

(19)



(11)

EP 1 647 201 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
05.09.2007 Bulletin 2007/36

(51) Int Cl.:
A46B 3/14 (2006.01) A46B 13/00 (2006.01)

(21) Application number: **04077736.9**

(22) Date of filing: **08.10.2004**

(54) **Brush ring assembly**

Bürstenringanordnung

Assemblage d'une brosse annulaire

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**

(43) Date of publication of application:
19.04.2006 Bulletin 2006/16

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(56) References cited:
**DE-B- 1 132 891 US-A- 3 839 763
US-A- 4 998 316 US-B1- 6 205 609**

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Description

[0001] The invention relates to a ring-shaped brush comprising a number of brush-rings each consisting of a ring-shaped core part and a radially protruding brush part, which brush-rings can be axially fixed one after another on a shaft-shaped pick-up instrument of a sweeping machine, said ring-shaped core part comprising a number of deformations along its circumference.

[0002] Such a brush is known by US 6,205,609 B1. In this known brush the flat surface of said ring-shaped core part is deformed such that a descending part is followed by a corresponding ascending part. By this a relatively equal brush thread division along the formed cylindrical surface of the finished brush for a sweeping machine is obtained.

[0003] It is, however, not possible to adjust the number of brush-rings placed against each other on the shaft-shaped pick-up instrument and so it is not possible to adjust the sweeping intensity and/or the number of sweeping threads per surface unit.

[0004] The object of the invention is to raise this disadvantage and to provide an improved brush.

[0005] According to the invention such an improved brush is characterized in that each ring-shaped core part is shaped such that along its circumference a multiple set of deforming steps is present, each set comprising at least two descending steps followed by one ascending step.

[0006] The advantage is, that as regards intensity of the brush surface, a very flexible adjustable brush ring assembly is created, which assembly can be used for very different, more or less intensive surfaces to be swept. The economy is also in the benefit, because by adjustment, the surface to be swept can mechanically be less affected and for lighter sweeping work, one can use less brush rings for the cylindrical brush ring assembly.

[0007] Further, the device according to the invention is further developed in such a way, that n is at least 3 and with larger diameters preferably 5 and more, in which the mentioned ring-shaped core part is applied rotation fixed by means of an axial catch pin and groove construction along the radial inner circumference of the ring-shaped core part and along the radial outer circumference of the mentioned shaft-shaped pick-up instrument.

[0008] The advantages are, that an optimal adjustment can be reached and with that, the rotation fixation of the brush rings is also reasonably simple to do.

[0009] Furthermore, the device according to the invention is further developed in such a way, that the mentioned ring-shaped brushes, placed on the shaft-shaped pick-up instrument of the sweeping machine can be locked at the ends with a fast mountable flange or disc construction.

[0010] The advantage is a very handy and simple catch pin- and groove construction to mount and lock the separate brush rings in the required position onto the shaft-

shaped pick-up instrument.

[0011] The preferred construction of the invention will be described by way of example, and with reference to the accompanying drawing.

[0012] In which:

Fig. 1 shows a view in oblique projection of the core part of a separate brush ring, in which the radial protruding fibres are left out and the core part is constructed according to a preferred embodiment of the invention, for a compact transport and stock of it and to be able to form several densities of the brush ring assembly;

Fig. 2 shows a view in oblique projection of the most open stacked or placed beside each other brush rings, shown without the fibres forming the brush parts, according to the invention;

Fig. 3A-3C shows a partly side view along the circumference of the stacking or placing possibilities of the brush rings in the most dense, medium and most open stack, according to the invention;

Fig. 4 shows a front view of the complete brush ring according to a preferred embodiment of the invention;

Fig. 5 shows a cross-section over the line V-V of figure 4;

Fig. 6 shows a front view of the core part of the brush ring in scale; and

Fig. 7 shows a front view over the line VII of figure 6.

[0013] Figure 1 shows a front view in oblique projection of the most dense stacking of the core part 2 of the separate brush ring 1 (see figure 4), in which the radially protruding fibres 7 (see figure 4) are left out. The core part 2 is deformed each time in at least two steps or positions 5-4 and 4-3 descending and each time in one step 3-5 ascending almost vertical to the flat surface to the original ring-shaped core part 2. The rotation fixation of the core parts 2 and 2¹ is in this embodiment constructed by the centric protruding instrument or cams or catch pins 6, which stick into the not shown axial grooves of the shaft-shaped pick-up instrument. The mentioned axial grooves are applied over a suitable angle dependant on the value n on or over the shaft-shaped pick-up instrument in order to create the positions of the core parts 2 and 2¹ to respectively the most dense, medium and most open brush or by more steps into even more positions.

[0014] Figure 2 shows the most open stacked brush rings in oblique projection, as also shown in figure 3C. At the most open brush a minimum quantity of brush rings 1 come onto the not shown shaft-shaped pick-up instrument of the sweeping machine.

