Abstract: Double fuel burning stove formed by an external casing, characterised by the fact that said stove is composed of two hearths, a first hearth (4) for one fuel and a second hearth (5) for a second fuel, the second hearth (5) being placed above the first hearth (4) and the second hearth (5) is completely separated from the first hearth (4).
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DOUBLE FUEL BURNING STOVE

Technical field of the patent

The object of the present invention is a double fuel burning stove that is capable of functioning with two different fuels, both with a solid fuel in pieces or logs such as wood and with a loose solid fuel such as sawdust, wood pellets etc., and with gaseous fuel and liquid fuel.

State of the Art

Solid fuel fired stoves have been in use for a long time and, above all in those places near to woods, are frequently used because of the availability of wood both in quantity and because of its low cost, and represent a form of heating that is widely used in these areas.

Recently, stoves using loose solid fuels such as sawdust, wood pellets, stones from olives or other dried fruits, olive residue etc. have been developed. Loose solid fuel has, in respect to wood, the advantage of being more easily transportable. Furthermore, a loose solid-fuel stove can be automated and permits lighting and putting out the stove by a timer or by remote control.

Gas and liquid fuelled stoves have also been in use for a long time.

Bi-fuelled stoves are also present on the market, that have attempted to unite the advantages of a specific fuel with those of another fuel. For example, in order to unite the advantages of wood, above all its economy, to those of loose
solid fuels, above all easy to handle, stoves have been designed that can function with both fuels.

Patent DE3632023 describes a double fuel burning stove with two hearths. This stove presents, however, the inconvenience of having two communicating hearths and thus of having problems with the air flow necessary for combustion in the two hearths.

The patent Application FR-A-2745371 describes a coal and wood fired stove that can be transformed into a stove with a burner for liquid or gaseous fuels. Patent EP 1427966 also describes a double fuel burning stove with two burners, but it too has the disadvantage of having the two hearths communicating between themselves and thus of having problems with the flow of the air necessary for the combustion of the two hearths.

This disadvantage, present both in DE3632023 and in FR-A-2745371 and in EP 1427866, does not permit the simultaneous use of the two fuels or, if it does permit their use, it does so with the loss of the quality of the combustion since the air for the combustion of a fuel cannot be dosed in a specific way for that fuel; in general if two fuels need a different dosing of the air for combustion then the air for combustion will be dosed in such a way that it is an average of the air for one fuel and for that for the other fuel. In this way it will not be possible to obtain a high yield from the combustion.

The present invention proposes to overcome the difficulties and disadvantages present in the solutions on sale at present.
The principal aim of the present invention is to create a double fuel burning stove formed by an external casing, characterised by the fact that said stove is composed of two hearths, a first hearth for one fuel and a second hearth for a second fuel, the second hearth being placed above the first hearth and the second hearth is completely separated from the first hearth.

The principal characteristic of the invention is that of having a stove that can function with two different fuels, for example wood that is readily available in wooded areas and another fuel, for example pellets, that is easily handled. The wood fuel is fed by hand while the pellets can be fed automatically.

The two fuels can be fed into one of the two hearths of the stove contemporarily or into only one of the two, according to whichever of the fuels is more readily available or economically convenient or better adapted at the moment of use.

For example the stove can be brought automatically to the desired temperature with pellets when one is at a distance from it, while when one is near to the stove it can be fed with wood. The stove also permits the pellets to be fed automatically if for any reason the user does not feed the wood-fired hearth with the necessary quantity of wood.

Another characteristic is given by the fact that both the first and the second fuels are solids and that one of the two fuels is a loose solid fuel.

Another characteristic is given by the fact that the first hearth has a first flue and that the second hearth has a second flue and that said flues are separated.

Another characteristic is given by the fact that both the first and the second hearths have separate aeration systems.
Another characteristic is given by the fact that a heat exchanger is placed below the second hearth.

Another characteristic is given by the fact that the first hearth has a first door and that the second hearth has a second door.

Another characteristic is given by the fact that the second hearth is completely separated from the first hearth by means of a double-walled box that surrounds said second hearth.

Another characteristic is given by the fact that the double-walled box that surrounds said second hearth is present at least on the bottom and on three sides.

Another characteristic is given by the fact that the double-walled box is a water-jacket.

Another characteristic is given by the fact that the heat exchanger positioned below the second hearth is a heat exchanger for the heating of the water.

Another characteristic is given by the fact that the double-walled box is a heat exchanger for the heating of the air.

Another characteristic is given by the fact that the heat exchanger positioned below the second hearth is an air heat exchanger.

Another characteristic is given by the fact that the first hearth is a hearth for wood and the second hearth is a hearth for loose solid fuel.

Another characteristic is given by the fact that the first hearth is a hearth for loose solid fuel and the second hearth is a hearth for wood.
Other characteristics and advantages of the invention will appear clear from the following description of some methods of creating the invention, given as non-limiting examples in figure 1.

A brief description of the figures

Figure 1 represents a section of the double fuel burning stove, object of the present invention.

Description of the invention

In figure 1 a double fuel burning stove is represented, that is formed by an external casing 1, that can be of sheet-steel with a cavity space 2 that separates an internal metal sheet 3 or which can be an external sheet 1 insulated by refractory material or ceramic both internally and externally.

