

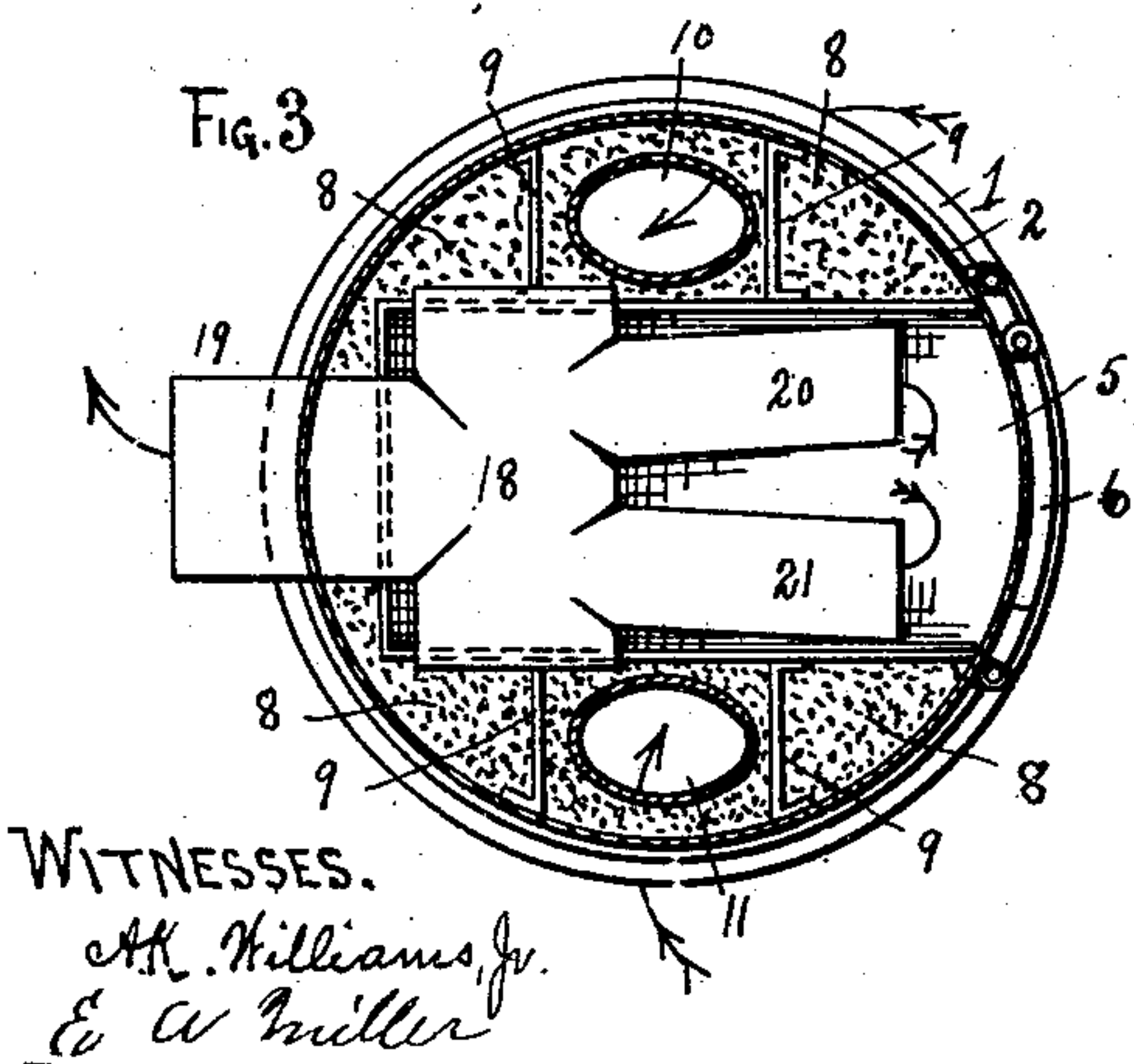
