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(54) Forced draught wall mounted boiler

(57) It is described a forced draught type CM wall boiler, in particular an open room type (Bf) or sealed room type (C), equipped with a draught fan (7) and adapted to be connected exclusively to flues (2.2) permitted for the evacuation of flue gas under pressure. According to the invention, said CM wall boiler is further adapted to be connected to flues (2.1.) for flue gas evacuation in pressure drop, the boiler being equipped with means (AR, 5, 6, 7; 11, 11.1, 6.1) adapted to maintain the flue gas entry pressure in the flue (2.1) equal to the atmospheric pressure even in the presence of unforeseen disturbance or circumstances.

According to a first variant of the invention, this can be obtained with the application of an antirefouler AR device that necessarily maintains the flue gas pressure at the same level as the environmental pressure.

According to a second variant, particularly useful for sealed room wall boilers, the fan speed (7) is maintained at values that will not generate residual pressure at the wall boiler outlet; this is obtained through an electronic control unit on the wall boiler, that receives pressure signals from an electronic pressure switch (11) installed at the connection to the flue (2.1).

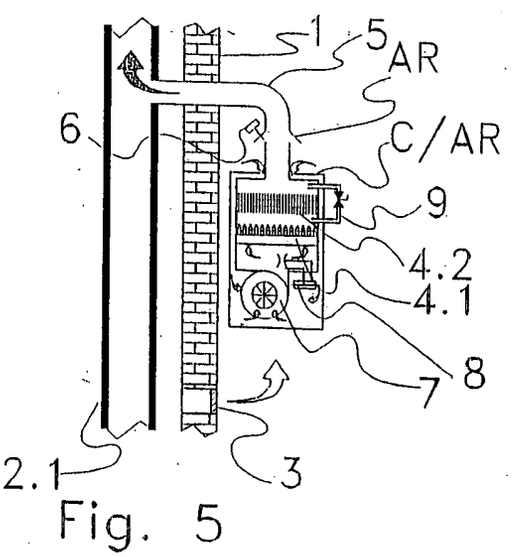

Fig. 5

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Description

[0001] This invention refers to a means for installing wall mounted forced draught boilers in flues destined exclusively for natural draught boilers.

[0002] In recent years the CM sealed room and forced draught wall mounted boiler (C type GAS model) has increased its market share very strongly compared to the open room version (B type GAS model) in both natural and forced draught versions because of higher safety levels, the possibility of obtaining more efficient yield, because of incentives or legislative measures applied in many countries, and lastly because manufacturers have concentrated their efforts strongly in this direction.

[0003] In fact, even though the C type CM wall boiler is more complex than the B type version, it is more easily adapted to technological innovations such as more compact combustion rooms, the possibility of prior gas and comburent air mixing (technology commonly referred to as premix), and increased compliance with standards and regulations.

[0004] However, in spite of certain drawbacks, compared to the B type forced draught CM wall boiler (hereafter referred to as Bf) and the C type boiler, the B type natural draught CM wall boiler (hereafter referred to as Bn) has the advantage of being able to evacuate flue gas in a traditional flue in pressure drop, whether this is a single or shared gas flue designed for natural draught, and therefore flue gas is emitted easily from the roof without any danger of infiltration into surrounding walls. On the other hand the cost of ducting flues or installing new multiple flues for discharging specific flue gas for Bf or C type CM wall boilers in order to prevent any infiltration of flue gas under pressure, is very expensive and project planning of these flues is complex. The most recent regulations limit or even forbid the use of sealed rooms with walled evacuation.

[0005] This situation is leading designers and installers to search for alternative solutions to Bf or C type CM wall boilers, for example, with a return to central heating.

[0006] Regulations in certain countries, for example, the Italian UNI 10641 standards, have established the bases for the use of shared natural draught flues for Bf or C type CM wall boilers by indicating project design, calculation and control methods. The basic principle of the UNI 10641 standard is that a pressure of "± 0" must be ensured in the connection between the boiler evacuation pipe and the flue (naturally this refers to relative pressure, or in other words, the difference from atmospheric pressure). In fact, it is obvious that if the boiler discharges flue gas without pressure, there will be no flue gas infiltration into walls, or flue gas emission in other rooms through other B type CM wall boilers connected to the same flue.

[0007] However, till now, it has been difficult to apply this regulation and other similar standards in other countries because the Bf or C type boilers currently on the market are only partially suited to this use, because they have not been designed to effectively guarantee that the evacuation pressure to the flue will always and exactly be "± 0". Even though laboratory measurements confirm the sufficiency of this condition, which is also reasonably easy to obtain, in practice there are many unforeseeable parameters and even transitory interference/disturbance that can influence flue draught. For this reason, certain project designers and authorities involved consider that the fundamental condition (pressure "± 0" at the flue mouthpiece) is not stationary and therefore cannot be guaranteed over a period of time.

[0008] Therefore, manufacturers are forced to provide for Bn type CM wall boilers as part of their range, even though they are technologically outdated, for installation in any areas where suitable flues are not available for Bf or C type CM wall boilers. This forces manufacturers to maintain strongly differentiated products in stock preventing standardisation that would contribute towards considerable reductions in cost, project design, production and management.

