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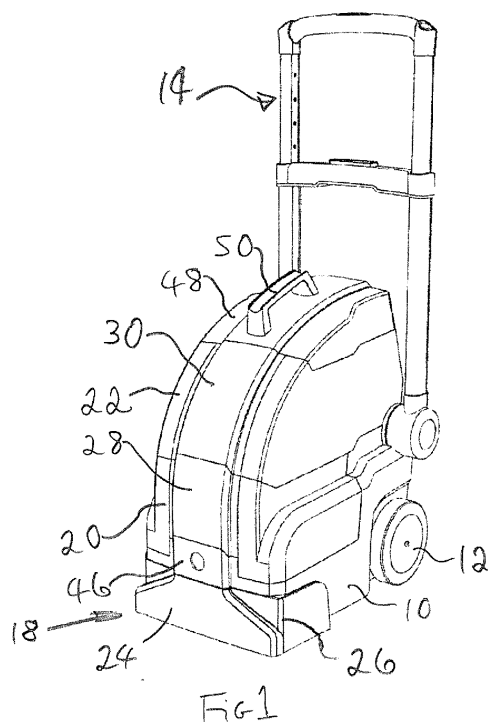
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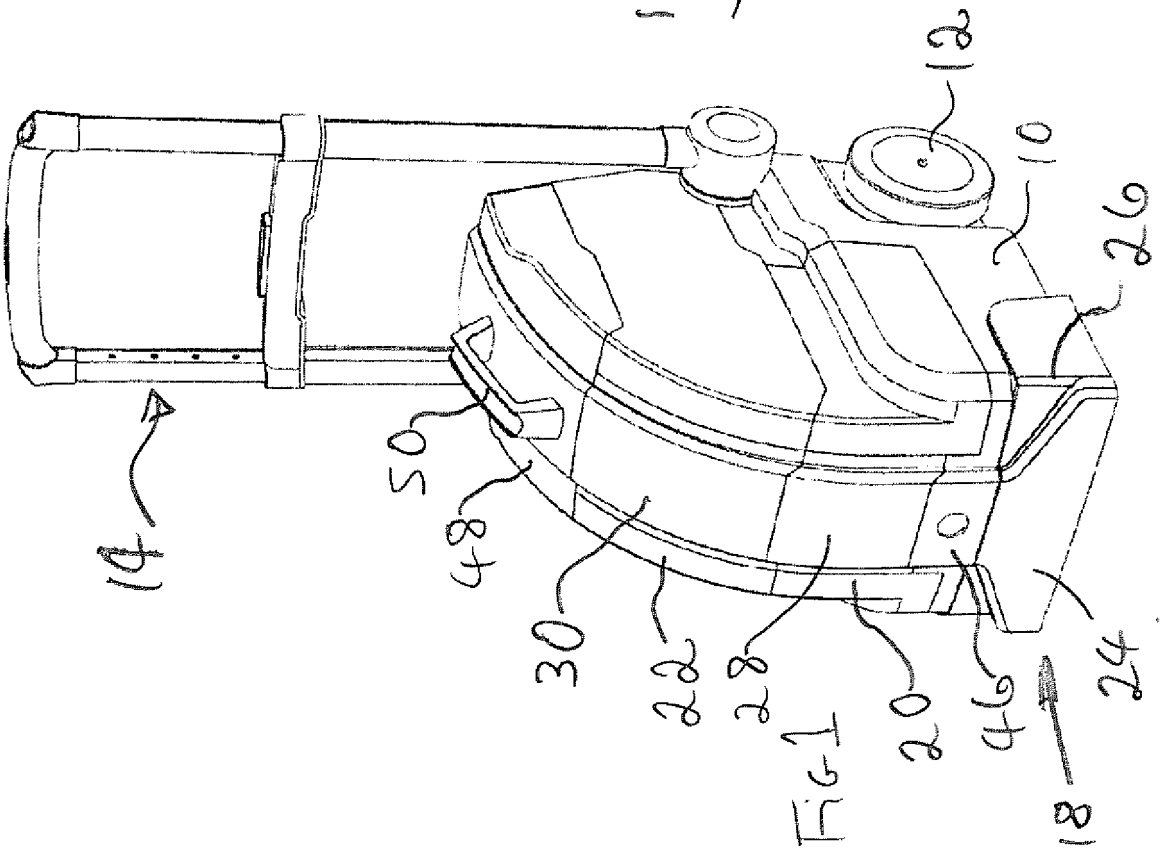
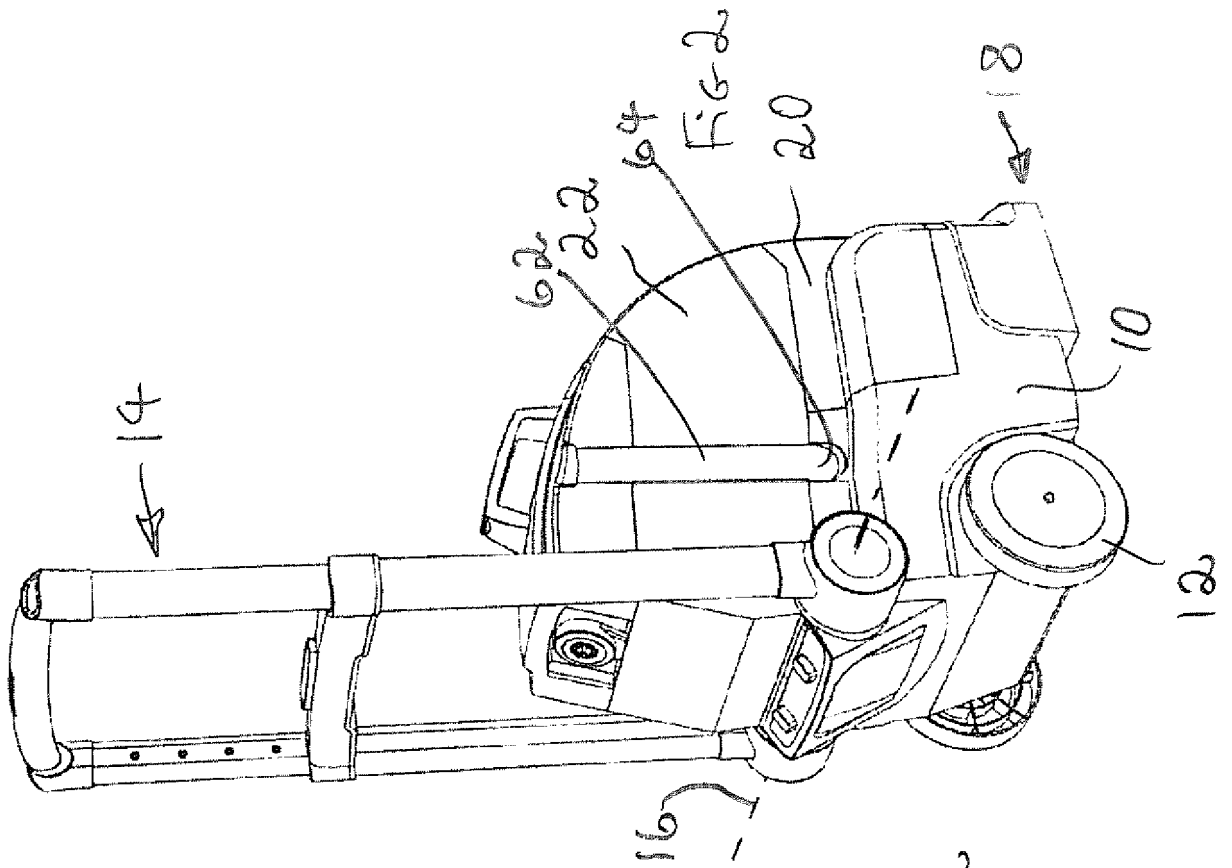
