



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 443 272 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

04.08.2004 Bulletin 2004/32

(51) Int Cl.7: **F23J 1/02**

(21) Application number: **04100191.8**

(22) Date of filing: **21.01.2004**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**

Designated Extension States:

AL LT LV MK

(72) Inventor: **Palazzetti, Ruben**
33080, PORCIA (PN) (IT)

(74) Representative: **Petraz, Gilberto et al**
GLP S.r.l.
Piazzale Cavedalis 6/2
33100 Udine (IT)

(30) Priority: **24.01.2003 IT UD20030016**

(71) Applicant: **PALAZZETTI LELIO SPA**
I-33080 Porcia (PN) (IT)

(54) **Heating apparatus such as a heater, a fireplace or suchlike**

(57) Heating apparatus such as a heater, a fireplace or suchlike, comprising a bearing structure (14) inside which at least a primary combustion chamber (16) is made. The primary combustion chamber (16) is associated with at least a main discharge channel (15) to dis-

charge the solid residues formed during combustion, such as ashes, soot or suchlike. The apparatus comprises an automatic removal device (30), connected to the main discharge channel (15) and able to collect the combustion residues and expel them in a desired position.

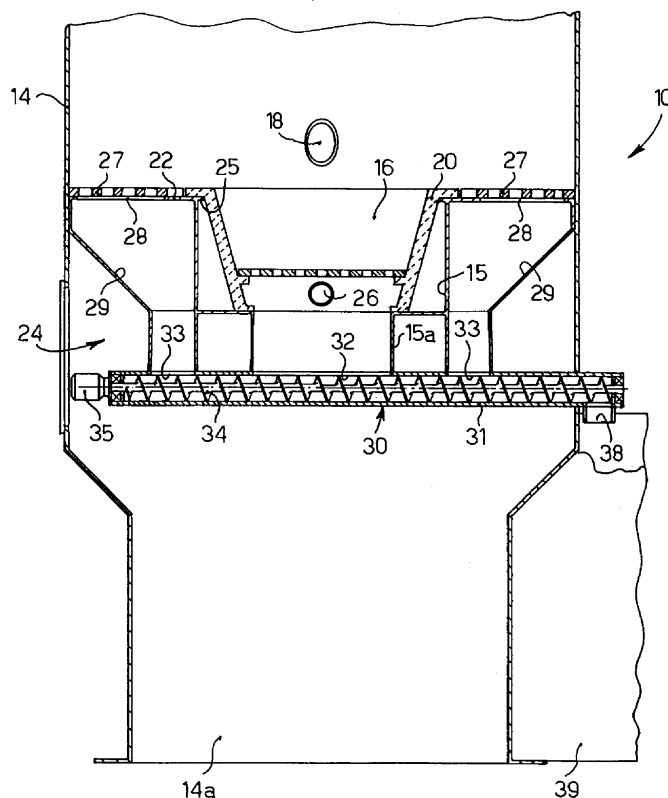


fig. 1

EP 1 443 272 A1

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a heating apparatus, such as for example a heater, a fireplace or suchlike, able to be fed by means of solid fuel such as for example pellets, or particles of pressed wood residues, firewood, coal or other inflammable material in the form of fragments or blocks. The apparatus according to the invention is provided with a removal device able to remove in a substantially automatic manner the combustion residues, such as ashes, fragments or suchlike and to discharge them in a desired collection zone.

BACKGROUND OF THE INVENTION

[0002] A combustion apparatus is known, fed by means of solid fuel, such as pellets or trunks of wood, which consists of a frame inside which a primary combustion chamber is made.

[0003] A feed member faces into the primary combustion chamber and feeds the fuel into a brazier which has holes in the bottom so as to allow the ashes to fall and collect below, in a collection container located below the primary combustion chamber.

[0004] In the rear zone of the apparatus there is a device to introduce comburent air into the primary combustion chamber in proximity with the brazier.

[0005] At the sides of the primary combustion chamber there are secondary combustion chambers, which have the bottom walls inclined and converging downwards in order to convey the ashes and residues towards the collection container.

[0006] The primary and secondary combustion chambers are separated from each other in order to optimize the combustion performance.

[0007] The known heating apparatus has the disadvantage that, in order to guarantee sufficient autonomy and to prevent frequent and laborious emptying operations, the collection container takes up a lot of space in the lower zone of the heating apparatus.

