(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 316 310 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.02.2024 Bulletin 2024/06

(21) Application number: **22075011.1**

(22) Date of filing: **04.08.2022**

(51) International Patent Classification (IPC):
A46B 13/00 *(2006.01)* ***A46B 3/06*** *(2006.01)*
A46B 3/14 *(2006.01)* ***A47L 11/24*** *(2006.01)*
A46D 1/00 *(2006.01)* ***A46B 7/04*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A46B 13/008; A46B 3/06; A46B 3/14; A46B 7/044; A46D 1/0207; A47L 11/24; A46B 2200/3066; A46B 2200/3093

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Koti Onroerend Goed b.v.**
6003 DG Weert (NL)

(72) Inventor: **Huybreckx, Michel Josef René Lambert**
6003 DG Weert (NL)

(54) **DISH BRUSH FOR SWEEPING MACHINES WITH DEMOUNTABLE SEGMENTAL PLATE ELEMENTS PROVIDED WITH BRUSH PLUGS**

(57) The invention relates to a further developed dish brush (1) for sweeping machines, wherein a central base plate (2) has in top view the form of a polygon with raised contour plates (4). Said raised contour plates (4) are mutually coupled with radially I-shaped radial profiles to take with a sliding movement the demountable segmental plate elements (3). So, a very efficiently constructed and environmentally friendly dish brush for sweeping machines is developed.

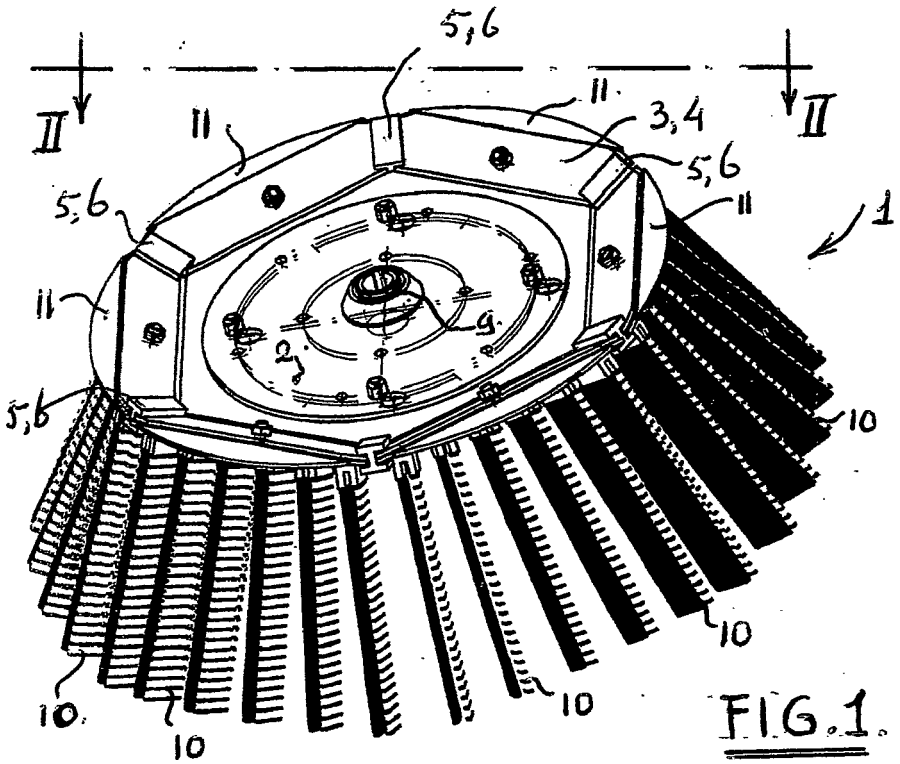

FIG.1.

EP 4 316 310 A1

Description

[0001] The present invention concerns a demountable dish brush for sweeping machines for cleaning, brushing and sweeping paved surfaces such as streets, squares etc. The dish brush is built up with a central dish formed plate with a polygonal contour. Said polygonal contour is executed in such a way, that with an easy handling, segmental plate elements provide with a set brush plugs are mountable or demountable on or from the central base plate of the dish brush.

Background of the invention

[0002] A somewhat similar dish-shaped brush for sweeping machines is known from the European Patent Application EP 1 623652 A1, filed 23-07-2004, titled: "Rotating Dish-Shaped Brush for Sweeping Machines", applicant Koti Onroerend Goed B.V., Weert, The Netherlands; Inventor M.J.R.L. Huybreckx, Weert, The Netherlands.

