Sept. 22, 1942. A. F. ZERIN 2,296,552

HEATING STOVE AND THE LIKE

Filed Oct. 25, 1940

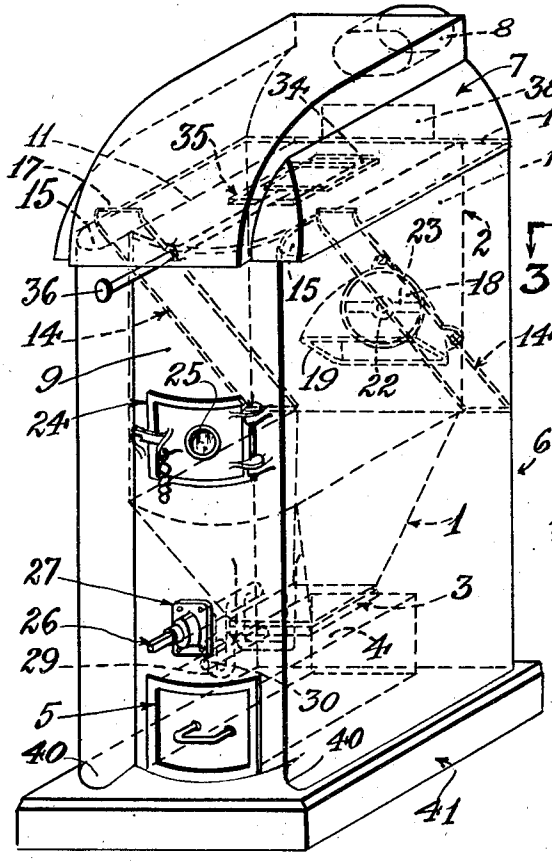

Fig. 1

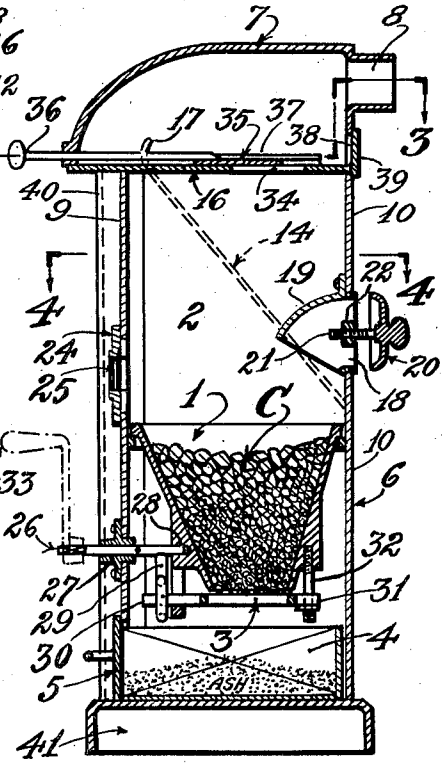

Fig. 2

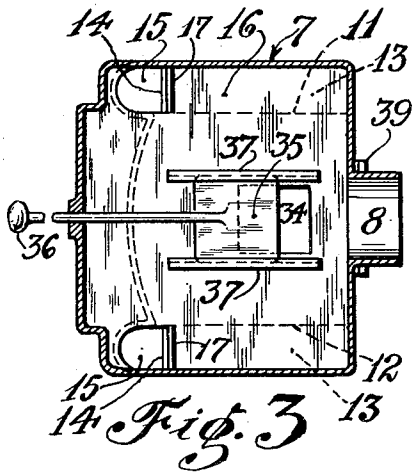

Fig. 3

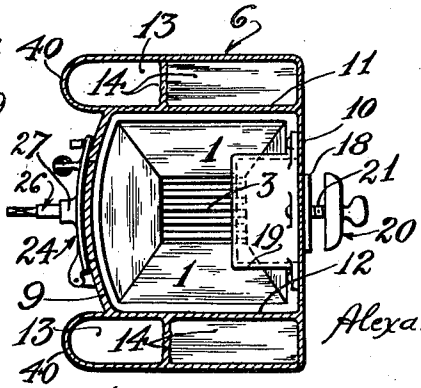

Fig. 4

Alexander F. Zerin,
INVENTOR

BY Paul Purchard.
ATTORNEY.

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HEATING STOVE AND THE LIKE

Alexander F. Zerin, Pittsburgh, Pa.

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2 Claims. (Cl. 126—74)

This invention relates to heating apparatus and more in particular to coal stoves and the like used for heating rooms or homes.

One of the primary objects of this invention is to provide a stove for solid fuels in which the gases of combustion are caused to travel through the ignited fuel bed, thereby insuring complete combustion of the gases and fuel particles entrained thereby, and reducing, therefore, the formation of objectionable smoke to a minimum.

