

No. 687,166.

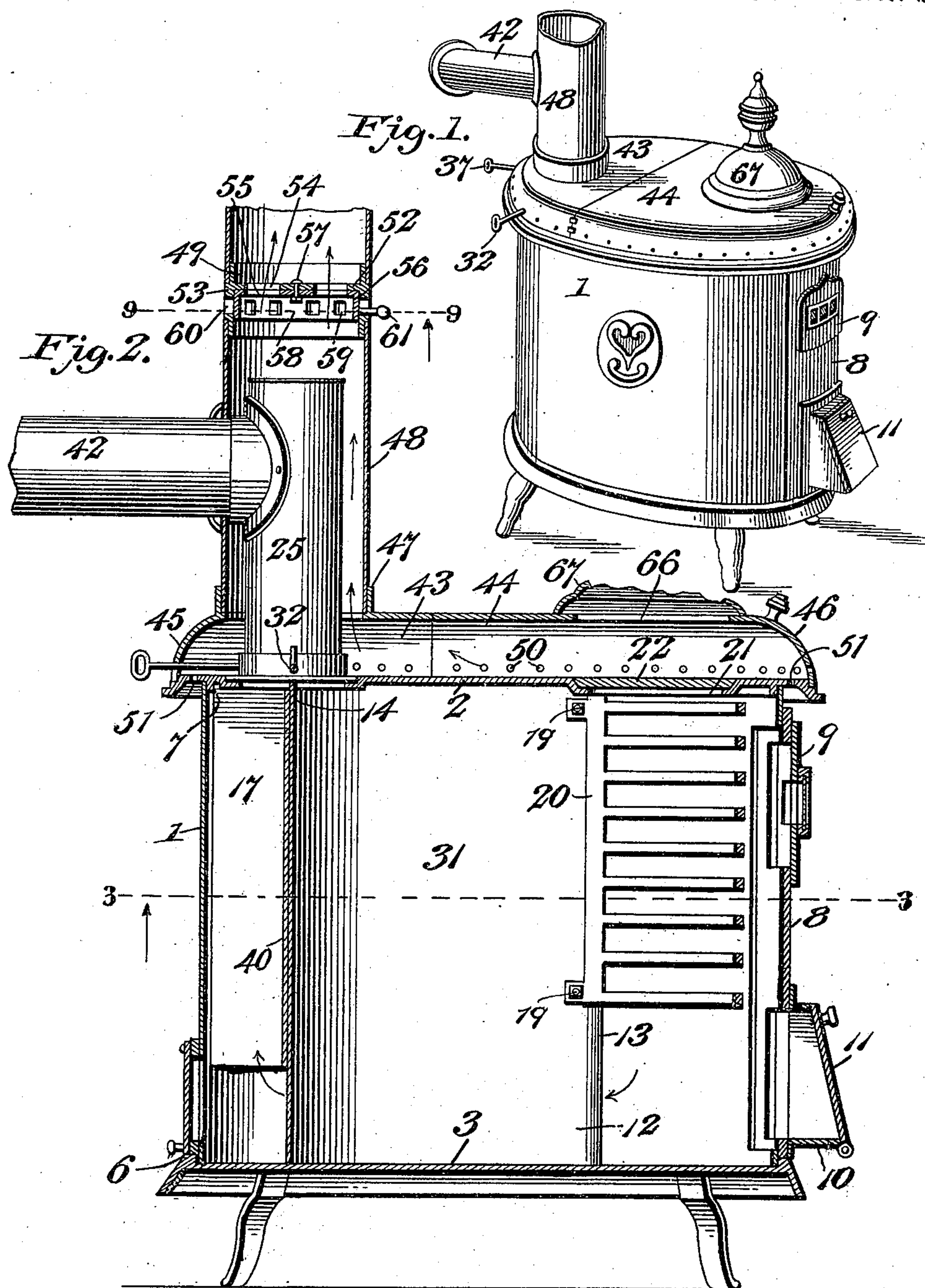
Patented Nov. 19, 1901.

J. L. RITTER.  
STOVE.

(Application filed Dec. 21, 1900.)

(No Model.)

