(No Model.) 2 Sheets—Sheet 1.

D. McCOWATT.

HOT AIR FURNACE.

No. 458,477. Patented Aug. 25, 1891.

Fig. 1.

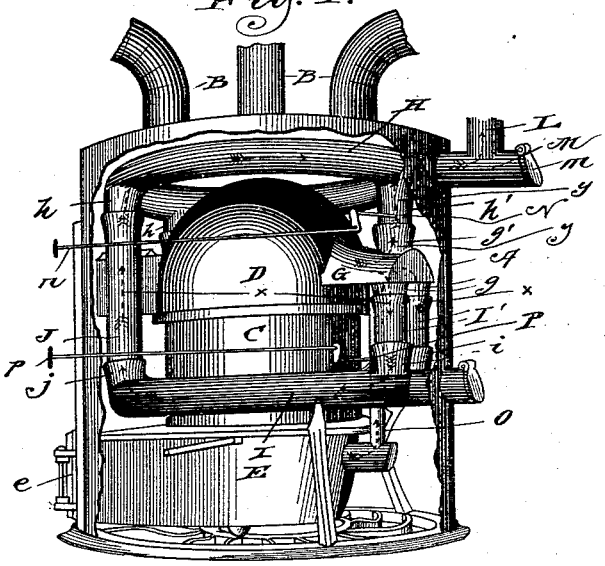
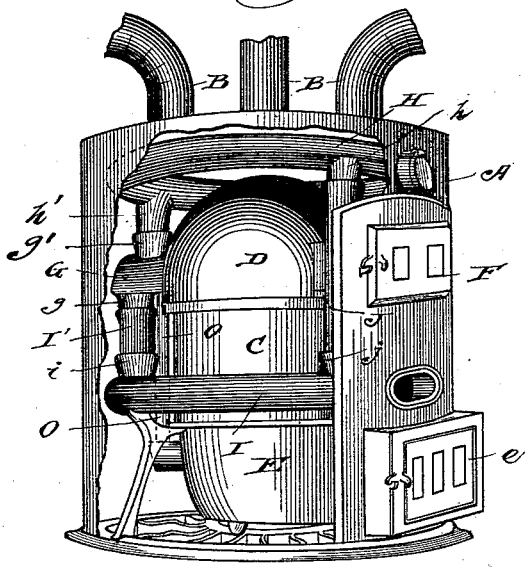


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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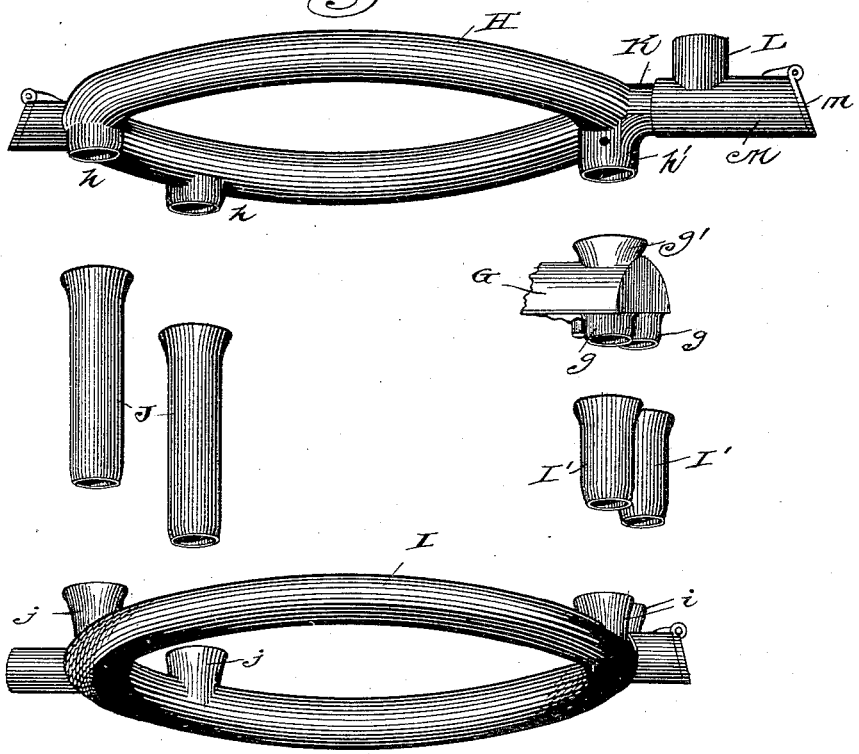
Fig. 3.



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DAVID McCOWATT, OF CHICAGO, ILLINOIS.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 458,477, dated August 25, 1891.

Application filed January 12, 1891. Serial No. 377,470. (No model.)