[0003] This patent application described a special gutter brush for sweeping machines. Mentioned brush is mountable or demountable in a rather complicated and time consuming sense. The brush is built up as a complicated constructed ring element, in which the individual brush elements are pushed with a sliding movement. Said brush elements are executed as a single plug with a connecting head plate for said sliding movement. When al the single plugs are placed, the ring with the plugs are covered with a circular plate and locked up with screws. To replace the plugs, the whole dish brush has to be demounted, which is a time consuming drawback and the construction of the dish brush is also very costly.

[0004] So, this embodiment of the dish-shaped brush does not have the inventive characteristics of our newly developed dish brush with a central dish plate executed as a polygon with more hook points, in which in between a complete set of brush plug can be mounted or replaced in a row in a very simple way.

[0005] Then, a second patent application EP 3 560 378 A1 is known and relevant in some way. This European Patent Application was filed with a Priority Dutch Patent Application NL 104 284 2 dated 25-04-2018; titled: "Dish Brush for Sweeping Machines". The Applicant is Koti Onroerend Goed B.V., Inventor M.J.R.L. Huybreckx, Weert, The Netherlands.

[0006] In this patent application, two embodiments of the dish brush for the conventional sweeping machines for cleaning paved surfaces are described. The two types of dish brushes are only mountable and demountable as a whole. Not the individual brush plugs, because of the welded joints. So, if the brush plugs are worn out, the dish brush is completely lost, as well as the steel central plate. In an environmental sense this is a considerable drawback. Another drawback is the big volume and the weight of the complete dish brush, which has to be transported to the user.

[0007] So, our invention overcomes mentioned drawbacks and has very positive characteristics, wherein the heavy steel central base plate is usable again and again after demounting the worn out segmental plate elements with their brush plugs. This inventive embodiment lowers the costs when using and transporting only the segmental plate elements. The transport volume is also much lower, because only segmental plate elements with their brush plugs have to be send to the user. So, lower transport costs.

Object of the invention

[0008] The aim of the invention is to produce and provide very effective and environmentally friendly dish brushes for sweeping machines at a lower price as usual.

Summary of the invention

[0009] Dish brush for conventional sweeping machines to clean, brush or sweep paved surfaces (streets, squares, etc.), wherein the central base plate with contour D and thickness d at the raised contour is provided with demountable sweeping elements in which mentioned central base plate has a polygonal contour and at the hook points are provided with I-shaped radial profiles with their axis directed to the centre of said central base plate, wherein mentioned demountable segmental plate elements with a trapezium surface are slidable between the I-shaped profiles with their brush plugs and locked up with a single screw bolt in a single borehole.

[0010] The advantage is that the intermediate brush plugs of the set brush plugs a circular and perpendicular thereon oscillating brush movement executes over the paved surface. This movement increases the quality of the brushing in a serious way as appears in practical use. Because of the fact that only the demountable segmental plate element with the set of brush plugs has to be demounted and a new one has to be mounted, the central base plate can be used again and again. So, in practice the costs of brushing are lower than with the usual dish brushes.

[0011] Furthermore, the dish brush according to the invention is developed in such a way characterized in that the polygonal contour of the central base plate has n angular hook point, which depend of the diameter D, wherein n is 4 till 10, for D is up to 500 mm, preferably n=6, wherein the diameter D is between 240 mm and 920 mm, preferably mostly up to 500 mm.

[0012] The advantages are, that for each used diameter D a suitable polygon contour can be fabricated with a minimum loss of material.

[0013] Then the dish brush according to the invention is further developed in such a way, that the central base plate has a raised contour with an angle α preferably up to 30 degrees, wherein the demountable segmental plate elements are slidable to mount between the I-shaped profiles and fixed with mentioned screw.

[0014] In practical sense, the advantage is a simple mounting and mechanically strong and stiff connection.

[0015] Furthermore, the dish brush according to the invention is developed in such a way, that the material of the central base plate is a steel plate with a thickness d between 4 mm and 10 mm, preferably 5 mm for D is up to 500 mm, wherein the material of the separately demountable segmental plate elements is steel with a thickness d between 3 mm and 6 mm, preferably 4 mm.

