(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 165 144 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.05.2017 Bulletin 2017/19

(21) Application number: **16184684.5**

(22) Date of filing: **10.01.2014**

(51) Int Cl.:
A47L 5/30 *(2006.01)* ***A47L 9/04*** *(2006.01)*
A47L 9/32 *(2006.01)* ***A47L 11/40*** *(2006.01)*
A47L 7/00 *(2006.01)*

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

(30) Priority: **11.01.2013 GB 201300526**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
14700761.1 / 2 943 104

(71) Applicant: **Techtronic Floor Care Technology Limited**
Tortola (VG)

(72) Inventors:
- **WILD, Matthew**
  Birmingham, West Midlands B4 6BN (GB)
- **BARRETT, Edward**
  Birmingham, West Midlands B4 6BN (GB)
- **MARSDEN, Jennifer**
  Birmingham, West Midlands B4 6BN (GB)

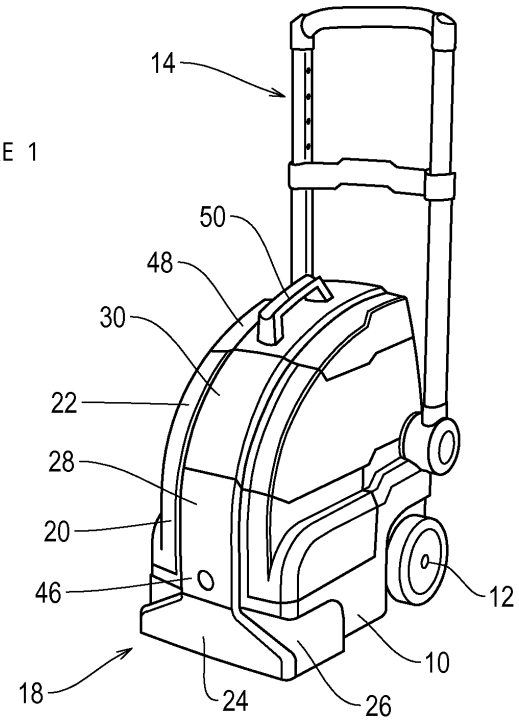
(74) Representative: **Palmer, Nicholas James**
Forresters
Skygarden
Erika-Mann-Strasse 11
80636 München (DE)

Remarks:
This application was filed on 18-08-2016 as a divisional application to the application mentioned under INID code 62.

(54) SURFACE TREATMENT DEVICE

(57) A surface treatment device comprising:
a body having a treatment head for treatment of a surface, and
a handle by which a user can move the device over the surface,
wherein the handle is connected to a rod rotatably held within a sleeve provided on the body of the device, the rod having a generally circular cross-sectional profile with a recessed portion providing an abutment surface adapted to abut a latching member so as to prevent rotation of the rod and of the handle in a first rotational direction when the latching member abuts the abutment surface, wherein the latching member is pivotably support on a pin and provides a trigger portion operable by a user, such that application of force to the trigger portion by the user causes rotation of the latching member about the pin, causing disengagement of the latching member from the recessed portion of the rod thereby enabling rotation of the rod and of the handle in the first rotational direction, and characterised in that the latching member is biased towards engagement with the recessed portion of the rod.

FIGURE 1



EP 3 165 144 A1

Description

[0001] This invention relates to a device for surface treatment. The invention has been devised, and is hereafter described, in relation to a device for cleaning a floor surface, more particularly a carpet-washing machine for washing carpets, in which the treatment comprises application of a treatment liquid to the surface and subsequent removal of (at least a substantial proportion of) the liquid. It will be appreciated that the invention may find application in relation to the treatment of other surfaces than floors, to floor surfaces other than carpets, and to treatment other than cleaning. For example, it is envisaged that the features described herein may be applied to suction cleaners that do not require cleaning fluid to be dispensed.

[0002] Such devices in the form of carpet-washing machines are well known. A typical carpet-washing machine, for washing a carpet in the course of being moved over its surface, comprises a body which carries a tank for containing a quantity of a cleaning liquid, normally water containing an appropriate quantity of at least one treatment agent such as a suitable detergent. The machine has a cleaning head, at or in the vicinity of which the cleaning solution is delivered to the carpet, e.g. through one or more delivery nozzles. The cleaning head may have an agitator device, by which the cleaning solution is worked into the pile of the carpet for effective cleaning; such an agitating device may comprise one or more static brushes which agitate the pile of the carpet as the machine is moved forwardly and rearwardly over its surface, or may be powered, e.g. a motor-driven rotatable brush bar or agitator roller.

[0003] The device also incorporates a source of suction, usually an electric motor driving an impeller fan for creating a suction airflow, to draw dirty cleaning liquid from the pile of the carpet after cleaning. A suction nozzle associated with the cleaning head closely faces the carpet to draw the liquid therefrom and the suction airflow passes through a suitable duct or passageway extending from the suction nozzle to a recovery tank for the dirty liquid. In the recovery tank the suction airflow is caused to follow a tortuous path in which the entrained dirty liquid is caused to separate from the airflow, with the air passing from the recovery tank to the source of suction by way of a suitable exit duct. Finally, the airflow is discharged to the surrounding atmosphere.

[0004] It is broadly the object of the present invention to provide improvements in a surface treatment device which is generally of the above-described type.

[0005] An aspect of the invention provides a surface treatment device comprising a body and a treatment head for treatment of a surface by application of a treatment liquid thereto and removal of at least a substantial portion of the liquid therefrom; wherein at least a part of the treatment head is detachable from the body of the device, and replaceable by a treatment head or part of different configuration from that of the first said head or part.

[0006] Further features of the above aspects of the invention are described in the appended claims.

[0007] These and other features of the invention will now be described by way of example with reference to the accompanying drawings, of which:

Figures 1 and 2 are perspective views, from different aspects, of a surface cleaning device in accordance with embodiments of the invention;

Figure 3 is a section through the device, showing internal components thereof and illustrating an airflow path therethrough;

Figure 4 is a view as figure 3 showing an alternative airflow path;

Figure 5 is a view from the aspect of figure 1, showing removal of a cleaning head part from the device;

Figure 6 is an enlarged view of part of figure 5;

Figure 7 is a perspective view of internal components of the cleaning head part.

Figures 8A and 8B illustrate alternative positions of components within the cleaning head part;

Figure 9 illustrates removal of an agitator member from the cleaning head part;

Figure 10 is a perspective view of the device, showing a handle part thereof in a folded-down position;

Figure 11 is a perspective view showing a pivoting mechanism for a handle;

Figure 12 is a section through the handle pivoting mechanism shown in figure 11;

Figure 13 is a section through part of the handle of the device, showing a latching mechanism therefor;

Figure 14 is a perspective view of a cleaning device according to alternative embodiments of the invention;

Figure 15 is another perspective view of the cleaning device of Figure 14, wherein the cleaning head part is separated from the body of the cleaning device;

Figure 16 is a perspective view of the cleaning head part of the device, wherein the cleaning component part and electrical component part are shown separate from one another;

Figure 17 is another perspective view of the cleaning head part of the device, showing an agitator member partially inserted;

Figure 18 is a side view of the cleaning component part of the cleaning head part;

Figure 19 is a view of the inner surface of a removable part of a housing wall of the cleaning head part;

Figures 20 and 21 are a perspective view, and cutaway perspective view, of the handle of the cleaning device according to embodiments of the invention;

Figures 22 and 23 are a cross-sectional front view of a releasable catch mechanism of a bridging member of a handle, and a perspective view of a portion of a cuff of the releasable catch mechanism; and

Figures 24, 25 and 26 are cross-section side views of the pivotable connection between the handle and

the body, of embodiments of the invention.

[0008] Referring firstly to figures 1 and 2 of the drawings, these show a surface cleaning device, specifically a carpet washing machine, in accordance with the invention. The device comprises a base or body portion 10, provided towards its rearmost end (having regard to normal usage of the device by a person cleaning a floor surface) with a pair of floor surface-engaging wheels 12 enabling the device to be supported on a floor surface and readily moved across the surface. The wheels may be mounted to the body 10 by any suitable method, e.g. an axle carrying both wheels and extending across the body of the device, or individual wheel-supporting formations, in each case including appropriate bearing arrangements.

[0009] The device further comprises a handle assembly indicated generally at 14. The handle assembly is pivotally connected to the body 10 of the device for movement about a transverse pivotal axis 16 shown in figure 2; the handle assembly and its associated mechanisms will be described in greater detail hereafter.

[0010] The device is used to clean a carpet or other surface by applying a cleaning liquid to the surface, agitating the liquid in contact with the surface (in the case of carpet, to cause the liquid to penetrate the pile of the carpet to remove dirt therefrom) and subsequently removing dirty liquid from the surface by suction. In the case of cleaning a carpet, the cleaning liquid generally is water with a suitable treatment or agent such as a detergent added thereto. The application of liquid to the surface, agitation thereof, and removal therefrom is effected by a cleaning head assembly 18 provided at the lower front end of the body of the device. The body of the device carries a tank indicated generally at 20 for fresh cleaning liquid to be applied to the surface and, above the tank 20, a recovery tank 22 for storage of dirty cleaning liquid recovered from the surface. These elements will be described in greater detail hereafter.

[0011] Visible at the front of the cleaning head assembly 18 is a part 24 of a housing 26 of the assembly, in which part is disposed a suction nozzle described in more detail hereafter. Above the part 24, the body 10 of the device defines a duct portion 46, and further duct parts 28, 30 are provided respectively on the exterior of the clean liquid and dirty liquid tanks 20, 22. Together the duct parts 46, 28, 30 provide for flow of air from the suction nozzle to the uppermost part of the tank 22 as described hereafter.

[0012] Referring now to figure 3 of the drawings, this shows the general arrangement of internal components of the device. Within the rear of the body 10 of the device, partially in the region between the wheels 12, there is a source of suction indicated generally at 34. It comprises an electric motor 36 driving a fan or impeller 38. The inlet for suction airflow to the fan 38 is at the top thereof, and an inlet duct part 40 extends upwardly from the fan inlet. After passing through the fan 38, the airflow is discharged into the space surrounding the motor and fan within the body 10, and is expelled from the body by way of an outlet opening 42 facing the surface on which the device is standing. Since the suction airflow entering the fan 38 might, despite the separating arrangement described hereafter, still contain some water particles, the air expelled from the fan 38 does not pass the motor 36 for cooling the latter; instead, ambient air is separately drawn into the motor and, having cooled the latter, is expelled through the opening 42 along with the expelled suction airflow. Such expelled air will be warm, and therefore will assist in drying of a surface after it has been cleaned.

[0013] Figure 3 shows the internal configuration of the tanks 20, 22 and the duct parts 28, 30, respectively, at the front exterior of the tanks. The lowermost end of the duct portion 28 at the front of tank 20 aligns with a duct portion 46 at the front of the body 10, and the duct portion 46 aligns with the uppermost end of the suction nozzle to receive suction airflow therefrom. Above the tank 22 there is a cover part 48 with a handle 50, the cover part 48 defining a further duct part 52 which ends facing a baffle 54 extending downwardly. The baffle 54 is followed by a forwardly extending inclined baffle 56 so that water-laden suction airflow is deflected to enter the tank 22 in a downwardly inclined forwards direction. At the rear of the tank 22 an opening at its top leads into a space 58 within the cover part 48 communicating with a duct 60 extending downwardly through the centre of the tank 22, for suction airflow to exit the tank 22 and enter the inlet duct 40 leading to the fan 38. Such airflow within the tank 22 is effective at causing water droplets entrained in the suction airflow to be precipitated from the airflow and retained in the tank 22.

[0014] For emptying such separated dirty cleaning liquid, the tank 22 has a pouring tube 62 which communicates with the interior of the tank 22 at its lowermost end 64. At its uppermost end, the tube 62 is closed by the cover member 48. With the cover member removed, the tank 22 can be removed from the base 10 of the device and tilted to empty it of recovered liquid by way of the tube 62. The tank 20 has a filling opening and closure cap indicated generally at 70. With the tank 22 removed, this is accessible for filling the tank 20, or the tank 20 can be removed from the body of the device for filling if required. Cleaning liquid is drawn from the tank 20 by a pump 71 as required, and delivered to an application nozzle or spray bar 72, from which it is applied to a surface being cleaned.

[0015] As an alternative to the drawing of dirty cleaning liquid from a surface by way of the suction nozzle, the device may provide for connection of a suction hose. Figure 4 of the drawings shows that a suction hose may be connected at a hose fitting 80 provided on the duct part 46. Within the duct part 46, there will be provided an appropriate changeover mechanism so that when a hose is not connected to the fitting 80 the fitting is closed, so as not to detract from the force of suction applied to the suction nozzle, and when a hose is connected to the fit-

ting 80 the connection to the suction nozzle is closed-off so that the force of suction at the hose is not reduced.

[0016] Such a hose may be connected to a hand-held cleaning head, and a means associated with such a hose for delivering cleaning liquid to such a cleaning head from the tank 22 by way of the pump 71 may be provided.

[0017] Referring now to figures 5 to 9 of the drawings, these illustrate details of the cleaning head 18 and its connection to the body 10 of the device. Figure 5 shows the device with a cleaning head slightly removed therefrom, and figure 6 shows the cleaning head and part of the body 10 of the device in greater detail. The body 10 is provided with two downwardly-extending mounting posts 86, spaced transversely of the body 10 from one another. Each post 86 has an annular recess 88 adjacent its lowermost, free, end.

[0018] The housing 26 of the cleaning head 18 has a front wall 92 from which the forwardly-extending part 24 in which the suction nozzle is disposed extends. The mounting posts 86 are able to enter into openings 94 extending downwardly into the housing 90 of the cleaning head from an upper surface 96 thereof. Turnable fasteners having heads 98 accessible on the front wall 92 of the housing are able to be turned by a screw driver or the like, to engage the recesses 88 on the mounting posts to hold the cleaning head assembly to the body of the device. Arrows on figure 6 depict the operations of fitting the cleaning head assembly to the device and fastening it in position; removal of the assembly is the reverse of such operations.

