Oct. 22, 1946. G. N. BOLINGER 2,409,731

FIREPLACE

Filed Feb. 25, 1944 2 Sheets-Sheet 1

Fig. 1.

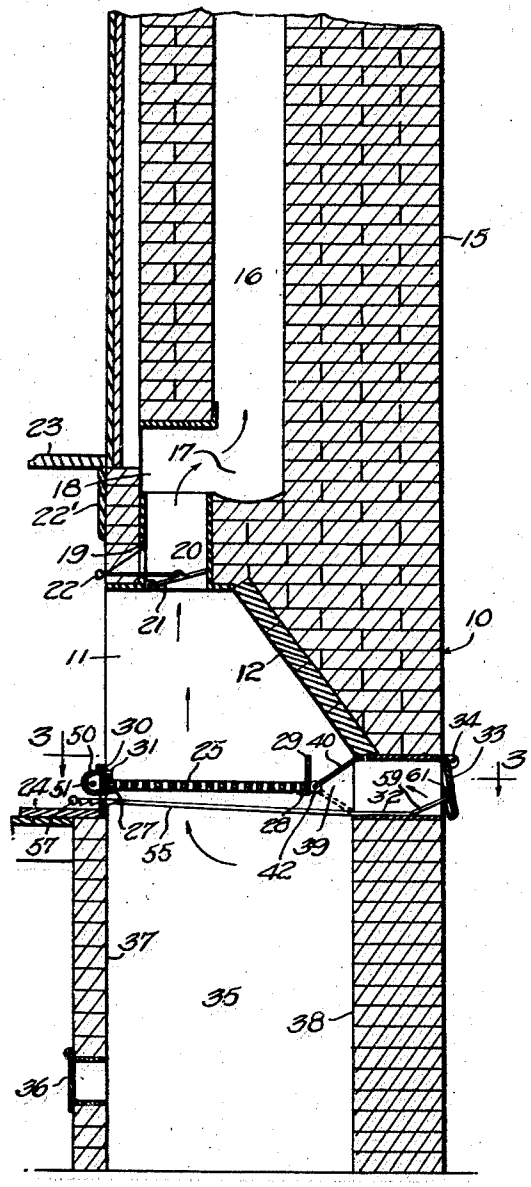
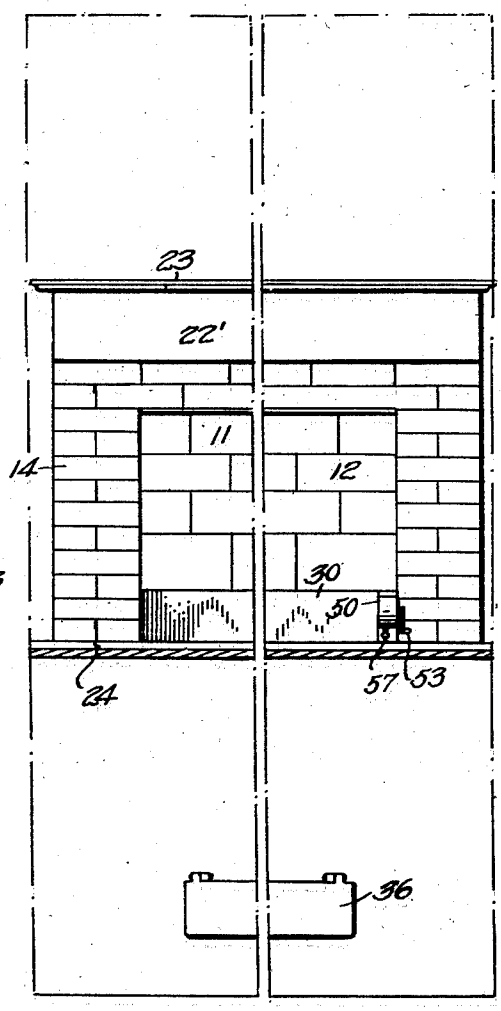


Fig. 2.