[0016] The advantages are a minimal use of material and therefore a minimal weight and volume in transport to the user.

[0017] Then, the dish brush according to the invention is further developed in such a way, that the material of the separately demountable segmental plate elements is a plastic, being for instance polypropylene (or other material, see description in the text).

[0018] The advantage is a further weight reduction of the segmental plate elements, which is advantageous for transport to the user.

[0019] Furthermore, the dish brush according to the invention is further developed in such a way, that said brush plugs are executed as flat sweeping elements with a length between 220 and 300 mm, preferably 260 mm and with a U-form metal holder connected with the demountable segmental plate elements.

[0020] The advantage is, that usual sweeping elements are used.

[0021] Then the dish brush according to the invention is further developed in such a way, that the demountable segmental plate elements are provided with segmental rounded plate part on the outside to give the dish brush a total circular diameter D, wherein the thickness d is the thickness and the material of the segmental plate elements.

[0022] The advantage is that scouring against kerbstones does not damage the hook points of the polygonal contour of the central base plate.

Brief description of the drawing.

[0023] A preferred 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 the complete dish brush according to the invention;
Figure 2 shows a top view of the dish brush of figure 1 and over the line II-II;
Figure 3 shows a top view of the central base plate with a polygonal contour (hexagonal in this case) according to a preferred embodiment of the invention;
Figure 4 shows a side view of the central base plate of figure 3 over the line IV-IV;
Figure 5 shows an oblique projection of the demountable segmental plate element with a trapezium surface according to the invention; and
Figure 6 also shows an oblique projection of the demountable segmental plate element with trapezium surface and a further segmental plate to give the total dish brushes of the figures 1 and 2 a circular contour in top view.

[0024] Figure 1 represents a view in oblique projection the complete dish brush 1 according to the invention. The complete dish brush 1 consists of two parts, the central base plate 2 and the demountable segmental plate elements 3. The central based plate had raised contour edge plates 4 and with the welded fixed I-shaped radial profiles 5 forms the hook points 6 for precisely sliding the demountable segmental plate elements 3 with their trapezium surface. Said central base plate 2 and said demountable segment plate elements 3 are fixed together with a single screw 7 in boreholes 8.

[0025] Mentioned I-shaped radial profiles 5 are directed to the centre 9 of said central plate 2. The demountable segmental plate elements 3 have a set brush plug 10 positioned in a row.

[0026] In figures 2 and 3 the polygonal contour of the centre base plate 2 is reproduced in a sharp way. The same parts always have the same numbers. Both figures 2 and 3 are top views of the central base plate 2. Figure 2 shows a top view over the line II-II from figure 1, the whole dish brush 1 with the central base plate 2 and the demountable segmental plate elements 3. Figure 3 only shows the central base plate 2 with the raised edge plates 4.

[0027] Figure 4 shows a side view over the line IV-IV of figure . This figure shows the radial directed I-shaped profiles 5.

[0028] Figure 5 shows an oblique projection of the demountable segmental plate elements 3 with the fixed brush plugs 10 with the metal holders at the bottom side. These brush plugs 10 and the demountable segmental plate elements 3 and are also made of PA (Polyamide/Nylon), PBT (Polybutylenetereftalaat), PE (Polyethylene), PP (Delrin/Polyacetate), PVC (Polyvinylchloride), Rubber, Steel, RVS, Copper, Bronze.

[0029] Figure 6 shows an oblique projection of the demountable segmental plate element 3 with a trapezium surface and a further fixed segmental plate element 11 to provide the dish brushes of figures 1 and 2 with an overall circular contour.

[0030] Finally it has to be emphasized, that a preferred embodiment of the invention is described and that it is self-evident that further modifications are possible without leaving the scope of the invention.

Claims

1. Dish brush for conventional sweeping machine to clean, brush or sweep paved surfaces (streets, squares, etc.), wherein the central base plate with contour diameter D and the thickness d at the raised

contour is provided with demountable segmental plate elements provided with brush plugs, **characterised in that,** mentioned central base plate (2) has a polygonal contour and at the hook points (6) are provided with I-shaped radial profiles (5) with their axis directed to the centre (9) of said central base plate (2), wherein mentioned demountable segmental plate elements (3) with a trapezium surface are slidable between the I-shaped profiles (5) with their brush plugs (10) and locked up with a single screw bolt (7) in a single borehole (8).

