

T. LEMBKE.  
OIL BURNING HEATING APPARATUS.  
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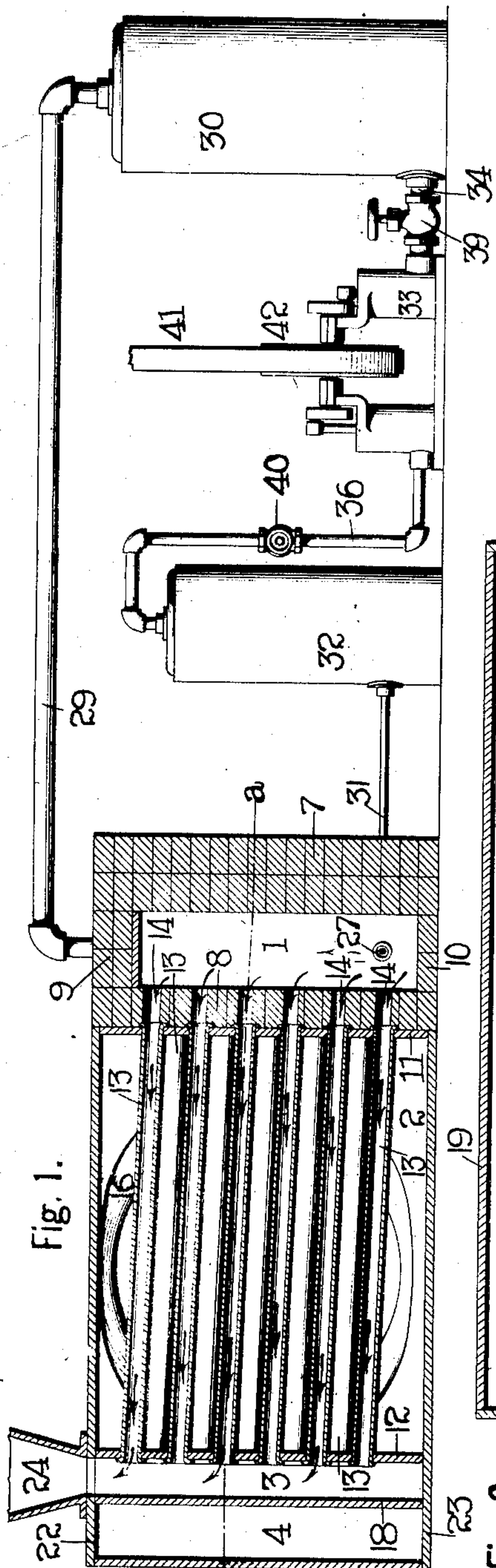


Fig. 1.

