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(54) **Device for ironing and drying fabrics simultaneously**

(57) The present invention refers to a device (1) for the ironing and simultaneous drying of fabrics and articles of clothing in general and comprising;

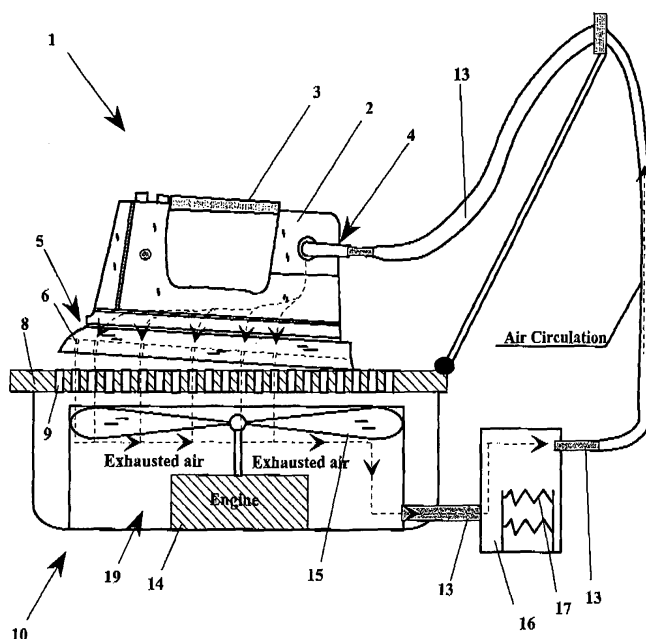
- An iron (2) comprising at least an inlet section (4) for a fluid and at least an outlet section (5) for said fluid;
- Means (19) for moving the fluid from the inlet section (4) towards the outlet section (5),

the device (1) further comprises a support surface

(8), on which the fabric or article of clothing to be ironed/dried is placed.

Said support surface comprises a plurality of openings (9) passing through the entire section of said surface (8), configured in such a way as to result opposed when used to the section (5) of the iron (2), so that the fluid coming out from the section (5) passes through the section of the support surface (8).

Fig. 1



Description

Technical Field

[0001] The present invention refers to the technical field relative to the treatment of fabrics in general, particularly for articles of clothing.

[0002] In particular, the invention refers to an innovative device that allows the simultaneous ironing and drying of articles of clothing.

Background Art

[0003] As it is well known, every time fabrics and articles of clothing in general are washed, it is necessary to dry them afterwards. For that purpose, the laundry is generally hanged out outdoors using suitable drying racks or washing lines and it is ironed only afterwards.

[0004] Nevertheless, it is quite usual to have no possibility of making use of wide spaces in the open. This is the case of flats in big cities, which not always have balconies. Moreover, balconies are sometimes in areas that are too much exposed to pollution and for this reason, people prefer to dry the laundry in other ways. The simplest way is using indoor drying racks. This solution, however, evidently presents significant inconveniences. First of all, it takes much more time for the laundry to dry and, in addition, it becomes impregnated with strong smells easily (for example, kitchen smells), which many times results unpleasant.

[0005] In other cases, washing-machines or other devices predisposed also for drying are used, for example that use hot air injection. But significant inconveniences are evident in this case as well. For example, in the case of washing machines that dry, it is known that these machines consume huge quantities of electric current, which means electricity bills for extremely high amounts. Moreover, the laundry never dries completely, being contained and tangled in the closed drum of the washing-machine. In addition to this, many times the laundry is extremely crumpled once the drying is over, thus making the subsequent ironing difficult and long.

[0006] It is therefore sought to avoid the inconvenience with other types of devices for drying more or less complex. For example, it is usual to find boxes in the market within which hot air with a certain degree of dampness is injected. Despite the good quality of the final result, there are many inconveniences in this case too. Such devices require a huge amount of electric current to work and moreover, they are extremely cumbersome, difficult to assemble and expensive. Last, it is always necessary to iron the laundry anyway once the drying is over.

[0007] Patent No. PD2001A000206 in the name of Bettella Manuela describes an apparatus that tries to overcome all the above-mentioned inconveniences.

[0008] It is basically an iron that comprises an air suction apparatus that exhausts the air through slits (B). In particular, a starter motor operates a fan (V) that exhausts

the air, while resistances placed downstream of the fan suitably heat the air. The hot air exits with a pre-determined pressure through the holes made on a plate (S), thus allowing the drying and simultaneous ironing of the article of clothing.

