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J. L. DAVIE

FIREPLACE

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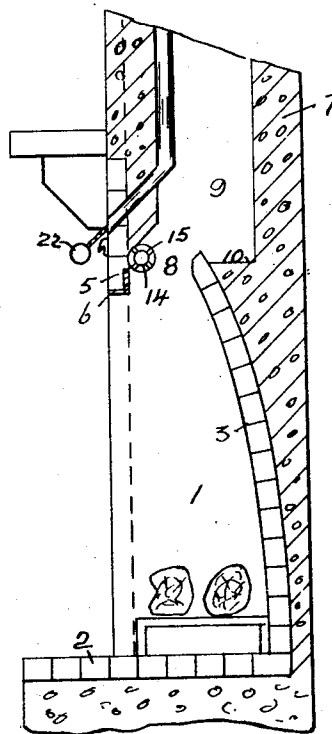
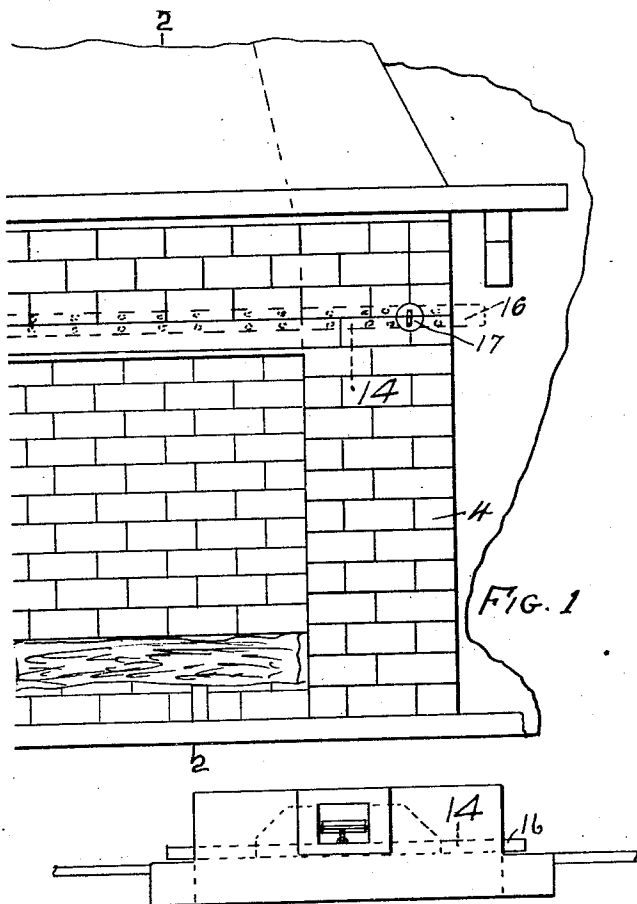


FIG. 3

FIG. 2

INVENTOR
JOHN L. DAVIE.

BY
Harry C. Schweder

ATTORNEY

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JOHN L. DAVIE, OF OAKLAND, CALIFORNIA.

FIREPLACE.

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My invention is a fire place having means to automatically regulate the chimney draft in accordance with the heat of the fire in the hearth.

5 Some of the objects of my invention are to prevent the smoking of fire places and thus filling the room with smoke and also to prevent an excess of air being drawn from the room and carried up a chimney, there-
10 by wasting the heat in the room. Another object of my invention is to maintain a steady draft independent to a certain extent of the fire in the hearth. I may also provide a damper which may be utilized but in
15 practice it is practically not necessary.

My invention in brief comprises a fire place having a hearth with a relatively narrow neck or passage leading to the chimney or smoke flue and situated across the neck
20 and provided with a perforated pipe which draws air from the outside of the building or another room. The fire-place is preferably made with a curved rear wall so that the heat will be reflected outwardly to better
25 advantage and the perforated pipe is directly in the path of the products of combustion as well as the radiated heat from the fire. This heats the pipe to a high degree, heating the air therein and causing it to
30 flow out of the perforations and up the chimney. As the air passes through the pipe the cold air from out of doors is drawn in.

It is well known that in most fire places,
35 especially those designed to burn wood in the form of logs, that practically all the combustion takes place on the hearth and that there are no inflammable gases which reach the neck of the hearth. With my
40 arrangement of perforated pipe the exhausted air utilized in the combustion of the fuel and the smoke therefrom is substantially all the air drawn from the room to pass up the chimney, as surplus air is drawn
45 from an exterior source through the pipe and into the chimney for properly maintaining the draft. With my construction it is usually not necessary to use a damper in the neck of the fire-place leading into the smoke
50 flue or chimney.

