

M. M. DILLON.

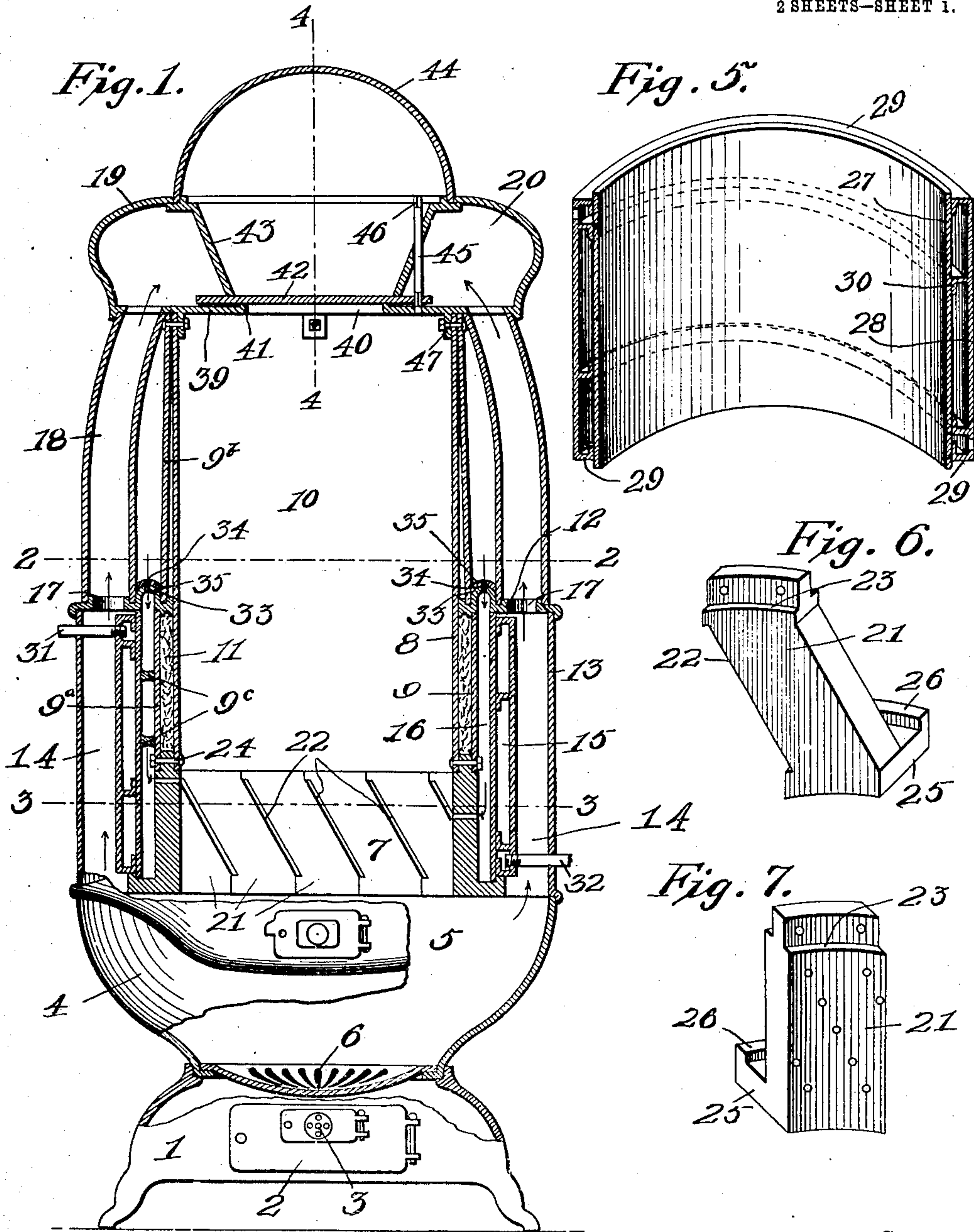
STOVE.

APPLICATION FILED APR. 2, 1908.

919,553.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.



Witnesses

James F. Brown
M. L. Skinner.

Inventor

Milton M. Dillon

By

Watson E. Coleman

Attorney

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2 SHEETS—SHEET 2.

Fig. 2.

