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(54) **A CHARGING STATION FOR BATTERY-OPERATED VACUUM CLEANERS**

(57) The present invention relates to a charging station (1) comprising a seating surface (2) whereon the vacuum cleaner (S) is placed; a support (3) which extends in the vertical direction from an edge of the seating surface (2) and against which the vacuum cleaner (S) bears; and charging pins which are provided on the support (3).

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Description

[0001] The present invention relates to a charging station for charging battery-operated vacuum cleaners.

[0002] With the development of battery technology, it is ensured that the vacuum cleaners used for cleaning can be operated with a battery. As the batteries can provide sufficient energy for the cleaning process, the performance of the cordless vacuum cleaners has approached the level of the corded vacuum cleaners, and users are encouraged to prefer the cordless vacuum cleaners. It is expected that battery-operated vacuum cleaners will become more widespread thanks to the desired mobility without causing cable clutter. Charging stations are used to charge the battery in the vacuum cleaners, and the charging stations can be either mounted to walls or free-standing. One of the problems encountered in the present charging stations is that the charging process does not start due to the failure to properly place the vacuum cleaner in the charging station. If the user does not notice this situation, the vacuum cleaner cannot be charged, causing the vacuum cleaner not to be used afterwards. Another problem is that due to causes such as vibration, etc. after the start of the charging process, the contact of the charging pins is interrupted, which leads to an incomplete charging process. Said problems result in that the users cannot use the vacuum cleaners when needed. This delays the expansion of the cordless vacuum cleaners. In the state of the art solutions for the uninterrupted contact of the charging pins, the design of the vacuum cleaner is changed, causing the ease of use of the vacuum cleaner to be lost. Moreover, the attachments added to the vacuum cleaner may be broken in the course of time, which leads to the reemergence of the issue.

[0003] In the state of the art United States Patent Application No. US20180199779, a charging station is disclosed, comprising a lid which partially covers the vacuum cleaner so as to retain the vacuum cleaner.

[0004] In the state of the art International Patent Application No. WO2018160047, a charging station is disclosed, comprising recesses wherein the protrusions provided on the vacuum cleaner are seated.

[0005] The aim of the present invention is the realization of a charging station wherein the battery-operated vacuum cleaner can be always charged without any problems.

[0006] The charging station realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises holders which are provided on the support surface against which the vacuum cleaner bears and which ensure a continuous contact between the charging pins and the charging points by surrounding the vacuum cleaner from the sides. When the vacuum cleaner is placed onto the charging station, the holders enter the recesses on the vacuum cleaner, thus ensuring interlocking. Consequently, when the vacuum cleaner is placed onto the charging station, the charging pins are always in contact with the charging points. Moreover, while entering the recesses to interlock during the placement of the vacuum cleaner, the holders make a noise, thus the user is ensured that the vacuum cleaner is properly placed. As the holders surround the vacuum cleaner, the incomplete charging process is processed due to the failure of contact with the charging pins.

[0007] In an embodiment of the present invention, the holders have an active position for locking the vacuum cleaner and a passive position wherein the vacuum cleaner is free. The holders are in the passive position as default, thus ensuring that the vacuum cleaner is easily placed onto the charging station, and then are shifted to the active position so as to ensure interlocking. Thus, ease of use is provided for the user while the vacuum cleaner is placed onto/removed from the charging station.

[0008] In another embodiment of the present invention, the charging station comprises a lower holder which remains below the holders. The vacuum cleaner is supported by the lower holder in addition to the seating surface, and thus the support against which the vacuum cleaner bears in the vertical direction can be produced very thin and the aesthetic appearance of the charging station is improved. In a version of this embodiment, the lower holder is movable, enabling the holders to shift between the active position and the passive position. Thus, no additional operation is required for the holders to shift positions, and as the vacuum cleaner is placed onto the charging station, the holders shift to the active position so as to surround and lock the vacuum cleaner. In an embodiment of the present invention, the movement of the lower holder is controlled by means of a spring connected to the support. Consequently, the vacuum cleaner can be continuously charged, preventing the production costs from increasing.

[0009] In another embodiment of the present invention, the holders are positioned in a channel arranged on the support. Thus, the vacuum cleaner gets in full contact with the support surface and the need for producing the charging pins with a length/size more than required is eliminated. The channel also guides the movement of the holders and the lower holder.

