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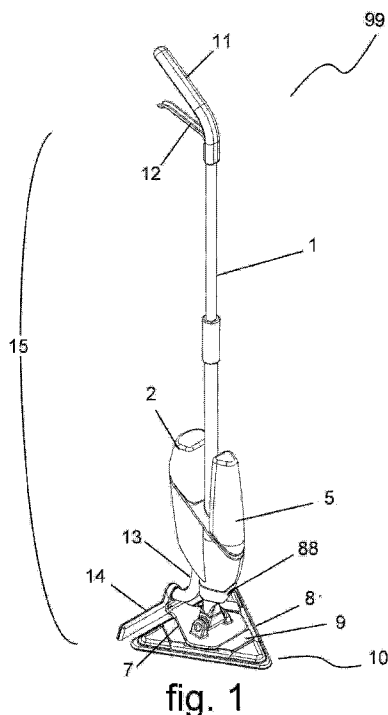
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(56) Documents Cited:
CN 212037420 U **CN 206896307 U**
CN 206026257 U **CN 205514432 U**
CN 205306931 U **CN 201164442 Y**

(58) Field of Search:
INT CL **A47L**
Other: **WPI, EPODOC**

(54) Title of the Invention: **A floor cleaning device**
Abstract Title: **A floor cleaning device comprising a fluid reservoir and drying means**

(57) A floor cleaning device 99 comprising a handle 14 and a plurality of heads, wherein the heads comprise an absorbent cleaning surface 8, mounted on the handle are a fluid reservoir 5 and a fluid control means which is operative to deliver fluid from the fluid reservoir to the cleaning surface, also mounted on the handle is a control means which operates a drying mechanism arranged to direct air to a location adjacent the cleaning surface, and wherein the head is removable from the handle so as to allow the head to be changed. The device may include a rechargeable battery 2 as well as a heating element 4 to heat the air in the mechanism and/or heat the fluid from the reservoir. The device may also include an ultraviolet sanitising light source and the head may attach to the handle by a ferromagnetic connection means.



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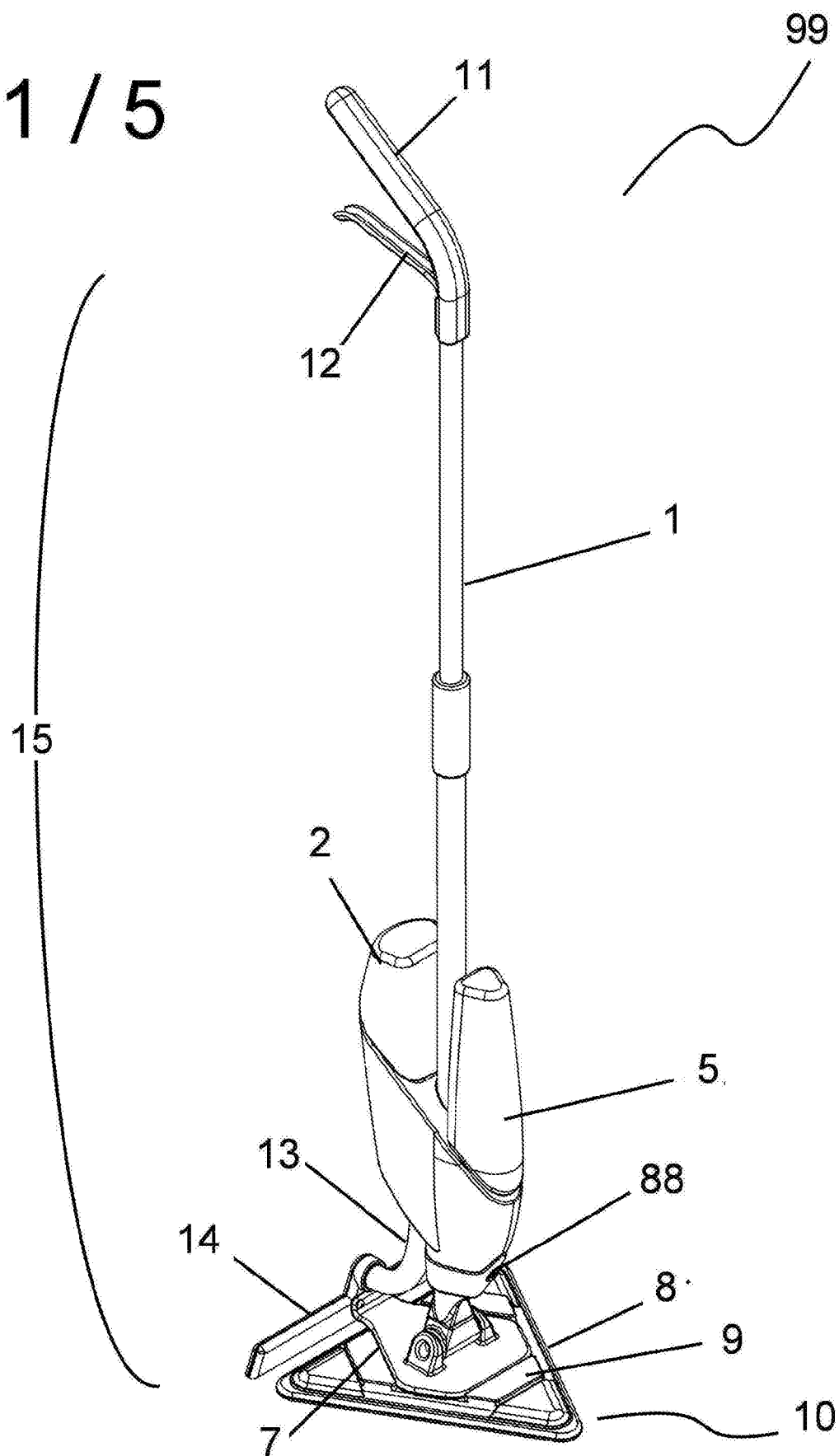