[0009] Nevertheless, this solution presents various inconveniences as well. First of all, the air outlet pressure cannot be excessively high, otherwise it would cause the lifting of the iron itself in respect to its support surface (ironing board) in a dangerous manner for the user. Moreover, the hot steam that rebounds on the ironing board can dangerously hit the face or the body of the user, causing him/her burns, even serious ones.

[0010] Most of the hot air given out by the iron dissipates through the lateral areas of the plate and only a part of it will be in contact with the article of clothing for the drying. In particular, the hot air cannot totally pass through the fibres of the fabric but, instead, follows a path that is tangential to the article of clothing towards the lateral areas of the plate, thus making the device not much functional. All this significantly increases the time of use to complete the operation of drying and ironing with a consequent increase in costs and inconveniences for the user.

[0011] Moreover, always during the ironing, the hot air is not recovered for re-use but is each time exhausted from the outside and completely dissipated in the environment. The whole is to the detriment of the heating system of the circulating air, which must always heat new inletting air. This implies a suitably powerful system, which always functions at full speed and which consumes much electric current.

[0012] Last, being all the air suction and heating systems integrated within the iron itself, it becomes very heavy and difficult to handle. Precisely for the purpose of containing the weights, air suction and heating systems are often realized in very reduced dimensions, with a consequent efficiency decrease of the device itself.

Disclosure of Invention

[0013] It is therefore the aim of the present invention to provide a new ironing/drying device that overcomes all the above-mentioned inconveniences.

[0014] In particular, it is the aim of the present invention to provide a device that is able to give out large quantities of air and, at the same time, of maintaining contained the weights of the iron and the consumption in general.

[0015] It is also the aim of the present invention to provide a device that is able to operate an efficient drying, avoiding dangerous rebounds of the iron and useless lateral leaks of the drying air in respect to the ironing board.

[0016] These and other aims are reached by the present device (1) for the ironing and the simultaneous drying of fabrics and articles of clothing according to claim 1.

[0017] In accordance with the invention, the device

therefore comprises an iron (2) having at least an inlet section (4) for a fluid, at least an outlet section (5) of the fluid and means (19) for moving the fluid from the inlet section (4) towards the outlet section (5).

[0018] The fluid that exits from the iron 2 when used therefore hits the ironing board 8 (that is the support plane 8) on which the ironing is carried out.

[0019] However, the support plane (8), on which the fabric or the article of clothing to be ironed is laid, has a plurality of openings (9) that pass through the entire thickness of the surface (8) itself and are configured in such a way as to result opposed to the section (5) of the iron (2) itself when used.

[0020] Thus, the fluid that exits from the iron is able to pass through the thickness of the ironing board 8 entirely, obtaining a double effect. The first one concerns the efficient drying of the fabric and its simultaneous ironing, since the fabric, being interposed between iron 2 and support 8, is entirely passed through by the flow jet (for example, hot air). The second effect refers to the fact that such a solution completely solves the problems of rebound of the iron on the ironing board. The thrust of the out-coming flow from the iron, in fact, is now dampened by the presence of the pass-through holes 9 of the surface 8, allowing the use of more powerful flows at the same time.

[0021] Moreover, the solution using the holed support with pass-through holes further allows to reduce to the minimum the lateral leaks, making the drying even more efficient.

[0022] Advantageously, a recovery chamber (10) comprising the support surface (8) can be provided so that the fluid out-coming from the section (5), and passing through the surface (8), can be collected inside the chamber.

[0023] Thus, a flow recovery is obtained, for example of air, used for the drying.

[0024] In order to conveniently re-use the air coming into the chamber 10, this can conveniently be connected to a return circuit-path (13) configured in such a way as to conduct the recovered fluid within the chamber (10) towards the inlet section (4) of the iron (2) in such a way as to realize an essentially closed circulation of the fluid.

[0025] Thus, the fluid circulates along a closed circuit that goes from the inlet section 4 towards the outlet section 5 through a first circuit 7 and from here, once entered within the chamber 10, in return again within the inlet section 4 through the second return circuit constituted by the return circuit 13.

[0026] Advantageously, the means (19) for moving the fluid along the entire circuit can be arranged within the recovery chamber (10) in such a way as to face the support surface (8) and thrust the fluid along the said closed circulation.

