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(54) **Burner for stoves fired by pellets, woodchips, cereals and vegetables waste in general**

Ofenbrenner zur Verbrennung von Pellets, Holzspänen, Getreiden und Pflanzenabfälle im allgemeinen

Brûleur de fourneau pour l'incinération de boulettes, de copeaux de bois, de céréales et de déchets végétaux en général

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EP-A- 0 915 289
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DE-B- 1 142 984
US-A- 4 672 899
US-A- 5 285 738
US-A- 5 617 841

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Description

[0001] The present finding concerns a burner particularly suitable for stoves fired by pellets, woodchips, cereals and vegetable waste in general.

[0002] As examples of the State of the Art the following documents can be cited:

D1: DE 11 42 984 B

D2: US-A-4 672 899

D3: EP-A-0 052 499

[0003] The first cited document regards a burner particularly suitable for stoves fired by coal.

[0004] In stoves for heating of the pellet type, the fuel is contained in a collection space, arranged outside or directly inside the stove body, from where, through an Archimedean screw, it is taken to be gradually deposited in the burner.

[0005] The burner consists of a fuel collection tank, equipped with a perforated bottom through which comburent air enters into the combustion chamber.

[0006] Usually, the fuel collection tank is square or rectangular shaped and is equipped with vertical walls that define the brazier and have the task of containing the ashes.

[0007] However, such an embodiment suffers from the drawback that, after a certain period of operation of the stove, on the bottom and, in particular, at the corners of the base, where the turbulence action caused by the air sucked in is less strong, the ashes and the other products of the combustion accumulate, with the consequence that a part of the air holes is blocked thus generating irregular combustion.

[0008] Currently, such a drawback occurs with substantial intensity since, with the rapid spread of pellet burners, the supply of this particular type of fuel has consequently also increased, which creates a substantial amount of ash.

[0009] Such a need has led to the fact that the producers of pellets and woodchips, to tackle the ever increasing demand, have been forced to use alternative products to just wood, such as processing residues, coming from joineries and from furniture industries, which also contain chemical, plastic and gluing substances and, moreover, to cut costs, they have released different combustible products onto the market, again as an alternative to wood, such as cereals and vegetable waste in general.

[0010] These alternative fuels, during combustion, in addition to normal ash, also produce substances that melt forming, when cooled down, a solid layer on the base of the brazier; such a layer adds to the unburned products, such as salts, silicon and other impurities, with this causing the blocking of the air holes on the brazier, to such a point as to lead to the flame going out and therefore drastically corrupting the thermal yield of the stove.

[0011] The purpose of the present finding is that of making a burner that allows complete combustion to be obtained even using poor quality solid fuels.

[0012] Specifically, the purpose of the finding is that of making a burner in which the through holes for the comburent air present on the base grid are never blocked.

[0013] A further purpose of the finding is that of making a self-cleaning burner, in which the ash and the other solid products of combustion are taken away from the brazier automatically.

[0014] Such purposes are obtained by foreseeing that a device acts on the plane of the brazier that continuously cleans the base grid, equipped with entry holes for the comburent air.

[0015] Such a device consists of a scraping blade arranged above and in contact with the grid, where said blade is moved with respect to said grid.

[0016] The finding foresees that the blade is equipped with alternative movement, substantially swinging and the grid remains fixed.

[0017] With such constructive solutions the end effect is obtained that the blade applies a scraping action on the surface of the grid, which allows a double effect to be achieved: that of cleaning the base of the grid, at the air holes and that of moving the combustion products sideways, on both sides.

[0018] The finding also foresees that the tank that defines the brazier is open on the two opposite side walls, which allows the lateral discharge of the ashes and of the other combustion residues from the brazier itself.

[0019] In greater detail, at each alternative movement of the blade on the grid the ashes are moved onto the two sides of the tank and, gradually accumulating, they are pushed to the two open ends of the tank, until they spontaneously fall into the ash-collection drawer below.

[0020] The finding shall be described hereafter in a possible embodiment thereof, given as an example, with the help of the attached tables of drawings; where:

- fig. 1 (Table I) represents a front elevation section view of a pellet stove equipped with the brazier according to the finding;
- fig. 2 represents a perspective detailed view of the brazier according to the finding;
- figs. 3 to 5 (Table II) represent the working steps of a brazier according to the finding, equipped with a mobile blade.
- figs. 6 to 8 represent the working steps of a brazier equipped with a mobile grid.

