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(54) **Brushing machine for fabrics**

Bürstmaschine für Gewebe

Machine à brosser pour tissus

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Description

[0001] The present invention relates to a brushing machine used in the field of surface treatment of fabrics.

[0002] It is well known that the brushing of fabrics is carried out by means of specific machines that perform, through the use of one or more brushes, a surface brushing of a fabric while it is in the form of a continuous web. Examples of said machines are described in DE 198 49 606, US-A 400 446, US-A-3 153 836.

[0003] Currently, brushing machines comprising a sequence of brushes interleaved with Idle rollers are well known, wherein the rollers cause a feed of the web of fabric along a zig - zag path, in such a way as to increase an angle of winding of the web of fabric on the brushes and to exert a traction action on the web itself, such that it adheres to the brushes.

[0004] Disadvantageously, in the brushing machines of the type described above the action of the rollers is not sufficient to guarantee a sufficient stretching effect and the web of fabric is not correctly held in contact with the brush. In particular, situations can occur, in which the web of fabric is not sufficiently pressed against the brush and, consequently, the brush cannot exert a sufficiently energetic action. This can leads to the need for further treatment of the web or to the discard of the treated portion if the web of fabric is thereby damaged.

[0005] The technical aim of the present Invention is to provide a fabric brushing machine that allows the disadvantages described above to be solved.

[0006] Within this technical aim, the object of the invention is to provide a fabric brushing machine, which allows high efficiency in surface treatment of fabrics.

[0007] This specified object and further objects are substantially achieved through a fabric brushing machine, according to claim 1 and/or one or more of the dependent claims.

[0008] Below there is the description, by way of no limiting example, of a preferred embodiment of a fabric brushing machine, according to the accompanying drawings, in which:

- figure 1 is a side view of a fabric brushing machine according to the present invention;
- figure 2 is an enlarged side view of a portion of the machine of figure 1;
- figure 3 is a perspective view of a component of the machine of figure 1.

[0009] With reference to the accompanying drawings, number 100 indicates, in its entirety, a fabric brushing machine, in particular for fabrics in the shape of continuous web. In figures 1 and 2, the continuous web of fabric is indicated with the reference number 101. The continuous web 101 is delivered from a feed station 200 and is subsequently fed to an exit station 300, for example in order to be subjected to further treatments.

[0010] The machine 100, having a configuration of substantially known type, comprises six consecutive stations 102, 103, 104, 105, 106, 107, through which the web 101 is made to advance and in correspondence of which a brushing treatment is carried out on a first side 101 a of the web 100.

[0011] The machine 100 further comprises three rotating brushes 108, 109, 110, each of which is rotatable around a respective rotation axis. Each brush 108, 109, 110 is positioned in correspondence of a respective pair of stations 102, 107; 103, 106; 104, 105 in such a way as to treat simultaneously two distinct portions of the same web 101 of fabric. In particular, each brush 108, 109, 110 acts simultaneously, in correspondence of two diametrically opposite portions thereof, on two distinct portions of the web 101.

[0012] According to the embodiment shown in figure 1, the machine 100 comprises a plurality of guide rollers "R1", some of which are idle and some motorized, in order to transfer and to guide the web 101 according to a desired path passing through the above mentioned stations 102, 103, 104, 105, 106, 107. The machine 100 further comprises suitable auxiliary rollers "R2", which are interleaved with the brushes 108, 109, 100, in order to increase an angle of contact of the web 101 on each of the brushes 108, 109, 110.

[0013] The stations 102, 103, 104, 105, 106, 107 are identical to one another. Therefore, only one of the above mentioned stations 102, 103, 104, 105, 106, 107 will be described hereunder, and in particular the station 106. The station 106 is shown in figure 2 as regards the contribution given to it from the present invention, whilst the known components thereof are not included for the sake of simplicity of description.

