

(19)



(11)

EP 2 164 378 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
19.06.2013 Bulletin 2013/25

(51) Int Cl.:
A47L 9/28 ^(2006.01) **A47L 11/40** ^(2006.01)
A47L 9/00 ^(2006.01) **G05G 1/10** ^(2006.01)

(21) Application number: **08767097.2**

(86) International application number:
PCT/SE2008/000425

(22) Date of filing: **03.07.2008**

(87) International publication number:
WO 2009/008800 (15.01.2009 Gazette 2009/03)

(54) DEVICE AND EQUIPMENT

VORRICHTUNG UND AUSRÜSTUNG

DISPOSITIF ET ÉQUIPEMENT

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**

(30) Priority: **06.07.2007 SE 0701709**

(43) Date of publication of application:
24.03.2010 Bulletin 2010/12

(73) Proprietor: **Aktiebolaget Electrolux
10545 Stockholm (SE)**

(72) Inventors:
• **ENGSTRÖM, Christer**
S-171 57 Solna (SE)
• **HEDLUND, Tomas**
S-593 33 Västervik (SE)

(56) References cited:
EP-A2- 0 820 716 EP-A2- 1 297 776
JP-A- 2003 304 991 JP-A- 2003 337 628

EP 2 164 378 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Field of the invention

[0001] The present invention relates to a device for equipment such as a vacuum cleaner. The device comprises a regulating means connected to a control unit, said regulating means being turnable about an axis of rotation between a first position and a second position for regulating the control unit. The invention further relates to equipment such as a vacuum cleaner, comprising such a device. Such a device is known from

[0002] JP 2003 337628.

Technical background

[0003] Electrical equipment for domestic use, such as vacuum cleaners, often comprise a regulating means for regulating the power of the electrical machine. The regulating means is accessible for the user and provides the user a possibility to adjust the power level. The regulating means is further connected to a control unit that controls the actual power level of the device. The regulating means may be designed in many different ways, for instance as a button, as a slide control, or as a turnable handle.

[0004] More specifically, for a vacuum cleaner, it is preferred that the regulating means for regulating the power is located in a position that is easily accessible for the user during use.

[0005] Generally, the power of the vacuum cleaner is controlled by moving the regulating means, e.g. by using a thumb or finger grip. The shape and width of a grip surface of the regulating means has to be adapted to provide a comfortable and ergonomic grip. Thereby, the width of the regulating means has to be sufficient large in order to provide an ergonomic regulating means.

[0006] However, this requirement results in a manufacturing problem, since such large amounts of material is unwanted during injection moulding due to extensive material consumption, shrinking and a time consuming manufacturing process, thus resulting in an uneconomical manufacture of the regulating means.

Summary of the invention

[0007] It is an object of the present invention to provide an improvement over the above described techniques and prior art.

[0008] A further object is to provide a device with a regulating means that reduces the material consumption and manufacturing time, thereby providing a more economical manufacturing and assembling process.

[0009] Another object is to provide a device with a regulating means that is ergonomic and reduces the user's cognitive effort for understanding the function and handling of the device.

[0010] A further object is to provide equipment, such

as a vacuum cleaner, comprising such a device.

[0011] These and other objects and advantages that will be apparent from the description are achieved by a device for equipment such as a vacuum cleaner, the device comprising a regulating means connected to a control unit, said regulating means being turnable about an axis of rotation between a first position and a second position for regulating the control unit. The device is characterised in that the regulating means comprises a first part having an outer section and a second part having an outer section receiving recess, wherein said outer section receiving recess of said second part is adapted to receive said outer section of said first part and to retain said first part by enclosing said outer section by an angle exceeding 180°.

[0012] An advantage of the inventive device is that the first and second part of the regulating means may be produced by two individual manufacturing processes. Thereby, the design of the second part could be optimized without any consideration has to be taken regarding the design of the first part. By this two-part design, it is possible to form the desired cavity of the second part in order to reduce the material thickness. In addition, the second part can be formed to fit the user's hand, allowing a larger flexibility for the design of the second part. As a consequence of the reduced material thickness, the material consumption is reduced and the manufacturing process is shortened, resulting in a more economical manufacture of the regulating means.

[0013] The first part is easily attached to the second part by the outer section of the first part being received by the outer section receiving recess of the second part. As the second part is enclosing the outer section of the first part with an angle exceeding 180°, relative movement between the first and the second part in a geometrical plane is reduced.

[0014] The first and the second part function as a unit, nevertheless allowing a large degree of design flexibility as they are manufactured as separate parts.