2. Dish brush as in claim 1, **wherein** said polygonal contour of the central base plate (2) has n angular hook points (6) dependent from said diameter D, wherein n is 4 until 10, for D is up to 500 mm preferably n=6.

3. Dish brush as in claim 1-2, **wherein** the central base plate (2) has a raised contour with an angle α preferably up to 30 degrees, wherein the demountable segmental plate elements (3) are slidable to mount between the I-shaped profiles (5) and are fixed with said screw (7).

4. Dish brush as in claim 1-3, **wherein** the material of the central base plate (2) preferably is made of steel with a thickness between 4 mm and 10 mm, preferably 5 mm for D is up to 500 mm.

5. Dish brush as in claim 1-3, **wherein** the material of the separately demountable segmental plate elements (3) is steel with a thickness d between 3 mm and 6 mm, preferably 4 mm.

6. Dish brush as in claim 1-3, **wherein** the material of the separately demountable segmental plate elements (3) is a plastic being for instance a polypropylene or other material (see description).

7. Dish brush as in claim 1, **wherein** said brush plugs (10) are executed as flat sweeping elements with a length between 220 mm and 300 mm, preferably 260 mm and with a U-form metal holder (12) connected with the demountable segmental plate elements (3).

8. Dish brush as in claim 1, **wherein** said diameter D is between 240 mm and 920 mm, preferably mostly up to 500 mm.

9. Dish brush as in claim 1-9, **wherein** said demountable segmental plate elements (3) are provided with a segmental rounded plate part (11) on the outside to give the dish brush a total circular diameter D, wherein the thickness d is the thickness of the segmental plate elements (3).

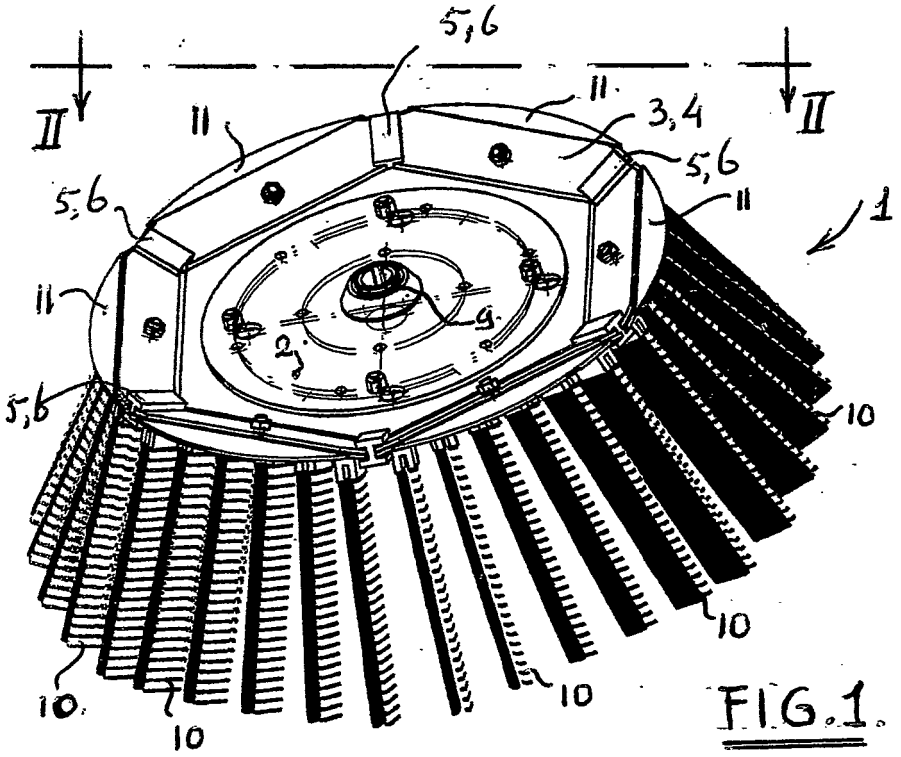
5,6
II
II
11
3,4
5,6
11
1
5,6
11
9
2
5,6
10
10
10
10
10

FIG.1.