My invention may likewise be applied to stoves and furnaces in which cold air from
55 outside is led into a perforated pipe situated in the stove or furnace adjacent the smoke pipe so that as the pipe becomes heated more air will be drawn from the

outside and pass up the chimney and thereby lessen the excess amount of air which is usually drawn through the stove beyond that required for combustion.

My invention in its several aspects will be more readily understood from the following description and drawings in which;
60 Figure 1 is a front elevation of a fire place indicating the perforated air pipe situated
65 therein.

Figure 2 is a vertical section of Figure 1 as if taken on the line 2-2 of Figure 1 showing the hearth and the back wall of the fire place, the smoke flue or chimney,
70 with the perforated air pipe situated at the neck of the fire-place.

Figure 3 is a plan of my improved fire-place on a reduced scale indicating the usual relations of the fire-place and chimney to
75 the wall.

Referring particularly to Figures 1, 2, and 3, the fire place is designated generally by the numeral 1 and is constructed with a hearth 2 and curved rear wall 3 and side
80 walls or pilasters 4. The cap of the fire-place 5 is preferably supported by an angle iron 6 in the usual manner. A chimney 7 of the usual construction is connected with the fire place by a narrow neck 8 which may
85 be made quite small from front to back. The smoke flue 9 leading to the chimney is preferably tapered in the usual manner. The lower portion of the chimney may be provided with a soot catching shelf 10 or
90 this can be curved to connect with the neck of the fire place if desired.

A pipe 14 having perforations 15 is placed across the chimney and situated in the neck or passage between the hearth and the chimney.
95 This pipe preferably leads outside of the hearth wall and extends from said hearth on the outside of the building as indicated at 16 so that air may be drawn entirely from the outside of the building to enter the pipe
100 and pass out the chimney as herein described. A pair of dampers 17 one of which is shown in Figure 1 will preferably be placed on opposite sides of the fire-place in order to shut
105 off the perforated pipe or vary the opening therefrom. It is manifest that the pipe may lead to any suitable place for the air inlet thereto.

The chimney ordinarily is equipped with a damper (not shown), the operating means
110 being shown as a chain and ball, indicated at 22.

The manner of operation of my fire place is substantially as follows: When a fire is properly burning on the hearth such as a fire of logs, the air to cause combustion, is, of course, drawn directly from the room and usually from along the floor. There is such an excess of air that the fuel is either completely burnt without formation of smoke or combustible gases or else the combustible gases are chilled to such an extent by the inrush of air that they do not ignite and pass up the chimney. As the perforated pipe becomes heated the air in the pipe expands and passes up the chimney, being aided of course by the draft of the combustion and cold air is drawn into the pipe. The hotter the fire, the greater the heating of the perforated pipe, both by the heated gases and air striking the pipe and by radiated heat from the fuel which causes a more rapid flow of air from the outside through the pipe and up the chimney.

The perforated pipe also functions in first lighting a fire by quickly becoming heated in starting a flow of warm air up the chimney, and thereby to a great extent eliminating the smoking of the fire place in lighting it. As it is always necessary to make the cross section of the chimney larger than the cross section should be under ideal conditions there is usually a large amount of warm air drawn from the room through the chimney. This is practically eliminated by my construction as the cold air from outside is drawn into the pipe becomes heated and rises through the chimney. This circulation of air prevents the warm air from being exhausted from the room but still allows sufficient air for combustion and gives a better circulation to carry the smoke up the chimney.

The operation of the perforated pipe in connection with a stove is on substantially

the same principle as in my fire place. That is, the air in the pipe becomes heated and passes out of the perforations up the chimney, utilizing the air from outside of the room. This prevents an excess of air beyond that required for the combustion from being drawn in to the stove through the draft dampers. Moreover, in burning some types of fuel hot air will be introduced directly into the path of hot combustible vapors and cause these to ignite thereby giving out heat in the stove and the smoke-pipe.

It is manifest that my invention may be considerably modified and utilized in a more elaborate construction for different types of fire places, stoves or furnaces.

Having described my invention, what I claim is:

1. In means of the character set forth, a fire-place comprising a hearth, side walls and a rear wall, the front of the fireplace being open and the space confined by said walls affording an open combustion-chamber, a chimney extending upwardly from the upper portion of said fireplace and connected with said combustion-chamber by a restricted throat disposed adjacent the upper portion of the open front, and a transverse air-pipe disposed above said combustion-chamber in said throat and having discharge openings communicating therewith, said pipe being provided with an inlet from a source exterior to the room which contains said fireplace and discharging air into said chimney and thus lessen the capacity of the chimney to draw air from said room.

2. The means set forth in claim 1, characterized by locating said transverse pipe adjacent the front wall of said restricted throat.

In testimony whereof I affix my signature.
JOHN L. DAVIE.