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(11) Publication number:

0 434 169 A2

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 90203455.2

(51) Int. Cl.⁵: D06F 58/04, D06F 39/12

(22) Date of filing: 20.12.90

(30) Priority: 22.12.89 IT 2283189

(43) Date of publication of application:
26.06.91 Bulletin 91/26

(84) Designated Contracting States:
DE ES FR GB GR SE

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(54) Manufacturing method and improved rotary drum clothes.

(57) A method for manufacturing a drying machine having a rotary drum, traversed by dehumidified hot air, designed to contain the material to be dried, in particular clothes, comprises the moulding of a base for said machine with housings integrally formed therein for receiving functional elements of the air circuits of the machine and ducts for connecting them to one another, so as to constitute at least part of the circuits for the generation and circulation of said hot air and for the circulation of air for cooling and condensing the moisture from said hot air.

A machine manufactured according to said method comprises a base (11) with at least one box-shaped housing (12) for receiving a steam condenser (13), a housing (14) for a pump (15) for discharging the condensate forming in said box-shaped housing (12), housings (17, 18) constituting scrolls of air circulating fans, housings for receiving electric air heaters (16), housings for receiving at least one motor (19) for operating said fans and for rotating the drum, ducts moulded integrally with said base also being provided for interconnecting the aforementioned housings.

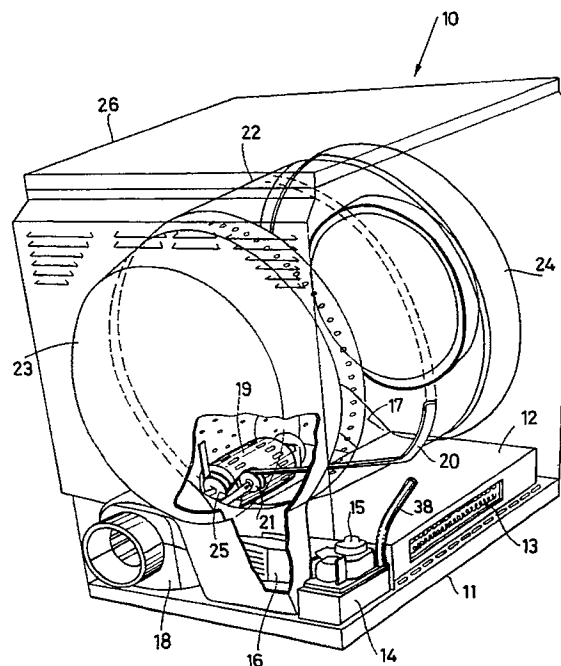


Fig.1

"MANUFACTURING METHOD AND IMPROVED ROTARY DRUM CLOTHES DRYER"

This invention refers to a clothes drying machine of the type with a rotary drum, containing the material to be dried, which is traversed by a flow of hot air.

A machine of this type is usually composed of a bearing structure to which are secured the various functional elements of the machine such as air circulating fans, moisture condensers, heaters, etc. These functional elements are interconnected by suitable ducts which, together with the latter, constitute the air circulating and dehumidifying circuits.

The plurality of elements and connections required to achieve said circuits entails a considerable amount of assembling, resulting in relatively long operating times, a large number of operations to be carried out and a possible source of error by the personnel in charge of the assembling. In the final analysis, the known manufacturing methods are expensive and not wholly efficient. Moreover, due the plurality of fittings existing in the known types of machines, the various connections between them are liable to be shaken loose by the vibrations of the machine, resulting in breakdowns and the need to carry out repairs.

The general scope of this invention is to obviate the aforementioned problems by providing a manufacturing method and a rotary-drum drying machine according to said method with a low number of connections and separate parts in the air circulating, heating and dehumidifying circuits.

