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(54) IRONING MACHINE

BÜGELMASCHINE

MACHINE À REPASSER

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Description

Technical Field

[0001] The present invention relates to an upgraded ironing machine.

Background Art

[0002] In the area of commercial or industrial laundries the use is known of professional ironing machines for pieces of clothing such as shirts, jackets, coats, trousers, or the like.

[0003] For example, with particular reference to the drying and ironing of shirts, coats, jackets or the like, the use is known of special machines comprising a support structure to a dummy suitably shaped to fit the particular piece of clothing and provided, on its external surface, with a plurality of holes for the emission of hot air or steam.

[0004] Prior to ironing, an operator arranges on the dummy the shirt or a similar piece of clothing, taking care to straighten it properly with the aid of any special tensioning elements.

[0005] Subsequently, the emission in sequence firstly of steam and then of hot air permits to iron and dry the piece of clothing, respectively.

[0006] Such machines comprise a fan with an air suction mouth and connected to the dummy by means of an appropriate connecting pipe.

[0007] The air, once sucked by the fan through the suction mouth, is pushed through the connecting pipe to the dummy (or to any other support for ironing), where it flows out from the holes, for the ironing of the piece of clothing.

[0008] The machines of known type also comprise a steam circuit having an inlet fitting connectable to an external steam feeding circuit.

[0009] A suitable heating battery is connected to the inlet fitting and is arranged within a part of the pipe which connects the fan to the dummy, so as to allow the heating of air before being emitted to the dummy itself.

[0010] Commonly, the ironing machines comprise a steam tank (so-called condenser) provided with the inlet fitting and connected by means of the steam circuit to the heating battery. Such a machine is known, for example, from US 3,568,900.

[0011] Furthermore, the tank can be connected directly to the dummy by means of a further pipe to allow the emission of steam through the holes of the dummy itself.

[0012] Commonly, the steam circuit comprises an outlet fitting suitable for allowing the removal of condensate.

[0013] In particular, this outlet fitting is connected to a suitable condensate trap which, in turn, is connected to a condensate cooling and collection basin.

[0014] The basin is connected in input to a cooling water supply line and is connected in output to a pump suitable for bringing the condensate collected and cooled by the basin (together with the water used for cooling the condensate) to the boiler of the steam feeding circuit.

[0015] The ironing machines of known type do however have some limits..

[0016] Indeed, the use of ironing machines of conventional type inevitably involves a considerable waste of energy.

[0017] In particular, the collected condensate, despite reaching high temperatures, is conveyed any way to the collection basin and is therefore not used in order to reduce energy consumption and/or improve the performance of the machine. Furthermore, in some cases inside of the recovery basin, before conveying to the boiler, also the cooling of condensate is performed through the introduction of cooling water.

[0018] This involves, firstly, an even greater energy waste, since the condensate must first be cooled inside the basin, and then re-heated again for the production of steam once sent to the boiler.

[0019] Furthermore, this necessarily implies a considerable consumption of water for cooling the condensate.

Description of the Invention

[0020] The main aim of the present invention is to provide an upgraded ironing machine which allows high energy saving.

[0021] Another object of the present invention is to provide an upgraded ironing machine which allows to considerably reduce the time for ironing and drying the pieces of clothing.

[0022] Another object of the present invention is to provide an upgraded ironing machine which allows to overcome the above mentioned drawbacks of the prior art in the ambit of a simple, rational, easy and effective to use as well as low cost solution.

[0023] The above objects are achieved by the present upgraded ironing machine, comprising:

at least a bearing structure;

at least a sustaining element associated with said bearing structure and suitable for sustaining at least a piece of clothing to iron;

emission means suitable for emitting steam and/or hot air for the ironing and/or drying of said piece of clothing;

ventilation means having at least an air suction mouth and connected to said emission means;

at least a steam circuit with at least an inlet fitting connectable to a steam feeding circuit, at least a first heat exchanger suitable for heating the air conveyed by said ventilation means to said emission means, at least a condensate outlet fitting;

and at least a second heat exchanger connected to said condensate outlet fitting and arranged substan-

tially in the proximity of said suction mouth of the ventilation means to reuse the condensate for the pre-heating of the suctioned air.

