

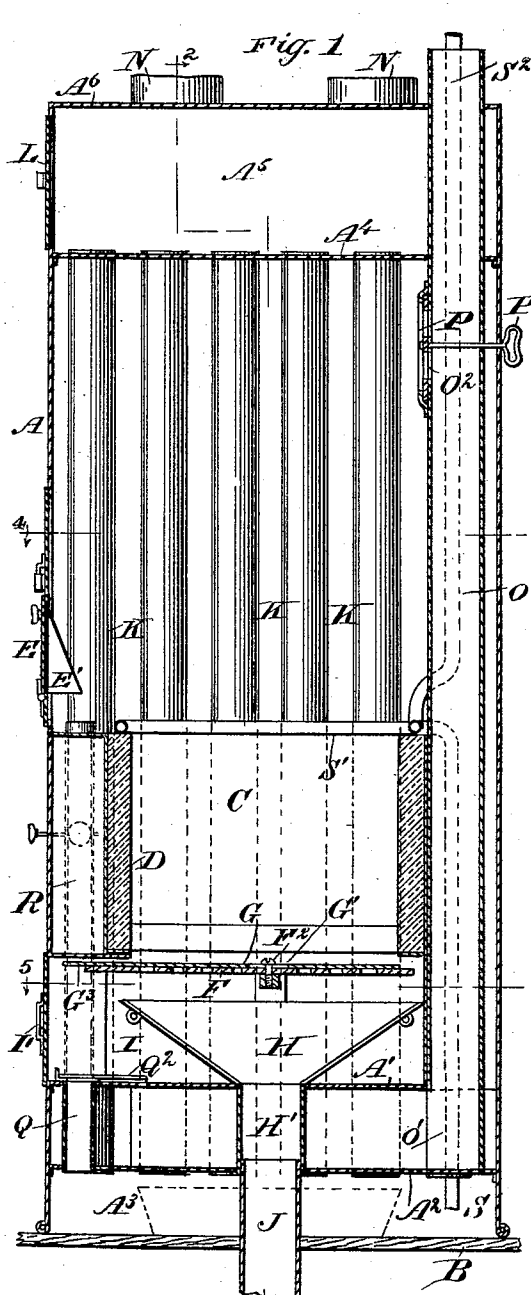
(No Model.)

2 Sheets—Sheet 1.

J. W. FRIZZELL.
HOT AIR FURNACE.

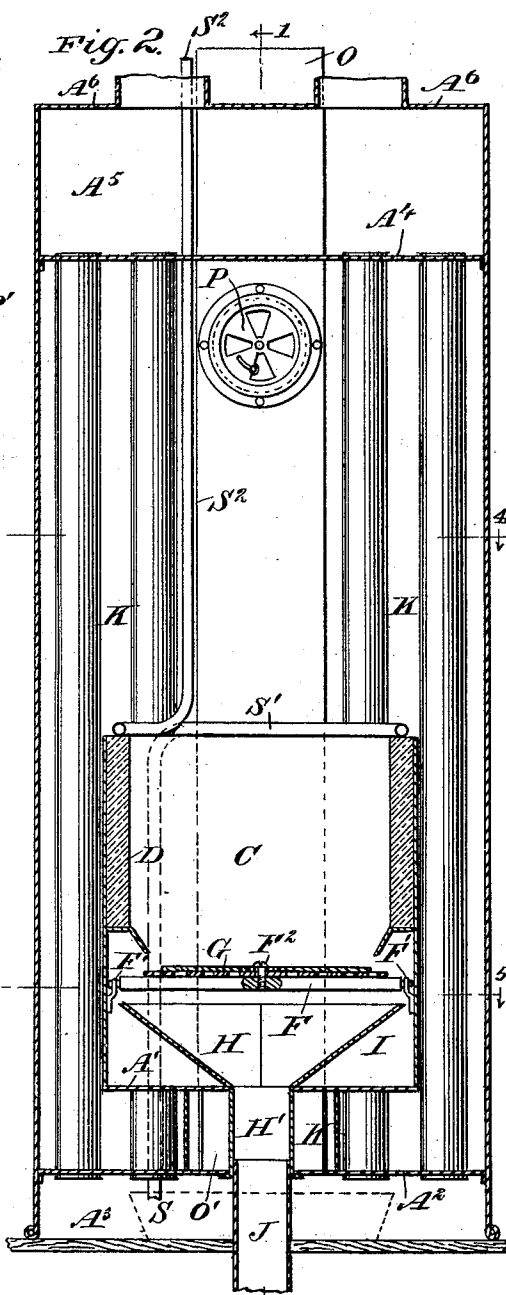
No. 478,001.