This scope is achieved by providing a method, according to the invention, for manufacturing a drying machine of the type having a rotary drum for containing the material to be dried, in particular clothes, traversed by dehumidified hot air, characterized by the fact of comprising the moulding of a base for said machine having, integrally formed therein, at least one box-shaped housing to receive a steam condenser, a housing for a pump for discharging the condensate forming in said box-shaped housing of the condenser, housings constituting scrolls of air circulating fans, housings for electric air heaters, housings for at least one motor to operate said fans and to rotate the drum, said method also comprising the moulding of ducts integral with said base for interconnecting the aforementioned housings to form at least part of circuits for generating and circulating said hot air and for circulating air for cooling and condensing the moisture from said hot air.

Moreover, by applying such method, a drying machine is also provided of the type having a rotary drum which holds the material to be dried, in particular, clothes, and which is traversed by dehumidified hot air, characterized by the fact of

comprising a base for said machine having, integrally formed therein, at least one box-shaped housing to receive a steam condenser, a housing for a pump for discharging the condensate forming in said box-shaped housing of the condenser, housings constituting scrolls of air circulating fans, housings for electric air heaters, housings for at least one motor to operate said fans and to rotate the drum, ducts integrally moulded with said base being also provided for interconnecting the aforementioned housings to form at least part of circuits for generating and circulating said hot air comprising the heater and the steam condensing path of said condenser, and at least part of circuits for circulating air for cooling and condensing the moisture from said hot air comprising an intake for collecting cold air from the outside and the path for cooling said condenser.

The innovatory principles of this invention and its advantages with respect to the known technique will be more clearly evident from the following description of a possible exemplificative embodiment applying such principles, with reference to the accompanying drawings, in which:

- figure 1 shows a schematic perspective view of a drying machine made according to the invention;
- figure 2 shows an exploded schematic perspective view of the base of the drying machine of figure 1;
- figure 3 shows a partial cutaway view along the line III-III of figure 4;
- figure 4 shows a partial cutaway view along the line IV-IV of figure 3.

With reference to the figures, a drying machine made according to the innovatory principles claimed herein and generically indicated by reference 10 in figure 1, comprises a base 11 on which are obtained by moulding in one piece (as can also be clearly seen in figure 2) a box-shaped housing 12 for an air-type steam condenser 13 of known technique, a housing 14 for a suction pump 15 for liquids, a housing 39 for connecting an electrical resistance heating unit 16, scrolls 17 and 18 for air circulating fans, driven by a motor 19 secured to said base and having a pulley 25 keyed onto its shaft which controls the rotation of a drum 22, containing the clothes to be dried, by means of a circumferential belt 20 tightened by means of a tightening pulley 21. The drum is provided at both ends with air conveying shells 23 and 24 the first of which is connected from below to the heating unit 16 and the second, for example semitoroidal in shape to enable the material to be dried to be introduced into the drum, is connected from below

to the suction inlet of the scroll 17. For the sake of clarity the drum 22 has been drawn in figure 1 (likewise to the casing 26 of the machine) in transparency.

As can be seen in figure 2, the scrolls 17 and 18 are advantageously made in one piece composed of two half shells connected by means of pliable seams 27 and 28 respectively.

Thus, after having positioned the motor 19 coaxially supporting the blades 29 and 30 constituting the two fans, the scrolls can be closed by simply turning over the upper half shells along the two seams 27 and 28 respectively. The half shells are locked in place for example by means of clips which snap onto the contacting edges. Since these clips can be of any known type they are neither shown nor further described. The half shells can alternatively be joined together by glueing or by means of screw fasteners. As can also be seen in figure 1 and figure 3, the steam condenser supports baffles 31 and 32 and a closing wall 33 so as to form, when inserted in the box-shaped casing 12, air circulating circuits.

In particular, as can be clearly seen in figure 3, two main circuits are obtained. The first, whose path is indicated by the letter "a", conveys air, which is made to move by the rotation of the fan composed of the scroll 17 and the blades 29, through the condensation path inside the steam condenser 13, then through the heater 16 and then on, through the shell 23, to the suitably perforated drum 22, passing through it and then returning, through the shell 24, to the fan 17, 29 and then recommencing the cycle.

