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(54) Title of the Invention: **A vacuum appliance**
Abstract Title: **A vacuum appliance**

(57) A vacuum appliance having a front end and a rear end opposite the front end. The vacuum appliance having a main body 106 comprising an air inlet 102, air outlet 104 and an airflow generator 112 to generate an airflow from the air inlet to the air outlet. A diffuser 116 is positioned between the airflow generator and the air outlet and is closer to the front end than the airflow generator. In use of the vacuum appliance, the airflow travels through the air inlet in a rearward direction, through the airflow generator in a forward direction, then through the diffuser, and in a rearward direction downstream of the diffuser, the forward and rearward directions being relative to the front and rear ends of the vacuum appliance. Also disclosed is a vacuum appliance characterised by a diffuser closer to the first end of the housing than the outlet, wherein an airflow path is defined from the inlet, around the outside of the generator, reversing flow direction for a first time into the generator, through the diffuser and out of the outlet, the flow direction reversing for a second time between the outlet of the generator and the outlet.

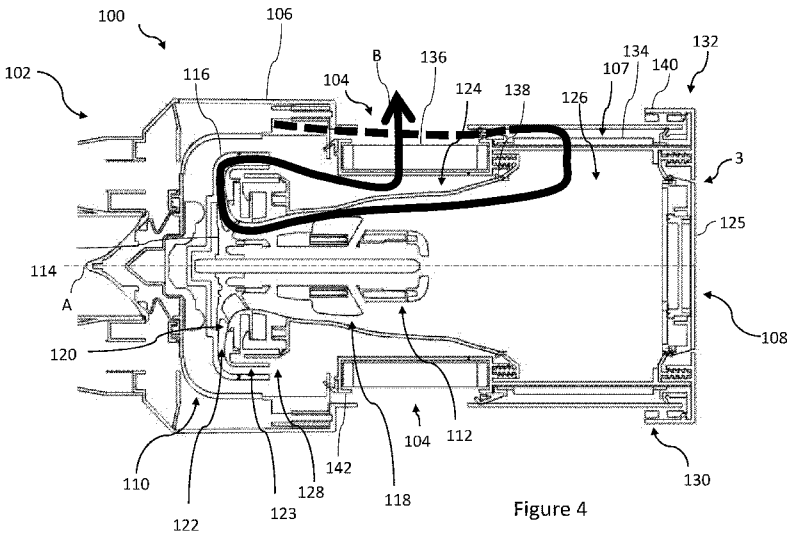

Figure 4

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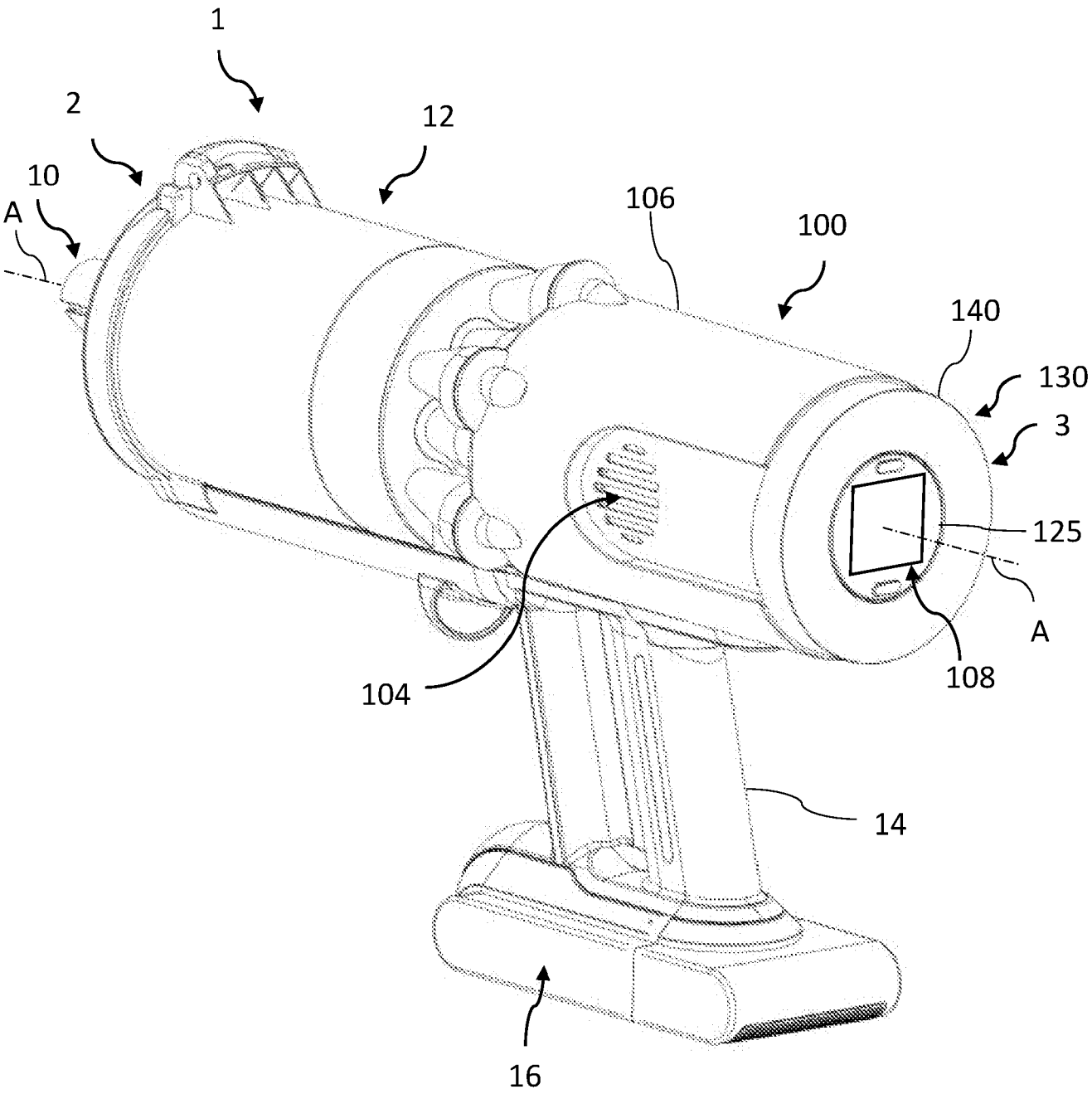
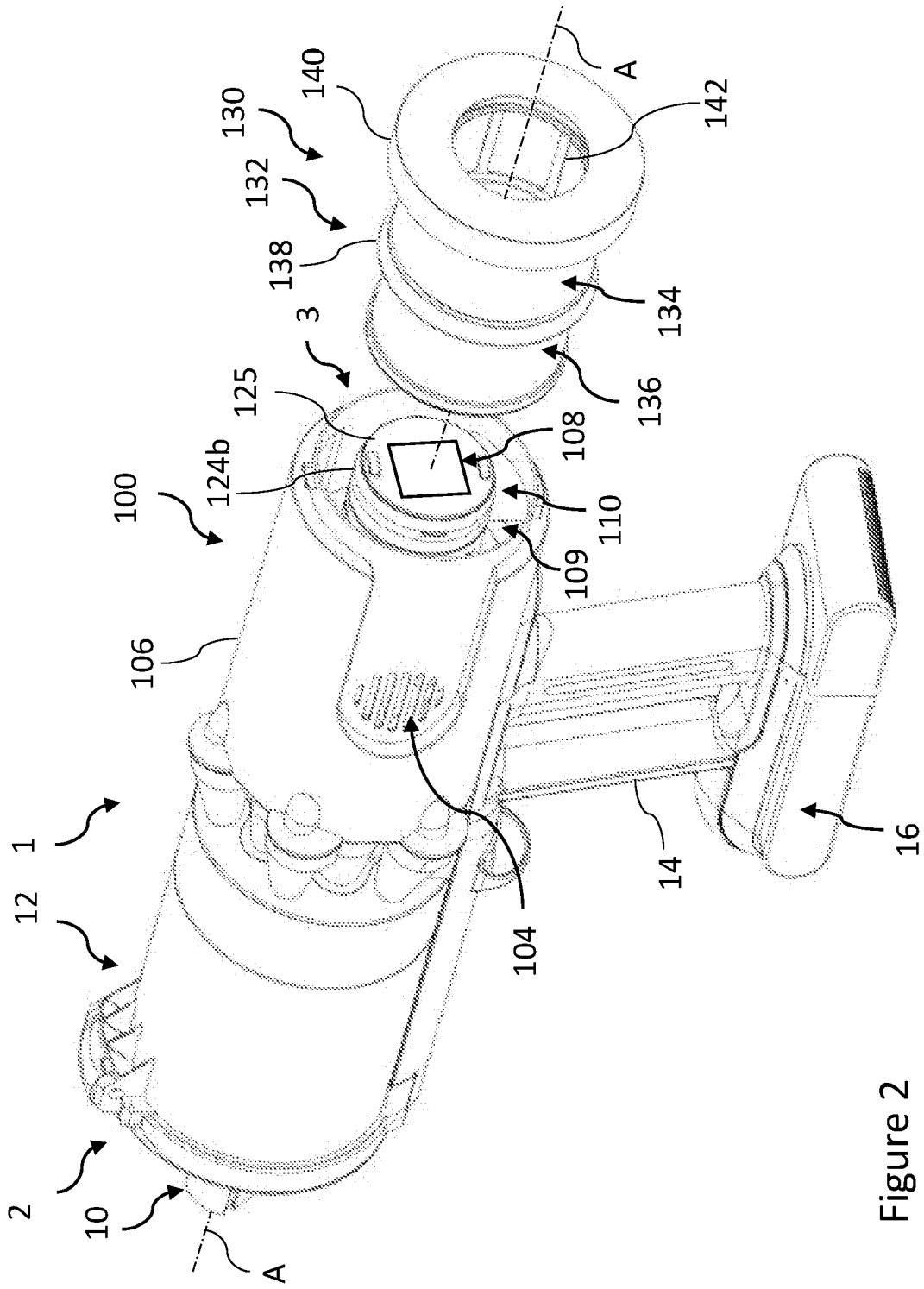


