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(54) **NOZZLE FOR A VACUUM CLEANER AND VACUUM CLEANER COMPRISING A NOZZLE**

(57) A nozzle (1) for a vacuum cleaner is provided comprising an inlet part (3) comprising a suction opening (5) with a suction area and a first edge (7) arranged to pivot about a first axis (9), wherein the suction area is defined by at least the first edge (7), wherein the first edge (7) is arranged to pivot between a retracted position and a deployed position and is arranged to reduce the suction area of the suction opening (5) in the deployed position of the first edge (7). Further, a vacuum cleaner (29) comprising a nozzle (1) is provided.

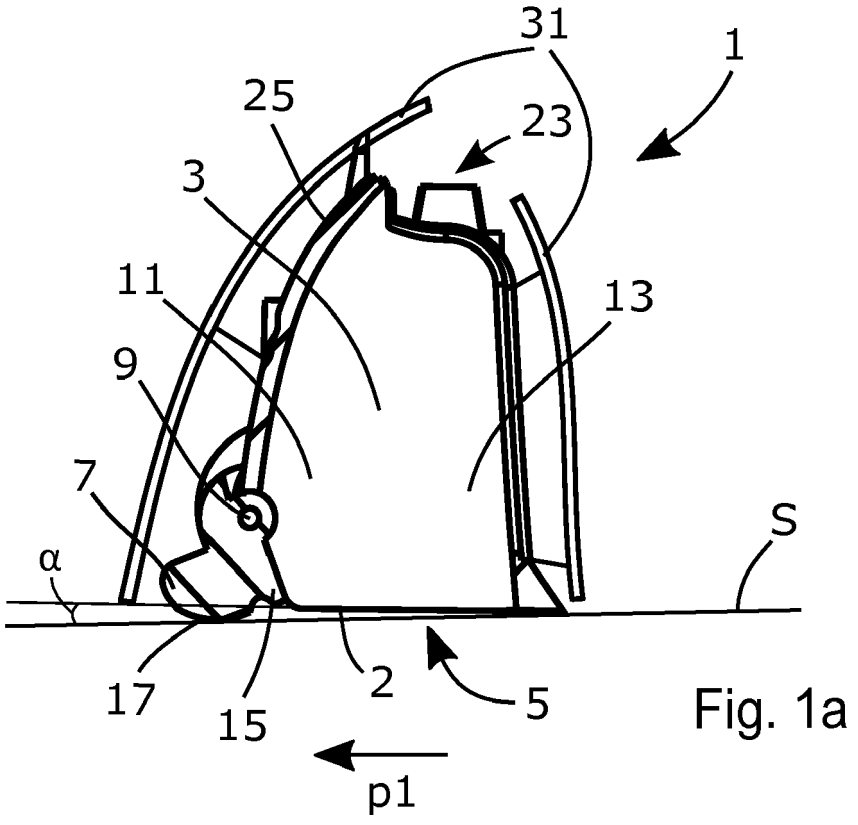

Fig. 1a

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of nozzles for vacuum cleaners. In particular, the present invention relates to nozzles comprising a pivotably arranged edge.

BACKGROUND

[0002] A vacuum cleaner is a device that uses a suction force generated by a fan or motor unit to create a particular vacuum or underpressure to suck up objects like dust, particles, fibres, hair etc. from surfaces such as e. g. floors and carpets. Typically, this is done by means of a vacuum cleaner nozzle that is connected via a nozzle outlet to an extension tube and/or suction hose to a dust compartment, in which dust can be separated from a dust laden air stream.

[0003] Efforts have been made to increase the performance, such as the dust pick up capacity, of the nozzles and to comply with energy efficiency requirements and energy labels and also to facilitate using of a vacuum cleaner. The dust pick up of a vacuum cleaner may e.g. be determined by the underpressure and the air flow at the nozzle. There is however a need for a balance between those parameters, since the underpressure is associated with motion resistance of the nozzle and the air flow associated with energy consumption of the motor unit.

[0004] In US20170231449, an example of a cleaner head for a vacuum cleaner is disclosed which comprises pivotally arranged edges adapted to pivot between a retracted and a deployed position.

[0005] Although known nozzles for vacuum cleaner, there is a need for improved vacuum cleaner nozzles that are more user friendly and more flexible with regard to various types of surfaces, motion resistance and/or dust pick up properties.

SUMMARY

[0006] To better address one or more of the above mentioned concerns, a nozzle for a vacuum cleaner having the features defined in the independent claim is provided. Preferable embodiments are defined in the dependent claims. Hence, according to a first aspect, a nozzle for a vacuum cleaner is provided.

[0007] During operation of the nozzle, i.e. during vacuuming of a surface of e.g. a flooring or a carpet, the nozzle may be pushed and pulled across the surface in a reciprocating movement in which an underside of e.g. a suction plate of the nozzle, i.e. a side or portion at which the suction opening of the nozzle may be located, may be arranged substantially horizontal or parallel to the surface.

[0008] The nozzle comprises an inlet part comprising a suction opening i.e. an inlet to the inlet part, with a suction area which is defined by at least a first edge. With other words, the suction area is limited by at least the first edge and also other edges that define the suction opening. Further, the first edge is arranged to pivot about a first axis, which means that the first edge may rotate around the first axis and by this to change an angle position of the first edge in relation to the suction plate. The first edge is arranged to pivot between a retracted position and a deployed position. The retracted position of the first edge implies that the first edge is arranged substantially parallel or substantially in the same plane as the suction plate. The deployed position of the first edge implies that the first edge has been rotated around the first axis from the retracted position in a direction from the suction plate towards the surface intended to be cleaned. By this an angle between the first edge and the suction plate and also between the first edge and the surface intendent to be cleaned during use of the nozzle is created.