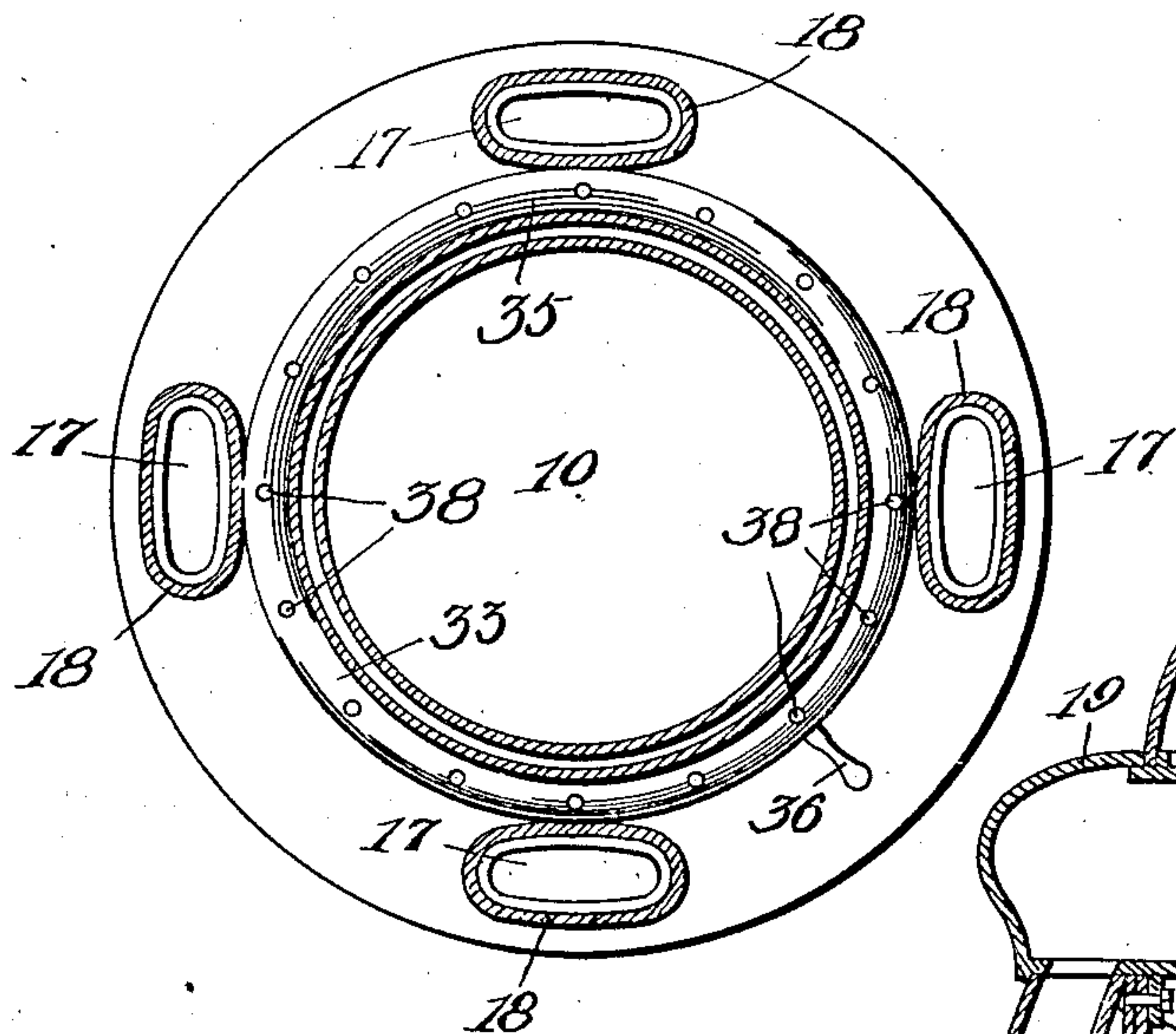


Fig. 4.

