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(54) **APPARATUS FOR CLEANING A FLOOR SURFACE**

(57) A floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction, the floor tool including:

a base assembly including a base part having:
a first passage with a respective inlet; and
a second passage with a respective inlet;

a device for effecting movement of the base part between respective first and second conditions;
wherein the first and second inlets are positioned in respective planes.

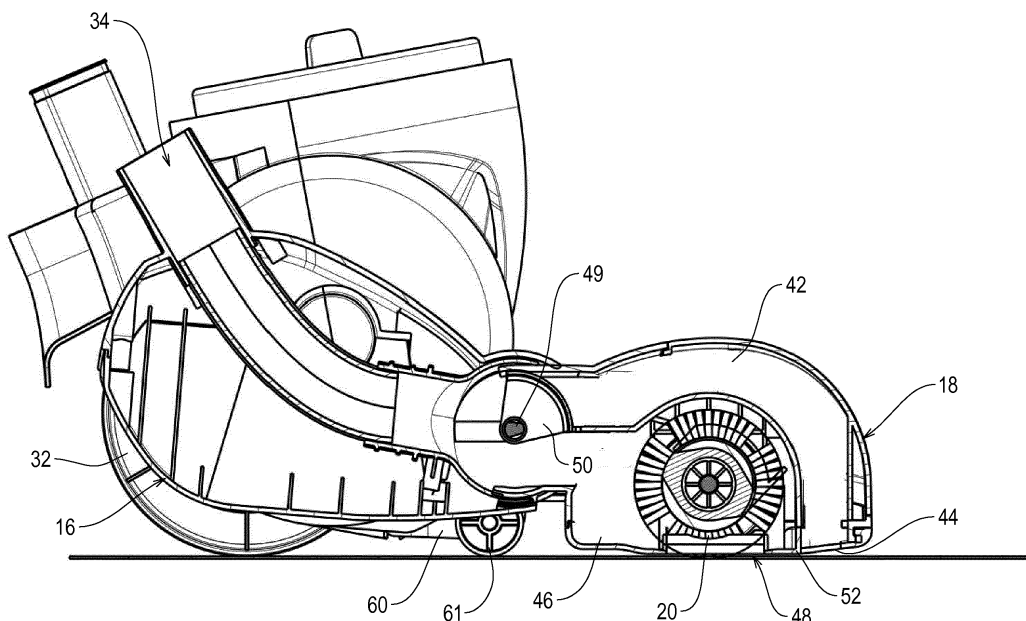


Figure 4

EP 3 175 756 A1

Description

Description of Invention

[0001] This invention relates to an apparatus for cleaning a floor surface and/or a floor tool for such an apparatus. In particular, this invention relates to an apparatus which utilises a source of suction to draw dirt and/or debris from a floor surface being cleaned for storage in a dirt chamber or bag for emptying by a user. Such apparatus are typically known as "vacuum cleaners".

[0002] More particularly the invention relates to an apparatus which has an upright part pivotally connected to a base assembly supported on wheels. The user can grasp a handle of the upright part so as to push and pull the base assembly over the floor surface to clean it as required. The base assembly includes a passage which terminates at a floor facing opening and to which suction is applied by a suction source to cause air, and any dirt entrained within the air, to travel towards the dirt chamber. The base assembly includes a cleaning member driven by a motor for assisting in the cleaning of a carpet or upholstery. The cleaning member is generally cylindrical and has bristles which extend radially outwardly from its elongate axis. The cleaning member is supported for rotation about its elongate axis and remote parts of the bristles extend through the floor facing opening of the apparatus during use. A motor is drivingly connected to the cleaning member by a belt or the like to cause rotation of the cleaning member.

[0003] When the apparatus is to be used to clean a floor surface covered by a carpet, it is desirable for the cleaning member to be positioned close to the carpet so that the bristles are in contact with the carpet. Dirt is loosened by the cleaning member and entrained in the suction air flow. When the apparatus is to be used to clean a hard floor surface, e.g. a laminate or tiled floor, it is not desirable for the bristles of the cleaning member to contact the floor surface as this can cause deterioration in the finish of the floor surface. The bristles may, for example, cause scratches or remove any floor surface coating such as polish. To overcome this issue, it is known to provide means for raising the part of the base assembly which supports the cleaning member away from the floor surface to move the cleaning member out of contact with the floor surface. Dirt from the floor surface is still entrained in the suction air flow through the floor facing opening. However, a disadvantage of this arrangement is that the floor facing opening is further away from the floor surface meaning that the amount of suction air flow near or at the floor surface is reduced. The cleaning process is thus less effective.

[0004] According to a first aspect of the invention we provide an apparatus for cleaning a floor surface including an upright part including a user graspable handle, a base assembly including: a first base part connected to the upright part; and a second base part connected to the first base part, which second base part includes a

cleaning member; and a device for effecting movement of the first and second base parts relative to each other.

[0005] Further features of the first aspect of the invention are set out in the dependent claims thereto which are appended hereto.

[0006] According to a second aspect of the invention we provide an apparatus for cleaning a floor surface including an upright part including a user graspable handle, a base assembly connected to the upright part, the base assembly including a base part having a first passage with a respective inlet and a second passage with a respective inlet. The apparatus also includes a device for effecting movement of the base part between respective first and second conditions and a suction source for providing suction to one or both of the first and second passages, wherein as the base part is moved between its first and second conditions by the device, the suction provided to one or both of the first and second passages is changed.

[0007] Further features of the second aspect of the invention are set out in the dependent claims thereto which are appended hereto.

[0008] According to a third aspect of the invention we provide a floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction, the floor tool including a base assembly including a base part having a first passage with a respective inlet and a second passage with a respective inlet. The floor tool includes a device for effecting movement of the base part between respective first and second conditions; wherein the first and second inlets are positioned in respective planes.

[0009] Further features of the third aspect of the invention are set out in the dependent claims thereto which are appended hereto.

[0010] According to a fourth aspect of the invention we provide an apparatus for cleaning a floor surface including a floor tool according to the third aspect of the invention.

[0011] According to a fifth aspect of the invention we provide a floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction, the floor tool including a base assembly. The base assembly including a passage with an inlet for communication with the source of suction and the inlet has a length of between 280 to 350mm.

[0012] According to a sixth aspect of the invention we provide an apparatus for cleaning a floor surface including a floor tool according to the fifth aspect of the invention.

[0013] According to a seventh aspect of the invention we provide a surface cleaning apparatus according to the first aspect of the invention including one or more or all of the features of any one of the second to sixth aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the second to sixth aspects of the invention.

[0014] According to an eighth aspect of the invention

we provide a surface cleaning apparatus according to the second aspect of the invention including one or more or all of the features of any one of the third to sixth aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the third to sixth aspects of the invention.

[0015] According to a ninth aspect of the invention we provide a floor tool according to the third aspect of the invention including one or more or all of the features of any one of the fourth to sixth aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to any one of the fourth to sixth aspects of the invention.

[0016] According to a tenth aspect of the invention we provide a surface cleaning apparatus according to the fourth aspect of the invention including one or more or all of the features of the fifth and sixth aspects of the invention, and/or including one or more or all of the features set out in the dependent claims relating to the fifth and sixth aspects of the invention.

[0017] According to an eleventh aspect of the invention we provide a floor tool according to the fifth aspect of the invention including one or more or all of the features of the sixth aspect of the invention, and/or including one or more or all of the features set out in the dependent claims relating to the sixth aspect of the invention.

[0018] Embodiments of the various aspects of the invention will now be described by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of an apparatus for cleaning a floor surface in accordance with the present invention;

Figure 2 is a perspective view of a base assembly of the apparatus of figure 1 in a first condition with some component parts removed;

Figure 3 is a perspective view of part of the apparatus of figure 1 in a second condition, again with some component parts removed;

Figure 4 is a first side cross-sectional view of the base assembly of figure 3;

Figure 5 is a first side cross-sectional view of the base assembly in a first condition;

Figure 6 is a second side cross-sectional view of the base assembly in a first condition;

Figure 7 is a first side cross-sectional view of the base assembly in a second condition;

Figure 8 is a second side cross-sectional view of the base assembly in a second condition;

Figure 9 is a side view of part of a second base part

of the base assembly;

Figure 10 is a side view of the second base part of the base assembly in both its first (dashed lines) and second (solid lines) conditions;

Figure 11 is an underside view of the base assembly;

Figure 12a is a first side cross-sectional view of a floor tool in accordance with an aspect of the present invention; and

Figure 12b is a second side cross-sectional view of the floor tool shown in Figure 12a.

[0019] Referring to the figures, these show an embodiment of an apparatus 10 embodying various aspects of the invention. The apparatus 10 includes an upright part 12 including a user graspable handle and a base assembly 14. The base assembly 14 includes a first base part 16 and a second base part 18 which are connected to each other. The first base part 16 is positioned rearwardly of the second base part 18. The first base part 16 is connected to the upright part 12. The second base part 18 includes a cleaning member 20. An aspect of the present invention is that the apparatus 10 has a device 22 for effecting movement of the first and second base parts 16, 18 relative to each other.

[0020] The upright part 12 is pivotally connected to the base assembly 14 remote from a leading edge of the base assembly 14. The upright part 12 contains operative components of the apparatus 10 such as a suction source in the form of a suction motor and fan to provide the suction to the base assembly 14, and a dirt chamber for receiving any dirt entrained in the suction air flow drawn through the base assembly 14. The upright part 12 includes a dirt separator in the form of a cyclonic separator for separating dirt entrained in the suction air flow from the base assembly 14. These components are not shown in the figures but are well known in the art and so will not be discussed in any further detail. Although this embodiment includes a cyclonic separator, other embodiments of the invention may have no such separator, but instead rely on a bag for collection of dirt from the air flow.

[0021] The first base part 16 includes first and second side portions 24, 26 spaced apart from one another to define part of an interior space 28. Within the space 28 a lower portion of the upright part 12 is positioned near a rear portion of the base assembly 14. The lower portion of the upright part 12 is pivotally connected to the respective side portions 24, 26. The side portions 24, 26 support respective wheels 30, 32 which permit the base assembly 14 to be rolled over a floor surface. One of the side portions 24 includes an air flow passage 34 one end of which includes a connection for a hose 25 and the other end of which is fluidly connected to the second base part 18 as will be described in more detail. The hose 25 is connected to the air flow passage 34 at one end and at its opposite

end to a passage in the upright part 12 which is in fluid communication with the suction source (not shown). This arrangement permits the flow of suction through the second base part 18 from the first base part 16 and towards the dirt chamber.

[0022] The second base part 18 has a generally elongate main portion 36 which expands laterally across the apparatus with a curved, semi-circular (inside cross section), outer surface. The second base part 18 has two portions 38, 40 spaced apart from one another and which extend away from the main portion 36 towards the first base part 16. The portions 38, 40 connect to the respective side portions 24, 26 of the first base part 16 as will be described below.

[0023] The second base part 18 has a first passage 42 with a respective inlet 44 and a second passage 46 with a respective inlet 48. A part of the first passage 42 passes around the outer surface of the main portion 36 whilst a part of the second passage 46 is formed from an interior space defined by the main portion 36. The passages 42, 46 pass through one of the side portions 38 and communicate with a valve 49 which has a valve member 50. The valve 49 is also in fluid communication with the air flow passage 34 of the first base part 16. The suction source provides suction to both of the first and second passages 42, 46 and movement of the valve member 50 controls the flow of suction to the passages 42, 46.

[0024] The inlet 48 of the second passage 46 is positioned rearwardly of the inlet 44 of the first passage 42 and is positioned in between the inlet 44 of the first passage 42 and the connection of the first base part 16 to the upright part 12. The inlets 44, 48 are rectangular in shape and extend lengthwise of the main portion 36 of the second base part 18. The lengthwise direction is defined as the direction which is perpendicular to the forward and rearward direction in which the base assembly 14 is moved by the user during cleaning. The widthwise direction is defined as the direction which is parallel to the forward and rearward direction in which the base assembly 14 is moved by the user during cleaning. The inlets 44, 48 permit the flow of air through them. The inlet of the first passage 42 is relatively narrow in comparison to the inlet of the second passage 46. The inlets 44, 48 each include respective rib portions which extend widthwise across the inlets 44, 46 to divide the inlets 44, 48 into a plurality of respective apertures. The width of each of the ribs of the inlet 44 is 4mm and the width of each of the ribs of the inlet 48 is 4mm. In other embodiments the rib portions may not be present or there may be more or fewer. The second base part 18 includes a ground engaging portion 52 which is positioned between the inlets 44, 48 of the first and second passages 42, 46.