Figure 1


A
142
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130
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124b
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110
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106
1
12
104
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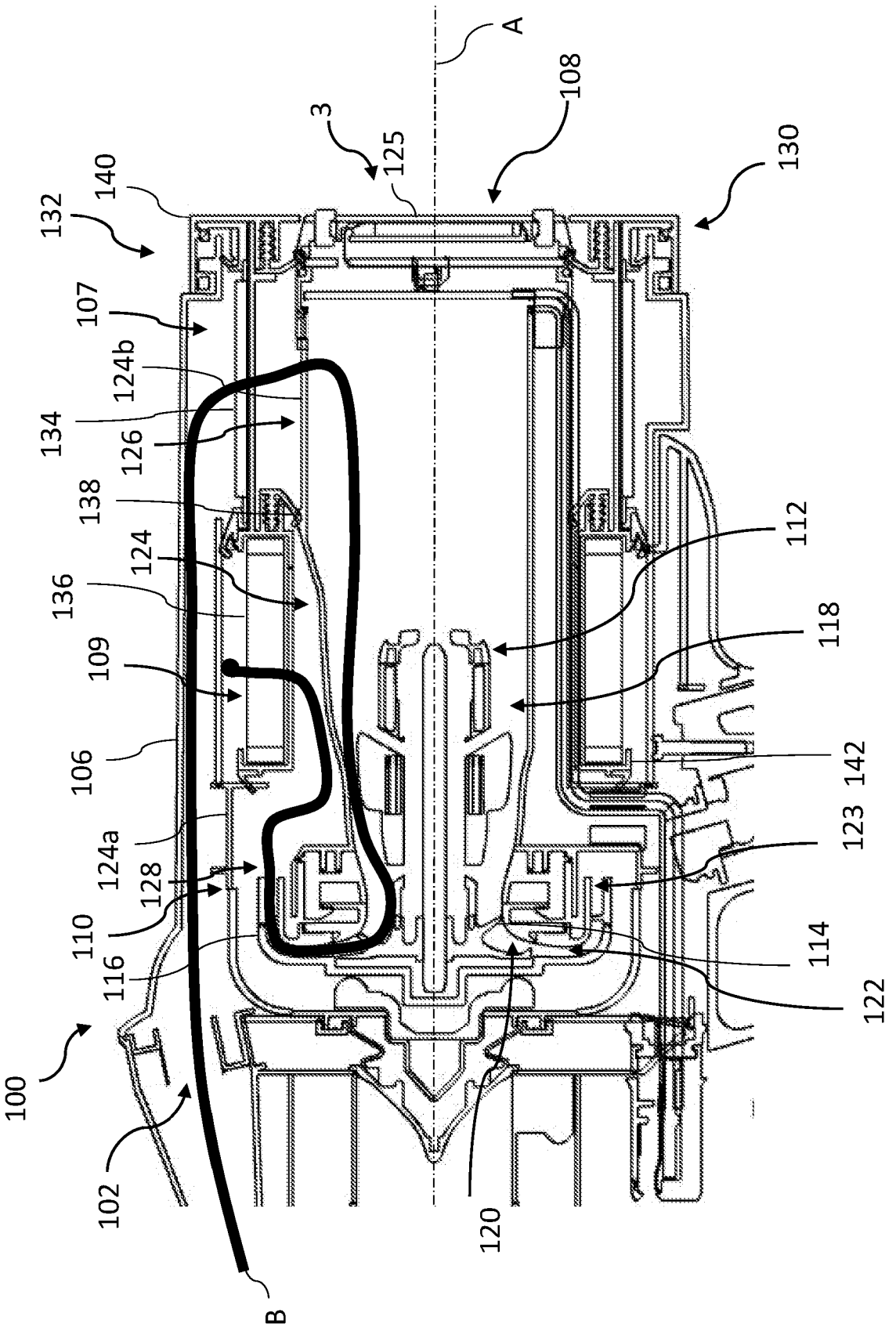
16
2
10
A

Figure 2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124a
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102
B
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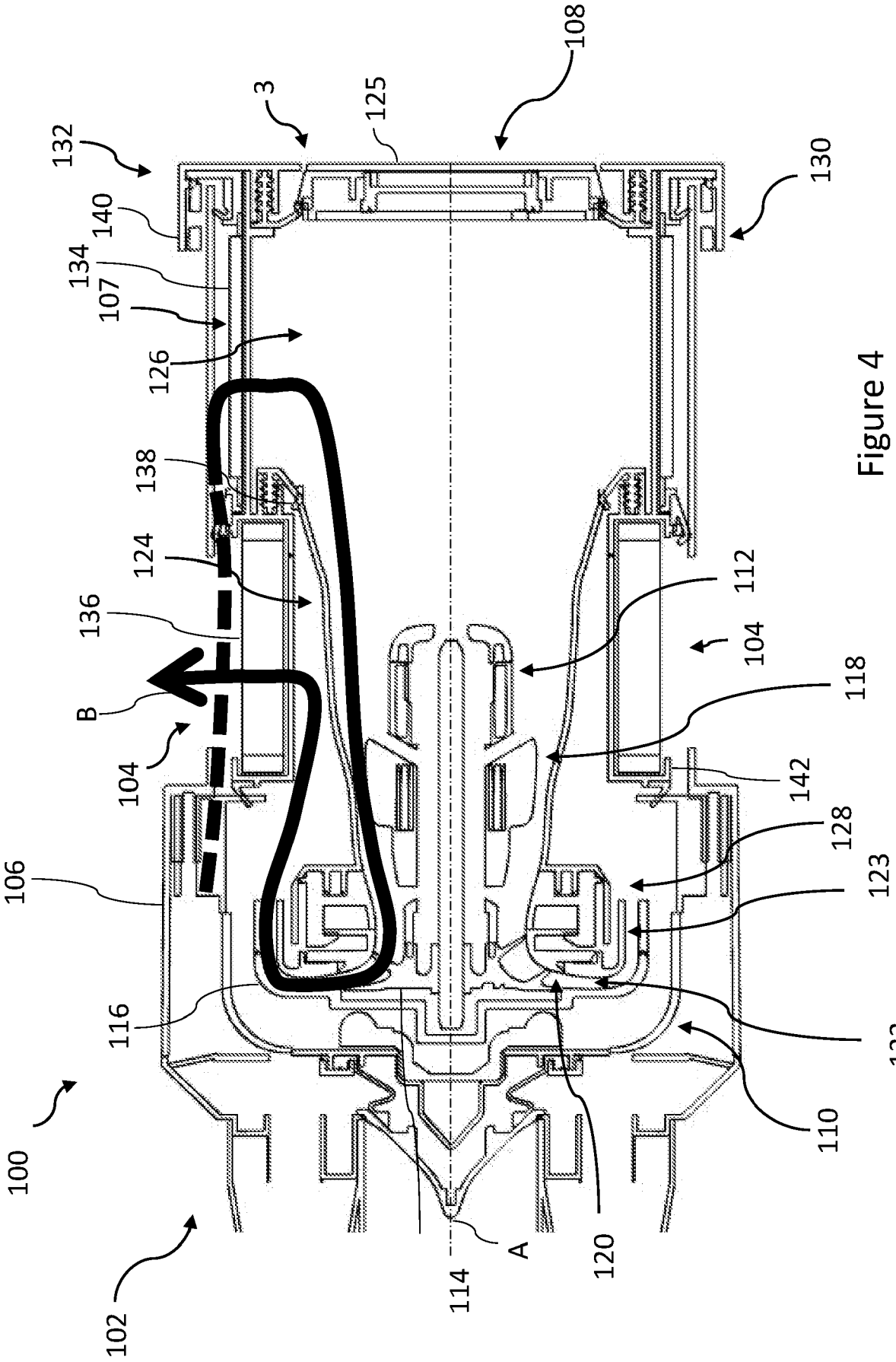
118
142
123
114
122