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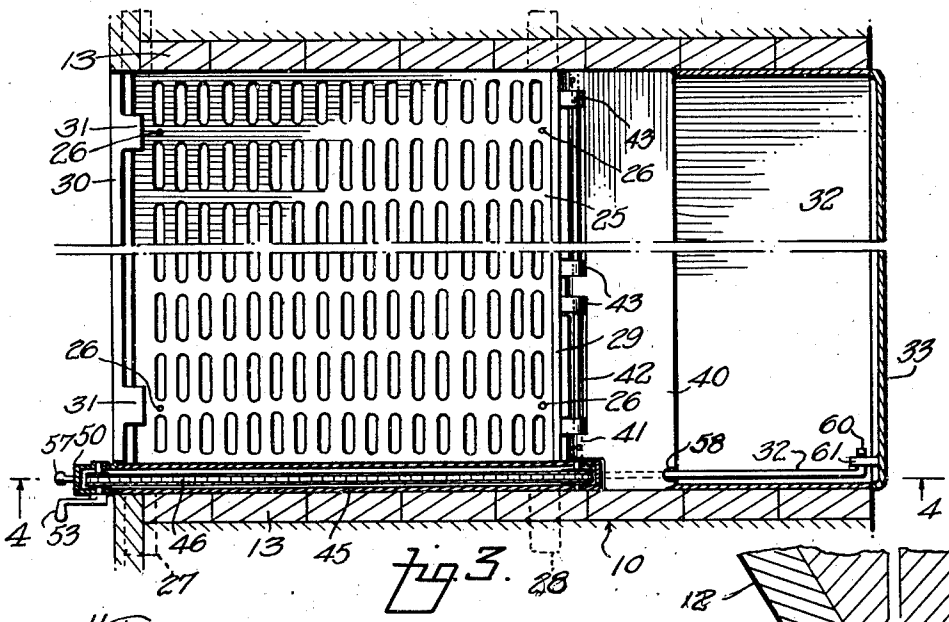


Fig. 3.

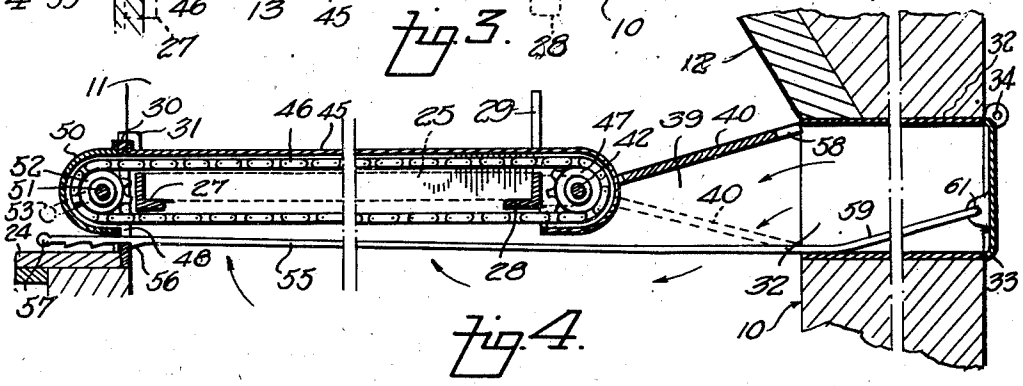


Fig. 4.

