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(54) A hand dryer

(57) A hand dryer comprising a body (1) having installed in its inside a motor-blower-resistance assembly (5) suctioning air from an inlet (6) being provided in said body and expelling said air once heated through an outlet (7) also being provided in said body. This dryer is characterized in that it incorporates inside the body (1) a printed circuit board (13) comprising means (14, 15, 16, 17) by means of which the operation of the motor-blower-resistance assembly (5) is controlled, said dryer being thus put in a position to put up a performance of which the known dryers of the same type are incapable. Thus through the action of some (14, 15, 17) of said means the outflowing air temperature is automatically regulated, and by means of all (14, 15, 16, 17) of them the time is limited during which the dryer can be kept in continuous operation each time when used and the activation of its drive and heating unit is inhibited in case of a detection of the presence of undesirable, stationary elements in front of the outlet (7), one of said means (14, 15, 16, 17) totally disconnecting the dryer if its motor (12) is out of order.

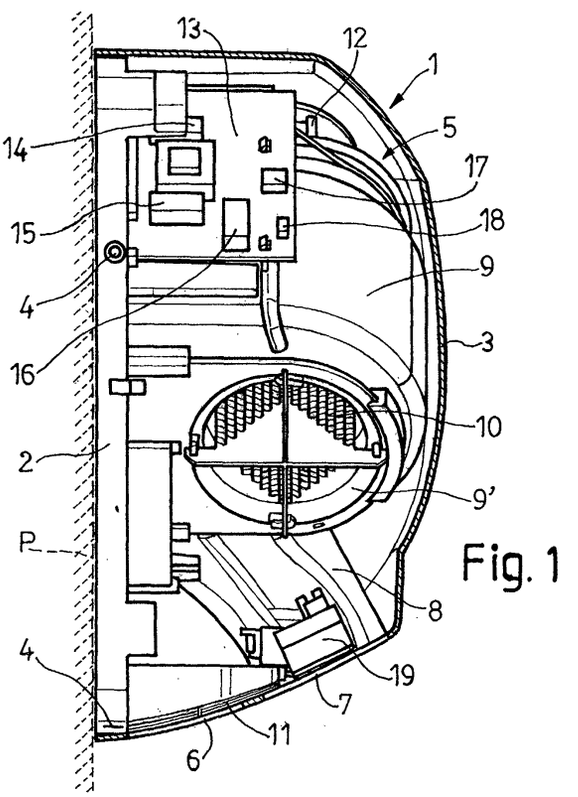

Fig. 1

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Description

[0001] The hand dryer to which the present invention refers is of the type comprising a body having installed in its inside a motor-blower-resistance assembly suctioning air from an inlet being provided in said body and expelling said air once heated through an outlet also being provided in said body.

[0002] As compared with the already existing hand dryers of the aforementioned type the dryer being the object of the invention provides notable advantages deriving from the incorporation inside its body of a printed circuit board comprising means through which the motor-blower-resistance assembly is controlled, the dryer being thus put in a position to put up a performance of which the already existing, above-mentioned dryers are incapable.

[0003] Through the control being exerted by the aforesaid means upon the motor-blower-resistance assembly the temperature of the air flowing out of the dryer is thus automatically regulated after a previous sensing of the ambient temperature by a sensor being provided in the body of said dryer.

[0004] In this way, if said ambient temperature is high the air being supplied by the dryer will be less hot, and if said ambient temperature is low the supplied air will be hotter, whereby the power input will always be made the most of, and the comfort level for the user will always be higher.

[0005] The above-mentioned printed circuit board does besides as well comprise means being provided to limit the time during which the dryer can be kept in continuous operation each time when used thus preventing uncivic actions that could seriously damage the dryer if this latter were to be kept operating for an indefinite period of time.

[0006] Said printed circuit board is on the other hand provided with sensing/decision making means allowing to notify of the presence of stationary targets such as shelves, marble tops, etc. not corresponding to the hands of a possible user and being located in the vicinity of the air outlet of the dryer, in which case said means will inhibit the activation of the drive and heating unit of the dryer.

[0007] The aforesaid printed circuit board does also comprise means being provided to totally disconnect the dryer if the motor is out of order thus preventing the occurrence of damages.

