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(54) **HAND DRYING DEVICE**

(57) A hand dryer device. This device belongs to the type which has a turbine that is activated by a motor that takes in air at room temperature makes it pass through a spiral, expels it at greater speed through an outlet nozzle and is **characterised** because the spiral (1), houses a motor turbine (3) at the beginning (6) of the air inlet area (2) surrounding the centrifuge wheel (4) of the turbine, having a spiral configuration (7) in which the section progressively increases until it connects to the outlet duct (8), and is then finished off with a progressive narrowing (11) that ends with the air outlet nozzle (12). All of this allows the device to have reduced dimensions and consumption and that, in addition takes maximum advantage of the flow-dynamic features.

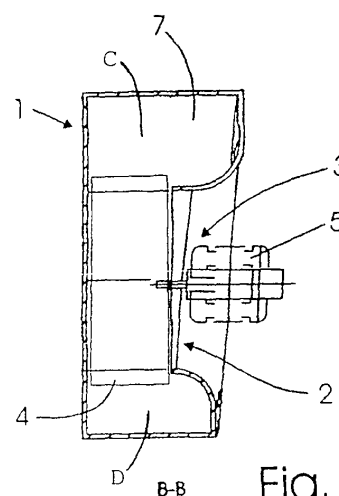


Fig. 3

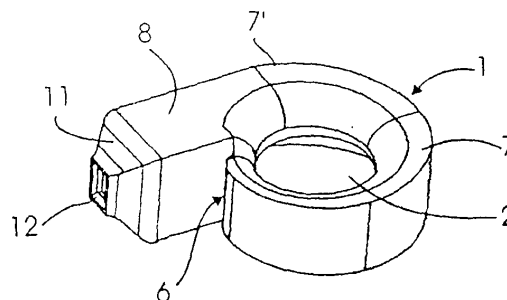


Fig. 5

EP 1 654 971 A1

## Description

### OBJECT OF THE INVENTION

**[0001]** The object of the invention is a reduced sized hand drying device.

### FIELD OF THE INVENTION

**[0002]** This device belongs to the type which has a turbine that is activated by a motor, takes in air at room temperature makes it pass through a spiral followed by an air duct which expels it at great speed through an outlet nozzle. The device has been developed mainly for application as a hand dryer of the type which is installed in the toilets of many companies and in public establishments, and which will be installed, like those already fitted, into a suitable housing made up of a base and a cover, the base being able to be made from a single piece with the spiral or part of same.

### BACKGROUND TO THE INVENTION

**[0003]** The already known devices of said type are generally made up of from a motor with a certain power in order to aspirate and expel the quantity of air that is sufficient to fulfil its objective, said motor producing a specific consumption, likewise being of a specific size that has an effect on the overall size of the device, having, in general, to resort to a complex arrangement that with the object of reducing said sized prejudices the features of same.

### SUMMARY OF THE INVENTION

**[0004]** With the device object of this present invention, the maximum advantage is achieved in terms of the fluid-dynamic features, starting out from reduced dimensions and consumption, at the air inlet to the motor has an arrangement that improves the cooling of same and being characterised mainly by the arrangement of the spiral on the inlet side enabling the entry of air in spite of the reduced size and the locating of the motor-turbine in the air inlet area.

**[0005]** Said spiral arrangement represents a progressive increase of the section size of said spiral from its beginning and surrounds the centrifugal wheel making up the turbine until it connects up with the air outlet, which has a constant section until being finished off with progressive narrowing until ending at the air outlet nozzle.

**[0006]** This outlet nozzle is of a lesser section than the ducting from which it comes, the ducting being made by means of gentle and progressive narrowing without sharp or angular changes to the section through which the air passes.

**[0007]** As an advantage, the air outlet duct is made up of a stretch that is an extension of the spiral and the inside of which shapes, in the part with the constant section, a

chamber into which a heating resistance is fitted so that the air expelled by the device is heated, this chamber minimises the blockage of the air due to the incorporation of said element and brings about the minimum loss of pressure.

**[0008]** After the end of the constant section or 'chamber' some directing vanes are fitted which form a grid, these are placed between the heating resistance and the narrowing of the air outlet, the progressive reduction of the section allows for the progressive channelling of the air and the concentration of same, increasing its speed and thus obtaining, at the outlet nozzle, a concentrated and fast flow of air.

**[0009]** These and other characteristics will be seen more easily from the detailed description that follows, which will make it easier to understand, attached to this present document is a set of drawings of a practical embodiment that is by way of being an example but not limiting, the scope of this present invention.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0010]** In the drawings:

Figure 1 shows a schematic view of a side view of the hand dryer device of the invention, with a cross section as shown by the cross cut line A-A in Figure 4. Figure 2 shows a schematic view of a front view of same without the motor.

Figure 3 shows a schematic view of a transversal section view of the hand dryer device as shown by the cross cut line B-B in Figure 1.

Figure 4 shows a schematic plan view of said device without the motor.

Figure 5 shows a schematic perspective view of same without the motor-turbine equipment.