The second air circulating circuit, which is indicated in figure 3 by the letter "b", conveys air, sucked in from the outside through the inlet 34 of the fan composed of the scroll 18 and the blades 30, through the cooling path of the condenser 13, said path being disposed at right angles with respect to its condensation path forming part of the circulating circuit "a".

After having passed through the condenser, the air of the "b" circuit is discharged into the environment through an aperture 35 and slits 36 in the base.

When the motor 19 is operated, the drum 22, drawn by the belt 20, begins to rotate and the two fans 18, 30 and 17, 29 generate said forced air circulations, so that the air heated by the unit 16 passes through the drum removing the moisture contained in the material to be dried and then passes through the condenser 13, cooled by the air from the inlet 34, so as to condense the moisture which drops onto the suitably sloped bottom 37 of the casing 12 and is then conveyed into the collection tank 14 housing the pump 15 which discharges it through a duct 38 to the outside of the machine.

The blades 29 and 30 are advantageously shaped together with their respective scrolls so as to constitute reversible fans so that the flow of air generated always moves in the same direction regardless of the direction of rotation of the blades. In this way, the motor 19 can be alternately made to rotate for a certain length of time in one direction and for a certain length of time in the other direction, thereby preventing the clothes being dried from becoming tangled and at the same time improving the efficiency of the drying action, as will be clearly evident to any technician expert in the field.

In addition to that heretofore described, the drying machine made according to the invention obviously comprises all the other devices of known technique necessary to operate a machine of this type. For example, it will be provided with thermostats, programmers, water level sensors in the tank 14 operating the pump 15, suspension means for the rotary drum, doors giving access to the latter, etc.

Since these further devices are of known technique and of widespread use, they are neither described nor shown herein since they are well known by the technician who will easily imagine their disposition and connection inside the machine described above. Moreover, the precise internal conformation of the moulded scrolls will be made according to the normal experience of the technician insofar as the production of fans of the aforesaid type is concerned.

It has not therefore been considered necessary to give a detailed drawing of the scrolls which are easily imaginable by the technician.

It can be seen that the intended scope of incorporating numerous parts of a rotary-drum drying machine into a unit integrated with the base of the machine, thereby drastically reducing the number of fitting and connecting operations necessary for assembling the machine, has thus been achieved.

The foregoing description of a machine applying the innovatory principles of this invention is obviously given by way of example in order to illustrate such principles and should not therefore be understood as a limitation to the sphere of the invention claimed herein.

For example, the baffles 31 and 32 supported by the condenser can if required be moulded in one piece with the inside of the casing 12.

Moreover, the drive system between the motor and the drum can be made according to other known techniques; for example with friction rollers mechanically connected to the motor and disposed in contact with the outer circumferential wall of the drum.

Rollers can also be provided, with bearings

moulded directly into the base 11 to partially or fully support the drum.

Lastly, the disposition and shape of the various elements moulded in the base is not restrictive. Depending upon the available dimensions of the various elements and those desired for the complete machine, they can be made with other dispositions and shapes as will be undoubtedly clear to the technician. For example, the housing for the heating unit 16 can be made in the form of a box-shaped casing into which the unit can be inserted, in the same way as the housing for the condenser 13.

The base including the various parts of the machine can be advantageously made by means of the technique known as blow moulding and subsequently machined to obtain the various slots.

