

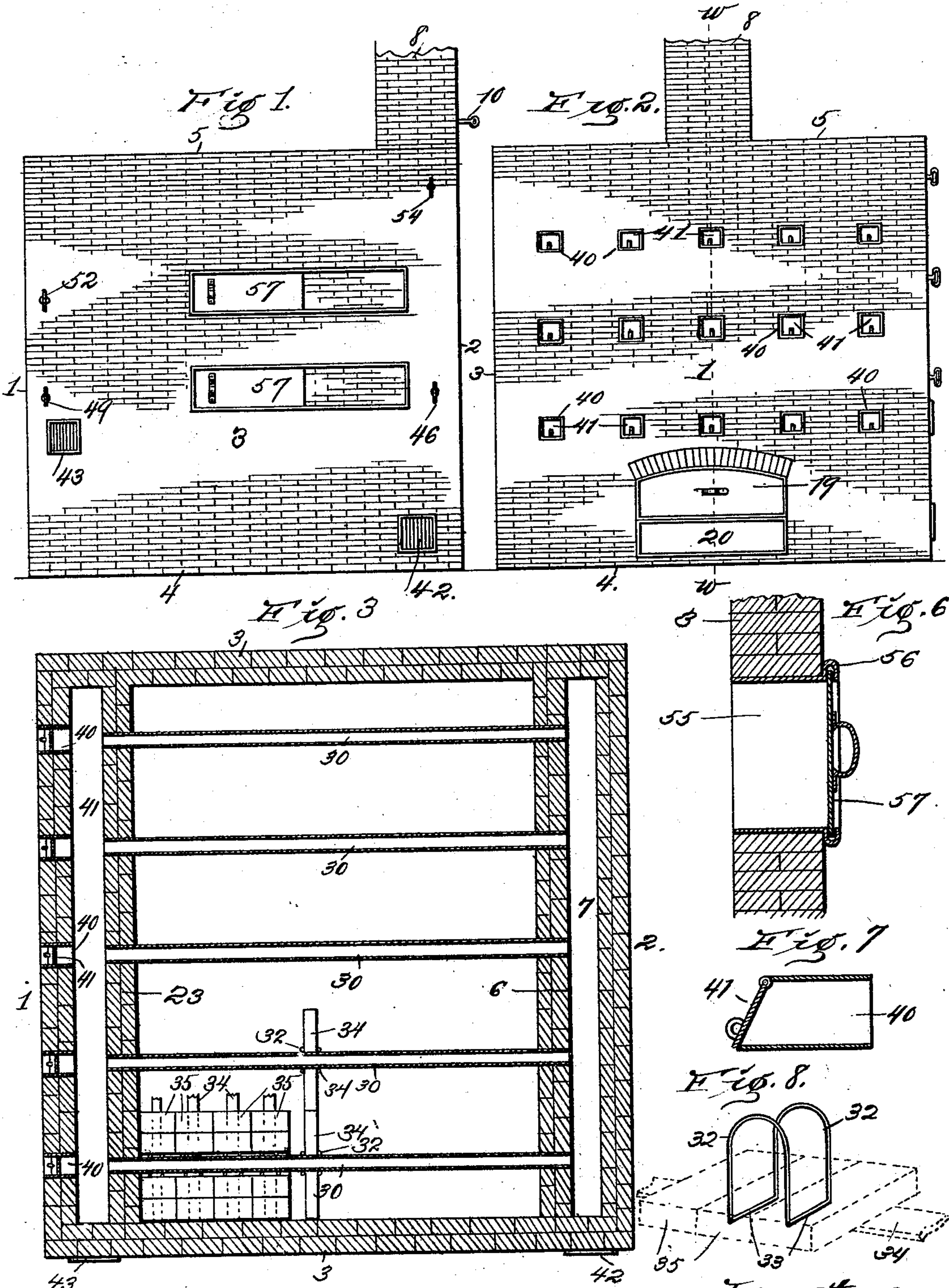
(No Model.)

2 Sheets—Sheet 1.

R. H. & D. C. CRAINE.  
DIRECT DRAFT BAKE OVEN.

No. 517,844.

Patented Apr. 10, 1894.



