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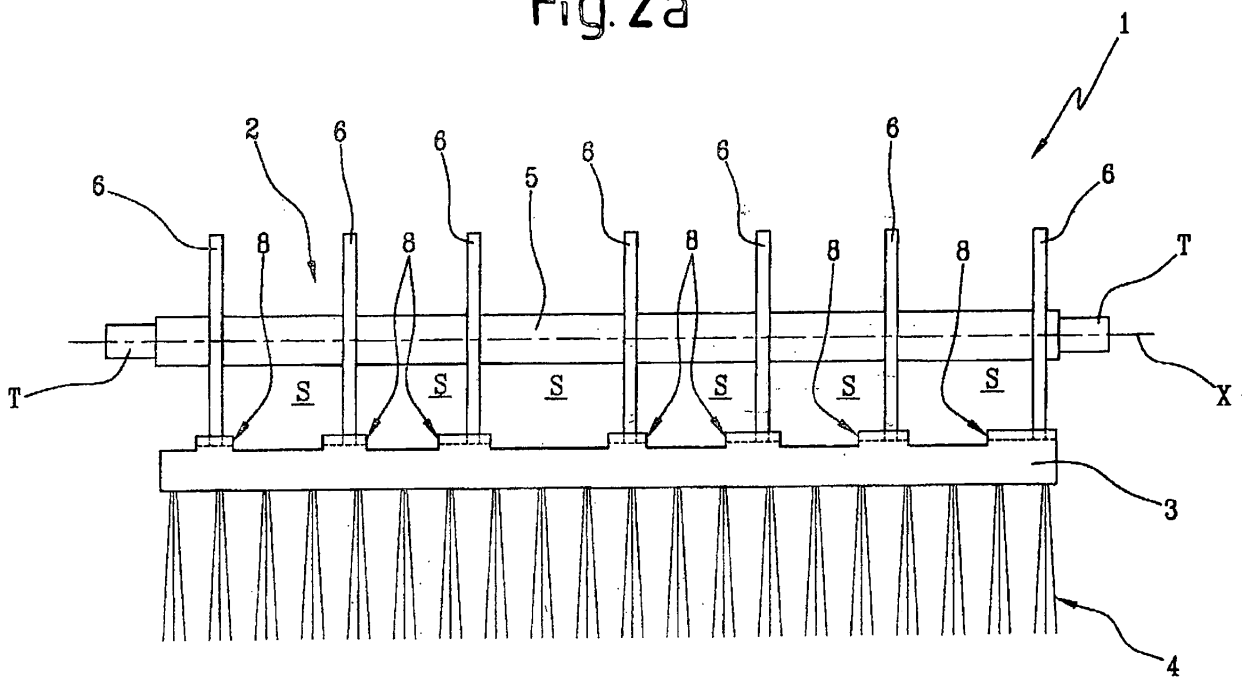
(54) **Rotating brush, in particular for fabrics**

(57) A rotating brush, in particular for fabrics, comprises a support body (2) rotatable around an axis (X) and a plurality of bars (3), mounted on the support body (2) in a stable manner and each supporting one or more groups (4) of fringes suitable to perform the brushing of a fabric. The support body (2) presents a plurality of radial expansions (6), which extend from the axis (X) and are mutually spaced along the axis (X), whilst each bar (3) presents a plurality of projections (8), each of which can be stably engaged in a removable manner with one of the radial expansions (6).

Fig. 2a



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Description

[0001] The present invention relates to a rotating brush, and in particular to a rotating brush of the type designed for treating fabrics.

[0002] The brushes currently known for the surface treatment of fabrics are incorporated in brushing machines having a feed path for feeding a continuous web of fabric, on a surface of which more brushes act, arranged in succession.

[0003] It is well known that the brushes for the surface treatment of fabrics, and in particular of fabrics in the shape of continuous web, comprise a shaft rotatable around an axis and supported by end bearings, and a grooved body integral with the shaft having an extension, along said axis, corresponding to the entire length of the brush. The grooved body has a plurality of grooves, inside which it is possible to insert in a slidable manner respective bars or flexible strips counter-shaped with respect to the grooves and supporting a plurality of flexible fringes or bristles suitable to provide a brushing effect on the fabric.

[0004] The above mentioned grooves, as well as the grooved body, extend along an entire longitudinal development of the brush and are parallel to the axis of rotation of the brush itself. Since the bars are suitable to be held inside the respective grooves by means of a grooved coupling, i.e. by means of undercuts, the bars can be therefore inserted in the grooves, and can be extracted from them, through sliding along the axis of rotation of the brush.

[0005] In more detail, the extraction of each bar (which is necessary, for example, in order to regenerate or to replace the fringes or bristles), is carried out by withdrawing it entirely from the respective groove according to a movement parallel to the axis of rotation of the brush, until the bar is entirely disengaged from the grooved body.

