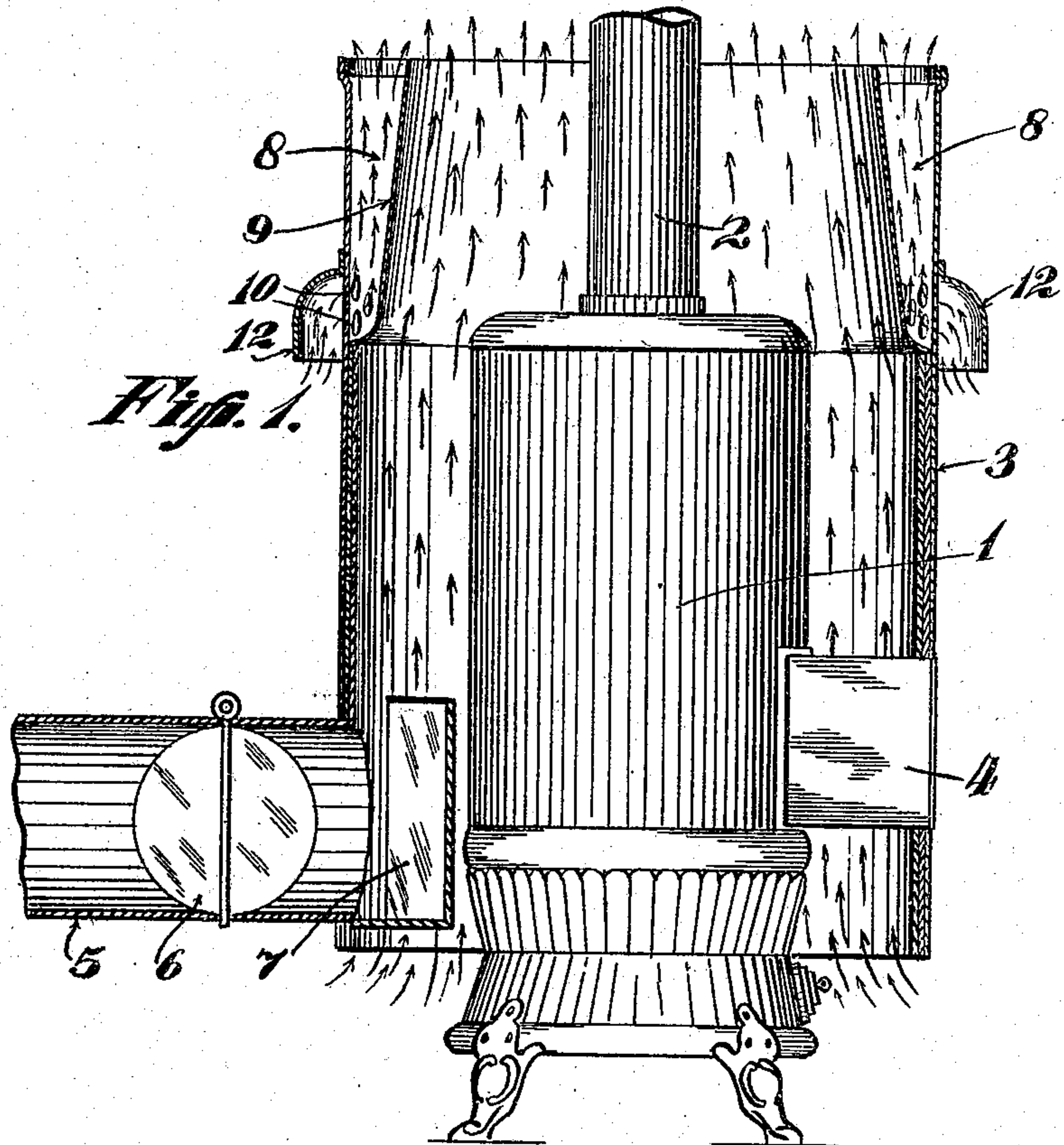


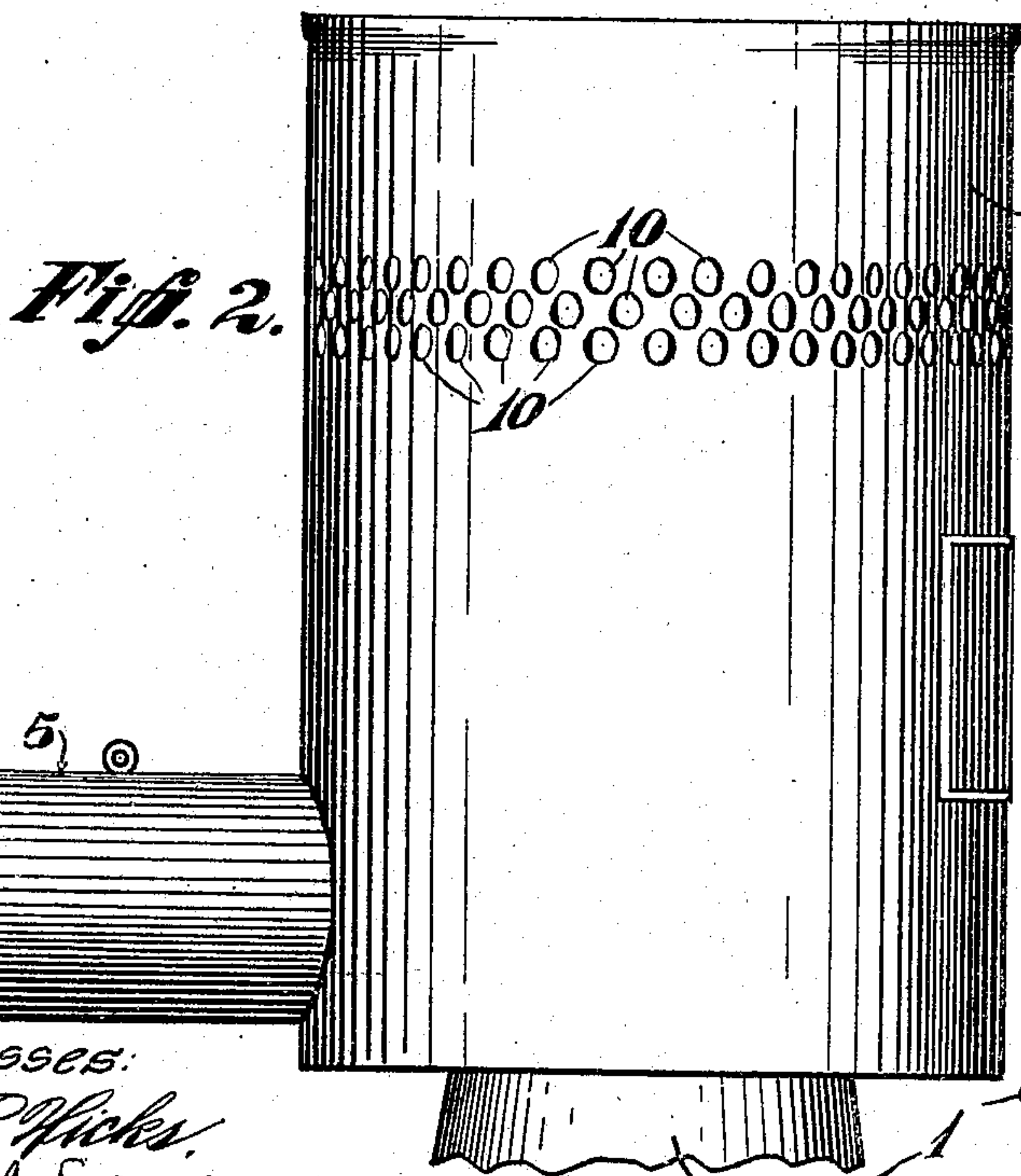
C. H. SMITH.  
AIR HEATING AND CIRCULATING SYSTEM.  
APPLICATION FILED MAR. 19, 1909.

930,424.

