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(54) **A hand dryer**

Handtrockner

Sèche-main

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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 that under the control of means being provided on a printed circuit board being also installed in the inside of said body is fit to suction air from an inlet being provided in it and to expel said air once heated through an outlet also being provided in it.

[0002] Up to this date the dryers of the aforementioned type such as that of patent EP 0329171 and also although with structural differences that of patent DE 8610579 preceding the former comprise their control board with sensing devices and circuits that when the user puts his or her hands in front of the air outlet of said dryers proceed to activate them during a period of time being sufficient for drying up the hands but not too long in order to avoid wasting electric power and to prevent the occurrence of uncivic actions that could seriously damage them.

[0003] As compared with these already existing hand dryers the dryer being the object of the invention provides notable advantages deriving from the inclusion among the means of the printed circuit board of components such as a microcontroller and several relays allowing the dryer to put up a performance of which the already existing, above-mentioned dryers are incapable.

[0004] Through the control being exerted by some of said components 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.

[0005] 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.

[0006] Furthermore, it is with some of the above-mentioned components that besides limiting the time during which the dryer can be kept in continuous operation each time when used thus preventing the uncivic actions as well totally disconnected if the motor is out of order this hence avoiding the ocurrence of damages.

[0007] From among the aforementioned components the printed circuit board is on the other hand provided with some making up actual 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.

[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 inlet openings 6 being provided at the lower portion of the cover 3 and being adjacent to this latter's assembly opening, another outlet opening 7 being provided next to said inlet 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 outlet 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 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 outlet 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) being controlled by means being provided on a printed circuit board (13) being also installed in the inside of the body (1), said motor-blower-resistance assembly thus suctioning air from an inlet opening (6) being provided in said body and expelling said air once heated through an outlet opening (7) also being provided in said body; **characterized in that** the means being comprised by the printed circuit board (13) include a microcontroller (17) and relays (14, 15) being fit to automatically regulate the out flowing air temperature as per the sensing of the ambient temperature being carried out by a sensor (18) being provided in the body (1).

2. A hand dryer as per claim 1, **characterised in that** the means being comprised by the printed circuit board (13) include the microcontroller (17) and relays (14, 15, 16) which upon receiving the signal from a detector (19) being provided in the body (1) 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, **characterised in that** the means being comprised by the printed circuit board (13) include the microcontroller (17) and relays (14, 15, 16) which besides limiting the time during which the dryer can be kept in continuous operation each time when used are fit to totally disconnect said dryer if the electric motor (12) is out of order.

Patentansprüche

1. Händetrockner, bestehend aus einem Gehäuse (1), in welchem ein Motor-Gebläse-Widerstands-Aggregat (5) installiert ist, das über die Mittel, die auf einer ebenfalls im Gehäuse (1) installierten Leiterplatte (13) vorgesehen sind, gesteuert wird, wobei das Motor-Gebläse-Widerstands-Aggregat die Luft durch eine im Gehäuse vorgesehene Einlassöffnung (6) ansaugt und die erwärmte Luft durch eine ebenfalls im Gehäuse vorgesehene Austrittsöffnung (7) ausstößt, **dadurch gekennzeichnet, dass** die auf der Leiterplatte (13) vorhandenen Mittel einen Mikrocontroller (17) und Relais (14, 15) umfassen, die geeignet sind, die Temperatur der ausströmenden Luft automatisch zu regulieren, und zwar durch Erkennen der Raumtemperatur mit Hilfe eines im Gehäuse (1) vorgesehenen Fühlers (18).

2. Händetrockner nach Anspruch 1, **dadurch gekennzeichnet, dass** die auf der Leiterplatte (13) vorhandenen Mittel den Mikrocontroller (17) und Relais (14, 15, 16) umfassen, die bei Empfang des Signals von einem im Gehäuse (1) vorgesehenen Detektor (19) verhindern, dass der Trockner durch das Vorhandensein von unerwünschten, ortsfesten Elementen, die sich vor seiner Austrittsöffnung (7) befinden und im Falle des Erkennens sonst als irreführende Zielobjekte wirken würden, in Betrieb gesetzt wird.

3. Händetrockner nach Anspruch 1, **dadurch gekennzeichnet, dass** die auf der Leiterplatte (13) vorhandenen Mittel den Mikrocontroller (17) und Relais (14, 15, 16) umfassen, die nicht nur die Zeit begrenzen, während der der Trockner bei jeder Benutzung kontinuierlich in Betrieb gehalten werden kann, sondern auch geeignet sind, den Trockner ganz abzuschalten, wenn der Elektromotor (12) eine Störung aufweist.

Revendications

1. Un sèche-mains comprenant un corps (1) contenant en son intérieur un groupe moteur-souffleur-résistance (5) contrôlé par des moyens installés sur une carte à circuit imprimé (13) également installée à l'intérieur du corps (1), ledit groupe moteur-souffleur-résistance aspirant l'air par une ouverture d'entrée (6) fournie sur ledit corps et expulsant ledit air une fois chauffé à travers une ouverture de sortie (7) également fournie sur ledit corps, **caractérisé en ce que** les moyens compris sur la carte à circuit imprimé (13) incluent un microcontrôleur (17) et des relais (14, 15) installés afin de régler automatiquement la température de l'air provenant de l'extérieur conformément à la détection de la température ambiante réalisée par un capteur (18) logé dans le corps (1).