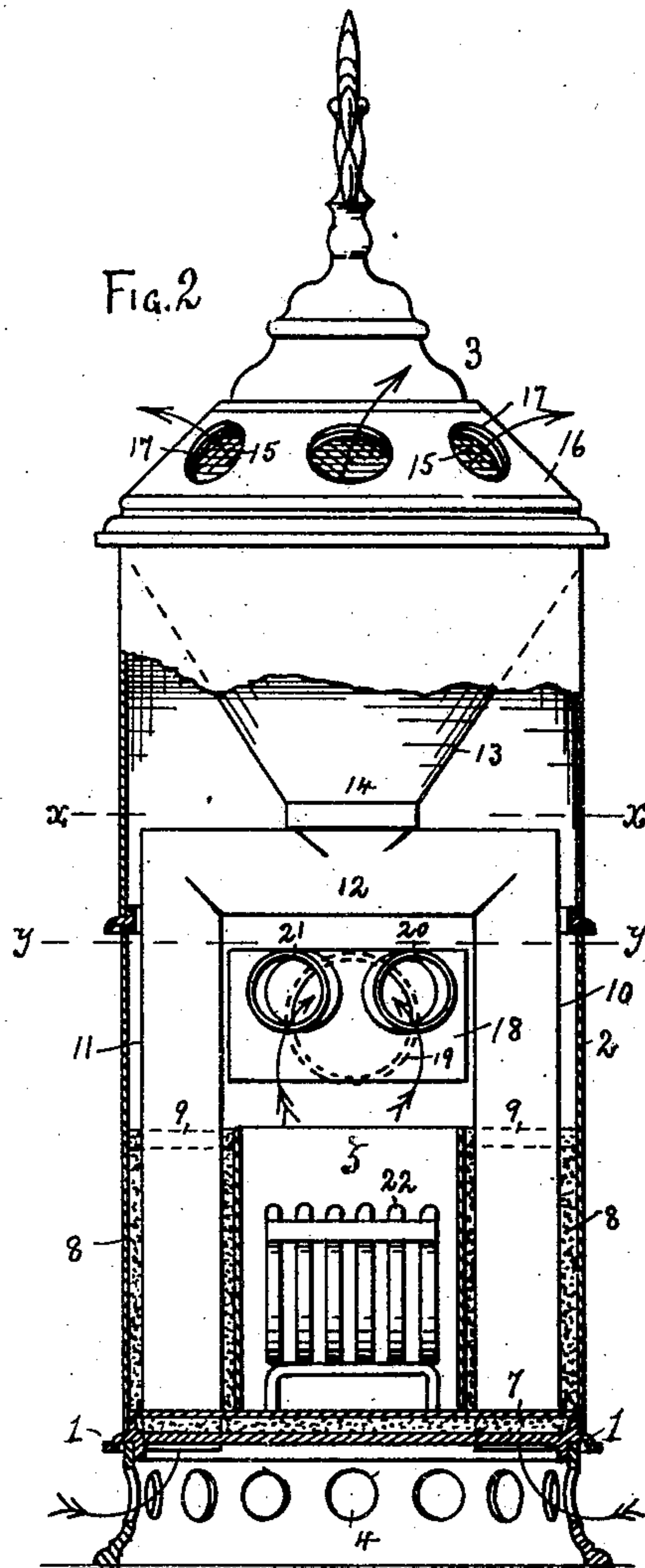