[0009] In addition, even if a solution is provided against forced draught CM wall boiler instability in flues designed for natural draught, the fact remains that C type CM wall boilers may also require the presence of comburent air ducts, thus forming another barrier that makes the installation of C type CM wall boilers in old buildings even more problematic and improbable.

[0010] The object of this invention is to furnish means that permit the installation of Bf or C type CM wall boilers in flues designed for Bn type CM wall boilers in complete safety and in full compliance with current regulations.

[0011] A further object of this invention is to permit considerable product standardisation by concentrating on C type CM wall boilers, that are technologically more advanced.

[0012] A further object of a variant of this invention is to permit the connection of C type CM wall boilers to flues designed for Bn type CM wall boilers while maintaining the sealed status inside the environment in which it is installed.

[0013] This and other objects are attained according to this invention, through the application of appropriate accessory means that cause Bf or C type CM wall boilers to perform like Bn type CM wall boilers regarding flue gas emission in flues designed for Bn type CM wall boilers. Said means and the corresponding advantages will be made clear in the following description and in the appended drawings that illustrate a preferred embodiment, and the appended claims that form an integrated part of the same description.

Fig. 1 shows a Bn type CM wall boiler installed according to methods known in the art in a flue with natural draught pressure drop.

Fig.2 shows a Bf type CM wall boiler installed according to methods known in the art in a flue under forced draught pressure.

Fig.3 shows a C type CM wall boiler installed according to methods known in the art in a flue under forced draught pressure.
Fig. 4 shows a Bf type CM wall boiler installed according to this invention in a flue with natural draught pressure drop.
Fig. 5 shows a C type CM wall boiler installed according to this invention in a flue with natural draught pressure drop.
Fig 6 shows a detail of fig. 5 according to a variant of this invention.
Fig 7 shows a detail of fig. 5 according to a further variant of this invention.
Fig 8 shows a C type CM wall boiler installed according to a variant of this invention in a flue with natural draught pressure drop.

[0014] The various elements are identified in the figures as follows: Bn refers to an open room and natural draught type CM wall boiler; Bf refers to an open room and forced draught type CM wall boiler; C refers to a sealed room and forced draught type Cm wall boiler; Bf/AR refers to a B type CM wall boiler converted according to this invention; C/AR refers to a C type CM wall boiler converted according to this invention.

[0015] The numeral 1 refers to the wall on which a standard CM wall boiler is installed. Numeral 2.1 refers to a flue for flue gas evacuation suitable for natural draught pressure drop only, and 2.2 refers to a flue for flue gas evacuation also suitable for forced draught pressure type CM wall boilers; naturally said flues 2.1 or 2.2 , generally designed to be connected to one or more CM wall boilers, are located inside the wall 1: however, they are illustrated as being external in the drawings for graphical comprehension and clarity.

[0016] Numeral 3 refers to the inlets connected directly to the exterior or through comburent air supply ducts (not shown). 4.1 refers to the burner unit and 4.2 refers to the flue gas/ thermal carrier fluid heat exchanger. 5 refers to a flue gas evacuation duct equipped with the known draught-breaking device AR (commonly known as "antirefouler") used in Bn type CM wall boilers. On the other hand 5.1 refers to sealed flue gas evacuation ducts used on Bf type CM wall boilers, and 5.2 refers to a sealed flue gas evacuation duct coaxial to an inlet duct to take in comburent air from the exterior used on C type CM wall boilers. 6 refers to the safety thermostat, obviously mounted opposite the AR antirefouler to deactivate the CM wall boiler in the case of flue gas reflux towards the environment where the CM wall boiler is installed. 7 refers to the fan mounted on all forced draught CM wall boilers; 8 refers to the safety differential pressure switch, equipped with venturi control metres, known in the art, with a sufficient flow generated by the fan 7. In figures 2 and 4 the fan 7 is shown installed downstream of the heat exchanger 4.2, and in figures 3, 5, 7 and 8, installed upstream of the burner 4.1 as on CM wall boilers with total comburent air and gas premix.

[0017] According to certain variants if this invention, the drawings also schematically illustrate a by-pass pipe 9 inserted permanently or in the case of necessity between the openings 9.1 and 9.2 in figure 6, and if necessary, possible mounted with a valve or equivalent interception device 9.3, as will be explained in more detail according to other variants of this invention.

[0018] According to certain variants of this invention, figure 7 shows a baffle 10 inserted between some of the fins of the heat exchanger 4.2.

[0019] According to a further variant of this invention figure 8 shows an electronic pressure switch 11.

[0020] The white arrows indicate the comburent air flow direction while the grey arrows show the flow direction of the flue gas to be evacuated.

[0021] The means used by the invention to permit the installation of forced draught CM wall boilers in a flue 2.1 designed for flue gas evacuation under pressure drop, in other words for natural draught CM wall boilers only, can be clearly understood from the drawings.

[0022] The Bf/AR and C/AR boilers according to this invention are simply Bf or C type standard boilers respectively, or generally forced draught boilers on which the following modifications have been applied where necessary or according to the CM wall boiler model.