[0025] The cleaning member 20 is positioned in the second passage 46 and its respective inlet 48. The cleaning member 20 is generally cylindrical in shape and has bristles which extend radially outwardly from its elongate axis. The cleaning member 20 is supported for rotation about its elongate axis and remote portions of the bristles

extend through the inlet of the second passage 48. A motor (not shown) for driving the cleaning member 20 is positioned in the first base part 16 and is drivingly connected to the cleaning member 20 by a belt 54.

[0026] The connection between the first and second base parts 16, 18 includes an elongate generally cylindrical rod 56 which extends width wise of the interior space 28. The rod 56 passes through respective apertures provided in end portions of the side portions 24, 26, 38, 40 to pivotally connect the parts 16, 18 together. The valve member 50 is connected to the rod 56 such that rotation of the rod 56 causes pivotal movement of the valve member 50.

[0027] The device 22 includes a generally wedge shaped cam member 58 which is connected to the rod 56 (they are formed as a single component part), and a cam follower 60 which is pivotally connected to the first base part 16. The cam member 58 tapers to a respective free end. The cam member 58 extends radially away from the rod 56. The cam follower 60 is a generally rectangular part which extends width wise across part of the interior space 28 and is supported on a pair of respective ground engaging wheels 61. An upwardly facing surface of the cam follower 60 co-operates with the cam member 58. Rotation of the rod 56 causes movement of the cam member 58 to effect relative movement between the first and second base parts 16, 18 as will be described.

[0028] The apparatus includes a user operable member 62 which is pivotally supported and positioned on one side of the base assembly 14 for actuating the device 22. The user operable member 62 is disc shaped and is connected to one end of the rod 56. The pivot axis of the user operable member 62 is coaxial with the pivotal connection of the first and second base parts 16, 18. The pivotal connection of the first and second base parts 16, 18 is parallel to the pivotal connection of the first base part 16 with the upright part 12. The user operable member 62 can be operated by a user using his or her hand to cause it to rotate.

[0029] The user connects the apparatus 10 to an electricity source through a cable (not shown), although the apparatus could be powered by a battery. The user must put the apparatus 10 either into a first condition which is more suited to hard floor cleaning or a second condition which is more suited to carpet cleaning. As will be described, components of the apparatus 10 such as the first and second base parts 16, 18, the valve 49 and valve member 50 are moveable between respective first and second conditions that correspond to the first and second conditions of the apparatus 10.

[0030] Considering the user putting the apparatus 10 into its first condition to clean a hard floor, the user uses his or her hand to hold the user operable member 62 and rotate it in a first, forward, direction and actuate the device 22 which effects a corresponding rotation of the rod 56. The end of the cam member 58 then pushes onto and slides across the upwardly facing surface of the cam follower 60 as the cam member 58 pivots. The upwardly

facing surface of the cam follower 60 has a slight gradient which makes it easier for the cam member 58 to slide over it until the cam member 58 eventually reaches a generally vertical position. In doing so the connection between the first and second base parts 16, 18 is moved generally upwards, i.e. away from the floor surface, into its respective first condition.

[0031] The first and second base parts 16, 18 are pivotally connected and so raising the pivotal connection between them causes the second base part 18 to pivot downwardly about the connection under the effect of gravity. The second base part 18 also pivots about the ground engaging portion 52, although said portion also translates rearwardly towards the first part 16. It will be seen that a leading edge of the second base part 18, which is positioned remote from its connection to the first base part 16, pivots towards the floor surface whilst a rear portion of the second base part 18 remote to the leading edge is pivoted away from the floor surface. Once the device 22 has effected movement of the second base part 18 to its respective first condition the cleaning member 20 is in a raised position in which it is out of contact with the floor surface. When the second base part 18 is in its first condition the leading edge of the second base part 18 is positioned closer to a floor surface than it is positioned when the second base part 18 is in its second condition. It will also be seen that when the second base part 18 is in its first condition the inlet of the first passage 44 is positioned closer to the floor surface than it is positioned when the second base part 18 is in its second condition.

[0032] As the valve member 50 is connected to the rod 56, the rotation of the rod 56 also causes corresponding movement of the valve member 50 to its first condition. When the valve member 50 is in its first condition the valve member 50 is positioned within the second passage 46 to block the second passage 46 whilst leaving the first passage 42 open. The suction source will therefore only provide a flow of suction in the first passage 42 due to the position of the valve member 50 blocking the flow of suction in the second passage 46. The user can then commence cleaning of a hard floor surface.

[0033] Considering a user putting the apparatus into its second condition for carpet floor cleaning, the user uses his or her hand to rotate the user operable member 62 to rotate it in a second, rearward, direction, and actuate the device 22 which effects a corresponding rotation of the rod 56. The end of the cam member 58 moves away from and out of contact with the upwardly facing surface of the cam follower 60 as it pivots. The cam member 58 eventually reaches a generally horizontal position. In doing so the connection between the first and second base parts 16, 18 is moved generally downwards, i.e. closer to the floor surface, to its respective second condition.

[0034] Lowering of the pivotal connection causes the second base part 18 to pivot about the ground engaging portion 52 such that the rear portion of the second base

part 18 remote to the leading edge pivots towards the floor surface and the leading edge of the second base part 18 pivots away from the floor surface. Once the device 22 has effected movement of the second base part 18 to its respective second condition the cleaning member 20 is in a lowered position which brings it into contact with the floor surface. It will be seen that when the second base part 18 is in its second condition the leading edge of the second base part 18 is positioned further from a floor surface than it is positioned when the second base part 18 is in its first condition. When the second base part 18 is in its second condition the cleaning member 20 is positioned closer to a floor surface than it is when the second base part 18 is in its first condition. The apparatus is then in a suitable mode for carpet cleaning as the cleaning member 20 can agitate the carpet during cleaning.

[0035] Actuation of the device 22 causes movement of the valve member 50 to its second condition in which it is positioned in the first passage 42. As the valve member 50 moves from its first condition towards its second condition the flow of suction is diverted from the first passage 42 to the second passage 46. In other words, as the second base part 18 is moved to its second condition by the device 22, the valve 49 is caused to decrease the flow of suction in the first passage 42 and increase the flow of suction in the second passage 46. When the valve member 50 has moved to its second condition, the suction source will only provide a flow of suction in the second passage 46 due to the position of the valve member 50. The user can then commence cleaning of a carpet.

[0036] The arrangement for movement of the second base part to its first condition is advantageous as it means that the first passage associated with hard floor cleaning is positioned closer to the floor surface whilst the cleaning member is positioned to be out of contact with the floor surface. The amount of suction air flow provided by the first passage through its respective inlet near or at the floor surface is therefore increased even though the part of the second base part which contains the cleaning member has been raised. Thus the cleaning process for the hard floor surface is more efficient. Similarly the movement of the second base part to its second condition is advantageous as it brings the passage associated with carpet cleaning closer to the floor surface to increase the amount of suction flow through it to make carpet cleaning more effective.

[0037] The linking of the valve operation with the movement of the second base part such that the flow of suction is diverted to the first passage or second passage based on the cleaning operation is also advantageous. This is because it means that substantially all of the suction provided by the suction source is directed to the passage associated with the corresponding cleaning operation. Thus the amount of suction air flow is maximised which provides more effective dirt/debris pick up.

[0038] In this embodiment the device 22, user operable member 62 and valve member 50 are all connected to the rod 56. In other words, they are mechanically con-

nected to or form part of the connection between the first and second base parts 16, 18. Thus, operation of the user operable member 62 causes simultaneous actuation of the device 22 and valve member 50. However, in other embodiments, one or more of the components may be formed separate from the connection between the base parts. In such embodiments there may be further mechanical devices to cause actuation or movement of the components when the user operates the user operable member 62. In other embodiments one or more of the components may be electronically activated and controlled by electronic circuitry operable by the user.

[0039] Similarly, in the present embodiment the flow of suction in the first and second passages 42, 46 is changed simultaneously on movement of the first and second parts. In other embodiments the flow of suction may be changed, i.e. increased or decreased, before or after movement of the first and second base parts 16, 18 to their first or second conditions has occurred.

[0040] The present embodiment utilises the valve member 50 to block one of the passages 42, 46 so that there is no flow of suction or substantially no flow of suction in it. Other changes of the suction may take place in other embodiments where rather than blocking substantially all of the flow of suction in a passage, the suction is merely decreased by the valve member 50. For example, in one embodiment the apparatus is arranged so that when the valve member is in its first condition the flow of suction in the first passage is greater than it is when the valve member is in its second condition. In other embodiments the apparatus is arranged such that when the valve member is in its second condition the flow of suction in the second passage is greater than it is when the valve member is in its first condition and/or when the valve member is in its first condition the flow of suction in the first passage is greater than the flow of suction in the second passage.

[0041] It will be understood that the terms first and second conditions need not necessarily correspond to the hard floor or carpet floor modes of operation of the apparatus 10. One or more aspects of the invention are applicable to apparatus which need not be arranged to be switchable between hard floor and carpet floor modes of operation. The terms first and second conditions are reference points by which to define the functional operation of the various components of the apparatus between intermediary or final stages of operation.

[0042] In certain embodiments, when the first and/or second base parts are moved between first and second conditions, the flow of suction may stay constant in one of the passages and the flow of suction be increased or decreased to the other of the passages. In alternative embodiments the apparatus may be arranged so that when the suction provided to the second passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased.

[0043] The suction provided to the first and/or second passages may be increased or decreased. In alternative

embodiments the apparatus need not have a valve. For example, respective suction motors may provide suction to the passages, and the amount of suction provided by the suction motors may be increased or decreased when the base part is moved between its first and second conditions.

[0044] In the present embodiment the cleaning member 20 is in the form of a motor driven agitator. In other embodiments other types of cleaning members such as non-motor driven agitators, e.g. turbine driven agitators, or static brushes may be used.

[0045] An aspect of the present invention is that the base assembly need not be made of two parts which are connected together or necessarily include a cleaning member. According to such an aspect of the present invention, the base assembly includes a base part having a first passage with a respective inlet and a second passage with a respective inlet. As the base part is moved between its first and second conditions by the device, the suction provided to the first and second passages is changed. The apparatus is configured so that movement of the base part causes a change in the suction provided to the first and second passages. In other embodiments the change in suction may occur before or after the movement of the base part.

[0046] When the base part is in its first condition the inlet of the first passage is positioned closer to a floor surface than it is positioned when the base part is in its second condition. When the base part is in its second condition the inlet of the second passage is positioned closer to a floor surface than it is positioned when the base part is in its first condition.

[0047] In other embodiments the suction provided to one, rather than both, of the passages is changed.

[0048] An aspect of the present invention relates to the arrangement of the respective inlets 44, 48. According to this aspect of the present invention, the first and second inlets 44, 48 are positioned in respective planes A, B. The planes A, B intersect about or close to the ground engaging portion 52 between the respective inlets 44, 48.

[0049] With reference to the figures, in particular Fig. 9, it will be seen that the respective plane A of the first inlet 44 is inclined at an angle β with respect to the respective plane B of the second inlet 48. The first inlet 44 is spaced apart from the second inlet 48 in a generally vertical direction.

[0050] With reference to Fig. 10 the second base part 18 is pivotally moveable through an angle θ between its first condition (shown in dashed lines) and its second condition (shown in solid lines). The apparatus 10 has been configured such that the angles β and θ are equal or substantially equal, and in this embodiment are 6° .

[0051] It has been noted that an angle of 6° or 7° for β and/or θ leads to an unexpected improvement in suction/cleaning of the apparatus 10 when it is in the first condition. However, angles in the range of around 4° to 8° are also envisaged as being beneficial for cleaning.

[0052] This configuration is advantageous as it means

that when the second base part 18 is in its first condition the inlet of the first passage 44 is positioned in a plane which is parallel or substantially parallel to the floor surface and when the second base part 18 is in its second condition the inlet of the second passage 48 is positioned in a plane which is parallel or substantially parallel to the floor surface. This reduces suction flow losses.

[0053] It will be seen that when the second base part 18 is in its first condition the second inlet 48 is positioned in a plane which is generally inclined with respect to the floor surface and when the second base part 18 is in its second condition the first inlet 44 is positioned in a plane which is generally inclined with respect to the floor surface.

