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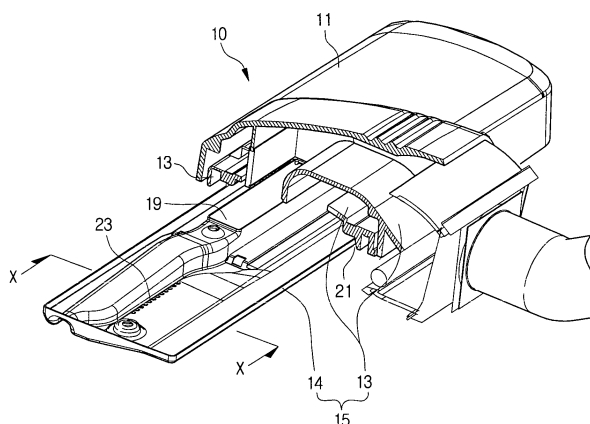
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(54) **Suction brush for a vacuum cleaner**

(57) A suction brush (10) for a vacuum cleaner including a body (15), the bottom side of which is formed with a suction port; a cover (11) for covering the top side

of the body (15); and an air jetting path (B) for absorbing ambient air from the bottom side of the body (15) and jetting the air toward a surface to be cleaned, to space the bottom side from the surface to be cleaned.

FIG. 2



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application No. 2005-93114 filed on October 4, 2005 with the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference

FIELD OF THE INVENTION

[0002] The present invention relates to a suction brush for a vacuum cleaner, and more particularly to a suction brush having improved manipulation capability.

BACKGROUND OF THE INVENTION

[0003] In general, a conventional suction brush for a vacuum cleaner has a suction port formed in the bottom thereof, to suction dust or dirt from a surface to be cleaned, and one or more dust guide grooves for guiding dust to the suction port. As seen in FIG. 1, the suction brush via a suction motor (not shown) absorbs dust together with ambient air through opposite ends 5a and 5b of a dust guide groove 5 when the bottom surface of the body 1 of the suction brush is in close contact with carpet. The dust and air introduced into the dust guide groove 5 is suctioned into the vacuum cleaner through the suction port 7. Then, the dust is collected in a dust collection section (not shown), and the air is filtered and discharged to the outside of the vacuum cleaner.

[0004] The performance of a conventional suction brush is generally based on dust removal capability (suction force) and manipulation capability (push force) for smoothly moving the suction brush on a carpet. If the suction brush is in close contact with the carpet, the dust removal capability is enhanced. However, if the suction brush is in close contact with the carpet, the manipulation capability for moving the suction brush is considerably deteriorated. Therefore, the suction force and the push force are contrary to each other. Accordingly, there is a need for designing a suction brush so that both the suction force and push force are simultaneously optimized.

[0005] When cleaning a carpet using a conventional suction brush, as shown in FIG. 1, the opposite ends 5a and 5b of the dust guide groove 5 and the suction port 7 are in close contact with the carpet due to the suction force. As a result, when a user moves the suction brush 1 in any direction on the carpet the suction force serves as a resistance force against the movement of the suction brush 1.

[0006] In order to overcome the above-mentioned problem, a pair of wheels 9a and 9b may be provided at the opposite sides of the rear part of the body 2 of the suction brush 1, as shown in FIG. 1. However, when cleaning a bristly area, a carpet or bedding, the dust guide groove 5 and the suction port 7 are still in close contact with the surface being cleaned, thereby still having the

same inconvenience- to the user.

[0007] In order to solve the above-mentioned inconvenience, Korean Patent Registration Nos. 244348 and 133742 disclose a suction brush having an air suction structure which allows ambient air to be introduced between the bottom surface of the suction brush and a surface to be cleaned through a part of the bottom surface of the suction brush so as to weaken the vacuum pressure generated between the bottom surface of the suction brush and the surface being cleaned.

[0008] With this suction brush, it is the manipulation capability of the suction brush may be improved by weakening the vacuum pressure, but only if the surface being cleaned is a hard floor. If the surface being cleaned is bristly or soft like a carpet or bedding, the surface being cleaned is in contact with the suction brush by the air suction structure. Accordingly, the manipulation capability is deteriorated as the contacting force between the surface being cleaned and the suction brush is increased.