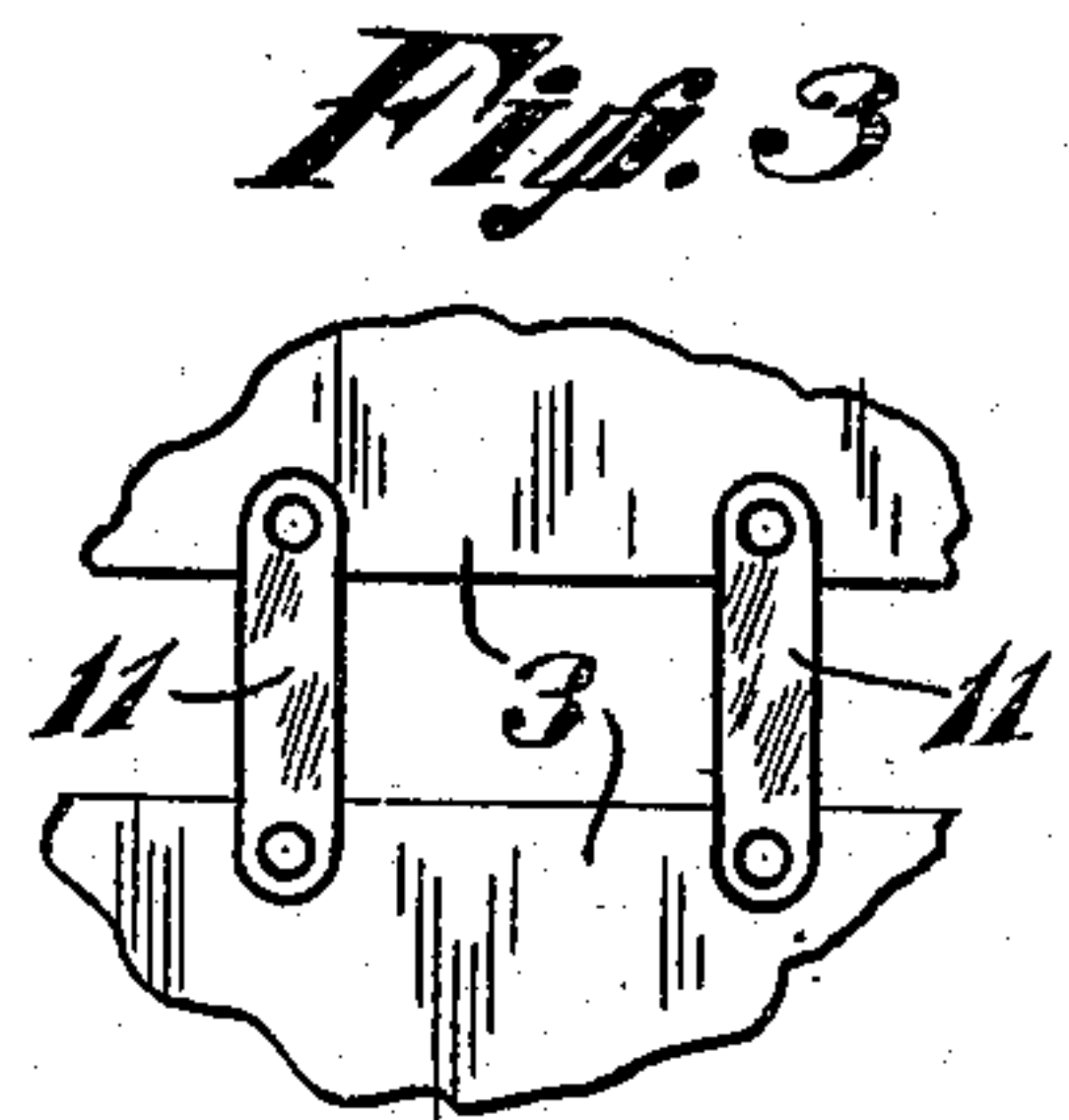
Patented Aug. 10, 1909.



