Dec. 2, 1924. 1,517,271

J. C. WOODSON

SECTIONAL BAKE OVEN

Filed June 5, 1922 3 Sheets-Sheet 1

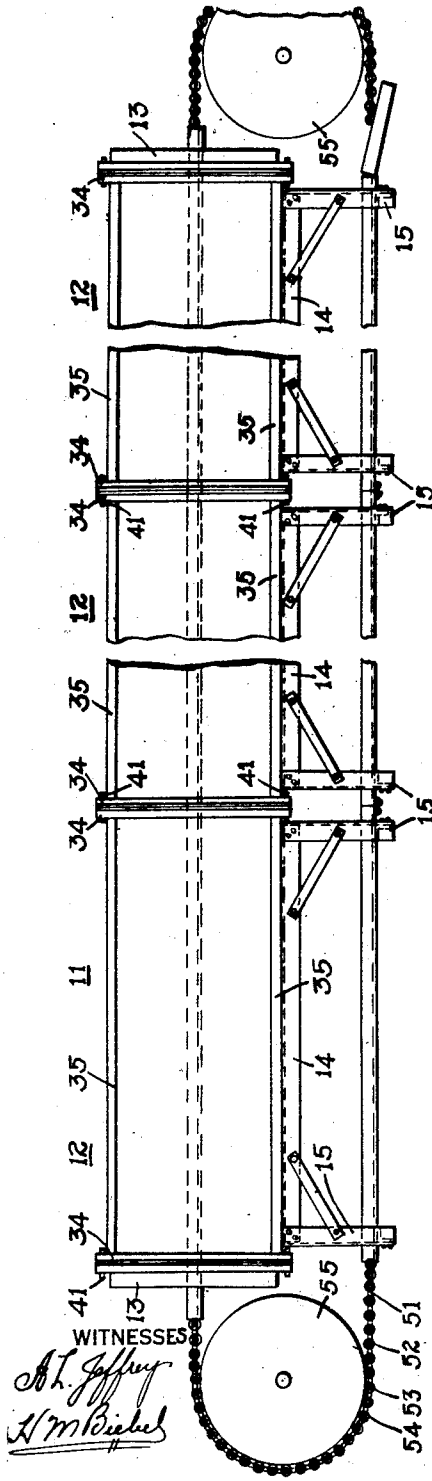


Fig. 1.

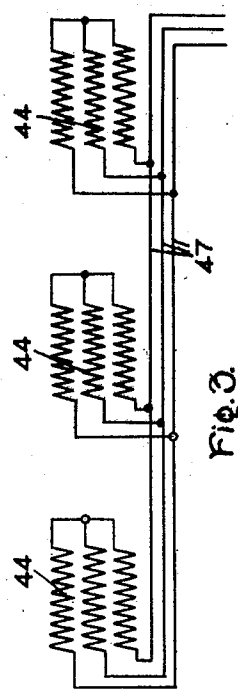
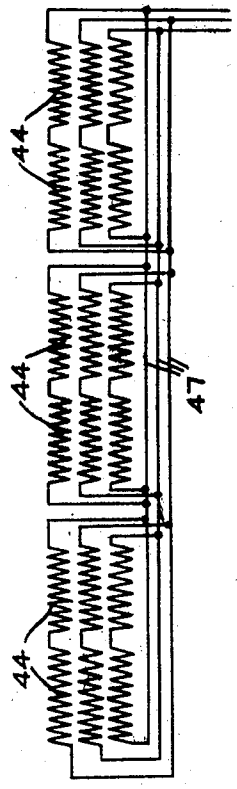


Fig. 3.



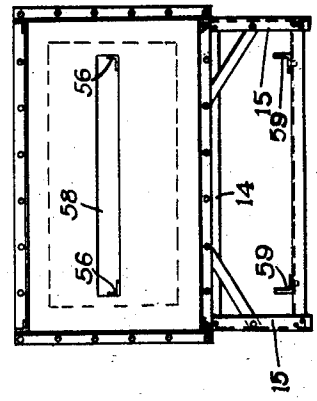


Fig. 2.