2. Un sèche-mains comme indiqué dans la revendication 1, **caractérisé en ce que** les moyens compris sur la carte à circuit imprimé (13) comprennent le microcontrôleur (17) et les relais (14, 15) qui en re-

cevant le signal d'un détecteur (19) installé dans le corps (1) évite que le sèche-main soit activé par la présence en face de sa sortie d'air (7) d'éléments indésirables, immobiles qui en les détectant pourraient agir comme des cibles trompeuses.

3. Un sèche-mains comme indiqué dans la revendication 1, **caractérisé en ce que** les moyens compris sur la carte à circuit imprimé (13) comprennent le microcontrôleur (17) et les relais (14, 15) qui, en plus de limiter le temps pendant lequel le sèche-main peut fonctionner de manière continue chaque qu'il est utilisé, déconnectent complètement ledit sèche-main si le moteur électrique (12) est en panne.

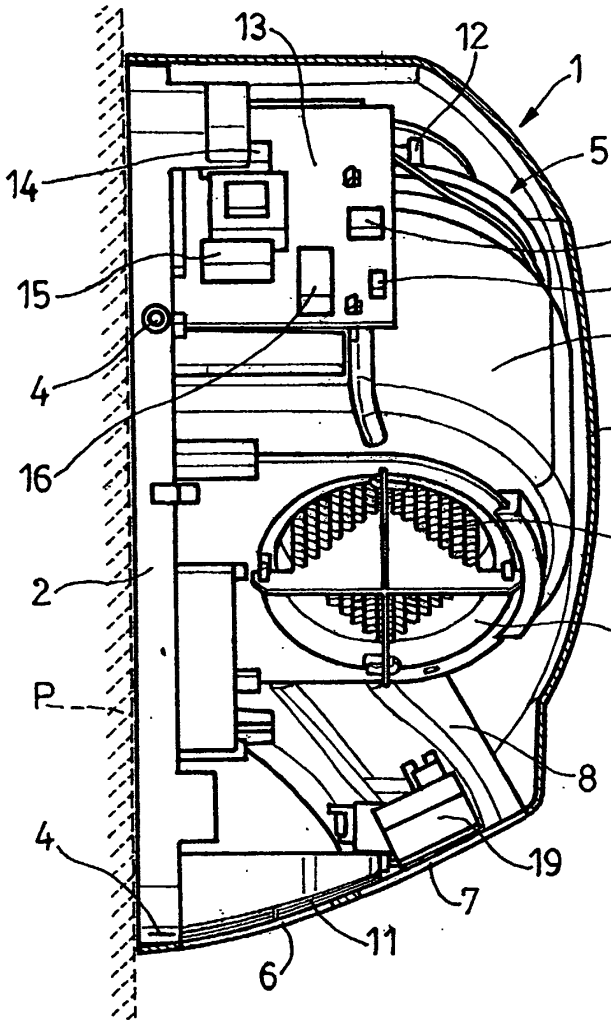


Fig. 1

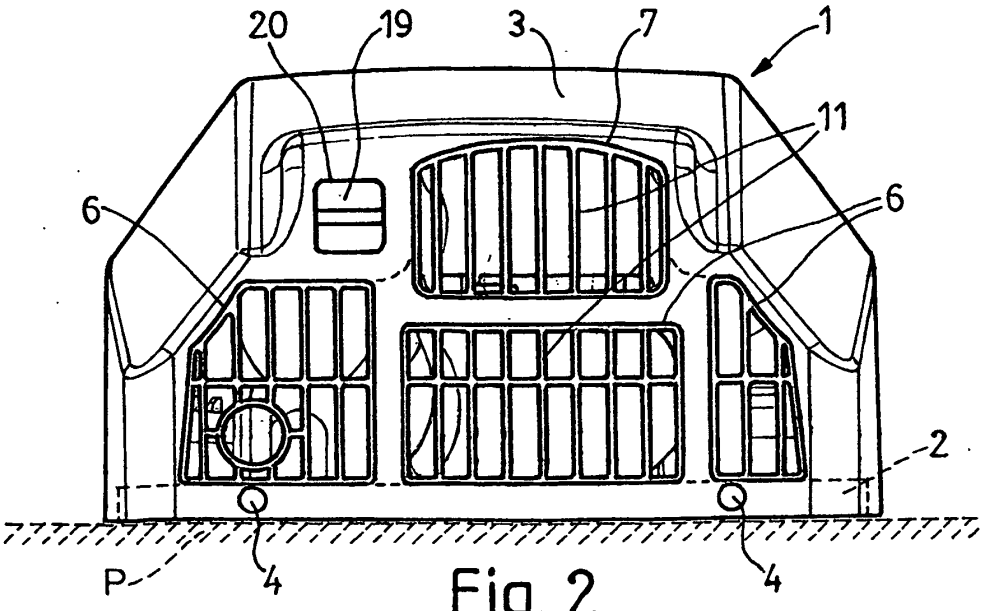


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0329171 A **[0002]**
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