Brief Description of the Drawings

[0024] Other characteristics and advantages of the present invention will become evident from the description of two preferred, but not exclusive embodiments, of an upgraded ironing machine, illustrated by way of an indicative, but not limitative, example in the accompanying drawings in which:

Figure 1 is a perspective view that illustrates a possible first embodiment of the upgraded ironing machine according to the invention;

Figure 2 is a left side view of the ironing machine of Figure 1 ;

Figure 3 is a right side view of the ironing machine of Figure 1 ;

Figure 4 is a rear view of the ironing machine of Figure 1 ;

Figure 5 and Figure 6 are side views of the ironing machine of Figure 1 illustrating details of the housing compartment intended to accommodate the second heat exchanger;

Figure 7 is a perspective view that illustrates a possible second embodiment of the upgraded ironing machine according to the invention. Embodiments of the Invention

[0025] With particular reference to these figures, by reference numeral 1 is globally indicated an upgraded ironing machine, usable in particular in the field of commercial and industrial ironing.

[0026] With reference to a first possible embodiment illustrated in Figures from 1 to 6, the ironing machine 1 comprises a bearing structure 2 which can be positioned resting on the ground.

[0027] For example, the bearing structure 2 may be composed of a suitable support base.

[0028] The ironing machine 1 also comprises a sustaining element 3 supported by the bearing structure 2 and suitable for sustaining a garment to iron.

[0029] For example, with reference to the drying and ironing of shirts, coats, jackets or the like, the sustaining element 3 may be made up of a suitably shaped dummy. Different types of media usable for different pieces of clothing such as, e.g., trousers or the like, cannot be ruled out.

[0030] The ironing machine 1 further comprises emission means, not illustrated in the figures, suitable for emitting steam and/or hot air for the ironing and/or drying of the garment.

[0031] In particular, the steam and hot air emission means can be composed of a plurality of holes distributed on the external surface of the dummy 3 itself.

[0032] The machine 1 also comprises ventilation means 4, constituted by e.g. a fan, connected to the dummy 3 and provided with an air suction mouth 5.

[0033] In particular, the fan 4 is connected to the dummy 3 by means of a ventilation pipe 6.

[0034] The air, once suctioned by the fan 4 through the suction mouth 5, is pushed through the ventilation pipe 6 to the dummy 3 (or to any other support for ironing), where it flows out through the holes for the ironing of the piece of clothing.

[0035] The ironing machine 1 comprises a steam circuit provided with an inlet fitting 7 connectable to an external steam feeding circuit and a first heat exchanger 8, connected to the inlet fitting 7 and suitable for heating the air conveyed by the fan 4 to the dummy 3. In particular, the first heat exchanger 8 is preferably composed of a suitable heating battery arranged within an end portion of the ventilation pipe 6 below the dummy 3, so as to allow the heating of air before its introduction into the dummy itself.

[0036] The ironing machine 1 also comprises an outlet fitting 9 connected to the first heat exchanger 8 and suitable for permitting the removal of the condensate that is produced within the circuit.

[0037] In particular, the outlet fitting 9 is connected to a suitable condensate trap 10. The ironing machine 1 also comprises a steam tank 11 (so-called condenser) provided with the inlet fitting 7 and connected by means of the steam circuit to the first heat exchanger 8.

[0038] With reference to the particular embodiment illustrated in Figures from 1 to 6, the steam circuit of the ironing machine 1 comprises a first pipe 12 connecting the tank 11 to the first heat exchanger 8 and a second pipe 13 connecting the first heat exchanger 8 to the outlet fitting 9.

[0039] The tank 11 can be connected to the dummy 3 by means of a further third pipe 14 to allow the direct emission of steam through the holes of the dummy itself, for ironing the garment.

[0040] Furthermore, the tank 11 may be provided with a further exhaust fitting 15, suitable for allowing the removal of condensate that collects inside the tank itself.

[0041] According to the invention, the ironing machine 1 comprises a second heat exchanger 16 connected to the outlet fitting 9 and arranged substantially in the proximity of the suction mouth 5 of the fan 4 for pre-heating the suctioned air.

[0042] In this way, the condensate normally directed to the external collection basin can be reused for pre-heating the air, before suctioning by means of fan 4, resulting in considerable energy saving.

[0043] Furthermore, air pre-heating allows to bring air at higher temperatures, thereby decreasing considerably (even more than a third) conventional time for ironing/dry-

ing pieces of clothing.

[0044] To this is added the fact that the condensate exits from the second heat exchanger 16 at a lower temperature and, therefore, cooling is not necessary inside of the basin through the use of cooling water, resulting in further energy and water saving.

[0045] In particular, the second heat exchanger 16 comprises a first fitting 17 connected to the outlet fitting 9 by means of a connecting pipe, and a second fitting 18 connectable to an external condensate recovery circuit.

[0046] Conveniently, the bearing structure 2 comprises a compartment 19 for housing the second heat exchanger 16, obtained in the proximity of the suction mouth 5 of the fan 4.

[0047] In particular, a small frame 20 supporting the second heat exchanger 16 is secured inside the compartment 19 by means of threaded means.

