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(54) **STRUCTURE OF A BRUSH FOR A SWEEPER MACHINE**

(57) A brush structure for a sweeper machine, comprising a shaft (11) and a set of rings (1) to bear the filaments (10) for sweeping, characterised in that the rings of the structure are formed by two half-rings (2), each of these comprising an internal side and an external side, where the internal side comprises an array of U-shaped notches (5), in such a way that the extremities of the arms of said notches (5) extend towards the perimeter edge of each half-ring (2), and each half-ring (2) further comprising mutual coupling means on the internal sides thereof, in such a way that once coupled they form the ring (1), and the notches (5) of both half-rings coincide to form a U-shaped housing with two exit orifices (6) at the perimeter edge of the ring (1), where in each housing a filament (10) for sweeping is disposed, the extremities whereof project from the exit orifices (6).

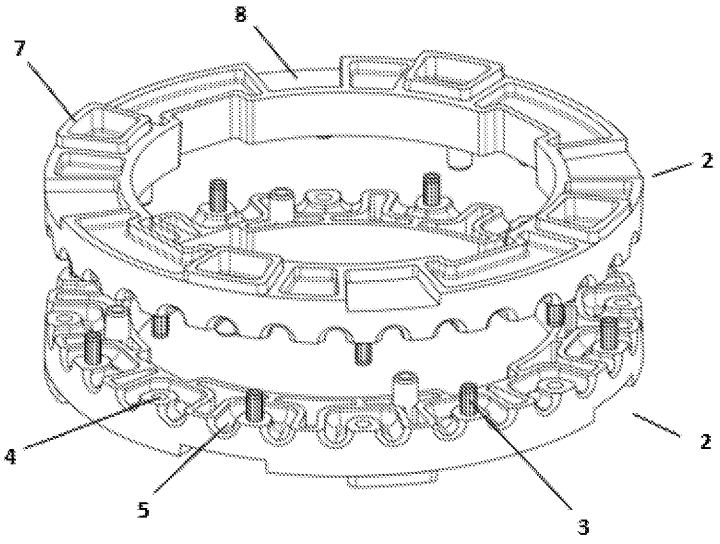

Fig. 2

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Description

[0001] The object of the present invention is a lightweight and easy-to-assemble brush structure, and particularly for sweeper machine brushes.

State of the art

[0002] Sweeper machines are used on construction sites to collect waste such as dust or gravel generated during milling tasks for lifting pavements in poor condition, in order to facilitate work on site and the adherence of subsequently applied layers, or as finishing work in the construction site prior to painting the pavement.

[0003] Document ES2244256A1 describes a scoop-sweeper tool for construction sites having a sweeping function through a roller or brush with filaments. The roller or brush is formed by a core or shaft which has keys and on which there is assembled a set of rings secured to said core by means of the keys. Each of said rings comprises an array of perimeter orifices in which an array of filaments, usually made of steel cable, are inserted such that the two extremities of each filament emerge through two adjacent orifices, leaving the bent portion of the filament inside the ring. In said document it can also be seen how the shaft or core is a solid core.

[0004] The present invention provides a brush structure for a sweeper machine which allows for simpler installation, therefore reducing the time and cost for assembling the filaments for sweeping in each of the rings. Additionally, the present invention has a configuration which allows the weight of the shaft of the brush of the sweeper machine to be reduced.

Description of the invention

[0005] The brush structure of a sweeper machine of the present invention is formed by a shaft and a set of rings, said rings bearing the filaments for sweeping. Each of the rings is formed by two parts which are coupled to one another and form the ring for the brush of a sweeper machine. Each of the parts forming the ring for the brush of a sweeper machine is referred to as a "half-ring" (each of the half-rings consists of a ring which can be coupled to the other half-ring to form the ring for the brush of a sweeper machine of the present invention).

[0006] Each of the half-rings has an internal side, which is the side for coupling to the other half-ring to form the ring for the brush of a sweeper machine object of the present invention, and an external side.

[0007] The internal side of each of the half-rings forming the ring for the brush comprises fixing means for fixing to the other half-ring. According to an embodiment option, said fixing means consist of an array of bolts disposed on the internal side of a half-ring, and an array of housings corresponding to said bolts on the internal side of the other half-ring, in such a way that the bolts are introduced in the housings and the internal sides of the two half-rings are attached, making contact with one another. According to an embodiment option, each of the internal sides of each half-ring comprises as many bolts as bolt housings disposed on the internal side of the other half-ring.

