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(54) **Fireplace insert and fireplace stove with device for increase of heat efficiency and reduction of emissions**

(57) Fireplace insert and fireplace stove with a device for increase of heat efficiency and reduction of emissions with a deflector containing at least two parts, one of which is a bottom part (1) creating and from above bounding a primary afterflaming zone (7) above a combustion chamber (9) and the other is an upper part (2), whereby the bottom part (1) of the deflector and the upper part (2) of the deflector are respectively arranged in such way that they create a tunnel labyrinth defining a secondary afterflaming zone (8) and mouthing into a settling space (4). The bottom part (1) of the deflector is movable.

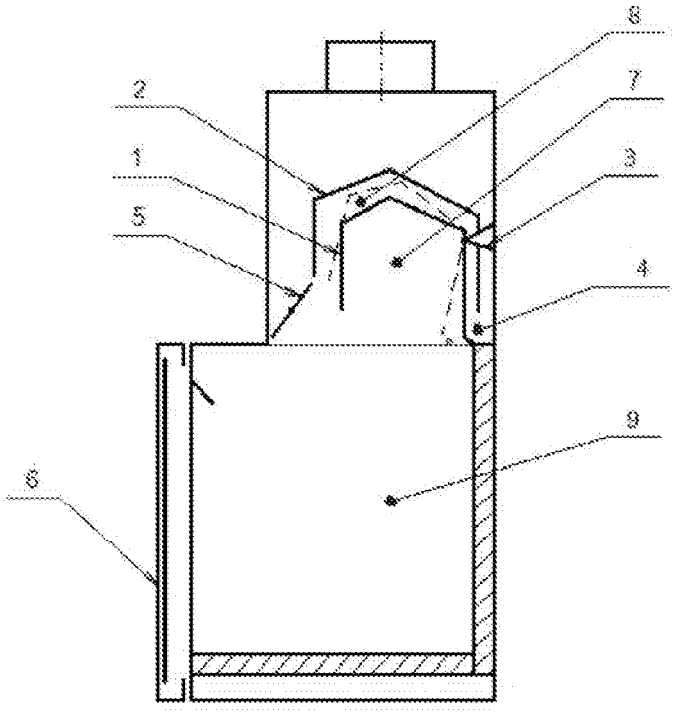

fig.1

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Description

Technical Field

[0001] Technical solution concerns a fireplace insert and a fireplace stove for solid fuel with a device for heat efficiency increase, reduction of emissions and solid polluting substances during the process of burning.

Background Art

[0002] Heat efficiency of fireplace inserts and fireplace stoves belongs to their important utility parameters. Due to the increase of effective utilization of fuel and the reduction of malignant emissions arising during the process of fuel burning it is important to increase efficiency of fuel burning and consequently maximal utilization of the heat arising during the process of burning.

[0003] By this reason various deflectors and bypass plates are used in fireplace inserts and fireplace stoves, which often have complicated construction and extend the trajectory of combustion products between a fire place and mouth of combustion products withdrawal from heating body. Severity of handling of heating body as to the maintenance and cleaning increases proportionately with the complicacy of construction of combustion products leading. In cleaning of the deflector and bypass plates from the layer of deposited fly ash they must be normally disassembled, i.e. it can not be performed in current cleaning by user. Fly ash deposited on the areas of deflector and bypass plates works as isolation and in their silting-up by fly ash the efficiency of heating body declines and heat load of these parts increases. This also directly influences the lifetime of these parts.

[0004] The aim of the invention is to eliminate mentioned shortcomings and improve above mentioned utility parameters with the emphasis to user comfort. The aim is to achieve increase of heat efficiency and reduction of emissions of fireplace inserts and fireplace stoves under the simultaneous simple handling of heating body especially its maintenance and cleaning.

Disclosure of the Invention

[0005] Mentioned shortcomings are significantly eliminated by the fireplace insert and the fireplace stove with the device for heat efficiency increase, emissions and solid polluting substances reduction during the process of burning according to this technical solution, nature of which is that the deflector contains at least two parts, one of which is the bottom part and the other is the upper part. The bottom part creates and bounds from the top the primary afterflaming zone above combustion chamber, which is provided above the fire place and starts above the upper edge of isolation casing of combustion chamber. The bottom part of the deflector and the upper part, of the deflector are respectively arranged in such a way that they create a tunnel labyrinth, which mouths into the settling space for solid polluting substances arising during the process of burning. The bottom and the upper part of the deflector together create and bound the secondary afterflaming zone, which mouths into the settling space, i.e. the secondary afterflaming zone is provided in the space of tunnel labyrinth.

[0006] To simplify maintenance of the fireplace insert and the fireplace stove it is advantageous if the bottom part of the deflector is movable. The movability of the bottom part can be achieved in such a way that the bottom part is rotationally located on the console. Then it is possible to remove settled fly ash from the settling space without the need of parts disassembly by simple movement in usual cleaning of heating body, namely by slewing of the bottom - movable part of the deflector around pivot point at fixed console. The fly ash drops out of settling space by slewing of the bottom - movable part of the deflector.

[0007] It is advantageous, if the construction of labyrinth tunnel is such that the settling of fly ash on its areas by the influence of flow and gravitation outside of settling space is minimal. Therefore it is advantageous, if the bottom part of the deflector and the upper part of the deflector have roof-shaped construction. The settling space works as a gravitational separator.