[0006] Disadvantageously, the complete extraction of the bar from the grooved body requires a wide space in correspondence of one or both heads of the shaft of the brush, and extracting the above mentioned bars is therefore impossible when the brush is still mounted on the brushing machine.

[0007] Vice versa, it is necessary to remove the brush from the brushing machine, in particular by disengaging the shaft from the end bearings or anyway from the respective supports, and only at this point it is possible to remove the bars from the grooved body.

[0008] This however has the great drawback of requiring the stop of the brushing machine for a long time, necessary to allow one or more operators to access the machine, remove the brush, replace the bars and then put the brush on the respective supports again, and furthermore this operation is clearly arduous and delicate.

[0009] The technical aim of the present invention is therefore to provide a rotating brush, in particular for fabrics, that allows the disadvantages described above to be at least partly alleviated.

[0010] Within this technical aim, the object of some embodiments of the invention is to provide a rotating brush, in particular for fabrics, which allows simple and fast replacement of the flexible fringes or bristles carried by the brush itself.

[0011] This object, and further objects, are substantially achieved through a rotating brush, in particular for fabrics, according to claim 1 and/or one or more of the dependent claims.

[0012] According to some embodiments, the brush includes a core or support body, on which one or more sets of receiving members are provided in a longitudinal alignment. A respective bar is engageable with the support body by engaging corresponding connection members arranged along said bar with corresponding receiving members on the support body. A space is provided between adjacent receiving members of the support body, such that a limited longitudinal movement, i.e. a movement substantially parallel to the rotation axis of the brush, is sufficient to engage or disengage the bar to or from the support body or core of the brush. Thus, each bar can be connected to the body by a combined radial and axial movement, which brings the connection members into alignment with the receiving members first, and then into engagement therewith. Disengagement is achieved with a reverse sequence of motion.

[0013] According to some embodiments, connection members and receiving members are preferably in the form of projections on the bar(s) and receiving seats on the core or support body of the brush.

[0014] According to some preferred embodiments, a free space, here below also called maneuvering space, is provided between adjacent and longitudinally aligned receiving members, i.e. receiving seats provided on the support body.

[0015] Below there is the description, by way of no limiting example, of a preferred embodiment of a rotating brush, in particular for fabrics, according to the accompanying drawings, in which:

- figure 1 is a side view of a rotating brush according to the present invention;
- figures 2a to 2c show three front views of the brush of figure 1 according to a time sequence of demounting the brush;
- figure 3 shows a perspective view of a portion of a brush according to another embodiment of the invention.

[0016] With reference to the accompanying drawings, and specifically referring to figures 1, 2a, 2b and 2c, number 1 indicates, in its entirety, a brush according to the present invention. The brush 1 can be used in a brushing machine, in particular of the type suitable to carry out a surface treatment on a continuous web fabric.

[0017] The brush 1 comprises a support body 2, developing around an axis X matching with the axis of ro-

tation of the brush 1, and a plurality of bars 3, each of which supporting a group 4 of flexible fringes or bristles. The term bar as used herein includes any elongated body suitable to support bristles or equivalent brushing members. The term bar therefore encompasses both a rigid or semi-rigid or even a flexible longitudinally extended support.

[0018] The group 4 of fringes or bristles properly defines brushing means for brushing the fabric, and in particular it defines the portion of the brush 1 suitable to come into direct contact with the web fabric, in order to perform the brushing thereof.

[0019] The support body 2 comprises a central portion 5, adjacent to the axis X, and a plurality of radial expansions 6, which extend from the axis X, only one of which is shown in figure 1. In correspondence of its opposite ends the central portion 5 is provided with cylindrical portions or pins T designed to engage into support bearings, not shown.

[0020] According to some embodiments, the radial expansions 6 are disk shaped, i.e. they develop along an entire angular development of the support body 2 and are arranged preferably perpendicular to the axis X of the support body 2, Furthermore, the radial expansions 6 have a substantially symmetrical conformation around the above mentioned axis X.

[0021] Advantageously, the radial expansions 6 are spaced from one another along the axis X, in such a way that between two consecutive radial expansions 6 a maneuvering space S is provided, the function of which will be illustrated below.

[0022] Each radial expansion 6 has externally, i.e. in a position more distant from the axis X, a plurality of protrusions 7 angularly equally spaced around the axis X and defining, in cooperation with each other, corresponding receiving members 7a for receiving the mentioned bars 3. Here below the receiving members 7a will be referred to as "receiving seats". The protrusions 7, as well as the receiving seats 7a defined by them, develop parallel to the above mentioned axis X.

[0023] Each bar 3 has an elongated conformation along the axis X, in particular it extends along the entire longitudinal dimension of the brush 1 along the axis X. Furthermore, in correspondence of a portion thereof intended to face the support body 2, each bar 3 has a plurality of connection members 8, each of which can be engaged with a respective radial expansion 6, and more specifically it can be engaged inside one of the mentioned receiving seats 7a defined by the protrusions 7. Said connection members will be referred to here below as "projections 8".