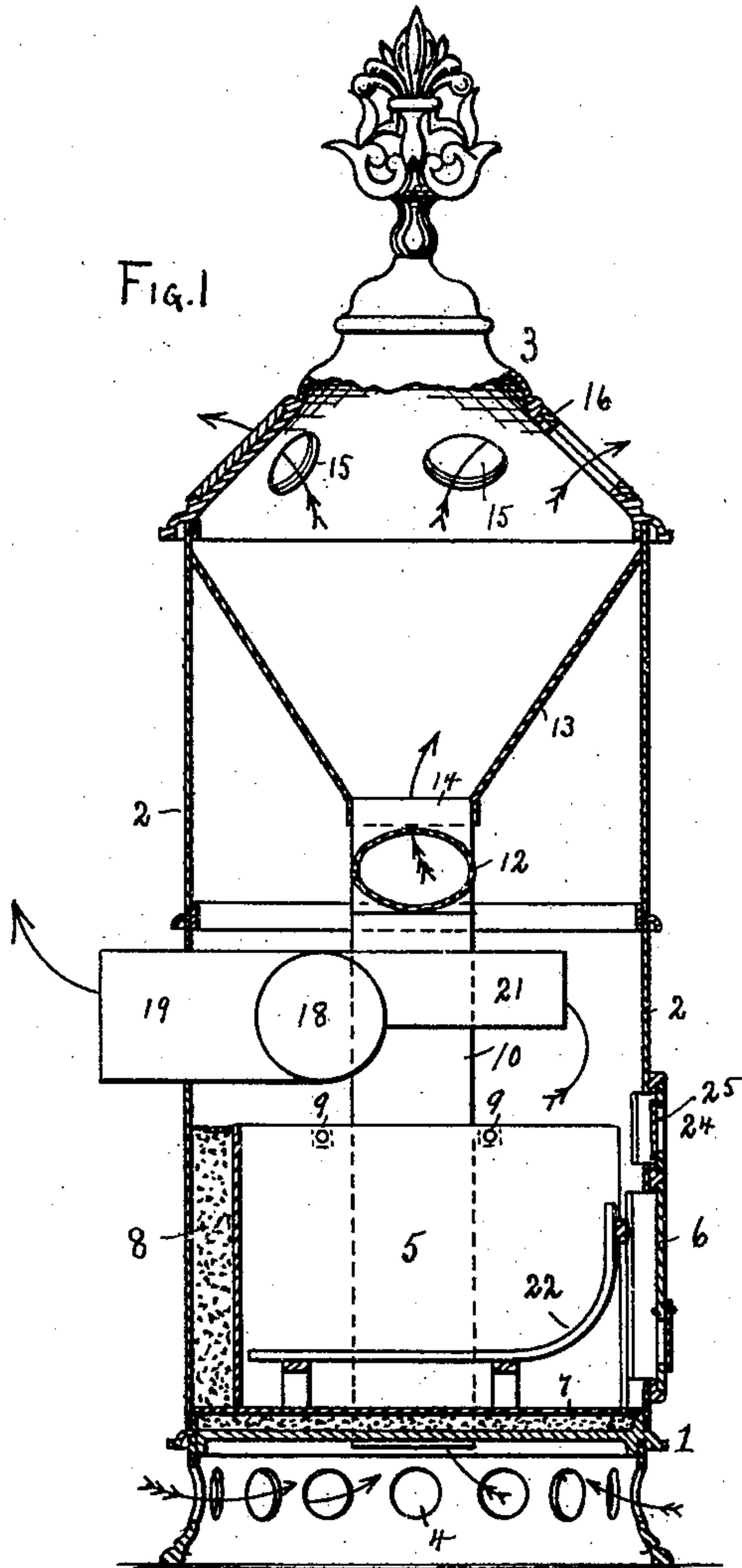
No. 685,238.

