are made of steel and in which one or several parts of the base plate and counter plate can be provided with sound insulating material, such as, for example, a rubber layer.

[0012] The advantage of sound insulating material is, that the noise nuisance during sweeping as a result of metal on metal contact is being avoided, which is of importance when working in built-up areas with regard to the environmental laws.

[0013] The preferred construction of the invention will be described by way of example, and with reference to the accompanying drawing.

[0014] In which:

- Fig. 1 shows a view in oblique projection of a sweeping machine provided with a gutter brush, according to the invention;
- Fig. 2 shows a view in oblique projection of an existing steel KOTI gutter brush constructed as disposable brush;
- Fig. 3 shows a view in oblique projection of the new gutter brush according to a preferred embodiment of the invention;
- Fig. 4 shows a top view of the circle shaped base plate with diameter D constructed according to a preferred embodiment of the invention;
- Fig. 5 shows an enlarged top view of a quarter of the circle shaped base plate with indication of several preferred dimensions;
- Fig. 6 shows a side view VI of the brush strip according to a preferred embodiment of the invention; and
- Fig. 7 shows a cross-section over the line VII of figure 5.

[0015] Figure 1 shows a sweeping machine 1 in oblique projection with an improved gutter brush 2 according to the invention, in which one or more gutter brushes 2 can be applied together with, for example, a brush roller 3 underneath the sweeping machine 1.

[0016] Figure 2 shows a view in oblique projection of an existing gutter brush 4, which is constructed as a disposable brush. It concerns a pre-shaped steel brush plate 5 in which a raised edge 6 is formed (see figure 7) at an angle α of approximately 30 degrees. Along mentioned raised edge 6, brush strips 7 are welded at equal distances at the bottom side, in which the holders 9 with sweeping wires 8, called brush elements are placed. The sweeping wires 8 of the brush strips 7 can be composed of different materials, such as hardened steel wire, corrugated steel wire or plastic. Due to the choice of sweeping wires 8 and the precise embodiment of the brush strips 7 the gutter brush 4 is made suitable for the execution of normal work, heavy work and work with regard to sweeping, for example, gutters. A disadvantage of these known embodiments is, that a good passing between the holders 9 and the brush strips 7 is difficult to realise. The assembly of the brush elements must be done quite quickly with a hammer, therefore the mentioned brush elements were called hammer strips and later, when worn, could not or hardly be removed. So, usually the whole gutter brush 4 had to be changed or it cost a lot of labour time to replace the brush element one by one.

[0017] Figure 3 shows a view in oblique projection of the new gutter brush 10 according to the invention. Here, it concerns a flat ring or brush plate 11 with the suspen-

sion bores 12, 13, 14, 15 and the catch opening 16, and 17. Along the circumference of the flat ring 11, rectangular open recesses 18 (see also figure 4, 5) are applied at equal distances, in which the gutter brush strips 19 are 5
slided in radially from the outside towards the inside and after that are pushed downward to be fixed in this position against tilting and this also forms an excellent radial locking for the gutter brush strips. To realize the aforementioned, transverse slots 20 are applied in the side walls 10
of the rectangular open recesses 18, in which the broad bent legs of the strip 21 fall, in which the body part is welded at an angle α of approximately 30 degrees onto the clamped holders 22 of the gutter brush strips 19. The mentioned strip 21 has a receding width of approximately 15
25 mm to approximately 38 mm and thus slides the leg 24 in the transverse slots 20 of the open rectangular recesses 18, so that a fixed position of the gutter brush strips 19 in the flat ring 11 is achieved, which also works against the generated centrifugal forces during rotation 20
of the flat steel ring 11 in the sweeping machine.

[0018] Figure 6 shows a side view IV of figure 7 and figure 7 shows the cross-section over the line VII. The gutter brush strips 19 consist of the clamped holder 22 (approximately U-shaped) with the above described 25
sweeping wires 24. The indicated measurements are in mm. The hooked in gutter brush strip 19, after placement in the flat steel ring 11, is locked by a so called circle shaped counter plate 23, through which for the rotating sweeping work an excellent locking is achieved.