*Fig. 1.*



*Fig. 2.*



*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

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AND ONE-THIRD TO H. L. SMITH, OF MINNEAPOLIS, MINNESOTA.

## AIR HEATING AND CIRCULATING SYSTEM.

No. 930,424.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed March 19, 1909. Serial No. 484,428.

*To all whom it may concern:*

Be it known that I, CHARLES H. SMITH, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Air Heating and Circulating Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to heating systems of the type wherein a stove is located within a surrounding jacket or casing, that is open at the top and bottom. In a heating apparatus of this kind, the air heated by the stove within the jacket, is caused to rapidly rise to the ceiling and after circulating through the room, is drawn back into the open lower end of the jacket, so that a continuous circulation of the air in the room is maintained through the jacket. Of necessity, a box-like fuel door casing is extended from the jacket to the stove and this cuts off considerable of the air space between the stove and jacket, or in other words, reduces the cross section of the annular air channel which is formed within the said jacket. Furthermore, the circulation of air through these jackets as hitherto constructed, has been entirely from the floor upward through the jacket to the ceiling.

I have discovered that by providing the jacket in its upper portion with an auxiliary or supplemental air circulating channel arranged to take in air approximately at the altitude of the top of the stove, and to discharge the air after heating at the top of the jacket, very greatly increased circulation of air may be produced, and greater heat efficiency thereby obtained. Such an auxiliary air circulating channel in the jacket may be provided in a great many different ways, and there may be one or more thereof, but in the preferred arrangement wherein a cylindrical jacket is placed around an approximately cylindrical stove, this auxiliary air heating channel is made annular and extends approximately from the upper extremity of the stove body to the top of the jacket. I have further discovered that with this preferred arrangement, this annular auxiliary air heating channel may be located within the jacket and extended above the stove body

without reducing or choking the air conducting capacity of the main air heating channel of the said jacket, provided the cross section of the said auxiliary air channel, in line with the top of the stove, has an area not greater than that of the horizontal cross section of the fuel door casing.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view partly in vertical section, and partly in elevation, showing the invention applied to the jacket of a heating apparatus, such as above indicated; Fig. 2 is a side elevation of the parts shown in Fig. 1, some parts being broken away; and Fig. 3 is a fragmentary view in elevation illustrating a slightly modified construction.

The stove which is indicated by the numeral 1, is provided with a smoke pipe 2 that extends upward from the central portion of the top thereof. The jacket which surrounds the stove is indicated by the numeral 3, and the box-like fuel door casing which extends from the outer portion of the jacket to the fuel chamber of the stove is indicated by the numeral 4.

The numeral 5 indicates a fresh air intake pipe which extends from the exterior of the room or building, and opens into the lower portion of one side of the jacket 3. Within the fresh air pipe 5 is a damper 6. The said intake pipe as shown, opens into a so-called cold or fresh air intake box 7, which is located within the jacket 3 and has an open top arranged to direct the incoming fresh air upward within the jacket where it will be mixed with ascending currents of hot air continually drawn upward through the annular space between the stove and jacket. This fresh air or cold air intake device, as shown, is of the character disclosed and claimed in my prior patent 868,299, of date October 15, 1907, entitled "Heating and ventilating system," but it will be understood, that so far as my present invention is concerned, any suitable form of cold or fresh air intake device may be employed.

The auxiliary air heating and circulating channel 8, which as stated, is preferably annular in cross section, is as shown, formed by an annular truncated conical metal sheet 9 located within the upper portion of the jacket 3, and having its lower edge turned



outward and secured to the said jacket 3 approximately in horizontal line with the top of the stove. The upper extremity of the annular auxiliary air channel 8 is entirely open. Air from the room is adapted to be drawn into the lower portion of said annular channel 8 through a multiplicity of perforations or openings 10, formed in the sides of the jacket 3, above the lower extremity of the annular plate 9. These perforations should be of such size and in such number, that their total area will be equal to, or greater than, the area of the cross section of the lower portion of the said air channel 8. The lower extremity of the said channel 8 may be opened up in various other ways, as for instance, by forming the upper portion of the said jacket 3 of a separate piece, spaced vertically upward from the body of the said jacket, but connected thereto by vertical bars 11, as shown in Fig. 3.

