No. 843,105. PATENTED FEB. 5, 1907.

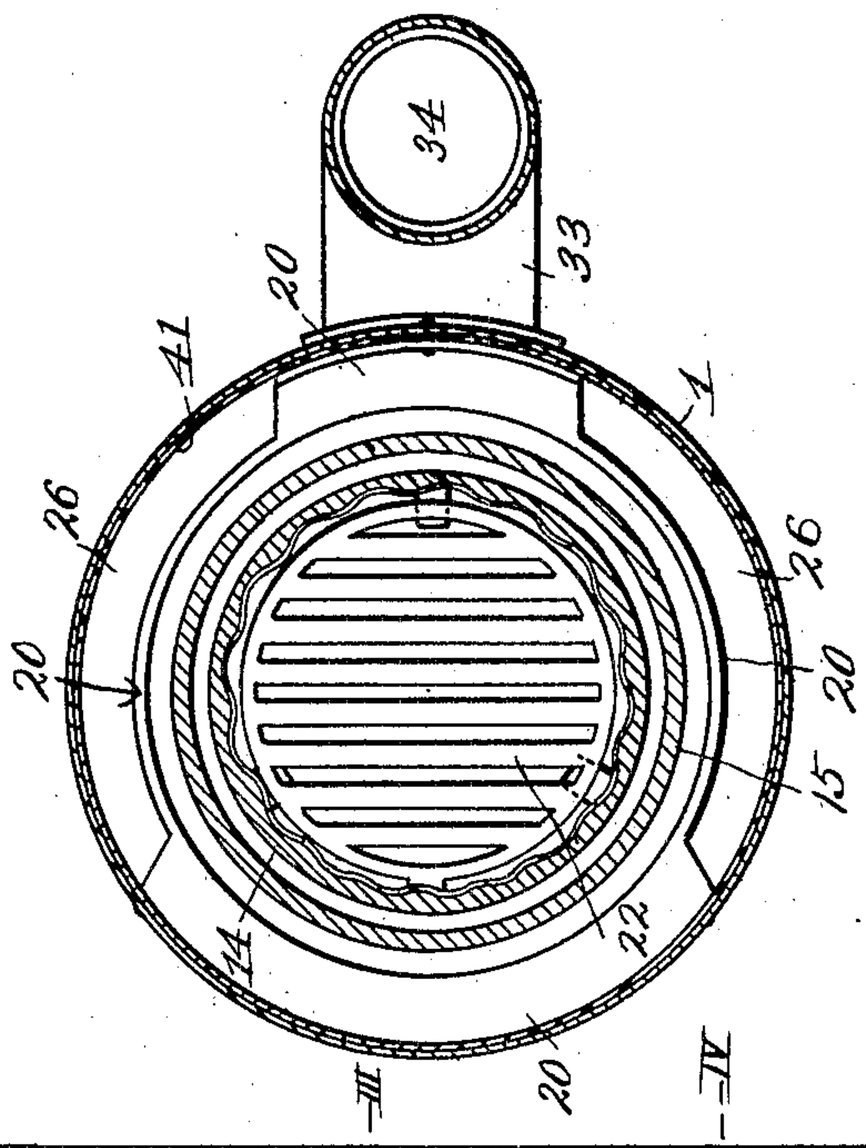
C. F. A. RÖELL.