[0019] Figure 7 shows internal components of the cleaning head assembly. In particular, a suction nozzle 100 of "fishtail" shape in front view is connected to the housing within the part 24 thereof. It has a downwardly facing open mouth at its lower edge 102, and an outlet opening 104 at its upper end. The opening 104 faces an aperture 106 in the upper surface 96 of the housing 26, which faces the lowermost end of the duct part 46 for flow of suction air into the ductwork leading to the dirty liquid tank 22.

[0020] Internally of the housing 26 there is a part-cylindrical cover 108, open at a lowermost part of its circumference to enable an agitator member rotatably mounted within the cover 108 to contact the surface therebeneath which is to be cleaned. Such an agitator member, which may be an elongate cylindrical member provided on its periphery with a number of beater and/or brush elements (sometimes referred to as a brush bar) is rotationally supported about its longitudinal axis by suitable bearings. It is driveable by an electric motor having a housing 110 and an output shaft rotatable about an axis generally parallel to the length of the agitator member, and a driving connection between the output shaft of the motor and the agitator member is provided by a drive means, e.g. a drive belt (possibly a toothed belt) or a gear train, disposed within a casing 112 extending between the motor 110 and the cover member 108.

[0021] The agitator member and associated components including the cover 108 are disposed within the housing 26 for movement upwardly and downwardly relative thereto. The moveable components are connected to the housing 26 by four vertically oriented helical springs 114, each connected at its lowermost end to the cover 108 and at its uppermost end to the housing 26 below the upper wall 96 thereof. Thus, the agitator member is able to move and, to some extent, self-align to contact a surface therebeneath.

[0022] An electrical connection for powering the motor 110 is established between co-operating electrical contacts (not illustrated) associated with the cleaning head assembly and the body of the device respectively which engage when the cleaning head is fitted to the body of the device. The electric motor 110 may be moveable upwardly and downwardly within the housing 26 with the agitator member and its components, or may be fixed at a stationary position within the housing 26 in which case the drive mechanism within the casing 112 must allow for relative movement between the motor and the agitator member.

[0023] Figures 8a and 8b illustrate the ability of the agitator member and cover 108 to move upwardly and downwardly within the housing 26; figure 8a shows a lowermost position of the agitator member and figure 8b an uppermost position thereof.

[0024] The agitator member itself may be withdrawn from the cleaning head in a direction transversely of the device, should it be necessary to change the agitator member or clean it. The end of the agitator member opposite its end at which it is driven by the motor 110 faces an end wall portion 118 of the housing 26, moveable upwardly and downwardly with the agitator member relative to the housing. In line with the end of the agitator member, a part 120 of the wall portion 118 is removable from the rest of the wall portion 118, having bayonet-fit engagement therewith and being removable after angular movement effected by a coin, for example, engaged with a slot 122 in the removable wall part 120. Figure 9 of the drawings shows the wall portion 120 removed, and an agitator member 124 being withdrawn through the opening thereby established in the wall part 118. At its end opposite the wall portion 118, the agitator member has during engagement with a drive member rotatable by the motor as above described. The driving engagement may be by way of interengaging splines or other non-circular cooperating surfaces. Figure 10 shows the manner in which the handle assembly 14 may be pivoted about the axis 16 to assume a horizontal or near-horizontal orientation, so as to minimise the amount of space occupied by the device when not in use. The handle assembly is also telescopically extendible and contractible.

[0025] Figure 11 shows the handle assembly in greater detail, and the pivoting mechanism by which it is movable and able to be held in a required position.

[0026] In more detail, the handle assembly 14 comprises two limbs 130, 132 which extend substantially parallel to one another. The first limb 130 comprises two

elements 134, 136 telescopically connected to one another with the element 134 extending into the interior of the element 136. Similarly, the limb 132 comprises telescopically-connected elements 138, 140 with the former extending into the interior of the latter. The free ends of the elements 134, 138 are joined by a transverse member 142, and a bridging member 144 extends transverse between the adjacent ends of the elements 136, 140. The transverse member 142, of course, forms a handle portion graspable by a user. For holding the elements 134, 138 in a selected one of a number of desired positions relative to the elements 136, 140, a catch mechanism shown in greater detail in figure 13 is provided.

[0027] The bridging member 144 is hollow in configuration, and carries in its interior two oppositely outwardly facing catch members 146, 148. These catch members are biased by springs as 150 to retract into the interior of the member 144. They are urged outwardly into engagement with selected apertures of a number of apertures 152 in the elements 134, 138 by cam surfaces 154, 156 at opposite sides of a cam member 158. The cam member 158 is able to be manually depressed, against the action of a spring 160, by a press-bar 162, to enable the catch members 146, 148 to be retracted out of engagement with the respective apertures 152 under the action of the springs 150. When the press bar 162 is released, the cam member 158 biases the catch members outwardly, and when opposed apertures 152 come into alignment with the catch members they are engaged thereby to hold the telescopic setting of the handle.

[0028] The pivoting mechanism for the handle assembly 14 comprises cup-like members 164,166 at the ends of elements 136, 140. A spindle 168 extends through the body 10 of the device. Each of the members 164, 166 contains a catch mechanism by which the member is able to be held in a selected angular position relative to the device, and such catch mechanisms are able to be released by pressing inwardly an end cap 170 of the member 164. The catch member may provide for the handle to be held at positions spaced 90 degrees apart from one another, i.e. the downwardly-folded position shown in figure 10 and the upright position shown in other figures. Holding of the handle assembly at one or more intermediate positions may also be provided for.

[0029] With reference to Figures 14 to 26 of the drawings, further features of embodiments of the treatment device are now described. Features of all embodiments described herein are combinable unless otherwise stated, and the skilled person will understand that the following features are complementary to those described previously in the description.

[0030] It should be understood that unless described otherwise, mechanisms employed in the earlier-described embodiments are also present in these further embodiments. Those mechanisms include all suction and cleaning fluid-distribution mechanisms, the general principles of operation of the agitator member, cleaning fluid and dirty water storage, and the like.

[0031] Figure 14 shows a surface treatment device 200 comprising a main body and a treatment head 218, and a handle assembly 250 of substantially the same general structure as that of earlier embodiments. The handle assembly 250 comprises a pair of limbs 254 extending substantially parallel to one another, each limb 254 comprising a first 268 and a second 266 element telescopically connected to one another with the first element 268 extending into an interior of the second element 266, and a bridging member 270 extending transverse between the pair of second elements 266, and a releasable catch mechanism 258 being provided by the bridging member 270. Each limb 254 is pivotally connected to the body of the device 200 at a respective pivot connection point 256. The handle assembly 250 will also be referred to hereinafter as a 'handle' for simplicity.

[0032] With reference to figures 15 and 16, the treatment head 218 of the device 200 is detachable from the body of the device 200. In embodiments, and as shown, the treatment head 218 includes first and second portions 220,221. It is contemplated that the treatment head 218 may include more than two portions, detachable from each other, but for simplicity we described the situation in which the treatment head 218 includes two portions. A variety of treatment heads 218 may be provided, such that they are interchangeably connectable to the device 200. It is envisaged that treatment heads may include heads having rollers, brush-bars, squeegees, or any other type of surface-cleaning equipment.

[0033] The method of connecting the treatment head 218 to the body of the cleaner is substantially the same as described before, using latching mechanisms, clips, or the like. One or other portion of the treatment head may further or alternatively require removal of screws in order to release it from the body of the device 200. In this way a user may disconnect and change / replace / clean the treatment head 218 or portions of the treatment head 218.

[0034] The device 200 treatment head includes an agitator member 226 supported within a housing, the agitator member 226 being rotatably driveable by a motor 228 via a drive formation 230 engageable with an end of the agitator member 226 so as to transmit rotational drive thereto, the drive formation 230 being driven by a drive train that includes a drive element extending around respective formations provided on the drive formation 230 and on an output shaft of the motor 228. While the embodiments illustrated in the drawings show an agitator that is a driven rotatable brush bar, it should be understood that a non-driven agitator may be used, or any other form of driven agitator (which may slide, wipe, vibrate, or the like).

[0035] The first portion 220 includes the motor 228, drive train and drive formation 230 for driving the agitator member 226. The second portion 221 includes a housing for at least partially surrounding the agitator member 226 (although the agitator member 226 is of course removable from the second portion 221). The two portions 220,

221 are connectable to one another by a latching arrangement 222, 224 so that they may be simply connected to one another by a user. In addition, or instead, pins may be inserted (in the vertical direction), through respective apertures provide in the first and second portions 220, 221, to further secure those parts to one another.

[0036] In embodiments, securing arrangements are provided, comprising pairs of locking pins 223 provided on the body of the device 200, and respective sockets 225 provided on the treatment head 218. The sockets 225 may be generally keyhole-shaped. To secure the treatment head 218 to the body, each locking pin 223 is aligned with a wider end of each respective socket 225, so that the locking pin 223 may be inserted into the socket 225. Subsequent lateral movement of the treatment head 218 relative to the body causes the locking pins 223 to slide within the socket 225, such that the locking pin 223 moves to a narrower portion of the socket 225, in which position a head of the pin 223 having a wider diameter than that of the narrower portion of the socket 225 is prevented from being withdrawn from the socket 225, thus holding the treatment head 218 in position. In embodiments, it is envisaged that other connection arrangements may be used, such as screws, for example, when connecting one or both portions 220, 221 to the body of the device 200.

[0037] In embodiments, the first portion of the treatment head provides all of the electrical components required to drive the agitator member 226, whilst the second portion 221 contains no electrical components at all, including any wiring or cables and the like. This means that a user may disconnect the first portion 220 from the second portion 221 so that the second portion 221 (which contains the agitator housing and any nozzle or opening for intake of dirt provided by the treatment head 218) may be cleaned by the user. Since no electrical components are present, this cleaning may include submersion in liquid. In embodiments, the first portion 220 containing electrical components may be left in attachment with the body of the device 200 while the second portion 221 is removed. In embodiments, the first portion 220, containing electrical components, requires screws to be removed in order for the first portion 220 to be removed from the body of the device 200, in order to prevent or minimise the risk of electrical components becoming exposed and/or loose. In such embodiments, the second portion 221 may be detachable from the body and from the first portion 220 by releasing latches, clips, or the like, while the first portion 220 remains connected to the body.

[0038] As shown in Figures 17 to 19 the agitator member 226 itself may be withdrawn from the treatment head in a direction transversely of the device. The housing defines an opening and the cleaning head 218 includes an agitator door 202 moveable between an open and a closed position relative to the housing, so as to open and close the opening in the housing. The agitator member 226 is removable from the housing when the door 202 is in its open position. An end formation 206 is provided at the end of the agitator member 226 opposite its end at which it is driven by the drive formation 230. A portion of the end formation 206 abuts a part of the treatment head 218 on full insertion of the agitator member 226, so as to prevent further insertion of the agitator member 226.

[0039] In embodiments one or more alignment formations 212 are provided around the opening in the housing, for alignment with corresponding formations 210 provided on the end formations 206, to ensure correct alignment between the end formation 206 and housing on full insertion of the agitator member 226.

[0040] When fully inside the treatment head 218, an outwardly-facing surface of the end formation 206 lies adjacent an end wall portion of the housing providing an agitator door 202 that is slideable between open and closed positions. The agitator door 202 defines a pair of ridges, one on each edge running from top to bottom, configured to engage a corresponding channel at either side of the agitator door 202, provided in the treatment head 218.

[0041] In embodiments, the agitator member end formation 206 is disposed directly adjacent the agitator door 202 when the agitator member 226 is within the housing. The outwardly-facing surface of the end formation 206 provides a first retaining formation 208 configured to engage a corresponding second retaining formation 216 provided on an inwardly facing surface of the agitator door 206 respectively (as shown in Figure 19). In embodiments the second retaining formation 216 is provided by a pair of sprung steel pieces (or similar resilient parts), each curved inwardly between respective pairs of spring-holding formations 215 provided on the agitator door 202. The first retaining formation 208 comprises a pair of walls extending from the surface of the end formation 206, each having a contact portion 214 angled outwardly and configured so that relative sliding movement of the agitator door 202 relative to the end formation 206 causes the steel pieces of the second retaining formation 216 to abut the contact portions 214 of the first retaining formation 208. In this manner, the pairs of retaining formations 208, 216 are configured to oppose movement of the agitator door 202 between its open and closed positions. On closing or opening the agitator door 202, the two retaining formations contact one another so as to resist further movement of the door relative to the end formation 206 of the agitator member 226. Sufficient force applied to the agitator door 202 by the user causes the sprung parts 216 to flex, allowing the retaining formations 208, 216 to move past one another, and thereby allowing the door to open or close, respectively.

[0042] Figures 20 to 26 show aspects of a handle assembly 250 of embodiments of the invention. The general configuration of the handle assembly 250 is described above in relation to Figure 14. The handle assembly 250 provides a graspable portion (transverse member 252 disposed between the ends of the two limbs 254) by which a user can move the device 200 over the surface.

The handle 250 is at least one of (a) pivotably connected to the body of the device and (b) extensible and contractible in respect of its length. In embodiments, the handle 250 is both pivotably connected to the body and also extensible and contractible lengthwise. In embodiments, the handle 250 is telescopically extendible and contractible.

[0043] In embodiments, and with reference to Figures 22 and 23, the device 200 includes a releasable catch mechanism 258 for holding a selected length setting of the handle 250. The releasable catch mechanism 258 is provided by the bridging member 250. The bridging member 270 is generally hollow, and carries in its interior two oppositely outwardly facing catch members 274. These catch members 274 are biased outwardly by at least one spring 276. The catch members 274 are urged into engagement with pairs of apertures 260 provided in the first elements 268.

[0044] In embodiments, the device 200 includes a cuff 272 substantially surrounding a portion of the bridging member 270, wherein the cuff 272 defines a pair of slots 284 adapted to receive a pair of pins 282 connected to respective catch members 274. The slots 284 are configured to provide a cam surface such that rotation of the cuff 272 about the bridging member 270 in a first direction causes engagement of the pins 282 with the slots 284 so as to cause each respective pin 282 and connected catch member 274 to move away from its respective aperture 260. This motion causes the catch member 274 to disengage from the aperture 260, thereby allowing relative movement between the first 268 and second 266 elements. When the cuff 272 is rotated in a second opposite direction, the biasing force of the spring 276 causes the catch members 274 to move outwardly into engagement with respective apertures 260, as the slots 284 rotate such that the pins 282 are able to move outwardly. In embodiments, the cuff 272 may be biased (by a spring or the like), to its original position in which the catch members 274 engage the apertures 260.