[0008] The internal side of each half-ring further comprises an array of U-shaped notches, in such a way that the extremities of the arms of said notches extend towards the perimeter edge of each half-ring. When the half-rings are coupled to one another, the notches of both half-rings coincide, in such a way that once attached they form a U-shaped housing with two exit orifices at the perimeter edge. In this way, and before coupling both half-rings to form the ring for the brush of a sweeper machine, a filament for sweeping, usually made of steel cable, is disposed in each of the notches of a half-ring, the extremities of each filament projecting radially outwards from the half-ring; and once the filaments are disposed in the respective housings of the half-ring, the other half-ring is coupled, with the filaments being fitted in each housing.

[0009] According to an embodiment option, the ring further comprises on its external sides (i.e., on the external side of each of the half-rings) an array of coupling means for coupling to the adjacent ring. The purpose of these coupling means for coupling a ring with the adjacent ring is to transmit the driving power from one ring to another tangentially, preventing the shaft from being the element transmitting all the driving power to each of the rings, and therefore allowing the weight of said shaft, and thereby the weight of the entire brush structure for a sweeper machine, to be reduced.

[0010] Although a solid shaft can be used and the driving power can be transmitted through the key, the shaft is preferably formed by tube fragments attached to one another through one or more linear elements. According to an embodiment option, the tube fragments are attached to one another by means of one or more keys corresponding to the keyways of the rings.

Brief description of the drawings

[0011] As a complement to the description provided herein, and for the purpose of helping to make the features of the invention more readily understandable, in accordance with a preferred exemplary embodiment thereof, said description is accompanied by a set of figures constituting an integral part of the same, which by way of illustration and not limitation, represent the following:

Figure 1 shows a perspective view of a pair of rings of the brush structure of a sweeper machine coupled to one another, according to an embodiment of the present invention.

Figure 2 shows a perspective view of a ring of the brush structure of a sweeper machine, in which the two portions forming the ring are uncoupled, according to an embodiment of the present invention.

Figure 3 shows a perspective view of a pair of rings of the brush structure of a sweeper machine coupled to one another, one of the rings comprising an array of filaments for sweeping, according to an embodiment of the present invention.

Figure 4 shows a detail of the arrangement of the filaments in one of the notches made in each of the rings of the brush structure of a sweeper machine, according to an embodiment of the present invention.

Figure 5 shows a perspective view of the shaft of the brush structure of a sweeper machine, according to an embodiment of the present invention.

Description of the preferred embodiments of the invention

[0012] In light of the aforementioned figures, and in accordance with the adopted numbering, one may observe therein a preferred exemplary embodiment of the invention, which comprises the parts and elements indicated and described in detail below.

[0013] The brush structure of a sweeper machine object of the present invention is formed by a shaft (11) and a set of rings (1), said rings (1) bearing the filaments (10) for sweeping.

[0014] In that sense, as seen in Figures 1 to 4, each of the rings of the structure is formed by two half-rings (2). Each of the half-rings (2) comprises on its internal side an array of U-shaped notches (5), in such a way that the extremities of the arms of said notches (5) extend towards the perimeter edge of each half-ring (2). When the half-rings (2) are coupled to one another, the notches (5) of both half-rings coincide, in such a way that once attached they form a U-shaped housing with two exit orifices (6) at the perimeter edge. Therefore, as can be observed particularly in Figure 4, and before coupling both half-rings (2) to form the ring (1), a filament (10) for sweeping is disposed in each of the notches (5) of one of the half-rings, the extremities of each filament (10) projecting radially outwards from the half-ring (2); and once the filaments (10) are disposed in the respective housings of the half-ring, the other half-ring (2) is coupled, with the filaments (10) being fitted in each housing.

[0015] Additionally, each of the half-rings (2) comprises on the internal side fixing means for fixing to the other half-ring (2). In the embodiment shown, said fixing means consist of an array of bolts (3) disposed on the internal sides of the two half-rings (2) forming the ring (1) and an array of housings (4) corresponding to said bolts (3) disposed on the internal sides of the two half-rings (2). In the embodiment shown, the bolts (3) and the housings (4) are disposed alternately in the space formed between the arms of each of the notches (5) in each half-ring (2).

[0016] The ring (1) further comprises on its external sides (i.e., on the external side of each of the half-rings (2)) an array of coupling means for coupling to the adjacent ring. These coupling means consist of a set of protruding portions (7), i.e., protruding above the external side of the ring (1), which are inserted into an array of second notches (8) disposed on the external side of the adjacent ring (1). Preferably, each of the external sides of each ring comprises an array of protruding portions (7) and an array of second notches (8) disposed alternately.

