

J. J. WEST.

FURNACE.

APPLICATION FILED OCT. 6, 1910.

Patented Apr. 25, 1911.

2 SHEETS-SHEET 1.

990,466.

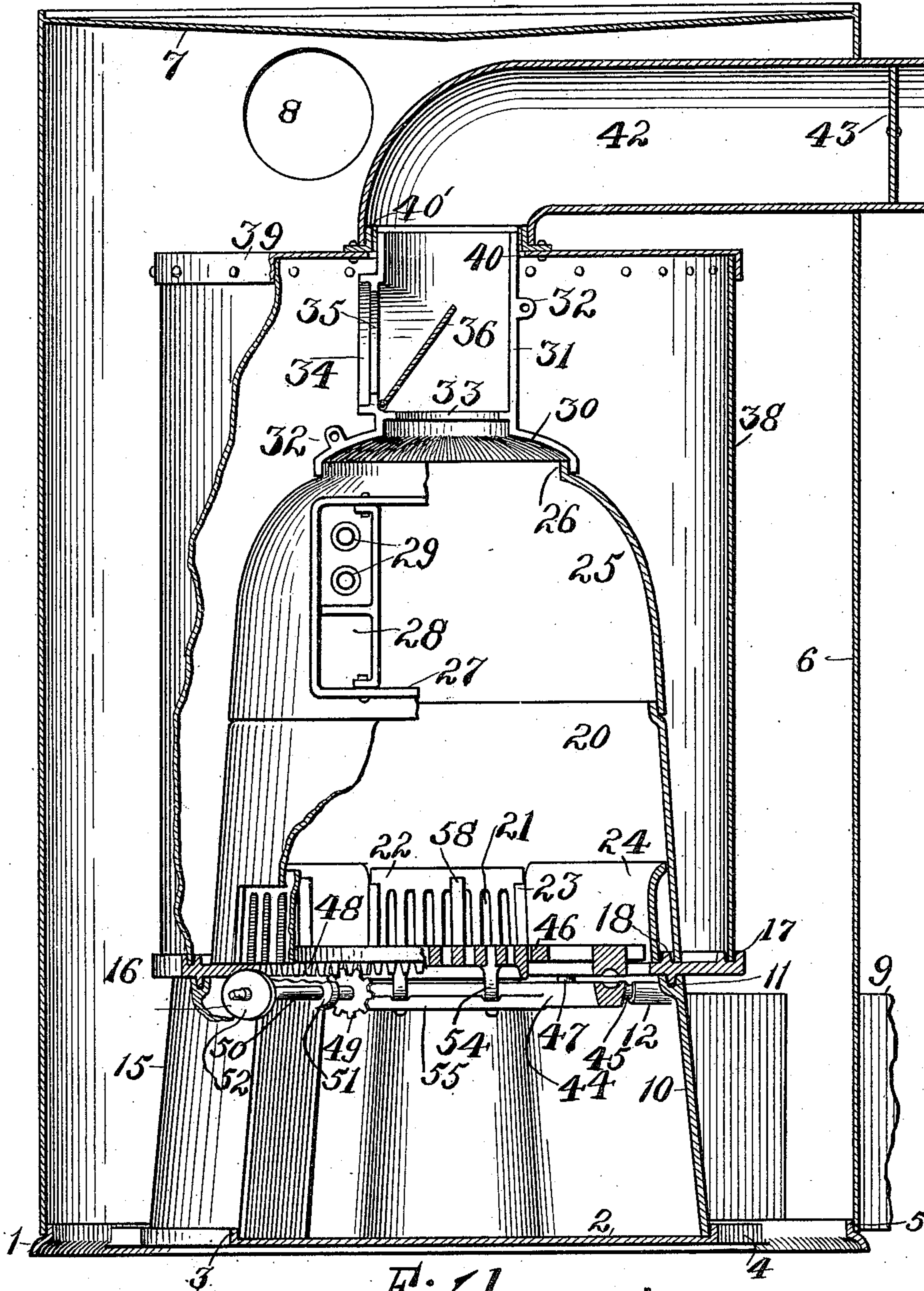


Fig. 1

Witnesses:

Austin B. Nauscom  
Glenara Fox

INVENTOR-

J. J. West,

By C. E. Humphrey  
ATTORNEY.