- The flue gas evacuation duct 5.1 or 5.2. respectively is replaced with a flue gas evacuation duct 5 equipped with an antirefouler AR, as well as a safety thermostat 6 if necessary or if required by safety regulations.
- The maximum flue gas flow may need to be reduced.
- The maximum power distributed by the CM wall boiler may need to be reduced.
- The temperature of the evacuated flue gas may need to be increased.

[0023] Below is the explanation for the reasons for the modifications listed above and their actuation methods.

Antirefouler application

[0024] If, as described above, the conditions for obtaining a pressure of "± 0" is relatively easy with the appropriate adjustment settings, in actual practice, unexpected differences could occur, were it not for the fact that now the forced draught CM wall boiler is equipped with said flue gas evacuation duct 5 equipped with the antirefouler AR, according to this invention.

[0025] The prevalence of fan on forced draught CM wall boilers is due to the fact that they are generally used totally to combat the head loss inside the CM wall boiler itself, and therefore also the residual pressure at the mouthpiece of the flue, whether this is 2.1 or 2.2 type, and already very close to the value "±0". This is particularly true for the latest high technology premix boilers with the fan mounted upstream of the burner, as de-

scribed above, and therefore, basically upstream of the whole circuit mainly responsible for head loss. In this case, by placing the evacuated flue gas in contact with the environment where the boiler is installed, the antirefouler AR prevents any differences in the pressure "±0" at the mouthpiece of the flue 2.1. in a practically natural manner. The efficacy of this system has been proven in a very satisfactory manner during laboratory tests on a wide range of CM wall boilers.

[0026] Therefore, the simple application of a flue gas evacuation duct 5 equipped with an antirefouler is sufficient to attain the main object of the present invention, that is the connection of a forced draught CM wall boiler, in particular a premix sealed room model, to a flue 2.1, designed for natural draught.

[0027] Incidentally, whether due to necessity, or in compliance with regulations, the flue gas evacuation duct 5 is equipped with a safety thermostat 6 opposite the antirefouler AR for the known objects of the invention described above.

[0028] However it may occur that for certain CM wall boiler models, the simple use of flue gas evacuation duct 5 is not sufficient to ensure the possibility of connection to 2.1 type flues in compliance with standards and regulations.

Maximum flue gas flow rate

[0029] In certain forced draught CM wall boiler models, the evacuated flue gas flow could result as excessive for the evacuation capacity of the natural draught flue 2.1, especially if the flues are connected to several CM wall boilers; this will lead to a reflux of excess flue gas into the environment through the antirefouler AR. In this case the maximum flue gas flow must be reduced.

[0030] For this purpose the fan 7 designed as standard equipment for forced draught for connection to 2.2 type flues, can be maintained, but the maximum flow distributed by the fan must be reduced, using any kind of known means, for example by reducing the maximum speed. Naturally, although the method is less convenient when considering product standardisation, the fan 7 can be replaced with another with a lesser evacuation rate. Another method for reducing the maximum flow rate may be, as an alternative or in combination with the aforesaid modifications to fan 7, to create partial blocking in the comburent air or flue gas circuit in order to increase head loss. Naturally this block system must be easy to insert and remove by an authorised operator, including in the location where the CM wall boiler is installed.

Reduction of the maximum CM wall boiler distributed output

[0031] Naturally reduced flue gas flow could provoke a corresponding reduction in the maximum heat distribution output for certain forced draught CM wall boiler models. This can be obtained using known means, preferably with an adequate gas feed nozzle, in a manner so that this application can be made during boiler installation.

Increase in evacuated flue gas temperature

[0032] To ensure natural flue gas draught in the flue 2.1, it may be necessary to guarantee that the temperature of the flue gas in the flue 2.1 is sufficiently high.

[0033] This may be possible to obtain automatically as a direct result of the reduction of the maximum flue gas flow rate, however if the maximum distributed output is also reduced, it may be necessary to introduce other methods that are easily performed by a technician in this sector to guarantee sufficiently high temperatures.

[0034] For example part of the flue gas generated in the burner 4.1 can by-pass the heat exchanger 4.2 to then mix with the flue gas that has crossed the heat exchanger and that has been excessively cooled. For this purpose it is sufficient to create a simple by-pass channel 9 that can be built as standard equipment on all forced draught CM wall boilers, but that remains open during production or during installation only if said CM wall boilers are connected to a natural draught flue 2.1.

[0035] There are many simple methods for creating a by-pass 9; for example, the by-pass can consist of a tube to be inserted between the two openings 9.1 and 9.2, respectively upstream and downstream of the heat exchanger 4.2, otherwise sealed by appropriate plugs when the by-pass is not required, or by a permanently applied tube equipped with an interception valve 9.3. or an equivalent interception means, to be opened when the by-pass is required.

[0036] As an alternative or an addition to the by-pass 9, the flue gas temperature can be raised by reducing the surface of the heat exchanger 4.2; this can also be obtained easily using various different methods: a preferred means, because of its simplicity and ease of application, even in the location during CM wall boiler installation, is the application of baffle 10 among an appropriate number of fins of the heat exchanger 4.2, that prevents them from being licked by the flue gas.

[0037] At this point it is obvious that a forced draught CM wall boiler, installed according to the instructions provided in this invention, can guarantee the emission of flue gas in the flue 2.1 at a pressure that is certainly equal to "±0" under any conditions, even faulty, since the presence of the antirefouler AR prevents any pressure change from the atmospheric pressure.