Another object of this invention is to provide a coal stove in which the gases of combustion are made to travel a greater distance before reaching the smoke flue, than occurs in stoves of conventional design, thus enabling said gases to dissipate their heat more completely and over a greater heating surface.

Still another object of this invention is the provision of a coal stove and the like which, because of the above mentioned features, is very economical in fuel and which greatly reduces the amount of soot and losses in the ashes.

Additional features and advantages of this invention will appear in the course of the following description, considered in connection with the accompanying drawing forming part of this application.

In the drawing:

Fig. 1 is an isometric view, with some structural details omitted for the sake of clarity, showing my invention applied to a stove for directly heating the room in which it is located.

Fig. 2 is a longitudinal sectional view taken substantially on the central vertical axis of said stove.

Fig. 3 is a cross-sectional view taken substantially along line 3—3 in Fig. 2, and

Fig. 4 is a similar view taken on line 4—4, also in Fig. 2.

Reference being had to the drawing, the coal stove shown as one embodiment of my invention, comprises a fire-pot 1, of any desired and suitable shape, in which the coal C is placed. This pot is surmounted by a combustion-chamber 2, normally closed at the top. At the bottom of the fire-pot is a grate 3 of any desired conventional type, and below it is the ash-pit 4, which in the present example is built into a drawer 5, so that the ashes may be removed from the stove without the accompaniment of dust, due to shoveling or raking.

The fire-pot and combustion-chamber are enclosed in an outer casing 6 which is direct contact with the ambient air of the room to be heated, and which is constructed to offer a great radiating surface.

Surmounting the combustion-chamber and casing is a smoke-dome 7, having a smoke-outlet 8 connected in any desired manner to the chimney of the building.

The front and the rear sides 9 and 10 respectively of the combustion-chamber 2 are in direct contact with the corresponding sides of the casing, or may be made integral parts thereof, as shown in the drawing; whereas the two lateral sides 11 and 12 are set away from the sides of the casing, thus leaving two substantially equal wells 13 through which the gases of combustion travel before entering the smoke-dome 7.

In order to further increase the length of travel of the combustion gases in the smoke-dome, for the purpose of facilitating the transmission of their heat to the walls of the dome, there is installed in each lateral well 13 a closely fitting, forwardly rising, inclined baffle-plate 14 which guides the rising hot gases toward the front of the stove. These gases, after passing through apertures 15 provided therefor in the top 16 of the combustion-chamber 2, are forced to travel the whole length of the dome 7 before reaching the smoke-outlet 8. These baffle-plates are preferably extended above the top 16 and curved rearwardly, as at 17, to assist the flow of smoke toward the outlet 8.

The air necessary for the combustion of the fuel is introduced through an adjustable air-inlet, of any desired and suitable type. This inlet is placed above the fire-pot 1 and is, preferably in the rear of the stove.

The air-inlet shown in the drawing comprises an inlet-pipe 18 having an integral downwardly bent hood 19 secured to the rear wall of the combustion-chamber. The supply is controlled manually by a circular cover 20 provided with a central threaded stem 21 engaging a tapped hub 22 supported by the diametral arm 23 cast integrally with the inlet-pipe. The purpose of this hood is to direct the incoming air toward the fire-pot, and also to prevent coal too strenuously shoveled therein from flying out through the air-inlet, which is substantially opposite the coal-door.

Coal is supplied to the fire-pot through a close-sealing coal-door 24, of conventional construction, and preferably provided with a window 25 of fireproof transparent material, such as mica, so that combustion in the fire-pot may be observed without opening the coal-door, thus preventing the admission of superfluous air in the stove.

The grate 3 shown in the drawing is of the conventional reciprocable hinged type and is moved right and left by means of a rocker-shaft 26 supported in bearings 27 and 28 and provided with an angularly disposed slotted arm 29 which receives the handle 30 of the grate. At the rear thereof there is an extension 31 pivotally engaged by the pivot-pin 32 secured to the fire-pot 1. The front end of the shaft 26 is preferably made of angular cross-section adapted to

receive a crank 33 whereby the grate may be shaken to remove the ashes from the fire-pot.

In the top-plate 16 of the combustion-chamber 2 there is provided a direct draft opening 34 which may be regulated by means of a slide-damper 35 having a handle 36 extending outwardly of the smoke-dome 7. This damper is guided for sliding movement by means of guide-strips 37 secured on the top-plate.

A clean-out opening 38, tightly closable by a door 39, is also provided in the smoke-dome, so that all dust and soot deposited on the top-plate may be removed occasionally.

