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(54) **BATTERY POWERED VACUUM CLEANER**

BATTERIEBETRIEBENER STAUBSAUGER

ASPIRATEUR À PILES

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EP-A2- 0 783 863 WO-A1-2006/106278

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EP 3 829 405 B1

Description

FIELD OF THE INVENTION

[0001] This invention relates to a battery-powered vacuum cleaner and in particular to a vacuum cleaner having multiple modes of operation.

[0002] In the following description, directional and orientational terms such as "top", "bottom" etc. refer to the vacuum cleaner in its normal orientation of use upon a substantially horizontal surface, as represented for example in Figs. 1 and 2. It is nevertheless a particular benefit of the invention that the vacuum cleaner can be used in other orientations.

BACKGROUND TO THE INVENTION

[0003] Vacuum cleaners have a motor which drives an impeller to create a flow of air. The air usually enters the vacuum cleaner through an opening or nozzle, the opening or nozzle being placed upon or adjacent to the surface to be cleaned. The air carries dirt and debris into the vacuum cleaner and transports the dirt and debris by way of one or more airflow ducts. The dirt and debris is transported through the duct(s) to a dirt-collection chamber. The air then passes through one or more filters before leaving the vacuum cleaner, the filters being arranged to trap the dirt and debris within the dirt-collection chamber for subsequent disposal.

[0004] It is recognised that some vacuum cleaners use a fan or turbine rather than an impeller, but the term impeller is nevertheless used herein to describe any component which generates the required air flow when driven by the motor.

[0005] The dirt-collection chamber can contain or comprise a disposable bag, the wall of the bag also acting as a filter. Alternatively, the dirt-collection chamber is a receptacle which can be removed from the vacuum cleaner, emptied, and reinstalled into the vacuum cleaner for re-use.

[0006] Many vacuum cleaners are specifically designed to clean floor surfaces, in which case the vacuum cleaner includes a suction head having wheels, rollers and/or slides so that it can be moved across the floor, with the opening in the bottom of the suction head.

[0007] A rotatable brush is often located adjacent to the opening of the suction head. The brush is rotated and engages the surface which is being cleaned. The brush helps to dislodge dirt and debris from the surface which is then entrained in the air flow and transported to the dirt-collection chamber.

[0008] Many vacuum cleaners are mains powered, and most are designed for floor cleaning, with additional tools being provided for use in above-floor cleaning. The manufacturers of mains powered vacuum cleaners will often seek to maximise the electrical and suction power of their vacuum cleaners in an attempt to increase their marketability. In such vacuum cleaners the opening in

the suction head is surrounded by a wall. The air is forced to pass underneath the wall and through the underlying carpet or the like whereby to dislodge dirt and debris from between the fibres of the carpet. As impellers are typically 10 to 40% efficient in use this is a relatively inefficient method of cleaning. In order to achieve higher impeller efficiencies, manufacturers have tended to develop faster spinning impellers creating higher suction. However, as it is air flow rather than suction which dislodges dirt and debris, such vacuum cleaners generally do not achieve improved dirt and debris collection efficiency. Manufacturers have therefore tended to quote electrical and suction power as an indicator of the effectiveness of their appliances rather than cleaning efficiency.

[0009] Most domestic mains-powered vacuum cleaners fall into two broad classes. The first class is often referred to as cylinder vacuum cleaners. In cylinder vacuum cleaners the suction head is connected to an operating handle which in turn is connected to a flexible hose through which the dirt and debris pass on their way to the dirt-collection chamber. The dirt-collection chamber is located within a body which is separate from the suction head and which also contains the motor, the body having wheels or slides by which it may be pulled across the floor during the cleaning operation.

[0010] The second class is often referred to as upright vacuum cleaners. In upright vacuum cleaners the motor and dirt-collection chamber are carried by, or in some cases are integral with, the operating handle, so that the body containing the motor and the dirt-collection chamber typically lie above the suction head during the cleaning operation.

[0011] As an alternative to mains power, the provision and use of battery-powered vacuum cleaners is becoming more widespread. Some battery-powered vacuum cleaners are designed primarily for floor cleaning. The structure of these battery-powered vacuum cleaners is somewhat different to that of a mains-powered vacuum cleaner, with the battery, motor, impeller and dirt-collection chamber all located in the suction head. The suction head is connected to an operating handle which is used solely for manoeuvring the suction head across the floor being cleaned.

[0012] Other battery-powered vacuum cleaners are designed to be hand-held, i.e. they are designed to be carried during use. In such vacuum cleaners the battery, motor, impeller and dirt-collection chamber are all contained in the body of the vacuum cleaner, the body having a nozzle through which air enters the vacuum cleaner. Many such vacuum cleaners are primarily intended for short-term use, for example for cleaning up isolated spillages and the like. Other designs have an increased battery life and can be used for extended cleaning periods. The hand-held vacuum cleaner described in WO 2014/195711 for example is designed for extended periods of use, and can be used instead of a mains-powered vacuum cleaner.

[0013] A particular class of hand-held battery-powered

vacuum cleaner is referred to as a "stick-vac"; in such vacuum cleaners the nozzle of the hand-held body of the vacuum cleaner is connected to a suction head by a rigid tube, the user carrying the body of the vacuum cleaner and moving the suction head across the floor (or other surface being cleaned) by way of the rigid tube.

[0014] WO 2006/106278 discloses the body of a vacuum cleaner which has three separate flow paths for collected dirt and debris. The body has a first opening in its bottom wall and a rotating brush located in the opening. Dirt and debris which is mobilised by the rotating brush can enter the first opening and pass into a first dirt-collection chamber located in the suction head. Behind the first opening is a set of nozzles through which dirt and debris can also pass, this dirt and debris passing to a cyclonic separator and to a second dirt-collection chamber in the suction head. Behind the first set of nozzles is a second set of nozzles through which dirt and debris can also pass, this dirt and debris passing through the suction head, into the operating handle and to a separate suction means connected to the operating handle. The body contains a battery and a motor for rotating the brush and operating the cyclonic separator, the battery and motor being located together to one side of the body, the battery being alongside the first dirt-collection chamber and the motor being behind the first dirt-collection chamber.

[0015] EP 0 783 863 discloses a battery-powered vacuum cleaner with a body having a battery, a motor, an impeller and a dirt-collection chamber. The battery and motor are located together to one side of the body and behind the dirt-collection chamber.

SUMMARY OF THE INVENTION

[0016] The inventor has conceived a battery-powered vacuum cleaner which can be used in several different modes of operation to replicate the different designs of battery-powered vacuum cleaner described above. In particular, the battery-powered vacuum cleaner can be used for floor cleaning, with an operating handle for manoeuvring the suction head across the floor being cleaned. Alternatively, the battery-powered vacuum cleaner can be used as a hand-held vacuum cleaner. Alternatively again the battery-powered vacuum cleaner can be used with a nozzle for clearing up spillages and the like.

[0017] According to the present invention there is provided a battery-powered vacuum cleaner having a body with a battery, a motor, an impeller and a dirt-collection chamber, the body having a front, a back, a first side and a second side, the body also having a bottom wall with an opening through which air may pass into the body, a rotatable brush being mounted adjacent to the opening, the opening spanning a large proportion of the body between the first and second sides, the battery being located at the first side, characterised in that the motor is located at the second side with the dirt-collection chamber

between the battery and the motor.

[0018] In the known battery-powered vacuum cleaners which are designed for floor cleaning, the battery and motor are typically located behind the dirt-collection chamber. The dirt-collection chamber is typically located across the general centre of the body or suction head between the opening at the front of the body and the battery and motor at the back of the body.

[0019] In the present invention, however, it is desired to minimise the length of the body (i.e. the distance between the front and back of the body) so that the vacuum cleaner can alternatively be hand-held. Locating the battery and motor to opposing sides of the dirt-collection chamber permits a reduction in the length of the body.

[0020] Preferably, the body has a front wall at its front and a back wall and its back and the length of the body, i.e. the distance between the front and back walls, is less than around 20 cm, and ideally less than around 15 cm. Preferably also, the body has at least one gripping surface between its front and back walls permitting the body to be grasped with one hand and manipulated as a hand-held vacuum cleaner.

[0021] When used as a hand-held vacuum cleaner the user can move the body, and in particular the opening, to a location of use, and can position the opening against a surface to be cleaned. The surface may be horizontal (e.g. a stair or worktop), vertical (e.g. a hanging curtain), or any intermediate angle.