[0021] As can be seen in fig. 1, the brazier, wholly indicated with reference numeral 1, arranged inside the furnace 2, is supplied, through the Archimedean screw 3, with the fuel 4, contained in the accumulation space 5.

[0022] The brazier 1 comprises, in addition to the tank 6 for collecting and containing the fuel and ashes, also a blade 7, arranged substantially in contact with the perforated base 8 of the grid 9 of said brazier.

[0023] As can be seen in figure 2, the blade 7 is arranged vertically with respect to the base 8 and is equipped with alternative angular motion or circular motion, obtained with *per se* known mechanisms, for which in each step corresponding to a swinging period or to a complete turn, the blade carries out a scraping action and therefore continuously cleans the perforated base itself, onto which the pieces of fuel fall and are deposited.

[0024] The finding foresees that the perforated base 8 is slightly concave so as to ease the depositing of the pieces of fuel and to increase the contact surface between the scraping wire and said surface during the angular movement of said blade.

[0025] As can easily be seen by observing the succession of steps according to figs. 3 to 5, each alternative periodic angular movement of the blade 7 causes a sideways movement of the ashes, which gradually accumulate on the two sides of the tank. Said sides, being open, allow these ashes to fall freely, into a collector 10 below.

[0026] As can be seen by observing the succession of steps according to figs. 6 to 9, the continuous cleaning of a known perforated grid and the spontaneous discharge of the ashes is carried out by keeping the blade 7 fixed and equipping the entire tank 6 of the brazier or just the perforated grid 9 with alternative rectilinear movement.

[0027] That which has been described above allows it to be stated that, without any constructive complication, the purposes set previously have been accomplished; in particular, it is possible to always keep the combustion regular, with the stove being able to be supplied by a regular flow of air (nominal flow); it is also possible to continuously and automatically remove and discharge the ashes and the other combustion products from the brazier.

Claims

1. BURNER FOR STOVES FIRED BY PELLETS, WOODCHIPS, CEREALS AND VEGETABLE WASTE IN GENERAL, a brazier (1) with a grid on which the fuel (4) to be burned is disposed, the brazier being disposed in a tank (6) containing the fuel and the ashes, the fuel being contained in an accumulation space (5), a device which acts on the surface of the brazier and being arranged to continuously clean the base grid, said grid being equipped with entry holes for combustion air, the brazier being **characterized in that** said device consists of a scraping blade (7) arranged above and in contact with the grid, said blade being arranged with a swinging movement, but the grid remains still, said perforated base (8) being slightly concave to ease the depositing of the pieces of fuel and to increase the contact surface between the scraping wire of the blade and said surface during the angular movement of said blade.

2. BURNER, according to claim 1, **characterised in that** the tank that defines the brazier is open on the two opposite side walls, which allows the lateral discharge of the ashes and of the other combustion residues from the brazier itself.

3. BURNER, according to claims 1 or 2, **characterised in that** the blade (7) is arranged vertically with respect to the base (8) and is equipped with circular motion, for which in each complete turn, the blade carries out a scraping action and therefore continuously cleans said perforated base (8), onto which the pieces of fuel fall and are deposited.

4. BURNER, according to claim 3, **characterised in that** each alternative periodic angular movement of the blade (7) causes a sideways movement of the ashes, which gradually accumulate on the two sides of the tank (6), said sides being open to allow the aforementioned ashes to fall freely onto a collector (10) below.

5. COMBINATION of a burner according to one or more of the previous claims, and a furnace (2), in which the burner is arranged inside and of an Archimedean screw which supplies the fuel contained in the accumulation space (5).