[0014] The machine 100 comprises a contrast element 1 for each station 102, 103, 104, 105, 106, 107. The contrast element 1 is suitable to act on a second side 101 b of the web of fabric, opposite to the above mentioned first side 101a. At this end, the contrast element 1 is mounted opposite to the respective brush 109 with respect to the web 101 of fabric, and it defines, in cooperation with the brush 109, a nip through which the web 101 is made to advance.

[0015] Advantageously, the contrast element 1 can abut the brush 106 in order to press the web 101 against the brush 109, thus increasing the brushing effect on the first side 101 a of the web 101. At this end, the machine 100 comprises thrust means, not shown, that act on the contrast element 1 in order to maintain it pressed against the brush 109 and, possibly, to move the contrast element 1 towards or away from the brush 109. According to the view of figure 2, the feed of the web 101 occurs according to a direction indicated with "A", whilst the brush 109 rotates around its own axis "X" according to a direction of rotation indicated with "D", which is opposite to the direction "A" of feed of the web 101.

[0016] Figure 3 shows the contrast element 1 according to a preferred embodiment. The contrast element 1 extends along an axis "Y" between a first end 2 and a

second end 3, in correspondence of which support means 4 are provided, which have the function of supporting and guiding the support element 1 during operation of the machine 100. The support means 4 are shown in shape of cylindrical terminals 4a.

[0017] In the illustrated embodiment, the axis "Y" of the contrast element 1 coincides with a prevalent direction of development thereof. Furthermore, the axis "Y" is preferably parallel to the axis "X" of rotation of the brush 109.

[0018] The contrast element 1 has an outer surface 5, which can be directly engaged with the second side 101 b of the web 101 of the fabric, in order to maintain the web 101 pressed against the brush 109 and therefore in contact therewith.

[0019] The outer surface 5 has a first intermediate cylindrical portion 6, which is preferably entirely cylindrical, designed to abut the brush 109 during an operation of the machine 100. Preferably, the above mentioned axis "Y" of the contrast element 1 is an axis of axial symmetry of the first cylindrical portion 6.

[0020] In a position adjacent to the first portion 6, and in correspondence of opposite ends thereof, i.e. between said intermediate first portion 6 and the ends of the contrast element 1, the outer surface 5 has two second portions 7 with partially cylindrical shape. The first portion 6 and the second portions 7 have preferably circular cross section and are mutually coaxial. However, the second portions 7 have a flattened area, which defines a tapered shape of said potions, as will be described in more detail here below. Furthermore, the first portion 6 and the second portions 7 have a same curvature radius, and are mutually connected in a continuous manner, i.e. they form a continuous outer surface. According to figure 3, the first portion 6 and the second portions 7 are convex.

[0021] According to the view of figure 3, the second portions 7 define an extension of a part of the cylindrical surface of the first portion 6, in such a way so as to eliminate discontinuities and/or variations in the diameter during passage from the first portion 6 to the second portions 7.

[0022] According to the preferred and illustrated embodiment, the outer surface 5 of the contrast element 1, surface which is suitable to engage with the brush 109, can be obtained through intersection between a cylindrical surface, preferably with circular cross section, and a pair of planes inclined with respect to the above mentioned axis "Y" of the contrast element 1, i.e. to an axis of symmetry of the above mentioned cylindrical surface. The portion of the above mentioned cylindrical surface not affected by the intersection with the inclined planes forms the first cylindrical portion 6 of the contrast element 1, whilst the portions affected by the intersection with the inclined planes form the second portions 7. In other words, the two end portions 7 have an outer surface which is cylindrical except for the two flattened areas 8, each of which is planar and gradually extends from the outer cylindrical surface towards the respective end and the axis of the contrast element 1.

[0023] From the configuration described above, and from the view of figure 3, it is clear that the second portions 7 present a tapered conformation extending away from the first portion 6. In other words, the cylindrical part of the second portions 7 becomes narrower moving from the first portion 6 towards the corresponding end 2, 3.

[0024] The tapered configuration of the second portions 7 allows to vary the contact area between the contrast element 1 and the brush 109 by varying the angular position of the contrast element 1 around its own axis "Y".

