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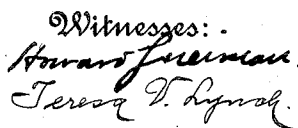


Fig. 1.

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CORE OVEN.

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Patented June 9, 1914.

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1,099,546.

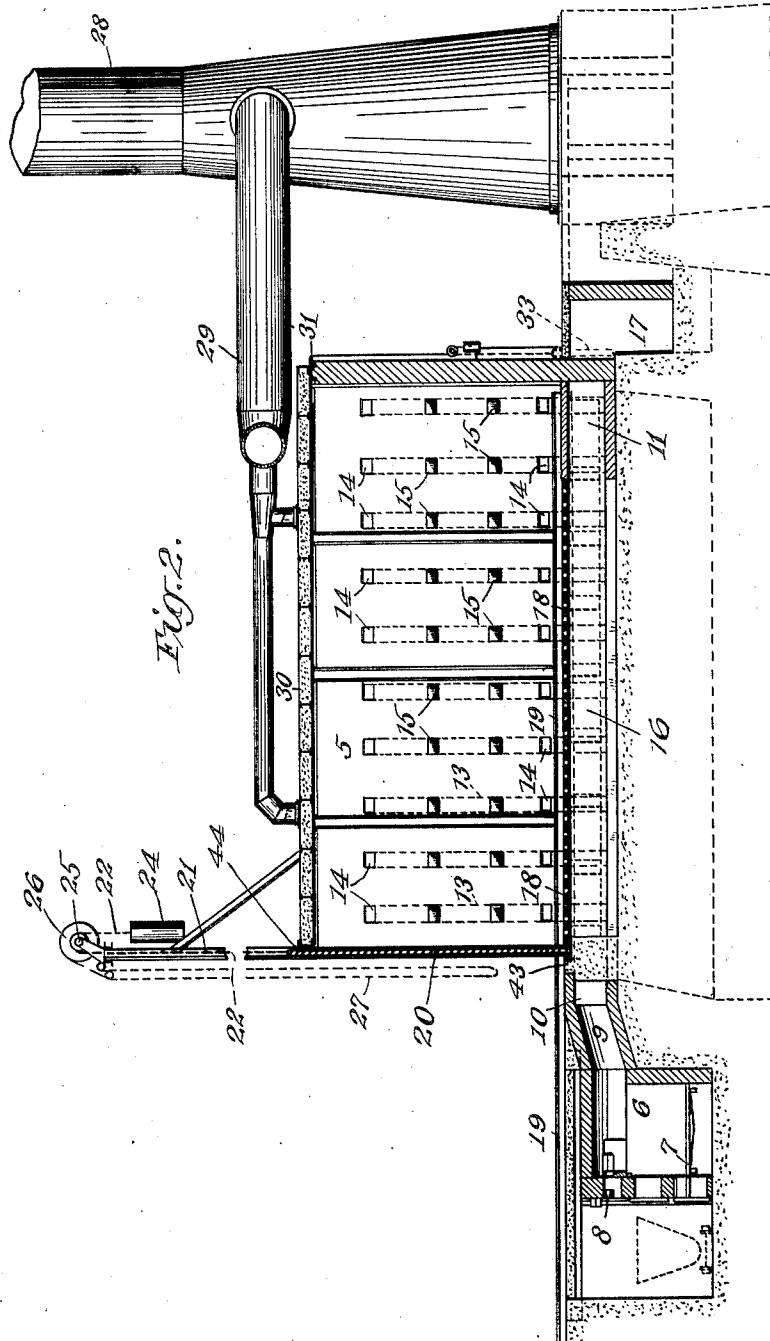


Fig. 2.