[0015] The outer section receiving recess of the second part and the outer section of the first part may have a circular arc shape. For the user, it is easy to understand that it is possible to turn the regulation means as it is circular arc shaped. Further, it is easy to understand that the turning of the regulation means controls a specific function of the device.

[0016] The first part may comprise a locking boss, which is adapted to co-operate with a locking boss receiving recess of the second part for preventing movements between the first part and the second part about the axis of rotation. The locking boss, in co-operation with the locking boss receiving recess, functions as a lock, locking the first part to the second part. As a result, the risk of an unintended relative movement between the first and second part is reduced. Thereby, the first part may be firmly attached to second part and when the user rotates the second part, the first and the second part rotate together.

[0017] The first part may comprise an axle extending along the axis of rotation. The axle may be used for mounting the regulating means in the device. The axle may further be connected to the control unit for transmitting the movements of the regulating means to the control unit.

[0018] The second part may further comprise a grip surface adapted to facilitate handling of the regulating means. The grip surface facilitates the handling of the adjustment device, and it is possible to turn the regulating means for, for instance, controlling the power level with a finger or thumb grip. Further, it is easy to assign the regulating means its function, such as in the case for power level regulation, due to the easily understood function and handling of the regulating means.

[0019] The outer section receiving recess of the second part may be adapted to enclose the outer section of the first part by an angle in the range of 200° to 220°.

[0020] The first and the second part may be made of a plastic material.

[0021] The second part may be flexible and thereby facilitating the assembly of the regulating means, allowing the outer section of the first part to be received with a snap fit by the outer section receiving recess of the second part.

[0022] The first part may further comprise a guide boss adapted to co-operate with a guide boss receiving recess of the second part. If the first or the second part is not symmetrical, the guide boss may be used to reduce the risk of incorrect assembly of the regulating means.

[0023] The regulating means may be continuously turnable between the first and second position and thereby allowing a continuous adjustment without any fixed steps.

[0024] The regulating means may be gradually turnable in a stepwise mode between the first and second position, allowing the user to adjust the regulating means in steps and to receive tactile feedback.

[0025] According to another aspect of the invention, equipment such as a vacuum cleaner is provided, comprising such a device. The equipment incorporates all the advantages of the device, which previously has been discussed. Whereby, the previous discussion is applicable also for the inventive equipment.

Brief description of the drawings

[0026] The invention will by way of example be described in more detail with reference to the appended schematic drawings.

Fig. 1 is a schematic illustration of a vacuum cleaner with a regulating means.

Fig. 2 is a perspective view of a first and second part of a regulating means before assembly.

Fig. 3 is a perspective view of the first and second part of the regulating means shown in Fig. 2 before assembly.

Fig. 4 is a perspective view of the regulating means shown in Fig. 2 when assembled.

Fig. 5 is a cross-sectional view of the regulating means shown in Fig. 2.

Detailed description

[0027] Fig. 1 discloses an upright vacuum cleaner 1 comprising a device according to the present invention with a regulating means 10 arranged adjacent to a handle 2 of the vacuum cleaner 1. Even if an upright vacuum cleaner 1 is shown in fig. 1, the regulating means 10 is suitable for all kind of vacuum cleaners, and in general, for all equipment having a regulating means.

[0028] The regulating means 10 is connected to a control unit 3, schematically shown in fig. 1, arranged inside the vacuum cleaner 1. In the shown embodiment, the control unit 3 controls the power level of the electrical motor of the vacuum cleaner 1.

[0029] The regulating means 10 is turnable between a first position and a second position. The user operates the regulating means 10 by turning the regulating means 10 about an axis. In the following, all directions will be defined referring to the directions derived from an axis and the turning movement about this axis.

[0030] When the regulating means 10 is turned from the first position to the second position, the connection between the regulating means 10 and the control unit 3 allows the regulating means 10 to regulate the control unit 3. In the disclosed embodiment, the movement of the regulating means 10 results in an adjustment of the power level, regulated by the control unit 3, from a first level to a second level.

[0031] The regulating means 10 is either continuously movable or gradually movable in a stepwise mode. If the regulating means 10 is movable in steps, the user obtains tactile feedback when regulating the power level.

[0032] Now referring to fig. 2, a first part 20 and a second part 30 of the regulating means 10 is shown in an unassembled state. The first part 20 is formed as a disc. In the shown embodiment, said disc is circular where a portion of the disc is removed. The first part has two side surfaces 25, 26. The rim portion of the first part 20 forms an outer section 21 of the first part 20, indicated by the hatched area in fig. 2. An axle 22 has an extension through the first part 20 in an axial direction. The axle 22 comprises two grooves 27, 28 for mounting the first part 20 in the vacuum cleaner 1, or the like. A locking boss 23 is arranged on the outer section 21 of the first part 20, forming a projection on both side surfaces 25, 26. Similarly, a guide boss 24 is arranged on the outer section 21 of the first part 20, at a distance from the locking boss 23. The guide boss 24 forms a projection on both side surfaces 25, 26.

