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DISK BROOM, SWEEPING DEVICE AND FLOOR CLEANING MACHINE

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Abstract

Illustrated and described is a disc broom (1) which is adapted for being connected to a rotary drive (43) so as to form a sweeping device, having a base body (3) which can be coupled to the rotary drive (43) for rotation about a rotation axis (13) and which has a circumferential outer edge (19), having bristles (5) which are attached at one end to the base body (3) and extend away from the base body (3) and towards a sweeping plane (21) which is perpendicular to the rotation axis (13); and having a cover element (7) which has a conical shell (23) made of a flexible material, said shell (23) extending away from the base body (3), preferably away from the outer edge (19), and towards the sweeping plane (21), wherein the shell has an inner side (25) which faces an interior (29) of the shell (23), and an outer side (27) which faces an exterior (31) of the shell (23), wherein the shell (23) envelopes the bristles (5) perpendicularly to the rotation axis (13) in such a way that the bristles (5) are arranged in the interior (29) of the shell (23). Moreover illustrated and described are a sweeping device (37) and a floor cleaning machine (35).

(Figure 1)

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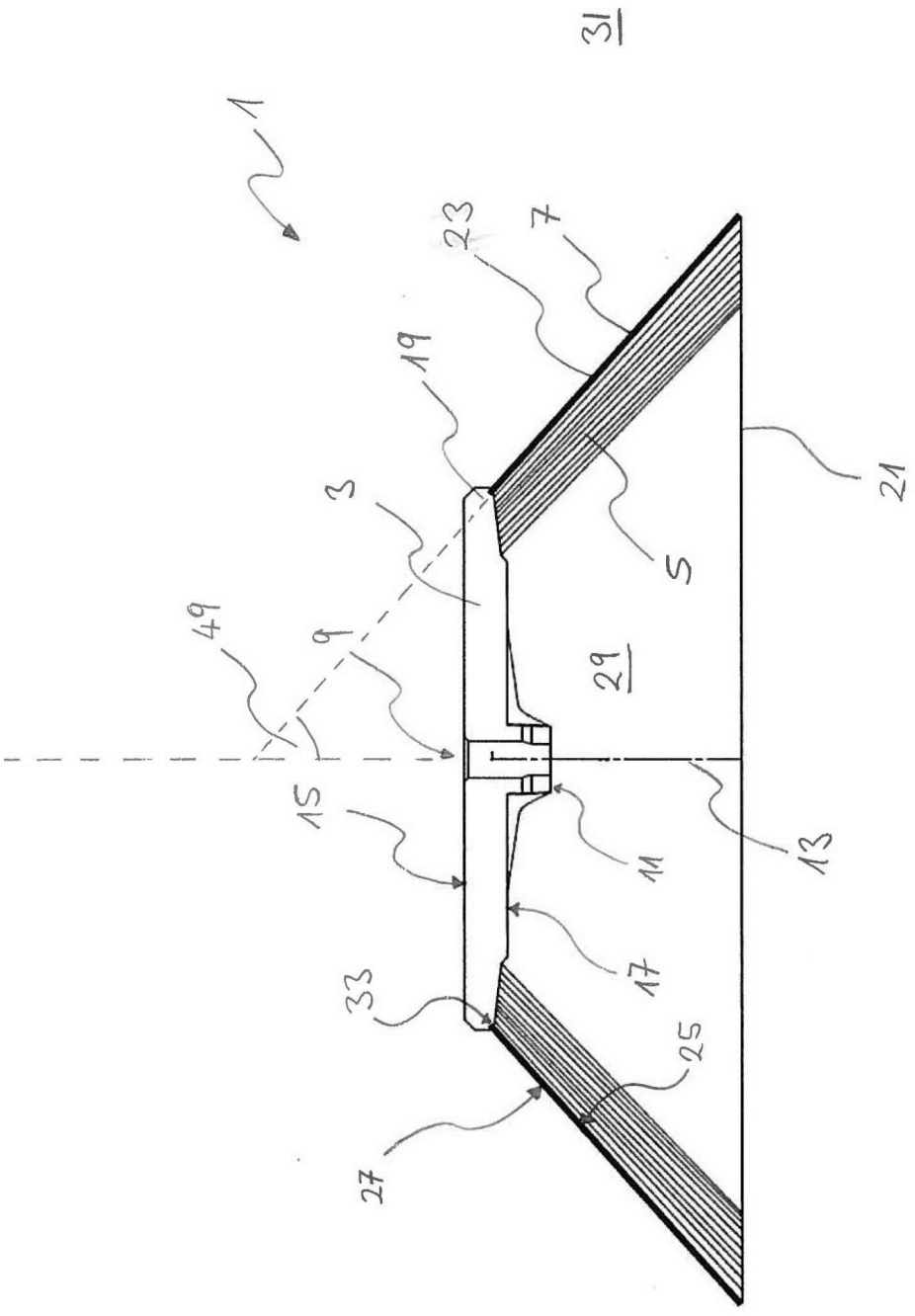

Fig. 1

Disc broom, sweeping device, and floor cleaning machine

The present invention relates to a disc broom, a sweeping device, and a floor cleaning machine.

Disc brooms are known from the prior art. For example, disc brooms are used in sweeping devices of floor cleaning machines, wherein said disc brooms are rotatingly driven so as to, by way of the bristles thereof, convey swept material on a floor area to be cleaned in the direction of a receptacle device of the floor cleaning machine such that the receptacle device can receive the swept material from the floor area to be cleaned.