Patentansprüche

1. Ofenbrenner zur Verbrennung von Pellets, Holzspänen, Getreiden und Pflanzenabfällen im allgemeinen mit einer Feuerschale (1) mit einem Rost, auf dem der zu verbrennende Brennstoff (4) angeordnet ist, wobei die Feuerschale in einem den Brennstoff und die Asche beinhaltenden Behälter (6) angeordnet ist, wobei sich der Brennstoff in einem Sammelraum (5) befindet, einer auf die Oberfläche der Feuerschale einwirkenden Vorrichtung, die so ausgebildet ist, dass sie den Bodenrost kontinuierlich reinigt, wobei der Rost mit Eingangsöffnungen für Verbrennungsluft ausgestattet ist, wobei die Feuerschale **dadurch gekennzeichnet ist, dass** die Vorrichtung aus einer oberhalb des Rosts angeordneten und in Kontakt zu diesem stehenden Schabklinge (7) besteht, wobei die Klinge in eine schwingende Bewegung versetzt ist während der Rost ortsfest bleibt, wobei der perforierte Boden (8) etwas konkav verläuft, um das Lagern der Brennstoffteile zu erleichtern und die Kontaktfläche zwischen dem Schabdraht der Klinge und der Oberfläche während der Drehbewegung der Klinge zu erhöhen.

2. Brenner nach Anspruch 1, **dadurch gekennzeichnet, dass** der die Feuerschale definierende Behälter an zwei gegenüber liegenden Seitenwänden offen, was den seitlichen Auswurf der Asche und der sonstigen Verbrennungsrückstände aus der Feuerschale selbst ermöglicht.

3. Brenner nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Klinge (7) im Verhältnis zum Boden (8) vertikal angeordnet ist und in eine kreisförmige Bewegung versetzt wird, bei der die Klinge bei jeder kompletten Umdrehung einen Schabvorgang ausführt und damit den perforierten Boden (8) kontinuierlich reinigt, auf welchen die Brennstoffteile fallen und gelagert werden.

4. Brenner nach Anspruch 3, **dadurch gekennzeichnet, dass** jede abwechselnde periodische Drehbewegung der Klinge (7) eine Seitwärtsbewegung der Asche bewirkt, welche sich nach und nach an den beiden Seiten des Behälters (6) anhäufen, welche offen sind und so erlauben, dass die vorgenannte Asche frei auf einen darunter liegenden Sammler (10) fallen kann.

5. Kombination eines Brenners nach einem oder mehreren der vorstehenden Ansprüche und eines Ofens (2), bei der der Brenner im Inneren angeordnet ist, und einer archimedischen Schraube, welche den im Sammelraum (5) vorhandenen Brennstoff befördert.

Revendications

1. Brûleur pour fourneaux d'incinération de boulettes, copeaux de bois, céréales et déchets végétaux en général, un brasero (1) avec une grille sur laquelle le combustible (4) devant être brûlé est disposé, le brasero étant disposé dans un réservoir (6) contenant le combustible et les cendres, le combustible étant contenu dans un espace d'accumulation (5), un dispositif qui agit sur la surface du brasero et étant agencé pour nettoyer de manière continue la grille de base, ladite grille étant équipée de trous d'entrée pour l'air de combustion, le brasero étant **caractérisé en ce que** ledit dispositif consiste en une lame de raclage (7) agencé au-dessus et en contact avec la grille, ladite lame étant agencée avec un mouvement oscillant, mais la grille reste immobile, ladite base perforée (8) étant légèrement concave de manière à faciliter le dépôt des pièces de combustible et à augmenter la surface de contact entre le fil de raclage de la lame et ladite surface durant le mouvement angulaire de ladite lame.

2. Brûleur, selon la revendication 1, **caractérisé en ce que** le réservoir qui définit le brasero est ouvert sur les deux parois latérales opposées, ce qui permet l'évacuation latérale des cendres et des autres résidus de combustion du brasero lui-même.

3. Brûleur, selon la revendication 1 ou 2, **caractérisé en ce que** la lame (7) est agencée verticalement par rapport à la base (8) et est équipée d'un mouvement circulaire, pendant lequel à chaque tour complet, la lame réalise une action de raclage et par conséquent nettoie de manière continue ladite base perforée (8), sur laquelle les pièces de combustible tombent et sont déposées.

4. Brûleur, selon la revendication 3, **caractérisé en ce que** chaque mouvement angulaire périodique alternatif de la lame (7) provoque un mouvement latéral des cendres, qui s'accumulent graduellement des deux côtés du réservoir (6), lesdits côtés étant ouverts pour permettre aux cendres citées précédemment de tomber librement sur un collecteur (10) situé dessous.

5. Combinaison d'un brûleur selon une ou plusieurs des revendications précédentes, et d'une chaudière (2), dans laquelle est agencé le brûleur à l'intérieur et d'une vis d'Archimède qui fournit le combustible contenu dans l'espace d'accumulation (5).

