

(43) International Publication Date
21 September 2017 (21.09.2017)

(51) International Patent Classification:

A47L 11/40 (2006.01) A47L 13/24 (2006.01)
A47L 13/22 (2006.01)

(21) International Application Number:

PCT/IT2017/000051

(22) International Filing Date:

14 March 2017 (14.03.2017)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

102016000027284 15 March 2016 (15.03.2016) IT

(72) Inventor; and

(71) Applicant : MILANESE, Pier Antonio [IT/IT]; Via Val Longa 18, 31058 Susegana (TV) (IT).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA,

MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

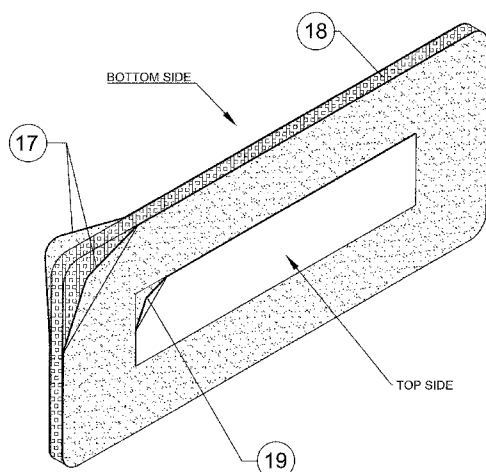
Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: CLEANER WITH HOT PLATE FOR FLOORS PROVIDED WITH A SANDWICH PANEL FOR HEATING AND GRADUAL RELEASING OF THE WATER TO AN UNDERLYING CLEANING CLOTH

FIGURE 4



(57) Abstract: Hot plate cleaner for floors composed by one handgrip (1), a handle (2), a tank (3) for containing the water, a main body shaped as a brush (5) a heating plate (6) fixed below the body shaped as a brush (5) and provided with an electrical resistance (9) for heating the plate (6) and at least one thermostat (10) for regulating the temperature, and by cleaning fabrics (16) for the floor. Said cleaning fabrics (16) are hooked below a sealing frame (13), adapted to be hooked and unhooked below said body shaped as a brush (5), with the interposition of a sandwich panel (12) kept into direct contact with the heating plate (6) that is composed of at least one layer of polyurethane foam (18), placed between two polyester fabrics (17) and coupled thereto, and of a waterproof element (19) applied to the panel (12), in order to let the water flow that comes from the tank (3) in a scattered way on the sandwich panel (12) to dampen it and to retain the water, thus acting as a tank in order to reach the same temperature as the heating plate (6) and keep it unchanged until the panel has got dry (12) and to transmit the same temperature to the cleaning fabric (16).

“CLEANER WITH HOT PLATE FOR FLOORS PROVIDED WITH A SANDWICH PANEL FOR HEATING AND GRADUAL RELEASING OF THE WATER TO AN UNDERLYING CLEANING CLOTH”

DESCRIPTION

This invention patent concerns a surface hot cleaning device whose characteristic is that of being provided with a heated plate and a special sandwich panel that is kept always in contact with the same heating plate preferably through a frame. Said panel absorbs a preset quantity of water supplied by a tank located above it and retains it while it is heated up to reach the temperature of the heating plate and releases it gradually onto the cleaning cloth located underneath.

Several hot cleaning devices are known that generally use steam generated by instantaneous vaporizers or pressure boilers. The generated steam is usually conveyed through output pipes towards the cleaning cloth located under the brush that will be in touch with the floor.

The disadvantage of all these devices is that the steam gets immediately cold when getting in touch with the cloth being in contact with the floor, thus losing the temperature that would be necessary for efficient cleaning; moreover, since steam continues to be released, the cloth gets increasingly wet and spills water on the floor, thus actually preventing proper cleaning.

These shortcomings are overcome by the new device provided with a heated plate and a special sandwich panel.

The new device for surface hot cleaning consists of a main body pivoted into a handle by means of a universal joint, a handgrip, a water tank and a power supply cable.

The main body is formed by a shell, preferably made of plastic, inside which a plate is installed, preferably made of aluminium, heated by a heating element and provided with a thermostat for adjusting the temperature, a frame with a sandwich panel that can be detached from said main body. The frame is fastened to the main body and keeps the sandwich panel in direct contact with the heating plate.