[0015] Figures 3A, 3B and 3C show in side view along the circumference of the brush ring 1 (see also figure 4),

the most dense stacking (figure 3A), the medium stacking (figure 3B) and the most open stacking of the core parts 2 and 2¹ of the brush rings 1 at an n of 3, in which n shows the number of deformations of the descending and ascending steps along the circumference vertical on-

to the brush surface of the core part 2, 2¹.
[0016] Figure 4 shows a front view of the complete brush ring 1, in which the core part 2, 2¹ is shown in steps with the same indication numbers of steps 5-4, 4-3 and 3-5 or 5¹-4¹, 4¹-3¹ and 3¹-5¹. The core part 2, 2¹ with the radial brush part 7 is mostly made as a whole of plastic, such as, for example, polypropylene.

[0017] Figure 5 shows over the line V-V of figure 4 a cross-section of the brush ring 1 according to a preferred embodiment of the invention. The different steps and parts are each time indicated with the same numbers.

[0018] Figure 6 shows a front view of the core part 2 of the brush ring 1 only, in which the different steps of 5-4, 4-3 and 3-5 are shown along the circumference of the 20 mm broad edge. Also the catch pins 6, in this case 4 pieces, are shown. The successive core parts can be turned over suitable angles to lie against the different surfaces 5, 4 and 3, through which the catch pins 6 can be turned over the mentioned angles over the grooves in the shaft-shaped pick-up instrument, through which a suitable brush density s created.

[0019] Figure 7 shows a side view over the line VII of figure 6 for clarification, in which the brush threads are left out.

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

Claims

1. Ring-shaped brush comprising a number of brush-rings each consisting of a ring-shaped core part (2,2¹) and a radially protruding brush part (7), which brush-rings can be axially fixed one after another on a shaft-shaped pick-up instrument of a sweeping machine, said ring-shaped core part comprising a number of deformations along its circumference, **characterized in that** each ring-shaped core part is shaped such that along its circumference a multiple (n) set of deforming steps is present, each set comprising at least two descending steps (5-4,4-3;5¹-4¹,4¹-3¹) followed by one ascending step (3-5;3¹-5¹).
2. Device as claimed in claim 1, **characterized in that**, n is at least 3 and with larger diameters preferably 5 and more.
3. Device as claimed in claim 1, **characterized in that**, the mentioned ring-shaped core part (2, 2¹) is applied rotation fixed by means of an axial catch pin and groove construction along the radial inner circumference of the ring-shaped core part (2, 2¹) and along the radial outer circumference of the mentioned shaft-shaped pick-up instrument.
4. Device as claimed in claim 1, **characterized in that**, the depth of the descending steps (5-4, 4-3 and 5¹-4¹, 4¹-3¹) lies between 5 mm and 50 mm, preferably mostly 10 mm.
5. Device as claimed in claim 1, **characterized in that**, the disc thickness of the mentioned ring-shaped core part (2, 2¹) lies between 10 mm and 60 mm, preferably 30 mm, and that the ring width lies between 10 mm and 50 mm, preferably approximately 20 mm, at a material choice of plastic, such as, for example, polypropylene.
6. Device as claimed in claims 1-3, **characterized in that**, the disc thickness of the mentioned ring-shaped core part lies between 5 mm and 50 mm, preferably 15 mm, and the ring width lies between 10 mm and 60 mm, preferably 20 mm, at a material choice of metal, such as, for example, steel.
7. Device as claimed in aforementioned claims, **characterized in that**, the outer diameter X of the mentioned core part (2, 2¹) can be minimally 80 mm and is constructive suitable at a usual outer diameter of the matching brush part (7) varying from 200 mm to approximately 1500 mm.
8. Device as claimed in claims 1, 3, **characterized in that**, the mentioned catch pin and groove construction consist of at least 3 and preferably more axial grooves along the circumference of the mentioned shaft-shaped pick-up instrument and at the mentioned groove fitting centric protruding instruments, cams or catch pins (6).
9. Device as claimed in aforementioned claims, **characterized in that**, the mentioned ring-shaped brushes (1), placed on the shaft-shaped pick-up instrument of the sweeping machine can be locked at the ends with a fast mountable flange or disc construction.
10. Device as claimed in claims 8, 9, **characterized in that**, the mentioned shaft-shaped pick-up instrument usually consists of a tube with along the circumference in axial direction the mentioned grooves for the catch pins (6), in which the number of grooves is such, that the core parts (2, 2¹) are adjustable in relation to each other over angles fitting the number of adjusted steps of the required brush density.