[0025] In fact, the above mentioned second tapered portions 7 can be seen as chamfers 8 obtained on a cylindrical surface, which would normally extend between the ends 2, 3 of the contrast element 1, i.e. as removals of material from this cylindrical surface in order to increasingly reduce the thickness of the contrast element 1 towards the respective one of the above mentioned ends 2, 3. Consequently, by orienting the contrast element 1 in a different manner around its axis "Y" it is possible for the above mentioned flattened portions 8 to face more or less the brush 109 and this leads to a smaller or larger contact surface between the contrast element 1 and the brush 109.

[0026] What described above has the effect of allowing setting of the dimension, measured along the axis "X" of rotation of the brush 109, of a contact surface between the contrast element 1 and the brush 109, thus avoiding that the brush 109 comes into direct contact with the outer surface 5 of the contrast element 1. This in particular can occur if the web 101 of fabric has a limited width, i.e. a width (i.e. a dimension in the cross-machine direction) smaller than a corresponding width of the potential contact surface between the contrast element 1 and the brush 109. Under these circumstances, only a part of the brush 109 intercepts the web 101, whilst the remaining parts could impact on the outer surface 5 of the contrast element 1 causing a surface abrasion thereof and a damage of the brush 109 itself.

[0027] Advantageously, the contrast element 1 can move around an adjustment axis, which coincides with the axis "Y" thereof and the orientation, i.e. the angular position, of the contrast element 1 around said axis "Y" can be adjusted according to the width of the web 101 of fabric to be treated. In particular, the contrast element 1 can be fixed in a stable manner according to a desired angular orientation which is maintained during the entire working cycle of the machine 100. If the web 101 has a decrease in width, or if it is replaced with a web 101 of different width, the angular orientation of the contrast element 1 around its axis "Y" can be adjusted, in such a way that the dimension of the contact surface between the outer surface 5 of the contrast element 1 and the brush 109 is substantially equal to the width of the web 101.

[0028] The chamfers 8 can be thus positioned advantageously in such a way as to cover the excess of the outer surface 5 of the contrast element 1 with respect to

the width of the web 101.

[0029] In order to perform the above described adjustment , the machine 100 comprises adjusting means, not shown, which act on the contrast element 1 in order to position it according to a desired angular orientation around its axis "Y" and to maintain it stably in said angular orientation during normal operation of the machine 100. Preferably, the adjusting means are suitable to set the contrast element 1 in any one of a a plurality of angular orientations around its axis "Y", and more preferably to vary in a continuous manner the orientation of the contrast element 1 around the axis "Y". Continuous variation of the angular orientation of the contrast element 1 around its adjustment axis "Y" allows to vary in a continuous manner the dimension of the contact surface between the brush 109 and the outer surface 5 of the contrast element 1, said dimension being measured along the above mentioned axis "X" of rotation of the brush 109.

[0030] According to figure 3, the contrast element 1 is symmetrical with respect to a plane perpendicular to the axis "Y" of the contrast element 1 itself. According to an embodiment not shown, which is however comprised within the scope of the concept on which the invention is based, the contrast element 1 has only one tapered portion 7, arranged atone end of the first cylindrical portion 6 and extending between said intermediate cylindrical portion 6 and the respective axial end 2 or 3 of the contrast element 1.

[0031] The above description refers to a preferred embodiment, but it is understood that the geometry of the contrast surface of the element 5 can be different from what was described, for example presenting a curvature analogous to that of the brush mounted on the brushing machine.

[0032] The invention was described with reference to a preferred embodiment, but it is understood that equivalent modifications can be made, without however departing from the scope of protection defined by the appended claims.

