

F. S. LANG.
STOVE.

APPLICATION FILED AUG. 27, 1908.

934,445.

Patented Sept. 21, 1909.

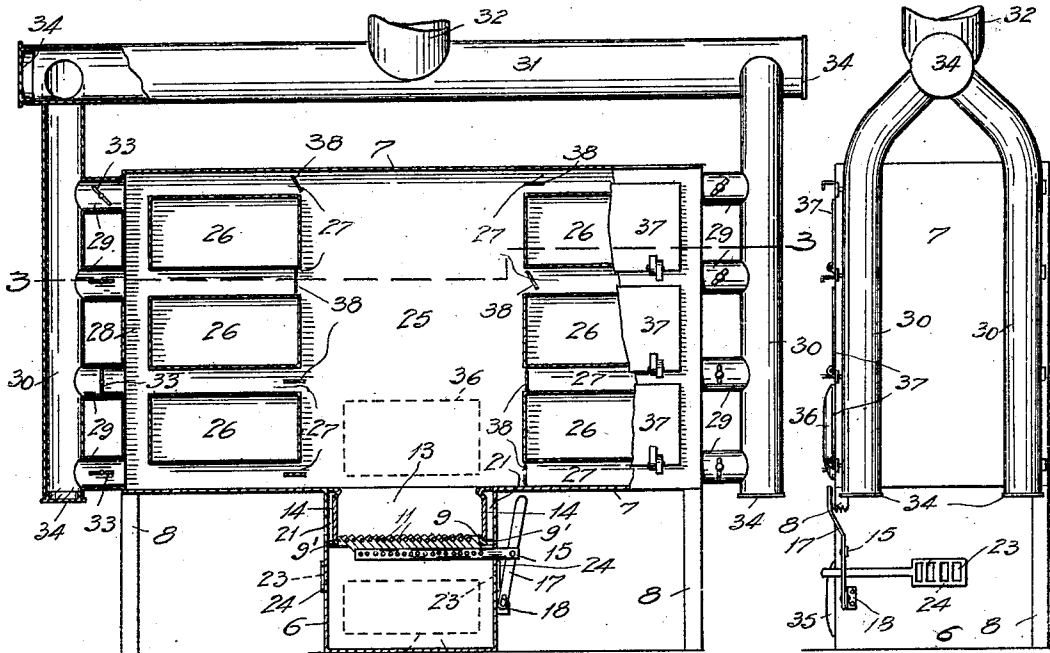


FIG. 1

FIG. 2

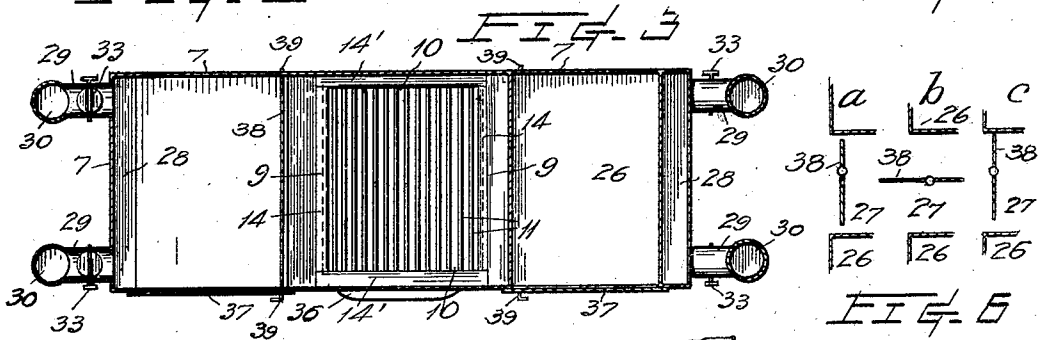


FIG. 3

FIG. 4

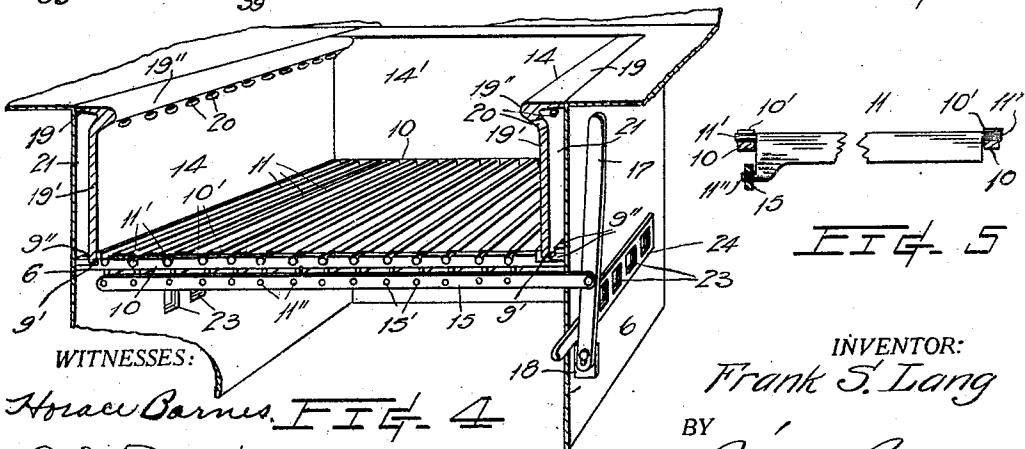


FIG. 5

WITNESSES:

Horace Barnes, FIG. 4
A. D. Smith.