3 Sheets—Sheet 1.



John L. Ritter Inventor

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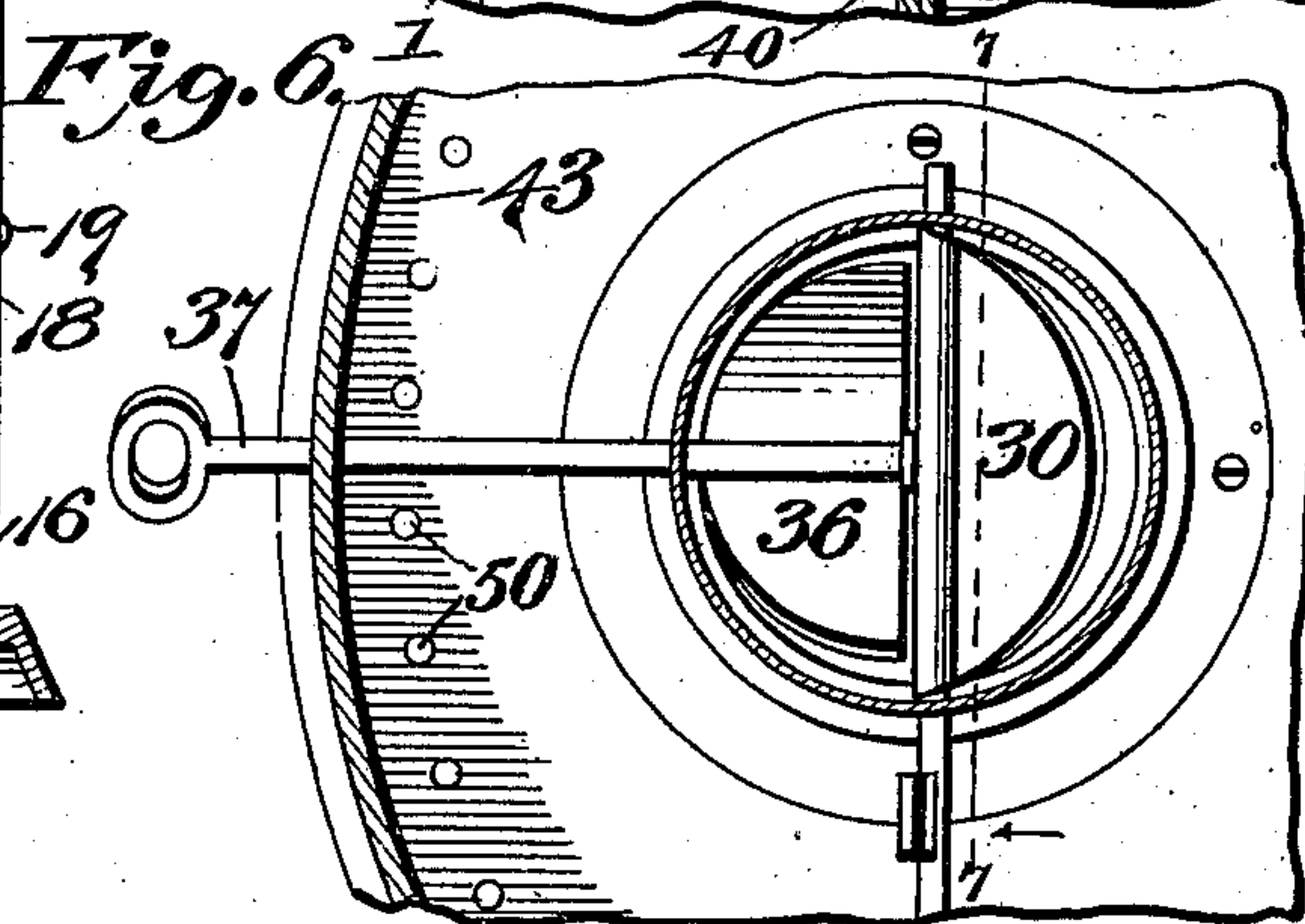
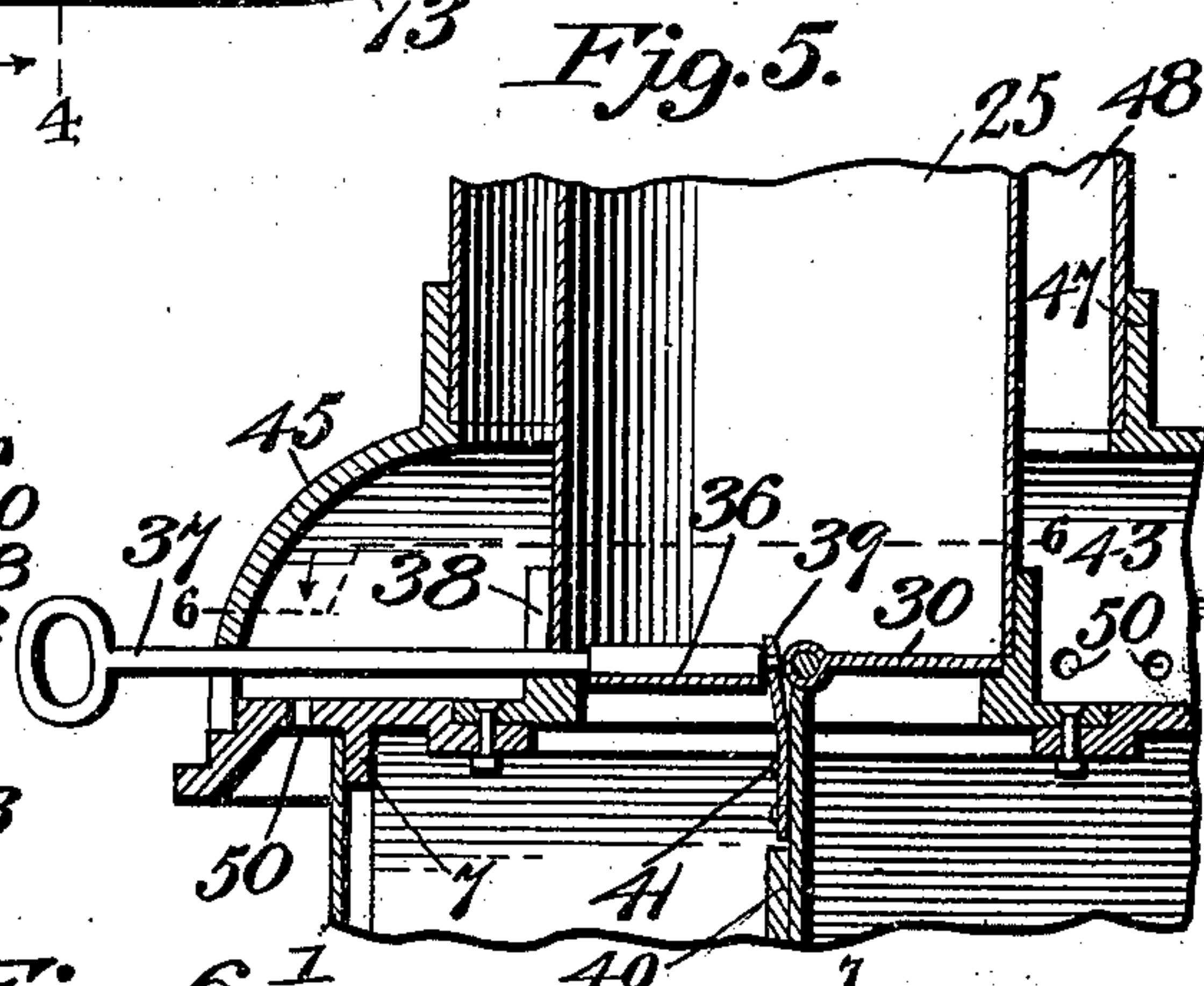
