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(54) BRUSH FOR MOUNTING ON A VEHICLE

BÜRSTE ZUM ANBAUEN AN EIN FAHRZEUG

BROSSE À MONTER SUR UN VÉHICULE

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Description

[0001] This invention relates to a brush and particularly but not exclusively a brush for mounting on a vehicle.

[0002] Vehicle mounted brushes are well known. One common type of vehicle mounted brush is a rotary brush, which is often used in road-sweeping. A rotary brush generally comprises a plurality of bristled mounted to an underside of a circular mounting plate, the mounting plate being rotatable about an axis perpendicular to the plane thereof. One problem associated with the use of rotary brushes is that the rotary action can cause gravel and the like to move outwardly from the brush at high speeds, which is potentially hazardous to an operator or bystander. Furthermore, the rotary motion may agitate dust and other small particles, resulting in visibility and/or breathing problems for persons in the vicinity of the brush. A further problem with rotary brushes is the complexity of the rotary mechanisms; this gives rise to a high initial manufacturing cost and high maintenance costs. GB2326901 discloses the preamble of claim 1. Another type known type of vehicle mounted brush is a fixed brush such as the brush disclosed by US Patent No. 5,621,940. This brush comprises a plurality of straight rows of bristles mounted on an underside of a rectangular mounting plate, the rows of bristles extending in a direction perpendicular to the direction on motion when the brush is in use. Whilst a brush of the type disclosed by US 5,621,940 substantially alleviates the above-mentioned problems associated with rotary brushes, there are many other problems associated with its use. One disadvantage of the brush disclosed by US 5,621,940 is that it is ineffective at capturing the dust and debris it its path' any dust or debris that is picked up by the brush is generally displaced towards the edges of the brush and eventually spills over the edges of the brush.

[0003] According to the present invention there is provided a brush as claimed in the accompanying claims.

[0004] In accordance with the present invention, as seen from a first embodiment, there is provided a brush for mounting on a motor vehicle, the brush comprising a body portion and an arm portion,

> the arm portion being coupled to an end of the body portion such that the arm portion extends forwardly of the body portion in a direction of motion of the brush when the brush is in use,
> the arm portion comprising a support and a row of brushing members arranged to extend generally downwardly therefrom when the brush is in use,
> wherein at least some of the brushing members are inclined laterally inwardly or outwardly relative to the body portion.

[0005] Advantageously, the forwards protrusion of the arm portion relative to the body portion enables the arm portion to direct dust and debris towards the body portion. This action is further aided by the inclined brushing members, as discussed below.

[0006] Preferably the upper ends of the brushing members are coupled to the support in a substantially straight line, this line preferably extending in a substantially horizontal plane and more preferably extending in a direction substantially parallel to the direction of motion of the brush when the brush is in use.

[0007] At least some of the brushing members are preferably inclined laterally inwardly towards the body portion. The brushing members that are inclined laterally inwardly are preferably disposed at an end of the arm portion proximal to the body portion, the proximal end being equivalent, in use, to the rearmost end of the arm portion in the direction of motion

[0008] The angle of inclination relative to the vertical direction may be non-uniform such that certain brushing members are inclined inwardly to a greater extent than other brushing members. Preferably, of the inwardly inclined brushing members, those proximal to the body portion are inclined inwardly to a greater extent than those distal to the body portion. According to the invention, the lower ends of the brushing members that are inclined laterally inwardly towards the body portion form a substantially continuous curve. The lower ends of the brushing members that are inclined laterally inwardly towards the body portion may form a substantially straight line. It will be appreciated that the formation of a continuous curve or line minimises the risk of dust or debris passing through any gaps or discontinuities in the row of brushing members.

[0009] A portion of the row in which the inwardly inclined brushing members are disposed may be helical in structure, the lower ends of the inwardly inclined brushing members defining a portion of a helix and the upper ends of the inwardly inclined brushing members defining an axis of the helix.

[0010] At least some of the brushing members are preferably inclined laterally outwardly away from the body portion, these brushing members being preferably disposed at an end of the arm portion distal to the body portion.

[0011] The angle of inclination relative to the vertical direction may be non-uniform such that certain brushing members are inclined inwardly to a greater extent than other brushing members. Preferably, of the outwardly inclined brushing members, those distal to the body portion are inclined outwardly to a greater extent than those proximal to the body portion.

[0012] The lower ends of the brushing members that are inclined laterally outwardly away from the body portion may form a substantially continuous curve. Alternatively, the lower ends of the brushing members that are inclined laterally outwardly away from the body portion may form a substantially straight line.

[0013] A portion of the row in which the outwardly inclined brushing members are disposed may be helical in structure, the lower ends of the outwardly inclined brushing members defining a portion of a helix and the upper

ends of the outwardly inclined brushing members defining an axis of the helix.

[0014] In a preferred embodiment, the row of brushing members comprises at least some brushing members that are inclined laterally inwardly and at least some brushing members that are inclined laterally outwardly. In this preferred embodiment, the lower ends of the inwardly inclined brushing members and the lower ends of the outwardly inclined brushing members may together form a substantially continuous curve. Alternatively, the lower ends of the inwardly inclined brushing members and the lower ends of the outwardly inclined brushing members may together form a substantially straight line. A portion of the row in which the inclined brushing members are disposed may be helical in structure, the lower ends of the inclined brushing members defining a portion of a helix and the upper ends of the inclined brushing members defining an axis of the helix.

[0015] The arm portion may comprise a brush track for coupling the row of brushing members to the support, the brush track being preferably arranged for sliding cooperation with the row of brushing members to allow for the brush track to be slidingly detached from the arm portion for repair and/or replacement.

[0016] The arm portion may comprise a second row of brushing members disposed inwardly of the first row so as to define inner and outer rows of brushing members. Preferably the inner and outer rows of brushing members are substantially parallel. At least some of the brushing members of the inner row of brushing members are preferably inclined laterally inwardly or outwardly relative to the body portion, the brushing members of the inner row being preferably inclined to a lesser extent that than the brushing members of the outer row in an equivalent longitudinal position. In a preferred embodiment the brushing members of the inner and outer rows converge at their lower ends.

[0017] The arm portion may be detachably coupled to the body portion. Advantageously, this enables removal of the arm portion for the purposes of storage, maintenance and the like.

[0018] The brush may further comprise a second arm portion coupled to an opposing end of the body portion.

[0019] In a preferred embodiment, the brush is substantially symmetrical about the direction of motion.

[0020] The body portion may comprise a row of downwardly depending brushing members, a longitudinal axis of the row of brushing members of the body portion preferably extending in a direction substantially perpendicular to the direction of motion. More preferably, the body portion comprises a first set of rows and second set of rows, the first and second sets being preferably spatially separated in a direction substantially parallel to the direction of motion.

[0021] The body may comprise a mounting plate from which the row or rows of brushing members depend.

[0022] The mounting plate preferably extends forwardly of the row or rows of brushing members of the body portion with respect to the direction of motion such that a portion of the mounting plate defines a leading lip, the leading lip being preferably turned downwardly i.e. towards the floor when the brush is in use. Advantageously, the leading lip substantially prevents agitated dust from moving upwardly and hence substantially alleviates visibility and breathing problems associated with agitated dust.