Witnesses:  
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Inventors  
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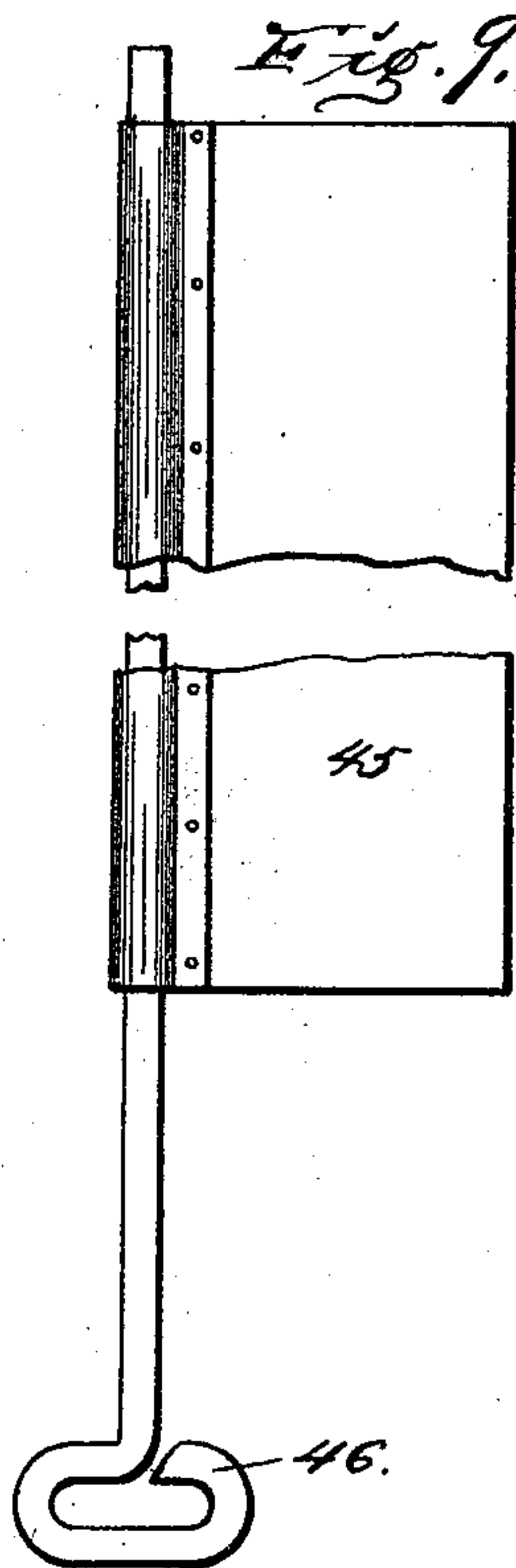