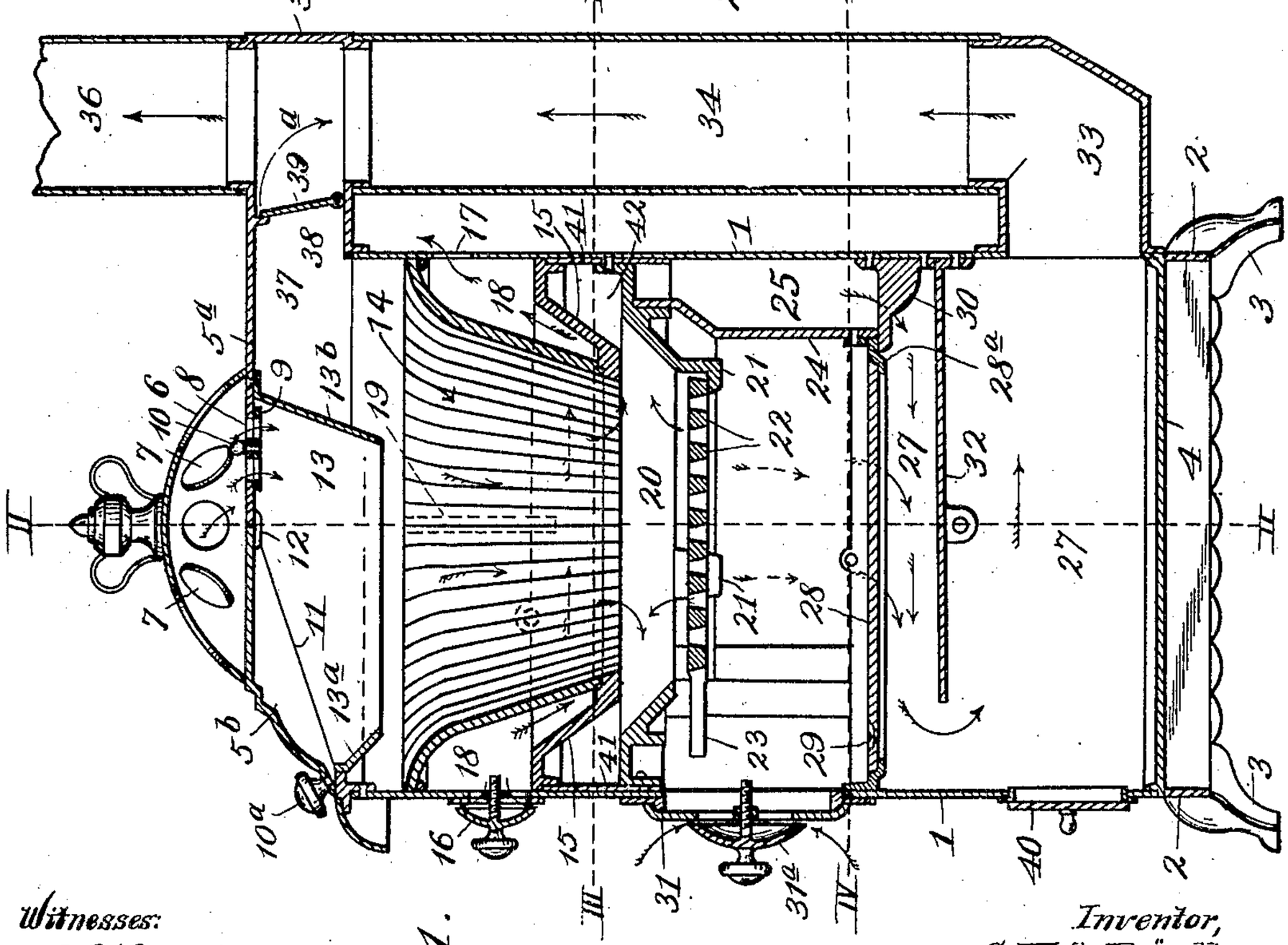
SMOKE CONSUMING HEATER.

APPLICATION FILED DEC. 5, 1905.

2 SHEETS—SHEET 1.

Fig. 3.





Witnesses:

P. C. Hamilton.

J. Morris.

Fig. 1.

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2 SHEETS—SHEET 2.