[0033] The second part 30 is formed as a circular arc shaped member having an inner surface 32 forming a cavity in the second part 30. The angle of the circular arc of the second part 30 is exceeding 180°. The second part

30 comprises an outer surface 31 forming a grip surface 39 accessible to user. The outer surface 31 comprises a plurality of depressions 33, facilitating the user's interacting with the regulating means 10. The second part 30 further comprises flanges 34, extending in the axial direction, arranged on an inner section of the second part 30. In the shown embodiment, the second part 30 is flexible. The flexibility of the second part 30 may be such that the radius of the circular arc shaped second part 30 could be increased.

[0034] Now referring to fig. 3, showing the first part 20 and the second part 30 in an unassembled state. The inner surface 32 of the second part 30 comprises an outer section receiving recess 36 having a depth. The outer section receiving recess 36 is adapted to receive the outer section 21 of the first part 20. The width of the outer section receiving recess 36 substantially corresponds to the thickness of the first part 20 in the form of a disc. The inner surface 32 of the second part 30 further comprises a locking boss receiving recess 37 and a guide boss receiving recess 38. The locking boss receiving recess 37 is adapted to receive the locking boss 23 and the guide boss receiving recess 38 is adapted to receive the guide boss 24.

[0035] As shown in fig. 3, the axle 22 comprises a first axle portion 22a and a second axle portion 22b. The first axle portion 22a, extending from the side surface 25, is formed of a hollow cylinder having a diameter essentially greater than the second axle portion 22b. The second axle portion 22b, having an angular shape, is extending from the side surface 26.

[0036] With reference to fig. 4, the regulating means 10 in an assembled state will now be described. The first part 20 is inserted into the second part 30. More specifically, due to the flexibility of the second part 30, the outer section 21 of the first part 20 may be received with snap fit by the outer section receiving recess 36.

[0037] The second part 30 encloses the first part 20 with an angle exceeding 180°. Thereby, relative movements between the first part 20 and the second part 30 is reduced and the first part is engaged to the second part 30. As a consequence, the first and second part 20, 30 form an integrated unit, corresponding to a one-piece design.

[0038] The outer section 21 of the first part 20 is received in the outer section receiving recess 36 of the second part 30. The first part 20 is in this manner fixedly arranged in the axial direction.

[0039] The locking boss 23 and the guide boss 24 are received in the locking boss receiving recess 37 and in the guide boss receiving recess 38, respectively. The locking boss 23 locks the first part 20 to the second part 30. The locking function of the locking boss 23 prevents that the second part 30 and the first part 20 turn about the axle independent of each other. When the locking boss 23 is received in the locking boss receiving recess 37, the first and second part 20, 30 turn about the axle 22 as an integrated unit.

[0040] The guide boss 24, in co-operation with the guide boss receiving recess 38, improves the locking mechanism. Additionally, the guide boss 24 facilitates correct assembly of the first and second part 20, 30. If the design of the first and second part 20, 30 requires a certain mutual orientation, the presence of the guide boss 24 makes incorrect assembly of the parts more difficult.

[0041] The first axle portion 22a of the axle 22 is adapted to attach the regulating means 10 to the vacuum cleaner 1, or the like. In addition, the first axle portion 22a may comprise a member providing step-like feedback when the user turns the regulating means 10.

[0042] The second axle portion 22b is connected to the control unit 3. The second axle portion 22b transmits the movement of the regulating means 10 between the first position and the second position to the control unit 3, which performs the corresponding change of the power level of the electrical motor, or the like.

[0043] When the regulating means 10 is mounted on the vacuum cleaner 1, only a portion of the second part 30 projects over the adjoining surface and is accessible to the user, as shown in fig. 1. If the user wants to adjust the power level of the vacuum cleaner 1, the user turns the regulating means 1 by touching the outer surface 31, i.e. the grip surface 39, of the second part 30. Since the second part 30 encloses the outer section 21 of the first part 20, the outer section 21 of the first part 20 is received in the outer section receiving recess 36, and the locking boss 23 is received in the locking boss receiving recess 37, the first part 20 is retained in the second part 30 and the first and second part 20, 30 perform the turnable movement as a unit. The movement of the regulating means 10 controls the control unit 3, and thereby the power level of the electric motor, or the like. The movement of the regulating means 10 is transmitted to the control means by the second axle portion 22b.

