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(54) **CLEANING IMPLEMENT FOR A VACUUM
CLEANER AND CLEANING APPARATUS**

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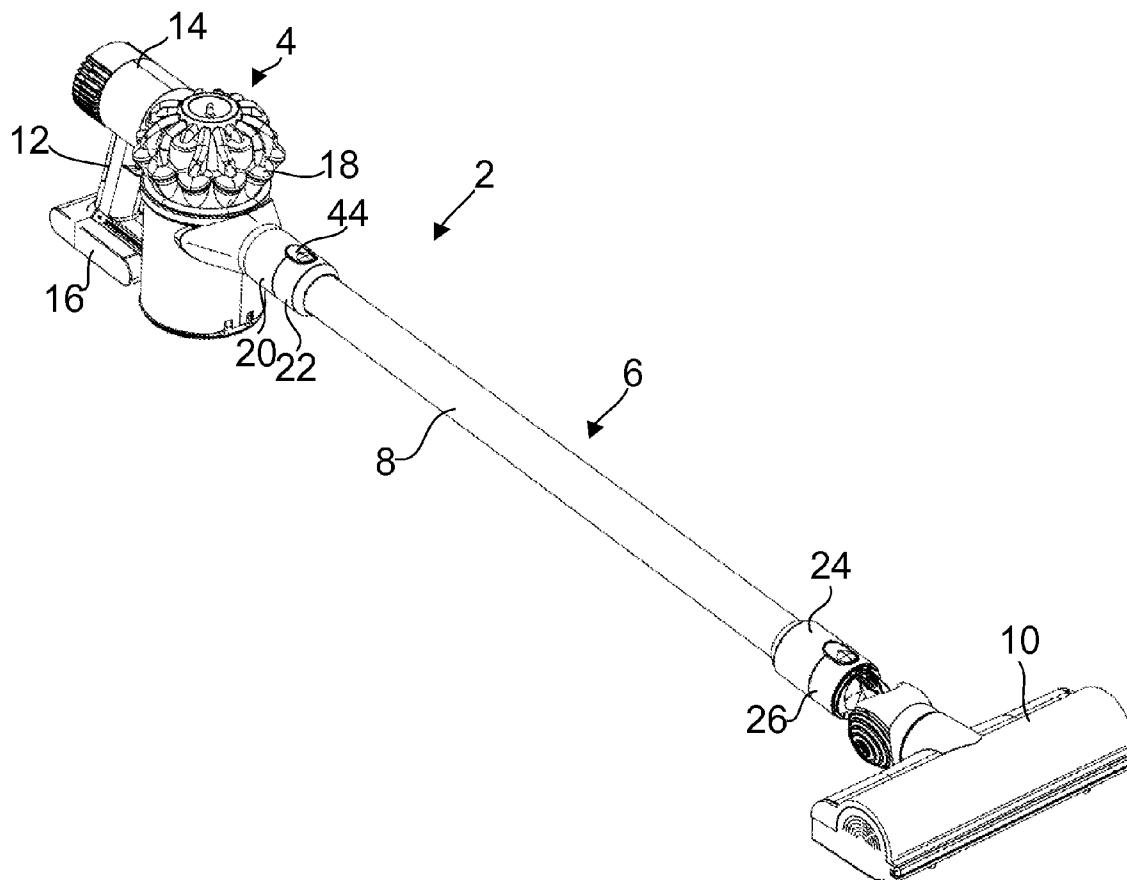
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(57) **ABSTRACT**

A cleaning implement comprising a connector for connecting the cleaning implement to a vacuum cleaner such that the cleaning implement is in fluid communication with the vacuum cleaner. The connector comprises an engagement portion and a catch pivotally connected to the engagement portion such that the catch has a pivot axis X, the catch comprises a pressing portion spaced from the pivot axis X and a latching element arranged on a portion of the catch extending from the pivot axis X to the pressing portion. The catch is arranged such that pressing on the pressing portion pivots the catch from a first configuration in which the latching element is in an engagement position for preventing disengagement of the connector from the vacuum cleaner, to a second configuration in which the latching element is in a disengagement position in which the connector can be disengaged from the vacuum cleaner.