[0054] In other embodiments, the respective planes are spaced from each other and/or spaced from each other, for example, in a generally vertical direction away from the floor surface. In the described embodiment, the respective planes intersect about the ground engaging portion 52 but in alternative embodiments the planes may not intersect about the ground engaging portion 52 of the base assembly 14.

[0055] As shown in Fig. 11, the first inlet 44 has a length 64 and a width 66, and the second inlet 48 has a length 68 and a width 70. An aspect of the invention relates to the selection of the dimensions of the first and second inlets so as to provide an unexpected improvement in cleaning effectiveness and suction characteristics.

[0056] The first inlet 44 has a width of 17mm and a length of 338mm.

[0057] Other advantageous embodiments are envisaged for which the width 66 of the first inlet 44 is within the following ranges: 12 and 22mm, or more preferably 15 and 19mm; and for which the length 64 of the first inlet 44 is within the following ranges: 280 to 350mm or more preferably 300 to 340mm.

[0058] The second inlet 48 has a width of 41 mm and a length of 320mm.

[0059] Advantageous embodiments are envisaged for which the width 70 of the second inlet 48 is within the following ranges: 30 to 50mm, more preferably 35 to 45mm, yet more preferably 40 to 45mm; and for which the length 68 is within the following ranges: 280 to 350mm, more preferably 290 to 340mm, yet more preferably 310 to 330mm and yet more preferably 290 to 300mm. Other advantageous specific values of the length 68 are 293mm and 294mm.

[0060] It will be understood that the one or more features of the base assembly of one or more of the embodiments described hereinbefore in relation to upright cleaners can also be incorporated as part of a floor tool for a suction cleaner. For example a floor tool for connection to a cylinder or canister type cleaner. Such a floor tool 101 is shown in Fig. 12a and Fig. 12b which embodies various aspects of the invention.

[0061] Features in common with the embodiments described above have been given the same reference number with the addition of 100.

[0062] An aspect of the present invention relates to the floor tool 101 including a base assembly 114 which has a first base part 116 and a second base part 118 which is positioned forwardly of the first base part 116. The base assembly 114 has a first passage 142 with a respective inlet 144 and a second passage 146 with a respective inlet 148. The base assembly 114 has a cleaning member 120 and a device 122 for effecting movement of the first and second base parts 116, 118 relative to each other. The cleaning member 120 is positioned in the second passage 146 and its respective inlet 148.

[0063] The first base part 116 includes a rearwardly extending connection member for connection with a suction hose (not shown) of a suction cleaner so as to provide fluid communication between the source of suction of the suction cleaner and the first and second passages 142, 146. The first base part 116 includes a turbine 170 having a rotor which is drivingly connected to the cleaning member by a belt 154. The turbine 170 is positioned within the suction flow path and rotates during use so as to correspondingly drive rotation of the cleaning member 120 in a known manner during use. A motor could be used instead or in addition to the turbine 170.

[0064] The general arrangement, and operation, of the floor tool and its various components is similar to that described in relation to the previous embodiments and so will not be described in any more detail here. It will be understood that the aspects of the present invention related to the apparatus 10 are similarly applicable to the floor tool 101.

[0065] 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.

[0066] 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.

[0067] Further aspects of the present invention are set out in the numbered clauses below.

Clauses

[0068]

1. An apparatus for cleaning a floor surface including:

an upright part including a user graspable handle;

a base assembly including:

a first base part connected to the upright part; and

- a second base part connected to the first base part, which second base part includes a cleaning member; and
- a device for effecting movement of the first and second base parts relative to each other. 5
2. An apparatus according to clause 1 wherein the device effects movement of the second base part between respective first and second conditions. 10
3. An apparatus according to clause 2 wherein when the second base part is in its second condition the cleaning member is positioned closer to a floor surface than it is when the second base part is in its first condition. 15
4. An apparatus according to clause 2 or 3 wherein the second base part includes a leading edge which is positioned remote from its connection to the first base part, and wherein when the second base part is in its first condition the leading edge of the second base part is positioned closer to a floor surface than it is positioned when the second base part is in its second condition. 20 25
5. An apparatus according to any one of clauses 2 to 4 wherein the second base part has a first passage with a respective inlet and a second passage with a respective inlet, and wherein when the second base part is in its second condition the inlet of the second passage is positioned closer to a floor surface than it is positioned when the second base part is in its first condition. 30 35
6. An apparatus according to clause 5 wherein when the second base part is in its first condition the inlet of the first passage is positioned closer to a floor surface than it is positioned when the second base part is in its second condition. 40
7. An apparatus according to clause 5 or 6 wherein the cleaning member is positioned in the second passage and/or its respective inlet. 45
8. An apparatus according to clause 5, 6 or 7 wherein the inlet of the second passage is positioned rearwardly of the inlet of the first passage, and preferably is positioned in between the inlet of the first passage and the connection of the first base part to the upright part. 50
9. An apparatus according to any one of clauses 3 to 8 when directly or indirectly dependent on clause 2 wherein when the second base part is in its second condition the connection between the first and second base parts is positioned closer to a floor surface than the connection is positioned when the second

base part is in its first condition.

10. An apparatus according to any preceding clause wherein the device effects movement of the first base part between respective first and second conditions.
11. An apparatus according to clause 10 when directly or indirectly dependent on clause 2 wherein the first and second conditions of the first base part correspond respectively to the first and second conditions of the second base part.
12. An apparatus according to any preceding clause wherein the device effects movement of the connection between the first and second base parts so as to effect movement of the first and second base parts relative to each other.
13. An apparatus according to any preceding clause wherein the first base part is pivotally moveable.
14. An apparatus according to any preceding clause wherein the second base part is pivotally moveable.
15. An apparatus according to any preceding clause wherein the first and second base parts are pivotally connected to each other.
16. An apparatus according to any preceding clause wherein the first base part is pivotally connected to the upright part.
17. An apparatus according to any preceding clause when directly or indirectly dependent on clause 2 wherein the second base part includes a ground engaging portion about which the second base part is pivotally moveable as it moves between its first and second conditions.
18. An apparatus according to clause 17 when directly or indirectly dependent on clause 5 wherein the ground engaging portion of the second base part is positioned between the inlets of the first and second passages.
19. An apparatus according to any preceding clause wherein the apparatus includes a suction source for providing a source of suction to the second base part.
20. An apparatus according to clause 19 when directly or indirectly dependent on clause 5 wherein the suction source is for providing suction to one or both of the first and second passages.
21. An apparatus according to clause 20 wherein as the base part is moved between its first and second conditions by the device, the suction provided to one or both of the first and second passages is changed.

22. An apparatus according to clause 21 wherein the suction provided to the first passage is increased or decreased.

23. An apparatus according to clause 21 or 22 wherein the suction provided to the second passage is increased or decreased.

24. An apparatus according to clause 23 when dependent on clause 22 wherein when the suction provided to the first passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased.

25. An apparatus according to clause 24 or clause 23 when dependent on clause 22, wherein when the suction provided to the second passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased.

26. An apparatus according to any one of clauses 20 to 25 including a valve for controlling the flow of suction to one or both of the first or second passages.

27. An apparatus according to clause 26 wherein the valve includes a valve member moveable between respective first and second conditions.

28. An apparatus according to clause 27 wherein when the valve member is in its first condition the flow of suction in the first passage is greater than it is when the valve member is in its second condition.

29. An apparatus according to clause 27 or 28 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than it is when the valve member is in its first condition.

30. An apparatus according to clause 27, 28 or 29 wherein when the valve member is in its first condition the flow of suction in the first passage is greater than the flow of suction in the second passage.

31. An apparatus according to any one of clauses 27 to 30 wherein when the valve member is in its first condition there is no or substantially no flow of suction in the second passage.

32. An apparatus according to any one of clauses 27 to 31 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than the flow of suction in the first passage.

33. An apparatus according to any one of clauses 27 to 32 wherein when the valve member is in its second condition there is no or substantially no flow

of suction in the first passage.

34. An apparatus according to any one of clauses 27 to 33 wherein the device for effecting movement of the first and second base parts relative to each other is configured for effecting movement of the valve member between its first and second conditions.

35. An apparatus according to clause 34 when directly or indirectly dependent on clause 2 wherein as the second base part is moved to its second condition by the device, the valve is caused to decrease the flow of suction in the first passage.

36. An apparatus according to clause 34 or 35 when directly or indirectly dependent on clause 2 wherein as the second base part is moved to its first condition by the device, the valve is caused to decrease the flow of suction in the second passage.

37. An apparatus according to clause 34, 35, or 36 when directly or indirectly dependent on clause 2 wherein as the second base part is moved to its second condition by the device, the valve is caused to increase the flow of suction in the second passage.

38. An apparatus according to any one of clauses 34 to 37 when directly or indirectly dependent on clause 2 wherein as the second base part is moved to its first condition by the device, the valve is caused to increase the flow of suction in the first passage.

39. An apparatus according to any one of clauses 34 to 38 when directly or indirectly dependent on clause 2 wherein the valve is caused to gradually increase and/or decrease the flow of suction in the passage(s).

40. An apparatus according to any of clauses 34 to 39 wherein the device simultaneously effects movement of the first and second parts to their respective first conditions and movement of the valve member to its first condition.

41. An apparatus according to any one of clauses 34 to 40 wherein the device simultaneously effects movement of the first and second parts to their respective second conditions and movement of the valve member to its second condition.

42. An apparatus according to any preceding clause wherein the device includes a cam member and a cam follower.

43. An apparatus according to clause 42 wherein the cam member is connected to one of the first and second base parts and the cam follower is connected

to the other of the first and second base parts.

44. An apparatus according to clause 43 wherein the cam member is pivotally connected to one of the first and second base parts.

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45. An apparatus according to clause 43 or 44 wherein the cam follower is pivotally connected to one of the first and second base parts.

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46. An apparatus according to any preceding clause including a user operable member for actuating the device.

47. An apparatus according to clause 46 wherein the user operable member is pivotally moveable.

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48. An apparatus according to clause 47 when dependent directly or indirectly on clause 15 wherein a pivot axis of the user operable member is coaxial with the pivotal connection of the first and second base parts.

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49. An apparatus according to any preceding clause wherein the cleaning member is movable.

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50. An apparatus according to clause 49 including a motor drivingly connected to the cleaning member to rotate the cleaning member about an axis.

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51. An apparatus for cleaning a floor surface including:

an upright part including a user graspable handle;

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a base assembly, connected to the upright part, including a base part having:

a first passage with a respective inlet; and
a second passage with a respective inlet;

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a device for effecting movement of the base part between respective first and second conditions;
a suction source for providing suction to one or both of the first and second passages;
wherein as the base part is moved between its first and second conditions by the device, the suction provided to one or both of the first and second passages is changed.

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52. An apparatus according to clause 51 wherein the suction provided to the first passage is increased or decreased.

53. An apparatus according to clause 51 or 52 wherein the suction provided to the second passage is increased or decreased.

55

54. An apparatus according to clause 52 or 53 wherein when the suction provided to the first passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased.

55. An apparatus according to clause 52, 53 or 54 wherein when the suction provided to the second passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased.

56. An apparatus according to any one of clauses 51 - 55 wherein when the base part is in its first condition the inlet of the first passage is positioned closer to a floor surface than it is positioned when the base part is in its second condition.

57. An apparatus according to any one of clauses 51 - 56 wherein when the base part is in its second condition the inlet of the second passage is positioned closer to a floor surface than it is positioned when the base part is in its first condition.

58. An apparatus according to any one of clauses 51 - 57 including a valve for controlling the flow of suction in one or both of the first and second passages, including a valve member moveable between respective first and second conditions.

59. An apparatus according to clause 58 wherein the first and second conditions of the base part correspond respectively to the first and second conditions of the valve member.

60. An apparatus according to clause 59 wherein when the valve member is in its first condition the flow of suction in the first passage is greater than it is when the valve member is in its second condition.

61. An apparatus according to clause 59 or 60 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than it is when the valve member is in its first condition.

62. An apparatus according to any one of clauses 58 to 61 wherein the device for effecting movement of the base part is configured for effecting movement of the valve member between its first and second conditions.

63. An apparatus according to clause 62 wherein as the base part is moved to its second condition by the device, the valve is caused to decrease the flow of suction in the first passage.

64. An apparatus according to clause 62 or 63 where-

in as the base part is moved to its first condition by the device, the valve is caused to decrease the flow of suction in the second passage.