[0045] With reference to Figures 24 to 26, a handle pivoting mechanism of embodiments of the invention is explained. A rod or spindle 290 extends across the width of the body of the device 200. The handle 250 is connected to the rod 290, and the rod 290 is rotatably held within a sleeve 288 provided on the body of the device 200.

[0046] The rod 290 has a generally circular cross-sectional profile. However, at a position on the circumference of the rod 290 a recessed portion is provided. The recessed portion provides an abutment surface 294 adapted to abut a latching member 296 provided on the body of the device 200. Rotation of the rod 290 and of the handle 250 in a first rotational direction relative to the body is prevented when the latching member 296 abuts the abutment surface 294.

[0047] The latching member 296 provides a further recess 300 for receiving a pin 298, and provides a trigger portion 286 operable by a user. The latching member 296 is pivotably support on the pin 298. The trigger portion 286 may comprise a handle or a pedal (e.g. a foot-operated pedal) operable by the user. Application of force to the trigger portion 286 by the user causes rotation of the latching member about the pin 298, causing disengagement of the latching member 296 from the recessed portion of the rod 290, lifting the latching member 296 away from the abutment surface 294, thereby enabling rotation of the rod 290 and of the handle 250 in the first rotational direction (as indicated in Figure 26). In embodiments the latching member 296 is biased towards its original configuration in with it is engaged with the recessed portion of the rod 290 (by a compression spring located at 293, for example, or by a tension or torsion spring located at a suitable position).

[0048] In embodiments, the recessed portion of the cross-sectional profile of the rod 290 also provides a lip 292, opposite the abutment surface 294, and configured such that when the latching member 296 is engaged with the recessed portion the lip 292 resists rotational movement of the rod 290 and of the handle 250 in a second opposite rotational direction. From its original position, in which the latching member 296 is engaged with the recessed portion, the rod 290 and handle 250 are rotatable in the second rotational direction on application of a sufficient (and predetermined) force to the handle 250 in the second rotational direction by the user. This force acts against the force of the biasing spring urging the latching member 296 into engagement with the recessed portion of the rod 290. Once a sufficient force is applied to overcome the opposing biasing force, a tip of the latching member 296 is moved outwardly away from the central axis of the rod 290 as the latching member 296 tip moves over the lip 292 of the rotating rod 290. The user may then move the handle 250 back to its original position, rotating the rod 290 so that the latching member 296 once again engages the recessed portion.

[0049] When used in this specification and claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

[0050] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

[0051] Features of embodiments of the invention are set out in the following clauses:

1. A surface treatment device comprising a body and a treatment head for treatment of a surface by application of a treatment liquid thereto and removal of at least a substantial portion of the liquid therefrom; wherein at least a part of the treatment head is de-

tachable from the body of the device, and replaceable by a treatment head or part of a different configuration from that of the first said head or part.

2. A device according to clause 1 wherein the treatment head is detachable and replaceable as an assembly.

3. A device according to clause 1 or clause 2 wherein the treatment head is a cleaning head.

4. A device according to clause 3 wherein the cleaning head includes means for applying cleaning liquid to the surface and means for applying suction to the surface to remove the liquid.

5. A device according to clause 4 wherein the cleaning head further comprises an agitator member.

6. A device according to clause 5 wherein the agitator member is rotatably driveable, and the cleaning head includes a motor for effecting such driving.

7. A device according to clause 6 wherein the motor is spaced from the agitator member and drives the latter by way of a drive train therebetween.

8. A device according to clause 7 wherein the drive train includes a drive element extending around respective formations provided on the agitator member and on an output shaft of the motor.

9. A device according to clause 8 wherein the drive element comprises a drive belt.

10. A device according to clause 6 or any clause appendent thereto wherein the agitator member is able to move, in use, upwardly and downwardly relative to a housing of the cleaning head.

11. A device according to clause 10 wherein the agitator member is biased to move downwardly relative to the housing, to engage a surface being cleaned.

12. A device according to clause 10 or clause 11 wherein the agitator member assembly is guided for movement upwardly and downwardly relative to the housing by generally upright guide formations.

13. A device according to clause 12 wherein spring means is associated with at least some of said formations to effect the biasing.

14. A device according to any one of clauses 10 to 12 as appendent directly or indirectly to clause 7, wherein the motor is movable upwardly and downwardly relative to the housing with the agitator assembly.

15. A device according to clause 5 or any clause appendent thereto wherein the agitator member is removable in a transverse direction from the cleaning head.

16. A device according to clause 15 wherein said removal is able to be effected without the use of tools

17. A device according to clause 15 or 16, as appendent directly or indirectly to clause 10, wherein the housing includes an openable or removable portion permitted said removal of the agitator member.

18. A device according to any one of the preceding clauses wherein the treatment head comprises a suction nozzle through which the treatment liquid may be drawn from a surface being treated.

19. A device according to clause 18 wherein the suction nozzle has an opening facing a surface being treated, extending transversely of the device to substantially the same width as the cleaning head.

20. A device according to clause 19 comprising a source of suction for creating a suction airflow to remove liquid from the surface being treated.

21. A device according to any one of the preceding clauses comprising a recovery tank for receiving liquid removed from the surface being treated.

22. A device according to clause 21 wherein the recovery tank is removable from the body of the device.

23. A device according to clause 22 as appendent to clause 20 wherein the recovery tank is disposed in an upper region above the base of the device, and the source of suction is disposed in a part of the base of the device.

24. A device according to clause 23 wherein the recovery tank includes a duct extending downwardly through the tank, to lead to the source of suction.

25. A device according to any one of clauses 21 to 23 as appendent to clause 18 or 19 including ducting extending upwardly from the suction nozzle to the recovery tank.

26. A device according to clause 25 wherein the suction airflow enters the recovery tank downwardly, and then flows upwardly within the tank to enter the duct leading to the source of suction.

27. A device according to clause any one of clauses 21 to 26 further comprising a supply tank for clean liquid for delivery to a surface being treated.

28. A device according to clause 27 wherein the supply tank is disposed at least partially beneath the recovery tank.

29. A surface treatment device comprising a body; a treatment head for application of a liquid to a surface and removal of at least a substantial portion of the liquid; a supply tank for a clean supply of the liquid; a recovery tank for receiving liquid removed from the surface being treated; a source of suction for creating a suction airflow; and ducting for conveying the suction airflow and liquid removed from the surface, from the treatment head to the recovery tank; wherein the recovery tank includes a duct leaving the tank downwardly to convey suction airflow to the source of suction.

30. A device according to clause 29 wherein the suction airflow enters the recovery tank downwardly and then flows upwardly within the tank to enter the duct leading to the source of suction.

31. A device according to clause 29 or 30 wherein the duct leading to the source of suction extends downwardly through the recovery tank.

32. A device according to any one of clauses 29 to 31 wherein the recovery tank has a cover including a duct part for suction airflow entering the tank.

33. A device according to any one of clauses 29 to 32 wherein the supply tank is disposed at least partially beneath the recovery tank.

34. A surface treatment device comprising a body, and a treatment head for treatment of a surface by application of a treatment liquid thereto and removal of at least substantial proportion of the liquid therefrom; and further comprising a handle by which a user can move a device over the surface; wherein the handle is at least one of (a) pivotably connected to the body of the device and able to be set in a selected one of a number of angular positions relative to the body and (b) extensible and contractible in respect of its length.

35. A device according to clause 34 wherein the handle is generally of inverted U shape, having spaced limbs whose one ends are pivotably connected to the device and whose other ends are joined to one another by a joining portion.

36. A device according to clause 35 wherein at least one of the pivotal connections of the limbs to the handle incorporates a holding mechanism to hold a selected angular position of the handle relative to the body.

37. A device according to clause 36 comprising a release mechanism for releasing of a handle to enable it to be pivoted relative the base of the device.

38. A device according to clause 37 wherein the release mechanism is operable to release respective holding mechanisms for both limbs of the handle together.

39. A device according to any one of clauses 34 to 38 wherein the handle is telescopically extendible and contractible.

40. A device according to clause 39 wherein there is a releasable catch mechanism for holding a selected length setting of the handle.

41. A device according to any one of clauses 1 to 28 and any one of clauses 29 to 33.

42. A device according to any one of clauses 1 to 28 and any one of clauses 34 to 40.

43. A device according to any one of the preceding clauses adapted for treatment of a floor surface

44. A device according to clause 43 which is a carpet washer.

[0052] Yet further features of preferred embodiments are set out in the following further set of clauses:

1. A surface treatment device comprising a body and a treatment head for treatment of a surface wherein at least a part of the treatment head is detachable from the body of the device, and replaceable by a treatment head or part of a different configuration from that of the first said head or part.

2. A device according to clause 1 wherein the treatment head is detachable and replaceable as an assembly.

3. A device according to clause 1 or clause 2 wherein the treatment head is a cleaning head, and the device being operable to treat a surface by application of a treatment liquid thereto and removal of at least a substantial portion of the liquid therefrom.

4. A device according to clause 3 wherein the cleaning head includes means for applying cleaning liquid to the surface and means for applying suction to the surface to remove the liquid.

5. A device according to clause 4 wherein the cleaning head further comprises an agitator member.

6. A device according to clause 5 wherein the agitator

member is rotatably driveable, and the cleaning head includes a motor for effecting such driving.

7. A device according to clause 6 wherein the motor is spaced from the agitator member and drives the latter by way of a drive train therebetween.

8. A device according to clause 7 wherein the drive train includes a drive element extending around respective formations provided on the agitator member and on an output shaft of the motor.

9. A device according to clause 8 wherein the drive element comprises a drive belt.

10. A device according to clause 6 or any clause appendent thereto wherein the agitator member is able to move, in use, upwardly and downwardly relative to a housing of the cleaning head.

11. A device according to clause 10 wherein the agitator member is biased to move downwardly relative to the housing, to engage a surface being cleaned.

12. A device according to clause 10 or clause 11 wherein the agitator member assembly is guided for movement upwardly and downwardly relative to the housing by generally upright guide formations.

13. A device according to clause 12 wherein spring means is associated with at least some of said formations to effect the biasing.

14. A device according to any one of clauses 10 to 12 as appendent directly or indirectly to clause 7, wherein the motor is movable upwardly and downwardly relative to the housing with the agitator assembly.

15. A device according to clause 5 or any claim appendent thereto wherein the agitator member is removable in a transverse direction from the cleaning head.

16. A device according to clause 15 wherein said removal is able to be effected without the use of tools.

17. A device according to clause 15 or 16, as appendent directly or indirectly to claim 10, wherein the housing includes an openable or removable portion permitting said removal of the agitator member.

18. A device according to any one of the preceding clauses wherein the treatment head comprises a suction nozzle through which the treatment liquid may be drawn from a surface being treated.

19. A device according to clause 18 wherein the suction nozzle has an opening facing a surface being treated, extending transversely of the device to substantially the same width as the cleaning head.

20. A device according to clause 19 comprising a source of suction for creating a suction airflow to remove liquid from the surface being treated.

21. A device according to any one of the preceding clauses comprising a recovery tank for receiving liquid removed from the surface being treated.

22. A device according to clause 21 wherein the recovery tank is removable from the body of the device.

23. A device according to clause 22 as appendent to clause 20 wherein the recovery tank is disposed in an upper region above the base of the device, and the source of suction is disposed in a part of the base of the device.

24. A device according to clause 23 wherein the recovery tank includes a duct extending downwardly through the tank, to lead to the source of suction.

25. A device according to any one of clause 21 to 23 as appendent to claim 18 or 19 including ducting extending upwardly from the suction nozzle to the recovery tank.

26. A device according to clause 25 wherein the suction airflow enters the recovery tank downwardly, and then flows upwardly within the tank to enter the duct leading to the source of suction.

27. A device according to any one of clauses 21 to 26 further comprising a supply tank for clean liquid for delivery to a surface being treated.

28. A device according to clause 27 wherein the supply tank is disposed at least partially beneath the recovery tank.

29. A device according to clause 5 wherein the agitator member is supported in a housing within the cleaning head and is removable in a transverse direction from the cleaning head, the housing defining an opening and the cleaning head including an agitator door moveable between an open and a closed position relative to the housing, so as to open and close the opening in the housing wherein the agitator member is removable from the housing when the door is in its open position.

30. A device according to clause 29 wherein the agitator door is slideable between its open and closed positions.

31. A device according to clause 29 or clause 30 wherein the agitator member includes an end formation disposed adjacent the agitator door when the agitator is within the housing, and the device further including respective retaining formations provided on an outwardly facing surface of the agitator end formation and an inwardly facing surface of the agitator door respectively, configured to resist movement of the agitator door between its open and closed positions.

32. A device according to clause 2 wherein the treatment head an agitator member, the agitator member being driven by a motor via a drive formation, wherein the detachable part of the treatment head includes first and second portions, the first portion including the motor and drive formation, and the second portion including the agitator member, such that the second portion includes no electrical components.

33. A device according to clause 32, wherein the agitator member is supported within a housing and is rotatably driveable by a motor via the drive formation, the drive formation being driven by a drive train that includes a drive element extending around respective formations provided on the drive formation and on an output shaft of the motor, the drive formation being engageable with an end of the agitator member so as to transmit rotational drive thereto, wherein the first portion of the treatment head includes the motor, drive train and drive formation, and the second portion includes the housing and agitator member.

34. A surface treatment device comprising a body having a treatment head for treatment of a surface, and a handle by which a user can move the device over the surface; wherein the handle is at least one of (a) pivotably connected to the body of the device and (b) extensible and contractible in respect of its length.

35. A device according to clause 34 in which the handle is pivotably connected to the body of the device, the handle being connected to a rod rotatably held within a sleeve provided on the body of the device, the rod having a generally circular cross-sectional profile with a recessed portion providing an abutment surface adapted to abut a latching member so as to prevent rotation of the rod and of the handle in a first rotational direction when the latching member abuts the abutment surface.