[0019] In order to limit the noise nuisance during sweeping work of the rattling gutter brush strips 19 in the flat steel ring 11, the flat steel ring 11 and the central plate 23 can partly or wholly be provided with a layer of 30
sound insulating material, such as rubber.

[0020] Finally it has to be emphasized, that the above description constitutes a preferred embodiment of the present invention and that further variations and modifications are still possible without departing the scope of 35
this patent description.

Claims

1. Device constructed as a rotating brush disk (10) for sweeping machines (1), in which along the circumference of the base plate (11) with diameter D a multiple of gutter brush strips (19) are fixed, which gutter brush strips (19) stand with their longitudinal axis perpendicular to the rotating sweeping direction of the brush disc (10), in which the fibres, strips or wires of the brush strips (19) are applied in special steel clamped U-shaped holders with suitable width and length, **characterized in that**, the mentioned circle shaped base plate (11) with diameter D is a flat plate with along the circumference at equal mutual distances open rectangular recesses (18) directed radially outward with width B with centrifugal locking facilities, in which on mentioned steel clamped 50
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U-shaped holders (22) of the brush strips (19) a strip (21) provided with bent legs is welded at an angle α for immediate manual placement of the gutter brush strips (19) in the rectangular recesses (18) of the circle shaped base plate (11) and further the brush strips (19) are locked by a circle shaped counter plate (23).

2. Device as claimed in claim 1, **characterized in that**, the mentioned width B of the radially outward directed open rectangular recesses of the circle shaped base plate (11) and the width B of the brush strips (19) is between 10 mm and 50 mm, preferably approximately 25 mm and have a length between 30 mm and 90 mm, preferably approximately 60 mm.
3. Device as claimed in claim 1 and 2, **characterized in that**, the mentioned strip (21) provided with bent legs has a receding width B and B plus approximately 13 mm, so preferably 25 and 38 mm, through which one bent leg (25) is then 25 mm wide and the other bent leg (26) and the body are 38 mm wide and the mentioned bent leg (26) can be put into the transverse slots, in which the angle α is approximately 30 degrees, in which the sweeping angle β is approximately 60 degrees.
4. Device as claimed in claims 1 - 3, **characterized in that**, the mentioned centrifugal locking facilities consist of mentioned transverse slots (20) in the side walls of the open rectangular recesses (18) of the circle shaped plate (11), in which the depth of the mentioned transverse slots (20) is approximately 7,5 mm.
5. Device as claimed in aforementioned claims, **characterized in that**, the diameter D of the circle shaped base plate (11) is between 200 mm and 2800 mm, preferably approximately 1000 mm, in which the thickness of the base plate (11) depends on the used material.
6. Device as claimed in claims 1 - 4, **characterized in that**, the mentioned fibres, strips or wires (24) have a suitable projecting length of approximately 500 mm and are made of steel wire, such as corrugated plate steel wire, hardened steel wire, drawn steel wire, spring steel wire and such.
7. Device as claimed in claim 5, **characterized in that**, the thickness of the circle shaped base plate (11) is between 4 mm and 16 mm, preferably approximately 8 mm and the material is preferably steel.
8. Device as claimed in aforementioned claims, **characterized in that**, the mentioned circle shaped base plate (11) and counter plate (23) are made of steel and can be provided with sound insulating material,

such as, for example, a rubber layer.

9. Device as claimed in claims 1 - 7, **characterized in that**, the mentioned circle shaped base plate (11) is made of wood, plastic or metal.

Amended claims in accordance with Rule 86(2) EPC.

