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(54) **Pellet stove with system of self-cleaning of the brazier**

(57) Pellet stove comprising a case (10) which is internally provided with a hopper (11) for containing the pellets (12) for feeding to a brazier (15) provided with holes (62) for the entry of combustion air aspirated,

through a pressure drop, by a flue gas extraction fan (18), wherein the base wall of said brazier (15) is formed by a section provided with said holes (62) for the entry of the combustion air of a pipe (50) having at least one end (55) open, mounted so as to be able to rotate around its axis.

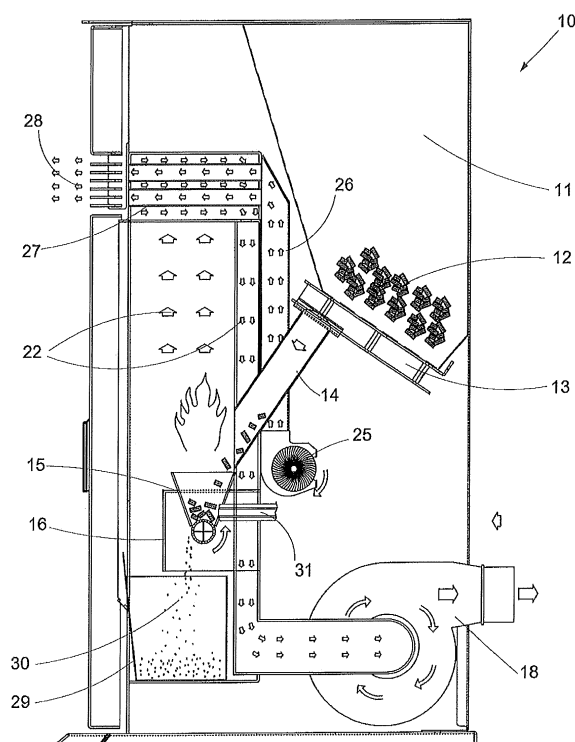


FIG. 2

Description

[0001] The object of the invention is a pellet stove provided with a system for self-cleaning of the brazier and of feeding of combustion air to the same.

[0002] A pellet stove of the prior art, illustrated in the accompanying Figure 1, comprises a case 10, with a substantially parallelepiped shape, in whose upper part a hopper 11 is placed wherein the pellet 12 is loaded, which by means of a worm conveyor 13 is conducted to a drop pipe 14 which feeds it to a brazier 15 where combustion takes place.

[0003] The brazier 15 is mounted on a support 16, and has holes 17 for the passage of the combustion air which is aspirated from the outside by the pressure drop created by a flue gas extraction fan 18, as illustrated by the arrows. More particularly the fresh air from the environment indicated by the arrows with reference numeral 19, entering through an opening 20 and a conduit 21, is drawn into the brazier 15 through the holes 17, while the hot combusted gases, denoted by the arrows with reference numeral 22, are aspirated and expelled by the fan 18.

[0004] A further fan 25 feeds ambient air represented by the arrows denoted by reference numeral 26, which heats by passing through an exchanger 27 where it takes heat from the hot flue gas produced by the combustion and is fed back hot into the environment, as represented by the arrows 28.

[0005] Below the brazier 15 a box 29 is placed for the collection of the ashes 30.

[0006] According to this known technique the cleaning of the brazier takes place periodically by increasing the speed of rotation of the flue gas extraction fan 18, in such a way as to increase the pressure drop and therefore make the ashes jump upwards and then make them fall into the underlying collection box 29, as schematically shown by the dots in Figure 1.

[0007] Figure 1 also shows schematically a resistor, referred to in jargon as plug, which generates the heat necessary for igniting the pellets in the brazier 15.

[0008] The system of cleaning of the brazier 15 described above has proved to be inadequate in eliminating possible incrustations which may form on the walls of the brazier 15, which tend to obstruct the holes 17 of passage of the combustion air, with consequent loss of efficiency of the stove. Therefore frequent manual cleanings of the brazier 15 are made necessary.

[0009] Alternative systems for the removal of the ashes have likewise been proposed, such as for example a screw placed on the base of the brazier, having half right threading and half left threading which, when it is rotated, draws the dust from the brazier, making it drop into the collection box below.

