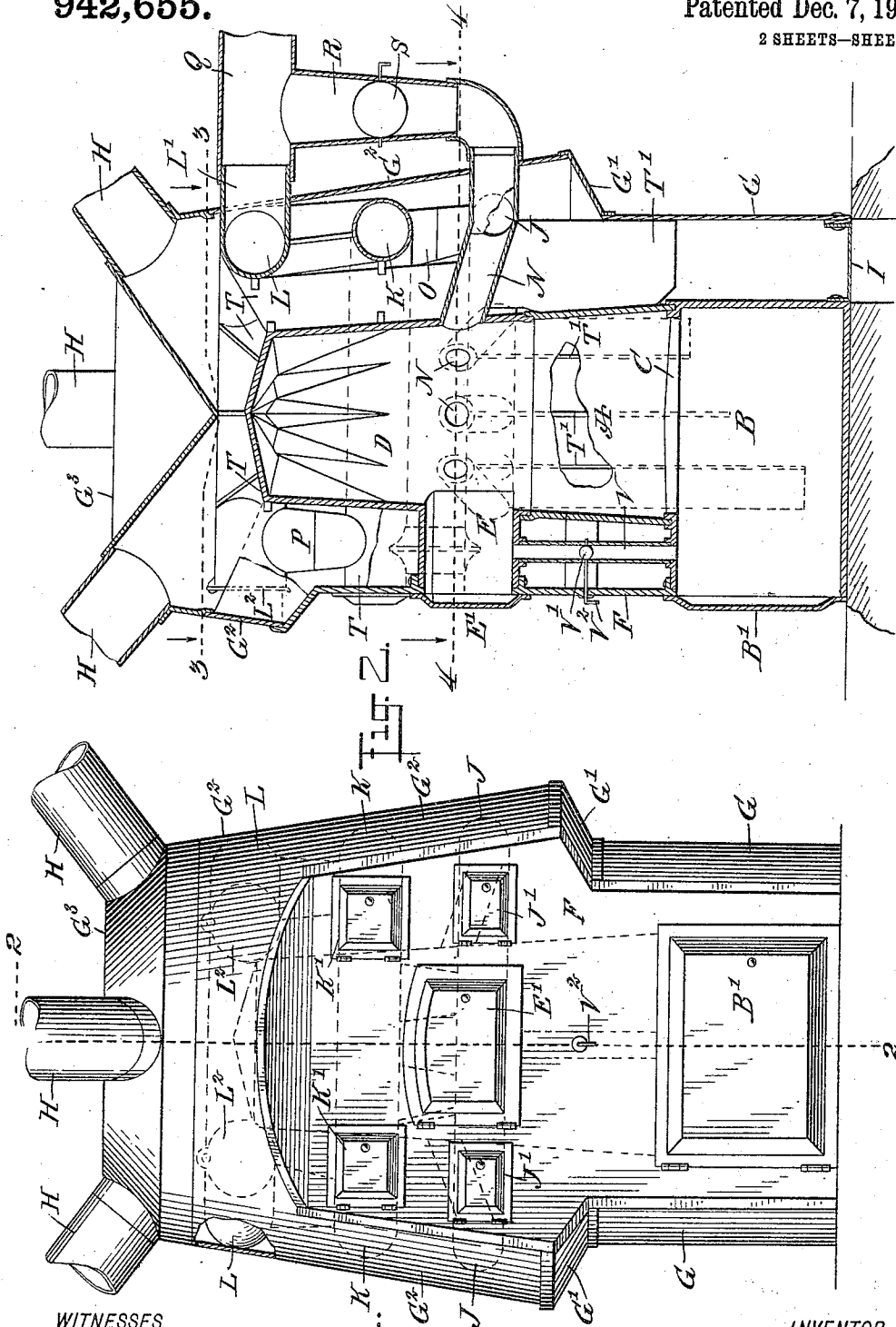


W. MILLER.
HOT AIR FURNACE.
APPLICATION FILED SEPT. 12, 1908.

942,655.