The numeral 12 indicates an outwardly and downwardly extended annular hood of sheet metal, the upper edge of which is secured to the jacket 3 above the perforations 10, or equivalent air inlet passages to the lower portion of the annular auxiliary air channel 8. This annular hood 12 will in some instances, be found highly desirable, but in many instances, may be dispensed with.

The upper perforations 10, it will be noted, are located above the top of the stove, and the cross section of the auxiliary air channel 8, it will also be noted, increases from its lower to its upper extremity, so that in line with the upper perforations 10, the area of the cross section of said channel 8 is made greater than the area of the horizontal cross section of the furnace door casing 4, without reducing the conducting capacity of the main air channel of the jacket. As is evident, the effective cross section or total air conducting capacity of the main air channel through the jacket, is measured by subtracting the area of the horizontal section of the furnace door casing 4 from the total area of the annular main air channel between the stove and jacket, so that if the cross section of the said air channel in the plane of the top of the stove is equal to the amount thus obtained, there will be no actual contraction or choking action at the point where the air passes between the top of the stove and the lower portion of the annular plate 9. This, as is already stated, is what is accomplished in this improved arrangement. By this arrangement nevertheless, the fresh air is caused to spread out, and hence, the same is caused to more thoroughly commingle with the air circulated from the room, and furthermore, the upward and inward convergence of the said annular plate 9 tends to throw all of the air circulated through the main channel of the jacket, over the top

of the stove, and closer to the smoke pipe 2, thereby very greatly increasing the heating efficiency of the device and accelerating the travel of the hot air and greatly increasing the amount of fresh air taken in, when the damper 6 is open.

Independent of the main circulation of air through the main channel of the jacket as above described, an auxiliary or secondary circulation of air will be produced upward through the annular channel 8, and the air thus circulated will be drawn from the room at a point high above the floor, and approximately at what may be designated as the breathing line of persons in the room. The main and auxiliary air heating channels of the jacket maintain circulation of air from different points, and cooperate to produce an increased or accelerated circulation of air, and to more thoroughly commingle the air of the room.

This air heating and circulating system is primarily designed for use in connection with heating and ventilating systems of the type disclosed and claimed in my prior patent 665,351, of date January 1, 1901, entitled "System of retaining heat and of ventilation," wherein the relatively heavy carbonic acid gases and other heavy foul gases are drawn off from the room from a point at, or very close to the floor.

The term stove is used in the specification and in the claims, in a broad enough sense to include furnaces or similar heating means.

What I claim is:

1. The combination with a stove, of an open ended jacket surrounding and spaced apart from the same, and a fuel door casing extending from one side of said jacket to said stove, said jacket having an annular auxiliary air circulating channel extending approximately from the plane of the top of the stove to the upper extremity of said jacket and open at its lower portion to the air of the room.
2. The combination with a stove, of an open ended cylindrical jacket surrounding and spaced apart from said stove, and a fuel door casing extending from one side of said jacket to said stove, said jacket having an internal annular auxiliary air circulating channel open at its upper and lower extremities to the air of the room, and extending upward approximately from the plane of the top of the stove to the top of said jacket.
3. The combination with a stove and an open ended jacket surrounding and spaced apart from and extending above the same, and a fuel door casing extending from one side of said jacket to said stove, said jacket having an internal auxiliary air circulating channel open at its upper and lower portions to the air of the room, and extending upward from approximately the plane of the top of said stove to the top of said jacket,



the inner wall of which auxiliary air chamber is upwardly tapered or contracted, substantially as described.

5 4. The combination with a stove, of an open ended jacket surrounding the same, said jacket having a continuous annular auxiliary air circulating channel, open at its top and open at its lower portion to the exterior

of said jacket approximately in line with the top of said stove.

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

CHARLES H. SMITH.

Witnesses:

HARRY D. KILGORE,

ALICE V. SWANSON.