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(72) Inventor: **Piazzetta, Domenico**
31010 Casella D'Asolo (Treviso) (IT)

(74) Representative: **Reniero, Cirillo Silvano**
Reniero, Bergamini & Partners s.r.l.,
21, Via A. Sciesa
37122 Verona (IT)

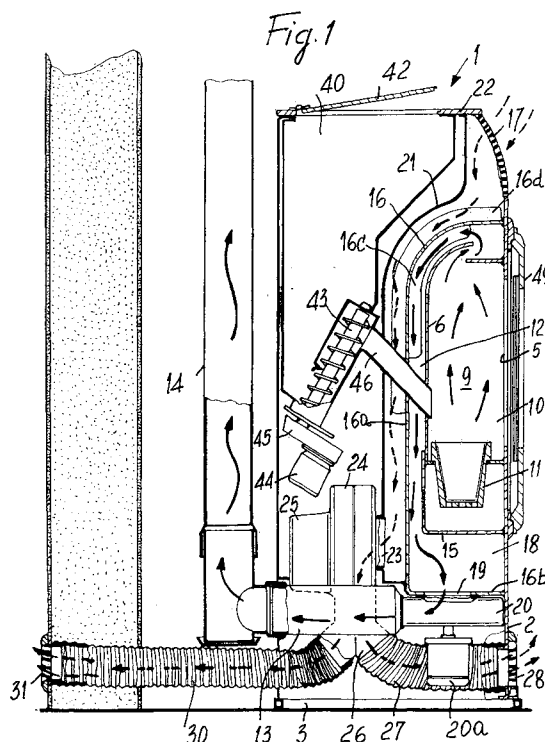
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(71) Applicant: **Gruppo Piazzetta S.p.A.**
31010 Casella d'Asolo (Treviso) (IT)

(54) **Improvements in a pellet stove**

(57) The invention relates to a pellet stove comprising a support and containment structure (2), a pellet combustion chamber (10), an exhaust circuit (12) leading to a chimney (14) for releasing flue gases and including at least one side section downwardly extending from the top of said combustion chamber (10), an downwardly extending ambient air intake circuit (16, 21) including at least one air inlet (17) at the upper portion of

the said support and containment structure (2), and at least one section in heat exchange relationship with the said downwardly extending section of said exhaust circuit (12) to heat the ambient air taken in, and a heated-air feeding circuit (25, 26, 27, 30), wherein the said heated-air feeding circuit (25, 26, 27, 30) is located in the lower portion of the said support and containment structure (2) and comprises at least one duct having its outlet at floor level (28, 31).



Description

[0001] The present invention relates to improvements in or relating to a pellet stove, particularly suitable for heating a number of dwelling spaces.

[0002] Numerous versions of pellet stoves have been proposed in the prior art, which are fed with relatively small standard sized capsules obtained by pressing saw dust. In a more recent and rather widely used type of such a stove air is heated and fed back into the space where the stove is located through one or more slots formed in the upper front portion of the stove. The air properly heated within the stove flows through a grid located approximately 1 m high above the floor level. With a thus structured stove it is possible to heat the room or space where the stove is installed.

[0003] Stoves of this type available on the market, however, are unsuitable for supplying warm air also to other rooms. To do this, it would be necessary to install a stove in each room or space to provide proper heating of an entire apartment. Moreover, any warm air released from the stove at an approximately one metre from floor level is often a source of nuisance for people standing in front of the stove since they are directly hit by a relatively warm air blow and, in any case, it is unsuitable for quickly heating ambient air below such level, where instead quick warming is desirable because, as known, warm air tends to rise towards the room ceiling, thus generating an undesired heat gradient at least at the initial heating stage of a room between the air close to the ceiling and the air below the level of the air releasing grid which remains cold for a much longer time.

[0004] The main object of the present invention is to provide a pellet stove suitable for heating to a comfortable level not only the room or space where it is located, but also other rooms or spaces in a building or apartment.

[0005] Another object of the present invention is to provide a stove that can be manufactured at a low production cost and is highly efficient with optimum yield endurance and long endurance of operation.