Claims

1. A fabric brushing machine including at least one rotating brush (109) for surface treatment of a first side (101 a) of a web fabric (101), and a contrast element (1) suitable to define, in cooperation with the brush (109), a nip through which said fabric (101) can pass, said contrast element (1) being placed in correspondence of the brush (109) in order to confine the fabric (101) in a contact region between the brush (109) and the fabric during rotation of the brush, said contrast element (1) having an outer surface (5) which can be directly engaged with a second side (101b) of the web fabric (101) opposite to said first side (101a), in order to maintain the web fabric (101) pressed against the brush (109) and therefore in contact therewith, **characterized in that** said outer surface (5) has a dimension, measured along an axis (X) of rotation of the brush (109), which can be adjusted according to a corresponding width of the web (101) of the treated fabric.

2. A machine according to claim 1, **characterized in that** said dimension of the outer surface (5), measured along said axis (X) of rotation, can vary in a continuous manner between a minimum value and a maximum value through an adjusting movement for adjusting the contrast element (1) around an adjustment axis (Y) thereof.

3. A machine according to claim 1 or 2, **characterized in that** said outer surface (5) is defined by intersection between a cylindrical surface and at least one inclined surface passing through an external generatrix of the cylindrical surface and the axis of symmetry of said cylindrical surface, in such a way as to define a first entirely cylindrical portion (6) of said outer surface (5), and at least one second portion (7) of said outer surface (5), which is partially cylindrical, said second portion being arranged between said first entirely cylindrical portion (6) and a respective end (2, 3) of said contrast element (1).

4. A machine according to claim 3, **characterized in that** said cylindrical surface has a circular cross section.

5. A machine according to claim 3 or 4, **characterized in that** said at least one inclined surface is planar.

6. A machine according to claim 3, 4 or 5, **characterized in that** said second portion (7) of the outer surface (5) has a cylindrical part, which thins from said first portion (6) towards the respective end (2, 3) of the contrast
element (1), said second portion (7) having a tapered conformation.

7. A machine according to one or more of claims 3 to 6, **characterized in that** said first entirely cylindrical portion (6) is arranged in an intermediate position, two partially cylindrical second portions (7) extending respectively between said entirely cylindrical portion (6) and a respective end (2, 3) of said contrast element.

8. A machine according to one or more of the previous claims, **characterized in that** said contrast element (1) is movable according to an adjusting movement around an axis (Y) thereof, said machine (100) comprising adjusting means acting on the contrast element (1) in order to maintain it in a stable position according to a desired orientation at least during an operation of said machine (100).

9. A machine according to claim 3, 4, 5, 6 or 7, **characterized in that** said axis (Y) of the contrast element (1) is an axis of axial symmetry of said first entirely cylindrical portion (6).

10. A machine according to claim 9, **characterized in that** said axis of the contrast element is parallel to the axis of rotation of the brush.

11. A machine according to one or more of the previous claims, **characterized in that** the contrast element (1) is associated with thrust means that act on the contrast element (1) for moving said contrast element (1) towards and away from the brush (109).

Patentansprüche

1. Bürstmaschine für Gewebe, umfassend wenigstens eine drehende Bürste (109) für die Oberflächenbehandlung einer ersten Seite (101a) eines Bahngewebes (101) und ein Gegenelement (1) das dafür geeignet ist, im Zusammenwirken mit der Bürste (109) einen Spalt zu definieren, durch den das Gewebe (101) hindurch gehen kann, wobei das Gegenelement (1) in Übereinstimmung mit der Bürste (109) angeordnet ist, um das Gewebe (101) bei der Drehung der Bürste in einem Kontaktbereich zwischen der Bürste (109) und dem Gewebe einzuspannen, wobei das Gegenelement (1) eine Außenfläche (5) aufweist, die direkt mit einer zweiten Seite (101b) des Bahngewebes (101), die der ersten Seite (101a) gegenüber liegt, in Eingriff gebracht werden kann, um das Bahngewebe (101) gegen die Bürste (109) gedrückt und somit in Kontakt mit dieser zu halten, **dadurch gekennzeichnet, dass** die Außenfläche (5) eine entlang einer Achse (X) der Drehung der Bürste (109) gemessene Größe aufweist, die entsprechend einer Breite der Bahn (101) des behandelten Gewebes angepasst werden kann.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Größe der entlang der Drehachse (X) gemessenen Außenfläche (5) in kontinuierlicher Art variieren kann zwischen einem Minimalwert und einem Maximalwert durch eine Anpassbewegung zum Anpassen des Gegenelements (1) um eine Anpassachse (Y) von ihm.