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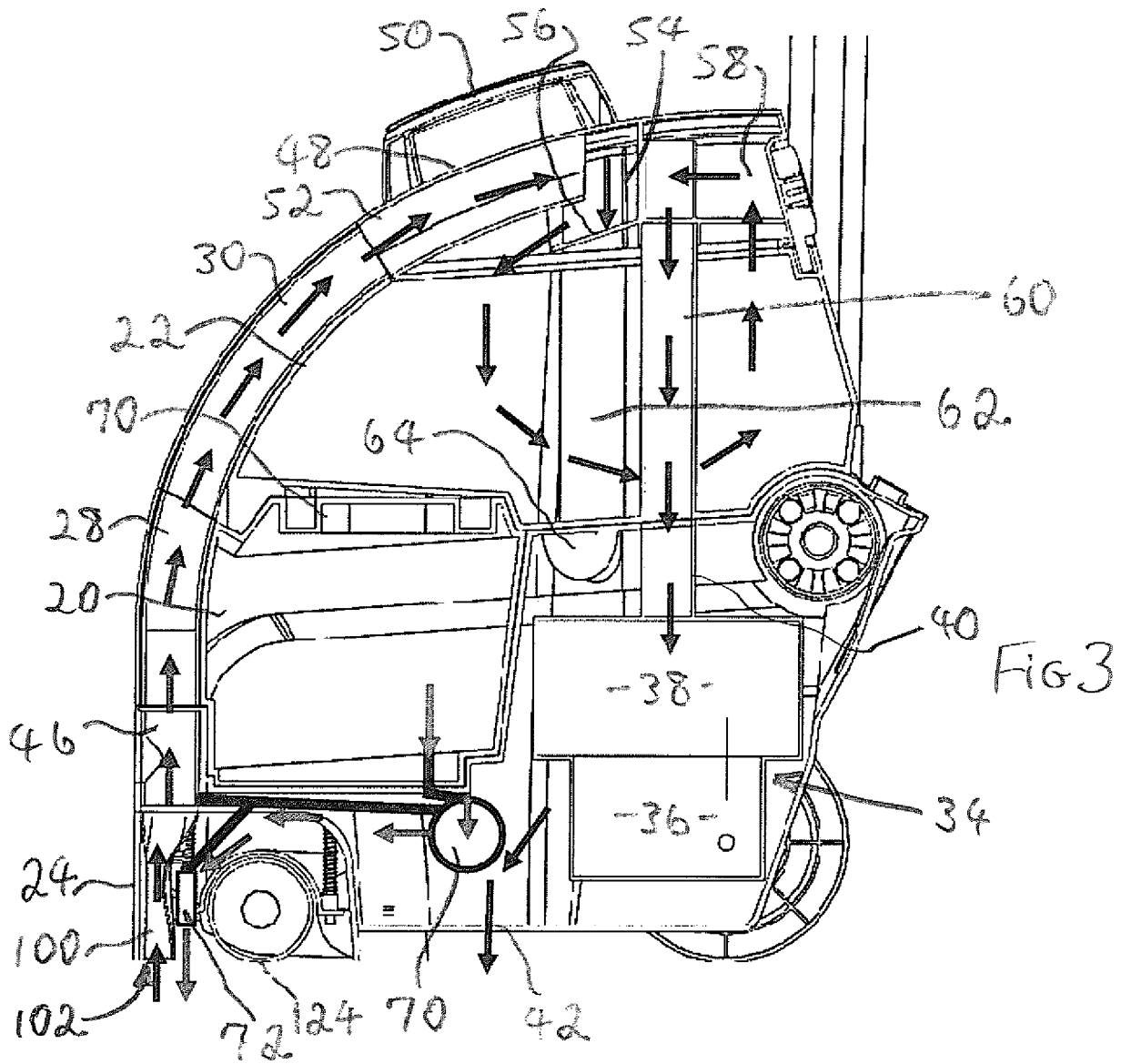
(54) Title of the Invention: **Surface treatment device**  
Abstract Title: **Surface Treatment Device**