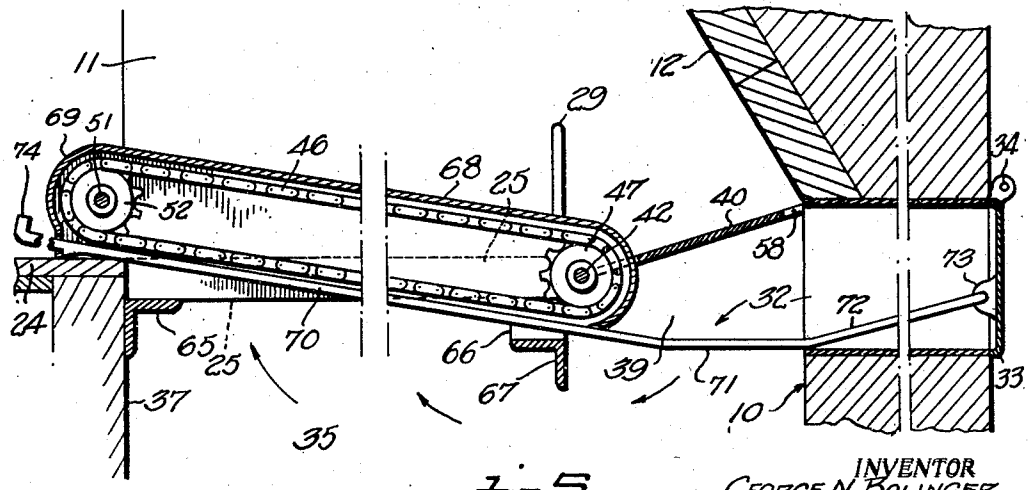


Fig. 5.

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FIREPLACE

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Application February 25, 1944, Serial No. 523,869

6 Claims. (Cl. 126—120)

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This invention relates to fireplaces.

In the conventional open fireplace, the grate is arranged above the level of the floor of the room and is supplied with air to support combustion from beneath the grate, and this air is drawn from the room over the adjacent surface of the floor. As is well known, this tends to create a drafty condition close to the floor.

Moreover, while fireplace chimneys are provided with dampers, such devices do not function to control the rate of combustion since there is no means to control the rate of flow of air through the fuel on the grate.

An important object of the present invention is to provide a novel fireplace construction wherein the space beneath the grate is blocked off from the interior of the room to prevent the drawing of cold air over the floor toward the grate.

A further object is to provide a fireplace construction wherein all of the air for supporting combustion is drawn from the exterior of the building.

A further object is to provide novel means operating in conjunction with the air inlet for governing the flow of air through the fuel on the grate thus permitting the rate of fuel combustion to be controlled.

More specifically a further object is to provide novel means for controlling the flow of air from the exterior of the building so that all of the air may be supplied to the bottom of the grate to flow therethrough; or all of the air may be directed over the grate; or the air may be divided so that any desired proportion flows upwardly through the grate and the remainder directly toward the chimney, thus controlling the rate of combustion as may be desired.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings I have shown two embodiments of the invention. In this showing—

Figure 1 is a central vertical sectional view through a fireplace and associated elements,

Figure 2 is a front elevation of the same, parts being broken away,

Figure 3 is a horizontal sectional view on line 3—3 of Figure 1,

Figure 4 is a vertical sectional view on line 4—4 of Figure 3, and,

Figure 5 is a similar view showing a modified form of the invention.

Referring to Figure 1 the numeral 10 designates the masonry structure as a whole forming the main elements comprising the fireplace. The opening forming the fireplace is indicated by the numeral 11 and the fireplace opening is provided with a sloping back wall 12 preferably formed of fire brick as is customary. The side walls of the fireplace opening also are preferably formed of

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fire bricks 13 (Figure 3) and these fire bricks are preferably covered at the front of the fireplace by conventional stones or bricks 14 (Figure 2).

Above the fireplace opening the masonry structure forms a chimney 15 having the usual stack 16 therein which may be provided with a wind shelf 17 the forwardly offset portion 18 of which communicates with the fireplace, toward the front thereof, through a preferably cast shell 19 forming a smoke passage 20. This passage may be provided with a conventional damper 21 operable by a handle 22 to close the stack when the fireplace is not in operation.

The fireplace may be provided with the usual auxiliary elements such as a wall board 22' surmounted by a mantle 23. Similarly the fireplace may be provided with the usual hearth 24.