[0022] Preferably, the battery-powered vacuum cleaner has a removable operating handle. It will be understood that an operating handle is of benefit when the vacuum cleaner is being used for floor cleaning, permitting the user to manoeuvre the body across the floor as desired. An operating handle is not, however, of benefit when the vacuum cleaner is used in the hand-held mode of operation and it is preferred to remove the handle rather than retain it, the retained handle being a potential obstacle during hand-held use.

[0023] Desirably, the handle has wheels or rollers. It will be understood that wheels or rollers are of benefit when the vacuum cleaner is being used for floor cleaning, permitting the user more easily to manoeuvre the body across the floor. Wheels or rollers are of little if any benefit when the vacuum cleaner is used in the hand-held mode of operation, however, and removing the wheels or rollers with the operating handle permits a reduction in the size and/or weight of the vacuum cleaner when used in that mode of operation.

[0024] Preferably, the operating handle has a steering joint. Desirably the steering joint comprises a pivoting joint and a rotatable joint. In known fashion, the pivoting joint permits the operating handle to pivot relative to the body about a pivot axis (which axis is substantially horizontal when the body is upon a horizontal floor) and the rotatable joint permits the operating handle to rotate about a rotation axis. In common with known steering joints, the rotation axis is perpendicular to the pivot axis and is angled relative to the longitudinal axis of the op-

erating handle. Such a steering joint permits the body to be steered by way of the user twisting the operating handle as desired. The pivoting joint maintains the horizontal orientation of the body as the operating handle is twisted.

[0025] Whilst a steering joint comprising a pivoting joint and a rotatable joint are preferred, simpler steering joints (perhaps comprising only a pivotable joint, or comprising only a rotatable joint) could be utilised if desired.

[0026] Many vacuum cleaners utilise steering joints such as that described above. In the present invention, the steering joint is a part of the operating handle rather than a part of the body or suction head. The inventors have appreciated that the steering joint is of little if any benefit when the vacuum cleaner is used in the hand-held mode of operation, and removing the steering joint with the operating handle minimises the weight of the vacuum cleaner when used in that mode of operation.

[0027] Desirably, the operating handle has a handle part and a connecting part, the handle part being designed for gripping by the user, the connecting part being designed for removable connection to the body of the vacuum cleaner. Preferably the steering joint is located adjacent to the connecting part.

[0028] Desirably, the operating handle is extendable, preferably telescopically extendable. Preferably, the operating handle has four tubular sections which can slide telescopically into one another. In addition, ideally the largest of the tubular sections (in its cross-sectional dimensions) comprises the handle part and the smallest of the tubular sections is connected to the steering joint.

[0029] Telescopically extendable operating handles are known, but generally comprise two tubular sections. Also, the smallest diameter tubular section is typically connected to or comprises the handle part. The present invention reverses the typical arrangement, and incorporates more telescoping sections, both of which minimise the length of the operating handle when collapsed. This is beneficial as the operating handle of the present invention is not required when the vacuum cleaner is used in the hand-held mode of operation and the reduced size of the collapsed operating handle makes it easier to store unobtrusively (in a drawer for example).

[0030] Preferably, the battery-powered vacuum cleaner has a cover for the opening, the cover having a nozzle. Whilst an opening with its rotatable brush is particularly suitable for floor cleaning, and may also be beneficial for other surface cleaning, it is less suitable for localised cleaning for which a nozzle (and perhaps a dedicated tool) is better suited. The cover can be fitted to the opening as desired by the user, and will cause the air to enter the body by way of the nozzle. Thus, whilst the opening is generally rectangular and of relatively large area, the nozzle is circular and of relatively small area. The nozzle can be fitted with a crevice tool, dust brush, or other chosen tool for dedicated cleaning operations.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] The invention will now be described in more detail, by way of example, with reference to the accompanying drawings, in which:

Fig.1 shows a perspective view of a battery-powered vacuum cleaner according to the present invention in a first mode of operation;

Fig.2 is a front view of the vacuum cleaner of Fig.1;

Fig.3 is a side view of the vacuum cleaner of Fig.1 ;

Fig.4 is a vertical sectional view of the vacuum cleaner of Fig.1;

Fig.5 is a view of the bottom surface of the body of the vacuum cleaner;

Fig.6 is a horizontal sectional view of the body of the vacuum cleaner;

Fig.7 is a perspective view from below of the vacuum cleaner;

Fig.8 is a perspective view of the vacuum cleaner with the operating handle in a contracted condition;

Fig.9 is a perspective view of the contracted operating handle when removed from the body of the vacuum cleaner;

Fig.10 is a perspective view of the vacuum cleaner in a second mode of operation;

Fig.11 is a perspective view of the body of the vacuum cleaner with a separate cover and crevice tool;

Fig.12 is a view of the vacuum cleaner in a third mode of operation; and

Fig.13 is a sectional side view of the vacuum cleaner.

DETAILED DESCRIPTION

[0032] The vacuum cleaner 10 is battery-powered. As such (and as seen in Figs. 4 and 6) the body 12 houses a battery 14 (or battery pack), a motor 16, an impeller 18 and a dirt-collection chamber 20.

[0033] The body 12 has an on-off switch 22 and therefore carries all of the operating componentry of the vacuum cleaner 10. The operating handle 24 is used only to manoeuvre the body 12 across a floor or other surface during use in this first mode of operation.

[0034] The body 12 has wheels or rollers 26 at its front

end 28 (the term "front" being used herein to describe the leading end of the vacuum cleaner when it is being pushed across a surface by the user). Other wheels 30 are located adjacent to the back end 32 of the body 12, the wheels being visible in the side view of Fig.3 and the perspective view of Fig.7.

[0035] As seen in Figs.5 and 7, in known fashion the bottom wall of the body 12 has an opening 34 through which air (and entrained dirt and debris) enters into the body 12. A rotatable brush 36 is located adjacent to the opening 34, the bristles 38 of the brush 36 extending a short distance beyond the opening 34 to engage the surface being cleaned. In known fashion, the opening 34 extends from close to the first side 44 to close to the second side 46 of the body 12 and therefore spans a large proportion of the body.

[0036] The wheels 26 and 32 hold the bottom wall of the body 12 a small distance above the surface being cleaned. In this embodiment a movable strip 40 (see Fig. 5) is located behind the opening 34, and fixed strips 42 are located to either side of the opening 34. The movable strip 40 and the fixed strips 42 reduce the air flow into the opening 34 from those regions, and thereby maximise the air flow from the front end of the body 12, which is beneficial when the body is being moved forwards across the surface.

[0037] Figs. 1-3 represent the vacuum cleaner 10 ready for use in the first mode of operation. This mode of operation is most suitable for floor cleaning, with the body 12 acting like the suction head of a mains-powered vacuum cleaner. The body 12 can be manoeuvred across the floor by the user by way of the operating handle 24, in known fashion. Whilst the operating handle 24 is shown in its upright or storage position in Figs. 1-3, it will be understood that it can be pivoted (clockwise as drawn in Fig.3) to a position of use.

[0038] The operating handle 24 includes a steering joint 50. In known fashion the steering joint 50 comprises a pivoting joint which permits the upper part of the operating handle 24 to pivot relative to the body 12 about a (horizontal) pivot axis 52. The steering joint also includes a rotatable joint which permits the upper part of the operating handle 24 to rotate about a rotation axis which is perpendicular to the junction 54 between the lower (non-rotatable) and upper (rotatable) parts of the rotatable joint. The rotation axis is angled relative to the longitudinal axis of the operating handle and twisting of the operating handle 24 permits the body to be steered across the floor surface during use.

[0039] The front end 28 and the back end 32 of the body 12 are interconnected by the first side 44 and the second side 46. As seen in Fig.4 (and also in Fig.6), the battery 14, dirt-collection chamber 20, impeller 18 and motor 16 are arranged in a substantial line across the body 12. In particular, the battery 14 is located at the first side 44 and the motor 16 is located at the second side 46, with the dirt-collection chamber 20 directly between the battery and the motor (where "directly between" in

this context indicates that a straight line can be drawn which passes through the battery then the dirt-collection chamber then the motor).

[0040] In the embodiment shown in the drawings, the whole of the dirt-collection chamber 20 is located between the motor and the battery and the dirt-collection chamber is therefore spaced away from the first side 44 and from the second side 46. In an alternative embodiment only a part of the dirt-collection chamber is located between the motor and the battery and another part of the dirt-collection chamber extends fully across the body, the dirt-collection chamber being of general "T"-shape (preferably inverted "T"-shape) when viewed as in Fig.6. This alternative embodiment increases the length of the body which may not be acceptable to all users.