[0048] With reference to a second embodiment illustrated in Figure 7, the ironing machine 1 comprises recovery means 21 suitable for recovering at least part of the steam and/or air emitted during ironing and/or drying.

[0049] The recovery means 21 have at least a recovery mouth 22 arranged in the proximity of the sustaining element 3, at the rear of the sustaining element itself, and at least one connecting pipe 23 suitable for connecting the recovery mouth 22 to the suction mouth 5 of fan 4.

[0050] The hot air and steam used during ironing are recovered at least in part through the recovery mouth 22 and are reintroduced by the fan 4 along the ventilation pipe 6 and towards the dummy 3.

[0051] Advantageously, with reference to this particular embodiment, the second heat exchanger 16 may be arranged, e.g., within said connecting pipe 23.

[0052] Different positions of the second heat exchanger 16, e.g. in the proximity of the suction mouth 5 of fan 4, cannot be ruled out.

Claims

1. Ironing machine (1), comprising:

at least a bearing structure (2);
at least a sustaining element (3) associated with said bearing structure (2) and suitable for sustaining at least a piece of clothing to iron;
emission means suitable for emitting steam and/or hot air for the ironing and/or drying of said piece of clothing;
ventilation means (4) having at least an air suction mouth (5) and connected to said emission means;
at least a steam circuit with at least an inlet fitting (7) connectable to a steam feeding circuit, at least a first heat exchanger (8) suitable for heating the air conveyed by said ventilation means (4) to said emission means and at least a condensate outlet fitting (9);
and at least a second heat exchanger (16) connected to said condensate outlet fitting (9); **characterized in that** said second heat exchanger (16) is arranged substantially in the proximity of said suction mouth (5) of the ventilation means (4) to reuse the condensate for the pre-heating of the suctioned air.

2. Ironing machine (1) according to claim 1, **characterized in that** said second heat exchanger (16) comprises at least a first fitting (17) connectable to said condensate outlet fitting (9).

3. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** said second heat exchanger (16) comprises at least a second fitting (18) connectable to a condensate recovery circuit.

4. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** said bearing structure (2) comprises at least a compartment (19) for housing said second heat exchanger (16), made in the proximity of said suction mouth (5) of the ventilation means (4).

5. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** it comprises recovery means (21) of at least part of the steam and/or air emitted during ironing and/or drying, having at least a recovery mouth (22) arranged in the proximity of said sustaining element (3) and at least a connecting pipe (23) between said recovery mouth (22) and said suction mouth (5) of the ventilation means (4), and **in that** said second heat exchanger (16) is arranged in the proximity of said suction mouth (5) of the ventilation means (4) and/or inside said connecting pipe (23).

6. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** it comprises at least a ventilation pipe (6) connected to said ventilation means (4) and to said steam and/or hot air emission means.

7. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** said second heat exchanger (16) comprises at least a heating battery.

8. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** said steam circuit comprises at least a first pipe (12) for connecting said inlet fitting (7) to said first heat exchanger (8).

9. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** said steam circuit comprises at least a second pipe (13) for con-

necting said first heat exchanger (8) to said condensate outlet fitting (9).

10. Ironing machine (1) according to one or more of the preceding claims, **characterized in that** said steam circuit comprises at least a third pipe (14) for connecting said inlet fitting (7) to said emission means.

Patentansprüche

1. Bügelmaschine, aufweisend:

wenigstens eine Tragstruktur (2);
wenigstens ein Stützelement (3), welches mit der Tragstruktur (2) verbunden ist und dazu ausgebildet ist, wenigstens ein Kleidungsstück zum Bügeln zu stützen;
eine Ausgabevorrichtung, die dazu ausgebildet ist, Dampf und/oder heiße Luft zum Bügeln und/oder Trocknen des Kleidungsstücks zu emittieren;
eine Belüftungsvorrichtung (4) die wenigstens eine Luftansaugöffnung (5) aufweist und mit der Ausgabevorrichtung verbunden ist;
wenigstens einen Dampfkreislauf mit wenigstens einem Einlassformstück (7), welches mit einem Dampfzuführkreislauf verbunden werden kann, wenigstens einemn ersten Wärmetauscher (8), der zum Erwärmen der Luft ausgebildet ist, welche durch die Belüftungsvorrichtung (4) der Ausgabevorrichtung zugeführt wird, und wenigstens einen Kondensatauslassanschluss (9);
und wenigstens einen zweiten Wärmetauscher (16), der mit dem Kondensatauslassanschluss (9) verbunden ist;
dadurch gekennzeichnet,
dass der zweite Wärmetauscher (16) im Wesentlichen in der Nähe der Ansaugöffnung (5) der Belüftungsvorrichtung (4) angeordnet ist, um das Kondensat für das Vorheizen der angesaugten Luft wiederzuverwenden.