The double fuel burning stove presents a first hearth 4 and a second hearth 5. The second hearth 5 is placed above the first hearth 4. The second hearth 5 is completely separated from the first hearth by means of a double-walled box 6 that surrounds said second hearth 5 at least on the bottom and on three sides.

The first hearth 4 and the second hearth 5 have separate flues, respectively the first hearth 4 has a first flue 8 and the second hearth 5 has a second flue 9.

The smoke from the combustion in the first hearth 4 in passing to the first flue 8 brushes against and thus heats the external surface of the double-walled box 6, while the smoke from the combustion in the second hearth 5 brushes against and thus heats the internal surfaces of the double-walled box 6.
The first hearth 4 has a first door 10 provided with a first handle 12, just as the second hearth 5 has a second door 11 provided with a second handle 13. Both the first hearth 4 and the second hearth 5 have separate aeration systems that are controlled externally, to increase or decrease the air necessary for combustion, which for simplicity's sake are not shown.

Below the second hearth 5 a heat exchanger 14 is positioned, which has the double function of heating a fluid contained within it and of protecting the second hearth 5 from excessive heating from the effect of the flames that can arrive directly from the first hearth 4 positioned immediately below it.

In the stove shown in figure 1 the stove is a double fuel burning stove and presents the first hearth 4 that is fuelled by wood and the second hearth 5 that is fuelled by a loose fuel (for example sawdust, wood pellets etc.). The second hearth 5 is positioned above the first hearth 4. The double-walled box 6 is a water-jacket that surrounds the second hearth 5 at least on the bottom and on three sides and separates it completely from the first hearth 4.

The water heated in the water-jacketed box 6 can be used for domestic heating and a heat exchanger for hot sanitary water 7 can be placed in the water-jacket. The first hearth 4 and the second hearth 5 have separate flues (8 and 9). The smoke from the combustion in the first hearth 4 in passing to the first flue 8 brushes against and thus heats the external surface of the water-jacketed box 6, while the smoke from the combustion in the second hearth 5 brushes against and thus heats the internal surface of the water-jacketed box 6.
Both the first hearth 4 and the second hearth 5 have separate aeration systems, externally controlled, to increase or decrease the air necessary for combustion, which for simplicity's sake are not shown.

Below the second hearth 5 a heat exchanger 14 is positioned, and which has the double function of heating a fluid contained within it and of protecting the second hearth 5 from excessive heating caused by the flames that can arrive directly from the first hearth 4 positioned directly below it.

The stove can also be composed of the first hearth 4 for loose solid fuels placed in the lower part and of the second hearth 5, placed above it, for wood, but can also be composed of the first hearth for wood placed in the lower part and of the second hearth, placed above it, for loose solid fuels.

Furthermore, the double-walled box 6 can be a water-jacket, or it can be substituted by a heat exchanger for heating the air. The heat exchanger 14 can function with water or it can be substituted by an air heat exchanger.

This invention is not limited to the representation given by the figures but can be perfected and modified by men expert in the art without altering the aim of the patent.

This invention has numerous advantages and will permit to overcome problems which could not be achieved by heating systems on the market today.
CLAIMS

1) Double fuel burning stove formed by an external casing, characterised by the fact that said stove is composed of two hearths, a first hearth (4) for one fuel and a second hearth (5) for a second fuel, the second hearth (5) being placed above the first hearth (4) and the second hearth (5) is completely separated from the first hearth (4).

2) Double fuel burning stove according to claim 1 characterised by the fact that both the first and the second fuels are solids and that one of the two fuels is a loose solid fuel.

3) Double fuel burning stove according to claim 1 characterised by the fact that the first hearth (4) has a first flue (8) and that the second hearth (5) has a second flue (9) and that said flues are separated.

4) Double fuel burning stove according to claim 1 characterised by the fact that both the first (4) and the second hearths (5) have separate aeration systems.

5) Double fuel burning stove according to claim 1 characterised by the fact that a heat exchanger (14) is placed below the second hearth (5).
6) Double fuel burning stove according to claim 1 characterised by the fact that the first hearth (4) has a first door (10) and that the second hearth (5) has a second door (11).

7) Double fuel burning stove according to claim 1 characterised by the fact that the second hearth is completely separated from the first hearth (4) by means of a double-walled box (6) that surrounds said second hearth (5).

8) Double fuel burning stove according to claim 1 characterised by the fact that the double-walled box (6) that surrounds said second hearth (5) is present at least on the bottom and on three sides.

9) Double fuel burning stove according to claim 1 characterised by the fact that the double-walled box (6) is a water-jacket.

10) Double fuel burning stove according to claim 1 characterised by the fact that the heat exchanger (14) positioned below the second hearth (5) is a heat exchanger for the heating of the water.

11) Double fuel burning stove according to claim 1 characterised by the fact that the double-walled box (6) is a heat exchanger for the heating of the air.
12) Double fuel burning stove according to claim 1 characterised by the fact that the heat exchanger (14) positioned below the second hearth (5) is an air heat exchanger.

13) Double fuel burning stove according to claim 1 characterised by the fact that the first hearth (4) is a hearth for wood and the second hearth (5) is a hearth for loose solid fuel.

14) Double fuel burning stove according to claim 1 characterised by the fact that the first hearth (4) is a hearth for loose solid fuel and the second hearth (5) is a hearth for wood.