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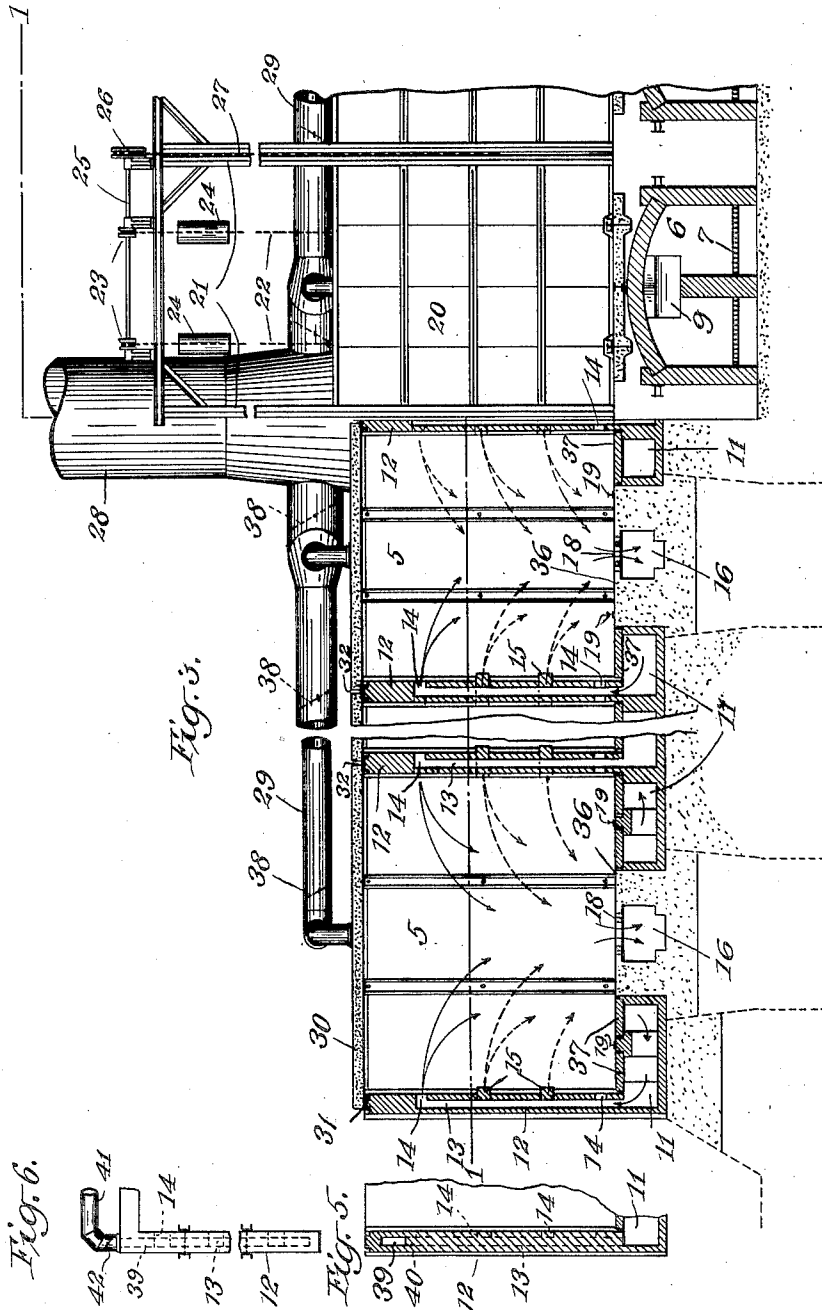
CORE OVEN.

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3 SHEETS—SHEET 3.

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# UNITED STATES PATENT OFFICE.

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## CORE-OVEN.

1,099,546.

Specification of Letters Patent.

Patented June 9, 1914.

Application filed January 15, 1913. Serial No. 742,092.

*To all whom it may concern:*

Be it known that I, FRANK S. GARRETT, a citizen of the United States, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Core-Ovens, of which the following is a specification.

In the designing of core ovens heretofore the general object has been to heat the oven chamber uniformly, or substantially so, throughout. When the oven chamber is not completely filled with cores, a considerable part of this heat is simply wasted. The cores usually vary in size and shape and some, on account of their bulk or form, may therefore require more heat than others. The uniform heating of the oven chamber, on account of these different characteristics of the cores, therefore frequently results in some of the cores being only partially or imperfectly baked or dried.

