(No Model.) 2 Sheets—Sheet 1.

J. A. KIRKPATRICK.

AIR HEATING AND VENTILATING APPARATUS FOR STOVES OR FURNACES.

No. 452,105. Patented May 12, 1891.

Fig. 2.

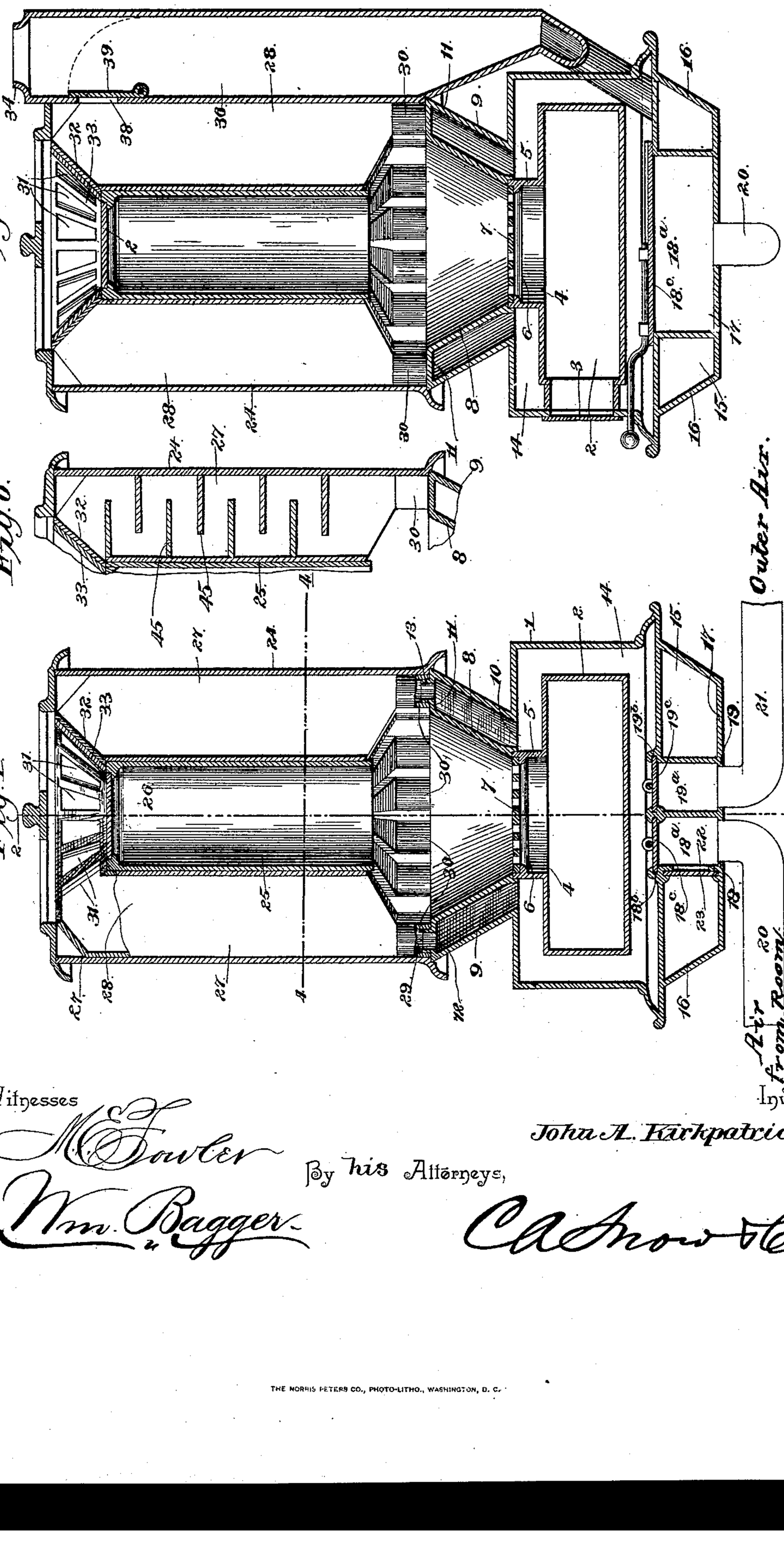

Fig. 6.