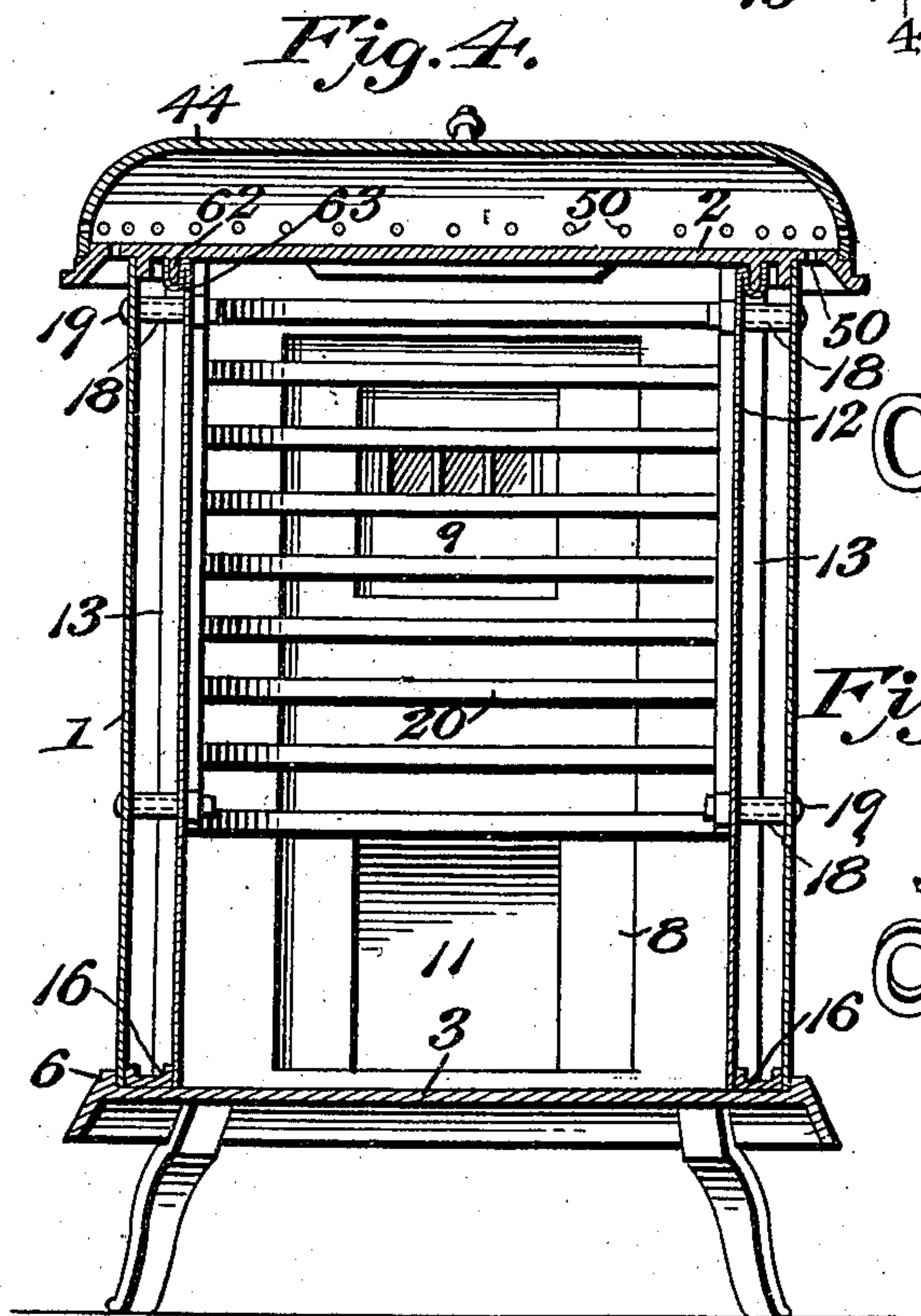
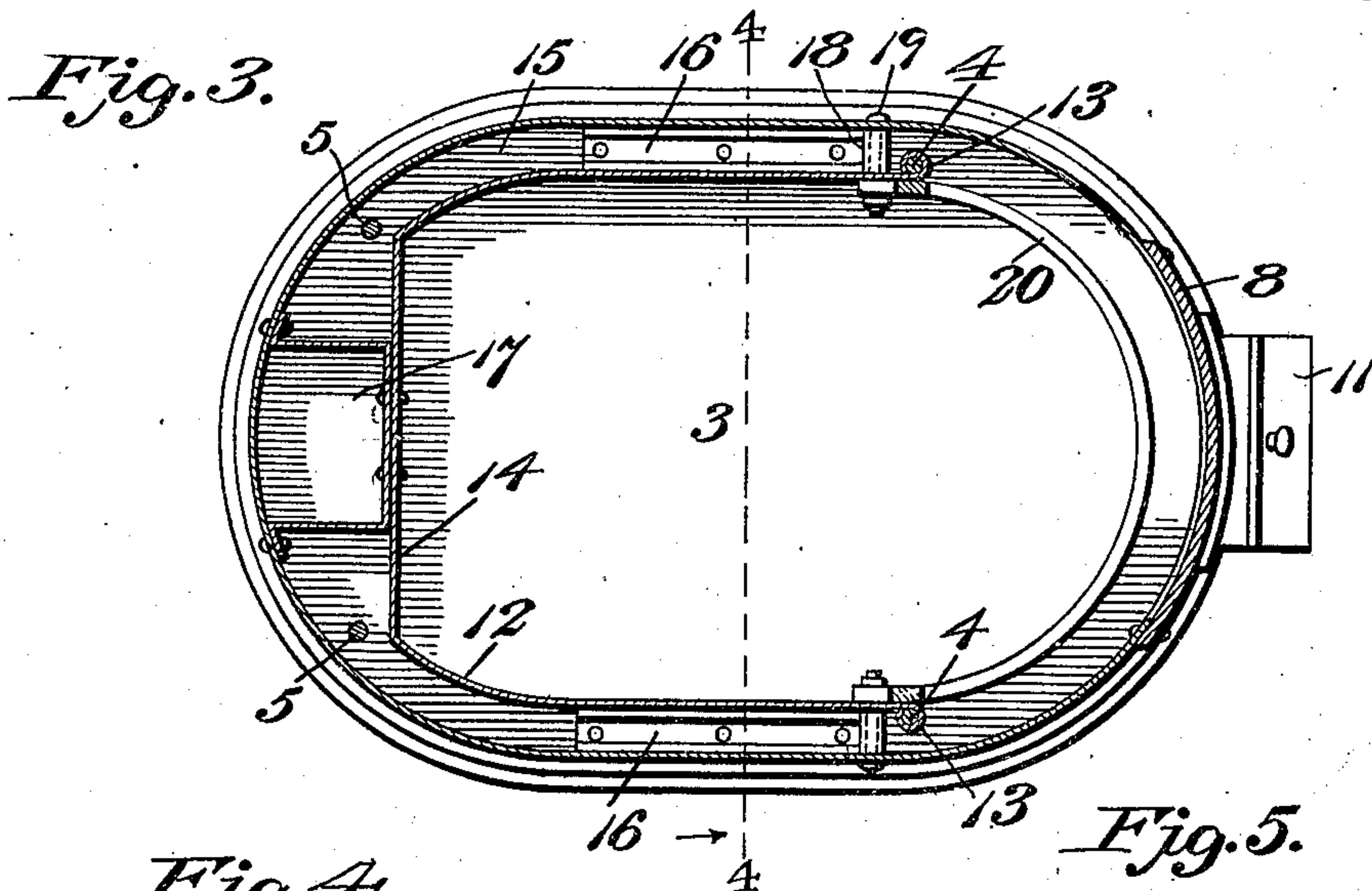
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(No Model.)