On account of the rotating disc brooms, the bristles of the disc brooms rotate about the rotation axis of said disc broom. The movement of the bristles about the rotation axis in turn causes an air flow into the region of the bristles, and thereafter radially away from the bristles, such that the swept material can be swirled prior to said swept material being able to be received by the receptacle device. In particular when the swept material has a high dust content, a whirling upof the swept material leads to whirled-up dust which can float in the air for a comparatively long time and can settle in a widely distributed manner on surfaces. However, whirled-up dust is to be avoided when conveying swept material.

It is therefore an object of the present invention to provide a disc broom by way of which swept material can be reliably conveyed, and whirled-up dust can be avoided,

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or at least the amount of whirled-updust can be kept as low as possible.

According to a first aspect of the invention, the mentioned object is achieved by a disc broom having the features of patent claim 1. The disc broom is adapted for being connected to a rotary drive so as to form a sweeping device. The disc broom has a base body. The base body can be coupled to the rotary drive for rotation about a rotation axis and has a circumferential outer edge. The disc broom has bristles which are attached at one end to the base body and extend away from the base body and towards a sweeping plane which is perpendicular to the rotation axis. The disc broom has a cover element. The cover element has a preferably conical shell made of a flexible material, said shell extends away from the base body, preferably away from the outer edge, and towards the sweeping plane. The shell has an inner side which faces an interior of the shell. The shell has an outer side which faces an exterior of the shell. The shell envelopes the bristles perpendicularly to the rotation axis in such a way that the bristles are arranged in the interior of the shell.

The base body can be coupled to the rotary drive for rotation about a rotation axis. When the base body is coupled to the rotary drive, the rotary drive can drive the base body such that the base body rotates about the rotation axis. For coupling to the rotary drive, the base body can have a coupling means. The coupling means of the base body can have a recess and a circumferential contact surface.

The disc broom has bristles which are attached at one end to the base body and extend away from the base body and towards a sweeping plane which is perpendicular to the rotation axis. Preferably, at least a radially outer part of the bristles relative to the rotation axis extends

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inclined to the rotation axis such that the free ends of the part of the bristles are at a greater distance from the rotation axis than the ends which are attached to the base body.

The attachment of the bristles at one end to the base body ensures that the bristles move about the rotation axis when the base body rotates about the rotation axis. The movement of the bristles about the rotation axis enables the bristles, when engaging with a floor area to be cleaned, to convey swept material along the floor area to be cleaned. The extension of the bristles away from the base body and towards the sweeping plane which is perpendicular to the rotation axis ensures that the free ends of the bristles remote from the base body can engage with the floor area to be cleaned and can thus convey swept material along the floor area to be cleaned.

The disc broom has a cover element having a preferably conical shell, wherein the shell surrounds the bristles. When at least the radially outer part of the bristles extends in an inclined or conical shape away from the base body and towards the sweeping plane, the conical shell is adapted to the profile of the bristles.

The preferably conical shell is formed from a flexible material. The flexibility of the material of the shell enables an elastic deformation of the shell over large deformation ranges such that the shell returns to its original shape even after severe deformation. The flexibility of the material of the shell enables a portion of the cover element to lie flat on the floor area when said portion engages with the floor area to be cleaned, such that swept material can be conveyed particularly thoroughly along the floor area to be cleaned due to a planar friction force. Moreover, the flexibility of the material of the shell can ensure that the shell deforms elastically when the shell hits an

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obstacle while moving over the floor area to be cleaned. An obstacle can be, for example, a wall which confines the floor area to be cleaned, or a shelf which extends over the floor area to be cleaned. The elastic deformability of the shell can thus increase the service life of the shell.

When the shell is elastically deformed, a partial quantity of the bristles can engage with the floor area to be cleaned, such that when the base body rotates around the rotation axis, the swept material can be conveyed from the floor area to be cleaned by the bristles. Conveying of the swept material is thus ensured even with an elastically deformed shell.

The shell extends away from the base body and towards the sweeping plane. The extension of the shell away from the base body and towards the sweeping plane enables an envelope of the bristles around the rotation axis. The shell can extend away from the outer edge of the base body. The shell can be in contact with the base body such that when the base body rotates about the rotation axis, the shell also rotates about the rotation axis due to friction forces which can act between the shell and the base body. The shell can be in contact with and be attached to the base body, such that when the base body rotates the shell rotates together with the base body about the rotation axis.

The shell has an inner side and an outer side. The inner side faces an interior of the shell, and the outer side faces an exterior of the shell. The shell can separate the interior of the shell from the exterior of the shell.

The shell envelopes the bristles perpendicularly to the rotation axis in such a way that the bristles are arranged in the interior of the shell. The envelope of the bristles perpendicular to the rotation axis by the shell, such

that the bristles are arranged in the interior of the shell, can minimize airflows towards the bristles and away from the bristles. Particularly, when the bristles move about the rotation axis, air flows between the interior of the shell and the exterior of the shell are reduced by the shell. The whirling up of swept material before it can be received by the receptacle device is also minimized by reducing the air flows. Therefore, if the swept material has a high dust content, the amount of whirled-up dust can be reduced. In particular, the shell prevents that an air flow enters the region of the bristles and the airis again radially accelerated out of the region of the bristles due to the rotation of the disc broom.By preventing such a flow, the disc broom according to the invention causes significantly less whirling up of dust during operation compared to brooms according to the prior art.