Fig. 1.

Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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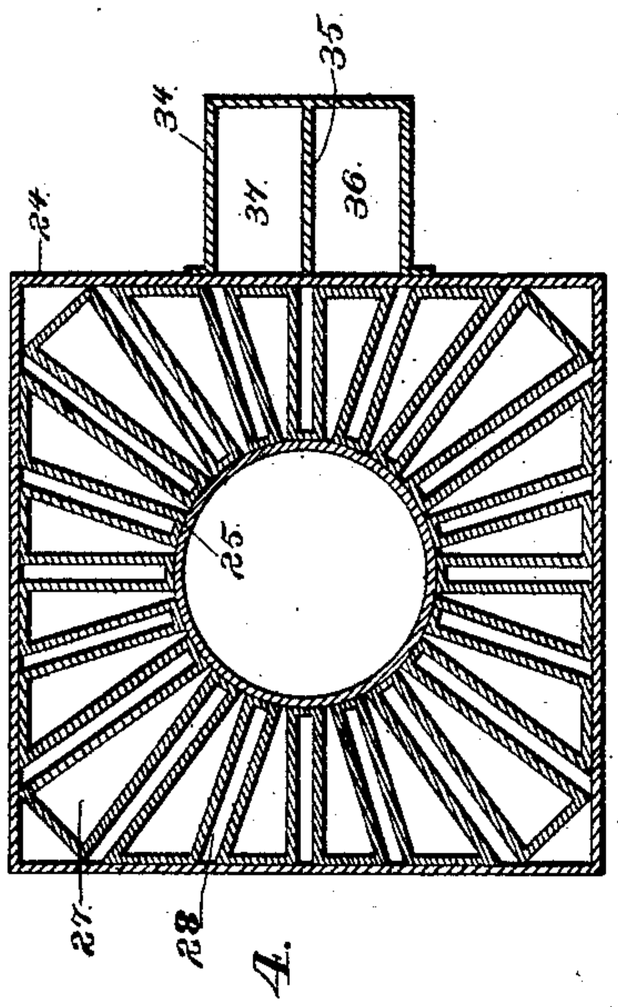

Fig. 4.