[0044] Fig. 5 illustrates a cross-sectional view of the regulating means, showing the outer section 21 of the first part 20 being received in the outer section receiving recess 36. Further, the cross-sectional view shows the locking boss 23 and the guide boss 24 being received in the locking boss receiving recess 37 and the guide boss receiving recess 38, respectively.

[0045] The control unit 3 may be a potentiometer, or any other device suitable for controlling the power level of an electrical motor, or the like.

[0046] It is contemplated that instead of using of a guide boss, the locking boss and the associated locking boss receiving recess may be formed in a way that makes incorrect assembly of the first and second part more difficult.

[0047] Even if a control unit controlling the power level of a device is described, it is contemplated that the control unit may control any other level or output of a device. Further, it is contemplated that the members forming the regulating means may have any other suitable form and/or shape.

[0048] There are modifications of the embodiments de-

scribed herein, which fall within the scope of the appended claims.

Claims

1. Device for equipment such as a vacuum cleaner (1), the device comprising a regulating means (10) connected to a control unit (3), said regulating means (10) being turnable about an axis of rotation between a first position and a second position for regulating the control unit (3),
characterised in
that the regulating means (10) comprises a first part (20) having an outer section (21) and a second part (30) having an outer section receiving recess (36), wherein said outer section receiving recess (36) of said second part (30) is adapted to receive said outer section (21) of said first part (20) and to retain said first part (20) by enclosing said outer section (21) by an angle exceeding 180°.
2. Device according to claim 1, wherein said outer section receiving recess (36) of the second part (30) and the outer section (21) of the first part (20) have a circular arc shape.
3. Device according to any of claims 1 and 2, wherein the first part (20) comprises a locking boss (23), which is adapted to co-operate with a locking boss receiving recess (37) of the second part (30) for preventing movements between the first part (20) and the second part (30) about the axis of rotation.
4. Device according to any one of claims 1-3 wherein the first part (20) comprises an axle (22) extending along the axis of rotation.
5. Device according to any one of claims 1-4, wherein the second part (30) further comprises a grip surface (39) adapted to facilitate handling of the regulating means (10).
6. Device according to any one of claims 1-5, wherein said outer section receiving recess (36) of the second part (30) is adapted to enclose the outer section (21) of the first part (20) by an angle in the range of 200° to 220°.
7. Device according to any one of claims 1-6, wherein the first and the second part (20, 30) are made of a plastic material.
8. Device according to any one of claims 1-7, wherein the second part (30) is flexible.
9. Device according to any one of claims 1-8, wherein the first part (20) further comprises a guide boss (24)

adapted to co-operate with a guide boss receiving recess (38) of the second part (30).

10. Device according to any one of claims 1-9, wherein the regulating means (10) is continuously turnable between the first and second position.
11. Device according to any one of claims 1-9, wherein the regulating means (10) is gradually turnable in a stepwise mode between the first and second position.
12. Equipment such as a vacuum cleaner (1), comprising a device according to any one of claims 1-11.

Patentansprüche

1. Vorrichtung für Ausrüstung wie einen Staubsauger (1), wobei die Vorrichtung ein an ein Steuergerät (3) angeschlossenes Reguliermittel (10) aufweist, wobei das Reguliermittel (10) für Regulieren des Steuergeräts (3) zwischen einer ersten Position und einer zweiten Position um eine Drehachse drehbar angeordnet ist,
dadurch gekennzeichnet, dass
das Reguliermittel (10) ein erstes Teil (20), das einen äußeren Bereich (21) aufweist, und ein zweites Teil (30), das eine den äußeren Bereich aufnehmende Aussparung (36) aufweist, umfasst, wobei das zweite, die den äußeren Bereich aufnehmende Aussparung (36) aufweisende Teil (30) für eine Aufnahme des äußeren Bereichs (21) des ersten Teils (20) und Festhalten des ersten Teils (20) durch Umschließen des äußeren Bereichs (21) in einem 180° übersteigenden Winkel angepasst ist.
2. Vorrichtung nach Anspruch 1, wobei die den äußeren Bereich aufnehmende Aussparung (36) des zweiten Teils (30) und der äußere Bereich (21) des ersten Teils (20) die Form eines Kreisbogens aufweisen.
3. Vorrichtung nach einem der Ansprüche 1 und 2, wobei das erste Teil (20) eine Verriegelungsnase (23) aufweist, die für Zusammenwirken mit einer Verriegelungsnasen-Aufnahmeaussparung (37) des zweiten Teils (30) ausgeführt ist, um Bewegungen zwischen dem ersten Teil (20) und dem zweiten Teil (30) um die Drehachse zu verhindern.
4. Vorrichtung nach einem der Ansprüche 1 bis 3, wobei das erste Teil (20) eine sich entlang der Drehachse erstreckende Welle (22) aufweist.
5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei das zweite Teil (30) ferner eine zur Vereinfachung der Handhabung des Reguliermittels (10)

ausgeführte Grifffläche (39) aufweist.

