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(54) **FLOOR CLEANING HEAD FOR A SUCTION CLEANER**

BODENREINIGUNGSKOPF FÜR EINEN STAUBSAUGER

TÊTE DE NETTOYAGE DE SOL POUR ASPIRATEUR

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Description

Description of Invention

[0001] This invention relates to a floor cleaning head for a suction cleaner, and particularly (but not exclusively) to a floor cleaning head built integrally in the base of a floor-standing upright vacuum cleaner.

[0002] Suction cleaning devices provide motors for establishing flow of air through the device, to transport air and entrained dirt from a suction inlet formed at the floor cleaning head of the cleaner, or from the mouth of a suction hose or cleaning tool connected to the device, to an exhaust outlet for expelling air from the device. The air with entrained dirt is drawn through a separator assembly, removing coarse dirt from the air flow, and a substantial proportion of fine dirt, for storage within a dirt bin. The filtered air is drawn through the motor and is subsequently expelled from the device via the exhaust outlet.

[0003] It is common for a floor cleaning head of a cleaner to provide an agitation device driven by a motor, to assist in dislodging dirt from the surface being cleaned, and to guide or sweep the dirt into the suction inlet of the floor cleaning head. The shape and contours of the suction inlet, and the area surrounding the suction inlet, affect the performance of the floor cleaning head in terms of the efficiency of its pick-up (i.e. the ability to gather dirt from the surface being cleaned).

[0004] CN 108968800 A describes a dust collection floor brush.

[0005] The present invention seeks to reduce or overcome one or more of the deficiencies associated with the prior art.

[0006] The invention is defined by the claims.

[0007] According to a first aspect of the disclosure we provide a floor cleaning head for a suction cleaner, the floor cleaning head including:

a lead agitator chamber in which a rotary lead agitator is supported; and

a suction chamber defining a suction inlet through which air and entrained dirt is drawn into the suction chamber, a suction outlet for fluid connection to a suction flow path of the suction cleaner, and a rotary rear agitator supported within the suction chamber; the suction chamber being disposed rearwardly of the lead agitator chamber and separated from it by a dividing wall;

wherein a sealing material is provided on a lower part of the dividing wall.

[0008] The sealing material may comprise a strip of bristles. The sealing material may be configured to inhibit air flow beneath the dividing wall. The sealing material may be configured to extend downwards from the dividing wall, towards the floor beneath the floor cleaning head. A lowermost part of the sealing material may lie at a height above the lowermost portions of both the lead

agitator and rear agitator.

[0009] The floor cleaning head may further include a deflecting surface disposed directly in front of and in close proximity to the lead agitator, and configured to deflect forward-travelling particles of dirt leaving the lead agitator.

[0010] According to a second aspect of the disclosure, we provide a floor cleaning head for a suction cleaner, the floor cleaning head including:

a lead agitator chamber in which a rotary lead agitator is supported; and

a suction chamber defining a suction inlet through which air and entrained dirt is drawn into the suction chamber, a suction outlet for fluid connection to a suction flow path of the suction cleaner, and a rotary rear agitator supported within the suction chamber; the suction chamber being disposed rearwardly of the lead agitator chamber and separated from it by a dividing wall;

wherein a deflecting surface is disposed directly in front of and in proximity to the lead agitator, and configured to deflect forward-travelling particles of dirt leaving the lead agitator.

[0011] The deflecting surface of either aspect may be provided rearwardly of a front wall of a front end of the housing of the floor cleaning head. The deflecting surface may be spaced from the front wall of the front end of the housing. The deflecting surface may be upright, or substantially upright.

[0012] The deflecting surface may be spaced from the lead agitator by between 1 mm and 10mm, or by between 3mm and 8mm, or by around 5mm.

[0013] A pair of sealing pads may be provided on an underside of the floor cleaning head, and offset from the ends of the lead agitator, the cleaning pads being formed of a fibrous material.

[0014] A portion of each sealing pad may be disposed in front of a central rotational axis of the lead agitator. The whole of each sealing pad may be disposed in line with or in front of the central rotational axis of the lead agitator. Each sealing pad may be disposed adjacent a respective ground engaging wheel on the underside of the floor cleaning head.

[0015] According to a third aspect of the disclosure we provide a suction cleaner, including:

a floor cleaning head according to the first or second aspects;

a motor for creating a suction flow of air through the cleaner between the suction inlet and an exhaust outlet; and

a separator assembly for separating dirt from the air flow between the suction inlet and the motor.

[0016] The floor cleaning head may be formed in a base portion of the suction cleaner.

[0017] Embodiments of the technology will now be described, by way of example only, with reference to the following figures, of which:

Figure 1 is a side view of a suction cleaner according to embodiments of the technology;

Figure 2 is a rear view of the device illustrated in Figure 2;

Figure 3 is a perspective view of a portion of the upright body of the suction device of Figure 1, shown with the separator assembly removed from the device;

Figure 4 is a perspective view of a floor cleaning head of a cleaning device according to embodiments of the technology;

Figure 5 is a side cross-sectional view of a floor cleaning head according to embodiments of the technology;

Figure 6 is a front view of a floor cleaning head according to embodiments of the technology;

Figure 7 is a view of the underside of a floor cleaning head according to embodiments of the technology; and

Figure 8 is a side cross-sectional view a portion of a floor cleaning head according to embodiments of the technology.

[0018] With reference to the drawings, we describe a suction cleaner 10 for cleaning a floor surface. The cleaner illustrated in this example embodiment is a floor-standing upright cleaner, although it should be understood that aspects of the invention may be applied to other types of suction cleaner, and in particular other forms of floor-standing cleaners, such as a canister type cleaner, or a cylinder cleaner, for example.

[0019] In general terms, and with reference to Figures 1, 2 and 3, we describe a suction cleaner 10 with a floor cleaning head 14 providing a nozzle that defines a suction inlet (or suction inlet) for applying a suction force to a surface being cleaned. A motor (the position of which is indicated generally at 39) creates a suction flow of air through the cleaner 10 between the suction nozzle and an exhaust outlet 26. Where the term 'floor cleaning head' is used, it is with reference to the base portion of the suction cleaner 10, generally providing a housing forming the suction inlet. The term floor cleaning head should be construed to cover both an integral base part of a floor-standing suction cleaner, and/or a separate floor cleaning head for use attached to a wand or the like, connected to a suction cleaner.

[0020] The suction cleaner 10 provides a separator assembly 18 for separating dirt from the air flow between the suction inlet and the motor 39, and an exhaust assembly for separating fine contaminants from the air flow between the motor 39 and the exhaust outlet 26.

[0021] In the embodiment illustrated, the suction cleaner 10 comprises an upright body 12 providing a handle portion 16 including a first user-graspable handle 30 to

allow a user to operate and steer the device. The floor cleaning head 12 provides rollers 20 (e.g. wheels) for moving the suction cleaner 10 across a surface.

[0022] The floor cleaning head 14 provides two rotary agitators 42, 44 for dislodging dirt from the floor surface and a floor cleaning head outlet 35 from which air and entrained dirt are drawn from the floor cleaning head 14 towards a separator assembly 18 via a suction passage 36. Each agitator 42, 44 is disposed across the width of the device, so that the lengthways rotary axis of each agitator is disposed widthways of the floor cleaning head 14. The suction passage 36 fluidly connects the floor cleaning head 14 to an inlet of the separator assembly 18. An outlet of the separator assembly 18 fluidly connects the separator assembly 18 to the motor 39, via which a suction air flow is generated within the suction cleaner, so as to draw air and entrained dirt through the floor cleaning head 14, to the separator assembly 18, and to draw cleaned air from the separator assembly 18. An exhaust outlet 26 vents air from the suction device 10, downstream of the motor 39.