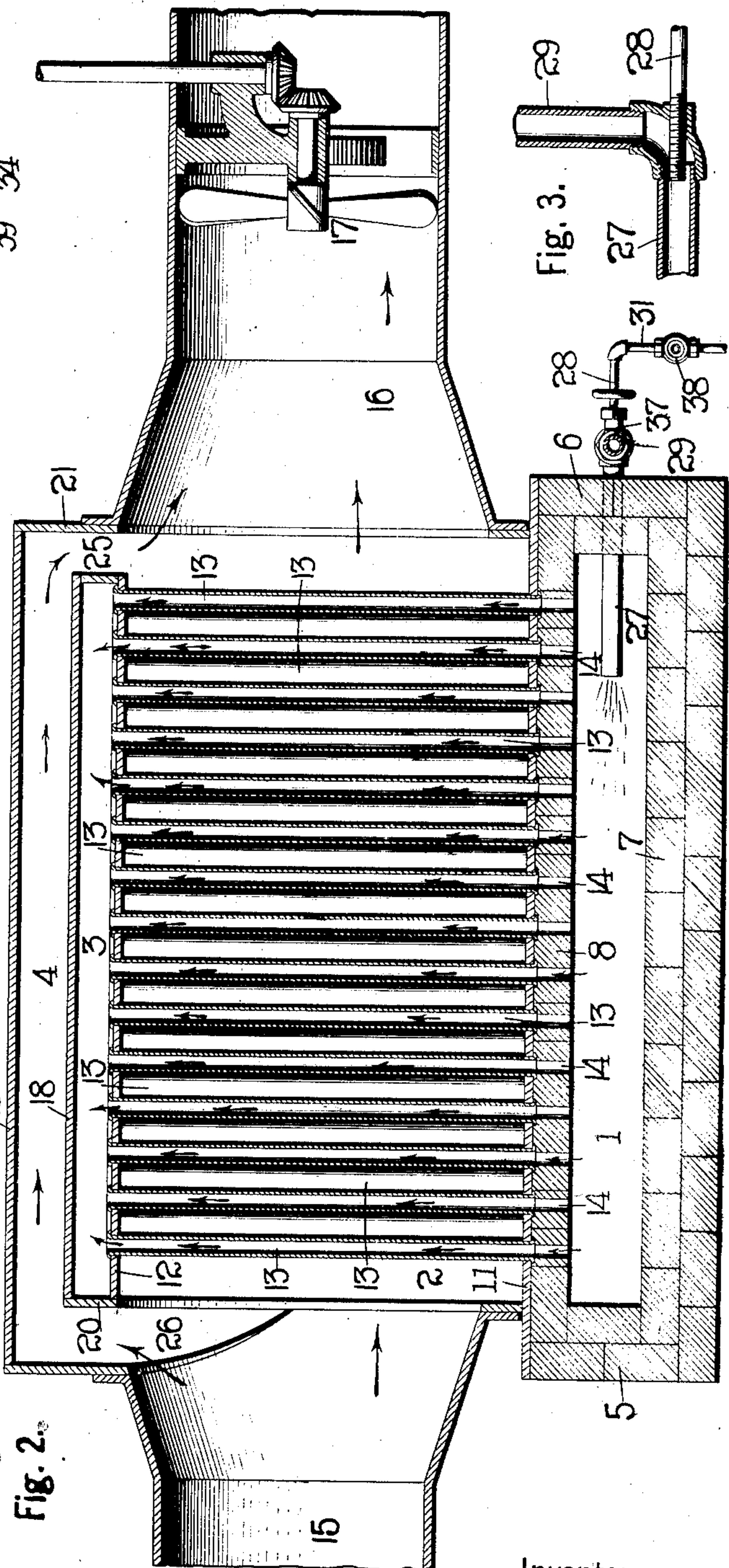


Fig. 2.

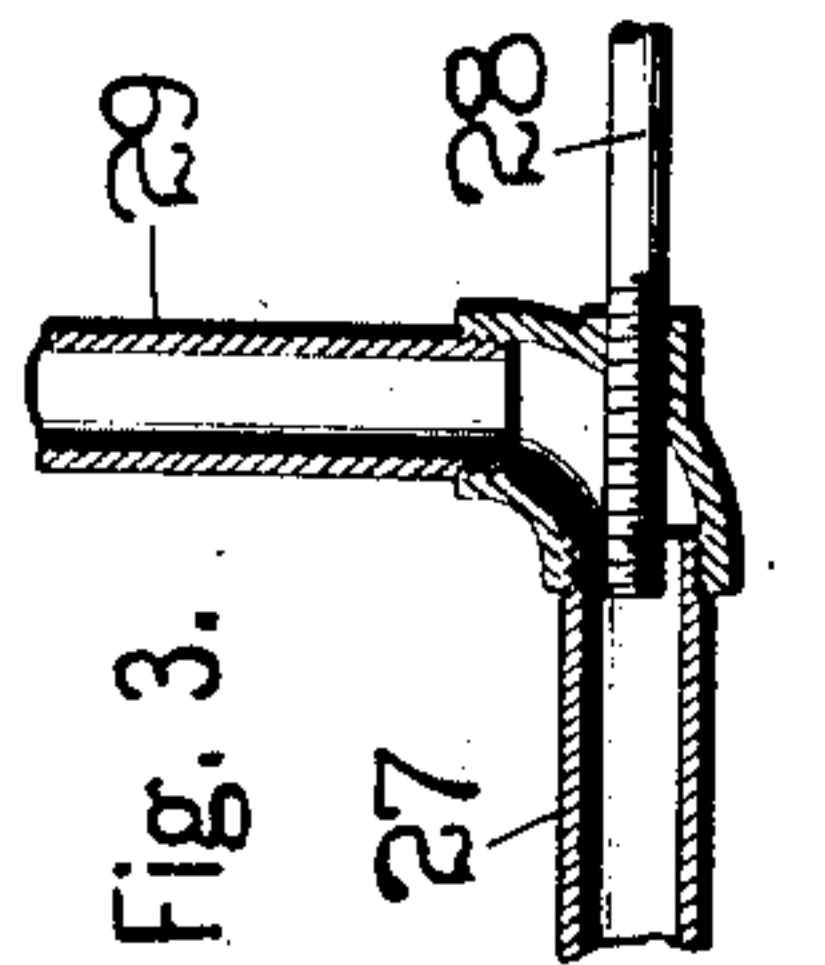


Fig. 3.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## OIL-BURNING HEATING APPARATUS.