[0009] Further, the first edge is arranged to reduce the suction area of the suction opening in the deployed position of the first edge. The position of the first edge affects the size of the suction area, which size of the section area may be reduced by at least the first edge. Thus, the size of the suction area may be regulated by changing the position of the first edge, and more particularly by pivoting, i.e. by rotating the first edge around the first axis. Thus, the first edge is arranged such that the suction area is reduced, i.e. the size of the suction area is decreased when the first edge is positioned in the deployed position.

[0010] The underpressure that is created by a vacuum cleaner at the nozzle depends on size of the suction area of the nozzle. Thus, the bigger suction area the higher underpressure and by this the higher suction forces acting on the nozzle which forces are associated with motion resistance of the nozzle against the surfaces intended to be cleaned.

[0011] Thus, by influencing the suction area the suction forces and by this motion resistance may be controlled and regulated in a simple and efficient manner. Therefore, by changing the position of the first edge and by positioning the first edge in the deployed position the motion resistance may be reduced and a smoother movement of the nozzle may be achieved as it is moved by a user across the surface to be cleaned.

[0012] Thereby an improved nozzle for a vacuum cleaner is provided and as a result, the above mentioned object is achieved.

[0013] Further, the inlet part may comprise a front portion and a rear portion, wherein the first edge may be arranged at the front portion of the inlet part or the first edge may be arranged at the rear portion of the inlet part.

[0014] With the front portion is meant a part of the inlet part, regarding to the placement at the nozzle, for example in relation to the suction opening, that is in front and ahead of the suction opening at a forward movement of

the nozzle during vacuuming of a surface. In a similar way, with the rear portion is meant a part of the inlet part that is back and behind the suction opening at a forward movement of the nozzle during vacuuming of a surface. Thus, by having the first edge arranged at the front portion of the inlet part, the motion resistance may be controlled and regulated during movement of the nozzle in a forward direction. In a similar way, by having the first edge arranged at the rear portion of the inlet part, the motion resistance may be controlled and regulated during movement of the nozzle in a direction backwards.

[0015] Optionally, the first edge may comprise a first lip arranged to abut the surface intended to be cleaned in the retracted position of the first edge and a second lip arranged to abut the surface intended to be cleaned in the deployed position of the first edge. With lip is meant a protrusion. Thus the first lip is arranged to abut, i.e. is arranged to be in contact with the surface intended to be cleaned in the retracted position of the first edge. The second lip is arranged to abut i.e. to be in contact with the surface intended to be cleaned in the deployed position of the first edge. By this, the first edge may contact the surface to be cleaned through the lip and/or through the second lip in retracted and deployed position of the first edge. The form of the first lip may differ from the form of the second lip. The difference regarding the form of the first lip and the second lip may result in different characteristics and properties of the nozzle when abutting the surface to be cleaned through the first lip or through the second lip of the first edge. Thereby different characteristics of the nozzle regarding for example motion resistance or frictions of the nozzle may be achieved in the retracted position and in the deployed position of the first edge.

[0016] Depending on the surface to be cleaned, the first lip may follow the surface smoothly in the retracted position of the first edge or may cause resistance forces acting on the first lip that may cause pivoting i.e. rotation of the first edge around the first axis during vacuuming of the surface. As a result, the first edge may be pivoted around the first axis when the resistance forces acting on the first lip exceed a threshold value.

[0017] Thus, an improved nozzle for a vacuum cleaner is provided, that enable change i.e. modification of the characteristics of the nozzle during use by positioning the first edge in retracted position or in the deployed position.

[0018] As an alternative, the second lip may comprise a rounded part to abut the surface intended to be cleaned in the deployed position of the first edge. Thus, the rounded part is arranged to abut i.e. is arranged to be in contact with the surface intended to be cleaned in the deployed position of the first edge. With rounded part is meant that it is curved or with other words which does not have any sharp angles. Thereby, the rounded part of the first edge is arranged to minimize resistance forces and friction forces between the first edge and the surface to be cleaned and by this to achieve smooth movement of the nozzle in the deployed position of the first edge.

Thus, an improved nozzle for a vacuum cleaner is provided, that enable change i.e. modification of the characteristics of the nozzle during use by positioning the first edge in retracted position or in the deployed position. Further, smoother movement of the nozzle in the deployed position of the first edge may be achieved through the rounded part.

[0019] As an alternative, the suction area of the suction opening may be reduced by at least the lip in the deployed position of the first edge. The lip is arranged such that it points towards the suction opening i.e. protrudes into the suction opening in the deployed position of the first edge. Thereby, the suction opening and the suction area may be reduced in a simple and efficient manner by at least the lip in the deployed position of the first edge.

[0020] The first edge may be arranged to lift the nozzle from a surface intended to be cleaned in the deployed position of the first edge. Thereby, a distance between the nozzle or at least a part of the nozzle and more particularly between an underside of a suction plate of the nozzle and the surface intended to be cleaned may be increased in the deployed position of the first edge.

[0021] According to an embodiment, the first axis may be arranged eccentrically in relation to the first edge. With eccentrically is meant that the first axis is displaced in relation to the center of rotation of the first edge. Because, the first axis may be arranged eccentrically in relation to the first edge, a larger radius of rotation of the first edge may be achieved. By the larger radius of rotation of the first edge a better control of the effects of pivoting of first edge may be achieved. The effects relate for example to reduction of the suction area and lifting of the nozzle in order to achieve: decrease of the motion resistance, smoother movement of the nozzle across the area to be cleaned, at least decrease of the effects that the nozzle jumps on the surface intended to be cleaned or that the nozzle get caught in for example a carpet that is vacuumed.