The device handle hosts the water tank, whose capacity corresponds to the water quantity necessary to dampen the sandwich panel. Said tank has a ball valve that locks the output hole under gravity, thus preventing water to get through when the handle is in vertical position. Only when the user starts using the device and the handle is moved to a slanted position, the ball will move and the valve will open the pipe and the water will start flowing towards the sandwich panel in a pipe connecting the tank to said panel, thus passing through the main hole of the heating plate.

The sandwich panel consists of two fabric-non-fabric cloths that resist to a temperature of at least 140 °C and an element in-between made of open-cell polyurethane foam with suitable density and thickness coupled to them. The panel has been conceived so that it can absorb and keep a certain quantity of water, thus acting as a tank for the absorbed water and releasing it gradually towards the cleaning cloth applied underneath.

The central area of the upper surface of this panel also hosts a waterproof element that lets the water coming from the tank flow down from the central hole in the heating plate in a scattered way along the edge of said element so that the sandwich panel can get wet and absorb water uniformly on its surface and not only on the central area.

When said panel is wet and kept in contact with the heating plate through the frame, it rapidly reaches the same temperature as the plate, about 100 °C that it will transmit on its turn to the cleaning cloth underneath.

The efficiency characteristics of the sandwich panel can be summed up in the following points:

- it retains the preset quantity of water coming from the tank, thus avoiding dripping on the floor
- the entire surface is dampened uniformly
- it allows the fast and homogeneous heating of its entire surface
- it keeps the same temperature of about 100° C for the entire duration of the cleaning operations by transmitting it to the cleaning cloth until it gets completely dry
- it improves the adherence to the floor of the cleaning cloths
- it cleans in depth and sanitises surfaces thanks to the high constant temperature transmitted to the cleaning cloth
- it allows using any type of cloth, even single-use ones
- floors dry up very fast
- the panel can be easily removed to wash or replace it thanks to the removable frame.

It also shows some safety features:

- it prevents the direct contact with the heating plate, thus avoiding unwanted burns.
- when the panel is dry, its surface is cold even when the plate is hot and therefore the device can remain on and in contact with the floor without any risk of spoiling it.

This device can also be used when it is cold with 'dust-catching' cloths applied under the sandwich panel to remove dust from the floors like a normal dust mop.

As an explanation but with no limitations of the characteristics of this invention, an example is now described of construction of the system according to this invention with reference to the enclosed drawings:

Figure 1 shows the entire hot plate cleaner consisting of:

A handgrip (detail 1), a handle (detail 2), a tank (detail 3), a main body (detail 5), a universal joint (detail 4), a heating plate (detail 6), and a power supply cable (detail 7).

Figure 2 shows the inner part of the heating plate (detail 6) where (detail 8) is the aluminium body, (detail 9) the heating element, (detail 10) the thermostat, and (detail 11) the hole for water flow.

Figure 3 shows in this order the heating plate (detail 6) seen from below, the sandwich panel (detail 12), the frame holding the sandwich panel (detail 13) with the fastening elements (dr.14) to be fastened to the brush (detail 5) and hooks along the lower edge (dr.15) to hook the cleaning cloths (detail 16).

Figure 4 shows a section of the composition of the sandwich panel (detail 12) that is formed by two external fabric-non-fabric elements (detail 17) resistant to a temperature of at least 140°C coupled with a central element made of open-cell polyurethane foam (detail 18) whose density and thickness are suitable to the purpose, and a waterproof element (detail 19) applied to the centre of said panel on its upper surface, i.e. the surface that gets in contact with the heating plate.

Figure 5 shows the water tank (detail 20), provided with a plug (detail 21) and a filter (detail 22) inside which a ball valve is installed (detail 23) that moves under gravity and prevents water from flowing when it is in vertical position (detail 24), while when it is in a slanted position (detail 23') it moves and opens the hole (dr.24).

The device ready for use will be already equipped with the sandwich panel (detail 12) assembled to the brush (detail 5) by means of the frame (detail 13).