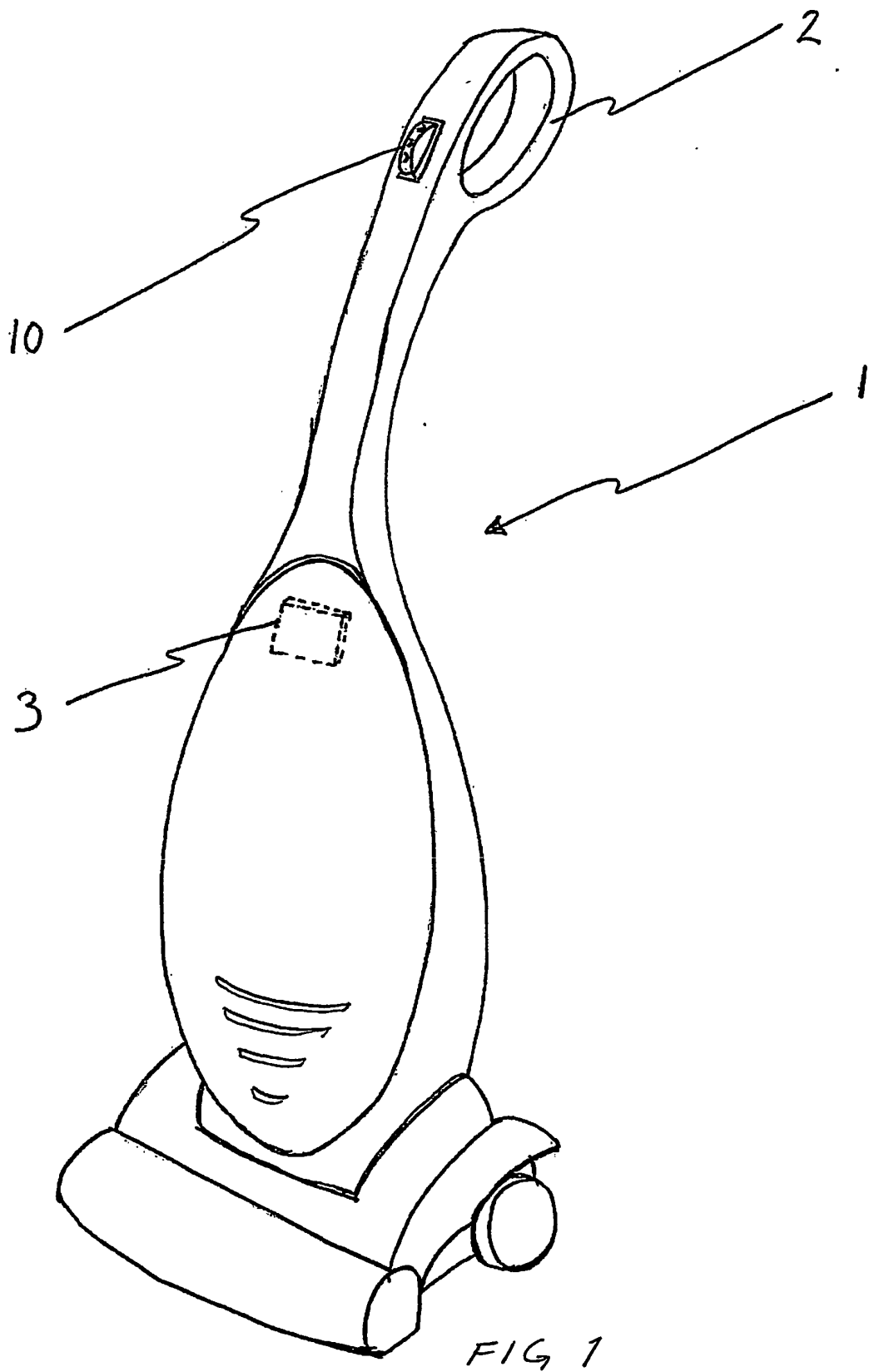
6. Vorrichtung nach einem der Ansprüche 1 bis 5, wobei die den äußeren Bereich aufnehmende Aussparung (36) des zweiten Teils 30 für ein Umschließen des äußeren Bereichs (21) des ersten Teils (20) in einem Winkel im Bereich von 200° bis 220° ausgeführt ist. 5
7. Vorrichtung nach einem der Ansprüche 1 bis 6, wobei das erste und das zweite Teil (20, 30) aus einem Kunststoff hergestellt sind. 10
8. Vorrichtung nach einem der Ansprüche 1 bis 7, wobei das zweite Teil (30) biegsam ist. 15
9. Vorrichtung nach einem der Ansprüche 1 bis 8, wobei das erste Teil (20) ferner eine Führungsnase (24), die für ein Zusammenwirken mit einer Führungsnasen-Aufnahmeaussparung (38) des zweiten Teils (30) ausgeführt ist, aufweist. 20
10. Vorrichtung nach einem der Ansprüche 1 bis 9, wobei das Reguliermittel (10) zwischen einer ersten und zweiten Position kontinuierlich drehbar ist. 25
11. Vorrichtung nach einem der Ansprüche 1 bis 9, wobei das Reguliermittel (10) zwischen einer ersten und zweiten Position in einem Stufenmodus schrittweise drehbar ist. 30
12. Ausrüstung wie ein Staubsauger (1), aufweisend eine Vorrichtung nach einem der Ansprüche 1 bis 11.