[0041] It will be understood that locating the battery 14, dirt-collection chamber 20 and motor 16 across the body 12 permits a reduction in the length L (Fig.3) of the body 12 (i.e. the distance between the front and back ends 28, 32) as compared to the conventional design in which the battery and motor are located between the dirt-collection chamber and the back end.

[0042] In addition, it will be understood that the battery 14 and motor 16 are relatively heavy, and in practice will likely be the heaviest components in the body of the vacuum cleaner. Separating these components, and in particular positioning them to either side of the dirt-collection chamber, permits the body 12 to be better balanced which is advantageous for use in the hand-held mode of operation.

[0043] Fig.6 also shows a part of the inlet duct 48 in the body 12 which connects the opening 34 to the dirt-collection chamber 20. In this embodiment the dirt-collection chamber 20 contains a disposable bag but other embodiments can be bagless.

[0044] The operating handle 24 is telescopically extendable. The operating handle 24 is shown in its extended condition in Figs. 1-4 and 7, and in its collapsed condition in Fig.8. It is not expected that the vacuum cleaner 10 will often be used with the operating handle in the collapsed condition shown in Fig.8 as the main benefit of the operating handle is to steer the body 12 when used in the floor cleaning mode. The operating handle might, however, be collapsed for use when cleaning stairs and the like, or perhaps to take advantage of the reduced length of the collapsed operating handle which makes the vacuum cleaner easier to manipulate in a confined space.

[0045] It is apparent from Fig. 1 that the operating handle 24 comprises four tubular sections, with the section having the largest cross-section comprising the handle part 56. Such a configuration results in the collapsed operating handle 24 having a relatively small volume, and as seen in Fig.9 the operating handle 24 when removed is ideally small enough to store unobtrusively, e.g. in a drawer.

[0046] It is also apparent from Fig.9 that the wheels 30 and also the steering joint 50 are parts of the operating

handle 24 and are therefore removed from the body with the operating handle. The operating handle 24 is connected to the back end 32 of the body 12 by way of its connecting part 58. The connecting part 58 is not shown in detail and can be any suitable form permitting secure connection to, and easy removal from, the body 12. The connecting part 58 includes a releasable latch mechanism which is actuated by opposing push-buttons 60, only one of which is visible in Fig.9. The operating handle 24 does not need to be collapsed before removal or storage, but it is expected to be more convenient for the user to do so.

[0047] Removal of the operating handle 24 permits the body 12 to be used in a hand-held mode of operation as represented in Fig.10. The length L (Fig.3) of the body 12 in this embodiment is approximately 13 cm which is sufficiently small to allow some users to be able to grasp the body by way of the front and back ends 28, 32. A gripping surface 62 is nevertheless provided on the top of the body 12, the gripping surface 62 being at a small angle (and in an alternative embodiment parallel with) the back end 32. The body 12 can thereby be gripped and held by one hand, and carried to the location of use, either by way of the front and back ends 28, 32, or by way of the gripping surface 62 and the back end 32, as is represented in Fig.10.

[0048] It will be understood that when used in the hand-held mode of operation as represented in Fig. 10, the battery 14 and motor 16 are to opposing sides of the user's hand. The body 12 is therefore well balanced with the result that it is comfortable to use in that mode of operation, even for extended periods if required.

[0049] It will also be understood that in the hand-held mode of operation the body 12 is manipulated so that the opening (and rotatable brush) are presented to the surface being cleaned, which surface may be vertical, horizontal or any orientation in between. This mode of operation is ideal for cleaning stairs and hanging curtains, for example.

[0050] Fig.11 shows the cover 70 which is used to convert the body 12 to its third mode of operation. The cover 70 is designed to clip or latch onto the bottom of the body 12 and specifically to enclose the (substantially rectangular) opening 34 (and the rotatable brush 26). When the cover 70 is correctly fitted the air is drawn into the body 12 solely through the substantially circular nozzle 72 of the cover 70. The cover 70 has resilient seals to minimise the ingress of air other than through the nozzle 72.

[0051] In the third mode of operation the vacuum cleaner 10 is suited for use in dedicated cleaning operations, for example to clean up isolated spillages and the like. In particular, it will be understood that the area of the nozzle 72 is significantly smaller than the area of the opening 34, with the result that the air travels faster through the nozzle in the third mode of operation than through the opening in the first and second modes of operation. In the third mode the vacuum cleaner is therefore able to collect larger and/or heavier pieces of dirt

and debris.

[0052] A crevice tool 74 can be fitted to the nozzle 72 (which will further reduce the area of air ingress) for other dedicated cleaning operations, as is represented in Fig. 12. Other tools (such as dust brush for example) can be fitted to the nozzle 72, as desired.

[0053] It will be understood that the rotatable brush 36 is redundant in the third mode of operation. It can be arranged that the rotatable brush is deactivated in that mode, but that is not provided for in this embodiment. Thus, it will be understood that the rotatable brush rotates substantially freely inside the cover 70 and does not use much energy, whereas the control equipment to selectively control the rotatable brush would add cost, weight and complexity to the body 12.

[0054] Fig.13 is a sectional side view showing part of the drive mechanism for the rotatable brush 36. To minimise the size and weight of the body 12 the impeller 18 and rotatable brush 36 are driven by the same motor 16. It will be understood, however, that these components should rotate at significantly different rates. In a preferred embodiment the impeller rotates at 32,000 rpm and the rotatable brush rotates at 3,200 rpm. To achieve this speed differential with a single motor it is arranged that the motor 16 drives the impeller 18 directly and rotates at 32,000 rpm. Two drive belts 74, 76 and intermediate reduction gearing 78 are provided to step down the rate of rotation of the rotatable brush 36 by a factor of ten.

Claims

1. A battery-powered vacuum cleaner (10) having a body (12) with a battery (14), a motor (16), an impeller (18) and a dirt-collection chamber (20), the body having a front (28), a back (32), a first side (44) and a second side (46), the body also having a bottom wall with an opening (34) through which air can pass into the body, a rotatable brush (36) mounted adjacent to the opening, the opening (34) spanning a large proportion of the body between the first and second sides, the battery (14) being located at the first side (44), **characterised in that** the motor is located at the second side (46) with the dirt-collection chamber (20) between the battery and the motor.
2. The battery-powered vacuum cleaner according to claim 1 in which the body (12) has a front wall at its front end (28) and a back wall at its back end (32) and the length (L) of the body between the front and back walls is less than 20 cm.
3. The battery-powered vacuum cleaner according to claim 2 in which the length (L) of the body is less than 15 cm.
4. The battery-powered vacuum cleaner according to claim 2 or claim 3 in which the body (12) has at least

one gripping surface (62) between its front and back walls.

5. The battery-powered vacuum cleaner according to any one of claims 1-4 having a removable operating handle (24). 5
6. The battery-powered vacuum cleaner according to claim 5 in which the operating handle (24) has wheels or rollers (30). 10
7. The battery-powered vacuum cleaner according to claim 5 or claim 6 in which the operating handle (24) has a steering joint (50). 15
8. The battery-powered vacuum cleaner according to claim 7 in which the steering joint (50) comprises a pivoting joint and a rotatable joint.
9. The battery-powered vacuum cleaner according to any one of claims 5-8 in which the operating handle (24) has a handle part (56) and a connecting part (58), the handle part being configured for gripping by the user, the connecting part being configured for removable connection to the body (12) of the vacuum cleaner (10). 20 25
10. The battery-powered vacuum cleaner according to claim 9 when dependent upon claim 7 or claim 8 in which the steering joint (50) is located adjacent to the connecting part (58). 30
11. The battery-powered vacuum cleaner according to any one of claims 5-10 in which the operating handle (24) is extendable. 35
12. The battery-powered vacuum cleaner according to claim 11 in which the operating handle (24) has a number of tubular sections which can slide telescopically relative to one another. 40
13. The battery-powered vacuum cleaner according to claim 12 in which the operating handle (24) has four tubular sections.
14. The battery-powered vacuum cleaner according to claim 9 or claim 10 in which the operating handle (24) has a number of tubular sections which can slide telescopically relative to one another, and in which the largest of the tubular sections comprises the handle part (56). 50
15. The battery-powered vacuum cleaner according to any one of claims 1-14 having a cover (70) for the opening, the cover having a nozzle (72), the cover being removably mountable to the body (12). 55