[0024] The coupling between the projections 8 and the receiving seats 7a defined by the protrusions 7, is a grooved coupling, i.e. a coupling with an undercut, such as a dovetail coupling, which allows the protrusions 7 to hold the respective projections 8 in a stable manner, preventing them from decoupling and moving away from the axis X. Preferably this coupling is of the so-called "tail coat" type, as shown in figure 1, in which the projections 8 and the receiving seats 7a have a trapezoidal shape.

[0025] A reversal arrangement, with receiving seats on the bar and projections on the support core is also possible, in which case adjacent receiving seats as well as adjacent projections would be again distanced from one another along the axial direction X for the purpose described here below.

[0026] Thanks to the mentioned grooved coupling, the projections 8 can be engaged in a slidable manner inside the receiving seats 7a and in particular this allows insertion and extraction of the projections 8 with respect to the receiving seats 7a. Due to the parallelism between the receiving seats 7a and the axis X, the movement to be imparted to the bars 3 in order to fix them on the radial expansions 6 or to disengage them from the same expansions is therefore a movement parallel to the axis X.

[0027] More in general, each projection 8 is movable with respect to the support body 2 between an engage position, in which it is interlocked within a respective receiving seat 7a, and a position of disengagement, in which it is completely slipped out of the receiving seat 7a. Switching between the two above mentioned positions takes place through a movement of the bar 3 parallel to the axis X.

[0028] With reference to the accompanying drawings, starting from a position in which the brush 1 is mounted, shown in figure 2a, to disengage the bar 3 from the support body 2 it is sufficient to impart to the bar 3 a translation movement along the axis X until the point in which the projections 8 are entirely outside the respective receiving seats 7a, i.e. outside the radial expansions 6. When the movement is completed, each projection 8 is entirely extracted from the respective receiving seat 7a, and is arranged entirely in correspondence of the maneuvering space S between the respective radial expansion 6 and the adjacent radial expansion 6 (figure 2b). When such position is achieved, it is possible to move the bar 3 supporting the groups 4 of fringes away from the support body 2, for example to replace it with a new bar 3.

[0029] In order to allow the mentioned sequence of demounting phases, each projection 8 has a dimension, measured along the axis X of the support body 2, preferably smaller than a corresponding dimension of the mentioned maneuvering space S, in which the projection 8 is placed during demounting.

[0030] Mounting of the brush 1 takes place according to a procedure reversed with respect to the demounting procedure. In particular, the bar 3 is placed in such a way that the projections 8 thereof are arranged in a position intercalated to the radial expansions 6 of the support body 2, i.e. in correspondence of the mentioned maneuvering spaces S.

[0031] Subsequently, the bar 3 are moved parallel to the axis "X in such a way that the projections 8 of the bar 3 enter into the receiving seats 7a and achieve a position, in which they are completely engaged inside them.

[0032] According to the embodiment shown in the ac-

companying drawings, the projections 8 have a dimension greater than a corresponding dimension of the radial expansions 6, the dimension being measured along the axis X. According to embodiments not shown, this dimension can be smaller, or alternatively the projections 8 and the radial expansions can have the same dimension along the axis X.

[0033] The present invention achieves the object set, overcoming the typical drawbacks of the fabric brushes of the prior art.

[0034] The presence of a discrete number of points of attack between the bars and the support body eliminates the need for demounting the brush from the supports or bearings of the brushing machine before removing the bars, and furthermore it allows an easy demounting of the bars through a limited movement of the bars along the axis of the support body. This limited movement does not require wide spaces in correspondence of one or both the ends of the support body, and demounting the bars is very simple and can be carried out very quickly, so as to reduce the down time of the brushing machine.

[0035] Fig.3 shows a modified embodiment of the invention. Same or equivalent parts are designated with the same reference numbers.

[0036] In this embodiment the brush 1 includes a support body in the form of a core 2. The core is provided with longitudinally extending channels, substantially parallel to the axis X of the brush. Each channel can house a respective bar 3 with bristles 4. The bar is provided with projections 8 engaging into corresponding receiving seats 7a defined in the respective channel. The receiving seats 7a and the projections 8 are shaped such as to form a dove-tail connection. Adjacent receiving seats 7a are distanced from one another by a free space S. Each bar 3 can be connected to the core forming the support body 2 by bringing the bar near the support body 2 and into the channel forming the seats 7a and spaces S. More specifically, the bar is placed with the projections S into the spaces S. Thereafter, the bar is moved parallel to the axis X of the brush 1, such that each projection 8 engages a respective receiving seat 7a. A reverse motion causes disengagement of the bar from the core 2.

[0037] It is understood that the drawing only shows an example given by way of a practical demonstration of the finding, as said finding can vary in forms and arrangements without however departing from the scope of the concept underlying the invention. Any reference numbers in the appended claims are provided to facilitate reading of the claims with reference to the description and to the drawing, and do not limit the scope of protection represented by the claims.