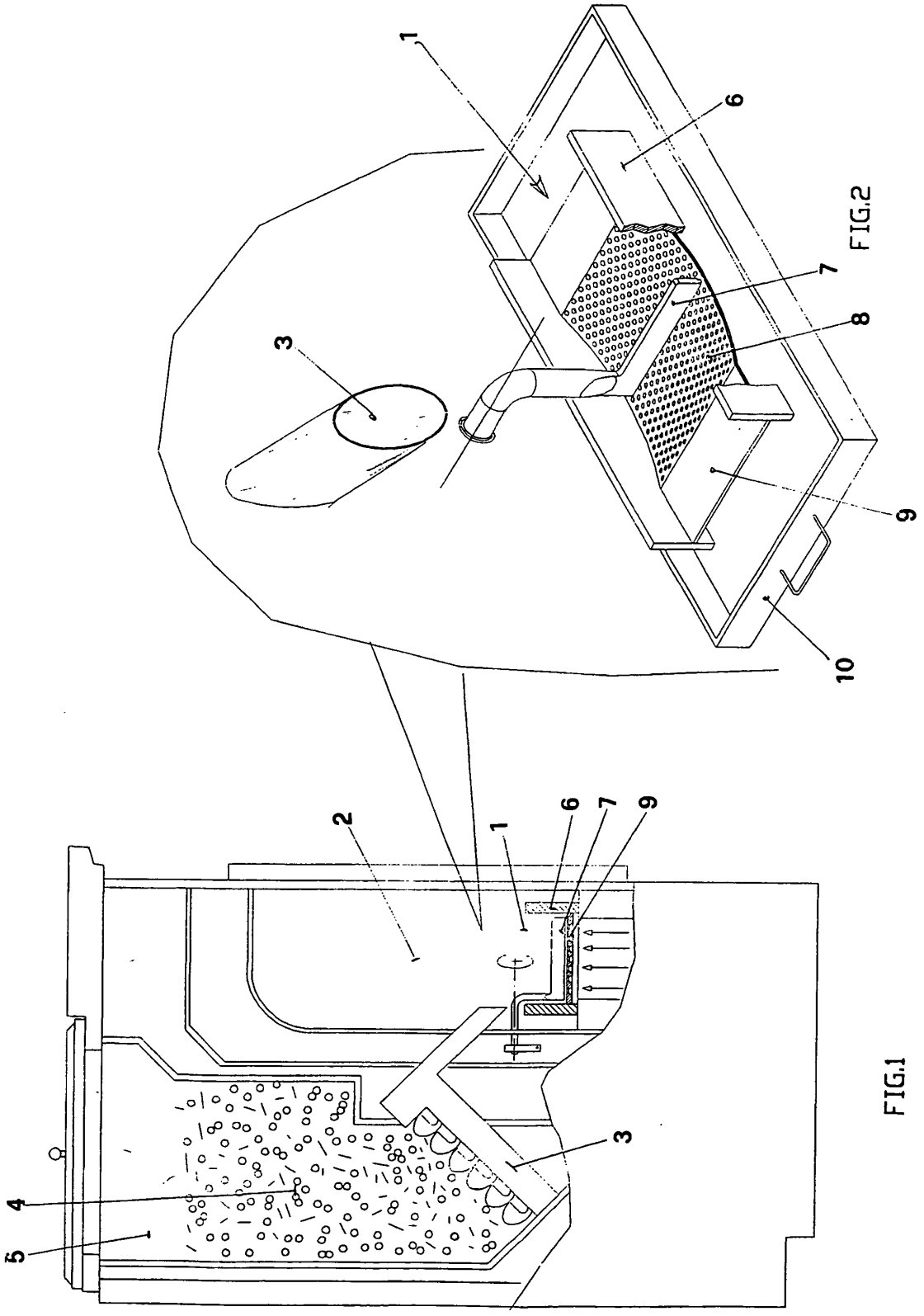

FIG.2

FIG.1

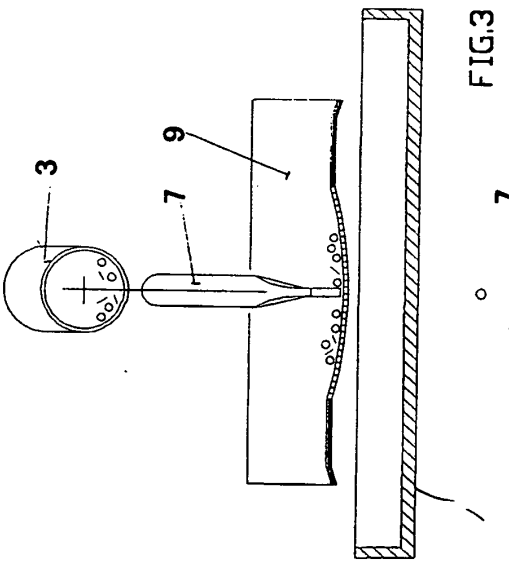

FIG.3

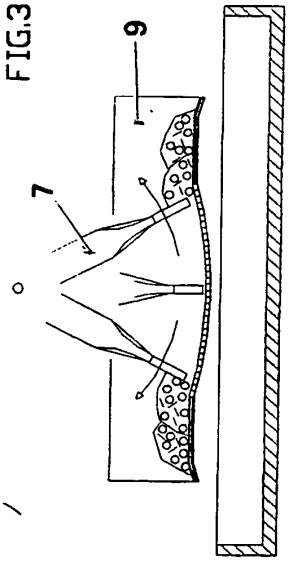

FIG.4

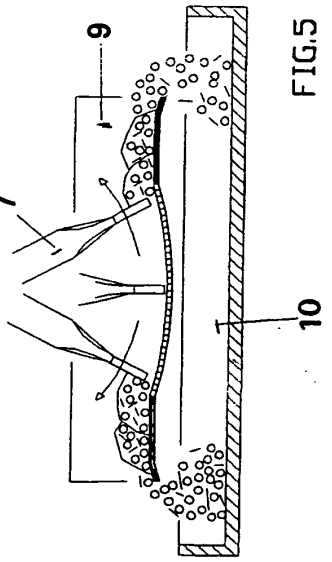

FIG.5

