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(54) **Handheld cleaning device**

(57) A handheld cleaning device 10 comprising a housing 12 having a handle for gripping the device 20; a motor-fan assembly 32 for generating an air flow; a cleaning head 18 comprising a suction nozzle 16 in fluid communication with the motor-fan assembly 32 and a cleaning accessory 52 mounted on the cleaning head 18; and a fluid tank 14 in fluid communication with the suction nozzle 16 and the motor-fan assembly 32 for receiving fluid from the suction nozzle 16 in the air flow; wherein the cleaning head 18 is rotatably mounted on the housing 12 and the cleaning head 18 is rotatable about a longitudinal axis of the housing 12 between a first position in which the suction nozzle 16 is in an operable position and a second position in which the cleaning accessory 52 is in an operable position.

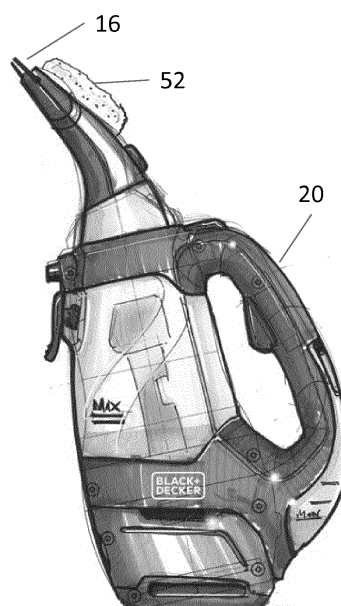


Figure 3

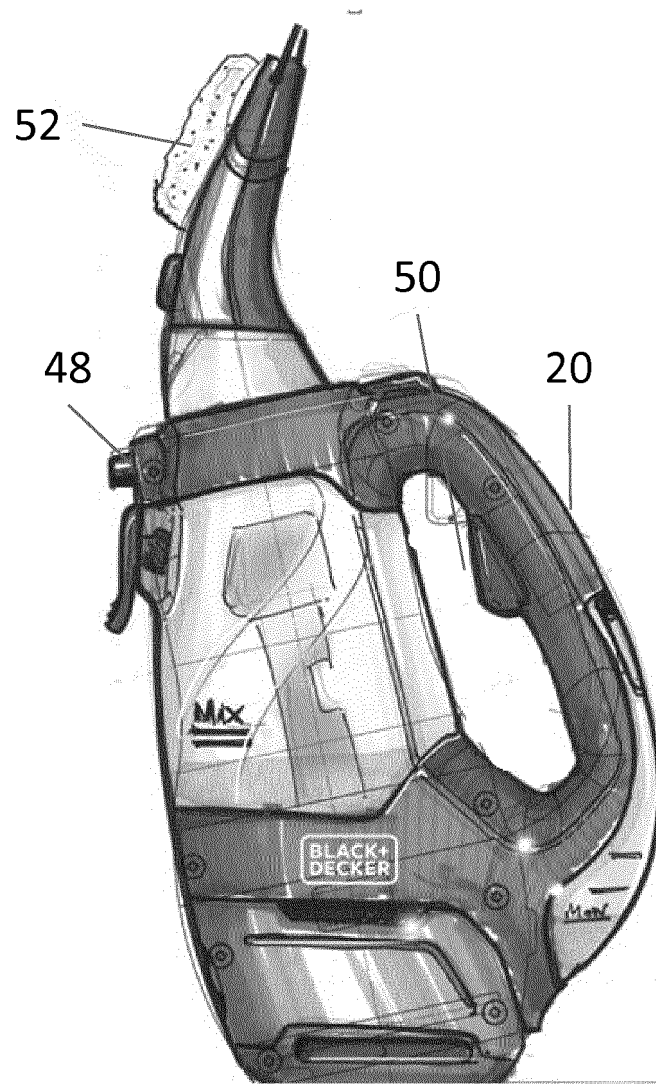


Figure 4

Description

[0001] The present invention relates to a handheld cleaning device. In particular the present invention relates to a handheld cleaning device for cleaning hard, smooth surfaces.

[0002] In the domestic environment it is desirable to maintain and clean hard smooth surfaces such as tiles and windows. Exterior windows may become dirty over time due to the grime of everyday life. Instead of cleaning the surfaces by hand some labour saving cleaning devices are known.

[0003] One such device is shown in EP2237711 which shows a window washing device having a motor fan assembly which sucks excess water on a hard surface through a suction nozzle and into a dirty water tank. This solution works if the hard surface is wet and the excess moisture sucked into the tank. However if the hard surface to be cleaned is dry, then the user must apply water. This may require the user to put the window washing device down whilst water is applied to the hard surface which is inconvenient if the user is working at height.

[0004] US 5,590,439 shows an apparatus for cleaning by spreading liquid and by suction of the used liquid. The cleaning device comprises a spray nozzle and brush arrangement for deploying cleaning fluid from a separate reservoir on to the hard surface. The excess cleaning fluid is then sucked into the dirty water tank via the suction nozzle. The spray nozzle is mounted on a different side to the suction nozzle. This means that the user has to turn the whole cleaning device around to use the suction nozzle after deploying the cleaning fluid. However, the handle is profiled for a grip facing the spray nozzle and this means that the handle is awkward and uncomfortable to grip when the user uses the cleaning device to suck up excess liquid.

[0005] Embodiments of the present invention aim to address the aforementioned problems.

[0006] According to an aspect of the present invention there is a handheld cleaning device comprising: a housing having a handle for gripping the device; a motor-fan assembly for generating an air flow; a cleaning head comprising a suction nozzle in fluid communication with the motor-fan assembly and a cleaning accessory mounted on the cleaning head; and a fluid tank in fluid communication with the suction nozzle and the motor-fan assembly for receiving fluid from the suction nozzle in the air flow; wherein the cleaning head is rotatably mounted on the housing and the cleaning head is rotatable about a longitudinal axis of the housing between a first position in which the suction nozzle is in an operable position and a second position in which the cleaning accessory is in an operable position.

[0007] This means that the handheld cleaning device can be held in the hand and the operable portion of the cleaning device can be rotated with respect to the housing without the user changing their grip of the cleaning device. This makes using the handheld cleaning device

more comfortable and the user is less likely to drop the handheld cleaning device. By rotating the cleaning head about a longitudinal axis of the housing, the user is required to positively select either the suction nozzle or the cleaning accessory and is not able to accidentally operate the cleaning head in the first or second position.

[0008] Preferably the handle is mounted on a first side of the housing and the operable position of the suction nozzle or the cleaning accessory is on a second side of the housing opposing the first side of the housing. This means that the operable position of the suction nozzle or the operable position of the cleaning accessory is visible to the user during operation.