[0006] These and other objects are attained by a pellet stove according to the present invention, which comprises a support and containment structure, a pellet combustion chamber, an exhaust circuit for leading flue gas to a chimney and including at least one lateral descending section downwardly extending from the top of said combustion chamber, an ambient air intake circuit downwardly extending and having at least one air inlet at the upper portion of the said support and containment frame, and at least one section in a heat-exchange relationship with said descending section of said exhaust circuit to heat inlet air, and a heated-air output or feeding circuit, and it is characterised in that the said heated-air output circuit is arranged in the lower portion of the said support and containment frame and comprises at least one duct with an air outlet at floor level.

[0007] Advantageously, said heated-air output circuit

comprises a plurality of ducts for supplying heated-air away to a space remote from that locating said pellet stove, which are arranged either at the same level, or at a lower or higher level with respect to one another.

[0008] Further aspects and advantages of the present invention will be better apparent from the following detailed description given with reference to the accompanying drawings, in which:

Figure 1 shows a side elevation view in cross section taken along a vertical line of a stove according to the present invention, illustrating a circuit or path of the ambient air coming in from above and flowing downwards and that of the flue gases;

Figure 2 is a side elevation view in longitudinal section taken along a vertical line at the front portion where the combustion chamber of the stove shown in Figure 1 is located;

Figure 3 shows a side view in longitudinal section taken along a vertical line at the rear portion or intake chamber of the stove;

Figure 4 is a diagrammatic top view of a pellet stove according to the present invention installed in a room or space of an apartment and suitable for heating other two spaces or rooms adjacent to the room or space where the stove is located; and
Figure 5 shows a partial elevation view of the stove of Figure 4.

[0009] With reference to the above listed Figures, a pellet stove according to the present invention is generally indicated at 1 and, as it will be noted, it comprises a support and containment structure including a frame 2 rising from a base 3 and delimiting a substantially parallelepiped-shaped body rectangular in top view, which is provided with a heat insulating lining 4 having a smooth outer face that can be variously finished, e.g. coloured or otherwise decorated. Within the frame 2 a pellet combustion chamber 10 is delimited between the front wall 5 of the stove and three side walls: a rear metal wall 6, and two side walls 7 and 8 each provided on its inner face with a flameproof lining. The combustion chamber 10 comprises hearth or brazier 11 and an exhaust circuit 12 for the hot flue gases which from the top of the combustion chamber 10 behind the metal wall 6 extend downwardly to a level lower than that of the combustion chamber 10 and then has a substantially horizontal tubular section 13 that communicates with a chimney 14.

[0010] The downwardly extending section of the exhaust circuit 12 is delimited, on one side, by the rear metal wall 6 of the combustion chamber that, if desired, can be provided with vertically extending wings, and by a side and bottom wall 15 of the combustion chamber, and, on the other, by a side wall 16, also made of metal, which extends from its upper end sealably connected to the front wall 5 closely underneath an air inlet grid 17, but above the combustion chamber 10, towards the in-

ner portion of the stove, preferably by bending downwardly, and further extends with an intermediate vertical section 16a substantially parallel to the rear wall 6 of the combustion chamber and terminating with a substantially horizontal lower portion 16b spaced from the bottom 15 of the combustion chamber 10 and sealably fixed at its free end to the front wall 5. The bottom portion 16b delimits a flue gas collection chamber 18 and has a wide port or through hole 19 through which the flue gases flow into the intake inlet of a fan 20 driven by an electric motor 20a and designed to force the combustion flue gases towards the lower tubular portion 13 of their path.

[0011] Advantageously, the metal wall 16 has longitudinal fins or wings 16c and 16d, i.e. in the flue gas and air flow, respectively, on its surface facing towards the exhaust circuit 12 and on its opposite surface to ensure optimum efficiency in the heat exchange between hot flue gases and ambient air coming in.

[0012] Between the metal wall 16 and an inner wall 21 also made of metal and extending substantially parallel to wall 16, but with its upper end airtight fixed to the top wall 22 of the stove and anyway beyond the upper edge of grid 17 and its lower end, welded, or otherwise tight fixed at a lower section close to the bottom 16b of the wall 16, so as to delimit therewith a ambient air intake circuit extending downwardly.