[0023] In embodiments, and as shown in Figure 3, the separator assembly 18 comprises a separator housing 22 that provides a collecting volume for collecting dirt separated from the incoming air flow. The separator housing 22 also contains a separator, which in embodiments is formed of a first stage cyclonic separator to remove large particles of dirt, and a second stage cyclonic separator for removing smaller particles of dirt from the air flow. In embodiments, the first stage separator provides a mesh shroud for filtering relatively large particles, and the second stage separator provides a plurality of cyclonic separators, each formed as cone shape as is known in the art, for filtering fine dirt particles from the air flow.

[0024] In embodiments, the separator assembly 18 is mounted on a portion 34 of the upright body 12 during use, but is detachable from the body 12 for the purpose of emptying the dirt from the separator assembly collecting volume. The separator assembly 18 may further include a pre-motor filter positioned downstream of the separator stages described above. In embodiments this pre-motor filter is housed within a removable lid portion 24 of the separator housing 22. In this way, the removable lid portion 24 may be detached to expose the filter for cleaning. The lid portion 24 may further provide a handle 32 to allow a user to lift away the separator housing 22 when detached from the upright body 12 of the cleaner. A motor inlet 38 communicates with the outlet of the separator assembly 18 when it is mounted on the upright body 12 of the suction cleaner 10.

[0025] The body 12 further provides a power source, which in embodiments is a rechargeable battery pack 31. The battery pack 31 may be rechargeable in situ, or when removed from the body 12, as is known in the art. Alternatively, or in addition, the suction cleaner 10 may be provided with a power cable for connection to a mains power source.

[0026] The body 12 further includes a carrying handle 28 configured to enable a user to lift and carry the suction cleaner 10.

[0027] With reference to Figures 4 to 8, we now describe aspects of the floor cleaning head 14 according to embodiments of the technology. In broad terms, the floor cleaning head 14 includes a lead agitator chamber 72 in which a rotary lead agitator 42 is supported, a suction chamber 47 defining a suction inlet 45 through which air and entrained dirt is drawn into the suction chamber 47, a floor cleaning head outlet 35 for fluid connection to the suction flow path 36 of the suction cleaner 10, and a rotary rear agitator 44 supported within the suction chamber 47. The suction chamber 47 is disposed rearwardly of the lead agitator chamber 72 and separated from it by a dividing wall 54.

[0028] The lead agitator 42 and rear agitator 44 are each formed as rotational agitators, and disposed widthways of the floor cleaning head 14. The floor cleaning head 14 provides a housing 55 having a front end 50, which extends in front of the lead agitator 42, and provides a lower edge defining a front inlet 52 between the lower edge and the floor surface.

[0029] In embodiments, the floor cleaning head 14 is supported on the floor surface by the rollers 20 disposed at the rear for the floor cleaning head 14, and by one or more further rollers disposed at or towards the front and/or midsection of the floor cleaning head 14. As shown in Figures 6 and 7, a pair of rollers, in this instance smaller floor-engaging wheels 58, is positioned at the front of the floor cleaning head 14, spaced outwardly from the ends of the lead agitator 42.

[0030] A further pair of rollers 64 is disposed behind the suction inlet 45. These rollers 58, 64 ensure that the floor cleaning head 14 sits at a desired ride height above a floor surface, establishing appropriate engagement between the agitators 42, 44 and the floor surface or carpet surface, for example.

[0031] The suction inlet 45 to the suction chamber 47 is formed as an opening in the underside of the housing 55, through which air flow containing debris is drawn, under the suction applied via the floor cleaning head outlet 35 leading to the suction motor 39. Dirt particles may be swept towards the suction inlet by the lead agitator 42.

[0032] In embodiments, the central axis X of the lead agitator 42, around which it rotates, lies above (i.e. higher than) the lower edge of the front end 50 of the floor cleaning head housing 55. The leading agitator 42 is preferably formed with fibres of a relatively soft material compared to the bristles of the rear agitator 44, such that it is suited to dislodging dirt and debris from a carpet, for example, and moving said debris rearwards towards or into the suction inlet formed behind the lead agitator 42. For example, the body of the lead agitator 42 may be formed of uniform soft fibres which are roughly 4-7 mm in length, preferably between 5mm and 6mm (and most preferably around 5.5mm in length). The lowermost part of lead agitator 42 lies roughly 0.7mm from the floor

surface, when the suction cleaner 10 is used on a hard floor.

[0033] In embodiments, each of the agitators 42, 44 is driven via a drive belt mechanism, in which a portion of a drive belt is disposed around an end portion of each respective agitator 42, 44, to transfer drive from the motor, the motor being disposed rearwardly of the rear agitator 44, within a rear portion of the housing 55 (the position of the agitator motor being indicated generally at 46). In embodiments, the lead agitator 42 is driven by the agitator motor at a speed of between 1700rpm and 2500rpm.

[0034] In embodiments, one or both of the lead agitator 42 and rear agitator 44 are each removable axially from the housing via openings in a side of the housing which in use are sealed with removable end caps 48. The agitators 42, 44 may be inserted through the openings, and pushed by a user into contact with an engaging formation disposed within the housing on the opposing side of the floor cleaning head 14. Alternatively, one or both of the lead agitator 42 and rear agitator 44 may be removable downwardly through the underside housing.

[0035] In embodiments of the technology, the lead agitator 42 has a diameter that is the same as or larger than the diameter of the rear agitator 44 (i.e. the diameter including the length of the bristles). Preferably, the lead agitator 42 is positioned with its central rotational axis being above the height of the central rotational axis of the rear agitator 44. The axis of the lead agitator 42 may be 1.2mm above the axis of the rear agitator 44.

[0036] In embodiments, and as shown in Figures 7 and 8 of the drawings, the rear agitator 44 is a bristled roller, having a row of relatively firm bristles 60 (i.e. firm compared to the lead agitator 42) extending outwardly from its cylindrical core. Preferably, the bristles are formed in clumps or tufts. Preferably, the rear agitator 44 provides multiple rows of bristles which wind around its perimeter in a chevron-style formation, for example.

[0037] The one or more rows of bristles 60 may be interspersed between one or more ridges 62 or flaps formed of a plastic or rubberised material, extending outwardly from the core of the agitator 44. The ridges 62 are preferably provided so as to impact the uppermost parts of a carpet surface, for example, to assist in dislodging dirt attached to or lodged in the carpet, so that the dirt particles can readily be swept into the suction inlet 45 by the bristles 60 as the agitator rotates. The ridges 62 also serve to prevent fine threads, hair, and the like from becoming wound tight around the core of the rear agitator 44, during use. It is well established that hairs and threads may be picked up by a bristled agitator such as the rear agitator 44, and commonly become wound tightly around the core of the agitator as it rotates. This tight binding of the threads around the core makes the threads difficult to remove, since it is hard to cut or unbind the threads without risking damaging the agitator itself. Having a flexible strip or ridge 62 running along the length of the rear agitator 44, means that threads or the like become

wrapped around the ridge 62 (rather than tightly around the core), thus ensuring that there is at least a small gap between the threads and the core of the agitator, so that a user may use a scissor blade, or similar, to cut through the threads or hairs to cut them free from the agitator.

[0038] The rear agitator 44 is substantially housed within the suction chamber 47 formed within the housing, to which suction is applied via the suction passage 36, such that only a lowermost part of the rear agitator 44 or its bristles (and/or ridge 62) protrudes from the suction inlet 45. In this way, the rear agitator 44 is disposed in the suction flow path formed between the suction inlet 45 and the floor cleaning head outlet 35.