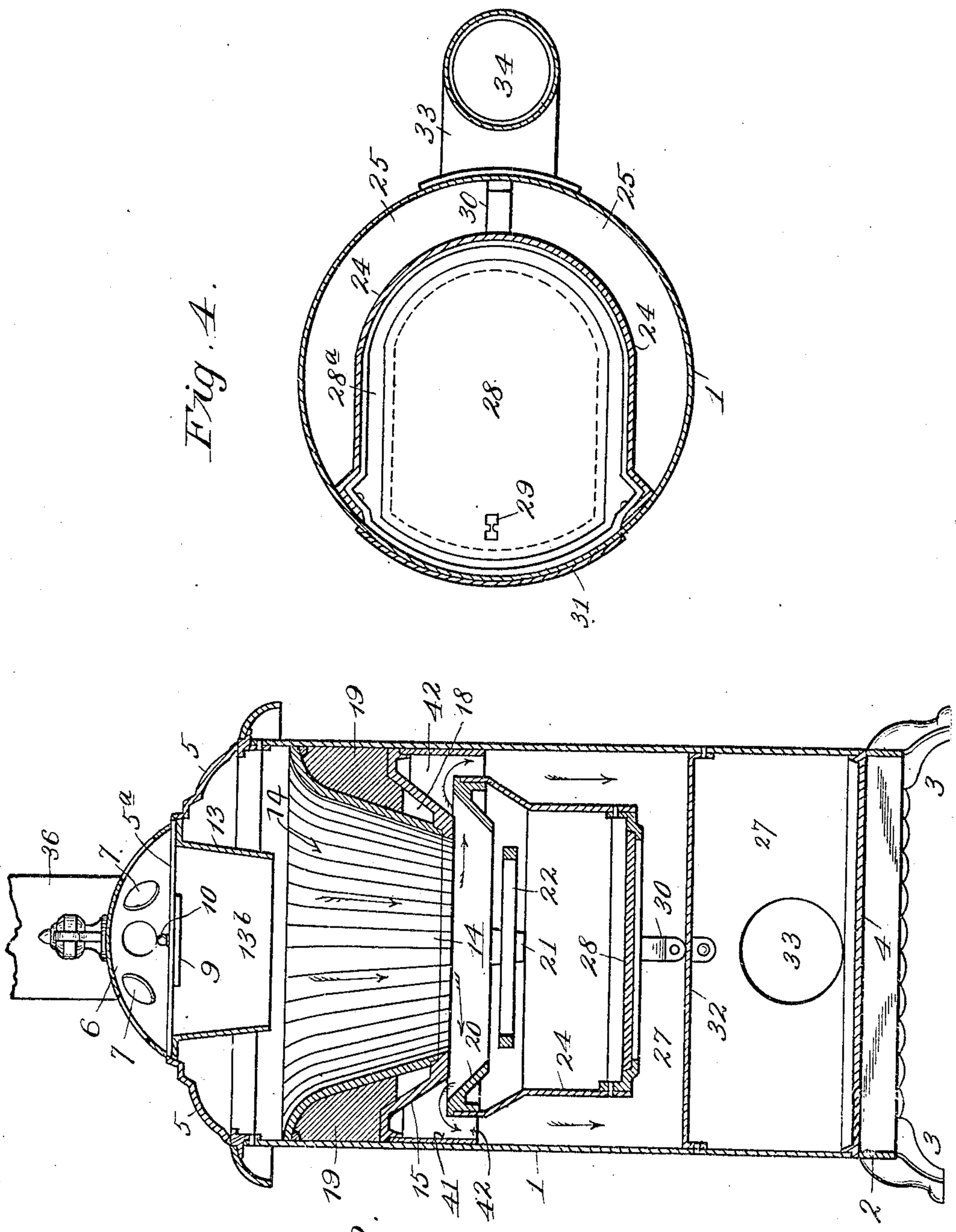

Fig. 2.

Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

CORNELIS F. A. RÖELL, OF INDEPENDENCE, MISSOURI, ASSIGNOR TO ROELL MANUFACTURING CO., A CORPORATION OF MISSOURI.

SMOKE-CONSUMING HEATER.

No. 843,105. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed December 5, 1905. Serial No. 290,338.

To all whom it may concern:

Be it known that I, CORNELIS F. A. RÖELL, a citizen of the United States, residing at Independence, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Smoke-Consuming Heaters, of which the following is a specification.

My invention relates to downdraft base-heating stoves; and the object of my invention is to produce a stove of this character which is more efficient than any such stove in present use—in other words, which will radiate more heat into the surrounding air in proportion to the fuel burned and will permit less heat to pass up the chimney.

Secondary objects of the invention are to provide for easy regulation of the heat and easy access to all interior parts when necessary.

In the operation of heating a room my stove heats the air largely by connection, as well as by radiation, whereas ordinary downdraft-stoves operate almost entirely by direct radiation, thereby permitting the heated products of combustion to pass into the chimney without heating any body of metal except the stovepipe, which, being in the upper portion of the room, is not efficient as a heating agency.

Referring now to the accompanying drawings, in which like reference characters indicate corresponding parts throughout the several views, Figure 1 is a central vertical section of a stove embodying my invention, the ash-pan being omitted. Fig. 2 is a vertical section on line II II of Fig. 1 viewed in the direction of the arrow. Fig. 3 is a horizontal section taken on line III III of Fig. 1 looking down. Fig. 4 is a horizontal section taken on line IV IV of Fig. 1 looking down.

1 indicates the cylindrical outer shell of the stove, supported by a base 2, provided with legs 3. The base also includes a bottom plate 4. The shell 1 is surmounted by a stationary top casting 5, having a flat upper surface on which is mounted a laterally-pivoted dome 6. Said dome is provided with air-inlet openings 7.