2. Bügelmaschine (1) nach Anspruch 1,
dadurch gekennzeichnet,
dass der zweite Wärmetauscher (16) wenigstens einen ersten Anschluss (17) aufweist, der mit dem Kondensatauslassanschluss (9) verbindbar ist.

3. Bügelmaschine (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet,**
dass der zweite Wärmetauscher (16) wenigstens einen zweiten Anschluss (18) aufweist, welcher mit einer Kondensatrückgewinnungseinheit verbindbar ist.

4. Bügelmaschine (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet,**
dass die Tragstruktur (2) wenigstens ein Gehäuse (19) zur Aufnahme des zweiten Wärmetauschers (16) aufweist, das in der Nähe der Ansaugöffnung (5) der Belüftungsvorrichtung (4) ausgebildet ist.

5. Bügelmaschine (1) nach einem oder mehreren der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass diese eine Rückgewinnungsvorrichtung (21) für wenigstens einen Teil des während des Bügelns und/oder Trocknens emittierten Dampfes und/oder der Luft, die während des Bügelns und/oder Trocknens emittiert wird, aufweist, aufweisend wenigstens eine Rückgewinnungsöffnung (22), welche in der Umgebung des Stützelements (3) angeordnet ist, und wenigstens einem Verbindungsrohr (23) zwischen der Rückgewinnungsöffnung (22) und der Ansaugöffnung (5) der Belüftungsvorrichtung (4), und
dass der zweite Wärmetauscher (16) in der Umgebung der Ansaugöffnung (5) der Belüftungsvorrichtung (4) und/oder innerhalb des Verbindungsrohres (23) angeordnet ist.

6. Bügelmaschine (1) nach einem oder mehreren der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass diese wenigstens ein Belüftungsrohr (6) aufweist, welches mit der Belüftungsvorrichtung (4) und mit der Dampf- und/oder Luftauslassvorrichtung verbunden ist.

7. Bügelmaschine (1) nach einem oder mehreren der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass der zweite Wärmetauscher (16) wenigstens eine Heizbatterie aufweist.

8. Bügelmaschine (1) nach einem oder mehreren der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass der Dampfkreislauf wenigstens ein erstes Rohr (12) zum Verbinden des Einlassformstücks (7) mit dem ersten Wärmetauscher (8) aufweist.

9. Bügelmaschine (1) nach einem oder mehreren der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
dass der Dampfkreislauf wenigstens ein zweites Rohr (13) zum Verbinden des ersten Wärmetauschers (8) mit dem Kondensatauslassanschluss (9) aufweist.

10. Bügelmaschine (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**,

der Dampfkreislauf wenigstens ein drittes Rohr (14) zum Verbinden des Einlassformstücks (7) mit der Auslassvorrichtung aufweist.

Revendications

1. Machine à repasser (1) comprenant :

au moins une structure de palier (2) ;
au moins un élément de support (3) associé avec ladite structure de palier (2) et approprié pour supporter au moins une pièce de vêtement à repasser ;
des moyens d'émission appropriés pour émettre de la vapeur et/ou de l'air chaud pour le repassage et/ou le séchage de ladite pièce de vêtement ;
des moyens de ventilation (4) ayant au moins une bouche d'aspiration d'air (5) et raccordés auxdits moyens d'émission ;
au moins un circuit de vapeur avec au moins un raccord d'entrée (7) pouvant être raccordé à un circuit d'alimentation en vapeur, au moins un premier échangeur de chaleur (8) approprié pour chauffer l'air transporté par lesdits moyens de ventilation (4) auxdits moyens d'émission et au moins un raccord de sortie de condensat (9) ;
et au moins un second échangeur de chaleur (16) raccordé audit raccord de sortie de condensat (9) ;
caractérisée en ce que ledit second échangeur de chaleur (16) est agencé sensiblement à proximité de ladite bouche d'aspiration (5) des moyens de ventilation (4) pour réutiliser le condensat pour le préchauffage de l'air aspiré.

2. Machine à repasser (1) selon la revendication 1, **caractérisée en ce que** ledit second échangeur de chaleur (16) comprend au moins un premier raccord (17) pouvant être raccordé audit raccord de sortie de condensat (9).

3. Machine à repasser (1) selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ledit second échangeur de chaleur (16) comprend au moins un second raccord (18) pouvant être raccordé à un circuit de récupération de condensat.

4. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite structure de palier (2) comprend au moins un compartiment (19) pour loger ledit second échangeur de chaleur (16), réalisé à proximité de ladite bouche d'aspiration (5) desdits moyens de ventilation (4).

5. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'**elle comprend des moyens de récupération (21) d'au moins une partie de la vapeur et/ou de l'air émis pendant le repassage et/ou le séchage, ayant au moins une bouche de récupération (22) agencée à proximité dudit élément de support (3) et au moins un tuyau de raccordement (23) entre ladite bouche de récupération (22) et ladite bouche d'aspiration (5) des moyens de ventilation (4), et **en ce que** ledit second échangeur de chaleur (16) est agencé à proximité de ladite bouche d'aspiration (5) des moyens de ventilation (4) et/ou à l'intérieur dudit tuyau de raccordement (23).

6. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'**elle comprend au moins un tuyau de ventilation (6) raccordé auxdits moyens de ventilation (4) et auxdits moyens d'émission de vapeur et/ou d'air chaud.

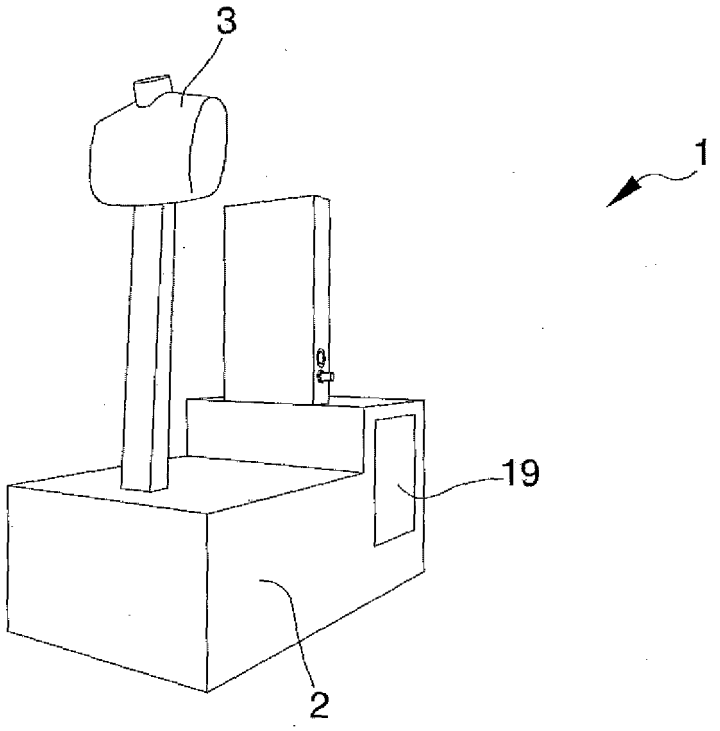
7. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit second échangeur de chaleur (16) comprend au moins une batterie chauffante.

8. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit circuit de vapeur comprend au moins un premier tuyau (12) pour raccorder ledit raccord d'entrée (7) audit premier échangeur de chaleur (8).

9. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit circuit de vapeur comprend au moins un deuxième tuyau (13) pour raccorder ledit premier échangeur de chaleur (8) audit raccord de sortie de condensat (9).

10. Machine à repasser (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit circuit de vapeur comprend au moins un troisième tuyau (14) pour raccorder ledit raccord d'entrée (7) auxdits moyens d'émission.