To all whom it may concern:

Be it known that I, DAVID MCCOWATT, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

The object of my invention is to improve the construction of hot-air furnaces by providing an increased radiating-surface without interfering with the draft. The increased radiating-surface is obtained in my invention by the employment of two radiators of tubular circular form concentrically arranged with reference to the fire-pot and external casing and located one above the other, the lower one surrounding the fire-pot and the other being preferably in line with or slightly above the plane of the top of the dome. These circular radiators are connected with each other, with the direct draft-pipe from the fire-pot, and also with the chimney, and by the aid of a damper arranged in the connection between the upper radiator and the furnace the products of combustion are caused to pass, preferably by a divided flue, into the lower radiator, and after traversing the latter escape through connecting-pipes between the lower and upper radiators into the latter, and after traversing the upper radiator pass out by way of the uptake to the chimney. Suitable provisions are made for cleaning the circular radiators, and by means of a dust-flue and damper the draft-chamber at the top of the fire-pot may be cleaned and the ashes discharged into the ash-pit below the fire instead of upon or over it, as in the usual construction.

In the accompanying drawings, Figure 1 is a perspective view of a hot-air furnace embodying my invention, the casing of the furnace being broken away to expose the interior construction and the hot-air pipes and uptake being broken away. The arrows in this figure indicate the course of the currents, and the view exhibits the rear of the furnace. Fig. 2 is a perspective view showing the furnace-front. Fig. 3 is a detail perspective view of the circular radiators and connections, the draft-chamber broken away.

In the drawings, A indicates the exterior casing of the furnace, and B the hot-air pipes leading from the top thereof. The cold air is admitted to the heating-chamber inside the casing through a duct at the bottom of the furnace in the usual manner.

C represents the fire-pot, and D the dome, which may be of usual construction.

E is the ash-pit having the door *e*, and F the fuel-door in the furnace-front.

G represents the draft-chamber, which leads from the fire-chamber.

H and I represent the circular radiators, which are preferably of tubular circular form, so as to present the least obstruction to the passage of the products of combustion therethrough. They may be, however, oval or elliptical and cast or made from sheet metal. The lower radiator communicates with the draft-chamber G by means of divided down-flues I′ I′, as shown in the drawings; but, if preferred, a single connecting-pipe may be employed. As shown also, the draft-chamber G has the stubs *g* on its under side, and the radiator I has the stubs *i i* thereon for convenience in mounting. At the furnace-front the lower radiator communicates with the upper through the uptake-pipes J J, which connect with stubs *j j* and *h h* of the radiators I and H, respectively. Instead of the divided uptake a single connection may be made in this instance also. The draft-chamber G is in communication with the radiator H through the connecting-pipe *h′*, which is adapted to enter the stub *g′* of the draft-chamber G, and from the radiator H leads the direct draft-pipe K, which communicates with the chimney-pipe L.

An extension M, provided with a hinge-door *m*, affords means for cleaning out the upper radiator from the back, and both the radiators H and I have similar provisions wherever necessary. In the furnace illustrated in the drawings each radiator has a clean-out at the front and back. These circular radiators are readily cleaned by using a flexible handled brush.

A damper N is placed in the connection between the upper radiator and the fire-chamber and controlled by a damper-rod *n*. When this damper is closed, the products of combustion take the course indicated by the arrows *x x*, Fig. 1, passing first from the draft-chamber downwardly into the radiator I through the divided connection, and thence

passing to the front of the furnace through said radiator and escaping upwardly into the upper radiator H, and thence out through the uptake to the chimney. In this course the products of combustion are compelled to travel through the two circular radiators, which afford a very large radiating-surface, with which the air to be warmed comes in contact. This surface, plus that furnished by the walls of the furnace, effects the warming of the air to a high temperature with a small expenditure of fuel and without loss of effective heat. It will be observed that the movements of the currents are not forced, but the currents at all times pursue their natural tendency to rise, except during their passage through the short connecting-pipes from the draft-chamber into the lower radiator, and the draft is therefore direct down, redirect, and revertible, thereby closely approximating in a furnace of this construction the action of a base-burner stove. If it be desired at any time to secure a direct draft—as, for example, in starting the fire—the damper N may be opened, and then the products of combustion will pass directly, as indicated by the arrows *y y*, to the uptake.

O represents a dust-pipe, which is connected with the draft-chamber G and leads into the ash-pit below the fire. A damper P is placed in this dust-pipe, which is controlled by the damper-lever *p*. In cleaning out the dust passes through this pipe into the ash-pit below the fire instead of into the fire-pot, as in the usual construction.

Of course I do not limit my invention to the precise details of construction herein shown, as the structural features may be varied considerably.

I claim—

In a hot-air heating apparatus, the combination, with a furnace, of two radiators of circular form, one located in a plane above the top of the dome and the other surrounding the fire-pot near the base, a distributing-chamber communicating with the rear of the dome and having revertible flues connecting with the lower radiator, flues connecting the lower with the upper radiator at the furnace-front, and a connection between the upper radiator and the distributing-chamber, with a damper in said connection, and a direct draft leading to the chimney from the upper radiator, substantially as described.

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Witnesses:
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