No. 692,336. Patented Feb. 4, 1902.

L. PATRIC.

HOT AIR FURNACE.

(Application filed June 4, 1901.)

(No Model.)

Fig. 2.

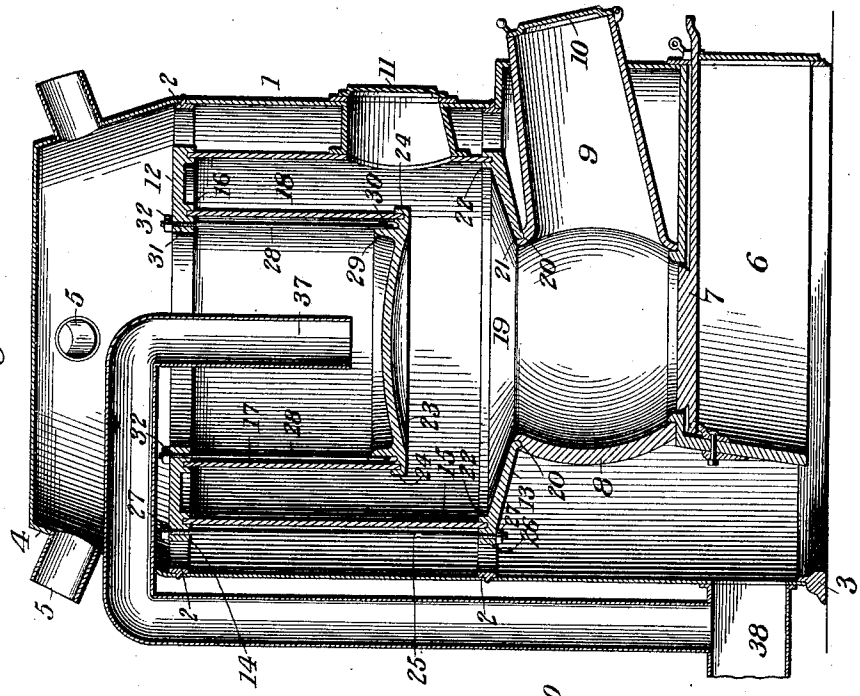
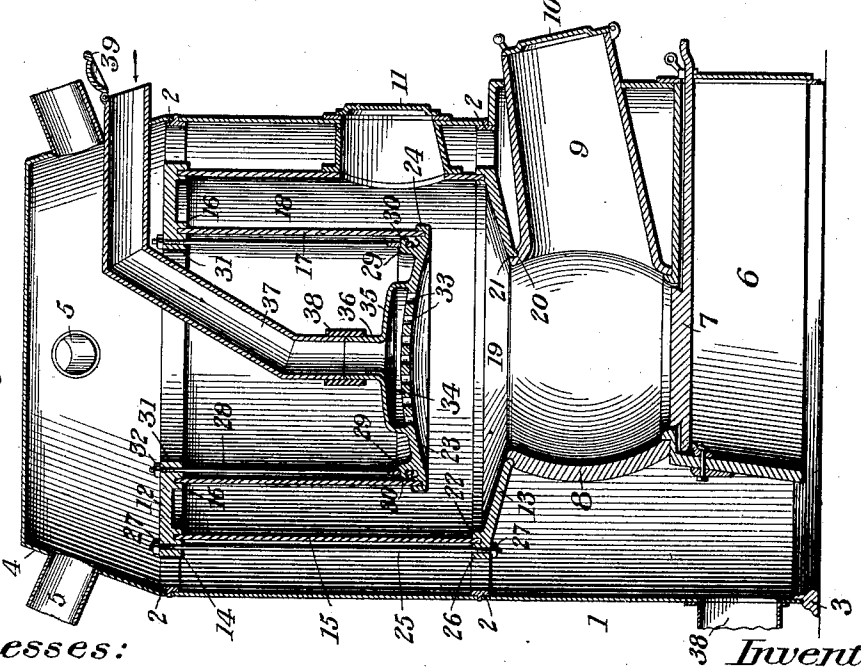


Fig. 1.



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HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 692,336, dated February 4, 1902.