(57) A surface treatment device has a body 10 and a treatment head 18 for treatment of a surface by application of a treatment liquid from supply tank 20 and removal of at least a substantial portion of the liquid, passing it to recovery tank 22. At least a part of the treatment head 18 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 head or part. The treatment head may be detachable as an assembly, and may be a cleaning head. Another aspect lacks the detachable treatment head and includes a suction source for creating an airflow through ducting 28, 30, 46 from the treatment head to a recovery tank which has a downwardly extending duct to convey suction airflow to the suction source. Another aspect lacks the detachable treatment head and the suction device but includes a handle 14 which is pivotally connected to the device body with a number of angular positions available and/or is extensible in respect to its length. This handle allows the user to move the device over the surface to be treated. Other components shown include cover 48, cover handle 50, device housing 26 and wheels 12



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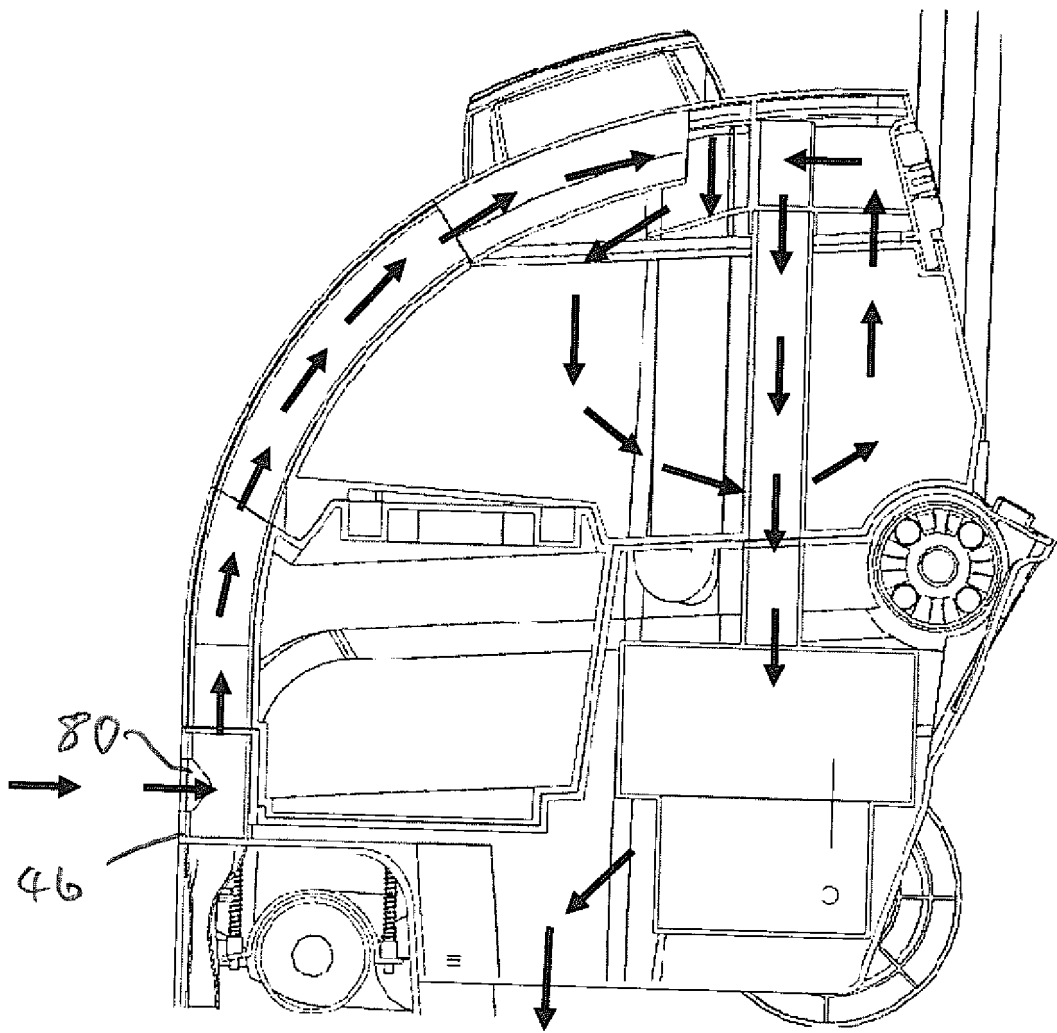
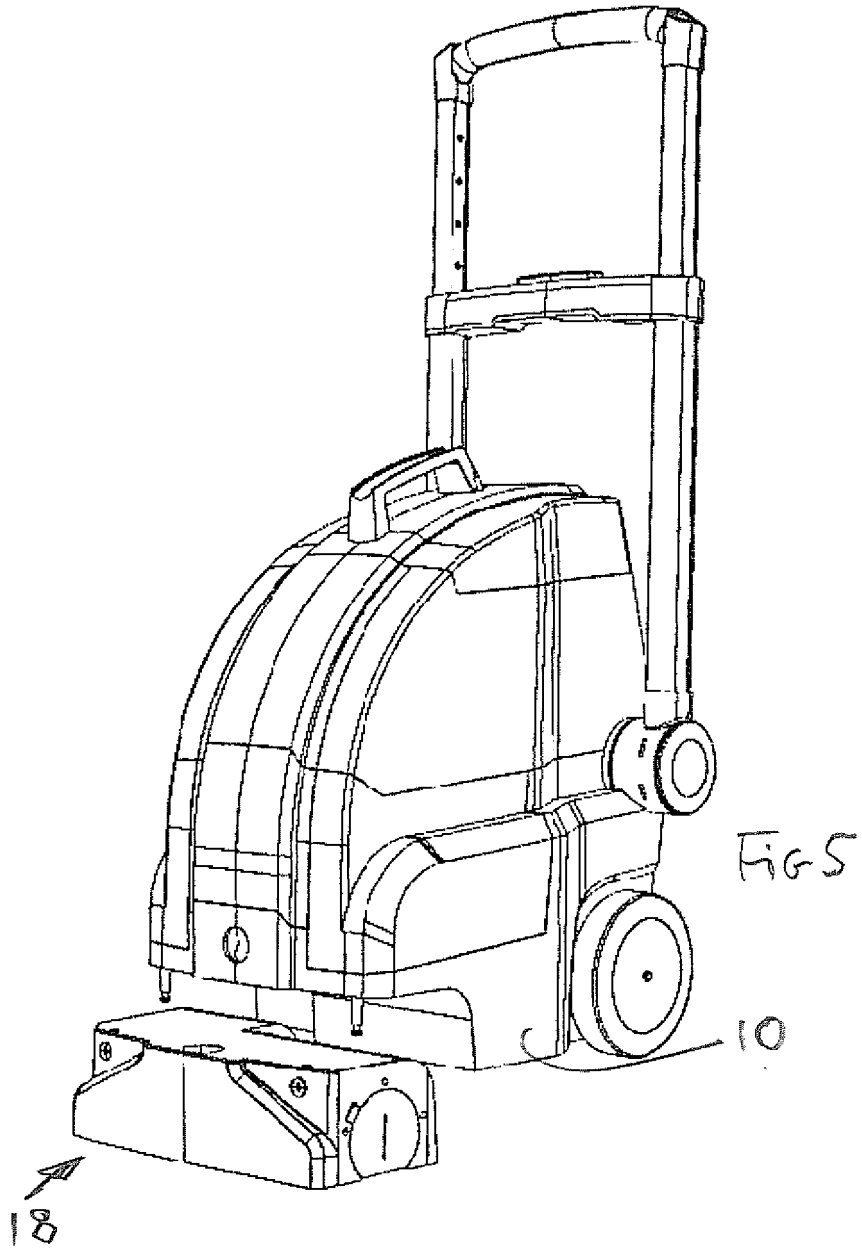
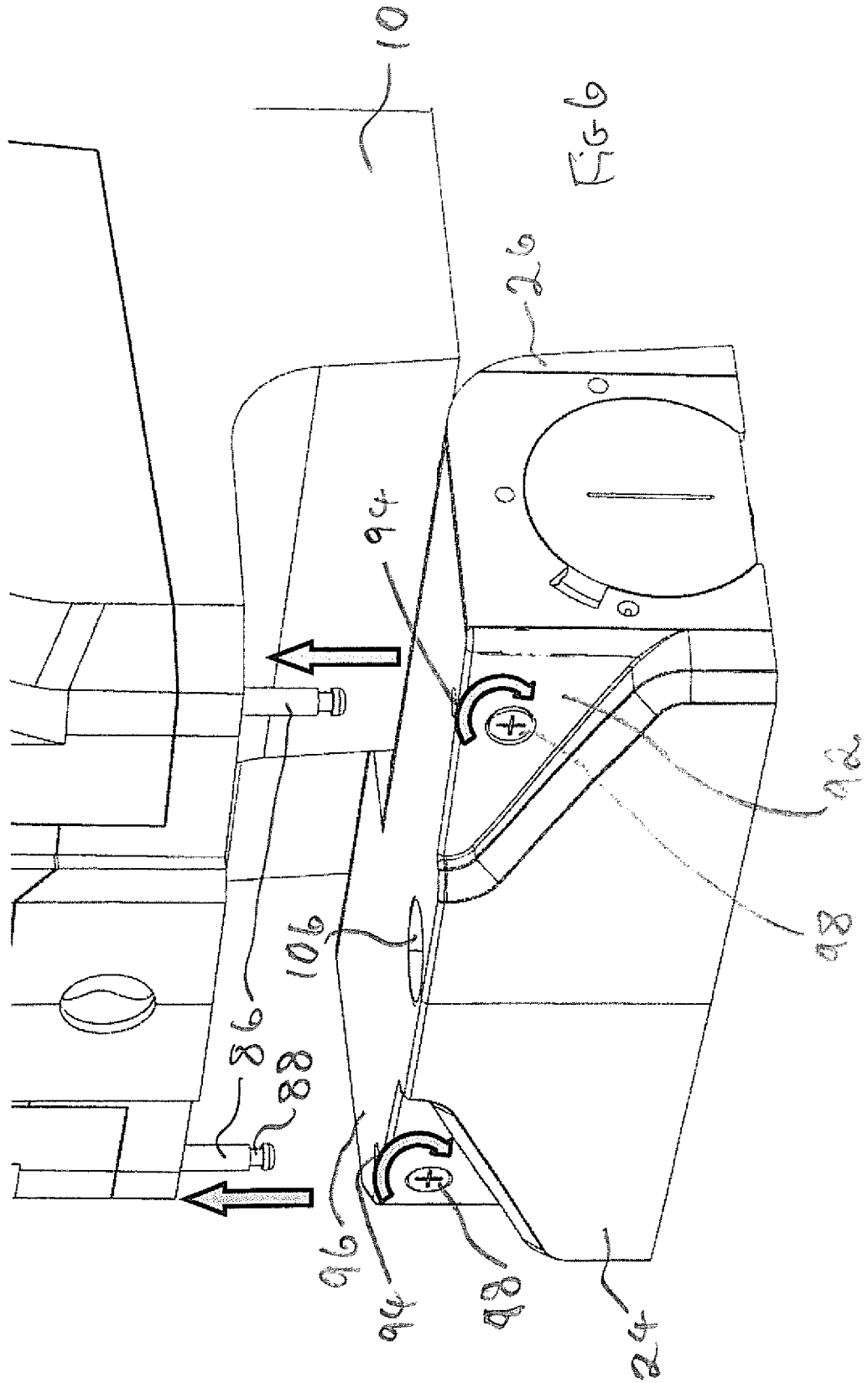