Claims

1. A rotating brush, in particular for fabrics, comprising:

- a support body (2) rotatable around an axis (X);
- at least one bar (3) supporting fringes or bristles (4) suitable to perform brushing of a fabric, said at least one bar (3) being stably mountable on said support body (2);

characterized in that said support body is provided with at least a first set of longitudinally aligned receiving members (7a), and that said at least one bar (3) is provided with corresponding connection members (8) removably engageable with said aligned receiving members (7a), said receiving members being spaced from one another by intercalated maneuvering spaces (S).

2. A brush according to claim 1, **characterized in that** said connection members (8) and said receiving members (7a) define a plurality of points of attack between the respective bar (3) and the support body (2), such that engagement of the bar with the support body (2) and disengagement therefrom are obtained by a limited longitudinal movement of said bar with respect to said support body, to move said connection members (8) from said maneuvering spaces (S) into engagement with said receiving members (7a) and vice-versa.

3. A brush according to claim 1 or 2, **characterized in that** said connection member (8) is a projection on said bar (3) and said receiving member (7a) is a seat on said support body (2).

4. A brush according to one or more of the previous claims, **characterized in that** said support body (2) is provided with at least one radial expansion (6) forming said receiving member (7a) and extending from said axis (X), said at least one bar (3) being provided with at least one projection (8) forming said connection member, stably engageable in a removable manner with said at least one radial expansion (6).

5. A brush according to one or more of the preceding claims, **characterized in that** said support body is provided with at least a first set of longitudinally aligned receiving seats (7a) and that said bar (3) is provided with a corresponding set of projections (8) removably engageable with said aligned receiving seats (7a).

6. A brush according to claim 5, **characterized in that** said projections (8) can be inserted in the respective receiving seats (7a) and extracted therefrom through a translation movement of the bar (3) with respect to the support body (2) along a direction substantially parallel to said axis (X).

7. A brush according to claim 5 or 6, **characterized in that** said longitudinally aligned receiving seats (7a)

are provided on corresponding radial expansions (6) of said support body (2).

8. A brush according to one or more of claims 5 to 7, **characterized in that** said support body (2) is provided with a plurality of sets of longitudinally aligned receiving seats (7a) designed to receive a corresponding plurality of said bars (3), said plurality of sets being angularly arranged around said axis (X).

9. A brush according one or more of claims 4 to 8, **characterized in that** a grooved coupling is provided between said projections (8) and said radial expansions (6) or said receiving seats (7a).

10. A brush according to one or more of claims 4 to 9, **characterized in that** each of said radial expansions (6) is disk-shaped and extends substantially perpendicularly to said axis (X) and around said axis (X) along an entire angular development of the support body (2), each radial expansion (6) being provided with a plurality of peripheral receiving seats (7a) angularly arranged around said axis (X) and engageable by the projections (8) of respective bars (3).

11. A brush according to one or more of claims 4 to 10, **characterized in that** each projection (8) has a dimension smaller than a distance between the respective radial expansion (6) and an adjacent radial expansion (6), said dimension being measured along said axis (X).

12. A brush according to claim 2, **characterized in that** each connection member (8) has a dimension, measured along said axis (X), which is smaller than the maneuvering space (S) between adjacent receiving members (7a) on said support body (2).

13. A mounting method for mounting a brush according to one or more of the previous claims, **characterized in that** it comprises the steps of:

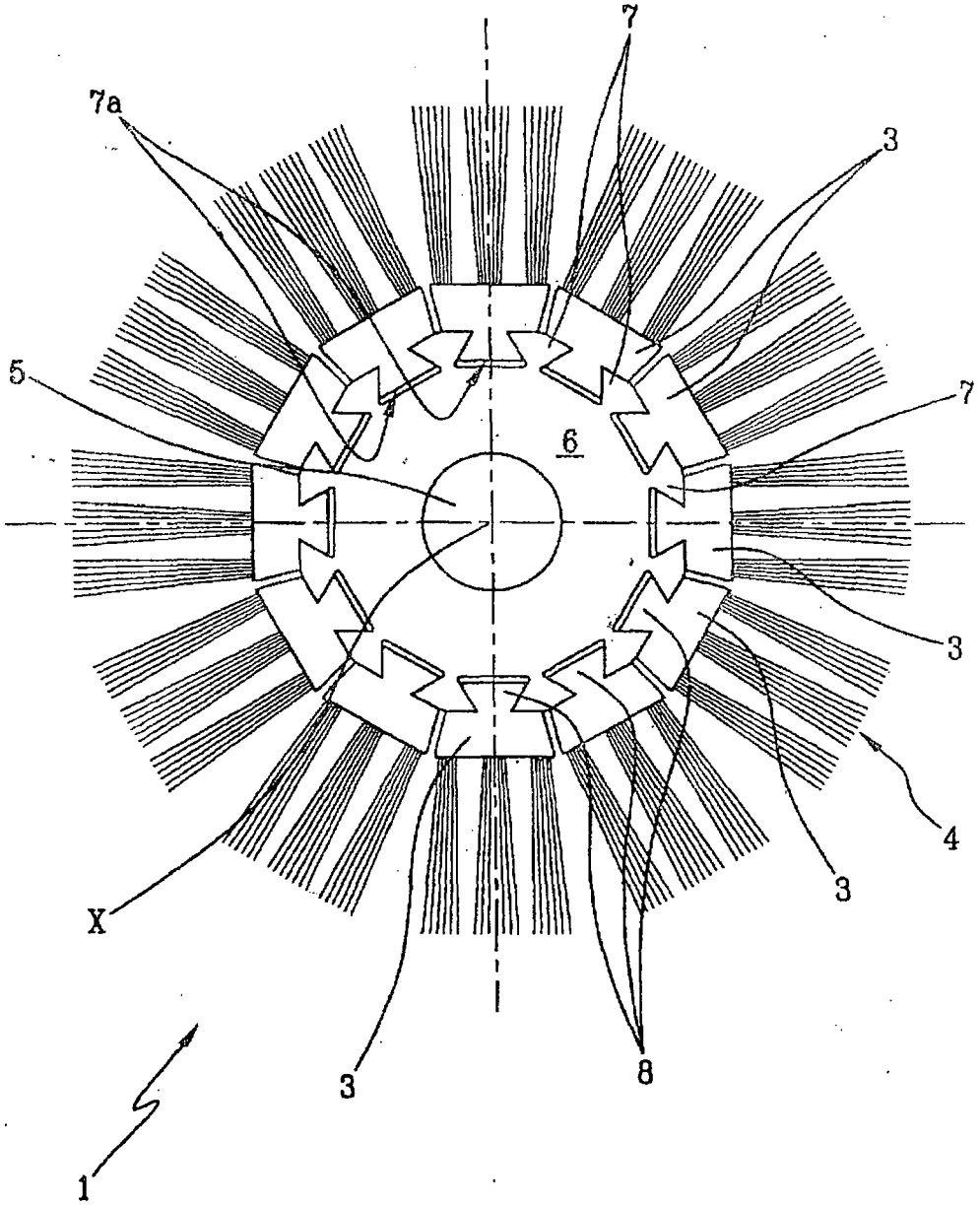
- moving a bar (3) close to the support body (2) arranging connection members (8) of the bar (3) in position intercalated to the receiving members (7a) of the support body (2);
- moving the bar (3) along the axis (X) of the support body (2) in such a way as to interlock the connection members (8) of the bar (3) in said receiving members (7a) of said support body (2).

14. A method according to claim 13, **characterized in that** said step of moving the bar (3) along said axis (X) is carried out until the connection members (8) are entirely engaged with the respective receiving member (7a).

15. A method for demounting a brush according to one or more of claims 1 to 12, **characterized in that** it comprises the step of moving at least one bar (3) along the axis (X) of the support body (2) in such a way as to disengage the connection members (8) of the bar (3) from the receiving members (7a) of the support body (2).

16. A method according to claim 15, **characterized in that** said step of moving the bar (3) along said axis (X) is carried out until the connection members (8) of the bar (3) are entirely arranged in a position intercalated to the receiving seats (7a) of the support body (2).