Application filed June 4, 1901. Serial No. 63,153. (No model.)

To all whom it may concern:

Be it known that I, LEWIS PATRIC, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented a certain new and useful Hot-Air Furnace, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to hot-air furnaces; and the invention has several objects in view.

One object of the invention is to provide an annular fire-chamber above and in connection with the fire-pot and defined by and located between outer and inner drums or shells, the lower end of the inner drum being partially or wholly closed by means of a perforated concavo-convex head.

Another object of the invention is to provide an auxiliary hot-air chamber above the bottom of the inner drum and to connect said hot-air chamber with a fresh-air-supply conduit, whereby heated air is delivered to the combustion-chamber and from thence directly over the bed of coals.

A further object of the invention is to provide in connection with such hot-air chamber and perforated lower head a fresh-air conduit so arranged that it will not penetrate the outer and inner drums, but pass only through the outer furnace-casing, where it is provided with means for regulating the quantity of air admitted thereto.

With the above and other objects in view, the nature of which will appear more fully as the description proceeds, the invention consists in the novel construction, combination, and arrangement of parts hereinafter fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a central vertical section through a hot-air furnace constructed in accordance with the present invention, showing the hot-air chamber and fresh-air conduit combined therewith. Fig. 2 is a similar view omitting the hot-air chamber and showing the fresh-air conduit arranged in a slightly-different manner.

Similar numerals of reference designate corresponding parts in both figures of the drawings.

For the purpose of illustrating the present invention I have shown the same applied to a form of hot-air furnace now in common use and in which 1 designates the furnace-casing, which is usually composed of sheet metal and which is composed of sections connected by furnace-casing rings 2, surmounted upon a base-ring or bed-piece 3, the casing being provided with the usual contracting top section 4, provided with the thimbles 5 for the attachment of the hot-air flues. Within the casing is arranged the ash-pit 6, surmounted by a grate 7, of any preferred form, above which is arranged the circular fire-pot 8, in communication with which is an inwardly and downwardly inclining magazine 9, the outer end of which is normally closed by a fuel-door 10 for the insertion of soft coal. At a higher elevation the furnace is provided with another fuel-door 11, adapted to receive hard coal. The soft-coal door is arranged at one side of the fire-pot and delivers through one side of the same, while the door 11 is arranged above the plane of the fire-pot, so as to deliver the coal through the top thereof.

In carrying out the present invention upper and lower radiator-heads 12 and 13, respectively, are employed, the upper head being in the form of a ring or annulus having two sets of concentric flanges on its lower side, the outer set 14 being adapted to receive between them the upper edge of the outer drum or shell 15, while the inner set of flanges 16 are designed to receive between them the upper edge of the inner drum or shell 17. The two sets of flanges 14 and 16 are located a sufficient distance apart to leave an annular fire or combustion chamber 18 between the drums, which chamber is in direct communication with the fire-pot, as will hereinafter appear. The lower head 13 is also in the form of a ring or annulus, but is provided with an inclined upper surface 19, which slopes toward the center and toward the upper edge of the fire-pot, so as to prevent soot and ashes from lodging thereon and clogging the furnace. The upper edge of the fire-pot 8 is preferably rabbeted or grooved, as at 20, to receive a downturned annular lip 21 at the inner edge of the bottom head 13, which is thus supported directly upon the fire-pot. The lower head 13 is provided with concentric flanges 22, between which the bot-

tom edge of the outer drum or shell 15 is received.

In addition to the heads 12 and 13 an intermediate head 23 is provided for partially or wholly closing the head of the inner drum 17. The said intermediate head 23 is provided adjacent to its periphery with upwardly-projecting concentric flanges 24, between which the bottom edge of the inner drum 17 is received. By means of the several sets of flanges 14, 16, 22, and 24 a close junction is formed between the several heads and the outer and inner drums, which will prevent the drums from buckling and the consequent escape of gas and smoke.