The tank (detail 3) is filled with water up to the level marked on the same tank. The device is turned on by connecting the cable (detail 7) to the grid that energises the heating element (detail 9) located on the heating plate (detail 6). The plate temperature is adjusted by the thermostat (detail 10) fastened to the same plate. Once the system has

reached the preset temperature, it will inform the user by means of a beeper and then the user can start the cleaning operations after applying the cleaning cloth (detail 16) under the sandwich panel (detail 12).

When the user tilts the handle (detail 2) and the tank fastened to it at the same time and starts moving the device, the ball valve (detail 23) located in the tank (detail 3) will move under gravity and will thus open the hole (detail 23' / 24) and the water will flow through the connection pipe (detail 25) towards the sandwich panel (detail 12) that is located under the heating plate (detail 6), which will get wet and reach the temperature of the plate very fast. The waterproof element (detail 19) located in the sandwich panel (detail 12) has the purpose to scatter the water coming from the tank (3) through the connection pipe (25) and the hole in the plate (11), along its edge, thus favouring the homogeneous dampening of the panel instead of concentrating the water only in the centre where there is the hole for the water flow (detail 11).

The special composition of the sandwich panel shown in figure 4 allows retaining water, thus acting as a tank of the absorbed water, keeping it at the same temperature as the heated plate (detail 6) and gradually releasing it towards the cleaning cloth underneath (part.16) at a temperature of about 100 °C.

The special features and advantages deriving from the use of the innovative sandwich panel can be summed up as follows:

- it absorbs the water coming from the tank in a homogeneous way on its entire surface
- it retains the water thus avoiding dripping on the floor
- it allows the fast heating of the entire panel
- it keeps the temperature unchanged for the entire cleaning cycle (about 100°C) until the panel has dried up completely.
- it improves the adherence to the floor of the cleaning cloths

- the floors are not dampened more than necessary and get dry very rapidly
- it allows the use of any cleaning cloth including the single-use ones
- it has a more effective cleaning and sanitizing action on the surfaces thanks to the high and constant temperature transmitted to the cleaning cloth
- the panel can be easily removed to wash or replace it thanks to the removable frame.

It also shows the following safety features:

- it prevents the direct contact with the hot plate thus avoiding unwanted burns
- when the panel is dry, it remains cold even when the plate is hot and therefore the device can remain on and in the same place on the surface without causing damage to it.

This brief explanation is sufficient to an expert to build the invention and as a consequence, the actual application can show some variations that do not change the substance of the idea.

CLAIMS

1. Cleaner with hot plate for floors composed by one handgrip (1), a handle (2), a tank (3) for containing the water, a main body shaped as a brush (5), into which the handgrip (1) is pivoted preferably by means of an universal joint (4), a heating plate (6) fixed below the body shaped as a brush (5) and provided with an electrical resistance (9) for heating the plate (6) and at least one thermostat (10) for regulating the temperature as well as an electrical supplying cable (7) for such component parts, and composed also by cleaning fabrics (16) for the floor, applied to and supported below said heating plate (6), **characterized in that** said cleaning fabrics (16) are hooked below a sealing frame (13), adapted to be hooked and unhooked below said body shaped as a brush (5), with the interposition of a sandwich panel (12) kept into direct contact with the heating plate (6), and **that** said sandwich panel (12) is composed of at least a layer of polyurethane foam (18) having a suitable thickness and density, placed between two polyester fabrics (17) and coupled thereto, and of a waterproof element (19) applied centrally to the panel (12) onto the surface coming into contact with the heating plate (6), in order to let to drain the water coming from the tank (3), through a connection pipe (25) and at least a central passage (11) of the heating plate (6), in a scattered manner onto the same sandwich panel (12), in such a way that this latter is wetted by the water drained uniformly on to the entire surface thereof and not only in the central point of waterfall; **that** said sandwich panel (12) is adapted to retain the water, by acting as a tank, and to attain in a very short time the same temperature of the heating plate (6), by maintaining the same temperature up to the same panel is dried and namely at approximately 100° C and by transmitting gradually this temperature to the underlying cleaning fabric (16) ; and **characterized in that** said water tank (3) is provided with a plug (21) and a filter (22), into which a ball valve (23) is installed and is operating by gravity, which valve may be displaced from a vertical position thereof, by closing the water passage (24)

from the tank (3) toward the connection pipe (25) and by preventing the sandwich panel (12) to become wet, to an oblique position thereof (23'), by letting free said water passage (24) and allowing the sandwich panel (12) to become wet, and vice versa.