Patented Oct. 22, 1901.

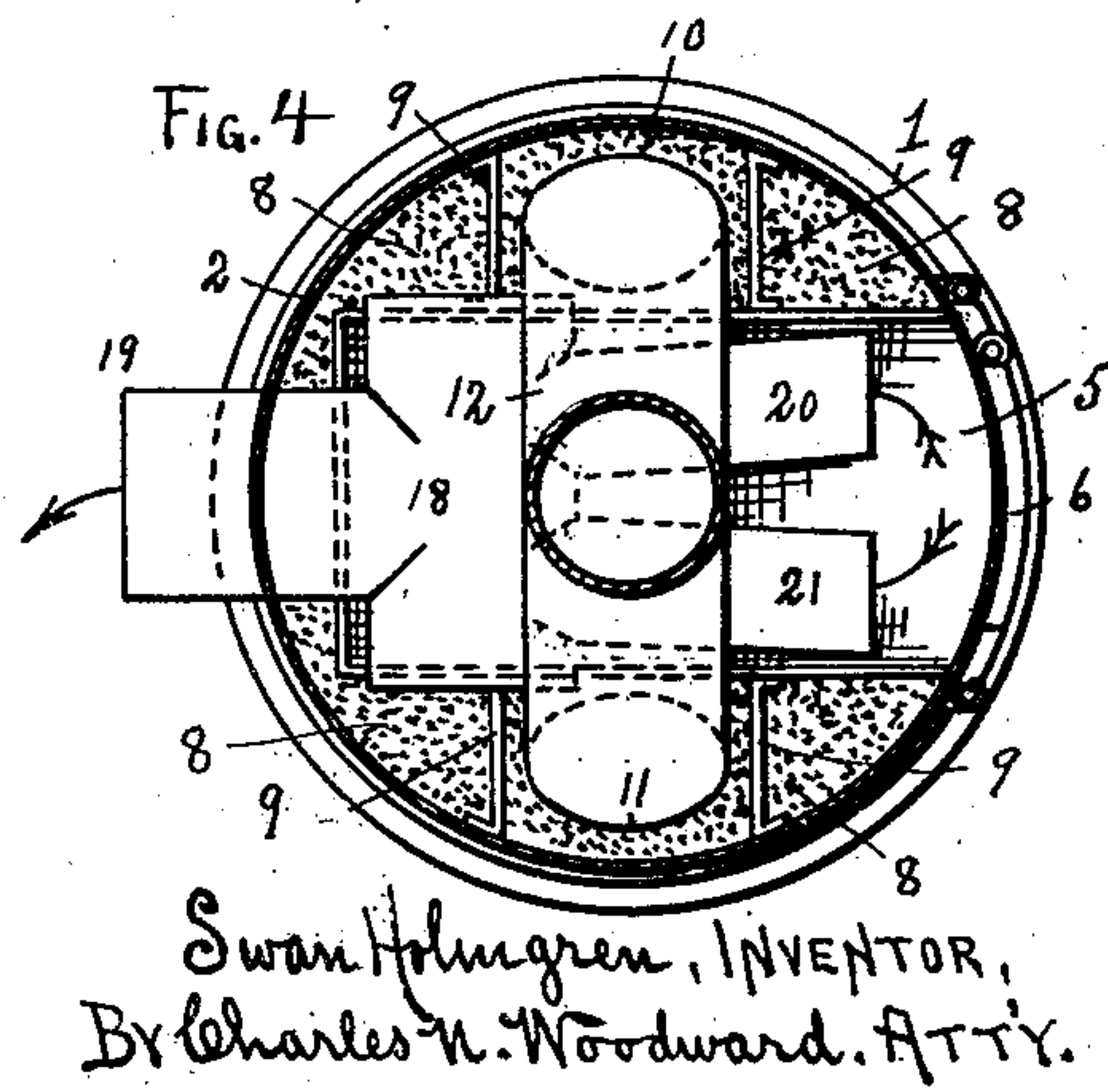
S. HOLMGREN.  
HEATING STOVE.

(Application filed Jan. 29, 1901.)

(No Model.)



WITNESSES.  
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# UNITED STATES PATENT OFFICE.

SWAN HOLMGREN, OF ST. PAUL, MINNESOTA.

## HEATING-STOVE.

SPECIFICATION forming part of Letters Patent No. 685,238, dated October 22, 1901.

Application filed January 29, 1901. Serial No. 45,247. (No model.)