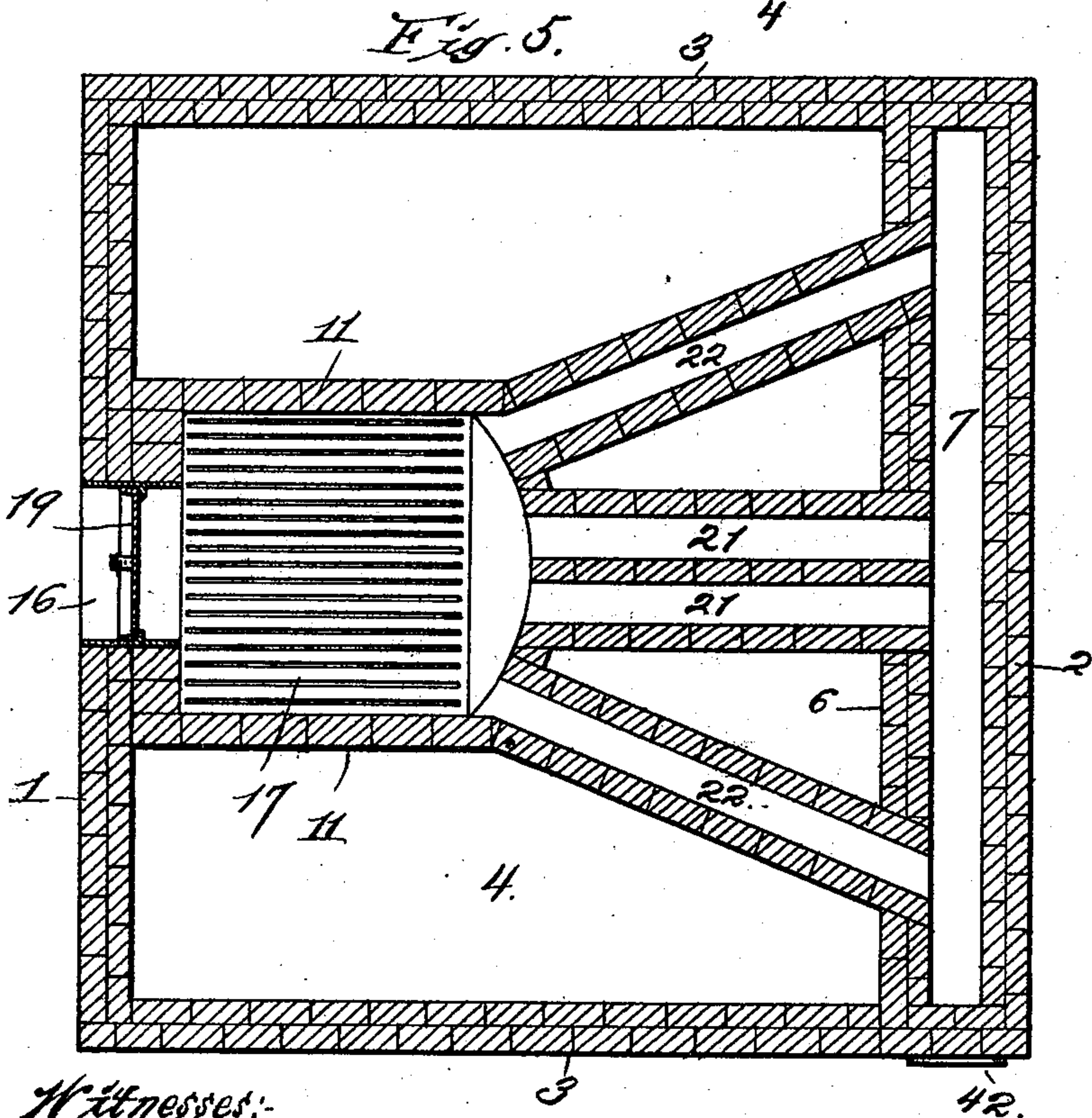
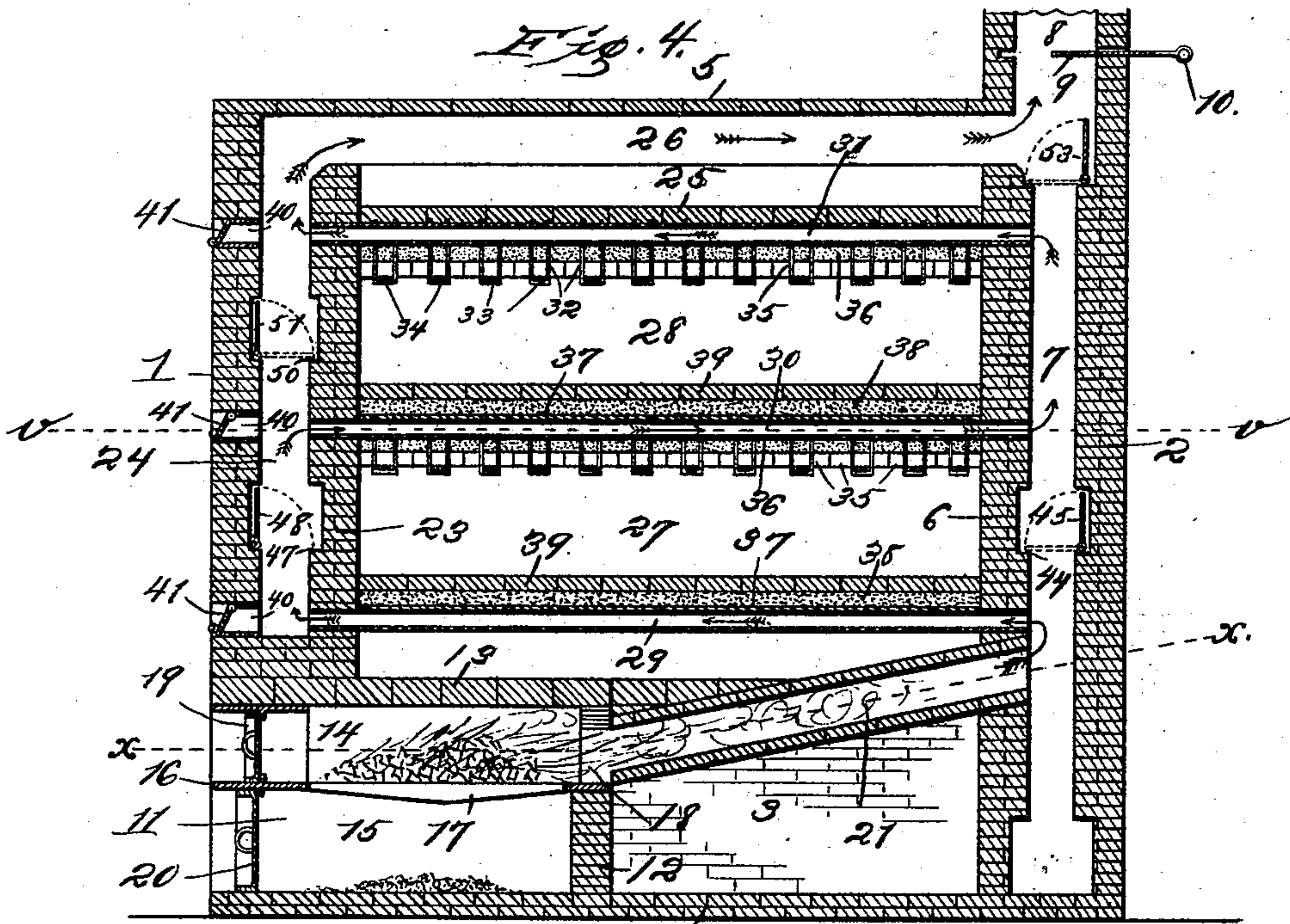
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# UNITED STATES PATENT OFFICE.