Patentansprüche

1. Batteriebetriebener Staubsauger (10) mit einem Gehäuse (12) mit einer Batterie (14), einem Motor (16), einem Laufrad (18) und einer Schmutzsammelkammer (20), wobei das Gehäuse weist eine Vorderseite (28), eine Rückseite (32), eine erste Seite (44) und eine zweite Seite (46) auf, wobei das Gehäuse auch eine Bodenwand mit einer Öffnung (34) aufweist, durch die Luft in das Gehäuse eindringen kann, eine drehbare Bürste (36), die neben der Öffnung angebracht ist, wobei die Öffnung (34) einen großen Teil des Gehäuses zwischen der ersten und der zweiten Seite überspannt, wobei die Batterie (14) an der ersten Seite (44) angeordnet ist, **dadurch gekennzeichnet, dass** der Motor an der zweiten Seite (46) angeordnet ist, wobei die Schmutzsammelkammer (20) zwischen der Batterie und dem Motor angeordnet ist.
2. Batteriebetriebener Staubsauger nach Anspruch 1, bei dem das Gehäuse (12) an seinem vorderen Ende (28) eine Vorderwand und an seinem hinteren Ende (32) eine Rückwand aufweist und die Länge (L) des Gehäuses zwischen den vorderen und hinteren Wänden weniger als 20 cm beträgt.
3. Batteriebetriebener Staubsauger nach Anspruch 2, bei dem die Länge (L) des Gehäuses weniger als 15 cm beträgt.
4. Batteriebetriebener Staubsauger nach Anspruch 2 oder Anspruch 3, bei dem das Gehäuse (12) zwischen seinen Vorder- und Rückwänden mindestens eine Greiffläche (62) aufweist.
5. Batteriebetriebener Staubsauger nach einem der Ansprüche 1 bis 4 mit abnehmbarem Betätigungsgriff (24).
6. Batteriebetriebener Staubsauger nach Anspruch 5, bei dem der Betätigungsgriff (24) Räder oder Rollen (30) aufweist.
7. Batteriebetriebener Staubsauger nach Anspruch 5 oder Anspruch 6, bei dem der Betätigungsgriff (24) ein Lenkungs gelenk (50) aufweist.
8. Batteriebetriebener Staubsauger nach Anspruch 7, bei dem das Lenkungs gelenk (50) ein Schwenk gelenk und ein Dreh gelenk umfasst.
9. Batteriebetriebener Staubsauger nach einem der Ansprüche 5 bis 8, bei dem der Betätigungsgriff (24) ein Griffteil (56) und ein Verbindungsteil (58) aufweist, wobei das Griffteil zum Greifen durch den Benutzer und das Verbindungsteil zur lösbaren Verbindung mit dem Gehäuse (12) des Staubsaugers (10)

ausgebildet ist.

10. Batteriebetriebener Staubsauger nach Anspruch 9, wenn er von Anspruch 7 oder Anspruch 8 abhängig ist, bei dem das Lenkungsgelenk (50) neben dem Verbindungsteil (58) angeordnet ist.
11. Batteriebetriebener Staubsauger nach einem der Ansprüche 5 bis 10, bei dem der Betätigungsgriff (24) ausziehbar ist.
12. Batteriebetriebener Staubsauger nach Anspruch 11, bei dem der Betätigungsgriff (24) eine Anzahl von rohrförmigen Abschnitten aufweist, die teleskopisch zueinander verschiebbar sind.
13. Batteriebetriebener Staubsauger nach Anspruch 12, bei dem der Betätigungsgriff (24) vier rohrförmige Abschnitte aufweist.
14. Batteriebetriebener Staubsauger nach Anspruch 9 oder Anspruch 10, bei dem der Betätigungsgriff (24) weist eine Reihe von rohrförmigen Abschnitten auf, die teleskopisch zueinander verschiebbar sind und bei dem der größte der Rohrabschnitte das Griffteil (56) umfasst.
15. Batteriebetriebener Staubsauger nach einem der Ansprüche 1 bis 14 mit einer Abdeckung (70) für die Öffnung, wobei die Abdeckung eine Düse (72) aufweist und abnehmbar am Gehäuse (12) befestigt werden kann.

Revendications

1. Aspirateur alimenté par batterie (10) ayant un corps (12) avec une batterie (14), un moteur (16), une turbine (18) et une chambre de collecte de saleté (20), le corps ayant un avant (28), un arrière (32), un premier côté (44) et un deuxième côté (46), le corps ayant également une paroi inférieure avec une ouverture (34) à travers laquelle l'air peut passer dans le corps, une brosse rotative (36) montée de manière adjacente à l'ouverture, l'ouverture (34) couvrant une grande proportion du corps entre les premier et deuxième côtés, la batterie (14) étant située au niveau du premier côté (44), **caractérisé en ce que** le moteur est situé au niveau du deuxième côté (46) avec la chambre de collecte de saleté (20) entre la batterie et le moteur.
2. Aspirateur alimenté par batterie selon la revendication 1, dans lequel le corps (12) a une paroi avant à son extrémité avant (28) et une paroi arrière à son extrémité arrière (32) et la longueur (L) du corps entre les parois avant et arrière est inférieure à 20 cm.

3. Aspirateur alimenté par batterie selon la revendication 2, dans lequel la longueur (L) du corps est inférieure à 15 cm.
4. Aspirateur alimenté par batterie selon la revendication 2 ou la revendication 3, dans lequel le corps (12) présente au moins une surface de préhension (62) entre ses parois avant et arrière.
5. Aspirateur alimenté par batterie selon l'une quelconque des revendications 1 à 4, comportant une poignée de commande amovible (24).
6. Aspirateur alimenté par batterie selon la revendication 5, dans lequel la poignée de commande (24) comporte des roues ou des rouleaux (30).
7. Aspirateur alimenté par batterie selon la revendication 5 ou la revendication 6, dans lequel la poignée de commande (24) présente une articulation de direction (50).
8. Aspirateur alimenté par batterie selon la revendication 7, dans lequel l'articulation de direction (50) comprend une articulation pivotante et une articulation rotative.
9. Aspirateur alimenté par batterie selon l'une quelconque des revendications 5 à 8, dans lequel la poignée de commande (24) comporte une partie poignée (56) et une partie de liaison (58), la partie poignée étant configurée pour être saisie par l'utilisateur, la partie de liaison étant configurée pour être reliée de manière amovible au corps (12) de l'aspirateur (10).
10. Aspirateur alimenté par batterie selon la revendication 9 lorsqu'il dépend de la revendication 7 ou de la revendication 8, dans lequel l'articulation de direction (50) est située de manière adjacente à la partie de connexion (58).
11. Aspirateur alimenté par batterie selon l'une quelconque des revendications 5 à 10, dans lequel la poignée de commande (24) est extensible.
12. Aspirateur alimenté par batterie selon la revendication 11, dans lequel la poignée de commande (24) comporte un certain nombre de sections tubulaires qui peuvent coulisser de manière télescopique les unes par rapport aux autres.
13. Aspirateur alimenté par batterie selon la revendication 12, dans lequel la poignée de commande (24) comporte quatre sections tubulaires.
14. Aspirateur alimenté par batterie selon la revendication 9 ou la revendication 10, dans lequel la poignée de commande (24) présente plusieurs sections tu-

bulaires qui peuvent coulisser de manière télescopique les unes par rapport aux autres, et dans lequel la plus grande des sections tubulaires comprend la partie poignée (56).

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- 15.** Aspirateur alimenté par batterie selon l'une quelconque des revendications 1 à 14, comportant un couvercle (70) pour l'ouverture, le couvercle comportant un embout (72), le couvercle pouvant être monté de manière amovible sur le corps (12).