fig. 1

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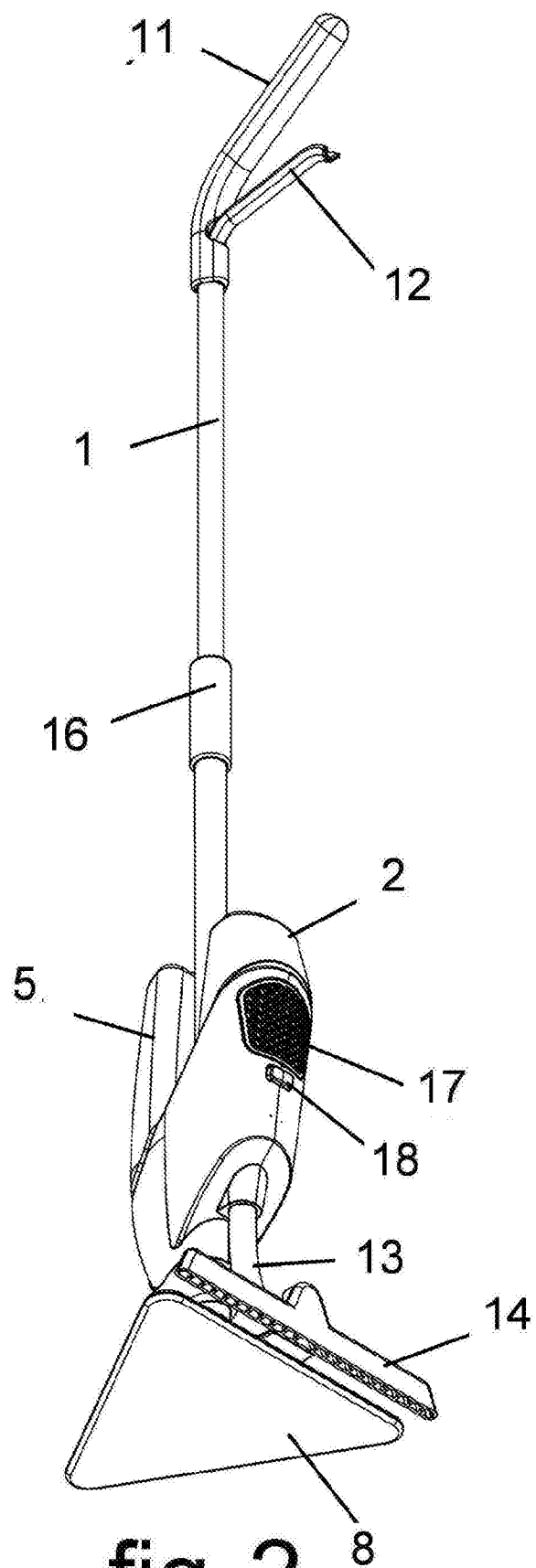