[0039] In embodiments, a rear sealing strip 66 formed of a plastic, rubberised, or a fibrous material, is formed adjacent a rear portion of the suction inlet 45. The rear sealing strip 66 extends substantially across the width of the suction inlet 45, lying close to a rear edge of the suction inlet 45. The rear sealing strip 66 has the effect of creating a partial seal at the rear edge of the suction inlet, against a floor surface below, so as to concentrate the suction effect in the area in front of the strip, improving the pick-up efficiency of the floor cleaning head 14 in lifting dirt from the surface below.

[0040] The floor cleaning head 14 provides the housing 55 having a suction inlet 45, and the housing 55 provides a lead agitator chamber 72 having ends forming a pair of side walls disposed on opposing sides of the floor cleaning head 14. A dividing wall 54 lies to the rear of the agitator 42, between the lead agitator 42 and rear agitator 44, forming a back part of the lead agitator chamber 72. The lead agitator 42 is supported between the side walls and configured to rotate about a lengthways central rotational axis X.

[0041] In embodiments of the technology, a ramp may extend around a portion of a periphery of the lead agitator and inwardly from a side wall of the chamber, the ramp providing a deflecting surface configured to deflect dirt particles inwardly from the side wall of the chamber towards a central portion of the floor cleaning head 14. Preferably, such a ramp is provided at each end of the agitator chamber.

[0042] The lead agitator 42, as described above, effectively lies at the very front of (or slightly in advance of) the suction inlet 45, and acts to dislodge particles from a carpet surface, for example, in order to transfer those dirt particles back towards and into the suction inlet 45 lying behind it. The dividing wall 54 lies to the rear of the lead agitator 42, under which dislodged particles of dirt are flung by the rotational movement of the lead agitator 42. At either side of the housing, surrounding the lead agitator 42, the separating wall seals to the side wall of the housing, on which the agitator is supported and from which it extends inwardly towards the centre of the floor cleaning head 14. In this way, the floor cleaning head 14 is effectively divided into a lead agitator chamber 72 and a suction chamber 47 spaced behind it, the two chambers being separated by the dividing wall 54.

[0043] In embodiments, the lead agitator 42 in the lead agitator chamber 72 lies largely outside of the suction flow path, separated from the suction chamber 47 by the dividing wall 54 between the two agitators 42, 44. The surface of the lead agitator 42 may contact the dividing wall 54, or may lie very close to the dividing wall 54. A portion of the dividing wall 54, shown at 74, may have a concave side cross-sectional profile to conform to the shape of the surface of the lead agitator 42. Alternatively, the portion 74 of the dividing wall 54 may be flat, angled from the vertical, to align tangentially with the surface of the lead agitator 42 at its closest point. Preferably, the separation between the lead agitator 42 and the dividing wall 54 is very small or non-existent, to prevent or inhibit ingress of dirt particles into an upper part of the lead agitator chamber 72.

[0044] The lead agitator 42 preferably sits at a height such that the lowermost surface of the lead agitator 42 is raised slightly above the surface being cleaned, where that surface is a flat floor surface. When used on a carpet surface, the lower most portion of the lead agitator 42 impacts the carpet surface as the device moves across the carpet. A lower edge of the dividing wall 54 sits at a position raised above the surface being cleaned, so as not to interfere with the carpet surface since doing so would create unwanted friction and drag on the surface, and potentially cause snagging.

[0045] A sealing material 70 is provided on a lower part of the dividing wall 54. In embodiments, the sealing material is formed as a row or strip of bristles which descend from the lower edge of the dividing wall 54 (preferably extending downwards towards the floor), to inhibit the flow of air beneath the dividing wall 54; i.e. between the lowest portion of the lead agitator 42 and the suction chamber located behind it. The bristles are typically fine bristles. In this way, the sealing material 70 has the effect of defining a front portion of the suction inlet 45. It should be noted that the fine bristles do not directly contact the floor surface; a lowermost part of the sealing material 70 lies at a height above the lowermost portions of both the lead agitator 42 and rear agitator 44. Even so, the sealing material 70 provides an effective screen with the aim of concentrating the suction applied to the floor surface, to the area directly behind the row of bristles.

[0046] As shown in Figure 8, the front end 50 of the housing 55 extends in front of the lead agitator 42. The lower edge of the front end 50 defines a front inlet 52 between the lower edge and the floor surface below. In embodiments of the technology, and as shown, the lower edge lies below a rotational central axis of the lead agitator 42. This configuration means that if a dirt particle is drawn into the lead agitator chamber 72 and rotated with the lead agitator 42, it is not then flung forwardly out of the housing 55, in front of the suction cleaner 10, as the agitator rotates. Instead, the front end 50 of the housing 55 provides a surface against which dirt particles, released from the agitator surface with a forward moment,

collide and either drop to the floor surface in front of the lead agitator 42 or rebound back towards the suction inlet 45.

[0047] Further, in embodiments of the technology and as shown in Figure 8, a front deflecting surface 71 may be provided. The front deflecting surface 71 lies directly in front of and in close proximity to the lead agitator 42, and is configured to deflect forward-travelling particles of dirt leaving the lead agitator 42. In embodiments, and as shown, the front deflecting surface 71 is disposed between the front end 50 of the housing 55 and a leading surface of the lead agitator 42 (i.e. a frontmost part of the agitator); in other words, it is provided rearwardly of a front wall forming the front end 50 of the housing 55, and is spaced from that front wall. The front deflecting surface 71 may be provided as a flat surface or as a curved surface (e.g. concave facing the lead agitator 42). In embodiments, the front deflecting surface 71 is substantially flat, and extends vertically (or close to vertical) close to the leading surface of the lead agitator 42. The frontmost part of the lead agitator 42 may be separated from the front deflecting surface 71 by a distance of between 0.5mm and 5mm, and preferably between 1mm and 3mm, or around 2mm. The front deflecting surface 71 may extend downwards from an upper part of the lead agitator chamber 72. Alternatively, the front deflecting surface 71 may be provided by a portion of the front end 50 of the housing 55, having an increased thickness, so that the surface on the inside of the front end 50 of the housing, i.e. facing the lead agitator 42, provides the front deflecting surface 71. The deflecting surface 71 is preferably spaced from the lead agitator 42 by between 1 mm and 10mm, and more preferably between 3mm and 8mm, and yet more preferably by around 5mm.

[0048] In embodiments, on either side of the floor cleaning head 14, air channels 56 are provided in the side walls of the floor cleaning head. The air channels 56 provide an opening through the side wall of the housing 55, to allow air to flow inwardly from the sides of the floor cleaning head 14, into the suction inlet 45. This has the effect of drawing fine dirt from the sides of the floor cleaning head 14 into the suction inlet 45, and also assists in allowing air flow into the suction flow path when the device is used on a very deep carpet, to ensure the carpet does not entirely block access to the suction inlet 45.

[0049] In embodiments of the technology, at either side of an underside of the floor cleaning head 14, a sealing pad 68 is provided, positioned behind the floor-engaging wheels 58 at the front of the floor cleaning head 14. The sealing pads 68 are aligned with the lead agitator 42 and offset from the ends of the lead agitator 42. The sealing pads 68 are preferably formed of a material (such as felt, or another suitable fibrous fabric) that will form at least a light seal with the floor surface below the cleaner (such as a carpet, for example), to inhibit the flow of air between the sealing pad 68 and the floor below. In this way, positioning the sealing pads 68 at the front of the floor

cleaning head 14 and in front of a central rotational axis of the lead agitator 42, means that the suction effect provided at the suction inlet 45 behind the lead agitator 42, is concentrated more to the front of the floor cleaning head 14 and less to the position of the floor-engaging wheels 58, for example. The sealing pads 68 are preferably disposed in front of the rotational axis of the lead agitator 42, so that at least a portion of each pad lies in front of that axis. In embodiments, the whole of each pad lies level with or in front of the axis. Preferably, no part of the cleaning pads lies rearwardly of the axis.