[0022] Optionally, the first edge may be biased in the retracted position. Thus, spring forces may act on the first edge in the retracted position holding the first edge in retracted position and preventing the first edge to be pivoted from the retracted position in an uncontrolled way. With other words, an improved control of the rotational movement of the first edge around the first axis between the retracted position and the deployed position may be achieved.

[0023] According to an embodiment, the first edge may be arranged to be locked in the retracted position or in the deployed position by a locking mechanism. For example by a button or a slider activated locking pin. Thus, the first edge may be fixed in the retracted position or in the deployed position and thereby may maintain in the retracted position or in the deployed position during a movement of the nozzle along the surface, which surface may be a floor. Thus, a user may lock the first edge in the retracted position or in the deployed position by said

locking mechanism.

[0024] Further, the first edge may return to the retracted position from the deployed position when a movement direction of the nozzle is changed and if the first edge has not been locked in the retracted position or in the deployed position.

[0025] The first edge may be arranged to pivot into the deployed position during movement of the nozzle in a first direction. The first direction may correspond to a movement of the nozzle forward which results in that the first edge may pivot into the deployed position during movement of the nozzle forward during vacuuming of a surface.

[0026] The first edge may be arranged to pivot into the deployed position automatically. With automatically is meant that there is no need of an action of a user to pivot the first edge into the deployed position. Thus, the first edge may pivot into the deployed position automatically for example when resistance forces or friction forces acting on the first edge exceed a threshold value. Further, the first edge may also pivot into the deployed position by suction/vacuum forces created at the nozzle and when suction/vacuum forces exceed a threshold value. Thereby, the first edge may pivot into the deployed position simply by resistance forces or friction forces acting on the first edge or by suction/vacuum forces at the nozzle. Thus, an improved nozzle is provided that may facilitate using of a vacuum cleaner.

[0027] According to an embodiment, the first edge may be arranged to pivot into the deployed position by interaction of the first lip with the surface, e.g. rug or carpet, intended to be cleaned. The first lip, that also may be called a first protrusion, is arranged to protrude from the first edge and to contact the surface in the retracted position. Because the first lip protrudes from the first edge it may protrude into the surface intended to be cleaned during movement of nozzle and by this to cause friction forces acting on the first edge.

[0028] The friction forces created by interaction of the first edge with the surface may cause the first edge to pivot from the retracted position to the deployed position.

[0029] According to an embodiment the nozzle may comprise a second edge arranged to pivot about a second axis, wherein the suction area is then defined by at least the first edge and the second edge wherein the second edge is arranged to pivot between a deployed position and a retracted position and is arranged to reduce the suction area of the suction opening in the deployed position of the second edge, wherein the second edge is arranged at an opposite portion of the inlet part in relation to the first edge. The second edge may be arranged in similar way as the first edge, i.e. it may comprise a lip and a rounded part with functions and effects as regarding to the first edge. The second edge may be arranged to pivot into the deployed position during movement of the nozzle in a second direction that is opposite to the first direction. The second direction may correspond to a backward movement of the nozzle during vacuuming of a surface.

[0030] The nozzle may further comprise an outlet part with an outlet adapted to be coupled to a hose of the vacuum cleaner, an air channel between the suction opening and the outlet and a housing arranged to enclose the air channel.

[0031] According to a second aspect, a vacuum cleaner is provided, comprising a nozzle according to the first aspect described above. Thus, an improved vacuum cleaner is provided.

[0032] Further features of, and advantages with, the present invention will become apparent when studying the appended claims and the following detailed description. Those skilled in the art will realize that the different features described may be combined to create embodiments other than those described in the following, without departing from the scope of the present invention, as defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] The various aspects of the invention, including its particular features and advantages, will be readily understood from the following detailed description and the accompanying drawings, in which:

Fig. 1a is side view of a nozzle comprising a first edge and during movement in a first direction,

Fig. 1b is side view of a nozzle comprising a first edge and a second edge during movement in a second direction,

Fig. 2a and 2b are top view of an inlet part of the nozzle in Fig. 1a with a first edge in a retracted position, Fig 2a, and in a deployed position, Fig 2b.

Fig. 3 is a graph presenting a relation between motion resistance and the size of the suction area.

Fig. 4 is a view of a nozzle.

Fig 5 shows a vacuum cleaner.

DETAILED DESCRIPTION

[0034] The embodiments herein will now be described more fully with reference to the accompanying drawings, in which example embodiments are shown. Disclosed features of example embodiments may be combined. Like numbers refer to like elements throughout. Well-known functions or constructions will not necessarily be described in detail for brevity and/or clarity.

[0035] Fig. 1a illustrates a nozzle 1 for a vacuum cleaner, the nozzle 1 comprises an inlet part 3 comprising a suction opening 5. Further, the nozzle comprises a first edge 7 arranged to pivot about a first axis 9. The first axis 9 is illustrated in more details in Fig.2. In Fig 1a joint

between the first edge 7 and the inlet part 3 of the nozzle is illustrated, this at the axis 9. The joint may comprise a seal.

[0036] The inlet part 3 comprises a front portion 11 and a rear portion 13. As illustrated in Fig. 1a the first edge 7 is arranged at the front portion 11 of the inlet part 3 of the nozzle 1. However, the first edge may be arranged at the rear portion 13. The nozzle 1 is illustrated during movement of the nozzle in a first direction p1 which may be a movement forward of the nozzle during vacuuming of a surface S, e.g. a floor. Thereby the nozzle may be used for floor cleaning.