[0038] Using known methods, the presence of the safety thermostat 6 also prevents any reflux of flue gas into the internal environment temporarily or permanently deactivating the CM wall boiler if any abnormal reflux occurs.

[0039] With the adaptions described in this invention a forced draught CM wall boiler will generally have performance levels lower than those obtained according to

the installations shown in figures 2 and 3, but for similar sized models, it will have at least the same performance as that of Bn type CM wall boilers, and will guarantee at least the same safety conditions. On the other hand, product standardisation provides considerable production and installation cost savings that result advantageous for the end user as well.

[0040] A preferred embodiment of the methods shown in this invention foresees the production of absolutely undifferentiated forced draught CM wall boilers for connection to forced draught flues 2.2, or natural draught flues 2.1, and equipped to react as known, using both the safety differential pressure switch 8, as well as the safety thermostat 6, if envisaged. These CM wall boilers are differentiated at the moment they are installed, with the mounting of a flue gas evacuation kit, sold separately according to usual practice, such as the types 5.1 or 5.2 in the case of Bf or C models for connection to 2.2 type flues, or the flue gas evacuation kit type 5 when the same model boiler is connected to the 2.1 type flue,

- the fan 7 speed is reduced by a fixed established percentage for each CM wall boiler model, using an appropriate command on any type of known means for this purpose, for example a switch to be inserted or to change value or other means;
- as an alternative or in addition to the previous point, the block system previously described can be inserted in the comburent air or flue gas circuit; and additionally, if the CM wall boiler to be installed requires and foresees this option,
- the maximum distribution gas flow is adjusted;
- the by-pass 9 is activated by opening or removing the interception means 9.3, and/or again where necessary, baffle 10 is inserted between certain fins of the heat exchanger 4.2;
- the safety thermostat 6 is mounted on the antirefouler AR and connected to the CM wall boiler command and control device, previously equipped to read the signals according to known methods, whereas, if this is superfluous, the safety differential pressure switch 8 can be disconnected or not mounted.

[0041] It has been demonstrated how, according to the means of this invention described up to this point, C type CM wall boilers or sealed room boilers can be converted to open room models with the presence of the antirefouler AR. However in certain cases and for certain users, this may not be desirable since the hermetically sealed rooms on these CM wall boiler models are a safety guarantee against any type of unforeseen fault or defect.

[0042] However, according to a further variant of this invention, it is possible to attain the objects declared by avoiding the use of the antirefouler AR, thus maintaining the sealed room boiler. Therefore, although it is also perfectly applicable to Bf type boilers or forced draught open room models, the variant that will now be described is particularly advantageous for C type boilers, or sealed room models, and will be described with particular reference to the C type model.

[0043] It is known that these boilers, technologically very advanced, are all equipped with an electronic unit that controls boiler functions such as heat output modulation according to requirements, and the modulation of the comburent air flow aimed at maintaining excess air within the optimum values.

[0044] In certain CM wall boilers, the differential pressure switch 8 is the electromechanical type, where action is limited to checking whether the fan distributes enough flow. However on other models, the switch is electronic, and consists of a pressure sensor that transmits an electric signal to the electronic unit which, in turn, interprets the signal; in this manner, on models with the latest technology, it is possible to modulate the comburent air and gas flow, thus modulating the output and maintaining excess air within optimum values.

[0045] According to the variant described here, it is possible to maintain the respect of the "±0" condition by simply programming the unit in order to adjust the fan speed so that the pressure read by another electronic pressure switch 11, positioned near the flue gas evacuation mouthpiece 5.2 of flue 2.1 will be "±0". The maintaining of this condition generally leads to a variation in the comburent air flow, and therefore also in the gas flow to maintain the air excess within values considered acceptable. The electronic unit, as described above, is perfectly able to perform these functions. The maximum output distributed instant by instant will be therefore be the lesser among those requested, and that compatible with the "±0" pressure condition at the mouthpiece on flue 2.1.

[0046] Although it has been seen that, even when subjected to this additional control the flue gas temperature during flue gas evacuation is always sufficient to guarantee natural draught from the 2.1 type flue, the electronic unit is also perfectly able to calculate the evacuated flue gas temperature and to maintain values high enough to guarantee natural draught in the flue 2.1, so in this variant of the invention, the installation of by-pass 9 or baffles 10 is absolutely not necessary in order to raise flue gas temperatures.

[0047] As far as the system's reliability is concerned, the self-diagnosis procedure that permits the control of the correct function of pressure switches mounted on CM wall boilers is known, and a technician skilled in the art can easily adapt the system to control faults on the electronic pressure switch 11. However, if he considers this necessary a second safety pressure switch 11.1, not necessarily electronic, can be mounted next to the electronic pressure switch 11, and set at a fixed point to exclude the CM wall boiler temporarily or permanently in the case of intake pressure other than 0, in the flue 2.1. Although it is considered absolutely superfluous, a con-

trol thermostat 6 could be mounted in the flue gas evacuation duct 5.2, able to control whether the flue gas entry temperature is sufficient.