65. An apparatus according to clause 62, 63, or 64 wherein as the base part is moved to its second condition by the device, the valve is caused to increase the flow of suction in the second passage. 5

66. An apparatus according to any one of clauses 62 to 65 where as the base part is moved to its first condition by the device, the valve is caused to increase the flow of suction in the first passage. 10

67. An apparatus according to any one of clauses 62 to 66 wherein the valve is caused to gradually increase and/or decrease the flow of suction in the passage(s). 15

68. An apparatus according to any one of clauses 62 to 67 wherein as the device moves the base part to the respective first or second conditions, the valve gradually increases or decreases the flow of suction respectively to the respective first and second passages. 20 25

69. An apparatus according to any one of clauses 62 to 68 wherein the device simultaneously effects movement of the base part to its first position and the valve member to its first position. 30

70. An apparatus according to any one of clauses 62 to 69 wherein the device simultaneously effects movement of the base part to its second position and the valve member to its second position. 35

71. An apparatus according to any one of clauses 51 to 70 wherein the base part is pivotally moveable.

72. An apparatus according to any one of clauses 51 to 71 the base part includes a ground engaging portion about which the base part is pivotally moveable as it moves between its first and second conditions. 40

73. An apparatus according to clause 72 wherein the ground engaging portion is positioned between the inlets of the first and second passages. 45

74. An apparatus according to any one of clauses 51 to 73 wherein the inlet of the second passage is positioned rearwardly of the inlet of the first passage and preferably is positioned in between the inlet of the first passage and the connection of the base assembly to the upright part. 50 55

75. An apparatus according to any one of clauses 51 to 74 wherein the base assembly has a leading

edge remote from its connection to the upright part and the inlet of the first passage is positioned near to or adjacent the leading edge.

76. An apparatus according to any one of clauses 51 to 75 wherein the device includes a cam member and a cam follower.

77. An apparatus according to clause 76 wherein the cam member is connected to one of the base part and the remainder of the base assembly and the cam follower is connected to the other of the base part and the remainder of the base assembly.

78. An apparatus according to any one of clauses 51 to 77 wherein the base assembly includes a cleaning member.

79. An apparatus according to any one of clauses 51 to 78 wherein the base assembly is pivotally connected to the upright part.

80. An apparatus according to any one of clauses 51 to 79 including a user operable member for actuating the device.

81. An apparatus according to clause 80 wherein the user operable member is pivotally moveable.

82. An apparatus according to any one of clauses 51 to 81 wherein the base part includes:

a first base part connected to the upright part;
a second base part connected to the first base part, which second part includes a cleaning member; and

wherein the device effects movement of the first and second base parts relative to each other.

83. An apparatus according to clause 82 wherein the device effects movement of the second base part between respective first and second positions.

84. An apparatus according to clause 82 or 83 wherein the second base part includes the first and second passages and their respective inlets.

85. An apparatus according to clause 84 including one or more of the features set out in any one of clauses 1 to 50.

86. A floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction, the floor tool including:

a base assembly including a base part having:

a first passage with a respective inlet; and
a second passage with a respective inlet;

a device for effecting movement of the base part
between respective first and second conditions; 5

wherein the first and second inlets are positioned in
respective planes.

87. A floor tool according to clause 86 wherein the 10
respective planes are spaced from each other.

88. A floor tool according to clause 87 wherein the
respective planes are spaced from each other in a
generally vertical direction away from the floor sur- 15
face.

89. A floor tool according to clause 86, 87 or 88
wherein the respective planes are angularly spaced
from each other. 20

90. A floor tool according to clause 89 wherein the
respective plane of the first inlet is inclined at an an-
gle β with respect to the respective plane in which
the second inlet is positioned. 25

91. A floor tool according to clause 90 wherein β is
between **4 to 8°**.

92. A floor tool according to clause 91 wherein β 30
angle is 6° or about 6°.

93. A floor tool according to any one of clauses 86
to 92 wherein the planes are intersecting planes. 35

94. A floor tool according to any one of clauses 86
to 93 wherein the base part is pivotally moveable.

95. A floor tool according to clause 94 wherein the
base part is pivotally moveable through an angle θ . 40

96. A floor tool according to clause 95 wherein an
angle of inclination between the respective planes
is substantially equal to or equal to θ . 45

97. A floor tool according to clause 94, 95 or 96
wherein the base part includes a ground engaging
portion about which the base part is pivotally move-
able as it moves between its first and second condi- 50
tions.

98. A floor tool according to clause 97 wherein the
ground engaging portion is positioned between the
inlets of the first and second passages. 55

99. A floor tool according to clause 97 or 98 when
directly or indirectly dependent on clause 93 wherein
the planes intersect each other near or at the ground

engaging portion.

100. A floor tool according to any one of clauses 86
to 99 wherein the inlet of the second passage is po-
sitioned rearwardly of the inlet of the first passage
and preferably is positioned in between the inlet of
the first passage and the connection of the base as-
sembly to the upright part.

101. A floor tool according to any one of clauses 86
to 100 wherein when the base part is in its first con-
dition the inlet of the first passage is positioned closer
to a floor surface than it is positioned when the base
part is in its second condition.

102. A floor tool according to any one of clauses 86
to 101 wherein when the base part is in its second
condition the inlet of the second passage is posi-
tioned closer to a floor surface than it is positioned
when the base part is in its first condition.

103. A floor tool according to any one of clauses 86
to 102 wherein when the base part is in its first con-
dition the first inlet is positioned in a plane which is
substantially parallel or parallel to the floor surface.

104. A floor tool according to any one of clauses 86
to 103 wherein when the base part is in its second
condition the first inlet is positioned in a plane which
is generally inclined with respect to the floor surface.

105. A floor tool according to any one of clauses 86
to 104 when the base part is in its second condition
the second inlet is positioned in a plane which is sub-
stantially parallel or parallel to the floor surface.

106. A floor tool according to any one of clauses 86
to 105 wherein when the base part is in its first con-
dition the second inlet is positioned in a plane which
is generally inclined with respect to the floor surface.

107. A floor tool according to any one of clauses 86
to 106 wherein the source of suction is for providing
suction to one or both of the first and second pas-
sages.

108. A floor tool according to clause 107 including a
valve
for controlling the flow of suction to one or both of
the first or second passages.

109. A floor tool according to clause 108 wherein the
valve includes a valve member moveable between
respective first and second conditions.

110. A floor tool according to clause 109 wherein
when the valve member is in its first condition the
flow of suction in the first passage is greater than it

is when the valve member is in its second condition.

111. A floor tool according to clause 109 or 110 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than it is when the valve member is in its first condition. 5

112. A floor tool according to clause 109, 110 or 111 wherein when the valve member is in its first condition the flow of suction in the first passage is greater than the flow of suction in the second passage. 10

113. A floor tool according to any one of clauses 109 to 112 wherein when the valve member is in its first condition there is no or substantially no flow of suction in the second passage. 15

114. A floor tool according to any one of clauses 109 to 113 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than the flow of suction in the first passage. 20

115. A floor tool according to any one of clauses 109 to 114 wherein when the valve member is in its second condition there is no or substantially no flow of suction in the first passage. 25

116. A floor tool according to any one of clauses 109 to 114 wherein the device for effecting movement of the first and second base parts relative to each other is configured for effecting movement of the valve member between its first and second conditions. 30

117. A floor tool according to clause 116 wherein as the second base part is moved to its second condition by the device, the valve is caused to decrease the flow of suction in the first passage. 35

118. A floor tool according to clause 116 or 117 wherein as the second base part is moved to its first condition by the device, the valve is caused to decrease the flow of suction in the second passage. 40

119. A floor tool according to clause 116, 117, or 118 wherein as the second base part is moved to its second condition by the device, the valve is caused to increase the flow of suction in the second passage. 45

120. A floor tool according to any one of clauses 116 to 119 wherein as the second base part is moved to its first condition by the device, the valve is caused to increase the flow of suction in the first passage. 50

121. A floor tool according to any one of clauses 116 to 120 wherein the valve is caused to gradually increase and/or decrease the flow of suction in the 55

passage(s).

122. A floor tool according to any of clauses 116 to 121 wherein the device simultaneously effects movement of the first and second parts to their respective first conditions and movement of the valve member to its first condition.

123. A floor tool according to any one of clauses 116 to 122 wherein the device simultaneously effects movement of the first and second parts to their respective second conditions and movement of the valve member to its second condition.

124. A floor tool according to any one of clauses 86 to 123 wherein the device includes a cam member and a cam follower.

125. A floor tool according to clause 124 wherein the cam member is connected to one of the base part and the remainder of the base assembly and the cam follower is connected to the other of the base part and the remainder of the base assembly.

126. A floor tool according to any one of clauses 86 to 125 wherein the base assembly includes a cleaning member.

127. A floor tool according to clause 126 wherein the cleaning member is movable.

128. A floor tool according to clause 127 including a turbine rotor drivable by a flow of suction and drivingly connected to the cleaning member to rotate the cleaning member about an axis.

129. A floor tool according to any one of clauses 86 to 128 including a user operable member for actuating the device.

130. A floor tool according to clause 129 wherein the user operable member is pivotally moveable.

131. A floor tool according to any one of clauses 86 to 130 wherein the base part includes:

- a first base part for connection with the apparatus;
- a second base part connected to the first base part, which second part includes a cleaning member; and

wherein the device effects movement of the first and second base parts relative to each other.

132. A floor tool according to clause 131 wherein the device effects movement of the second base part between respective first and second positions.

133. A floor tool according to clause 131 or 132 wherein the second base part includes the first and second passages and their respective inlets.

134. An apparatus for cleaning a floor surface including a floor tool according to any of clauses 86 to 133. 5

135. An apparatus according to clause 134 including an upright part including a user graspable handle, wherein the base assembly is connected to the upright part. 10

136. An apparatus according to clause 135 wherein as the base part is moved between its first and second conditions by the device, the suction provided to one or both of the first and second passages is changed. 15

137. An apparatus according to clause 136 wherein the suction provided to the first passage is increased or decreased. 20

138. An apparatus according to clause 136 or 137 wherein the suction provided to the second passage is increased or decreased. 25

139. An apparatus according to clause 137 or 138 wherein when the suction provided to the first passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased. 30

140. An apparatus according to clause 137, 138 or 139 wherein when the suction provided to the second passage is increased or decreased, the suction provided to the second passage is the other of increased or decreased. 35

141. An apparatus according to any one of clauses 135 to 140 including one or more of the features set out in any one of clauses 1 to 50. 40

142. An apparatus according to any one of clauses 135 to 140 including one or more of the features set out in any one of clauses 51 to 84. 45

143. A floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction, the floor tool including: 50

a base assembly including:

a first base part;
a second base part;
a first passage with a respective inlet; and
a second passage with a respective inlet; and 55

a device for effecting movement of the first and second base parts relative to each other.

144. A floor tool according to clause 143 wherein the base assembly includes a cleaning member positioned in either the second passage and/or its respective inlet or in the first passage and/or its respective inlet.

145. A floor tool according to clause 143 or 144 wherein the device effects movement of the second base part between respective first and second conditions.

146. A floor tool according to clause 145 when dependent on clause 144 wherein when the second base part is in its second condition the cleaning member is positioned closer to a floor surface than it is when the second base part is in its first condition.

147. A floor tool according to clause 145 or 146 wherein the second base part includes a leading edge which is positioned remote from its connection to the first base part, and wherein when the second base part is in its first condition the leading edge of the second base part is positioned closer to a floor surface than it is positioned when the second base part is in its second condition.

148. A floor tool according to any one of clauses 145 to 147 when the second base part is in its second condition the inlet of the second passage is positioned closer to a floor surface than it is positioned when the second base part is in its first condition.

149. A floor tool according to clause 148 wherein when the second base part is in its first condition the inlet of the first passage is positioned closer to a floor surface than it is positioned when the second base part is in its second condition.

150. A floor tool according to any one of clauses 143 to 149 wherein the inlet of the second passage is positioned rearwardly of the inlet of the first passage.

151. A floor tool according to any one of clauses 146 to 149 when directly or indirectly dependent on clause 145 wherein when the second base part is in its second condition the connection between the first and second base parts is positioned closer to a floor surface than the connection is positioned when the second base part is in its first condition.

152. A floor tool according to any of clauses 143 to 151 wherein the device effects movement of the first base part between respective first and second conditions.