990,755.

Specification of Letters Patent.

Patented Apr. 25, 1911.

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*To all whom it may concern:*

Be it known that I, THEODORE LEMBKE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in Oil-Burning Heating Apparatus, of which the following is a specification.

This invention relates to an improved oil burning heating apparatus and the object of the invention is to produce an apparatus for heating buildings in which oil serves as the heating agent.

Another object of the invention is to construct the burner in such manner that the combustion chamber can be entirely inclosed as to exclude all air except that which enters through the burner and thus obtain a more even combustion and a greater degree of heat.

Another object is to so construct and arrange the heating chamber that the heat is utilized to the fullest possible degree in heating the air as it passes therethrough and thus effect a decided saving in cost of operation.

The invention also relates to certain details of construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which,—

Figure 1 represents a central vertical longitudinal section through the furnace of the improved apparatus showing a side elevation of the remainder thereof. Fig. 2 is a horizontal section through the furnace on line *a a*, Fig. 1. Fig. 3 is an enlarged detached sectional view of one of the burners.

In referring to the accompanying drawings for the details of construction, like numerals designate like parts.

The furnace of the improved apparatus consists of a combustion chamber 1, a heating chamber 2, an outlet chamber 3 communicating with the stack 24, and a supplementary heating chamber 4 extending around the ends and outer side of the outlet chamber and forming an auxiliary passage for air.

The combustion chamber 1 is inclosed by side and end walls 5, 6, 7 and 8, and top and bottom brick walls 9 and 10, so that it is wholly inclosed and walled in with fire-proof material.

The rear wall 8 of the combustion chamber 1 forms the separating partition be-

tween it and the heating chamber, as shown in Figs. 1 and 2. A vertical metal plate 11 is located within the heating chamber adjacent to the wall 8 and a similar vertical metal plate 12 forms the rear wall of the heating chamber. These plates support a multiplicity of flues 13 which are slightly inclined from the horizontal from the front to the rear, and have their extremities expanded in openings in the plates to securely fasten them therein. Transverse openings 14 are formed in the vertical wall 8 and register with the flues 13 so as to provide uninterrupted passage from the combustion chamber 1 to the outlet chamber 3.

A pipe 15 leads from the outside of the building through the side wall of the furnace and communicates with the heating chamber 2 forming an inlet passage for unheated air. Another pipe 16 is connected at its end to the opposite wall of the furnace and provides a passage for conducting the heated air from the furnace to the various flues or pipes leading to the different portions of the building.

A fan 17 is located in this outlet pipe 16 and serves to draw a current of pure fresh air into the heating chamber 2 through the inlet pipe 15 and then after it is thoroughly heated into and through the outlet pipe 16 to the pipes or flues for conducting heated air.

The rear supplementary heating chamber 4 is separated from the outlet chamber 3 by a vertical metal plate 18 and a similar plate 19 forms the rear wall of said chamber.

The heating chamber 2 and the outlet and supplementary chambers 3 and 4 are closed at the sides, top and bottom by metal plates 20, 21, 22 and 23, the top plate having an opening cut therein directly above the outlet chamber for the escape of gases into the stack 24.

The supplementary heating chamber 4 is of a narrow elongated form extending longitudinally of the furnace and has its ends extending at substantially right angles to extend in heating proximity to the ends of the outlet chamber and also to provide passages 25 and 26 which communicate respectively with the inlet and outlet pipes 15 and 16, see Fig. 2.

The burner consists of a pipe 27 leading through the side wall 6 into the combustion chamber 1 and a pipe 28 of smaller diameter which enters the pipe 27 outside the combus-



tion chamber and extends but a short distance within said pipe.

The pipe 27 is connected by a pipe 29 to a tank 30 adapted to contain compressed air, and the pipe 28 is connected by a pipe 31 to a tank 32 which serves as a reservoir for the oil.

An air compressor 33 is connected to the compressed air tank 30 by a pipe 34 and also to the oil reservoir 32 by a pipe 36 to supply air thereto. By forcing air into the reservoir the oil is fed into the pipe 27 within the combustion chamber.