FIG 4





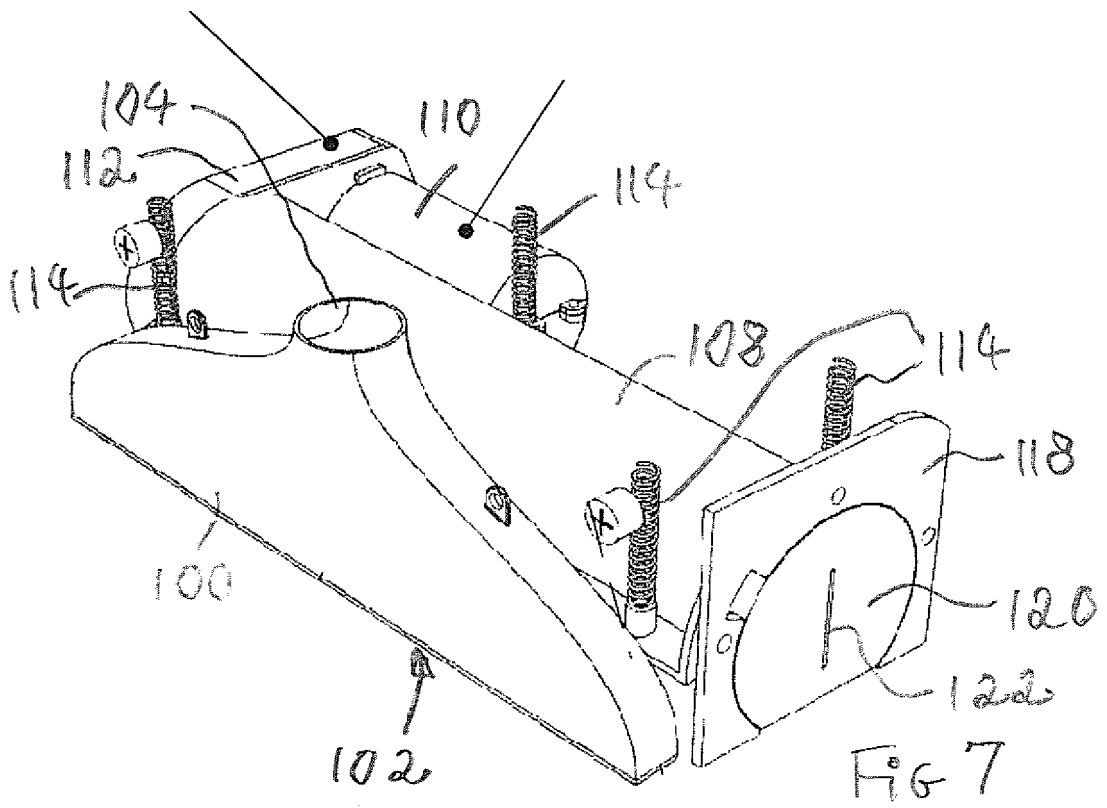


FIG 8A

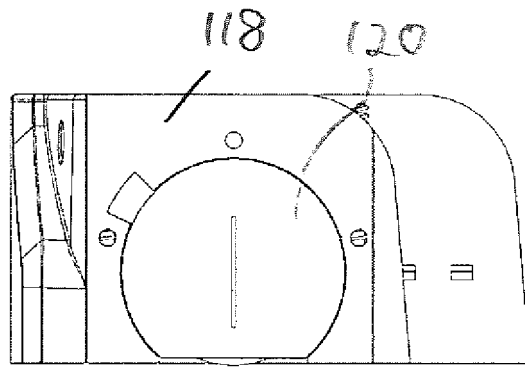


FIG 8B

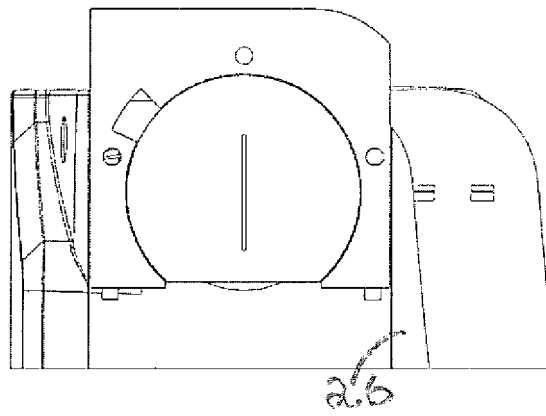
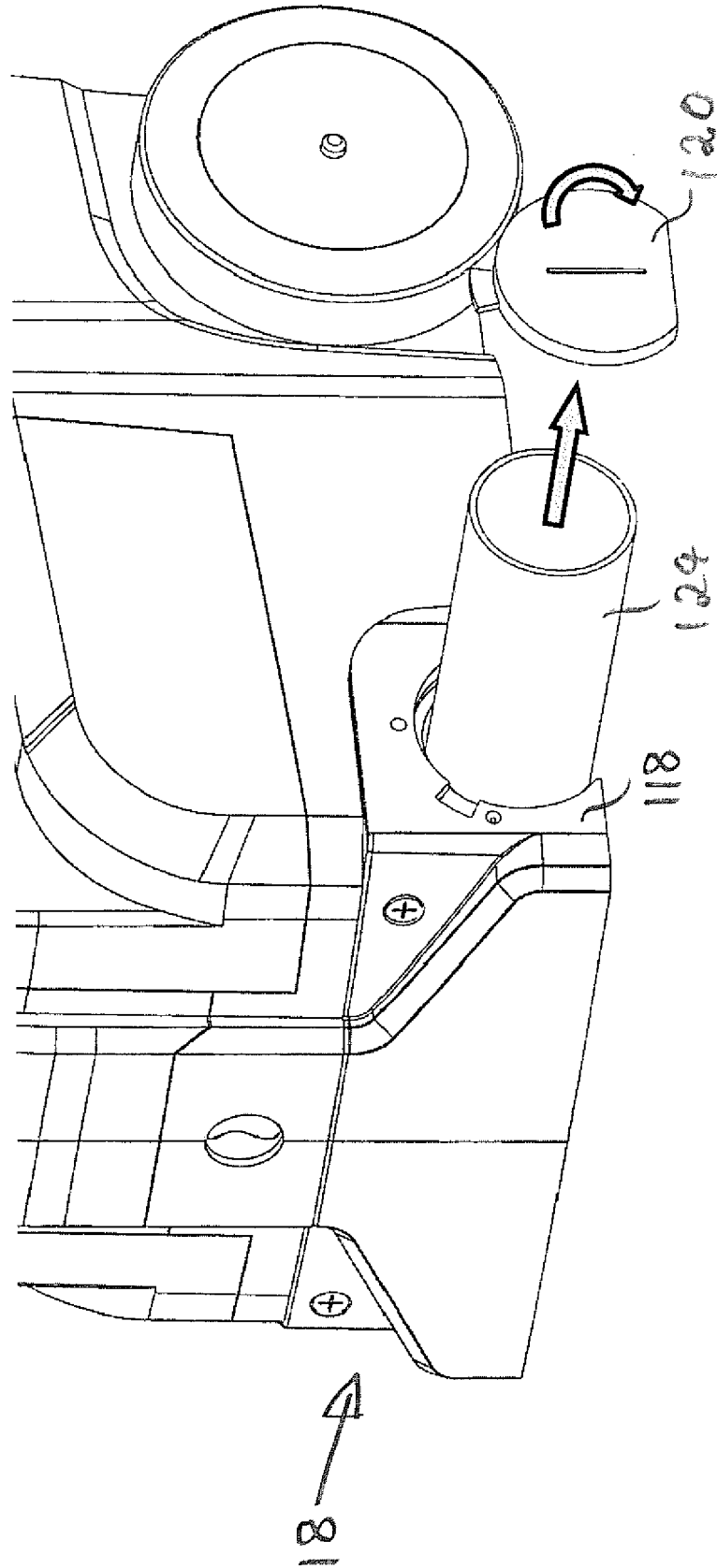