[0023] The mounting plate preferably extends rearwardly of the row or rows of brushing members of the body portion with respect to the direction of motion such that a portion of the mounting plate defines a trailing lip, the trailing lip being preferably turned downwardly. It will be appreciated that dust and debris may be deflected upwardly by the sweeping action of the brush if, for example, the brush passes over uneven ground. Advantageously, the trailing lip acts to shield an operator or bystander from upwardly deflected debris. Furthermore, the trailing lip substantially prevents agitated dust from moving upwardly and hence substantially alleviates visibility and breathing problems associated with agitated dust.

[0024] An upper side of the mounting plate of the body portion preferably comprises attachment means for attaching the brush to a vehicle.

[0025] Preferably the brushing members are bristles.

[0026] In accordance with the present invention, also as seen from the first embodiment there is provided a vehicle and brush assembly, the assembly comprising a brush as hereinbefore described and a motor vehicle. The brush is preferably detachably coupled to the vehicle via the attachment means disposed on the upper side of the mounting plate.

[0027] In accordance with the present invention, as seen from a second embodiment, there is provided a brush comprising a substantially planar support and a row of brushing members arranged in a substantially helical structure, the upper ends of the brushing members being coupled to the support and defining a substantially linear axis of the helical structure, and the lower ends of the brushing members being arranged for contacting a surface when the brush is in use.

[0028] Preferably the substantially planar support is arranged to extend in a substantially horizontal plane when the brush is in use.

[0029] Preferably the lower ends of the brushing members define a portion of a helix, said portion being preferably less than one quarter of a full revolution of the helix i.e. the brushing members at a first end of the row are preferably rotated relative to the brushing members at a second end of the row by less than 90 degrees about a longitudinal axis of the row.

[0030] In accordance with the present invention, as seen from a third embodiment, there is provided a brush comprising first and second rows of brushing members and a resiliently flexible lip disposed intermediate the first and second rows of brushing members and arranged to contact a floor surface when the brush is in use.

[0031] One advantage of the present invention is that

the resiliently flexible lip acts to separate the first and second rows of brushing members. Another advantage is that the resiliently flexible lip enables the brush to capture fine material and fluids.

[0032] A longitudinal axis of the first row is preferably substantially parallel to a longitudinal axis of the second row. More preferably, said longitudinal axes of the first and second rows are substantially parallel to a longitudinal axis of the lip.

[0033] The lip and the first and second rows of brushing members preferably extend downwardly to a substantially equal extent.

[0034] The lip and the first and second rows of brushing members preferably extend longitudinally to a substantially equal extent.

[0035] The lip preferably comprises a sheet of resiliently flexible material, which is preferably water-resistant and most preferably formed of rubber.

[0036] The brush may be arranged for mounting on a vehicle.

[0037] The first and second rows and the lip may be twisted about their respective longitudinal axis so as to form respective helical structures.

[0038] An embodiment of the present invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a schematic illustration of an underside of a known brush comprising a plurality of straight rows of bristles, the Figure illustrating the flow of dust and debris when the brush is in use;

Figure 2 is a schematic illustration of an underside of a brush in accordance with an embodiment the present invention as seen from the first aspect, the Figure illustrating the flow of dust and debris when the brush is in use;

Figure 3 is a perspective view of the arm portion the brush illustrated in Figure 2;

Figure 4 is a perspective view of the arm portion illustrated in Figure 3 with the brushing members omitted and the position of the lower end of the brushing members shown in dashed outline;

Figure 5 is a side view of the arm portion illustrated in Figures 3 and 4 with the brushing members removed, the foremost and rearmost orientations of the brush tracks being illustrated;

Figure 6 is a perspective view of the brush illustrated in Figures 2 to 5; and

Figure 7 is a schematic underside view of a brush in accordance with an embodiment of the present invention as seen from the third aspect.

[0039] As used herein, the terms "front", "forwards", "forwardly", "foremost", "back", "rearwards" and "rearwardly" are defined relative to the direction of motion of the brush when the brush is in use.

[0040] As used here, the term "vertical" is defined as a direction perpendicular to the floor when the brush is in use.

[0041] As used herein, the term "horizontal plane" is defined a plane parallel to the floor when the brush is in use.

[0042] As used herein, the term "downwardly" is defined as directed towards the floor when the brush is in use. It will be appreciated that the vertical direction includes the downward direction.

[0043] Referring to Figure 1 of the drawings, there is illustrated an underside of a known brush 10 comprising a rectangular mounting plate 11, and rows 12a-12l of brushing members, arranged in two spatially separated sets. The rows 12 of brushing members are mounted to an underside of the rectangular mounting plane 11. In use, an upper side on the rectangular mounting plate 11 is attached to a vehicle (not shown) such that any motion of the vehicle (not shown) acts to push the brush 10.

[0044] The arrows X, Y, Z schematically illustrate the flow of debris (not shown) from the reference frame of the brush 10 when the brush 100 is in use. The debris (not shown) is initially incident on a first row of bristles 12a belonging to the first set 12, as illustrated by arrow X. Once the debris (not shown) has contacted the first row of bristles 12a, further motion of the brush 10 causes an accumulation of debris (not shown) and hence lateral displacement of the debris (not shown) as illustrated by arrow Y. Eventually, the debris (not shown) spills over the edges of the brush 10 (as illustrated by arrow Z) and is thus distributed on the floor.

[0045] Referring to Figures 2 to 6 of the drawings, there is illustrated a brush 100 in accordance with the present invention. The brush 100 comprises a body portion 110 and first and second arm portions 120. It will be appreciated, however, that the brush 100 may only comprise one arm portion 120. The arm portions 120 are mounted at opposing side edges of the body portion 110 by bolts or the like, and extend forwardly of the body portion 110.

[0046] The body portion 110 comprises a rectangular mounting plate 111 and rows 112 of brushing members. The mounting plate 111 is formed of steel or any other rigid material such as a metal or plastics material and comprises a major face 113, a leading lip 114 and a trailing lip 115. The leading lip 114 and trailing lip 115 are formed integrally with the major face 113 in the illustrated embodiment, but may also be formed separately. In the illustrated embodiment, the leading lip 114 and trailing lip 115 depend downwardly from the major face 113, forming an angle of approximately 50° with the major face 113. However, it will be appreciated that the leading lip 114 and/or trailing lip 115 may extend downwardly from the major face 113 at a greater or lesser angle or may be coplanar with the major face 113.

[0047] The rows 112 of brushing members are separated into a first set 112a-g and a second set 112h-l. It is envisaged that each row 112 is held within a respective brush track (not shown), although the rows 112 may alternatively be directly mounted to the mounting plate 111. Each brush track comprises two side walls (not shown) that extend substantially perpendicularly to the underside of the major face 113 of the mounting plate 111 and are fixedly coupled thereto by welding or the like. An inwardly depending flange (not shown) is formed integrally with each side wall at a distal edge thereof. Each brush track therefore defines a channel that is C-shaped in cross-section. It will be appreciated that when the arm portion 120 is attached to the body portion 110, it prevents each row of brushing members 112 from sliding relative to the respective brush track. The arm portion 120 may, however, be detached from the body portion 110 for replacement of a row of brushing members 122.

[0048] Each row 112 of brushing members comprises between 10 and 1000 individual brushing members such as bristles 1121 in a direction perpendicular to the direction in which the row 112 extends. The individual bristles 1121 are formed of a durable, resiliently deformable material such as polypropylene. It will be appreciated that the degree of structural rigidity of each of the individual bristles 1121 is dictated by the material of the bristles 1121 (for example polypropylene) and the thickness of each of the bristles 1121. The structural rigidity is such that the bristles 1121 are sufficiently deformable to allow the brush 100 to pass over uneven ground, but also enable the brush 100 to capture large and/or heavy items of debris such as gravel and metal parts.