Claims

1. Method for manufacturing a drying machine of the type having a rotary drum for containing the material to be dried, in particular clothes, traversed by dehumidified hot air, characterized by the fact of comprising the moulding of a base for said machine having, integrally formed therein, at least one box-shaped housing to receive a steam condenser, a housing for a pump for discharging the condensate forming in said box-shaped housing of the condenser, housings constituting scrolls of air circulating fans, housings for electric air heaters, housings for at least one motor to operate said fans and to rotate the drum, said method also comprising the moulding of ducts integral with said base for interconnecting the aforementioned housings to form at least part of circuits for generating and circulating said hot air and for circulating air for cooling and condensing the moisture from said hot air.
2. Drying machine of the type having a rotary drum into which the material to be dried, in particular clothes, is introduced, and which is traversed by dehumidified hot air, characterized by the fact of comprising a base for said machine with integrally formed therein at least one box-shaped housing to receive a steam condenser, a housing for a pump for discharging the condensate forming in said box-shaped housing of the condenser, housings constituting scrolls of air circulating fans, housings for electric air heaters, housings for at least one motor to operate said fans and to rotate the drum, ducts integrally moulded with said base being also provided for interconnecting the aforementioned housings to form at least part of circuits for generating and circulating said

hot air comprising the heater and the steam condensing path of said condenser, and at least part of circuits for circulating air for cooling and condensing the moisture from said hot air comprising an intake for collecting cold air from the outside and the path for cooling said condenser.

3. Machine as claimed in Claim 2, characterized by the fact that the scrolls are two in number, one inserted in said hot air generating and circulating circuit and one inserted in said cooling air circulating circuit.
4. Machine as claimed in Claim 2, characterized by the fact that the housings forming said scrolls each comprise two half shells made in one piece in a substantially flat position side by side and joined by a pliable portion so as to enable the overlapping and mating of their complementary edges to form the complete scrolls when said pliable portions are bent, said half-shells being permanently couplable together by reciprocal fastening means.