3. Maschine nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Außenfläche (5) definiert ist durch einen Schnitt zwischen einer zylindrischen Fläche und wenigstens einer geneigten Fläche, die durch eine äußere Generatrix der zylindrischen Fläche und die Symmetrieachse der zylindrischen Fläche hindurch geht, derart, dass ein erster vollständig zylindrischer Abschnitt (6) der Außenfläche (5) und wenigstens ein zweiter Abschnitt (7) der Außenfläche (5), der wenigstens teilweise zylindrisch ist, definiert sind, wobei der zweite Abschnitt zwischen dem ersten vollständig zylindrischen Abschnitt (6) und einem jeweiligen Ende (2, 3) des Gegenelements (1) angeordnet ist.

4. Maschine nach Anspruch 3, **dadurch gekennzeichnet, dass** die zylindrische Fläche einen kreisförmigen Querschnitt aufweist.

5. Maschine nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** die wenigstens eine geneigte Fläche eben ist.

6. Maschine nach Anspruch 3, 4 oder 5, **dadurch gekennzeichnet, dass** der zweite Abschnitt (7) der Außenfläche (5) einen zylindrischen Teil aufweist, der vom ersten Abschnitt (6) zum jeweiligen Ende (2, 3) des Gegenelements (1) dünner wird, wobei der zweite Abschnitt (7) eine konische Ausgestaltung aufweist.

7. Maschine nach einem oder mehreren der Ansprüche 3 bis 6, **dadurch gekennzeichnet, dass** der erste vollständig zylindrische Abschnitt (6) an einer mittleren Position angeordnet ist, wobei sich zwei teilweise zylindrische zweite Abschnitte (7) jeweils zwischen dem vollständig zylindrischen Abschnitt (6) und einem jeweiligen Ende (2, 3) des Gegenelements erstrecken.

8. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Gegenelement (1) entsprechend einer Anpassbewegung um eine Achse (Y) von ihm beweglich ist, wobei die Maschine (100) Anpassmittel umfasst, die auf das Gegenelement (1) wirken, um es in einer stabilen Position entsprechend einer gewünschten Orientierung wenigstens während einem Betreib der Maschine (100) zu halten.

9. Maschine nach Anspruch 3, 4, 5, 6 oder 7, **dadurch gekennzeichnet, dass** die Achse (Y) des Gegenelements (1) ein Achse in axialer Symmetrie zum ersten vollständig zylindrischen Abschnitt (6) ist.

10. Maschine nach Anspruch 9, **dadurch gekennzeichnet, dass** die Achse des Gegenelements parallel zur Drehachse der Bürste ist.

11. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dem Gegenelement (1) Druckmittel zugeordnet sind, die auf das Gegenelement (1) wirken, um das Gegenelement (1) zur Bürste (109) hin und von ihr weg zu bewegen.

Revendications

1. Machine pour brosser le tissu, comprenant au moins une brosse rotative (109) pour un traitement de surface d'un premier côté (101a) d'un tissu de toile (101), et un élément de contraste (1) adapté pour définir, en coopération avec la brosse (109), un point de pinçage à travers lequel ledit tissu (101) peut passer, ledit élément de contraste (1) étant placé au niveau de la brosse (109) afin de confiner le tissu (101) dans une zone de contact entre la brosse (109) et le tissu pendant la rotation de la brosse, ledit élément de contraste (1) ayant une surface extérieure (5) qui peut être directement en prise avec un second côté (101b) du tissu de toile (101) opposé audit premier côté (101a), afin de maintenir le tissu de toile (101) comprimé contre la brosse (109) et donc en contact avec elle, **caractérisée en ce que** ladite surface extérieure (5) a une dimension, mesurée le long d'un axe (X) de rotation de la brosse (109), qui peut être ajustée selon une largeur correspondante de la toile (101) du tissu traité.

