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(54) **A stove.**

(57) The invention relates to a solid fuel stove for use in heating. The stove includes a housing (1) which defines a heating chamber (2) therein. An opening (5) is provided in front wall (3) of the housing (1). Air inlet means (20) are provided in association with one or more walls (8,11) of said housing (1), the air inlet means (20) being in communication with one or more air passages (25) which are formed or provided on an inner surface(s) of at least one other wall (10,11) of the housing (1). The one or more air passages (25) may extend across inner surfaces (8a, 11a) walls (10,11) of the housing (1), from said air inlet means (20), to a position (30) at or adjacent an upper inner end of the front wall (3) of said housing (1). A flue (12) is provided for the exit of extraneous and gaseous matter from within said housing (1).

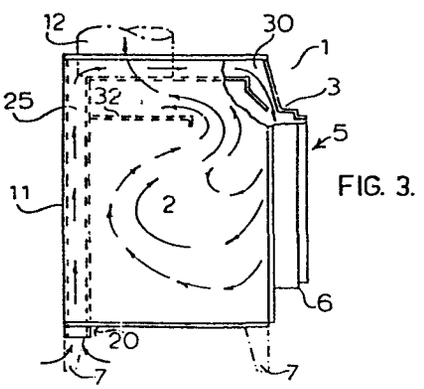

FIG. 3.

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BACKGROUND TO THE INVENTION

This invention relates to a stove and in particular to a solid fuel stove such as for heating, cooking and the like.

It is becoming increasingly popular to provide such solid fuel stoves for use in heating and cooking, especially having regard to the increasing costs of other forms of energy, such as oil based fuels, electricity, and the like.

Up until this time, numerous arrangements have been provided for utilising solid and natural fuels, such as wood, coal and the like. Generally such stoves have included housings which define a heating chamber, openings being provided into the chamber generally in the form of a door which includes one or more windows or louvres. Thus, when a stove is used in domestic surroundings (for example in a home), the fire within the heating chamber can be seen. This has been found to be pleasing from an aesthetic point of view.

The stoves known up until this time have both domestic and commercial applications. In some countries, (such as for example in the United States of America), such heaters or stoves are also used in caravans or mobile homes, which have found to be particularly popular in that part of the world.

In some stoves used up until this time, numerous arrangements have been provided for the combustion of fuel within the heating chamber. For example, arrangements

have been provided which allow for the introduction of primary air, through an appropriate inlet, control means or the like being provided which can, for example, be operated to control the amount of air entering into the chamber, and thus the amount of combustion and heat within the chamber. In some arrangements, air enters through vents or inlets immediately above or adjacent a door or window in a front face of the stove, such air then being drawn down over an inner surface of the d-or and window, and into the heating chamber.

In addition, some stoves used up until this time have incorporated means for the secondary burning of air, in that in some stoves, air when initially drawn into a heating chamber, has not been of a sufficiently high termperature to maximise use of the stove. For example, such arrangements have included the provision of a divide or partial wall, within the heating chamber to form a heating chamber within the stove. One such stove is disclosed in United States patent specification No.4,461,273.

Further, in some stoves, air is drawn into the heating chamber from a position immediately above or adjacent a door in the front thereof, the air thereafter being drawn down over the inner surface of the door, whereafter it is circulated about and within the heating chamber, by means of one or more baffles, for further heating and combustion.

In other arrangements additional or secondary air

inlets in the form of ports, pipes and the like have been provided, to allow for the passage of secondary air into the chamber so that as the additional air passes through the chamber, it is heated before it is exited from within the heating chamber. Such arrangements including the provision of a plurality of pipes, within the heating chamber, have brought about clogging between the pipes, and thus involve additional time and expense in so far as manufacture, cleaning and maintenance. In addition, such arrangements are not always as efficient as desired.

Examples of other stoves and heating arrangements known up until this time, are disclosed in United States patent specifications No's 4,461,273; 4,329,930; 4,230,093; 4,196,713; 3,616,788 and 2,864,358.