The object of my invention is to remedy these faults and this object I accomplish by the provision of means for heating variably-positioned predetermined portions of the oven chamber at will. In this way provision is made whereby when, on account of the shape, size or location of a particular core or cores, more heat is needed in one or more portions of the oven chamber, that requisite amount of heat will be supplied just as needed. Or again, if the cores only occupy a certain portion of the oven chamber, the heat will be supplied to that particular portion of the chamber to the practical exclusion of other portions of the chamber.

A preferred manner of carrying out the invention is to convey the heating medium from the furnace or other source of heat up through conduits in the side walls of the oven chamber and to provide the conduits with regulatable discharge outlets which open into different portions of the oven chamber. Then by opening or closing these variably-located discharge outlets any predetermined portion of the oven chamber may be heated as desired. The waste products may be taken out through a suitable exit flue and preferably this exit flue extends along the bottom of the oven chamber and is in communication with the chamber substantially the full length of the same so as to form a common outlet for any portions of

the chamber being heated. The ovens may be built singly or in a "battery," in which latter case the ovens would preferably be disposed side by side, each provided with an independently operable heating furnace and all discharging their waste products at the back into a common exhaust passage.

Various other objects and features of my invention will appear as the specification proceeds.

In the drawings accompanying the specification I have illustrated my invention in a concrete and preferred embodiment but I would have it understood that the invention is capable of many changes and modifications without departure from the spirit and scope of the invention.

In the drawings: Figure 1 is a broken top plan view, partly in section, of a battery of core ovens embodying the invention, the section being taken substantially on the line 1—1 of Fig. 3. Fig. 2 is a longitudinal sectional view of one of the ovens, this view being taken substantially on the line 2—2 of Fig. 1. Fig. 3 is a transverse sectional view taken substantially on the line 3—3 of Fig. 1. Fig. 4 is a detail view of one of the removable grating sections and the cover therefor. Fig. 5 is a vertical sectional view illustrating a modification in which a smoke flue is provided in the upper portion of the side wall of the oven chamber. Fig. 6 is a broken plan view of this modification.

Like reference characters refer to like parts throughout the several views.

The oven chamber is designated by the reference character 5 and the means for supplying the heat is here shown as a furnace 6. This furnace is, in the illustration, provided with a grate 7 and also with a burner opening 8, so that it may operate either as a coal-burning or gas or oil-fired furnace. Extending from the furnace is a supply conduit 9 which in the illustration is branched at 10 into two conduits 11 extending alongside of and substantially beneath the base of the side walls 12 of the oven chamber. The heating medium is then conducted from the supply conduits 11 up through the branch passages 13 which, as shown, preferably pass up through the side walls 12 and are provided with discharge outlets 14 opening into the oven chamber. These discharge outlets are, as best shown in Figs. 2 and 3,

preferably disposed at different levels in the oven chamber and also at different points in the length of the oven chamber. The discharge from these various outlets may be governed by any suitable means, and such means here takes the form of removable plugs 15 which may be inserted in the outlets. It will be clear from Figs. 2 and 3 that by opening or closing the various outlets any predetermined portion of the oven chamber may be heated at will.

Suitable provision is preferably made for carrying off the waste products in the oven chamber and the means for this purpose here takes the form of an exit flue 16 located in the bottom of the oven chamber and communicating at its rear end with an exhaust passage 17. The exit flue 16 preferably extends substantially the full length of the oven chamber and also it is preferably placed in communication with the oven chamber for substantially the full length of the chamber. In the illustration the exit flue is in communication with the chamber by means of a grating 18. The object of having this exit flue in communication with the chamber for its full length is to thereby provide a common means for carrying off the waste products from any and all portions of the oven chamber which are being heated.