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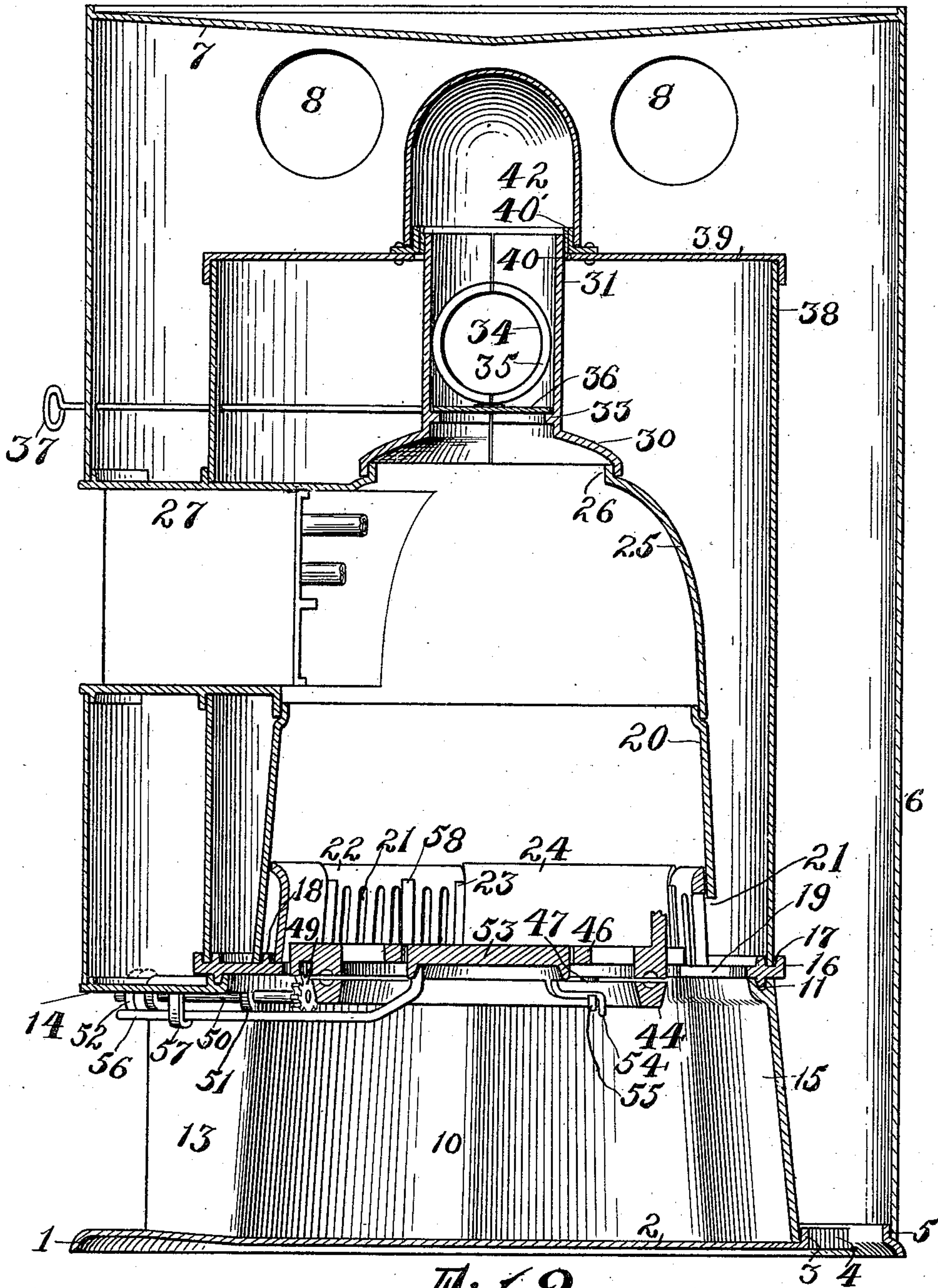


Fig. 2

Witnesses:

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# UNITED STATES PATENT OFFICE.