The pipes 29, 31, 34 and 36 are provided with valves 37, 38, 39 and 40 by means of which they may be closed against the passage of air or oil.

The air compressor is driven by a belt 41 which runs on a pulley 42 on the compressor shaft and is connected to any suitable source of power.

The operation of the improved oil burning apparatus is as follows,—A suitable quantity of oil is placed in the reservoir 32 and the air compressor is started to force the air into both the storage tank 30 and the reservoir. The pressure within the reservoir forces the oil through the pipes 31 and 28 into the pipe 27 which constitutes in reality a blast pipe from whence it is ejected. The compressed air and the oil are united as they leave the nozzle and burn with an intense heat in the combustion chamber. From the combustion chamber the heat passes through the flues 13 which become heated to a high temperature, and into the outlet chamber from whence the remaining gases pass out through the stack. As the air is drawn into the heating chamber by the fan 17 in the passage 16 it comes into contact with the heated flues and immediately becomes heated and then passes on through the passage 16 into the flues leading to the different portions of the building. The air in the supplementary heating chamber 4 which is heated by contact with the metal plate forming the rear wall of the outlet chamber, is drawn into the heating chamber through the connecting passage by the suction of the fan.

By referring to Figs. 1 and 2 it will be noted that the flues are staggered so that no air currents can pass directly through the heating chamber but must pass around them in a sinuous course. In this way the air is quickly and thoroughly heated to such a temperature that all germs and foreign matter is destroyed.

The currents of air in passing through the heating chamber move in a direction approximately transverse to or across the flues so that the heat units thrown off by the gases of combustion passing through the flues are fully and efficiently utilized.

When starting the furnace a number of bricks are removed from the wall of the

combustion chamber and the oil issuing from the blast pipe 27 set afire. The bricks are then replaced so that no air can enter the combustion chamber except through the blast pipe.

One or more burners can be used, the number varying with the size and capacity of the apparatus.

In this construction the four chambers of which the furnace consists are arranged side by side in a horizontal row as shown in Figs. 2.

One of the principal advantages of this improvement is that the products of combustion are entirely isolated from the air so that they cannot contaminate or become mixed with the air as it is passing through the furnace.

Another advantage resides in the thorough and efficient manner in which the heat is utilized, air being drawn through the heating chamber between the flues and also around the outer side of the outlet chamber which practically forms a continuation of the heating chamber as one end of the flues extends through the wall between the heating chamber and the outlet chamber and conducts the heated products of combustion to said outlet chamber.

I claim—

1. A furnace having side walls, end walls provided respectively with an inlet and outlet for the passage of air through the furnace, a bottom wall, a top wall having an outlet opening for the products of combustion, vertical longitudinal and transverse partitions extending between the bottom wall and the top wall and dividing the interior of the furnace into a plurality of chambers, there being a comparatively large chamber centrally located and forming a heating chamber, a chamber on one side of the heating chamber forming a combustion chamber and a chamber on the opposite side of the heating chamber forming an outlet chamber and being in communication with the outlet opening in the top wall and a plurality of flues having their ends extending to and through the longitudinal partitions forming the side walls of the heating chamber and affording communication between the combustion chamber and the outlet chamber and a chamber extending on the exterior of the outlet chamber forming a supplementary heating chamber, the said outlet chamber extending substantially across one side and from top to bottom of said furnace and the outer wall of said outlet chamber forming the inner wall of said supplementary heating chamber.

2. A furnace having side walls, end walls provided respectively with an inlet and outlet for the passage of air through the furnace, a bottom wall, a top wall having an outlet opening for the products of combustion



tion, vertical longitudinal and transverse partitions extending between the bottom wall and the top wall and dividing the interior of the furnace into a plurality of chambers, 5 there being a comparatively large chamber centrally located and forming a heating chamber, a chamber on one side of the heating chamber forming a combustion chamber, a chamber on the opposite side of the 10 heating chamber forming an outlet chamber and being in communication with the outlet opening in the top wall and the chamber extending on the exterior of the outlet chamber forming a supplementary heating cham- 15 ber and being connected at its respective ends to the inlet and outlet of the furnace

and a plurality of flues having their ends extending to and through the longitudinal partitions forming the side walls of the heating chamber and affording communication 20 between the combustion chamber and the outlet chamber the said outlet chamber extending substantially across one side and from top to bottom of said furnace and the outer wall of said outlet chamber forming 25 the inner wall of said supplementary heating chamber.

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Witnesses:

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