[0010] In another embodiment of the present invention, the charging station comprises a magnet which is provided on the support so as to support the locking performed by the holders. The magnet pulls the ferromagnetic material on the vacuum cleaner, thus ensuring a continuous contact between the charging pins and the charging points.

[0011] By means of the present invention, after the vacuum cleaner is placed onto the charging station, the contact between the charging pins and the charging points is not interrupted, thus providing uninterrupted charging. The vacuum cleaner is surrounded by the holders immediately after being placed and is prevented from tilting forward due to the full or empty dust bag, thus eliminating

any risk of incomplete charging process.

[0012] The charging station realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the front view of a charging station.
Figure 2 - is the perspective view of a charging station.
Figure 3 - is the front view of a charging station when the holders are in the passive position.
Figure 4 - is the front view of a charging station when the holders are in the active position.
Figure 5 - is the front view of the holders in the passive position and of the lower holder.
Figure 6 - is the front view of the holders in the active position and of the lower holder.
Figure 7 - is the perspective view of a vacuum cleaner placed onto the charging station.
Figure 8 - is the sideways view of a vacuum cleaner to be placed onto the charging station.

[0013] The elements illustrated in the figures are numbered as follows:

[0014]

1. Charging station
2. Seating surface
3. Support
4. Holder
5. Lower holder
6. Arm
7. Channel
8. Magnet
9. Guide
10. Pin

S. Vacuum cleaner
g. Recess

[0015] The charging station (1) comprises a seating surface (2) whereon the vacuum cleaner (S) is placed; a support (3) which extends in the vertical direction from an edge of the seating surface (2) and against which the vacuum cleaner (S) bears; and charging pins (not shown in the figures) which are provided on the support (3). The vacuum cleaner (S) is placed onto the seating surface (2). In this case, the charging points (not shown in the figures) on the surface of the vacuum cleaner (S) facing the support (3) align with the charging pins on the support (3), thus performing the charging process.

[0016] The charging station (1) of the present invention comprises L-shaped holders (4) which are oppositely provided on the edges of the support (3) and which enter the recesses (g) on the vacuum cleaner (S) when the vacuum cleaner (S) bears against the seating surface (2). The holders (4) preferably provided on the upper region of the support (3) open sideways from the edges of the support (3) with one side thereof extending towards the vacuum cleaner (S). One side of the L-shaped holders (4) enter the recesses (g) on the vacuum cleaner (S). Thus, the holders (4) surround the vacuum cleaner (S), ensuring a continuous contact between the charging pins and the charging points. The sides of the holders (4) surrounding the vacuum cleaner (S) and getting in contact with the vacuum cleaner (S) are L-shaped, and can be produced in the form of a U depending on the movement and the installation point of the holders (4) according to the structure of the charging station (1).

[0017] In an embodiment of the present invention, the holders (4) have an active position for clamping the vacuum cleaner (S) and a passive position wherein the vacuum cleaner (S) is free. The above-described position where the holders (4) grasp the vacuum cleaner (S) is the active position. The position where the holders (4) is not in the recesses (g) on the vacuum cleaner (S) is the passive position. The holders (4) are preferably movable and can move between said two positions.

[0018] In a version of this embodiment, the holders (4) are produced from a flexible material and can be manually shifted between the active position and the passive position. After placing the vacuum cleaner (S) onto the charging station (1), the user manually shifts the holders (4) from the passive position to the active position where the holders (4) enter the recesses (g), thus ensuring uninterrupted charging of the vacuum cleaner (S).

[0019] In another embodiment of the present invention, the charging station (1) comprises a lower holder (5) which extends from the front surface of the support (3) so as to be positioned below the holders (4), which is connected to the holders (4) and whereto the vacuum cleaner (S) is attached. The lower holder (5) is positioned below the holders (4). The vacuum cleaner (S) is attached to the lower holder (5) preferably by means of a gap provided thereon. The lower holder (5) is connected to the holders (4), thus increasing the strength thereof, and the support (3) can be produced with a thin structure.

[0020] In different embodiments of the present invention, the charging station (1) comprises the lower holder (5) which can move on the support (3) in the vertical direction, and arms (6) which connect the holders (4) to the lower holder (5) and which enable the holders (4) to shift between the active position and the passive position upon the movement of the lower holder (5). The lower holder (5) and the holders (4) are connected to each other by means of the arms (6). The lower holder (5) can move on the support (3). The holders (4) are preferably positioned at an angle with respect to the support (3) and react to the movement of the lower holder (5) in the vertical direction by moving diagonally. When the lower holder (5) moves downwards, the holders (4) shift to the active position, and when the former moves upwards the latter shifts to the passive position. As shown in Figure 5 and Figure 6, a guide (9) on the holder (4) and pins (10) entering the guide (9) can be used to determine the movement limitations of the holders (4).