RICHARD H. CRAINE AND DAVID C. CRAINE, OF ROSEDALE, KANSAS.

## DIRECT-DRAFT BAKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 517,844, dated April 10, 1894.

Application filed October 31, 1893. Serial No. 489,673. (No model.)

*To all whom it may concern:*

Be it known that we, RICHARD H. CRAINE and DAVID C. CRAINE, of Rosedale, Wyandotte county, Kansas, have invented certain new and useful Improvements in Direct-Draft Bake-Ovens, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to that class of bake-ovens having a number of superimposed compartments and flues, and has for its object to produce an oven of this character, wherein the baking compartments are entirely surrounded by brick, and the flues may be easily cleaned.

With these special objects in view, our invention consists in its peculiar, novel, and generally improved construction and combinations of parts, as hereinafter described, claimed, and illustrated in the accompanying drawings, in which—

Figure 1, is a side elevation of a bake-oven embodying our improvements. Fig. 2, is a front view of the same. Fig. 3, is a horizontal sectional view taken on the line *v—v* of Fig. 4. Fig. 4, is a vertical sectional view taken on the line *w—w* of Fig. 2. Fig. 5, is an irregular sectional view taken on the line *x—x* of Fig. 4. Fig. 6, is a vertical sectional view of a portion of one of the side walls and showing also in section one of the slide doors controlling access to an oven. Fig. 7, is a detached sectional view of one of the tubes opposite the ends of the flue pipes. Fig. 8, is a detail perspective view of one of the supporting stirrups. Fig. 9, is a detail view of one of the dampers.

Referring to the drawings, a furnace is shown consisting of the front wall 1, the rear wall 2, the side walls 3, the bottom 4 and the top or roof 5. A vertical partition or wall 6 is erected from the bottom 4 a slight distance inward of the rear wall 2, so as to form a compartment 7 there between which communicates with the chimney or escape flue 8 at its upper end. The wall 6 terminates a suitable distance from the top or roof 5 for a purpose hereinafter explained, and the chimney 8 is provided with a slide damper 9 having a handle 10 by which it may be operated, and this damper 9 is adapted to control the pas-

sage of the chimney. A furnace chamber is formed in the lower front portion of the structure and centrally between the side walls 3, by means of the side walls 11; the vertical and rear wall 12 which is located about midway between the front of the structure and the vertical wall 6 near its rear end, and the top or bridge-wall 13. This furnace chamber is divided into the fire-box 14 and the ash pit 15 by means of a horizontal plate 16 secured in any suitable manner, and the grate 17 which is secured at its front and rear ends to the plate 16, and in an opening or passage 18 formed through the rear wall 12.