Figure 3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128
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134
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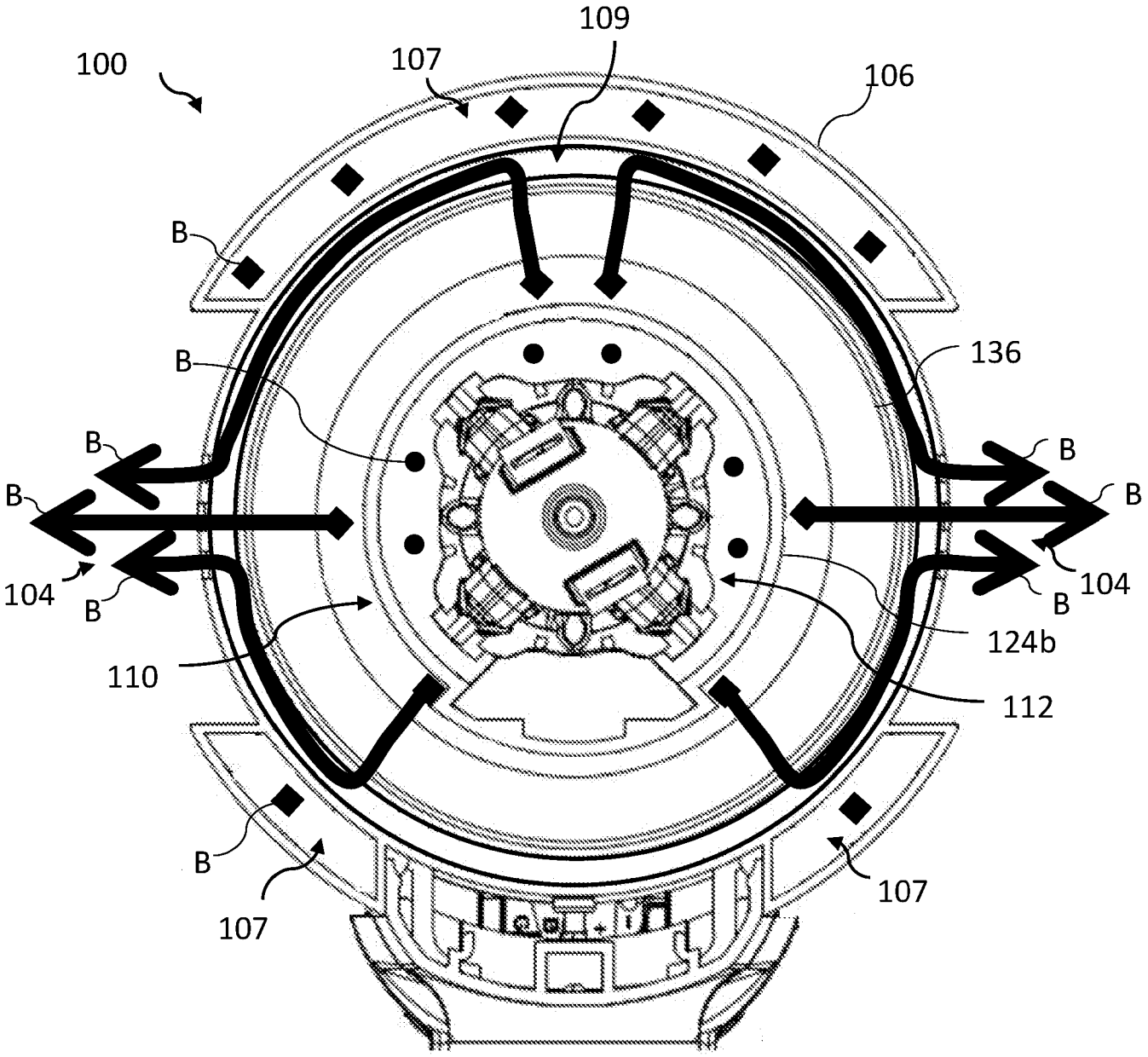
142
3
A
B

Figure 4


100
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106
B
B
136
B
B
B
B
104
B
104
B
124b
110
112
B
107
107

A VACUUM APPLIANCE

Field of the Invention

The present invention relates to a vacuum appliance.

Background of the Invention

The performance parameters of vacuum appliances, particularly handheld vacuum appliances, must be balanced with acoustic output and ergonomic factors such as the size, weight, functionality and shape of a vacuum appliance.

The position of components within a vacuum appliance relative to one another can affect the efficiency, acoustic output and usability of the vacuum appliance. An increase in performance of some components, such as a motor or a diffuser, may be achieved by increasing the physical size of the components. However, this may detrimentally affect ergonomic and functional aspects of a vacuum appliance, for example removal of filters from the vacuum appliance for regeneration and/or replacement.

Summary of the Invention

According to a first aspect of the present invention there is provided a vacuum appliance having a front end and a rear end opposite the front end, the vacuum appliance having a main body comprising: an air inlet; an air outlet; an airflow generator to generate an airflow from the air inlet to the air outlet; and a diffuser between the airflow generator and the air outlet, wherein at least a portion of the diffuser is closer to the front end than the airflow generator, wherein, in use, the airflow travels through the air inlet in a rearward direction, through the airflow generator in a forward direction, then through the diffuser, and in a rearward

direction downstream of the diffuser, the forward and rearward directions being relative to the front and rear ends of the vacuum appliance.

The vacuum appliance may provide a longer airflow path from the air inlet to the air outlet, which may help to reduce acoustic emissions of the vacuum appliance in use.

A diffuser is typically larger in diameter than an airflow generator. The arrangement of the vacuum appliance may therefore help to allow a reduction of an overall diameter of the vacuum appliance at the rear end of product, compared to a typical vacuum appliance in which the diffuser is closer to the rear end of the vacuum appliance than the airflow generator. In turn, this may provide a more ergonomic appliance.

In use, a direction of the airflow downstream of the diffuser may be more than 180 degrees from a direction of the airflow as the airflow passes through the airflow generator. This may provide a longer airflow path from the air inlet to the air outlet, which may help to further reduce acoustic emissions of the vacuum appliance in use.