*To all whom it may concern:*

Be it known that I, SWAN HOLMGREN, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Heating-Stoves; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Figure 1 is a sectional side elevation. Fig. 2 is a semisectional front elevation. Fig. 3 is a cross-sectional view on the line  $x x$  of Fig. 2. Fig. 4 is a cross-sectional view on the line  $y y$  of Fig. 2.

1 is the base of the stove, from which the shell 2 rises and with the top 3 resting on the shell, as shown. The base 1 is perforated, as shown at 4, or it will be otherwise arranged to permit the free circulation of air. The base and the shell may be of any size or shape and of any fanciful design, but will preferably be circular, as shown. The top 3 is formed, preferably, conical in outline and with a series of outlet-openings 15 near the base of the top and just above the upper line of the shell 2, as shown, with an annular band or ring valve 16, fitting revolubly over the perforations 15, and with corresponding perforations 17, adapted to register with the openings 15. By this means a means is provided whereby the perforations 15 may be opened and closed or partially opened and closed by adjusting the ring-valve upon its seat upon the conical top. Thus the outflow of the air may be perfectly controlled from outside the stove.

5 is the fire-chamber, which is in the form of an oblong box open at the top and front, with the main door 6 of the stove leading into the fire-chamber. The fire-chamber rests upon a diaphragm or transverse partition 7, which is supported from the base or shell, so as to leave a space between it and the base, which space may be filled with some heat-retaining substance or compound, such as sand, and the spaces between the fire-chamber and shell may be likewise filled with a similar heat-retaining material, as indicated

at 8. The fire-chamber will preferably be supported from the shell by suitable braces, as at 9.

Passing vertically upward through the bottom of the base 1 and the diaphragm 7 at the sides of the fire-chamber are two flues 10 11, one on each side, and united by a horizontally-disposed transverse flue 12 at some distance above the fire-chamber. The flues 10 and 11 also pass through the mass of sand or other heat-retaining medium 8 at the sides of the fire-chamber, as shown, so that the air in the flues will receive the benefit of the heat radiating from the heat-retaining medium as it passes upward through the flues.

In the upper part of the outer shell 1 is a conical shell or drum 13, connected to the interior of the shell 1 at its upper wider part and connected to the center of the horizontal transverse flue 12 at its throat or narrowest part 14, as shown.

The air-flues 10 and 11, rising vertically through the shell at the sides of and outside the fire-pot, do not offer any obstruction to or project over any part of the fire-pot, leaving the whole fire-pot thus entirely unobstructed, so as not to be interfered with in any manner by the presence of the flues. Then, again, the flues rising vertically through the shell permit the air to rise freely and rapidly and without obstruction from any inclinations or bends and passes rapidly into the horizontal section 12, where it is suddenly turned at right angles and subjected to the strong heat-currents rising from the product of the combustion and from the smoke-conducting drum, as hereinafter shown. The hot air then flows rapidly into the lower section 13 of the conical drum and expands into the double conical drum 3 13, completely filling the whole drum and expanding therein and escaping, as required, through the exit-ports 15. The chamber in the top 3 above the outlets 15 forms an important feature of the invention, as a limited air-pressure is thereby formed by the expansion of the hot air to serve as a means of accelerating the outflow of the air from the ports 15 and keeping the flow constant and regular, serving to a limited extent the same purpose as an air-chamber in a force-pump. This is an important feature, and is not shown by any structure with which I am



acquainted. The air by this arrangement is caused to pass rapidly throughout the whole system of flues and chambers and subjected to the influence of the products of the combustion in the best position to fully absorb the heat radiated therefrom. The sand or other heat-retaining filling 8, which incloses the flues 10 11, serves an important function in this connection, as it materially aids in imparting heat to the air as it passes through the flues, as well as retaining the heat and radiating it continuously into the surrounding atmosphere, thus requiring a less amount of fuel to produce the required results.