Revendications

1. Dispositif pour un équipement tel qu'un aspirateur (1), le dispositif comprenant un moyen de régulation (10) relié à une unité de commande (3), ledit moyen de régulation (10) pouvant tourner autour d'un axe de rotation entre une première position et une seconde position afin de réguler l'unité de commande (3),
caractérisé en ce que
le moyen de régulation (10) comprend un premier élément (20) ayant une section externe (21) et un second élément (30) ayant un creux (36) apte à recevoir la section externe, dans lequel ledit creux (36) apte à recevoir la section externe dudit second élément (30) est adapté pour recevoir ladite section externe (21) dudit premier élément (20) et pour maintenir ledit premier élément (20) en enfermant ladite section externe (21) avec un angle supérieur à 180 °. 40 45 50 55
2. Dispositif selon la revendication 1, dans lequel ledit creux (36) apte à recevoir la section externe du se-

cond élément (30) et la section externe (21) du premier élément (20) sont en arc de cercle.

3. Dispositif selon l'une quelconque des revendications 1 et 2, dans lequel le premier élément (20) comprend une protubérance de blocage (23), qui est adapté pour coopérer avec un creux (37) apte à recevoir la protubérance de blocage du second élément (30) pour empêcher les mouvements entre le premier élément (20) et le second élément (30) autour de l'axe de rotation.
4. Dispositif selon l'une quelconque des revendications 1 à 3, dans lequel le premier élément (20) comprend un axe (22) s'étendant le long de l'axe de rotation.
5. Dispositif selon l'une quelconque des revendications 1 à 4, dans lequel le second élément (30) comprend en outre une surface de préhension (39) adaptée pour faciliter la manipulation du moyen de régulation (10).
6. Dispositif selon l'une quelconque des revendications 1 à 5, dans lequel ledit creux (36) apte à recevoir la section externe du second élément (30) est adapté pour enfermer la section externe (21) du premier élément (20) avec un angle compris dans l'intervalle 200 ° à 220 °.
7. Dispositif selon l'une quelconque des revendications 1 à 6, dans lequel le premier et le second élément (20, 30) sont en matière plastique.
8. Dispositif selon l'une quelconque des revendications 1 à 7, dans lequel le second élément (30) est flexible.
9. Dispositif selon l'une quelconque des revendications 1 à 8, dans lequel le premier élément (20) comprend en outre une protubérance de guidage (24) adaptée pour coopérer avec un creux (38) apte à recevoir une protubérance de guidage du second élément (30).
10. Dispositif selon l'une quelconque des revendications 1 à 9, dans lequel le moyen de régulation (10) peut tourner d'une manière continue entre la première et la seconde position.
11. Dispositif selon l'une quelconque des revendications 1 à 9, dans lequel le moyen de régulation (10) peut tourner d'une manière graduelle selon un mode pas à pas entre la première et la seconde position.
12. Equipement tel qu'un aspirateur (1), comprenant un dispositif selon l'une quelconque des revendications 1 à 11.