[0049] Each arm portion 120 comprises a support 121 and two rows 122 of brushing members depending downwardly from a lower surface of the support 121. Whilst the illustrated embodiment depicts two rows 122 of brushing members, it will be appreciated that an arm portion with one row 122 or more than two rows 122 of brushing members is also within the scope of the present invention. With reference to Figure 5 in particular, the two rows 122 of bristles 1221 belonging to the arm portion 120 are orientated such that the bristles 1221 converge at the lower ends thereof. This is achieved by the relative incline of the brush tracks 123 in which each row 122 is held. As illustrated by the dashed lines in Figure 5, the major wall 1231 of one brush track is not parallel to the major wall 1231 of the adjacent brush track.

[0050] It is envisaged that each row 122 is held within a respective brush track 123, which is mounted to the underside of the support 121 by welding or the like. It will, however, be appreciated that the rows 122 may alternatively be directly mounted to the support 121. Each brush track 123 comprises a major wall 1231, and two side walls 1232 depending therefrom, the sidewalls having inwardly depending flanges such that the brush track 123 defines a channel that is C-shaped in cross-section. Each row 122 of brushing members comprises between 3 and 1000 individual brushing members such as bristles 1221 in a direction perpendicular to the direction in which the row 122 extends. The individual bristles 1221 are formed of a durable, resiliently deformable material such as polypropylene. It will be appreciated that the degree of structural rigidity of each of the individual bristles 1221 is dictated by the material of the bristles 1221 (for example polypropylene) and the thickness of each of the bristles 1221. The structural rigidity is such that the bristles 1221 are sufficiently deformable to allow the brush 100 to pass over uneven ground, but also enable the brush 100 to capture large and/or heavy items of debris such as gravel and metal parts.

[0051] In the illustrated embodiment, each row 122 comprises two inclined portions: an inwardly inclined portion 122a extending from the centre of the row 122 to the proximal (rearmost) end of the row 122, and an outwardly inclined portion 122b extending from the centre of the row 122 to the distal (forwardmost) end of the row 122. The bristles 1221a belonging to the inwardly inclined portion 122a are inclined inwardly towards the body portion 110, whilst the bristles 1221b belonging to the outwardly inclined portion 122b are cinlined outwardly away from the body portion 110. The degree of incline changes gradually along each inclined portion 122a, 122b such that the lower ends of the bristles 1221 of the inclined portions 122a, 122b form a substantially continuous curve or straight line. In the illustrated embodiment, the row 122 is twisted about its longitudinal axis so as to form a helical structure, the axis of the helix being defined by the upper ends of the bristles 1221. This is achieved by forming each brush track 123 such that it is twisted about its longitudinal axis, thereby forcing each row 122 of bristles 1222 to twist when it is inserted into the respective brush track 123. In the illustrated embodiment, the maximum angle of inclination for both the inwardly and outwardly inclined portions 122a, 122b is approximately 20 degrees relative to the vertical. However, it will be appreciated that the maximum angle of inclination may extend to 45 degrees relative to the vertical (or further, although the bristles 1221 will not contact the floor for angles of inclination greater than 45 degrees). In addition, the maximum angle of inclination of the inwardly inclined portion 122a does not have to be equal to the maximum angle of inclination of the outwardly inclined portion 122b.

[0052] The brush 100 further comprises attachment means 130 for attachment to a motorised vehicle 200 such as a fork-lift truck. The brush is designed predominantly for use as a push-broom i.e. the attachment means 130 are arranged for attaching the brush forwardly of the vehicle 200. The attachment means 130 are disposed on an upper side of the mounting plate 111 and comprise four brackets 131a-d arranged in two pairs. Each bracket 131 comprises a flange 132 that depends outwardly from the bracket 131, away from the other bracket 131 in the pair. Two pairs of apertures (not shown) are formed in each flange 132 for engaging with a screw or a bolt or the like. A channel 133ab, 133cd is formed intermediate each pair of brackets 131a & 131b,

131c & 131d. Each channel 133ab, 133cd is arranged to receive a sleeve 134. The sleeve 134 comprises two outwardly depending flanges 135, each with two pairs of apertures 1351. When the sleeve 134 is disposed within the channel 133, the outwardly depending flanges 135 of the sleeve 134 are disposed above the outwardly depending flanges 132 of the attachment means 130 of the brush 100. The apertures 1351 of the sleeve 134 are aligned with the apertures (not shown) of the bracket 131, thereby enabling a bolt or screw or the like to pass through both apertures to secure the sleeve 134 to the brush 100. As shown in Figure 6, the sleeve 134 may be slidably mounted around a pair of tines 210 of a forklift truck 200.

[0053] Alternatively, the sleeve 134 may be replaced by apparatus (not shown) appropriate for securing the attachment means to a lower lip of a bucket of a digger (not shown) or to a category II 3-point hitch of a tractor (not shown).

[0054] Referring to Figure 2 of the drawings, the arrows V, X schematically illustrate the flow of debris (not shown) from the reference frame of the brush 100 when the brush 100 is in use. Some debris (not shown) is initially incident on a first row of bristles 112a of the body portion 110 at a laterally central region thereof, as illustrated by arrow X. This debris is captured by the brush 100 and moves forwards in accordance with the forwards motion of the brush 100. Other debris (not shown) is initially incident on the foremost end of the arm portion 110, as illustrated by arrow V. This debris is directed towards the body portion 120 by the lower ends of the bristles 1221 of the inclined portions 122a, 122b of the rows 122 belonging to the arm portion 120. As illustrated in the Figure, the lower ends of the bristles 1221 of the inclined portions 122a, 122b define a straight line that depends inwardly from the foremost end of the arm portion 120 to rearmost end of the arm portion 120. Continued forwards motion of the brush 100 causes an accumulation of debris (not shown) at the central region of the first row of bristles 112 belonging to the body portion 110, but the arm portion 120 substantially prevents debris (not shown) from spilling over the edge of the brush 100.

[0055] It will be appreciated that, in use, the first row of bristles 112a of the body portion 320 will capture a significant fraction of any debris (not shown) incident thereupon. However, the remaining eleven rows of bristles 112b-l act to capture any debris (not shown) that may pass through the first row of bristles 112a. Furthermore, each row of bristles 112 adds to the structural rigidity of the body portion 110, thereby enabling the brush 100 to capture large and/or heavy debris such as gravel and metal parts.

[0056] In use, the brush 300 is likely to agitate any dust in its path. The leading lip 114 and trailing lip 115 of the mounting plate 111 act to substantially prevent this agitated dust from moving upwardly and hence substantially alleviate visibility and breathing problems associated with agitated dust. Furthermore, the trailing lip 115 acts to shield an operator or person positioned downstream of the brush 100 from any debris that may be deflected upwardly by the sweeping action of the brush 100.

[0057] After repetitive use, a particular row 112 of bristles 1121 belonging to the body portion 110 may become worn. In this event, an operator (not shown) may detach the arm portion 120 from the body portion 110, slidingly remove the worn row 112 of bristles 1121 from the corresponding brush track and slidingly insert a new row of bristles in its place.