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UNITED STATES PATENT OFFICE.

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STOVE.

934,445.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed August 27, 1908. Serial No. 450,565.

To all whom it may concern:

Be it known that I, FRANK S. LANG, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Stoves, of which the following is a specification.

This invention relates to stoves; and its object is the provision of means whereby the fuel may be utilized in an exceedingly economical and effective manner.

With these ends in view the invention consists in the novel assemblage of bake ovens with the various flues for which are provided dampers arranged so that the heating gases emanating from the fire may be directed through selected flues to subject the several ovens to more or less heat according to the demand.

The invention also consists in the employment of a furnace and combustion chambers which are peculiarly adapted for the furtherance of such ends through devices which eliminate the production of smoke with soot having a tendency to make deposits and thus interfere with the efficient action of the various ovens.

The invention further consists in the novel construction and combination of various component parts of the stove, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a view partly in front elevation and partly in transverse vertical section of a stove embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a horizontal section taken through 3—3 of Fig. 1. Fig. 4 is a perspective view of a portion of the stove drawn to an enlarged scale. Fig. 5 is a fragmentary longitudinal elevational view of one of the grate bars, together with the supports and the shaking bar therefor, which are represented in cross section. Fig. 6 represents in vertical section diagrammatic views of dampers shown in Figs. 1 and 3.

The reference numeral 6 designates the casing of the furnace portion of the stove and 7 the casing of the superstructure thereof of which is of greater width than the casing 6 and has its ends supported by legs 8. Within the furnace casing is a frame comprised, respectively, of longitudinal and transverse members 9 and 10 arranged to be in a horizontal plane and suitably secured to the casing to afford a rigid support for the grate bars 11, which divide the casing into

an ash-pit 12 and a fire-box 13. These members also furnish a support for the fire-box linings 14 and 14'. The grate-bars are provided at their extremities with alined cylindrical projections 11' disposed to be in proximity of the top edge of the respective bars for seating in spaced notches 10' of said transverse members and whereby the bars are sustained. From one end of each of the bars is a protruding stud 11'' for insertion in the appropriate apertures 15' of a shaking-bar 15 which extends through one of the side walls of the casing part 6 and is operatively secured to a lever 17 which is fulcrumed to a bracket piece 18 upon the outside of such wall.

The linings 14, positioned at the sides of the fire-box, have their bottom edges seated in grooves 9' in the respective supporting members, while along the tops are laterally extending flanges 19. At the juncture of the wall-parts 19' with said flanges 19 of the respective lining members is a nosing 19'' which projects inwardly with respect to the fire-box. Apertures 20 are provided at the underside of said nosings and extend through the linings so that they will be directed downwardly toward the inside of the fire-box. The widths of the flanges 19 and the location of grooves 9' are such as to maintain the main portions, or walls, 19'' of the linings at a distance from the adjacent walls of the casing 6 to afford compartments 21 therebetween.

Communication is had between the compartments 21 and the ash-pit 12 through apertures 9'' in the members 9. In the walls of casing 6 are draft openings 23 to admit air to the ash-pit in quantities regulated by manipulating grid-dampers 24.

Above the fire-box 13 is a space 25 extending to the top of the casing part 7 and serving as the combustion chamber of the stove. Disposed at each side of the combustion chamber is a series of superposed bake ovens 26 which are separated from each other in the respective series by horizontal flues 27 and from the side walls of the inclosing case by vertical flues 28. In the planes of the various said horizontal flues and in proximity of the vertical corners of the casing 7, are pipe connections 29 with uptake pipes 30 which open into a common header 31 having a chimney connection, 32. A damper, such as 33, is provided for each of the connections 29 and, for cleaning pur-

poses, the uptake pipes 30 and the header 31 are desirably provided with removable ends 34.

Doors 35 and 36 are respectively provided for the ash-pit and the combustion chamber for the removal of ashes from and the supply of fuel to the furnace, and the doors 37 are provided to give access to the several ovens.

In proximity of the combustion chamber 25 and within each of the flues 27 is a damper 38 which affords means to sensitively control the flow of the hot combustion products through these channels. Such dampers are of less width than the depths of the flues and, as shown in Fig. 3, have projections 39 which are journaled in the front and back walls of the casing and arranged to be at one side of the axes of the respective dampers. By such devices a damper may be adjusted from its wide open condition, as in *b*, in Fig. 6, to its most closed positions as exhibited in *a* and *c* wherein, and by reason of the eccentric positioning of the pivots the openings above and below the damper may be regulated with a nice degree of precision to afford efficient control over the baking operations which may be progressing in the several ovens.