The airflow generator may comprise an impeller, and the diffuser may comprise: a radial channel extending radially outward from the impeller, and an outlet duct contiguous with the radial channel and configured to emit airflow from the diffuser in a rearward direction. The diffuser may help to increases pressure of the airflow and direct airflow in the rearward direction downstream of the diffuser.

The diffuser may have an outer diameter of at least 60 mm. This may help to ensure that the diffuser generates a sufficient pressure increase for the airflow generator to operate at a desired operating level.

The vacuum appliance may comprise an annular filter assembly. The annular filter assembly may be selectively attachable to, and removable from, the rear end of the vacuum appliance by sliding the annular filter assembly along a longitudinal axis of the vacuum cleaner relative to the airflow generator, wherein the annular filter assembly comprises a front annular portion configured to surround the airflow generator when the annular filter assembly is attached to the vacuum appliance. Annular filters can help to provide efficient filtration with a relatively small filter footprint, which can be particularly advantageous in handheld vacuum appliances. Annular filter assemblies may also be relatively easy to manufacture, low cost, and easy to seal.

Providing a selectively attachable and removable annular filter assembly may enable relatively simple cleaning and/or replacement of filters in the filter assembly. Sliding the filter assembly in the rearward direction may facilitate the use of a single annular filter assembly, which is simple for a user to remove compart to, for example, the filter assembly being removable as multiple parts in a radial direction of the filter assembly.

The longitudinal axis extends from the front end to the rear end of the vacuum appliance and is coaxial with an axis of rotation of the airflow generator.

When the annular filter assembly is attached to the vacuum appliance, the diffuser may be closer to the front end of the vacuum appliance than a frontmost face of the filter assembly, the frontmost face being relative to the front end of the vacuum appliance. By positioning the diffuser closer to the front end than the frontmost face of the filter assembly, a diffuser with a greater diameter than an inner diameter of the front portion of the filter assembly may be provided whilst permitting removal of the filter assembly from the rear end of the vacuum appliance.

Additionally, in use, the diffuser may heat to a relatively high temperature. By positioning the diffuser closer to the front end than the frontmost face of the filter assembly, the diffuser may be less accessible when the filter assembly is removed than if the diffuser were closer to the rear end. Accordingly, this may increase safety of the appliance.

An inner diameter of the front portion of the filter assembly may be smaller than an outer diameter of the diffuser. This may help to keep an overall diameter of the vacuum appliance relatively small compared to the diameter of the diffuser. Providing a relatively large diameter diffuser may permit the airflow generator to operate at a higher efficiency than with a smaller diameter diffuser.

The filter assembly may comprise a first filter upstream of the airflow generator and a second filter downstream of the airflow generator and the diffuser, the first filter closer to the rear end of the vacuum appliance than the second filter when the annular filter assembly is attached to the vacuum appliance. This may help to reduce an overall diameter of the filter assembly because the first filter is closer, in a direction extending from the front end to the rear end of the vacuum appliance, to an intake of the airflow generator than the second filter, and the second filter is closer to the diffuser, in a direction extending from the front end to the rear end of the vacuum appliance, than the first filter.

The air outlet may be closer to the front end of the vacuum appliance than the first filter when the annular filter assembly is attached to the vacuum appliance. This may help to further reduce an overall diameter of the filter assembly because the air outlet is closer to the second filter than the first filter.

In use, the airflow may travel in a rearward direction directly upstream of the first filter and in a forward direction directly downstream of the first filter. This may help to provide a space-efficient arrangement, with the airflow being filtered as the

airflow changes direction. For example, the airflow may pass through the first filter in a radial direction of the annular filter assembly.

In use, the airflow may be emitted from the air outlet in a radial direction, the radial direction relative to a longitudinal axis of the vacuum appliance. This may help to direct the airflow away from user in use.

The longitudinal axis extends from the front end to the rear end of the vacuum appliance and is coaxial with an axis of rotation of the airflow generator.

In use, the airflow generator may be configured to generate the airflow at a rate of at least 15 L/s. This may increase vacuum performance of the vacuum appliance compared to a lower flow rate. The airflow generator may be configured to generate airflow at a rate of at least 20 L/s.

The vacuum appliance may be a handheld appliance. In handheld vacuum appliances, the size, shape and weight of the appliance is of particular importance to provide an ergonomic appliance.

According to a second aspect of the present invention, there is provided vacuum appliance comprising: a housing with a first end and a second end generally opposite the first end, an inlet at or near the first end and an outlet closer to the second end than the inlet; an airflow generator within the housing, the airflow generator having an air inlet and an air outlet, the air outlet closer to the first end of the housing than the air inlet; and a diffuser coupled to the air outlet and positioned closer to the first end of the housing than the outlet of the housing, the housing, airflow generator and diffuser defining an airflow path from the inlet of the housing, around an outside of the airflow generator, reversing flow direction for a first time into the airflow generator, through the diffuser and out of the outlet, the flow direction reversing for a second time between the outlet of the airflow generator and the outlet of the housing.

The vacuum appliance provides a relatively long airflow path compared to a length of the housing, which may help to reduce acoustic emissions of the vacuum appliance in use.

A diffuser is typically larger in diameter than an airflow generator. The arrangement of the vacuum appliance may therefore help to allow a reduction of an overall diameter of the vacuum appliance at the rear end of product, compared to a typical vacuum appliance in which the diffuser is closer to the rear end of the vacuum appliance than the airflow generator. In turn, this may provide a more ergonomic appliance.

The vacuum appliance may comprise a filter assembly comprising a first filter between the inlet and the air inlet, wherein the first filter is positioned on the airflow path where the flow direction reverses for the first time. This may provide a relatively space-efficient arrangement.

The filter assembly may comprise a second filter between the air outlet and the outlet and closer to the first end than the first filter, wherein the second filter is positioned on the airflow path downstream of where the flow direction reverses for the second time. This may provide a relatively space-efficient arrangement.

The second filter may be annular, may surround at least part of the airflow generator, and may have a smaller inner diameter than an outer diameter of the diffuser. This may permit use of a relatively large diffuser compared to a diameter of the second filter.