Patentansprüche

1. Ringförmige Bürste mit einer Anzahl von Bürstenringen, von denen jeder aus einem ringförmigen Kernstück (2, 2') und einem radial abstehenden Bürstenteil (7) besteht, wobei die Bürstenringe axial nacheinander auf einem schaffförmigen Aufnahmeinstrument einer Kehrmaschine befestigt werden können, wobei das ringförmige Kernstück eine Anzahl von Deformationen entlang seines Umfangs umfasst, **dadurch gekennzeichnet, dass** jedes ringförmige Kernstück so geformt ist, dass entlang seines Umfangs eine multiple Gruppe von (n) deformierenden Stufen vorhanden ist, wobei jede Gruppe aus mindestens zwei absteigenden Stufen (5-4, 4-3, 5'-4', 4'-3'), gefolgt von einer aufsteigenden Stufe (3-5, 3'-5'), besteht.
2. Gerät nach Anspruch 1, **dadurch gekennzeichnet, dass** n mindestens 3 beträgt, und - bei größeren Durchmessern - vorzugsweise 5 und mehr beträgt.
3. Gerät nach Anspruch 1, **dadurch gekennzeichnet, dass** das ringförmige Kernstück (2, 2') rotationsfest mit Hilfe einer axialen Splint- und Nutkonstruktion entlang des radialen inneren Umfangs des ringförmigen Kernstücks (2, 2') und entlang des radialen äußeren Umfangs des erwähnten schaffförmigen Aufnahmeinstruments befestigt ist.
4. Gerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Tiefe der absteigenden Stufen (5-4, 4-3 und 5'-4', 4'-3') zwischen 5 mm und 50 mm liegt, vorzugsweise zumeist bei 10 mm.
5. Gerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Scheibendicke des ringförmigen Kernstücks (2, 2') zwischen 10 mm und 60 mm liegt, vorzugsweise bei 30 mm, und dass die Ringbreite zwischen 10 mm und 50 mm liegt, vorzugsweise etwa bei 20 mm, bei einer Wahl des Materials aus Kunststoff, wie z.B. Polypropylen.
6. Gerät nach Anspruch 1 - 3, **dadurch gekennzeichnet, dass** die Scheibendicke des erwähnten ringförmigen Kernstücks zwischen 5 mm und 50 mm liegt, vorzugsweise bei 15 mm, und dass die Ringbreite zwischen 10 mm und 60 mm liegt, vorzugsweise bei 20 mm, bei einer Wahl des Materials aus Metall, wie z.B. Stahl.
7. Gerät nach den vorangegangenen Ansprüchen, **dadurch gekennzeichnet, dass** der äußere Umfang X des Kernstücks (2, 2') minimal 80 mm sein kann und konstruktionsgeeignet mit einem üblichen äußeren Durchmesser des kompatiblen Bürstenteils (7) passend ist, der zwischen 200 mm und etwa 1500 mm variiert.

8. Gerät nach Anspruch 1 und 3, **dadurch gekennzeichnet, dass** die erwähnte Splint- und Nutkonstruktion aus mindestens 3, vorzugsweise aber mehr axialen Nuten entlang des Umfangs des erwähnten schaffförmigen Aufnahmeinstruments und an den erwähnten zentrisch vorstehenden, in die Nut passenden Instrumenten, Nocken oder Splinte (6) besteht.
9. Gerät nach den vorangegangenen Ansprüchen, **dadurch gekennzeichnet, dass** die ringförmigen Bürsten (1), die auf dem schaffförmigen Aufnahmeinstrument der Kehrmaschine platziert sind, an den Enden mit einer schnell montierbaren Flansch- oder Scheibenkonstruktion fixiert werden können.
10. Gerät nach den Ansprüchen 8 und 9, **dadurch gekennzeichnet, dass** das erwähnte schaffförmige Aufnahmeinstrument gewöhnlich aus einem Rohr mit den erwähnten axialen Nuten für die Splinte (6) entlang des Umfangs besteht, wobei die Anzahl der Nuten so ist, dass die Kernstücke (2, 2') im Verhältnis zueinander über Winkel anpassbar sind, die zu der Anzahl der angepassten Stufen der geforderten Bürstendichte passen.

Revendications

1. Brosse annulaire comprenant un certain nombre d'anneaux de brosse composé chacun d'une partie centrale en forme d'anneau (2, 2') et d'une partie de brosse saillant radialement (7), lesquels anneaux de brosse peuvent être fixés axialement l'un après l'autre sur un instrument de ramassage en forme d'arbre d'une machine de balayage, ladite partie centrale en forme d'anneau comprenant un certain nombre de déformations le long de sa circonférence, **caractérisée en ce que** chaque partie centrale en forme d'anneau est conformée de sorte que le long de sa circonférence, un ensemble multiple (n) de gradins de déformation soit présent, chaque ensemble comprenant au moins deux gradins descendants (5-4, 4-3 ; 5'-4', 4'-3') suivis d'un gradin ascendant (3-5, 3'-5').
2. Dispositif selon la revendication 1, **caractérisé en ce que** n est au moins égal à 3 et, avec des diamètres supérieurs, de préférence égal à 5 et plus.
3. Dispositif selon la revendication 1, **caractérisé en ce que** la partie centrale en forme d'anneau mentionnée (2, 2') est appliquée en rotation et fixée au moyen d'un doigt axial d'entraînement et d'une structure de cannelure le long de la circonférence interne radiale de la partie centrale en forme d'anneau (2, 2') et le long de la circonférence externe radiale de l'instrument de ramassage en forme d'arbre men-

tionné.

angles adaptés au nombre de gradins ajustés selon la densité de brosse requise.