[0058] Referring to Figure 7 of the drawings, there is illustrated an underside of a brush 1000 in accordance with the present invention as seen from the second aspect. The brush 1000 comprises an elongate support 1001 and first and second rows of bristles 1002, 1003 coupled to the support 1001 at their upper ends and arranged to extend downwardly therefrom. A downwardly depending lip 1004 is provided intermediate the first and second rows of bristles 1002, 1003 for capturing fine material and fluids that may pass through the rows of bristles 1002, 1003.

[0059] The lip 1004 is formed of a sheet of resiliently deformable material, ideally a water-resistance material such as rubber. An upper edge of the sheet of material is coupled to the support 1001 and extends in a direction substantially parallel to the longitudinal axes of the first and second rows of bristles 1002, 1003. The lip 1004 and the bristles of the first and second rows 1002, 1003 extend downwardly from the support 1001 by a substantially equal extent, thereby enabling both the bristles and the lip 1004 to contact the floor when the brush 1000 is in use.

[0060] The lip 1004 may be less rigid than the first and second rows of bristles 1002, 1003. Accordingly, the spacing between the lip 1004 and first and second rows of bristles 1002, 1003 is chosen such that the rows of bristles 1002, 1003 act to support the lip 1004.

[0061] In use, the resiliently flexible and enables the brush to capture fine material and fluids. The rows of bristles 1002, 1003 either side of the lip 1004 prevent the lip 1004 from deflecting to such an extent that it moves out of contact with the floor.

[0062] Whilst it is not illustrated, it will be appreciated that both the first and second rows of bristles and the resiliently flexible lip may be twisted about their respective longitudinal axes in accordance with the first aspect of the present invention. In this embodiment, the first and second rows of brushing members act to support the lip in its twisted position.

[0063] From the foregoing therefore, it is evident that the present invention provides a simple yet effective means of sweeping debris.

Claims

1. A brush (100) for mounting on a motor vehicle, the brush comprising a body portion (110) and an arm portion (120),
the arm portion being coupled to an end of the body

portion such that the arm portion extends forwardly of the body portion in a direction of motion of the brush when the brush is in use,
the arm portion comprising a support (121) and a row of brushing members (112) arranged to extend generally downwardly therefrom when the brush is in use,
characterised in that at least some of the brushing members are inclined laterally inwardly or outwardly relative to the body portion, such that the lower end of said inclined brushing members form a substantially continuous curve line.

2. A brush according to claim 1, wherein the upper ends of the brushing members are coupled to the support in a substantially straight line.

3. A brush according to claim 2, wherein the substantially straight line defined by the upper ends of the brushing members extends in a substantially horizontal plane.

4. A brush according to claim 2 or claim 3, wherein the substantially straight line defined by the upper ends of the brushing members extends, in use, in a direction substantially parallel to a direction of motion of the brush.

5. A brush according to any preceding claim, wherein certain inclined brushing members are inclined to a greater extent than other inclined brushing members.

6. A brush according to claim 2, wherein the lower ends of the inclined brushing members define a helix, the upper ends of the brushing members forming an axis of the helix.

7. A brush according to any preceding claim, wherein at least some of the brushing members are inclined laterally inwardly towards the body portion.

8. A brush according to claim 7, wherein the inwardly inclined brushing members are disposed at an end of the arm portion proximal to the body portion.

9. A brush according to claim 7 or claim 8, wherein, of the inwardly inclined brushing members, those proximal to the body portion are inclined to a greater extent than those distal to the body portion.

10. A brush according to any preceding claim, wherein at least some of the brushing members are inclined laterally outwardly away from the body portion.

11. A brush according to claim 10, wherein the outwardly inclined brushing members are disposed at an end of the arm portion distal to the body portion.

12. A brush according to claim 10 or claim 11, wherein, of the outwardly inclined brushing members, those distal to the body portion are inclined to a greater extent than those proximal to the body portion.

13. A brush according to any preceding claim, wherein the arm portion comprises a brush track for coupling the row of brushing members to the support.

14. A brush according to claim 13, wherein the brush track (123) is arranged for sliding cooperation with the row of brushing members.

15. A brush according to any preceding claim, wherein the arm portion comprises a second row of brushing members disposed inwardly of the first row so as to define inner and outer rows of brushing members.

16. A brush according to claim 15, wherein the inner and outer rows of brushing members are substantially parallel.

17. A brush according to claim 15 or claim 16, wherein at least some of the brushing members of the inner row of brushing members are inclined laterally inwardly or outwardly relative to the body portion.

18. A brush according to claim 17, wherein the brushing members of the inner row are inclined to a lesser extent that than the brushing members of the outer row in an equivalent longitudinal position.

19. A brush according to claim 17 or claim 18, wherein the brushing members of the inner and outer rows converge at their lower ends.

20. A brush according to any preceding claim, wherein the arm portion is detachably coupled to the body portion.

21. A brush according to any preceding claim, wherein the brush further comprises a second arm portion coupled to an opposing end of the body portion.

22. A brush according to any preceding claim, wherein the body portion comprises a row of downwardly depending brushing members.

23. A brush according to claim 22, wherein a longitudinal axis of the row of brushing members of the body portion extends in a direction substantially perpendicular to the direction of motion.

24. A vehicle and brush assembly, the assembly comprising a vehicle and a brush according to any of claims 1 to 23.

Patentansprüche

1. Bürste (100) zum Anbauen an ein Fahrzeug, wobei die Bürste einen Körperabschnitt (110) und einen Armabschnitt (120) umfasst,

   wobei der Armabschnitt an ein Ende des Körperabschnitts derartig gekoppelt ist, dass sich der Armabschnitt nach vorn vom Körperabschnitt in eine Bewegungsrichtung der Bürste erstreckt, wenn die Bürste in Gebrauch ist,
   wobei der Armabschnitt einen Träger (121) und eine Reihe von bürstenden Elementen umfasst, die angeordnet sind, sich generell davon nach unten zu erstrecken, wenn die Bürste in Gebrauch ist,
   dadurch gekennzeichnet, dass zumindest einige der bürstenden Elemente relativ zum Körperabschnitt lateral nach innen oder außen geneigt sind, derartig, dass das untere Ende der geneigten bürstenden Elemente eine im Wesentlichen kontinuierliche Kurvenlinie bilden.

2. Bürste nach Anspruch 1, wobei die oberen Enden der bürstenden Elemente in einer im Wesentlichen geraden Linie an den Träger gekoppelt sind.

3. Bürste nach Anspruch 2, wobei sich die im Wesentlichen gerade Linie, die durch die oberen Enden der bürstenden Elemente definiert ist, in einer im Wesentlichen horizontalen Ebene erstreckt.

4. Bürste nach Anspruch 2 oder Anspruch 3, wobei sich die im Wesentlichen gerade Linie, die durch die oberen Enden der bürstenden Elemente definiert ist, im Gebrauch, in eine Richtung im Wesentlichen parallel zu einer Bewegungsrichtung der Bürste erstreckt.

5. Bürste nach einem vorhergehenden Anspruch, wobei gewisse geneigte bürstende Elemente in einem größeren Ausmaß als andere geneigte bürstende Elemente geneigt sind.

6. Bürste nach Anspruch 2, wobei die unteren Enden der geneigten bürstenden Elemente eine Spirale definieren, die oberen Enden der bürstenden Elemente eine Achse der Spirale bilden.