The present invention sets out to provide an arrangement whereby at least some of the problems encountered up until this time are avoided or at least minimised. The invention also sets out to provide an arrangement whereby the public and industry are presented with a useful choice and a straight forward and efficient stove.

BRIEF SUMMARY OF THE INVENTION

According to one aspect of this invention there is provided a stove including a housing defining a heating chamber; an opening being provided in a first wall of said housing; an air inlet being provided and being in communication with one or more air passages formed

or provided on an inner surface of at least a second wall of said housing; said air passage extending to a position at or adjacent an upper end of said first wall of the housing; a flue being provided for the exit of extraneous and gaseous matter from within said housing.

According to a further aspect of this invention, there is provided a stove including a housing defining a heating chamber; said housing including a base; a front wall; a rear wall; side walls and a top wall; flue means being provided and extending from said heating chamber to allow for the exit of extraneous and gaseous matter from therewithin; a door being provided within said front wall; air inlet means leading into said heating chamber and connecting with one or more air passages, integrally formed with inner surfaces of said rear wall and said top wall, and extending up an inner surface of said rear wall and across an inner surface of said top to exit at or adjacent an inner upper end of said front wall, within said heating chamber.

According to a further aspect of this invention there is provided a stove including a housing defining a heating chamber; said housing including a base; a front wall; a rear wall; side walls and a top wall; flue means extending from said heating chamber to allow for the exit of extraneous and gaseous matter; a door including a window being provided in said front wall; an

elongate air inlet slot being provided adjacent a lower rear portion of said housing, at or adjacent a connection between said base and said rear wall; said inlet being in communication with an elongate air passage which is integrally formed with inner surfaces of said rear wall and said top wall; said air passage extending up the inner surface of the rear wall of said housing and across an inner surface of the top wall of said housing, so as to terminate at a position adjacent to, but spaced apart from, an inner upper end of said front wall.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will be described by way of example only, and with reference to the accompanying drawings wherein:

Figure 1: is a partially exploded front view of a stove arrangement according to one form of the present invention.

Figure 2: is a partially exploded plan view of a stove arrangement according to one form of the present invention.

Figure 3: is a partially exploded side view of a stove arrangement according to one form of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The stove of the present invention is preferably formed of any appropriate material such as for example

a cast metal material. It should be appreciated however, that the stove can be constructed of any material which is suitable, bearing in mind that the stove is used for heating and cooking purposes.

The stove arrangement of the present invention includes a housing 1 which defines therewithin a heating chamber 2. The housing 1 includes a front wall 3 which is provided with an opening 5 therein. The opening 5 is preferably provided with a door 6 which is hinged to the front wall 3 of the housing 1. This therefore allows for the opening 5 to be opened and closed. Suitable handle and locking means can be provided. The door 6 preferably allows for the heating chamber to be cleaned and also allows for the entry of fuel. In one preferred form of the invention the door 6 is provided with a window or louvres therein, so that the burning within the heating chamber can be observed. It has been found that this is particularly pleasing from an aesthetic point of view (especially when such stoves are used in domestic situations).

The stove arrangement is preferably provided with approrpiate legs or supports 7 so that the stove is able to be held and spaced above the ground or floor.

The housing 1 also includes a base 8, side walls 9, a top or upper wall 10 and a rear wall 11. An outlet flue such as an outlet pipe 12 is provided and is, in

one form of the invention, formed or provided in association with the upper wall 10, to allow for the outlet of extraneous or gaseous matter from within the chamber.

The outlet flue 12 can extend from some other part of the housing or heating chamber, if desired.

In the present invention, air inlet means are provided for the inlet of air into the heating chamber. The air passes through an appropriate inlet or inlets and leads into an air passage which is provided on an inner surface of at least one wall of the heating chamber. The air passage leads to a position substantially adjacent an inner, upper end of the front wall, so that air passes through the air inlet, through the air passage, and is exited within the chamber, at a position adjacent an upper, inner front face of the chamber. Preferably, but not essentially, this position is adjacent or immediately above the door and window at the front of the chamber.