4. Dispositif selon la revendication 1, **caractérisé en ce que** la profondeur des gradins descendants (5-4, 4-3 et 5¹-4¹, 4¹-3¹) se situe entre 5 mm et 50 mm, de préférence essentiellement 10 mm. 5

5. Dispositif selon la revendication 1, **caractérisé en ce que** l'épaisseur de disque de la partie centrale en forme d'anneau mentionnée (2, 2¹) se situe entre 10 mm et 60 mm, de préférence 30 mm, et que la largeur de l'anneau se situe entre 10 mm et 50 mm, de préférence approximativement 20 mm, avec un choix de matériau de plastique comme, par exemple, le polypropylène. 10
15

6. Dispositif selon l'une des revendications 1 à 3, **caractérisé en ce que** l'épaisseur de disque de la partie centrale en forme d'anneau mentionnée se situe entre 5 mm et 50 mm, de préférence 15 mm, et la largeur d'anneau se situe entre 10 mm et 60 mm, de préférence 20 mm, avec un choix de matériau métallique, comme, par exemple, l'acier. 20

7. Dispositif selon l'une des revendications précédentes, **caractérisé en ce que** le diamètre extérieur X de la partie centrale mentionnée (2, 2¹) peut être au minimum de 80 mm et est adapté, du point de vue de la construction, à un diamètre extérieur habituel de la partie de brosse adaptée (7) variant de 200 mm à approximativement 1500 mm. 25
30

8. Dispositif selon l'une des revendications 1 et 3, **caractérisé en ce que** le doigt d'entraînement et la structure de cannelure mentionnés sont composés d'au moins 3 cannelures axiales, et de préférence davantage, le long de la circonférence de l'instrument de ramassage en forme d'arbre mentionné et au niveau des instruments saillants centraux de fixation de cannelure, cames ou doigts d'entraînement (6) mentionnés. 35
40

9. Dispositif selon l'une des revendications précédentes, **caractérisé en ce que** les brosses en forme d'anneau mentionnées (1), placées sur l'instrument de ramassage en forme d'arbre de la machine de balayage peuvent être bloquées aux extrémités par une construction à bride ou à disque à montage rapide. 45
50

10. Dispositif selon l'une des revendications 8 et 9 **caractérisé en ce que** l'instrument de ramassage en forme d'arbre mentionné consiste habituellement en un tube muni, sur sa circonférence dans la direction axiale, des cannelures mentionnées pour les doigts d'entraînement (6), dans lequel le nombre de cannelure est tel que les parties centrales (2, 2¹) sont réglables les unes par rapport aux autres sur des 55

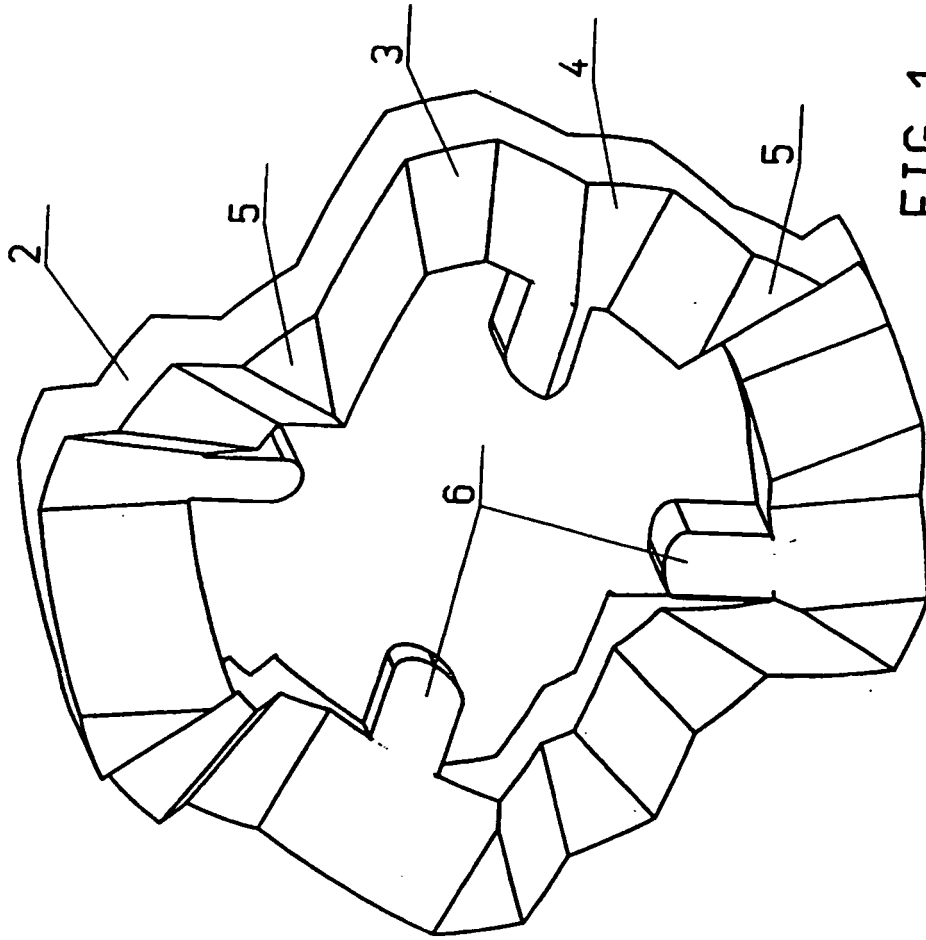


FIG. 1.