36. A device according to clause 35 wherein the latching member is pivotably support on a pin, and wherein the latching member provides a trigger portion operable by a user, such that application of force to the trigger portion by the user causes rotation of the latching member about the pin, causing disengagement of the latching member from the recessed portion of the rod thereby enabling rotation of the rod and of the handle in the first rotational direction.

37. A device according to clause 36 wherein the latching member is biased towards engagement with the recessed portion of the rod.

38. A device according to clause 36 or clause 37 wherein the trigger portion comprises a handle or a pedal operable by user.

39. A device according to any one of clauses 36 to 38, in which the recessed portion of the cross-sectional profile of the rod provides a lip configured such that when the latching member is engaged with the recessed portion the lip resists rotational movement of the rod and of the handle in a second opposite rotational direction.

40. A device according to clause 39 wherein when the latching member is engaged with the recessed portion the rod and handle are rotatable in the second rotational direction on application of a predetermined force to the handle in the second rotational direction.

41. A device according to any one of clauses 34 to 40 wherein the handle is extensible and contractible in respect of its length, the device including a releasable catch mechanism for holding a selected length setting of the handle.

42. A device according to clause 41 wherein the handle is telescopically extendible and contractible.

43. A device according to clause 42 wherein the handle comprises two limbs extending substantially parallel to one another, each limb comprising a first and a second element telescopically connected to one another with the first element extending into an interior of the second element, and a bridging member extending transverse between the pair of second elements, and wherein the releasable catch mechanism is provided by the bridging member.

44. A device according to clause 43, wherein the bridging member carries substantially in its interior two oppositely outwardly spring-biased catch members for engagement with pairs of apertures provided in the respective first elements.

45. A device according to clause 44, including a cuff substantially surrounding a portion of the bridging member, wherein the cuff defines a pair of slots adapted to receive a pair of pins connected to respective catch members, configured such that rotation of the cuff about the bridging member causes

engagement of the pins with the slots so as to cause each respective pin and connected catch element to move away from its respective aperture so as to disengage the catch member from the aperture, thereby allowing relative movement between the first and second elements.

46. A device according to any one of the preceding clauses adapted for treatment of a floor surface

47. A device according to clause 46 which is a carpet washer.

Claims

1. A surface treatment device (100,200) comprising:

a body (10) having a treatment head (18,218) for treatment of a surface, and
a handle (14, 250) by which a user can move the device over the surface, wherein the handle (14, 250) is connected to a rod (290) rotatably held within a sleeve provided on the body (10) of the device, the rod (290) having a generally circular cross-sectional profile with a recessed portion providing an abutment surface (294) adapted to abut a latching member (296) so as to prevent rotation of the rod (290) and of the handle (14, 250) in a first rotational direction when the latching member (296) abuts the abutment surface (294),

wherein the latching member (296) is pivotably support on a pin (298) and provides a trigger portion (286) operable by a user, such that application of force to the trigger portion (286) by the user causes rotation of the latching member (296) about the pin (298), causing disengagement of the latching member (296) from the recessed portion of the rod (290) thereby enabling rotation of the rod (290) and of the handle (14, 250) in the first rotational direction,
and **characterised in that** the latching member (296) is biased towards engagement with the recessed portion of the rod (290).

2. A device according to claim 1 wherein the trigger portion (286) comprises a handle or a pedal operable by user.

3. A device according to claim 1 or claim 2, in which the recessed portion of the cross-sectional profile of the rod (290) provides a lip (292) configured such that when the latching member (296) is engaged with the recessed portion the lip (292) resists rotational movement of the rod (290) and of the handle (14, 250) in a second opposite rotational direction.

4. A device according to claim 3 configured such that when the latching member (296) is engaged with the recessed portion the rod (290) and handle (14, 250) are rotatable in the second rotational direction on application of a predetermined force to the handle (14, 250) in the second rotational direction.

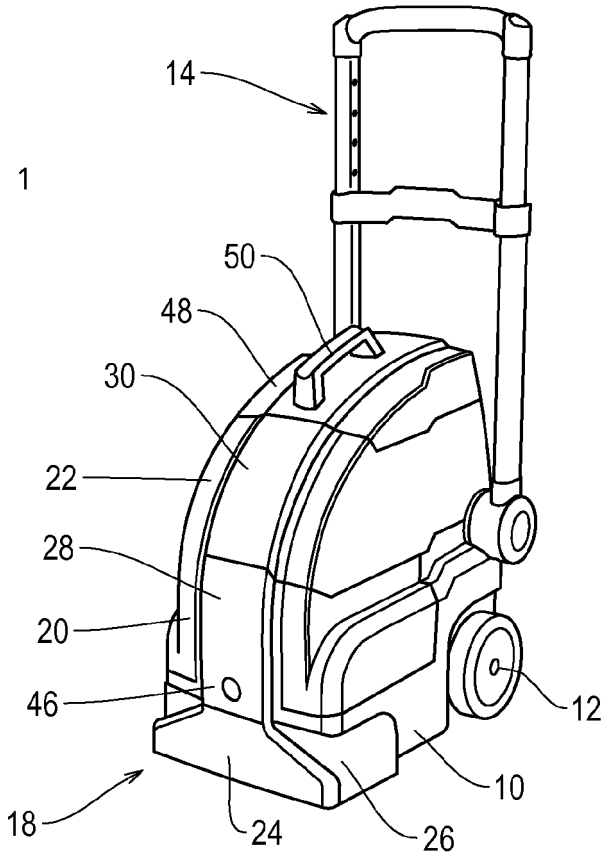
5. A device according to any one of the preceding claims wherein the handle (14, 250) is extensible and contractible in respect of its length, the device including a releasable catch mechanism for holding a selected length setting of the handle (14, 250).

6. A device according to claim 5 wherein the handle (14, 250) is telescopically extendible and contractible.

7. A device according to any one of the preceding claims adapted for treatment of a floor surface

8. A device according to claim 7 which is a carpet washer.

FIGURE 1



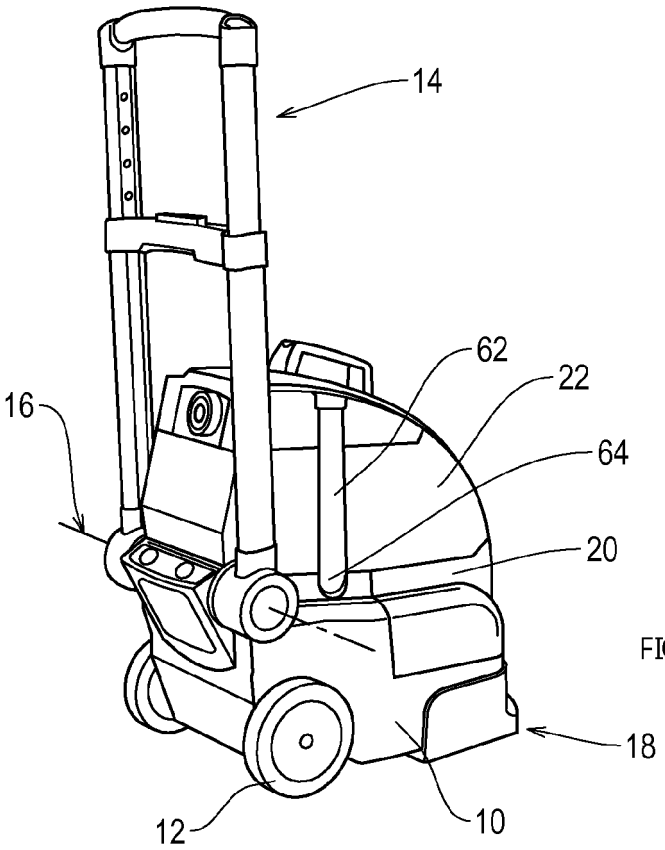


FIGURE 2

FIGURE 3

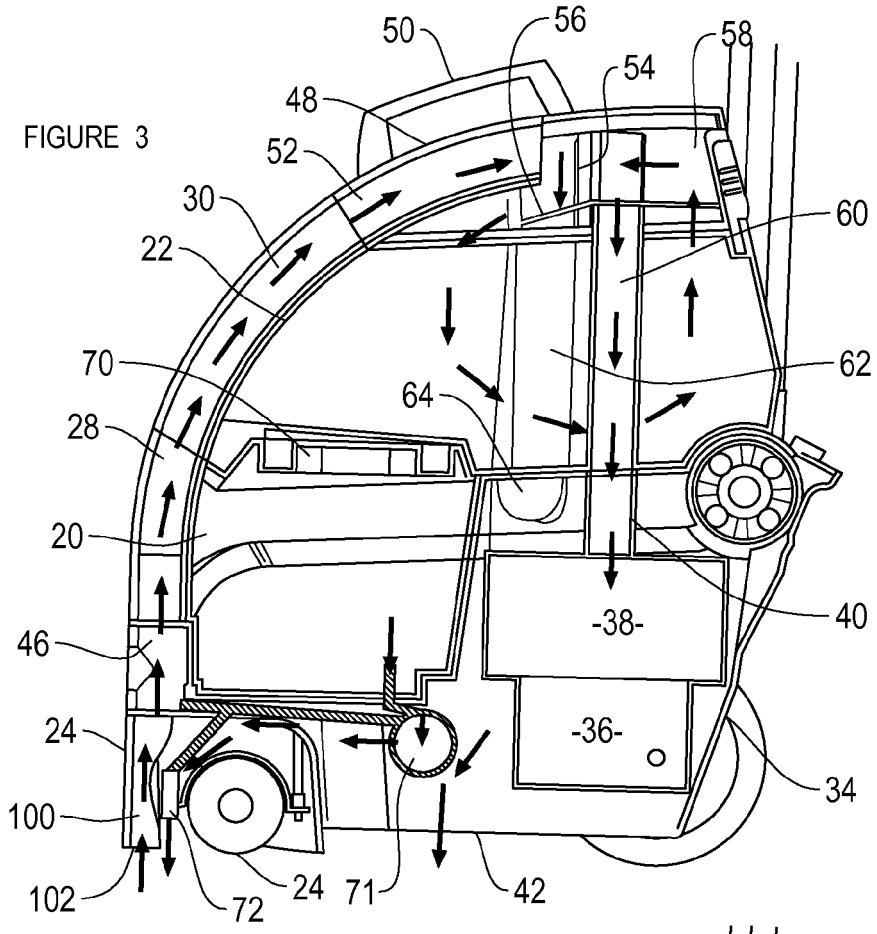


FIGURE 4

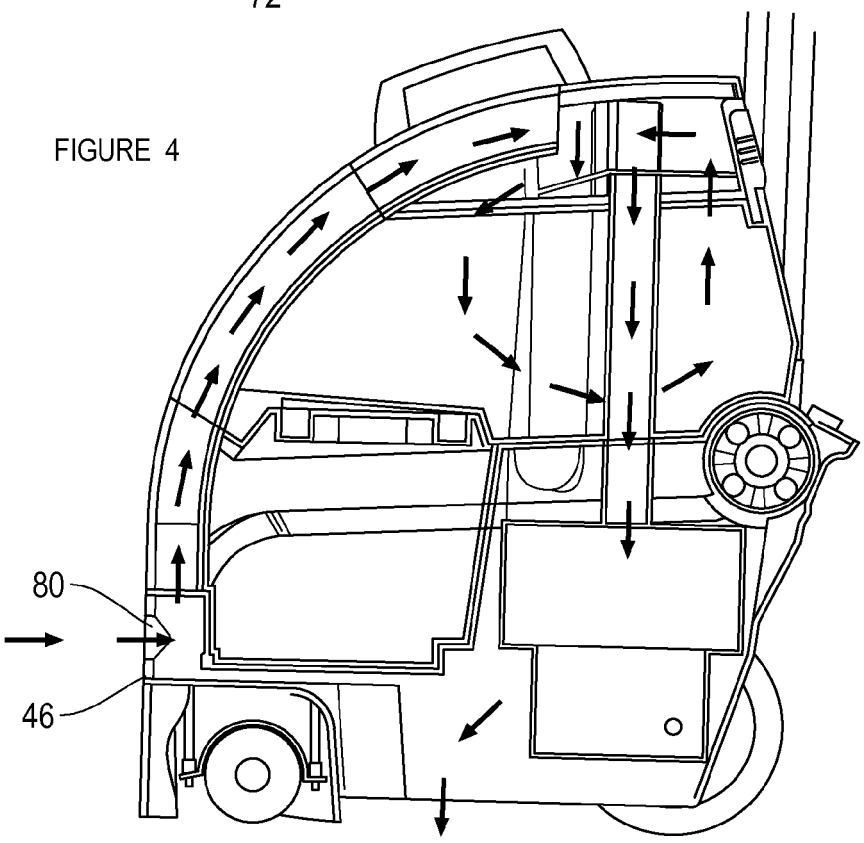
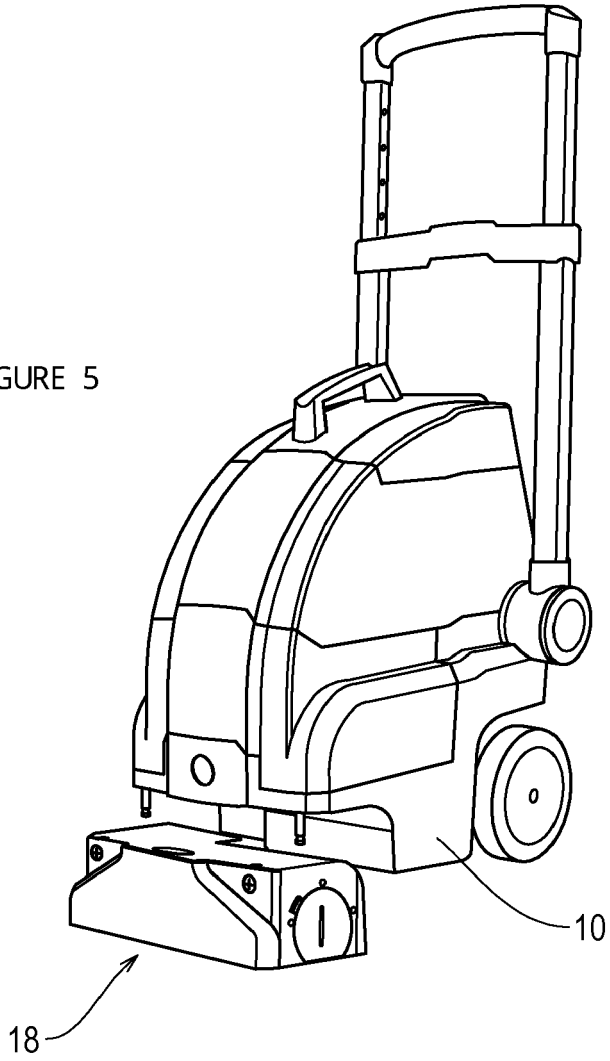