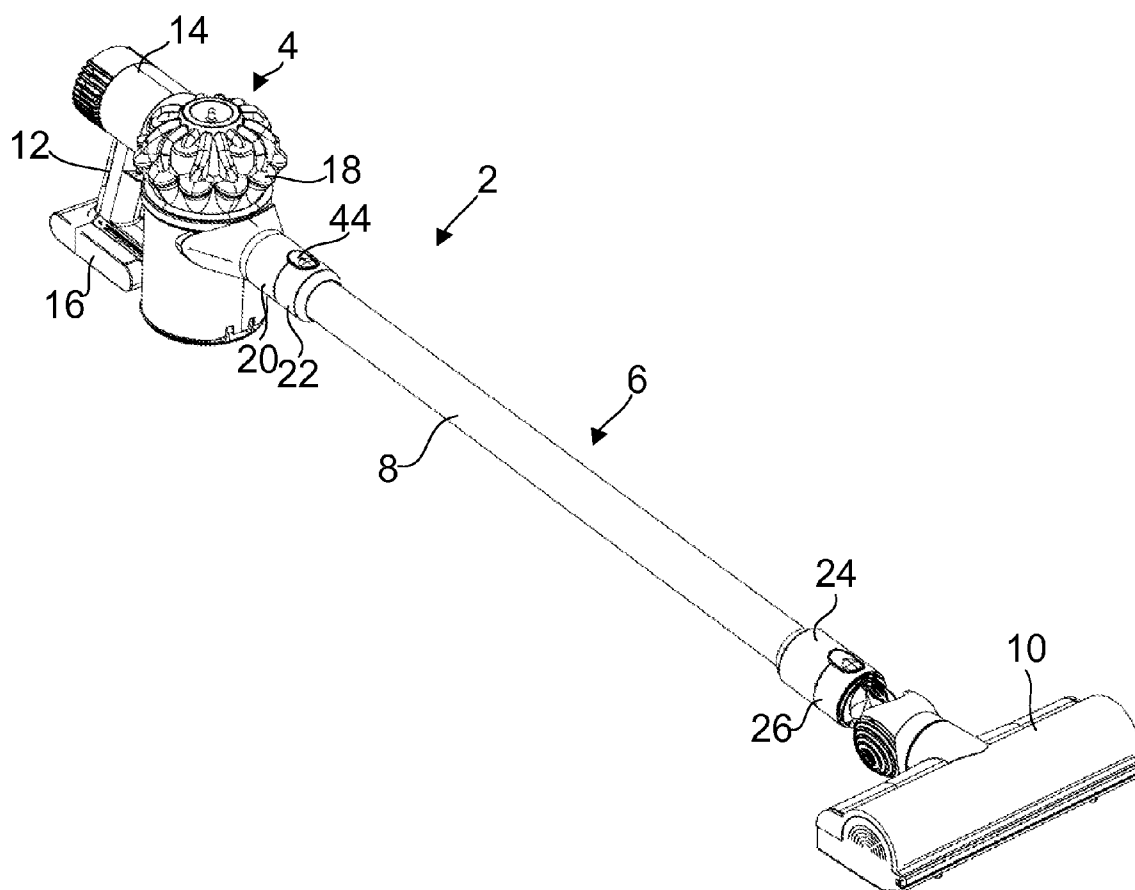


Figure 1

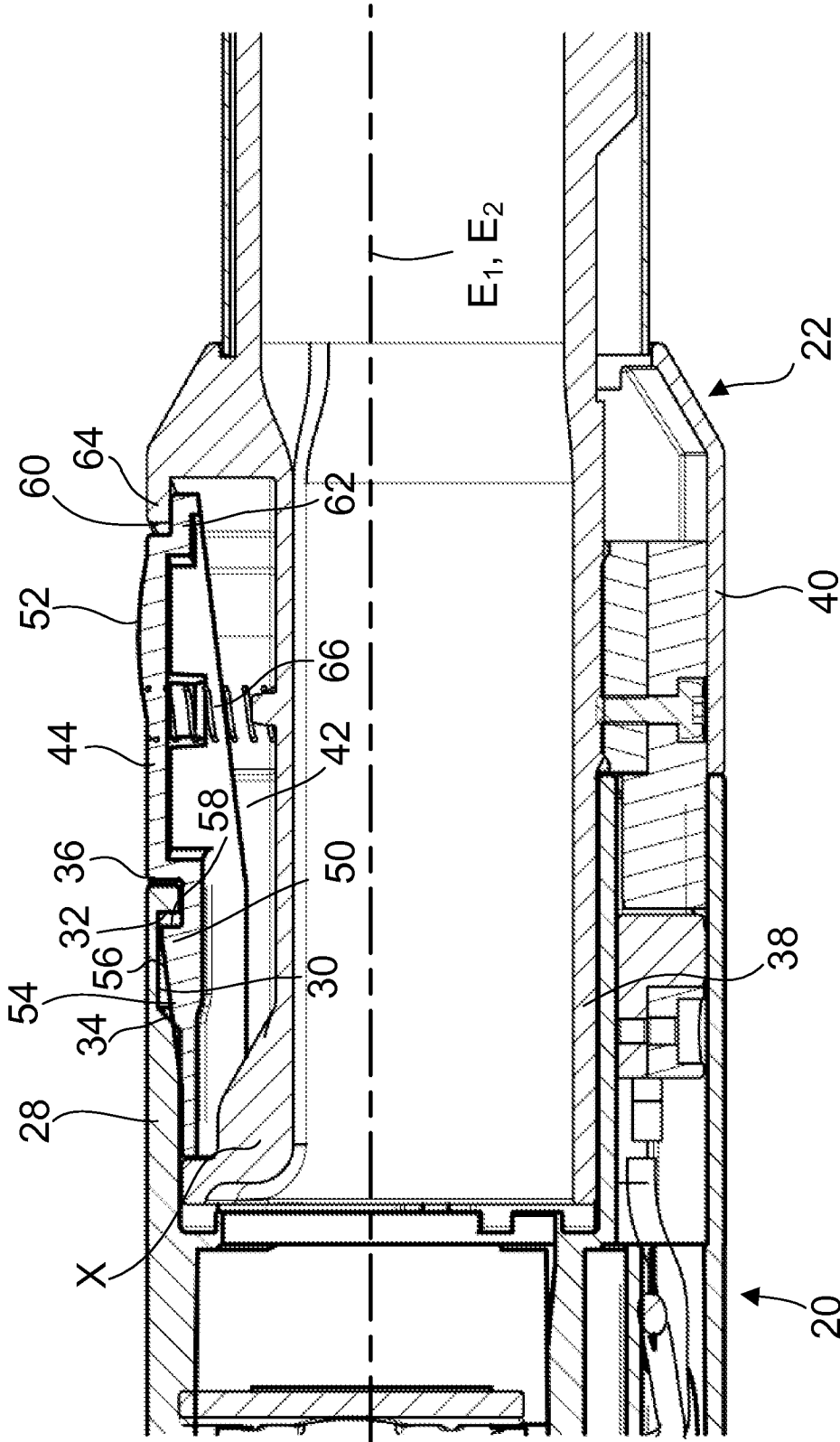


Figure 2

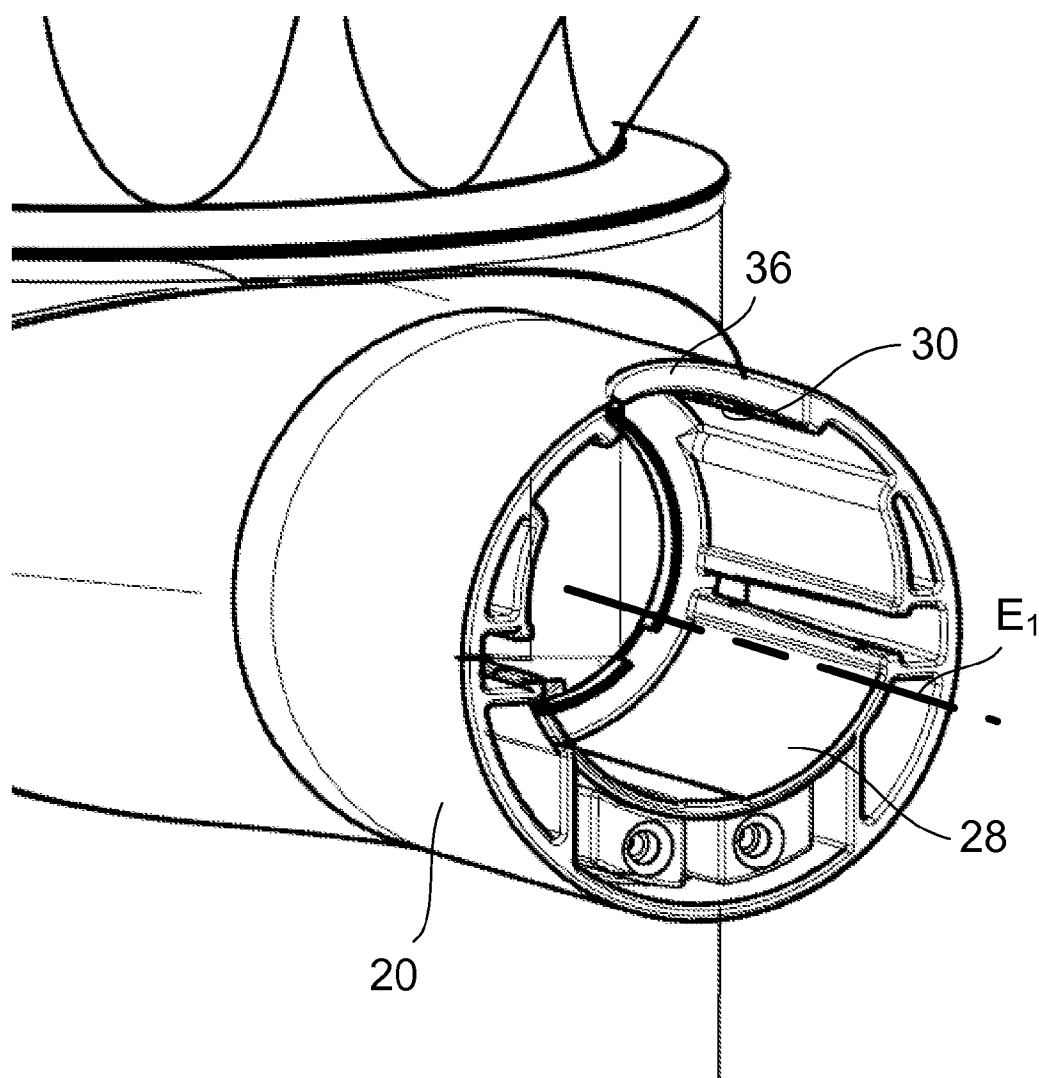


Figure 3

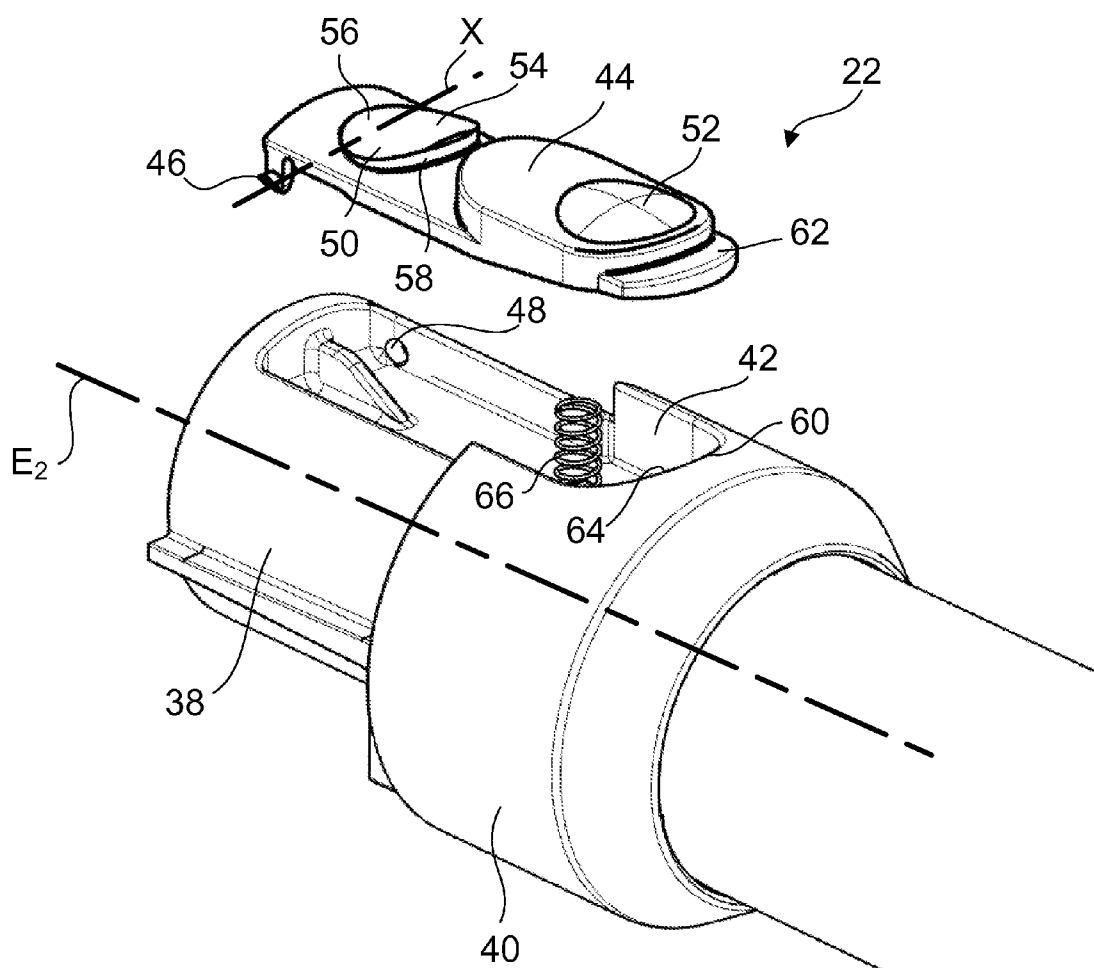


Figure 4

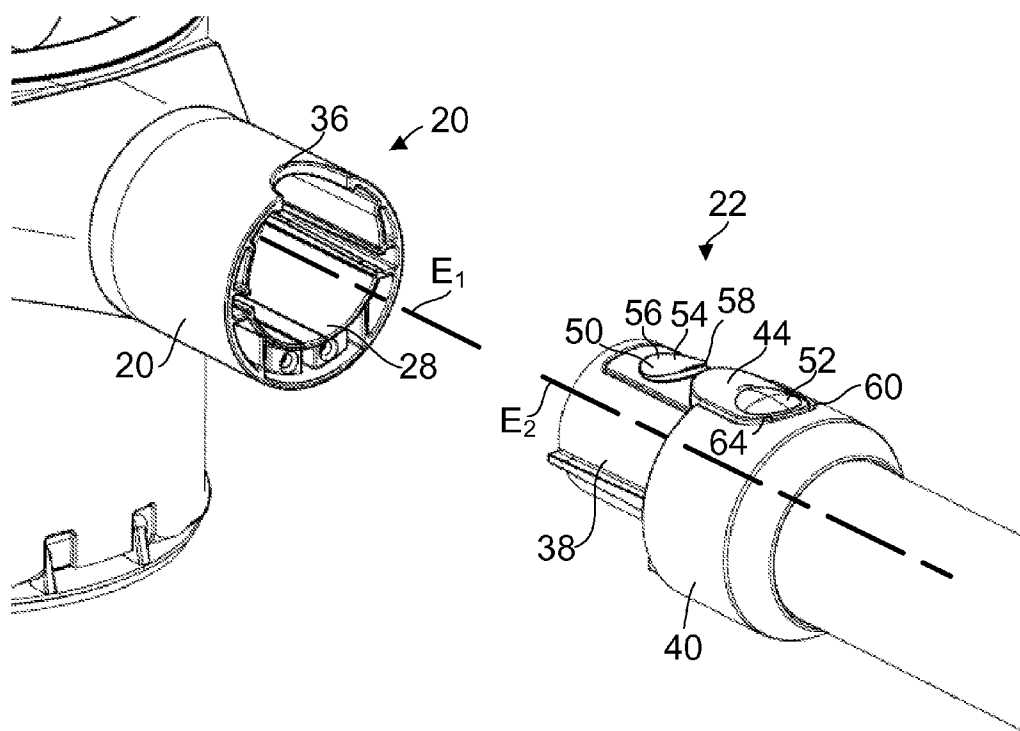


Figure 5

CLEANING IMPLEMENT FOR A VACUUM CLEANER AND CLEANING APPARATUS

REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to United Kingdom Application No. 1406874.6, filed Apr. 16, 2014, the entire contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention relates to a cleaning implement for a vacuum cleaner and a cleaning apparatus comprising a cleaning implement.

BACKGROUND OF THE INVENTION

[0003] GB2497944A discloses a handheld vacuum cleaner comprising a main body 4, a grip 6, a separator 12 and an inlet nozzle 14. The handheld vacuum cleaner is similar to a vacuum cleaner that has been sold by Dyson in the United Kingdom having the model number DC59. The inlet nozzle 14 is configured to receive a brush tool and is provided with a catch 16 which secures the brush tool to inlet nozzle 14. The catch 16 is pivotally connected to the inlet