The operation is as follows: A fire built within the fire-box 13 is supplied with air to support combustion through the draft openings 23 in the sides of the ash-pit 12 whence the air passes through the apertures 9" into the wing compartments 21 to escape into the fire-box through the apertures 20. Under such conditions the air while passing through said compartments is made relatively hot from the heat produced by the fire and conducted through the intervening linings 14 so that the air thus delivered into the fire-box is in a suitable state to combine with the combustion gases arising from the fire and effect the complete combustion thereof within the chamber 25. During the kindling of the fire, or until the same is burning with considerable briskness, the grate-bars 11 are adjusted by the lever 17 so as to be vertical and give the maximum amount of openings between the several bars to allow the air to flow upwardly through the grate and penetrate the fire-bed as in an ordinary stove, and assist in the upflow of the gases from the fire into the space above for consumption. When the fire is, however, well established, then the lever 17 is manipulated to tilt the grate bars to occupy the positions in which they are represented in Fig. 1 whereupon the interstices between the grate bars are closed and thereafter such air as enters the ash-pit is constrained to enter the fire-box only above the fire to meet the fuel gases produced, resulting in a fire unaccompanied by soot or smoke. When the volatile gases have

been thus liberated and consumed the grate-bars may be restored to their former upright positions and allow the air to resume its flow through the grates to accomplish the burning of the coke products. The incombustible gases in a highly heated condition flow from the combustion chamber 25 through the flues 27 and 28 to the pipes 29 whence they escape through the uptake pipes 30 and header 31 to the chimney and in so doing traverse the walls of the ovens 26 to produce more or less heat within the individual ovens according to the positions of the latter with respect to the courses of the heated gases influenced by the various dampers 33 and 38. For example, assuming that all of the dampers are open, the tendency of the heated gases being to ascend, the upper ovens will be subjected to more heat than those below, but should the dampers be closed excepting those in the lowermost outlets, then the hot gases while flowing to a certain extent through all of the horizontal flues 28 wherein the gas course is toward the unobstructed of the pipes 29, the lower of the flues 27 will be favored and the lowermost ovens will be affected by heat to a greater extent than the superimposed ones. From this it will be obvious that by regulating the flow of the hot gases by adjusting the various valves the heat of the ovens may be graduated at the will of the operator.

What I claim as my invention, is—

1. In a stove having a furnace and a combustion chamber thereabove, a series of bake-ovens positioned in and upon each side of said chamber and spaced from the ends of said chamber and each other so as to afford vertical flues and horizontal flues, uptake pipes, communicative connections between the vertical flues and the respective uptake pipes, and a damper for each of said connections.

2. A stove having a series of superposed bake-ovens therein spaced apart to provide horizontally disposed flues, a vertical flue on one side of said ovens communicating with said horizontal flues, the opposite side of said ovens forming one wall of a combustion chamber, uptake pipe connections, a plurality of pipe connections connecting said vertical flue with said uptake pipe connections, means to direct the heated gases from the combustion chamber predeterminately through said horizontal flues, and means in said pipe connections to control communication between the uptake pipe connections and the vertical flue.

3. A stove having a series of superposed bake-ovens therein spaced apart to provide horizontally disposed flues, an uptake pipe connection, a series of pipe connections on one side of said flues connecting said flues with said uptake pipe connection, dampers in each of said pipe connections, the inner end walls of the bake ovens forming one wall

of a combustion chamber on the opposite side of said flues and dampers located in said flues at their point of juncture with said combustion chamber.

5 4. A stove composed of a casing, forming a combustion chamber, a series of superposed ovens arranged in said combustion chamber, said ovens being spaced from the end walls of said casing to provide vertical side flues, and being spaced from each other to provide
10 horizontal flues, a vertical uptake pipe located beyond each end wall of said casing, a series of pipe connections leading from each of said vertical flues to the corresponding uptake pipe, and a header connecting said
15 uptake pipes at a point above the casing.

5. A stove composed of a casing, forming a combustion chamber, a series of ovens in said casing spaced apart to provide hori-
20 zontal flues, an uptake pipe connection spaced from said casing and a series of pipe con-

nections connecting said uptake pipe connection with said casing and being arranged to aline with said horizontal flues.

6. A stove having a series of superposed 25 bake-ovens spaced apart to afford horizontally arranged flues which communicate with the combustion chamber of the stove, a vertical flue at one side of said ovens communicating with said horizontal flues, a pair of 30 uptake pipes arranged in spaced relation to said vertical flue and at the ends of the same, a pipe connection between each uptake pipe and each of said horizontal flues, and means connected to the upper end of each uptake 35 pipe to connect with the chimney to convey the products of combustion from said uptake pipes to the chimney.

FRANK S. LANG.

Witnesses:

HORACE BARNES,
PIERRE BARNES.