[0009] Korean Patent Publication No. 2000-7490 discloses a suction brush, which is exclusively used for bedding. When suction force is generated, a suction brush rapidly absorbs ambient air through plural air suction openings formed on the top of the suction brush and blows the air out to the surface being cleaned, that is, the surface of the bedding, thereby facilitating the removal of various foreign matters. With this suction brush, however, because the air suction openings are exposed to the outside, noise is generated around the air suction openings as the ambient air is rapidly suctioned into the air suction openings. Because the suction brush and the surface being cleaned (the surface of bedding) are still in close contact with each other, the manipulation capability of the suction brush is not improved.

SUMMARY OF THE INVENTION

[0010] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is to provide a suction brush of a vacuum cleaner, which is improved in manipulation capability when the suction brush is in contact with a surface to be cleaned.

[0011] Another object of the present invention is to provide a suction brush of a vacuum cleaner which can reduce a noise.

[0012] In order to achieve the above-mentioned objects, there is provided a suction brush for a vacuum cleaner comprising a body, the bottom side of which is formed with a suction port; a cover for covering the top side of the body; and an air jetting path for absorbing ambient air from the bottom side of the body and jetting the air toward a surface to space the bottom side from the surface to be cleaned.

[0013] The body may comprise a bottom panel having a dust guide groove formed in the bottom surface thereof so as to guide dust-laden air from the front and lateral sides of the body to the suction port, and a top panel

interposed between the bottom panel and the cover, wherein it is preferable that the top and bottom panels are spaced from each other at the rear side thereof, thereby forming an air suction gap for introducing air from the lower side of the suction, and that the bottom panel may have a plural jetting holes formed along the portions of the dust guide groove.

[0014] Because the air jetting path may comprise an air suction gap, a space formed between the top and bottom panels, and plural jetting holes for discharging the air to the surface to be cleaned, it is possible to improve the manipulation capability of the suction brush as the distance between the dust guide groove and the surface to be cleaned is increased by the air jetted from the air jetting path.

[0015] In addition, because the air suction gap is located at a position higher than that of the bottom side of the bottom panel, ambient air can be smoothly introduced into the air suction gap. Furthermore, because the air to be jetted through the jetting holes is absorbed from the bottom side of the body, which is not exposed to the outside, it is possible to minimize the noise generated when absorbing the air.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The above aspects and features of the present invention will be more apparent from the description for certain embodiments of the present invention taken with reference to the accompanying drawings, in which:

[0017] FIG. 1 is a perspective view of a conventional suction brush of a vacuum cleaner;

[0018] FIG. 2 is a partially cut-away perspective view illustrating an internal construction of a suction brush of a vacuum cleaner according to an embodiment of the present invention;

[0019] FIG. 3 is a bottom plan view of the suction brush illustrated in FIG. 2;

[0020] FIG. 4A is an elevational view of the suction brush taken in section along line X-X of FIG. 2;

[0021] FIG. 4B is an enlarged view of Y illustrated in FIG. 4A;

[0022] FIG. 5A is a graph comparing an embodiment of the present invention and a conventional suction brush, in terms of suction force which indicates dust removal capability; and

[0023] FIG. 5B is a graph comparing the embodiment of the present invention and the conventional suction brush in terms of push force.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] Hereinbelow, certain embodiments of the present invention are described in detail with reference to accompanying drawings. In the following description, a detailed description of known functions and configurations incorporated herein will be omitted when it may

make the subject matter of the present invention rather unclear.

[0025] FIG. 2 is a partially cut-away perspective view illustrating an internal construction of a suction brush of a vacuum cleaner according to an embodiment of the present invention, FIG. 3 is a bottom view of the suction brush of FIG. 2, FIG. 4A is a cross-sectional view taken along line X-X of FIG. 2, and FIG. 4B is an enlarged view of Y illustrated in FIG. 4A.

[0026] As shown in FIG. 2, the suction brush 10 of a vacuum cleaner according to an embodiment of the present invention has a body 15 which comprises a bottom panel 14 which contacts the surface to be cleaned, a top panel 13 located on the top of the bottom panel 14.