[0027] Thus, such a solution advantageously allows to significantly reduce the weights of the iron, making it easier to handle. It also gives the possibility of freely increasing the dimensions and the power of the means 19 used.

[0028] Among the different possible solutions, the means (19) can comprise at least a turbine (15).

[0029] Advantageously, means of operation (14) of the turbine are further foreseen.

5 [0030] The means of operation (14) can also comprise a simple starting motor, for example.

[0031] Advantageously, the recovery chamber comprises lateral walls (11) arranged so as to define a chamber (12).

10 [0032] The chamber (12) constitutes the collection environment of the piped air.

[0033] Advantageously, the outlet section (5) can comprise a plate element (5') to iron the fabric and which has a plurality of openings (6) through which the fluid coming from the inlet section (4) is expelled.

15 [0034] Advantageously, at least a heating section (16) of the circulating fluid along the entire circuit can be foreseen.

[0035] Such a solution makes the fluid recovery even more advantageous since, once heated, it can be used again at a continuous cycle with a significant energy saving. Once the pre-established fluid temperature is reached, the maintenance of the said temperature will require an essentially minimum energy inlet.

20 [0036] Advantageously, the heating section (16) can be arranged along the return circuit (13).

[0037] Advantageously, the heating section can comprise at least an electric resistance (17) passed through by electric current of adjustable intensity.

25 [0038] Thus, the heating temperature of the fluid can be changed.

[0039] Advantageously, at least one further additional turbine (18) can be foreseen arranged along any point of the circulation (13, 7) for thrusting the fluid further.

30 [0040] Advantageously, the additional turbine (18) can be arranged downstream of the heating section (16).

Brief description of the drawings

40 [0041] Further characteristics and the advantages of the present device, according to the invention, will be clearer with the description of one of its embodiments that follows, made to illustrate and not to limit, with reference to the annexed drawings, wherein:

- Figure 1 schematically represents an overall view of the invention;
- Figure 2 represents a view of the holed plate of the iron and the circuit 7 that connects the inlet section 4 with the outlet section 5;
- Figure 3 schematically represents the coupling of the support surface on which the ironing of the article of clothing is to be carried out with the chamber 12;
- Figure 4 shows a solution of the invention comprising more thrust and/or suction fans arranged along the circuit.

Description of a preferred embodiment

[0042] Figure 1 describes a device **1** to realize the ironing and/or drying of fabrics according to the invention.

[0043] For that purpose, an iron **2** comprises an inlet section **4** and an outlet section **5** for a fluid, for example, air. Through the inlet section **4** the fluid is therefore exhausted inside the iron to be piped towards the outlet section **5** through a first circuit **7** inside the iron.

[0044] A portion destined to be a handle **3** allows to handle the iron in a known way.

[0045] In the specific case (see figure 2), the outlet section **5** comprises an ordinary metal plate **5'** to realize the ironing and comprising a plurality of openings or holes **6** through which the fluid exits. Always as shown in the partial section of figure 2, the air coming in through the inlet **4** flows towards the outlet section **5** through the said circuit **7**.

[0046] Naturally, fluids of a nature different from air and useful for the purpose of the invention can be used without for this moving apart from the present inventive concept, for example, humidified air.

[0047] Going back to figure 1, the iron **2** is operatively placed in combination with a recovery chamber **10** comprising a support surface **8** on which the articles of clothing are laid and the ironing is carried out (that functions as an ironing board **8**). For that purpose, the surface **8** in question has a plurality of openings **9** passing through along its entire thickness.

[0048] When used, as better explained below in the present description, the said openings **9** face the openings **6** of the plate **5'** that slides over the surface **8**. Just for reasons of simplicity and clarity of the drawing, figure 1 shows only an overall number of six openings **6**. Moreover, always with a dotted line, the fluid path is stressed that through the iron **2** is directed through the outlet section **5** towards the recovery chamber **10**.

[0049] Going further into the constructive details (see for that purpose also figure 3), the recovery chamber **10** comprises lateral walls **11** so as to realize a chamber **12**. The support surface **8** closes the chamber **12** in a way similar to a lid. Naturally, the chamber **12** must be sealed to the plate so as to reduce the leaks as much as possible. Moreover, commonly known means for realizing the connection can perfectly be used, without for this moving apart from the present inventive concept.