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## FURNACE.

990,466.

Specification of Letters Patent.

Patented Apr. 25, 1911.

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*To all whom it may concern:*

Be it known that I, JAMES J. WEST, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Furnaces, of which the following is a specification.

The present invention relates to new and useful improvements in heating furnaces and the object thereof is to construct a furnace provided with the usual combustion chamber from which extends a direct passage for the products of combustion to the offtake flue, said combustion chamber being inclosed by a heating drum spaced from said combustion chamber to provide a heating space to which the products of combustion may pass, either from the combustion chamber proper, or from the ash-pit of the device, to constitute the space intervening between the combustion chamber and the heating drum, a portion of the indirect flue-system of the furnace.

A further object of the invention is to provide the space inclosed between the combustion chamber and the heating drum with an outlet communicating with the direct passage leading from the combustion chamber, so that when the passage from the combustion chamber is closed, the products of combustion may pass from the combustion chamber downwardly and laterally to the heating space and from thence outwardly by a circuitous path to the offtake flue of the furnace to constitute the drum an additional heating surface or radiator when the closure means for the direct passage from the combustion chamber is closed, thereby securing an indirect draft for the products of combustion for increasing the heating qualities thereof.

The device also embodies means for closing the outlet passage of the heating space within the drum when the direct passage from the combustion chamber to the offtake flue is open, such as in starting a fire.

A still further object accomplished by this device is to provide the lateral walls of the combustion chamber with means for permitting the escape of the products of combustion from the combustion chamber to the space inclosed by the drum, which latter is kept free from being clogged by ashes and

cinders by means carried by the grate of the device.

Another object of the invention is to provide the floor of the drum with one or more openings leading to the ash-pit by which the ashes and other debris escaping laterally from the combustion chamber may pass downwardly to the ash-pit of the device and at the same time all smoke and gaseous matter may arise through said openings and pass upwardly through the space inclosed by said drum.

A final object of the invention is to provide simple and efficient means for changing from a direct draft, where the products of combustion pass directly from the combustion chamber, to an indirect draft, where the products of combustion travel in a circuitous path to the offtake flue, said means being so arranged as to alternately permit either the use of the direct or the indirect draft and capable of being manipulated from a position outside of the furnace casing of the device.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts constituting the invention to be hereinafter specifically described and illustrated in the accompanying drawings which form a part hereof wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, in which similar reference numerals indicate like parts in the different figures: Figure 1 is a view in side elevation of a furnace constructed in accordance with this invention, portions thereof being broken away and shown in section; and, Fig. 2 is a vertical, central, longitudinal, sectional view of the device shown in Fig. 1.

Referring to the drawings in detail, 1 is a base ring of common construction provided with a pan 2 surrounded by a marginal flange 3 for a purpose to be later described. Extending outwardly from the pan 2 are a plurality of arms 4 to sustain an inclosing upwardly-extending marginal flange 5. Mounted on the base ring 1 and retained in



position by means of the marginal flange 5 is the furnace casing 6 provided at its upper end with a top 7 below which extend the exit pipes 8 for the heated air. At some point near the lower portion of the casing 6 is an inlet pipe 9 by which fresh air is supplied to the interior of the casing.

Mounted on the pan 2 of the base ring 1 and held in position by means of the marginal flange 3 is a frusto-conically-formed ash-pit 10 having in its upper edge a seat 11, for a purpose to be stated. The inner face of the ash-pit 10 near the upper portion thereof is provided with three inwardly-projecting semi-circularly-formed keepers 12. The ash-pit 10 is provided with the usual entrance 13 which is customarily closed by a door through which the ashes, etc., are removed, and the upper portion of the entrance 13 is closed by means of an upper wall 14. The side walls of the ash-pit 10 are provided at, say for instance, three equidistant points, with laterally-projecting or bulging portions 15 extending from the floor to the upper end thereof, for a purpose to be stated.