The vacuum appliance may be a handheld appliance. In handheld vacuum appliances, the size, shape and weight of the appliance is of particular importance to provide an ergonomic appliance.

Optional features of aspects of the present invention may be equally applied to other aspects of the present invention, where appropriate.

Brief Description of the Drawings

Figure 1 is a perspective view of a handheld vacuum appliance according to an example, with a filter assembly assembled in place;

Figure 2 is a perspective view of the handheld vacuum appliance of Figure 1 during removal and reinstallation of the filter assembly;

Figure 3 is a schematic slice side view of a main body of the handheld vacuum appliance of Figure 1, with the filter assembly installed;

Figure 4 is a schematic slice plan view of the main body of the handheld vacuum appliance of Figure 1, with the filter assembly installed; and

Figure 5 is a schematic slice forward-facing view of the main body of the handheld vacuum appliance of Figure 1, with the filter assembly installed.

Detailed Description of the Invention

Figures 1 to 5 show different views of a handheld vacuum appliance 1 according to an example. The vacuum appliance 1 has a primary inlet 10 through which air is drawn into the vacuum appliance 1, a dirt separator 12, a handle in the form of a pistol grip 14, a power source in the form of a battery pack 16, and a main body 100 which comprises a motor assembly 110 (visible in Figures 3 to 5) and a filter assembly 130.

In use of the vacuum appliance 1, an electric motor 112, which is housed within the main body 100 and powered by the battery pack 16, generates an airflow that

draws dirt-laden air into the vacuum appliance 1 via the primary inlet 10. The airflow passes into the dirt separator 12 where dirt is separated from the airflow. The airflow is then drawn into the main body 100 via a main body inlet 102, and passes through the motor assembly 110 and the filter assembly 130, as will be described in more detail herein. Cleaned air is then expelled from the vacuum appliance 1 through a main body outlet 104. Figure 5 is a slice taken through the main body outlet 104, looking towards a front end 2 of the vacuum appliance 1.

The vacuum appliance 1, and more particularly in this example, the main body 100, dirt separator 12 and the motor assembly 110 in combination, define a longitudinal axis A of the vacuum appliance 1. The longitudinal axis A extends from the front end 2 of the vacuum appliance 1 to a rear end 3 opposite the front end 2. The primary inlet 10 is positioned at the front end 2 of the vacuum appliance 1, and the main body 100 is positioned behind the dirt separator 12, towards the rear end 3 of the vacuum appliance 1. Figures 3 and 4 are slices taken along the longitudinal axis A.

The motor assembly 110, also known as a motor bucket, is housed in an outer housing 106 of the main body 100. The motor assembly 110 comprises the motor 112 and an impeller 114, which together form an airflow generator, and a diffuser 116. The airflow generator has an air inlet 118 at an intake of the motor 112, and an air outlet 120 at an output of the impeller 114. The airflow generator is oriented within the motor assembly 110 along the longitudinal axis A such that the impeller 114 rotates about the longitudinal axis A, and with the air inlet 118 closer to the rear end 3 of the vacuum appliance than the air outlet 120.

The impeller 114 is a radial impeller and the air outlet 120 is an annular outlet. A radial impeller may provide a relatively wide range of peak motor operating parameters compared to a mixed-flow impeller, which has a relatively narrow peak operating efficiency range. This may be beneficial because the vacuum

appliance 1 is operable in different modes corresponding to different operating speeds of the motor 112 and impeller 114.

The diffuser 116 comprises a radial channel 122 coupled to, and extending radially outward from, the air outlet 120, and an outlet duct 123 which is contiguous with the radial channel 122 and opens towards the rear end 3 of the vacuum appliance 1. In this example, the diffuser 116 does not comprise vanes, or blades, that extend into the radial channel 122. This may provide a more efficient diffuser 116 than one that does comprise blades or vanes due to the diffuser 116 generating less skin friction in use. The diffuser is positioned closer to the front end 2 of the vacuum appliance 1, along the longitudinal axis A, than the motor 112.

The motor assembly 110 comprises a motor assembly housing 124, which has a generally cylindrical outer shape, as best shown in Figure 2. A forward portion 124a of the motor assembly housing 124 has a first diameter, and a rearward portion 124b of the motor assembly housing 124 has a second diameter, which is smaller than the first diameter. The forward portion 124a accommodates the diffuser 116. The rearward portion 124b accommodates the motor 112.

The motor assembly housing 124 defines a motor assembly inlet 126, which in this example comprises a plurality of apertures (not shown) disposed around the circumference and towards a rear end of the rearward portion 124b of the motor assembly housing 124. The motor assembly housing 124 also defines a motor assembly outlet 128, which in this example is a downstream annular opening of the outlet duct 23 of the diffuser 116. A rear wall 125 of the motor assembly housing 124 supports a user interface 108 and associated electronics, such as a PCB. The user interface 108 and associated electronics are powered by the battery pack 16. The user interface 108 comprises a screen configured to display information relating to the vacuum appliance 1, for example a mode of operation that the vacuum appliance 1 is operating in and power remaining in the battery

pack 16, and buttons that a user may press to cause the vacuum appliance 1 to operate in a desired mode of operation.

The main body 100 has an outer housing 106, which is generally annular. The main body 100 defines an annular void 109 between the motor assembly housing 124 and the outer housing 106.

The outer housing 106 defines a main body inlet 102, which is in fluid communication with the dirt separator 12, and the main body outlet 104, which in this example comprises two clusters of apertures on opposing sides of the outer housing 106, as best shown in Figures 1, 2 and 5.

The main body inlet 102 is positioned at a forward-most point of the main body 100 along the longitudinal axis, and in this example is generally shaped as an annular sector. An inner diameter of the main body inlet 102 is greater than the first diameter of the forward portion 124a of the motor assembly housing 124. The main body outlet 104 is closer to the rear end 3 of the vacuum appliance 1 than the main body inlet 102 and the forward portion 124a of the motor assembly 110. Ducts 107, of which there are three in this example, as best shown in Figure 5, extend from the main body inlet 102 towards the rear end 3 of the vacuum appliance 1. The ducts 107 extend along an inner surface of the outer housing 106 and pass by opposing sides of the two clusters of apertures that form the main body outlet 104.