[0017] Figure 5 shows a possible embodiment of the shaft (11) of the brush structure of a sweeper machine. The shaft (11) is formed by an array of tube fragments (12) attached to one another by means of an array of keys (13) corresponding to keyways (9) made in the central hole of each ring (1).

Claims

1. A brush structure for a sweeper machine, formed by a shaft (11) and a set of rings (1) to bear filaments (10) for sweeping, **characterised in that** each of the rings of the structure is formed by two half-rings (2); each of said half-rings (2) comprising an internal side and an external side, where the internal side of each of the half-rings (2) comprises an array of U-shaped notches (5), in such a way that the extremities of the arms of said notches (5) extend towards the perimeter edge of each half-ring (2); each of the half-rings (2) further comprising mutual coupling means on the internal sides thereof, in such a way that once coupled they form the ring (1), and the notches (5) of both half-rings coincide to form a U-shaped housing with two exit orifices (6) at the perimeter edge of the ring (1), where in each of said housings a filament (10) for sweeping is disposed, the extremities whereof project from the exit orifices (6).

2. The brush structure for a sweeper machine according to claim 1, **characterised in that** the fixing means consist of an array of bolts (3) disposed on the internal sides of the two half-rings (2) forming the ring (1) and an array of housings (4) corresponding to said bolts (3) disposed on the internal sides of the two half-rings (2).

3. The brush structure for a sweeper machine according to claim 2, **characterised in that** the bolts (3) and the housings (4) are disposed alternately in the space formed between the arms of each of the notches (5) in each half-ring (2).

4. The brush structure for a sweeper machine according to any of the preceding claims, **characterised in that** the ring (1) comprises on its external sides, i.e., on the external side of each of the half-rings (2), an array of coupling means for coupling to the adjacent ring.

5. The brush structure for a sweeper machine accord-

ing to claim 4, **characterised in that** the coupling means for coupling to the adjacent ring consist of a set of protruding portions (7) which are inserted into an array of second notches (8) disposed on the external side of the adjacent ring (1).

6. The brush structure for a sweeper machine according to claim 5, **characterised in that** each of the external sides of each ring comprises an array of protruding portions (7) and an array of second notches (8) disposed alternately.

7. The brush structure for a sweeper machine according to any of the preceding claims, **characterised in that** the shaft (11) is formed by an array of tube fragments (12) attached to one another by means of an array of keys (13) corresponding to keyways (9) made in the central hole of each ring (1).