FIG 9



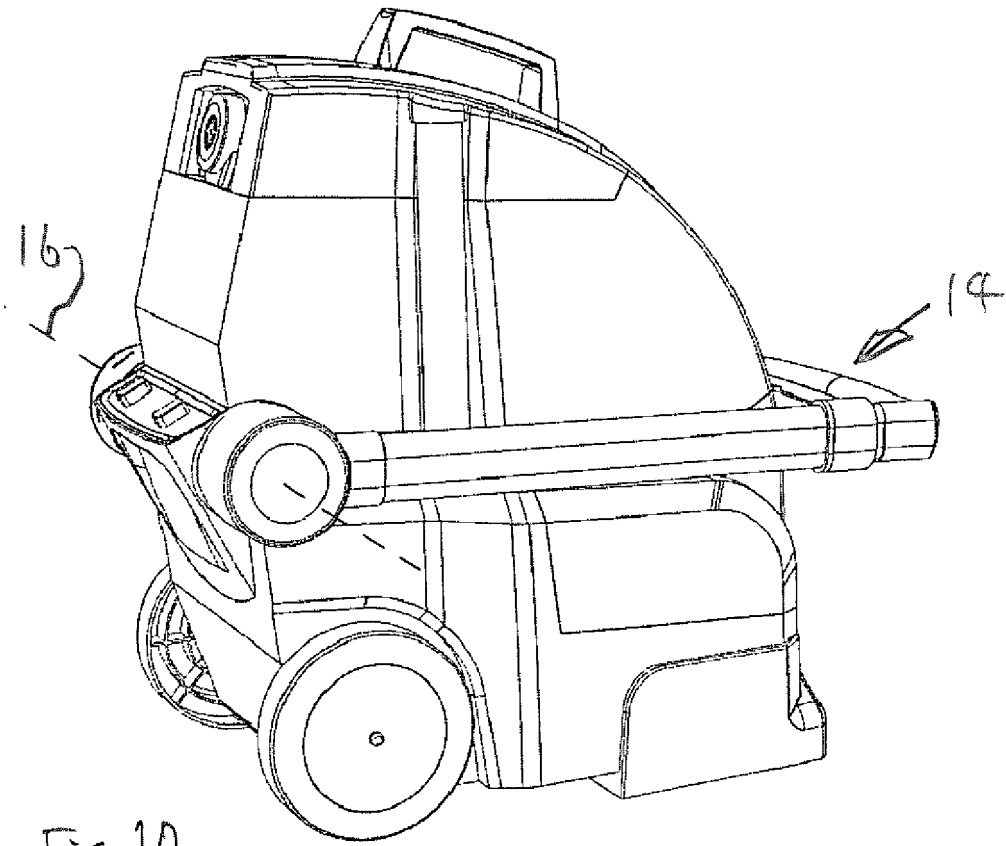


FIG 10

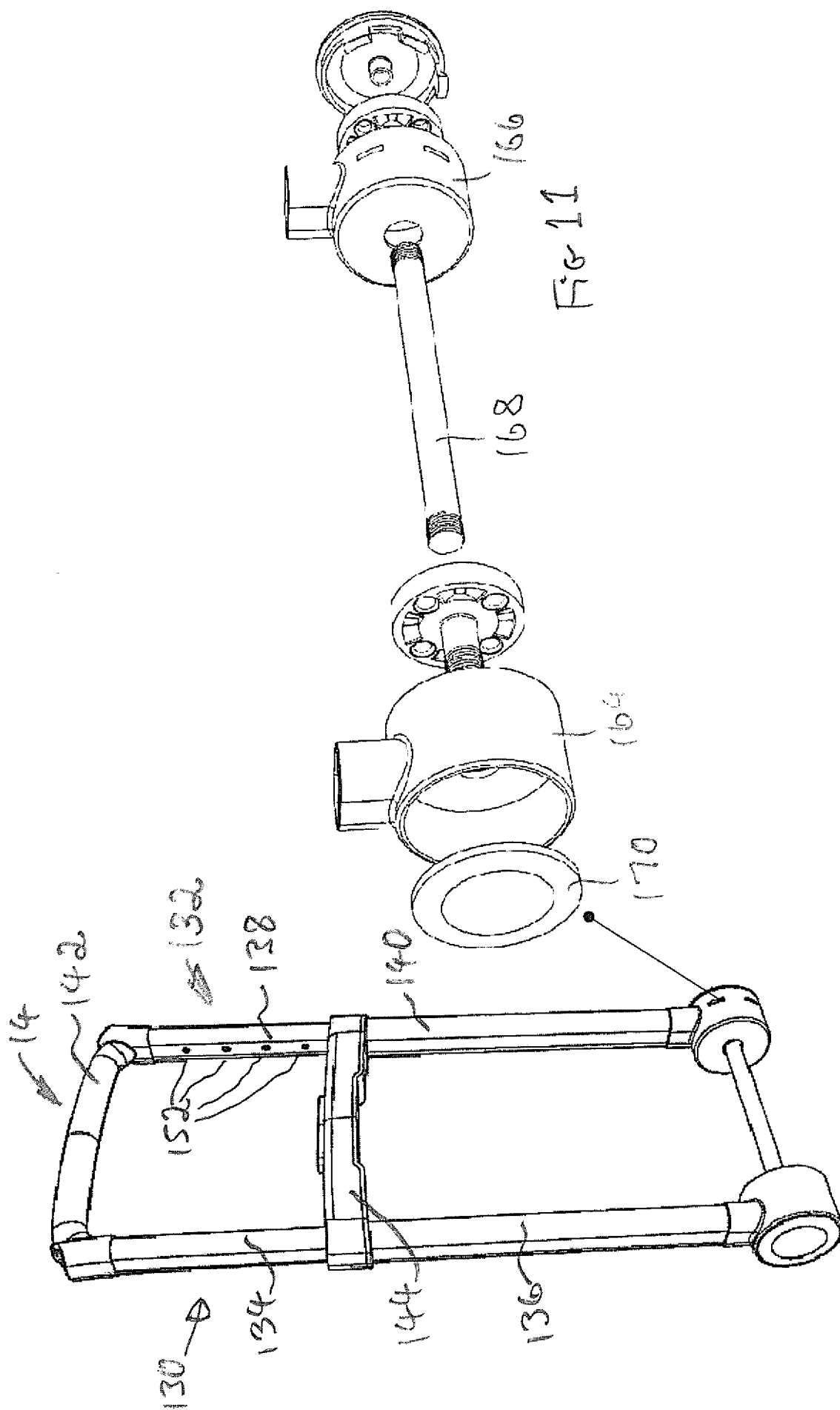


FIG 11

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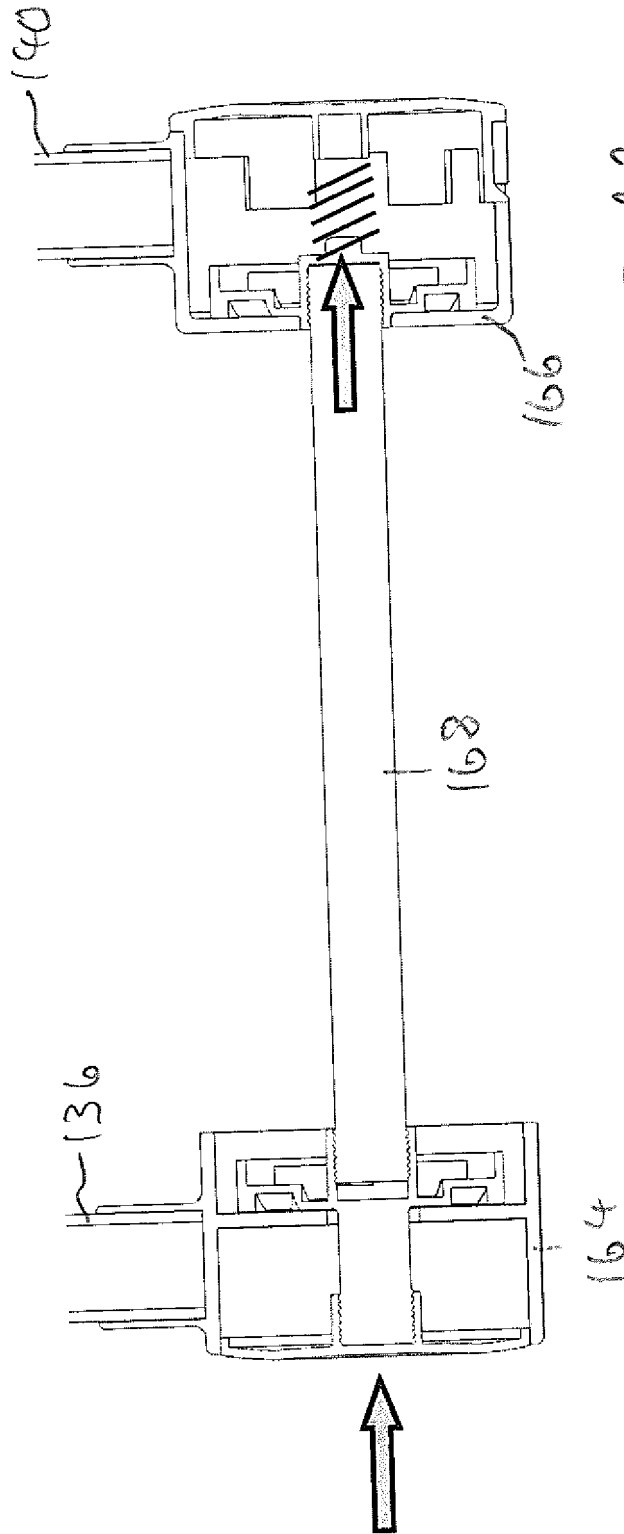