Entrance to the fire box and to the ash pit is controlled by removable doors 19 and 20 respectively.

A series of draft-flues 21 and 22 communicate at their front ends with the opening 18 formed through the rear wall 12 of the furnace chamber, and extending obliquely upward and rearward communicate at their opposite ends with the compartment 7. The draft flues 22 also diverge rearwardly as shown clearly in Fig. 5, and in order to distribute the heat from the furnace as equally as possible, the mouths of the several flues are arranged concentric or approximately so to the center of the grate 17.

Extending from side wall to side wall in a manner similar to the wall 6, and also rising vertically from the top wall 13 of the furnace chamber is a partition or wall 23, and this partition or wall 23 is arranged a slight distance inward of the front wall 1 in order to form a compartment 24 therebetween. This partition or wall 23 also terminates a suitable distance from the roof or top 5 of the structure, and is connected to the partition 6 by means of a horizontal wall 25 of fire brick, tile or other suitable material, so as to form a passage 26 in the upper portion of the structure; said passage 26 communicating at its opposite ends with the upper end of the compartments 24 and 7.

Between the walls 13 and 25, the side walls 3 of the structure, and the partitions or inner walls 6 and 23, a series of ovens are formed. In this instance two ovens only are shown, the lower oven 27 and the oven 28 located thereabove, and a series of flues or pipes are arranged above and below each oven, and



these flues or pipes communicate at their opposite ends with the compartments 7 and 24. In this instance the lower series of pipes 29 are arranged a slight distance above the top or bridge wall 13 of the furnace chamber, and form the base or foundation upon which the floor of the oven 27 is supported; the construction of which floor is hereinafter explained.

Each successive tier or series of pipes 30 and 31 form a bridge which supports the floor of the oven immediately above, and from which bridge the roof of the oven immediately therebelow is also supported, and the construction of which is as follows: A series of stirrups consisting of the parallel and inverted U-shaped portions 32 connected at their lower ends by bridge portions 33, are suspended from said pipes, and resting upon the bridge portions 33, and held from lateral displacement by the side portions 32 of said stirrups are the transversely extending strips or plates 34; the ends of the strips or plates 34 carried by one pipe abutting or fitting closely against the adjacent end of the strip or plate 34 supported from the next pipe of the series, as clearly shown in Fig. 3. Bricks or tile 35, are now laid transversely of and upon the strips or plates 34, and the ends of these bricks or tiles fit snugly against the adjacent ends of the bricks or tiles carried by the adjacent stirrup suspended from the same pipe. It will thus be seen that the length of the brick or tile used in constructing the roof of the ovens will govern the number of stirrups employed to support them, though if desired more than one stirrup can be used to support each brick or tile, and it will be further seen that the brick thus supported and extending from side wall to side wall, and from partition 6, to partition 24, forms approximately a solid brick roof or top for each oven. In order to prevent any escape of air between the bricks or tiles forming this roof, a mixture of sand and mortar 36, is filled in upon said brick or tile until the pipes 30 and 31 are partially embedded, if desired. This mixture of sand and mortar of course strengthens the roof and prevents not only the escape of air but also any possibility of any of the brick or tile becoming displaced.

The bottom of each oven consists of a plate 37 which rests upon the pipes 29 and 30, of such size as to fit snugly between the side walls 3, and the partitions 6 and 23; a layer of sand or mortar or other suitable mixture 38, similar to the mixture 36, upon the plate 37, and a layer of brick or tile 39 upon said mixture; said layer of brick or tile 39 forming the immediate bottom of the oven. It will thus be seen that each oven is entirely surrounded by brick work.

Formed through the front wall of the structure in alignment with and opposite each pipe or flue connecting the compartments 7 and 24, are openings in which are secured the tubular boxes 40, and these boxes are pro-

vided at their outer ends with doors or lids 41 which when closed prevent the entrance or passage therethrough of air.