[0013] At its lower portion, wall 21 is formed with an opening or through hole 23 located at the inlet of a fan 24 driven by an electric motor 25 and having its outlet connected to a two or multiple way output line 26, one of said ways feeding a line arranged at floor level and being designed to feed heated-air to an outlet 28 at floor level, whereas the other ways 29 feed respective lines 30 located at floor level to supply air to as many outlets 31 through which warm air is released into spaces or rooms other than the space or room in which the stove 1 is located (Figs. 1, 4 and 5).

[0014] The fact of providing output ducts 27 and 30 arranged at floor level makes it possible to provide a network for delivering the warm air provided by the stove 1 with minimum adverse effect on the room design and with interventions that require negligible modifications in the structure and interior decorations of the rooms. The ducts 30 can extend around a corner at floor level and/or along a vertical corner of a room, through partitions or slabs by simply forming one or more through holes in them.

[0015] As it is usual in the state of the art, stove 1 is advantageously provided with an automatic or semi-automatic device for feeding the combustion chamber, which device comprises a loading hopper 40 e.g. provided between the rear wall and inner wall 21 of the stove, and is accessible through a top hatch or side door 42. At the bottom of the hopper 40 a screw feeder 43 driven by an electric motor 44 equipped with a reduction unit 45 is provided which is designed to feed pellets to a tubular chute 46 directly discharging onto the hearth or brazier 11. The hearth or brazier 11 can be shaped

as an upwardly open vase the bottom 11a of which is formed with holes to allow comburant air supplied by a feeding duct 47 to be fed from underneath thereof (Fig. 2).

[0016] Brazier 11 is provided with a sparking plug 48 to effect lighting automatically. Above the sparking plug 48, at the front of the stove, an access door 49 to the combustion chamber 10 is provided to allow cleaning, ash removal and maintenance to be carried out.

[0017] Advantageously, as shown in Figs. 2 and 3, walls 6, 7 and 8 can have outer fins 6a, 7a and 8a, respectively, to increase heat exchange efficiency between hot flue gases and the air to be heated.

[0018] The above described invention is susceptible to numerous modifications and variations within the scope as defined by the claims.

[0019] Thus, the remote feeding ducts can be provided with a respective check valve that can be either located in the stove 1, or at the remote end of its respective feeding duct.

[0020] Materials and sizes can vary depending on the specific requirements.

[0021] The disclosure in Italian patent application No. VR2002A000001 from which priority is claimed is incorporated herein by reference.

[0022] Any reference sign following technical features in any claim has been provided to increase intelligibility of the claim and shall not be construed as limiting the scope of the claim.

Claims

1. A pellet stove comprising a support and containment structure (2), a pellet combustion chamber (10), an exhaust circuit (12) leading to a chimney (14) for releasing flue gases and including at least one side section downwardly extending from the top of said combustion chamber (10), a downwardly extending ambient air intake circuit (16, 21) including at least one air inlet (17) at the upper portion of the said support and containment structure (2), and at least one section in heat exchange relationship with the said downwardly extending section of said exhaust circuit (12) to heat the ambient air taken in, and a heated-air feeding circuit (25, 26, 27, 30), **characterised in that** the said heated-air feeding circuit (25, 26, 27, 30) is located in the lower portion of the said support and containment structure (2) and comprises at least one duct having its outlet at floor level (28, 31).
2. A pellet stove according to claim 1, **characterised in that** the said heated-air feeding circuit comprises a plurality of remotely heated-air feeding ducts (27, 30).
3. A pellet stove according to claim 1 or 2, **character-**

ised in that it comprises an intake motor driven fan having its inlet (25) communicating with the said intake circuit and with said at least one air inlet (17) and its outlet in communication with each remotely heated-air feeding duct (27, 30).

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4. A pellet stove according to claim 2 or 3, **characterised in that** each feeding duct (27, 30) is provided with at least one check valve.

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5. A pellet stove according to any claim 1 to 4, **characterised in that** the or each air inlet (17) is located in the upper front portion of the stove.

6. A pellet stove according to any claim 1 to 5, **characterised in that** at least said air intake circuit section in heat exchange relationship with the said exhaust circuit (12) is provided with a plurality of fins.

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7. A pellet stove according to any claim 1 to 6, **characterised in that** it comprises an automatic feeding device (40, 43, 44, 46) for feeding pellets to the combustion chamber (10).