Fig.1



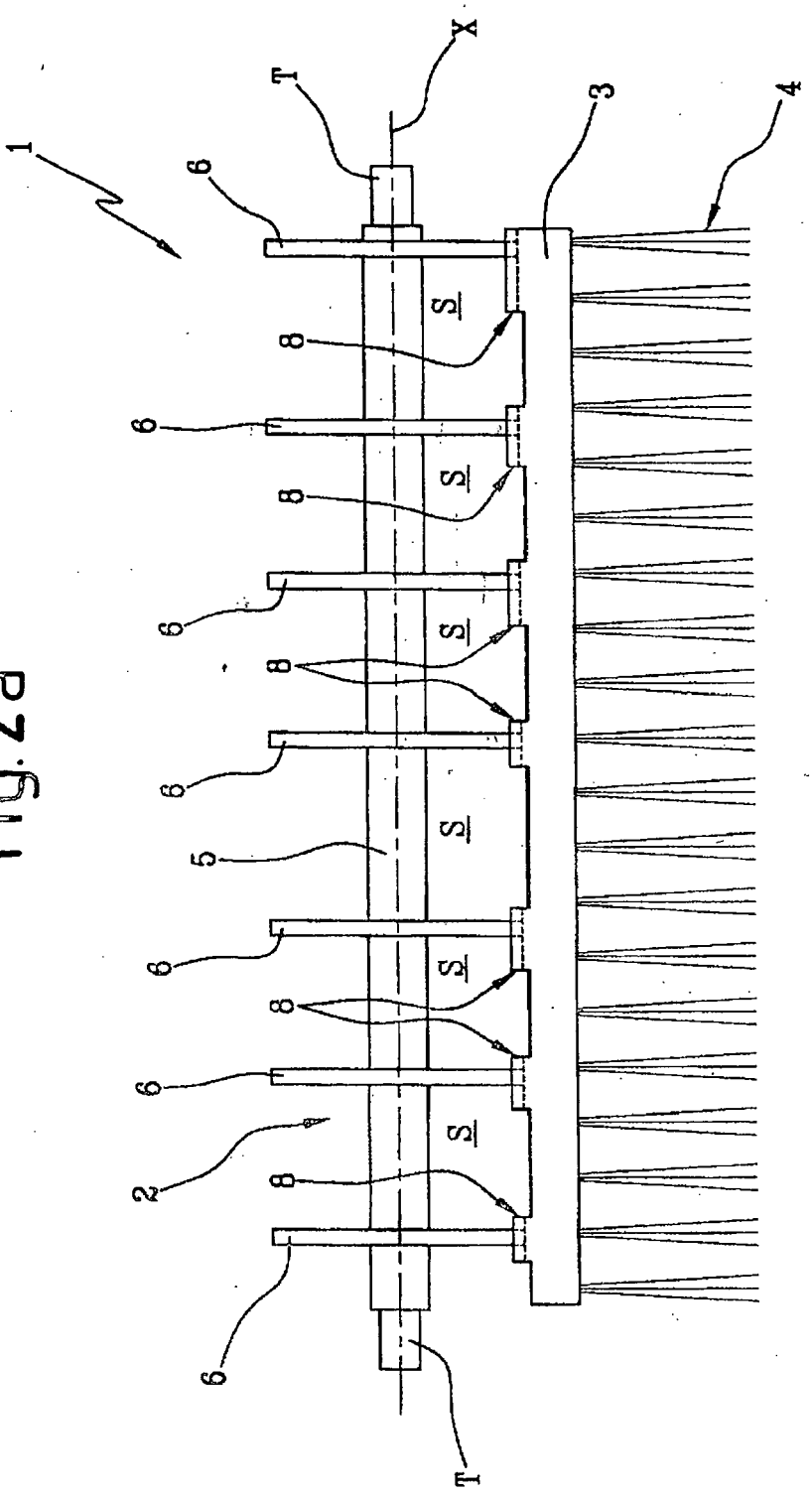


Fig.2a

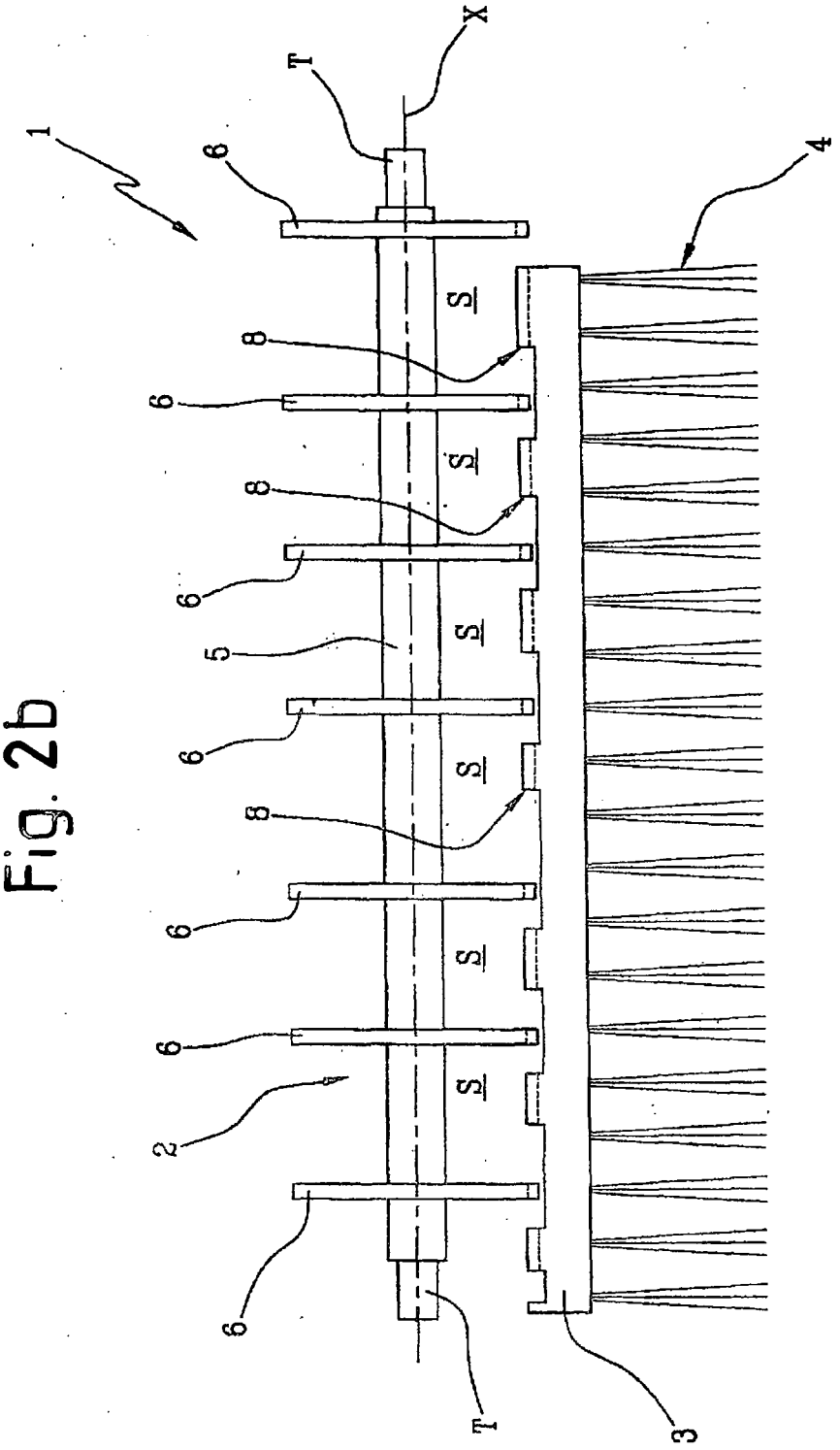


Fig. 2b

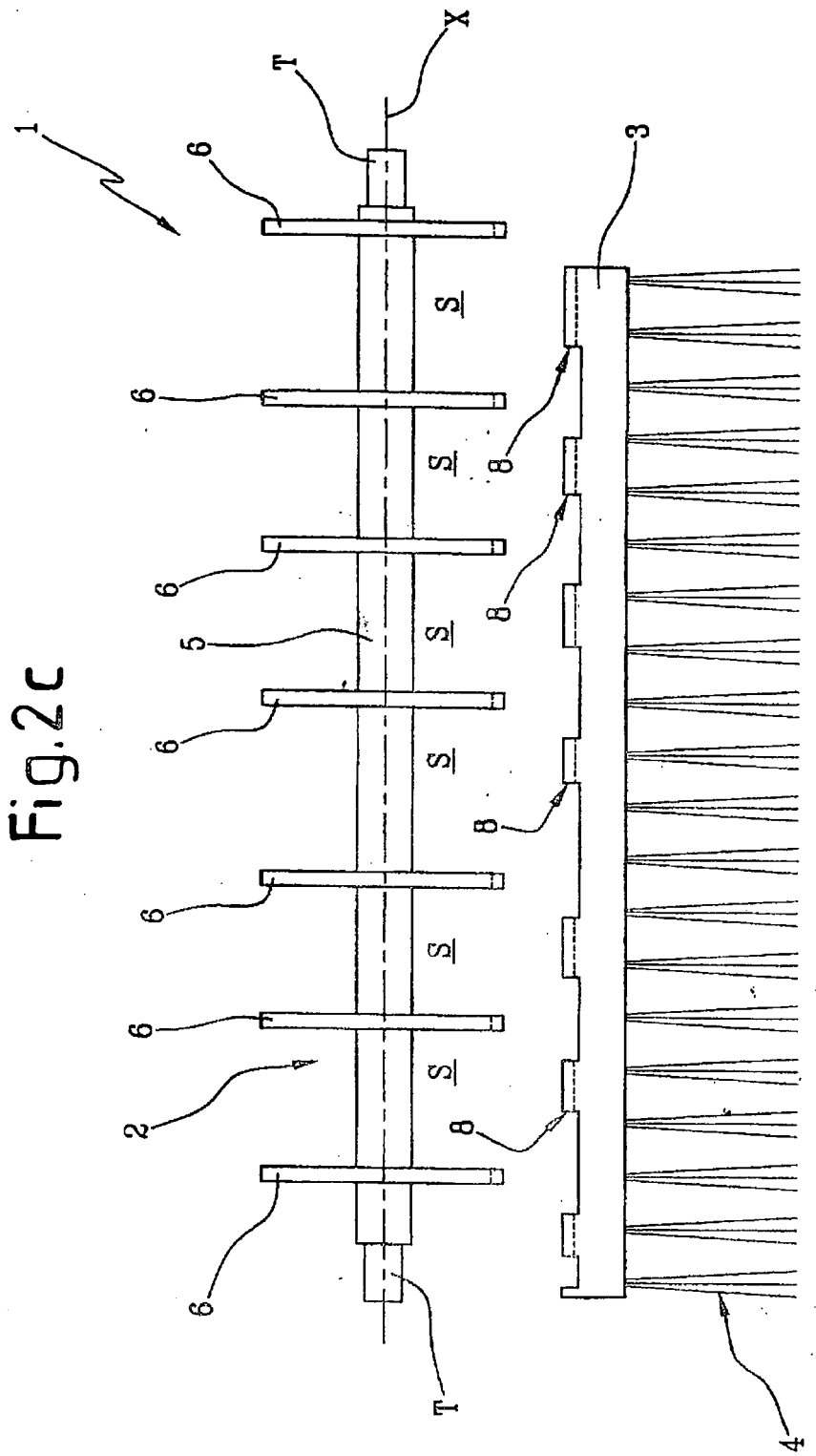


Fig.2c

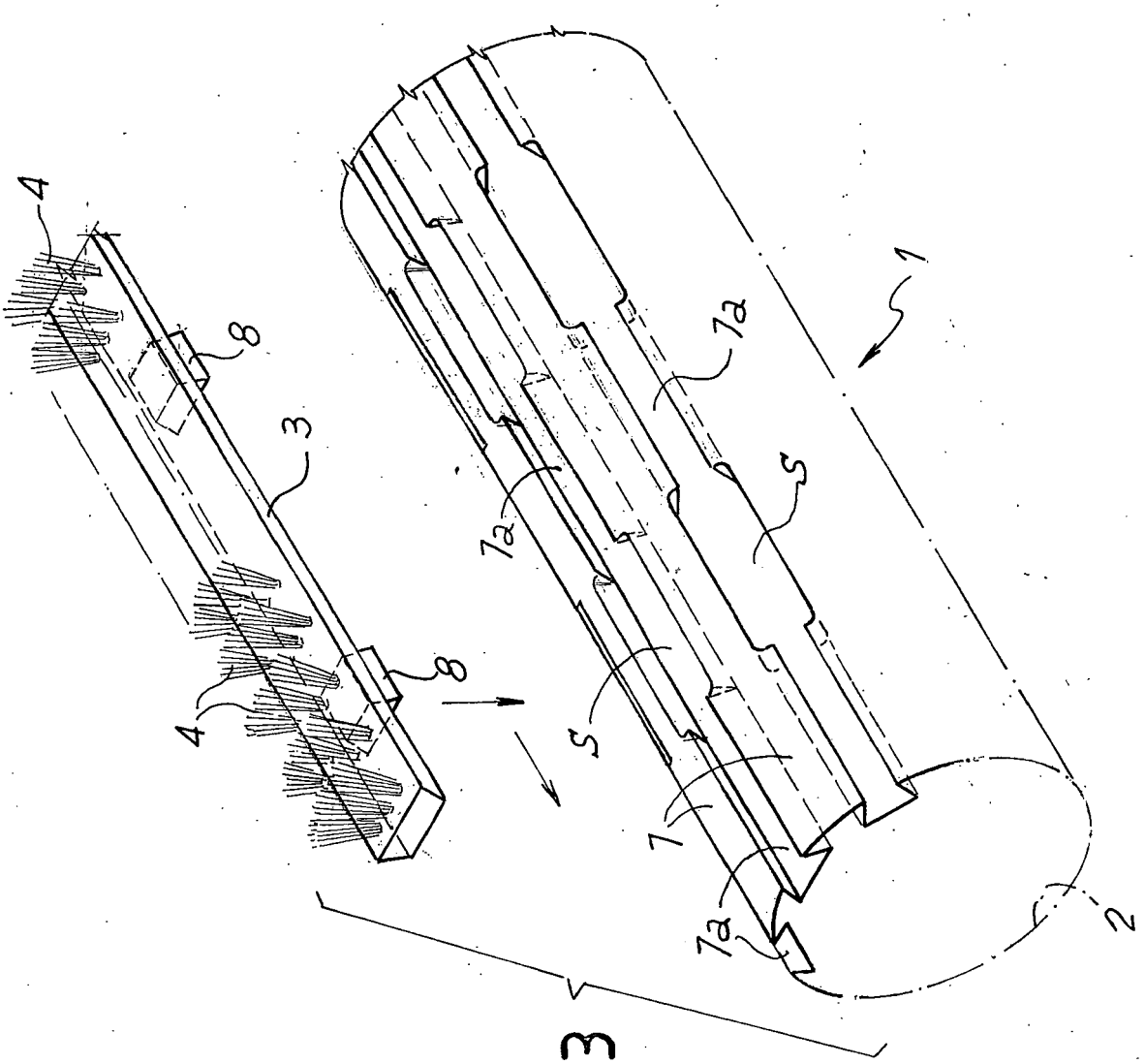


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5509

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 3 324 496 A (HARACZ EDWARD F) 13 June 1967 (1967-06-13) * the whole document * -----	1-3,5,6, 8,12-16	INV. A46B13/00
A	DE 12 90 919 B (JACOB REISLAENDER OHG) 20 March 1969 (1969-03-20) * abstract; figure 3a * -----	1	
A	US 5 396 680 A (BELANGER MICHAEL J [US]) 14 March 1995 (1995-03-14) * abstract; figures 1-4 * -----	1	
A	DE 20 2004 021149 U1 (BTD BARTELDREES GMBH & CO [DE]) 22 February 2007 (2007-02-22) * abstract; figure 2a * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)
A46B A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 November 2008	Nicolás, Carlos

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 42 5509

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
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05-11-2008

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