2. Machine selon la revendication 1, **caractérisée en ce que** ladite dimension de la surface extérieure (5), mesurée le long dudit axe (X) de rotation, peut varier de manière continue entre une valeur minimale et une valeur maximale, à travers un mouvement d'ajustement pour ajuster l'élément de contraste (1) autour d'un axe d'ajustement (Y) correspondant.

3. Machine selon la revendication 1 ou 2, **caractérisée en ce que** ladite surface extérieure (5) est définie par une intersection entre une surface cylindrique et au moins une surface inclinée passant à travers une génératrice externe de la surface cylindrique et l'axe de symétrie de ladite surface cylindrique, de façon à définir une première partie totalement cylindrique (6) de ladite surface extérieure (5) et au moins une seconde partie (7) de ladite surface extérieure (5), qui est partiellement cylindrique, ladite seconde partie étant disposée entre ladite première partie entièrement cylindrique (6) et une extrémité respective (2, 3) dudit élément de contraste (1).

4. Machine selon la revendication 3, **caractérisée en ce que** ladite surface cylindrique a une section transversale circulaire.

5. Machine selon la revendication 3 ou 4, **caractérisée en ce que** ladite au moins une surface inclinée est plane.

6. Machine selon la revendication 3, 4 ou 5, **caractérisée en ce que** ladite seconde partie (7) de la surface extérieure (5) a une partie cylindrique, qui se rétrécit depuis ladite première partie (6) vers l'extrémité respective (2, 3) de l'élément de contraste (1), ladite seconde partie (7) ayant une forme conique.

7. Machine selon une ou plusieurs des revendications 3 à 6, **caractérisée en ce que** ladite première partie totalement cylindrique (6) est disposée dans une position intermédiaire, deux secondes parties partiellement cylindriques (7) s'étendant respectivement entre ladite partie entièrement cylindrique (6) et une extrémité respective (2, 3) dudit élément de contraste.

8. Machine selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit élément de contraste (1) est mobile selon un mouvement d'ajustement autour d'un axe (Y) correspondant, ladite machine (100) comprenant des moyens d'ajustement agissant sur l'élément de contraste (1), afin de le maintenir dans une position stable selon une orientation souhaitée au moins pendant une opération de ladite machine (100).

9. Machine selon les revendications 3, 4, 5, 6 ou 7, **caractérisée en ce que** ledit axe (Y) de l'élément de contraste (1) est un axe de symétrie axiale de ladite première partie entièrement cylindrique (6).

10. Machine selon la revendication 9, **caractérisée en ce que** ledit axe de l'élément de contraste est parallèle à l'axe de rotation de la brosse.

11. Machine selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** l'élément de contraste (1) est associé à des moyens de poussée qui agissent sur l'élément de contraste (1) pour déplacer ledit élément de contraste (1) vers la brosse (109) et dans une direction opposée à celle-ci.