[0008] Aerodynamics of the mixture of afterflaming combustion products and air is significantly changed by building-up the labyrinth tunnel. Afterflaming combustion products are intensively mixed with the air, they are heated and so the conditions of combustion are significantly improved even in greater distance from the fire place and therefore the flammable components of combustion products may afterflame.

[0009] The advantage of this technical solution is achievement of increased heat efficiency of the fireplace inserts and the fireplace stoves, reduction of emissions and solid polluting substances during the process of burning under the simultaneous simple handling especially in maintenance and cleaning from settling fly ash without the need of parts disassembling.

[0010] The construction of the deflector according to this technical solution increases the heat efficiency of the fireplace inserts and the fireplace stoves, namely by improvement of combustion conditions.

[0011] The increase of heat efficiency is connected with better economic utilization of fuel and thereby it leads to savings of fuel costs.

[0012] The reduction of emission amount arising during the process of burning is important from the view of environment protection.

An overview of figures

[0013] The technical solution is explained in detail on Figure 1, which simply illustrates cross section of the fireplace insert with the labyrinth tunnel.

[0014] Position in cleaning of settling space is shown by broken line.

Examples of implementation of technical solution

Example 1

[0015] The fireplace insert has been equipped with the deflector - a tunnel labyrinth according to Figure 1 and this deflector is created by the bottom part 1, which is movable with the possibility of slewing around the pivot point in the fixed console 3 and the upper part 2, which is fixed.

[0016] The bottom part 1 creates and bounds from above the primary afterflaming zone 7 above the combustion chamber 9, which is provided above the fire place and starts above the upper edge of isolation casing of combustion chamber 9. The bottom part 1 of the deflector and the upper part 2 of the deflector are respectively arranged in such way that they create the tunnel labyrinth which mouths into the settling space 4 for the solid polluting substances arising during the process of burning. The bottom part 1 and the upper part 2 of the deflector together create and bound the secondary afterflaming zone 8, which mouths into the settling space 4, i.e. the secondary afterflaming zone 8 is provided in the space of the tunnel labyrinth.

[0017] The bottom part 1 of the deflector and the upper part, 2 of the deflector have the shape of castellated roof, as it is shown on Figure 1.

[0018] The shorting key 5 is opened simultaneously with the opening of the door 6 in order to get the combustion products to the chimney by the shortest way.

Example 2

[0019] The same construction of the deflector as described in Example I was used in the fireplace stove.

Claims

1. Fireplace insert and fireplace stove with a device for increase of heat efficiency and reduction of emissions **characterized in that** a deflector contains at least two parts, one of which is a bottom part (1) creating and from above bounding a primary afterflaming zone (7) above a combustion chamber (9) and the other is an upper part (2), whereby the bottom part (1) of the deflector and the upper part (2) of the deflector are respectively arranged in such way that they create a tunnel labyrinth defining a secondary afterflaming zone (8) and mouthing into a settling space (4).

2. Fireplace insert according to claim 1 **characterized in that** the bottom part (1) of the deflector is movable.

3. Fireplace insert according to claims 1 and 2 **characterized in that** the bottom part (1) of the deflector is rotationally located on a console (3).

4. Fireplace insert according to claims 1 to 3 **characterized in that** the bottom part (1) of the deflector and the upper part (2) of the deflector have roof-shaped construction.

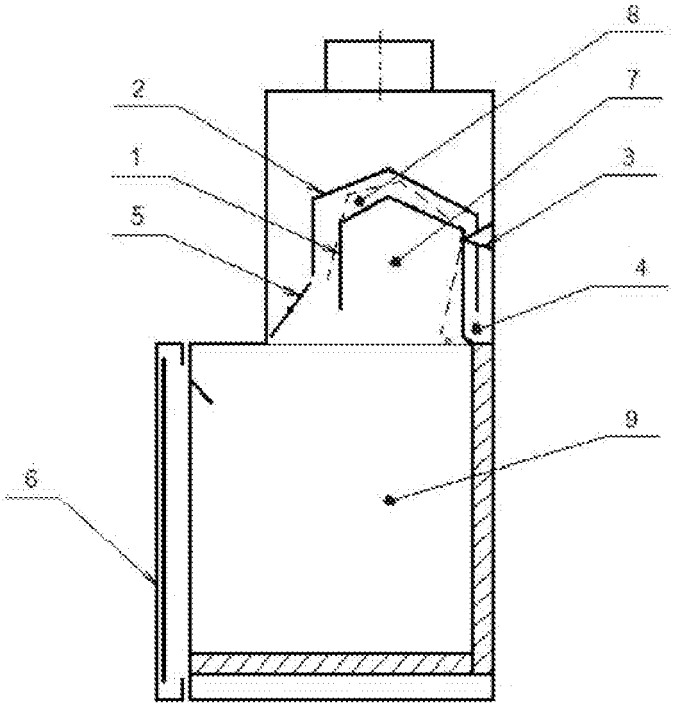

fig.1

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EUROPEAN SEARCH REPORT

Application Number
EP 11 17 6898

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 December 2011	Makúch, Milan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82