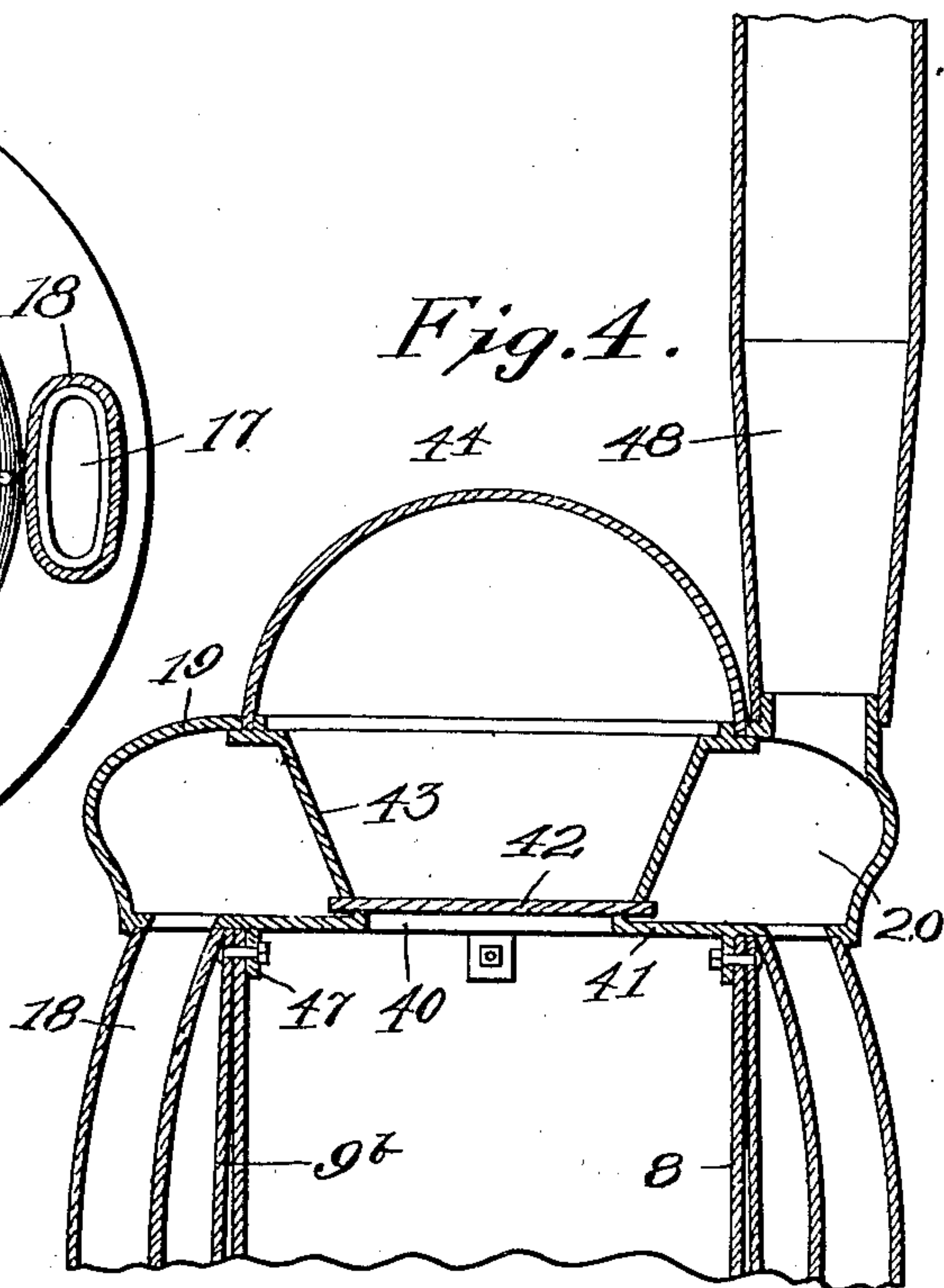