In summary, it can thus be stated that the disc broom can reliably convey swept material and whirled-up dust is avoided, or at least the amount of whirled-up dust is kept low.

In one embodiment, the base body has an upper side which faces away from the interior of the shell, and a lower side which faces the interior of the shell, wherein, when the base body is connected to the rotary drive, there is no fluid connection through the base body between the interior of the shell and the upper side of the base body. By avoiding a fluid connection through the base body, air flows through the base body towards the bristles and through the base body away from the bristles can be prevented, so that whirling up of the swept material can be significantly reduced.

In one embodiment, the free ends of the bristles remote from the base body are arranged in the sweeping plane. The arrangement of the free ends of the bristles remote

from the base body in the sweeping plane enables the free ends of the bristles to move about the rotation axis in the sweeping plane. A movement of the free ends of the bristles about the rotation axis in the sweeping plane enables a precise engagement of the free ends of the bristles with the floor area to be cleaned.

In one embodiment, a circumferential shell portion of the shell forms a shell angle with the rotation axis of at least 5 and at most 85 degrees, preferably at least 20 and at most 70 degrees, particularly preferably at least 35 and at most 55 degrees. A shell angle of at least 5 degrees ensures that when a portion of the cover element engages with the floor area to be cleaned, the shell portion deforms away from the rotation axis and in the direction of the exterior of the shell. This effect increases as the shell angle increases. A shell angle of at most 85 degrees ensures an envelope of the bristles extending around the rotation axis by the shell even when the shell deforms elastically. When the shell angle is further reduced, an envelope of the bristles extending around the rotation axis by the shell can be ensured even in the case of comparatively large elastic deformations of the shell.

In one embodiment, the flexible material is formed from a natural rubber. Natural rubber is a particularly flexible and wear-resistant material. The flexible material can be formed completely or at least partially from the natural rubber. The natural rubber may be vulcanized. A vulcanized natural rubber provides an almost purely elastic deformation behaviour over wide deformation ranges. The flexible material can be formed from Linatex. Linatex has proven particularly advantageous when used as the flexible material of the conical shell. When Linatex is used, the shell has optimum flexibility and durability while simultaneously having high sweeping effects. The present invention is

not limited to the flexible material being formed from a natural rubber. The flexible material can also be formed completely or at least partially from a synthetic rubber. The present invention is not limited to the flexible material being formed from a natural rubber or a synthetic rubber. The flexible material may also be formed from other elastomers.

In one embodiment, the flexible material has a glass transition temperature of at most 0°C. A glass transition temperature of at most 0°C ensures that the flexible material is elastic at temperatures above 0°C. When the flexible material is an elastomer, a glass transition temperature of at most 0°C ensures that the flexible material is used at temperatures above 0°C in the rubber-elastic range. It is particularly advantageous when the flexible material has a glass transition temperature of at most -30°C, since this makes the shell elastically deformable, even when the disc broom is used in outdoor areas in heavy frost.

In one embodiment, the flexible material has a Young's modulus of at most 5 GPa. A Young's modulus of at most 5 GPa ensures that the shell has a low resistance against elastic deformation so that the shell deforms upon contact with an obstacle, and the shell and the obstacle are not plastically deformed.

In one embodiment, the shell is configured as a closed surface such that there is no fluid connection through the shell between the exterior of the shell and the interior of the shell. By preventing a fluid connection through the shell, air flows through the shell towards the bristles and through the shell away from the bristles can be particularly reliably prevented, so that whirling up of the swept material can be further reduced.

In one embodiment, the cover element has an attachment section which is attached to the base body, preferably to the outer edge of the base body. With the attachment section the cover element can be attached to the base body. An attachment of the cover element to the base body can ensure that the cover element rotates about the rotation axis when the base body rotates about the rotation axis. The attachment section can be configured to be circumferential, so that the attachment section can be attached circumferentially to the outer edge. The attachment section can be configured to be stiffer than the shell so that the attachment section enables a mechanically stable attachment to the base body, and simultaneously the shell can be configured to be sufficiently flexible.

In one embodiment, the attachment section is adhesively bonded and/or affixed to the base body, preferably to the outer edge. An adhesive bond provides a simple and mechanically robust materially integral (firmly bonded) connection. When the attachment section is affixed to the base body, a form-fitting and/or force-fitting connection is provided between the attachment section and the base body. For example, the attachment section can be stapled to the base body. Stapling the attachment section to the base body is particularly simple and fast. When the attachment section is adhesively bonded and affixed to the base body, a materially integral (firmly bonded) and form-fitting and/or force-fitting connection is provided between the attachment section and the base body such that the attachment section and the base body are connected to one another in a particularly mechanically robust manner.

According to a second aspect of the invention, the object mentioned at the outset is solved by a sweeping device having the features of patent claim 11. The sweeping device has a disc broom according to the first aspect of

the invention, and a rotary drive. The base body of the disc broom is coupled to the rotary drive for rotation about the rotation axis.

The features, technical effects, and/or advantages described in the context of the disc broom according to the first aspect of the invention apply, at least in an analogous manner, also to the sweeping device according to the second aspect of the invention, so that no corresponding repetition is made at this point.