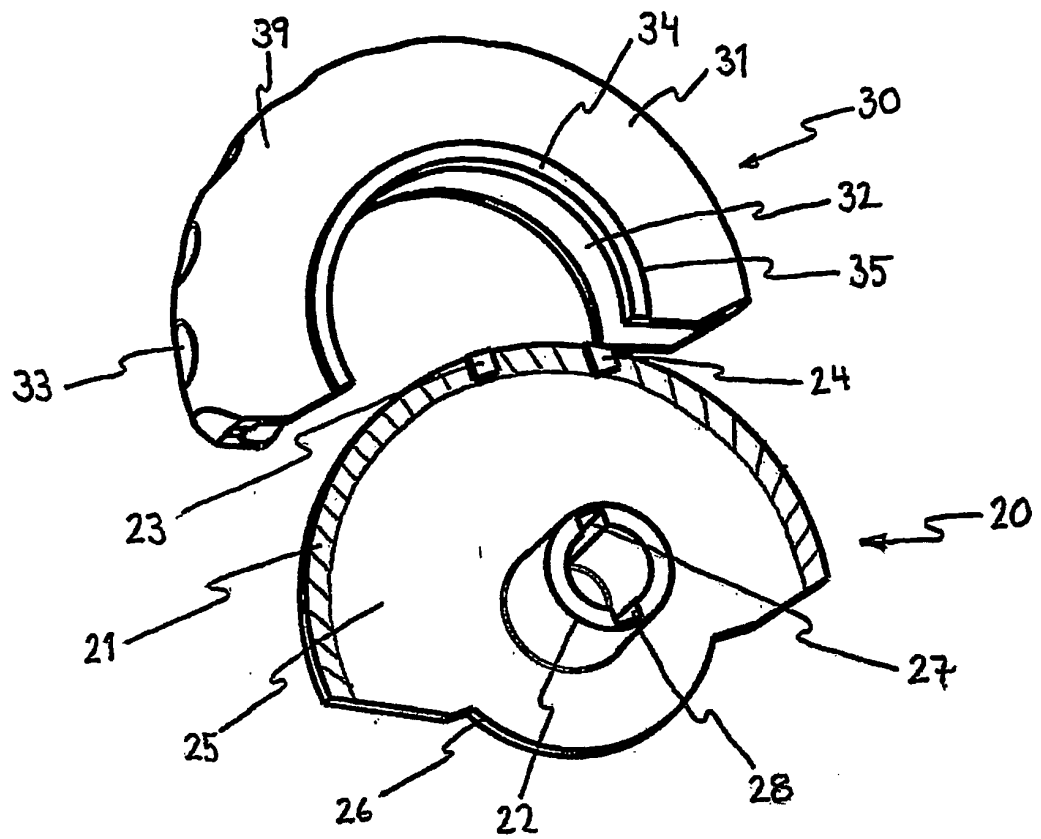
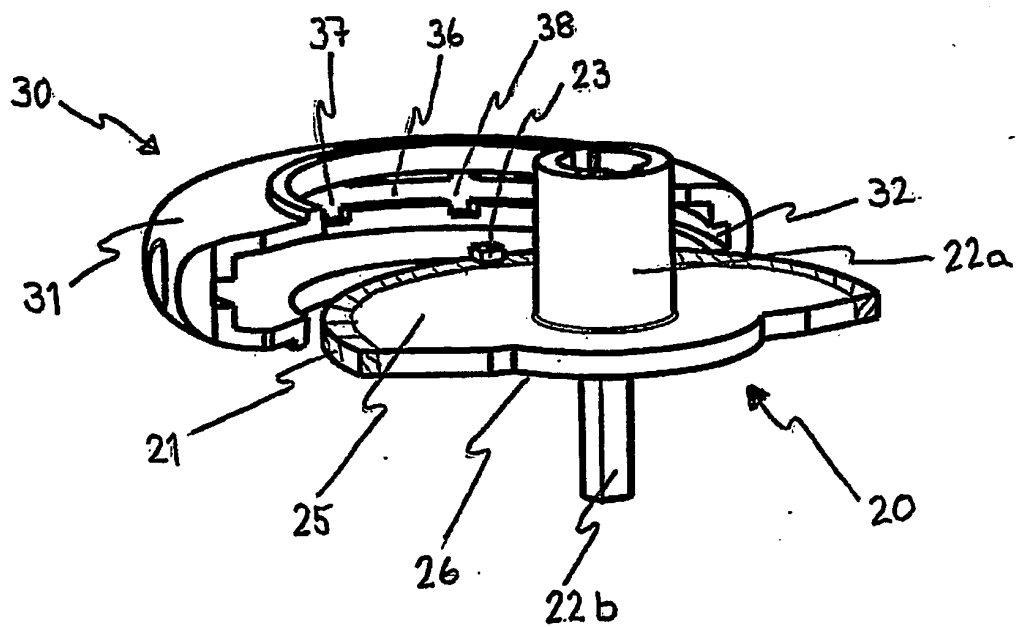