Figs. 1 and 3 illustrate the circulation of the heating medium. From these views it will be clear that the heating medium flows from the source of heat up through the conduits in the side walls of the oven chamber and through the variably-located discharge outlets into the oven chamber. The waste products flow downwardly into the centrally located exit flue in the bottom of the chamber, as indicated in Fig. 3, and thence through this flue out to the exhaust passage at the back of the chamber. In Fig. 2 the middle discharge outlets are shown closed, with the upper ones open. The heating medium therefore enters in the top portion of the oven and the heat is therefore greatest at this level. If the lower discharge outlets only were open then the heat would be confined practically to the bottom portion of the furnace. The intermediate portion of the furnace will be heated by closing all but the intermediate series of discharge outlets. By leaving all the discharge outlets open, the oven chamber will be heated substantially uniformly throughout. One end of the oven chamber may be heated to the exclusion of other portions of the chamber by closing all the discharge outlets except those at that particular end. In the same way a portion intermediate the ends of the furnace might be heated by closing all the discharge outlets except those at such intermediate portion. It will be clear from this that the oven chamber may be heated only in certain predetermined portions thereof, or it may be

heated uniformly throughout so that all the many different requirements of a core oven may be met.

The cores or other articles to be baked or treated are supported within the oven chamber in any suitable way. Preferably for ease in transportation they are carried upon cars which move over the tracks 19 extending into the oven chamber. A suitable entrance or doorway is provided to the oven chamber and preferably the entire front end of the chamber is left open so as to permit the greatest freedom in placing and removing the cores. This doorway is closed by a suitable door 20 which, in the present instance, is shown mounted to slide in the vertical guides 21. The means for operating this door is shown in the form of chains 22 which pass over sheaves 23 and are connected with counter-weights 24, the said sheaves being mounted on a shaft 25 carrying a wheel 26 at one end over which passes a hand-chain 27.

The waste products from the oven chamber are preferably finally discharged through a suitable stack 28 with which the exhaust passage 17 communicates (Fig. 1) and for the purpose of carrying off any fumes or vapors liberated in the oven chamber, there are preferably provided suitable exhaust pipes 29 which extend from the top portions of the oven chambers and may discharge directly into the stack, as indicated in the several views.

As the side walls of the heating chamber may be more or less affected by the unequal heating of the various portions of the chamber, I make provision whereby any expansion or contraction of the side walls of the chamber, occasioned by such unequal heating, will have no injurious effect upon the chamber as a whole. To this end I make the roof or top of the oven chamber in a single piece or slab 30 which simply rests upon the top of the side walls and may have more or less of a sliding movement thereon. To facilitate this sliding movement occasioned by unequal expansion or contraction of the side walls, I may place a bearing plate 31 on the top of the side walls which forms a bearing upon which the roof 30 rests. Where the ovens are arranged in a battery, as in the illustration (Fig. 3), the roofs of the respective oven chambers are preferably made of such a width as to leave an expansion space 32 between adjoining roofs so that there will be no interference between such adjoining roofs.

The draft through the exit flue or flues may be governed by suitable means such as a sliding damper 33 located at the junction of the exit flue with the exhaust passage. Additional means for controlling the draft through the exit flue are preferably provided by making the grating 18 which forms

the entrance to the exit flue in removable sections, as indicated at 34 in Fig. 1. An increased draft may thus be obtained at any point in the length of the exit flue by removing one or more of these sections of the grating 18. Thus in the illustration Fig. 1, the grating has been removed from over the rearward end of the exit flue and consequently the draft into the exit flue will be greatest at this rearward end of the oven chamber. The flow into the different portions in the length of the exit flue may be still further governed by providing means such as the removable cover plates 35 for closing the openings in the grating (see detail Fig. 4). The control of the flow of the waste products is of considerable assistance in obtaining the proper heating of the various portions of the oven chamber. For instance, when it is desired to heat a certain portion of the chamber the heat may be concentrated in that portion of the chamber first by directing the heating medium into that particular portion and secondly, by opening up the grating in the exit flue at that portion of the chamber so as to create a stronger draft at that point. By using the cover plates 35 to entirely cut off the flow into certain portions of the exit flue the heating of the oven chamber may be still further governed.