Fig. 1



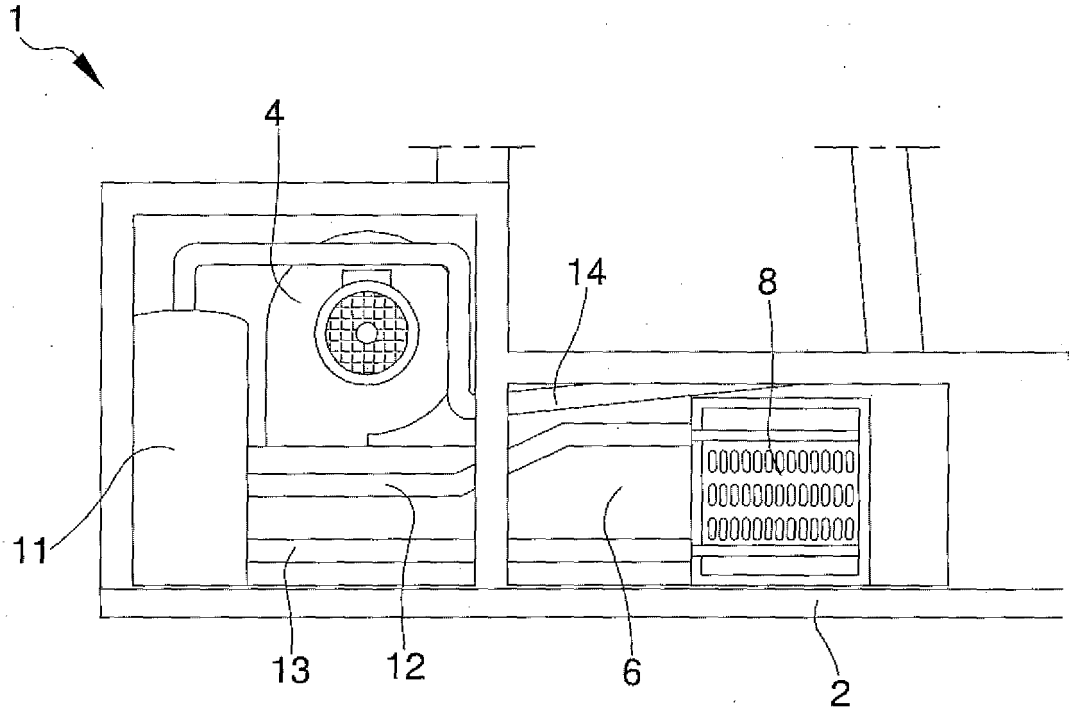


Fig. 2

Fig. 3

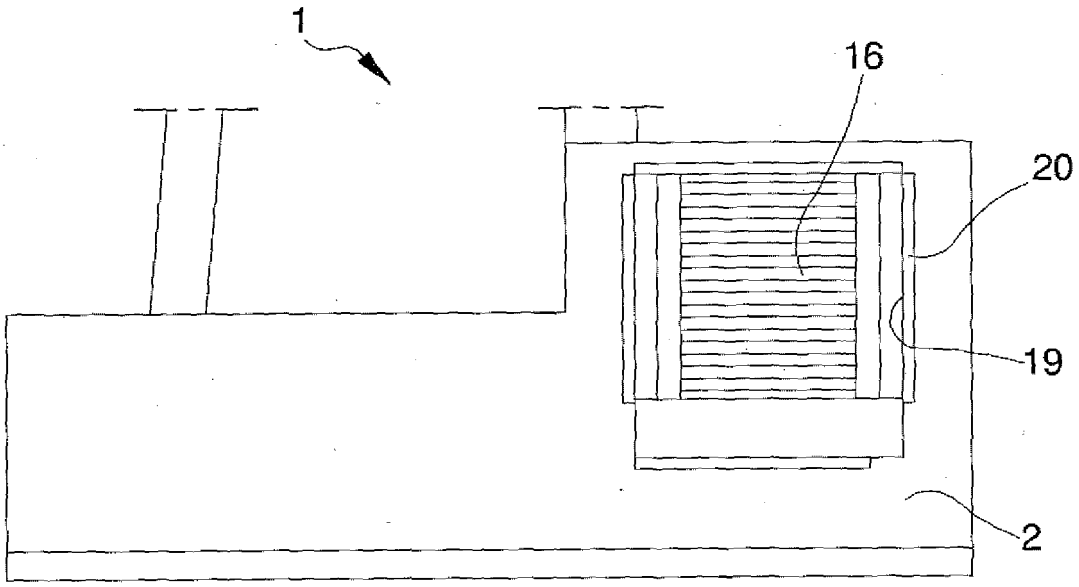


Fig. 4