3 Sheets—Sheet 2.



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No. 687,166.

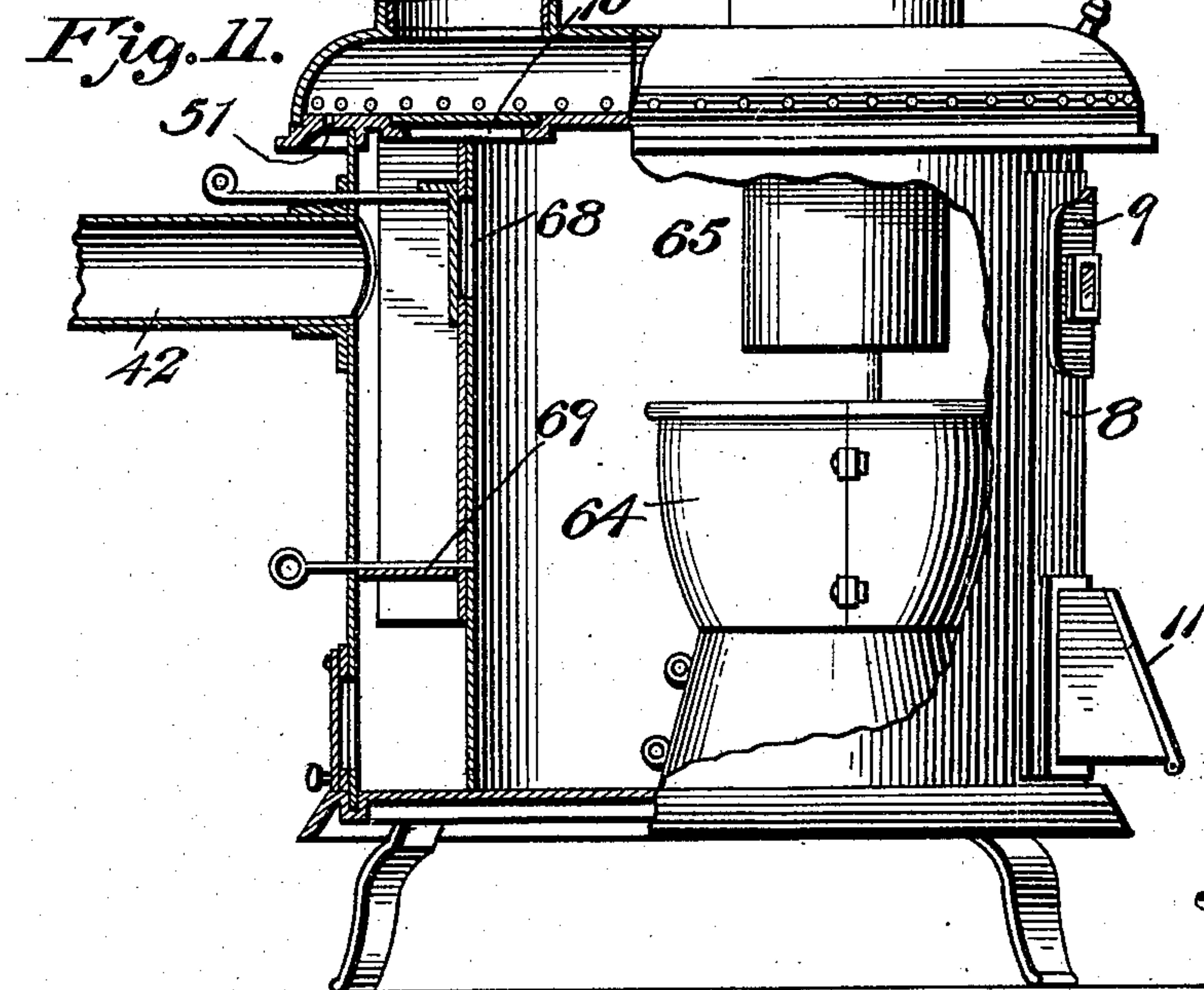
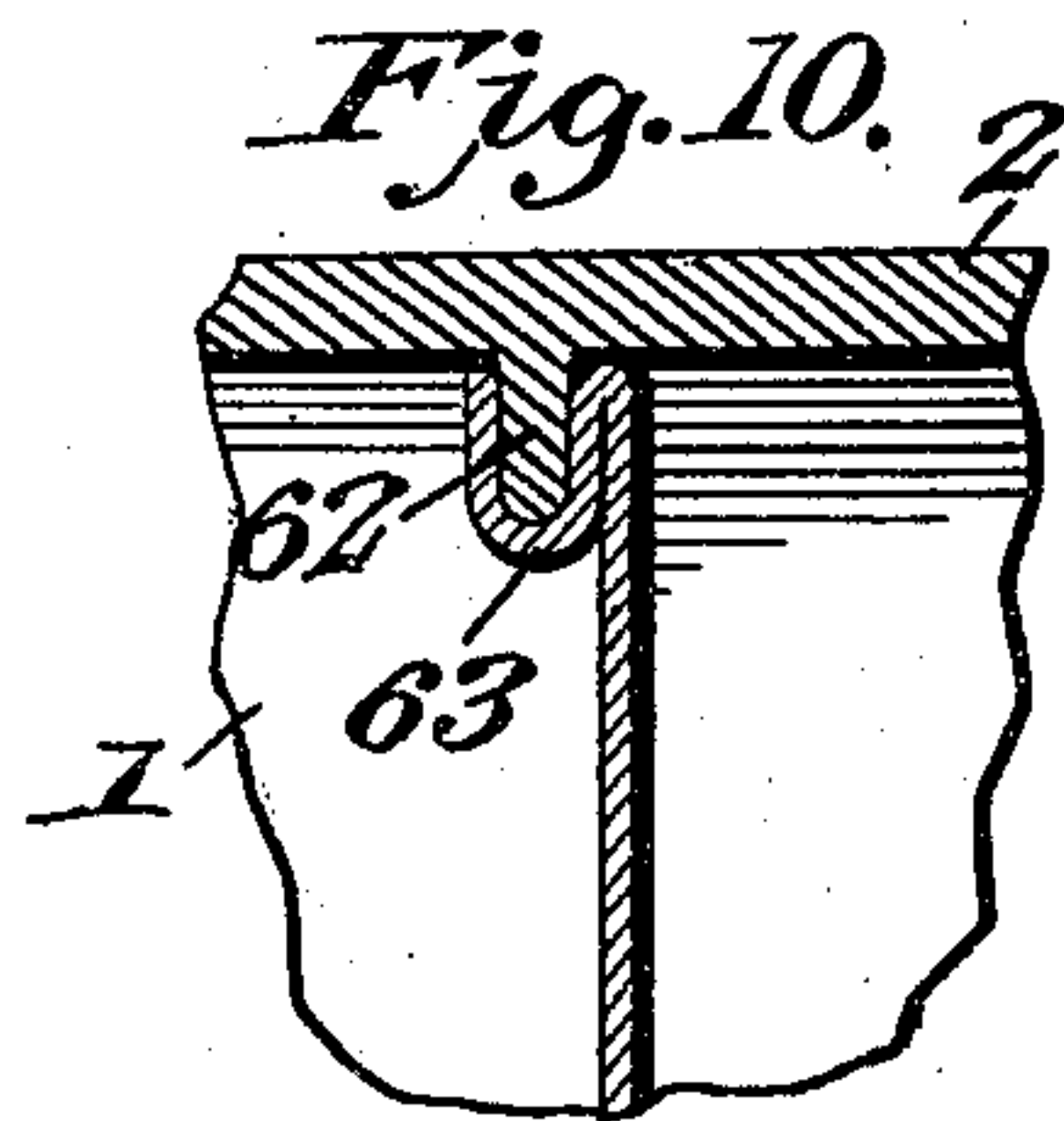