FIG. 3



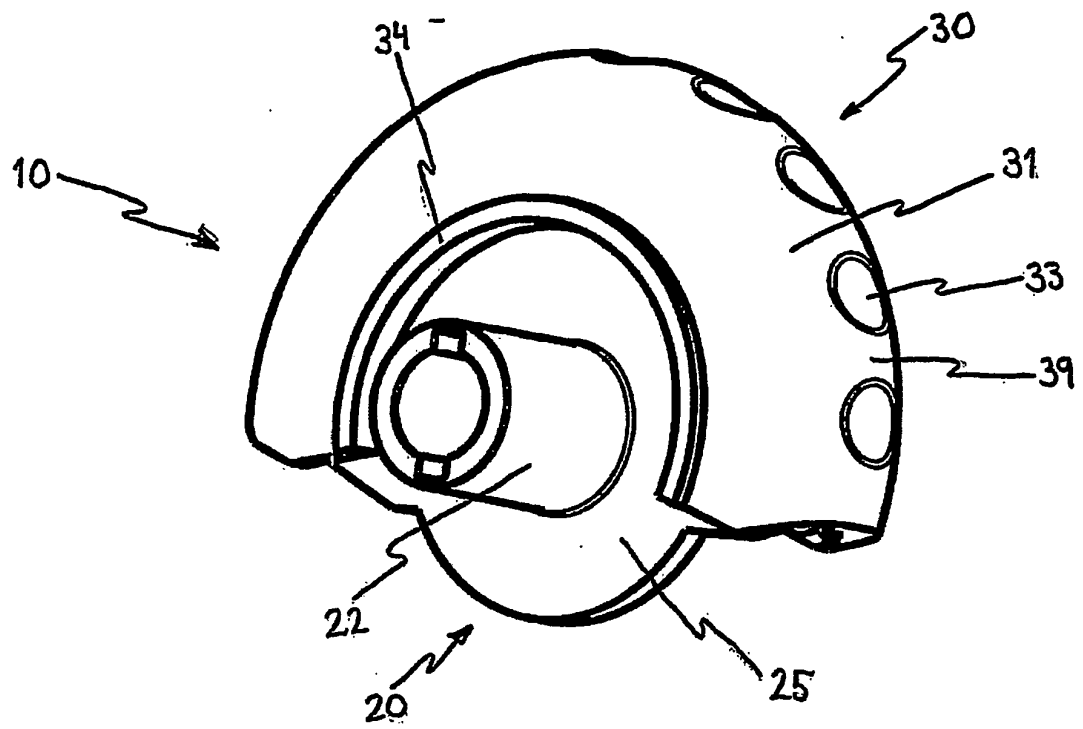
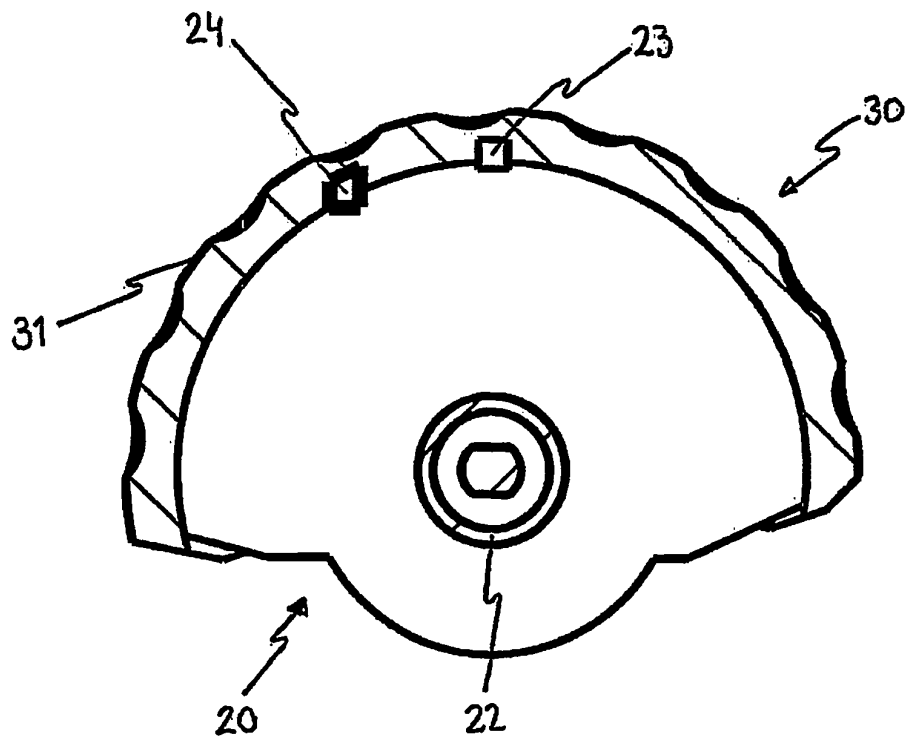


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2003337628 A [0002]