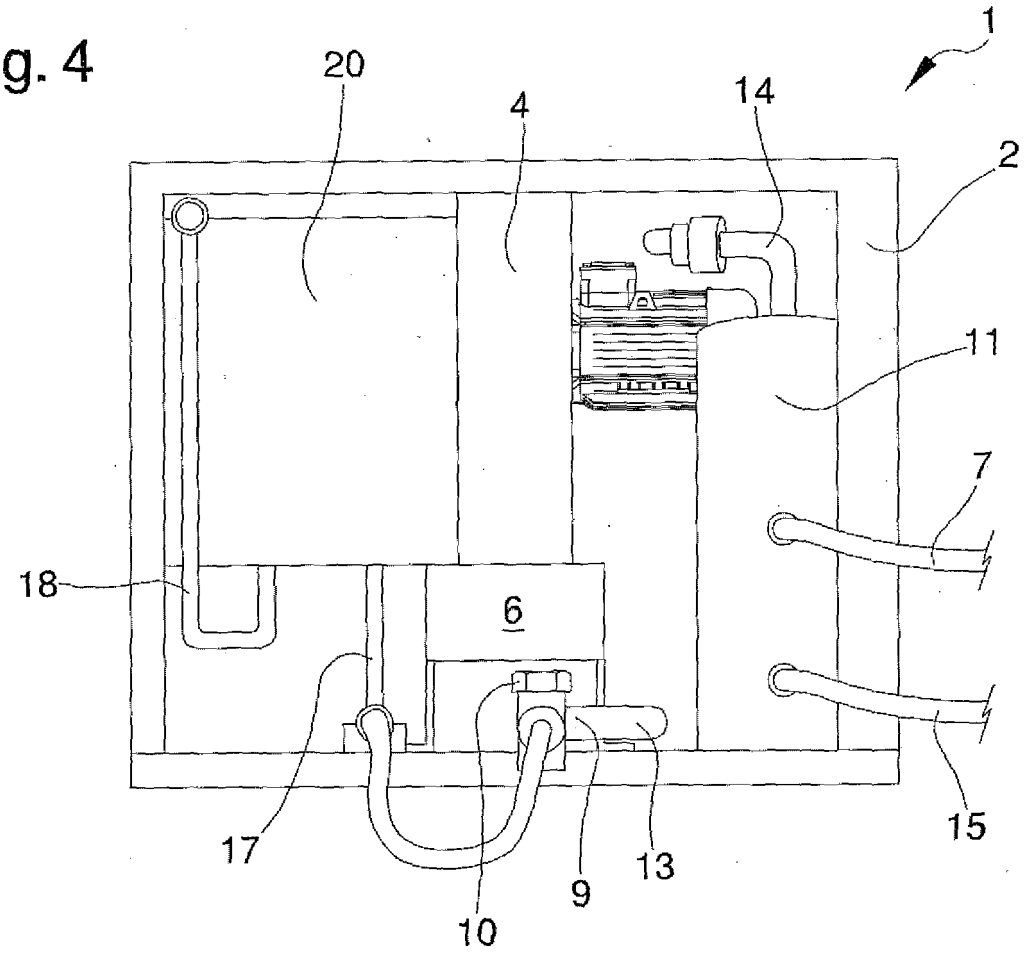


Fig. 5

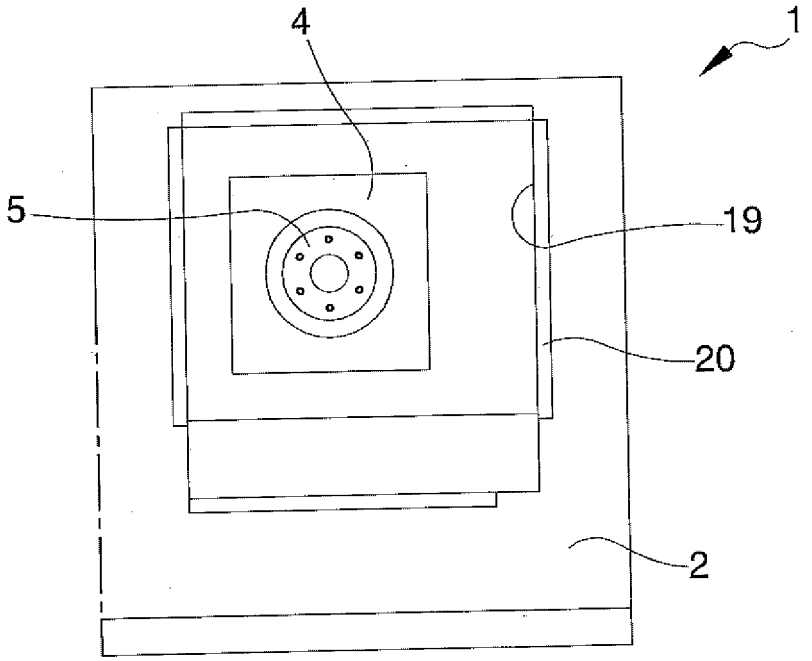
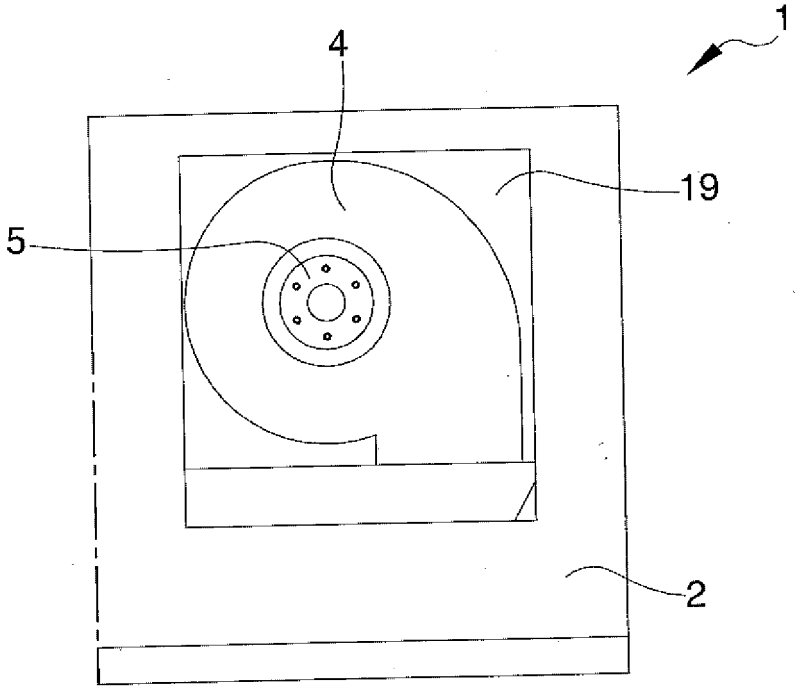