[0008] On the one hand this prevents the overall size of the apparatus being reduced, and on the other hand it does not allow auxiliary equipment to be placed in said lower zone, such as for example a tank to contain the fuel.

[0009] Another disadvantage is that emptying the tank necessarily entails first stopping and then re-starting the heating apparatus, with negative consequences in its performance, requires a continuous control of the accumulated ashes and is inconvenient and tiring for the user.

[0010] Applicant has devised and embodied the present invention to overcome these shortcomings of the state of the art and to obtain other advantages.

SUMMARY OF THE INVENTION

[0011] The present invention is set forth and characterized essentially in the main claim, while the dependent claims describe other innovative characteristics of the invention.

[0012] The purpose of the invention is to achieve a heating apparatus wherein it is possible to discharge the combustion residues which have just formed in a substantially automatic manner, discharging them in a desired position, so as to increase the functioning autonomy of the apparatus and to obviate the need to continuously control the quantity of ashes which has accumulated.

[0013] Another purpose of the present invention is to free at least part of the lower zone of the heating apparatus in order to make space that can be used for other equipment, for example a tank for the fuel.

[0014] In accordance with these purposes, a heating apparatus according to the present invention, such as a heater, a fireplace or suchlike, comprises a bearing structure, inside which a primary combustion chamber is made having at least a discharge channel to discharge the residues formed during combustion, such as ashes, soot, fragments, splinters or suchlike.

[0015] According to a characteristic of the present invention, the apparatus comprises an automatic removal device, connected to the discharge channel of the combustion chamber, which is able first to collect and then to discharge said combustion residues in a desired position.

[0016] In a preferential solution, the removal device is able to convey the combustion residues outside and on one side of the bearing structure, so that the lower zone of the bearing structure, under the primary combustion chamber, is free and available to accommodate other equipment.

[0017] In one form of embodiment, the removal device comprises a tubular body, advantageously of a tubular shape, which faces at the upper part the discharge channel and is located in proximity therewith; inside the body there is a conveyor member, arranged so as to be able to translate, able to selectively discharge the residues.

[0018] The conveyor member is able to remove the residues, with programmable temporal modes, through a corresponding outlet aperture, able to be selectively opened, and comprises for example a screw, a thruster element or suchlike, the movement of which is actuated by corresponding actuation means.

[0019] Advantageously there is a tank where the ashes accumulate, arranged in a position to the side of the primary combustion chamber and easily accessible for the user, into which the conveyor member is able to discharge the ashes collected in the tubular body.

[0020] According to a variant, the removal device comprises temporary collection means, arranged in an intermediate position between the discharge channel

and the conveyor member and able to collect, at a first moment, the combustion residues and to discharge them, at a second moment, into said tubular body.

[0021] Said temporary collection means comprise, for example, an outer shell open at the upper part in correspondence with the discharge channel of the brazier, and an inner containing element movable between a collection position, wherein it is able to receive the combustion residues, and a discharge position wherein it is able to discharge the residues into the tubular body.

[0022] According to a variant, the heating apparatus comprises, at the sides of the primary combustion chamber, one or more secondary chambers with relative secondary discharge channels, converging towards the lower zone of the apparatus.

[0023] In this case, in a first embodiment, there is only one removal device and it faces both the discharge channel and also the secondary channels in order to be able to collect the combustion residues both from the primary combustion chamber and also from the secondary chambers.

[0024] According to a variant, different and independent removal devices are provided, one for the primary combustion chamber and one for the secondary chambers. This embodiment also ensures that the combustion chambers are insulated, and hence an optimum yield.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] These and other characteristics of the present invention will become clear from the following description of two preferential forms of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

- fig. 1 shows a vertical section of a heating apparatus according to the present invention;
- fig. 2 shows a variant of fig. 1;
- fig. 3 shows a side view of fig. 2;
- fig. 4 shows an enlarged detail of fig. 3.

DETAILED DESCRIPTION OF TWO PREFERENTIAL FORMS OF EMBODIMENT OF THE INVENTION

[0026] With reference to the attached figures, a heater 10 according to the present invention, able to be fed by means of fuel in particle form, such as pellets 11, consists of a bearing structure 14, inside which a primary combustion chamber 16 is made. A feed channel 18 faces into the latter, by means of an aperture in the rear wall, and is connected to an automatic loading device 19 arranged vertically, and able to selectively pour the pellet 11, in a programmable manner, into a brazier 20.