[0037] According to the embodiments illustrated in Fig. 1a and 1b, the first edge 7 comprises a first lip 15 and a second lip, wherein the second lip comprises a rounded part 17. Thus, the first edge 7 comprises different portions with different shapes and by this resulting in different characteristics of the nozzle when the different portions of the first edge 7 abut the surface to be cleaned. By this, the characteristics of the nozzle may be changed and controlled simply by changing which portion of the first edge that abuts the surface intended to be cleaned. The first lip 15 may be sharp or may be rounded i.e. curved. The rounded part 17 may for example have a cutouts form or a circular form in a side view of the first edge 7. The first lip 15 is arranged to abut a surface S intended to be cleaned in the retracted position of the first edge 7 (shown in Fig. 1b) and the rounded part 17 is arranged to abut the surface S in the deployed position of the first edge 7. In Fig. 1a the first edge 7 is positioned in the deployed position, this during movement of the nozzle in the first direction p1.

[0038] The first edge 7 is arranged to pivot between a retracted position and a deployed position. As may be seen in Fig. 2, the suction area A has been reduced by the first lip in the deployed position of the first edge 7.

[0039] The first edge 7 is arranged to lift the nozzle 1 from a surface S intended to be cleaned in the deployed position of the first edge 7. Thereby, a distance between the nozzle or at least a part of the nozzle 1 and more particularly between an underside 2 of a suction plate of the nozzle and the surface intended to be cleaned may be increased in the deployed position of the first edge. With the first edge 7 in the deployed position, the front portion 11 of the inlet part 3 of the nozzle 1 is lifted. As illustrated an angle α is created between the underside 2 of a suction plate and the surface S at the deployed position of the first edge 7. Depending on the size of the first edge 7, i.e. the largest distance between the placement of the first axis 9 at the first edge 7 to an outermost point at the first edge 7 and depending on the location of the retracted position and the deployed position the angle α may vary between for example 0-10°.

[0040] The first axis 9 is arranged eccentrically in relation to the first edge 7. With eccentrically is meant that the first axis 9 is displaced in relation to the center of rotation of the first edge.

[0041] Further the nozzle 1 comprises an outlet part with an outlet 23 adapted to be coupled to a hose of a vacuum cleaner. An example of a vacuum cleaner is illustrated in Fig. 5. The nozzle 1 comprises also an air channel (not shown) between the suction opening 5 and the outlet 23 and a housing 25 arranged to enclose said air channel.

[0042] In Fig. 1b a nozzle 1 comprising a first edge 7 and a second edge 19 is illustrated. The second edge 19 is arranged to pivot about a second axis 21, wherein the suction area is defined by at least the first edge 7 and the second edge 19 wherein the second edge 19 is arranged to pivot between a deployed position and a retracted position in a similar way as the first edge described above and is arranged to reduce the suction area of the suction opening 5 in the deployed position of the second edge 19. The second edge 19 is arranged at an opposite portion of the inlet part 3 in relation to the first edge 7. The second edge 19 may be arranged in a similar way as the first edge 7, i.e. the second edge 19 may comprise a second lip and a second rounded part arranged in a similar way as at the first edge described above.

[0043] In Fig. 1b the second edge 19 is arranged at the rear portion 13 of the inlet part 3. In Fig. 1b the first edge 7 is positioned in the retracted position, and the second edge 19 is positioned in the deployed position, this during movement of the nozzle in the second direction p2. The second direction p2 may be a movement backwards of the nozzle 1. With the second edge 19 the deployed position, the rear portion 13 of the inlet part 3 of the nozzle 1 is lifted. As illustrated in Fig. 1b the nozzle 1 has been lifted by the second edge 19 in the deployed position and an angle β has been created between the underside of a suction plate and the surface S. Depending on the size of the second edge 19 i.e. Depending on the size of the first edge 7, i.e. the largest distance between the placement of the second axis 21 to an outermost point at the second edge 19 and depending on the location of the retracted position and the deployed position the angle β may vary between for example 0-10°.

[0044] The nozzle 1 may be manufactured of a plastic material. The first edge 7 and the second edge 19 may be manufactured of a plastic material or of a metal, such as for example aluminum.

[0045] According to an embodiment, the first edge 7 may be arranged to be locked in the retracted position or in the deployed position by a locking mechanism (not shown), which locking mechanism may by a button or a slider activated locking pin. Thus, the first edge 7 may be fixed in the retracted position or in the deployed position.

[0046] As illustrated in Fig. 1a and 1b the nozzle 1 may be arranged within an outer shell 31. Thus, according to an embodiment the outer shell 31 is arranged so that the outer shell encloses the nozzle 1. Thereby the nozzle 1 is protected from possible impacts during use of the nozzle 1, i.e. during vacuuming. The outer shell 31 may be attached to the nozzle 1 by an attaching means arranged

in a common way and therefore not described in details herein.

[0047] In Fig. 1a an embodiment is illustrated where a nozzle 1 comprises a first edge 7. Thus, the outer shell 31 may be adapted, by for example the design of the outer shell 31, to a nozzle 1 comprising a first edge 7. As an alternative, the outer shell 31 may be adapted, by for example the design of the outer shell 31, to a nozzle 1 comprising a first edge 7 and a second edge 19, as is illustrated in Fig. 1b.

[0048] The outer shell 31 may be manufactured from a plastic material or any other material suitable for the outer shell 31 for a nozzle 1 for a vacuum cleaner.