[0021] In another embodiment of the present invention,

the charging station (1) comprises a spring (not shown in the figures) which is connected to the lower holder (5) from one end and to the support (3) from the other end and which pulls the lower holder (5) so as to force the holders (4) to stay in the passive position. The lower holder (5) is connected to the support (3) from one end by means of the spring, and the spring pulls the lower holder (5) upwards. Thus, the holders (4) remain in the passive position as default. After the vacuum cleaner (S) is attached to the lower holder (5), the lower holder (5) moves downwards and the holders (4) shift to the active position so as to surround the vacuum cleaner (S). After removing the vacuum cleaner (S) from the charging station (1), the spring pulls the lower holder (5) upwards, thus enabling the holders (4) to shift from the active position to the passive position and ensuring the easy removal of the vacuum cleaner (S).

[0022] In another embodiment of the present invention, the charging station (1) comprises at least one channel (7) which is arranged on the support (3) and wherein the lower holder (5) and the holders (4) move. By means of the channel (7), a section of the lower holder (5) and the holders (4) are embedded into the support (3) such that the holders (4) become flush with the support (3). Thus, the need for the charging pins on the support (3) extending outwards is eliminated.

[0023] In another embodiment of the present invention, the charging station (1) comprises a magnet (8) which is provided on the support (3) and which pulls the ferromagnetic material (not shown in the figures) on the vacuum cleaner (S). By means of the magnet (8), the function of the holders (4) is improved, guaranteeing a continuous charging of the vacuum cleaner (S).

[0024] In the charging station (1) of the present invention, the vacuum cleaner (S) is surrounded from sides by the holders (4), and the vacuum cleaner (S) is enabled to be always correctly placed onto the charging station (1). Moreover, the holders (4) continuously keep the vacuum cleaner (S) in the correct position, preventing the charging process from being interrupted.

Claims

1. A charging station (1) comprising a seating surface (2) whereon the vacuum cleaner (S) is placed; a support (3) which extends in the vertical direction from an edge of the seating surface (2) and against which the vacuum cleaner (S) bears; and charging pins which are provided on the support (3), **characterized by** L-shaped holders (4) which are oppositely provided on the edges of the support (3) and which enter the recesses (g) on the vacuum cleaner (S) when the vacuum cleaner (S) bears against the seating surface (2).

2. 2 - A charging station (1) as in Claim 1, **characterized by** the holders (4) having an active position for clamping the vacuum cleaner (S) and a passive position wherein the vacuum cleaner (S) is free.

3. 3 - A charging station (1) as in Claim 1 or 2, **characterized by** a lower holder (5) which extends from the front surface of the support (3) so as to be positioned below the holders (4), which is connected to the holders (4) and whereto the vacuum cleaner (S) is attached.

4. 4 - A charging station (1) as in Claim 3, **characterized by** the lower holder (5) which can move on the support (3) in the vertical direction, and arms (6) which connect the holders (4) to the lower holder (5) and which enable the holders (4) to shift between the active position and the passive position upon the movement of the lower holder (5).

5. 5 - A charging station (1) as in Claim 3 or 4, **characterized by** a spring which is connected to the lower holder (5) from one end and to the support (3) from the other end and which pulls the lower holder (5) so as to force the holders (4) to stay in the passive position.

6. 6 - A charging station (1) as in any one of the Claims 3 to 5, **characterized by** at least one channel (7) which is arranged on the support (3) and wherein the lower holder (5) and the holders (4) move.

7. 7 - A charging station (1) as in any one of the above claims, **characterized by** a magnet (8) which is provided on the support (3) and which pulls the ferromagnetic material on the vacuum cleaner (S).