[0010] Such a solution is somewhat complex and does not allow optimal cleaning to be carried out, in particular possible incrustations to be eliminated which may have formed at the holes of feeding of the combustion air into the brazier.

[0011] A further solution is described in the document US2007/0215021 wherein a constructionally complex burner apparatus or device is illustrated which, in one embodiment, comprises a brazier below which a component is placed which can rotate with respect to a horizontal rotation axis suitable for collecting and holding the combustion products in order to convey them, by means of a rotation, in the direction of an underlying ashes collection box, with said brazier which comprises, moreover, elements of retaining of the ash provided with springs and hinged on the base of the brazier at the rotatable component and a fuel retaining slide placed above the openable base of the brazier and of the rotatable component and such as to be able to be moved inside and outside of the brazier in order to retain the burning fuel or allow the drop thereof in the direction of the rotatable component.

[0012] However, this solution too has some major disadvantages linked to the constructional complexity and to the fact that it does not allow the transfer to the pellets of air coming from the outside in such a way as to improve the heat yield of the burner device.

[0013] The object of the invention is that of eliminating the aforementioned disadvantages of the prior art.

[0014] More particularly one object of the invention is that of providing a system of self-cleaning of the brazier of a pellet stove which allows a perfect disincrustation of the holes of feeding of the combustion air.

[0015] Another object of the present invention is that of providing such a self-cleaning system which allows at the same time the feeding of the combustion air into the brazier.

[0016] Yet another object of the invention is that of providing such a system which is simple and economical to manufacture.

[0017] These objects are achieved in accordance with the features of the annexed independent claims.

[0018] Advantageous embodiments of the invention are disclosed by the dependent claims.

[0019] Substantially the pellet stove according to the invention, of the type described previously, has, on the base of the brazier, a pipe mounted between the walls of the case of the stove so as to be able to rotate around its axis and having at least one end, preferably both ends, open for the entry of ambient air, and a plurality of holes at its section placed at the brazier.

[0020] This perforated pipe constitutes in practice the base wall of the brazier and has its shell a short distance from two opposite longitudinal walls placed as a funnel of the brazier.

[0021] In this way the aforementioned perforated pipe acts both as feed of the comburent air to the brazier and as cleaner element for the elimination of the ashes and the removal of possible incrustations. In fact, by periodically rotating this pipe, the ashes and possible incrustations which may have formed around the holes of entry of the air are evacuated through the gap between the shell of the pipe and one of said longitudinal walls of the

brazier.

[0022] The pipe preferably has at least one longitudinal baffle, preferably at least two, in such a way as to divide its span into several longitudinal sectors and block the openings of entry of the air in the lower half, in such a way as to limit to a minimum the possible escape of air through holes of the pipe not placed inside the brazier, for whatever angular position of the same pipe.

[0023] The pipe being totally inside the stove body, it allows a preheating of the air, and therefore a better yield of the combustion.

[0024] Other advantages obtained with the system according to the invention are reduced cleaning operations, the elimination of the failed lightings and of the incorrect combustions due to the clogging of the holes of passage of the air and the simplicity of manufacture of the single components.

[0025] Further features of the invention will be made clearer by the following detailed description, referred to one of its embodiments purely by way of a non-limiting example illustrated in the accompanying drawings, wherein:

Fig. 1 is a schematic sectioned view of a traditional pellet stove, as described previously;

Fig. 2 is a view like that of Fig. 1 of a pellet stove incorporating the self-cleaning system according to the invention;

Fig. 3 is an enlargement of a detail of Fig. 2 relating to the brazier and to the box of collection of the dust;

Fig. 4 is a section taken along the plane IV-IV of Fig. 3;

Fig. 5 is a further enlarged schematic view, partially sectioned, partially viewed along the arrow F of Figure 4.

[0026] A traditional pellet stove shown in Fig. 1 has been described previously.

[0027] Herein below the pellet stove according to the invention will be described with reference to Figs. 2 to 5, wherein the same reference numerals are given of Fig. 1 to denote identical or similar parts, which will not be described further, as likewise the functioning of the stove will not be repeated, also already described in brief.

[0028] The description will therefore be limited to the innovative parts of the stove according to the invention.

[0029] As shown more clearly in Figs. 3 and 4, on the base of the brazier 15 a pipe 50 is positioned, supported in such a way as to be able to rotate around its axis from the sides 51 of the case 10 of the stove, by means of bushings or bearings 52, in order to reduce the friction during the rotation to a minimum.