According to a third aspect of the invention, the object mentioned at the outset is solved by a floor cleaning machine having the features of patent claim 12. The floor cleaning machine is configured for cleaning a floor area of swept material, in particular dust. The floor cleaning machine has a sweeping device according to the second aspect of the invention, a chassis for moving the floor cleaning machine over the floor area to be cleaned, and a swept material receptacle device, in particular a dust receptacle device. The disc broom of the sweeping device can be moved into a working position. In the working position, a partial quantity of the bristles and preferably a portion of the cover element engage with the floor area to be cleaned such that, when the base body rotates about the rotation axis caused by the rotary drive of the sweeping device, swept material is conveyed from the floor area to be cleaned by the bristles and the cover element to an inlet of the swept material receptacle device, in particular of the dust receptacle device.

The disc broom of the sweeping device can be moved into a working position. Preferably, the disc broom of the sweeping device can be moved from a transport position into the working position. In the transport position, the bristles and the cover element are spaced apart from the floor area such that the floor cleaning machine can be

moved towards the floor area to be cleaned and away from the floor area to be cleaned without a partial quantity of the bristles and a portion of the cover element engaging with the floor area. In the working position, a partial quantity of the bristles and preferably a portion of the cover element engage with the floor area to be cleaned.

In one embodiment, in the working position the sweeping plane is arranged at a sweeping angle of more than 0 degrees to the floor area to be cleaned. Due to a sweeping angle of more than 0 degrees, the swept material is conveyed by the bristles and the cover element in a particularly efficient manner and in the direction of the inlet of the swept material receptacle device.

In one embodiment, the swept material receptacle device, in particular the dust receptacle device, is configured for conveying swept material, in particular dust, from the floor area to be cleaned into a receiving container. The conveying of the swept material into a receiving container ensures that the swept material can be collected in the floor cleaning machine and transported to a waste treatment area.

In one embodiment, the floor cleaning machine is a sweeper, a vacuum sweeper, a scrubbing machine, or a vacuum scrubbing machine. As the floor cleaning machine can be a sweeper, a vacuum sweeper, a scrubbing machine or a vacuum scrubbing machine, different application fields are provided for the disc broom according to the first aspect of the invention and for the sweeping device according to the second aspect of the invention.

The features, technical effects, and/or advantages described in the context of the disc broom according to the first aspect of the invention, apply at least in an analogous manner also to the floor cleaning machine

according to the third aspect of the invention, such that no corresponding repetition is made at this point.

Further features, advantages, and potential applications of the present invention result from the following description of an exemplary embodiment and from the figures. All described and/or illustrated features, individually and in any combination, form the subject matter of the invention, also independently of the composition of said features in the individual claims or the back references of the claims. Furthermore, the same reference signs are used for identical or equivalent objects in the figures.

Figure 1 shows a schematic sectional view of an embodiment of a disc broom according to the invention.

Figure 2 shows a schematic lateral view of a part of an embodiment of a floor cleaning machine according to the invention.

Figure 3 shows a schematic illustration of the portions of a floor area in which the bristles of the disc brooms of the embodiment of the floor cleaning machine from Figure 2 engage with the floor area when the sweeping devices are in the working position.

Figure 1 shows a schematic sectional view of an embodiment of a disc broom 1 according to the invention. The disc broom 1 has a base body 3, bristles 5, and a cover element 7.

The base body 3 has a recess 9 and a circumferential contact surface 11. The recess 9 and the contact surface 11 enable a rotatable coupling of the base body 3 about a rotation axis 13. The base body furthermore has an

upper side 15 and a lower side 17 and an circumferential outer edge 19.

The bristles 5 are attached at one end to the base body 3 and extend away from the base body 3 and towards a sweeping plane 21 which is perpendicularly to the rotation axis 13. In this exemplary embodiment, the free ends of the bristles 5 remote from the base body 3 are arranged in the sweeping plane 21. In this exemplary embodiment, the bristles 5 are inclined in relation to the rotation axis 13 such that the free ends of the bristles 5 are at a greater distance from the rotation axis 13 than the ends which are attached to the base body 3.

The cover element 7 has a conical shell 23. The shell 23 has an inner side 25 and an outer side 27, and the inner side 25 faces an interior 29 of the shell 23. The outer side 27 faces an exterior 31 of the shell 23. The shell 23 extends away from the outer edge 19 and towards the sweeping plane 21. The cover element 7 has an attachment section 33 which is attached to the outer edge 19 of the base body 3. The attachment section can be adhesively bonded and/or affixed to the outer edge 19.

The shell 23 in this preferred exemplary embodiment is formed from a flexible material. The flexible material is formed from a natural rubber, has a glass transition temperature of at most 0°C, and has a Young's modulus of at most 5 GPa. Particularly high sweeping effects and a simultaneously minor whirling up of the swept material has been demonstrated when the flexible material is formed from Linatex.

The shell 23 envelopes the bristles 5 perpendicularly to the rotation axis 13 in such a way that the bristles 5 are arranged in the interior 29 of the shell 23.

The envelope of the bristles 5 perpendicular to the rotation axis 13 by the shell 23, such that the bristles 5 are arranged in the interior 29 of the shell 23, can minimize air flows towards the bristles 5 and away from the bristles 5. In particular when the bristles 5 move about the rotation axis 13, air flows between the interior 29 of the shell and the exterior 31 of the shell are reduced due to the shell 23. The whirling up of swept material before it can be received by a swept material receptacle device 41 (see Figure 2) is likewise minimized by reducing the air flows. Therefore, in case the swept material has a high dust content, the amount of whirled-up dust can be reduced.