The main body 100 also comprises a filter assembly 130, which can be removed from and reinstalled on the main body 100, as best shown in Figure 2. This permits filters of the filter assembly 130 to be cleaned, regenerated and/or replaced by a user, to maintain filtration efficiency and thus the performance of the vacuum cleaner 10. To remove and reinstall the filter assembly 130, the filter is caused to slide relative to the motor assembly 110 and the outer housing 106, in a direction parallel to the longitudinal axis A. With the filter assembly 130

installed on the main body 100, the filter assembly 130 is positioned at the rear end 3 of the vacuum appliance 1.

The filter assembly 130 is generally annular, and, when installed on the main body 100, surrounds the motor assembly housing 124. The filter assembly 130 comprises a filter housing 132, to which are fixed two annular filters: a pre-motor filter 134, and a post-motor filter 136. The annular filters 134, 136 are arranged co-axially and axially adjacent to each another. The filters 134, 136 do not axially overlap. With the filter assembly 130 installed on the main body 100, the annular filters 134, 136 are coaxial with the longitudinal axis A, and the post-motor filter 136 is closer to the front end 2 of the vacuum appliance than the pre-motor filter 134.

The filter housing 132 also comprises an annular seal 138 positioned generally between the pre-motor filter 134 and the post-motor filter 136, inside the filter assembly 130. The annular seal 138 acts to seal with the motor assembly housing 124 when the filter assembly 130 is installed on the main body 100.

The pre-motor filter 134 can be formed of any suitable filter material, or combination of materials, typically found in pre-motor filters. In this case the pre-motor filter 134 comprises layers of filter media including a layer of scrim or web material, a non-woven filter medium such as fleece, followed by a further layer of scrim or web material. An electrostatic filter medium could also be included if desired. The post-motor filter 136 can similarly be formed of any suitable filter material, or combination of materials, typically found in post-motor filters. In the present case, the post-motor filter 136 is formed of a pleated HEPA-standard (high efficiency particulate air) filter medium.

The filter housing 132 consists of two identifiably distinct areas, a front portion and a rear portion. When installed on the main body 100, the front portion is closer to the front end 2 of the vacuum appliance 1 than the rear portion.

The rear portion of the filter housing 132 has an end casing 140 which supports the pre-motor filter 134. With the filter assembly 130 installed on the main body 100, the end casing 140 forms part of an outer surface of the main body 100. In this example, the end casing 140 has the same outer diameter as the main body housing 106 and abuts and seals with a rear end of the housing 106.

The pre-motor filter 134 is fixed in the end casing 140 around a frame 142, and in a position such that, when the filter assembly 100 is installed on the main body 100, an annular cavity 148 is defined between the pre-motor filter 134 and the main body housing 106 of the main body 100. This annular cavity 148 is fluid communication with the ducts 107.

The frame 142 extends to the front portion of the filter housing 132. The post-motor filter 136 is positioned around the frame 142. The frame 142 acts to support the post-motor filter 136 such that it maintains its annular shape when the filter assembly 130 is in use.

With the filter assembly 130 installed on the main body 100, the front portion is received in the void 109 between the motor assembly 110 and the outer housing 106. The front portion of the filter housing 132 has an inner diameter that is greater than the second diameter of the rearward portion 124b of the motor assembly housing 124, but smaller than the first diameter of the forward portion 124a of the motor assembly housing 124. Accordingly, the front portion of the filter assembly 130 axially overlaps the rearward portion 124b of the motor assembly housing 124, but does not axially overlap the forward portion 124a of the motor assembly housing 124. With the filter assembly 130 installed on the main body 100: the main body outlet 104 axially overlaps, and is in fluid communication with, the post-motor filter 136; the post-motor filter 136 is in fluid communication with motor assembly outlet 128; and the main body outlet 104 is closer to the front end 2 than the rear portion of the filter assembly 130.

In use of the vacuum appliance 1, with the filter assembly 130 installed on the main body 100, the airflow generator generates an airflow, which draws airflow, typically dirt-laden airflow, into the vacuum appliance 1 via the primary inlet 10. The airflow is drawn through the dirt separator 12, where dirt is separated from the airflow, and passes into the main body 100 via the main body inlet 102.

The airflow then travels in a rearward direction of the vacuum appliance 1 along the ducts 107 and into the filter assembly. The airflow then travels to a generally inward radial direction, relative to the longitudinal axis A, and passes through the pre-motor filter 134, where particulates are filtered from the airflow. The airflow then travels in a generally forward direction of the vacuum appliance 1, and passes into the motor assembly 110, via the motor assembly inlet 126, over the motor 112 (to cool the motor 112), and then through the impeller 114, which turns the airflow to a generally outward radial direction, relative to the longitudinal axis A. The airflow then passes through the radial channel 122 of the diffuser 116 in a generally outward radial direction and is turned in a generally rearward direction in the outlet duct 123. The airflow then travels in a generally rearward and inward radial direction as the airflow passes through the motor assembly outlet 128 towards the post-motor filter 136. The airflow then travels in a generally outward radial direction, relative to the longitudinal axis A, to pass through the post-motor filter 136, where more particulates are filtered from the airflow. The airflow then passes around the circumference of the rearward portion 124b of the motor assembly housing 124 and/or in a radially outward direction, relative to the longitudinal axis A, from the post-motor filter 136 towards the main body outlet 104, via the void 109. Finally, cleaned airflow exits the vacuum appliance 1 via the main body outlet 104 in a generally outward radial direction.

The general airflow path, from the main body inlet 102 to the main body outlet 104, is denoted by arrows, diamonds and dots B in Figures 3 to 5. The dots indicate that the airflow is travelling into or out of the page. For example, the dot

at the end of the line B in Figure 3, indicates that the airflow travels circumferentially around the void 109 between the post-motor filter 136 and the main body outlet 104, as better shown in Figure 5. The dashed part of arrow B in Figure 4 denotes that the airflow passes circumferentially around the main body outlet 104, as better shown in Figure 5. The diamonds B in Figure 5 denote that the airflow is travelling out of the page, in a rearward direction, through the ducts 107 and around the rearward portion of the motor assembly housing 124b. The dots B in Figure 5 denote that the airflow is travelling into the page, in a forward direction, around the motor 112.