[0030] The pipe 50 can be made to rotate by means of a motor, not shown, which controls a chain 53 meshing a pinion 54 mounted at one end of the pipe.

[0031] At least one end of the pipe 50, and preferably both the ends 55, are open to allow the entry of air from the environment as indicated by the arrows 19.

[0032] Longitudinal baffles are preferably placed in the pipe 50, in the example shown four baffles 56 placed in a cross in order to channel the flow of air 19. Naturally the number of baffles can be higher or lower than four.

[0033] Respective fixed shutters 57 are placed at the ends 55 of the pipe 50 (see also Fig. 5) which, together with the baffles or partitions 56 inside the pipe, allow the air to be conveyed only in the upper zone of the pipe.

[0034] The pipe 50 is placed in such a way as to constitute in practice the base wall of the brazier 15, and therefore constitute an integral part of the same.

[0035] In the example shown the brazier or crate 15 for containing the pellets has a substantially overturned truncated pyramid shape, with two opposite walls 60 which extend longitudinally along the axis of the pipe 50 and converge as a funnel on the shell of the pipe, leaving a small gap 61 between their ends and the shell of the pipe 50.

[0036] The section of the pipe 50 below the brazier 15 has a plurality of holes 62 on the entire section, to allow the entry of air in the brazier 15.

[0037] During the normal functioning of the stove the pipe 50 feeds the combustion air to the pellet 12 in the brazier 15, air which is aspirated through the holes 62 by the pressure drop created by the flue gas extraction fan 18. Since the pipe 50 constitutes an integral part of the brazier 15, and is therefore at high temperature at least in the zone of the support 16 of the brazier, the air 19 undergoes a preheating before coming into contact with the pellets 12 in the brazier 15, thus improving the heat yield of the stove and reducing the production of carbon dioxide.

[0038] When it is necessary to perform the cleaning, the pipe 50 is rotated, as indicated by the arrow in Fig. 3, thus making the ashes 30 fall into the collection box 29, through the gap 61 between a wall 60 of the brazier and the shell of the pipe 50.

[0039] This rotation likewise allows the elimination of possible incrustations which may form on the pipe, which could block the holes 62.

[0040] Conveniently a control unit (not shown) is provided, with a user interface through which it is possible to set the cyclical cleaning times, on the basis of the thermal power of the stove, for example a slow rotation of the pipe 50 (1-10 rpm) lasting 10-60 seconds every 3-8 minutes can be provided. When the stove is extinguished a longer rotation is provided, for example of 3-12 minutes.

[0041] From what has been disclosed the advantages of the pellet stove according to the invention appear clear, which by means of the perforated pipe 50 allows both the feeding of preheated air to the pellets in the brazier 15 and the self-cleaning of the same brazier.

[0042] Naturally the invention is not limited to the particular embodiment previously described and illustrated in the accompanying drawings, but instead numerous detail changes can be made thereto, within reach of the person skilled in the art, without thereby departing from the scope of the same invention as defined in the an-

nexed claims.

Claims

1. Pellet stove comprising a case (10) which is internally provided with a hopper (11) for containing the pellets (12) to feed a brazier (15) below which a pipe (50) is placed, cyclically rotating with respect to its axis, having holes (62) formed in its shell for the entry of combustion air aspirated, through a pressure drop, by a flue gas extraction fan (18), **characterised in that** it comprises a system of self-cleaning of the brazier defined by said pipe (50) placed in such a way as to define the base of the brazier and determine at least one gap (61) for the fall of the ashes (30) formed between its shell and at least one of two opposite walls (60) of the brazier (15) converging as a funnel on the shell of the pipe, said pipe (50) having at least one end (55) open for the entry of said air. 5
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2. Pellet stove according to any one of the preceding claims, **characterised in that** said pipe (50) has at least one longitudinal baffle (56) and a fixed shutter (57) suitable for closing the lower half of said at least one open end (55), such as to channel the air into the upper part of the pipe (50). 25
3. Pellet stove according to any one of the preceding claims, **characterised in that** said pipe (50) is supported by two opposite walls (51) of said case (10) by means of bushings or bearings (52). 30
4. Pellet stove according to any one of the preceding claims, **characterised in that** said pipe (50) is driven by a motor by means of a pinion (54) mounted at one of the ends (55) thereof. 35
5. Pellet stove according to any one of the preceding claims, comprising a control unit with user interface for the setting of the cyclical rotation times of said pipe (50) and the time of rotation at the extinguishing of the stove. 40