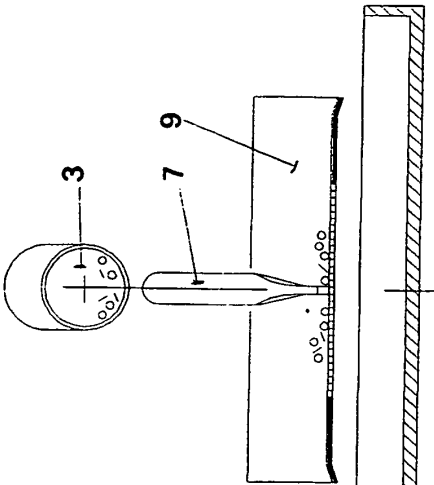

FIG.6

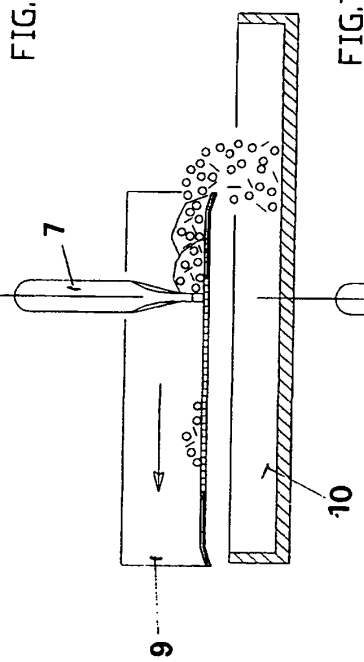

FIG.7

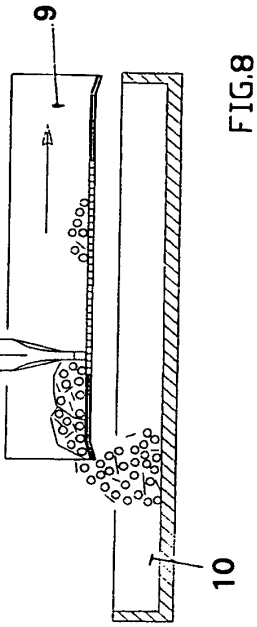

FIG.8

REFERENCES CITED IN THE DESCRIPTION

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