Patented June 28, 1892.



WITNESSES:

J. W. Frizzell.
C. Sedgwick



INVENTOR:

J. W. Frizzell
BY Munr & Co

ATTORNEYS

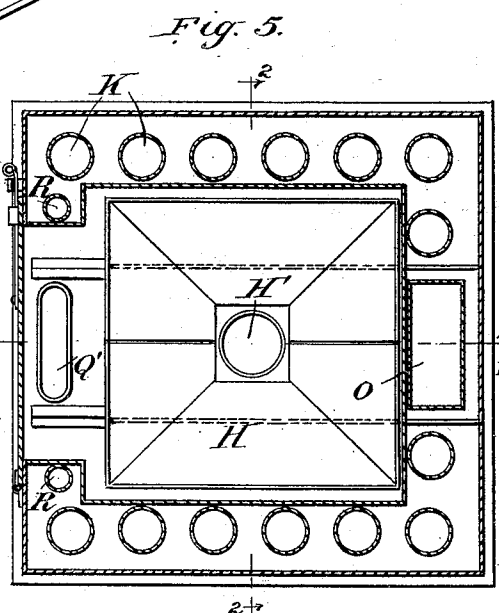
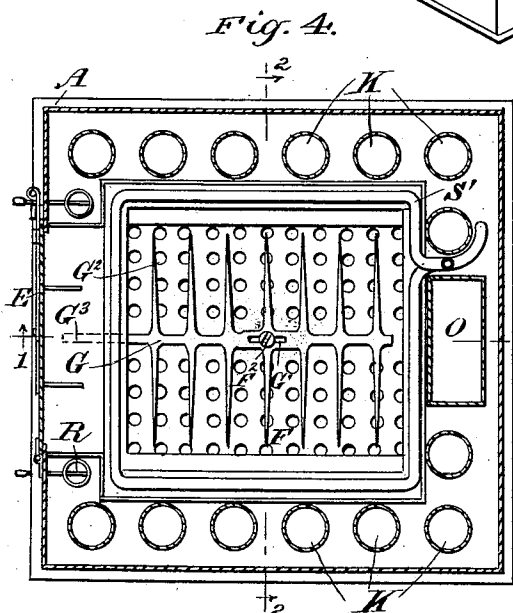
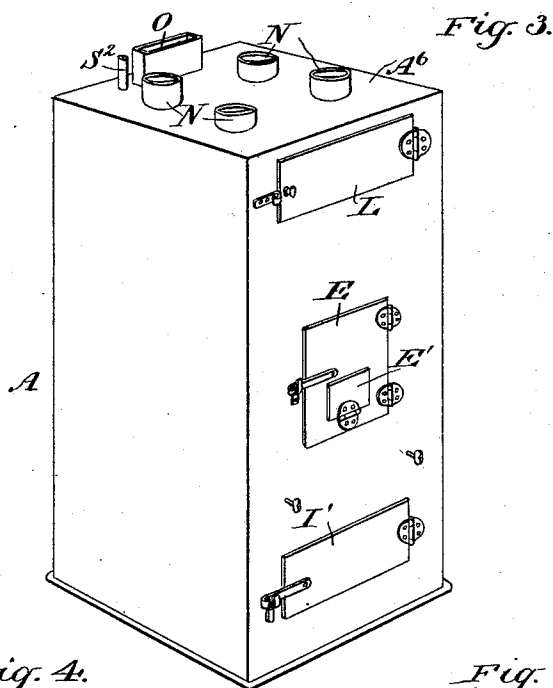
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UNITED STATES PATENT OFFICE.