7. Bürste nach einem vorhergehenden Anspruch, wobei zumindest einige der bürstenden Elemente in Richtung des Körperabschnitts lateral nach innen geneigt sind.

8. Bürste nach Anspruch 7, wobei die nach innen geneigten bürstenden Elemente an einem Ende des Armabschnitts proximal zum Körperabschnitt angeordnet sind.

9. Bürste nach Anspruch 7 oder Anspruch 8, wobei, von den nach innen geneigten bürstenden Elementen, jene, die proximal zum Körperabschnitt sind, in einem größeren Ausmaß als jene geneigt sind, die distal zum Körperabschnitt sind.

10. Bürste nach einem vorhergehenden Anspruch, wobei zumindest einige der bürstenden Elemente in Richtung vom Körperabschnitt weg lateral nach außen geneigt sind.

11. Bürste nach Anspruch 10, wobei die nach außen geneigten bürstenden Elemente an einem Ende des Armabschnitts distal zum Körperabschnitt angeordnet sind.

12. Bürste nach Anspruch 10 oder Anspruch 11, wobei, von den nach außen geneigten bürstenden Elementen, jene, die distal zum Körperabschnitt sind, in einem größeren Ausmaß als jene geneigt sind, die proximal zum Körperabschnitt sind.

13. Bürste nach einem vorhergehenden Anspruch, wobei der Armabschnitt eine Bürstenführungsbahn zum Koppeln der Reihe von bürstenden Elementen an den Träger umfasst.

14. Bürste nach Anspruch 13, wobei die Bürstenführungsbahn (123) für gleitendes Zusammenwirken mit der Reihe von bürstenden Elementen eingerichtet ist.

15. Bürste nach einem vorhergehenden Anspruch, wobei der Armabschnitt eine zweite Reihe bürstender Elemente umfasst, die von der ersten Reihe nach innen gerichtet angeordnet sind, um innere und äußere Reihen bürstender Elemente zu definieren.

16. Bürste nach Anspruch 15, wobei die inneren und äußeren Reihen von Bürstenelementen im Wesentlichen parallel sind.

17. Bürste nach Anspruch 15 oder Anspruch 16, wobei zumindest einige der bürstenden Elemente der inneren Reihe bürstender Elemente relativ zum Körperabschnitt lateral nach innen oder außen geneigt sind.

18. Bürste nach Anspruch 17, wobei die bürstenden Elemente der inneren Reihe in einem geringeren Ausmaß als die bürstenden Elemente der äußeren Reihe in einer entsprechenden longitudinalen Position geneigt sind.

19. Bürste nach Anspruch 17 oder Anspruch 18, wobei die bürstenden Elemente der inneren und äußeren Reihen an ihren unteren Enden konvergieren.

20. Bürste nach einem vorhergehenden Anspruch, wobei der Armabschnitt lösbar an den Körperabschnitt gekoppelt ist.

21. Bürste nach einem vorhergehenden Anspruch, wobei die Bürste ferner einen zweiten Armabschnitt umfasst, der an ein entgegengesetztes Ende des Körperabschnitts gekoppelt ist.

22. Bürste nach einem vorhergehenden Anspruch, wobei der Körperabschnitt eine Reihe von nach unten abhängenden bürstenden Elementen umfasst.

23. Bürste nach Anspruch 22, wobei sich eine longitudinale Achse der Reihe bürstender Elemente des Körperabschnitts in eine Richtung erstreckt, die im Wesentlichen senkrecht zur Bewegungsrichtung ist.

24. Fahrzeug- und Bürstenbaugruppe, wobei die Baugruppe ein Fahrzeug und eine Bürste nach einem der Ansprüche 1 bis 23 umfasst.

Revendications

1. Brosse (100) destinée à un montage sur un véhicule motorisé, la brosse comprenant une partie de corps (110) et une partie de bras (120),
la partie de bras étant couplée à une extrémité de la partie de corps de sorte que la partie de bras s'étende vers l'avant de la partie de corps dans une direction de déplacement de la brosse lorsque la brosse est en utilisation,
la partie de bras comprenant un support (121) et une rangée d'éléments de brossage (112) agencés pour s'étendre généralement vers le bas à partir de celui-ci lorsque la brosse est en utilisation,
caractérisée en ce qu'au moins une partie des éléments de brossage sont inclinés latéralement vers l'intérieur ou vers l'extérieur par rapport à la partie de corps, de sorte que l'extrémité inférieure desdits éléments de brossage inclinés forme une ligne courbe sensiblement continue.

2. Brosse selon la revendication 1, dans laquelle les extrémités supérieures des éléments de brossage sont couplées au support en une ligne sensiblement droite.

3. Brosse selon la revendication 2, dans laquelle la ligne sensiblement droite définie par les extrémités supérieures des éléments de brossage s'étend dans un plan sensiblement horizontal.

4. Brosse selon la revendication 2 ou la revendication 3, dans laquelle la ligne sensiblement droite définie par les extrémités supérieures des éléments de brossage s'étend, en utilisation, dans une direction sensiblement parallèle à une direction de déplacement de la brosse.

5. Brosse selon l'une quelconque des revendications précédentes, dans laquelle certains éléments de brossage inclinés sont inclinés dans une plus grande mesure que d'autres éléments de brossage.

6. Brosse selon la revendication 2, dans laquelle les extrémités inférieures des éléments de brossage inclinés définissent une spirale, les extrémités supérieures des éléments de brossage formant un axe de la spirale.

7. Brosse selon l'une quelconque des revendications précédentes, dans laquelle au moins une partie des éléments de brossage sont inclinés latéralement vers l'intérieur vers la partie de corps.

8. Brosse selon la revendication 7, dans laquelle les éléments de brossage inclinés vers l'intérieur sont disposés à une extrémité de la partie de bras proximale de la partie de corps.

9. Brosse selon la revendication 7 ou la revendication 8, dans laquelle, parmi les éléments de brossage inclinés vers l'intérieur, ceux qui sont proximaux de la partie de corps sont inclinés dans une plus grande mesure que ceux qui sont distaux de la partie de corps.

10. Brosse selon l'une quelconque des revendications précédentes, dans laquelle au moins une partie des éléments de brossage sont inclinés latéralement vers l'extérieur en éloignement de la partie de corps.

11. Brosse selon la revendication 10, dans laquelle les éléments de brossage inclinés vers l'extérieur sont disposés à une extrémité de la partie de bras distale de la partie de corps.

12. Brosse selon la revendication 10 ou la revendication 11, dans laquelle, parmi les éléments de brossage inclinés vers l'extérieur, ceux qui sont distaux de la partie de corps sont inclinés dans une plus grande mesure que ceux qui sont proximaux de la partie de corps.

13. Brosse selon l'une quelconque des revendications précédentes, dans laquelle la partie de bras comprend une piste de brosse destinée à coupler la rangée d'éléments de brossage au support.

14. Brosse selon la revendication 13, dans laquelle la piste de brosse (123) est agencée pour une coopération coulissante avec la rangée d'éléments de brossage.

15. Brosse selon l'une quelconque des revendications précédentes, dans laquelle la partie de bras comprend une deuxième rangée d'éléments de brossage disposés vers l'intérieur de la première rangée de façon à définir des rangées interne et externe d'éléments de brossage.

16. Brosse selon la revendication 15, dans laquelle les rangées interne et externe d'éléments de brossage sont sensiblement parallèles.