[0008] These and other characteristics will be best made apparent by the following detailed description whose understanding will be made easier by the accompanying sheet of drawings showing a practical embodiment cited only by way of example not limiting the scope of the present invention.

[0009] In the drawings:

Fig. 1 is a lateral elevation of the hand dryer in question with a part of its body corresponding to a cover being shown in a sectional view; and
Fig. 2 illustrates a plan-view from the bottom of said dryer.

[0010] According to these Figures the hand dryer being shown in them comprises a body 1 being made up of a vertical, flat base 2 being provided to be secured to the corresponding wall P and having fitted and/or secured to its front surface the members being innerly comprised by the dryer, and a cover 3 being arranged on these latter members and for such a purpose being fitted at its assembly opening to the contour of the base 2 and being secured to this latter at predetermined locations 4.

[0011] Among the above-mentioned members there is the motor-blower-resistance assembly 5 being provided to suction the air at ambient temperature through openings 6 being provided at the lower portion of the cover 3 and being adjacent to this latter's assembly opening, another opening 7 being provided next to said openings 6 and in a forwardly positioned relationship with respect to them, said motor-blower-resistance assembly being as well provided to expel the hot air through a duct 8 and through said opening 7, said duct being connected to this latter opening and to the outlet of the volute 9, this latter being secured to the base 2 and having installed in its inside the resistance 10 and the blower (not being visible in the drawings) of the motor-blower-resistance assembly 5.

[0012] The body 1 of the dryer does innerly comprise a grating 11 being fitted to the openings 6 and 7 and preventing the access to the inside of the dryer, and the resistance 10 is housed in one of the air inlet openings 9' of the volute 9, in such a way that the blower suctions air through said inlet and expels said air once heated towards duct 8, the motor 12 being externally fitted behind the other opening of said volute 9.

[0013] Also installed on the base 2 is a printed circuit board 13 comprising means such as various components particularly being a microcontroller 17 and electromechanical relays 14, 15 and 16 with which said printed circuit board controls the operation of the motor-blower-resistance assembly 5, the microcontroller 17 incorporating a special software having been previously stored in it, the printed circuit board 13 through said microcontroller and two (14 and 15) of the relays automatically regulating the outflowing air temperature once a sensor 18 being provided in the dryer and being for example fitted to said printed circuit board 13 has sensed the ambient air temperature.

[0014] The printed circuit board 13 does as well limit through the above-mentioned components namely being the microcontroller 17 and the relays 14, 15 and 16 the time during which the motor-blower-resistance assembly 5 can be kept in continuous operation, and through another of these very components totally disconnects the dryer if the motor 12 is out of order.

[0015] By means of these very components 14, 15,

16 and 17 the printed circuit board 13 prevents the activation of the dryer when undesirable, stationary elements not corresponding to the hands of a possible user are being present in front of the air outlet opening 7 of the dryer, this latter as well comprising a detector 19 being installed in its inside in front of a suitable opening 2 being provided in the cover 3 next to the aforesaid opening 7, said detector being apt to notify the printed circuit board 13 of the presence of said elements.

Claims

1. A hand dryer comprising a body (1) having installed in its inside a motor-blower-resistance assembly (5) suctioning air from an inlet (6) being provided in said body and expelling said air once heated through an outlet (7) also being provided in said body; **characterized in that** the motor-blower-resistance assembly (5) is controlled by means (14, 15, 16 and 17) belonging to a printed circuit board (13) being also installed in the inside of the body (1) of the dryer, said means automatically regulating the outflowing air temperature as per the sensing of the ambient temperature being carried out by a sensor (18) being provided in said body.

2. A hand dryer as per claim 1, **characterized in that** the printed circuit board (13) comprises means (14, 15, 16 and 17) which upon receiving the signal from a detector (19) being provided in the body (1) of the dryer prevent the dryer from being activated by the presence in front of its air outlet (7) of undesirable, stationary elements that when sensed would otherwise act as misleading targets.

3. A hand dryer as per claim 1, **characterized in that** the printed circuit board (13) comprises means (14, 15, 16 and 17) being provided to totally disconnect the dryer if the electric motor (12) is out of order and to limit the time during which said dryer can be kept in continuous operation each time when used.