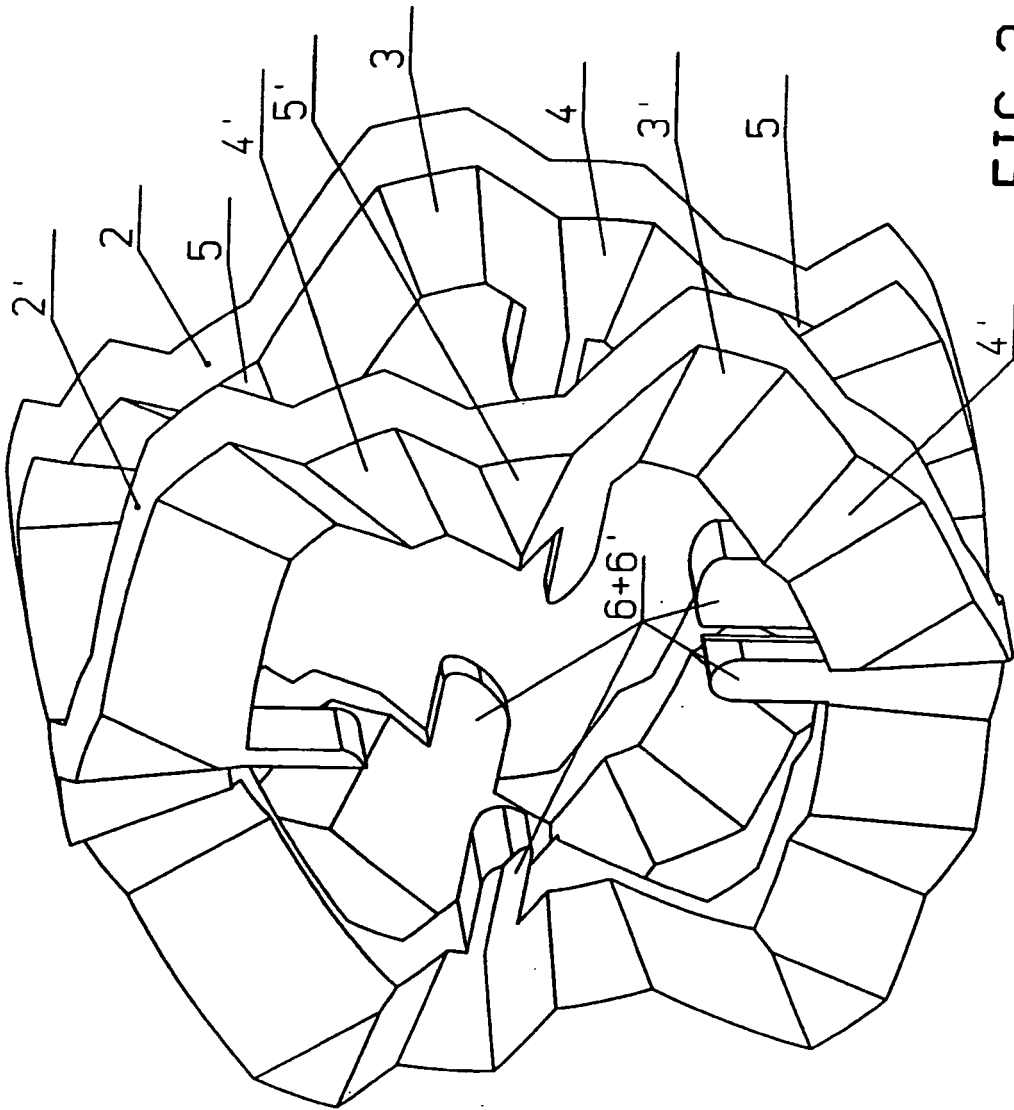
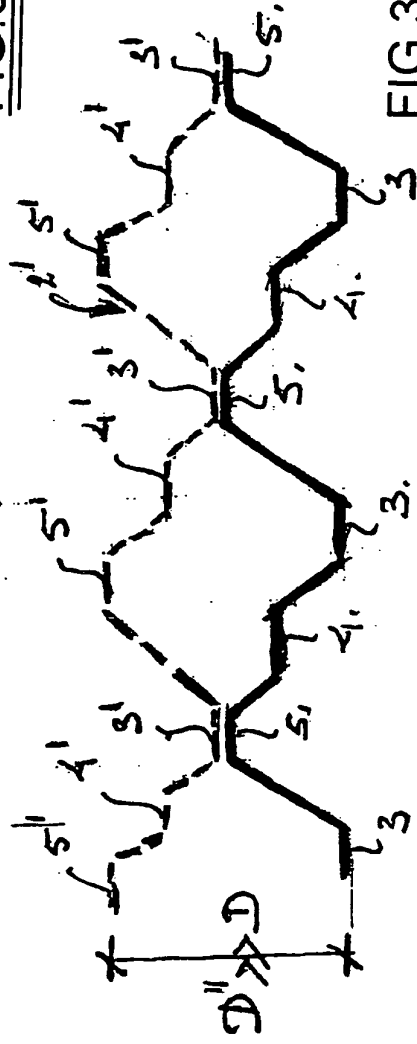
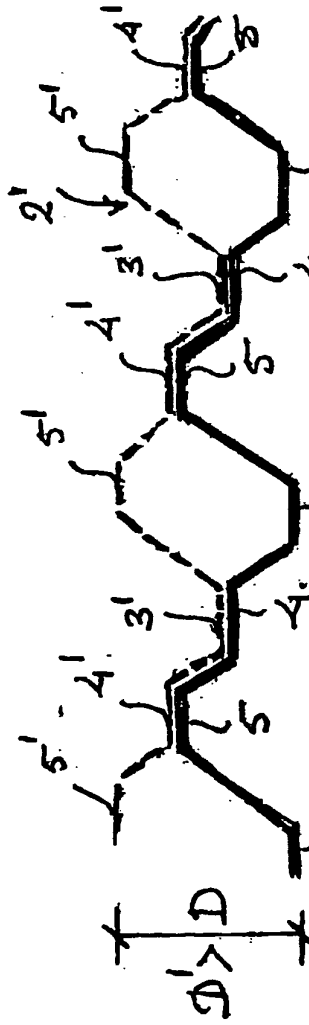
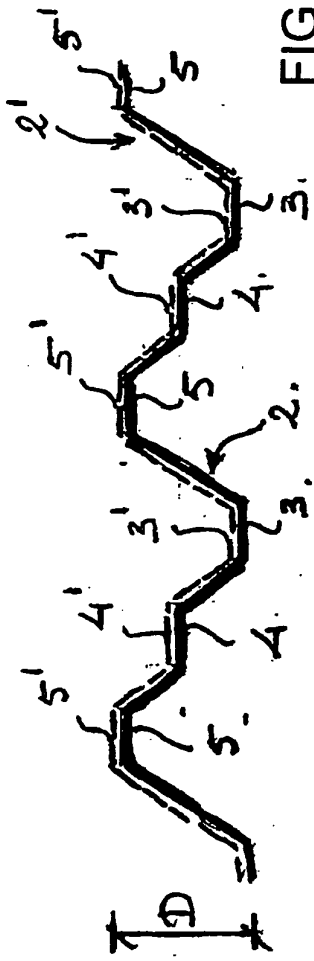