Preferably supported by the ash-pit is a ring 16 having a downwardly-projecting annular ridge engaging in the seat 11 in the upper edge of the ash-pit to prevent its dislodgment and further provided in its upper face with an annular seat 17, laterally-spaced from which is an annular ridge 18 also formed in the upper face of the ring 16. This ring 16 is provided with a plurality, say three, of long, longitudinally-extending notches 19 formed in the inner face thereof and of the same approximate size as the outwardly-bulged or extended portions 15 of the ash-pit, and when being mounted, the ring 16 will be so adjusted that the notches 19 are in vertical alinement with the outwardly-bulged portions 15, so that any matter accumulating on the ring 16 will generally fall through the notches 19 into the body of the ash-pit.

Mounted on the ring 16 is the lower member 20 of the combustion chamber of the device which is preferably frusto-conically-formed and with the lower end thereof having sufficient diameter to lap the annular ridge 18 for maintaining the same against lateral displacement. The lower portion of the lateral wall of the member 20 is preferably provided with, say three, openings 21, usually spaced equidistant from each other and this member 20 is so seated on the ring 16 that the openings will be in alinement with the notches 19 in the ring 16.

To prevent the escape of burning coal or fuel from the openings 21 through the notches 19 in the ash-pit 10, I close each of the openings by means of grates 22 held in position by means of dove-tail-shaped keepers 23 carried on the inner wall of the

member 20, and between the keepers 23 and preferably held in place thereby I place segmental linings 24 the lower edges of which are adapted to lap the inner face of the annular ridge 18.

Mounted on the lower member 20 of the combustion chamber is a second member 25, preferably conoidal in form and having at its upper end a flanged opening 26. The upper member 25 is provided with the usual fuel-pouch 27 closed by a door (not shown) of ordinary construction. At one side of the fuel-pouch 27 there is provided an indirect draft opening 28, closed by a door if desired, and also openings 29 through which hot-air pipes such as those indicated, may enter the furnace. Mounted on the flanged opening 26 of the member 25 is a dome 30 from which extends upwardly an integral tubular member constituting a flue 31. To make the manufacture of the dome 30 and flue 31 more easy, they are made in two pieces and united after manufacture by means of bolts passed through suitably registering ears 32 formed on each half. The tubular member constituting the flue 31, immediately above the dome 30, is provided with an inwardly-projecting flange constituting a seat 33, and the members are further provided with laterally-projecting portions to form a hollow elbow 34 provided with an interiorly-arranged flange constituting a seat 35. Mounted in the flue 31 is a gate or damper 36, so pivoted that when swung in one direction, it will engage the seat 33 and close the exit for the products of combustion from said combustion chamber and simultaneously open the opening in the elbow 34, and when swung into a position to close the opening in the elbow 34, by engaging the seat 35, it permits the passage of the products of combustion from said combustion chamber. The gate or damper 36 is manipulated by means of a handle 37 extending outwardly from the casing 6.

Mounted in the annular seat 17 in the upper face of the ring 16 is a radiator or drum 38 spaced from the outer surface of the combustion chamber to provide a passage for the escape of the products of combustion emerging from the combustion chamber through the openings 21. The drum 38 has a top 39 provided with an aperture 40 therein to receive the upper end of the flue 31, and about this aperture 40 is an upwardly-extending flanged collar 40' which incloses the flue 31 and is adapted to form a telescopic engagement therewith to permit the expansion and contraction of the various members without disturbing the others.

Preferably telescopically-mounted on the flanged collar 40' is the inner end of a smoke pipe 42 the outer end of which projects be-



yond the casing 6 and is provided at any convenient point with an ordinary damper 43 to carry the products of combustion to the chimney.

5 Any form of grate may be employed with the construction of furnace just described, but the one to be now described is the preferred one.