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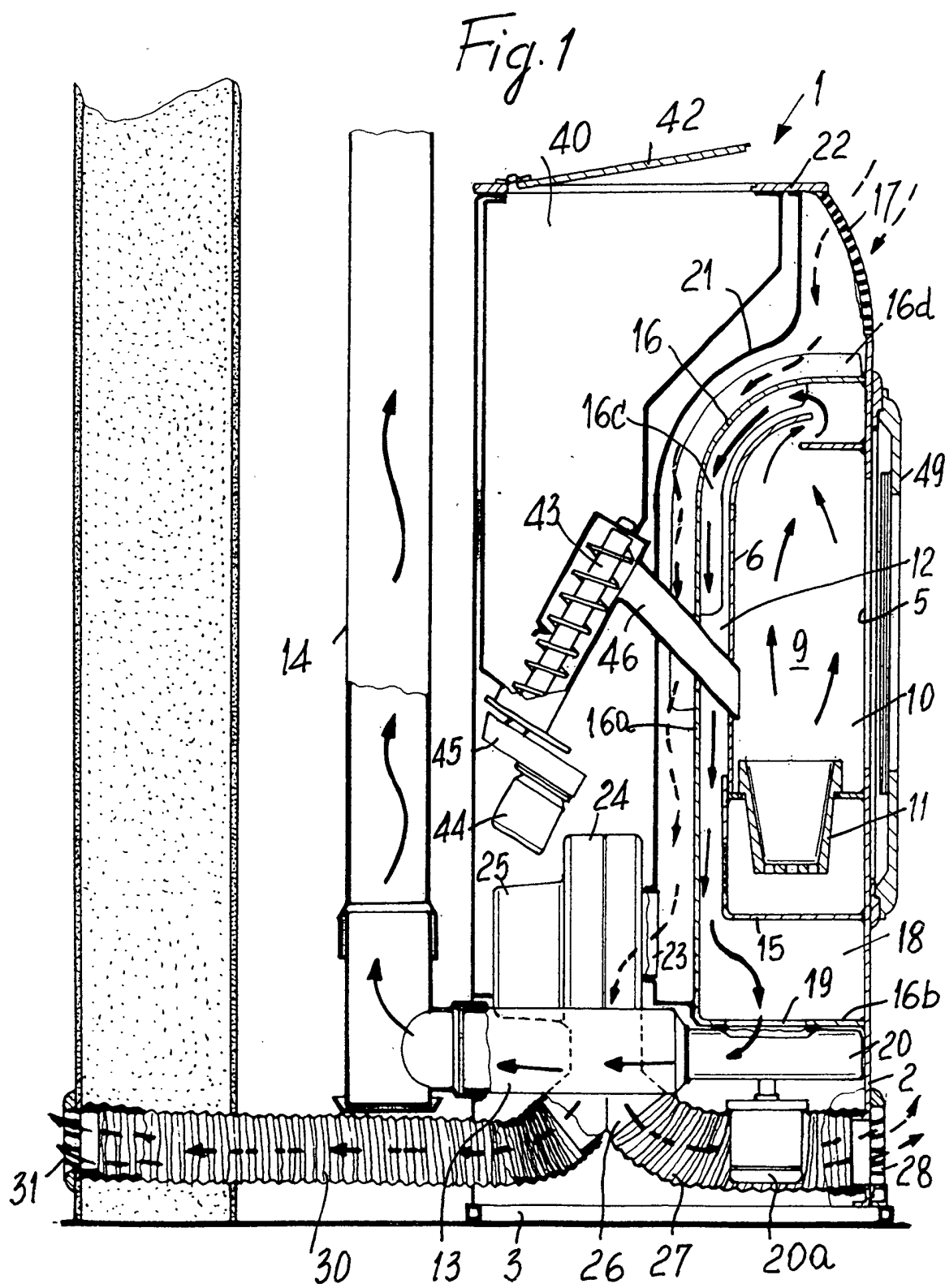
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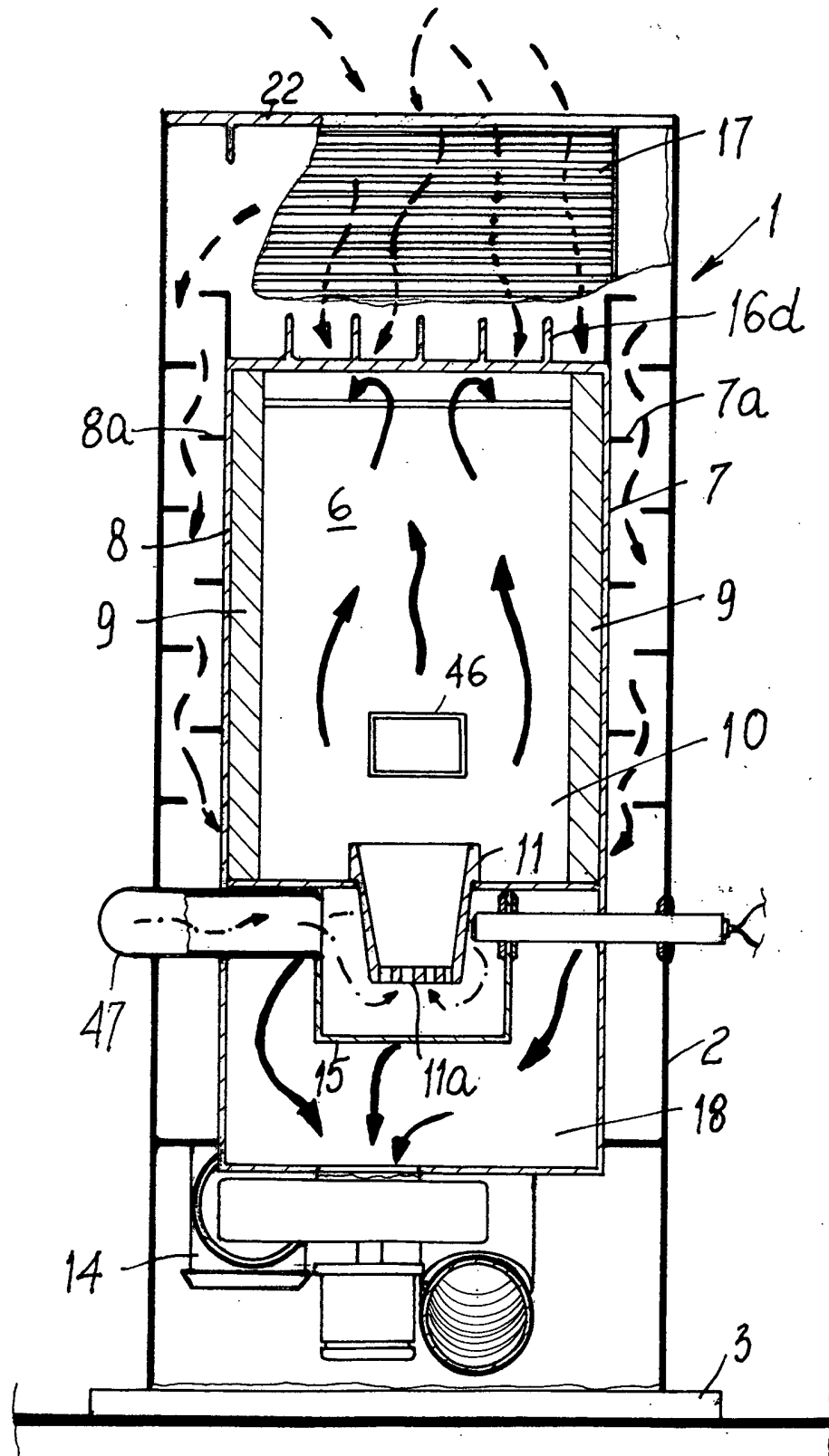
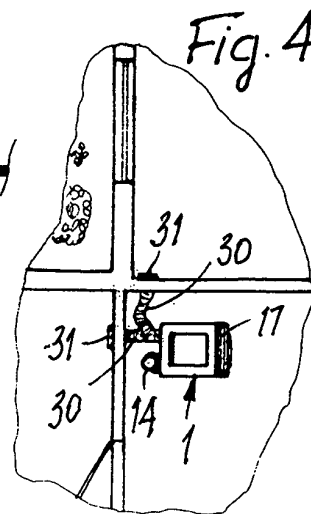
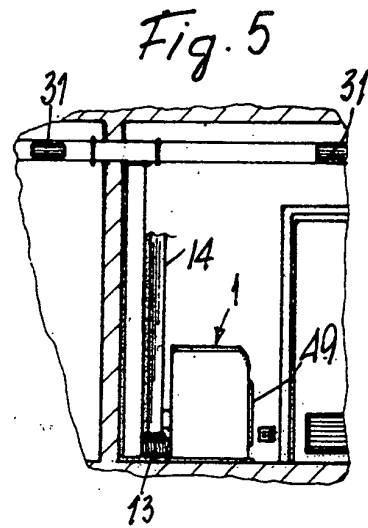