FIGURE 5



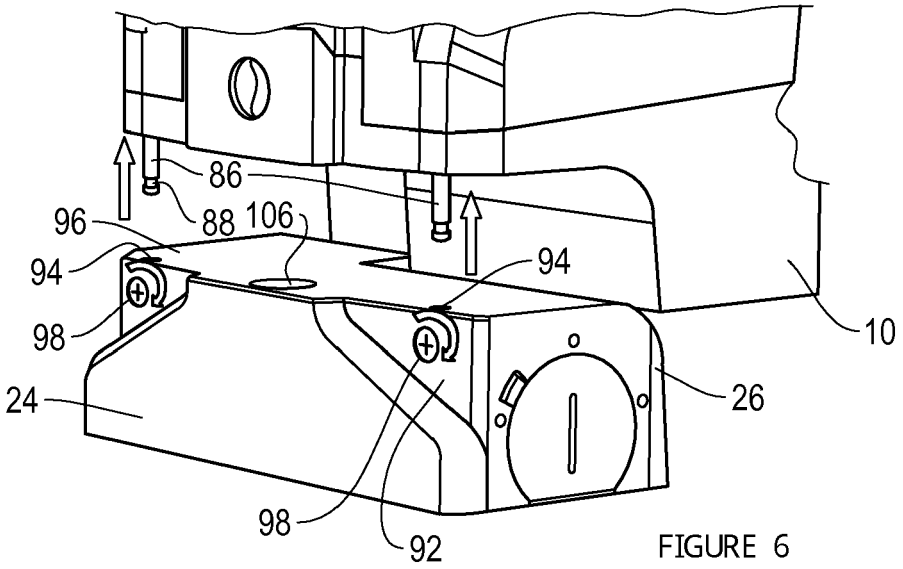


FIGURE 6

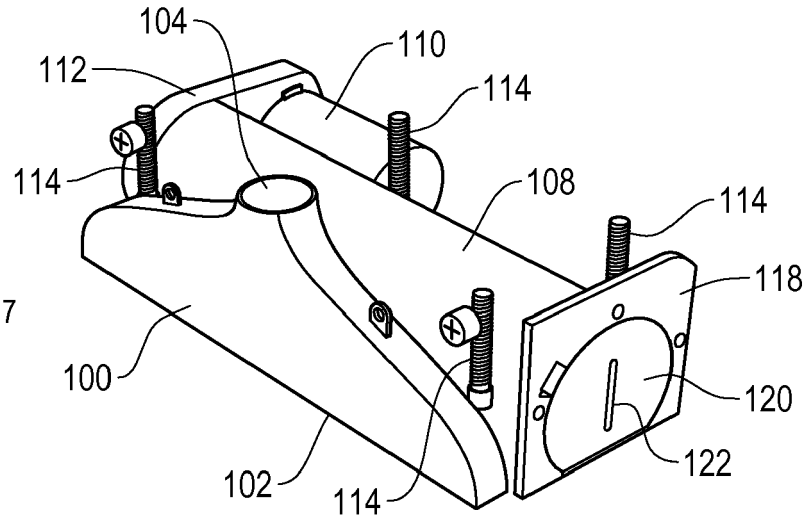


FIGURE 7

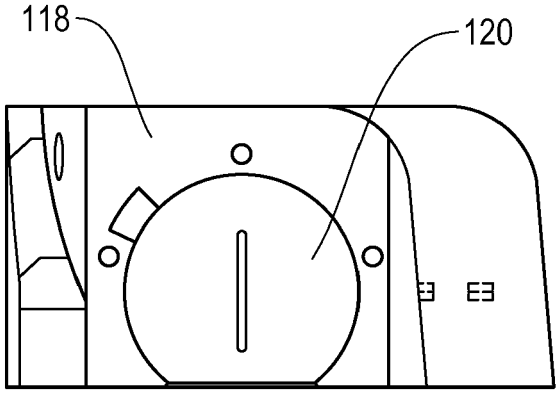


FIGURE 8A

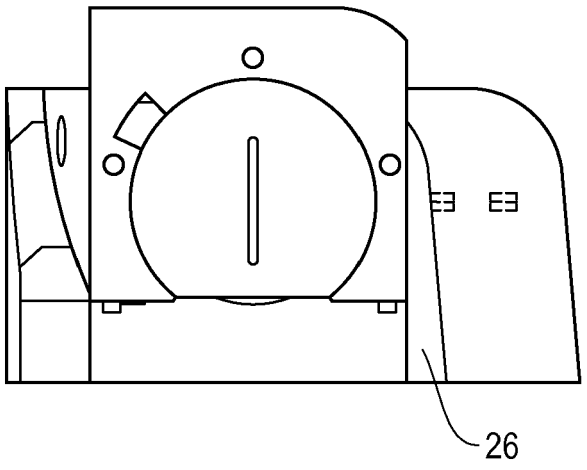


FIGURE 8B

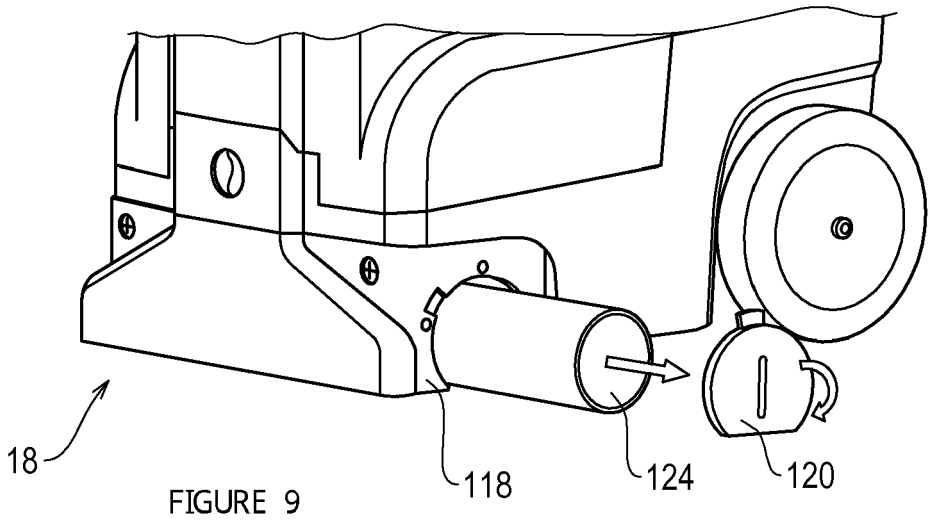


FIGURE 9

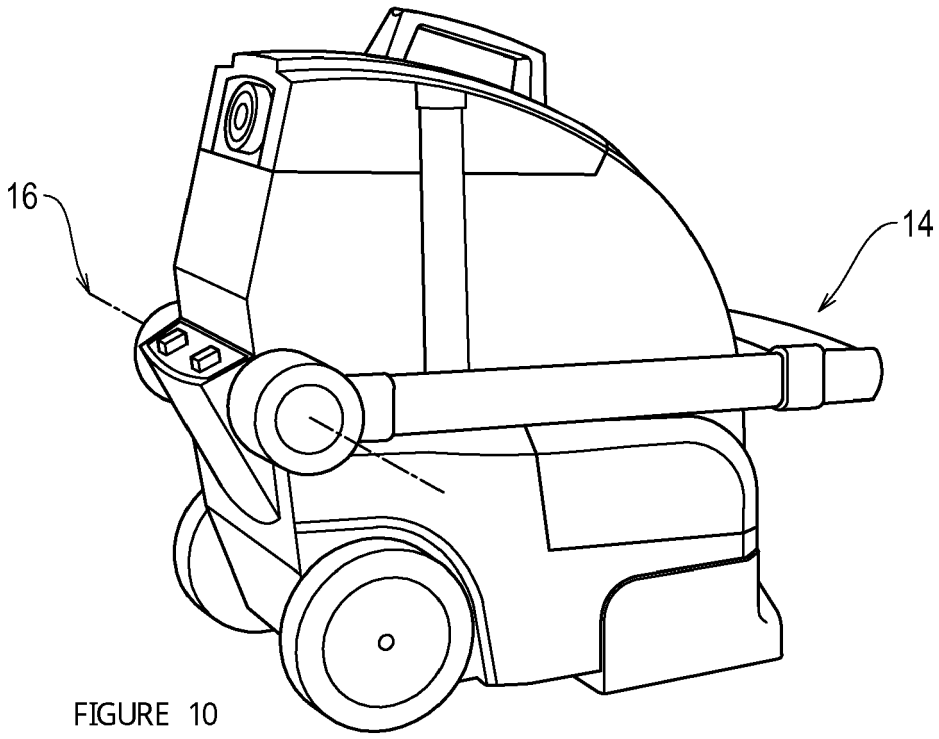


FIGURE 10

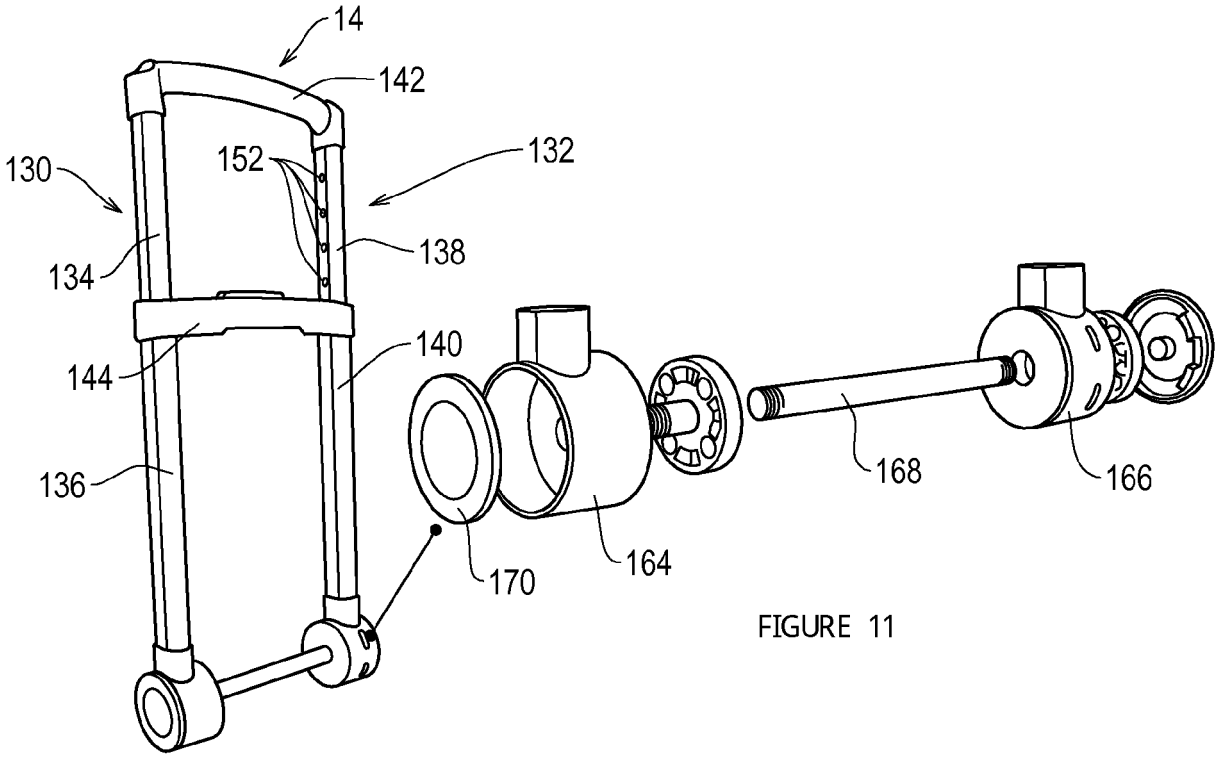


FIGURE 11

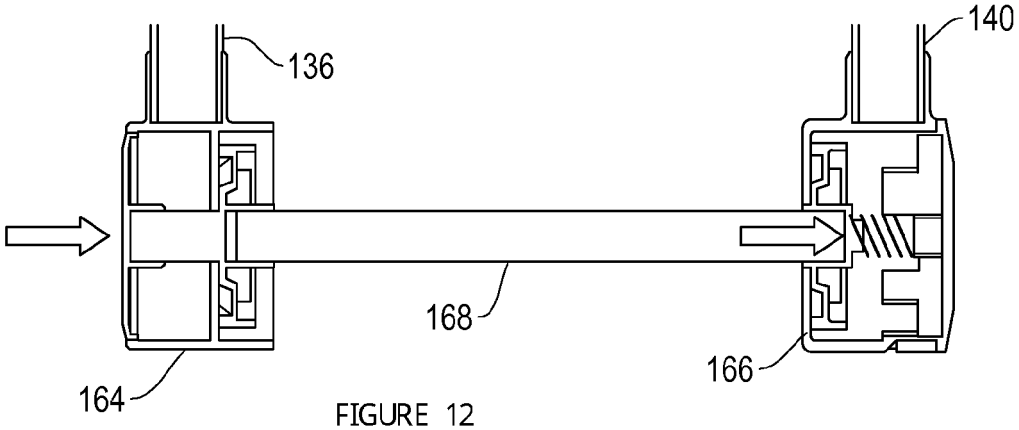


FIGURE 12

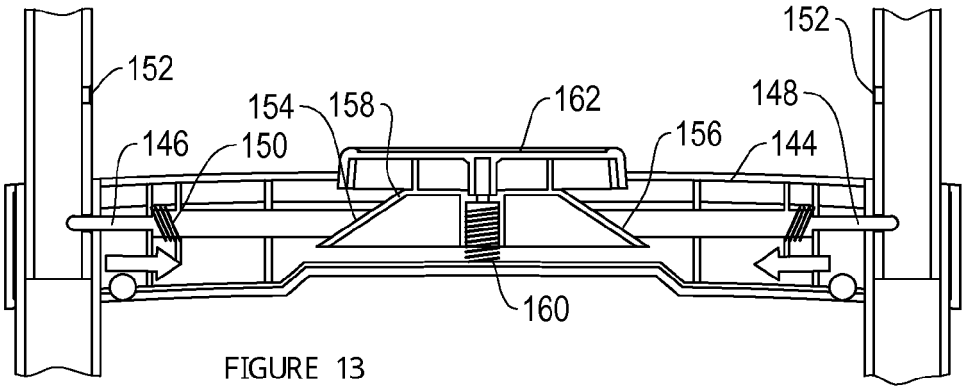


FIGURE 13

FIGURE 14

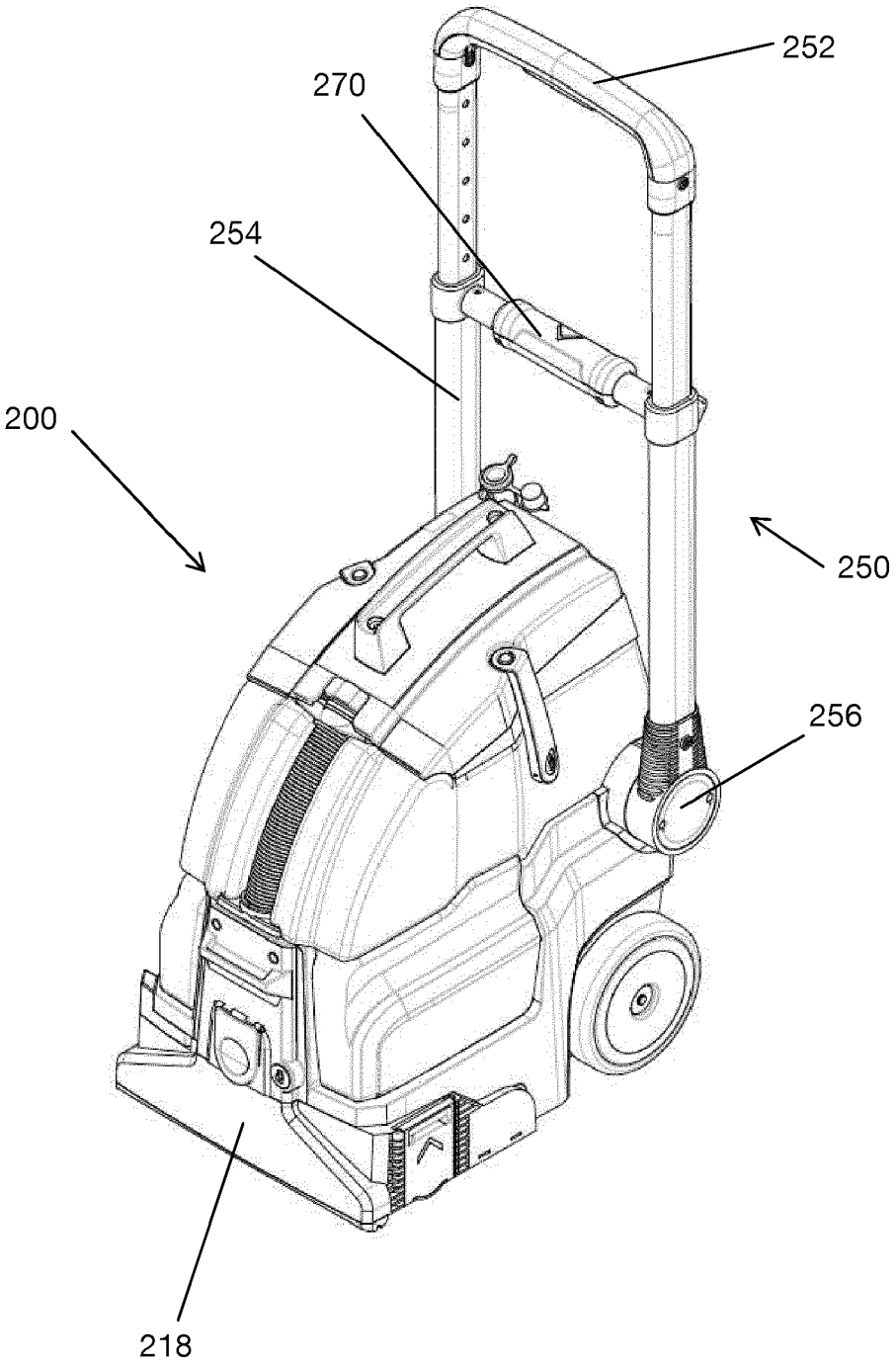


FIGURE 15

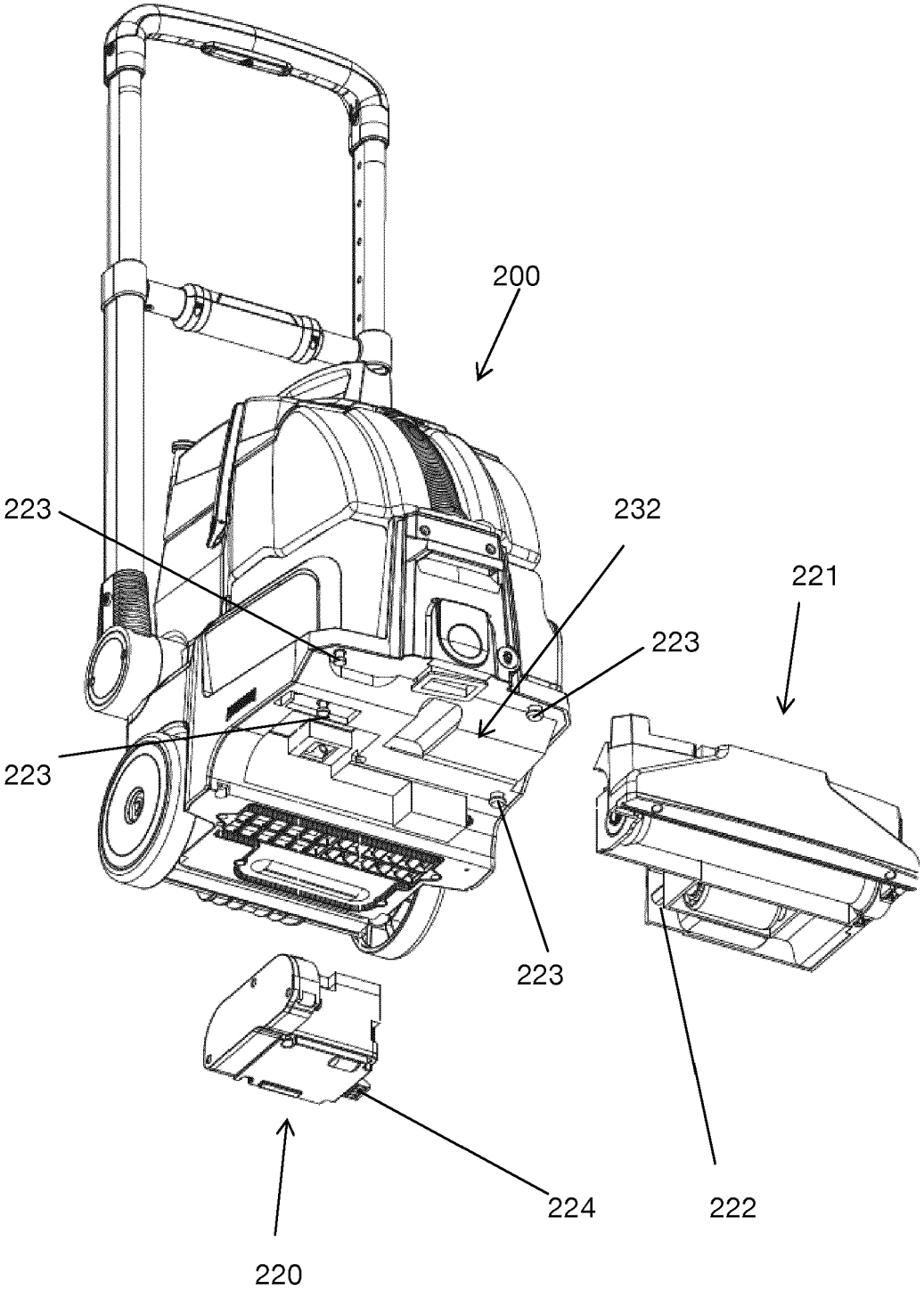


FIGURE 16

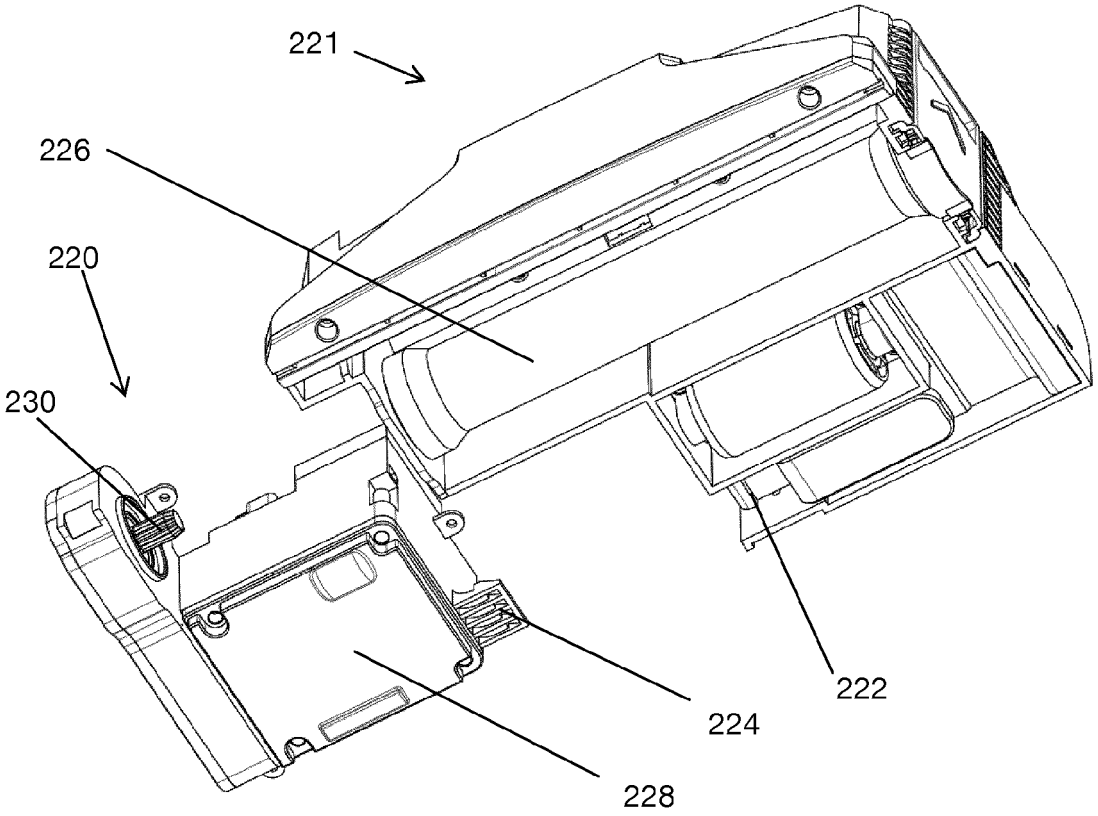


FIGURE 17

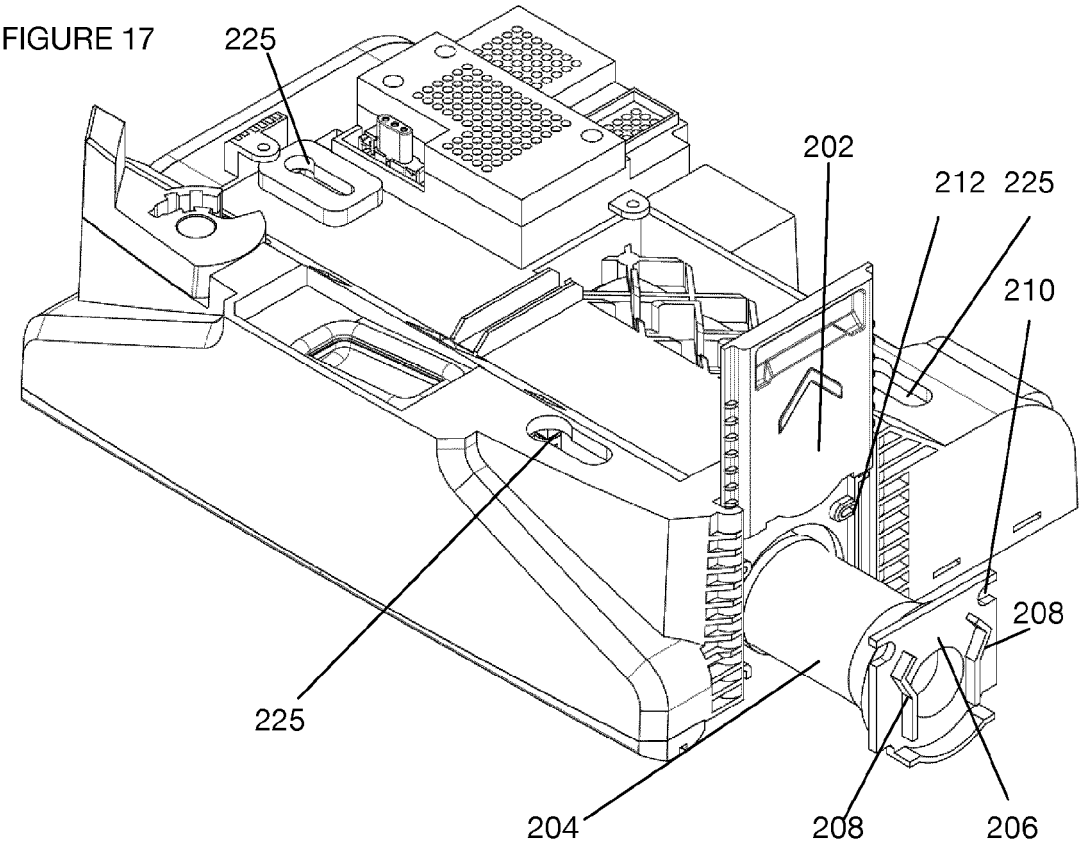


FIGURE 18

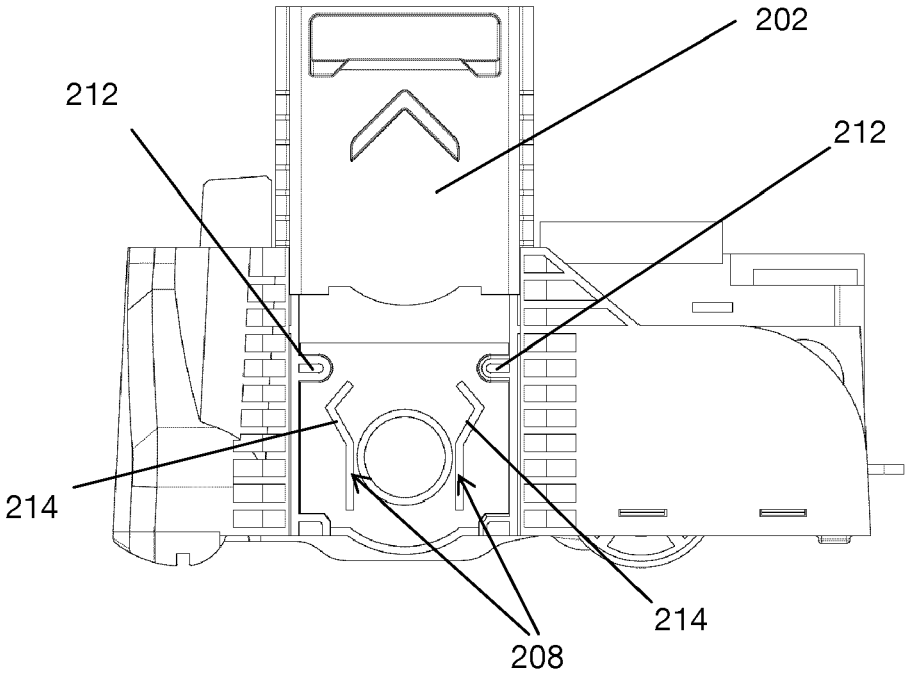


FIGURE 19

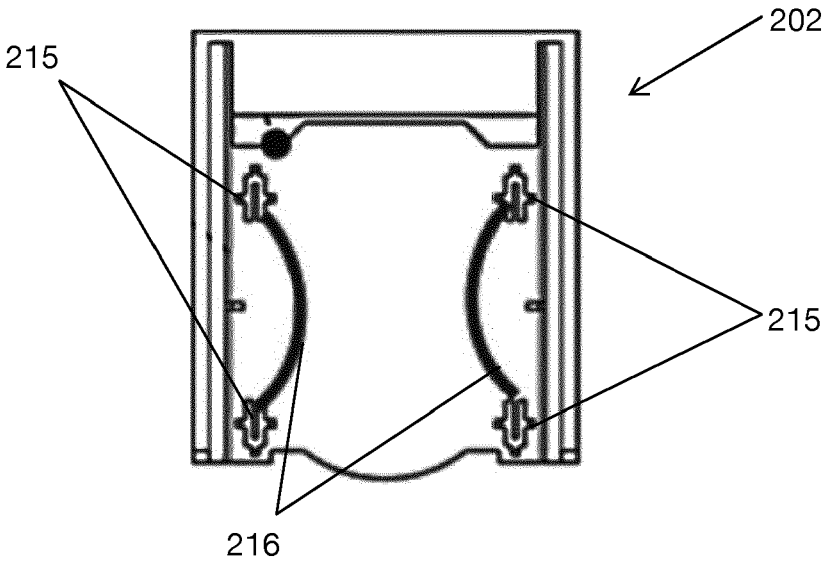


FIGURE 24