nozzle 14 midway along the catch 16. The catch 16 has a circular pressing portion at the end nearest the inlet and a latching element at the other end. The catch 16 is released by pressing the pressing portion against a spring disposed between the pressing portion and the inlet nozzle 14.

[0004] It is desirable to provide a catch that is more ergonomic and which provides a secure connection between the brush tool and the inlet nozzle 14.

SUMMARY OF THE INVENTION

[0005] A cleaning implement comprising a connector for connecting the cleaning implement to a vacuum cleaner such that the cleaning implement is in fluid communication with the vacuum cleaner, the connector comprises an engagement portion and a catch pivotally connected to the engagement portion such that the catch has a pivot axis, the catch comprises a pressing portion spaced from the pivot axis and a latching element located at a portion of the catch extending from the pivot axis to the pressing portion, wherein the catch is arranged such that pressing on the pressing portion pivots the catch from a first configuration in which the latching element is in an engagement position for preventing disengagement of the connector from the vacuum cleaner, to a second configuration in which the latching element is in a disengagement position in which the connector can be disengaged from the vacuum cleaner.

[0006] The pressing portion may be spaced from the pivot axis by a first distance and the latching element spaced from the pivot axis by a second distance which is less than the first distance. The second distance may, for example, be not greater than half of the first distance.

[0007] The connector may be a male connector having an engagement axis which is aligned with the direction in which the connector is brought into engagement with the vacuum cleaner.

[0008] The portion of the catch comprising the latching element and the pressing portion may extend from the pivot axis in a direction which is opposite the direction in which the connector is brought into engagement with the vacuum cleaner.

[0009] The catch may be configured such that, when the connector is engaged with the vacuum cleaner with the catch in the engagement position, exerting a force on the connector along the engagement axis away from the vacuum cleaner urges the latching element away from the disengagement position. The latching element may be urged into the engagement position.

[0010] The latching element may be spaced at a distance from the pivot axis in a direction which is parallel with the engagement axis and a distance from the pivot axis in a direction which is orthogonal to the engagement axis, such that exerting a force on the connector along the engagement axis away from the vacuum cleaner generates a moment about the pivot axis thereby urging the latching element away from the disengagement position. The latching element may be urged into the engagement position.

[0011] The cleaning implement may comprise a biasing device which biases the catch into the first configuration. For example, the biasing device may be a spring, such as a compression spring, or other resilient element. The biasing device may be a resilient portion of the catch. The biasing device may be arranged to act on a portion of the catch extending from the latching element away from the pivot axis.

