

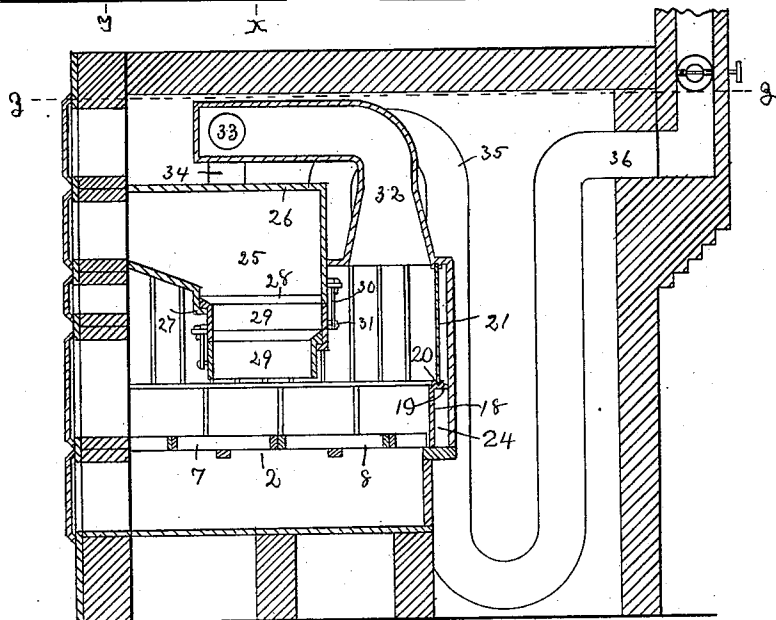
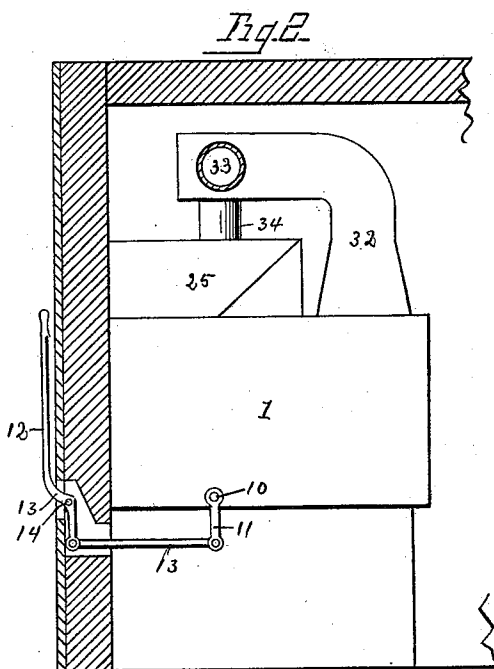
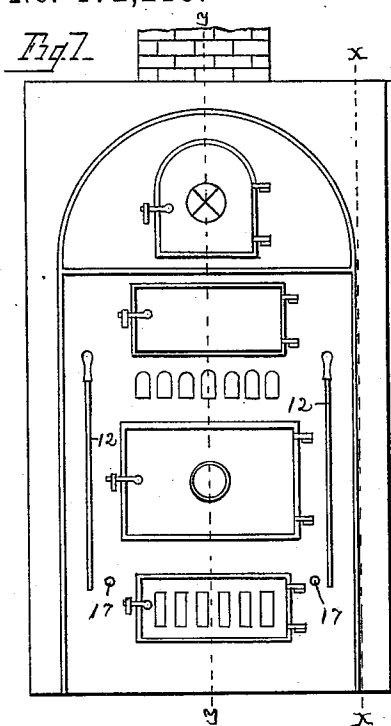
(No Model.)

2 Sheets—Sheet 1.

M. KOEHLER.
HOT AIR FURNACE.

No. 472,219.

Patented Apr. 5, 1892.



WITNESSES

Carroll J. Webster.
Bertrude Clifford

Fig. 3.

INVENTOR

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Attys

(No Model.)

2 Sheets—Sheet 2.

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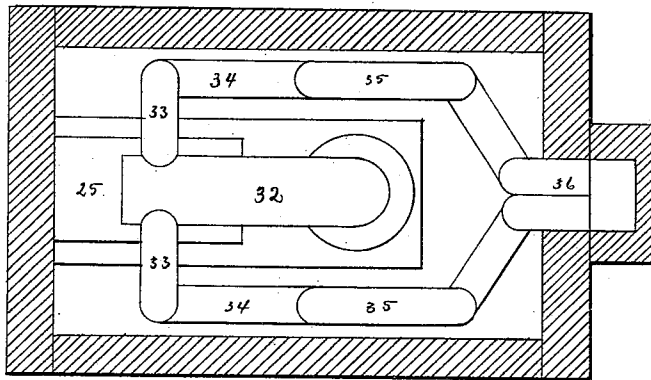
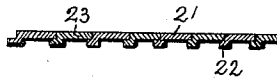


Fig. 4.

Fig. 5.



WITNESSES.

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INVENTOR.

Martin Koehler
By Myers + Webster
Attys.

UNITED STATES PATENT OFFICE.

MARTIN KOEHLER, OF TOLEDO, OHIO.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 472,219, dated April 5, 1892.

Application filed December 31, 1890. Serial No. 376,340. (No model.)