[0027] As shown in FIG. 3, the bottom panel 14 is formed with a dust guide groove 17 on the bottom side thereof for absorbing dust-laden air from a surface to be cleaned through the opposite lateral portions 17a, and a suction port 19 is formed through the bottom panel 14 at the center of the dust guide groove 17.

The top panel 13 is wider than the bottom panel 14 in the direction of advancing the vacuum cleaner, so that the rear portions of the top and bottom panels 13 and 14 are spaced from each other. Consequently, an air suction gap 21 (FIG. 1) is formed between the rear portions of the top and bottom panels 13 and 14. The air suction gap 21 is an inflow opening, from which an air jetting path is originated. In addition, the bottom panel 14 has a plurality of jetting holes 23 (FIG. 2) formed and arranged along left and right portions of the rear edge 17b of the dust guide groove 17.

[0028] There is no limitation to the shape and diameter of the jetting holes 23, the space between adjacent jetting holes 23, or the arranged distance of the jetting holes 23, as long as air is jetted to the surface to be cleaned through the plural jetting holes 23, so that a certain gap can be produced between the surface to be cleaned and the bottom panel 14 through the jetting pressure. In order to increase the jetting velocity of air, it is preferable to arrange a plurality of small-sized holes as the jetting holes 23.

[0029] An air jetting path B (FIGS. 4A and 4B) for absorbing and jetting air to the surface to be cleaned originates from the air suction gap 21, which is an ambient air inflow opening, and consists of a space 22 formed between the top and bottom panels 13 and 14, to guide the ambient air introduced through the air suction gap 21 toward the jetting holes 23, allowing the jetting holes 23 to discharge the air that passed through the space 22. That is, the air flows through the air jetting path B which originates from the air suction gap 21, and connects to the space 22 and the jetting holes 23.

[0030] The operation of the suction brush of a vacuum cleaner with the above-mentioned construction is now described with reference to FIGS. 4A and 4B.

[0031] Initially, the vacuum cleaner is powered on to operate a vacuum motor, and vacuum pressure is transferred to the suction brush 10. Then, a user applies the

suction brush 10 in close contact with a surface to be cleaned, e.g., a carpet. Between the carpet and the bottom side of the suction brush 10, a predetermined level of vacuum pressure is produced.

[0032] Consequently, dust scattered on the carpet and air is absorbed into the suction brush 10 along the air suction path A. That is, dust-laden air is drawn in by suction into the opposite side portions 17a of the dust guide groove 17, guided to the center of the dust guide groove 17, then introduced into the suction port 19. Next, the dust, that has passed through the suction port 19, travels toward the rear side of the suction brush 10 through the space between the cover 11 and the top panel 13. In the rear part of the bottom side of the suction brush 10, ambient air is introduced into the body 15 through the air jetting path B and then jetted to the carpet. That is, as shown in FIGS. 4A and 4B, the air introduced through the air suction gap 21 passes the space 22 between the top and bottom panels 13 and 14, and then is jetted to the surface to be cleaned with a predetermined level of pressure through the plural jetting holes 23. In this case, a part of the air jetted to the surface to be cleaned is introduced into the dust guide groove 17 and moved along the air suction path A. The remaining air is jetted to the surface to be cleaned.

[0033] At this time, the suction brush 10 is somewhat floated by the air jetted through the jetting holes 10 and therefore, thereby spacing the suction brush 10 and the carpet from each other, to form a gap between them. As a result, the contacting force between the suction brush 10 and the carpet is reduced and accordingly, the user can easily pull or push the suction brush 10 during the cleaning. In addition, because the air being introduced through the air jetting path B is introduced and discharged through the bottom side of the body, the noise generated at the air jetting path B is insignificant to the user.

[0034] FIG. 5A is a graph comparing an embodiment of the present invention and a conventional suction brush in terms of suction force which indicates dust removal capability, and FIG. 5B is a graph comparing the embodiment of the present invention and the conventional suction brush in terms of push force. Referring to FIG. 5A, even if plural suction openings are formed, there is no substantial change in suction efficiency. However, referring to FIG. 5B, it can be confirmed that the force required for a user to move the suction brush (push force) is substantially reduced.

[0035] Noise is generated around the air suction gap 21 as the air is absorbed. However, according to the embodiment of the present invention, it is possible to reduce the noise as compared to the prior art, because the suction brush 10 absorbs the air through the air suction gap 21, which is formed in the bottom side of the suction brush 10. Thus, because air is not suctioned through exposed portions, such as the top or lateral sides of the suction brush, the noise is significantly reduced.