JOHN W. FRIZZELL, OF BRAINERD, MINNESOTA.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 478,001, dated June 28, 1892.

Application filed July 14, 1891. Serial No. 399,517. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. FRIZZELL, of Brainerd, in the county of Crow Wing and State of Minnesota, have invented an Improved Hot-Air Furnace, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved hot-air furnace which is simple and durable in construction, very effective for heating rooms, entire dwellings, and other buildings, requires a small amount of fuel, can be cheaply manufactured, and takes up very little room.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is transverse section of the improvement on the line 1 1 of Figs. 2, 4, and 5. Fig. 2 is a sectional side elevation of the same on the line 2 2 of Figs. 1, 4, and 5. Fig. 3 is a perspective view of the improvement. Fig. 4 is a sectional plan view of the same on the line 4 4 of Figs. 1 and 2; and Fig. 5 is a like view of the same on the line 5 5 of Figs. 1 and 2.

The improved hot-air furnace is provided with an exterior shell A of any desired form and adapted to rest with its lower end on the floor B or other foundation. Within the shell A is arranged a fire-pot C, having a suitable lining D, of fire-clay or other material. Above the fire-pot C and in one side of the shell A is arranged a door E for introducing fuel to the fire-box. The door E is provided with an auxiliary charging-door E' for introducing coal or like fuel to the burning fuel in the fire-box. On the lower end of the fire-pot C is arranged a perforated plate F, forming the grate and provided on its sides with trunnions F', journaled in suitable bearings in the lower part of the fire-pot, so that the said grate can be dumped whenever desired. In the center of the grate F is held a pin or screw F², passing through a slot G', extending transversely in a regulating device G, fitted to slide on top of the grate F. The regulating device G is provided with sidewise-ex-

tending arms G², adapted to regulate the fuel over the apertures in the plate F. On the front end of the regulating device is arranged an arm G³, adapted to be engaged by the operator for manipulating the regulating device.

The grate F discharges into a hopper H, held in the ash-pit I, located below the fire-pot C, the hopper H being sufficiently large to receive all the ashes passing through the apertures of the plate F. The lower end of the hopper H is provided with a pipe H', extending downward through double bottoms A' and A², secured in the lower part of the shell A. The pipe H' is adapted to connect with a discharge-pipe J, leading to a convenient receptacle to receive the ashes.

The hopper H is made in two parts or sections, as plainly shown in Figs. 2 and 5, so that it can be conveniently removed and an ordinary ash-receptacle substituted in case it is not convenient to drop the ashes through pipes H' and J. The bottom A' does not extend to the front and rear of the shell A, but only to the walls of the fire box or pot C, so that the combustion-chamber opens into the compartment formed by the said bottoms A' A² at the front.

The lowermost bottom A² of the shell A forms with the floor or foundation B a compartment A³, connected by the usual cold-air duct with the outside of the building, so as to introduce fresh air to the said compartment A³.

The air-duct is provided with the usual valve for regulating the amount of air passing to the furnace. The compartment A³ is connected by a series of tubes K, passing through the bottom A² and through a partition-plate A⁴, with a compartment A⁵ arranged in the upper end of the shell A. The tubes K extend around the fire-pot C close to the shell A, as is plainly shown in Figs. 4 and 5. Air passing into the compartment A³ passes through the said tubes K to the compartment A⁵, the air being heated in its passage through the said tubes by the heat generated by the burning fuel in the fire-pot C and passing around the tubes K in the combustion-chamber of the shell A. The entire compartment is preferably made removable to be lifted off whenever desired.

The compartment A⁵ is provided in its front with a door L for conveniently cleaning the said compartment whenever necessary.

The top A⁶ of the shell A is provided with a number of pipes N, leading from the compartment A⁵ to the several rooms to be heated, so that the hot air generated by the furnace is carried through the said pipes to the rooms.