10 Positioned centrally in the upper portion of the ash-pit is a ring 44 the upper face of which is provided with a channel to constitute a ball-race and extending from the outer edge of this ring 44 are three laterally-projecting, integral pins 45 which seat in the 15 members 12 projecting inwardly from the inner face of the ash-pit 10 to constitute means for supporting the ring. Mounted on the ring 44 is an annular grate 46 the under face of which is provided with a semi-circular groove to receive balls 47 positioned in 20 the ball-race in the ring 44 to permit the annular oscillation of the grate itself. The under face of a portion of the grate is provided with annular rack-teeth 48 which are 25 arranged to be engaged by a pinion 49 mounted on a shaft 50 in suitable bearings 51 in one of the sides of the entrance to the ash-pit. The outer end of the shaft 50 is provided with a sheave 52 over which a rope 30 or chain may be passed to permit the alternate rotation of the pinion 49 from an adjoining apartment; or, if this is not desired, a suitable crank-arm or wrench may be applied to the outer end of the shaft 50, which 35 is squared for that purpose, and by rotating this shaft alternately, annular oscillation of the grate is obtained. The central portion of the grate is normally closed by a drop-center 53 pivotally-supported at its rear 40 end by means of a finger 54 which pivots on a cross-bar 55 extending across the ring 44; and the opposite under side of the drop-center 53 is provided with a manipulating lever 56 which is normally held in its upper 45 horizontal position by a keeper 57 from which it may be released to lower the center of the grate to remove the clinkers and ashes.

50 Projecting upwardly from the upper surface of the grate 46 opposite each opening 21 in the member 20 is an agitating pin or post 58 which is adapted to be oscillated annularly in unison with the movement of the grate 46 and to pass and re-pass in the vicinity of the grates 22 for agitating the ashes 55 and clinkers in front of the same for the purpose of cleaning these grates and causing the ashes, etc., to pass downwardly there-through and through the notches 19 in the 60 ring 16 into the outwardly-bulged or extended portions 15 of the ash-pit 10.

65 In starting a fire, the damper 36 is swung to a position to rest against the seat 35, allowing the products of combustion to pass from the combustion chamber directly up-

wardly through the flue to the smoke pipe 42 and thence to the chimney. After the fire has been properly started, the damper 36 is shifted to rest upon the seat 33 and close the direct draft to the furnace, causing the 70 products of combustion to pass from the dome of the combustion chamber downwardly through the openings 21 into the space inclosed by the drum 38 and from thence upwardly into the flue 31 through the 75 lateral opening therein and from thence to the smoke pipe 42. Any smoke or products of combustion from the combustion chamber which are caused to descend by the closing of the direct draft, either pass through 80 the openings 21 or downwardly through a portion of the fuel into the ash-pit, and in the latter instance, the products of combustion escape through the notches 19 in the ring 16 positioned immediately above the 85 enlarged or bulged portions of the ash-pit 10, so that if any smoke accumulates in the ash-pit it will be drawn therefrom through these notches.

I claim:

90 1. A heating stove or furnace comprising a combustion chamber having an exit opening therein and further provided with a lateral opening near the bottom of the wall thereof, a drum surrounding the combustion 95 chamber and communicating therewith through said lateral opening, a smoke pipe leading from the drum, a flue extending from said exit opening to said smoke pipe and provided with an opening communicat- 100 ing with the space between said combustion chamber and said drum and means in said flue when shifted to one position to close the direct draft from said combustion chamber and when shifted to the opposite posi- 105 tion to close the opening communicating with said space to produce a direct draft.

110 2. A heating stove or furnace comprising a combustion chamber having an exit opening therein and further provided with a lateral opening near the bottom of the wall thereof, a drum surrounding the combustion chamber and communicating therewith 115 through said lateral opening, a smoke pipe leading from the drum, a flue extending from said exit opening to said smoke pipe and provided with an opening communicating with the space between said combustion chamber and said drum and means in said 120 flue, which, when shifted to one position is adapted to close the direct draft from said combustion chamber through said drum to said smoke pipe and when shifted to the opposite position to close the opening communicating with said space to produce a di- 125 rect draft from said combustion chamber.