The grate for the fireplace is indicated by the numeral 25 and this grate will be of the proper construction depending upon the type of fuel to be burned. The grate may be secured as at 26 to forward and rear structural supporting elements 27 and 28, which may be in the form of angle irons with their ends embedded in the walls 13 as shown in Figure 3. These structural elements, therefore, support the grate and the fuel resting thereon. It will be noted that the wall 12 has its lower end terminating rearwardly of the rear limit of the grate. To properly maintain a bed of fuel on the grate, the rear support 28 may have its vertical flange 29 extending upwardly substantially above the grate as shown in Figures 1 and 4.

In the form of the invention shown in Figures 1, 2 and 3, the grate 25 is arranged above the level of the hearth 24, and accordingly above the floor level, substantially in accordance with common practice. In such case, the space beneath the grate 25 will be blocked off from communication with the room by a vertical wall 30 (Figure 1). This wall may be formed of any suitable material, for example, cast iron, and it may extend behind the last stones of the hearth as shown in Figure 1. Moreover, the wall 30 may be provided with hook elements 31 to extend over the top of the horizontal support 27 to fix this support and the wall 30 with respect to each other. Obviously, no air for supporting combustion of the fuel can pass from the room to a point beneath the grate.

A preferably cast iron air duct 32 is built into the masonry structure 10. This duct may be relatively wide as shown in Figure 3 and relatively shallow in depth, and the top and bottom of the duct may extend approximately equidistantly above and below the level of the grate 25. A control door 33 is hinged as at 34 to the outer end of the duct 32. The door 33 may be swung on its hinge to control the admission of air through the duct, and may be completely closed when the fireplace is not in operation. The

means for raising and lowering the door will be referred to later.

Beneath the grate a relatively large ashpit 35 is formed as shown in Figure 1, and this pit may be provided with a cleanout door 36. The forward wall 37 of the ashpit supports the wall 30 and the rear wall 38 of the ashpit extends upwardly to the lower rear limit of the wall 12. Between the rear edge of the grate and the wall 38 a substantial space is left to provide a throat 39 into which air flows from the duct 32. A plate 40 is adapted to control the disposition of the air flowing into the throat 39. This door is provided with ears 41 receiving a rod 42 passing through the ears 43 carried by the rear support 28 as shown in Figure 3. The shaft 42 rotates in the ears 43 and is fixed to the ears 41 to turn with the plate 40.

An elongated casing 45 is secured in any suitable manner against one of the walls 13 and houses a chain 46 passing around a sprocket 47 carried by the shaft 42 (Figure 4). The support 28 has its vertical flange cut down at the point where the support enters the housing 45 to thus extend between the upper and lower runs of the chain 46. The forward end of the housing 45 is secured to the wall 30 and the latter is provided with a vertically elongated opening 48 corresponding approximately in shape and size to the cross-sectional shape and size of the interior of the housing 45. Forwardly of the wall 30 a substantially semicircular housing 50 is secured to such wall and supports a shaft 51 carrying a sprocket 52 around which the chain 46 passes. A crank 53 is carried by the shaft 51 externally of the housing 50 as shown in solid lines in Figure 3. It will be apparent that operation of the crank 53 swings the plate 40 between its uppermost position shown in solid lines in Figure 4 and its lowermost position shown in dotted lines in Figure 4.

Beneath the housing 45 a rod 55 extends through the bottom portion of the opening 48 and is ratcheted as at 56 for engagement with the bottom of the opening 48 whereby the rod may be held in any desired position as will become apparent. The end of the rod 55 within the room may be provided with a suitable operating knob 57.

The rear portion of the rod 55 extends into the duct 32 preferably substantially in contact with the bottom of such duct. The plate 40 is notched as at 58 to receive the rod 55 when the plate 40 is swung to its lowermost position. Within the duct 32, the rod 55 slopes upwardly as at 59 and has its rear end extended transversely as at 60 and arranged in an ear 61 preferably formed integral with the door 33. Obviously the knob 57 may be operated to change the position of the door 33.

In Figure 5 of the drawings a slightly modified form of the invention is shown. In the modified form of the invention the grate 25 is arranged approximately flush with the floor and has its forward portion arranged on an angle iron support 65 carried by the wall 37 of the ashpit. The rear edge portion of the grate is provided with depending lugs 66 resting on a support 67 which may have its ends embedded in the side walls of the fireplace as in the case of the supports 27 and 28.