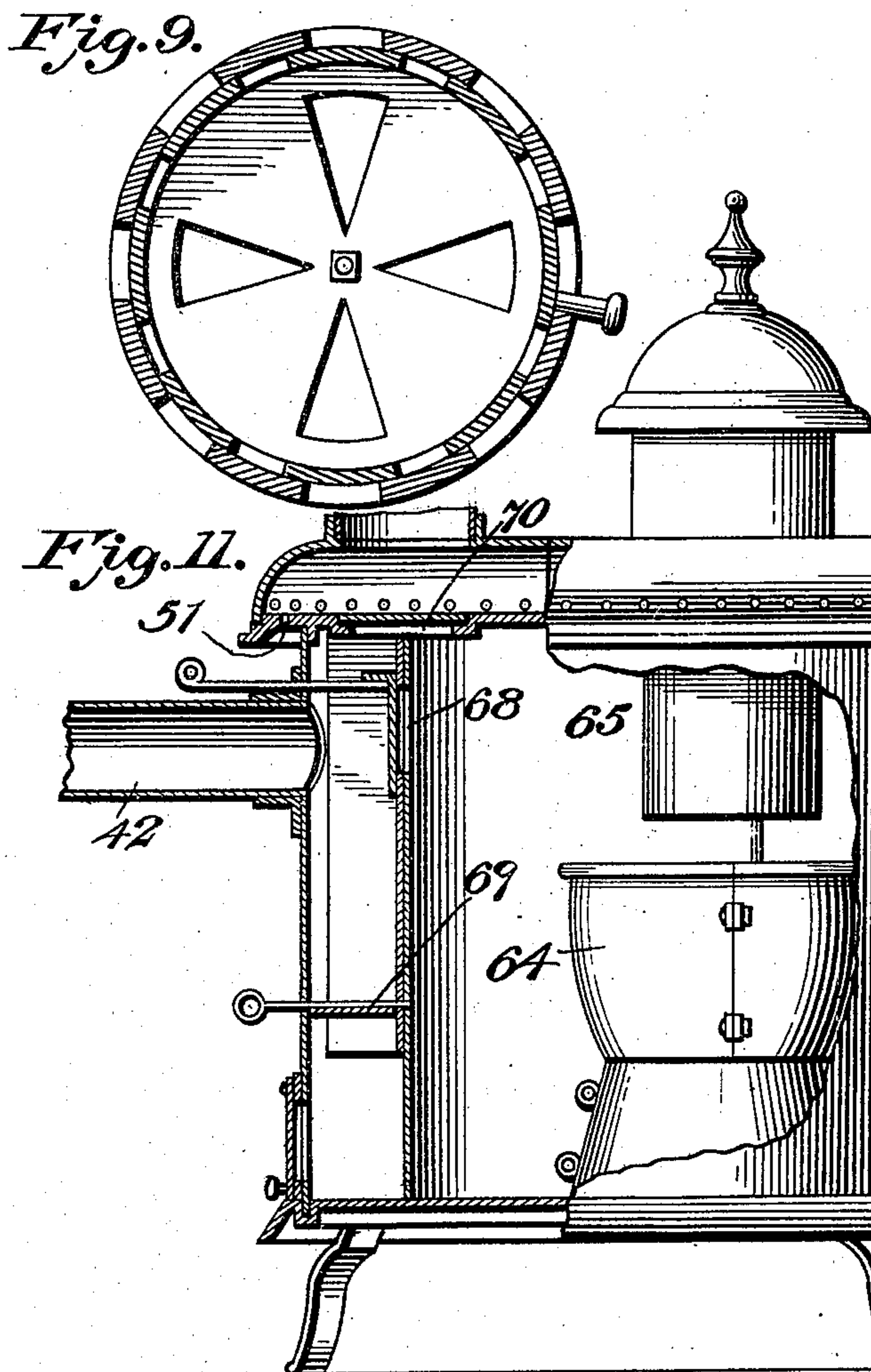
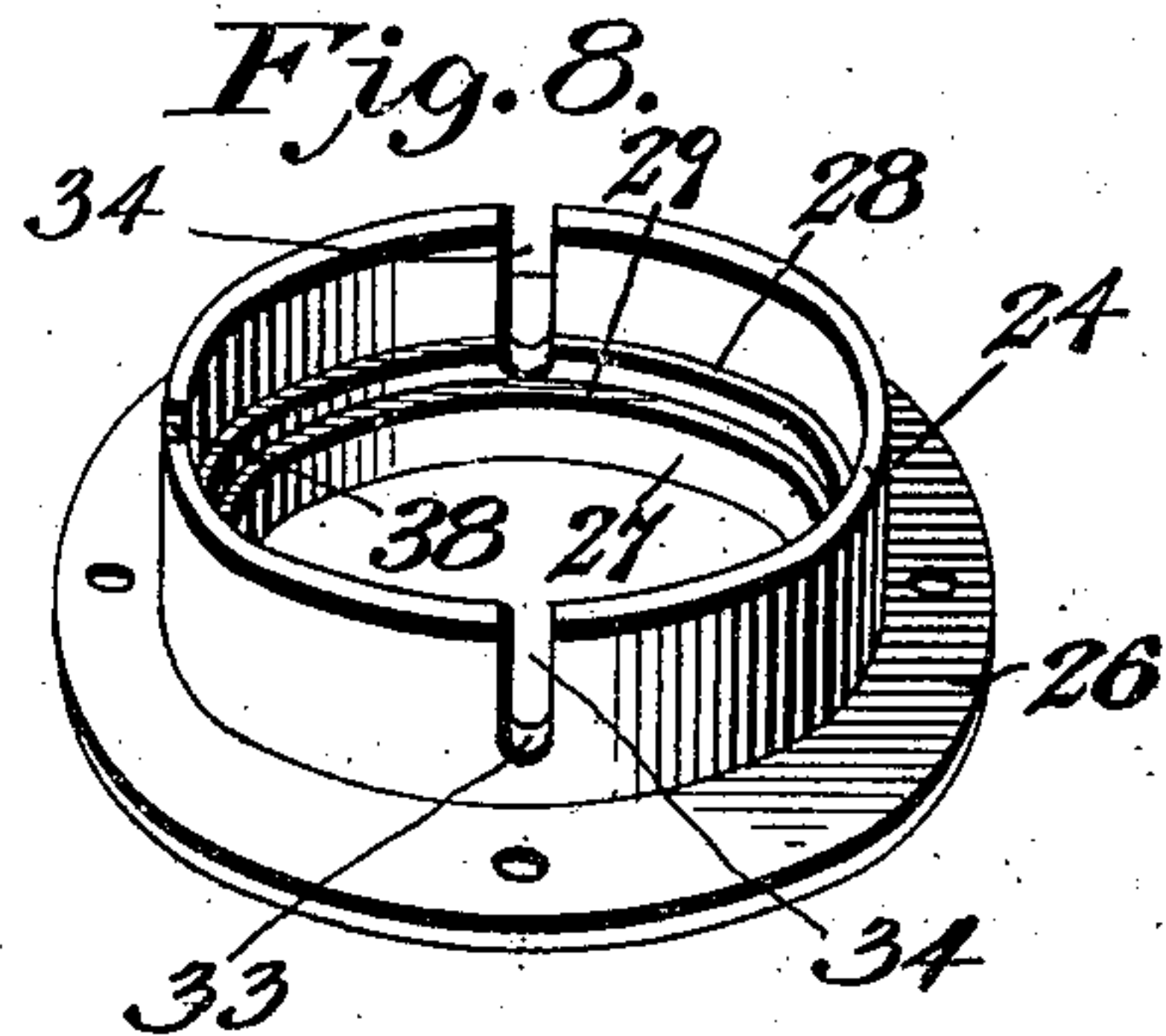
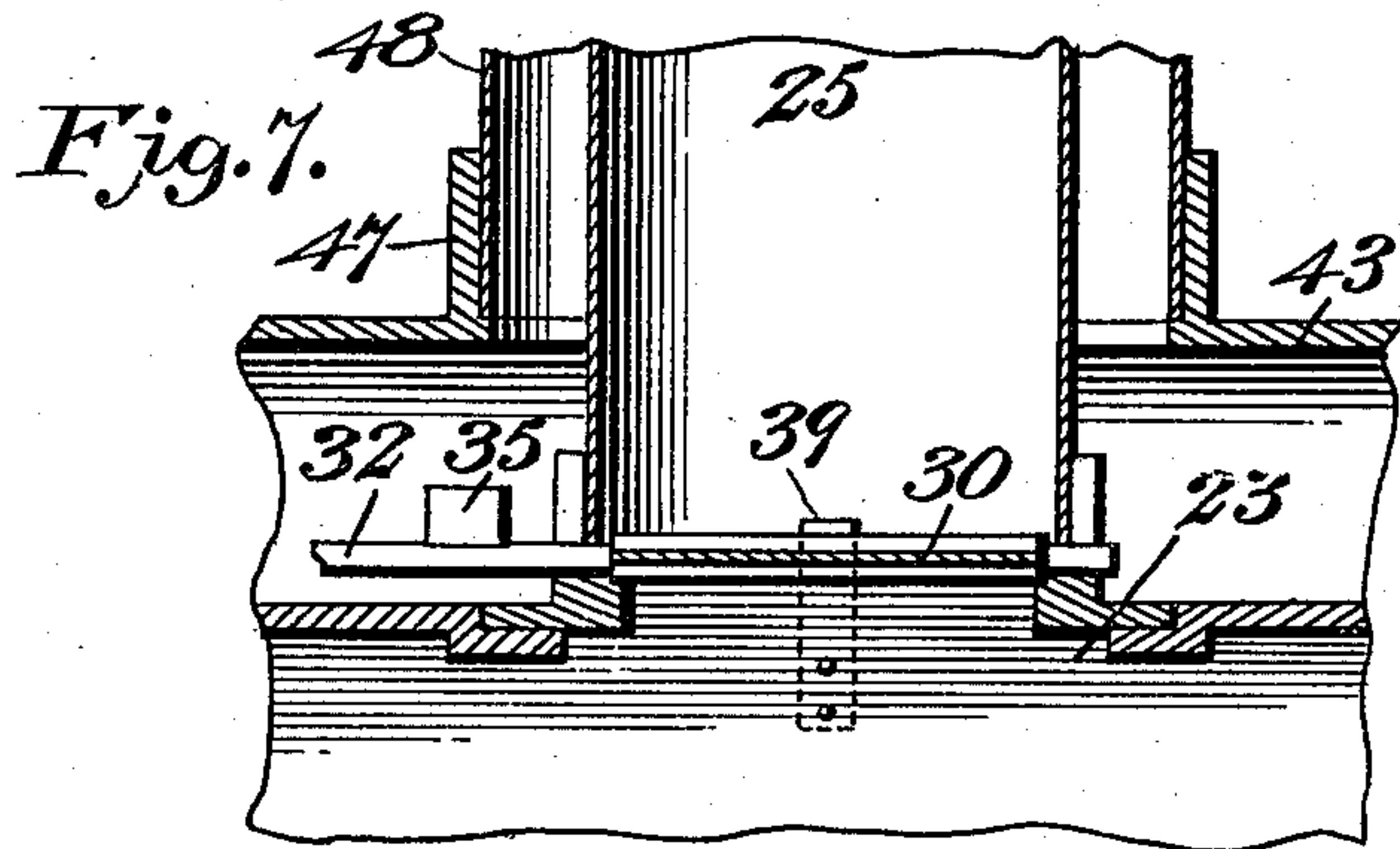
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