1. Device constructed as a rotating brush disk (10) for sweeping machines (1), in which along the circumference of the base plate (11) with diameter D a multiple of gutter brush strips (19) are fixed, which gutter brush strips (19) stand with their longitudinal axis perpendicular to the rotating sweeping direction of the brush disc (10), in which the fibres, strips or wires of the brush strips. (19) are applied in special steel clamped U-shaped holders (22) with suitable width and length, **characterized in that**, the mentioned circle shaped base plate (11) with diameter D is a flat plate with along the circumference at equal mutual distances open rectangular recesses (18) directed radially outward with width B with centrifugal locking facilities (20), in which on mentioned steel clamped U-shaped holders (22) of the brush strips (19) a strip (21) provided with bent legs (25, 26) is welded at an angle α for immediate manual placement of the gutter brush strips (19) in the rectangular recesses (18) of the circle shaped base plate (11) and the brush strips (19) are further locked by a circle shaped counter plate (23).
2. Device as claimed in claim 1, **characterized in that**, the mentioned width B of the radially outward directed open rectangular recesses of the circle shaped base plate (11) and the width B of the brush strips (19) is between 10 mm and 50 mm, preferably approximately 25 mm and have a length between 30 mm and 90 mm, preferably approximately 60 mm.
3. Device as claimed in claim 1 and 2, **characterized in that**, the mentioned strip (21) provided with bent legs (25, 26) has a receding width B plus approximately 13 mm, in total 38 mm, to a width B of preferably 25 mm, through which one bent leg (26) and the body, of strip (21) are 38 mm wide and can be put in the locking facilities (20) executed as transverse slots and that the other bent leg (25) can be put in the open rectangular recess (18), wherein the mentioned angle α is approximately 30 degrees and so the sweeping angle β is approximately 60 degrees.