153. A floor tool according to clause 152 when directly or indirectly dependent on clause 145 wherein the first and second conditions of the first base part correspond respectively to the first and second conditions of the second base part. 5

154. A floor tool according to any one of clauses 143 to 153 wherein the device effects movement of the connection between the first and second base parts so as to effect movement of the first and second base parts relative to each other. 10

155. A floor tool according to any one of clauses 143 to 154 wherein the first base part is pivotally moveable. 15

156. A floor tool according to any one of clauses 143 to 155 wherein the second base part is pivotally moveable. 20

157. A floor tool according to any one of clauses 143 to 156 wherein the first and second base parts are pivotally connected to each other.

158. A floor tool according to any one of clauses 143 to 157 wherein the first base part is pivotally connectable to the floor cleaning apparatus. 25

159. A floor tool according to any one of clauses 143 to 158 when directly or indirectly dependent on clause 145 wherein the second base part includes a ground engaging portion about which the second base part is pivotally moveable as it moves between its first and second conditions. 30

160. A floor tool according to clause 159 wherein the ground engaging portion of the second base part is positioned between the inlets of the first and second passages. 35

161. A floor tool according to any one of clauses 143 to 160 including a valve for controlling the flow of suction to one or both of the first or second passages. 40

162. A floor tool according to clause 161 wherein the valve includes a valve member moveable between respective first and second conditions. 45

163. A floor tool according to clause 162 wherein when the valve member is in its first condition the flow of suction in the first passage is greater than it is when the valve member is in its second condition. 50

164. A floor tool according to clause 162 or 163 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than it is when the valve member is in its first condition. 55

165. A floor tool according to clause 162, 163 or 164 wherein when the valve member is in its first condition the flow of suction in the first passage is greater than the flow of suction in the second passage.

166. A floor tool according to any one of clauses 162 to 165 wherein when the valve member is in its first condition there is no or substantially no flow of suction in the second passage.

167. A floor tool according to any one of clauses 162 to 166 wherein when the valve member is in its second condition the flow of suction in the second passage is greater than the flow of suction in the first passage.

168. A floor tool according to any one of clauses 162 to 167 wherein when the valve member is in its second condition there is no or substantially no flow of suction in the first passage.

169. A floor tool according to any one of clauses 162 to 168 wherein the device for effecting movement of the first and second base parts relative to each other is configured for effecting movement of the valve member between its first and second conditions.

170. A floor tool according to clause 169 when directly or indirectly dependent on clause 145 wherein as the second base part is moved to its second condition by the device, the valve is caused to decrease the flow of suction in the first passage.

171. A floor tool according to clause 169 or 170 when directly or indirectly dependent on clause 145 wherein as the second base part is moved to its first condition by the device, the valve is caused to decrease the flow of suction in the second passage.

172. A floor tool according to clause 169, 170, or 171 when directly or indirectly dependent on clause 145 wherein as the second base part is moved to its second condition by the device, the valve is caused to increase the flow of suction in the second passage.

173. A floor tool according to any one of clauses 169 to 172 when directly or indirectly dependent on clause 145 wherein as the second base part is moved to its first condition by the device, the valve is caused to increase the flow of suction in the first passage.

174. A floor tool according to any one of clauses 169 to 173 when directly or indirectly dependent on clause 145 wherein the valve is caused to gradually increase and/or decrease the flow of suction in the passage(s).

175. A floor tool according to any of clauses 169 to 173 wherein the device simultaneously effects movement of the first and second parts to their respective first conditions and movement of the valve member to its first condition.

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176. A floor tool according to any one of clauses 169 to 173 wherein the device simultaneously effects movement of the first and second parts to their respective second conditions and movement of the valve member to its second condition.

10

177. A floor tool according to any one of clauses 143 to 176 wherein the device includes a cam member and a cam follower.

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178. A floor tool according to clause 177 wherein the cam member is connected to one of the first and second base parts and the cam follower is connected to the other of the first and second base parts.

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179. A floor tool according to clause 178 wherein the cam member is pivotally connected to one of the first and second base parts.

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180. A floor tool according to clause 178 or 179 wherein the cam follower is pivotally connected to one of the first and second base parts.

181. A floor tool according to any one of clauses 143 to 180 including a user operable member for actuating the device.

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182. A floor tool according to clause 181 wherein the user operable member is pivotally moveable.

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183. A floor tool according to clause 182 when dependent directly or indirectly on clause 157 wherein a pivot axis of the user operable member is coaxial with the pivotal connection of the first and second base parts.

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184. A floor tool according to clause 144 or any one of clauses 145 to 183 when directly or indirectly dependent on clause 144 wherein the cleaning member is movable.

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185. A floor tool according to clause 184 including a turbine rotor drivable by a flow of suction and drivingly connected to the cleaning member to rotate the cleaning member about an axis.

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186. A floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction, the floor tool including:

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a base assembly including a passage with an inlet for communication with the source of suc-

tion;

wherein the inlet has a length of between 280mm and 350mm.

187. A floor tool according to clause 186, wherein the inlet has a length of between 290mm and 340mm.

188. A floor tool according to clause 186, wherein the inlet has a length of between 290mm and 300mm.

189. A floor tool according to clause 188, wherein the inlet has a length of or about 293mm, or of or about 294mm.

190. A floor tool according to clause 187, wherein the inlet has a length of between 300mm and 340mm.

191. A floor tool according to clause 190, wherein the inlet has a length of between 310mm and 330mm.

192. A floor tool according to clause 191, wherein the inlet has a length of or about 320mm.

193. A floor tool according to clause 190, wherein the inlet has a length of between 320mm and 340mm.

194. A floor tool according to clause 193, wherein the inlet has a length of or about 338mm.

195. A floor tool according to according to any one of clauses 186 to 194, wherein the inlet has a width of between 30mm and 50mm.

196. A floor tool according to clause 195, wherein the inlet has a width of between 35mm and 45mm.

197. A floor tool according to clause 196, wherein the inlet has a width of between 40mm and 45mm.

198. A floor tool according to clause 197, wherein the inlet has a width of or about 41 mm.

199. A floor tool according to any one of clauses 186 to 194 wherein the inlet has a length of between 12mm and 22mm.

200. A floor tool according to clause 199, wherein the inlet has a width of between 15mm and 19mm.

201. A floor tool according to clause 200 wherein the inlet has a width of or around 17mm.

202. A floor tool according to any one of clauses 186

to 201, including two said passages each having the respective inlet, wherein one of the inlets has a width which is larger than the width of the other inlet.

203. A floor tool according to any one of clauses 186 to 201, including two said passages each having the respective inlet, wherein one of the inlets has a width which is substantially equal to the width of the other inlet.

204. A floor tool according to clause 202 or 203, wherein one of the inlets has a length which is larger than the length of the other inlet.

205. A floor tool according to clause 202 or 203, wherein one of the inlets has a length which is substantially equal to the length of the other inlet.

206. A floor tool according to any one of clauses 186 to 205 preceding clause including a cleaning member positioned in one or each of the passage(s) and/or its respective inlet.

207. A floor tool according to clause 206 when directly or indirectly dependent on clause 204 wherein the cleaning member is positioned in the inlet which has the smallest length.

208. A floor tool according to clause 206 or 207 when directly or indirectly dependent on clause 202 wherein the cleaning member is positioned in the inlet which has the largest width dimension.

209. An apparatus for cleaning a floor surface including a floor tool according to any one of clauses 186 to 208.

210. An apparatus according to clause 209, wherein the apparatus includes an upright part including a user graspable handle, wherein the base assembly is connected to the upright part.

211. An apparatus according to clause 210 wherein the apparatus is a cylinder type cleaner.

212. An apparatus or floor tool substantially as hereinbefore described with reference to and/or as shown in the accompanying drawings.

213. Any novel feature or novel combination of features described herein with reference to and/or as shown in the accompanying drawings.

Claims

1. A floor tool for an apparatus for cleaning a floor surface, said apparatus including a source of suction,

the floor tool including:

a base assembly including a base part having:

a first passage with a respective inlet; and
a second passage with a respective inlet;

a device for effecting movement of the base part between respective first and second conditions;

wherein the first and second inlets are positioned in respective planes.

2. A floor tool according to claim 1 wherein the respective planes are spaced from each other.

3. A floor tool according to claim 2 wherein the respective planes are spaced from each other in a generally vertical direction away from the floor surface.

4. A floor tool according to claim 1, 2 or 3 wherein the respective planes are angularly spaced from each other.

5. A floor tool according to claim 4 wherein the respective plane of the first inlet is inclined at an angle β with respect to the respective plane in which the second inlet is positioned.

6. A floor tool according to claim 5 wherein β is between 4 to 8° and preferably β is 6° or about 6°.

7. A floor tool according to any one of claims 1 to 6 wherein the planes are intersecting planes.

8. A floor tool according to any one of claims 1 to 7 wherein the base part is pivotally moveable.

9. A floor tool according to claim 8 wherein the base part is pivotally moveable through an angle θ , and preferably an angle of inclination between the respective planes is substantially equal to or equal to θ .

10. A floor tool according to claim 8 or 9 wherein the base part includes a ground engaging portion about which the base part is pivotally moveable as it moves between its first and second conditions.

11. A floor tool according to claim 10 wherein the ground engaging portion is positioned between the inlets of the first and second passages.

12. A floor tool according to claim 10 or 11 when directly or indirectly dependent on claim 93 wherein the planes intersect each other near or at the ground engaging portion.

13. A floor tool according to any one of claims 1 to 12

wherein the inlet of the second passage is positioned rearwardly of the inlet of the first passage and preferably is positioned in between the inlet of the first passage and the connection of the base assembly to the upright part.

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14. A floor tool according to any one of claims 1 to 13 wherein when the base part is in its first condition the inlet of the first passage is positioned closer to a floor surface than it is positioned when the base part is in its second condition.

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15. A floor tool according to any one of claims 1 to 14 including one or more or all of the following:

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a) when the base part is in its second condition the inlet of the second passage is positioned closer to a floor surface than it is positioned when the base part is in its first condition;

b) when the base part is in its first condition the first inlet is positioned in a plane which is substantially parallel or parallel to the floor surface;

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c) when the base part is in its second condition the first inlet is positioned in a plane which is generally inclined with respect to the floor surface;

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d) when the base part is in its second condition the second inlet is positioned in a plane which is substantially parallel or parallel to the floor surface;

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e) when the base part is in its first condition the second inlet is positioned in a plane which is generally inclined with respect to the floor surface; and

f) the source of suction is for providing suction to one or both of the first and second passages, and preferably includes a valve for controlling the flow of suction to one or both of the first or second passages.