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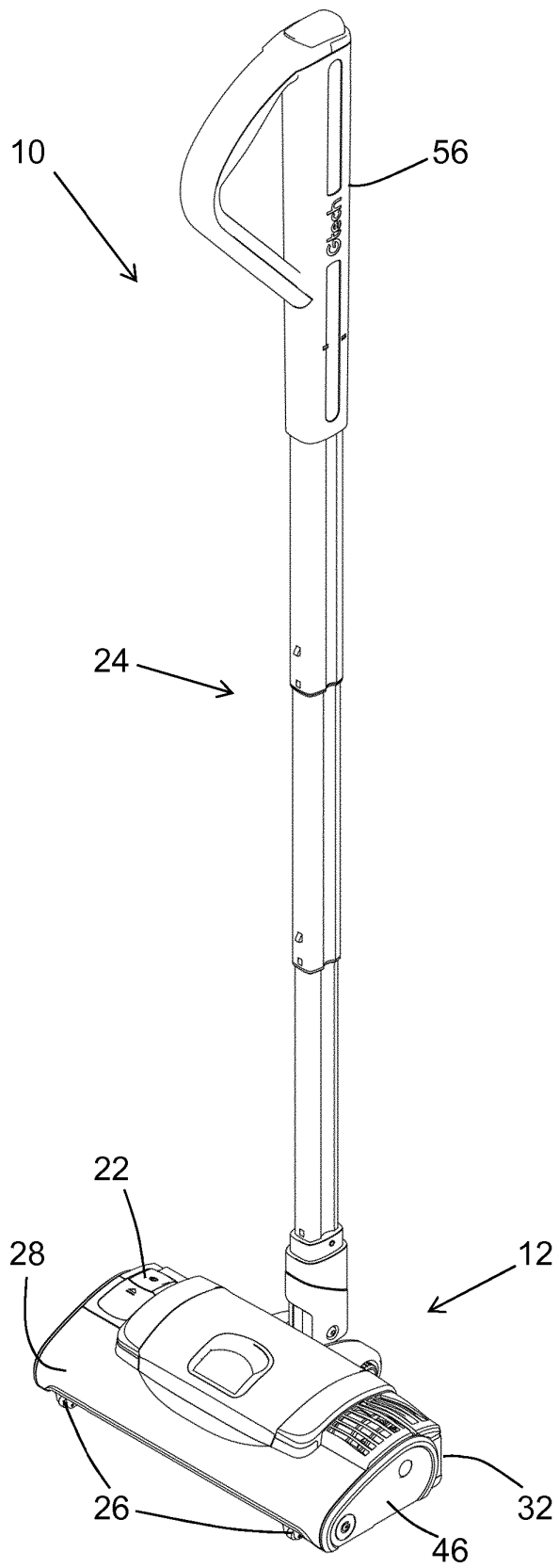


Fig.1

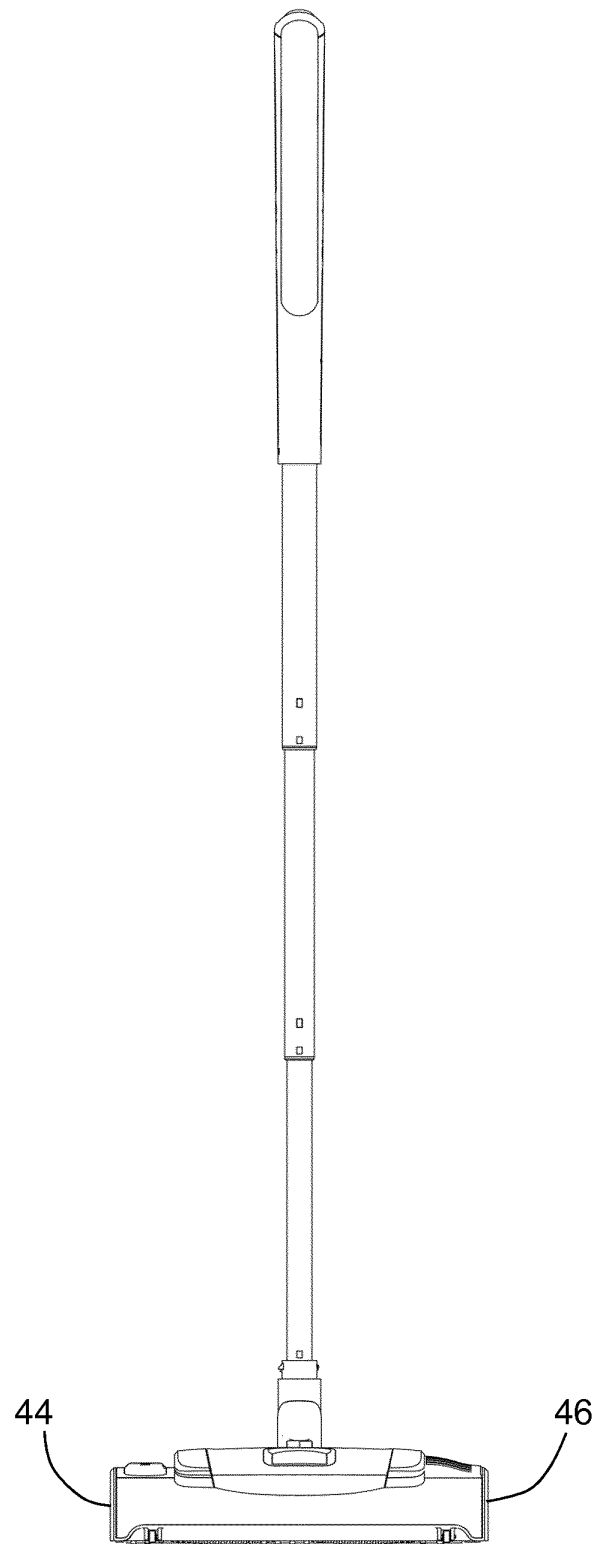
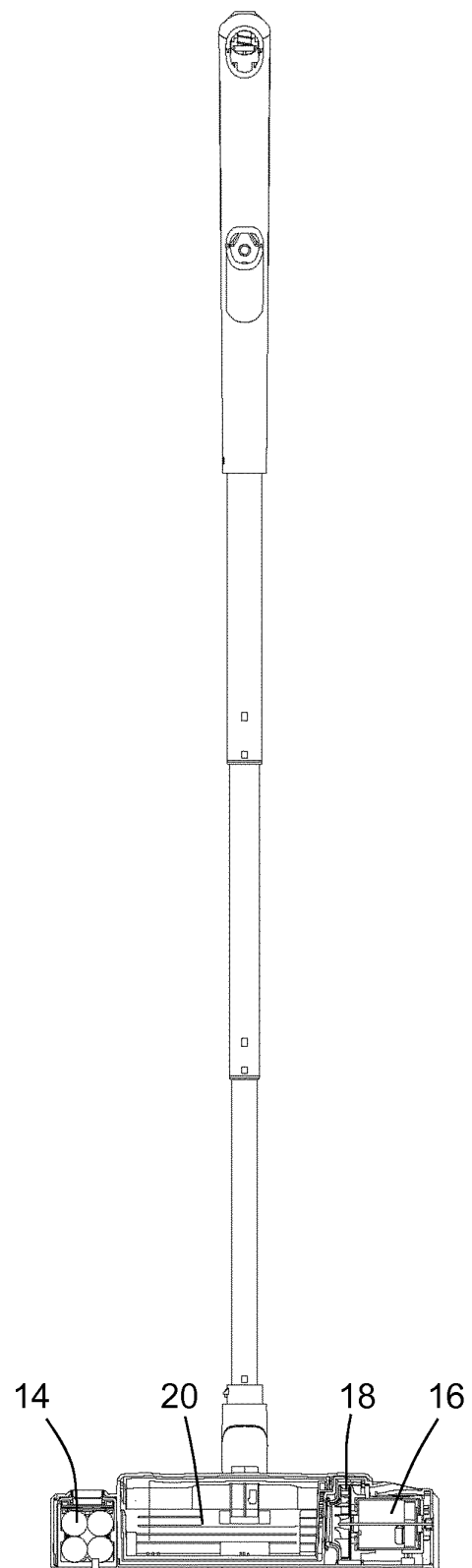
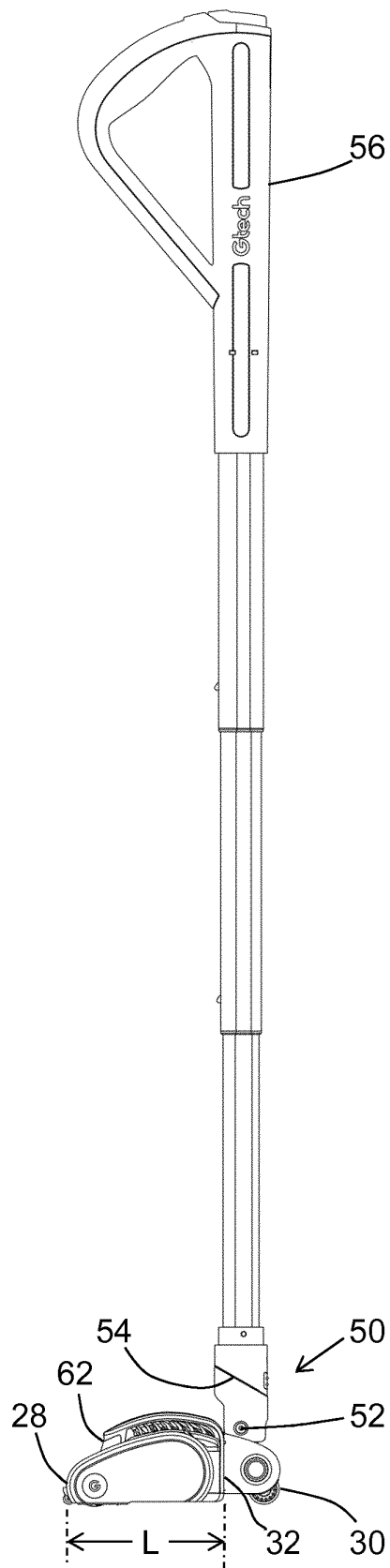