[0036] As described above, according to the present invention, there is an advantage in that it is possible to

improve the manipulation capability of suction brush 10 by forming a gap 21 between the dust guide groove 17 and a surface to be cleaned using the air jetted from the air jetting path B so that the contacting force between the suction brush 10 and the surface to be cleaned is reduced. In addition, because the air to be jetted through the jetting holes 23 is absorbed from the bottom side of the body of the suction brush, which is not exposed to the outside, it is possible to reduce the noise generated when the air is absorbed.

[0037] Although representative embodiments of the present invention have been shown and described in order to exemplify the principle of the present invention, the present invention is not limited to the specific embodiments. It will be understood that various modifications and changes can be made by one skilled in the art without departing from the spirit and scope of the invention as defined by the appended claims. Therefore, it shall be considered that such modifications, changes and equivalents thereof are all included within the scope of the present invention.

Claims

1. A suction brush for a vacuum cleaner comprising:
 - a body including a bottom side with a suction port disposed therein;
 - a cover for covering a top side of the body; and
 - an air jetting path configured to absorb ambient air from the bottom side of the body and jet the air toward a surface to be cleaned, to space the bottom side from the surface to be cleaned.
2. A suction brush as claimed in claim 1, wherein the body comprises an inflow opening formed remote from the suction port, and at least one jetting hole formed around the suction port, and the air is introduced into the air jetting path through the inflow opening and discharged through the at least one jetting hole.
3. A suction brush as claimed in any of claims 1 and 2, wherein the body is formed with a dust guide groove in the bottom side thereof to guide air from the front and lateral sides of the body to the suction port, and plural jetting holes are formed along the dust guide groove.
4. A suction brush as claimed in any of claims 2 and 3, wherein the body comprises a bottom panel having a dust guide groove to guide dust-laden air from the front and lateral sides of the body to the suction port, and a top panel interposed between the bottom panel and the cover, and wherein the top and bottom panels are spaced from each other, thereby forming an air suction gap for

introducing air from a lower side of the suction brush, and the bottom panel having plural jetting holes formed along side portions of the dust guide groove.

5. A suction brush as claimed in claim 4, wherein the air jetting path is an air path for discharging the air introduced through the air suction gap through the plural jetting holes via a space formed between the top and bottom panels. 5
6. A suction brush as claimed in claim 4, wherein the air suction gap is located at a position higher than that of the bottom side of the bottom panel. 10
7. A suction brush for a vacuum cleaner, comprising: 15
- a body, including:
- a suction port providing access to an air suction path, 20
- an inflow opening remote from the suction port,
- a plurality of jetting holes, and
- an air jetting path defined between the inflow opening and the plurality of jetting holes, whereby the air jetting path is separate from the air suction path. 25
8. A suction brush as claimed in claim 7, wherein air flowing through the air jetting path travels in a direction generally opposite to the air traveling in the air suction path. 30
9. A suction brush as claimed in any of claims 7 and 8, wherein the body includes a dust guide groove in a bottom side thereof to guide air from sides of the body to the suction port. 35
10. A suction brush as claimed in any of claims 7 to 9, wherein the body includes first and second panels, one of the first and second panels being wider than the other thereby defining an air suction gap therebetween. 40
11. A suction brush as claimed in claim 10, wherein the air jetting path discharges air introduced through the air suction gap through the jetting holes. 45