Communicating with the lower end of the compartments 7 and 24, are the registers 42 and 43 respectively; these registers being of the usual or any preferred construction whereby the outside air may be entirely cut off from said compartments, or may be admitted in limited quantities so as to regulate and control the temperature of the ovens. The compartment 7 is enlarged transversely to form a shoulder 44 in the wall 6, about midway between the flues or pipes 29 and the flues or pipes 30 immediately thereabove, and pivotally mounted in said recess is a damper 45, which is adapted when closed to rest upon the shoulder 44, and said damper is provided with a stem and handle portion 46, by which it may be operated. The compartment 24 about midway between the flues or pipes 29 and 30 is also similarly enlarged, so as to form a shoulder 47 at one side, and pivotally mounted therein is a damper 48 similar to the damper 45. This damper 48 is also provided with a stem and handle portion 49, and is adapted to rest upon the shoulder 47 when closed. The compartment 24 is similarly enlarged at a point about midway between the flues or pipes 30 and 31, so as to form a shoulder 50 upon which the damper 51 is adapted to rest when closed, and said damper is also provided with a stem and handle portion 52. The compartment 7 is also provided with a damper 53 which is located above a series of pipes 31, and rests when closed upon a shoulder formed to receive it, or upon the upper end of the partition 6. A series of holes or openings are formed through one or the other of the side walls 3, and one of these openings communicates with each oven. These ovens are preferably lined with tubular castings 55 which are bent to form grooves 56 at their outer margins, said castings however at one end being continued for about twice the length of the openings. Slide doors or covers 57 provided with handles of any suitable construction are retained in the grooves 56, and are adapted to open or close said openings. It will be seen from the arrangement of these dampers, that the draft may be directed both above and below any oven, any two or more ovens, or all of the ovens as desired; for example, by closing dampers 45, 51 and 53 as shown in dotted lines Fig. 4, the draft is directed as indicated by the arrows from the compartment 7 through the flues or pipes 29 through the compartment 24, thence back through the pipes 30 to the compartment 7, thence forward again through the pipes 31 to the compartment 24, thence rearwardly through the passage 26, and up through the chimney. By closing dampers 45 and 51, and opening dampers 48 and 53, it will be seen that the heat will pass forwardly from the compartment 7 through the pipes 29 to the compartment 24, and will thence pass back



through the pipes 30 to the compartment 7, and will thence pass upwardly through the chimney, or if more ovens be above the oven 28, the heat may be directed around any one 5 or more thereof as desired. It will be seen from this construction that the heat may be concentrated upon any one or more ovens desired, and that by the proper manipulation of the dampers the heat is caused to avoid 10 any oven vacant, or not needing the same; therefore utilizing all the heat of the furnace, and resulting in an economy of fuel. It will be further seen that a brick heat is afforded to each oven, by the construction previously 15 described. Should any of the flues 29, 30 or 31 become clogged with soot, by opening the doors 41 of the tubular boxes 40, a rod carrying a swab at its end may be introduced there-through and into the said flues or pipes so as 20 to clean the same and force all such accumulations to the bottom of the compartments 7 and 24, from which it may be removed by temporarily removing the ventilators 42 and 43.

Having thus described our invention, what 25 we claim as new, and desire to secure by Letters Patent, is—

1. In a bake-oven, the combination with the furnace, partitions dividing the structure into front and rear valve-controlled passages 24, 30 and 7, and flue-passages 21 and 22, connecting the furnace with the rear passage 7, of a number of superimposed baking compart-

ments, and a series of flues above and below each of said compartments, and communicating at their opposite ends with the passages 35 7 and 24, and tubular passages through the front wall of the oven corresponding in number to and located opposite the adjacent ends of the said flues, so that said flues may be cleaned, and hinged doors closing said tubu- 40 lar passages, substantially as set forth.

2. The combination in a bake-oven, of a pair of partition walls, forming a pair of passages communicating with the furnace and the chimney, of a series of horizontally arranged 45 pipes extending through and supported by said partition walls, a plate 37, resting upon said pipes and fitting snugly between the side and the partition walls, a layer of solidifying material upon said plate, and brick laid in said 50 material, and a second series of pipes arranged horizontally and above the first series, stirrups suspended from said pipes, strips supported by said stirrups, bricks resting upon said strips, and a layer of solidifying 55 material upon said bricks, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

RICHARD H. CRAINE.  
DAVID C. CRAINE.

Witnesses:

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M. P. SMITH.