[0048] Naturally the electronic unit on the C type CM wall boiler according to this last variant of the invention, must be programmed to take into consideration the signals from said electronic pressure switch 11, and possibly also from the safety pressure switch 11.1, as well as the safety thermostat 6.1.

[0049] At this point it is obvious that according to this last variant of the invention, not only any kind of C type CM wall boiler, but also the relative sealed flue gas evacuation duct 5.2, can be manufactured in an absolutely undifferentiated manner, since to attain the object of the invention it is sufficient that

- compared to prior art models, the electronic unit of said CM wall boiler must also be able to interpret the signals transmitted from said electronic pressure switch 11, and possibly also from the said second safety pressure switch 11.1, and/or said control thermostat 6.1;
- the corresponding flue gas evacuation duct 5.2 must foresee the possibility of adding a kit comprising the said electronic pressure switch 11 and possibly also the said second safety pressure switch 11.1, and/or the control thermostat 6.1, where necessary.

[0050] The flue gas evacuation duct 5.2 provides for the comburent air intake exterior to the room in which the CM wall boiler is installed, through a duct coaxial to that of the flue gas evacuation; however it is possible that this creates a problem and that is then necessary to provide for an adaptor for flue gas evacuation stub pipes destined for air intake, still from the exterior, but from another part of the wall, as is known, and therefore not illustrated in the drawings.

[0051] As far as activating the function modes of said CM wall boilers is concerned: different modes according to whether the boiler is installed on a 2.1 or 2.2 type flue, several known methods such as switches or similar means can be used, but it is also possible to adapt the electronic unit so that it will read the presence or absence of the electronic pressure switch 11, and activate the relative procedure according to the pressure switch status.

[0052] Finally, it is clear that the invention described here, with reference to wall mounted boilers, can also be applied just as efficiently to many types of fossil combustible and forced draught heat generators such as boilers for floor installation and accumulator or instant bathroom water heaters.

Claims

1. Forced draught type wall mounted boilers, in particular, open room (Bf) or sealed room (C) types equipped with draught fan (7) and adapted to be connected exclusively to flues (2.2) permitted for the evacuation of flue gas under pressure
characterised by the fact that
said CM wall boiler is further adapted to be connected to flues (2.1) permitted exclusively for the evacuation of flue gas under pressure drop, said boiler being equipped with means (AR, 5, 6, 7; 11, 11.1, 6.1) adapted to maintain the entry pressure of the flue gas in said flue (2.1) equal to the atmospheric pressure also in the presence of unforeseen disturbance or circumstances.

2. Wall boiler according to the previous claim
characterised by the fact that
said means comprise

- the application on said boiler (Bf, C) of a flue gas evacuation duct (5) used on natural circulation CM wall boilers (Bn), said flue gas evacuation ducts being equipped with an antirefouler (AR),
- and suitable known means for reducing the maximum flue gas flow in a manner that at the mouthpiece of the flue gas evacuation duct (5) in flue (2.1) the pressure results as being "± 0".

3. Wall boiler according to claim 2
characterised by the fact that
said reduction of the maximum flow is obtained using means that reduce the maximum speed, and therefore the prevalent influence of the fan (7).

4. Wall boiler according to the previous claim
characterised by the fact that
said reduction of the maximum fan (7) speed, aimed at reducing the prevalence, is obtained using any known means for this purpose such as a switch, a resistor for insertion or for value change, or any other means that can be applied by boiler installers. ,

5. Wall boiler according to claim 3
characterised by the fact that
said reduction of fan prevalence (7) is obtained by replacing the fan (7) with another fan (7) with a maximum prevalence equal to the required prevalence.

6. Wall boiler according to claim 2
characterised by the fact that
said reduction of maximum flow rate is obtained through the application of a blocking system in the comburent air or flue gas circuit that increases the head loss by the amount necessary in order to obtain a relative pressure equal to 0 at the mouthpiece of the flue (2.1).

7. Wall boiler according to the previous claim

characterised by the fact that
said block system can be easily inserted and removed by the boiler installers.

8. Wall boiler according to any one of previous claims **characterised by** the fact that
the maximum distributed output of the CM wall heater is reduced by known means

9. Wall boiler according to the previous claim **characterised by** the fact that
said known means are composed of an adequate gas injector nozzle.

10. Wall boiler according to any of the previous claims **characterised by** the fact that
a safety thermostat (6) is installed on said flue gas evacuation duct (5) equipped with an antirefouler AR, aimed at deactivating said CM wall boiler if any flue gas reflux is signalled in the internal environment, through existing connection means between said safety thermostat (6) and the command and control device on the CM wall boiler, said latter device being able to pick up the signals transmitted by the same thermostat (6).

11. Wall boiler according to the previous claim **characterised by** the fact that
said safety thermostat (6) can be connected to the command and control device on the CM wall boilers by the boiler installers.

12. Wall boiler according to any of the previous claims **characterised by** the fact that
certain means are foreseen to guarantee that the flue gas entry temperature in the flue (2.1) is high enough to ensure natural flue gas draught inside the flue (2.1).

13. Wall boiler according to the previous claim **characterised by** the fact that
said flue gas entry temperature is maintained sufficiently high with the application of a by-pass (9) through which part of the flue gas generated by the burner (4.1) by-pass the heat exchanger (4.2) then mixing with the flue gas that has crossed the heat exchanger to be cooled.