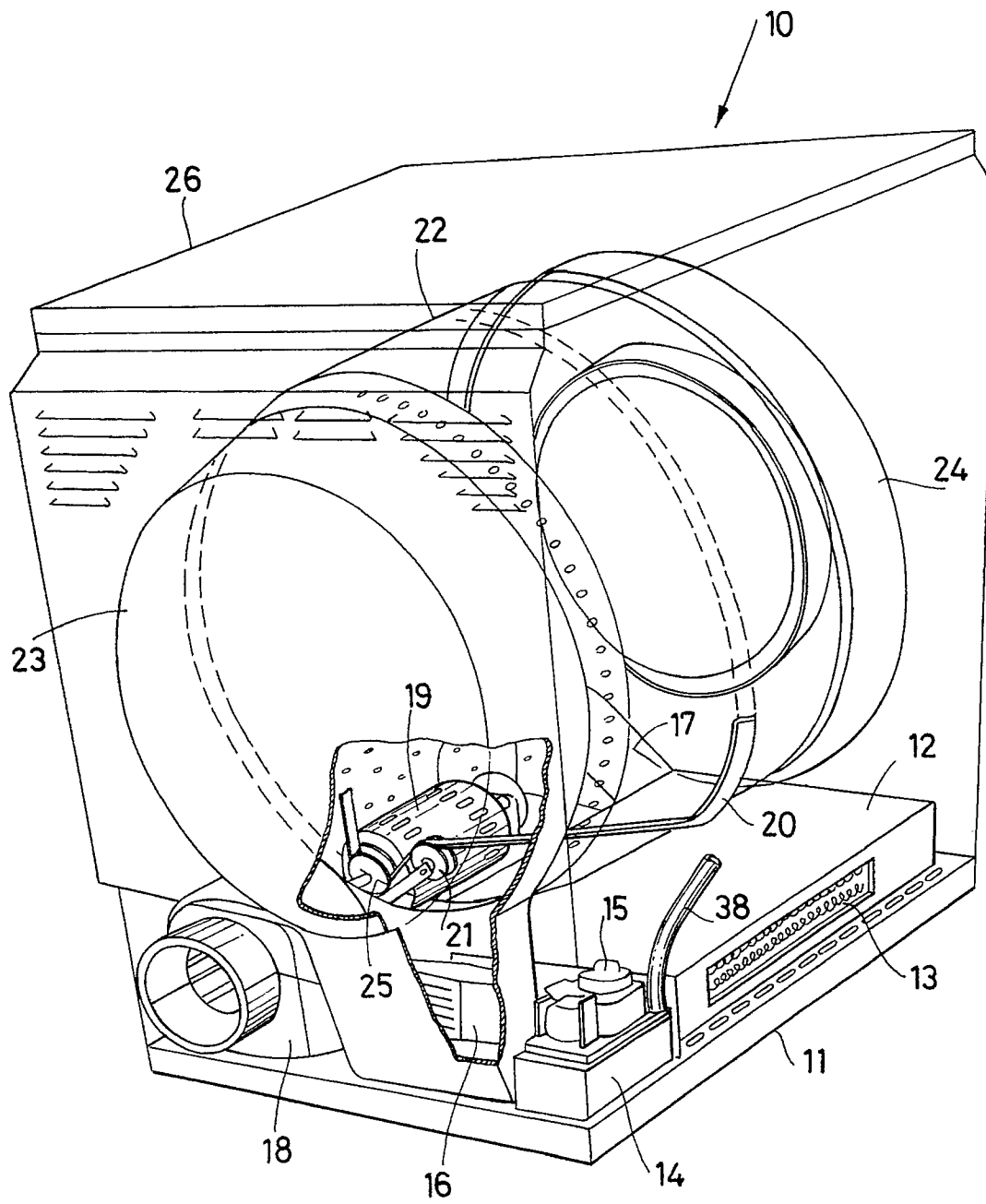


Fig.1

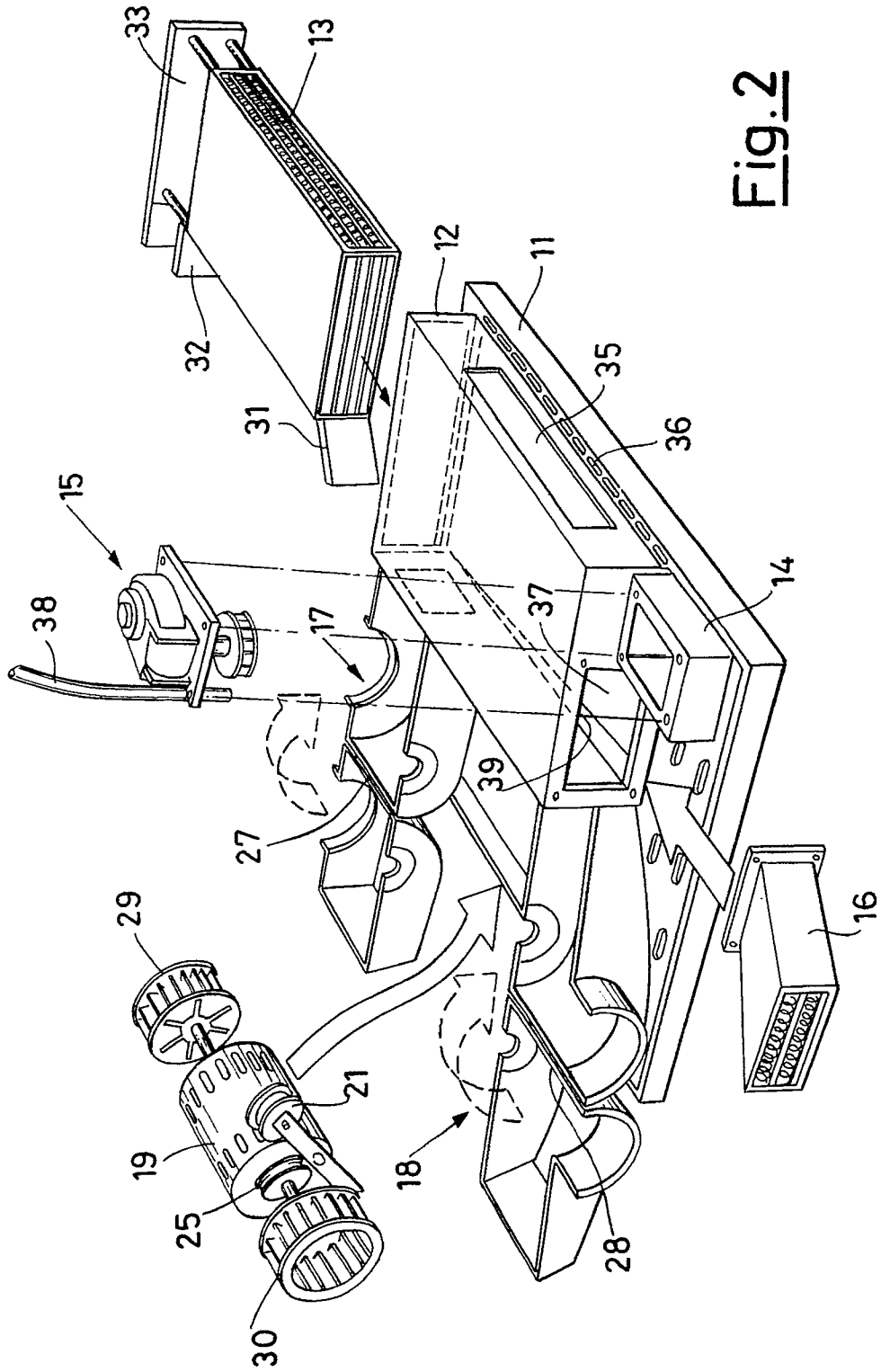