By orienting the motor 112 such that the air inlet 118 is closer to the rear end 3 of the vacuum appliance 1 than the air outlet 120, the airflow path B is longer than for a vacuum appliance of a similar size, but with the motor mounted in the opposite direction. A longer airflow path B may help to reduce noise output during use of the vacuum appliance 1.

By orienting the motor 112 such that the air inlet 118 is closer to the rear end 3 of the vacuum appliance 1 than the air outlet 120, the diffuser 116 can be positioned within the main body 100 such that the filter assembly 130 does not axially overlap the diffuser 116. This permits the diffuser to have a greater diameter than the inner diameter of the front portion of the filter assembly 130 because the filter assembly 130 does not axially pass the diffuser 116 during removal from and reinstallation on the main body 100. A larger diffuser 116 is generally associated with increased recovered air pressure, motor power and air watts, and thus increased performance by the vacuum appliance 1.

Although described herein as a handheld vacuum appliance, embodiments are also envisaged in which the vacuum appliance is not handheld. Although described herein as being battery-powered, the vacuum appliance may be, additionally or alternatively, mains powered.

Claims

1. A vacuum appliance having a front end and a rear end opposite the front end, the vacuum appliance having a main body comprising:

an air inlet;

an air outlet;

an airflow generator to generate an airflow from the air inlet to the air outlet; and

a diffuser between the airflow generator and the air outlet, wherein at least a portion of the diffuser is closer to the front end than the airflow generator,

wherein, in use, the airflow travels through the air inlet in a rearward direction, through the airflow generator in a forward direction, then through the diffuser, and in a rearward direction downstream of the diffuser, the forward and rearward directions being relative to the front and rear ends of the vacuum appliance.

2. The vacuum cleaner of claim 1, wherein, in use, a direction of the airflow downstream of the diffuser is more than 180 degrees from a direction of the airflow as the airflow passes through the airflow generator.

3. The vacuum appliance of any preceding claim, wherein the airflow generator comprises an impeller, and the diffuser comprises:

a radial channel extending radially outward from the impeller, and

an outlet duct contiguous with the radial channel and configured to emit airflow from the diffuser in a rearward direction.

4. The vacuum appliance of any preceding claim, comprising an annular filter assembly, the annular filter assembly being selectively attachable to, and removable from, the rear end of the vacuum appliance by sliding the annular filter assembly along a longitudinal axis of the vacuum cleaner relative to the airflow generator, wherein the annular filter assembly comprises a front annular portion

configured to surround the airflow generator when the annular filter assembly is attached to the vacuum appliance.

5. The vacuum appliance of claim 4, wherein, when the annular filter assembly is attached to the vacuum appliance, the diffuser is closer to the front end of the vacuum appliance than a frontmost face of the filter assembly, the frontmost face being relative to the front end of the vacuum appliance.

6. The vacuum appliance of claim 4 or claim 5, wherein an inner diameter of the front portion of the filter assembly is smaller than an outer diameter of the diffuser.

7. The vacuum appliance of any of claims 4 to 6, wherein the filter assembly comprises a first filter upstream of the airflow generator and a second filter downstream of the airflow generator and the diffuser, the first filter closer to the rear end of the vacuum appliance than the second filter when the annular filter assembly is attached to the vacuum appliance.

8. The vacuum appliance of claim 7, wherein the air outlet is closer to the front end of the vacuum appliance than the first filter when the annular filter assembly is attached to the vacuum appliance.

9. The vacuum appliance of claim 7 or claim 8, wherein, in use, the airflow travels in a rearward direction directly upstream of the first filter and in a forward direction directly downstream of the first filter.

10. The vacuum appliance of any preceding claim, wherein, in use, the airflow is emitted from the air outlet in a radial direction, the radial direction relative to a longitudinal axis of the vacuum appliance.

11. The vacuum appliance of any preceding claim, wherein, in use, the airflow generator is configured to generate the airflow at a rate of at least 15 L/s.

12. A vacuum appliance comprising:

a housing with a first end and a second end generally opposite the first end, an inlet at or near the first end and an outlet closer to the second end than the inlet;

an airflow generator within the housing, the airflow generator having an air inlet and an air outlet, the air outlet closer to the first end of the housing than the air inlet; and

a diffuser coupled to the air outlet and positioned closer to the first end of the housing than the outlet of the housing,

the housing, airflow generator and diffuser defining an airflow path from the inlet of the housing, around an outside of the airflow generator, reversing flow direction for a first time into the airflow generator, through the diffuser and out of the outlet, the flow direction reversing for a second time between the outlet of the airflow generator and the outlet of the housing.

13. The vacuum appliance of claim 12, comprising a filter assembly comprising a first filter between the inlet and the air inlet, wherein the first filter is positioned on the airflow path where the flow direction reverses for the first time.

14. The vacuum appliance of claim 13, wherein the filter assembly comprises a second filter between the air outlet and the outlet and closer to the first end than the first filter, wherein the second filter is positioned on the airflow path downstream of where the flow direction reverses for the second time.

15. The vacuum appliance of claim 14, wherein the second filter is annular, surrounds at least part of the airflow generator, and has a smaller inner diameter than an outer diameter of the diffuser.

Intellectual Property Office

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Claims searched:	1-11	**Date of search:**	25 October 2023

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	EP 3795053 A1 (LG)
A	-	JP 2020112144 A (HITACHI)
A	-	JP 2000245668 A (TOSHIBA)
A	-	KR 101606890 B1 (SAMSUNG)

Categories:

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Field of Search:

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Worldwide search of patent documents classified in the following areas of the IPC

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The following online and other databases have been used in the preparation of this search report

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International Classification:

Subclass	Subgroup	Valid From
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