[0009] Preferably the handheld cleaning device comprises a locking mechanism for preventing the cleaning head from rotating between the first position and second positions. Preferably the locking mechanism comprises a moveable locking arm arranged to interlock with at least one recess. Preferably the locking mechanism comprises an actuating button mounted on the handle. This means that the cleaning head is easily unlocked into a position in which the cleaning head can be rotated. By positioning the release button on the handle, the button can easily be depressed with the thumb of the same hand that is gripping the handle.

[0010] Preferably the cleaning head is arranged to be rotated about 180 degrees between the first and second positions.

[0011] Preferably handheld cleaning device comprises a cleaning fluid tank and a cleaning fluid delivery mechanism comprising a spray nozzle in fluid communication with the cleaning fluid tank. Preferably the spray nozzle is fixedly mounted on housing and the spray nozzle is mounted on the same side of the housing as the operable position of the suction nozzle or the cleaning accessory. Preferably the cleaning fluid delivery mechanism is actuated with a trigger mounted on the handle. Preferably the cleaning fluid tank is mounted in the handle. This means that the user can use handheld cleaning device and also deploy cleaning fluid without putting the handheld cleaning device down. By locating the trigger for actuating the cleaning fluid delivery mechanism on the handle, the user can easily hold the handheld cleaning device and spray cleaning fluid on to the dirty surface. Including the clean fluid tank in the handle saves space and reduces the overall size of the cleaning device.

[0012] Preferably cleaning head comprises an attachment for mounting the cleaning accessory. Preferably the cleaning accessory is one or more of the following a pad, cloth, or brush. This means that the cleaning accessory can be replaced and maintained. Furthermore different cleaning accessories can be use for different cleaning purposes.

[0013] Preferably the fluid tank comprises an inlet tube for receiving fluid from the suction nozzle and the longitudinal axis of the inlet tube is coaxial with the axis of rotation of the cleaning head. In this way the suction nozzle is capable of drawing air and water into the fluid tank

irrespective of the orientation of the suction head with respect to the housing. Alternatively the fluid tank comprises an inlet tube for receiving fluid from the suction nozzle and the longitudinal axis of the inlet tube is substantially parallel but not coaxial with the axis of rotation of the cleaning head.

[0014] Preferably the suction nozzle comprises a squeegee. A squeegee helps clean and remove liquid from hard surfaces such as windows or tiles.

[0015] Preferably the cleaning head is releasable from the housing. Preferably there is a locking mechanism for releasing the cleaning head from the housing.

[0016] Various other aspects and further embodiments are also described in the following detailed description and in the attached claims with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of the handheld cleaning device;

Figure 2 shows cross sectional side view of the handheld cleaning device;

Figure 3 and Figure 4 show side views of the handheld cleaning device in different configurations;

Figure 5 shows a partial cross sectional side view of the handheld cleaning device;

Figures 6a and 6b show partial perspective cut away views of the handheld cleaning device; and

Figure 7 shows a partial cross sectional side view of the handheld cleaning device.

[0017] Figure 1 shows a side view of a handheld cleaning device 10. The handheld cleaning device comprises a housing 12. The housing 12 comprises a two-part clamshell arrangement. The clamshell arrangement may be fixed together with screws or glue or any other means for fastening the clamshells together.

[0018] The housing 12 comprises a fluid tank 14 for receiving fluid entrained in an air flow received from a suction nozzle 16. The suction nozzle 16 is mounted in a cleaning head 18 and the cleaning head 18 is rotatably mounted to the housing 12. The housing 12 comprises an integral handle 20 and the handheld cleaning device suitable for the user to grip with their hand during operation. In this way the operable side of the handheld cleaning device 10 is on the side opposite the integral handle 20.

[0019] The housing 12 comprises a removably mountable motor housing 22. The motor housing 22 is detachable from the housing 12 so that the electrical components of the handheld cleaning device can be completely separated from the housing 12. For example a user can remove the motor housing 22 and then wash the rest of the handheld cleaning device 10 without damaging the electrical components. However in some alternative embodiments the motor fan assembly 32 is integral with the housing 12 and the motor fan assembly 32 is mounted within the housing 12.

[0020] The motor housing 22 comprises a catch mechanism (not shown) for releasably fixing the motor housing

22 to the housing 12. The catch mechanism comprises a release button (not shown) mounted on the housing for disengaging the catch and releasing the motor housing 22 from the housing 12. The motor housing 22 comprises a charging port 24 for charging a rechargeable battery 36. In some embodiments the charging port 24 is a micro USB port suitable for being charged from a standard 5V charger. However in other embodiments the charging port 24 may be any suitable means for charging the internal rechargeable battery 36.

[0021] Turning to Figure 2, the handheld cleaning device will now be discussed in further detail. Figure 2 shows a cross sectional side view of the handheld cleaning device.

[0022] The motor housing 22 will now be discussed in further detail. The motor housing 22 comprises a motor-fan assembly 32 for generating an air flow. The motor-fan assembly 32 is coupled to an electrical circuit 34 and powered by a rechargeable battery 36. The motor-fan assembly 32 is in fluid communication with the fluid tank 14 and the suction nozzle 16. In this way when the motor-fan assembly 32 operates air is drawn in from the suction nozzle 16, through the fluid tank 14 and towards the motor-fan assembly 32. Exhaust air is outputted from the motor housing 22 via air outlet holes in the housing 12 (not shown). The motor fan assembly 32 is configured to be powerful enough to draw air and water together into the handheld cleaning device 10 via the suction nozzle 16. The inventors have realised that a motor fan assembly 32 capable of generating between 4 to 5 Air Watts is sufficient to suck both air and water into the fluid tank 14.

[0023] The structure of the cleaning head will now be discussed in further detail. The cleaning head 18 comprises a suction conduit 26 which couples the suction nozzle 16 with a dirty water inlet 28 of the fluid tank 14. The suction nozzle 16 is an opening in the cleaning head 18 for drawing air and water into the handheld cleaning device 10. In some embodiments the suction nozzle 16 comprises a flexible squeegee. The flexible squeegee aids capture of the excess water on a hard surface. The flexible squeegee may be rubber or any other suitable flexible material such as silicone. In some embodiments the suction nozzle 16 comprises two flexible rubber strips which are mounted either side of the opening. The flexible rubber strips are mounted in a recess either side of the opening and the flexible rubber strips are removable so that they can be maintained and replaced. However the suction nozzle in other embodiments is an opening in the hard shell of the cleaning head 18 without the flexible squeegee.