JOHN L. RITTER, OF SHENANDOAH, VIRGINIA, ASSIGNOR OF TWO-THIRDS  
TO JOHN T. RODDEY, OF NEW YORK, N. Y.

## STOVE.

SPECIFICATION forming part of Letters Patent No. 687,166, dated November 19, 1901.

Application filed December 21, 1900. Serial No. 40,659. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN L. RITTER, a citizen of the United States, residing at Shenandoah, in the county of Page and State of Virginia, have invented a new and useful Stove, of which the following is a specification.

My present invention relates to improvements in combination heating-stoves of that class which are adapted to be employed with equal facility for the consumption of various kinds of fuel—as, for instance, wood, coal, &c.

The objects of the invention are to insure an effective circulation of the products of combustion in direct contact with the entire interior surface of the exterior wall of the stove or to effect a direct escape of the products of combustion from the fire-box or combustion-chamber to a smoke-dome extended from the top of the stove into a register-flue; to provide a heating-drum, extended over the surface of the stove and communicating with the register-flue, so that fresh air may be caused to circulate through the drum and be heated prior to its passage around a smoke-dome and into a register-flue into the lower end of which the drum projects; to improve the construction of the stove for the purpose of facilitating the assembling of its various parts, and to provide a novel arrangement of dampers for controlling the direct and indirect circulation of the products of combustion from the combustion-chamber to the smoke-dome.

To the accomplishment of these objects and others subordinate thereto, all as will hereinafter more fully appear, the preferred embodiment of the invention comprehends the construction and arrangement of parts to be described, illustrated in the accompanying drawings, and defined in the appended claims.

In the drawings, Figure 1 is a perspective view of my stove complete organized for burning wood. Fig. 2 is a vertical longitudinal section through the subject-matter of Fig. 1, the smoke-pipe and dome being shown in elevation. Fig. 3 is a transverse section on the line 3 3 of Fig. 2. Fig. 4 is a sectional view on the line 4 4 of Fig. 3. Fig. 5 is a detail sectional view, on a somewhat-enlarged scale, illustrating the arrangement and mounting of the dampers. Fig. 6 is a sectional view

on the line 6 6 of Fig. 5. Fig. 7 is a sectional view on the line 7 7 of Fig. 6. Fig. 8 is a detail view of the base-ring of the smoke-dome, illustrating the manner in which said ring is formed with seats for the damper-shafts. Fig. 9 is a sectional view, on a somewhat-enlarged scale, on the line 9 9 of Fig. 2. Fig. 10 is a detail sectional view illustrating the connection between the inner shell and the top plate of the stove; and Fig. 11 is a sectional view, partly in elevation, of my stove equipped for burning coal or other fuel of similar nature and illustrating a somewhat modified arrangement of smoke-pipe and dampers.

Referring to the numerals employed to designate corresponding parts throughout the views, 1 indicates the outer shell of my stove, having any contour which may suit individual tastes, but preferably of substantially elliptical form in cross-section, as shown, and against the opposite ends of which are drawn the top plate 2 and the base-plate 3, as by means of assembling-bolts 4 and 5. The base-plate 3 is supported, as usual, upon legs, as shown, and is provided around its outer edge with a flange 6, disposed against the outer face of the shell 1, the upper edge of which latter is seated in like manner against a pendent flange 7, formed upon the under face of the plate 2 for the purpose of maintaining the proper relative positions of the plate and shell in the usual manner. At the front of the stove the shell 1 is divided, for a purpose to be hereinafter explained, and the opening thus formed is covered by a removable shell-section or cover-plate 8, secured by bolts or other suitable means, as shown, and provided with the usual door 9, ash-chute 10, and draft-door 11. Within the outer shell 1 is a second or inner shell 12 in spaced relation to the shell 1 and secured—as, for instance, by having its front ends or edges bent around the assembling-bolts 4, as indicated at 13. The side walls of the inner shell 12 extend substantially parallel with the side walls of the outer shell 1, but are connected by a back wall 14, extending straight across the stove between the side walls of the inner shell for the purpose of widening at the back of the stove the hot-air or smoke space 15 defined between the shells.



In order to maintain the shells in their proper relations, spacing-blocks 16 are preferably bolted upon the base-plate 3 between the shells at the opposite sides of the stove, and the shells are further braced by the smoke-flue 17 and spacing-sleeves 18, the latter of which encircle a pair of bolts 19, passed through the inner and outer shells just behind the assembling bolts or rods 4. The bolts 19 are employed to secure a grated fuel-guard 20, curved around in substantially concentric relation with the front of the stove and extending between the front ends of inner shell. The fuel-guard 20 extends from the top of the stove to a plane somewhat above the base-plate 3, and its function is to support sticks of wood or other fuel to prevent the latter from resting directly against the outer shell.