fig. 2

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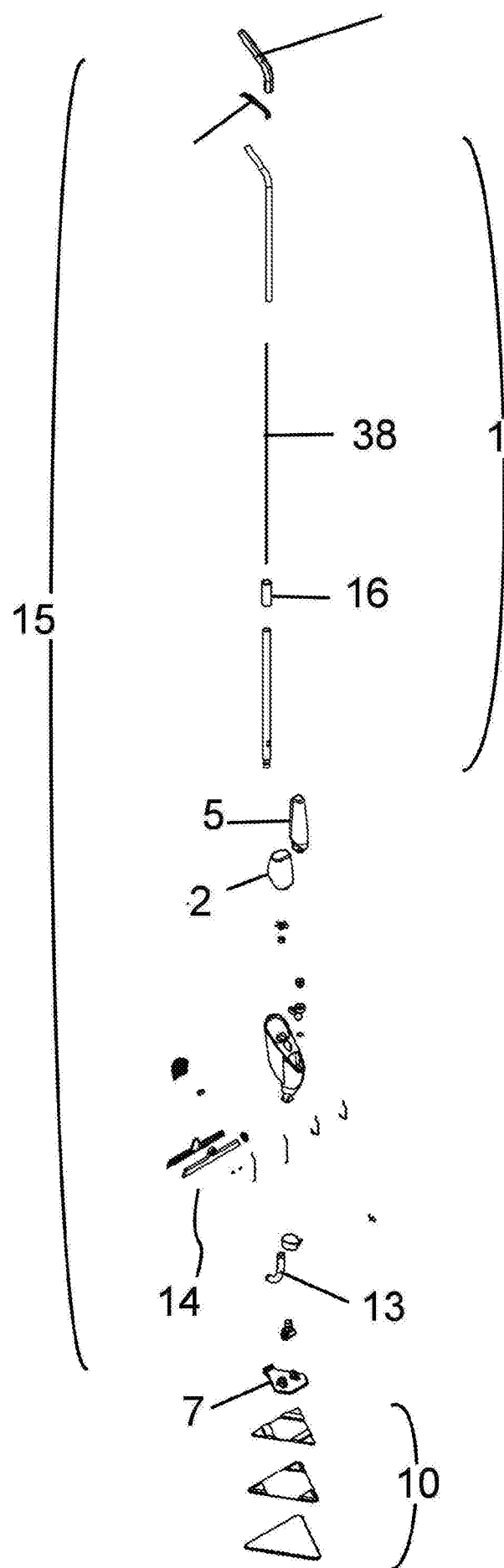