Fig.2



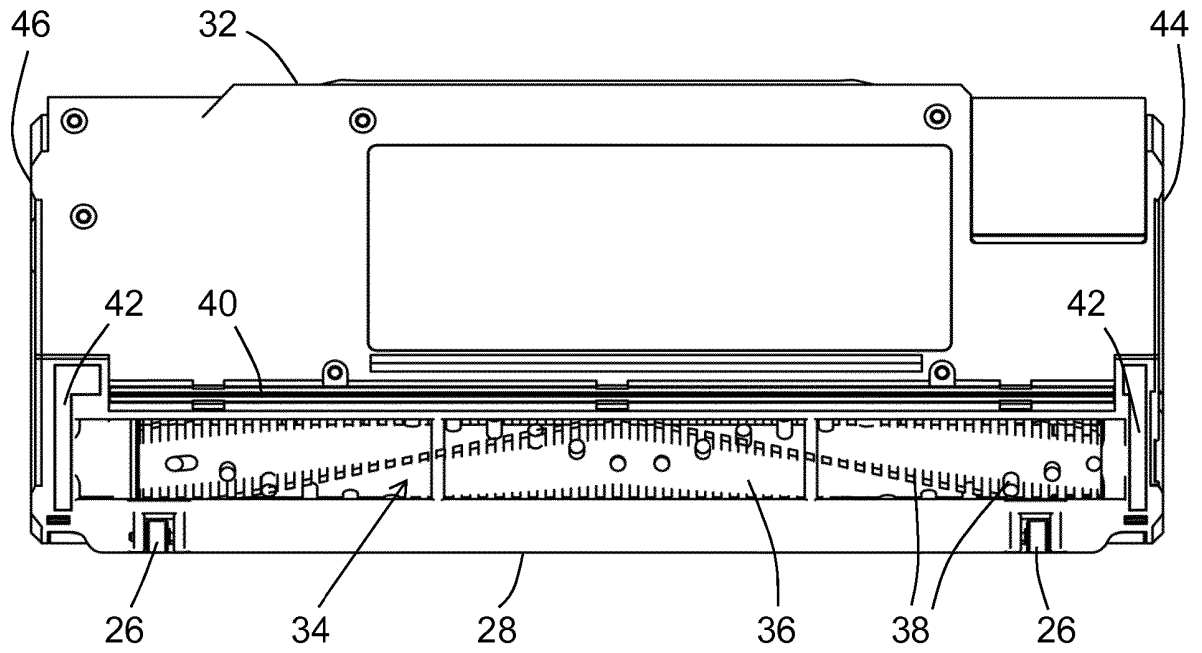


Fig.5

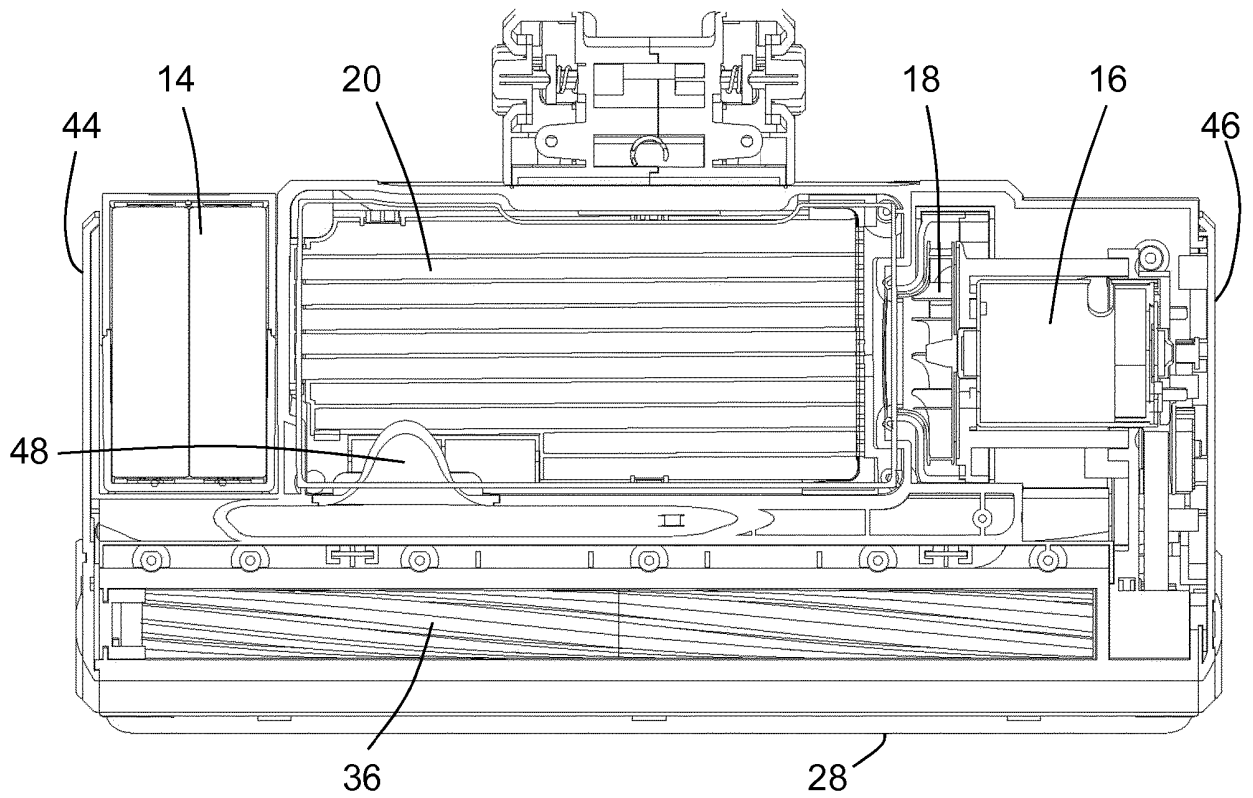


Fig.6

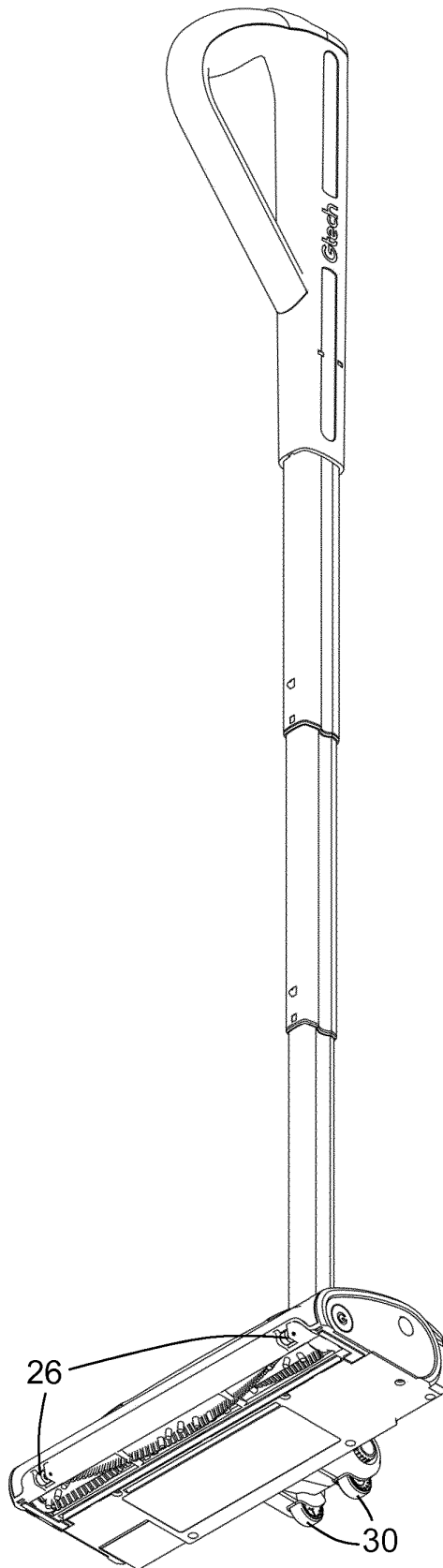


Fig.7

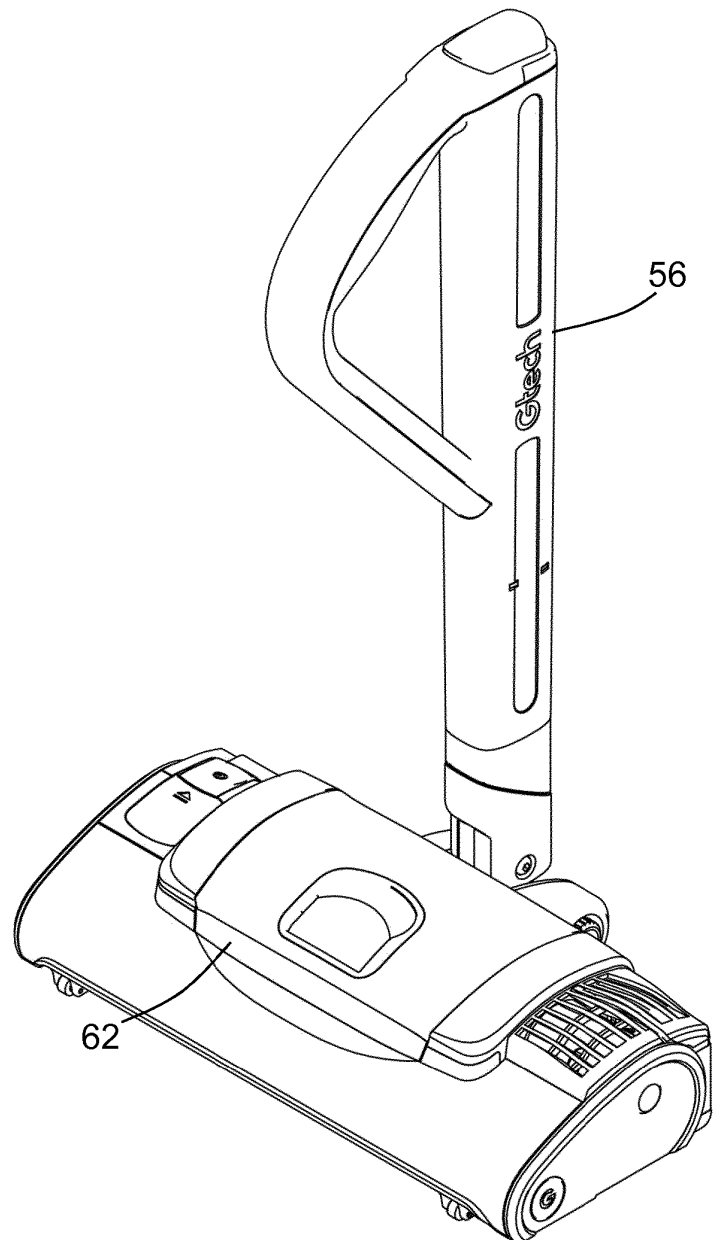