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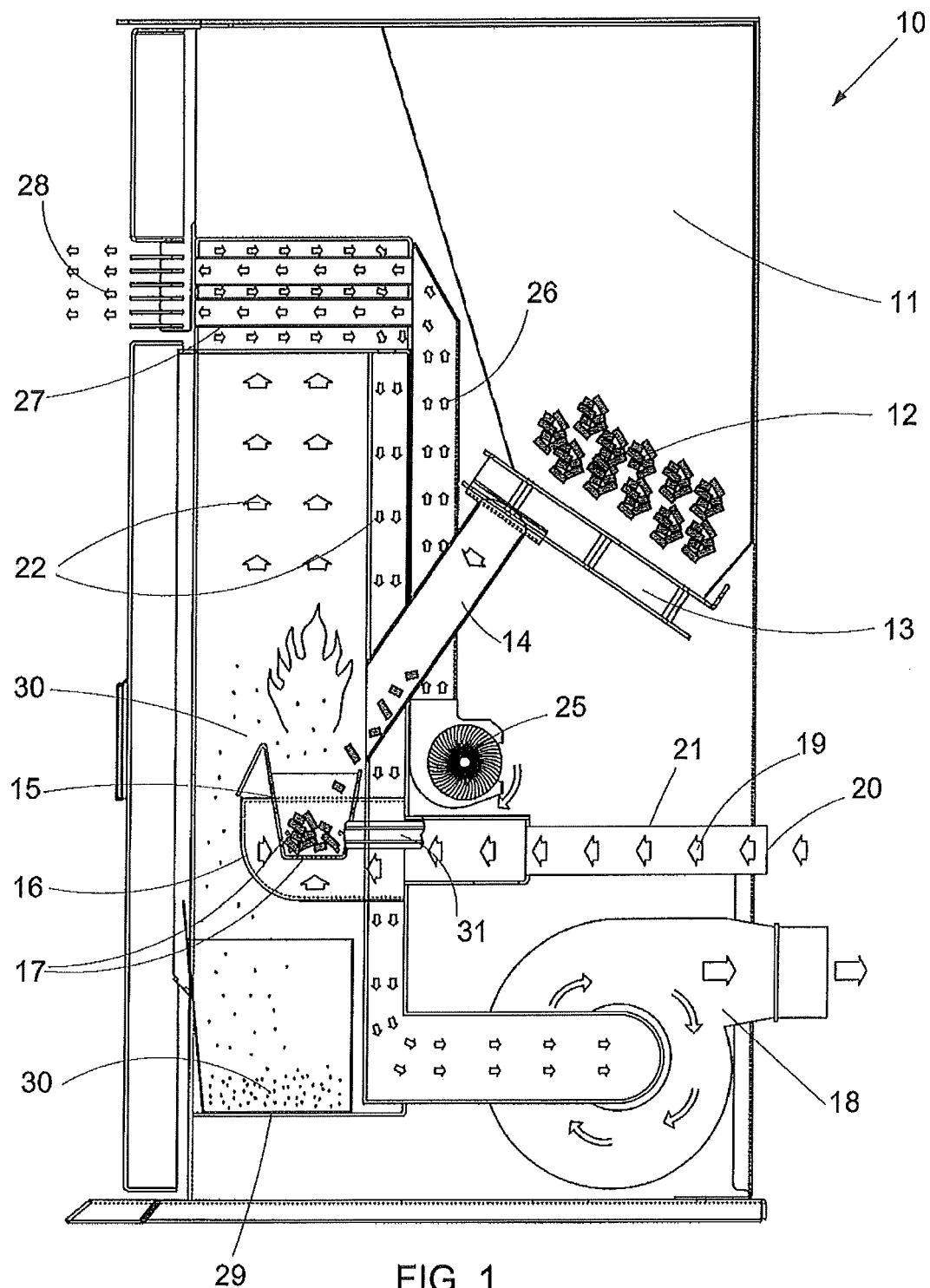