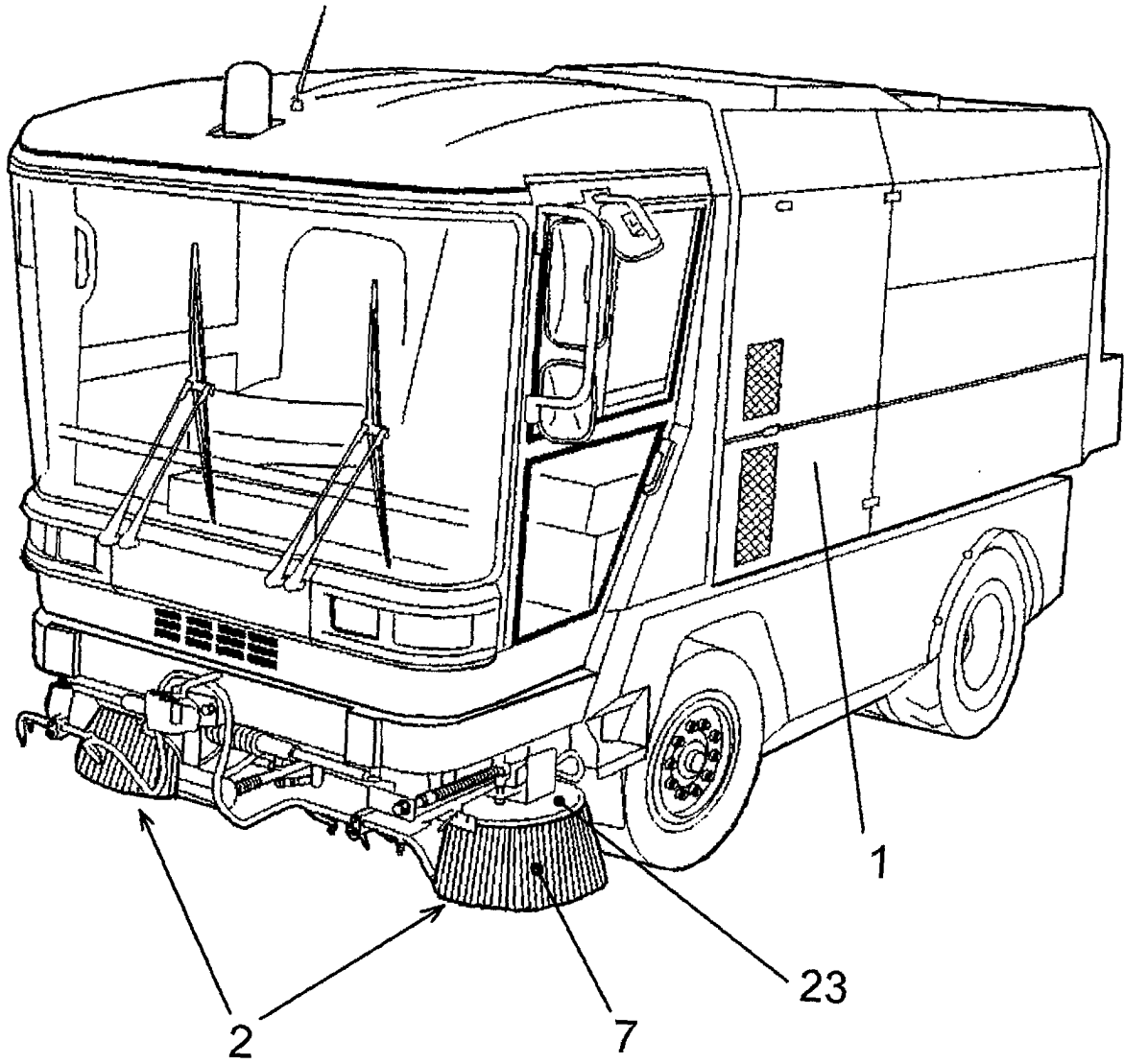


FIG. 1.