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FIG. 1

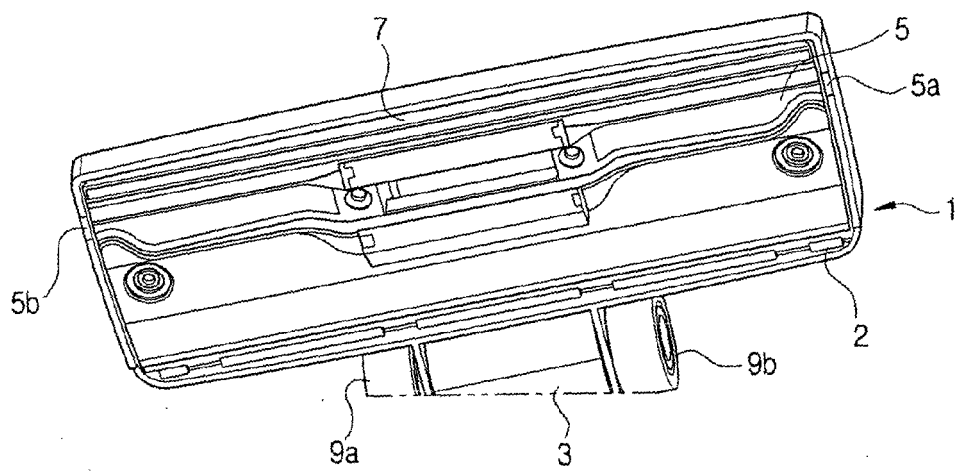


FIG. 2

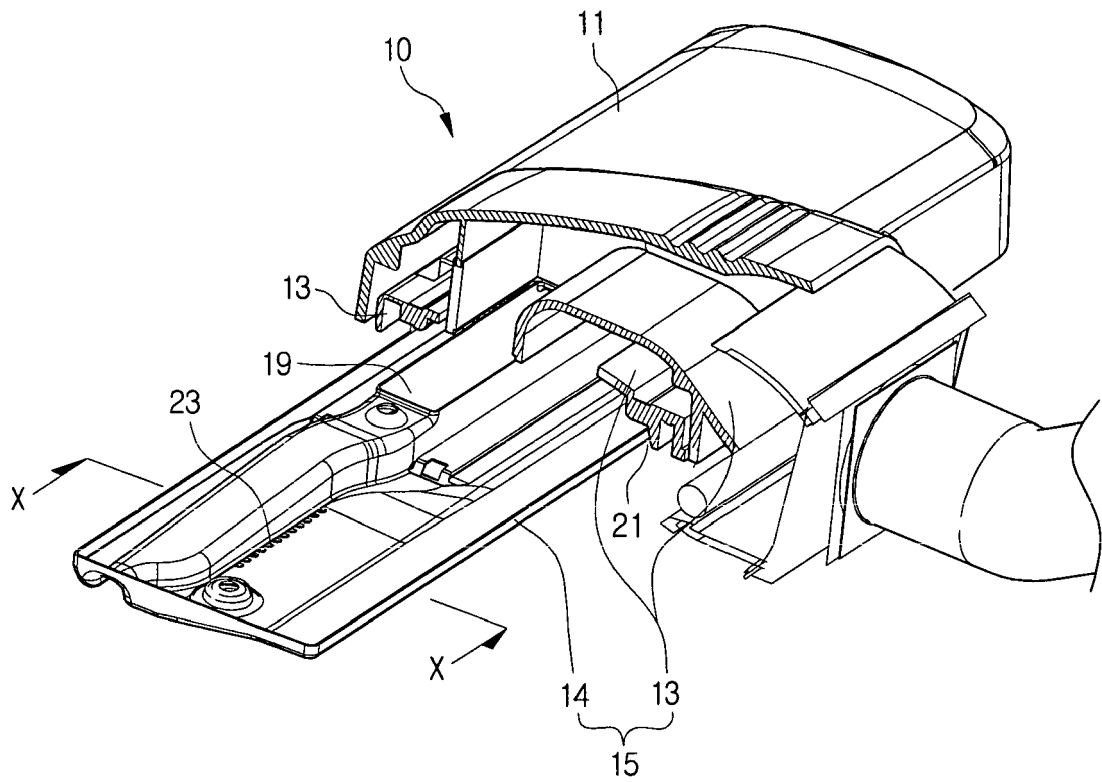


FIG. 3