The upper and lower heads 12 and 13 are securely united and held together by means of tie rods or bolts 25, which are arranged exteriorly of the outer drum, so as to be unexposed to the direct action of the flame. These bolts pass through lugs 26 on the heads 12 and 13 and are secured by means of nuts 27 or their equivalent. The intermediate head 23 is connected to the upper head 12 by means of tie rods or bolts 28, which are connected at their lower ends to lugs 29 on the upper side of the intermediate head by means of bolts or other suitable fasteners 30, the upper ends of said rods or bolts passing through lugs 31 on the upper head, where they are secured by means of nuts 32 or their equivalent. In this way the upper and lower heads are securely connected together and the outer drum held between the same, while the intermediate head is securely fastened to and suspended from the upper head and the inner drum 17 fastened tightly in place.

The intermediate head 23 is made in concavo-convex form, as shown in the drawings, with the concave side disposed downward. Said concavo-convex head is provided with a plurality of ports or perforations 33, communicating with a hot-air chamber 34, included within a dome 35, located above the head 23 and having an upwardly-projecting thimble 36, with which communicates the adjacent lower end of a fresh-air conduit 37, the said conduit and thimble being connected and held in proper relation to each other by a collar or sleeve 38, which surrounds the abutting ends of said parts. The conduit 37 extends upward through the top of the inner drum and thence laterally over the upper head 12, passing outward through an opening in the furnace-casing, where it is provided with a door or damper 39, by partially opening or closing which the amount of air admitted to the hot-air chamber may be regulated to a nicety.

In the cheaper grades of furnaces the hot-air chamber 35 may be omitted, as shown in Fig. 2, in which case the perforations 33 in the concavo-convex head 23 will also be omitted. The fresh-air conduit 37 may then be arranged as shown in Fig. 2, in which, instead of terminating said conduit just after it passes outward through the furnace-casing, said conduit may be extended downward outside of the furnace, so as to connect with the main cold-air-supply conduit 38. The main conduit 38 serves to introduce cold air into the lower portion of the furnace-casing, while the conduit 37 supplies air to the upper portion of the furnace within the inner drum, as shown in Fig. 2, or through the perforated intermediate head 33 directly over the fire, as shown in Fig. 1.

The advantage of supplying air above the fire-pot resides in the fact that if the same air only that comes in contact with the lower and hotter parts of the furnace is allowed to come in contact with the upper parts, which are more remote from the fire, the absorption of additional heat is quite small, due to the fact that the air which has already been heated is so near the temperature of the iron that it cannot well be additionally heated to any material extent; but if another supply of fresh air is admitted to the inner drum above the intermediate head the absorption is rapid and the volume of heated air greatly increased. The concavo-convexity of the intermediate drum greatly increases the strength and durability. It will further be seen that both ends of the drums or shells, which are ordinarily of sheet-steel, are securely held between two flanges, and thus the unequal heating or expansion and contraction of the drums cannot affect the joint, for the reason that the edges of the drum are wedged fast between the two flanges on each drum-head. Hence there can be no leakage of gas or smoke. The tie-rods which hold the drum-heads in place are not exposed to the fire, and therefore will not burn off, stretch, or form possible leaks by passing through the heads. Another important feature resides in the fact that there is no surface upon which soot or ashes may permanently lodge, the slanting upper surface of the lower head being readily accessible through the fuel-door.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a hot-air furnace, a radiator comprising outer and inner drums, an annular head connecting the top edges of said drums, a lower head connecting the outer drum and fire-pot, an intermediate head extending across the bottom of the inner drum and provided with perforations, and a fresh-air conduit extending through the open top of the inner drum and adapted to supply fresh air through the perforations in the intermediate head to the combustion-chamber.

2. In a hot-air furnace, a radiator comprising upper and lower annular heads, outer and inner drums interposed between said heads, the inner drum being suspended from the up-

per head and terminating above the lower head, an intermediate head extending across the bottom of the inner drum and provided with perforations, a hot-air chamber located over the intermediate head, and a fresh-air conduit communicating with said hot-air chamber and extending through the open top of the inner drum and outward through the furnace-casing where it is provided with means for regulating the air-supply.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS PATRIC.

Witnesses:
WM. M. ROEKEL,
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