17. Brosse selon la revendication 15 ou la revendication 16, dans laquelle au moins une partie des éléments de brossage de la rangée interne d'éléments de brossage sont inclinés latéralement vers l'intérieur ou vers l'extérieur par rapport à la partie de corps.

18. Brosse selon la revendication 17, dans laquelle les éléments de brossage de la rangée interne sont inclinés dans une moindre mesure que les éléments de brossage de la rangée externe dans une position longitudinale équivalente.

19. Brosse selon la revendication 17 ou la revendication 18, dans laquelle les éléments de brossage des rangées interne et externe convergent à leurs extrémités inférieures.

20. Brosse selon l'une quelconque des revendications précédentes, dans laquelle la partie de bras est couplée de manière détachable à la partie de corps.

21. Brosse selon l'une quelconque des revendications précédentes, la brosse comprenant en outre une deuxième partie de bras couplée à une extrémité opposée de la partie de corps.

22. Brosse selon l'une quelconque des revendications précédentes, dans laquelle la partie de corps comprend une rangée d'éléments de brossage qui pendent vers le bas.

23. Brosse selon la revendication 22, dans laquelle un axe longitudinal de la rangée d'éléments de brossage de la partie de corps s'étend dans une direction sensiblement perpendiculaire à la direction de déplacement.

24. Ensemble de véhicule et brosse, l'ensemble comprenant un véhicule et une brosse selon l'une quelconque des revendications 1 à 23.

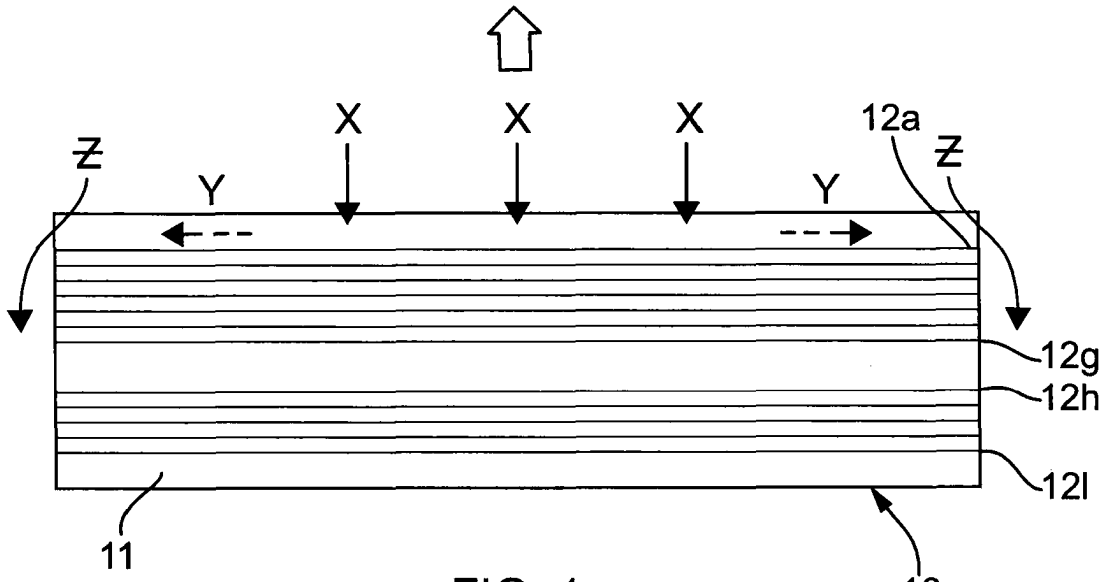
X
X
X
12a
Z
Z
Y
Y
12g
12h
12l
11
10

FIG. 1

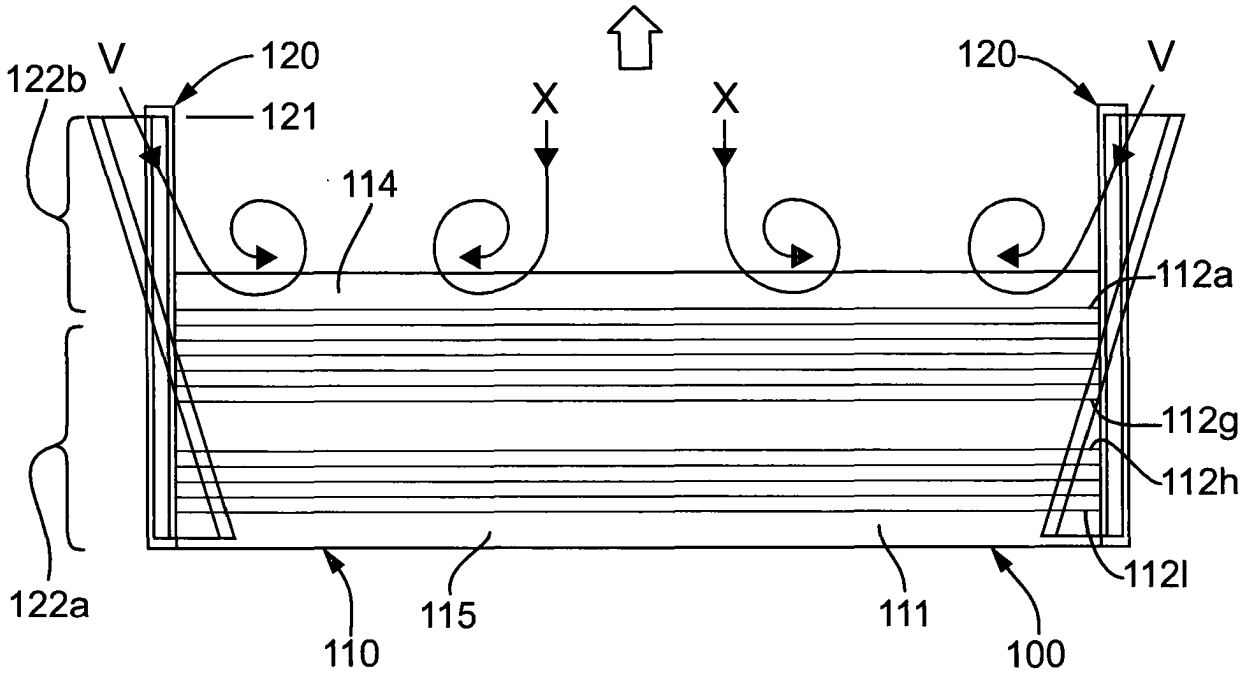
122b
V
120
121
X
X
120
V
114
112a
112g
112h
112l
122a
110
115
111
100