Referring to the accompanying drawings, an air inlet 20 is provided at a lower end of the rear wall 11, of the housing 1, or between the rear wall 11 and the base 8. The inlet 20 extends along the base 8, as at the join connection with the rear wall 11 and extends into or is connected to an air passage 25, which is preferably integrally formed with an inner surface of the rear wall 11 of the housing 1.

While the invention is described with reference to the air inlet 20 being in the form of an elongate slot, it should be appreciated that the air inlet can be in any particular form. For example, the inlet could be in the form of one or more slots; one or more bores; one or more holes or ports.

The air inlet passage 25 shown in the accompanying drawings, extends up the inner surface of rear wall 11 of the housing 1, thereafter extending across the inner wall under surface of the top wall 10 of the housing.

Preferably, the air passage 25 is integrally formed with the inner surfaces of the rear and top walls 11 and 10 of the housing 1.

The air passage 25 preferably terminates or exits as at 30, being a position on the inner surface of the top wall 10, at, adjacent to, or spaced apart from, an inner upper end of the front wall 3 of the housing 1.

Thus, air passes through the air inlet 20 and through the passage 25, to be thereafter exited at or adjacent an inner upper end of the front wall 3 of the housing 1.

Preferably, the exit or outlet 30 of the air passage 25, exits air at or adjacent an inner upper end of said front wall 3, preferably above an inner surface of the door 6, so that the heated air passes down over the inner surface of the door and window.

Thereafter, (and as shown by way of arrows in Figure 3 of the accompanying drawings), the air may be passed

down over the inner surface of the window of the door 6. A dividing baffle 32 and the like can be provided if desired, within the chamber 2.

It should be appreciated that the passage of air up the rear wall 11 and across the top 10, through the air passage 25, subjects the air to substantial heat from within the heating chamber. Thus, the air exiting from the air passage 25 has been heated to a substantial degree by already passing through the heating chamber 2. This is particularly advantageous for use in combustion purposes within theheating chamber 2, and also avoids or at least minimises the need for secondary heating of air, as has been used up until this time. Thus, the air is heated as it enters into the chamber through the air passage 25.

The air passage 25 is preferably of such a size and dimension as to extend substantially across the inner surfaces of the rear and top walls 11 and 10 of the heating chamber 2. This then provides relatively small side areas 11a and 10a, laterally of the air passage 25, on the inner surfaces of the rear and top walls. Thus, the air passage 25 occupies a substantial area of the rear and top walls, so as to provide for the passage of as much air as possible, through the air passage 25.

In one form of the invention, the inner or exposed surfaces of the air passage 25 are substantially flattened or planar so that a flat area of reasonably substantial dimensions is provided for having heat applied thereto, so that as much heat as possible is applied to

the exposed surface of the air passage 25, to thus be imparted to air passing therethrough.

Referring further to Figure 1 of the accompanying drawings, it will be appreciated that air passes up through an inlet 20, (such as for example an elongate, transverse inlet slot 20) the air passage 25 in communication therewith, then passing up the rear wall 11. The air passage 25 is then substantially divided or bifurcated into separate passes 25a and 25b, as it passes across the inner surface of the top wall 10, so that the passage arms 25a and 25b extend about either side of an outlet or flue 12, and allow for its accommodation in and through the top wall 10. The passage arms 25a and 25b are able to merge into the air passage 25, following the formation of an elongate slot or spacing, in the top wall 10, to again allow for the location of a flue or outlet for gaseous matter.

It should be appreciated that if desired, the flue or outlet 12, can be provided in some other position, which may mean that there is no need for the substantial bifurcation of the air inlet 25.

The invention is described by way of example only, and with reference to the accompanying drawings, with regard to air entering through the air inlets 20, at or adjacent the lower end of the rear wall 11, or at or adjacent a join or connection between the rear wall 11 and the base 8. It should be appreciated however, that air inlet means can be provided in other positions.