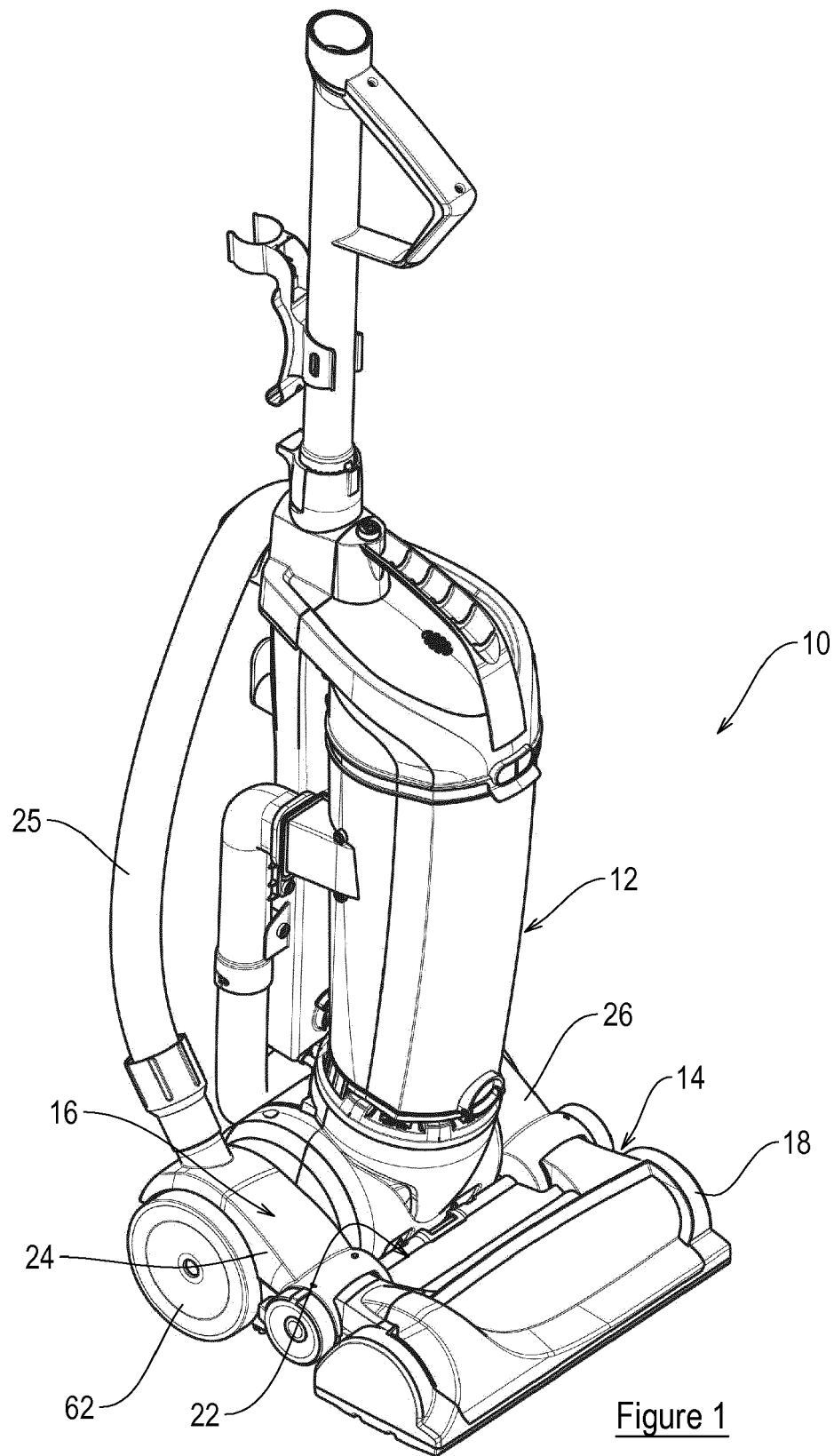
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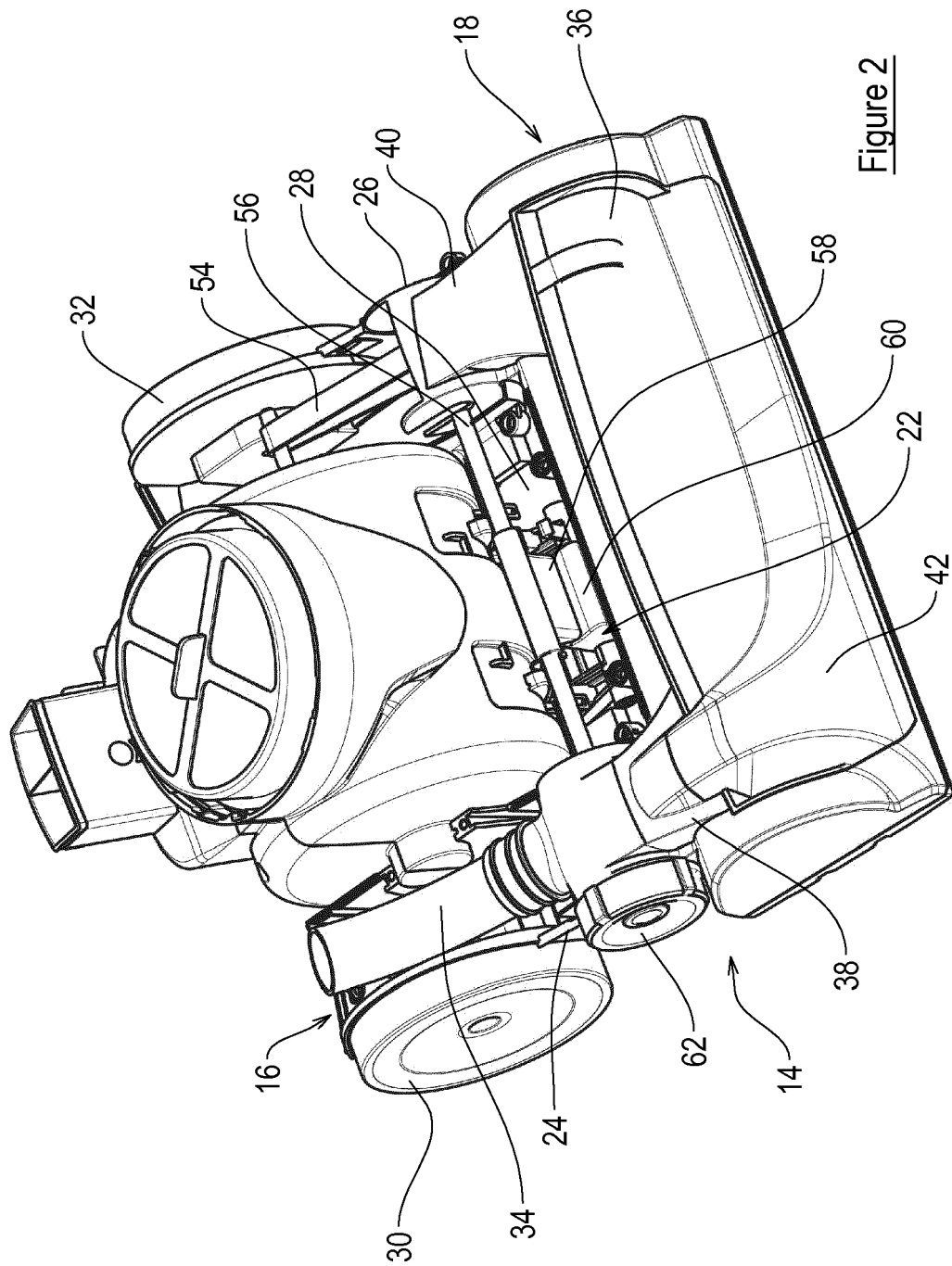