fig. 3

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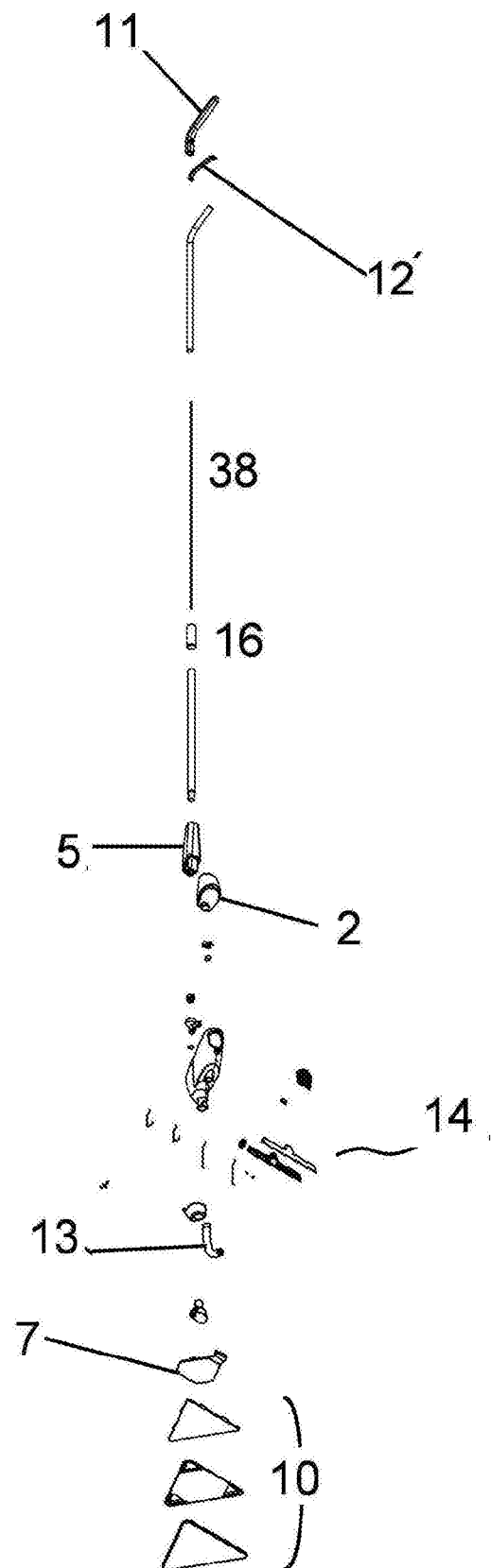


fig. 4

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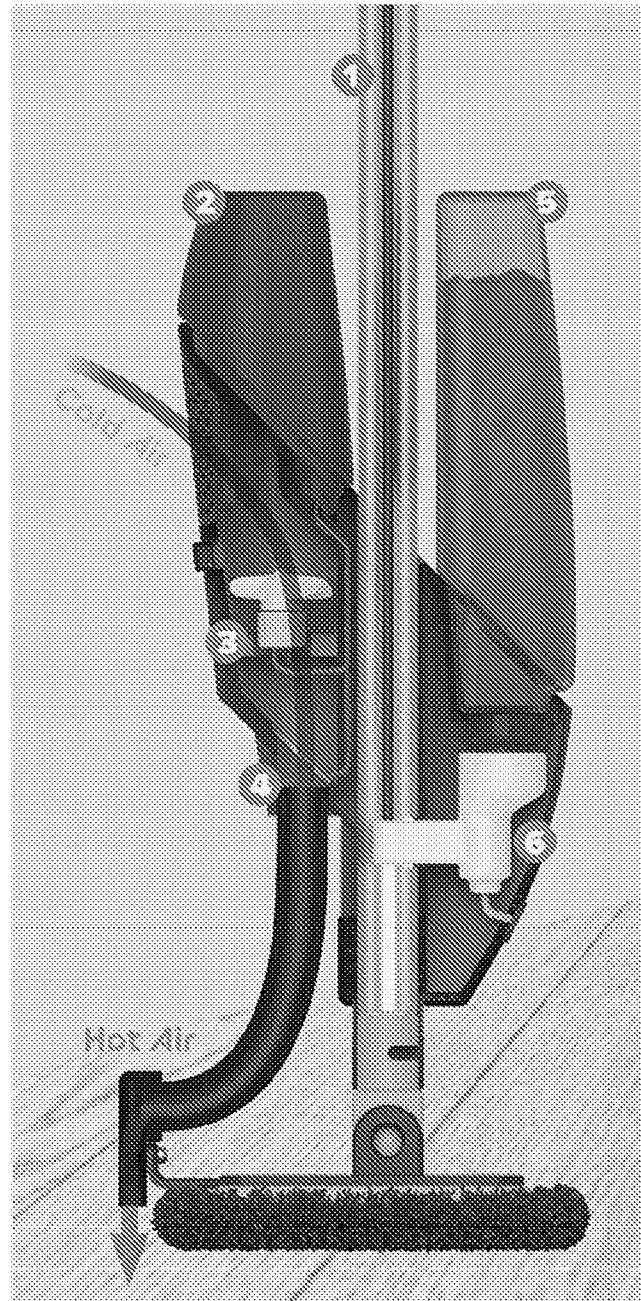


fig. 5

A FLOOR CLEANING DEVICE

Field of the Invention

- 5 The present invention relates to a floor cleaning device, in particular a device for cleaning hard floors.