Figure 1

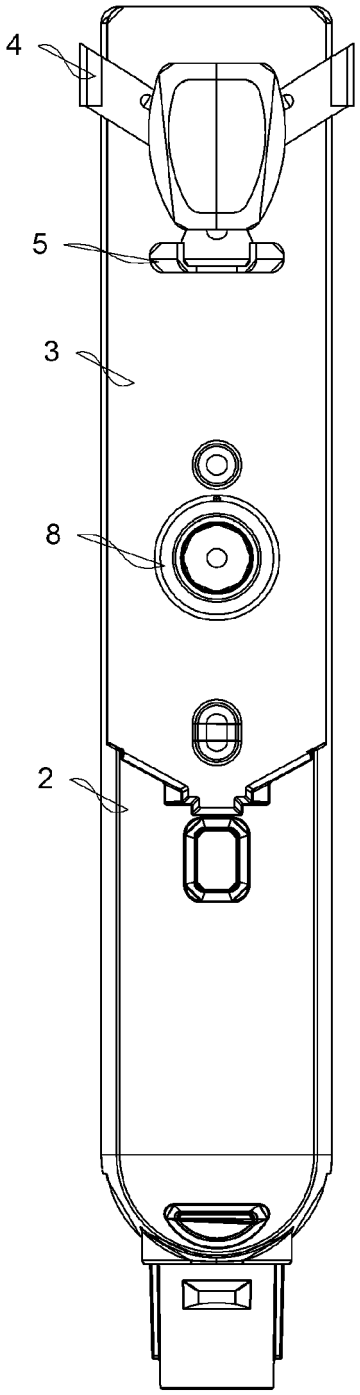


Figure 2

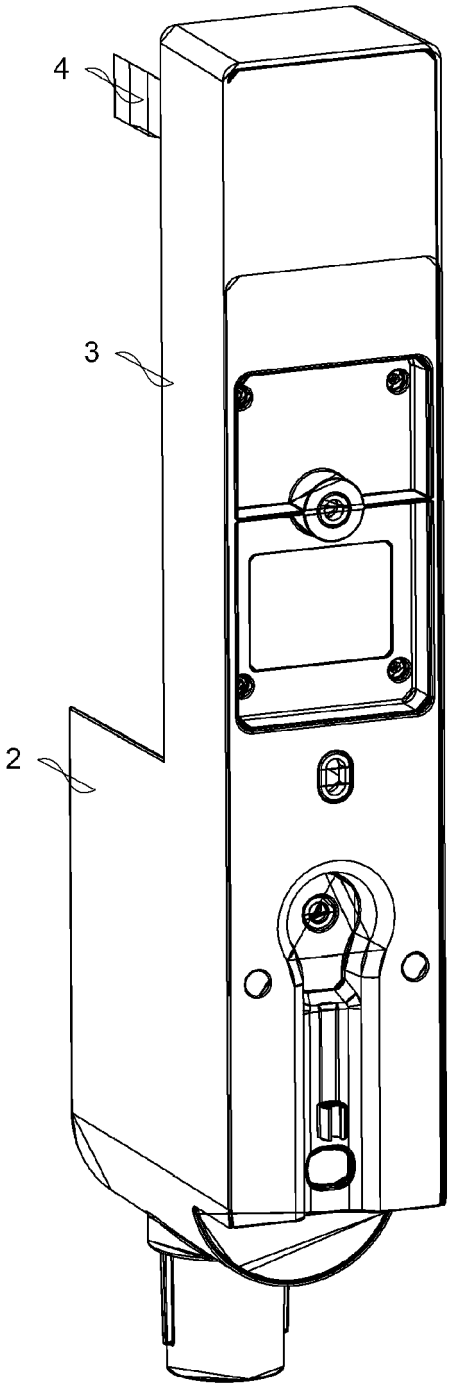


Figure 3

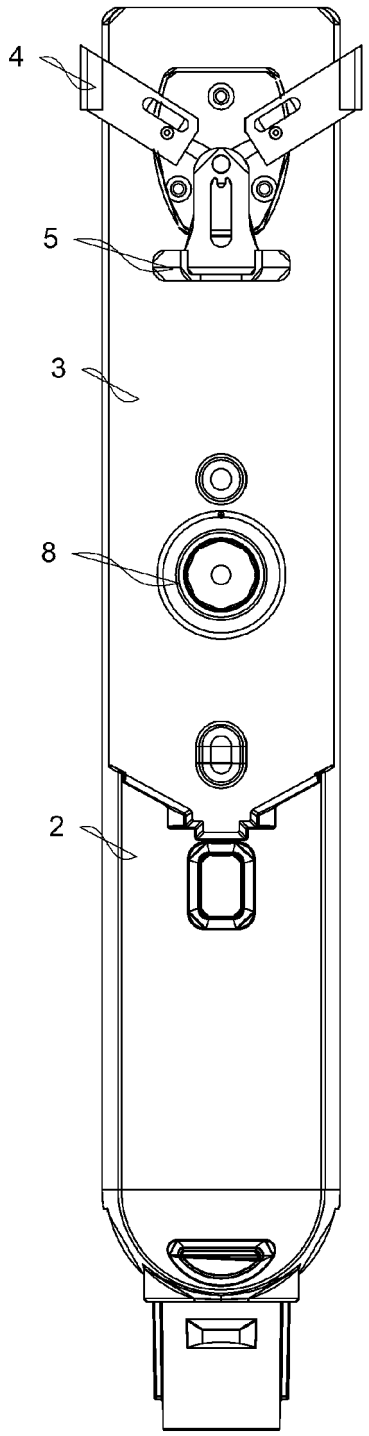


Figure 4

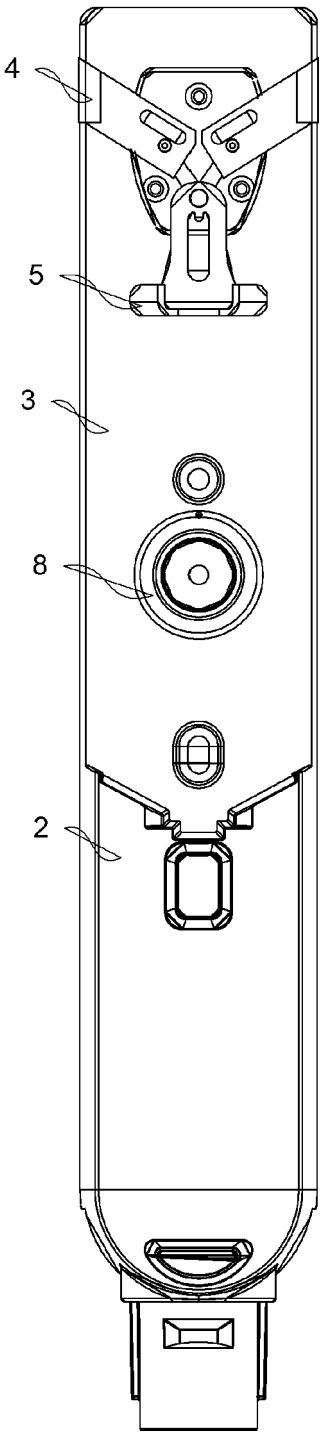


Figure 5

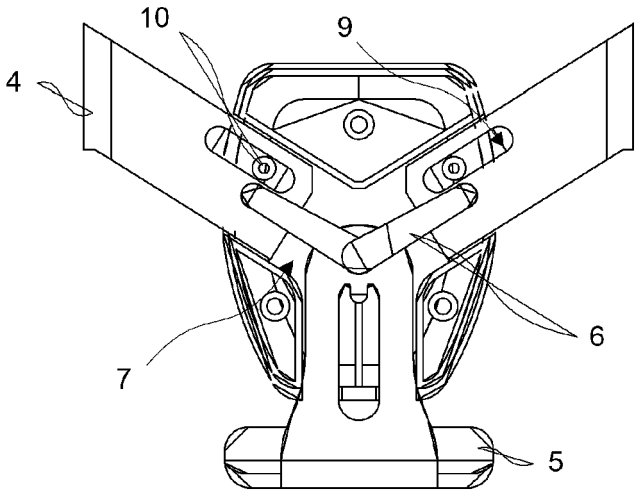