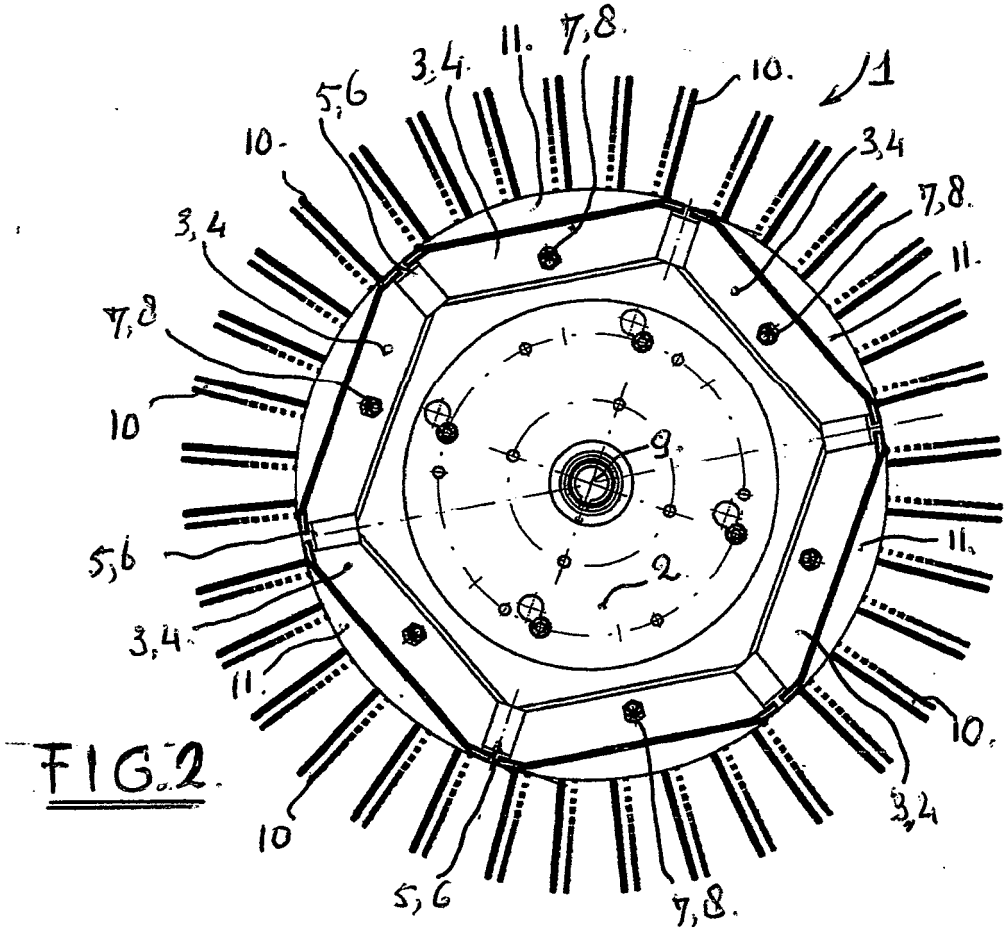
7,8
11
3,4
5,6
10
1
10
3,4
7,8
11
3,4
7,8
10
9
2
5,6
11
3,4
11
10
10
3,4
5,6
7,8

FIG.2.

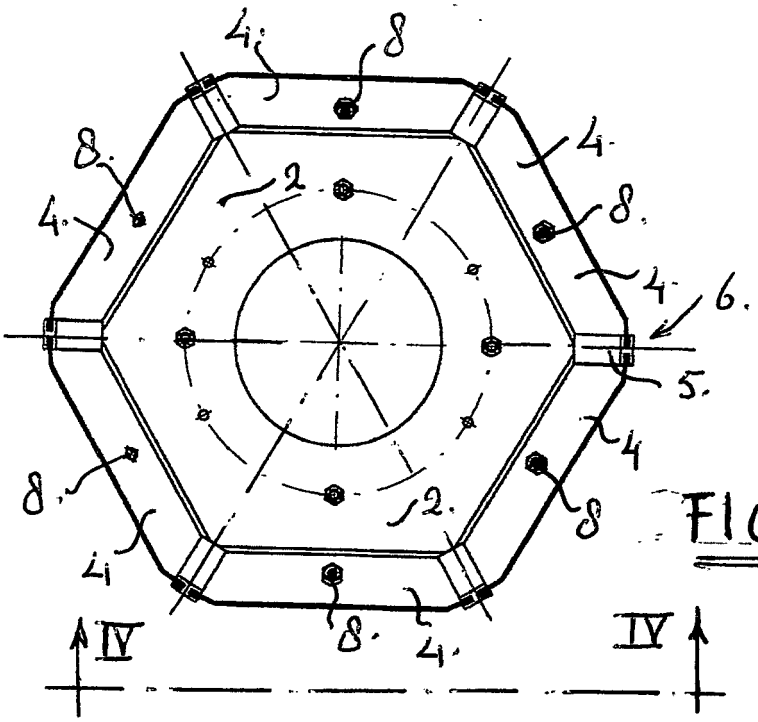

FIG. 3.