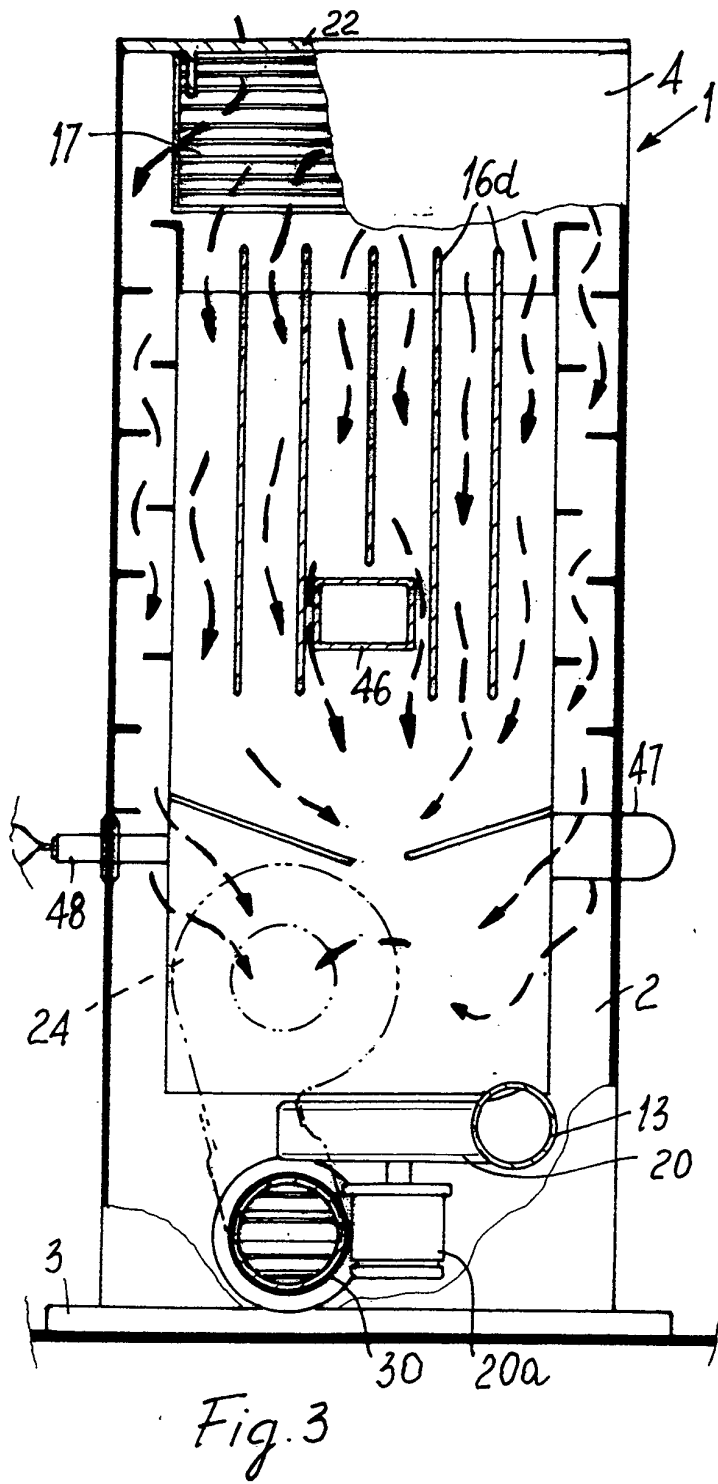


Fig. 2





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EUROPEAN SEARCH REPORT

Application Number
EP 03 00 0019

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 92 18 953 U (RIENER KARL STEFAN) 23 May 1996 (1996-05-23) * claim 1; figure 3 *	1	F24B1/02 F24B7/02
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		8 May 2003	Vanheusden, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 00 0019

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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