FIG. 2.



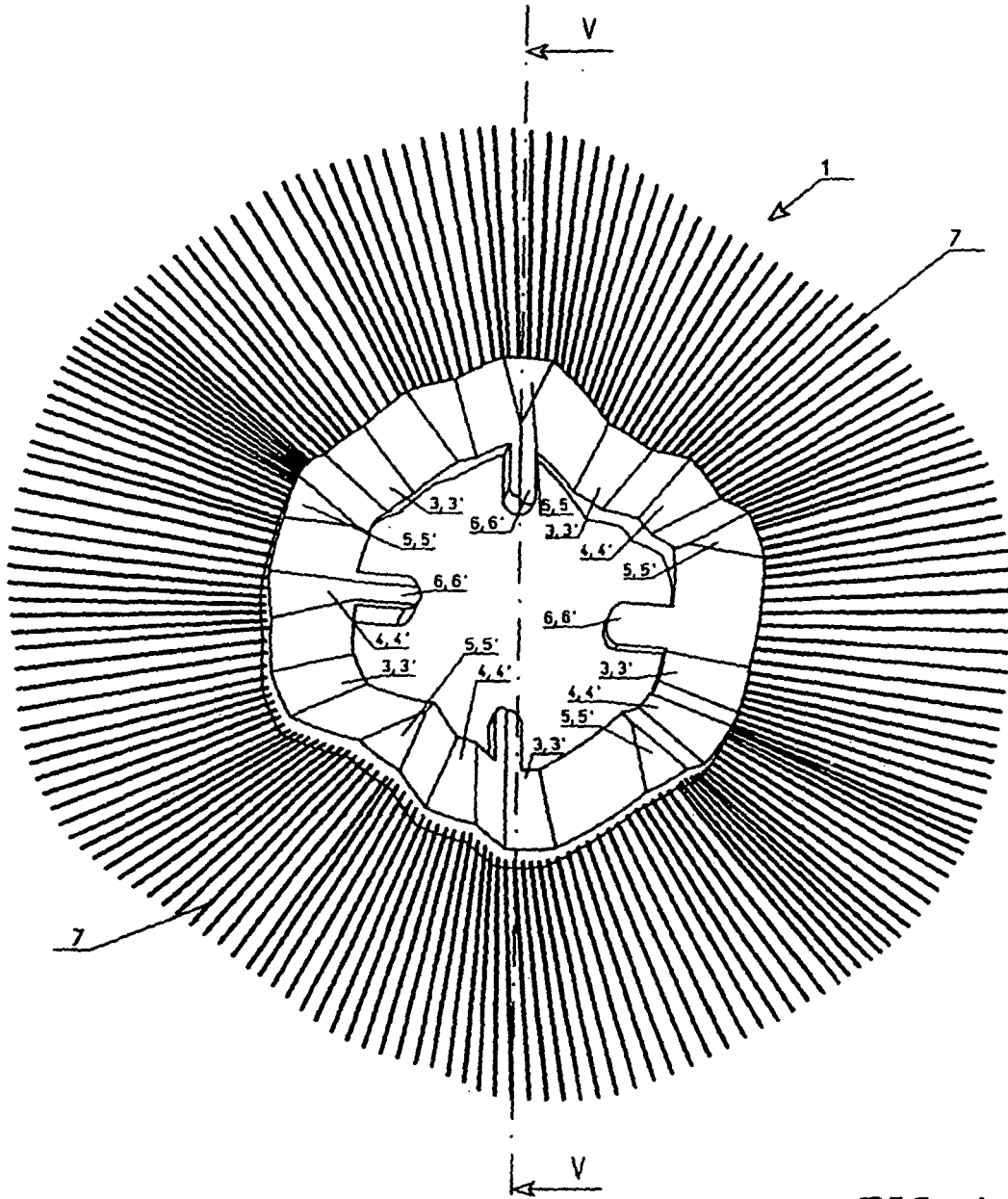