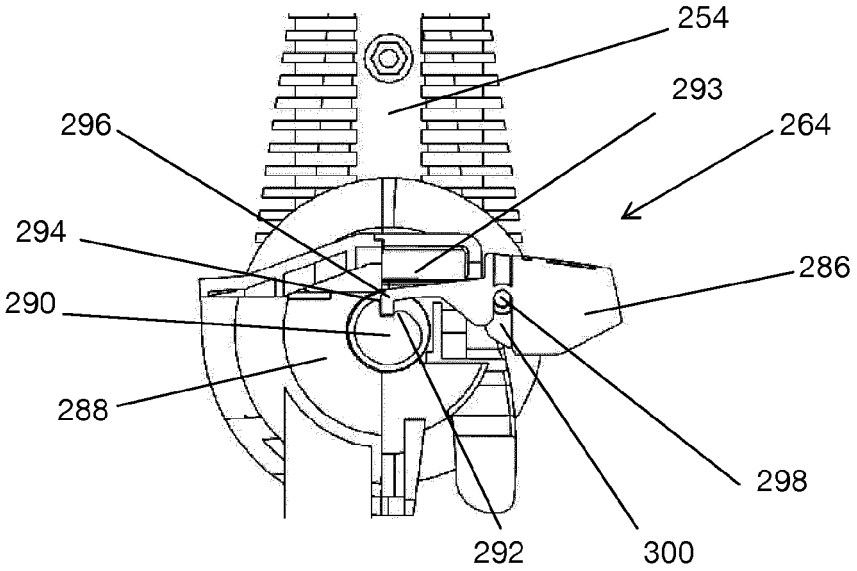


FIGURE 25

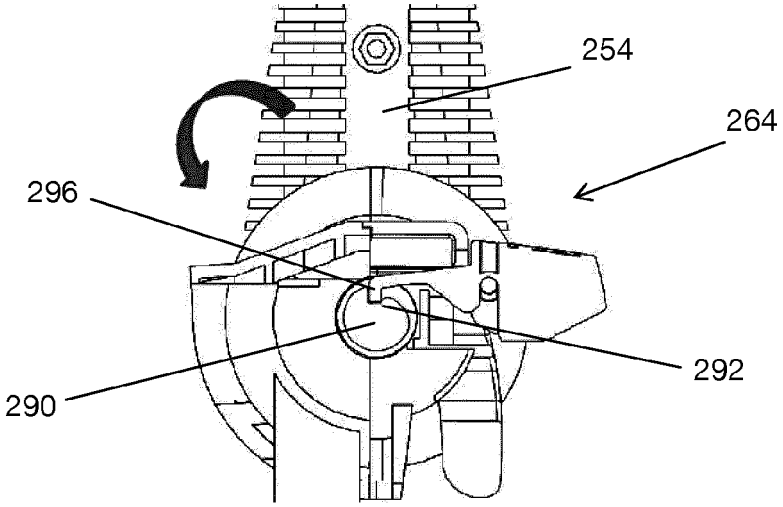


FIGURE 26

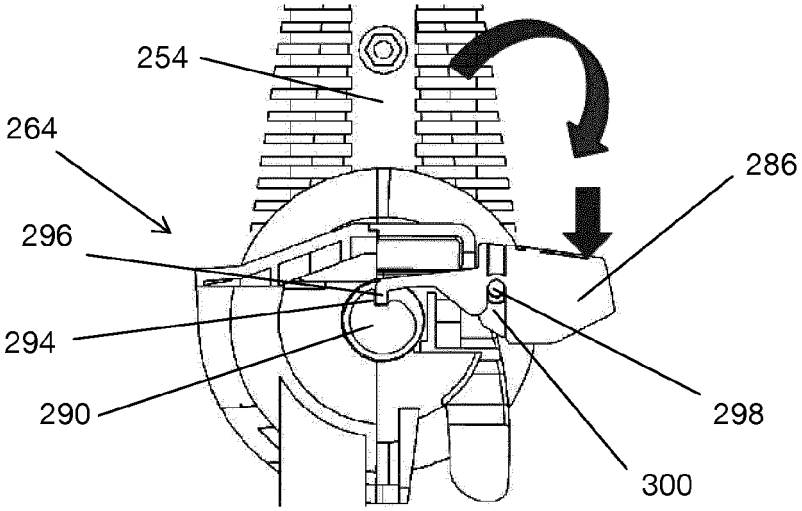


FIGURE 20

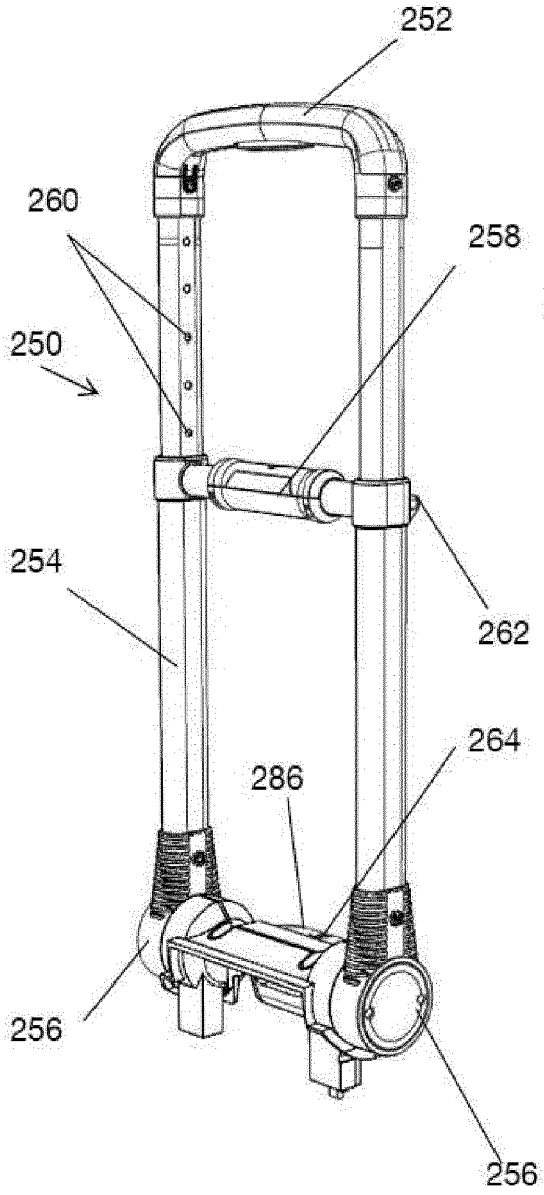


FIGURE 21

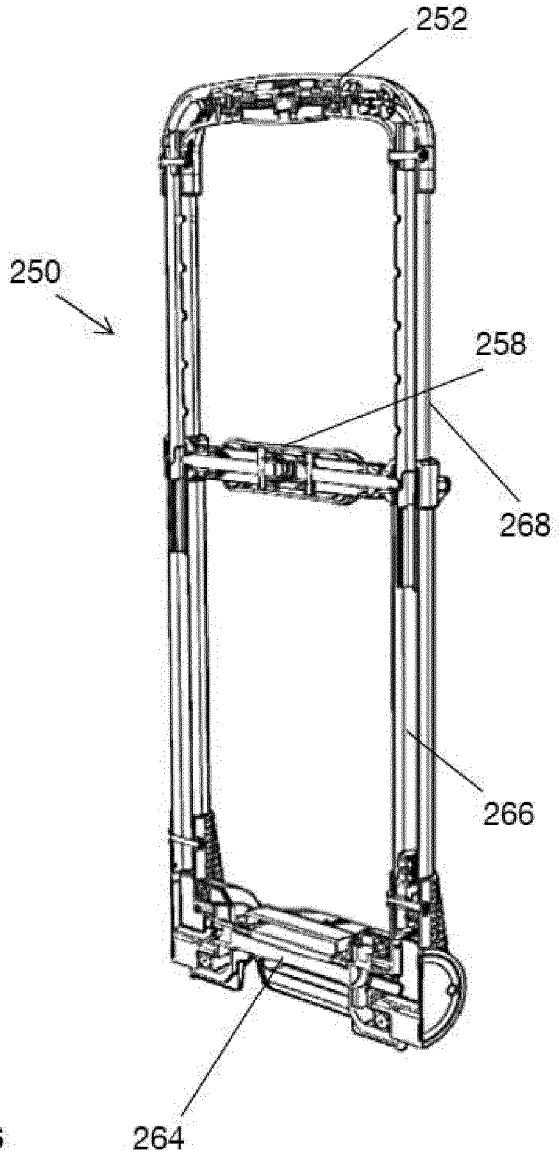


FIGURE 24

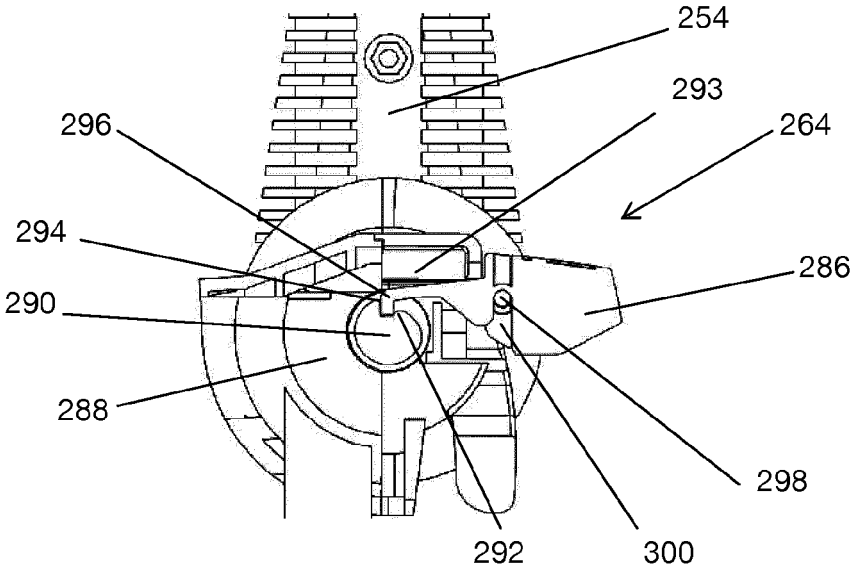


FIGURE 25

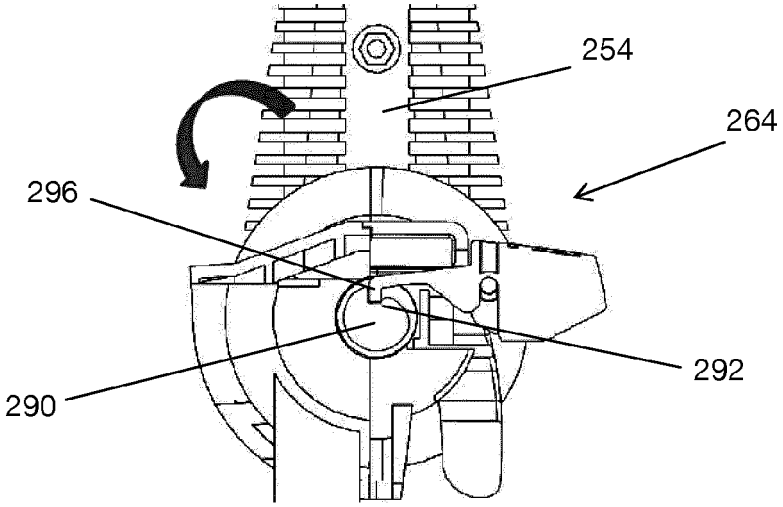


FIGURE 26

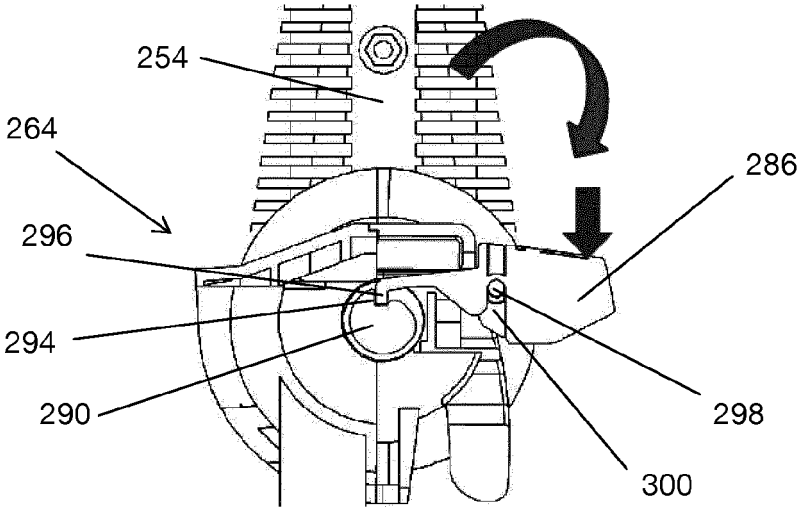


FIGURE 22

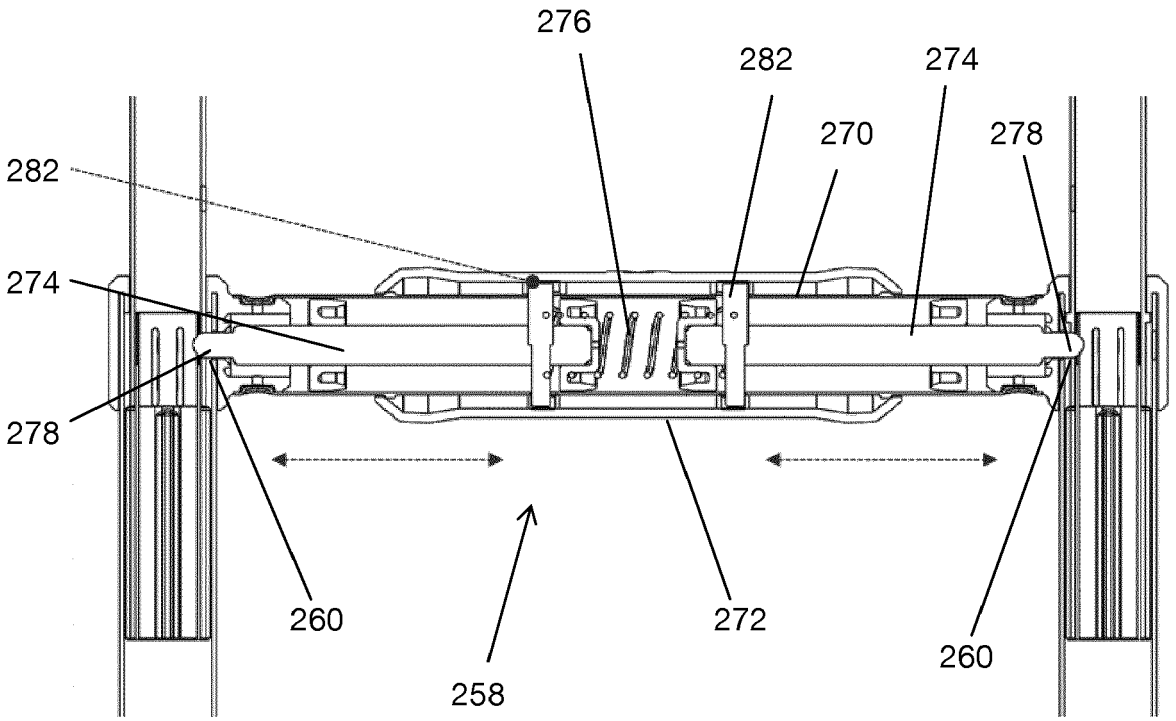


FIGURE 23

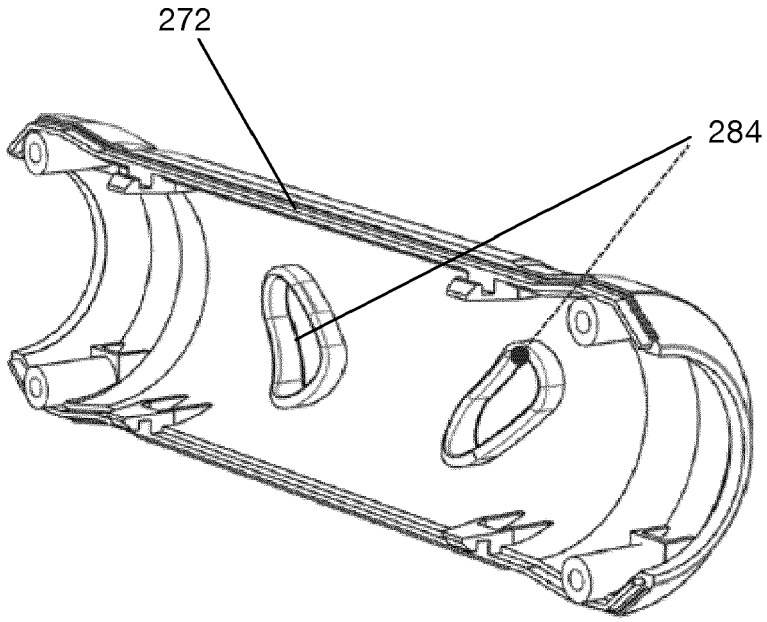


FIGURE 24

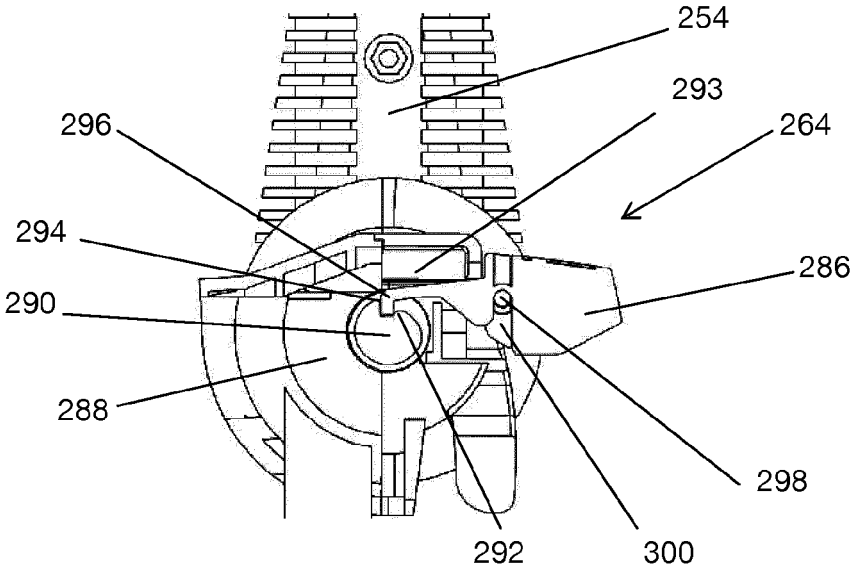


FIGURE 25

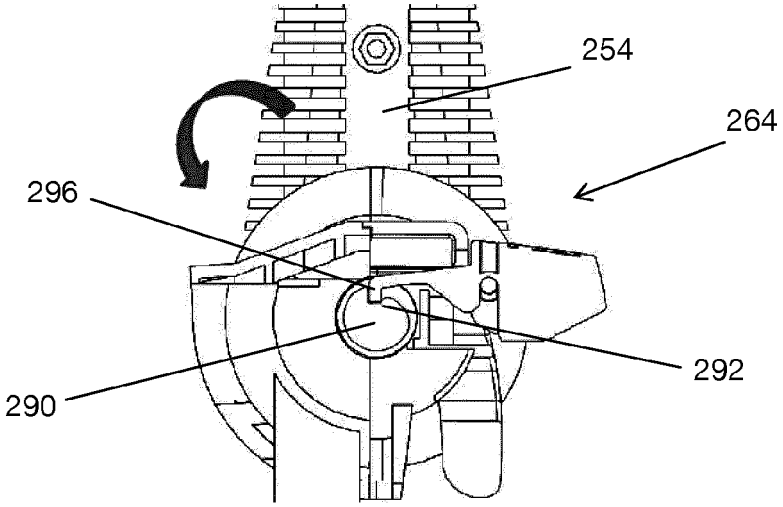
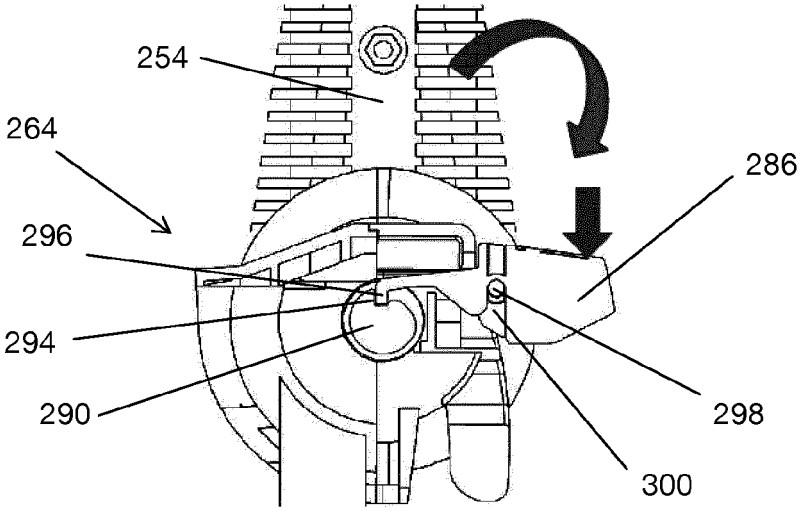


FIGURE 26



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 16 18 4684