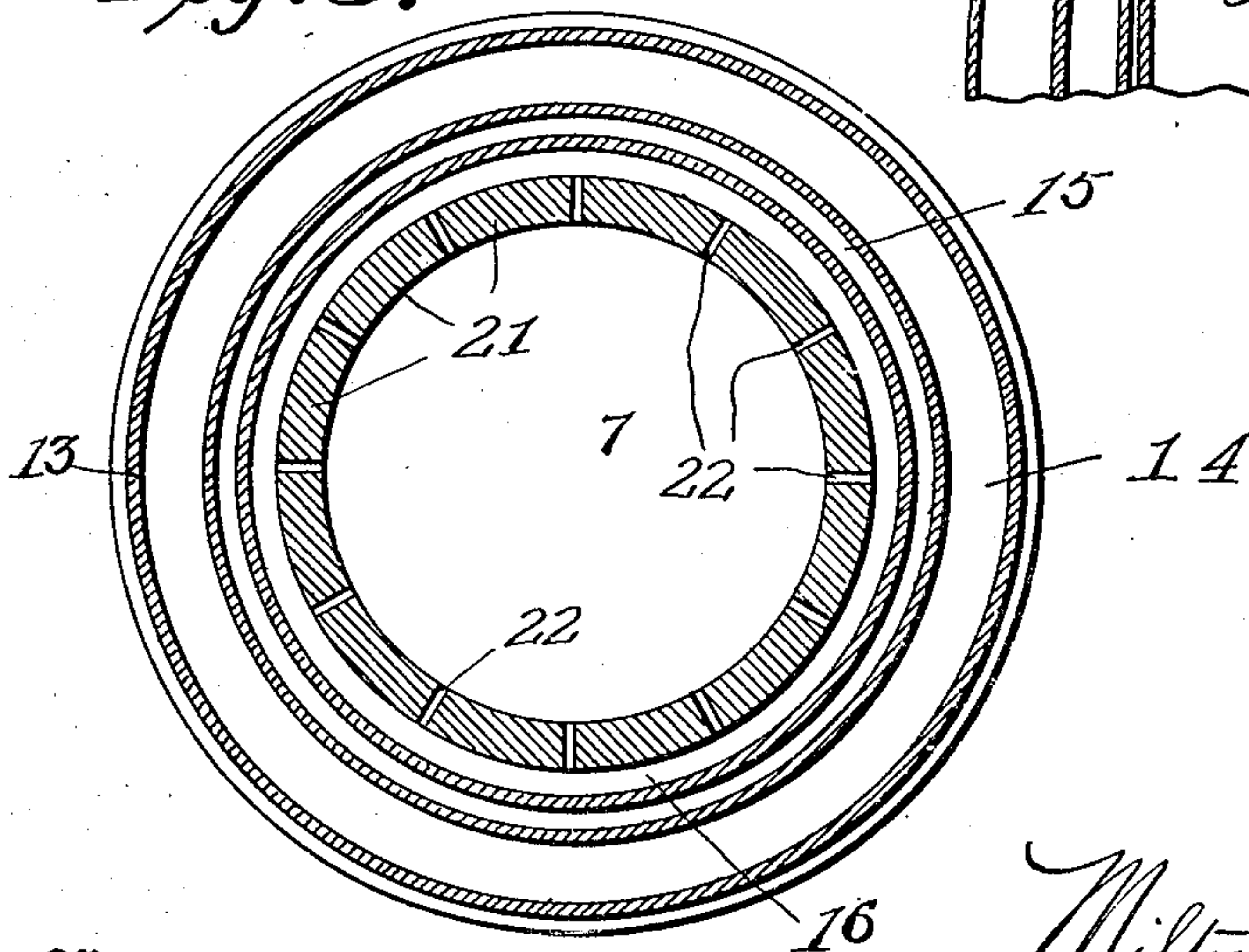