[0050] By providing a light sealing effect directly rearwardly of the floor-engaging wheels 58 at the front of the floor cleaning head, dirt is less likely to be drawn towards or into the wheels or into the housing 55 at the position of the wheels 58. Furthermore, by positioning the sealing pads 68 towards the front of the lead agitator 42, the suction effect applied at the lowest point of the lead agitator 42 and the floor below is focused more underneath the agitator than towards its ends, at either side of the width of the floor cleaning head 14. When used in this specification and claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

[0051] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

[0052] Although certain example embodiments of the invention have been described, the scope of the appended claims is not intended to be limited solely to these embodiments.

Claims

1. A floor cleaning head (14) for a suction cleaner (10), the floor cleaning head including:

a lead agitator chamber (72) in which a rotary lead agitator (42) is supported; and
a suction chamber (47) defining a suction inlet (45) through which air and entrained dirt is drawn into the suction chamber, a suction outlet (35) for fluid connection to a suction flow path (36) of the suction cleaner, and a rotary rear agitator (44) supported within the suction chamber;
the suction chamber being disposed rearwardly of the lead agitator chamber and separated from it by a dividing wall (54);
wherein a sealing material (70) is provided on a

lower part of the dividing wall; **characterized in that** the sealing material comprises a strip of bristles.

2. A floor cleaning head (14) according to claim 1, wherein the sealing material (70) is configured to inhibit air flow beneath the dividing wall (54). 5
3. A floor cleaning head (14) according to any preceding claim, wherein the sealing material (70) is configured to extend downwards from the dividing wall (54), towards the floor below the floor cleaning head. 10
4. A floor cleaning head (14) according to any preceding claim, wherein a lowermost part of the sealing material (70) lies at a height above the lowermost portions of both the lead agitator (42) and rear agitator (44). 15
5. A floor cleaning head (14) according to any preceding claim, further including a deflecting surface (71) disposed directly in front of and in proximity to the lead agitator (42), and configured to deflect forward-travelling particles of dirt leaving the lead agitator. 20
6. A floor cleaning head (14) according to claim 5, wherein the deflecting surface (71) is provided rearwardly of a front wall of a front end (50) of the housing (55) of the floor cleaning head. 25
7. A floor cleaning head (14) according to claim 6, wherein the deflecting surface (71) is spaced from the front wall of the front end (50) of the housing. 30
8. A floor cleaning head (14) according to any one of claims 5 to 7, wherein the deflecting surface (71) is upright. 35
9. A floor cleaning head (14) according to any one of claims 5 to 8, wherein the deflecting surface (71) is spaced from the lead agitator (42) by between 1mm and 10mm. 40
10. A floor cleaning head (14) according to claim 9, wherein the spacing is between 3mm and 8mm; or wherein the spacing is around 5mm. 45
11. A floor cleaning head (14) according to any preceding claim, wherein a pair of sealing pads (68) are provided on an underside of the floor cleaning head, and offset from the ends of the lead agitator (42), the cleaning pads being formed of a fibrous material. 50
12. A floor cleaning head (14) according to claim 11, wherein a portion of each sealing pad (68) is disposed in front of a central rotational axis of the lead agitator (42); or wherein the whole of each sealing pad is disposed in

line with or in front of the central rotational axis of the lead agitator.

13. A floor cleaning head (14) according to claim 11 or 12, wherein each sealing pad (68) is disposed adjacent a respective ground engaging wheel (58) on the underside of the floor cleaning head.
14. A suction cleaner (10), including:
 - a floor cleaning head (14) according to any one of claims 1 to 13;
 - a motor (39) for creating a suction flow of air through the cleaner between the suction inlet and an exhaust outlet (26); and
 - a separator assembly (18) for separating dirt from the air flow between the suction inlet and the motor.
15. A suction cleaner (10) according to claim 14, wherein the floor cleaning head (14) is formed in a base portion of the suction cleaner.

25 Patentansprüche

1. Bodenreinigungskopf (14) für einen Staubsauger (10), wobei der Bodenreinigungskopf beinhaltet:
 - eine vordere Agitorkammer (72), in der ein rotierender vorderer Agitator (42) gelagert ist; und
 - eine Saugkammer (47), die einen Saugeinlass (45), durch den Luft und mitgeführter Schmutz in die Saugkammer gesaugt werden, einen Saugauslass (35) zur Fluidverbindung mit einem Saugströmungsweg (36) des Staubsaugers und einen rotierenden hinteren Agitator (44), der innerhalb der Saugkammer gelagert ist, definiert;
 - wobei die Saugkammer hinter der vorderen Agitorkammer angeordnet und von ihr durch eine Trennwand (54) getrennt ist;
 - wobei ein Dichtungsmaterial (70) auf einem unteren Teil der Trennwand vorgesehen ist; **dadurch gekennzeichnet, dass** das Dichtungsmaterial eine Borstenleiste umfasst.
2. Bodenreinigungskopf (14) nach Anspruch 1, wobei das Dichtungsmaterial (70) dazu konfiguriert ist, eine Luftströmung unterhalb der Trennwand (54) zu verhindern.
3. Bodenreinigungskopf (14) nach einem vorhergehenden Anspruch, wobei das Dichtungsmaterial (70) dazu konfiguriert ist, sich von der Trennwand (54) nach unten hin zu dem Boden unterhalb des Bodenreinigungskopfes zu erstrecken.

4. Bodenreinigungskopf (14) nach einem vorhergehenden Anspruch, wobei ein unterster Teil des Dichtungsmaterials (70) in einer Höhe oberhalb der untersten Abschnitte sowohl des vorderen Agitators (42) als auch des hinteren Agitators (44) liegt. 5
5. Bodenreinigungskopf (14) nach einem vorhergehenden Anspruch, ferner beinhaltend eine Ablenkfläche (71), die direkt vor und nahe dem vorderen Agitator (42) angeordnet und dazu konfiguriert ist, nach vorne wandernde, den vorderen Agitator verlassende Schmutzpartikel abzulenken. 10
6. Bodenreinigungskopf (14) nach Anspruch 5, wobei die Ablenkfläche (71) hinter einer Vorderwand eines vorderen Endes (50) des Gehäuses (55) des Bodenreinigungskopfes vorgesehen ist. 15
7. Bodenreinigungskopf (14) nach Anspruch 6, wobei die Ablenkfläche (71) von der Vorderwand des vorderen Endes (50) des Gehäuses beabstandet ist. 20
8. Bodenreinigungskopf (14) nach einem der Ansprüche 5 bis 7, wobei die Ablenkfläche (71) aufrecht ist. 25
9. Bodenreinigungskopf (14) nach einem der Ansprüche 5 bis 8, wobei die Ablenkfläche (71) von dem vorderen Agitator (42) um zwischen 1 mm und 10 mm beabstandet ist. 30
10. Bodenreinigungskopf (14) nach Anspruch 9, wobei der Abstand zwischen 3 mm und 8 mm beträgt; oder wobei der Abstand rund 5 mm beträgt. 35
11. Bodenreinigungskopf (14) nach einem vorhergehenden Anspruch, wobei ein Paar Dichtungspads (68) auf einer Unterseite des Bodenreinigungskopfes vorgesehen und versetzt von den Enden des vorderen Agitators (42) ist, wobei die Reinigungspads aus einem faserigen Material gebildet sind. 40
12. Bodenreinigungskopf (14) nach Anspruch 11, wobei ein Abschnitt jedes Dichtungspads (68) vor einer zentralen Drehachse des vorderen Agitators (42) angeordnet ist; oder wobei die Gesamtheit jedes Dichtungspads in einer Linie mit oder vor der zentralen Drehachse des vorderen Agitators angeordnet ist. 45
13. Bodenreinigungskopf (14) nach Anspruch 11 oder 12, wobei jeder Dichtungspad (68) neben einem jeweiligen Bodeneingriffsrad (58) auf der Unterseite des Bodenreinigungskopfes angeordnet ist. 50
14. Staubsauger (10), beinhaltend: 55

einen Bodenreinigungskopf (14) nach einem der Ansprüche 1 bis 13;

einen Motor (39) zum Erzeugen einer Saugluftströmung durch den Sauger zwischen dem Saugseinlass und einem Abführauslass (26); und eine Abscheideranordnung (18) zum Abscheiden von Schmutz aus der Luftströmung zwischen dem Saugseinlass und dem Motor.