[0012] The biasing device may be arranged to act on the portion of the catch which extends from, and including, the latching element to the pressing portion. The biasing device may be a resilient member disposed between the pressing portion and the engagement axis.

[0013] At least part of the catch may be disposed within a channel provided along the engagement portion. The biasing device may be disposed between the catch and a base of the channel.

[0014] The cleaning implement may comprise a wand and/or a cleaner head.

[0015] According to a second aspect of the invention there is provided a cleaning apparatus comprising a vacuum cleaner and a cleaning implement in accordance with the first aspect of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] In order to better understand the present invention, and to show more clearly how the invention may be put into effect, the invention will now be described, by way of example, with reference to the following drawings:

[0017] FIG. 1 is a perspective view of a cleaning apparatus;

[0018] FIG. 2 is a partial sectional view of the cleaning apparatus shown in FIG. 1;

[0019] FIG. 3 is a perspective view of part of the cleaning apparatus shown in FIG. 1;

[0020] FIG. 4 is an exploded view of part of the cleaning apparatus shown in FIG. 1; and

[0021] FIG. 5 is a perspective view of part of the cleaning apparatus shown in FIG. 1 in a disengaged configuration.

DETAILED DESCRIPTION

[0022] FIG. 1 shows a vacuum cleaning apparatus 2 comprising a handheld vacuum cleaner 4 and a cleaning implement 6 comprising a tubular wand 8 and a cleaner head 10.

[0023] The handheld vacuum cleaner 4 comprises an elongate handle 12, an airflow generator 14 disposed at one end of the handle 12 and a power source 16 disposed at the other end of the handle 12. The handle 12 is arranged such that a user gripping the handle supports the vacuum cleaning apparatus 2

while manoeuvring the cleaner head 10 across a surface being cleaned. The handle 12 is located towards the rear of the handheld vacuum cleaner 4 so that the vacuum cleaner 4 can be supported in front of the user.

[0024] The handheld vacuum cleaner 4 further comprises a separator 18, in the form of a cyclonic separator, and a first connector 20. The first connector 20 is positioned towards the front of the handheld vacuum cleaner 4. The separator 18 is arranged between the first connector 20 and the handle 12.

[0025] The wand 8 comprises a second connector 22 at one end of the wand 8. The second connector 22 connects to the first connector 20 thereby securing the wand 8 to the handheld vacuum cleaner 4 such that the handheld vacuum cleaner 4 is in fluid communication with the wand 8. The wand 8 comprises a third connector 24 at the end of the wand 8 opposite the second connector 20. The third connector 24 is connected to a fourth connector 26 provided on the cleaner head 10. The fourth connector 26 is substantially identical to the second connector 22, as described below. The fourth connector 26 can therefore be connected to the first connector 22 so that the cleaner head 10 can be secured directly to the handheld vacuum cleaner 4.

[0026] FIG. 2 shows the first and second connectors 20, 22 connected to each other. FIG. 3 shows part of the cleaning apparatus 2 comprising the first connector 20. FIG. 4 shows part of the cleaning apparatus 2 comprising the second connector 22.

[0027] The first connector 20 is a female connector having a cylindrical receiving portion 28. The receiving portion 28 has a longitudinal axis which defines an engagement axis E_1 of the first connector 20. A recess 30 is formed in an inner surface of the receiving portion 28. The recess 30 has a flat forward surface 32 that extends in a plane that is substantially orthogonal to the engagement axis E_1 and a rearward surface 34, that is inclined from the base of the recess 30 towards the engagement axis E_1 (i.e. the surface extends radially inwardly and rearwardly). The first connector 20 has a slot 36 formed at the end of the first connector 20.

[0028] The second connector 22 is a male connector having a cylindrical engagement portion 38 and a collar 40. The engagement portion 38 is configured such that it can be inserted into the receiving portion 28 of the first connector 20. The engagement portion 38 has a longitudinal axis which defines an engagement axis E_2 of the second connector 22.

[0029] The engagement axes E_1 , E_2 are aligned when the second connector 22 is connected to the first connector 20. The engagement axes E_1 , E_2 correspond to the direction along which second connector 22 is inserted into the first connector 20.

[0030] A channel 42 extends along the engagement portion 38 in a direction which is parallel with the engagement axis E_2 . An elongate catch 44 is located within the channel 42 such that part of the outer surface of the catch 44 lies substantially within the same circumferential plane as the outer surface of the engagement portion 38. FIG. 2 shows the catch 44 in a first configuration in which disengagement of the second connector 22 from the first connector 20 is prevented.

[0031] The catch 44 is pivotally connected at one end to the engagement portion 38 by trunnions 46 (only one of which is visible in FIG. 4) provided on opposite lateral sides of the catch 44, which engage respective bores 48 provided in the sides of the channel 42. The pivot axis X of the catch 44 extends in a direction which is substantially orthogonal to the engagement axis E_2 of the second connector 22.