Fig. 3.



Witnesses

James F. Brown
M. L. Skinner.

Milton M. Dillon Inventor
By Watson E. Coleman Attorney

UNITED STATES PATENT OFFICE.

MILTON M. DILLON, OF YORK TOWNSHIP, WASHTENAW COUNTY, MICHIGAN.

STOVE.

No. 919,553.

Specification of Letters Patent.

Patented April 27, 1909.

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To all whom it may concern:

Be it known that I, MILTON M. DILLON, a citizen of the United States, residing in York township, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Stoves, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in stoves and furnaces, and more particularly to the one set forth in Patent #863,269 granted to me August 13, 1907.

The object of the present invention is to improve and simplify the construction of the stove and thereby render it more durable and less expensive, and also to increase its adaptability to the use of either soft or hard coal as fuel, the slack therefrom being so manipulated in the process of combustion as to burn with practically a smokeless flame and with a minimum annoyance from soot and a maximum amount of heat from the fuel used.

A further object of the invention is to provide a stove with an improved water heating means whereby hot water may be supplied to a system of radiators for heating the entire house.

With the above and other objects in view, as will hereinafter appear, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings in which—

Figure 1 is a vertical sectional view through my improved stove; Figs. 2 and 3 are horizontal sections taken respectively on the planes 2, 2—3, 3 in Fig. 1; Fig. 4 is a detail vertical section taken on the plane indicated by the line 4, 4 in Fig. 1; Fig. 5 is a sectional perspective of the water back or heater; Fig. 6 is a perspective view of one of the lining sections of the fire chamber and Fig. 7 is a similar view of a different form of lining section.

In the drawings 1 denotes the cast base having supporting legs or feet and an ash box or chamber adapted to contain an ash pan. At the front of the base is an ash door 2 containing a suitable damper 3 by means of which air is supplied to the bottom of the fire as presently explained. Formed in the open top of the base 1 is a groove to receive a cast shell 4 which forms a sub fire chamber or fire pot 5 arranged above a grate 6 and beneath an upper fire chamber 7. The shell

4 has an enlarged upper portion and a contracted lower end provided with an inwardly extending flange to support the grate 6 which latter may be of any suitable form and construction.

The fire chamber 7 is of less diameter than the sub-fire chamber 5 and is formed by a sectional lining secured between the lower ends of inner and outer cylindrical jackets 8, 9, of a fuel magazine 10 arranged immediately above and in open communication with the fire chamber 7 and the sub-fire chamber 5. The spaces between the jackets or walls 8, 9, may be filled with asbestos or any other material that is a non-conductor of heat and the outer jacket is preferably formed in two sections 9^a, 9^b, arranged below and above a cast ring or annular plate 12. The upper section 9^b of the outer jacket has its lower end seated in a groove in the ring 12 and its upper portion is tapered inwardly to engage the upper portion of the inner jacket 8 as clearly shown in Fig. 1. Arranged between the upper edge of the shell 4 and the ring or plate 12 is an outer cylindrical casing 13 which forms an annular combustion chamber between it and an annular water back or heater 15 arranged within the casing 13 and spaced from the lining of the fire chamber 7 and the outer jacket 9 to provide an annular air heating space 16. The combustion chamber 14 has its lower end in open communication with the sub-fire chamber 5 and its upper end is closed by the ring or plate 12 which latter is formed at suitable points with flanged openings 17 to receive the lower ends of vertical flues 18 the upper portions of which are inclined inwardly and project into flanged openings formed in a top casting 19 containing an annular heating chamber 20 with which said flues communicate.

As above stated the fire chamber 7 is composed of a plurality of lining sections 21 preferably cast of metal, and arranged diagonally as shown in Fig. 1. Each of said sections has one of its side edges cut away as shown at 22 so that when the adjacent sections are fitted together said cut away portions will form diagonally arranged slots through which air may pass from the air heating chamber 16 to the top of the fire as hereinafter more fully explained. Each of said lining sections 21 has the opposite edges of its top recessed as at 23 and apertured to receive bolts 24 which secure the lower ends of the inner magazine jacket 8 and the outer

section 9^a in said recesses. The bottom of each of the lining sections 21 is formed with an outwardly projecting flange 25 having an upwardly projecting lip or rim 26 and adapted to receive and support the bottom of the water back 15 which latter, it will be seen, serves as a partition or wall to separate the combustion chamber 14 from the air heating chamber 16.

10 Instead of constructing the lining sections of the fire chamber 7 as just explained, I may make them as shown in Fig. 7 upon reference to which it will be noted that the lining section has vertical side edges so that the sections may be disposed vertically instead of obliquely and that it has a plurality of transverse openings to permit of the passage of air from the air heating chamber 16 to the top of the fire.

20 The water back or heater 15, may be of any suitable or preferred form and construction but I preferably make it, as illustrated in Fig. 5, of an inner cylindrical section 27 and an outer cylindrical section 28, at the top and bottom edges of which are annular flanges 29 to space the two sections apart and to close the space between said sections so as to contain water. Also formed upon the inner face of the outer section 28 is a spiral flange or rib 30 which forms between the two sections a spiral or circuitous passage through which the water must pass in its circulation. Flow and return pipes 31, 32, are tapped into the upper and lower portions of the outer shell 28 and extend through the outer casing 13 as shown in Fig. 1. These pipes are included in a system of radiators arranged throughout the house in which the stove is used so that said radiators will be supplied with hot water from the heater 15. The water back or heater is preferably spaced from the outer jacket section 9^a by spacing blocks 9^c as shown in Fig. 1.