15. Saugreiniger (10) nach Anspruch 14, wobei der Bodenreinigungskopf (14) in einem Basisabschnitt des Staubsaugers ausgebildet ist.

Revendications

1. Tête de nettoyage de sol (14) pour un aspirateur (10), la tête de nettoyage de sol comprenant :

une chambre d'agitateur avant (72) dans laquelle un agitateur avant rotatif (42) est supporté ; et

une chambre d'aspiration (47) définissant une entrée d'aspiration (45) par laquelle de l'air et de la saleté entraînée sont aspirés dans la chambre d'aspiration, une sortie d'aspiration (35) pour un raccordement fluide à une voie d'écoulement d'aspiration (36) de l'aspirateur, et un agitateur arrière rotatif (44) supporté à l'intérieur de la chambre d'aspiration ;

la chambre d'aspiration étant disposée vers l'arrière de la chambre d'agitateur avant et séparée de celle-ci par une paroi de séparation (54) ;

un matériau d'étanchéité (70) étant disposé sur une partie inférieure de la paroi de séparation ; la tête de nettoyage de sol étant **caractérisée en ce que** le matériau d'étanchéité comprend une bande de poils.
2. Tête de nettoyage de sol (14) selon la revendication 1, dans laquelle le matériau d'étanchéité (70) est configuré pour empêcher une circulation d'air sous la paroi de séparation (54).
3. Tête de nettoyage de sol (14) selon l'une quelconque des revendications précédentes, dans laquelle le matériau d'étanchéité (70) est configuré pour s'étendre vers le bas à partir de la paroi de séparation (54), vers le sol en dessous de la tête de nettoyage de sol.
4. Tête de nettoyage de sol (14) selon l'une quelconque des revendications précédentes, dans laquelle une partie la plus basse du matériau d'étanchéité (70) repose à une hauteur plus haute que les parties les plus basses de l'agitateur avant (42) et de l'agitateur arrière (44).
5. Tête de nettoyage de sol (14) selon l'une quelconque

des revendications précédentes, comprenant en outre une surface de déviation (71) disposée directement devant et à proximité de l'agitateur avant (42), et configurée pour dévier les particules de saleté se déplaçant vers l'avant et quittant l'agitateur avant.

6. Tête de nettoyage de sol (14) selon la revendication 5, dans laquelle la surface de déviation (71) est située à l'arrière d'une paroi avant d'une extrémité avant (50) du boîtier (55) de la tête de nettoyage de sol. 10
7. Tête de nettoyage de sol (14) selon la revendication 6, dans laquelle la surface de déviation (71) est espacée de la paroi avant de l'extrémité avant (50) du boîtier. 15
8. Tête de nettoyage de sol (14) selon l'une quelconque des revendications 5 à 7, dans laquelle la surface de déviation (71) est verticale. 20
9. Tête de nettoyage de sol (14) selon l'une quelconque des revendications 5 à 8, dans laquelle la surface de déviation (71) est espacée de l'agitateur avant (42) d'une distance comprise entre 1 mm et 10 mm. 25
10. Tête de nettoyage de sol (14) selon la revendication 9, dans laquelle l'espacement est compris entre 3 mm et 8 mm ; ou 30
dans laquelle l'espacement est d'environ 5 mm.
11. Tête de nettoyage de sol (14) selon l'une quelconque des revendications précédentes, dans laquelle deux coussinets d'étanchéité (68) sont situés sur une face inférieure de la tête de nettoyage de sol et décalés par rapport aux extrémités de l'agitateur avant (42), les coussinets de nettoyage étant formés d'un matériau fibreux. 35
40
12. Tête de nettoyage de sol (14) selon la revendication 11, dans laquelle une partie de chaque coussinet d'étanchéité (68) est disposée devant un axe de rotation central de l'agitateur avant (42) ; ou 45
dans lequel la totalité de chaque coussinet d'étanchéité est disposée alignée sur l'axe de rotation central de l'agitateur avant ou devant celui-ci.
13. Tête de nettoyage de sol (14) selon la revendication 11 ou 12, dans laquelle chaque coussinet d'étanchéité (68) est disposé à côté d'une roue de contact avec le sol (58) respective sur la face inférieure de la tête de nettoyage de sol. 50
14. Aspirateur (10), comprenant : 55
une tête de nettoyage de sol (14) selon l'une quelconque des revendications 1 à 13 ;

un moteur (39) pour créer un flux d'aspiration d'air à travers l'aspirateur entre l'entrée d'aspiration et une sortie d'évacuation (26) ; et un ensemble séparateur (18) pour séparer la saleté du flux d'air entre l'entrée d'aspiration et le moteur.

15. Aspirateur (10) selon la revendication 14, la tête de nettoyage de sol (14) étant formée dans une partie de base de l'aspirateur.