Fig. 6



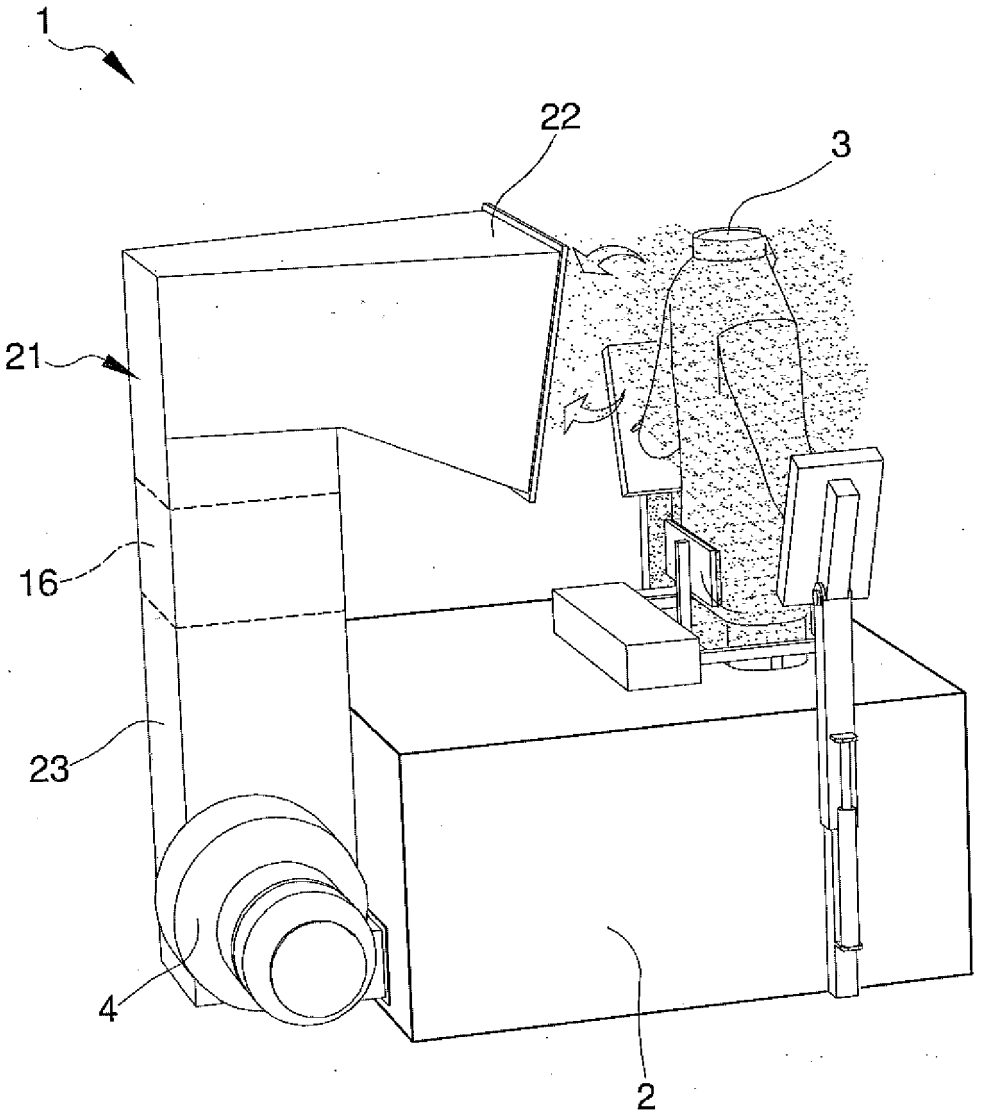


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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