The flat top 5^a of casting 5 is provided with suitable air-ports 8, controlled by a register 9 of any desired construction. The register is provided with an opening and closing knob 10, which is accessible when the dome 6 is turned to one side. The front portion 5^b of said casting 5 is made separate from the body thereof (11 indicating the joint between them) and is provided with lugs or fingers 12, which underlie the front edge of the body portion 5. Thus the lid 5^b may be tipped upward and backward by means of its knob 10^a, thereby forming an opening for the insertion of fuel.

Directly beneath the lid 5^b and the dome 6 is a hopper 13, whose front wall 13^a and back wall 13^b are preferably inclined, as shown in Fig. 1. Below said hopper is the main fire-pot 14. (Shown in horizontal section in Fig. 3.) Its upper edge fits within the shell 1. Its inner surface is corrugated, as shown in Fig. 3, the object being to add to its strength and form ducts for the passage of air between the downwardly-converging walls of the fire-pot and the fuel therein.

Fitted closely around and beneath the lower and smaller edge of the fire-pot 14 is the lower edge of an upwardly-flaring annulus 15, the upper edge of which is fitted closely within the shell 1. By this means an annular space is formed between said annulus and shell and the fire-pot 14. This annular space is provided with an atmospheric inlet provided with a register 16, Fig. 1, and with a rear aperture 17, cut through the shell 1, through which the air which enters through register 16 and is heated within the annular space 18 flows out and mingles with the air of the room. By thus causing an air-current to circulate around the fire-pot the latter is prevented from becoming unduly heated and burning out. The upper portion of said annular space is provided with two (or more) deflecting-plates 19 half-way between the inlet 16 and the outlet 17, Fig. 2. As these deflectors fit against the fire-pot 14 and the shell 1, the air entering through register 16 is compelled to pass below said deflectors in order to escape through the outlet 17. This causes the air to be more highly and uniformly heated before it escapes. It will be observed that the inlet-register 16 is located lower than the outlet 17. By this means the current of air through the annular heating-space is more quickly started and better maintained.

Spaced below the annulus 15 is a shallow subjacent fire-pot 20, having converging walls fitted within the shell 1 and having its lower edge provided with lugs 21, which sup-

port the grate 22. The grate is rotatable and is provided with a shaker 23.

The ash-pit is formed by a curved side and rear wall 24, Fig. 4, the ends of which are bolted to the front of the shell 1. This wall being spaced inwardly from the shell, as shown, forms a large downdraft-passage 25 almost completely around the ash-pit. The top of this passage is partly closed by the upper portion of the shallow fire-pot, as shown in Fig. 3. This portion is cut away at the sides, thereby forming two large segmental openings 26, through which the products of combustion descend into the hot-air chamber 27 below the ash-pit. The bottom 28 of the ash-pit is made separate and detachable and is provided with a socket 29 to receive a lifter, by which it may be removed. It is supported by a frame 28[a], carried by ash-pit wall 24, the rear portion of which is connected with the shell by a bracket 30.

31 is the ash-pit door, provided with a register 31[a]. The ash-pan is not shown.

The hot-air chamber 27 is divided a short distance below the ash-pit bottom 28 by a deflecting-plate 32, which fits within the sides and back of the shell 1, but does not extend to the front thereof. Said deflecting-plate is slightly inclined to prevent to a degree the lodgment of soot and ashes thereon carried by the downdraft from the fire-pot. Thus the products of combustion are compelled to pass forwardly over said plate, then back thereunder, to enter an elbow 33, from which a flue 34 leads up and connects with the stovepipe 36. The union 35 between the stovepipe and the flue 34 is connected to the chamber 37 back of the hopper 13 by an updraft-flue 38, provided with a damper 39.

The object of making the ash-pit bottom detachable is that soot and fine ashes are deposited upon the deflector-plate 32 from the smoke, and this deposit should occasionally be removed. This is done by removing the plate 28 and scraping the deposit forward until it falls into the hot-air chamber 27. The deposit may then be removed through a door 40.

The operation is as follows: When lighting or starting a fire, the damper 39 is turned back in the direction of arrow *a*, thereby forming a direct upward communication between the fire-pot 14 and the stovepipe. The register 31[a] is of course open. As soon as the fuel is well ignited the damper 39 is closed. Register 31[a] may be left open, however. The combustion is now fed by air entering through the down inlets 7. The products of combustion after reaching the lower edge of the fire-pot ascend into the annular space 42 below the annulus 15, then descend through the openings 26, Fig. 3, and the U-shaped space 25, Fig. 4, into the hot-air space 27 between the ash-pit bottom and plate 32. Thence they pass forward over said plate around its front edge and back beneath it, thoroughly heating the bottom 4 of the stove, and pass up through the smoke-flue 34. The air inclosed by the shell 1 between the annulus 15 and the shallow fire-pot 20 becomes intensely heated, and on this account this portion of the shell is reinforced by an internal ring 41, of metal or heat-resisting material of suitable thickness. As already described, the air of the room is further heated by air entering through register 16 becoming heated in the space 18, surrounding the fire-pot, and escaping through the outlet 17 at the back of the shell.