For example, air inlet means can be provided in a side wall 9 of the housing to thereafter lead into passages passing the side wall 9 and across the underside of the upper or top wall 10.

In a further form of the invention (not shown in the accompanying drawings) air passages can be provided on one or more side walls 9 as well as on the rear wall 11, all such passages on the inner surfaces of the side walls leading or extending into an air passage or chamber on an inner surface of the upper wall or top.

The present invention is described by way of example only, with reference to the air inlet 20 leading into the air chamber 25, which passes up the inner surface of the rear wall 11 and thereafter across an inner surface of the upper wall or top 10.

It is envisaged that in some forms of the invention sufficeint heating of the air may occur by merely passing the air through an air passageon the inner surface of one wall. For example, an air inlet can be provided in an upper portion ofthe rear wall 11 (or in an upper portion of a side wall 9), of the housing, such an air inlet can lead into an air passage formed or provided on an inner surface of the upper or top wall 10 to exit in substantially the same position as with other forms of the invention. That is, air would exit from an air passage 25 as at 30, at a position adjacent to but preferably spaced apart from an inner upper front wall of the chamber.

The air however would be brought into the air passage 25, through an air inlet in an upper portion of a rear or side wall so that air passing through the air passage 25 would only be heated or exposed to heat as it passed through the passage on the inner surface of one wall of the housing.

The present invention is described with reference to an air passage 25 being of a substantially unitary construction. It should be appreciated however, that a plurality of air passages can be integrally formed with inner surfaces of the side, rear and/or top walls of the housing, in order to obtain similar benefits and advantages. For example, an inner surface of a rear and/or side wall of the heating chamber could be provided with a plurality of integrally formed air passages or tubes, extending inwardly from the inner surface thereof, these in turn being connected to integrally formed passages extending across an underside of the top of the chamber, and exiting in substantially the same position as the air passage 25, as at 30.

As stated hereinbefore, it has been found to be particularly advantageous to have the leading or exposed faces of air passages substantially planar or flattened, to obtain maximum exposure to heat within the heating chamber.

The integral formation of the one or more air passages with the inner surfaces of the housing has been found to be advantageous, in that this avoids or

minimises gaps or spaces which can collect dirt, extraneous matter and the like as are found in arrangements which employ pipes or tubes which are attached to but slightly spaced apart from wall or support surfaces, for the introduction of secondary air. The integral formation of one or more air passages, therefore allows for a far more effective and straight forward maintenance and cleaning operation. The integral formation is also far more effective in so far as heat transfer is concerned, and is such as to offer substantial advantages in manufacturing time and cost.

In operation of the present invention, suitable known control means are provided in association with air inlet means 20, so as to allow the amount of air passing into the chamber to be controlled by a user or operator. This then controls the amount of combustion and heat.

It should be appreciated that the present invention has particular advantages over arrangements used and known up until this time, in that secondary heating, which has been attempted and used up until this time, is minimised if not avoided. Thus, the air is heated as it is passed into the heating chamber, by use of one or more air passages. Thus, the use of secondary and additional integers within and in association with the heating chamber, can be avoided or at least minimised. The use of integrally formed air passages, avoids the use of pipes and tubes which can provide difficulties

in cleaning and maintenance. Such pipes and tubes also tend to collect extraneous matter and can provide obstruction to the circulation of air within the chamber. The provision of integrally formed air passage means at least goes some way to minimising those problems.

It should be appreciated that the present invention has been described by way of example only, and that modifications and improvements may be made without departing from the scope thereof, as defined by the appended claims.

WE CLAIM:

1. A stove including a housing (1) defining a heating chamber (2); an opening (5) being provided in a first wall (3) of said housing (1); an air inlet (20) being provided and being in communication with one or more air passages (25), formed or provided on an inner surface of at least the other wall (10,11) of said housing (1); said air passage(s) extending to a position (30) at or adjacent an inner, upper end of said first wall (3) of the housing (1), a flue (12) being provided for the exit of extraneous and gaseous matter from within said housing (2).