Background

- 10 Many people are increasingly installing hard flooring in homes and commercial properties in many societies.

Such flooring requires frequent cleaning to maintain hygiene and aesthetics, particularly in high traffic areas. Typically this is with a mop and fluid.

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However such high traffic areas are typically by definition made problematic by use of cleaning fluids on the floor, leading to potential slip hazards. It is not desirable to wait for mopped areas to dry, and not practical to dry floors.

20 Prior Art

- CN 104 207 738 (LIU) discloses an air drying mop comprises a handle and a telescopic rod connected with the handle. A hot air blower is installed at the lower portion of the telescopic rod, a switch is installed on a shell of the hot air blower, the hot air blower
25 is electrically connected with a power line which is electrically connected with a plug, an air blowing port is installed in the bottom of the hot air blower, and a cardan joint is installed at the bottom of the telescopic rod and connected with a mop head.

- CN 102 462 461 (QIAN) discloses a mop with an air heater, comprising a mop handle,
30 a carriage, a blowpipe, a connecting pipe, an air heater.

- CN 2 429 094 (ZHENG) discloses a quick floor blowing drier which comprises a mop head and a mop rod. The utility model is characterized in that an electric heating blower is arranged in the mop head; an air inlet is arranged on the mop head; the bottom
35 surface of the mop head is provided with a hot blast outlet and can also connected with a dry cleaning plate with a vent.

The present invention arose in order to overcome problems suffered by existing devices.

5 Summary of the Invention

According to the present invention there is provided a floor cleaning device comprising a handle and a plurality of heads, wherein the heads comprise an absorbent cleaning surface, mounted on the handle are a fluid reservoir and a fluid control means which
10 is operative to deliver fluid from the fluid reservoir to the cleaning surface, also mounted on the handle is a control means which operates a drying mechanism arranged to direct air to a location adjacent the cleaning surface, and wherein the head is removable from the handle so as to allow the head to be changed.

15 In this way the drying mechanism may be envisaged to provide a drying means for the floor adjacent the head. Typically this may be envisaged to comprise a part of the floor directly behind the head in use, such that the device of the present invention is envisaged to provide a fluid cleaning operation, followed by a drying operation, such that the floor is advantageously cleaned and dried by the same device.

20 In some embodiments the mechanism may comprise an air outlet located adjacent the head.

In some embodiments the mechanism comprises an elongated air outlet. The air outlet
25 may provide a constricted exit, so as to compress, direct and focus the air, for example through a Venturi effect.

In some embodiments the mechanism is wholly located within or on the handle. For example the air outlet may be attached to the handle.

30 The elongated air outlet may enable the direction of air along a strip, which strip may be adjacent the head in use. The air outlet may comprise a rigid part, that maintains a fixed position in relation to the handle, and/or the plurality of heads.

35 In some embodiments the device comprises a rechargeable battery. In other embodiments the device may comprise a wired connection in addition or the

alternative. In embodiments comprising a rechargeable battery the battery may be a lithium-ion battery.

5 In some embodiments the surface is wholly displaceable from the head. For example the surface may comprise a cloth or other absorbent material part, which may include elastomeric connection to the head, or may use a hook and loop system such as Velcro (RTM).

10 In some embodiments the device includes a displaceable reservoir. In this way the reservoir may be easily refilled for use, for example by carrying to a tap or faucet.

15 In some embodiments the delivery means of the device includes a spray nozzle for dispersal of fluid from the reservoir. This spray nozzle may comprise an atomiser, and/or may be envisaged to atomise, disperse or spray the fluid from the reservoir, so as to more effectively disperse the fluid around the adjacent head, or onto the floor in front of or adjacent the head.