130 3. A heating stove or furnace comprising a combustion chamber having an exit opening therein and further provided with a lateral opening near the bottom of the wall



thereof, a grate, a drum surrounding the combustion chamber and communicating therewith through said lateral opening, a smoke pipe leading from the drum, a flue  
 5 extending from said exhaust opening to said smoke pipe and provided with an opening communicating with the space between said combustion chamber and said drum, means  
 10 in said flue adapted to be shifted alternately to close the direct draft from said combustion chamber and said opening to the interior of said drum and oscillatory means positioned on said grate adjacent to the lateral opening in said combustion chamber for preventing clogging of said opening.

4. A heating stove or furnace comprising an ash-pit, a ring mounted on the upper wall of said ash-pit provided with a notch therein, a combustion chamber mounted on said  
 20 ring having an exit opening therein and further provided with a lateral opening near the bottom of the wall thereof in registering relation with the notch in said ring, a grate, a drum mounted on said ring outside of said  
 25 notch and communicating with said combustion chamber through said lateral opening, a smoke pipe leading from the drum, a flue extending from said exit opening to said smoke pipe and provided with an opening  
 30 communicating with the space inclosed by said drum, means in said flue arranged to be alternately shifted to close the direct draft from said combustion chamber and the opening communicating with the space within  
 35 said drum to produce a direct draft and oscillatory means carried by said grate and positioned opposite to said notch and lateral opening for preventing clogging of the latter to permit the escape of ashes and the like  
 40 through said notch into said ash-pit, said notch permitting the escape of the gaseous products of combustion from said ash-pit through the space inclosed by said drum to said offtake pipe.

45 5. A heating stove or furnace comprising an ash-pit, an annular flange positioned at the top of the wall of said ash-pit and provided with a notch therein, a combustion chamber mounted on said flange having an  
 50 exit opening therein and further provided with a lateral opening near the bottom of the wall thereof arranged in registering relation with the notch in said flange, a grate, a drum mounted on said flange outside of  
 55 said notch communicating with said combustion chamber through said lateral opening,

ing, a smoke pipe leading from the drum, a flue extending from said exit opening to said smoke pipe and provided with an opening communicating with the space inclosed  
 60 by said drum, means in said flue arranged to be alternately shifted to close the direct draft from said combustion chamber and the opening communicating with the space between said drum to produce a direct draft,  
 65 and oscillatory means carried by said grate and positioned opposite said notch and lateral opening for preventing clogging of the latter to permit the escape of ashes and the like through said notch into said ash-pit,  
 70 said notch permitting the escape of the products of combustion from said ash-pit through the space inclosed by said drum to said smoke pipe.

6. A heating stove or furnace comprising  
 75 a combustion chamber having an exit opening therein and further provided with a lateral opening near the bottom of the wall thereof, a drum surrounding the combustion chamber and communicating therewith  
 80 through said lateral opening, a smoke pipe leading from the drum, a flue extending from the exit opening to said smoke pipe and provided with an opening communicating with the space between said combustion  
 85 chamber and said drum and means when moved in one direction to substantially simultaneously close the exit opening in said combustion chamber and open the opening to said flue from said space whereby the  
 90 products of combustion from said combustion chamber are compelled to pass downwardly through said lateral opening into the interior of said drum and from thence upwardly through said flue and into said  
 95 smoke pipe, and when moved in an opposite direction to simultaneously open the exit opening in said combustion chamber and close the opening communicating with said space whereby the products of combustion  
 100 from said drum are prevented from passing to said flue and are permitted ready exit from said combustion chamber to said smoke pipe, substantially as described.

In testimony whereof I have hereunto  
 105 set my hand in presence of two subscribing witnesses.

JAMES J. WEST.

Witnesses:

C. E. HUMPHREY,  
 C. A. HACKETT.