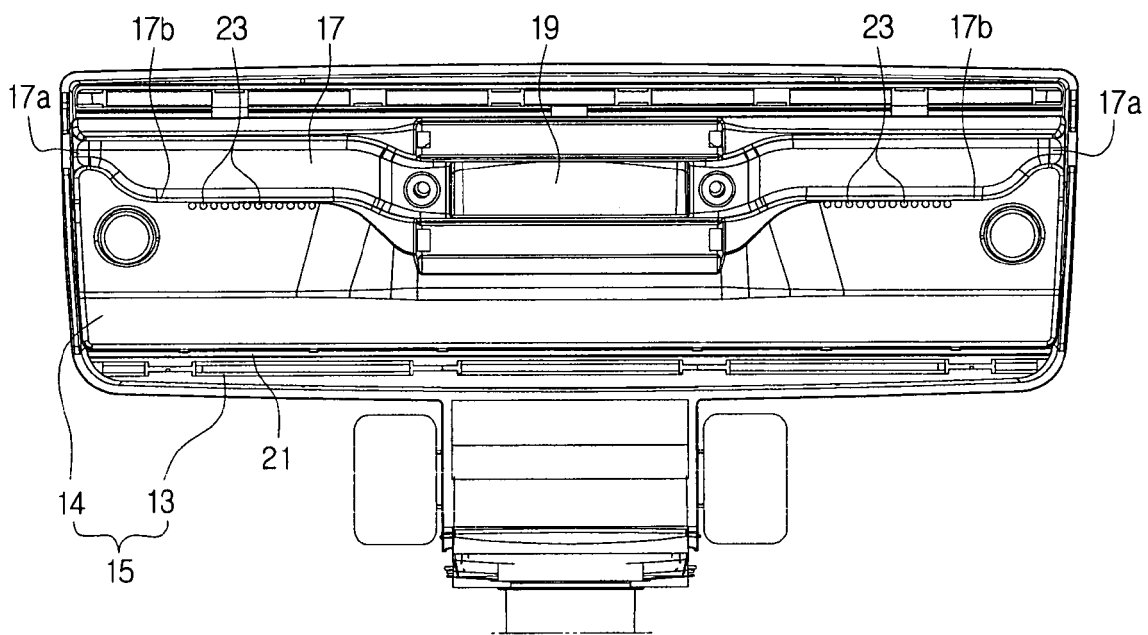


FIG. 4A

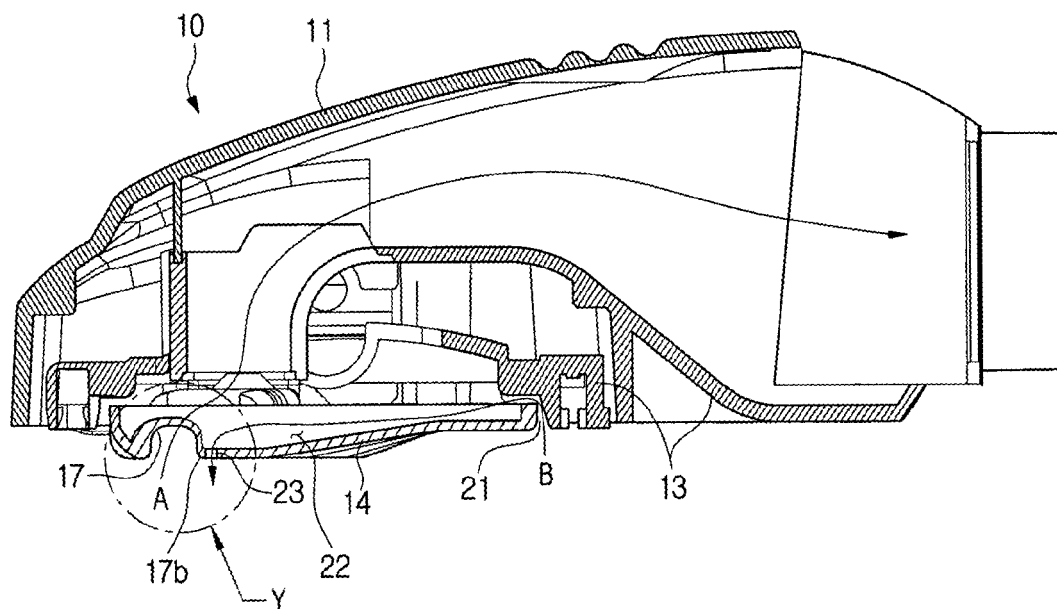


FIG. 4B

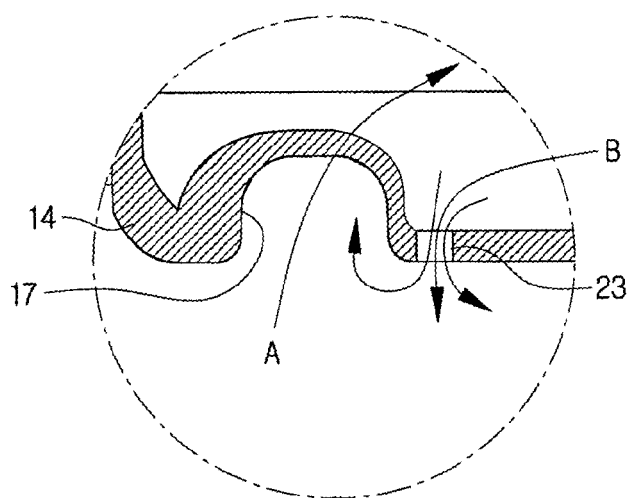


FIG. 5A

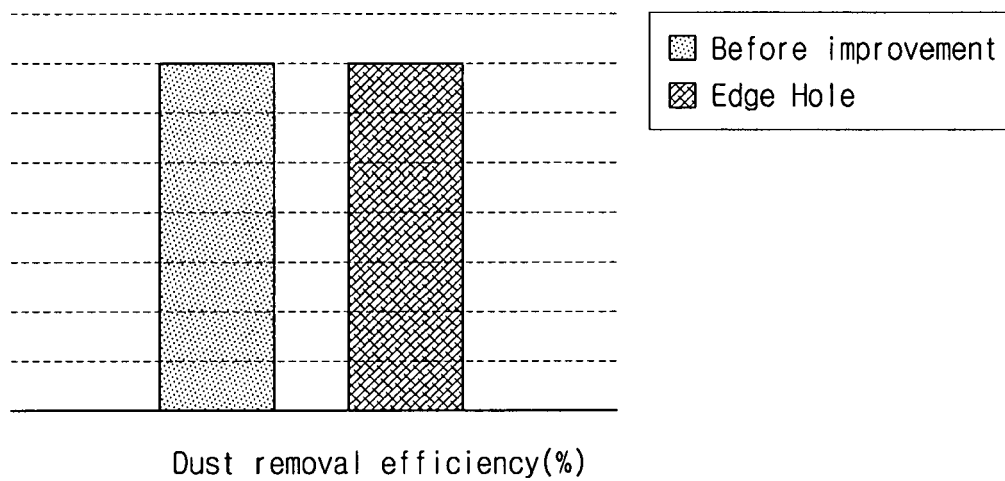