[0024] The dirty water inlet 28 receives dirty water entrained in an air flow from the suction conduit 26. The dirty water inlet 28 is directed at a water separating element 30 and the water separating element 30 receives the dirty water and the air flow from the suction conduit 26. When the air flow is incident on the water separating element 30, the kinetic energy of the dirty water entrained

in the air flow is dissipated. This means that the dirty water drops out of the air flow and the dirty water collects in the bottom of the fluid tank 14. The dirty water can be removed from the dirty water tank by pouring the water out of drain port 42 once drain port plug 44 has been removed.

[0025] Once the dirty water has been removed from the air flow by the water separating element 30, the motor-fan assembly draws the air from the fluid tank 14 through a vacuum conduit 38. The air enters the vacuum conduit 38 at vacuum conduit opening 40. The vacuum conduit opening 40 comprises a lip 41 for shielding the opening 40 from stray droplets of water. The lip 41 is mounted on one side of the vacuum conduit 38 and the water separating element 30 is mounted on the other side of the vacuum conduit 38. The lip 41 which projects in an opposite direction to the water separating element 30. This further prevents stray droplets from being sucked into the vacuum conduit 38.

[0026] The handheld cleaning device 10 also comprises a clean fluid tank 46 and a cleaning fluid delivery mechanism 55 connected thereto. The clean fluid tank comprises a cleaning fluid, such as clean water or a detergent.

[0027] The clean fluid tank 46 is separate from the fluid tank 14 and the dirty water contained in the fluid tank 14 cannot contaminate the clean fluid tank 46. This means that the user does not have to recycle dirty water on the surface such as a window which means the surface is cleaned more efficiently.

[0028] The cleaning fluid delivery mechanism 55 comprises the clean fluid tank 46 and a spray nozzle 48 which is coupled to the clean fluid tank 46 by a clean fluid conduit (not shown). In some embodiments the clean fluid conduit is a rubber hose or tube. The spray nozzle 48 is mounted in the wall of the housing 12. The spray nozzle 48 is mounted in a side of the housing 12 which is opposite the handle 20. The spray nozzle 48 of the cleaning fluid delivery mechanism 55 is actuated by trigger 50 which actuates a pump mechanism 51. The trigger 50 is mounted on the handle 20. The pump mechanism 51 is manually operated and when the user squeezes the trigger 50, the clean fluid is pumped along the clean fluid conduit to the spray nozzle 48. The pump mechanism 51 is a simple piston pump or a diaphragm pump. The trigger 50 is biased by spring 53 and is biased into an extended position as shown in Figure 2. In this way the clean fluid is sprayed from the spray nozzle 48 when the user actuates the trigger 50. The other embodiments the pump mechanism can be any suitable means for pumping the clean fluid to the spray nozzle. For example the pump mechanism can be powered by a motorised pump selectively operated by the user.

[0029] By mounting the spray nozzle on the housing 12 and not the suction head 18, the suction head 18 is rotatable and the spray nozzle is operable when the suction head 18 is in any orientation. This also means that the clean fluid conduit does not have to have excess housing or tubing to accommodate relative movement of the

spray nozzle with respect to the housing 12.

[0030] As mentioned above, the cleaning head 18 is rotatably mounted on housing 12. The cleaning head 18 will now be discussed in further detail with respect to Figures 3 to 5. Figures 3 and 4 show a side view of the handheld cleaning device 10 in two different modes.

[0031] Turning the Figure 3 the handheld cleaning device 10 is shown with the cleaning head 18 in a first position. In the first position the suction nozzle 16 is in an operable position. In the operable position the suction nozzle 16 is on the side of the housing which is opposite to the handle 20. In other words the handle is on a rearwardly facing side of the housing and the suction nozzle is on a forwardly facing side of the housing. When the suction nozzle 16 is forwardly facing the suction nozzle 16 is engageable with the hard surface to be cleaned.

[0032] The cleaning head 18 also comprises a cleaning accessory 52. The cleaning head 18 comprises an attachment element 54 for mounting the cleaning accessory to the cleaning head 18. In some embodiments the cleaning accessory 52 is removable and there may be a hook and loop attachment means such as Velcro®. In other embodiments the cleaning accessory 52 can be removably fixed to the cleaning head by any suitable attachment means. For example the cleaning accessory 52 may releasably clip into the suction head 18. Alternatively the cleaning accessory 52 may comprise holes for receiving screw fastenings for fastening the cleaning accessory 52 to the suction head 18. The cleaning accessory 52 may be one or more of a cloth, pad, foam pad, brush, scourer or any other suitable means for abrading, scraping or wiping dirt from a surface.

[0033] The cleaning accessory 52 is on an opposite side of the cleaning head 18 to the suction nozzle opening. This means a rotation of 180 degrees is required to rotate the cleaning head between the two cleaning positions wherein either the suction nozzle 16 or the cleaning accessory is operable.

[0034] Figure 4 shows the cleaning head 18 in a second position whereby the cleaning accessory 52 is in operable position. When the cleaning head 18 is in the second position the cleaning accessory 52 is forwardly facing and engageable with the hard surface to be cleaned. In this position, the user can operate the trigger 50 to spray cleaning fluid from the nozzle 48 and the cleaning accessory 52 is wetted with the cleaning fluid to aid cleaning.

[0035] The mechanism for rotating the cleaning head 18 will now be discussed in relation to Figures 5, 6a and 6b. Figure 5 shows a partial cross section of the handheld cleaning device at the point where the cleaning head 18 is mounted to the housing 12. Figures 6a and 6b show a partial perspective view of the cleaning head in different positions. The cleaning head 18 as shown in Figure 5 and Figure 6a is in the first position whereby the suction nozzle 16 is forwardly facing. The cleaning head 18 as shown in Figure 6b is in a position between the first and second positions.

[0036] The cleaning head 18 is rotatably mounted on the housing 12. The cleaning head 18 comprises an annular flange 56 which engages in a reciprocal annular groove 58 in the housing 12. The annular flange 56 and annular groove 58 allow the cleaning head 18 to rotate about a longitudinal axis A-A of the housing 12. The vacuum tube 38 and the dirty water inlet 28 as shown in the figures are not aligned with the longitudinal axis A-A. The longitudinal axis suction conduit 26 at the housing 12 is substantially parallel but not coaxial with the longitudinal axis of the vacuum tube 38 or the longitudinal axis of the handheld cleaning device 10. This means that the suction conduit 26 of the cleaning head 18 does not align with the dirty water inlet. This means that when the cleaning head 18 is in the first position, the suction conduit 26 and the vacuum tube 38 are aligned. When the cleaning head 18 is in the second position the suction conduit 26 and the vacuum tube 38 are not aligned and air and water cannot be drawn into the fluid tank 14 by the motor fan assembly. This is because when the suction conduit 26 and the vacuum tube 38 are not aligned not enough air is drawn through the suction conduit 26 by the motor fan assembly 32.