[0050] Going back to figure 1, a generic duct **13**, connected in a suitable point of the chamber **10**, creates a return circuit-path **13** for the fluid towards the inlet section **4**, thus realizing a closed air re-circulation circuit (circuit **7** together with circuit **13**).

[0051] Inside the chamber **10** suction means **19** are arranged to exhaust the air of the inlet section **4** towards the outlet section **5**, thus pulling it inside the chamber **10** to thrust it again along the return circuit **13** afterwards. Such means **19** therefore comprise one (or also more than one) turbine **15** (for example, a rotating fan) and placed within the chamber **10** in proximity of the surface **8**.

[0052] In case of only one turbine, the diameter of it can be conventionally chosen so as to exhaust through all the openings **9** arranged on the area of the plate **8**. Means to operate **14** the turbine allow its activation and turning off. In that case, for example, a simple starting motor or the like can constitute a suitable operation device (schematically represented in figure). Naturally, either different positions of the suction means or equivalent constructive solutions, suitable to realize a suction, can be arranged without for this moving apart from the present inventive concept.

[0053] Always as described in figure 1, in a convenient point of the return circuit **13** a further section **16** destined to the heating of the fluid can possibly be arranged. For that purpose, the section comprises inside one or more electric resistances **17**. Thus, the circulating air hits the resistances and absorbs the heat given out by them as a consequence of the electric current that goes through them. It is therefore possible to foresee an intensity adjustment of the circulating current in order to be able to adequately control the temperature of the air in the circuit. Naturally, although such an arrangement along the circuit **13** minimizes the weights of the iron, nothing would impede in an absolutely equivalent manner to insert such a section within the iron itself.

[0054] In addition, nothing would impede to add further turbines along the path to increase the thrust of the fluid towards the inlet section **4**, once the fluid has been exhausted within the chamber **10**. The example of figure 4 schematically shows a possible positioning of a further auxiliary turbine **18** downstream of resistances **17**. Naturally, any other position can be indifferently chosen.

[0055] Having structurally described the basic aspects of the invention, the functioning will also be described below for greater clarification.

[0056] As it is well known, the iron slides on the support surface **8** with the fabric comprised between them and with the plate **5'** appropriately heated.

[0057] In an initial start phase (see figure 4, for example), the turbine **15** is operated, which exhausts the air that is present outside the chamber **10** within the chamber itself through the openings **9** of the plate **8**. The turbine therefore injects the air in circulation along the entire path, thus forcing it along the return circuit **13** towards the inlet section **4**.

[0058] At steady state, as schematically represented in figure 1, a closed continuous circulation is created wherein the fluid goes up towards the inlet section **4** and from here towards the outlet section **5** through the circuit **7** to be then exhausted again within the chamber **10** and re-circulate.

[0059] The fan **15** therefore operates an air circulation which, once out of the holes **6** of the plate **5'**, is exhausted again through the holes **9** of the support surface **8**. Thus, during the ironing, the air will entirely pass through the fibres of the fabric interposed between plate and support to be piped within the containment chamber **10**, realizing an efficient drying.

[0060] If resistances **17** are also foreseen, then during the return path towards the inlet section **4** the air is forced to pass further through the heating section **16** and is thus appropriately brought to the temperature desired by the user.

[0061] Naturally, a certain percentage of air, also at steady state, will be exhausted also from the outside towards the chamber **10**. This basically depends on the operative distance of the iron in respect to the support **8** and also depends on the amplitude of area of the support surface **8** in respect to the amplitude of the plate **5'** of the iron in contact.

[0062] As described (see for that purpose figure 4), in case there is an overall number of fans higher than one, these will favour the pressure thrust of the air through the openings of the plate and towards the inlet section **4**, thus guaranteeing a continuous flow re-circulation.

Claims

1. Device **(1)** for the ironing and simultaneous drying of fabrics and articles of clothing in general and comprising:

- An iron **(2)** comprising at least an inlet section **(4)** and at least an outlet section **(5)** for a drying fluid;
- Means **(19)** configured to move the fluid from the inlet section **(4)** towards the outlet section **(5)**;

and characterized by the fact that the device **(1)** further comprises a support surface **(8)** on which the fabric or article of clothing to realize the ironing/drying is placed, the said support surface comprising a plurality of openings **(9)** that pass through the entire section of the surface **(8)** and configured in such a way as to result opposed to the section **(5)** of the iron **(2)** when used, so that the fluid coming out from the section **(5)** passes through the support surface **(8)**.