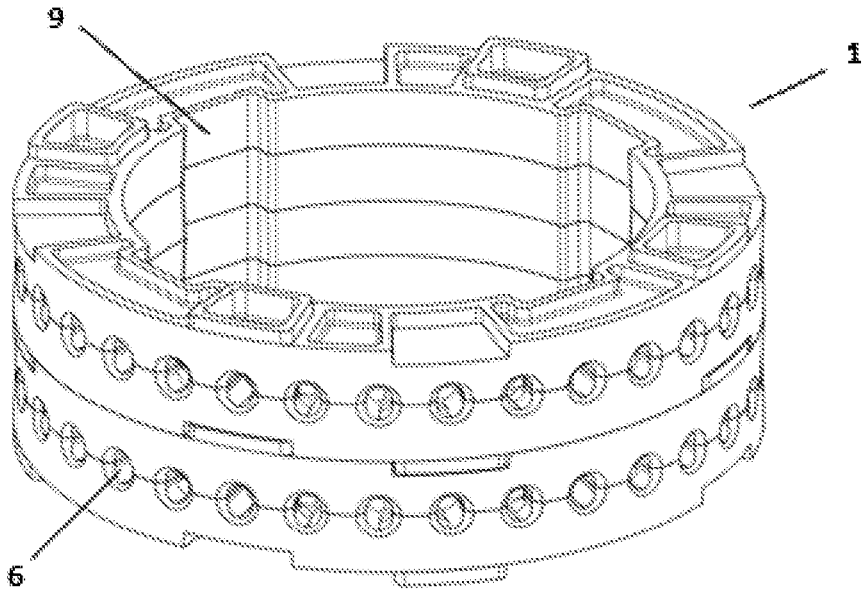

Fig. 1

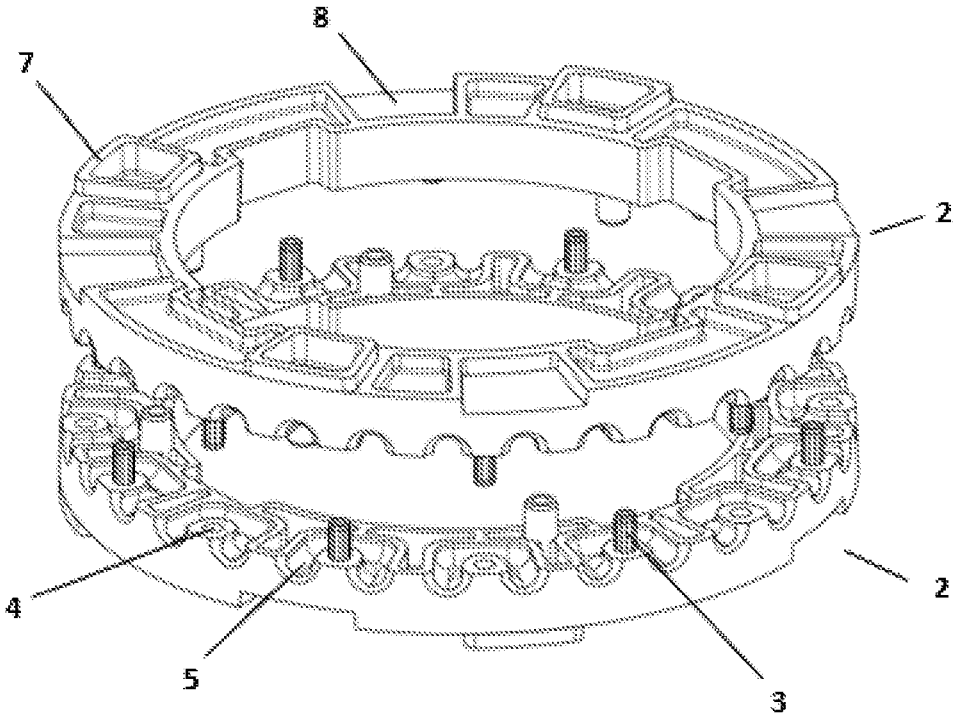

Fig. 2

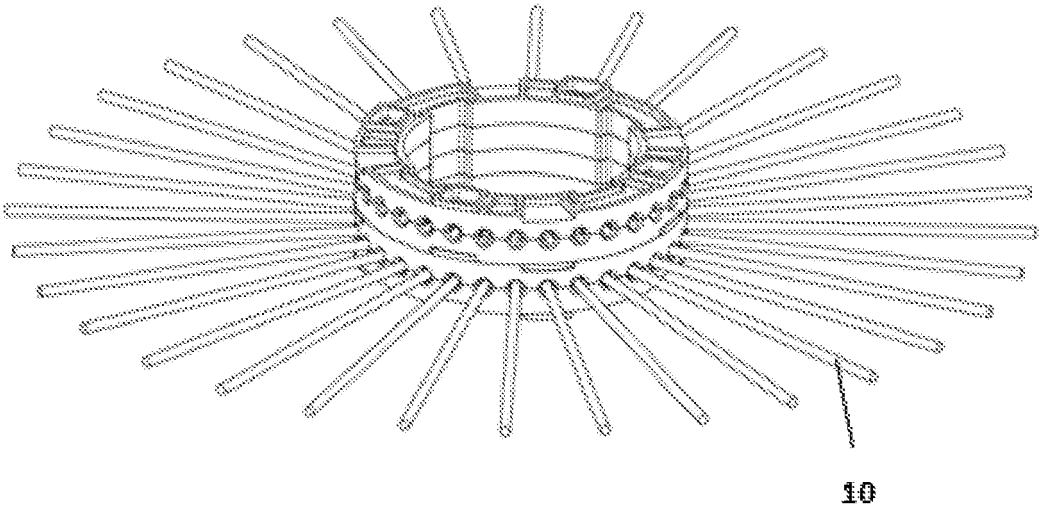

Fig. 3

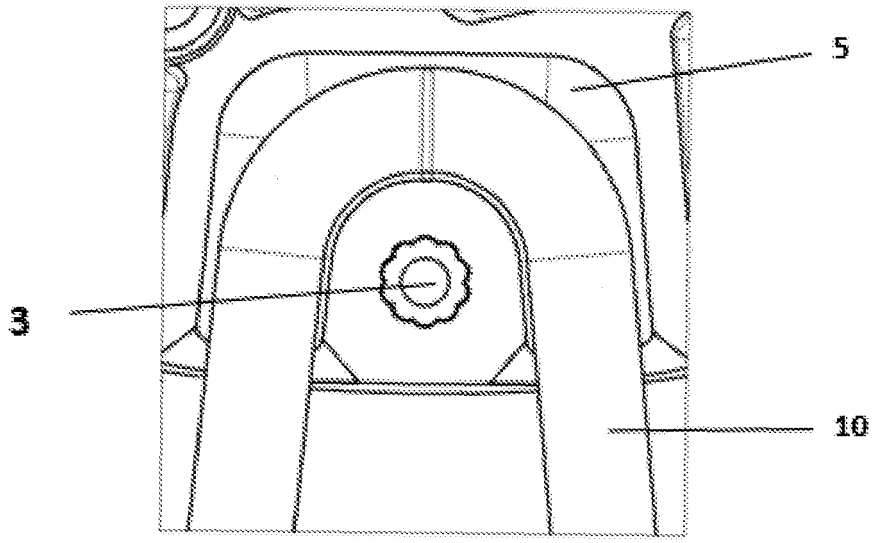

Fig. 4

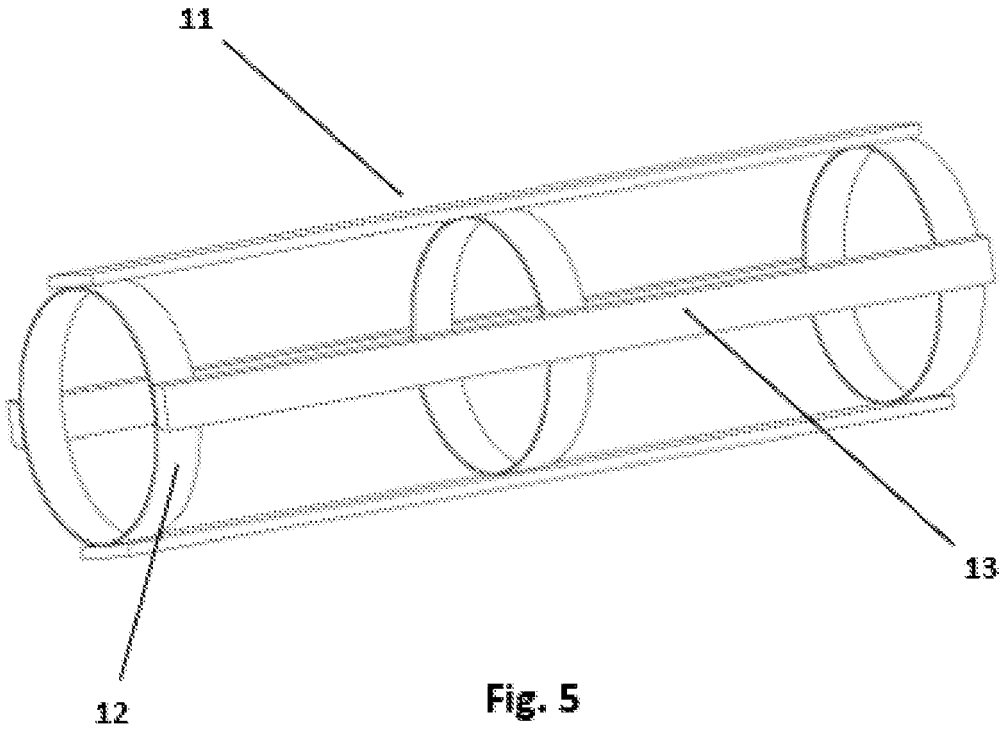

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2021/070270

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A46B, E01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0858751 A1 (LOZERIENNE PLASTIQUE S A) 19/08/1998, column 3, line 40 - column 4, line 25; figures 5, 6.	1
A	US 1970302 A (GERHARDT CHARLES C) 14/08/1934, page 1, line 110 - page 2, line 2; figures.	1
A	ES 2244256 A1 (SANCHEZ SANCHIS JOSE JUAN NECEMATT S L) 01/12/2005, the whole document.	1
A	US 3839763 A (GOULD W) 08/10/1974, the whole document.	1
A	US 553402 A (GOULDING JOHN W. et al) 21/01/1896, the whole document.	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08/06/2021	**(10/06/2021)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer J. Merello Arvilla Telephone No. 91 3498452

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2021/070270

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
EP0858751 A1	19.08.1998	FR2759264 A1 FR2759264 B1	14.08.1998 16.04.1999
US1970302 A	14.08.1934	NONE	
ES2244256 A1	01.12.2005	NONE	
US3839763 A	08.10.1974	NONE	
US553402 A	21.01.1896	NONE	

Form PCT/ISA/210 (patent family annex) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2021/070270

CLASSIFICATION OF SUBJECT MATTER

A46B3/14 (2006.01)
A46B3/16 (2006.01)
E01H1/05 (2006.01)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 2244256 A1 **[0003]**