Fig. 2

Fig.3

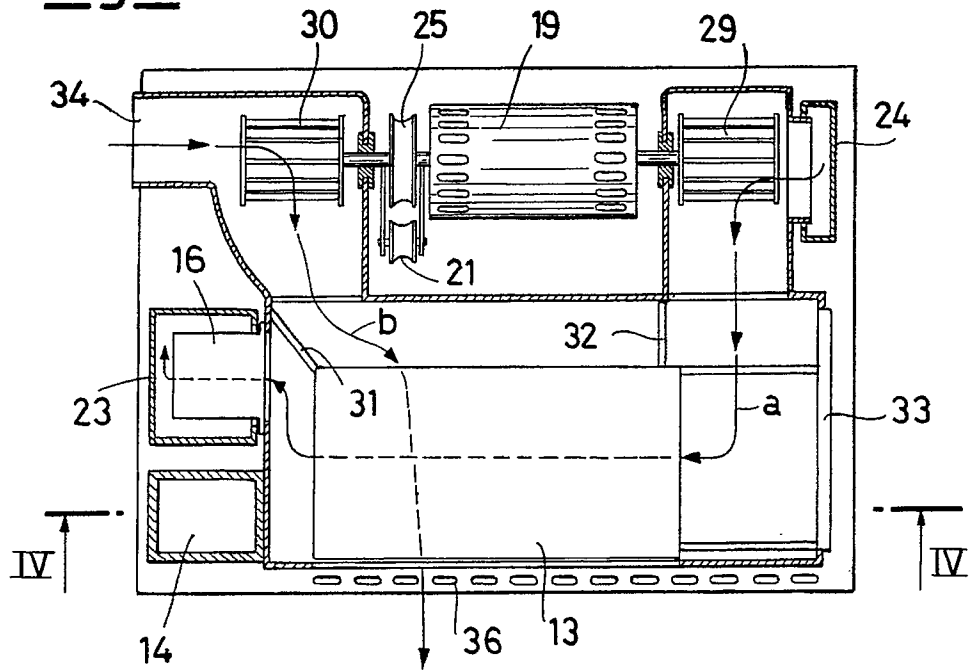


Fig.4