[0049] In Fig. 2a and 2b a top view of the inlet part of the nozzle in Fig. 1a with a first edge 7 in a retracted position, Fig 2a, and in a deployed position, Fig 2b, is shown. In the retracted position the suction area is presented as A and in the deployed position as B. As can be seen the suction area has been reduced by the first edge 7 in the deployed position as the area B is less than the area A of the suction area in the retracted position of the first edge 7. The suction area may for example be reduced by 5% - 10% from the area at the retracted position of the first edge 7 (area A) to the area at the deployed position of the first edge 7 (area B).

[0050] In Fig. 3 a graph is illustrated presenting a function "f" representing a relation between motion resistance and the size of the suction area. The underpressure that is created by a vacuum cleaner at the nozzle depends on the size of the suction area of the nozzle such that the bigger suction area the higher underpressure and by this higher suction forces acting on the nozzle which the forces are associated with motion resistance of the nozzle against the surfaces intended to be cleaned. Thus, the bigger suction area the higher motion resistance acting on the nozzle during vacuuming of a surface and as can be deduced from Fig. 3, the smaller suction area the lower motion resistance acting on the nozzle during vacuuming. The motion resistance may be measured in Newton [N] and the suction area in square meters [m^2].

[0051] Fig. 4 is a view of a nozzle 1 comprising a first edge 7 and a second edge 19, wherein the nozzle 1 comprises a tube 27 adapted to guide an air stream generated by a vacuum cleaner (illustrated in Fig. 5) from the nozzle 1 and further through a cleaning system of the vacuum cleaner. The nozzle 1 is arranged within an outer shell 31, which outer shell is described in conjunction with Fig. 1a and Fig. 1b.

[0052] Fig. 5 shows an exemplary vacuum cleaner 29 with a nozzle 1 connected to the vacuum cleaner 29. Thus, with the nozzle 1, a vacuum cleaner is provided which may facilitate the cleaning of a surface. Further, the user friendliness of a vacuum cleaner may be improved thanks to the nozzle 1 connected to the vacuum cleaner.

[0053] Even though embodiments of the various aspects have been described, many different alterations, modifications and the like thereof will become apparent for those skilled in the art. The described embodiments are therefore not intended to limit the scope of the present disclosure.

Claims

1. A nozzle (1) for a vacuum cleaner, the nozzle (1) comprising:

   an inlet part (3) comprising a suction opening (5) with a suction area and a first edge (7) arranged to pivot about a first axis (9), wherein the suction area is defined by at least the first edge (7), wherein the first edge (7) is arranged to pivot between a retracted position and a deployed position and is arranged to reduce the suction area of the suction opening (5) in the deployed position of the first edge (7).

2. The nozzle (1) according to claim 1, wherein the inlet part (3) comprises a front portion (11) and a rear portion (13), wherein the first edge (7) is arranged at the front portion (11) of the inlet part (3) or the first edge (7) is arranged at the rear portion (13) of the inlet part (3).

3. The nozzle (1) according to claim 1 or 2, wherein the first edge (7) comprises a first lip (15) arranged to abut a surface (S) intended to be cleaned in the retracted position of the first edge (7) and a second lip (17) arranged to abut the surface (S) intended to be cleaned in the deployed position of the first edge (7).

4. The nozzle (1) according to claim 3, wherein the second lip (17) comprises a rounded part to abut the surface (S) intended to be cleaned in the deployed position of the first edge (7).

5. The nozzle (1) according to claim 3 or 4, wherein the suction area of the suction opening (5) is reduced by at least the first lip (15) in the deployed position of the first edge (7).

6. The nozzle (1) according to any one of the preceding claims wherein the first edge (7) is arranged to lift the nozzle (1) from a surface (S) intended to be cleaned in the deployed position of the first edge (7).

7. The nozzle (1) according to any one of the preceding claims, wherein the first axis (9) is arranged eccentrically in relation to the first edge (7).

8. The nozzle (1) according to any one of the preceding claims, wherein the first edge (7) is biased in the retracted position.

9. The nozzle (1) according to any one of the preceding

claims, wherein the first edge (7) is arranged to be locked in the retracted position or in the deployed position by a locking mechanism.

10. The nozzle (1) according to any one of the preceding claims wherein the first edge (7) is arranged to pivot into the deployed position during movement of the nozzle (1) in a first direction p1.

11. The nozzle (1) according to any one of the preceding claims, wherein the first edge (7) is arranged to pivot into the deployed position automatically.

12. The nozzle (1) according to any one of claims 3-12, wherein the first edge (7) is arranged to pivot into the deployed position by interaction of the first lip (15) with the surface (S) intended to be cleaned.

13. The nozzle (1) according to claim 12, wherein the interaction of the first lip (15) with the surface (S) intended to be cleaned generates a resistance force, wherein the first edge (7) is arranged to pivot into the deployed position when the resistance force acting on the first lip (15) exceeds a threshold value.

14. The nozzle (1) according to any one of claims 2-13, comprising a second edge (19) arranged to pivot about a second axis (21), wherein the suction area is defined by at least the first edge (7) and the second edge (19) wherein the second edge (19) is arranged to pivot between a deployed position and a retracted position and is arranged to reduce the suction area of the suction opening (5) in the deployed position of the second edge (19), wherein the second edge (19) is arranged at an opposite portion of the inlet part (3) in relation to the first edge (7).

15. The nozzle (1) according to any one of the preceding claims further comprising an outlet part with an outlet (23) adapted to be coupled to a hose of the vacuum cleaner, an air channel between the suction opening (5) and the outlet (23) and a housing (25) arranged to enclose said air channel.