At the front of the stove the plate 2 is provided with the usual flanged feed-opening 21, closed by a lid 22, and at the back of the stove said plate is provided with a flanged opening 23, bisected by the back wall 14 of the inner shell and fitted with the base-ring 24 of the smoke-dome 25. The ring 24 is provided with an exterior bolt-flange 26, by means of which it is secured to the top plate, and with a stepped internal flange 27, the upper ledge 28 of which supports the upstanding smoke-dome 25, encircled by the ring 24, and the lower ledge 29 of which constitutes a stop-flange for the direct damper 30. The damper 30 serves to close that portion of the opening 23 at the inner side of the wall 14, and it is designated the "direct" damper, for the reason that it controls the direct communication between the dome 25 and the fire or combustion chamber 31 of the stove. The damper 30 is mounted upon the direct-damper shaft 32, rotatable in suitable bearings or seats 33, formed in the base-ring 24 by forming open-ended slots 34 therein at diametrically opposite points. The damper 30 is designed to be swung upward from its horizontal plane in order to establish the direct communication between the chamber 31 and the dome 25, and its upward movement is limited by a stop-lug 35, extending laterally from the shaft 32 and designed to abut against the top plate of the stove, the movement of the damper being limited in the opposite direction by the ledge 29 of the flange 27, upon which said damper rests when closed. (See Fig. 5.) The side of the opening 23 opposite the damper 30 is controlled by an indirect damper 36, which is of semicircular form, like the damper 30, but instead of being provided with a shaft along its edge is provided with an indirect-damper shaft 37, disposed at right angles to the shaft 32. The shaft 37 has a bearing in one side of the ring 24 by the provision therein of an open-ended slot 38; but at its inner extremity it is journaled in the upper free end of a spring 39, secured to the front wall 40 of the back flue 17—as, for instance, by bolts 41, which serve additionally to secure the back flue to the

back wall 14 of the inner shell. The damper-spring 39 performs a dual function, inasmuch as it constitutes a bearing and support for the inner end of the shaft 37 and also bears against the edge of the damper 36 and serves to retain it in any position to which it may be adjusted.

It has been stated that the smoke-dome 25 is seated within the base-ring 24, and by reference to Fig. 8 of the drawings it will be seen that when said dome is seated upon the ledge 28 of the flange 27 it serves to retain the damper-shafts 31 and 37 within their seats without the necessity for separate securing means. 42 indicates the stove or smoke pipe extending laterally from the dome 25 adjacent to its upper end and designed to carry off the products of combustion.

The construction thus far described constitutes a complete embodiment of my invention in its broadest aspect, since it embraces a completely operative wood-stove possessing a number of novel features; but before proceeding with the description of the operation of the device I will proceed to make plain in what manner the stove is not only employed for heating the apartment in which it is placed, but also causes hot air to circulate through a register-flue for the heating of other compartments.

The heating-drum (indicated by the numeral 43) is imposed above the top plate 2, which latter constitutes the bottom of the drum. The upper wall or drum proper is an inverted-saucer-shaped plate 44 of sectional form, one section 45 being fixed upon the plate 2 and the other section 46 being hinged to the fixed section and designed to be swung back from over the plate 2 whenever it is desired to remove the lid 22, covering the feed-opening. The fixed section of the heating-drum is provided with an upstanding collar 47, encircling the lower end of the register-flue 48, into the lower end of which the smoke-dome 25 extends and which is provided at suitable points removed from the stove with one or more hot-air registers 49. The air within the drum 43, being heated to a high degree by contact with the plate 2, is caused to ascend through the flue 48, thereby inducing a circulation of outside air into the drum through suitable ingress-apertures 50, formed in the side walls of the drum, and similar apertures 51 piercing the projecting edge of the plate 2 beyond the outer shell 1.

The construction of the registers may be varied within wide limits; but I prefer to mount within the flue 48 a transverse partition or diaphragm 52, suitably sustained—as, for instance, by being formed integral with a coupling-ring 53, disposed intermediate of two sections of the flue. The diaphragm or partition 52 is provided with a series of openings 54 for registration with similar openings 55 of the register proper, 56. The register proper, or the valve thereof, is mounted for free rotation upon a vertical axis through the



medium of a pivot-bolt 57, which effects its connection with the partition 52. The valve comprises an annular flange 58, provided with apertures 59, disposed for registration with similar apertures 60 in the wall of the flue 48—as, for instance, in the coupling-ring constituting the retaining member of the register. The valve is designed in this instance to be rotated by a projecting handle 61. By reference to Figs. 2 and 9 it will be observed that the openings 54 and 55 and the openings 59 and 60 are so relatively arranged that when one pair of said openings are registered the others will of necessity be disposed out of coincidence, so that in one position of the register the air passing through the flue will be prevented from escaping therefrom, but will be permitted to pass the register for delivery at a remote point, and that in like manner when the register is in its opposite position the air will be prevented from passing the register, but will be permitted to escape into the compartment in which the register is located.

In Fig. 10 I have illustrated a simple and convenient means for rigidly connecting the inner shell to the top plate, said means consisting in forming a pendent flange 62 on the plate 2 for engagement with a substantially U-shaped flange 63, formed by turning over and recurving the upper edge of the shell.

The operation of the stove is as follows: The front section of the heating-drum having been thrown back and the lid removed, sticks of wood are passed into the combustion-chamber 31, their upper ends resting against the fuel-guard 20. The lid and drum-section are now replaced and the fire is lighted. Assuming that the direct damper 30 is open, the products of combustion will pass directly from the interior of the stove to the smoke-drum 25 and will thus escape through the stovepipe 42. As soon as the top plate 2 of the stove is heated the cool pure outer air, free from vitiation by the products of combustion, will be drawn into the heating-drum 43 and will pass into the register-flue 48. As the air enters the register-flue it circulates around the smoke-dome 25 and after being thoroughly heated it ascends through the flue 48 and is liberated in any desired compartment by means of the registers. After the fire is well started the consumption of fuel is economized by closing the direct damper 30 and opening the indirect damper 36. The direct escape of the products of combustion being thus cut off the hot air and gases from the combustion-chamber will pass around the front ends of the inner shell into the hot-air space or smoke-chamber 15. This circulation of the heated products will bring them in direct contact with the outer shell of the stove, so that the full heating effect thereof may be utilized to permit the effective operation of the stove with a comparatively slight consumption of fuel. As the heated products pass from the combustion-chamber to the air-

space between the shells they will rise to the top of the stove and will heat the top plate 2 to a high degree for the purpose of effecting a powerful circulation of warm air through the heating-drum for delivery at the registers. As the temperature of these gases or products of combustion is lowered by radiation or by the absorption of heat they will gravitate toward the bottom of the stove and will finally escape into the lower end of the back flue 17, located just above the base 3, and will pass through the back flue and into the smoke-dome 25 for delivery to the stovepipe 42. Thus although a very small fire is maintained within the stove the heated products of combustion will be compelled to circulate in contact with the entire outer wall of the stove, so as to render the latter highly efficient with a comparatively slight consumption of fuel. On the other hand, it will be observed that when a direct escape is provided for the products of combustion the air-chamber 15 constitutes a jacket, which prevents the radiation of the heat from the wall of the stove, and thereby prevents the dissipation of the caloric and economizes the consumption of fuel necessary to induce a strong circulation through the heating-drum and register-flue.