Fig.8

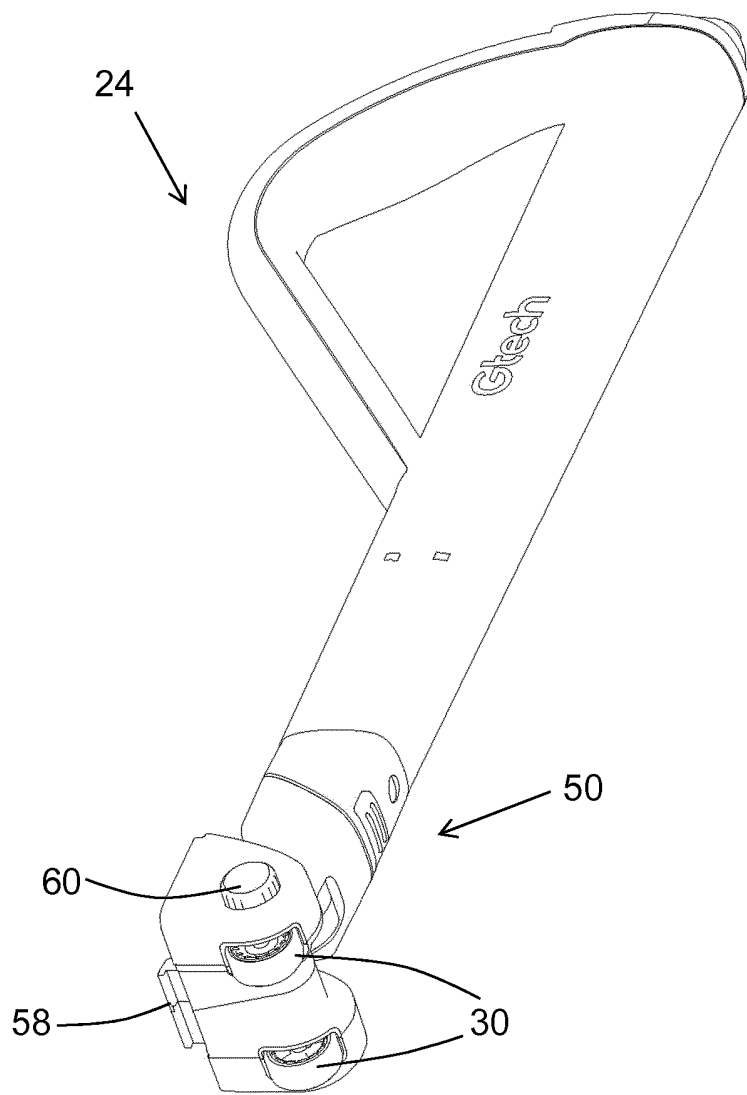


Fig.9

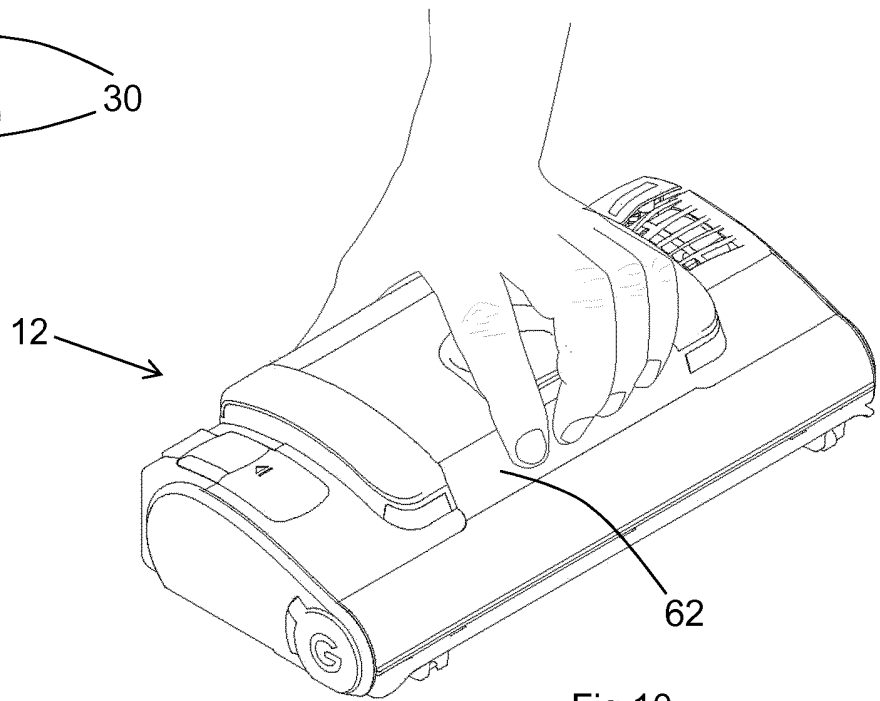


Fig.10

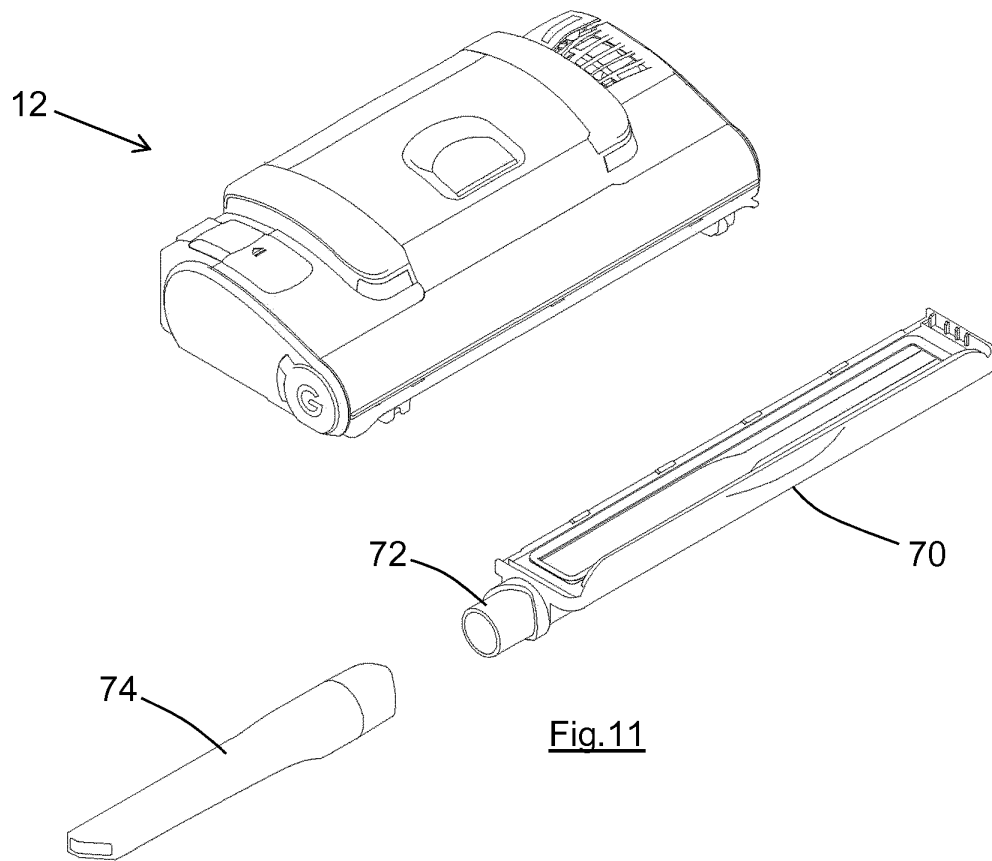


Fig.11