FIGURE 1

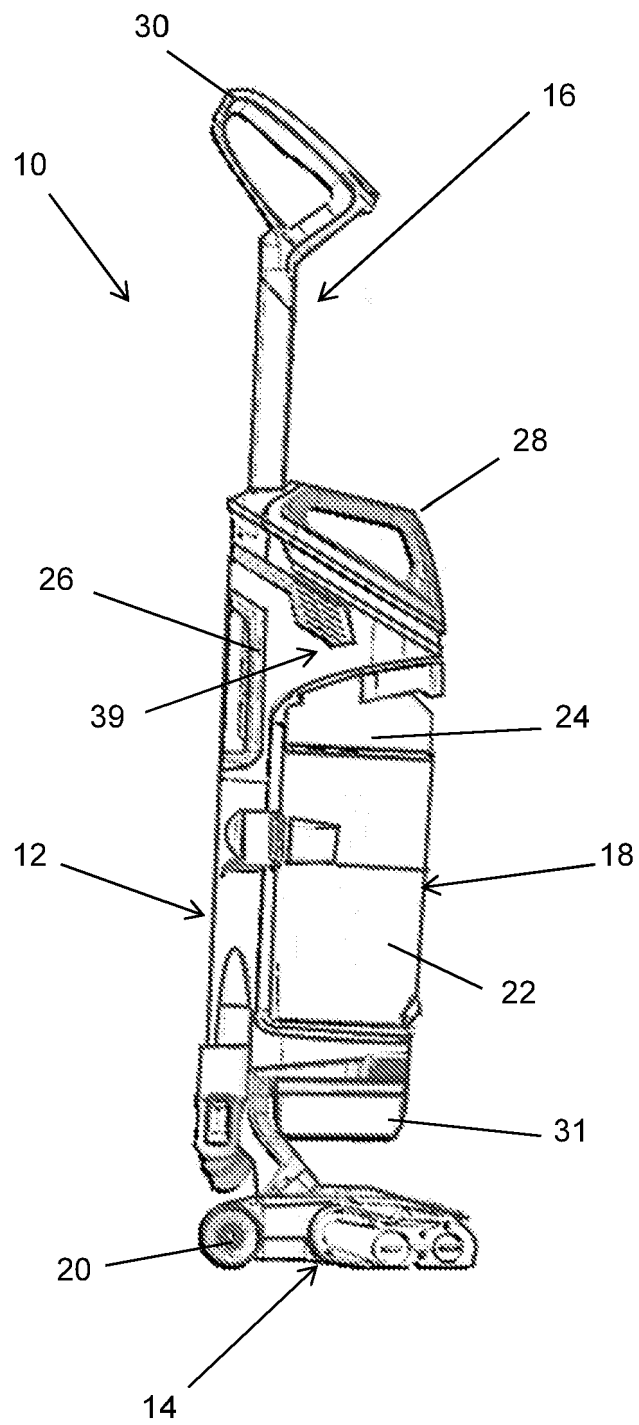


FIGURE 2

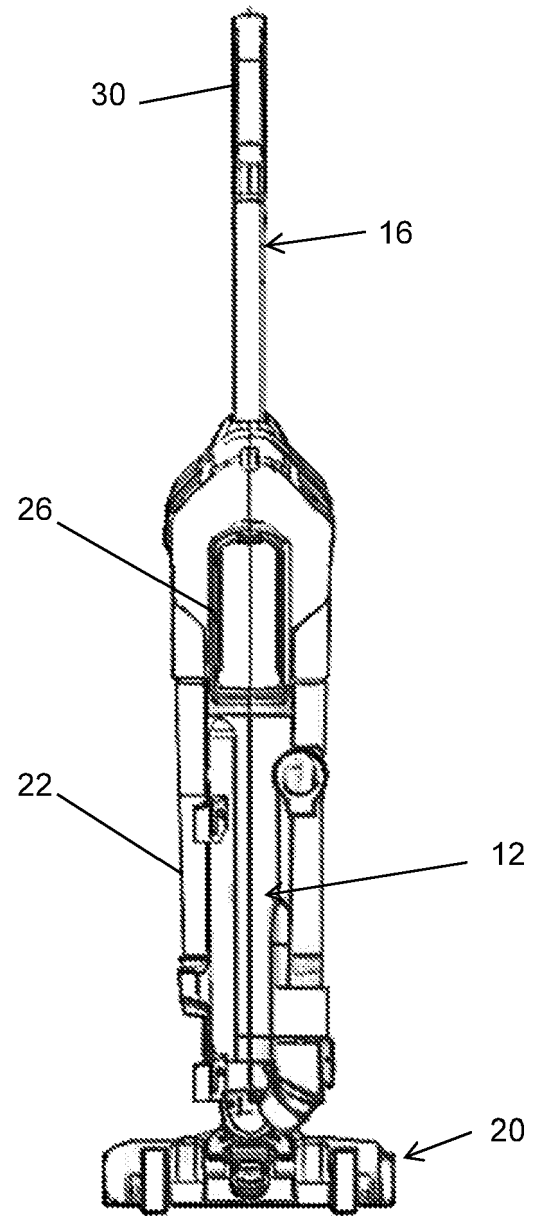


FIGURE 3

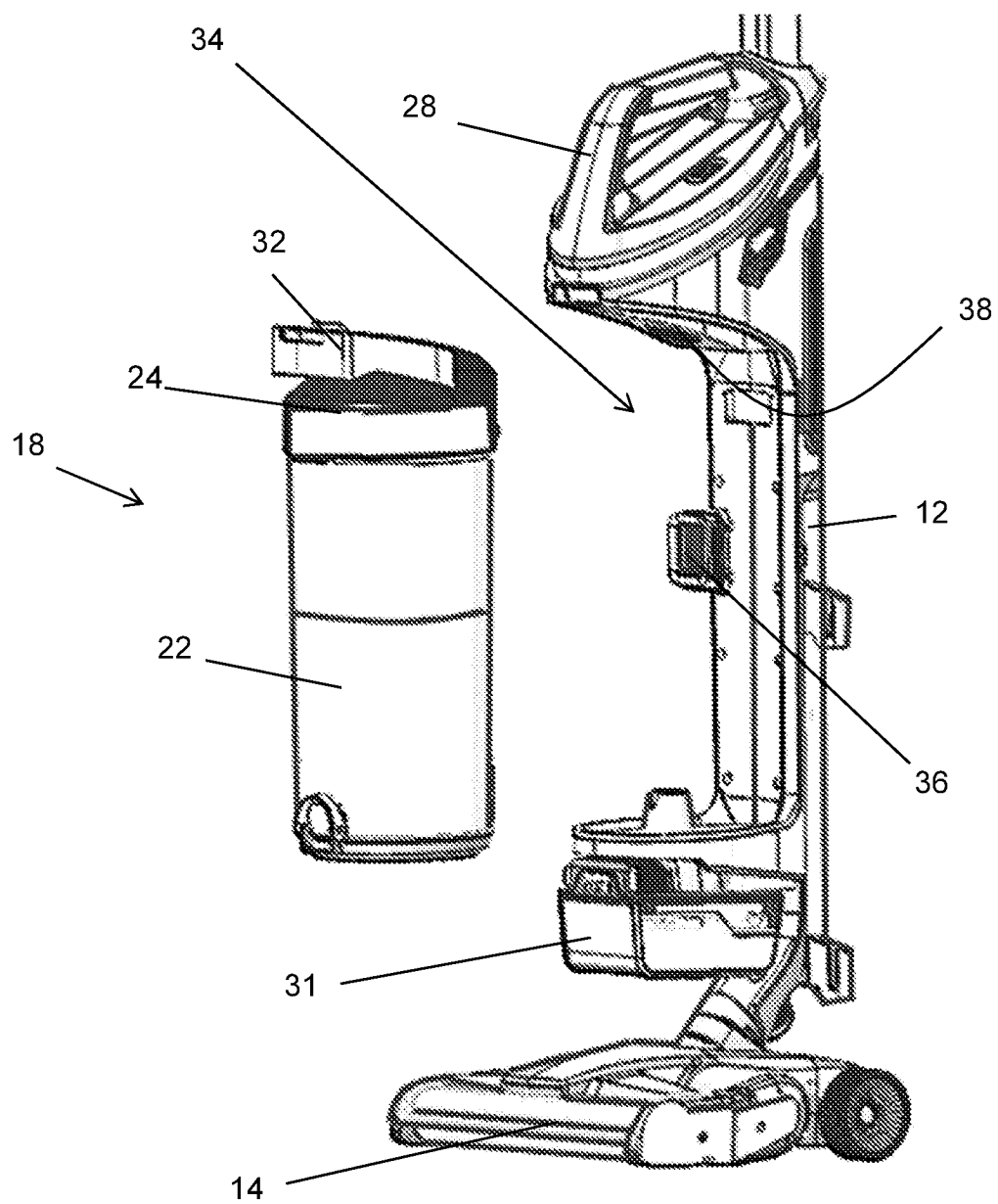


FIGURE 4