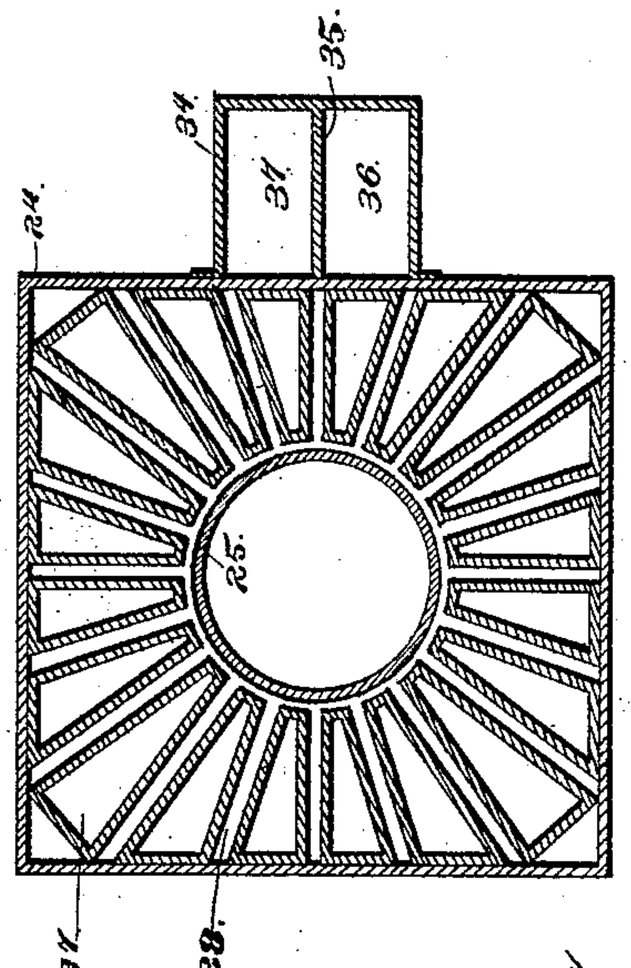

Fig. 5

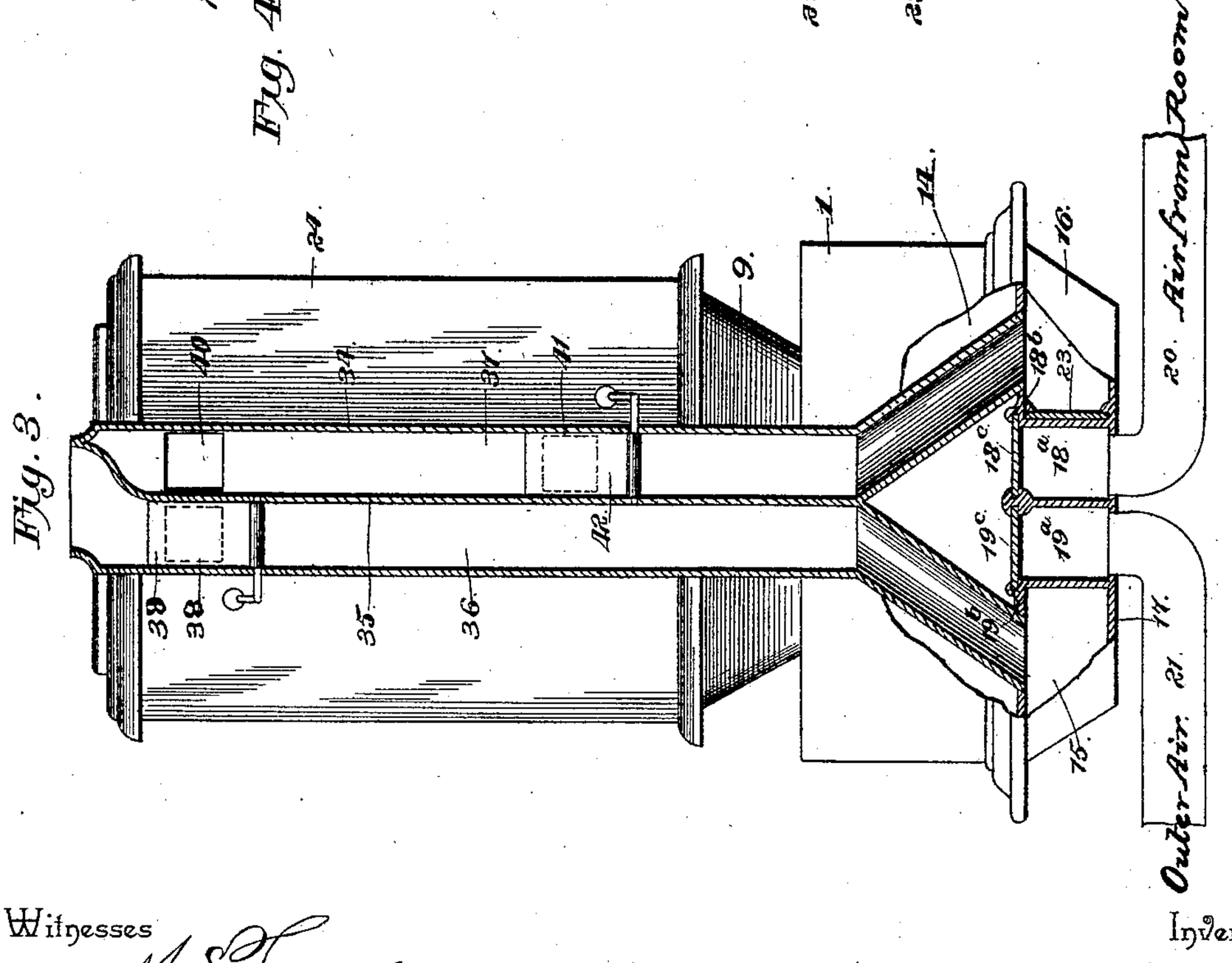

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN A. KIRKPATRICK, OF ANTHONY, KANSAS.