FIG. 4.

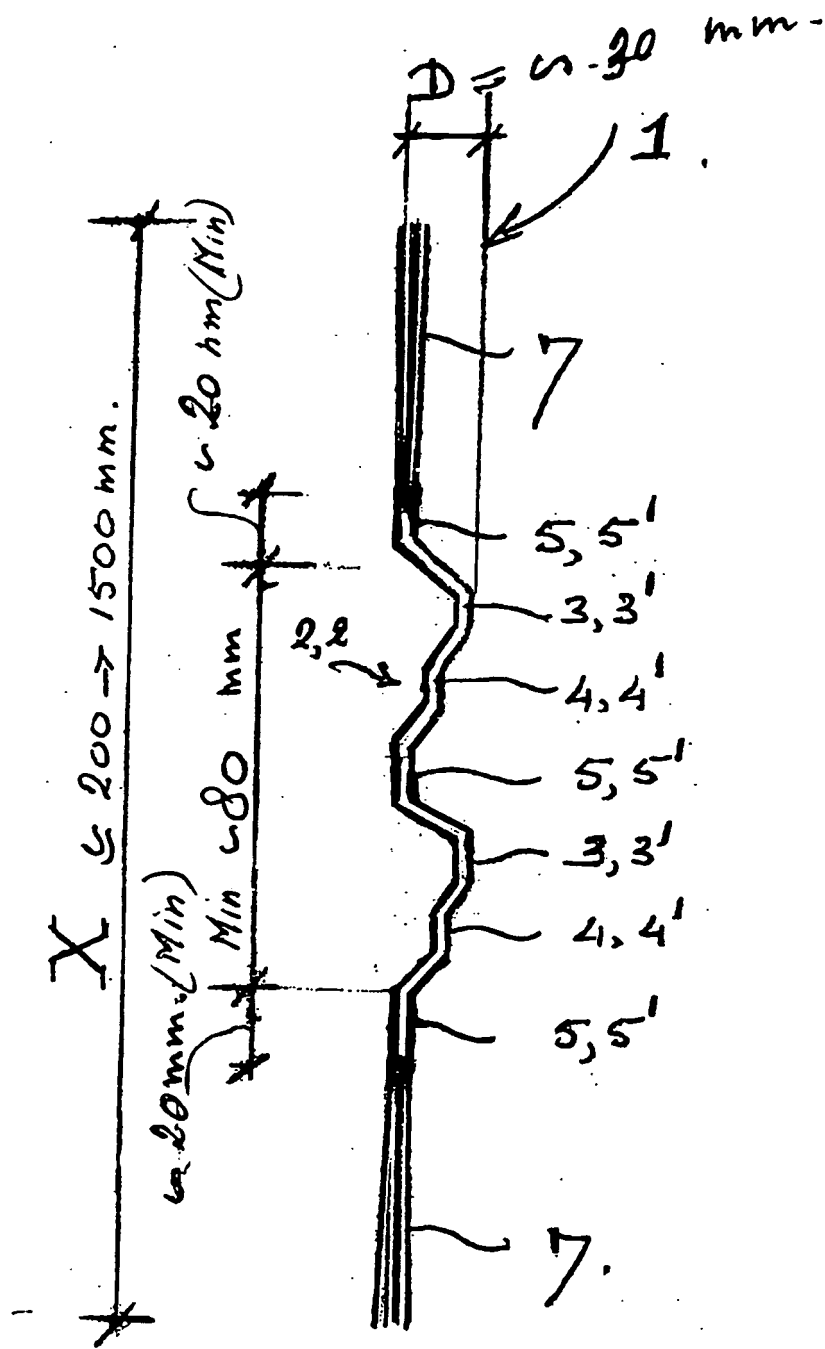


FIG.5.