I have premised that my stove is applicable for the consumption of coal and similar fuel as well as for the use of wood. I therefore contemplate the removal of the fuel-guard 20 and the substitution therefor of a fire-pot and ash-pit 64, constructed of bolted sections, as shown in Fig. 11, and the feed-chute 65, as also shown in said figure. In order to provide for the equipment of the stove with the feed-chute 55, the top wall of the drum 43 is formed with an aperture 66, covered by a cap 67, which when the chute is employed is intended to fit over the upper end thereof, as shown in Fig. 11. I have stated heretofore that the front of the stove is closed by a removable shell-section 8, and the utility of this section will now be apparent, since it will be seen that provision is thus made for inserting or removing the sectional fire-pot and ash-pit, as it is desired to employ the stove for the consumption of coal or to reorganize it for use as a wood-stove. In Fig. 11 I have also shown a modification of the damper arrangement, said modification consisting in connecting the stovepipe 42 directly with the outer shell, so that there is a direct communication between the back flue 17 and said pipe. The direct damper in this form of the invention covers an opening 68 in the wall 14, opposite the inner end of the stovepipe, and the indirect damper 69 is located in the back flue adjacent to its lower end. When this modification of the structure is adopted, the opening 23 is closed by a plate 70, and as a matter of course the smoke-dome 25 is eliminated.

From the foregoing it will be observed that I have produced a stove of simple, effective,



and inexpensive construction adapted for ready conversion for use as either a wood or coal stove, equipped with means for securing a direct or circuitous circulation of the products of combustion and means for warming and circulating pure air unvitiated by the products of combustion, and designed for the heating of compartments other than that in which the stove is located; but while the present embodiment of my invention is believed at this time to be preferable I desire to reserve to myself the right to effect such changes, modifications, and variations as may be suggested by experience and experiment, so long as they are properly embraced within the scope of the protection prayed.

What I claim is—

1. In a stove, the combination with top and bottom plates, an intermediate outer shell and assembling-bolts retaining the top and bottom plates in fixed relation, of an inner shell in spaced relation to the outer shell and secured at its front edges to the assembling-bolts, a smoke-pipe communicating with the interior of the stove at the back thereof, and means for effecting the direct circulation of the products of combustion from the combustion-chamber to the smoke-pipe or for effecting the indirect circulation of said products by way of the space between the shells.

2. In a stove, the combination with top and bottom plates, an outer shell, assembling-bolts retaining the top and bottom plates in fixed relation and an inner shell secured at its front edges to the assembling-bolts, of a back flue located at the back of the stove between the shells and having its lower end open for the ingress of products of combustion, a smoke-pipe leading from the back flue of the stove adjacent to its upper end, a direct damper controlling the egress of the products of combustion from the combustion-chamber at the back thereof, an indirect damper controlling the passage of the products through the back flue, and means for supplying fuel to the combustion-chamber through the top of the stove.

3. In a stove, the combination with the top and bottom plates, an outer shell divided at its front, assembling-bolts retaining the top and bottom plates, and an inner shell in spaced relation to the outer shell and secured at its front edges to the assembling-bolts, of a back flue disposed vertically between the shells and opening at its lower end adjacent to the bottom plate, a smoke-pipe in communication with the back flue at or adjacent to the upper end of the latter, a direct damper disposed adjacent to the upper end of the back flue and controlling the direct escape from the combustion-chamber of the products of combustion, an indirect damper controlling the passage of the products of combustion through the back flue in a longitudinal direction, means for sustaining the fuel within the combustion-chamber, and means for effect-

ing the feeding of the fuel through the top plate of the stove.

4. The combination with a stove comprising inner and outer shells defining a combustion-chamber and a smoke-chamber extended around the back of the stove and communicating with the combustion-chamber at the front of the stove, of a register-flue extending above the stove, a smoke-dome extending into the flue and designed for communication with either the smoke-chamber or the combustion-chamber, and dampers controlling such communication.

5. The combination with a stove comprising inner and outer shells defining a combustion-chamber and a smoke-chamber extended around the back of the stove and communicating with the combustion-chamber at the front of the stove, a register-flue disposed above the stove, a smoke-dome extended into the flue and disposed to receive the products of combustion from either the combustion-chamber or smoke-chamber as desired, dampers controlling such communication, and a smoke-pipe extending laterally from the smoke-dome.

6. In a stove, the combination with an outer shell, of an inner shell entirely open at the front and in spaced relation to the outer shell to define an intermediate smoke-chamber, a back flue disposed within said chamber at the back of the stove and having its lower open end located in proximity to the bottom of the stove for the ingress of products of combustion, a smoke-dome rising above the stove and designed for communication with either the back flue or the combustion-chamber defined within the inner shell, direct and indirect dampers controlling the communication between the smoke-dome and the combustion-chamber and back flue, respectively, and a smoke-pipe extending from the smoke-dome.

7. The combination with a stove comprising inner and outer shells defining a combustion-chamber and a smoke-chamber extended around the back of the stove and communicating with the combustion-chamber at the front of the stove, of a back flue communicating with the smoke-chamber, a heating-drum, a register-flue communicating with said drum, a smoke-dome extending through the drum and into the register-flue, and means comprising two independent dampers, one controlling the direct circulation of the products of combustion from the combustion-chamber to the dome, and the other controlling the indirect circulation of said products by way of the smoke-chamber and back flue.

8. In a stove, the combination with top and bottom plates, and an intermediate outer shell comprising a movable shell-section located at the front of the stove, of an inner shell in spaced relation to the outer shell and open at its front, a removable fuel-guard extending across the open front of the inner shell, and



a lid closing a feed-opening in the top plate of the stove adjacent to the front thereof.

9. The combination with a stove comprising inner and outer shells defining a combustion-chamber and a smoke-chamber extended around the back of the stove and communicating with the combustion-chamber at the front of the stove, of a back flue communicating with the smoke-chamber, a heating-drum located above the stove, a smoke-dome upstanding from the stove and extending through the heating-drum, a register-flue communicating with the heating-drum and disposed to receive the smoke dome, a smoke-pipe extending laterally from the smoke-dome, and two independent dampers located at the base of the smoke-dome and designed respectively to control the direct and indirect circulation of the products of combustion from the combustion-chamber to the dome.

10. In a stove, the combination with inner and outer shells arranged in spaced relation, the inner shell having its end bent to form vertically-disposed tubular portions and having its upper edge recurved, top and bottom plates clamped against the opposite ends of the inner and outer shells, said top plate being provided with a pendent flange set in the recurved upper edge of the inner shell, and assembling-bolts passed through the top and bottom plates and through the tubular end

portions of the inner shell, said bolts serving to draw the top and bottom plates into rigid engagement with the inner and outer shells, and to rigidly retain the ends of the inner shells in their proper relative positions.

11. In a stove, the combination with a top plate provided with an opening, a base-ring supported above said opening, and provided with an exterior bolt-flange by means of which it is secured to the said top plate and with a stepped internal flange, and a smoke-dome carried by said ring and engaging one of the steps, of a damper supported by the base-ring and retained in place by the dome, the damper to engage the other step thereby to limit its range of movement.

12. The combination with a smoke-dome, of a base-ring provided with seats and with internal steps one of which is engaged by the dome, a damper-shaft located within the seats and retained in place by the dome, and a damper carried by the damper-shaft, and having its range of movement limited by the other step.

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

JOHN L. RITTER.

Witnesses:

JOHN H. SIGGERS,  
FLORENCE E. WALTER.