[0037] This means that the handheld cleaning device 10 will only suck water and air into the fluid tank when the suction nozzle is in the operable position. In this way it is clear to the user which position the rotatable cleaning head 18 must be in for the handheld suction nozzle to work. For example a user is not able to orientate the cleaning head 18 with the cleaning accessory facing forwards and attempt to suck water in the suction nozzle 16 which would require the user to hold the handheld cleaning device in an awkward position to operate the suction nozzle 16 effectively.

[0038] By rotating the cleaning head 18 about the longitudinal axis of the housing 12, the user will not accidentally move the cleaning head between the first position and the second position, even without a locking mechanism. When the user presses the cleaning head 18 against the surface to be cleaned, there is substantially no turning moment on the cleaning head 18 created about the rotational axis of the cleaning head 18 because the entire length of the cleaning head 18 will engage with the surface. The longitudinal axis of the housing 12 is also the longitudinal axis of the handheld cleaning device 10. In particular the longitudinal axis of the housing 12 is substantially aligned with the centre of the cleaning head. Furthermore the longitudinal axis of the housing is substantially aligned with the longitudinal axis of the handle 20.

[0039] In another embodiment the vacuum tube 38 and the dirty water inlet are also aligned with the longitudinal axis A-A. In other words the axis of rotation of the cleaning head 18 is substantially coaxial with the longitudinal axis of the handheld cleaning device 10 and the vacuum tube 38. This means that the suction conduit 26 of the cleaning head 18 will always remain aligned to the dirty water inlet 28 when the cleaning head rotates 18. The cleaning head

18 is rotatable about 360 degrees about the longitudinal axis A-A.

[0040] The handheld cleaning device 10 comprises a locking mechanism 60. The locking mechanism 60 prevents rotation of the cleaning head 18 with respect to the housing 12 and prevents rotation of the cleaning head 18 between the first position and the second position. The locking mechanism 60 comprises an actuation button 62 for releasing the locking mechanism 60. The actuation button 62 is mechanically coupled to a locking arm 64 which engages with a reciprocal first recess 66 in annular flange 56 of the cleaning head 18. The locking arm 64 interlocks with the recess 66 and prevents rotation of the cleaning head 18 with respect to the housing 12. The cleaning head has a first recess 66 and a second recess 68 respectively associated with the first and second positions of the cleaning head 18. The first and second recesses 66, 68 are positioned diametrically opposite each other on the annular flange 54 to correspond with the first and second positions of the cleaning head 18. This means that the cleaning head 18 is rotatable about 180 degrees between the first position and the second position. The actuating button 62 and the locking arm 64 are biased to the locking position with spring 65. This means that when the user releases the locking mechanism 60, the cleaning head is free to rotate. The locking arm 64 will snap back in place when it is in proximity to the first or second recesses 66, 68. In this way the cleaning head 18 will automatically lock in either the first or second positions when the user rotates the cleaning head 18.

[0041] In some alternative embodiments there are additional recesses (not shown) in the annular flange 54 which correspond to different positions between the first and second positions. This means that the cleaning head 18 can be releasably fixed in other positions such as 45 degree or 90 degree rotation of the cleaning head 18 from the first or second positions. Additional positions may help clean surfaces at different or unusual orientations.

[0042] When the user wishes to rotate the cleaning head 18, the user depresses the actuating button 62, rotates the cleaning head 18 with respect to the housing 12. The locking mechanism 60 locks the cleaning head 18 in place when the user rotates the cleaning head 18 180 degrees about the longitudinal axis A-A.

[0043] In some embodiments the locking mechanism is not necessary. Instead the coefficient of friction is increased between the cleaning head 18 and the housing 12 such that the cleaning head 18 may be rotated by hand, but held in position during operation by friction.

[0044] Advantageously by providing a handheld cleaning device 10 with a cleaning head which is rotatable with respect to the housing, a user can easily change whether the cleaning accessory or the suction nozzle is forward facing. The user does not need to put the handheld cleaning device down to rotate the cleaning head and this makes the handheld cleaning device particularly advan-

tageous up ladders and other exposed environments.

[0045] In some embodiments the rotatable cleaning head 18 may be releasable from the housing 12. The releasable cleaning head 18 is an optional feature and not required for the cleaning head 18 to rotate. Figure 7 shows a partial cross sectional view of the cleaning head 18. The cleaning head 18 is similar to the cleaning head 18 as described in reference to the previous embodiments. The cleaning head 18 is releasably mounted on a collar portion 76. When the cleaning head 18 is mounted to the collar portion 76, the cleaning head 18 rotates with the collar portion 76 when the cleaning head is rotated from the first position to the second position. The cleaning head 18 comprises a locking mechanism 71 for releasing the cleaning head 18 from the collar portion 76. The locking mechanism 71 comprises a release button 70 for releasing the cleaning head 18 from a reciprocal recess 74 in the collar portion 76. The release button 70 comprises an engagement element 72 engageable with the reciprocal recess 74 in the collar portion 76. The release button 70 and the engagement element 72 are sprung biased towards a position in which the engagement element 72 protrudes into the reciprocal recess 74.

[0046] When the user wishes to release the cleaning head 18, the user depresses the release button 70 and this moves the engagement element 72 clear of the recess 74. This means that the cleaning head 18 is no longer mounted to the collar portion 76 and the user can lift the cleaning head 18 free of the collar portion 76. The cleaning head 18 is removed by removing the cleaning head 18 substantially along the longitudinal axis of the handheld cleaning device. The release button 70 is positioned on the cleaning head 18 and this means the user can depress the release button 70 and remove the cleaning head 18 from the collar portion 76 with one hand. To replace the cleaning head 18 the user simply pushes the cleaning head 18 into the collar portion 76 until the engagement element 72 snaps into place in the recess 74. In an alternative embodiment the cleaning head 18 comprises a recess and the collar portion 76 or the housing 12 comprises the release button and engagement element.

[0047] As mentioned above the releasable cleaning head 18 is optional and in some embodiments the cleaning head 18 and the collar portion 76 are integral.

[0048] In some embodiment the handheld cleaning device is a window washer or window washing device.

[0049] In another embodiment two or more embodiments are combined. Features of one embodiment can be combined with features of other embodiments. Embodiments of the present invention have been discussed with particular reference to the examples illustrated. However it will be appreciated that variations and modifications may be made to the examples described within the scope of the invention.