20 In some such embodiments the spray nozzle is located on the handle directed towards the head, in order to effectively ensure that the fluid is delivered for aiding cleaning purposes of the head.

25 In some embodiments the head is connected to the handle on an articulated joint. In this way the head may be envisaged to easily accommodate turns and movements during cleaning. The joint may comprise a ball joint which ball joint may be associated with the handle. The joint may further include a hinge, which hinge may be located on the head.

30 In some embodiments the device comprises a heating element. Such heating element may comprise a resistor, which heats and locally heats fluid, for example in a restricted passage, so as to heat the fluid in the reservoir.

35 In some embodiments the heating element heats air in the mechanism. In this way the heated air may be delivered to an outlet adjacent the head and is more effective in drying fluid placed on the floor by the head.

In some embodiments the heating element heats fluid from the reservoir. This may be additionally or alternatively to heating air in the mechanism. It may be envisaged that a plurality of heating elements may be provided, so as to provide different heating functions, for fluid and air.

5

Heating fluid in the reservoir or for delivery from the nozzle may be advantageous in providing an improved cleaning function, for example where superheated fluid or steam may be directed at the head or floor adjacent the floor.

10 In some embodiments the head attaches to the handle by a ferromagnetic means. In this way the head may be easily and quickly displaced from the handle, so as to enable a user to change the head. In this way the device may be enabled to have a plurality of different heads, such that the user may choose a circular head or triangular or rectangular head according to local requirements.

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In other embodiments a strip or sanitising light source may be envisaged to be provided for extra sanitation purposes or stages.

For example in such embodiments a ultraviolet or LED (light emitting diode) strip or
20 light source may be provided to provide extra sanitation. This strip or light source may be located near the drying mechanism on the device. The light source may be envisaged to comprise ultraviolet germicidal irradiation (UVGI) providing a disinfection method that uses germicidal (UV) light at a short wavelength of 253.7nm to kill
25 microorganisms and is known to be effective in destroying the nucleic acids in these organisms so that their DNA is disrupted, causing them to split and preventing them from reproducing.

A preferred embodiment of the invention will now be described by way of example only and with reference to the Figures in which:

30

Brief Description of Figures

Figure 1 shows an isometric view of an embodiment of the device according to the
35 present invention;

Figure 2 shows a reverse isometric view of the embodiment of the device shown in Figure 1;

Figure 3 shows an exploded isometric view of the embodiment shown in Figure 1;

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Figure 4 shows a reverse exploded isometric view of the embodiment shown in Figure 1;

and

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Figure 5 shows a sketch of a diagrammatic sectional detail view of the embodiment shown in Figure 1.

Detailed Description of Figures

15

With reference to the figures there is shown an embodiment of a floor cleaning device 99 generally comprising a handle 15 and a plurality of heads, shown with a triangular footprint head 10, which head comprises an absorbent cleaning surface 8, the handle comprises a fluid reservoir 5 and a control means for a fluid control means adapted to deliver fluid from the reservoir to the cleaning surface, wherein the handle controls a drying mechanism arranged to direct air from the handle to a location adjacent the cleaning surface, and wherein the head is wholly displaceable from the handle so as to allow variation of the head's shape.

20

25 With particular reference to the pictured embodiment the embodiment comprises a telescopic elongated handle with coaxial telescoping parts 1, having an axially deviated handgrip 11 at the end of the handle distal the head, which handgrip includes a control means comprised by a trigger 12, which trigger actuates the fluid control means driving fluid communication from the reservoir to a nozzle 88. It may be envisaged that the mechanism comprises a separate activation means, an on/off button for example local to the mechanism.

30

In use therefore it may be envisaged that the user presses an activation button for the mechanism and pulls the trigger to spray cleaning fluid onto the floor as and when.

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The device provides a revolutionary, domestic mop with automatic drying which follows the mop and instantly dries any mopped area automatically without requiring any input from the user.

- 5 The handle is an aluminium pole with a trigger, wherein when the trigger is pulled, the fluid control means is actuated, and fluid is pumped from the reservoir by a fluid pump 6.