[0032] The catch 44 comprises a latching element 50 and a pressing portion 52. The pressing portion 52 is located towards the end of the catch 44 opposite the pivotal connection. The latching element 50 is located closer to the pivot axis X than the pressing portion 52. In the embodiment shown, the latching element 50 is located approximately midway between the pressing portion 52 and the pivot axis X (it will be appreciated that the latching element need not lie in the same plane as a plane passing through the pressing portion 52 and the pivot axis X). The latching element 50 is spaced at a distance from the engagement axis E_2 which is greater than the distance by which the pivot axis X is spaced from the engagement axis E_2 .

[0033] The latching element 50 comprises a protrusion 54 that corresponds to the shape of the recess 30 provided on the first connector 20. The protrusion 54 has a leading surface 56 that is inclined with respect to the engagement axis E_2 of the second connector 22 and a trailing surface 58 that extends around the rear of the protrusion. The rearmost part of the trailing surface 58 extends in a plane that is substantially orthogonal to the engagement axis E_2 . The trailing surface 58 abuts the flat forward surface 32 of the recess 30 such that the catch 44 prevents withdrawal of the engagement portion 38 from the receiving portion 28.

[0034] The channel 42 extends into the collar 40 such that it defines a slot 60 into which the portion of the catch 44 comprising the pressing portion 52 extends. At least part of the pressing portion 52 extends forward of the slot 60, and hence forward of the collar 40. A flange portion 62 surrounds at least part of the periphery of the pressing portion 52. The flange portion 62 abuts the underside of a lip 64 provided at the end of the channel 42.

[0035] A biasing member in the form of a spring 66 is disposed between the catch 44 and the bottom of the channel 42. The spring 66 is disposed beneath the pressing portion 52 and is arranged to bias the pressing portion 52 away from the engagement axis E_2 such that the catch 44 is held in the first configuration in which the latching element 50 is located in the recess 30 and the flange portion 62 is pressed against the lip 64.

[0036] A user disconnects the wand 8 from the handheld vacuum cleaner 4 by gripping the collar 40 of the second connector 22, and pressing down on the pressing portion 52 with the thumb or a finger of the hand gripping the wand 8. While doing so, the user can keep hold of the handle 12 of the vacuum cleaner 4 with their other hand. It will be appreciated that the user may grip the end of the wand 8 adjacent the collar 40 as well as, or instead of, the collar 40 itself.

[0037] Pressing down on the pressing portion 52 pushes the catch 44 against the spring 66 into the channel 42 thereby rotating the pressing portion 52 towards the engagement axis E_2 and disengaging the latching element 50 from the recess 30. The catch 44 is then in a second configuration in which the user can slide the engagement portion 38 out from the receiving portion 28 and so disconnect the wand 8 from the vacuum cleaner 4. Because the user can simultaneously grip the end of the wand 8 and operate the catch with the same hand, the user is able to quickly and easily remove the wand 8 without having to let go of the handle 12 of the handheld vacuum cleaner 4. This greatly enhances the usability of the vacuum cleaner 4 because cleaning implements can be removed and replaced quickly and easily. The spring 66 urges the catch 44 back into the first configuration in which the flange portion 62 is pressed against the lip 64.

[0038] It will be appreciated that, because the latching element 50 is closer to the pivot axis X than the pressing portion 52, the force required to release the catch 44 by pressing on the latching element 50 is much less than the force that would be required should the pressing portion 52 be arranged at the latching element 50. Consequently, the latching element 50 is held in engagement with the recess 30 securely, while being relatively easy to release by pressing on the pressing portion 52.

[0039] In addition, should the wand 8 be pulled away from the vacuum cleaner 4 along the engagement axes E_1 , E_2 , for example, as a consequence of a user pulling against the cleaner head 10 when trapped by an item of furniture), the trailing surface 58 of the latching element 50 is pressed against the flat forward surface 32 of the recess 30. Consequently, a moment (which in FIG. 2, is an anti-clockwise moment) is exerted on the catch 44 about the pivot axis X which presses the latching element 50 into the recess 28. It will be appreciated that the harder a user pulls on the vacuum cleaner 4, the harder the latching element 50 is forced into engagement with the recess 28 and the harder it becomes to release the catch 44. The arrangement therefore provides a particularly secure connection between the wand 8 and the vacuum cleaner 4 which helps prevent accidental disconnection of the wand 8 from the vacuum cleaner 4. It will, however, be appreciated that it may be desirable to configure the arrangement so that the wand 8 and the vacuum cleaner 4 can be separated when a large force is applied, for example, in circumstances in which the arrangement is handled abusively, so as to avoid breaking of the apparatus.