FIG 12

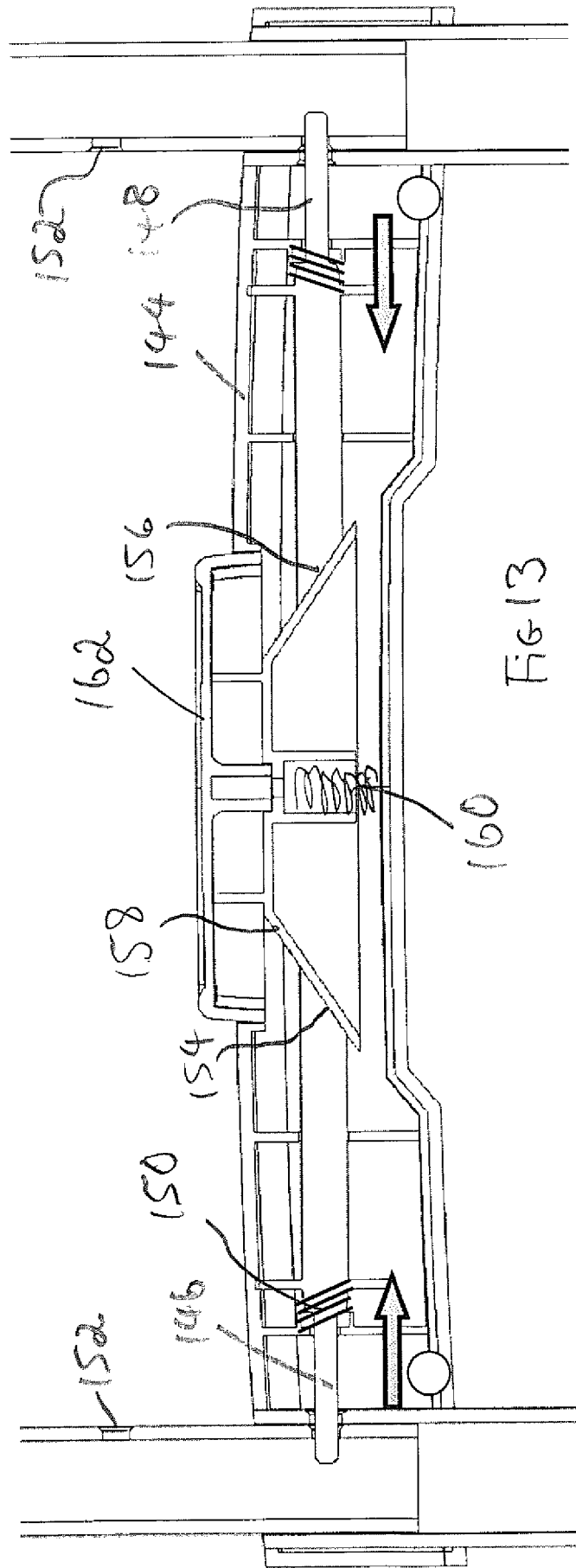


FIG 13

Title: Surface Treatment Device

5 Description of Invention

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.

15

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.

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

30

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  
5 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.

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.

10

One 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  
15 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.

A device (such as a carpet washing machine) in accordance with the invention presents the advantage that a range of devices of different specification (e.g.  
20 in terms of the dimensions of the cleaning head, the type of brush bar or agitating device incorporated therein, or other characteristics, can be provided by using a common basic body and relatively straightforward substitution of one type of cleaning head part with another type. Devices suitable for treating different types of carpet, e.g. in respect of the type or material on their pile,  
25 may thus be provided. A device may be sold with different cleaning head parts to render it more versatile if the user substitutes one such part for another, and, since carpet-washing devices are commonly made available for hire rather than being sold, a person hiring the device may be furnished by the supplier with one or more cleaning head assemblies suitable for the intended  
30 mode of usage of the device.

A cleaning head assembly which is detachable and replaceable in accordance with the invention may include a drivable agitator member and a motor for driving same. The agitator member may comprise an elongate member supported in the cleaning head for rotation about its longitudinal axis which extends transversely of the cleaning head and the device to provide an operating width which substantially approaches that of the cleaning head. The agitator member conveniently is of cylindrical form, having outwardly-projecting agitating formations on its surface. Such agitating formations may include brush elements, and in this case such an agitator member is commonly referred to as a brush bar.

The motor may be spaced from the agitator member and drive the latter by way of a drive train. The drive train may include a drive element such as a toothed belt, extending around respective pulley formations provided on the agitator member and an output shaft of the motor. In this case, it will be appreciated that the rotational axis of the motor's output shaft is substantially parallel to that of the agitator member.

Further aspects of the invention relate to constructional and operational features of the cleaning head assembly. The cleaning head assembly may comprise a housing wherein a agitator assembly (which preferably includes an agitator member arranged as aforesaid) is disposed, the agitator assembly being moveable upwardly and downwardly relative to the housing. Preferably, the agitator assembly is biased (e.g. spring-biased) to move downwardly relative to the housing, so that the agitator assembly is able to "float" in relation to the housing and effectively make agitating contact with whatever type of carpet or other surface is being cleaned.

The agitator assembly may be guided for movement upwardly and downwardly relative to the housing, e.g. by uprightly-oriented guide formations, and spring



means may be associated with said formations to effect the downwards biasing of the agitator assembly relative to the housing.

5 The motor may move upwardly and downwardly with the agitator assembly relative to the housing, or may remain stationary relative to the housing while the agitator assembly moves upwardly and downwardly relative thereto.

10 The agitator member may be removable in a transverse direction from the agitator assembly, so that it may be cleaned or replaced as required, preferably without the use of tools.

To facilitate this, the housing of the cleaning head may have an openable or removable portion, the opening or removal thereof being able to be effective without the use of tools other than, for example, a coin.

15 A cleaning head in accordance with the invention may further comprise a suction nozzle for drawing dirty cleaning liquid from a surface being cleaned. Such a suction nozzle may be fixed to the housing of the cleaning head, and have a opening facing a floor surface being cleaned, extending transversely  
20 for substantially the same width as the cleaning head.

Further aspects of the invention relate to the general configuration and disposition of tanks for clean cleaning liquid and for dirty cleaning liquid recovered by way of the suction nozzle.

25 In accordance with another aspect of the invention, we provide 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  
30 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.

- 5 Preferably the suction airflow leaves the tank by way of a duct extending downwardly through the tank.

Liquid may be separated from the suction airflow within the tank by being caused firstly to pass downwardly into the tank from an upper part thereof, and  
10 then upwardly within the tank to enter the downwardly-extending duct leading to the source of suction.

Such an arrangement of a duct within the tank enables, firstly, an airflow to be established within the tank which is effective at separating liquid from the  
15 suction airflow, and, secondly does not involve the provision of an over-complex path for the suction airflow which can lead to undesirable energy losses in such flow.

Preferably the recovery tank is removable from the device for emptying and/or  
20 cleaning-out purposes.

The device may further comprise a tank for clean liquid for delivery to a surface being cleaned, and conveniently such a tank is disposed beneath a part of the recovery tank. It will be appreciated that many different  
25 configurations of such tank are possible; the clean liquid tank may be removable from the device for filling purposes.

The device preferably has a handle by which a user can move the device over a surface being cleaned. A further aspect of the invention is concerned with  
30 the configuration of such a handle.

According to this further aspect of the invention, we provide 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  
5 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.

10 The handle may be 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.

One or both of the pivotal connections of the two limbs of the handle to the  
15 device may incorporate a holding mechanism by which it or they can be held a required position such that the handle extends at a required orientation relative to the body of the device, to suit the requirements of a device user. If both the pivotal connections have an associated holding device, preferably a release mechanism provides for release of both of them together when the handle is  
20 required to be pivoted relative to the base of the device.

Preferably the limbs of the handle are each telescopically extendible and contractible, enabling the handle to assume a more compact configuration when the device is stored or otherwise not in use.

25

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 the invention;

30 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;

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;

10 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;

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

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  
20 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  
25 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.

The device further comprises a handle assembly indicated generally at 14.

30 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.

The device is used to clean a carpet or other surface by applying a cleaning  
5 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 agents agent such as a detergent added thereto. The  
10 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  
15 surface. These elements will be described in greater detail hereafter.

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  
20 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, 38 provide for flow of air from the suction nozzle to the uppermost  
part of the tank 22 as described hereafter.

25 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  
30 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.

10

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.

25

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.

30

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 70 as required, and delivered to an application nozzle or spray bar 72, from which it is applied to a surface being cleaned.

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

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 70 may be provided.

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.

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  
5 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.

10 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,  
15 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.

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  
20 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  
25 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  
30 cover member 108.



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  
5 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.