Fig.1

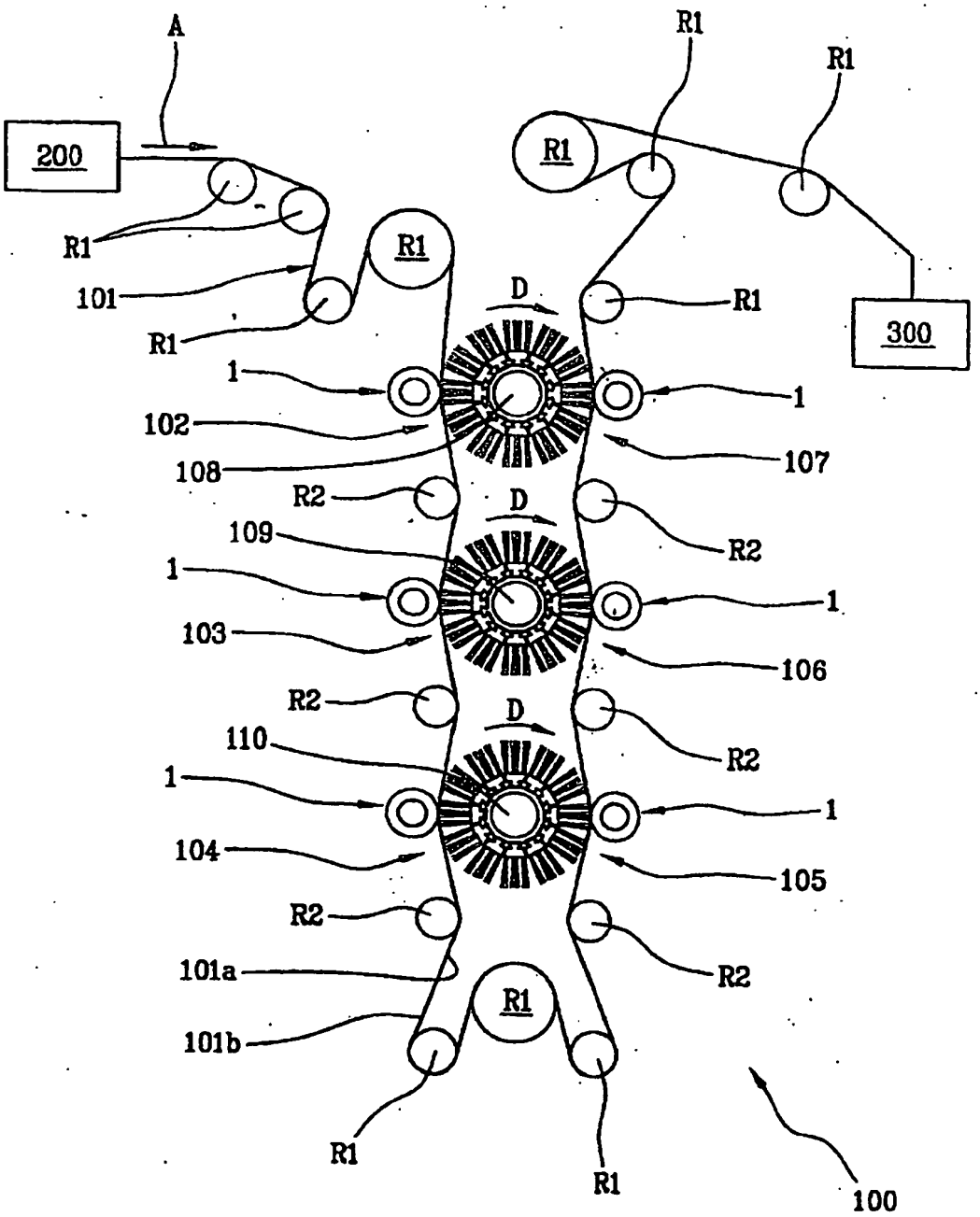
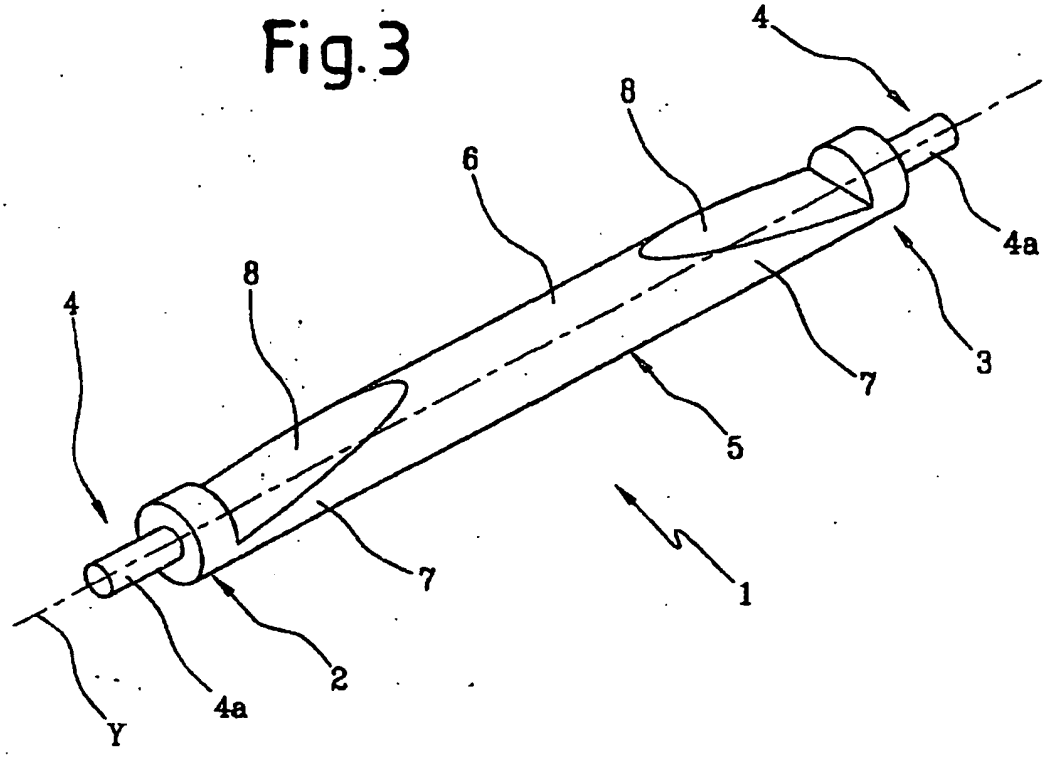