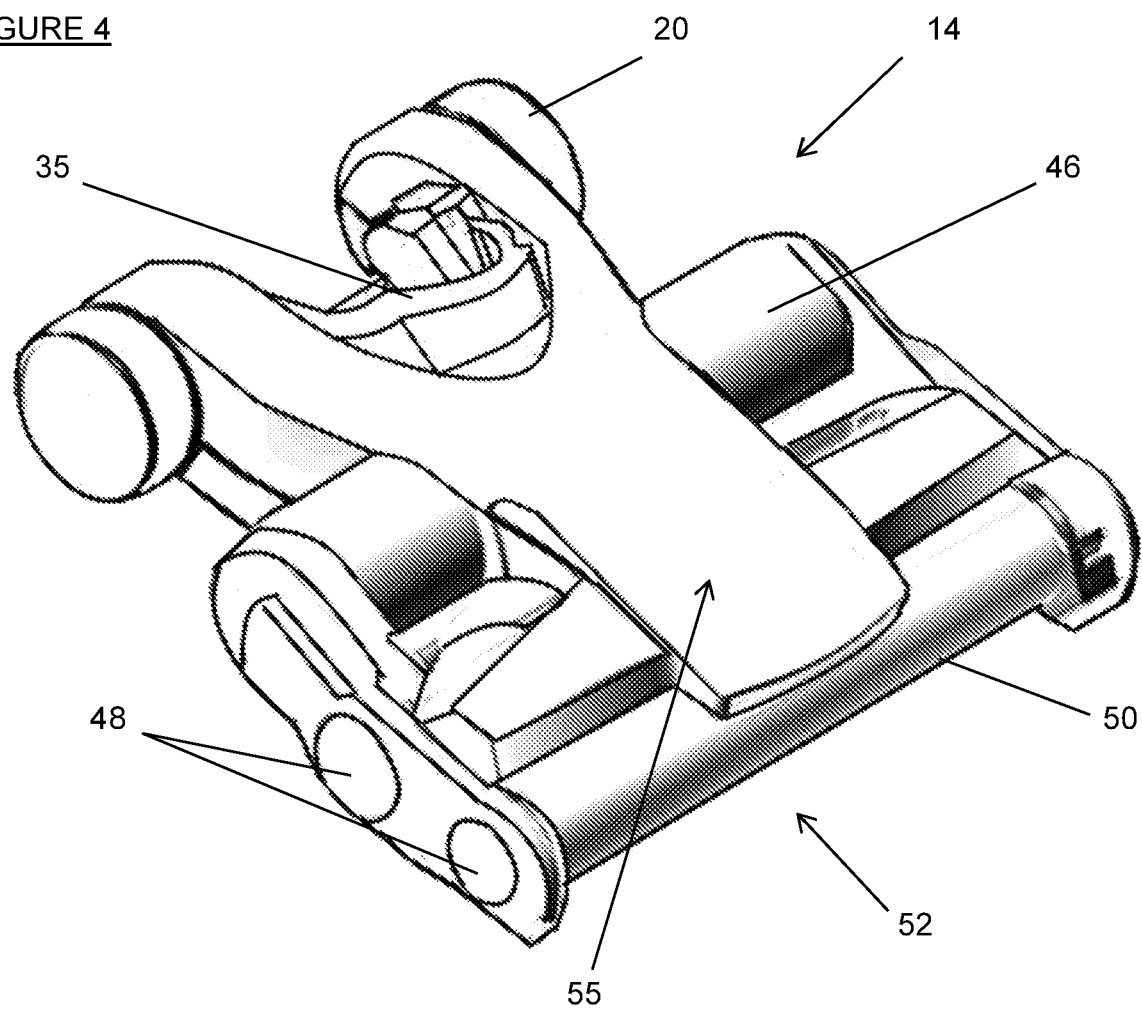


FIGURE 5

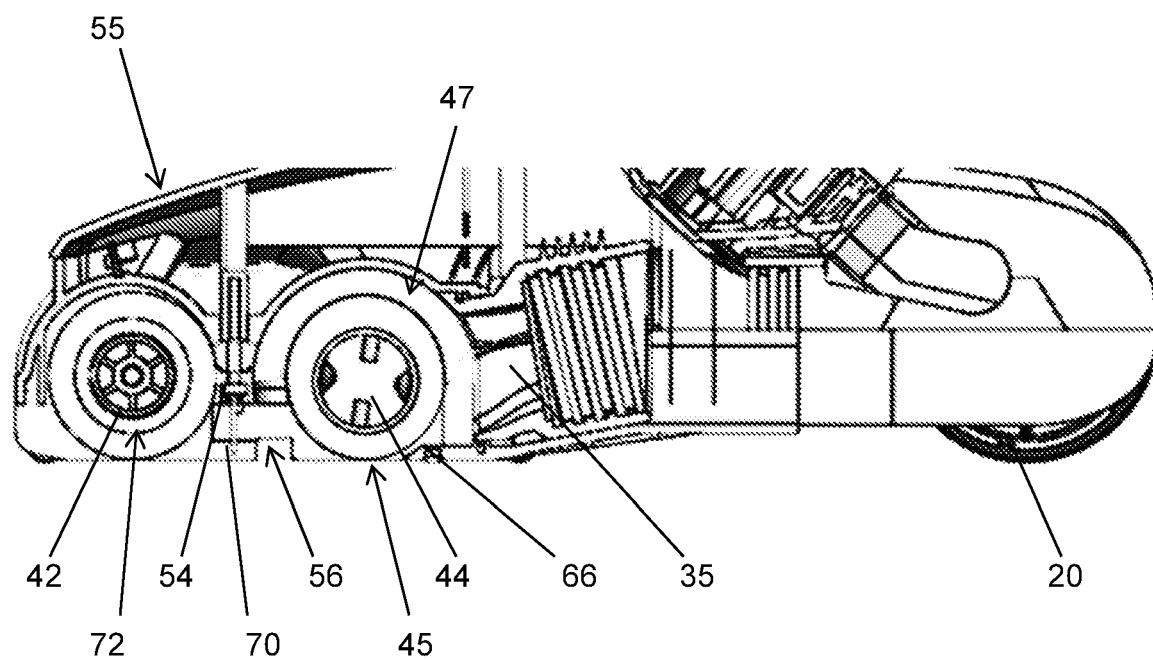


FIGURE 6

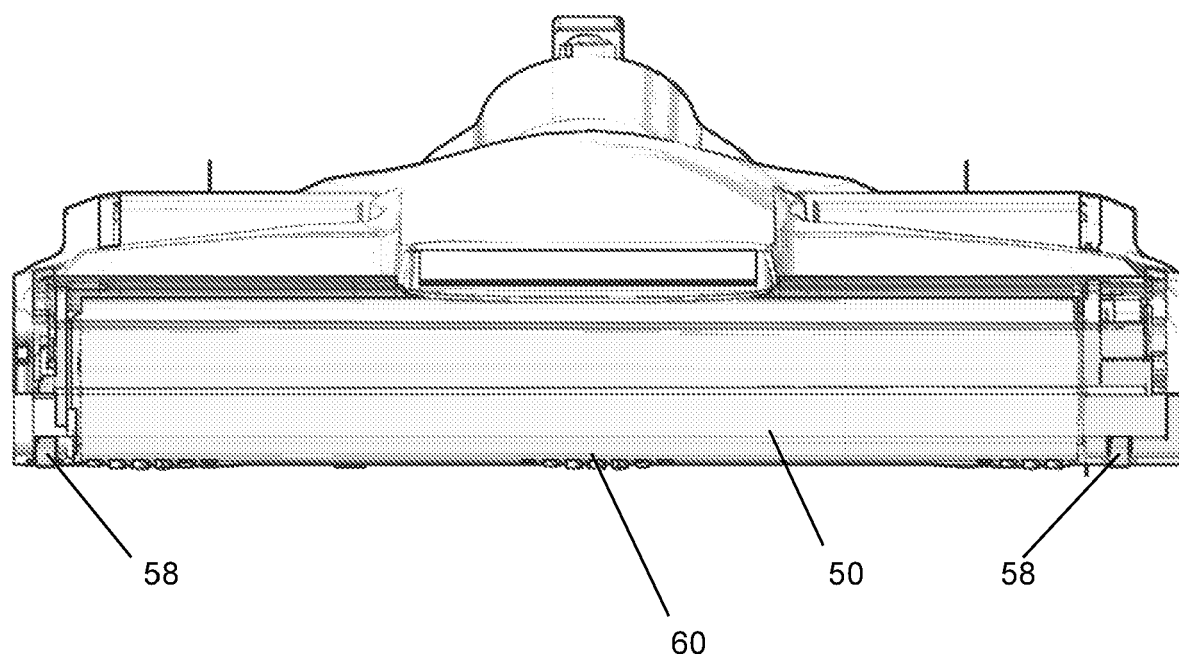


FIGURE 7