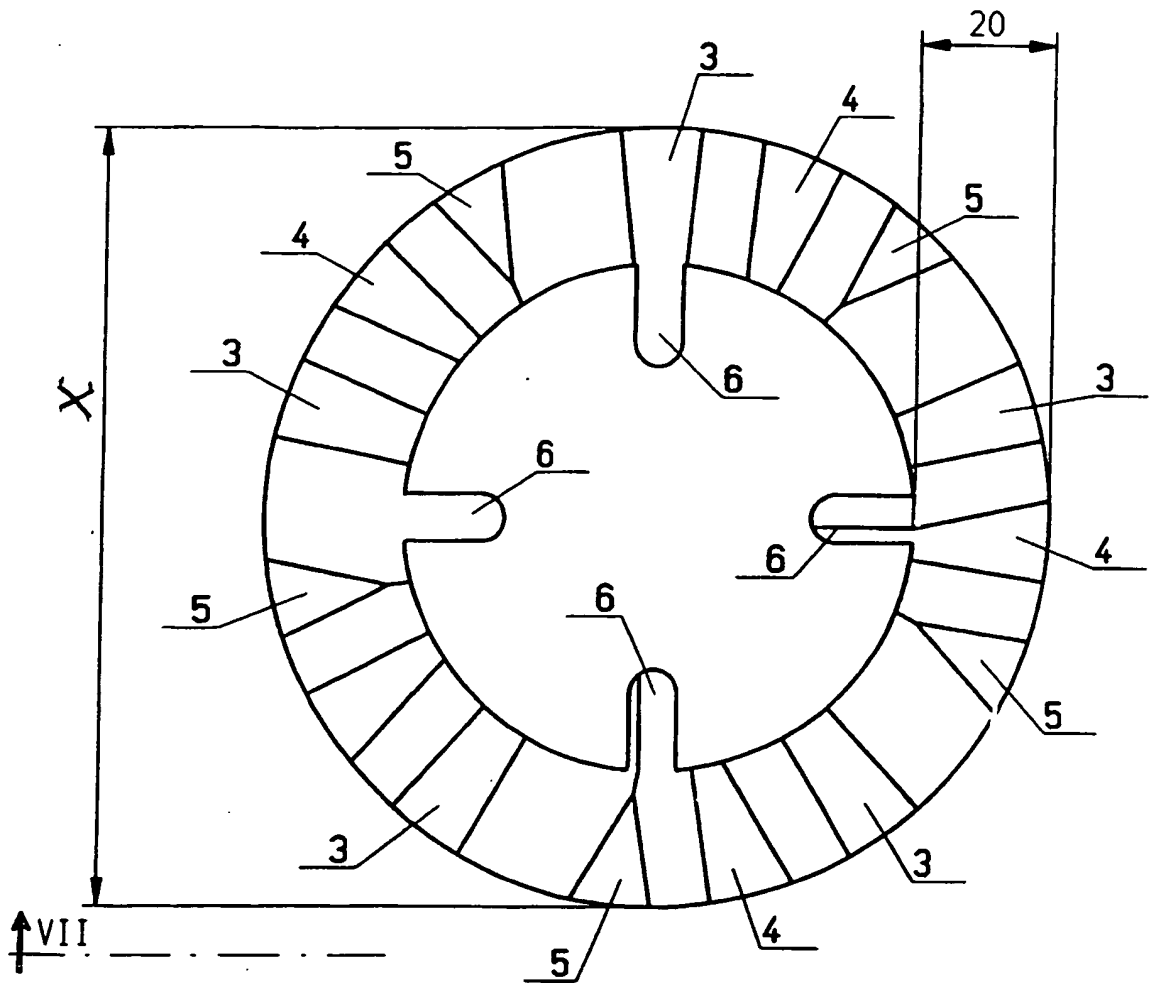


FIG. 6.

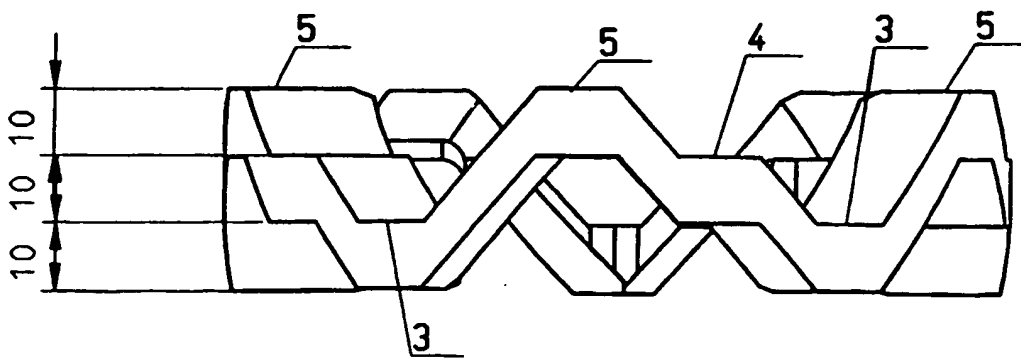


FIG. 7.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6205609 B [0002]