It is understood that the combustion-chamber extends within the shell A from the bottom A² to the under side of the partition A⁴, so that the heat generated passes around the tubes K and thoroughly heats the air passing through the same.

The smoke-flue O, for carrying off the products of combustion, extends from the bottom A² through the partition A⁴ and the top A⁶ to connect with a suitable chimney. The lower end O' of the smoke-flue O opens into the rear of the compartment formed between the bottoms A' and A², and near the upper end of the flue is arranged an opening O², leading into the combustion-chamber to carry off smoke and gases. The said second opening O² is adapted to be opened and closed by a circular damper P, having its handle P' extending to the outside of the shell A to be under the control of the operator. The pipe O also serves to create an indirect draft, which passes from the upper edge of the fire-pot downward and around all the lower ends of the flues K and then to the compartment between the bottoms A' and A² and to the pipe O at its lower end O'.

Into the compartment A³ opens a pipe Q, extending between the bottoms A' and A² and serving to supply fresh air to the ash-pit I. A valve Q² is fitted to slide on top of the bottom A' over the said pipe Q', so as to regulate the amount of air passing into the ash-pit I and to the burning fuel on the grate to control proper combustion. The pipe Q and the valve Q² are located near the front of the shell A, so as to be within convenient reach of the operator having access to the ash-pit I through the door I'. The compartment A³ is also connected by two short pipes R with the combustion-chamber, so that air can pass directly from the said compartment A³ to the combustion-chamber above the fire-pot C. The two pipes R are preferably located near the front and at the sides of the doors I' and E, as is plainly shown in the drawings. The said pipes R are provided with valves to regulate the amount of air admitted to the combustion-chamber. A water-pipe S, passing through the compartment A³ and the bottoms A² and A', forms a coil S' on top of the lining D of the fire-pot, the end S² of the said pipe passing upward through the combustion-chamber and the compartment A⁵ to a tank or other vessel to be heated by or supplied with hot water. It is understood that the lower end of the said pipe is con-

nected with a suitable source of water-supply, the water passing through the said pipe being heated by the products of combustion in the furnace.

It will be seen that the heat generated by the burning fuel in the fire-pot C is utilized to the fullest advantage for heating the air passing up the tubes K. The draft for the fire-pot can be conveniently regulated, so as to insure proper combustion, and the outlet for the smoke and gases can be regulated by the damper P, also under the control of the operator.

It is further understood that it requires but a small amount of fuel to thoroughly heat the air passing through the tubes, as all the units of heat are utilized to heat the tubes K and the air therein.

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

1. A hot-air furnace comprising the outer casing A, a closed hot-air chamber A⁵ in the the upper end thereof provided with outlets, a closed cold-air chamber A³ in the bottom of the casing, a series of vertical spaced pipes K around the interior of the casing connecting the two chambers, a fire-pot C between the two chambers A³ A⁵ and within the series of pipes, a closed ash-pit beneath the fire-box, a space being formed between the upper edge of the fire-pot and the outer casing to permit a downward draft around the pipes and sides of the fire-pot into the space between the ash-pit bottom A' and the top of the cold-air chamber A³, a smoke-pipe O, having an opening O' communicating with the said space under the ash-pit bottom, and a second valved opening O² near the upper end of the combustion-chamber, substantially as set forth.

2. The combination, with the ash-pit having a door and an opening in its bottom, of a sectional removable hopper H, having an outlet to carry off the ashes, whereby an ordinary ash-pan may be substituted for the hopper, substantially as set forth.

3. A hot-air furnace having a cold-air chamber in its bottom, the vertical series of heating-pipes leading up therefrom, the fire-pot having an ash-pit provided with a door, a pipe Q, connecting the front end of the ash-pit and said cold-air chamber, a valve Q² on the ash-pit floor over the pipe Q and having a handle next to the ash-pit door, and two other vertical pipes leading up from said cold-air chamber to the upper edge of the fire-pot to check the draft, and having dampers provided with handles projecting through the front side of the casing, substantially as set forth.

JOHN W. FRIZZELL.

Witnesses:

ANDREW E. VEON,
G. C. STRATTON.