[0027] Underneath, and partly lateral with respect to the primary combustion chamber 16, defined by a base wall 22, there is a lower zone 24 where the combustion residues fall due to gravity.

[0028] Under the brazier 20 there is a main discharge channel 15, through which the combustion ashes are conveyed towards the lower zone 24.

[0029] A device to introduce comburent air, arranged in the rear zone and not shown in the drawings, is connected to the primary combustion chamber 16 by means of a corresponding introduction channel 26, and is able to convey the comburent air towards the brazier 20 so that the pellet 11 can be burnt.

[0030] The base wall 22 also defines, at the sides of a main aperture 25, above the brazier 20, two secondary combustion chambers 28, closed at the upper part by means of grids 27. The secondary chambers 28 have bottom walls 29 which converge towards the lower zone 24, defining secondary discharge channels.

[0031] According to the invention, the heater 10 comprises in the lower zone 24 a removal device 30, able to expel the combustion residues, such as ashes, soot or other, outside the bearing structure 14, continuously and autonomously.

[0032] The removal device 30 extends substantially horizontal directly below the brazier 20, so as to leave the lower zone 14a of the bearing structure 14 free, which can therefore be used for other equipment, such as for example a tank 23 for the pellet 11 (fig. 3).

[0033] In a first form of embodiment, shown in fig. 1, the removal device 30 comprises a tubular body 31, which faces at the upper part, by means of respective apertures 32 and 33, the inclined bottom walls 29 and the main discharge channel 15 associated with the brazier 20.

[0034] In the embodiment shown, the tubular body 31 is welded in a single piece to the bottom walls 29 of the secondary combustion chambers 28 and to a cylindrical wall 15a which delimits the main discharge channel 15, so as to seal hermetically together the primary combustion chamber 16 and the secondary combustion chambers 28, in order to give an optimum combustion performance.

[0035] In this case, the bottom walls 29 are funnel-shaped converging downwards, to facilitate the conveying of the ashes to the tubular body 31.

[0036] Inside the tubular body 31 a screw 34 is mounted rotatable and driven continuously, or according to a programmed timing, by a motor reducer 35, provided with a timer unit not shown in the drawings.

[0037] The screw 34 is able to convey the ashes, which are unloaded from the brazier 20 and the bottom walls 29 of the secondary chambers 28, discharging them through an outlet aperture 38, below which a collection tank 39 is advantageously arranged.

[0038] The collection tank 39 is advantageously located in a lateral position, easily and quickly accessible to the user.

[0039] In the embodiment shown in fig. 2, the removal device 30 comprises a temporary collection member 40 (fig. 4) able to collect temporarily the ashes discharged by the main discharge channel 15 and by the bottom

walls 29, and to transfer them in a regular and programmable manner into the tubular body 31, to be subsequently removed.

[0040] To be more exact, the temporary collection member 40 comprises an outer shell 42 (fig. 3), in this case cylindrical in shape, which is welded in a single piece, at the lower part, to the tubular body 31 and, at the upper part, to the bottom walls 29 and to the cylindrical wall 15a.

[0041] Moreover, the outer shell 42 is open, at the upper part, in correspondence with the bottom walls 29 and the main discharge channel 15, in order to collect the ashes, and, at the lower part, in correspondence with the through apertures 32 and 33 of the tubular body 31, so that it can discharge them.

[0042] Inside the shell 42, a cylindrical element 45 is mounted rotatable, provided with longitudinal slits 47, which is able to be driven by a corresponding motor reducer 46.

[0043] To be more exact, the cylindrical element 45 is movable between a collection position, wherein the slits 47 face upwards to allow the ashes to be collected, and a discharge position wherein the slits 47 face downwards.

[0044] When the cylindrical element 45 turns over, this determines the discharge of the ashes directly into the tubular body 31, which is then emptied by driving the screw 34.

[0045] Advantageously the timer unit associated with the motor reducer 46 is programmed so that the cylindrical element 45 is turned over at regular intervals, according to an average accumulation of ashes.

[0046] According to a variant, sensor means are provided, able to detect that the cylindrical element 45 is full.

[0047] A control unit, not shown in the drawings, is able to command the functioning of the screw 34 during the turning over of the cylindrical element 45.