[0040] FIG. 5 shows the first and second connectors 20, 22 separated from each other. The connectors 20, 22 are engaged with each other by aligning the alignment axis E_2 of the second connector 22 with the alignment axis E_1 of the first connector 20, and inserting the engagement portion 38 of the second connector 22 into the receiving portion 28 of the first connector 20. In addition, the pressing portion 52 is aligned with the slot 36 so that, as the engagement portion 38 is inserted into the receiving portion 28, the pressing portion 52 is received by the slot 36. The slot 36 therefore acts as a guide for ensuring correct alignment of the connectors 20, 22. As the engagement portion 38 is inserted into the receiving portion 28, the leading surface 56 of the protrusion 54 rides over the front edge of the slot 36 thereby pressing the catch 44 against the spring 66 until the protrusion latches in the recess 30.

[0041] The third connector 24 is the same as the first connector 20 and the fourth connector 26 is the same as the second connector 22. It will be appreciated that the cleaner head 10 can be removed from the wand 8 by gripping the fourth connector 26, and pressing the catch located on the fourth connector 26, in the same manner as the wand 8 is removed from the handheld vacuum cleaner 4. Furthermore, the cleaner head 10 can be used as a cleaning implement itself by connecting the fourth connector 26 with the first connector 20 so that the cleaner head 10 is directly connected to the handheld vacuum cleaner 4.

[0042] Although the cleaning implement described above comprises a wand 8 and a cleaner head 10, it will be appreciated that the wand 8 could also be used as a cleaning implement by itself (for example to clean dirt/cobwebs from elevated areas). Other cleaning implements, such as a flexible hose, or specialised cleaning implements for cleaning hard floors, soft furnishings, specific types of carpets or crevices

could comprise a connector which is the same as the second and fourth connectors 22, 26 and so could be connected to the wand 8 or the vacuum cleaner 4 respectively.

[0043] Although the connector arrangement is particularly advantageous for handheld vacuum cleaners, it will be appreciated that the connector arrangement would be suitable for other types of vacuum cleaner including, but not limited to, cylinder vacuum cleaners and upright vacuum cleaners, including lightweight stick vacuum cleaners, in which cleaning implements, such as cleaner heads, are interchanged.

1. A cleaning implement comprising a connector for connecting the cleaning implement to a vacuum cleaner such that the cleaning implement is in fluid communication with the vacuum cleaner, the connector comprises an engagement portion and a catch pivotally connected to the engagement portion such that the catch has a pivot axis, the catch comprises a pressing portion spaced from the pivot axis and a latching element located at a portion of the catch extending from the pivot axis to the pressing portion, wherein the catch is arranged such that pressing on the pressing portion pivots the catch from a first configuration in which the latching element is in an engagement position for preventing disengagement of the connector from the vacuum cleaner, to a second configuration in which the latching element is in a disengagement position in which the connector can be disengaged from the vacuum cleaner.

2. The cleaning implement of claim 1, wherein the pressing portion is spaced from the pivot axis by a first distance and the latching element is spaced from the pivot axis by a second distance which is less than the first distance.

3. The cleaning implement of claim 2, wherein the second distance is not greater than half of the first distance.

4. The cleaning implement of claim 1, wherein the connector is a male connector having an engagement axis which is aligned with the direction in which the connector is brought into engagement with the vacuum cleaner.

5. The cleaning implement of claim 4, wherein the portion of the catch comprising the latching element and the pressing portion extends from the pivot axis in a direction which is opposite the direction in which the connector is brought into engagement with the vacuum cleaner.

6. The cleaning implement of claim 4, wherein the catch is configured such that, when the connector is engaged with the vacuum cleaner with the catch in the engagement position, exerting a force on the connector along the engagement axis away from the vacuum cleaner urges the latching element away from the disengagement position.

7. The cleaning implement of claim 6, wherein the latching element is spaced at a distance from the pivot axis in a direction which is parallel with the engagement axis and a distance from the pivot axis in a direction which is orthogonal to the engagement axis, such that exerting a force on the connector along the engagement axis away from the vacuum cleaner generates a moment about the pivot axis thereby urging the latching element away from the disengagement position.

8. The cleaning implement of claim 1, wherein the cleaning implement comprises a biasing device which biases the catch into the first configuration.

9. The cleaning implement of claim 8, wherein the biasing device is arranged to act on a portion of the catch extending from the latching element away from the pivot axis.

10. The cleaning implement of claim 9, wherein the biasing device is arranged to act on the portion of the catch which extends from, and including, the latching element to the pressing portion.

11. The cleaning implement of claim 8, wherein the biasing device is a resilient member disposed between the pressing portion and the engagement axis.

12. The cleaning implement of claim 8, wherein at least part of the catch is disposed within a channel provided along the engagement portion and the biasing device is disposed between the catch and a base of the channel.

13. The cleaning implement of claim 1, wherein the cleaning implement comprises one or both of a wand and a cleaner head.

14. A cleaning apparatus comprising a vacuum cleaner and the cleaning implement of claim 1.

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