AIR HEATING AND VENTILATING APPARATUS FOR STOVES OR FURNACES.

SPECIFICATION forming part of Letters Patent No. 452,105, dated May 12, 1891.

Application filed May 4, 1889. Serial No. 309,582. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. KIRKPATRICK, a citizen of the United States, residing at Anthony, in the county of Harper and State of Kansas, have invented a new and useful Improvement in Air Heating and Ventilating Apparatus for Stoves or Furnaces, of which the following is a specification.

This invention relates to an air heating and ventilating apparatus for stoves or furnaces; and it consists in the improved construction, arrangement, and combination of parts which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a vertical transverse sectional view, looking rearward, of a heating-stove having air heating and ventilating apparatus embodying my improvements. Fig. 2 is a vertical sectional view taken on the line 2 2 in Fig. 1. Fig. 3 is a rear elevation, with parts broken away in order to show the construction more clearly. Fig. 4 is a horizontal sectional view taken on the line 4 4 in Fig. 1. Fig. 5 is a sectional view taken on a plane similar to that of Fig. 4, but illustrating a modification. Fig. 6 is a detail vertical sectional view showing a modification.

Like numerals of reference indicate like parts in all the figures.

The base of my improved stove or heating apparatus consists of a casing 1, within which is located a box 2, constituting the ash-pit, and access to which may be had through a suitably-constructed door 3. The top of the box or ash-pit 2 has an opening 4, surrounded by an annular collar 5, having a flange 6, on which the grate 7 is supported. The outwardly-flaring fire-pot 8 rests upon the upper edge of the flange 6, and is surrounded by a flange 9, extending upwardly from an opening 10 in the upper side of the base or casing 1. The upper edges of the flange 9 and the fire-pot are connected by an annular plate 11, having openings 12, surrounded by collars 13 for the attachment of the air-flues to be hereinafter described. The bottom of the ash-pit is supported above the bottom of the base and the space between the walls of said base and ash-pit and between the flange 9 and the fire-pot constitutes an air heating and circulating chamber. (Designated in the drawings by 14.)

A sub-chamber 15, constituting a smoke chamber and passage, is constructed under the bottom of the base, from which the side walls 16 of said sub-chamber depend. The bottom 17 of the sub-chamber is provided with openings 18 and 19, connected by suitably-constructed vertical passages 18^a 19^a, with corresponding openings 18^b 19^b in the bottom of the base, which latter openings may be closed when desired by means of slide-valves or dampers 18^c 19^c. To the openings 18 and 19 are connected flues 20 and 21, that lead respectively, to the coldest part of the room or rooms that are to be heated and ventilated and to the external air. The side of the passage 18^a has an opening 22, provided with a slide-valve or damper 23 to enable communication to be established or cut off between said passage and the smoke-chamber 15, as may be desired. The stove or furnace casing 24 is supported upon the upper edge of the flange 9, and contains the centrally and vertically disposed magazine 25, having a cover 26.

In the annular space between the casing and the magazine are located a series of radial vertical air-flues 27. These flues may, as shown in Fig. 4, be formed by bending a single or continuous sheet of metal to form the alternating passages 27 and 28, the former of which are open at their inner ends and closed by the wall of the magazine, and the latter of which are open at their outer ends and closed by the wall of the furnace-casing. The lower ends of the flues 27 are closed by bottom plates having circular openings 29, provided with annular flanges 30, connected with the flanges 13, thus connecting said flues with the air-chamber 14. The upper end of the flues 27 have inclined inwardly-facing openings 31. A partition-plate 32 rests upon the upper ends of the flues and serves to cover the upper open ends of the fire flues or passages and to separate the air-space from the fire-space, and a frustum-shaped radially-slotted slide 33 rests upon said partition-plate and serves to cover the upper open ends of the air-flues while coal is being charged into the magazine, thus preventing coal from dropping into the air-flues.