The shell 23 is configured as a closed surface such that there is no fluid connection through the shell 23 between the exterior 31 of the shell 23 and the interior 29 of the shell 23. By preventing a fluid connection through the shell 23, air flows through the shell 23 towards the bristles and through the shell 23 away from the bristles can be particularly reliably prevented so that whirling up of the swept material can be reduced even more significantly.

The shell 23 has a circumferential shell portion 35 which forms a shell angle 49 with the rotation axis 13 of 48 degrees. A shell angle 49 of 48 degrees is only exemplary. Especially when the shell 23 moves about the rotation axis 13, the shell angle 49 can also have other values.

Figure 2 shows a schematic lateral view of a part of an embodiment of a floor cleaning machine according to the invention, wherein the part is configured as a sweeping attachment 35. The sweeping attachment 35 has sweeping devices 37, which are each attached to the sides, a chassis 39, and a swept material receptacle device 41, in particular a dust receptacle device.

The sweeping devices 37 comprise the disc broom 1 illustrated in Figure 1, the shell 23 of said disc broom 1 being illustrated in Figure 2. Moreover, the sweeping devices 37 have a rotary drive 43. The base body 3 (see Figure 1) of the disc broom 1 is coupled to the rotary drive 43 for rotation about the rotation axis 13. The sweeping devices 37 are adapted for use as part of a floor cleaning machine, here as part of a sweeping attachment 35. The sweeping devices 37 can also be used as part of a sweeper, a vacuum sweeper, a scrubbing machine, or a vacuum scrubbing machine.

The chassis 39 is configured for moving the sweeping attachment 35 over a floor area 45 to be cleaned. The swept material receptacle device 41 is configured for conveying swept material, in particular dust, from the floor area 45 to be cleaned into a receiving container 46 of the sweeping attachment 35. The sweeping attachment 35 is configured for cleaning the floor area 45 of dust.

As is illustrated in Figure 1, the upper side 15 of the base body 3 faces away from the interior 29 of the shell 23, and the lower side 17 faces the interior 29 of the shell 23. When the base body 3 is coupled to the rotary drive 43 as in Figure 2, there is no fluid connection through the base body 3 between the interior 29 of the shell 23 and the upper side 15 of the base body 3. By avoidance of a fluid connection through the base body 3 when the latter is coupled to the rotary drive 43, air flows through the base body 3 towards the bristles 5 and through the base body 3 away from the bristles 5 can be prevented when the bristles 5 move about the rotation axis 13. A prevention of air flows through the base body 3 can further reduce a whirling up of the swept material.

The disc broom 1 of the sweeping devices 37 can be moved from a transport position into a working position shown in Figure 2. In the transport position, the bristles 5

and the cover element 7 are spaced apart from the floor area 45 such that the sweeping attachment 35 can move towards the floor area 45 to be cleaned and away from the floor area 45 to be cleaned without a partial quantity of the bristles 5 and a portion of the cover element 7 engaging with the floor area 45. In the working position, a partial quantity of the bristles 5 and a portion of the cover element 7 engage with the floor area 45 to be cleaned. When the base body 3 rotates caused by the rotary drive 43 of the sweeping device 37, swept material is conveyed from the floor area 45 to be cleaned through the bristles 5 and the cover element 7 to an inlet of the swept material receptacle device 41, and conveyed from the latter into a receiving container 46 of the sweeping attachment 35.

In the working position, the sweeping plane 21 in the exemplary embodiment described here is arranged at a sweeping angle 47 of approximately 5 degrees to the floor area 45 to be cleaned. A sweeping angle 47 of 5 degrees is only exemplary. In particular when the sweeping attachment 35 moves over the floor area 45 to be cleaned, the sweeping angle 47 can also have other values. The sweeping angle 47 between the sweeping plane 21 and the floor area 45 to be cleaned corresponds to the inclination angle 47' of the rotation axis 13 of the disc broom 1. In the preferred embodiment illustrated here, in the working position the rotation axis 13 is inclined by 5 degrees to the side and by 5 degrees to the front in the travel direction F of the sweeping attachment 35.

Figure 3 shows in a topview as hatched regions B relative to the travel direction F of the sweeping attachment 35 those portions of the floor area 45 to be cleaned with which the partial quantities of the bristles 5 of the disc brooms 1 engage due to the oblique position of the rotation axes 13. The regions B extend over 180 degrees in total. Furthermore, said regions B extend by 60

Figure 3 shows in a topview as hatched regions B relative to the travel direction F of the sweeping attachment 35 those portions of the floor area 45 to be cleaned with which the partial quantities of the bristles 5 of the disc brooms 1 engage due to the oblique position of the rotation axes 13. The regions B extend over 180 degrees in total. Furthermore, said regions B extend by 60 degrees inwards towards the centre of the sweeping attachment 35 in relation to the travel direction F, and by 30 degrees backwards in relation to the travel direction F. Finally, the rotary drives 43 of the sweeping devices 37 are configured such that the disc brooms 1 rotate in opposite directions in such a way, when they engage with the floor area 45 to be cleaned, that the bristles 5 which engage in the regions B with the floor area 45 to be cleaned move towards the centre of the sweeping attachment 35. As a result, dirt on the floor area 45 is moved towards the centre of the sweeping attachment 35.