2. Device **(1)**, according to claim 1, wherein a recovery chamber **(10)** is foreseen, the chamber comprising the said support surface **(8)** so that the fluid exiting from the section **(5)** and passing through the surface **(8)** is collected inside the chamber.
3. Device **(1)**, according to claim 2, wherein the recovery chamber **(10)** is connected to a return circuit **(13)** configured in such a way as to conduct the piped fluid within the chamber **(10)** towards the inlet section **(4)** of the iron **(2)** so as to realize a substantially closed circulation of the fluid.
4. Device **(1)**, according to one or more of the preceding claims, wherein the said means **(19)** to move the

fluid are arranged within the recovery chamber **(10)** in such a way as to face the support surface **(8)** and thrust the fluid along the said closed circulation.

5. Device **(1)**, according to claim 4, wherein the said means **(19)** comprise at least a turbine **(15)**;
6. Device **(1)**, according to claim 5, wherein means of operation **(14)** of the turbine are further foreseen.
7. Device **(1)**, according to claim 6, wherein the means of operation **(14)** comprise a starting motor.
8. Device **(1)**, according to one or more claims from 2 to 4, wherein the said recovery chamber comprises lateral walls **(11)** so as to realize a chamber **(12)**.
9. Device **(1)**, according to claim 1, wherein the said outlet section **(5)** comprises a plate element **(5')** to iron the fabric and comprising a plurality of openings **(6)** through which the fluid coming from the inlet section **(4)** is expelled.
10. Device **(1)**, according to one or more of the preceding claims, wherein at least a heating section **(16)** of the fluid circulating along the circuit is foreseen.
11. Device **(1)**, according to claim 10, wherein the said heating section **(16)** is arranged along the return circuit **(13)**.
12. Device **(1)**, according to claim 10 or 11, wherein the said heating section comprises at least an electric resistance **(17)** passed through by electric current of adjustable intensity.
13. Device **(1)**, according to one or more of the preceding claims, wherein at least an additional turbine **(18)** is foreseen, arranged along the circulation for further thrusting the fluid.
14. Device **(1)**, according to claim 13, wherein an additional turbine **(18)** is foreseen downstream of the heating section **(16)**.