2. A stove including a housing (1) defining a heating chamber (2); said housing (1) including a base (8); a front wall (3); a rear wall (11); side walls (9) and a top wall (10), flue means (12) being provided and extending from said heating chamber (2) to allow for the exit of extraneous and gaseous matter from therewithin; a door (6) being provided in said front wall (3); air inlet means (20) leading into said heating chamber (2) and connecting with one or more air passages (25), integrally formed with inner surfaces of said rear wall (11) and said top wall (10), and extending up an inner surface of said rear wall (11) and across an inner surface of said top wall (10) so as to exit at or adjacent an inner, upper end of said front wall (3), and within said heating chamber (2).

3. A stove including a housing (1) defining a heating

chamber (2); said housing including a base (8); a front wall (3); a rear wall (11); side walls (9) and a top wall (10); flue means (12) extending from said heating chamber (2) to allow for the exit of extraneous and gaseous matter; a door (6) including a window being provided in said front wall (3); air inlet means (20) being provided adjacent a lower rear portion of said housing (1), at or adjacent a connection between said base (8) and said rear wall (11); said air inlet means (20) being in communication with an elongate air passage (25) which is integrally formed with inner surfaces of said rear wall (11) and said top wall (10); said air passage (25) extending up an inner surface of the rear wall (11) of said housing and across an inner surface of the top wall (10) of said housing, such as to terminate at a position (30) adjacent to, but spaced apart from, an inner upper end of said front wall (3).

4. A stove as claimed in claim 1, wherein said one or more air passages (25) are integrally formed with said at least one other wall (10,11) of said housing (1).

5. A stove as claimed in claim 1, wherein a plurality of air passages (25) are formed with inner surfaces of a rear wall (11) and a top wall (10) of said stove; said air inlet means (20) being provided at or adjacent a connection between a base (8) of said stove and a rear wall (11) of said stove; said air inlet means (20) being in communication with said air passages (25).

6. A stove as claimed in claim 1 wherein an exposed

surface of said air passage(s) (25) is substantially flat and planar.

7. A stove as claimed in claim 2 or claim 3, wherein the exposed surface of said air passage (25) is substantially flat and planar.

8. A stove as claimed in claim 2 or claim 3 hwerein said air inlet means (20) is in the form of one or more elongate slots.

9. A stove as claimed in claim 2 or claim 3 wherein said air inlet means (20) is in the form of one or more air inlet ports.

10. A stove as claimed in claim 1, including a base (8); a front wall (3); a rear wall (11); side walls (9) and a top wall (10); flue means (12) being provided and extending from the heating chamber (2) to allow for the exit of matter from therewithin; a door (6) including a window being provided in said front wall (3); air inlet means (20) being provided and leading into said heating chamber (2), at or adjacent a connection between said base (8) and said rear wall (11); a substantially unitary air passage (25) being integrally formed with inner surfaces of said rear wall (11) and said top wall (10) and extending across an inner surface of said top wall (10) so as to terminate at or adjacent an inner upper end of said front wall (3) and within said heating chamber (2).