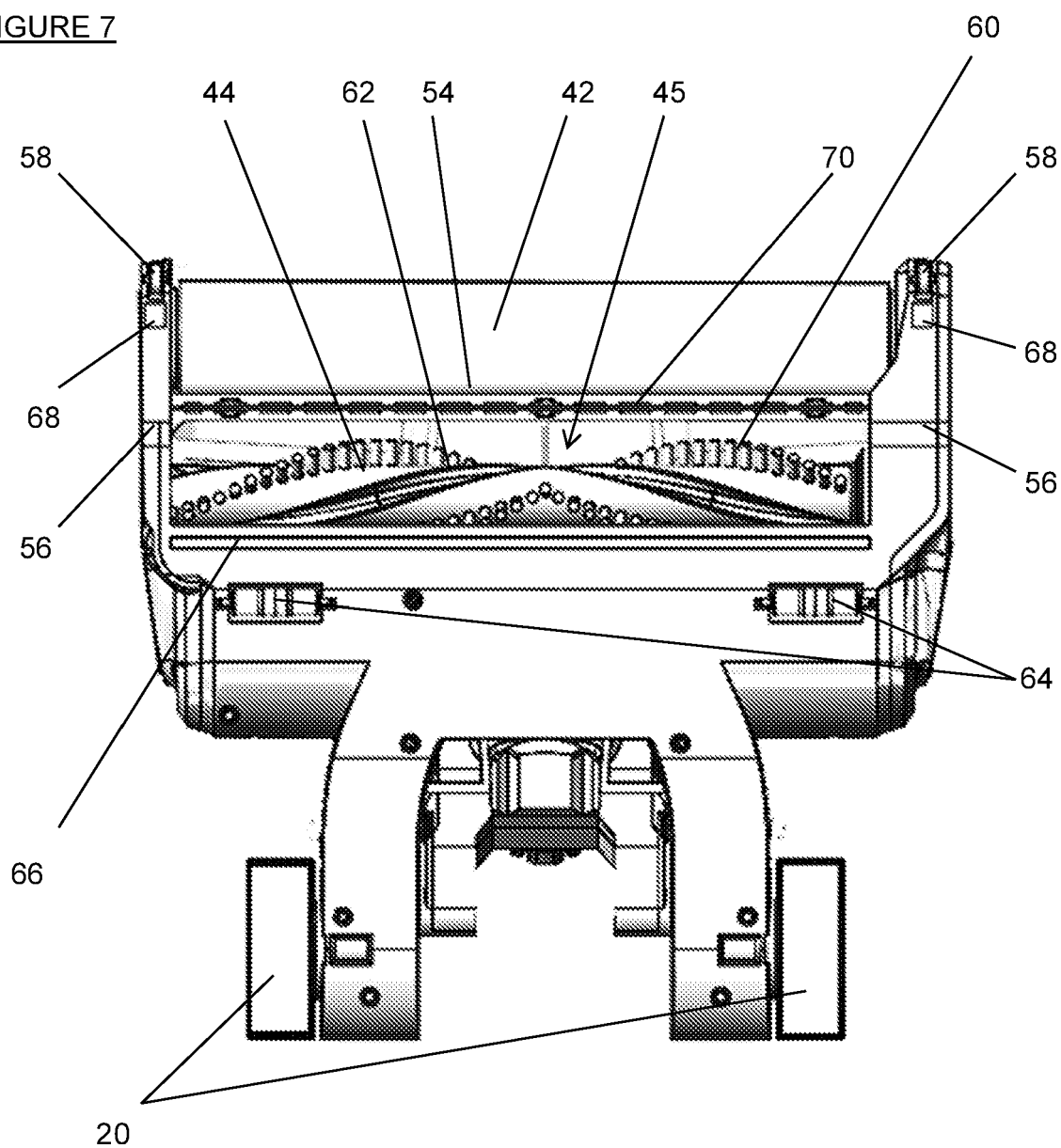
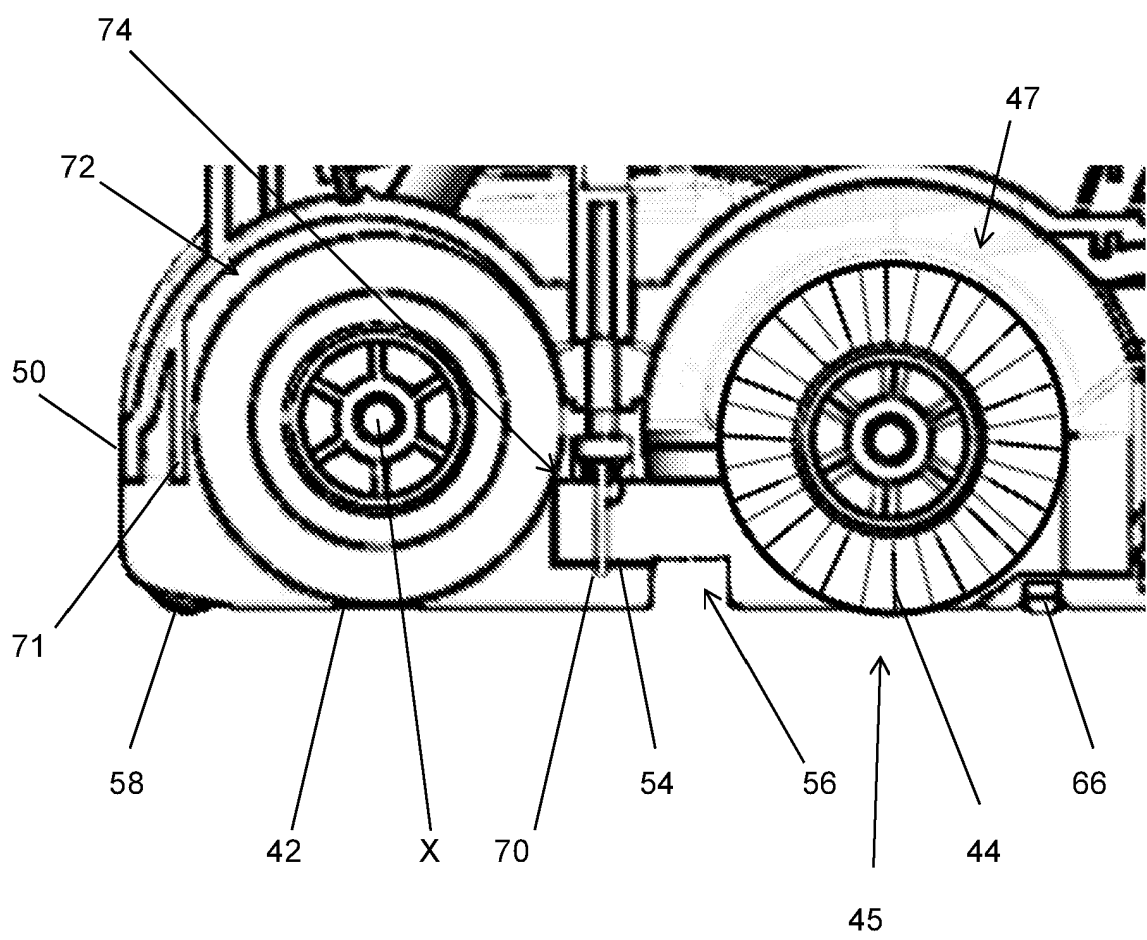


FIGURE 8



REFERENCES CITED IN THE DESCRIPTION

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