16. The nozzle (1) according to any one of the preceding claims, wherein the nozzle is adapted for floor cleaning.

17. A vacuum cleaner comprising a nozzle (1) as defined in any one of the preceding claims.

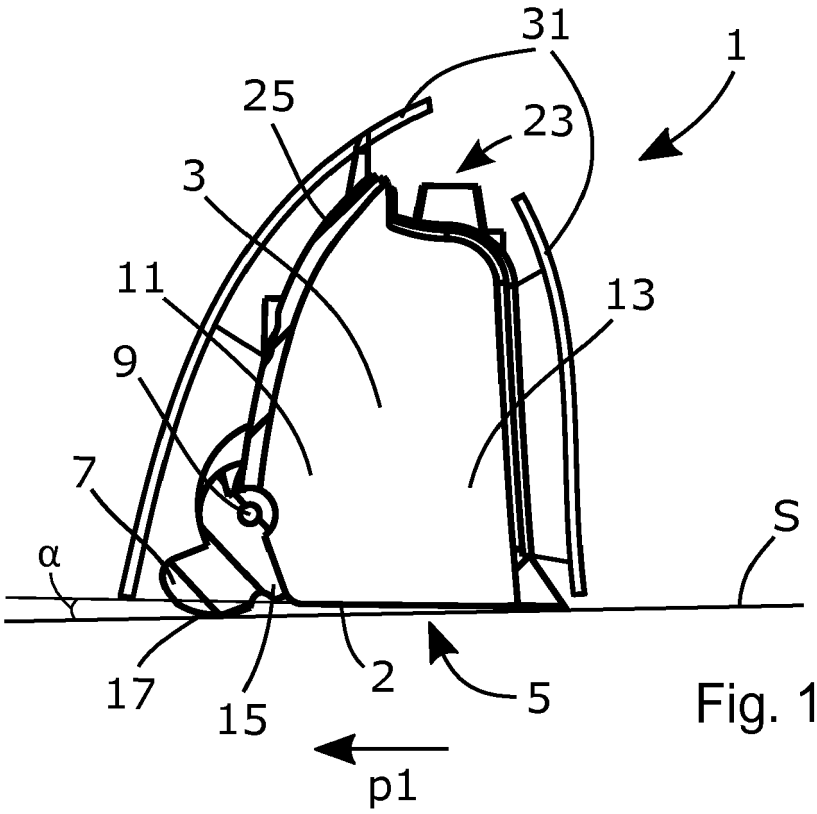
31
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Fig. 1a

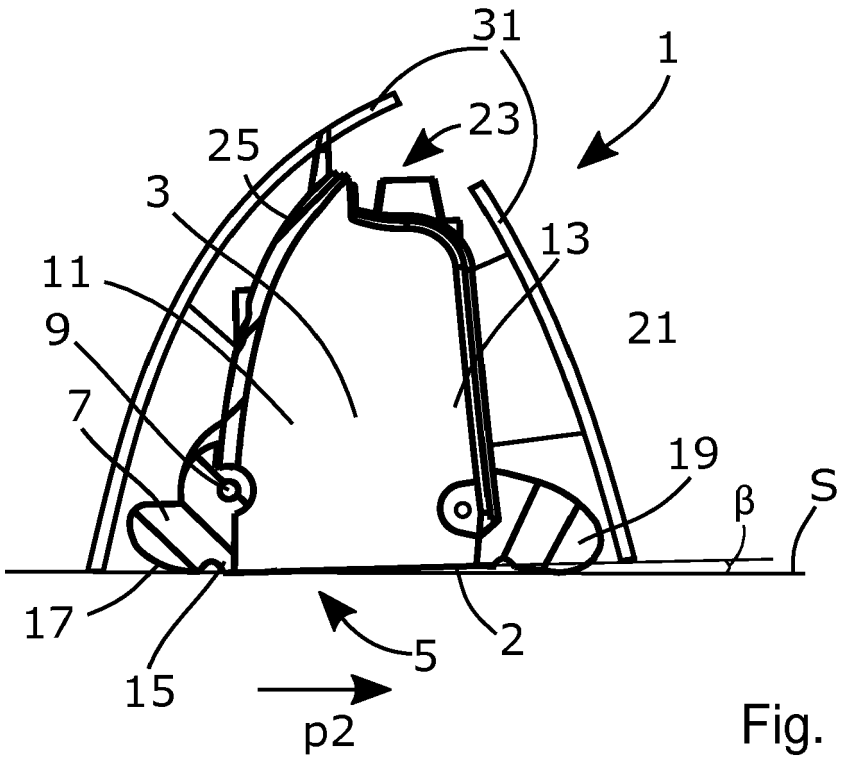
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Fig. 1b