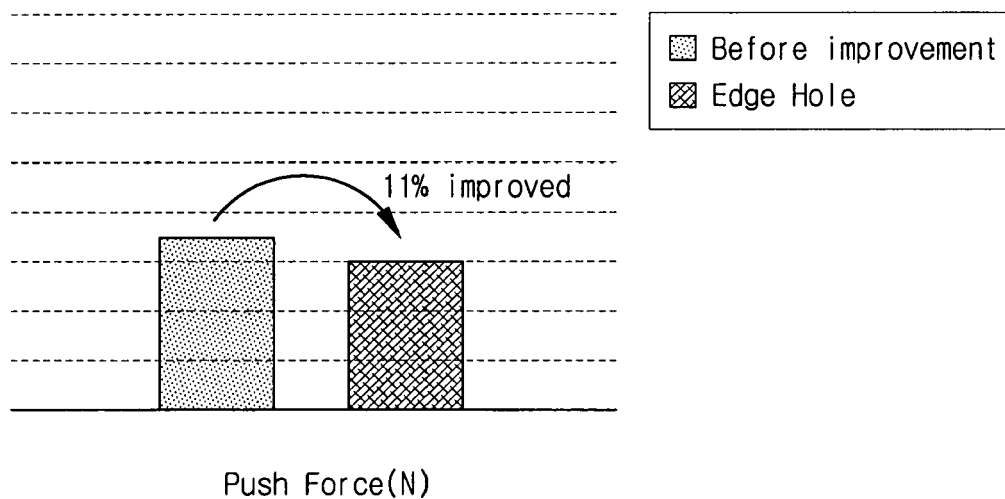


FIG. 5B



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 200593114 [0001]
- KR 244348 [0007]
- KR 133742 [0007]
- KR 20007490 [0009]