Patented Dec. 7, 1909.
2 SHEETS—SHEET 1.



WITNESSES

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Fig. 1.

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Fig. 4

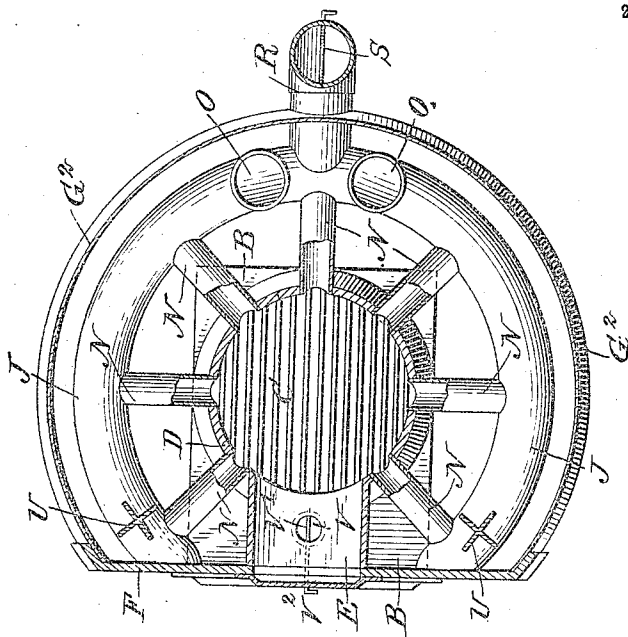
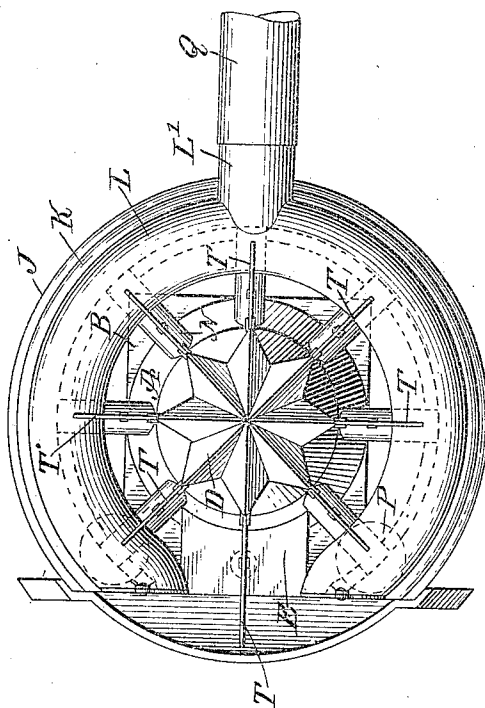


Fig. 2



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UNITED STATES PATENT OFFICE.

WILLIAM MILLER, OF NEW YORK, N. Y.

HOT-AIR FURNACE.

942,655.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed September 12, 1908. Serial No. 452,718.

To all whom it may concern:

Be it known that I, WILLIAM MILLER, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and 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, arranged to insure a rapid circulation and thorough heating of the air, at the same time utilizing the burning fuel to the fullest advantage.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of the improvement; Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1; Fig. 3 is a sectional plan view of the same on the line 3—3 of Fig. 2; and Fig. 4 is a similar view of the same on the line 4—4 of Fig. 2.

The fire box or fire pot A is mounted at its lower end on the ash pit B adapted to rest on a suitable foundation, and between the fire pot A and the ash pit B is arranged the usual grate C for the fuel. The upper end of the fire pot A supports the combustion chamber D having an inlet E provided with a door E', which when open permits passing the fuel through the inlet E to drop down into the fire box A. The door E' is mounted on the front F of the furnace, and on the said front is also mounted the door B' leading to the ash pit B. The lower portion G of the outer shell of the furnace connects with the front F and is spaced from the ash pit B at the sides and rear thereof, to form an entrance for the air to be heated, the upper end of the portion G supporting an outwardly and upwardly inclined plate G' supporting the lower end of the upper portion G² of the outer shell of the furnace, and the said upper portion G² supports the dome G³ from which lead the pipes H to the different rooms to be heated with hot air.