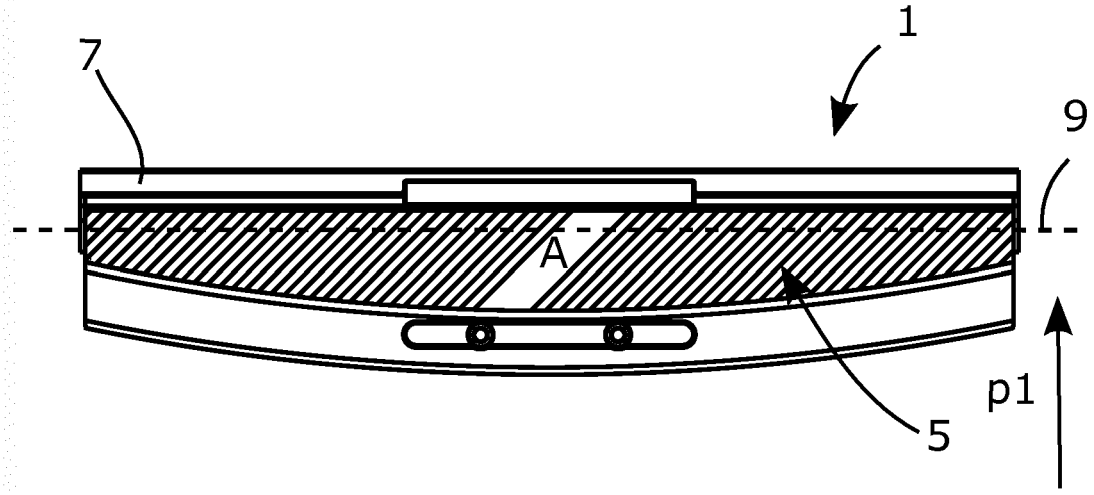

Fig. 2a

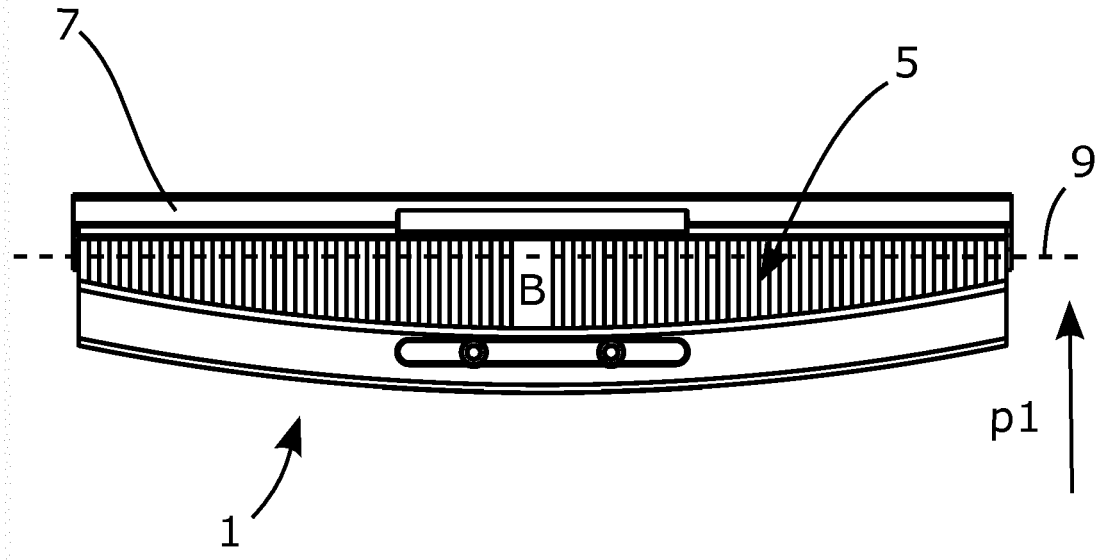

Fig. 2b

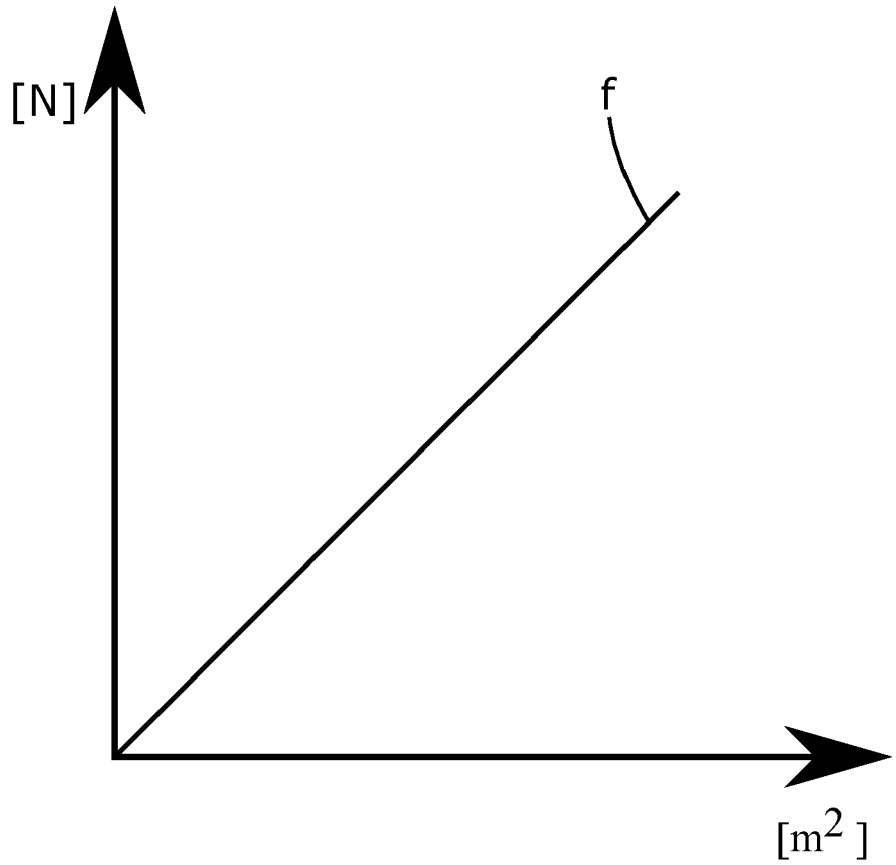

Fig. 3

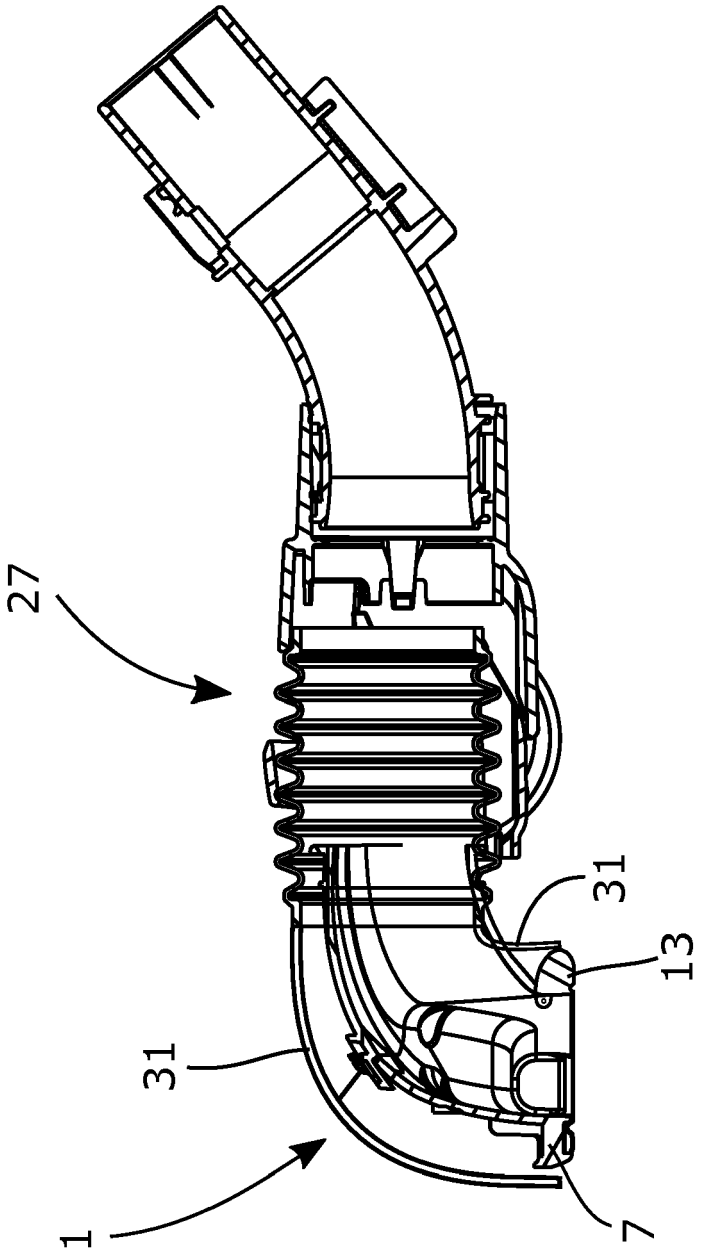

Fig. 4

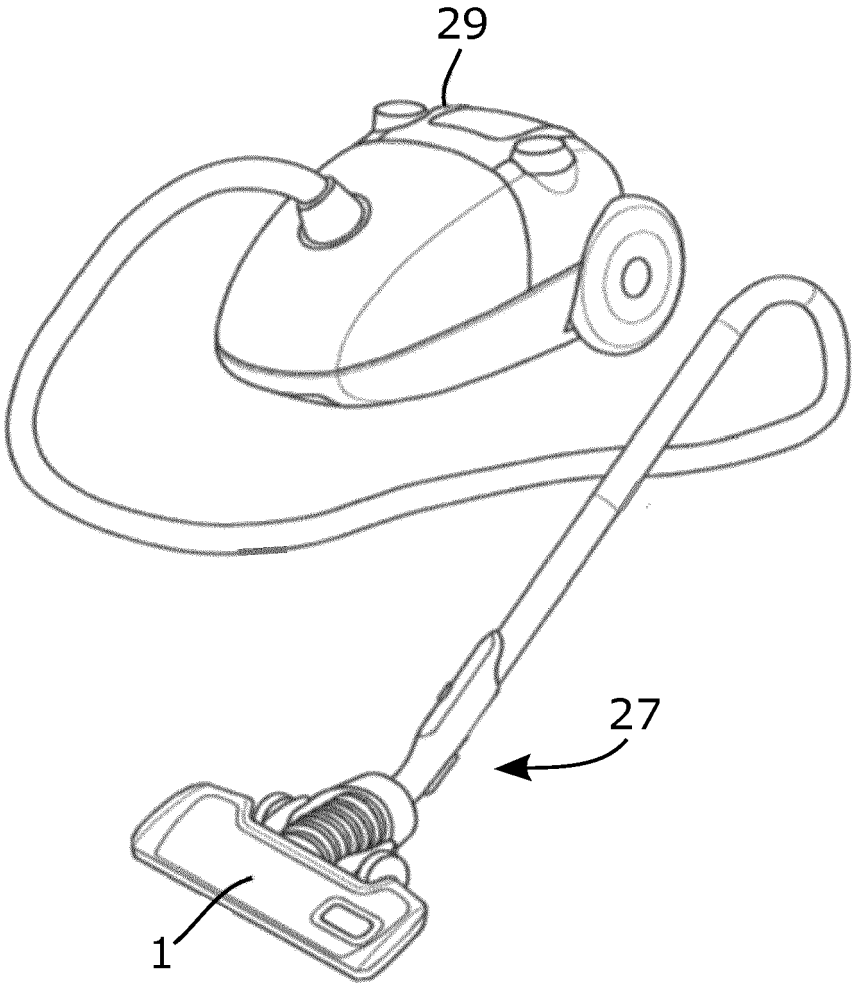

Fig. 5

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Application Number
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Munich	13 June 2019	Trimarchi, Roberto

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