18 is a drum having closed ends and arranged horizontally across the interior of the shell at one side and above the fire-chamber and beneath the line of the transverse flue 12 and in close proximity thereto and provided with a branch flue 19, leading rearward therefrom through the shell 2. Branching forward from the drum 18 are two branch flues 20 21 and opening near the front of the shell 1 the flues 20 21, preferably inclined outward slightly, as shown, so as to extend the intake of the flues laterally. The intake branch flues 20 21 are smaller than the drum 18 and are arranged to open at the greatest possible distance from the drum, the latter being arranged as near as possible at one side of the shell 2 and the intake ends of the branch flues being at the farthest possible point on the opposite side the smoke and other products of the combustion are caused to travel entirely to one side of the shell before they can enter the intake-flues and then traverse the entire distance back again across the shell before they are permitted to escape by the way of the outlet 19. The drum 18 and flue 19 20 21 form the means for the outlet of the smoke and other products of the combustion, and by arranging this conducting medium in the extended form shown all the smoke and flame will be first carried forward toward and in contact with the front of the shell, so as to provide for its radiation therethrough, and thence backward through the drum and flues, whereby the air within the shell surrounding the various flues and drums is highly heated, and thereby very greatly increasing the efficiency of the heater. The closed drum 18 being closed at the ends provides an expansion-chamber, in which the products of the combustion will expand and be somewhat retarded, so as to exert a large influence upon the surrounding atmosphere and also upon the air passing through the flues 10, 11, and 12. By placing the drum 18 as near the transverse flue 12 as possible the full benefit of the heat radiating therefrom will be imparted to the flues 10, 11, and 12, so that none of it will be lost or wasted. By this arrangement a very compact and economical arrangement of flues and chambers is insured and in which the radiation from the products of the combustion is utilized with very little waste. By this arrangement the

heat from the fire in the fire-chamber 5 is utilized to the greatest possible extent.

If wood is the fuel employed, a grate will not necessarily be required in the fire-box; but if coal is employed a grate 22 will be employed which will preferably be in the form of a removable basket-like structure, as shown in Figs. 1 and 2.

The main door 6 may be in two parts, if required, and will be provided with the usual draft-admitting slides or wing-valves 23.

24 is a smaller door above the main door 6, through which the fuel may be fed when the grate is employed, or this door may be also employed for the same purpose when the grate is not employed, if preferred. The smaller door will preferably be provided with mica lights, (indicated at 24 25.)

The base 1 may be supported upon legs in the ordinary manner instead of by the extended base, if preferred.

Having thus described my invention, what I claim as new is—

1. In a heating-stove, the combination of a shell or casing, a fire-pot inclosed by the lower part of said shell or casing, flues opening downwardly through said shell, and rising vertically between said fire-pot and said shell, a horizontal drum disposed transversely of said shell above said fire-pot, and connected at its ends to the upper ends of said vertical flues, a drum formed of two conical chambers united at their larger ends, and connected at the lower end centrally to said transverse drum, a series of apertures in said drum at substantially the center thereof, and means for regulating the outflow from said apertures, whereby the air-currents are caused to pass rapidly upward in said vertical flues, be subjected to the influence of the heat radiating from the products of the combustion in said transverse drum, and expanded and subjected to pressure in said double conical drum, substantially as set forth.

2. In a heating-stove, the combination of an inclosing shell, a fire-pot, a transverse drum above said fire-pot, vertical flues connecting said drum with the open air beneath said fire-pot, a double conical drum connected to said transverse drum, and projecting above said shell, apertures disposed centrally of said double conical drum, a closed drum transversely disposed with relation to said shell at one side and in close proximity to said first-mentioned transverse drum, an exit-flue leading from said closed drum, and contracted inlet-flues connected into said closed drum, and opening within said shell at the most remote points from said closed drum, and at the opposite side of said shell therefrom, substantially as set forth.

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

SWAN HOLMGREN.

Witnesses:

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A. H. AROSIN.