To all whom it may concern:

Be it known that I, MARTIN KOEHLER, of Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form part of this specification.

My invention relates to hot-air furnaces, and has for its object to provide for a maximum radiation of heat from the consumption of a minimum amount of fuel.

A further object is to provide for great surface for heat radiation with economy of space.

A further object is to provide an insertible and removable lining for the interior of the furnace.

The invention consists in the parts and combination of parts hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a front elevation of a furnace. Fig. 2 is a vertical sectional view on lines *xx*, Fig. 1. Fig. 3 is a longitudinal vertical section on lines *yy*, Fig. 1. Fig. 4 is a transverse section on lines *zz*, Fig. 3. Fig. 5 is a sectional plan view of a portion of the insertible lining to the furnace.

1 designates the furnace-chamber, which by reason of the improved form of lining herein shown and described may be constructed of brick, galvanized iron, or sheet metal.

2 designates the grate.

18 designates the lining of the lower portion of the combustion-chamber, being formed of metal plates having right-angled ends 19 formed with a guide or track way 20, into which the lower ends of the upper lining 21 seat. Each plate forming the lining, whether of the upper or lower series, is formed with an offset 22 at one side, adapted to overlap the body portion of the plate 23, as shown in Fig. 5. By this construction the plates may be easily removed or inserted, and the overlapping ends 22 may be of a width to always allow of expansion and contraction of the metal, due to variations in heat. The angled portions 19 of the plates are of a width to form

a chamber 24 upon the three sides of the combustion-chamber, thereby effectually preventing warping of the furnace-casing should sheet metal be employed.

25 designates the fuel-hopper, comprising a rectangular casing 26, having angular portions 27 and 28, which form guideways for an insertible supplemental ring 29, there being a series of rings 29, each of which is arranged to slide into position, as has been described, and be secured from lateral movement by means of a wedge-shaped locking-bolt 30, which projects through ears 31, formed in the hopper and rings, respectively. This construction allows of converting the combustion-chamber to the use of a granular fuel, as coal, by the attachment of the ring-sections 29, thereby forming a magazine through which the coal may drop, or into a combustion-chamber for wood by removing one or more of the rings.

32 designates the primary heat-conduit through which the caloric current ascends from the combustion-chamber. Conduit 32 opens into the rear portion of the combustion-chamber, and then extends directly from the same to near the front of the furnace, where it is intersected by pipes 33, extending at right angles and horizontally therefrom in opposite direction, each pipe 33 being connected with pipe 34, which extends vertically to its connection with pipe 33 to one side of and below the combustion-chamber, where by a return-bend it is extended vertically approximately in parallel relation with the primary pipe and to the same height, where by means of a return-bend 35 it is again extended vertically into a chamber directly in rear of the combustion-chamber, and through which point the heat may be taken and conducted to any desired apartment, the pipe extending to the base of said chamber and by a return-bend returning vertically to the top thereof, at which point the two pipes meet in the chimney-flue 36, through which the smoke is carried off.

It will be seen by the foregoing that there is great economy of space by reason of the heat-conducting pipes being located directly over and upon each side of the combustion-chamber, and that the division of the heat-conducting pipes by this manner is dupli-

cated and gives a maximum radiation of heat from a minimum use of fuel.

In operating the furnace should it be desired to use coal as fuel any number of rings 5 29 may be employed by inserting the first ring into the hopper, as has been described, and each succeeding ring into the ledges formed upon the ring 29 last inserted. Should it be desired to use wood as a fuel, the rings are 10 omitted and the heat arising through conduit 32 passes into horizontal flues 33 and then through the tortuous course caused by the several return-bends in the pipe with which it is connected, thereby radiating all or nearly 15 all of the heat units evolved from the fuel.

The furnace as thus described is compact, inexpensive, and convenient of operation.

What I claim is—

1. The combination, with a combustion- 20 chamber, of a forwardly-extending conduit connected with the rear end of said chamber, the laterally-projecting conduits connected with the forward end of said conduit upon opposite sides of the same, and the continu- 25 ous serpentine-shaped conduits arranged upon the opposite sides of the furnace and connecting the laterally-projecting conduits with the smoke-flue.

2. In a furnace, the combination, with a 30 combustion-chamber, of an insertible lining arranged therein, adapted to rest upon the

base of the same, said lining having an outwardly-projecting flange at its upper end adapted to form an air-space between the outer casing and the combustion-chamber, such lining 35 being composed of a series of plates having integral overlapping flanges.

3. In a furnace, the combination, with a combustion-chamber, of a removable lining composed of an upper and a lower section, the 40 lower section having an outwardly-projecting flange near its upper end upon which the upper section rests, each section being composed of a series of plates having integral overlapping flanges. 45

4. The combination, with the combustion-chamber, of the hopper arranged in the forward portion of the same, a conduit connected to the rear end of said chamber and extending forward above the said hopper, the later- 50 ally-projecting conduit, and the continuous serpentine-shaped conduits arranged on each side of the furnace and connecting the lateral conduits with the smoke-flue.

In testimony that I claim the foregoing as 55 my own I hereby affix my signature in presence of two witnesses.

MARTIN KOEHLER.

Witnesses:

CARROLL J. WEBSTER,
GERTRUDE GIFFORD.