14. Wall boiler according to the previous claim **characterised by** the fact that
said by-pass (9) is realised in the form of a tube inserted between the two openings (9.1) and (9.2), respectively upstream and downstream of the heat exchanger (4.2), while, when said by-pass (9) is not necessary, said openings (9.1) and (9.2) are plugged.

15. Wall boiler according to claim 13 **characterised by** the fact that
the passage of the flue gas through the by-pass (9) realised using a tube inserted between the two openings (9.1) and (9.2), respectively upstream and downstream of the heat exchanger (4.2), is obtained by means of an interception valve (9.3) or equivalent opening means.

16. Wall boiler according to any of the previous claims from 12 to 15 **characterised by** the fact that
said by-pass (9) can be activated by the boiler installers.

17. Wall boiler according to claim 12 **characterised by** the fact that
said flue gas entry temperature is maintained sufficiently high through the application of a baffle (10) between an appropriate number of fins of the heat exchanger (4.2) that prevents them from being licked by the flue gas.

18. Wall boiler according to the previous claim **characterised by** the fact that
said baffle (10) is easily inserted and removed by the boiler installers.

19. Wall boiler according to any of the previous claims **characterised by** the fact that
the flue gas evacuation duct (5) is interchangeable with the flue gas evacuation ducts (5.1; 5.2), foreseen for forced draught CM wall boilers, respectively open room (Bf) or sealed room (C) types and necessary for connecting said CM wall boiler to flues (2.2) suitable for flue gas under pressure.

20. Wall boiler according to any of the previous claims **characterised by** the fact that
the models of the forced draught CM wall boilers

- are manufactured in an absolutely undifferentiated manner independently of whether they are to be connected to forced draught (2.2) or natural draught (2.1) flues,
- are adapted to react as known to signals from a safety thermostat (6) or a safety differential pressure switch (8) if foreseen,
- all adaption operations of said CM wall boilers to the specific forced draught (2.2) or natural draught (2.1) flues are performed during boiler installation by the same boiler installers.

21. Wall boiler according to the aforesaid description and illustration for the specific objects of the invention.

22. Method for the installation of a forced draught wall boiler without distinction on forced draught (2.2) or

natural draught (2.1) flues according to one or more of the previous claims
composed of producing forced draught boiler models equipped for connection to both the first and the second type of said flue (2.2; 2.1) through the use of appropriate adaptions.

23. Method for the installation of a forced draught wall boiler according to the previous claim
characterised by the fact that
said adaptions to said boilers to the specific flues (2.2; 2.1) are performed during boiler installation by the boiler installers.

24. Wall boiler according to claim 1
characterised by the fact that
said boiler is a C type, sealed room and forced draught boiler equipped with an electronic unit, independently recognised and known, at least adapted to

- modulate the thermal output according to requirements and
- modulate the comburent air flow in order to obtain the excess air within the optimum values,

said unit being further adapted to

- receiving the signals transmitted by an electronic pressure switch (11) aimed at maintaining the air flow rate at values that will guarantee the pressure condition "±0" at the mouthpiece of the flue (2.1),
- maintaining the maximum output distribution instant by instant equal to the lesser between that required and that compatible with the pressure condition "±0" at the mouthpiece of the flue (2.1).

25. Wall boiler according to claim 24
characterised by the fact that
said unit is further adapted to receive signals transmitted by a safety pressure switch (11.1) set at a fixed point, and that excludes temporarily or permanently the CM wall boiler in the case of entry pressure other than 0 level in the flue (2.1).

26. Wall boiler according to the previous claims 24 and/or 25
characterised by the fact that
said unit is further adapted to receive the signals transmitted by a control thermostat (6.1) for the sufficient flue gas entry temperature value in the flue (2.1).

27. Wall boiler according to any previous claim from 24 to 26
characterised by the fact that
the specific control procedures for the same CM wall boiler function mode, that differ according to the installation on natural draught (2.1) or forced draught (2.2.) flues, are activated by means of a switch or an equivalent means.

28. Wall boiler according to any previous claim from 24 to 26
characterised by the fact that
said unit is adapted to identify the presence or absence of the electronic pressure switch (11), and consequently, activates the specific control procedure at the connection to a natural draught (2.1) or forced draught (2.2) flue respectively.

29. Wall boiler according to any previous claim from claim 24 onwards
characterised by the fact that
said electronic pressure switch (11) is installed on the flue gas evacuation duct (5.2) close to the mouthpiece of said flue (2.1).

30. Wall boiler according to any previous claim from claim 24 onwards
characterised by the fact that
said safety pressure switch (11.1) is installed on the flue gas evacuation duct (5.2) near said electronic pressure switch (11).

31. Wall boiler according to any previous claim from claim 24 onwards
characterised by the fact that
said thermostat (6.1) is installed on the flue gas evacuation duct (5.2) close to the mouthpiece of said flue (2.1).

32. Wall boiler according to any previous claim from claim 24 onwards
characterised by the fact that
said flue gas evacuation duct (5.2) is undifferentiated in relation to the possibility of connection to a natural draught (2.1) or forced draught (2.2) flue, but provides for an accessory kit adapted for the mounting of said electronic pressure switch (11).