2. Cleaner with hot plate according to claim 1, **characterized in that** said water tank (3) is integral with said handle (2), so that when this latter isn't inclined, said ball valve (23) is displaced in the vertical position thereof, and when said handle (2) is inclined said ball valve (23) is displaced in the oblique position thereof.

FIGURE 1

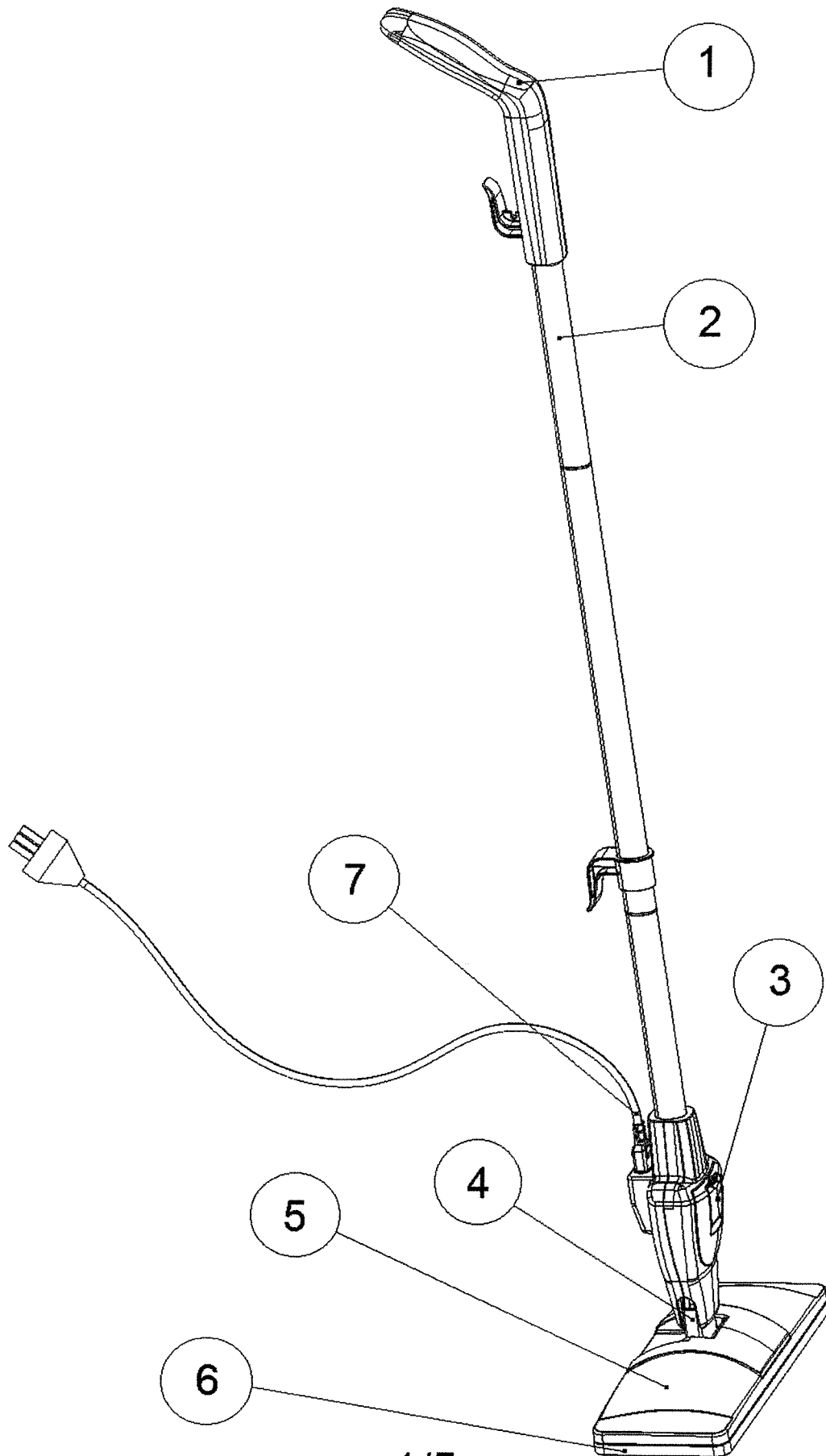


FIGURE 2

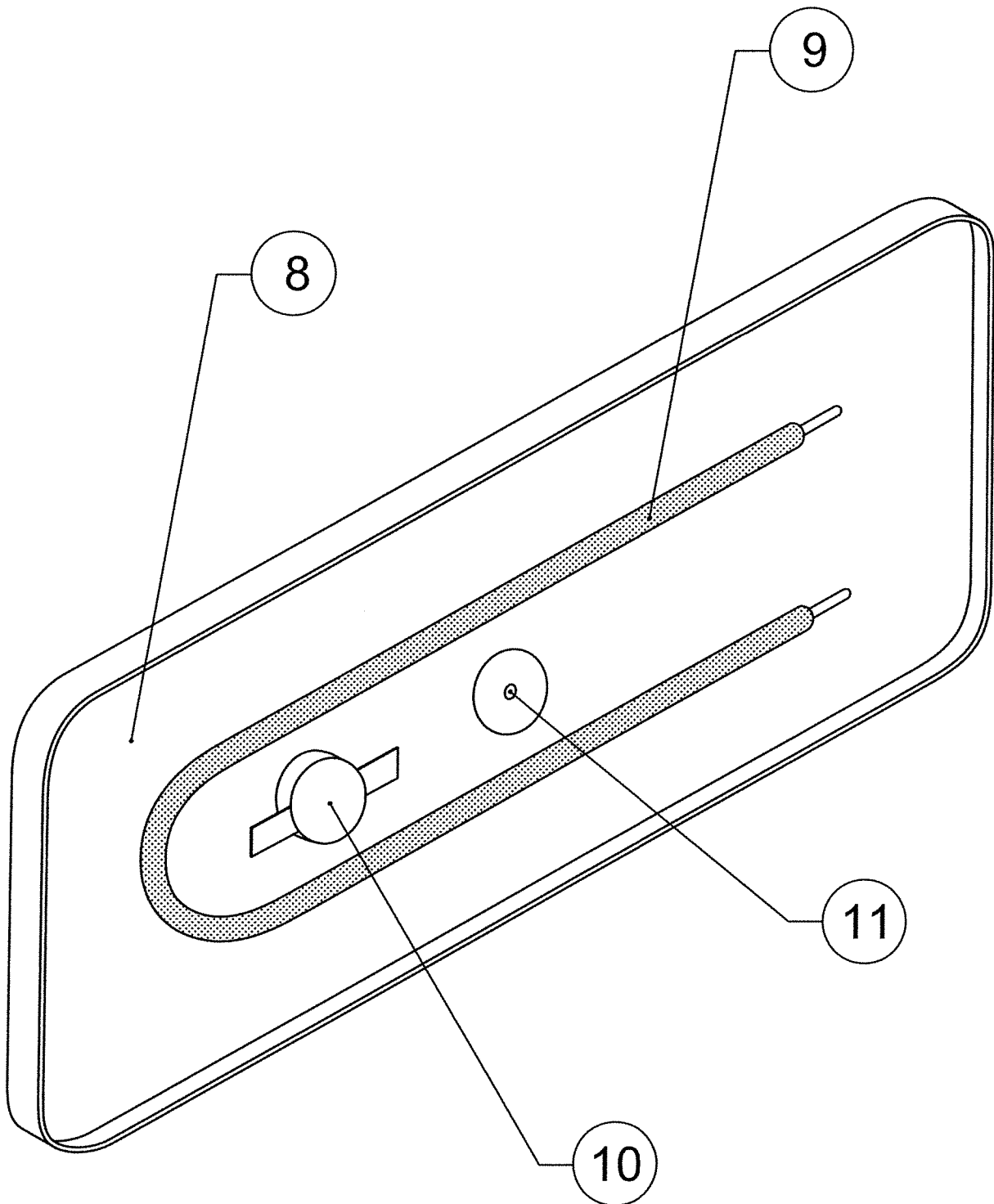


FIGURE 3

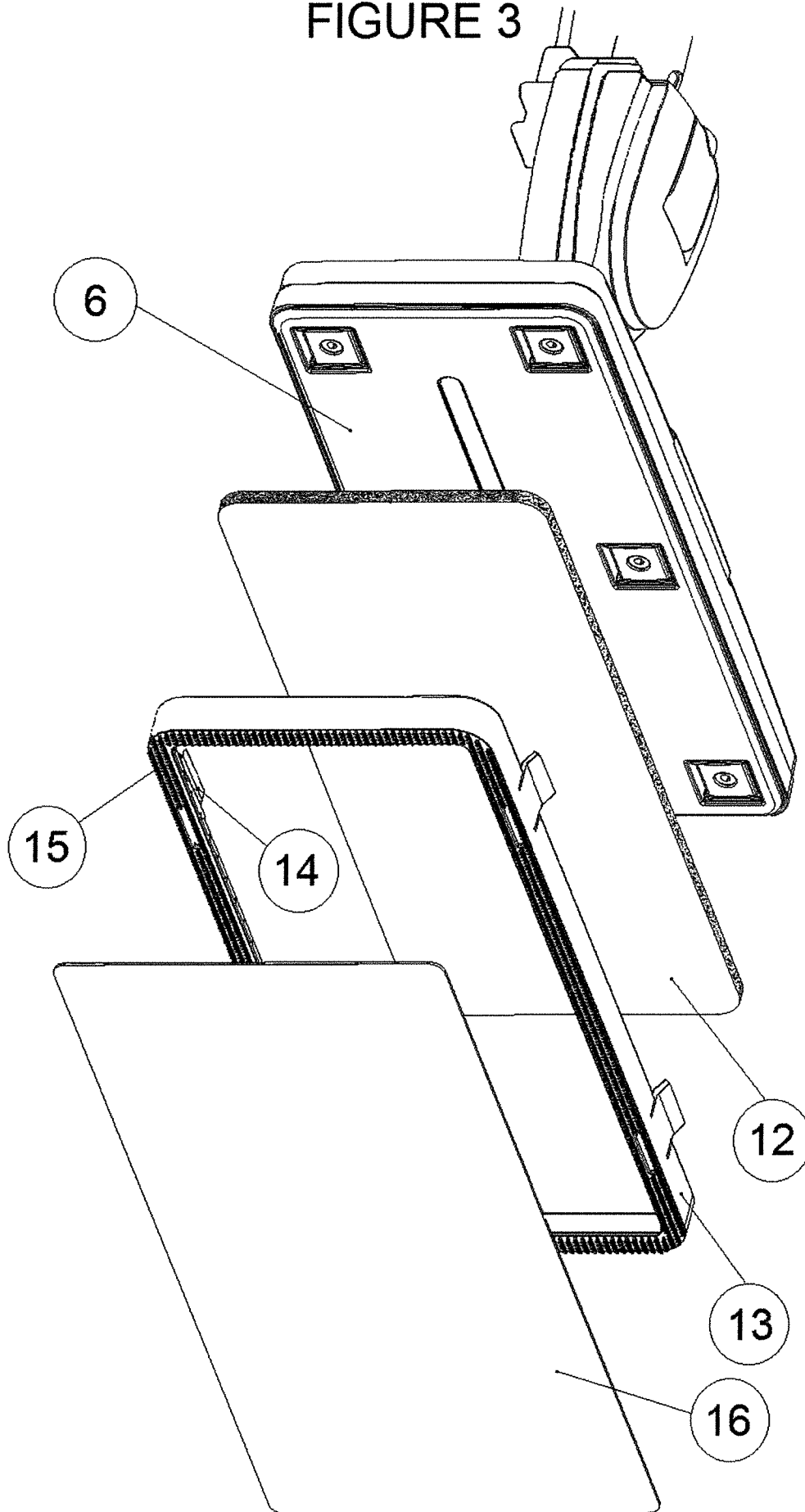


FIGURE 4

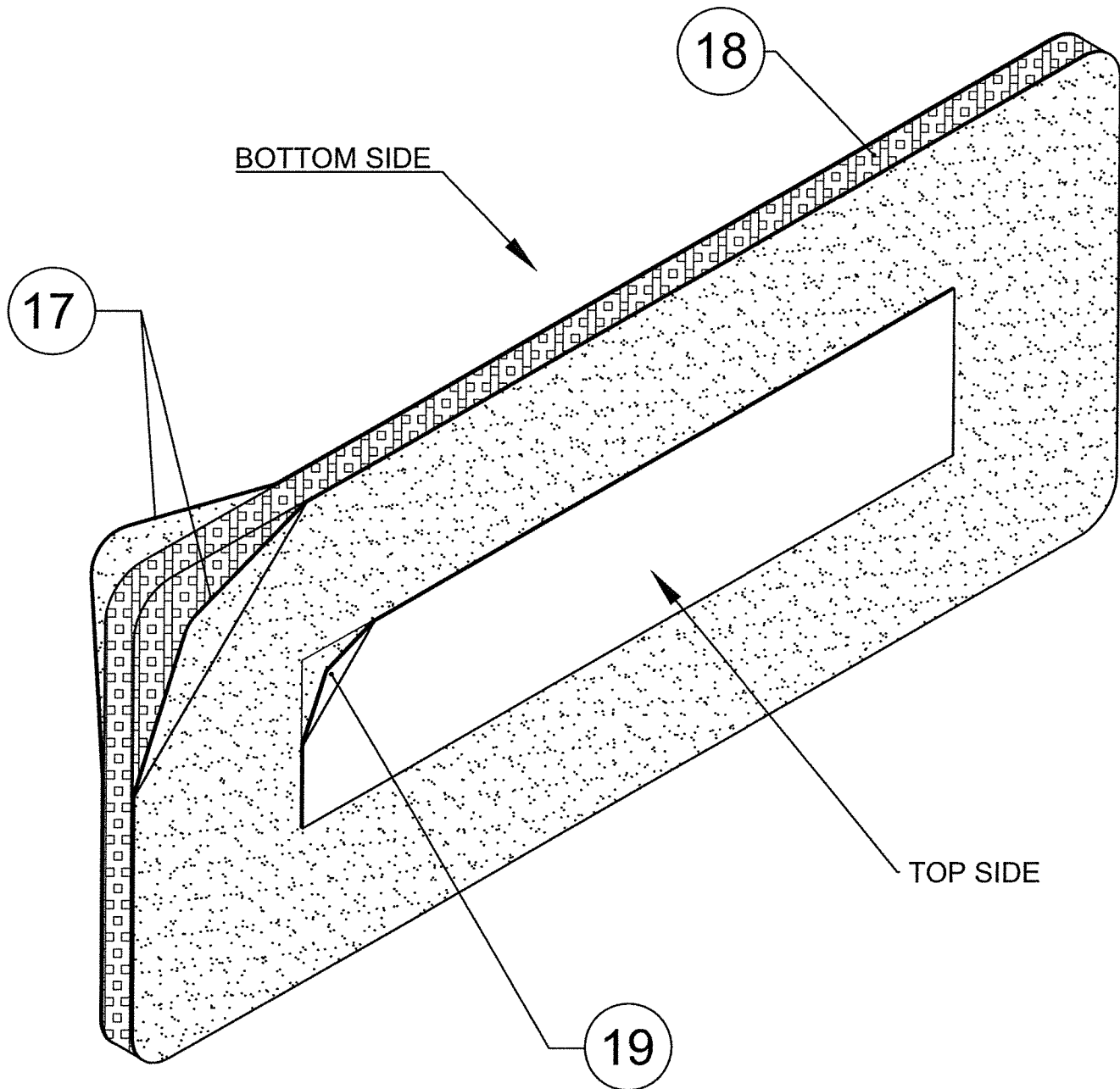
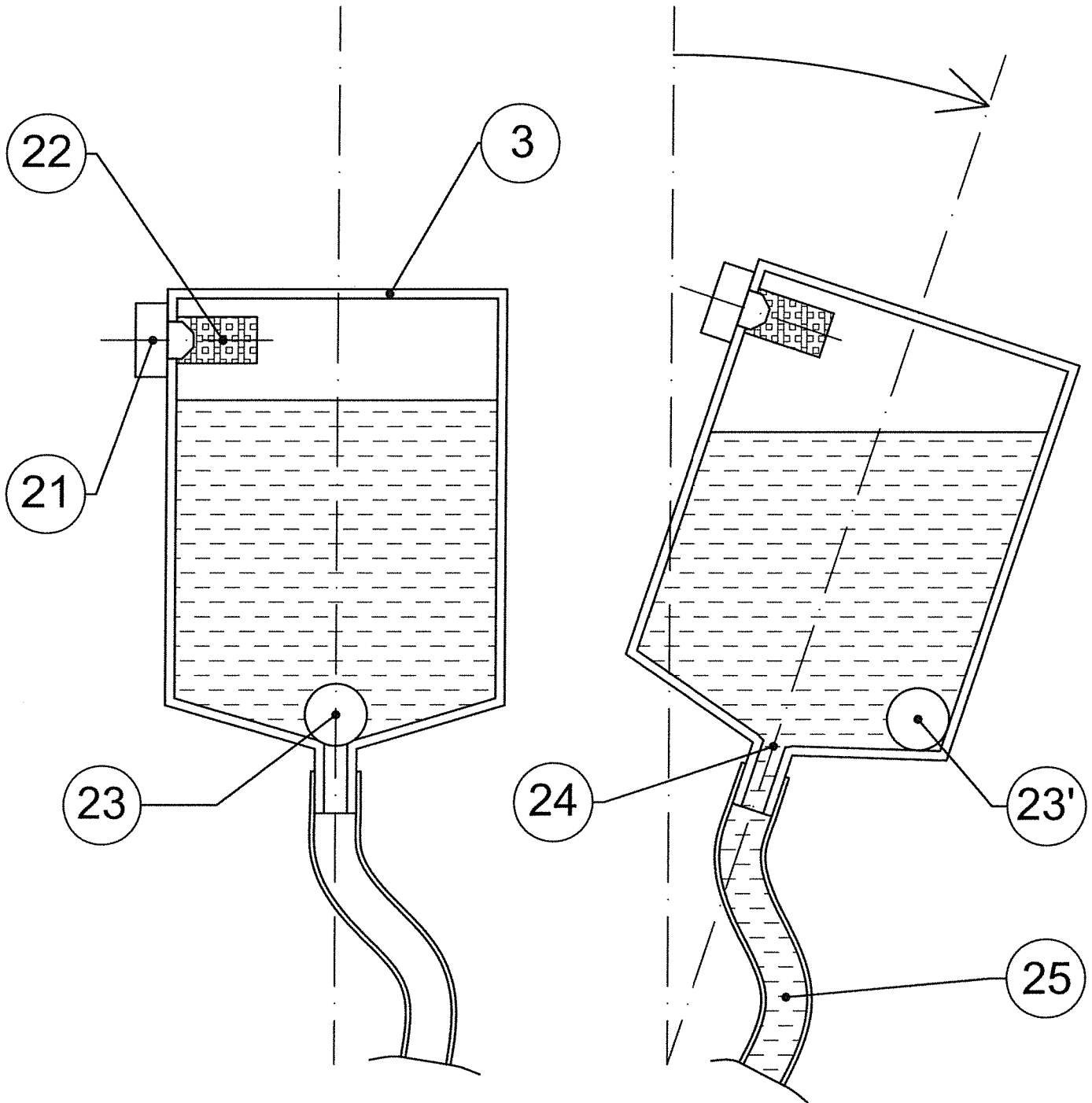


FIGURE 5



INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2017/000051

A. CLASSIFICATION OF SUBJECT MATTER

INV. A47L11/40 A47L13/22 A47L13/24
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2 671 493 A2 (BISSELL HOMECARE INC [US]) 11 December 2013 (2013-12-11) figure 3	1,2
A	US 2014/259478 A1 (CONRAD WAYNE ERNEST [CA]) 18 September 2014 (2014-09-18) figures 1-3	1,2



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

8 August 2017

Date of mailing of the international search report

17/08/2017

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Trimarchi, Roberto

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2017/000051

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2671493	A2	11-12-2013	AU 2013205675 A1 19-12-2013
			CN 103445730 A 18-12-2013
			EP 2671493 A2 11-12-2013
			US 2013318725 A1 05-12-2013
			US 2016353963 A1 08-12-2016

US 2014259478	A1	18-09-2014	NONE