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 1 922 973 A2 (BLACK & DECKER INC [US]) 21 May 2008 (2008-05-21) * abstract; figures 1-6 *	1-8	INV. A47L5/30 A47L9/04 A47L9/32 A47L11/40 A47L7/00
A	WO 2012/013223 A1 (KAERCHER GMBH & CO KG ALFRED [DE]; BRUECKNER JOERG [DE]; LORENZ ERNST) 2 February 2012 (2012-02-02) * abstract; figures 1-6 *	1-8	
A	EP 1 710 024 A2 (TECHTRONIC IND CO LTD [CN]) 11 October 2006 (2006-10-11) * abstract; figures 1-27 *	1-8	
A	EP 0 928 595 A1 (POLTI SPA [IT]) 14 July 1999 (1999-07-14) * abstract; figures 1-9 *	1-8	
A	EP 1 018 314 A1 (ROYAL APPLIANCE MFG [US]) 12 July 2000 (2000-07-12) * abstract; figures 1-24 *	1-8	

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	30 March 2017	Hubrich, Klaus

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. EP 16 18 4684

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-03-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1922973 A2	21-05-2008	EP 1922973 A2	21-05-2008
		US 2008115318 A1	22-05-2008
WO 2012013223 A1	02-02-2012	CN 103037747 A	10-04-2013
		DK 2598012 T3	21-07-2014
		EP 2598012 A1	05-06-2013
		RU 2013105197 A	10-09-2014
		US 2013133146 A1	30-05-2013
		WO 2012013223 A1	02-02-2012
EP 1710024 A2	11-10-2006	AU 2006201141 A1	05-10-2006
		CN 1840246 A	04-10-2006
		EP 1710024 A2	11-10-2006
		US 2006254008 A1	16-11-2006
EP 0928595 A1	14-07-1999	NONE	
EP 1018314 A1	12-07-2000	AT 278349 T	15-10-2004
		CA 2293961 A1	08-07-2000
		DE 69920858 D1	11-11-2004
		DE 69920858 T2	02-03-2006
		DK 1018314 T3	24-01-2005
		EP 1018314 A1	12-07-2000
		ES 2230793 T3	01-05-2005
		JP 2000201874 A	25-07-2000
		PT 1018314 E	31-12-2004
		US 6145159 A	14-11-2000
		US 6325864 B1	04-12-2001

EPO FORM P0459

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