FIG. 2

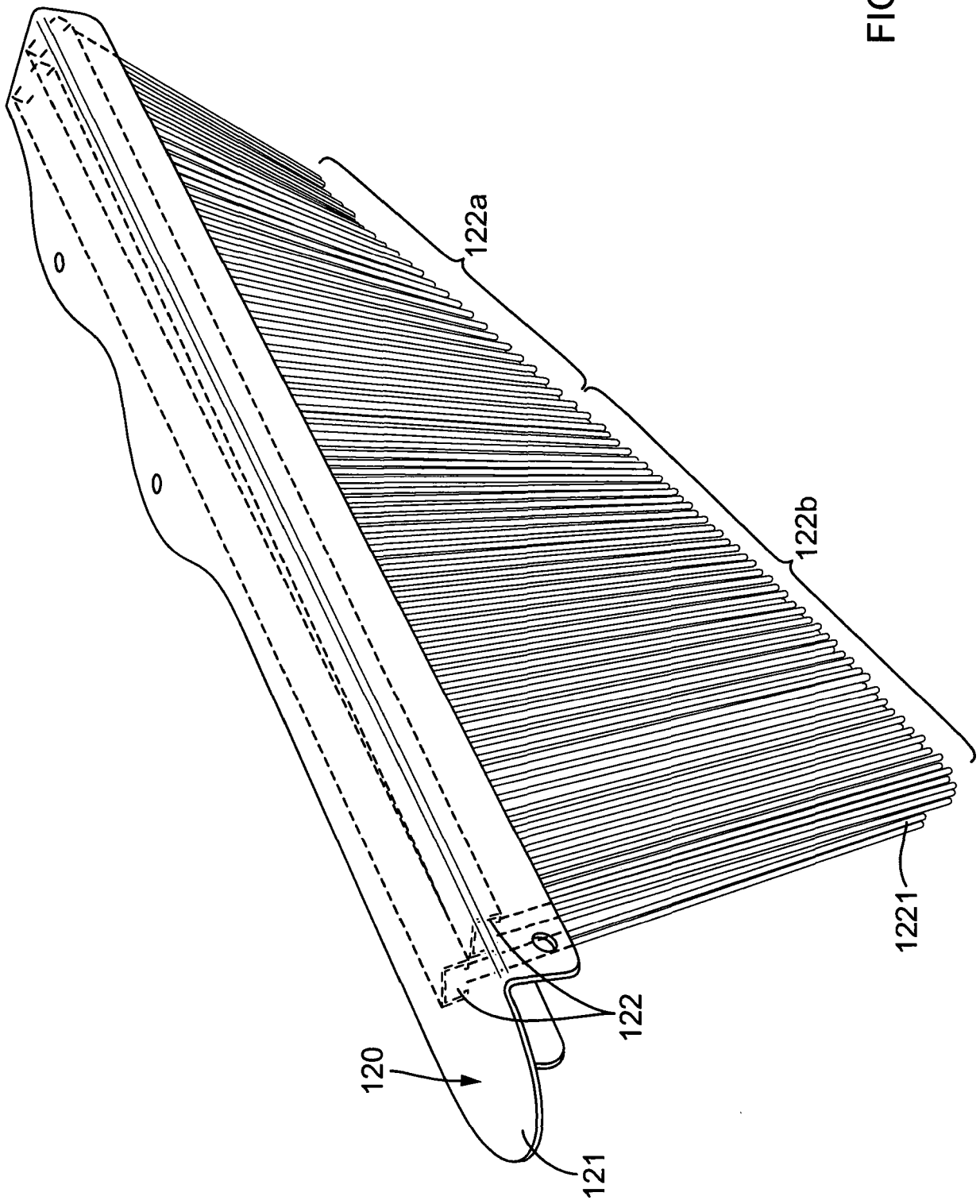

FIG. 3

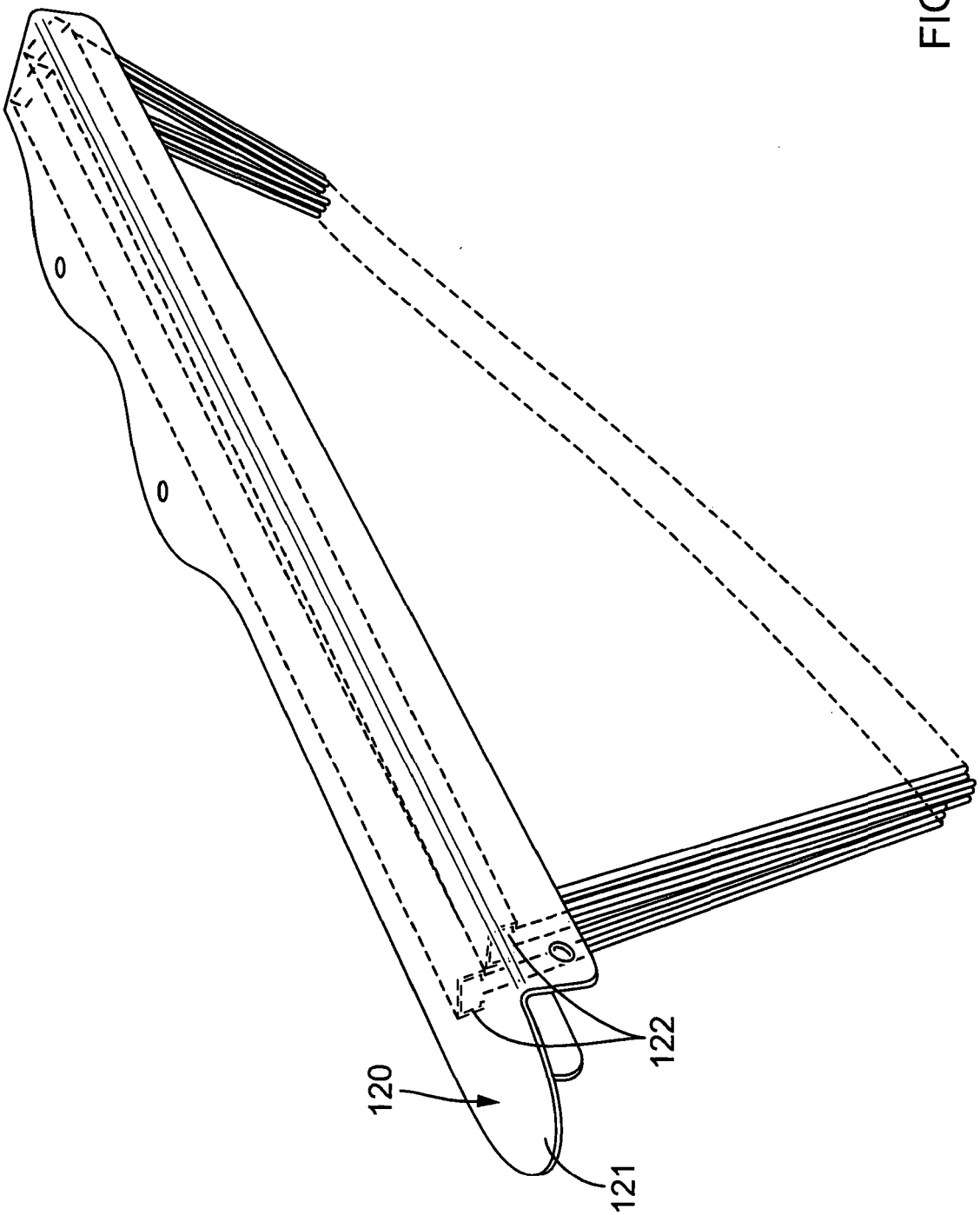

FIG. 4

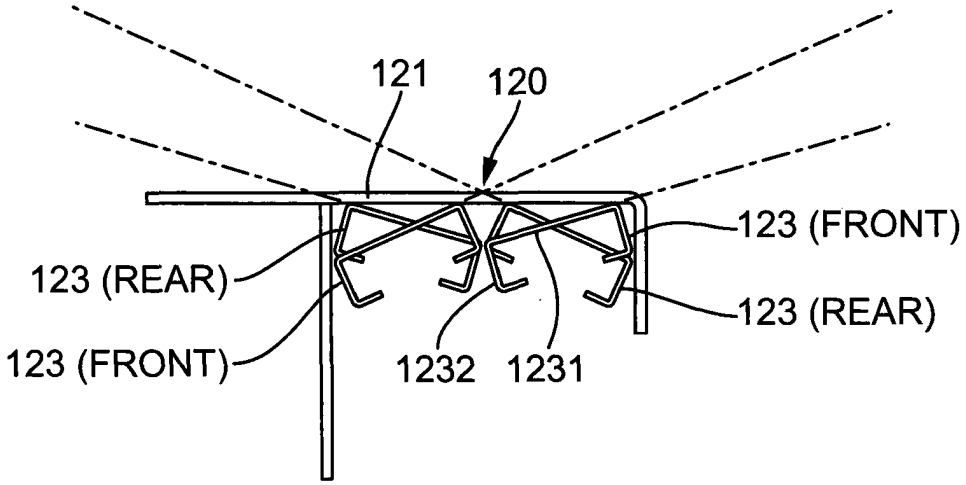
121
120
123 (FRONT)
123 (REAR)
123 (REAR)
123 (FRONT)
1232
1231