FIG. 1

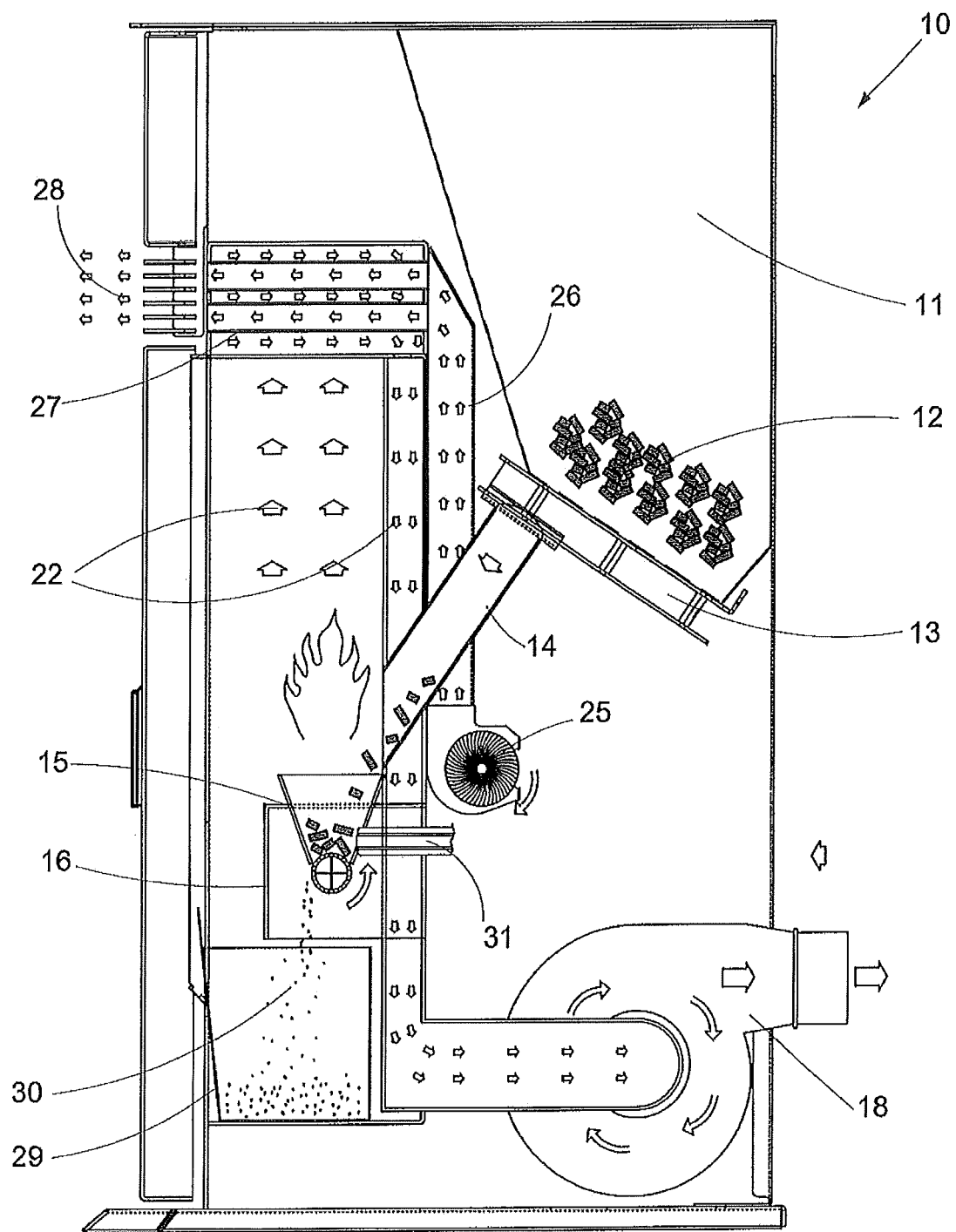
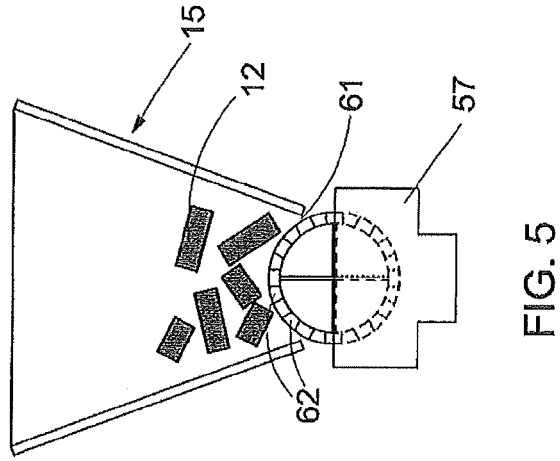
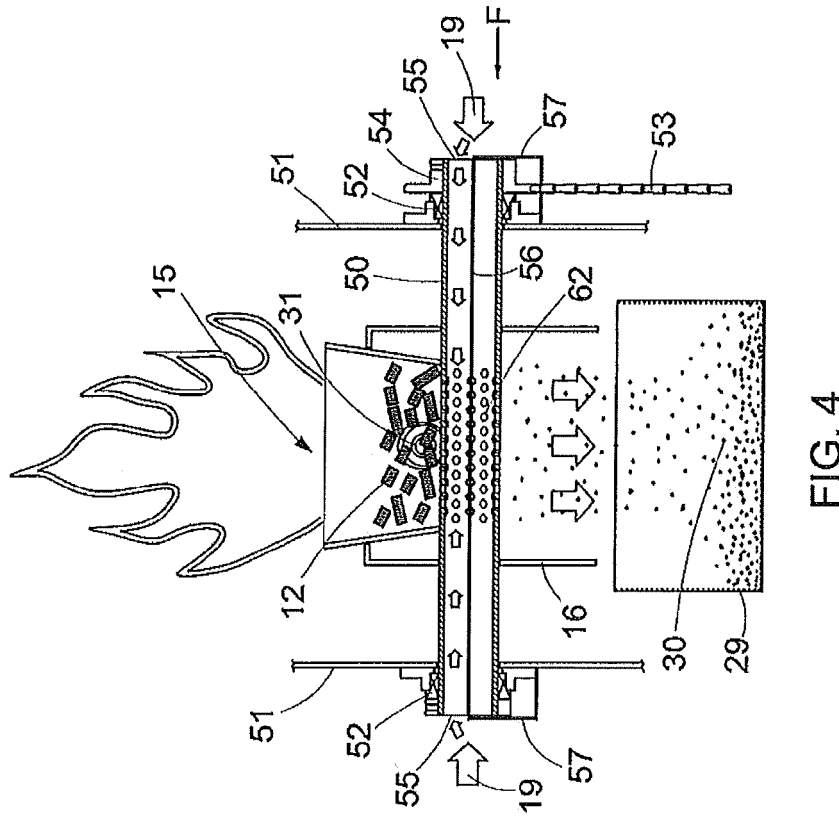
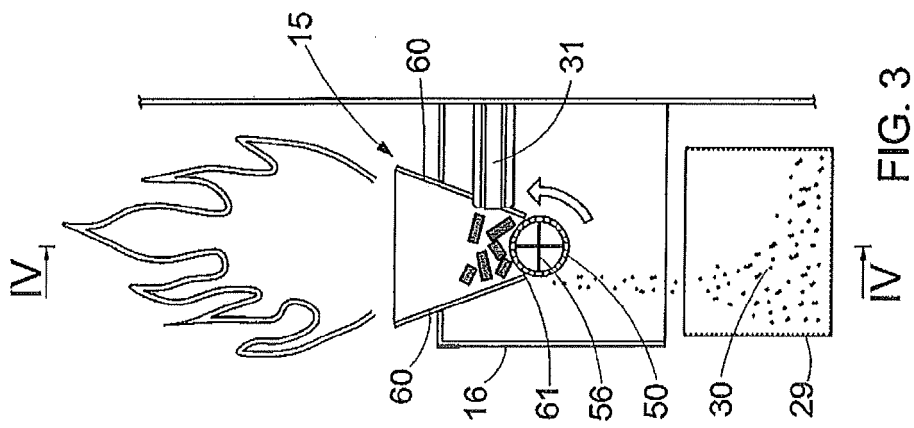


FIG. 2





EUROPEAN SEARCH REPORT

Application Number
EP 13 15 5544

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 June 2013	Examiner Mougey, Maurice
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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