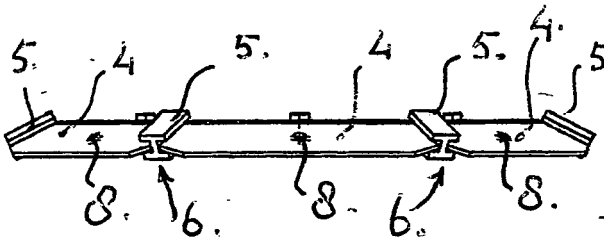

FIG. 4.

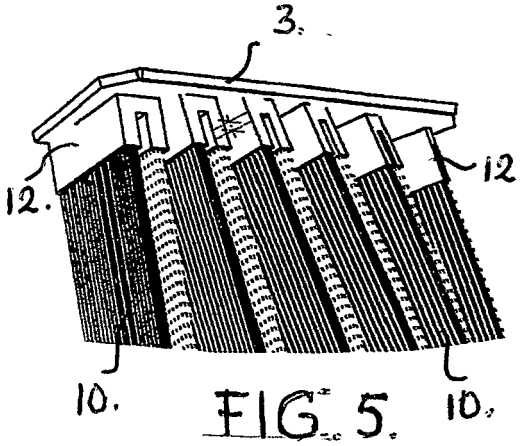

FIG. 5.

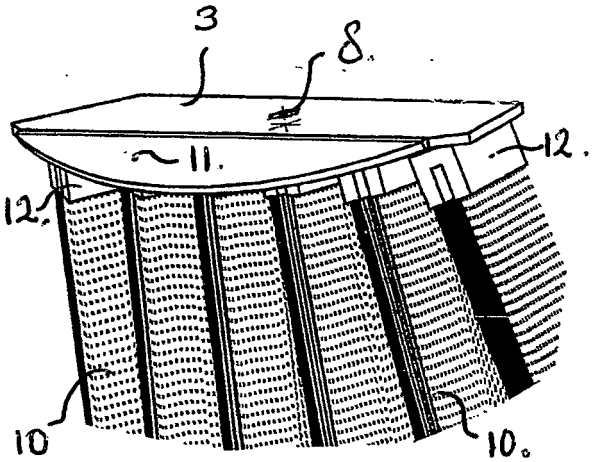

FIG. 6.

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 22 07 5011

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 87 18 053 U1 (NA) 4 March 1993 (1993-03-04) * Paragraphs 3-11, 16, figures 1-3 *	1-9	INV. A46B13/00 A46B3/06 A46B3/14
A	DD 151 553 A3 (SCHULTZ SYLVIA; WITTING HELMUT) 28 October 1981 (1981-10-28) * the whole document *	1-9	A47L11/24 A46D1/00 A46B7/04
A	US 2009/260171 A1 (SAJAKORPI KIMMO [FI] ET AL) 22 October 2009 (2009-10-22) * the whole document *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)

A46B
A47L
A46D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 November 2022	Horrix, Doerte

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 07 5011

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.

17-11-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 8718053 U1	04-03-1993	CH 673046 A5	31-01-1990
		DE 3711181 A1	13-10-1988
		DE 8718053 U1	04-03-1993
		IT 1211307 B	12-10-1989
		NL 8701722 A	01-11-1988
DD 151553 A3	28-10-1981	NONE	
US 2009260171 A1	22-10-2009	CA 2647950 A1	18-10-2007
		EP 2004007 A1	24-12-2008
		FI 20060344 A	11-10-2007
		RU 2008143659 A	20-05-2010
		US 2009260171 A1	22-10-2009
		WO 2007116115 A1	18-10-2007

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1623652 A1 **[0002]**
- EP 3560378 A1 **[0005]**
- NL 1042842 **[0005]**