The smoke-flue 34 is attached upon the rear side of the stove-casing and is provided with a central vertical partition 35, whereby it is divided into separate flues or passages 36 and 37, the lower ends of which diverge and are connected to opposite ends of the smoke-chamber 15. The upper end of the flue 36 forms the exit for the products of combustion, and is connected with the fire-space in the stove by an opening 38, adapted to be closed by a damper 39. The upper end of the flue 37 is connected with the fire-space by an opening 40, and an additional opening 41, adapted to be closed by a damper 42, is formed in the stove-casing about midway of the length of the flue 37.

In Fig. 5 of the drawings I have illustrated a modification which consists in making the air-flues 27 separate from and independent of each other, each flue being separately constructed of either wrought or cast iron. In this construction the spaces between and around the flues 27 form the smoke-passages.

When desired, baffle-plates 45 may be arranged in the smoke-passages 28, as shown in Fig. 6 of the drawings, in order to force the products to take a tortuous course, and thus cause a maximum amount of heat to be utilized in heating the air in the adjacent air-flues.

The operation of my invention will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. When the fire is first started, the damper 39 is opened, thus making a direct draft for the products of combustion to the exit-flue. When the fire is well started, the dampers 39 and 42 may be closed, when the products of combustion will pass through the opening 40, through the flue 37, smoke-chamber 15, and flue 36 to the exit, thus contributing to heat the air contained in the lower part of the air-space 14 and in the passages 18^a and 19^a. Should it be desired to still further check the draft, it may be done by opening the damper 42, which opens into and partially obstructs the flue 37. When the valves 23 and 19^c are open and the valve 18^c is closed, fresh or external air is admitted through the flue 21 and passage 19^a into the air-chamber 14, and it rises through said chamber and through the annular space surrounding the fire-pot and through the flues or passages 27, escaping through the openings 31 into the room, where the furnace is located, or is conveyed through suitable flues or ducts (not shown in the drawings) to other rooms that are to be heated. At the same time the air in the rooms is drawn through flue 20 into the passage 18^a and through opening 22 into the smoke-chamber 15, whence it escapes with the products of combustion, thus affording a constant supply of fresh and pure air to the apartments or rooms through the air-heating device and a constant escape of foul air from the coldest part of the rooms near the floor also serves as a check-draft. When the valve 18^c is opened, valves 19^c and 23 will be closed. The air will now be drawn through flue 20 from the coldest part of the rooms, as before described, and be fed to the chamber 14 and heated and again discharged into the rooms. This latter operation is preferred when the fire is first started, so as not to interfere with the draft.

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

1. The combination of the base, the box or ash-pit supported within the same, the fire-pot resting upon the ash-pit, the flange extending upwardly from the base and surrounding the fire-pot, the casing resting upon said flange, the magazine, the vertical air-flues arranged in the space between the casing and the magazine and having their lower ends connected with the air-space between the fire-pot and ash-pit and the base and its flange, means for supplying to said air-space pure air from the outside or air from the apartments that are to be heated, and means for carrying products of combustion, substantially as set forth.

2. The combination of the base, the ash-pit supported within the same, the sub-chamber 15, the passages connecting openings in the bottom of the latter with openings in the bottom of the base, the flues connecting said passages with the apartments to be heated and with the external air, respectively, the dampers 18^c, 19^c, and 23, vertical air-flues arranged in the stove-casing and having their lower ends connected with the air-space between the base and ash-pit, flues for carrying off the products of combustion, having their lower ends connected with the sub-chamber or smoke-chamber, the upper end of one of said flues being closed and the other connected with the exit, the openings 38, 40, and 41, and the dampers 39 42, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN A. KIRKPATRICK.

Witnesses:
C. M. JEROME,
H. PARKE JONES.