The lower shell G is preferably connected by braces I with the ash pits B, as plainly

indicated in Fig. 2, to give the desired rigidity to the shell.

Within the upper portion G² of the outer shell of the furnace are arranged the heating flues J, K and L, located one above the other and disposed horizontally, the flues increasing in cross sectional area, as will be readily understood by reference to Fig. 2. The lowermost flue J is connected by branch flues N with the interior of the combustion chamber D, and the said flues N extend downwardly and outwardly from the combustion chamber D to the flue J, as shown in Fig. 2. The lowermost heating flue J is connected at its rear by branch flues O with the rear of the intermediate heating flue K, which in turn is connected at its front ends by branch flues P with the front ends of the top heating flue L, provided at its rear end with a collar L' connected by a pipe Q with the chimney. The heating flues J, K and L are approximately segmental with their ends at the front of the furnace, access being had to the said ends by suitable doors J', K', L², of which the doors J' and K' are mounted on the front F of the furnace, while the doors L² are arranged within the upper section G² of the outer shell of the furnace. Now when the fuel is burning in the fire pot A and the combustion chamber D, the smoke and gases pass by way of the branch flues N into the lowermost heating flue J, from which the gases pass by the branch flues O into the rear of the intermediate heating flue K, to then travel to the front of the said flue and by way of the branch pipes P into the upper front ends of the top flue L, to travel rearward therein, and pass by the pipes L' and Q to the chimney. Now as the flues J, K and L are arranged within the upper portion of the shell and surround the combustion chamber D it is evident that the hot air passing up in the shell of the furnace is thoroughly heated by coming in contact with the ash pit B, fire pot A, the combustion chamber D and the several heating flues J, K and L, as well as their branch pipes O and P, so that the air finally reaches the dome G³ in a highly heated condition and passes into the rooms to be heated by way of the pipes H. The heating flues J, K and L are gradually increased in cross sectional area, so that choking is prevented and a rapid circulation of the heated gases takes place, and the lowermost heating flues J and K are

spaced from the upper shell portion G², while the latter touches the outer face of the uppermost heating flue L. By the arrangement of the flues as described, the incoming
 5 air can pass completely around the lowermost heating flue J and the intermediate heating flue K, thus cutting up the current of the air and retarding its ascent, to insure thorough heating of the air before passing
 10 to the outlet pipes H, and by the contact of the uppermost flue with the shell the air will be deflected to the crown sheet of the dome.

When starting a fire it is desirable to make a direct connection between the lowermost
 15 flue J and the chimney pipe Q, and for this purpose a branch pipe R connects the flue J with the pipe Q, and in the branch pipe R is arranged a damper S for opening or closing the connection between the flue J. Thus
 20 in starting the fire the damper S is opened, and after the fire is started the damper is turned into a closed position.

A pipe V connects the top of the ash pit B with the inlet E, and in this pipe V is
 25 arranged a damper V' having the stem V² extending to the outside of the front F of the furnace to allow the operator to open or close the damper V', with a view to connect and disconnect the ash pit B and the inlet
 30 E. By the arrangement described, the heated air in the ash pit B can ascend through the pipe V into the inlet E to then pass into the combustion chamber D.

