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J. W. CORNELIUS

AIR HEATING FIREPLACE

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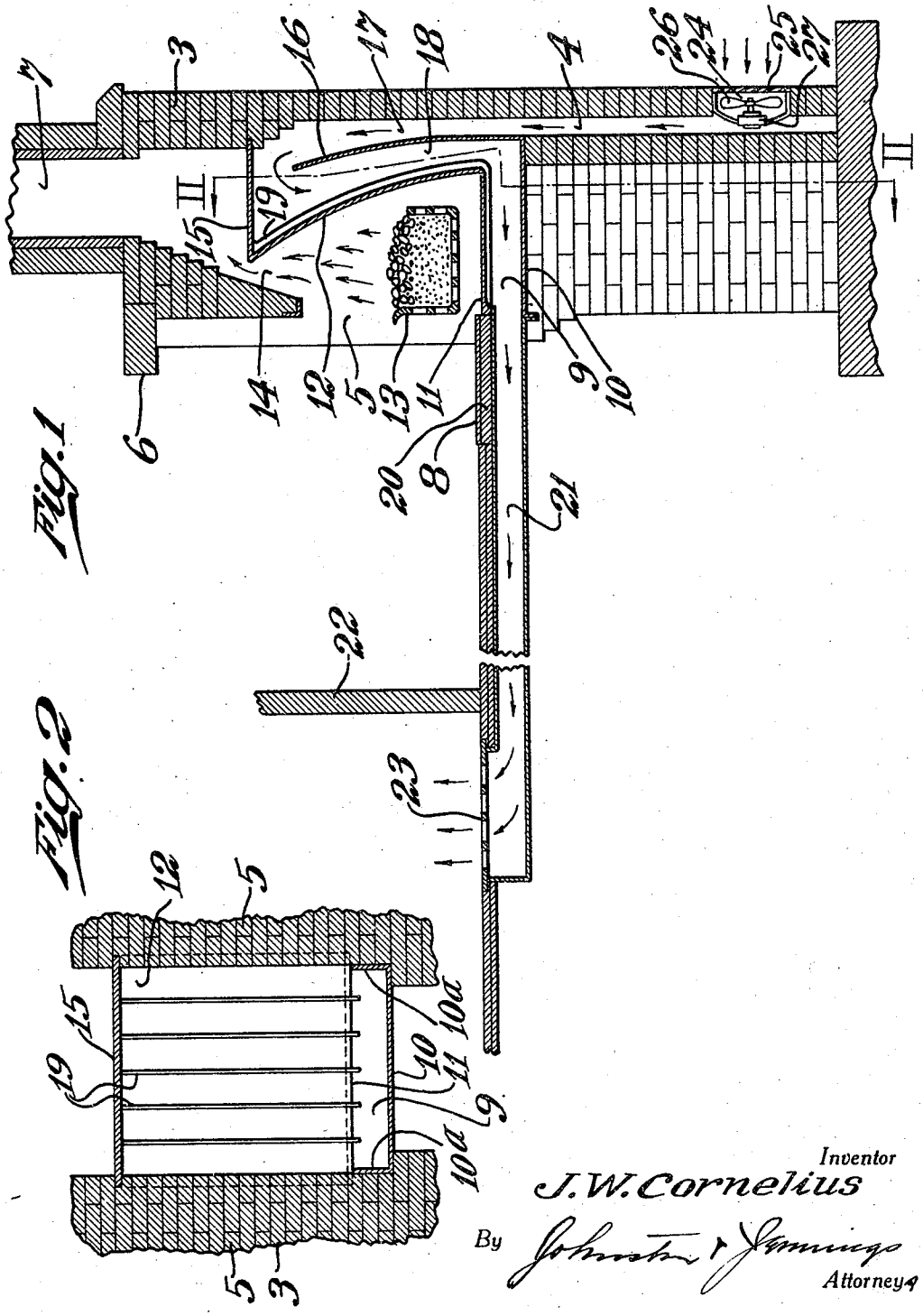

Inventor
J. W. Cornelius
By Johnston & Jennings
Attorneys

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JESSE W. CORNELIUS, OF BIRMINGHAM, ALABAMA.

AIR-HEATING FIREPLACE.

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This invention relates to fireplaces especially designed and adapted for the heating of air so as to enable warm air to be conducted to other rooms or to distant points in the room directly heated by the fireplace.

My invention contemplates the utilization of a forced draft means to pass a circulation of air first upwardly and then downwardly behind a cast iron fire back and then to conduct it under a cast iron back hearth and deliver it as hot air to a suitably insulated duct through which it flows to the register or registers.

One distinctive feature of my invention is the shape of the cast iron fire back and back hearth, this preferably being formed in a single casting having heat radiating ribs on its air contacting surfaces and adapted at its ends to be embedded in the side walls of the fireplace, thereby being very simply and economically installed.

A further distinctive feature of my invention relates to the construction of the baffle employed, the same being preferably a galvanized iron sheet bent to extend in spaced relationship under the back hearth and upwardly approximately midway between the fire back and the chimney to a point near the the top of the cast iron fire back, thereby providing a reverse bend which will direct the entering cold air upwardly against the top of the fire back and then downwardly along its ribbed surface and then inwardly under the back hearth to the point of delivery to the hot air duct.

My invention contemplates eliminating the back brick entirely in the fireplace back and relying upon the cast iron fire back to form the bottom and back walls and to define the throat of the fireplace, the fire back extending horizontally from the throat to its point of engagement with the back chimney wall.