It will be readily understood that most of the dust or soot that may be carried up to the smoke-dome through the apertures 15 will be deposited on the top-plate 16, because of the greatly reduced velocity of the smoke while passing through the relatively voluminous smoke-dome. Therefore, the smoke issuing from the chimney of this type of stove will be practically free of solid dust particles and, thus, greatly reduce atmospheric contamination and the danger of so-called chimney fires.

In the drawing, the casing 6 is shown with a convex center portion and with hollow rounded corners 40 for the purpose of increasing the heat radiating surface of the stove, as well as improve its appearance. For similar reasons, the stove is placed, preferably, on a metal base 41.

When a fire is started in the stove, the air-inlet 18 is preferably closed, and the ash-drawer 5 together with the slide-damper 35, are pulled out temporarily so that the stove will function like a conventional type of stove, the excessive smoke usually produced at the starting of a fire going directly from the fire-pot through the draft opening 34 and thence into the smoke-outlet 8.

After the fuel in the fire-pot is properly ignited and its smoke production reduced, the ash-drawer 5 and the draft-opening 34 are closed, and the air-inlet 8 opened and adjusted for best operation. The air necessary for proper combustion will, therefore, be drawn downwardly through the incandescent bed of coal, and all combustible gases generated in the upper layers of the fuel will be consumed. At the same time, the free particles of fuel will be retained in the bed of coal, acting now as a filter.

The strong draft created by the chimney will be found quite ample to force the gases of combustion down through the grate 3, then up along the outside of the fire-pot and combustion-chamber, and along the baffle-plates 14 into the smoke-dome 7, where the gases will deposit the remaining particles of soot and dust, before issuing through the outlet 8 into the chimney.

It will thus be noted that the gases of combustion travel, within the stove, a considerable greater distance than is the case in ordinary stoves, and that they are better able to impart their heat to the stove-casing and smoke-dome before their exit into the atmosphere.

When adding fuel to the fire-pot, the damper 35 is first pulled out to open the direct draft opening 34, before the fuel is shoveled through the opened coal-door 24. Then, the coal-door and the draft-opening are again closed, thus causing the stove to function normally, as above described.

Extensive use of a stove built substantially as above described and shown in the drawing has shown that this construction justifies the claims made hereinabove as to fuel economy and the resulting reduction of atmospheric polution by the smoke.

If desired, the same principles may be applied to other types of heating devices, such as, for instance, hot-air furnaces. In this case, the complete stove, as above described, would be enclosed in a larger sheet metal jacket, (not shown) provided with the usual hot-air pipes. Whatever structural modifications that would be required to this end will be readily conceived and executed by persons versed in this art, and need, therefore, not be detailed herein.

In the foregoing description, the operation of my invention with coal as a fuel has been assumed. It is however evident that the same principles of construction can be applied for the economic combustion of other fuels, such as coke, briquet, wood, etc., and the abatement of the smoke nuisance.

While I have illustrated and described herein a well tested embodiment of my invention, it may be found desirable after continued experience to make changes in the construction and arrangement of the details of my invention to suit various applications and fuels, and I intend to include in this application all such variations as fall within the scope of the appended claims.

I claim:

1. In a stove and the like, a fire-pot; a grate therefor; a combustion-chamber positioned on the fire-pot in direct connection therewith; a normally closed top for the combustion-chamber; a casing enclosing said fire-pot and combustion-chamber; said casing being in direct contact relation with the front and rear of the combustion-chamber and in substantially parallel spaced relation with the lateral sides thereof; a smoke-dome on the combustion-chamber and normally disconnected therefrom; adjustable means operable from without the smoke-dome to directly connect same with the combustion-chamber; an adjustable air inlet for and above the fire-pot; a smoke outlet for the smoke-dome, the top of said combustion-chamber having openings in direct communication with the spaces intermediate the lateral sides of said combustion-chamber and casing, and means positioned in said spaces to direct gases of combustion to said smoke-dome at points substantially farthest from the smoke-outlet.

2. In a stove and the like, a fire-pot; a grate therefor; a combustion-chamber positioned on the fire-pot in direct connection therewith; a normally closed top for the combustion-chamber; a casing enclosing said fire-pot and combustion-chamber, said casing being in direct contact relation with the front and rear of the combustion-chamber and in spaced relation with the lateral sides thereof; a smoke-dome on the combustion-chamber and normally disconnected therefrom; adjustable means operable from without the smoke-dome to directly connect same with the combustion-chamber; an adjustable air inlet for and above the fire-pot; a smoke outlet for the smoke-dome, the top of said combustion-chamber having openings in direct communication with the spaces intermediate the lateral sides of said combustion-chamber and casing, and inclined baffles positioned in said spaces to direct gases of combustion through said openings into the smoke-dome at points substantially farthest from the smoke-outlet.

ALEXANDER F. ZERIN.