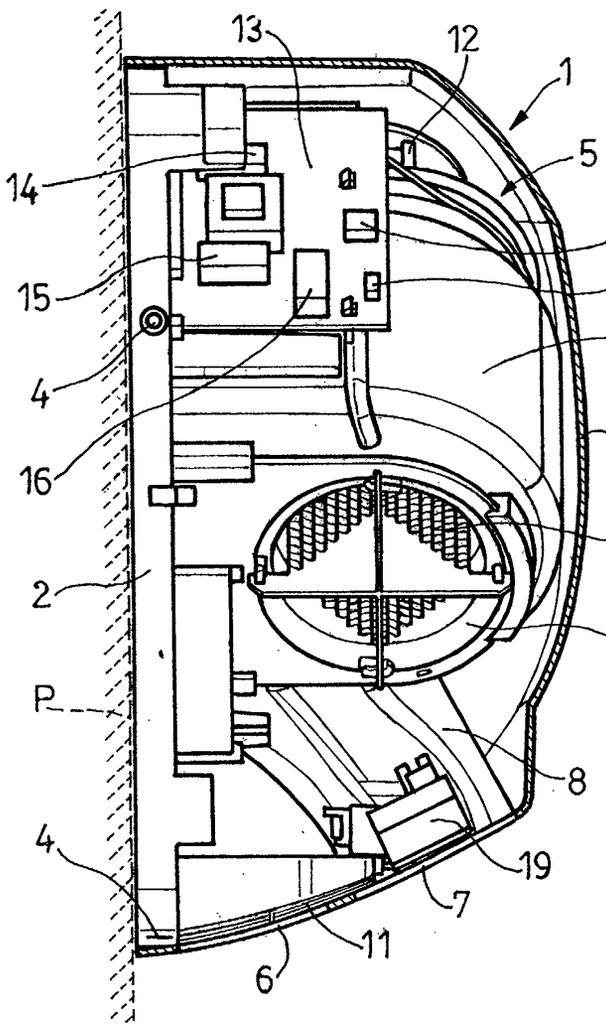

Fig. 1

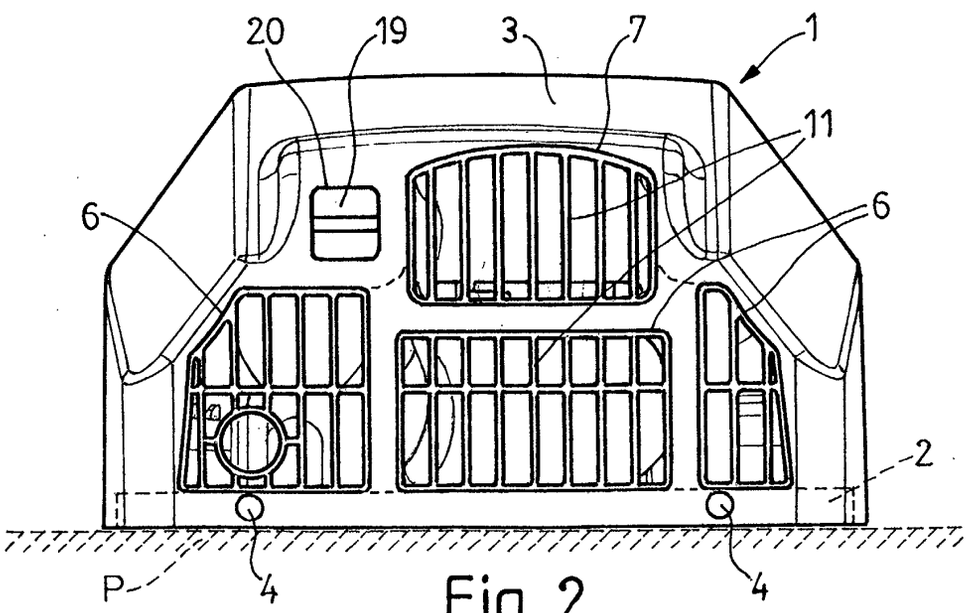

Fig. 2