According to my invention the cores or other products to be baked or otherwise heat-treated are subjected to heat by radiation as well as by being directly contacted with the heating medium. Fig. 3 illustrates this point. In this view is shown how the inlet or supply conduits 11 extend beneath the floor or hearth 36 of the oven chamber, and how the passages 13 extend from these flues up through the walls of the chamber. Consequently the articles within the chamber will be heated by radiation from the heated side walls and hearth. This is a decided advantage because by utilizing both the heat of radiation and of conduction practically all the useful heat energy is absorbed within the oven chamber. Provision is preferably made so that, if desired, the heat may be discharged directly into the oven chamber without being first passed through the side walls thereof. The means for this purpose here consists in making the inlet flues with removable cover plates 37 which when removed will permit the heating medium to discharge from the inlet flues 11 directly up into the oven chamber. By removing more or less of these cover plates in different portions of the oven chamber, a still further degree of control may be obtained. By the various means described I am thus enabled to heat the oven chamber either uniformly throughout or to heat certain portions of the same, and it will be further understood that the portions so

heated may be either heated uniformly or variably.

A still further degree of control of the heat within the oven chamber may be obtained by utilizing the dampers 38 with which the vapor discharge pipes 29 are preferably provided. It will be seen that by opening these dampers a certain amount of the waste products may be drawn off from the upper portion of the oven chamber out through the discharge conduits. The regulation of these dampers therefore will serve, to a certain extent, to control the amount of heat in the upper portion of the oven chamber. While I have shown only a single exit flue located in the bottom of the oven chamber, I would have it understood that, if found necessary or desirable, more than one of such flues may be provided.

In treating certain articles, and in particular when first starting up the furnace, it is found that the imperfectly consumed products usually generated when first starting up the furnace have a more or less injurious effect on the cores or other articles. Particularly is this true when burning coal as a fuel, for when first starting up such a fire considerable smoke and soot is usually given off. To prevent this injurious effect I may provide means such as illustrated in Figs. 5 and 6, in the form of a smoke flue 39 located preferably as shown within the upper portion of the wall 12 and in communication with the conduits 13 by extensions 40 at the upper ends of such conduits. The products from such smoke flue may be carried off through a pipe 41 which may, if desired, discharge into the main stack 28. A damper 42 is preferably provided for controlling discharge from this smoke flue. In the operation of this form of the apparatus the damper 42, or such other controlling means as may be employed, will preferably be left open at the time of first starting the furnace and consequently the products of combustion instead of being discharged into the oven chamber will flow up into the smoke-flue and out the said flue to the point of discharge. When the furnace becomes heated to the proper degree so that proper combustion takes place, the heated products may then be directed into the oven chamber by closing off the damper 42 thereby preventing further flow out through the smoke flue.

To prevent loss of heat beneath the door of the oven chamber, there is preferably provided a sand seal indicated at 43 in Fig. 2 to receive the lower edge of the door, and escape of heat at the top of the door may be prevented by mounting an angle iron 44 on the rear face of the door which when the door is closed engages with the top of the oven chamber.

While this invention relates particularly to core ovens, and is referred to as such

throughout the specification, I would have it understood that it is not limited to this one particular use, and the term core oven therefore is used merely as a convenient

name and not as a limitation.

What is claimed, is:

1. In a core oven, the combination of a furnace, an oven chamber, a main supply conduit extending from the furnace to the oven chamber, branch conduits extending from the main supply conduit up through the walls of the oven chamber and terminating in outlets discharging into different portions of the oven chamber, and means for independently governing the discharge from the various outlets.

2. In an oven of the character set forth, the combination of an oven chamber, a furnace, supply conduits extending from the furnace along beneath the side walls of the oven chamber, branch conduits extending from said supply conduits up through the side walls of the oven chamber and provided with outlets discharging into the oven chamber at different levels therein, independently adjustable closures controlling discharge through the said outlets, and means for withdrawing waste products from the oven chamber.

3. In an oven of the character set forth, the combination of an oven chamber, a furnace, supply conduits extending from the furnace along substantially beneath the side walls of the oven chamber, branch conduits extending from said supply conduits up through the side walls of the oven chamber and provided with outlets discharging into the oven chamber at different levels therein, independently adjustable closures controlling discharge through the said outlets, and an exit flue disposed in the bottom of the oven chamber and in communication with said chamber substantially the full length thereof.