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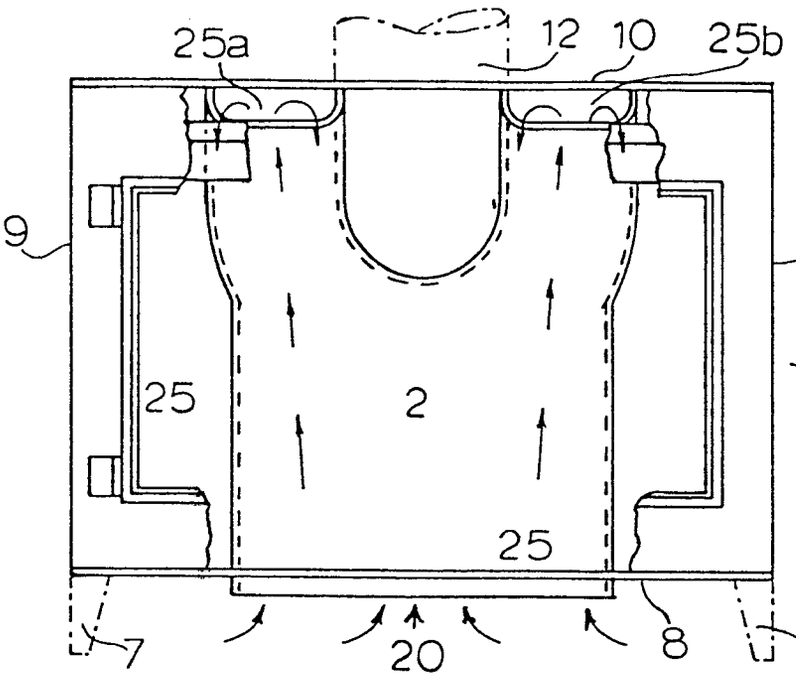

FIG. 1.

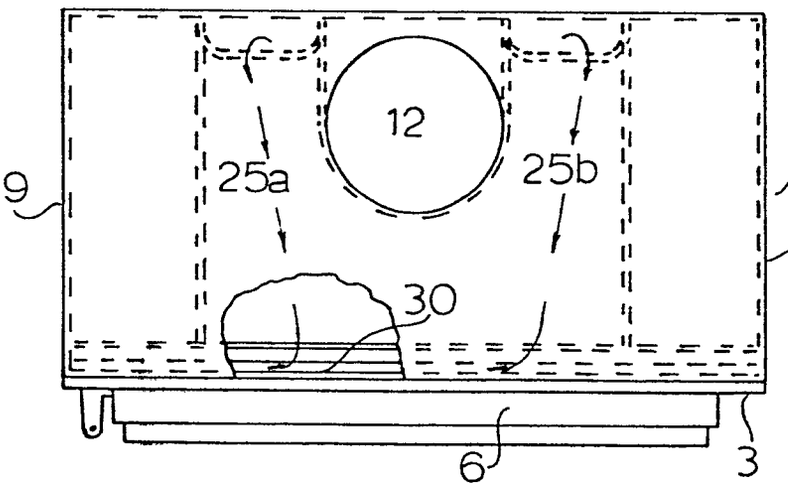

FIG. 2.

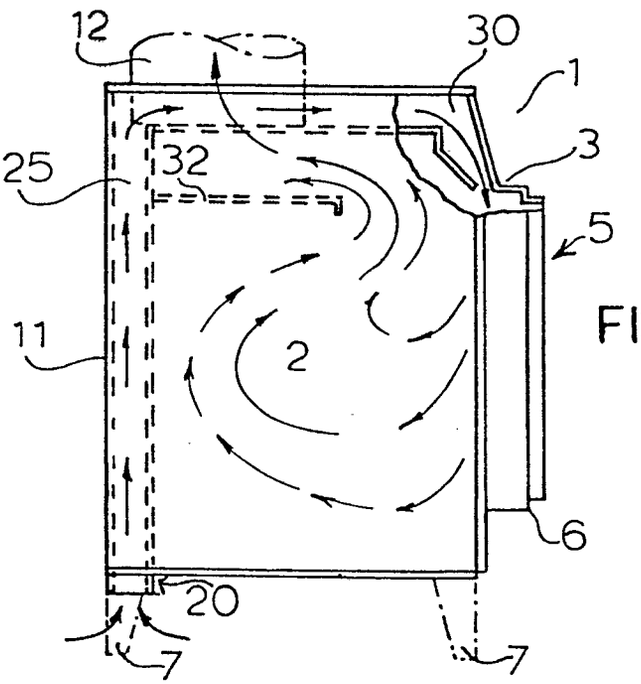

FIG. 3.