[0048] It is clear, however, that modifications and/or additions of parts can be made to the heater 10 as described heretofore, without departing from the field and scope of the present invention.

[0049] For example, according to a variant, instead of the screw 34, the removal device 30 comprises a drawer element into which the temporary collection member 40 described above discharges the ashes.

[0050] The drawer is able to slide on mating guides made inside the bearing structure 14 below the discharge channel 15 and is connected to a corresponding movement member, to be removed laterally from the structure 14.

[0051] According to another variant, instead of the screw 34, the removal device 30 comprises a conveyor belt.

[0052] According to another variant, the heater 10 comprises two distinct removal devices 30: to be more exact, a first removal device 30 able to remove the ashes discharged by the main discharge channel 15, and a

second removal device 30 able to remove the ashes discharged by the bottom walls 29 of the combustion chambers.

[0053] It is also clear that, although the present invention has been described with reference to specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of heating apparatus, all of which shall come within the field and scope of the present invention.

Claims

1. Heating apparatus such as a heater, a fireplace or suchlike, comprising a bearing structure (14) inside which at least a primary combustion chamber (16) is made, associated with at least a main discharge channel (15) to discharge the solid residues formed during said combustion, such as ashes, soot or suchlike, **characterized in that** it comprises an automatic removal device (30), connected to said main discharge channel (15) and able to collect said combustion residues and expel them in a desired position.
2. Heating apparatus as in claim 1, **characterized in that** said removal device (30) is able to convey said residues outside and on one side of said bearing structure (14).
3. Heating apparatus as in claim 1 or 2, **characterized in that** said removal device (30) comprises a tubular body (31), which faces at the upper part said main discharge channel (15) and inside which a movable conveyor member (34) is arranged, able to selectively discharge said residues.
4. Heating apparatus as in claim 3, **characterized in that** said conveyor member (34) is able to remove said residues according to programmable temporal modes through a corresponding outlet aperture (38).
5. Heating apparatus as in claim 4, **characterized in that** it comprises an accumulation tank (39) for said combustion residues, associated with said outlet aperture (38).
6. Heating apparatus as in claim 3, 4 or 5, **characterized in that** said conveyor member comprises a screw (34), driven by actuation means (35).
7. Heating apparatus as in any claim from 3 to 6 inclusive, **characterized in that** it comprises temporary collection means (40) arranged in an intermediate position between said main discharge channel (15) and said conveyor member (34) and able to collect said residues, at a first moment, and discharge

them, at a second moment, into said tubular body (31).

8. Heating apparatus as in claim 7, **characterized in that** said temporary collection means (40) comprise a fixed outer shell (42), open at the upper part in correspondence with said main discharge channel (15) and, at the lower part, in correspondence with mating apertures (32, 33) made in said tubular body (31), and an inner containing element (45) movable between a collection position, wherein it is able to receive said residues, and a discharge position wherein it is able to pour said residues into said tubular body (31).

5
10
15
9. Heating apparatus as in claim 8, **characterized in that** said inner containing element (45) is able to rotate between said collection position and said discharge position.

20
10. Heating apparatus as in claim 9, **characterized in that** said inner containing element comprises a cylindrical body (45) provided with at least a longitudinal slit (47).

25
11. Heating apparatus as in any claim from 8 to 10 inclusive, **characterized in that** actuation means (46) are provided to drive said inner containing element (45) and **in that** said actuation means (46) are associated with a timer unit able to drive the movement of said inner containing element (45) in programmable manner.

30
12. Heating apparatus as in any claim hereinbefore, comprising at the sides of said primary combustion chamber (16) one or more secondary combustion chambers (28), associated with relative secondary discharge channels (29), **characterized in that** there is only one said removal device (30) and it faces both said secondary discharge channels (29) and also said main discharge channel (15).

35
40
13. Heating apparatus as in any claim from 1 to 11 inclusive, comprising at the sides of said primary combustion chamber (16) one or more secondary combustion chambers (28), associated with relative secondary discharge channels (29), **characterized in that** it comprises at least a first and a second removal device (30), distinct and independent, wherein said first removal device faces said main discharge channel (15) and said second removal device faces said secondary discharge channels (29).