It is additionally to be pointed out that “having” and “comprising” does not exclude other elements or steps, and that “a” does not exclude a multiplicity. It is furthermore to be pointed out that features which have been described with reference to one of the above exemplary embodiments can also be used in combination with other features of other exemplary embodiments described above. Reference signs in the claims are not to be considered a limitation.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge in Australia.

List of reference signs

1	Disc broom
3	Base body
5	Bristles
7	Cover element
9	Recess
11	Contact surface
13	Rotation axis
15	Upper side
17	Lower side
19	Outer edge
21	Sweeping plane
23	Shell
25	Inner side
27	Outer side
29	Interior of the shell
31	Exterior of the shell
33	Attachment section
35	Sweeping attachment
37	Sweeping device
39	Chassis
41	Swept material receptacle device
43	Rotary drive
45	Floor area
46	Receiving container
47	Sweeping angle
47’	Inclination angle of the rotation axis
49	Shell angle

Claims

1. A floor cleaning machine comprising:

a disc broom that is rotatable about a rotation axis, the disc broom having a base body, bristles and a cover element, the base body having a circumferential outer edge, the bristles having proximal ends and distal ends, the proximal ends of the bristles being attached **to** the base body, the bristles extending away from the base body and terminating at the distal ends in a continuous planar shape, all of the distal ends cooperating to define a sweeping plane, the sweeping plane being perpendicular to the rotation axis, the cover element having a shell that is made of a flexible elastomeric material that is capable of flexing with the bristles, the shell extending away from the base body toward the sweeping plane, wherein the shell has an inner side, which faces an interior of the shell, and an outer side that faces an exterior of the shell,

wherein the shell envelopes the bristles perpendicularly to the rotation axis such that the bristles are disposed in the interior of the shell;

wherein the cover element has an attachment section, and wherein the attachment section is attached to the base body at an outer edge thereof, the cover element extending to the sweeping plane.

2. The floor cleaning machine of Claim 1, wherein at least a radially outer portion of the bristles relative to the rotation axis extends inclined to the rotation axis such that the distal ends of the at least the radially outer portion of the bristles are at a greater distance from the rotation axis than the proximal ends which are attached to the base body; and wherein the shell has a conical profile.

3. The floor cleaning machine of Claim 1, wherein the base body has an upper side, which faces away from the interior of the shell, and a lower side that faces the interior of the shell; and

wherein there is no fluid connection through the base body between the interior of the shell and the upper side of the base body.

4. The floor cleaning machine of Claim 1, wherein the distal ends of the bristles are arranged in the sweeping plane.

5. The floor cleaning machine of Claim 1, wherein an inner side of the shell forms a shell angle with the rotation axis of at least 5 degrees and at most 85 degrees.

6. The floor cleaning machine of Claim 5, wherein the shell angle is at least 20 degrees and at most 70 degrees.

7. The floor cleaning machine of Claim 6, wherein the shell angle is at least 35 degrees and at most 55 degrees.

8. The floor cleaning machine of Claim 1, wherein the flexible material is formed from a natural rubber.

9. The floor cleaning machine of Claim 1, wherein the flexible material has a glass transition temperature of at most 0°C.

10. The floor cleaning machine of Claim 1, wherein the flexible material has a Young's modulus of at most 5 GPa.

11. The floor cleaning machine of Claim 1, wherein the shell is configured as a closed surface such that there is no fluid connection through the shell between the exterior of the shell and the interior of the shell.

12. The floor cleaning machine of Claim 1, wherein the attachment section is adhesively bonded to the base body.

13. The floor cleaning machine of Claim 1, further comprising a sweeping device having a rotary drive, wherein the base body of the disc broom is coupled to the rotary drive for rotation about the rotation axis.

14. The floor cleaning machine of Claim 13, further comprising a chassis and a swept material receptacle, the chassis being configured to support the sweeping device for movement over a floor area that is to be cleaned;

wherein the disc broom is movable relative to the chassis into a working position;

wherein in the working position a partial quantity of the bristles engage with the floor area to be cleaned such that, when the rotary drive of the sweeping device rotates the base body about the rotation axis, swept material is conveyed from the floor area to be cleaned by the bristles to an inlet of the swept material receptacle.

15. The floor cleaning machine of Claim 14, wherein in the working position the sweeping plane is arranged at a sweeping angle of more than 0 degrees to the floor area to be cleaned.

16. The floor cleaning machine of Claim 14, further comprising a receiving container, and wherein the swept material receptacle is configured for conveying dust from the floor area to be cleaned into the receiving container.

17. The floor cleaning machine of Claim 14, wherein the floor cleaning machine is selected from a group of floor sweeping machines consisting of sweepers, vacuum sweepers, scrubbing machines and vacuum scrubbing machines.

18. The floor cleaning machine of Claim 14, wherein the cover element engages with the floor area to be cleaned when the disc broom is moved relative to the chassis into the working position.

19. The floor cleaning machine of Claim 1, wherein the flexible material extends from the circumferential outer edge of the base body.