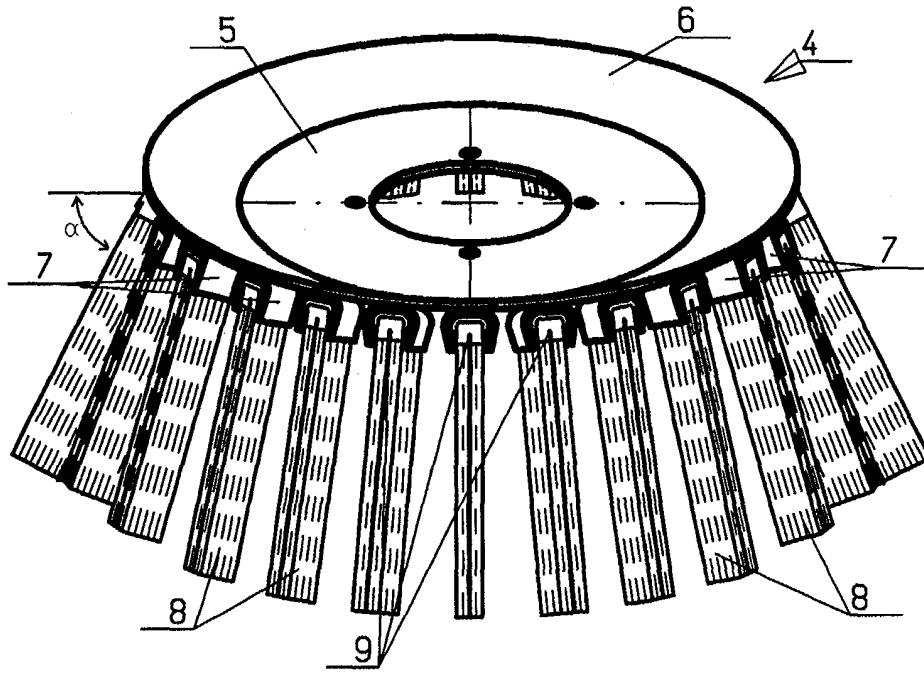


FIG. 2

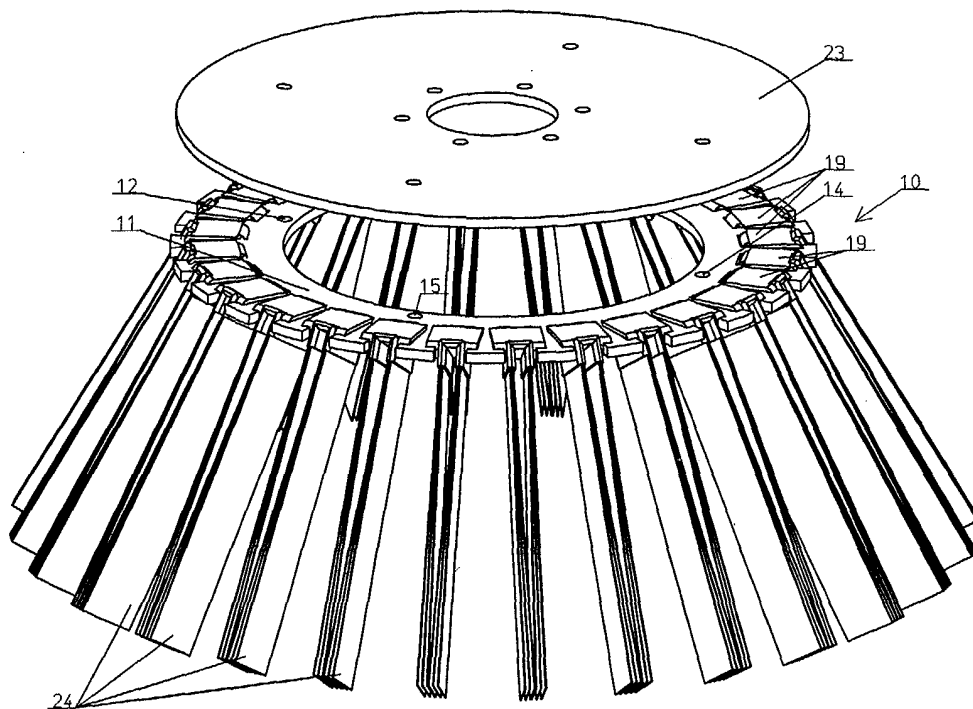


FIG. 3

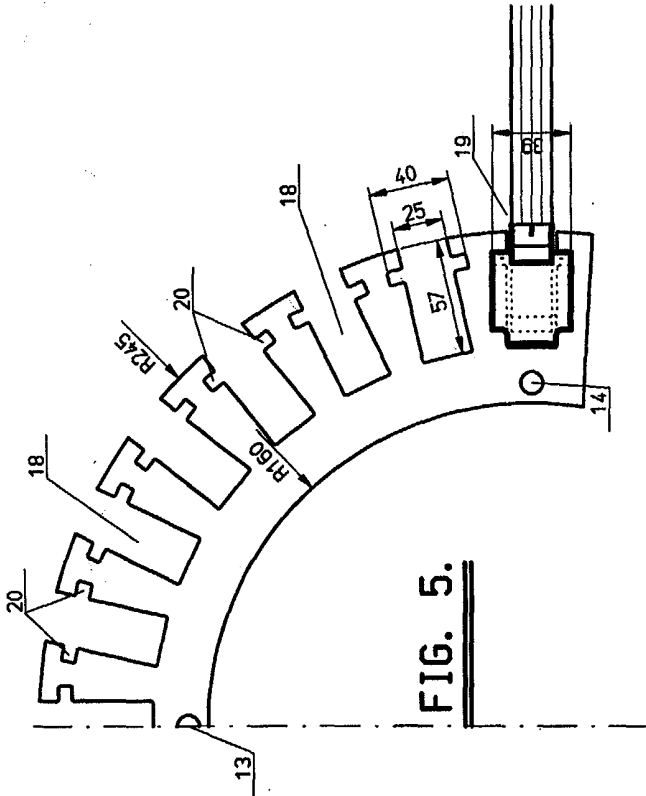


FIG. 5.

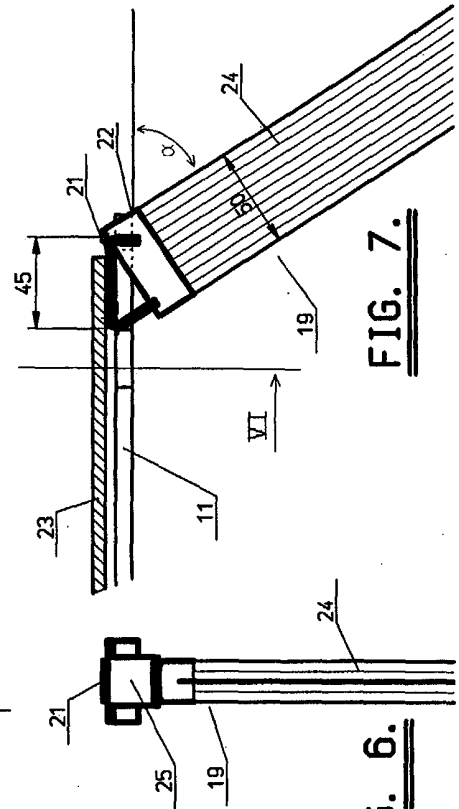


FIG. 6.