### DESCRIPTION OF AN EMBODIMENT

**[0011]** In accordance with said figures, the illustrated hand dryer device is made up of a single inlet spiral (1) that on one side has an eccentrically placed area or opening (2) for the room temperature air inlet and, housed in it, a motor-turbine (3) for the aspiration of said air, the centrifuge wheel (4) being fitted, likewise with a single inlet, inside the spiral (1) so that the motor (5) protrudes from it (see figure 3).

**[0012]** The stated opening or area (2) is bent around the periphery of the spiral (1) and has a variable width that, with a greater size at the beginning and less at the inlet to the wheel (4) (drawings 3 and 5), minimises the blockage to the air inlet due to the presence of the motor (5).

**[0013]** The spiral (1) has, from its beginning (6), a spiral arrangement (7) the section of which around the wheel (4) (figure 1) progressively increases in size and, at the end (7'), is connected to a duct (8) from where the aspirated air will exit, said duct being able to be constructed

of (as and how shown) from an extension of the spiral (1).

[0014] Said characteristics are shown with greater clarity in figure 3 where section "C" is bigger than section "D".

[0015] This duct (8) is straight, and has a constant section (that can be rectangular, as shown, or with any other shape) along its entire length, and on the inside forms a chamber (8') with a calming effect that minimises the blockage, in same, of the exiting air due to heating resistance (9) and some transversal and parallel vanes (10') that are fitted into said chamber (figure 1), the latter forming a grid (10) that is fitted between the element (9) and a progressively narrowing area (11) which is connected to the end of the duct (8).

[0016] Said narrowed area, that does not have sharp edges and that, at the end, forms the outlet nozzle (12) for the air, allows the progressive channelling of same and its concentration on the outside, reducing the level of turbulence and minimising pressure losses, the stated outlet nozzle being able to be rectangular (as and how shown) or any other shape.

[0017] As can be understood, the spiral (1) and the wheel (4) can have a double inlet and in whichever case, the device will be fitted into a suitably shaped housing (not illustrated) that will retain its parts and which, by means of same, will be fixed to a wall or facing, said housing being, in the example shown, a flat square vertical base (13) formed by a lateral side expanded from the spiral-duct (1, 8) assembly (figures 1 and 4), said face opposite that of the room temperature air inlet area (2), and the base (13) having suitable openings (14) for the stated fixing.

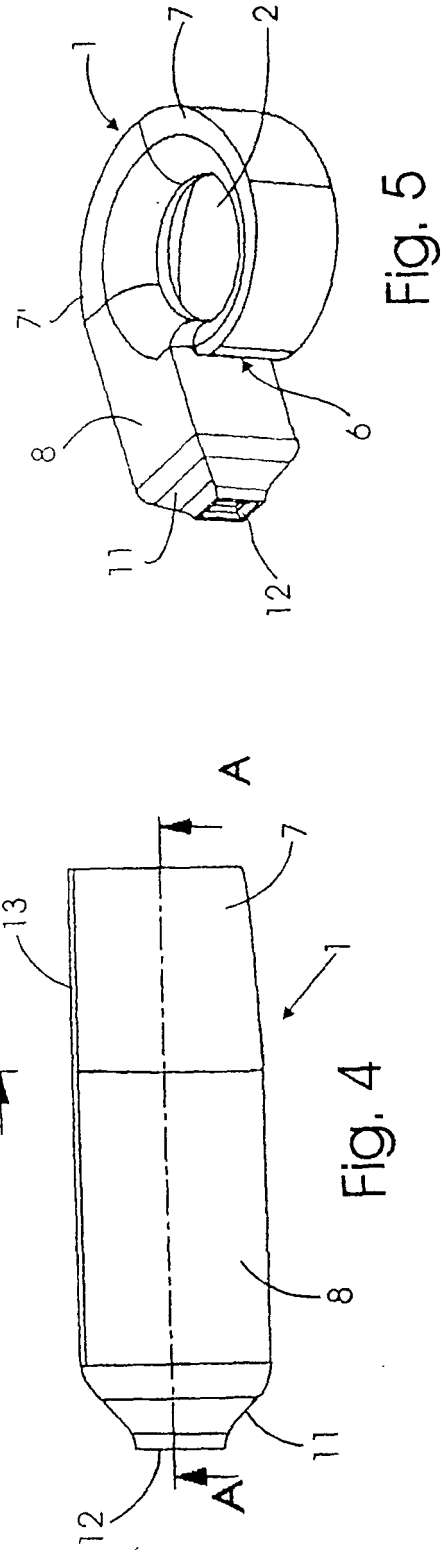
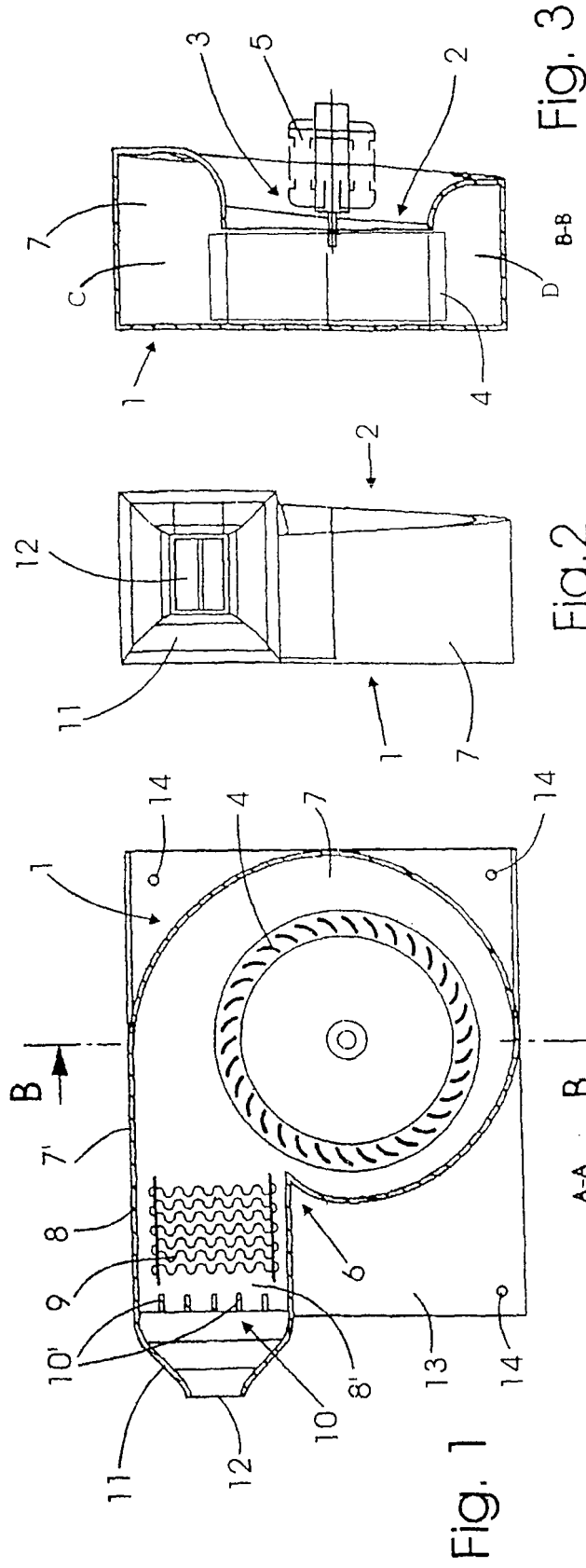
[0018] The invention, within its essential characteristics, can be put into practice in other embodiments that differ only in the detail of that stated solely by way of example and which will equally have the protection claimed.