My invention further contemplates the provision of a reversible blower so that the air can be both forced into the house through the fireplace heater in cold weather and can be drawn out of the house in warm weather, and it also contemplates taking the air from the outside or from the enclosed basement as may be most desirable.

Having these and other objects in view, my invention will be best understood by reference to the accompanying drawings which illustrate only what I consider the preferred embodiment of my invention.

In the drawings:—

Fig. 1 is a vertical cross-sectional view through a fireplace and chimney showing my air heating apparatus installed.

Fig. 2 is a detail view of the cast iron fire back and back hearth taken on the line II—II of Fig. 1, showing its ribbed surface and the manner of its tie-in into the side walls of the fireplace.

While it is to be understood that my invention is capable of various modifications, according to whether it is installed in new chimneys or adapted to old ones and according to the duty contemplated of it, nevertheless to those skilled in the art a clear understanding of the principles governing the construction and operation of my apparatus will be had from the accompanying description.

In the drawings, I show a chimney 3 formed with an air duct 4 opening at its bottom into the outer air or into the basement and extending to the hearth level. The fireplace is formed with the customary offset brick side walls 5, supports the mantel 6 and connects with the chimney flue 7. In new construction the outer wall of the duct 4 is carried straight up to a point near the top level of the fireplace opening and the inner wall of the duct terminates below the level of the hearth 8 sufficiently to provide space for an air duct 9 between the back hearth and the bottom horizontal leg 10 of a sheet metal baffle. The leg 10 has side flanges 10^a and extends from the inner edge of the hearth to the inner wall of the air duct 4 where it joins the unflanged upright leg 16 which extends on a gradual inward curve to a point near the top level of the fireplace opening. In spaced relation to this baffle I mount a cast iron element preferably of unitary structure, comprising a back hearth portion 11 and a curved fire back portion 12, the latter curving inwardly so as to overhang the grate 13 and at its upper edge to define the throat 14. This fire back 12 carries a horizontal top portion 15 which extends back to and is tied into the chimney in the same manner that the side edges of hearth 11 and fire back 12 are tied into the side walls 5 of the fireplace. The parts 10, 16, 11 and 12 with the outer wall of the chimney define a reverse bend heating passage comprising the upflow

duct 17, connecting below with the duct 4, and the downflow duct 18 connecting above with the duct 17 and below with the duct 9. The fire back and back hearth casting are preferably provided with heat radiating ribs 19 extending in vertical planes from the top wall 15 to the forward edge of the back hearth 11, thereby more efficiently transferring heat to the air current flowing through the ducts 18 and 9. The back hearth adjoins the concrete support 20 for the hearth 8 and the duct 9 formed by the parts 11, 10, and side flanges 10^a is connected to a suitable hot air insulated flue 21, which discharges the hot air into, or exhausts cold air through, a floor register 23. The duct 4 has an intake opening 24 covered by a louver 25 and within the opening is mounted a reversible type fan 26 driven by a reversible motor 27.

Having installed the apparatus in the manner described and it being understood that the flue 21 may lead to any desired point where one or more registers are desired, the operation of the apparatus is as follows. A fire is built in the grate 22 and in the usual manner radiates its heat to the room. As soon as the back hearth 11 and the fire back 12 become hot, the fan 26 is started up in a direction to force air upwardly through the duct 4 and with a reverse flow through the ducts 17, 18 and 9, and in this flow it becomes highly heated by contact with the elements 11, 12, 15 and 19 and is delivered as hot air through flue 21 to the register 23 with its volume controlled by the adjustment of the register or by the regulation of the fan. The air keeps the fire back from becoming overheated and absorbs surplus heat that would otherwise be wasted up the flue. The flat top 15 prevents undesirable disturbance by eddies with the draft of the fireplace and becomes highly heated from the products of combustion escaping through the throat 14. The entering air current impinges against this plate 15 and then flows parallel with and between the ribs 19 along down the fire back and under the back hearth so that the device constitutes an exceedingly efficient air heating plant without in any manner disturbing the efficiency of the fire to heat the room in which the fireplace is located. The one piece cast iron fire back and back hearth avoids any danger of sparks or ashes getting into the air duct and in eliminating fire brick it provides a most economic improvement in the fireplace proper.

Though I have described with great particularity the details of the embodiment of the invention herein shown, it is not to be construed that I am limited thereto, as changes in arrangement and substitution of equivalents may be made by those skilled in the art without departing from the invention as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an air heating fireplace, the combination with an integral metal casting forming a back hearth and fire back, said fire back being bent forwardly to form a heat absorbing surface, a baffle dividing the space behind the fire back into connecting up and downflow ducts and bent forwardly to form a horizontal outlet duct in cooperation with the back hearth, means to force an air current through said ducts, and an outlet duct leading from the downflow duct under the back hearth and delivering into a hot air flue, as and for the purposes described.

2. An air heating fireplace comprising brick side walls, a cast iron back hearth and fire back, both spaced from the back brick work and embedded in the side brick work, a sheet metal baffle rising to a point near the top of the space behind the fire back to define an upflow and a downflow duct and bent forwardly beneath the back hearth to form therewith a horizontal outlet duct, a forced feed air supply duct connecting with the upflow duct, and a house heating hot air flue connected to the outlet duct.

3. An air heating fireplace as set forth in claim 1, in which the fire back carries vertical ribs extending into the downflow duct.

4. An air heating fireplace according to claim 2, in which the casting forming the back hearth and fire back is provided with ribs exposed to the air current to be heated in the downflow and discharge ducts and extending from the top of the back wall to the front end of the back hearth.

In testimony whereof I, JESSE W. CORNELIUS, affix my signature.

JESSE W. CORNELIUS.