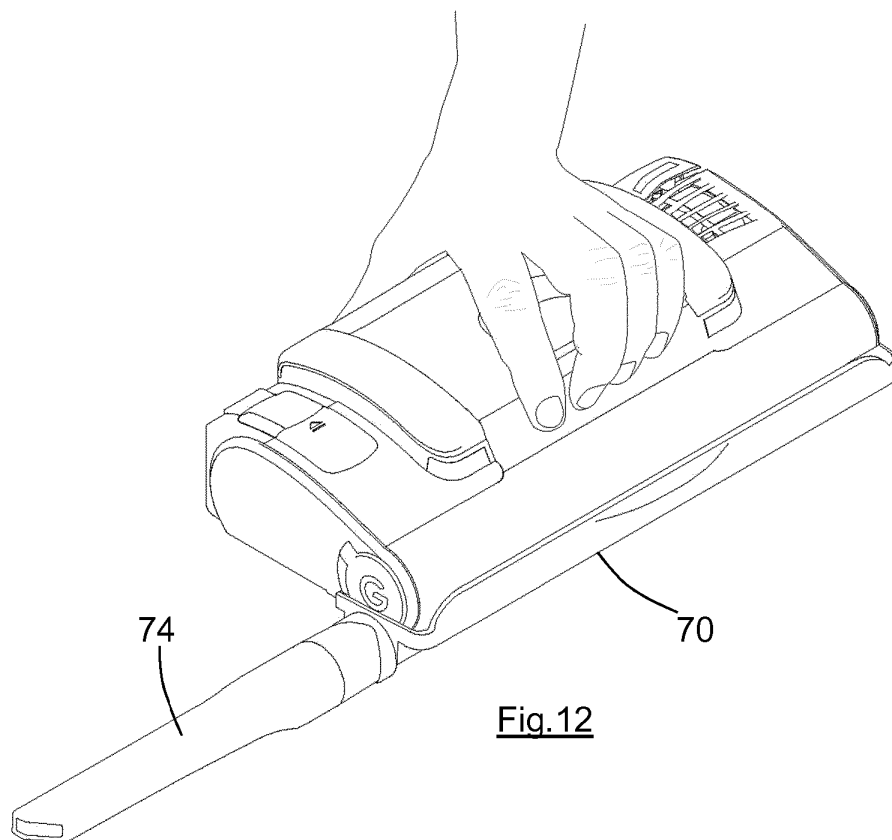


Fig.12

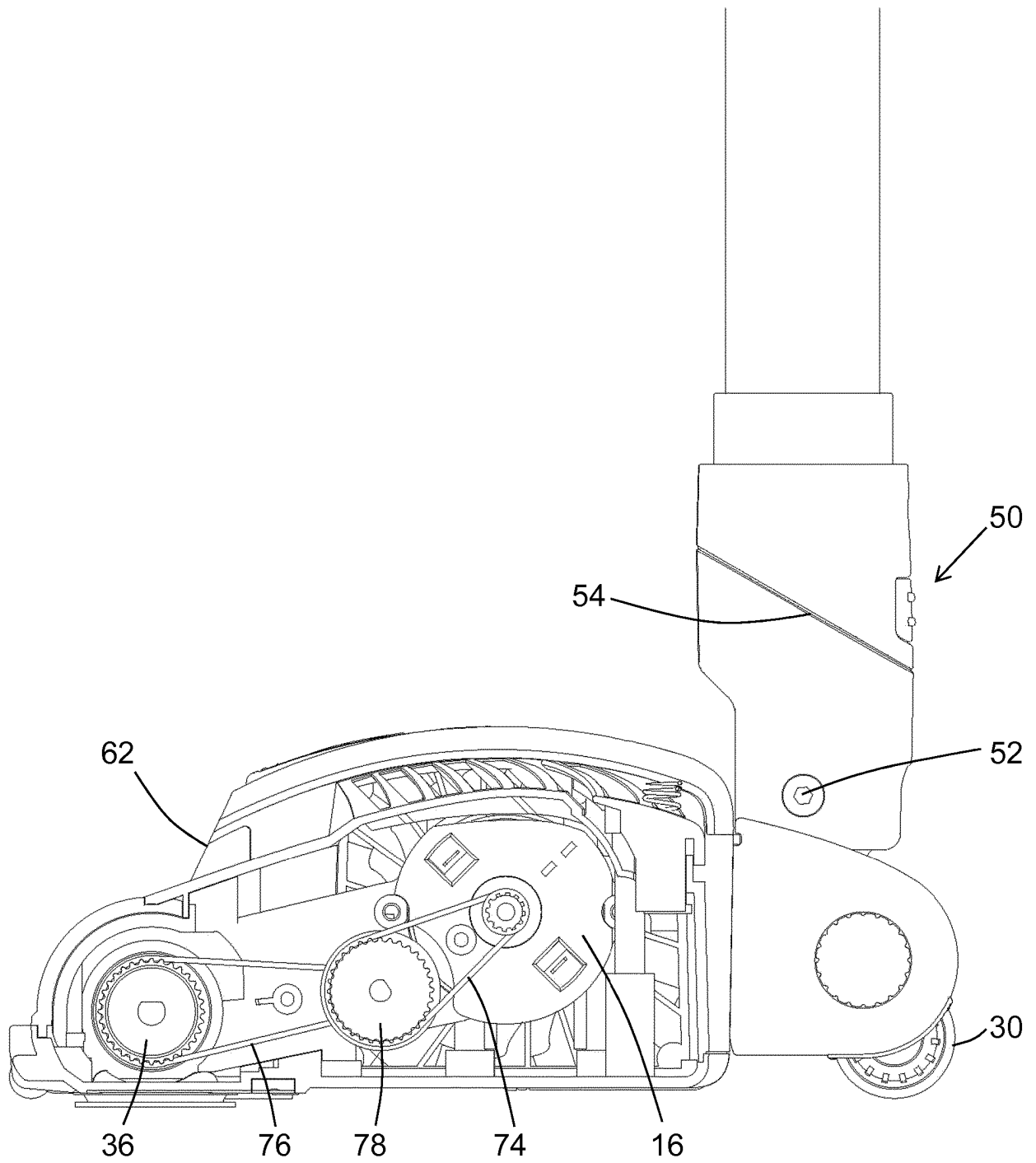


Fig.13

REFERENCES CITED IN THE DESCRIPTION

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