45
50

55

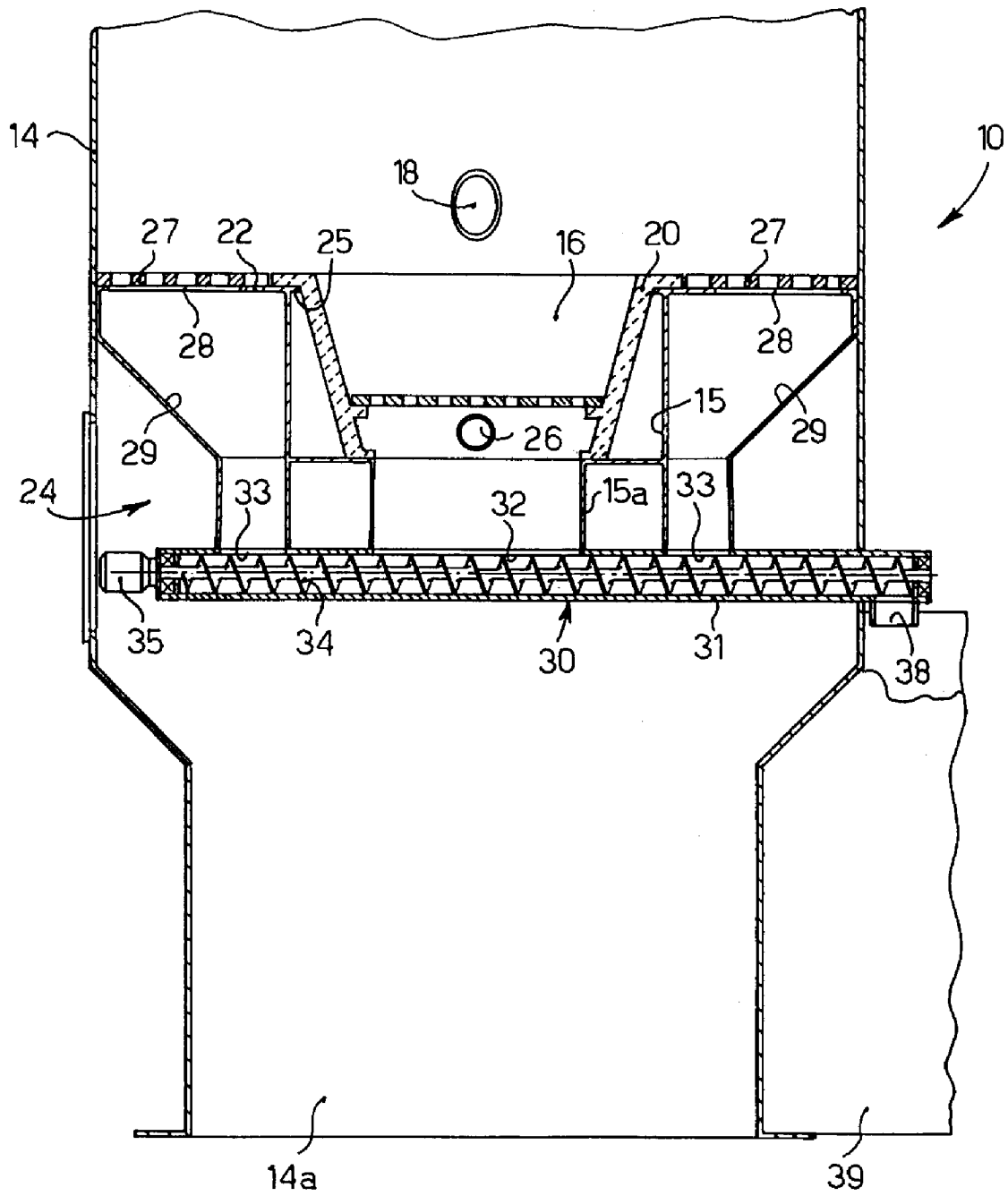


fig. 1

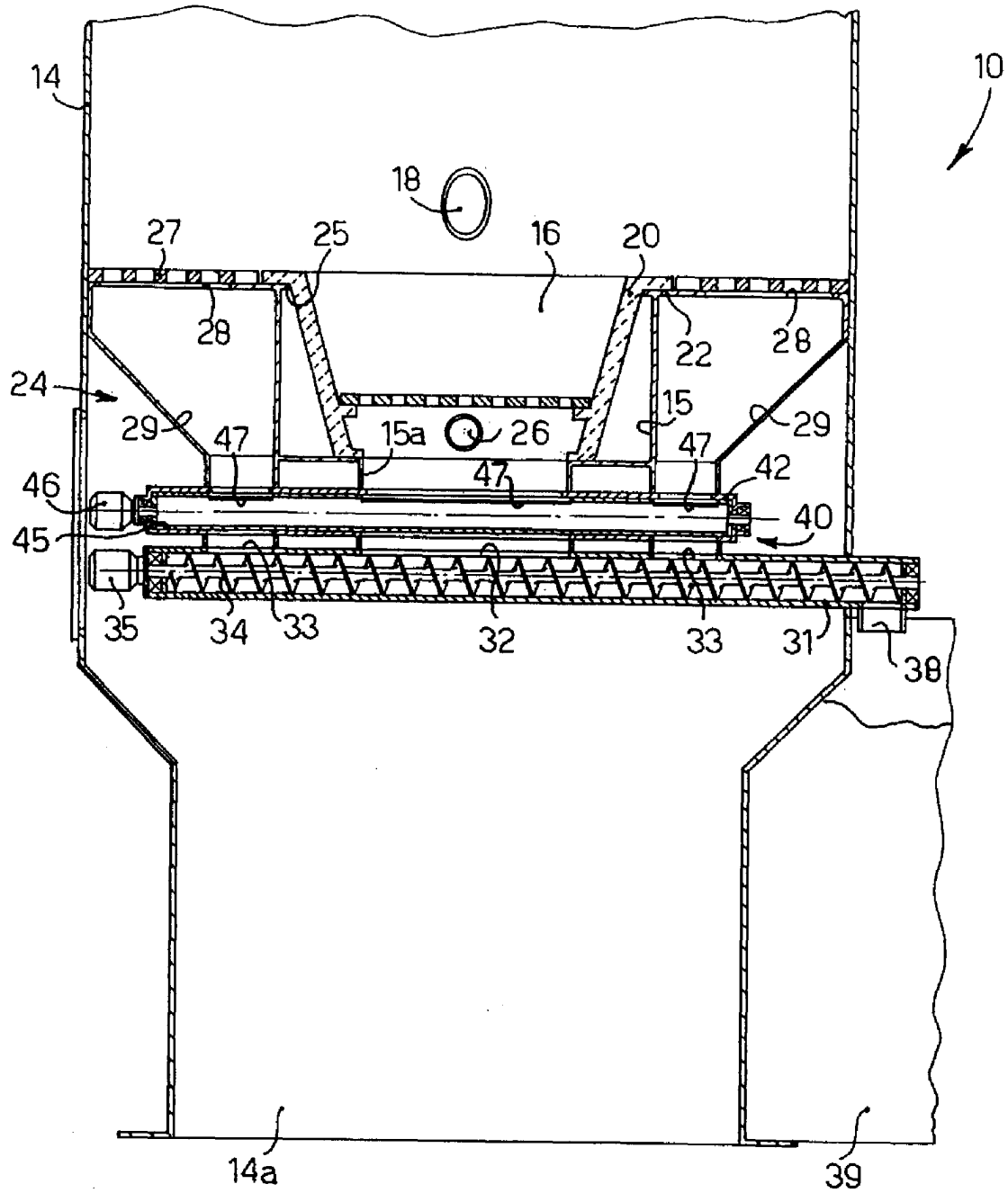


fig. 2

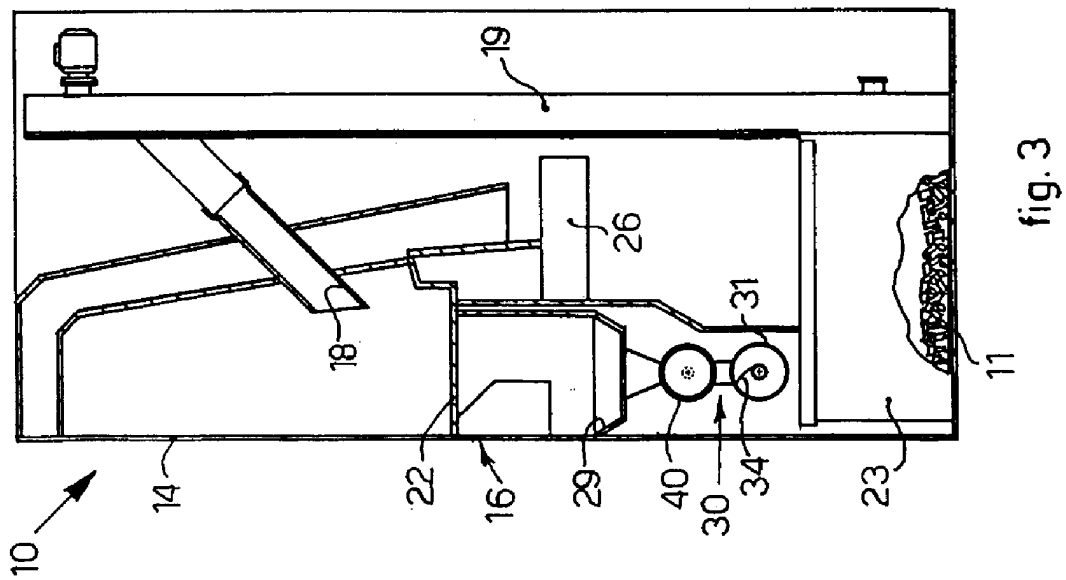


fig. 3

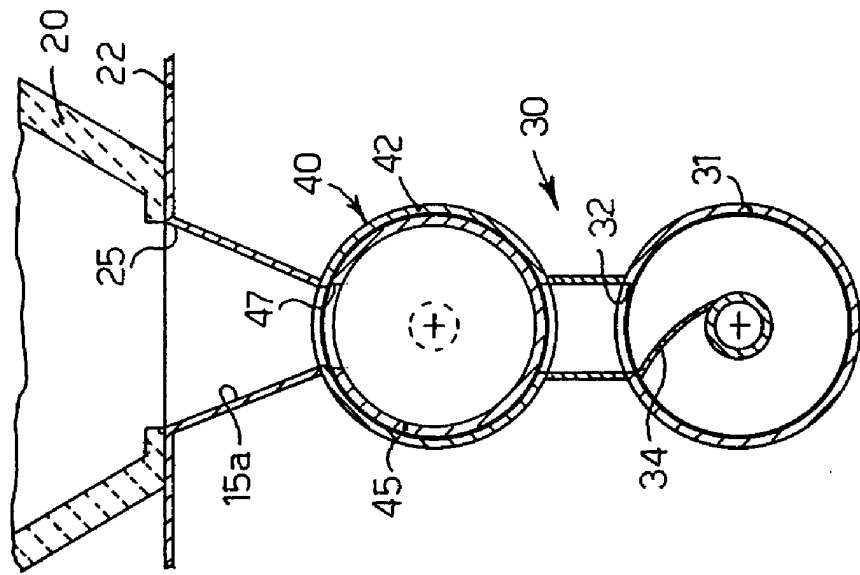


fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 10 0191

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)
X	US 2 100 937 A (BOWE CHARLES F) 30 November 1937 (1937-11-30) * column 1, line 42 - column 3, line 22; figures 1,2 *	1-7	F23J1/02