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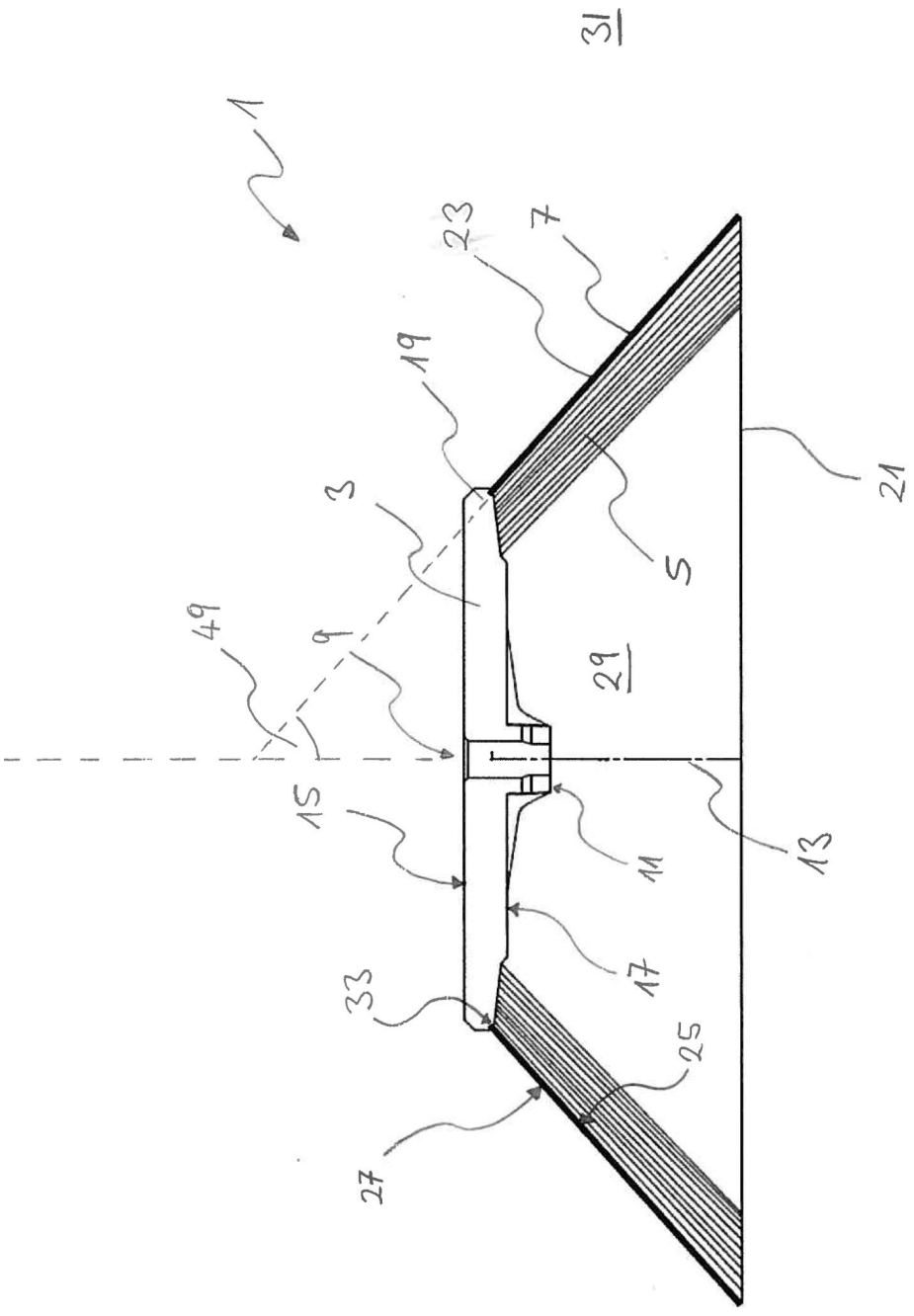