33. Wall boiler according to the previous claim
characterised by the fact that
said accessory kit further provides for the possibility of the mounting of said safety pressure switch (11.1) and/or said control thermostat (6.1).

34. Wall boiler according to any previous claim from claim 24 onwards
characterised by the fact that
said flue gas evacuation duct (5.2) provides for the possibility of mounting an adaptor for flue gas evacuation stub pipes destined to take in the air from a point in the wall different from that normally used for

flue gas evacuation according to prior art.

35. Fossil combustible and forced draught heat generator having one or more of the characteristics of the previous claims.

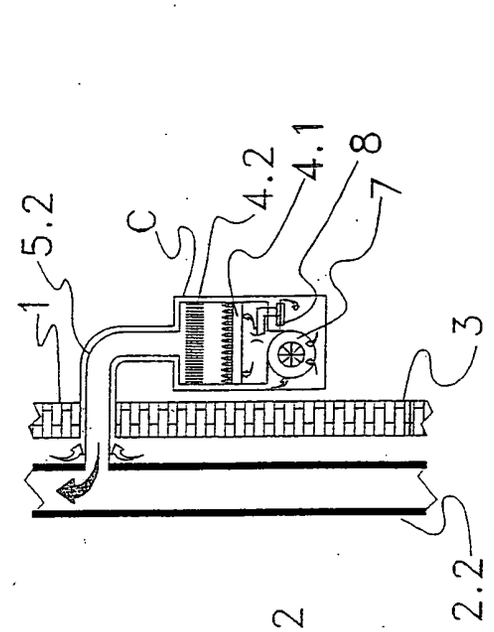

Fig. 3

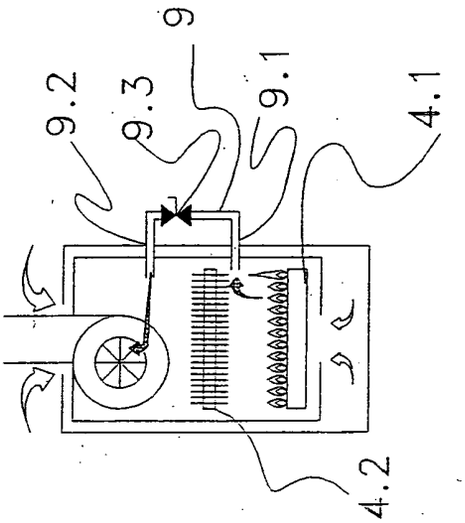

Fig. 6

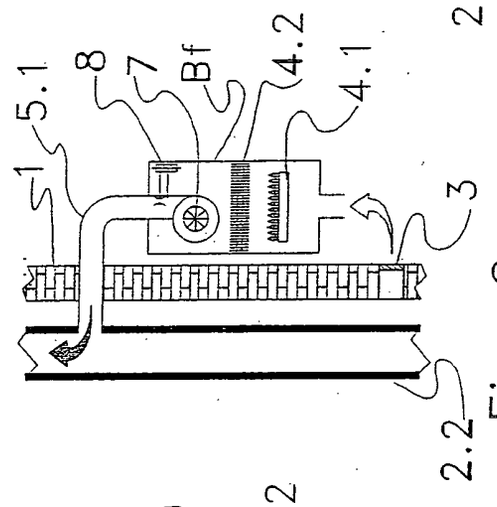

Fig. 2

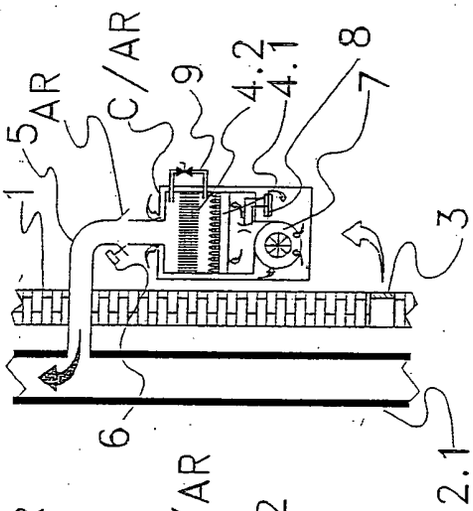

Fig. 5

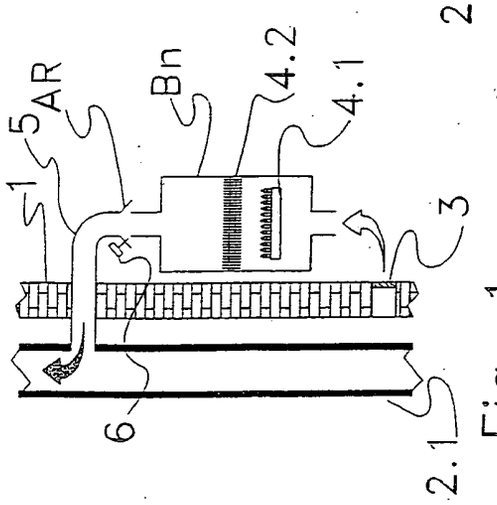

Fig. 1

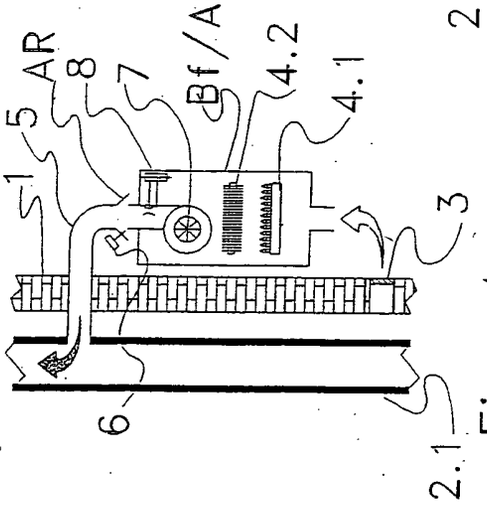

Fig. 4

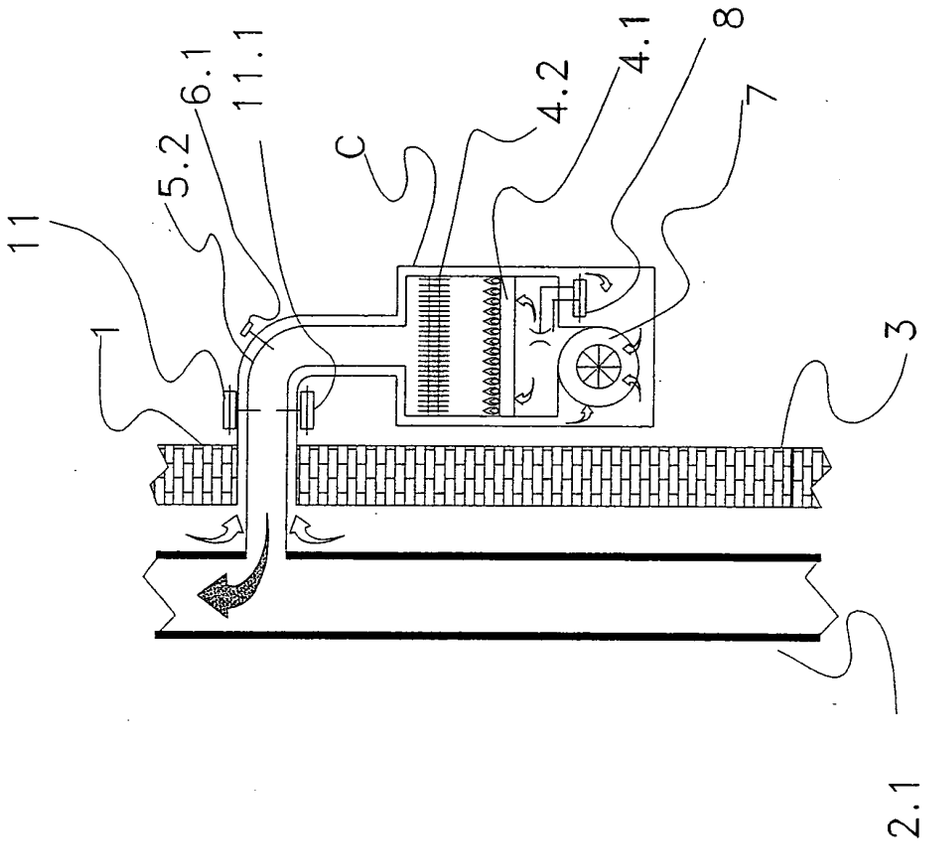

Fig. 8

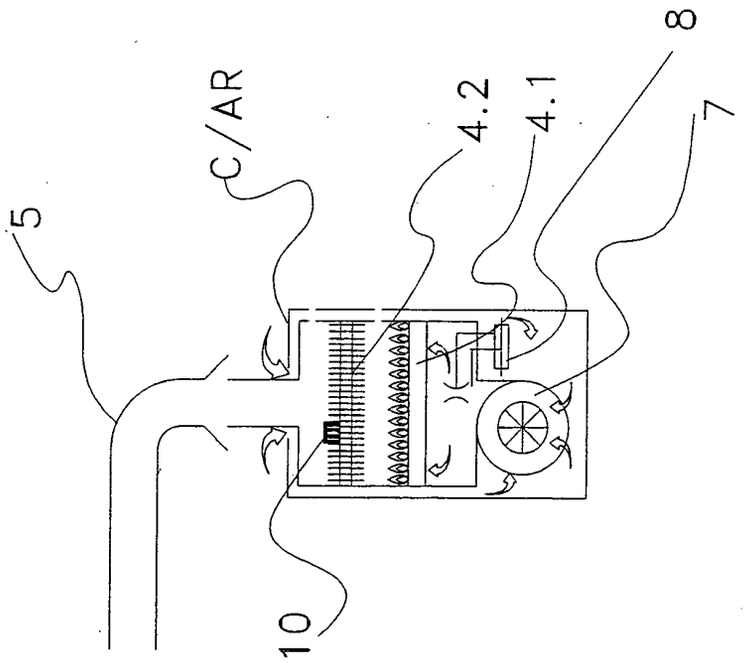

Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 02 9573

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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
MUNICH	22 March 2004	Arndt, M

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
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