Claims

1. A handheld cleaning device comprising:

5 a housing having a handle for gripping the device;
a motor-fan assembly for generating an air flow;
a cleaning head comprising a suction nozzle in fluid communication with the motor-fan assembly and a cleaning accessory mounted on the
10 cleaning head; and
a fluid tank in fluid communication with the suction nozzle and the motor-fan assembly for receiving fluid from the suction nozzle in the air flow;
15 wherein the cleaning head is rotatably mounted on the housing and the cleaning head is rotatable about a longitudinal axis of the housing between a first position in which the suction nozzle is in an operable position and a second position
20 in which the cleaning accessory is in an operable position.

2. A handheld cleaning device according to claim 1
25 wherein the handle is mounted on a first side of the housing and the operable position of the suction nozzle or the cleaning accessory is on a second side of the housing opposing the first side of the housing.

3. A handheld cleaning device according to claims 1 or 2 wherein the handheld cleaning device comprises a locking mechanism for preventing the cleaning head from rotating between the first position and second positions.
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4. A handheld cleaning device according to claim 3 wherein the locking mechanism comprises a moveable locking arm arranged to interlock with at least one recess.
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5. A handheld cleaning device according to claims 3 or 4 wherein the locking mechanism comprises an actuating button mounted on the handle.
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6. A handheld cleaning device according to any of the preceding claims wherein the cleaning head is arranged to be rotated about 180 degrees between the first and second positions.
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7. A handheld cleaning device according to any of the preceding claims wherein the handheld cleaning device comprises a cleaning fluid tank and cleaning fluid delivery mechanism comprising a spray nozzle in fluid communication with the cleaning fluid tank.
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8. A handheld cleaning device according to claim 7 wherein the spray nozzle is fixedly mounted on housing and the spray nozzle is mounted on the same
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side of the housing as the operable position of the suction nozzle or the cleaning accessory.

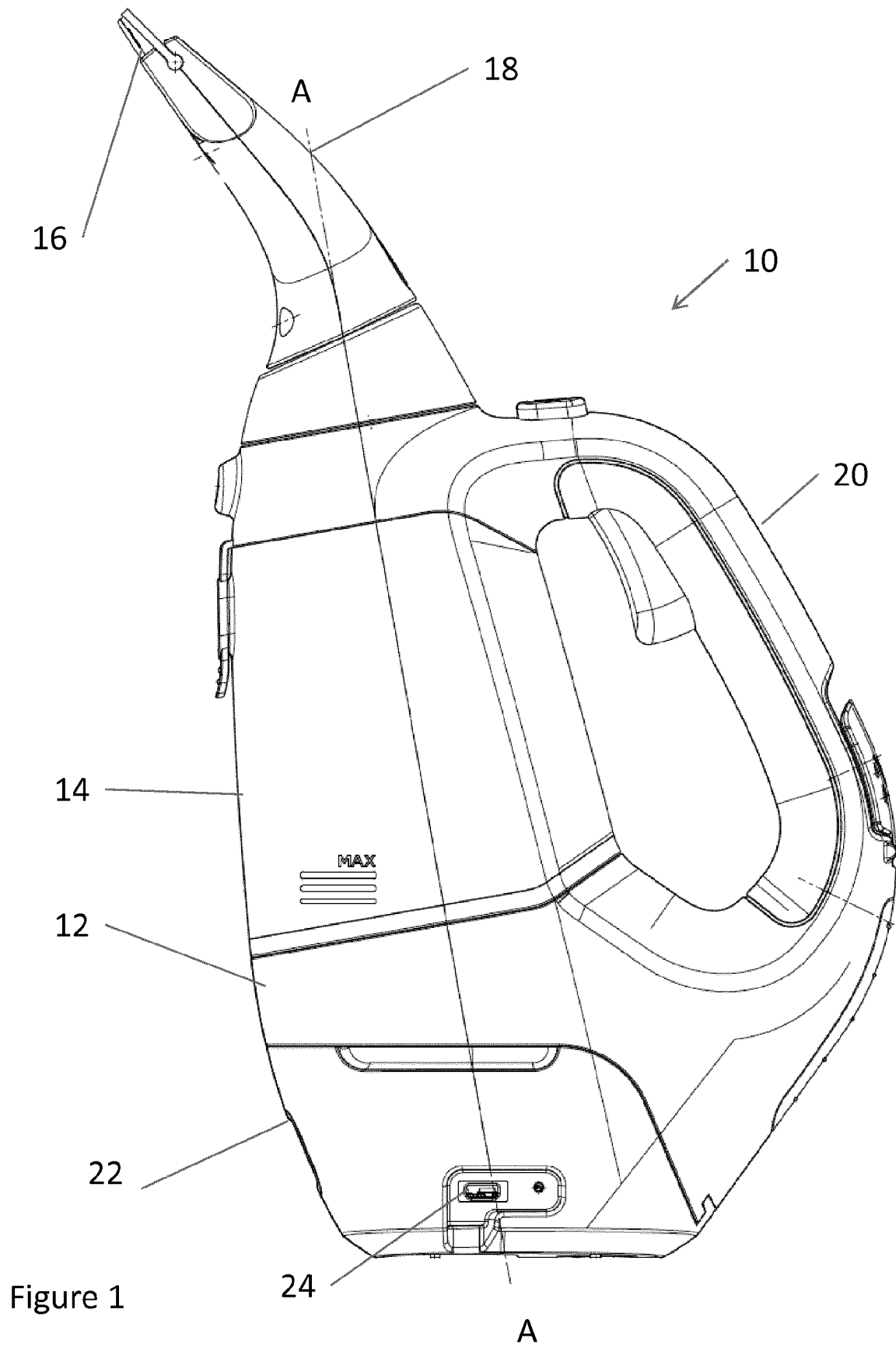
9. A handheld cleaning device according to claims 7 to 8 wherein the cleaning fluid delivery mechanism is actuated with a trigger mounted on the handle. 5
10. A handheld cleaning device according to claims 7 to 9 wherein the cleaning fluid tank is mounted in the handle. 10
11. A handheld cleaning device according to any of the preceding claims wherein the cleaning head comprises an attachment for mounting the cleaning accessory. 15
12. A handheld cleaning device according to any of the preceding claims wherein the cleaning accessory is one or more of the following a pad, cloth, or brush. 20
13. A handheld cleaning device according to any of the preceding claims wherein the fluid tank comprises an inlet tube for receiving fluid from the suction nozzle and the longitudinal axis of the inlet tube is coaxial with the axis of rotation of the cleaning head. 25
14. A handheld cleaning device according to any of claims 1 to 12 wherein the fluid tank comprises an inlet tube for receiving fluid from the suction nozzle and the longitudinal axis of the inlet tube is substantially parallel but not coaxial with the axis of rotation of the cleaning head. 30
15. A handheld cleaning device wherein the suction nozzle comprises a squeegee. 35