Fig. 1

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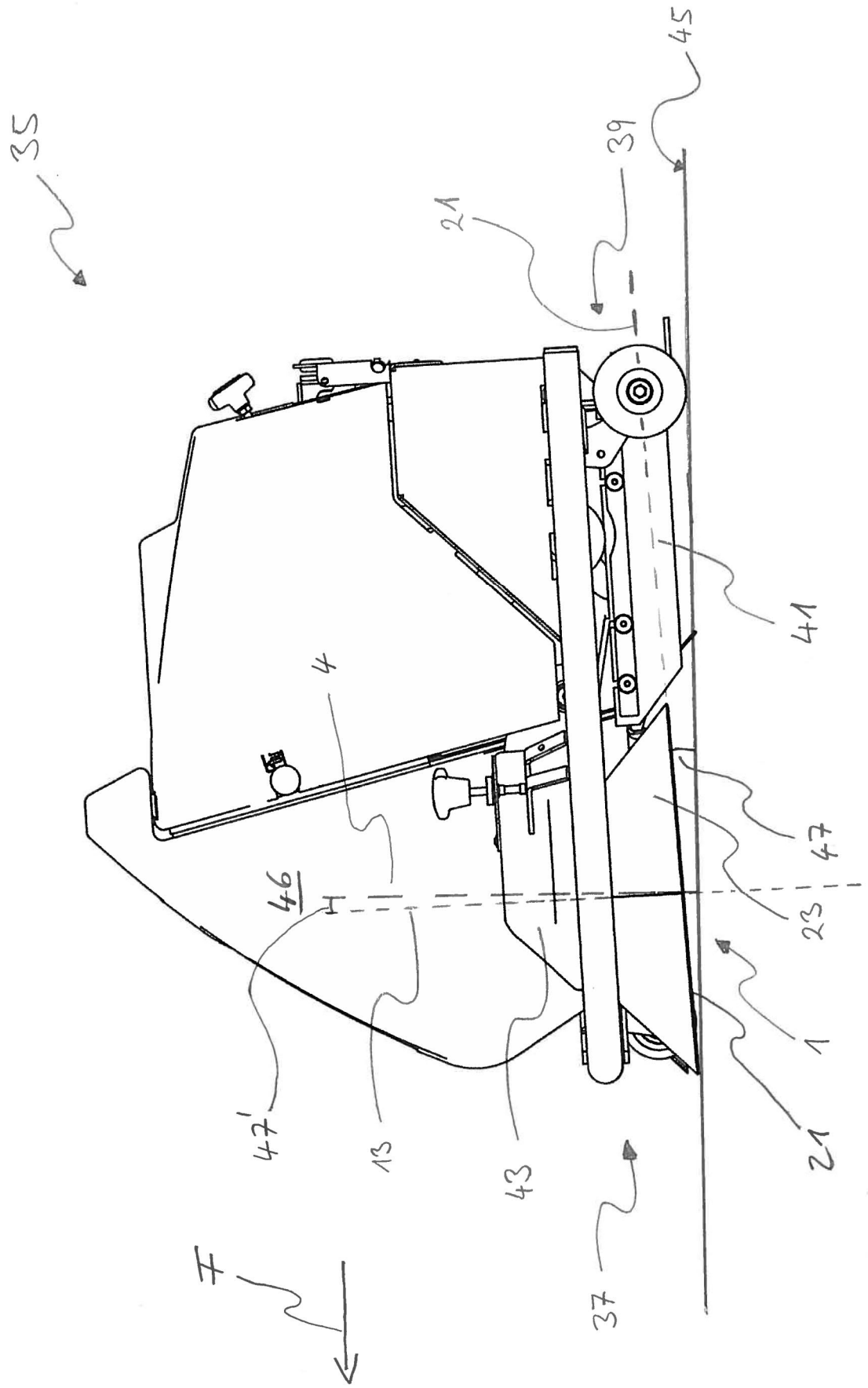

Fig. 2

2020201116 17 Feb 2020

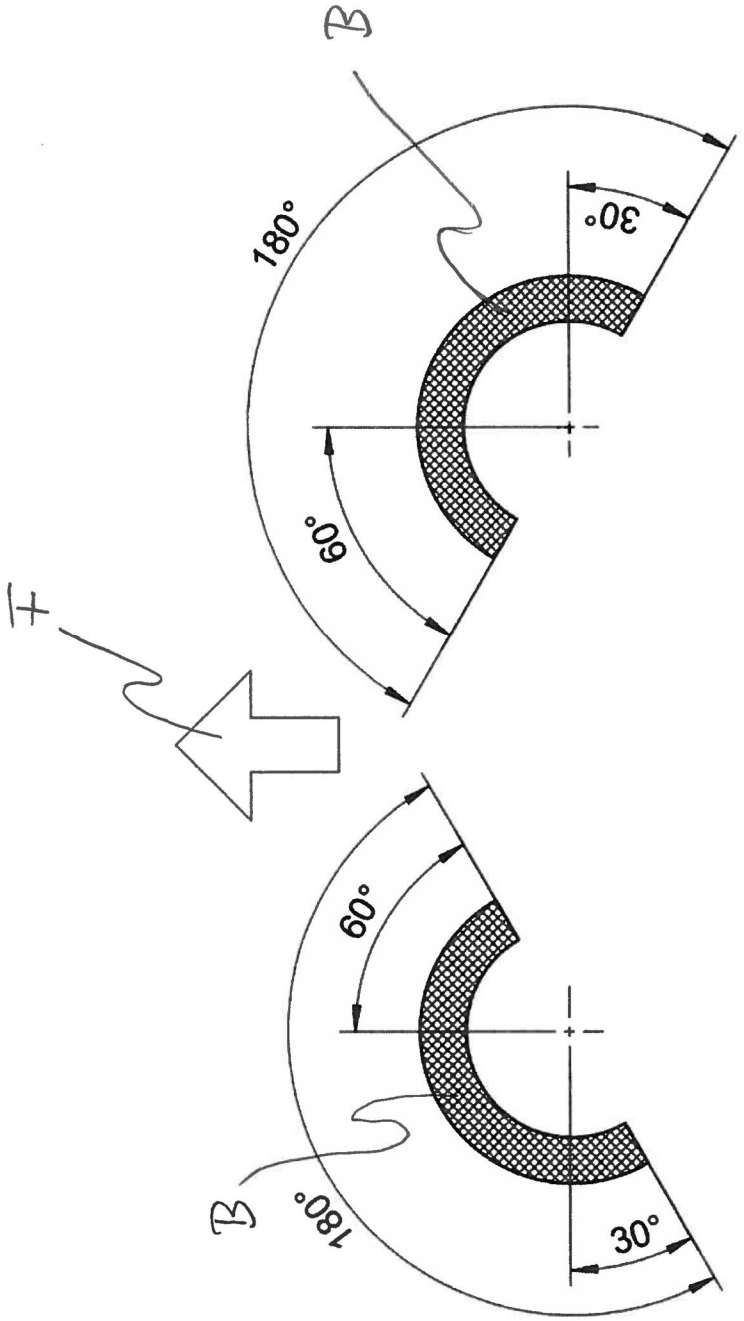

Fig. 3