45 The annular air heating chamber 16 extends vertically and is comparatively long or deep so that air admitted into it at its top will be thoroughly heated in passing downwardly through it to the obliquely arranged slots or openings 22 in the fire chamber 7. The top of the air heating space or chamber 16 is closed by a raised portion 33 of the ring or plate 12 which portion has a convex upper surface and is formed at suitable points with air inlet openings 34. The passage of air through the openings 34 is controlled by a damper ring 35 arranged upon the portion 33 and adapted to be oscillated by means of a handle 36 so that openings 38 formed in it may be brought into and out of alinement with the openings 34.

65 The top member or casting 19 of the stove has a bottom plate 39 in the outer portion of which are formed flanged openings to receive the flues 18 and the inner portion of which extends over the outer part of the fuel maga-

zine 10 and is formed with a central opening 40 through which fuel is introduced into the magazine. The edge or rim of the opening has an upwardly projecting flange 41 the upper edge of which is ground to receive a horizontal cover plate 42 arranged for horizontal swinging movement above the plate 39 and beneath a funnel shaped casting 43 arranged in the top of the casting 19 and adapted to form an inner wall for the annular heating chamber 20. The open top of the funnel 43 is formed with an annular groove to receive a removable cover 44. The plate or cover 42 for the top of the fuel magazine is fixed at its lower end upon a shaft or pivot 45 mounted for rotation in the plate 39 and funnel 43 and provided at its upper end with a squared portion 46 to receive a removable key or wrench by means of which said plate 42 may be swung to cover or uncover the opening 40. The top casting 19 is secured to the upper end of the fuel magazine by bolts or similar fastenings 47 as illustrated. Projecting from the rear portion of the cover or top member 19 is a pipe 48 which leads to the chimney.

In operation the air passes through the damper ring 35 into the air heating space 16 and, in its downward passage, through the same to the slots or openings 22 is heated. Owing to the circumferential arrangement of the air inlet openings or slots 22 around the lining of the fire chamber 7 the draft of air will be admitted in a downward and central direction and also in a spiral direction around the fuel in said chamber, the air being in a heated condition uniting with the gases escaping from the fuel and thereby causing a blast of burning gas which if allowed to follow its natural tendencies would proceed to ascend upwardly and, after reaching a point sufficiently cool, while passing out through the smoke pipe and chimney would condense back into soot and lodge but, owing to the peculiar construction of the invention, it lingers until the heated air and gas has sufficiently mingled and become ignited to form a blast of burning gas which in following the line of least resistance, passes downwardly and circumferentially around the fire chamber until it is met by the air blast proceeding upwardly from the grate 6. The meeting of these two blasts serves to focus and intensify the heat and, under the influence of the draft from the chimney, the gas and productions of combustion are drawn through the combustion chamber 14, the flues 18, the heating chamber 20 and out of the latter to the chimney. The effect of these upward and downward blasts focusing and combining while passing through the combustion chamber causes the entire consumption of the bituminous matter and the gas which would otherwise condense into soot and cause annoyance. Thus it will be seen that there are two different stages of combustion going on

separately and continuously in the stove; in the first instance, the gases and bituminous matter are liberated and burned out of the fuel in the fire chamber, and in the second instance as the fuel settles to the sub-fire chamber or fire pot the process of combustion is completed under the influence of the upward draft through the grate, it being understood that the entire mass of fuel in the fire chamber and sub-fire chamber or fire pot is under the process of combustion at the same time. The provision of the water back enables me to provide hot water for a system of radiators so that the entire house may be heated by the stove.

While I have shown and described in detail the preferred embodiment of my invention it will be understood that I do not wish to be limited to the precise construction set forth, and that various changes in the form, proportion, and minor details, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention what I claim is:

1. A stove of the character described, comprising a fuel magazine, a fire chamber and a sub-fire chamber or fire pot arranged one above the other and in open communication, the fire chamber being provided in its wall with air inlet openings, an annular combustion chamber surrounding the fire chamber and having its lower end in open communication with the fire pot, an annular water back or heater arranged within the combustion chamber and spaced from the fire chamber and the fuel magazine to form a vertically disposed annular air heating space or chamber the lower end of which is in communication with the openings in the fire chamber, and means for controlling the inlet of air at the top of said air heating space or chamber.