X	US 4 096 848 A (RICHTMAN WILLIAM M) 27 June 1978 (1978-06-27) * column 3, line 42 - column 6, line 55; figures 1-4 *	1-4,6	
X	US 4 450 776 A (STEVENSON ROBERT L) 29 May 1984 (1984-05-29) * column 1, line 65 - column 5, line 29; figures 3,4,7 *	1-4,6	
X	DE 195 28 422 C (HUNG LIN WEN CHIANG) 3 April 1997 (1997-04-03) * column 3, line 2 - column 4, line 62; figures 1,7,8 *	1-4,6	
A	DE 817 488 C (WAGNER GEB) 18 October 1951 (1951-10-18) * figures 1,2 *	8	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 87 11 538 U (WOLTER KARL) 28 January 1988 (1988-01-28) * the whole document *	12,13	F23J
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 April 2004	Examiner Theis, G
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 10 0191

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-04-2004

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2100937	A	30-11-1937	NONE		
US 4096848	A	27-06-1978	NONE		
US 4450776	A	29-05-1984	CA	1195879 A1	29-10-1985
DE 19528422	C	03-04-1997	DE	19528422 C1	03-04-1997
DE 817488	C	18-10-1951	NONE		
DE 8711538	U	28-01-1988	DE	8711538 U1	28-01-1988