FIG. 5

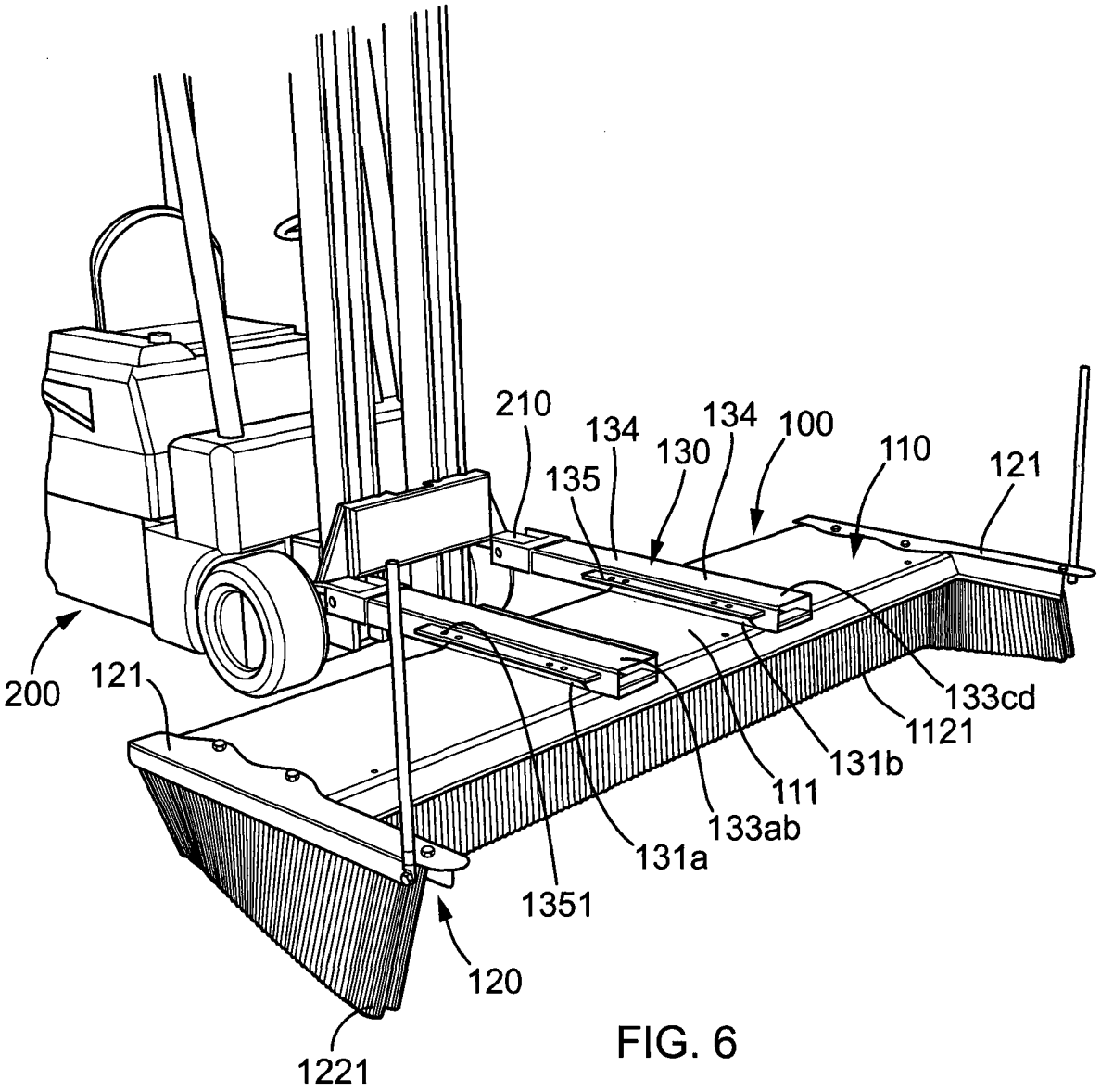
210
134
134
130
100
110
121
135
200
121
133cd
1121
131b
111
133ab
131a
1351
120
1221

FIG. 6

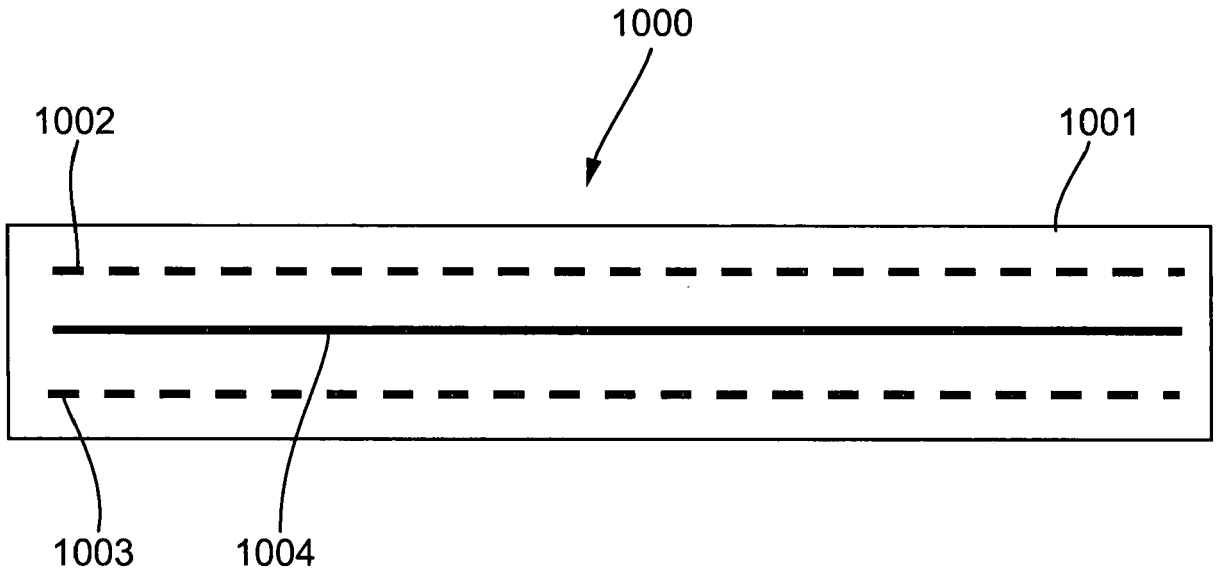

FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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