2. A stove of the character described, comprising a fuel magazine, a fire chamber and a sub-fire chamber or fire pot arranged one above the other and in open communication, the fire chamber being provided in its wall with air inlet openings, an annular combustion chamber surrounding the fire chamber and having its lower end in open communication with the fire pot, an annular water back or heater arranged in the combustion chamber and spaced from the fire chamber to provide an annular air heating space, a ring or plate surrounding the magazine and closing the top of the combustion chamber and said air space, said ring or plate being formed with openings, means for controlling the inlet of air into said air space, a cover member upon the top of the magazine and containing an annular heating chamber and a central fuel inlet passage, flues affording communication between the top of the

combustion chamber and said heating chamber and a cover for said fuel inlet passage.

3. A stove of the character described, comprising a base, a shell thereon, a grate in the bottom of the shell, an outer cylindrical casing supported by the shell, a ring or plate resting upon the casing, an inner cylinder forming a fuel magazine and arranged in said ring or plate, a fire chamber lining supported from the lower end of said inner cylinder and provided with air inlet openings, an annular water back or heater arranged between said outer casing and the inner cylinder and adapted to provide an annular combustion chamber and an annular air heating chamber, said water back or heater having its lower end supported by the fire chamber lining, means for controlling the inlet of air to the upper end of the air space, a cover member arranged upon the top of the fuel magazine and having an annular heating chamber and a central fuel inlet passage, a cover for the latter, and flues arranged between said ring or plate and the said cover member and affording communication with the combustion chamber and the heating chamber, substantially as described.

4. A stove of the character described, comprising a fuel magazine, a fire chamber, and a sub-fire chamber or fire pot beneath the same and in open communication therewith, an outer casing, an annular water back arranged within said outer casing and adapted to provide between it and the latter an annular combustion chamber in open communication with the fire pot, said water back consisting of spaced outer and inner sections, on one section of which is formed a spiral rib to provide a spiral water passage between the sections, and flow and return pipes in communication with the opposite ends of said spiral water passage and projecting through the outer casing, a cover member upon the top of the magazine, and having a bottom plate formed with a central opening and a funnel shaped partition surrounding said opening and having its upper edge placed above the same, said partition forming in the cover member an annular heating chamber, a vertical pivot, a top plate fixed to said pivot for swinging movement beneath said funnel shaped partition and over the opening in said bottom plate, and flues affording communication between the combustion chamber and said heating chamber.

5. A stove of the character described comprising a fuel magazine, a fire chamber and a sub-fire chamber or fire pot arranged one above the other and in open communication, the fire chamber being provided in its wall with air inlet openings, an annular combustion chamber surrounding the fire chamber and having its lower end in open communication with the fire pot, a vertically disposed annular heating chamber between the fire

chamber and the combustion chamber and having its lower end in communication with the fire chamber, a water heating apparatus in the combustion chamber, and means for
5 controlling the inlet of air at the top of said heating chamber.

6. A stove of the character described comprising a fuel magazine, a fire chamber and a sub-fire chamber arranged one above the
10 other in open communication, an annular combustion chamber surrounding the fire chamber and having its lower end in open communication with the fire pot, an air heating chamber arranged between the combustion chamber and the fire chamber, means
15 for creating a down draft through the air heating chamber, means for creating an up draft through the sub-fire chamber, and an annular water back or heater forming the inner wall of the annular combustion chamber.
20

7. A stove of the character described comprising

a fuel magazine, a fire chamber and a sub-fire chamber arranged one above the other in open communication, an annular combustion chamber surrounding the fire
25 chamber and having its lower end in open communication with the fire pot, an air heating chamber arranged between the combustion chamber and the fire chamber, means for creating a down draft through the air
30 heating chamber, means for creating an up draft through the sub-fire chamber, a water heating apparatus in the combustion chamber and outlet flues rising from the upper portion of the combustion chamber.
35

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

MILTON M. DILLON.

Witnesses:

JOEL L. MARBLE,
MARY COUDE.