By arranging the fire-pot in the upper portion of the stove or heater it is obvious that the latter will be uniformly heated from top to bottom when the downdraft is in operation, and by causing the air entering the air-ports 8 to pass downwardly through the fire-pot it is obvious that it will commingle with the gases arising from the burning fuel in such proportion as to effect complete combustion of said gases and other products of combustion. Consequently the greatest efficiency and economy of fuel will be had with but little or no smoke.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a heater, the outer shell, a fire-pot fitting at its top therein, an annulus fitted within the shell and around the lower edge of the fire-pot, the shell being provided with oppositely-disposed air inlet and outlet, and two upright deflecting-plates connecting the inner surface of the shell with the outer surface of the fire-pot, and extending from the top of the latter downward and partly into the annulus leaving air-passages below the deflecting-plates between the fire-pot and the annulus.

2. In a heating-stove, the outer shell, a fire-pot therein, an annulus fitted to the shell and to the lower edge of the fire-pot, the shell being provided with an air-inlet and an air-outlet, oppositely disposed, and two upright deflecting-plates arranged midway between the said inlet and outlet, connecting the inner surface of the shell with the outer surface of the fire-pot and extending from the top of the latter downward and partly into the annulus, leaving air-passages below the deflecting-plates between the fire-pot and the annulus.

3. In a heating-stove, the outer shell provided with air-inlet and air-outlet openings oppositely disposed; combined with a downwardly-tapering fire-pot fitting at its top within the shell above said openings, an annulus around its lower edge fitting within the shell below said openings, a second fire-pot below the first and fitting within the shell, its walls having openings, an ash-pit whose upright wall is spaced from the shell forming a draft-passage communicating with the open-

ings in the fire-pot, and properly-dampered inlets for fresh air and flues for the products of combustion.

4. In a heating-stove, the outer shell provided with air-inlet and air-outlet openings oppositely disposed; combined with a downwardly-tapering fire-pot fitting at its top within the shell above said openings, a downwardly-tapering annulus fitting at its upper edge within the shell below said openings and its lower edge around the lower edge of said fire-pot, a second fire-pot below the annulus and whose walls form with the annulus an annular space around the latter, said walls having openings communicating with this space, a draft-passage communicating with the openings in the fire-pot, and a smoke-flue communicating with said draft-passage.

5. In a heating-stove, the outer shell provided with air-inlet and air-outlet openings oppositely disposed; combined with a downwardly-tapering fire-pot fitting at its top within the shell above said openings, an annulus fitting around its lower edge and within the shell below said openings, a second fire-pot below the first, a reinforcing heat-resisting ring within the shell between said annulus and the second fire-pot, and openings and flues for the admission of air and the discharge of smoke.

6. In a heating-stove, the outer shell, a main fire-pot therein, and an annulus around its lower edge and fitting within the shell; combined with a second fire-pot below the first and having openings in its walls near said shell, communications between these openings and the smoke-flue, and a ring of heat-resisting material fitting within the shell between said annulus and the second fire-pot.

7. In a heating-stove, the combination with the shell having a transverse passage for air, and the main fire-pot around which said passage is directed; of a second fire-pot below the first having openings for the escape of the products of combustion, and an annulus interposed between the fire-pots and separating the fire-pot from said air-passage.

8. In a heating-stove, an upright cylindrical shell having dampered openings for the inlet of air and the escape of smoke; combined with a main fire-pot near the top of the shell, a second and shallow fire-pot below the first and having segmental openings, a grate, an upright wall spaced from the shell and contacting with said shallow fire-pot to produce an ash-pit below the grate and a surrounding draft-passage communicating with said openings, a plate closing the bottom of the ash-pit and forming a hot-air chamber below it, and a deflecting-plate standing nearly horizontal within said chamber, for the purpose set forth.

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

CORNELIS F. A. RÖELL.

Witnesses:
F. G. FISCHER,
LESLIE E. BAIRD.