A
200
R1
101
R1
R1
R1
R1
R1
R1
300
D
1
102
108
R2
109
1
103
R2
110
1
104
R2
101a
101b
R1
R1
R1
1
107
D
R2
1
106
D
R2
1
105
R2
R1
100

Fig.3



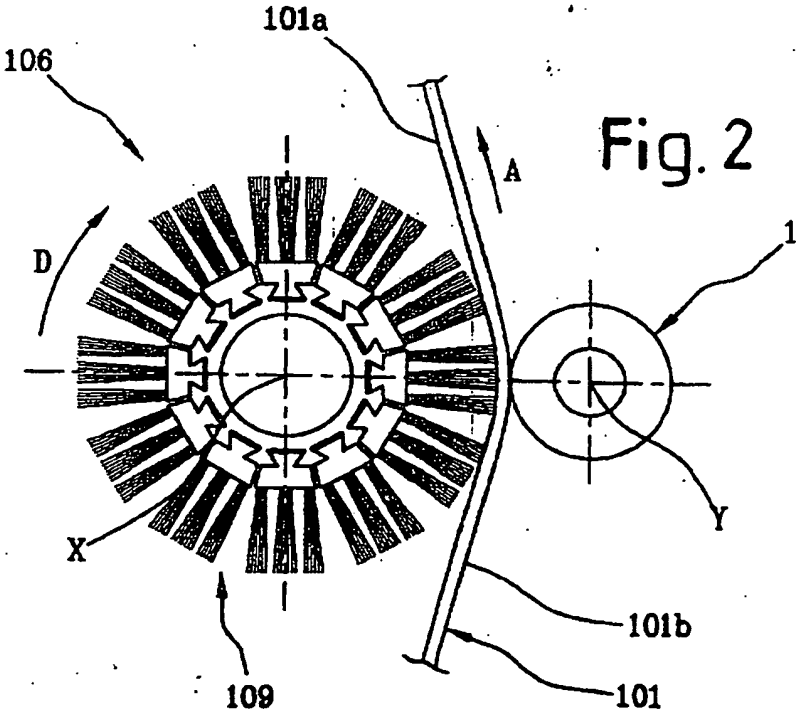


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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