Figure 2

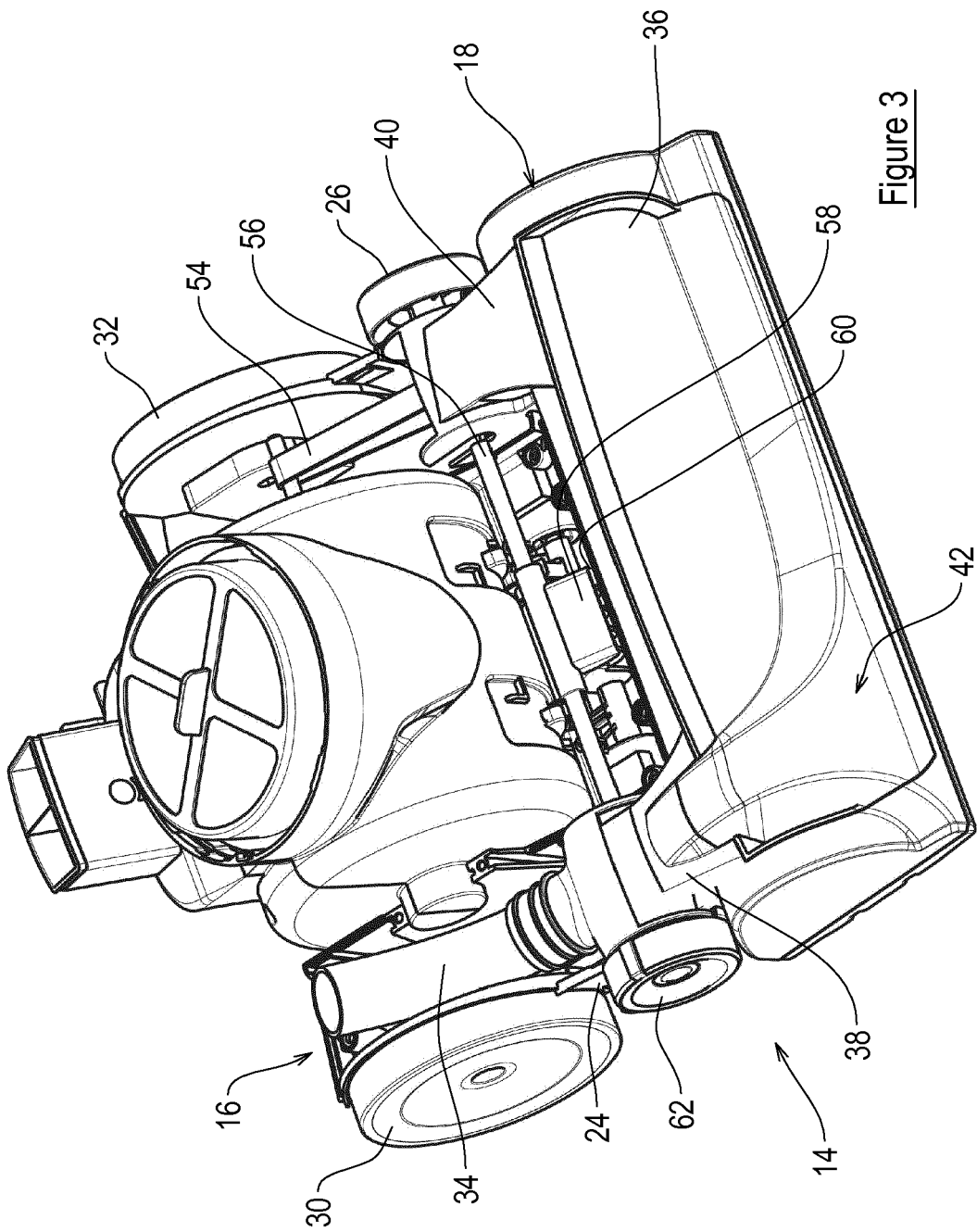


Figure 3

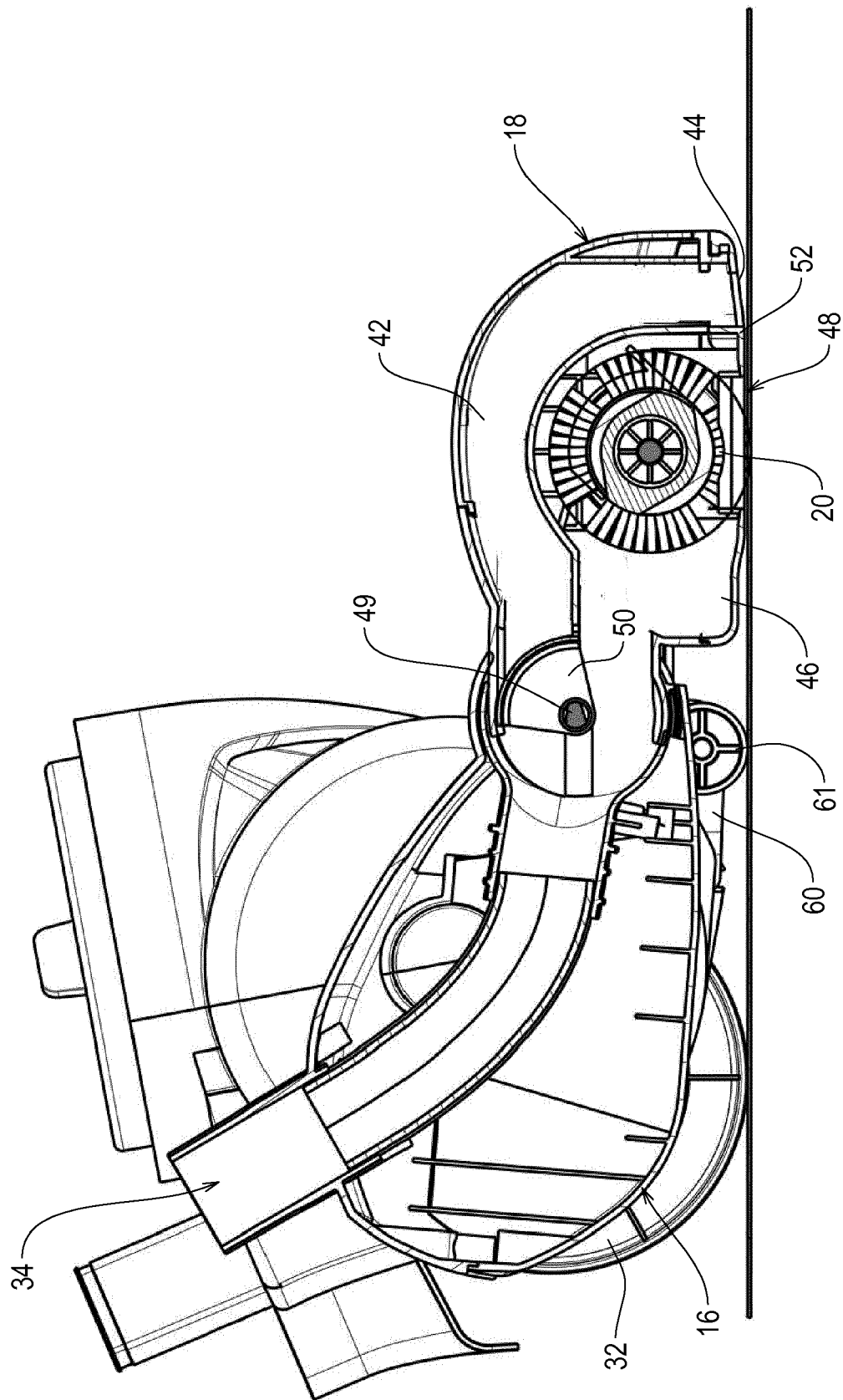


Figure 4

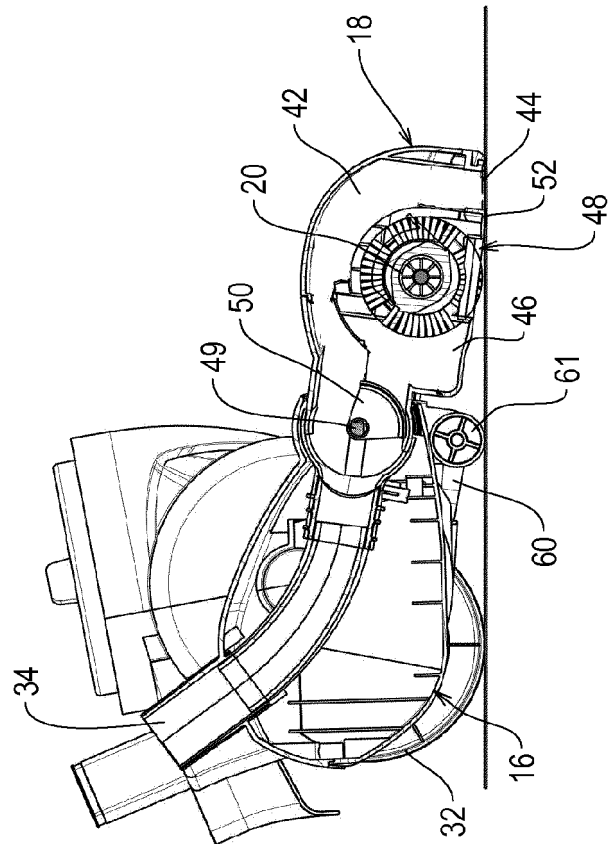


Figure 5

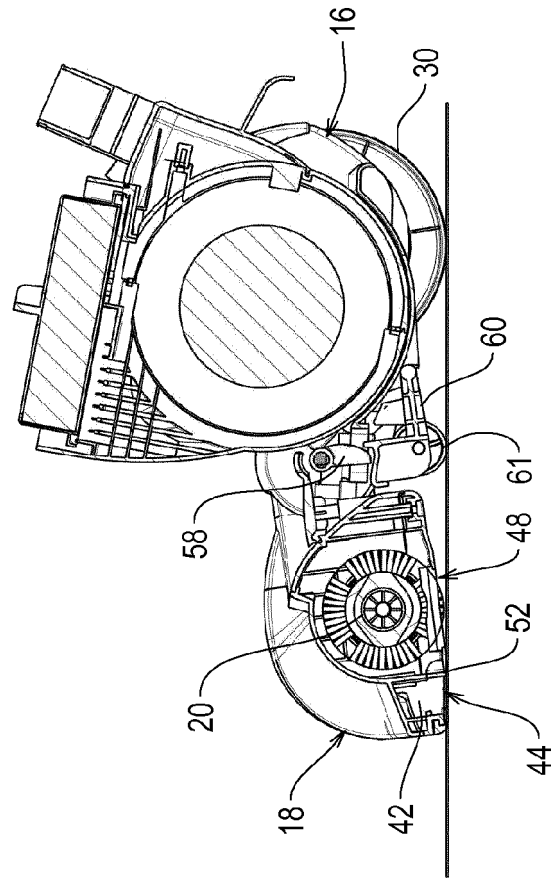


Figure 6

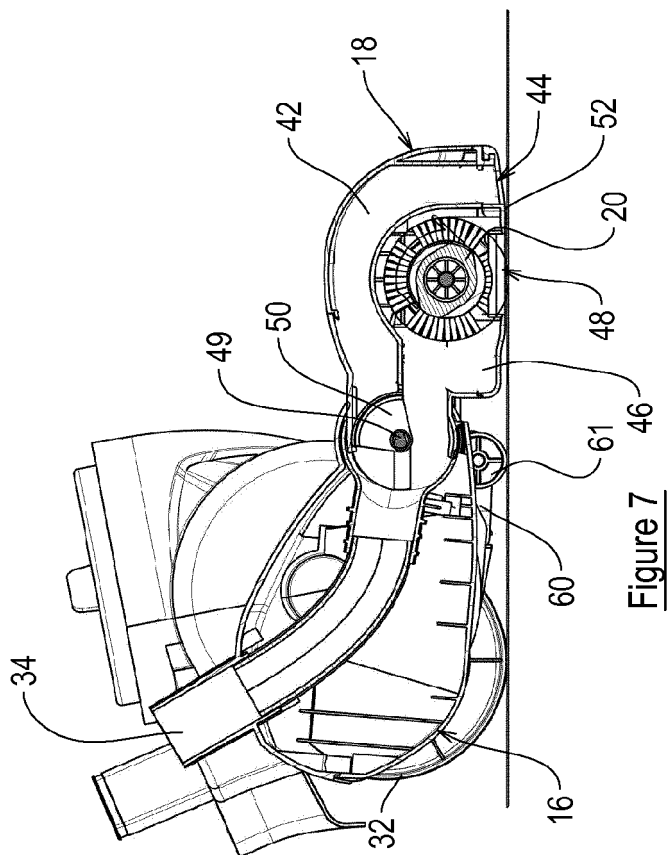


Figure 7

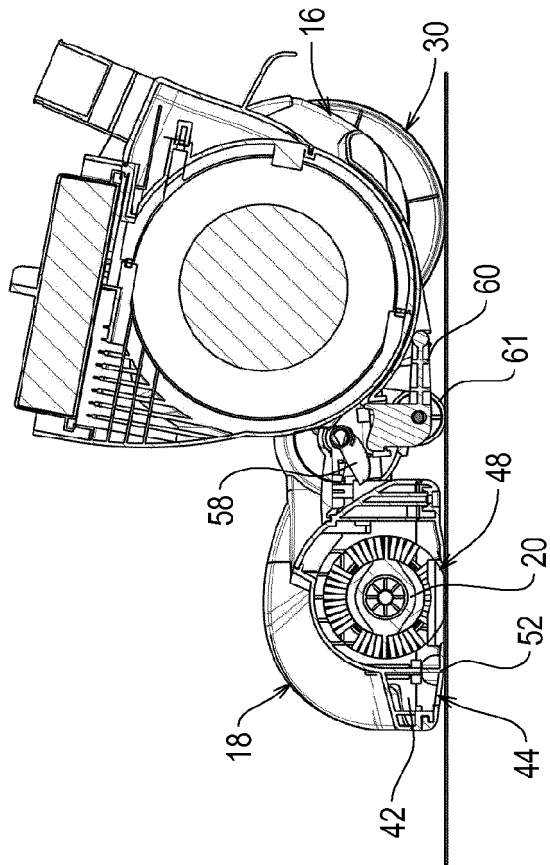


Figure 8

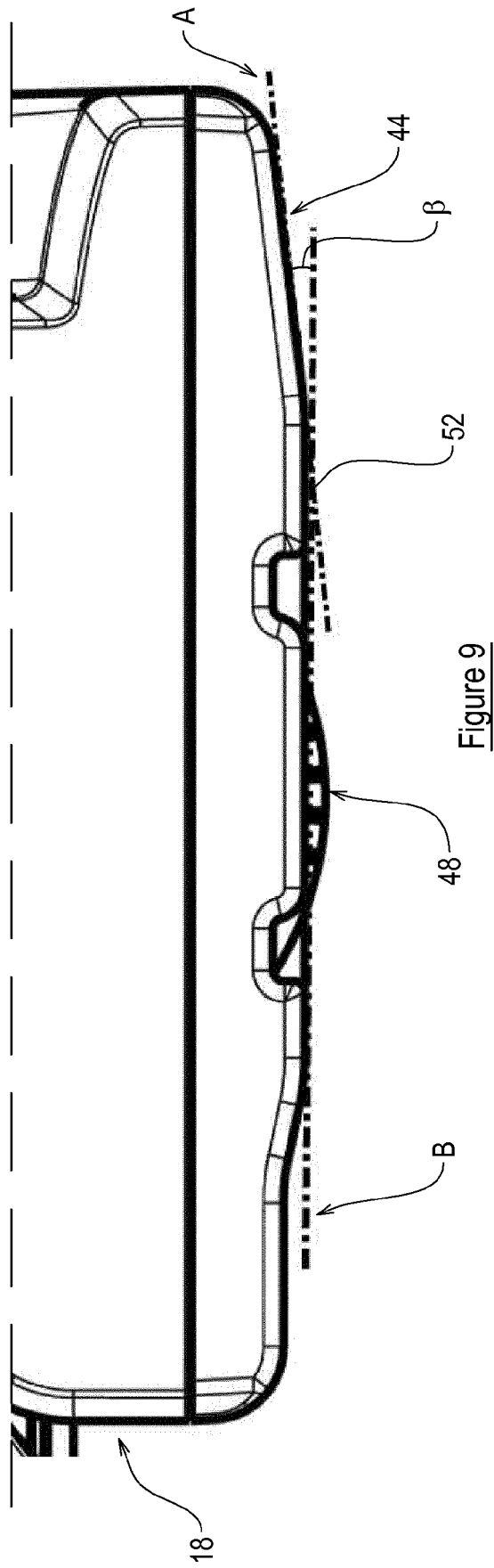


Figure 9

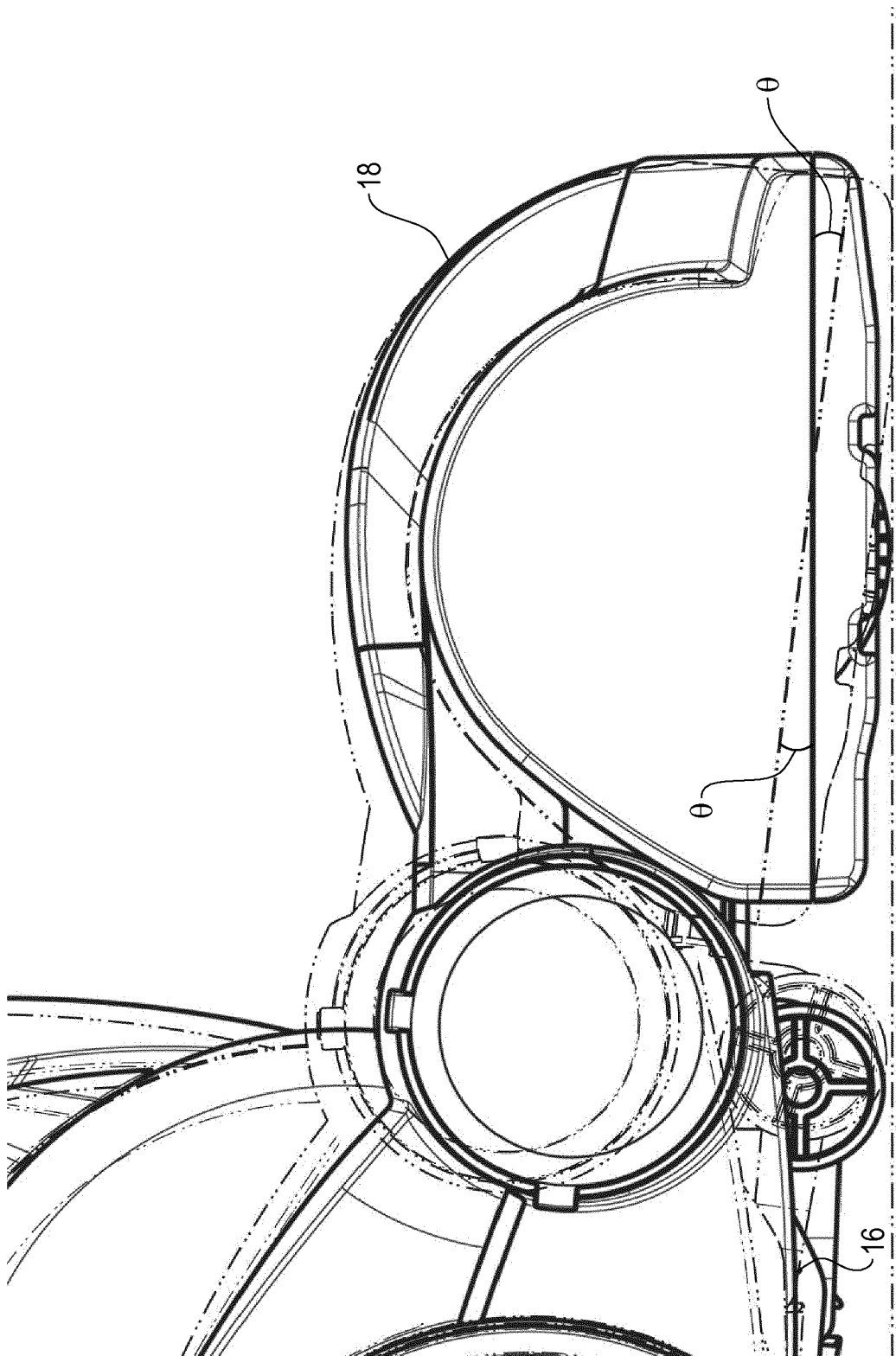


Figure 10

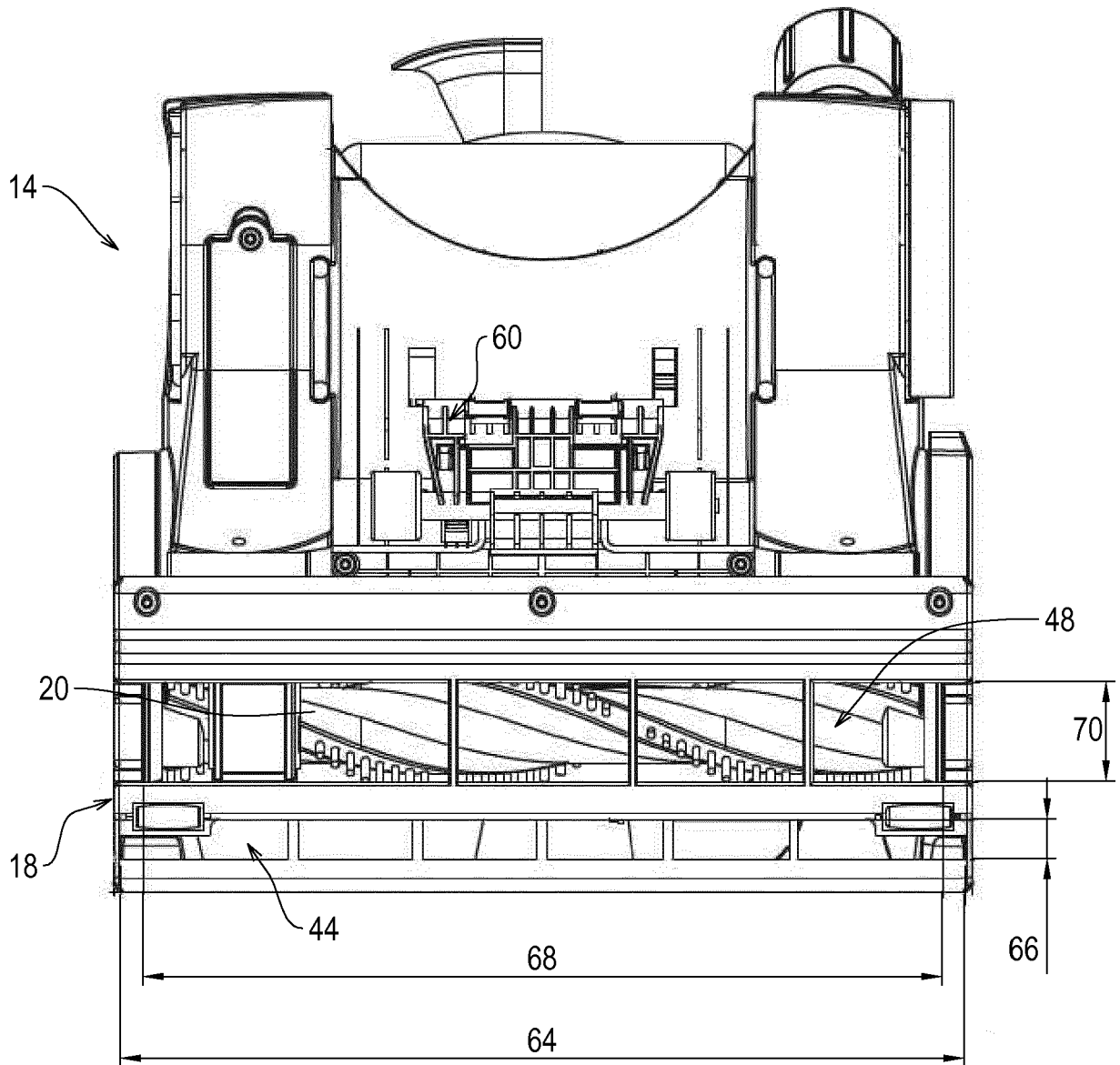


Figure 11

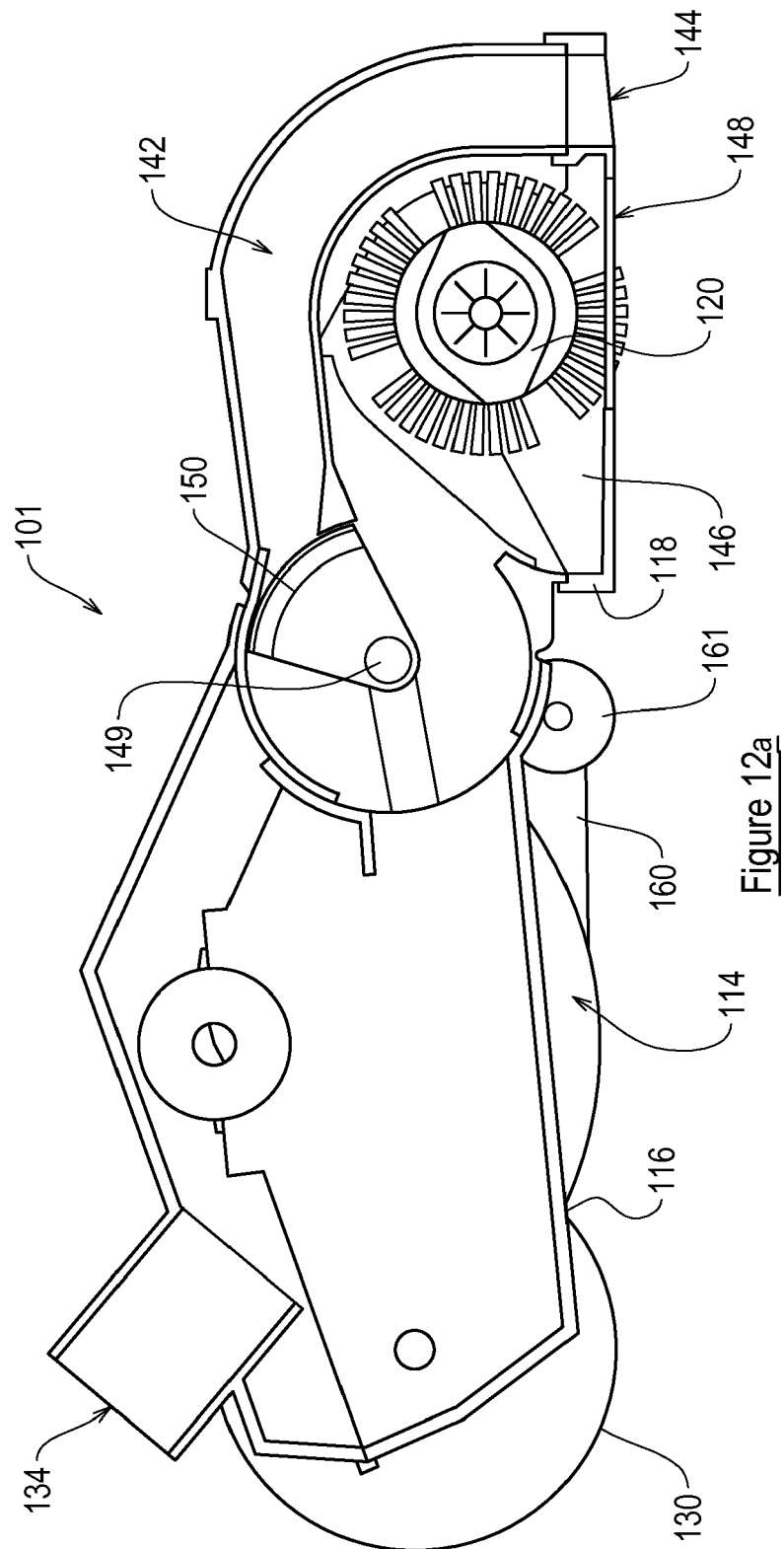


Figure 12a

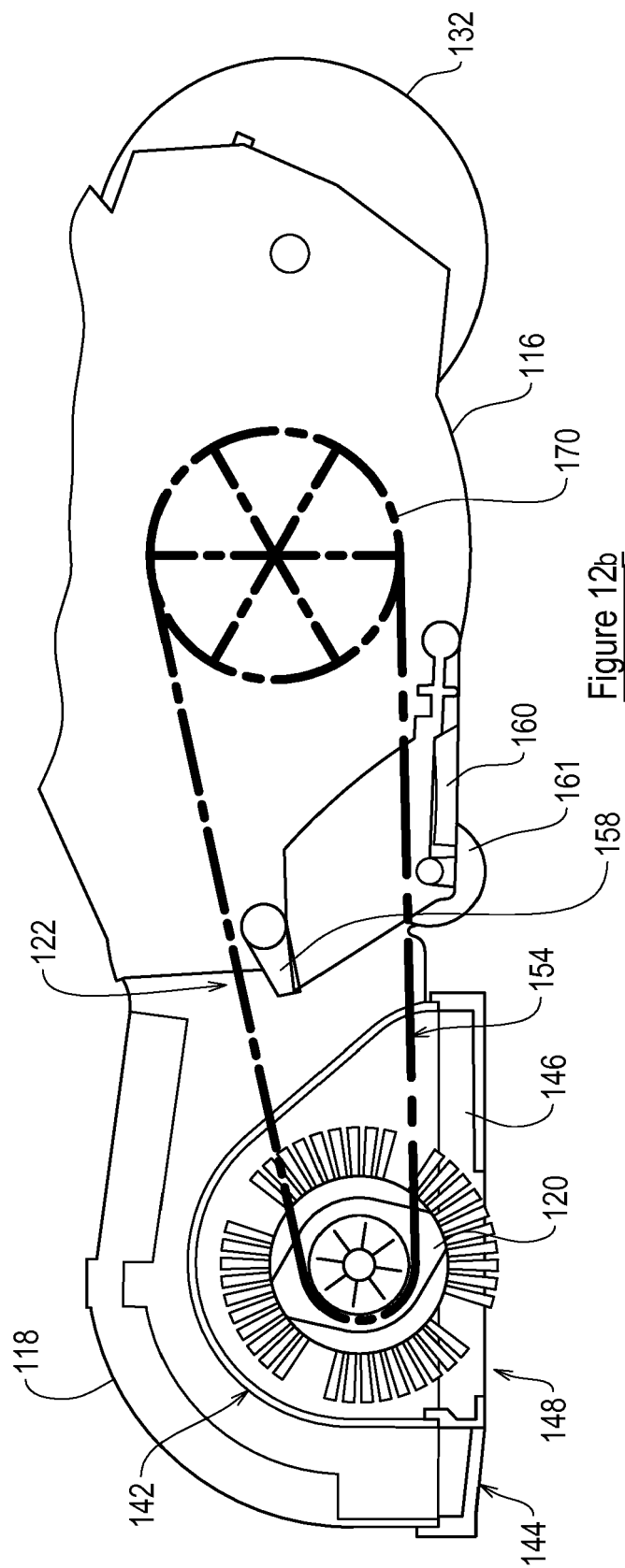


Figure 12b



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Application Number
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A	* paragraphs [0049] - [0052] *	5-7	
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A	* paragraphs [0037] - [0038] * * paragraph [0049] *	6	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L A47K
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 April 2017	Examiner Eckenschwiller, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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The members are as contained in the European Patent Office EDP file on
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