## Claims

1. A hand dryer device that is comprised of a motor, that works a turbine to aspirate air at room temperature and then passes it through a spiral, that expels it at greater speed through an outlet duct, being **characterised in that** there is a motor-turbine fitted in the air inlet area of the spiral, where the spiral arrangement on the aspiration side from the start and surrounding the centrifuge wheel is formed in such a way that the transversal section of the spiral progressively increases in size until connecting up with the progressive narrowing that ends at the air outlet nozzle.
2. A hand dryer device, in accordance with claim 1, is **characterised** because the outlet duct is made up of a stretch that is an extension of the spiral and has, prior to the narrowing and the consequent outlet nozzle,

a section that is constant throughout its length, the inside of which has a chamber into which an heating resistance is fitted and at the end there are directional vanes in the form of a grid.

3. A hand dryer device, in accordance with claim 2, is **characterised** because the air outlet duct has a smaller section than the ducting through which the air proceeds, making the channelling by means of a smooth and progressive narrowing without sharp or angular changes of the section through which the air passes.



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 2004/000349

A. CLASSIFICATION OF SUBJECT MATTER		
IPC <sup>7</sup> A47K10/48, A45D20/10 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)		
IPC <sup>7</sup> A47K+, A45D+		
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)		
CIBEPAT.EPODOC.WPI.PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP9098908 A (TERANISHI ELECTRIC WORKS) 1997-04-15; (Resumen) [en línea] [Recuperado el 15.10.2004 ] Recuperado de EPO PAJ DATABASE & JP9098908 A (TERANISHI ELECTRIC WORKS) 1997-04-15, todo el documento.	1-3
Y	FR2297387 AB (BOCCARDI CARLA) 1976-08-06; página 2, líneas 3- 25; resumen y figuras 1 y 3.	1-3
Y	US2646629 A (CLEMENS GEORGE ) 1953-07-28; column 1, línea 28 - column 3, línea 26; figura 1.	1-3
A	ES248455 U (ELECTRO JOFEL S.L.) 1980-05-01; página 3, línea 50 - página 4, línea 86 y figuras.	1-3
A	CH298458 A (GERBER KARL) 1954-05-15; todo el documento.	1-3
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 document 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		Date of mailing of the international search report
(15.10.2004)		08 NOV 2004 08.11.2004
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Facsimile No.		Telephone No.

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/ ES 2004/000349

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