In order to distribute the entering air
 35 within the heater and thus insure uniform heating thereof, use is made of an upper and a lower set of equalizing or baffle plates T, T', disposed vertically and radially, the upper set of plates T extending upward
 40 from the top of the branch flues N and one from the top of the inlet E, and reach with their side edges to the outer wall of the combustion chamber D, and the heating flues K and L, as plainly shown in Figs. 2 and 3, and
 45 the lower set of plates T' extending downward from the under side of the branch flues N to within a distance from the bottom of the lower portion G of the outer shell, the side edges of the plates extending to the
 50 wall of the fire pot A, and the lower portion of the combustion chamber D. By the arrangement of the baffle plates as described, the plates T and T' provide vertical separate channels for the entering air to pass in and
 55 to rise and become heated and owing to their stepped arrangement, they distribute the air equally to the pipes, thus insuring a uniform delivery of heated air to the several pipes H.

The lower heating flue J is supported by
 60 the branch pipes N from the combustion chamber D, and the rear end of the intermediate heating flue K is supported from the lower flue J by the branch pipes O, and the front end of the said intermediate heating
 65 flue K rests on brackets or posts U set

on the front ends of the lower heating flue J. The upper heating flue L is supported at the front by the connecting or branch flues P, and the rear end is supported by the collar L' seated in the wall of the upper shell section G².

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

1. A hot air furnace, comprising a combustion chamber, a plurality of horizontally-disposed segmental heating flues arranged around the said combustion chamber, located one above the other and connected with each other, the flues increasing in cross sectional
 75 area from the lowermost to the uppermost one, the lowermost heating flue having connection with the said combustion chamber and the uppermost heating flue connecting with the chimney, and an outer shell inclosing the said heating flues, and in contact
 80 with the outer face of the uppermost heating flue and spaced from the lower heating flues.

2. A hot air furnace, comprising a combustion chamber, an exterior shell, a plurality or horizontally-disposed segmental heating flues one above the other and arranged around the combustion chamber, the uppermost flue being in contact with the shell with its ends terminating a short distance from the front of the shell and having
 95 connection with the chimney and the other flues being spaced from the shell and having their ends in the front of the furnace, a plurality of branch flues extending inwardly and upwardly from the lowermost heating
 100 flue and opening into the combustion chamber, vertical branch flues connecting the lowermost heating flue with the intermediate or next heating flue above at the rear, and vertical branch flues connecting the front ends of the intermediate flue with the top
 105 heating flue.

3. A hot air furnace, comprising a fire pot, a combustion chamber on top of the said
 110 fire pot, an ash pit below the said fire pot, a plurality of horizontally disposed heating flues located one above the other and connected with each other, the upper heating flue having connection with the chimney, branch flues connecting the lower heating
 115 flue with the said combustion chamber, a shell having a dome and outlet flues and inclosing the said heating flues and the said fire pot, combustion chamber and ash pit, and vertical baffle plates extending on opposite sides of the branch flues and forming
 120 separate vertical channels for distributing the entering air and causing it to be heated uniformly.

4. A hot air furnace, comprising a fire pot, a combustion chamber on top of the
 125 said fire pot, an ash pit below the said fire pot, a plurality of horizontally-disposed heating flues located one above the other and

connected with each other, the upper heating flue having connection with the chimney, branch flues connecting the lower heating flue with the said combustion chamber, a
5 shell having a dome and outlet flues and inclosing the said heating flues and the said fire pot, combustion chamber and ash pit, and vertical baffle plates for forming
10 separate vertical channels for distributing the entering air and causing it to be heated uniformly, the said baffle plates extending from opposite sides of the branch flues between the heating flues and the fire box and
15 combustion chamber and in engagement therewith.

5. In a hot air furnace, a fire pot, a combustion chamber on the fire pot, a plurality

of heating flues arranged around the combustion chamber, one above the other and communicating with each other, branch flues
20 connecting the lowermost heating flues with the combustion chamber, and vertical baffle plates arranged on opposite sides of the branch flues and extending therefrom between the heating flues and the fire box and
25 combustion chamber, and secured thereto.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM MILLER.

Witnesses:

F. W. HANAFORD,
JOHN P. DAVIS.