- 10 The embodiment includes a lithium-ion rechargeable battery 2, and a DC (direct current) impeller fan 3 which pulls the air through an inlet 17 in the handle and pushes it towards an air outlet 14.

A heating element 4 intermediate the inlet 17 and outlet 14 heats the air that passes through it towards the outlet.

15

The reservoir 5 comprises a removable transparent or translucent plastic bottle filled with cleaning fluid in use, which is sprayed through a spray nozzle 88 by the fluid control means, so as to land in front of the head.

- 20 A plastic grill over the inlet allows air to pass through while stopping larger particles from entering and damaging internal components.

The heads are connected to the handle using ferromagnetic plates, where the handle has an articulated ball joint, and a hinged foot plate 7. The heads comprise connection 25 plates 9 which attach to the foot plate 7 by ferromagnetic means and the foot plate and head share mating features to ensure that the connection is correct.

The plates are connected via magnets such that the heads can be easily changed between round, rectangular and square variants.

30

The outlet 14 is an elongated rigid part that depends from the handle end and spreads the hot air across the width of the mop head on its trailing edge. The outlet is attached to the foot plate, such that it hinges with the foot plate in reference to the handle. The outlet is attached to the handle end using a flexible hose 11, such that the handle and 35 head can hinge freely with respect to each other, with the hose providing some resistance to hinging.

The cleaning surface 8 is provided by a microfibre mop head, which has an elastic connection means for connecting to the head, formed by a perimetric elastic cord.

- 5 The invention has been described by way of examples only and it will be appreciated that variation may be made to the above-mentioned embodiments without departing from the scope of invention as defined by the claims, in particular but not solely combination of features of described embodiments.

Claims

1. A floor cleaning device comprising a handle and a plurality of heads, wherein the heads comprise an absorbent cleaning surface, mounted on the handle are a fluid reservoir and a fluid control means which is operative to deliver fluid from the fluid reservoir to the cleaning surface, also mounted on the handle is a control means which operates a drying mechanism arranged to direct air to a location adjacent the cleaning surface, and wherein the head is removable from the handle so as to allow the head to be changed.
2. A device according to claim 1 wherein the drying mechanism comprises an air outlet located adjacent the head.
3. A device according to claim 1 or 2 wherein the drying mechanism comprises an elongated air outlet.
4. A device according to any preceding claim wherein the drying mechanism is housed within the handle.
5. A device according to any preceding claim comprising a rechargeable battery.
6. A device according to any preceding claim wherein the absorbent cleaning surface is removable from the head.
7. A device according to any preceding claim wherein the fluid reservoir is removable from the handle.
8. A device according to any preceding claim comprising a spray nozzle for dispersal of fluid from the reservoir.
9. A device according to claim 8 wherein the spray nozzle is located on the handle, preferably directing fluid towards the head.
10. A device according to any preceding claim wherein the head is connected to the handle by an articulated joint.
11. A device according to any preceding claim comprising a heating element.

12. A device according to claim 11 wherein the heating element heats air in the mechanism.
- 5 13. A device according to claim 11 wherein the heating element heats fluid from the reservoir.
14. A device according to any preceding claim comprising an ultraviolet sanitising light source.
- 10 15. A device according to any preceding claim wherein the head attaches to the handle by a ferromagnetic connection means.



Application No: GB2109884.3

Examiner: Evie Walton

Claims searched: 1-15

Date of search: 10 December 2021

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	1-10	CN212037420 U UNIV TAIYUAN NORMAL (See figures 1 and 2)
X	1-13	CN205306931 U XI'AN POLYTECHNIC UNIV (See figure 1)
X	1-10	CN206896307 U UNIV NORTH CHINA WATER RESOURCES & ELECTRIC POWER (See figure 1)
X	1-14	CN205514432 U TIANJIN JINQI YUBAO TECH CO LTD (See figures 1 and 2)
X	1-13	CN206026257 U UNIV WEST ANHUI (See figure 1)
X	1-13	CN201164442 Y HUIXIN YU (See figure 1)

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.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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

A47L

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

WPI, EPODOC



International Classification:

Subclass	Subgroup	Valid From
A47L	0013/22	01/01/2006
A47L	0013/20	01/01/2006