In such form of the invention a housing 68 may be employed having its rear end arranged approximately in the position of the rear end of the housing 45 previously described. Such end of the housing 68 receives the sprocket 47 mounted

on the shaft 42. Inasmuch as the grate is flush with the floor no forward blocking wall 30 is employed, and accordingly the housing 68 continues beyond the grate to terminate in a semicircular portion 69 which corresponds to the housing 50 previously described. Obviously the housing 68 slopes forwardly toward the room and the semicircular portion 69 of the housing rotatably supports the shaft 51 carrying the sprocket 52 around which the chain 46 passes. In both forms of the invention the corner portion of the plate 40 adjacent the chain housing will be cut away to substantially fit around the adjacent portion of the chain housing as shown in Figure 3. In the form of the invention shown in Figure 5 a rod 70 will be employed in place of the rod 55. This rod may extend parallel to the housing 68 just beneath the lower run of the chain 46, and beyond the rear end of such housing the rod extends substantially horizontally as at 71 until it passes into the duct 32. The rod then extends upwardly at an angle as at 72 to a pivotal connection with an ear 73 carried by the door 33. The forward end of the rod 70, within the room, may be provided with a suitable handle piece, for example, by turning its end upwardly as at 74.

The operation of the form of the invention shown in Figures 1 to 4 inclusive will be apparent from the foregoing description. The wall 30 prevents the thermosyphonic action of the combustion of the fuel from effecting a flow of air over the floor into the space beneath the grate, thus preventing the creation of uncomfortable and unhealthful drafts along the floor. The door 33 is left open while the fireplace is in use so that air to support combustion can be drawn through the duct 32.

The disposition of the air flowing through the duct 32 is wholly controlled by the plate 40. When this door is in its uppermost position as shown in solid lines in Figure 1, all of the incoming air will flow into the ashpit 35 beneath the grate and thence upwardly through the fuel to support combustion at the maximum rate. The plate 40 may be regulated as to position by operating the crank 53 to turn the door to any intermediate position, thus permitting any desired proportion of the air to flow directly upwardly from the throat 39 toward the chimney, the remaining portion of the air being permitted to be drawn into the ashpit by the action of the burning fuel. Thus the rate of combustion may be readily regulated as in the case of a stove or furnace. Such regulation is impossible with a conventional fireplace. A fire readily may be kept overnight by moving the plate 40 to the lowermost position shown in dotted lines in Figure 1, thus completely cutting off any flow of the air through the duct 32 to the space beneath the fuel.

If desired, the door 40 may be left in its uppermost position to direct all of the air beneath the fire, and the rate of admission of the air may be governed by opening the door 33 to the desired extent. This method does not provide as accurate a regulation of the fire and is not the preferred method of operation. When the fireplace is not in operation the door 33 may be completely closed to prevent the flow of outside air into the housing, thus eliminating unnecessary drafts. However, in warm weather the door 33 may be left open to provide for increased ventilation within the house.

The operation of the form of the invention

shown in Figure 5 is identical with that previously described. The only difference in the functioning of the modified form of the invention lies in the fact that the grate is flush with the floor, thus eliminating the use of the wall **30**. The form of the invention shown in Figures 1 to 4 inclusive is preferred, however, since the elevation of the fire above the floor level renders it far more attractive in appearance.

I claim:

1. A fireplace construction comprising a wall structure having an external side and an inside and being provided with a fireplace opening having an open mouth extending through such inside of the wall structure, a substantially horizontal grate arranged in said fireplace opening in a plane close to the level of the bottom of the mouth of said fireplace opening, said wall structure having a draft opening therethrough communicating with said fireplace opening and extending through the external side of said wall structure, and a draft control plate arranged between said draft control opening and the adjacent edge of said grate and mounted to swing on a horizontal pivot to control the relative flow of air through said draft opening above and below said grate.