4. In an oven of the character set forth, the combination with an oven chamber and a furnace, of a supply conduit extending from the furnace along substantially beneath the side wall of the oven chamber, branch conduits extending from said supply conduit up through the side wall of the oven chamber and provided with discharge outlets opening into the oven chamber at different points therein, and an exit flue located in the bottom of the oven chamber and in communication with said chamber substantially the full length thereof.

5. In an apparatus of the character set forth, the combination of a plurality of oven chambers arranged side by side, an independently controlled furnace for each oven chamber, conduits extending from the furnaces up through the side walls of the respective oven chambers and discharging

into said oven chambers at different points therein, exit flues in the bottoms of the oven chambers, and an exhaust passage at the back of the oven chambers common to all the exit flues of the different chambers.

6. In an apparatus of the character set forth, a heating chamber provided with relatively rigid side walls and a roof supported by and slidably resting upon the side walls whereby unequal expansion or contraction of the side walls will not affect the joint between the side walls and the roof, and means for introducing a heating medium into the heating chamber.

7. In an apparatus of the character set forth, a heating chamber, and means for introducing a heating medium into variably-located predetermined portions of the chamber, said heating chamber having relatively rigid side walls and a roof supported by and slidably resting upon the side walls, whereby unequal expansion or contraction of the side walls occasioned by unequal heating in the chamber will not affect the joint between the side walls and the roof.

8. In an apparatus of the character set forth, a plurality of heating chambers arranged side by side and provided with relatively rigid side walls, roofs to the respective heating chambers supported by and slidably resting upon the side walls of the respective chambers whereby expansion or contraction of such side walls will not affect the joint between the side walls and roofs, the roofs of adjoining heating chambers terminating short of contact with each other to leave an expansion space between adjoining roofs, and means for introducing a heating medium into the various chambers.

9. In an oven of the character set forth, the combination with an oven chamber, of heat-supplying conduits extending beneath the floor and up through the side walls of said oven chamber, and means for at will controlling discharge of the heated products into the oven chamber from the conduits beneath the floor of the oven chamber or from the conduits which extend up through the sides of the oven chamber.

10. In an oven of the character set forth, the combination with an oven chamber, of a supply conduit extending beneath the floor of the oven chamber, branch conduits extending from said supply conduit up through the side wall of the chamber and arranged to discharge into the side portion of the chamber, and a removable cover to the supply conduit arranged when open to permit discharge from said conduit up into the bottom portion of the oven chamber.

11. In an oven of the character set forth, the combination with an oven chamber and means for discharging heated products thereinto, of an exit flue disposed in the

floor of the oven chamber and extending substantially the full length thereof, and a grating covering the said exit flue and made in independently removable sections, and  
5 cover plates removably seated in said grating sections to prevent a discharge there-through.

12. In an oven of the character set forth, the combination with an oven chamber and  
10 means for discharging the heated products thereinto, of an exit flue disposed in the floor of the oven chamber and extending substantially the full length thereof, a grating covering said exit flue and provided  
15 with openings therein, and means for independently closing the openings in the grating.

13. In an oven of the character set forth, the combination with an oven chamber, of  
20 heat-supplying passages extending up through the side of the oven chamber and provided with outlets arranged to discharge into the oven chamber, and a flue disposed in the upper portion of the side of the oven

chamber in communication with the pas- 25  
sages aforesaid.

14. In an oven of the character set forth, the combination with an oven chamber, of supply conduits disposed at the base of the side walls of the chamber, smoke flues ex- 30  
tending longitudinally of the side walls in the upper portions thereof, passages extending up through the walls between the supply conduits at the base thereof and the smoke flues in the upper portion thereof, 35  
said passages provided with outlets into the oven chamber disposed at points intermediate the smoke flues at the top and the conduits at the bottom, and means for controlling flow through the said smoke flues. 40

Signed at New York city, in the county of New York and State of New York this 30th day of December A. D. 1912.

FRANK S. GARRETT.

Witnesses:

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