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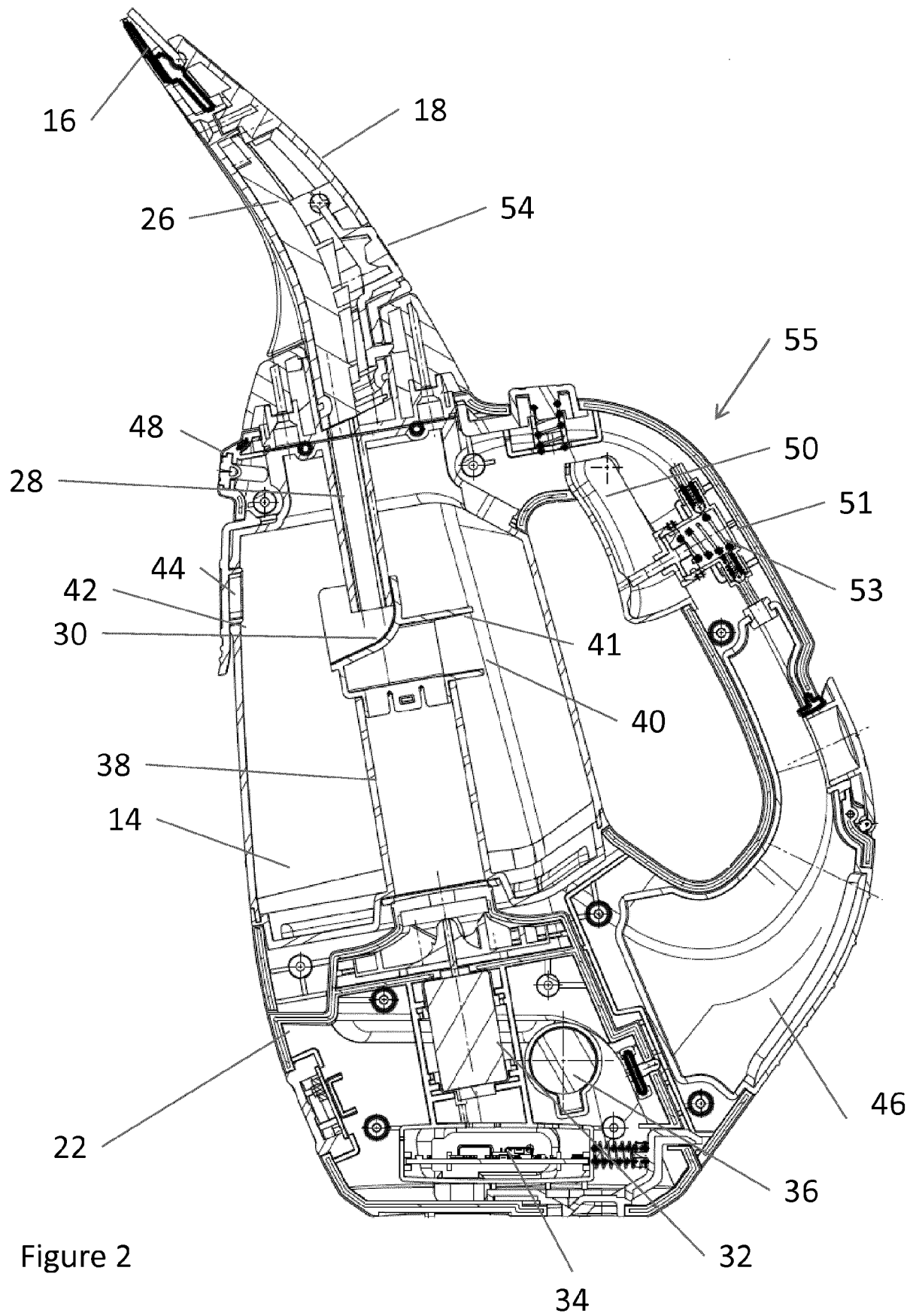