2. A fireplace construction comprising a wall structure having an external side and an inside and being provided with a fireplace opening having an open mouth through the inside of the wall structure and terminating in a rear wall spaced from such open mouth, a substantially horizontal grate arranged in said fireplace opening in a plane close to the level of the bottom of the mouth of said fireplace opening, the edge of said grate opposite said open mouth being spaced from and substantially parallel to said rear wall, said wall structure having a draft opening extending through said rear wall and through the external side of said wall structure, and a draft control plate having one edge pivotally connected to the rear edge of said grate with its opposite edge arranged to swing across said draft opening to control the relative flow of air through said draft opening above and below said grate.

3. A fireplace construction comprising a wall structure having an external side and an inside and being provided with a fireplace opening having an open mouth through the inside of the wall structure and terminating in a rear wall spaced from such open mouth, a substantially horizontal grate arranged in said fireplace opening in a plane close to the level of the bottom of the mouth of said fireplace opening, the edge of said grate opposite said open mouth being spaced from and substantially parallel to said rear wall, said wall structure having a draft opening extending through said rear wall and through the external side of said wall structure, a draft control plate having one edge pivotally connected to the rear edge of said grate with its opposite edge arranged to swing across said draft opening to control the relative flow of air through said draft opening above and below said grate, and means comprising a crank arranged externally of said fireplace opening adjacent the inside of said wall structure for swinging said draft control plate.

4. A fireplace construction comprising a wall structure having an external side and an inside and being provided with a fireplace opening having an open mouth through the inside of the wall structure and terminating in a rear wall spaced from such open mouth, a substantially horizontal grate arranged in said fireplace opening in a plane close to the level of the bottom of the mouth of said fireplace opening, the edge of said grate opposite said open mouth being spaced from and substantially parallel to said rear wall, said wall structure having a draft opening extending through said rear wall and through the external side of said wall structure, a draft control plate having one edge pivotally connected to the rear edge of said grate with its opposite edge arranged to swing across said draft opening to control the relative flow of air through said draft opening above and below said grate, a door pivotally connected at its upper edge to the external side of said wall structure and movable to a closed position over said draft opening, and means for controlling said door comprising a rod connected to said door and extending through said draft opening and beneath said grate and having a handle connected thereto externally of the fireplace opening adjacent the inside of said wall structure.

5. A fireplace construction comprising a wall structure having an external side and an inside and being provided with a fireplace opening having an open mouth through the inside of the wall structure and terminating in a rear wall spaced from such open mouth, a substantially horizontal grate arranged in said fireplace opening in a plane close to the level of the bottom of the mouth of said fireplace opening, the edge of said grate opposite said open mouth being spaced from and substantially parallel to said rear wall, said wall structure having a draft opening extending through said rear wall and through the external side of said wall structure, a draft control plate having one edge pivotally connected to the rear edge of said grate with its opposite edge arranged to swing across said draft opening to control the relative flow of air through said draft opening above and below said grate, means comprising a crank arranged externally of said fireplace opening adjacent the inside of said wall structure for swinging said draft control plate, a door pivotally connected at its upper edge to the external side of said wall structure and movable to a closed position over said draft opening, and means for controlling said door comprising a rod connected to said door and extending through said draft opening and beneath said grate and having a handle connected thereto externally of the fireplace opening adjacent the inside of said wall structure.

6. A fireplace construction comprising a wall structure having an external side and an inside and being provided with a fireplace opening having an open mouth extending through such inside of the wall structure, a substantially horizontal grate arranged in said fireplace opening in a plane close to the level of the bottom of the mouth of said fireplace opening, said wall structure having a draft opening therethrough communicating with said fireplace opening and extending through the external side of said wall structure, a draft control plate arranged between said draft control opening and the adjacent edge of said grate and mounted to swing on a horizontal pivot to control the relative flow of air through said draft opening above and below said grate, and means comprising a crank arranged externally of said fireplace opening and having mechanical connection with said draft control plate to swing it on its pivot.

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