An electrical connection for powering the motor 110 is established between co-  
10 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 90 with the agitator member and its components, or may be fixed at a stationary position within the  
15 housing 90 in which case the drive mechanism within the casing 112 must allow for relative movement between the motor and the agitator member.

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  
20 lowermost position of the agitator member and figure 8b an uppermost position thereof.

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  
25 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,  
30 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  
5 rotatable by the motor as above described. The driving engagement may be by way of interengaging splines or other non-circular co-operating surfaces.

Figure 10 shows the manner in which the handle assembly 14 may be pivoted about the axis 60 to assume a horizontal or near-horizontal orientation, so as  
10 to minimise the amount of space occupied by the device when not in use. The handle assembly is also telescopically extendible and contractible.

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.

15

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  
20 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 transverse bridging member 144 extends between the adjacent ends of the elements 136, 140. For holding the elements 134, and 138 in a selected one of a number of desired positions  
25 relative to the elements 136, 140 a catch mechanism shown in greater detail in figure 13 is provided.

The transverse bridging member 144 is hollow in configuration, and carries in its interior two oppositely outwardly facing catch elements 146, 148. These  
30 catch elements 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 these 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.

10

The pivoting mechanism for the handle assembly 14 comprises cup-like members 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.

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.

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

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combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

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  
5 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 a different configuration from that of the first said head or part.
- 10 2. A device according to claim 1 wherein the treatment head is detachable and replaceable as an assembly.
3. A device according to claim 1 or claim 2 wherein the treatment head is a cleaning head.  
15
4. A device according to claim 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.
- 20 5. A device according to claim 4 wherein the cleaning head further comprises an agitator member.
6. A device according to claim 5 wherein the agitator member is rotatably driveable, and the cleaning head includes a motor for effecting such driving.  
25
7. A device according to claim 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 claim 7 wherein the drive train includes a drive  
30 element extending around respective formations provided on the agitator member and on an output shaft of the motor.

9. A device according to claim 8 wherein the drive element comprises a drive belt.
10. A device according to claim 6 or any claim 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 claim 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 claim 10 or claim 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 claim 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 claims 10 to 12 as appendent directly or indirectly to claim 7, wherein the motor is movable upwardly and downwardly relative to the housing with the agitator assembly.
15. A device according to claim 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 claim 15 wherein said removal is able to be effected without the use of tools

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

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

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

15

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

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

23. A device according to claim 22 as appendent to claim 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.

25

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

30 25. A device according to any one of claims 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 claim 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.

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

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

10

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  
15 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.

20 30. A device according to claim 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.

25 31. A device according to claim 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 claims 29 to 31 wherein the recovery tank has a cover including a duct part for suction airflow entering the tank.

30 33. A device according to any one of claims 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  
5 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 claim 34 wherein the handle is generally of  
10 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 claim 35 wherein at least one of the pivotal  
15 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 claim 36 comprising a release mechanism for releasing of a handle to enable it to be pivoted relative the base of the device.

20

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

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

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

30

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

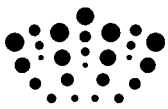
42. A device according to any one of claims 1 to 28 and any one of claims  
5 34 to 40.

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

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

45. A surface treatment device substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

15 46. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.



**Application No:** GB1300526.9 **Examiner:** Mr Simon Holloway  
**Claims searched:** 1 - 28 fully, 43 and 44 in part **Date of search:** 9 May 2013

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 - 4, 18 - 25, 27, 28, 43 and 44	US5584094 A (GURSTEIN) see figures and column 4 lines 21 - 44
X,Y	X: 1, 10 - 13, 17 - 25, 27, 28, 43 and 44; Y: 3 - 9	GB2163640 A (HIGH SPEED) see figures and page 1 line 110 - page 2 line 88
Y	3 - 9	US7849556 B1 (JANSEN) see figure 3 and column 4 lines 6 - 33

**Categories:**

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

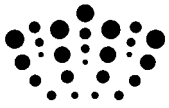
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Worldwide search of patent documents classified in the following areas of the IPC

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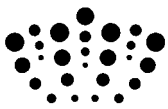
The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, TXTE, TXTT
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**International Classification:**

<b>Subclass</b>	<b>Subgroup</b>	<b>Valid From</b>
A47L	0011/34	01/01/2006
A47L	0011/00	01/01/2006
A47L	0011/29	01/01/2006
A47L	0011/292	01/01/2006
A47L	0011/30	01/01/2006
A47L	0017/00	01/01/2006



**Application No:** GB1300526.9  
**Claims searched:** 29 - 33, 43 and 44

**Examiner:** Mr Simon Holloway  
**Date of search:** 8 July 2013

**Patents Act 1977  
Further Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	29, 31, 33, 43 and 44	US2007/044269 A1 (DAY) see figures and paragraphs 0024 - 0026 and 0032
X	29, 31, 32, 43 and 44	US2005/125935 A1 (LEONATTI) see figures and paragraphs 0017 and 0021 - 0023
X	29, 30, 33, 43 and 44	US6481048 B1 (HAUFF et al.) see figures and paragraphs 0024 - 0028
X	29, 30 - 32, 43 and 44	US5779744 A (MUELLER et al.) see figures and column 3 lines 20 - 43
X	29 - 33, 43 and 44	US4314385 A (WIMSATT et al.) see figures and column 5 lines 18 - 37

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**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

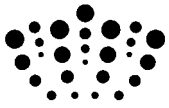
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WPI, EPODOC

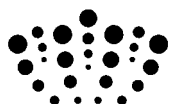
**International Classification:**

Subclass	Subgroup	Valid From
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<b>Subclass</b>	<b>Subgroup</b>	<b>Valid From</b>
A47L	0011/34	01/01/2006
A47L	0007/00	01/01/2006
A47L	0011/00	01/01/2006
A47L	0011/29	01/01/2006
A47L	0011/292	01/01/2006
A47L	0011/30	01/01/2006
A47L	0011/40	01/01/2006
A47L	0017/00	01/01/2006



**Application No:** GB1300526.9

**Examiner:** Mr Simon Holloway

**Claims searched:** 34 - 40, in full; 43 and 44, in part

**Date of search:** 18 July 2013

**Patents Act 1977**

**Further Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	34 - 40, 43 and 44	US2006/185113 A1 (KLOEPPPEL et al.) see figures 1, 2 and 17 - 20 and paragraphs 0005 - 0006, 0035, 0037 - 0038
X	34 - 40, 43 and 44	EP1922973 A2 (BLACK) see figures and paragraphs 0018, 0020 and 0031
X	34, 39, 40, 43 and 44	US6145159 A (ZAHURANEC et al.) see figures 1, 2 and 13, column 5 lines 15 - 30 and column 7 lines 48 - 61
X	34, 39, 40, 43 and 44	EP2494902 A2 (BISSELL) see figures and paragraphs 0019, 0020, 0026 and 0035
X	34, 39, 40, 43 and 44	GB2419812 A (HOOVER) see page 20 lines 11 - 19 and page 11 line 25 - page 12 line 5
X	34, 39, 40, 43 and 44	US4660246 A (DUNCAN et al.) see figures and column 3 lines 14 - 31

**Categories:**

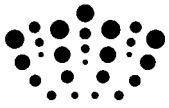
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A47L	0017/00	01/01/2006