Figure 2

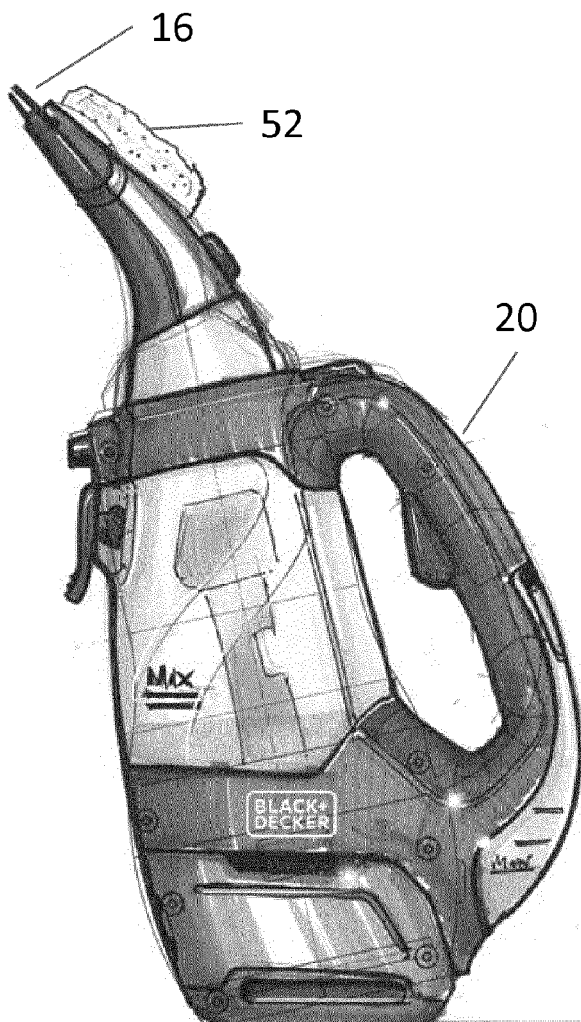


Figure 3

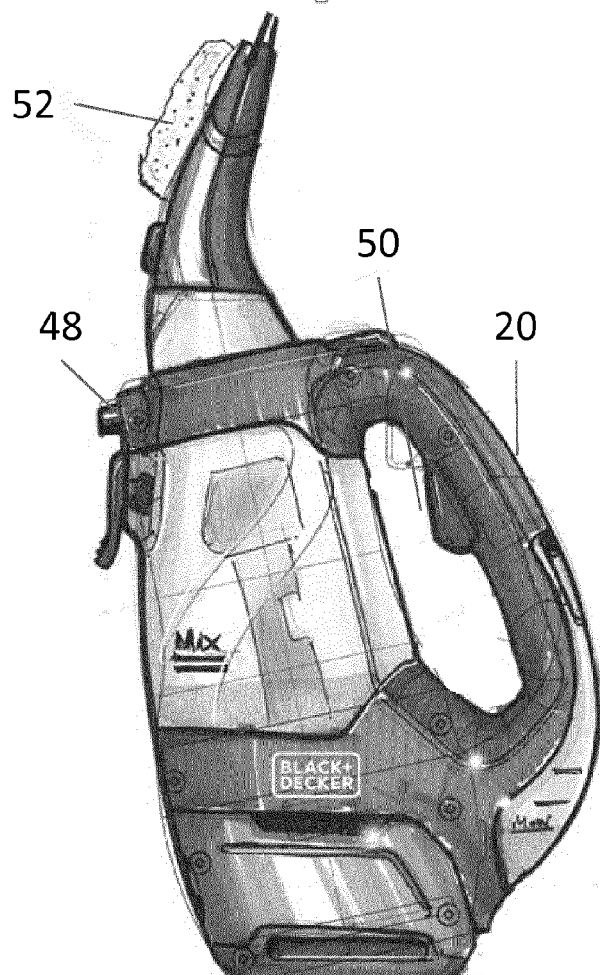


Figure 4

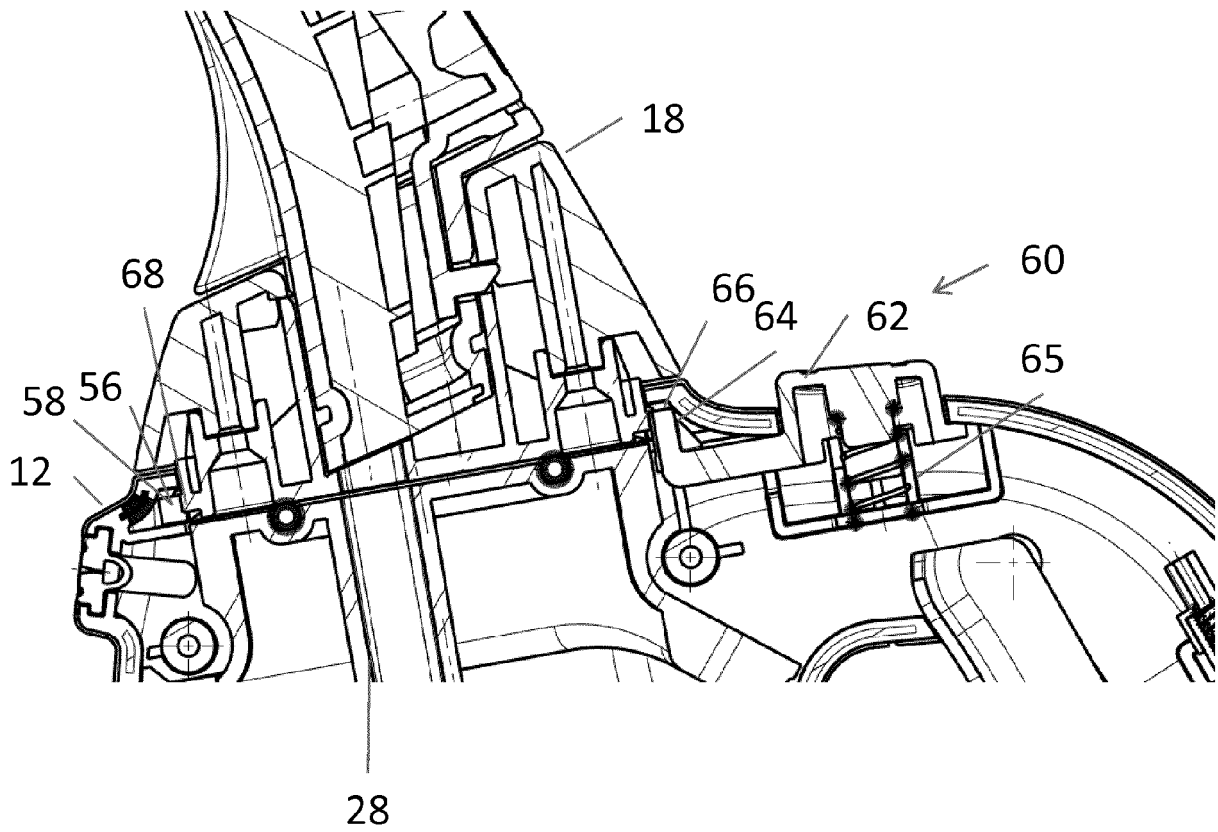


Figure 5

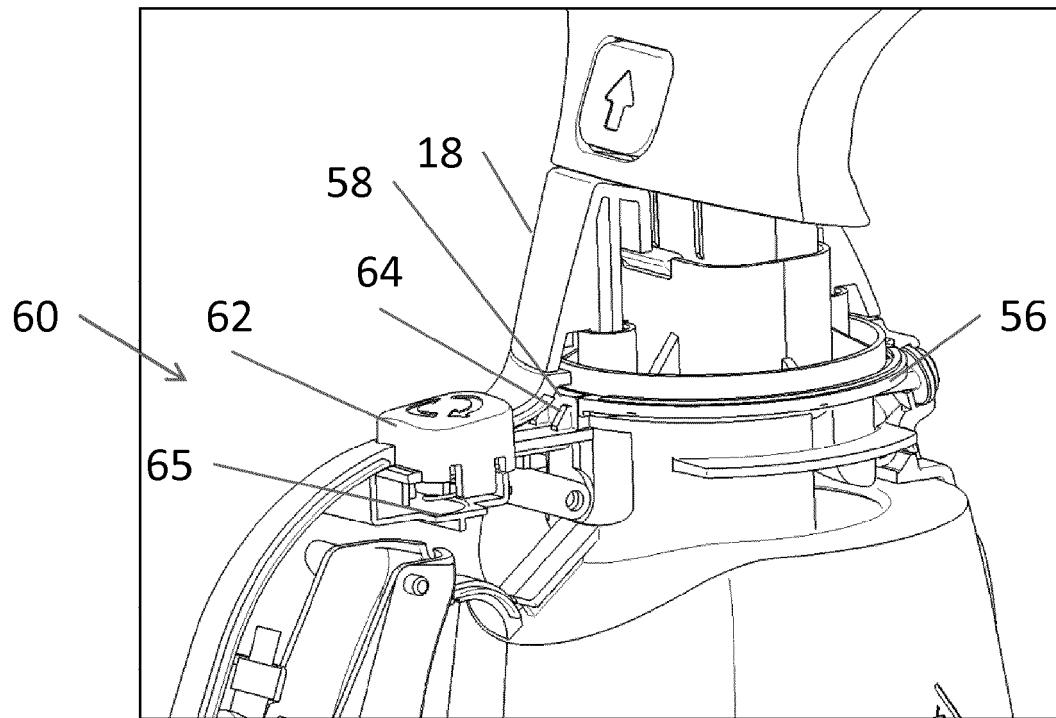


Figure 6a

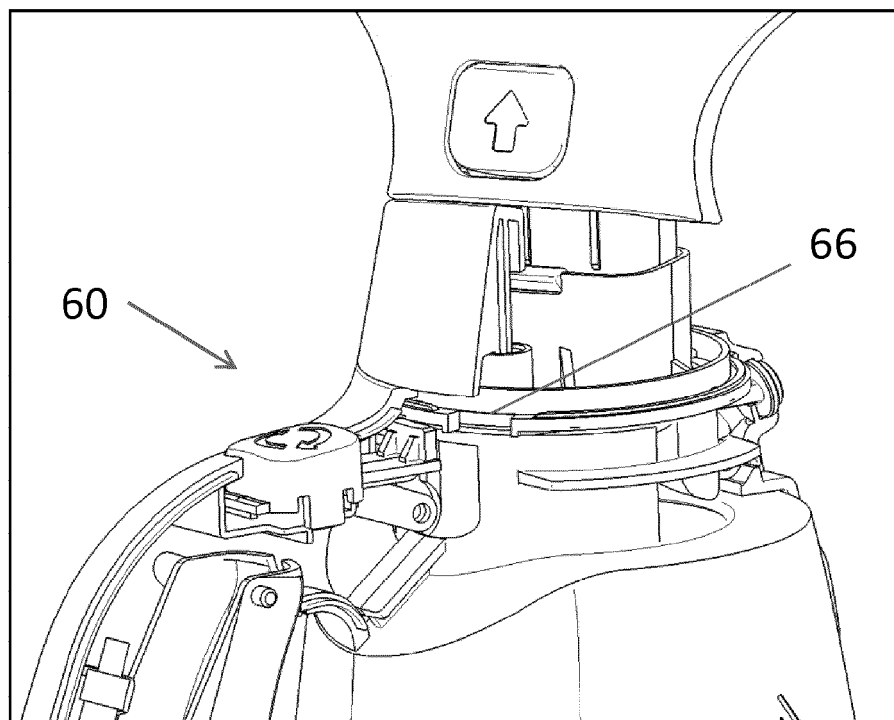


Figure 6b

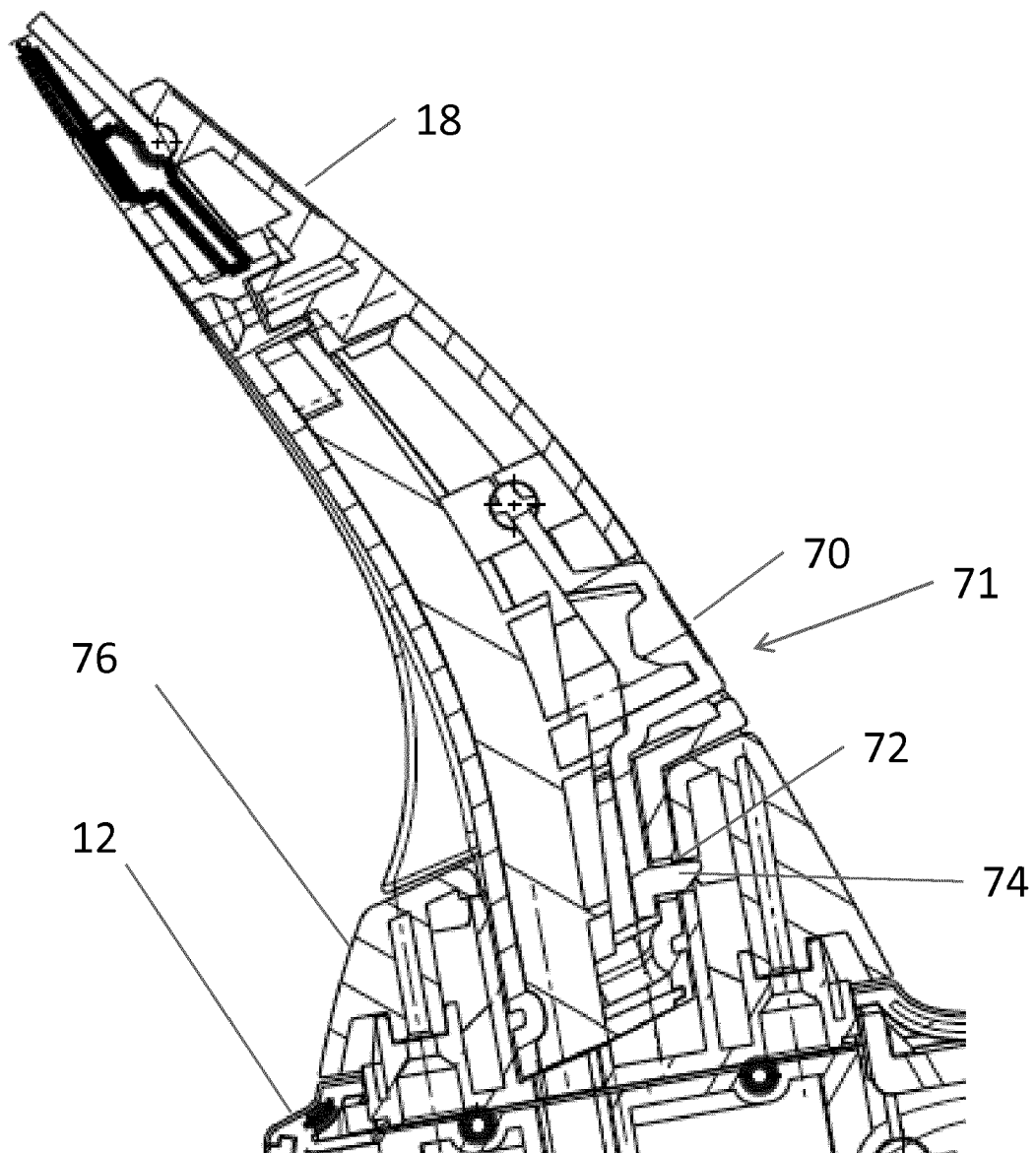


Figure 7



EUROPEAN SEARCH REPORT

Application Number
EP 14 18 3496

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			A47L B65G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 February 2015	Examiner Masset, Markus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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