Figure 6

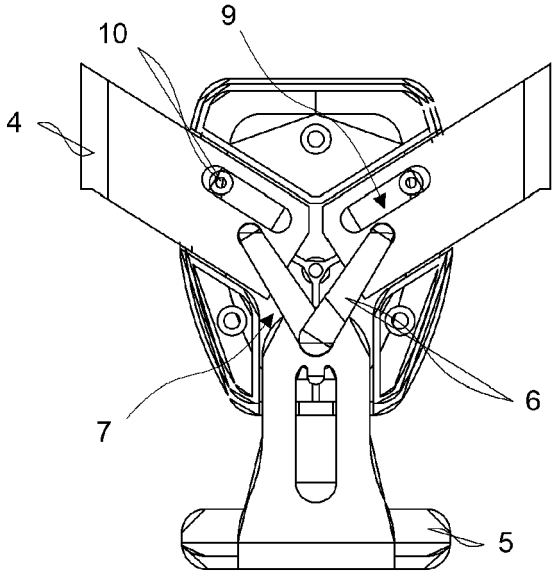


Figure 7

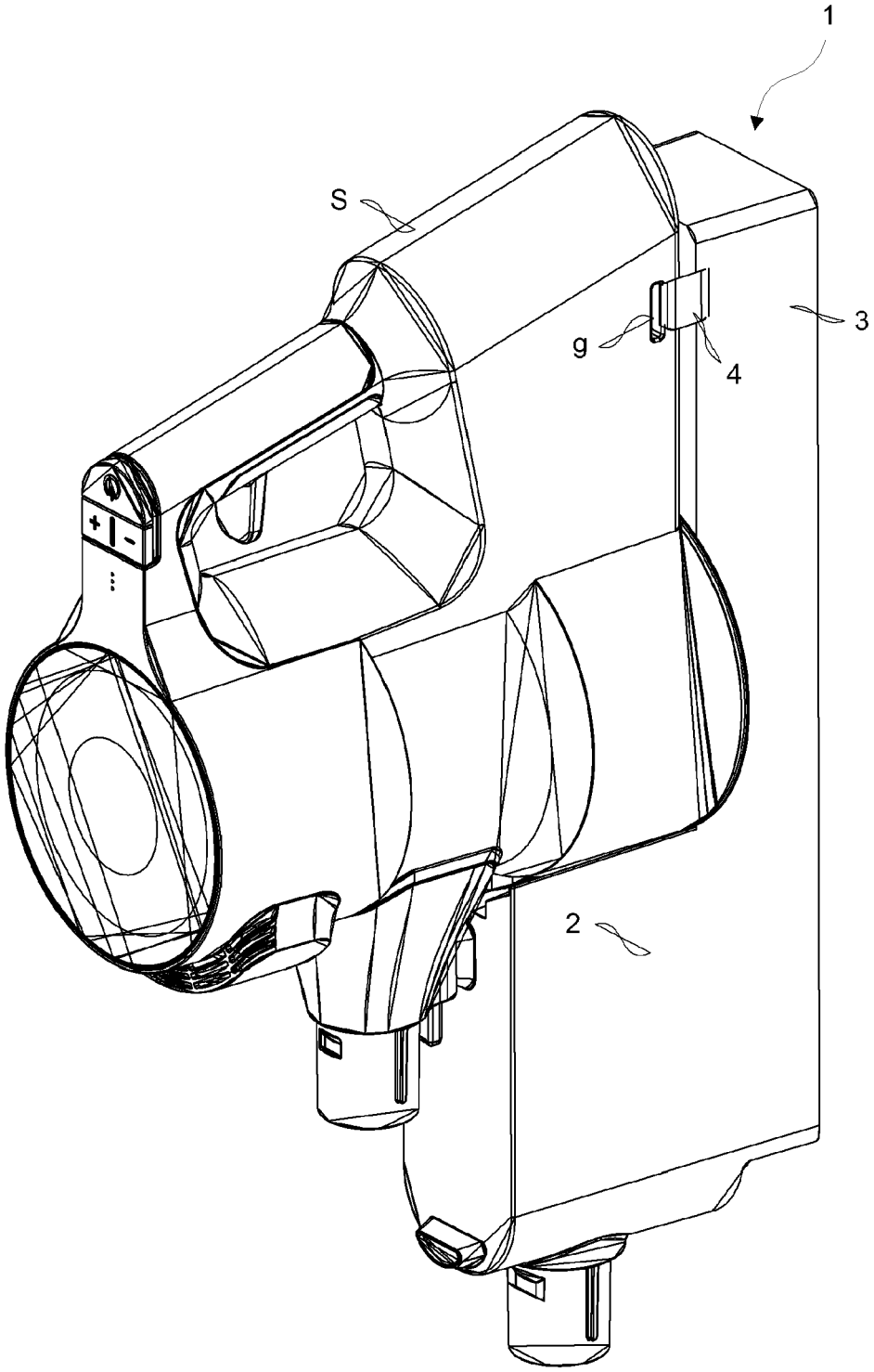
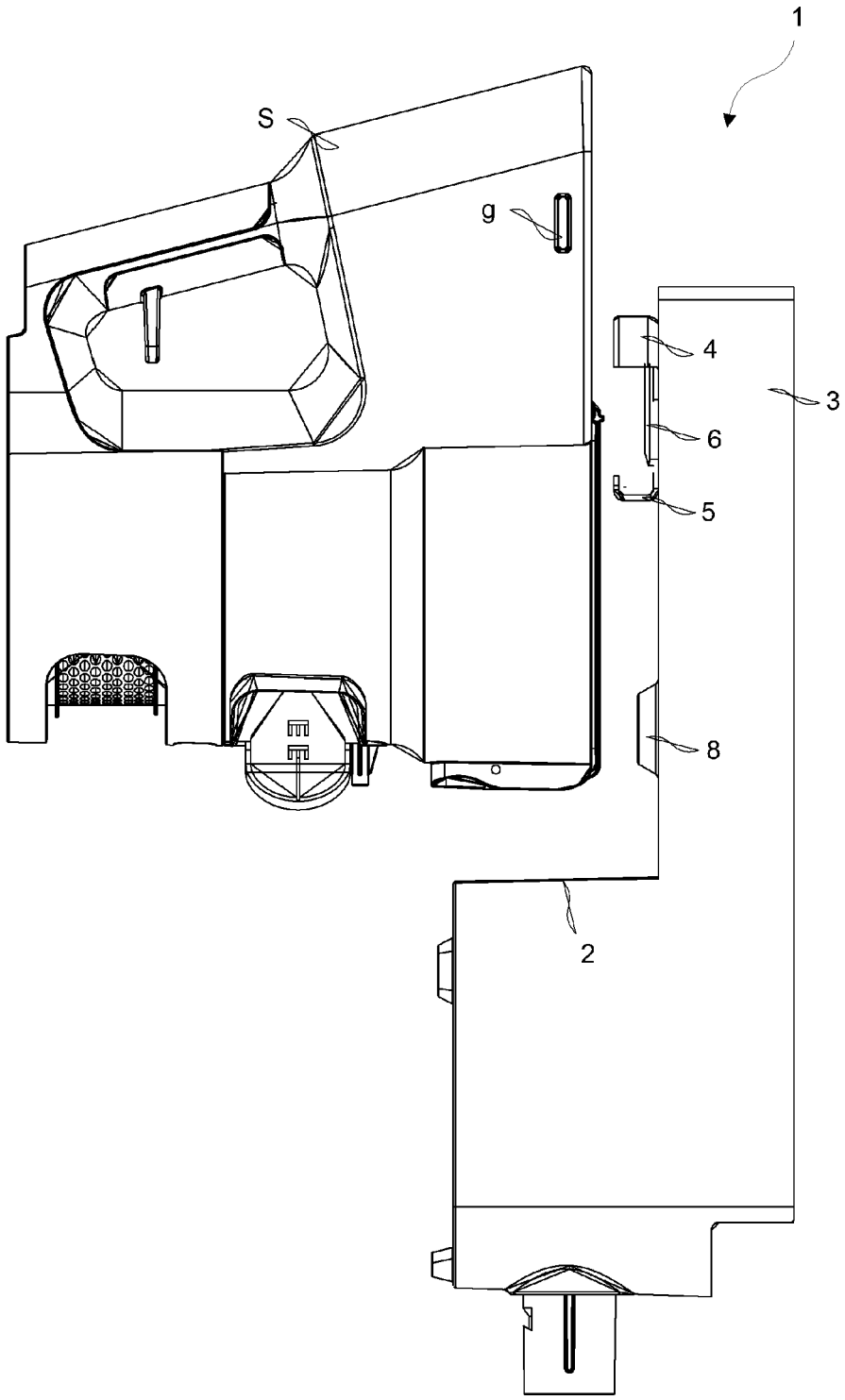


Figure 8



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EUROPEAN SEARCH REPORT

Application Number
EP 20 19 3646

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 3 524 115 A1 (LG ELECTRONICS INC [KR]) 14 August 2019 (2019-08-14) * paragraph [0067] - paragraph [0078]; figures 1,6-9 *	1-7	INV. A47L9/28 A47L9/00 A47L5/24
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TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 December 2020	Blumenberg, Claus

CATEGORY OF CITED DOCUMENTS

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01-12-2020

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- WO 2018160047 A **[0004]**