Fig. 1

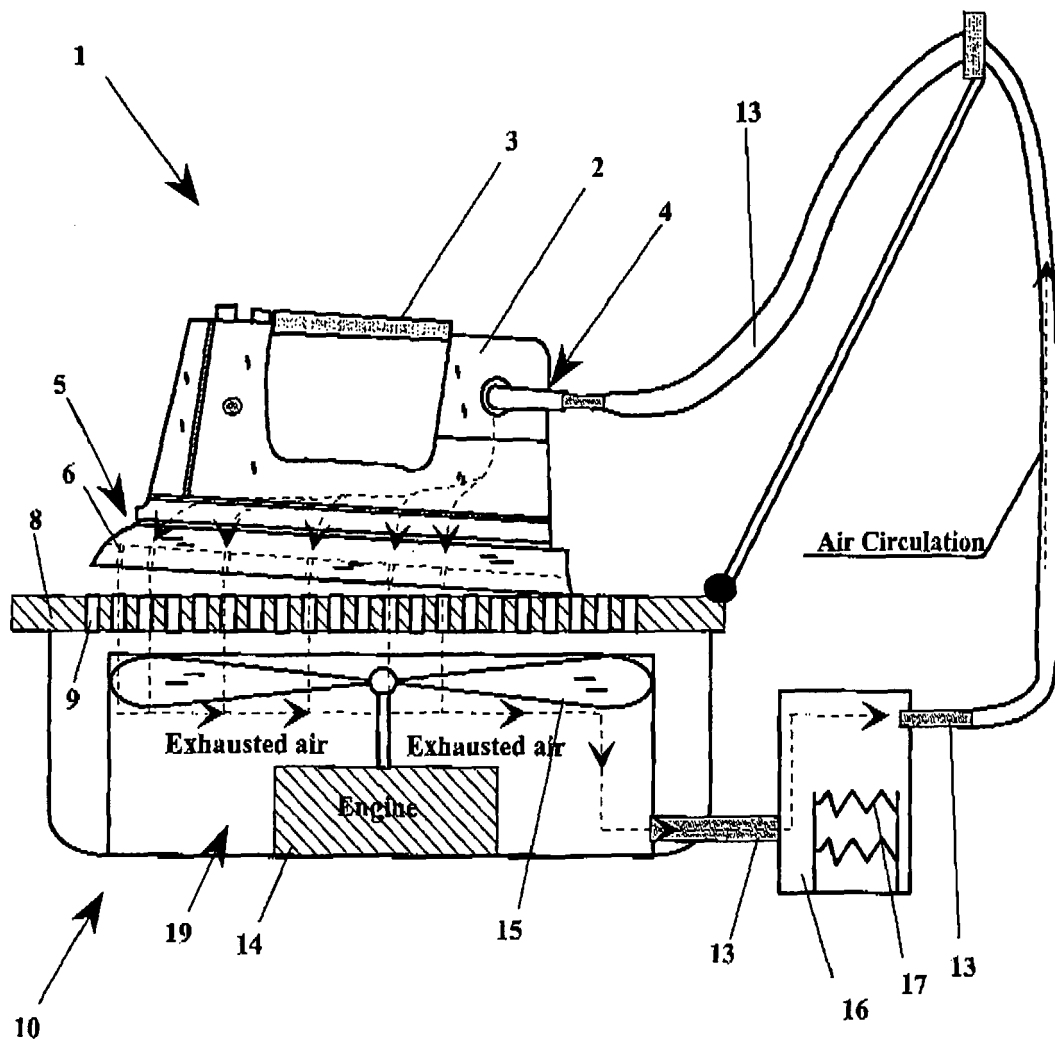


Fig. 2

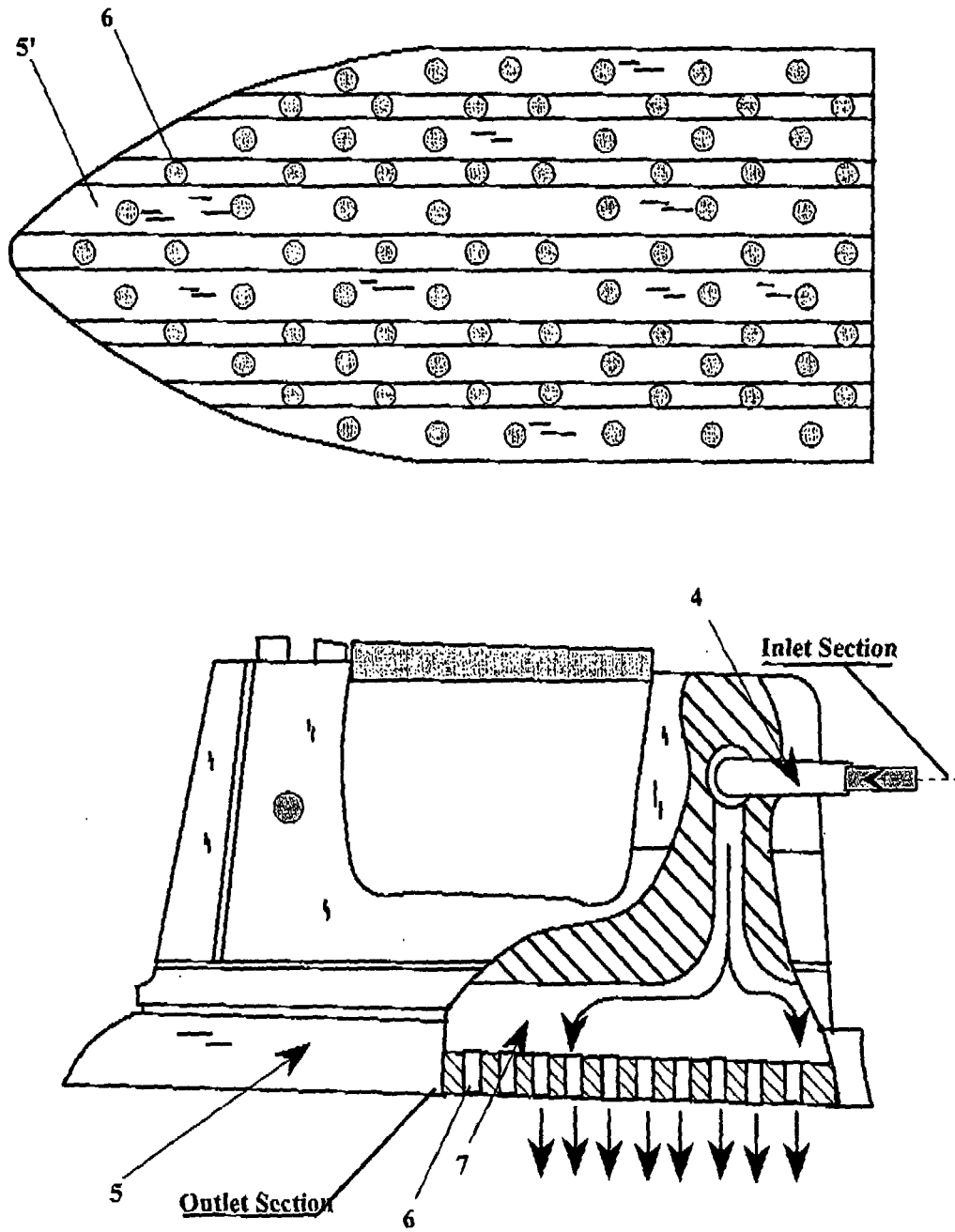


Fig. 3

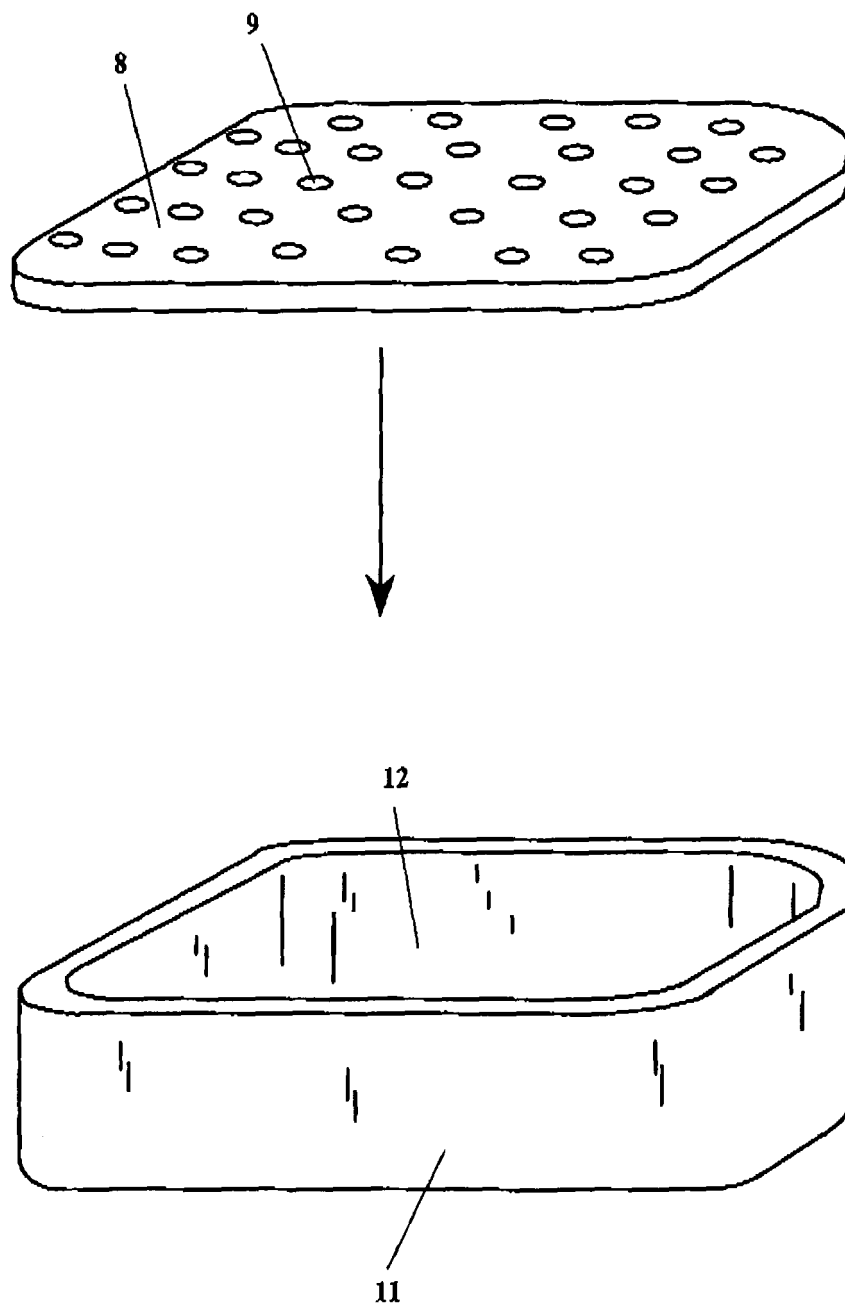
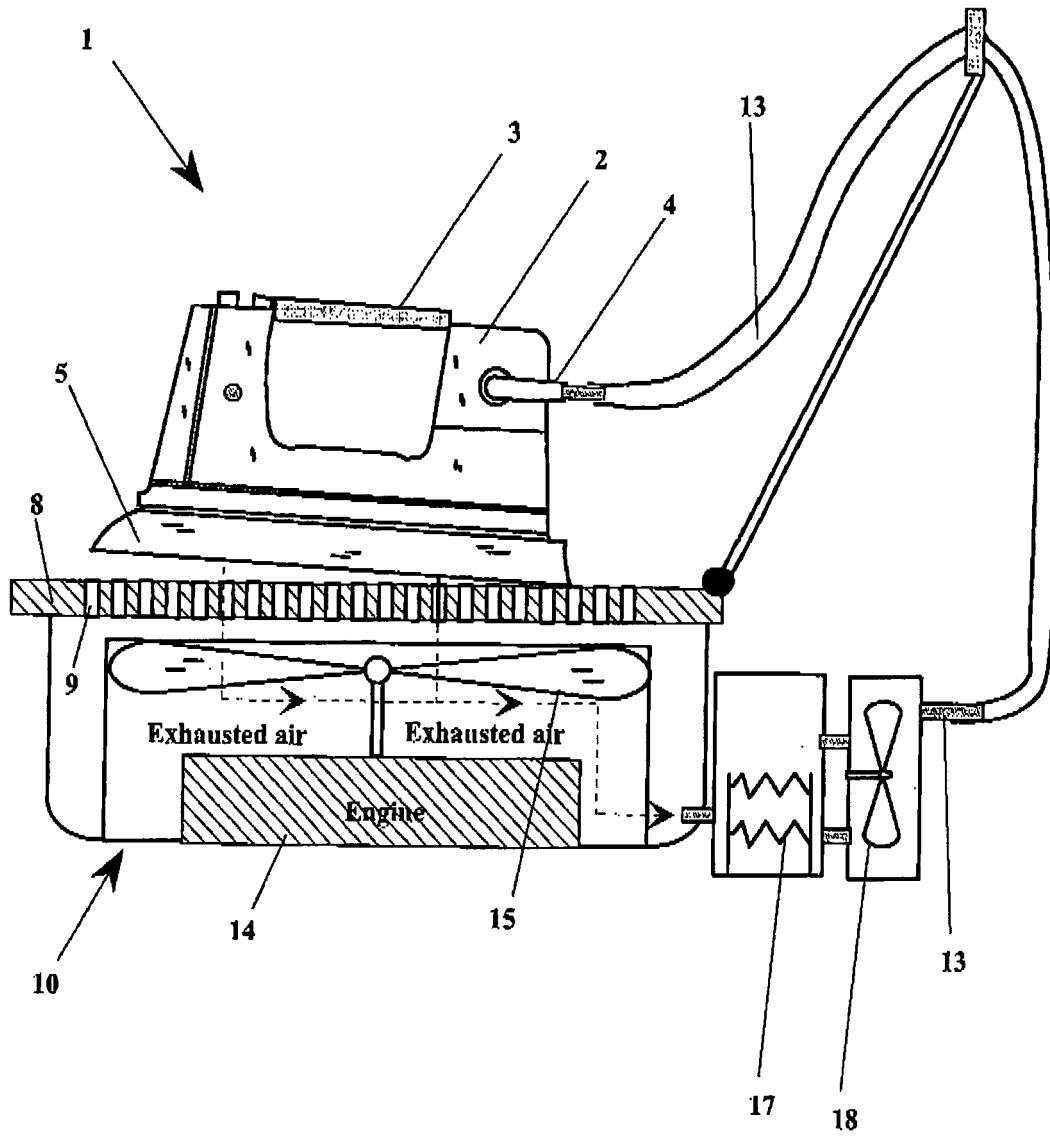


Fig. 4





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 EP 09 01 3857

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Place of search Munich		Date of completion of the search 5 May 2010	Examiner Clivio, Eugenio
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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