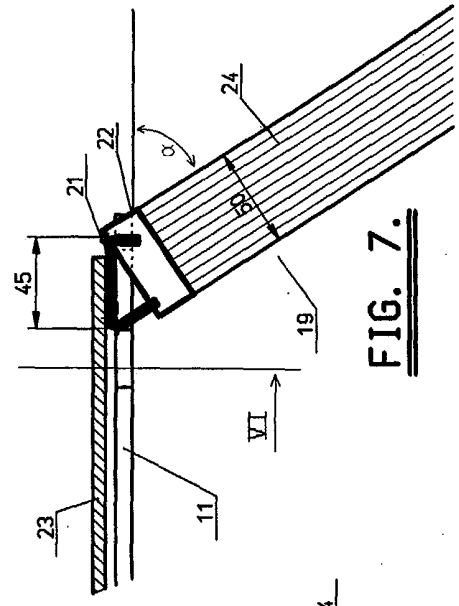


FIG. 7.

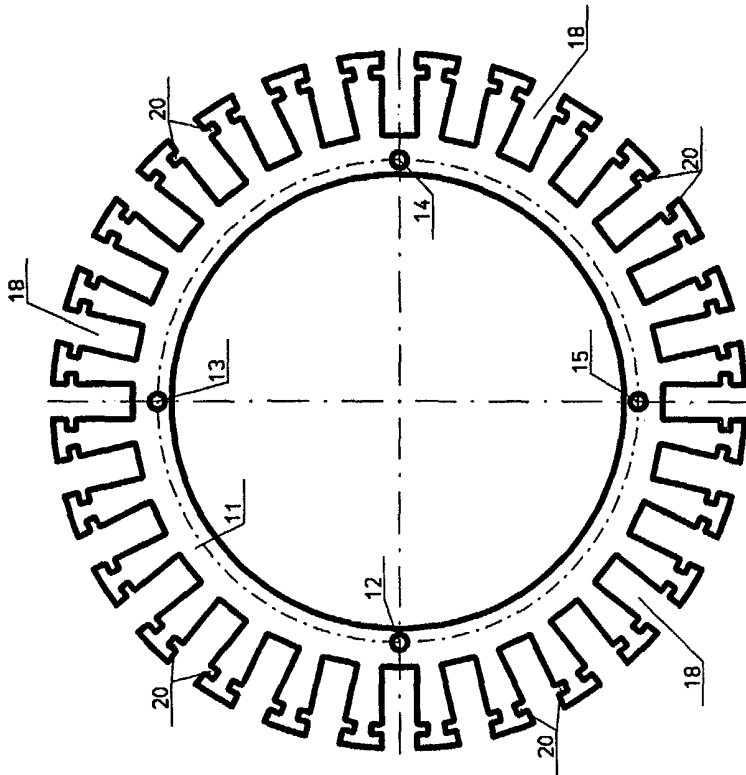


FIG. 4.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	FR 2 753 889 A (DEGRUMELLE ALAIN) 3 April 1998 (1998-04-03) * figures 1-3,14,15 *	1	A46B13/00 A46B3/14
A	EP 1 419 713 A (JORISSEN, CLEMENS JACOBUS FRANCISCUS MARIA) 19 May 2004 (2004-05-19) * figure 1 *	1	
A	FR 2 614 188 A (ROZIER HENRY) 28 October 1988 (1988-10-28) * figures 1-9 *	1	
A	GB 861 958 A (LEWIN ROAD SWEEPERS LIMITED) 1 March 1961 (1961-03-01) * figure 1 *	1	
E	WO 2004/086905 A (SAJAKORPI OY; KUIVIKKO, REIJO; SAJAKORPI, KIMMO) 14 October 2004 (2004-10-14) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A46B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 31 August 2005	Examiner Kerouach, M
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 07 7152

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-08-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2753889	A	03-04-1998	FR 2753889 A1	03-04-1998
EP 1419713	A	19-05-2004	NL 1021923 C2 EP 1419713 A1	17-05-2004 19-05-2004
FR 2614188	A	28-10-1988	FR 2614188 A1	28-10-1988
GB 861958	A	01-03-1961	NONE	
WO 2004086905	A	14-10-2004	FI 20030502 A WO 2004086905 A1	04-10-2004 14-10-2004