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SECTIONAL BAKE OVEN

Filed June 5, 1922 3 Sheets-Sheet 2

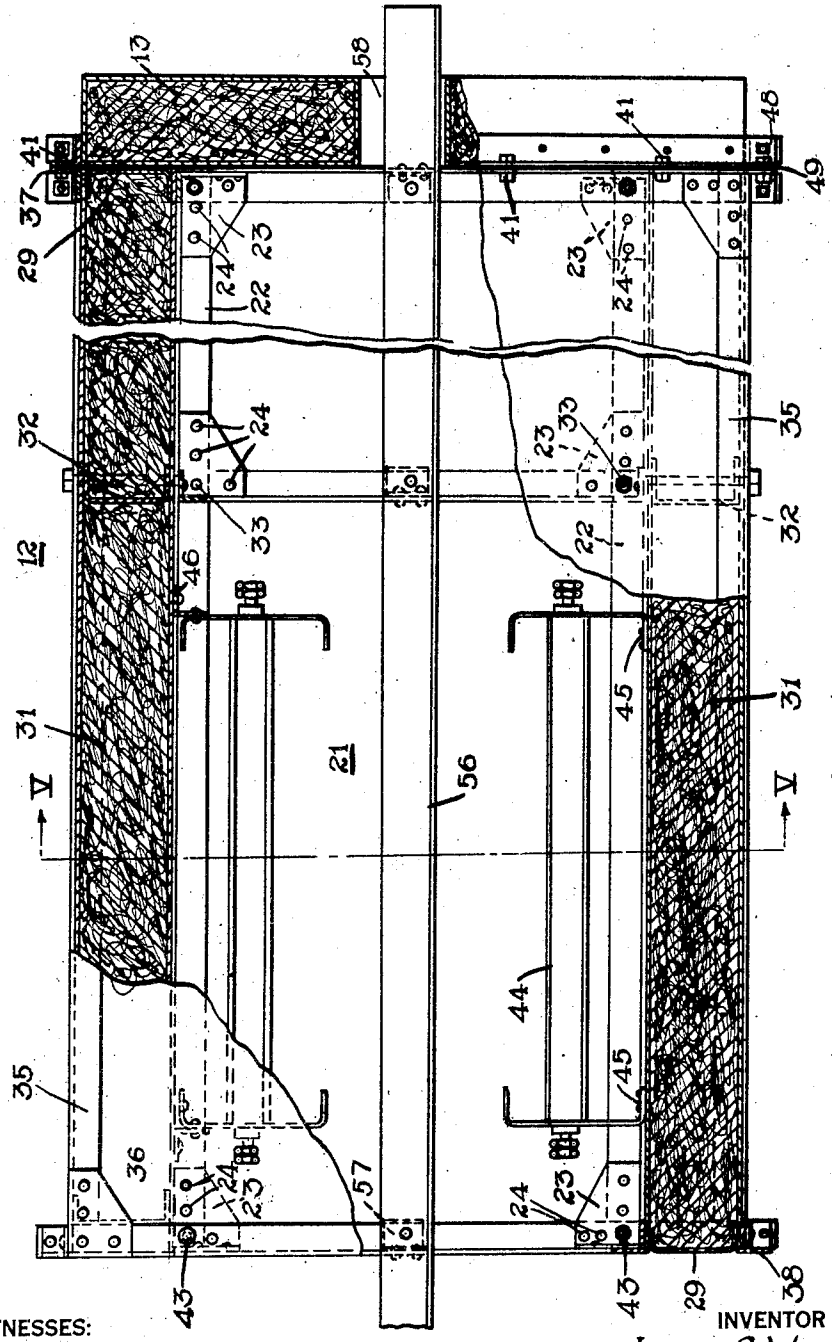


Fig. 4

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SECTIONAL BAKE OVEN

Filed June 5, 1922 3 Sheets-Sheet 3

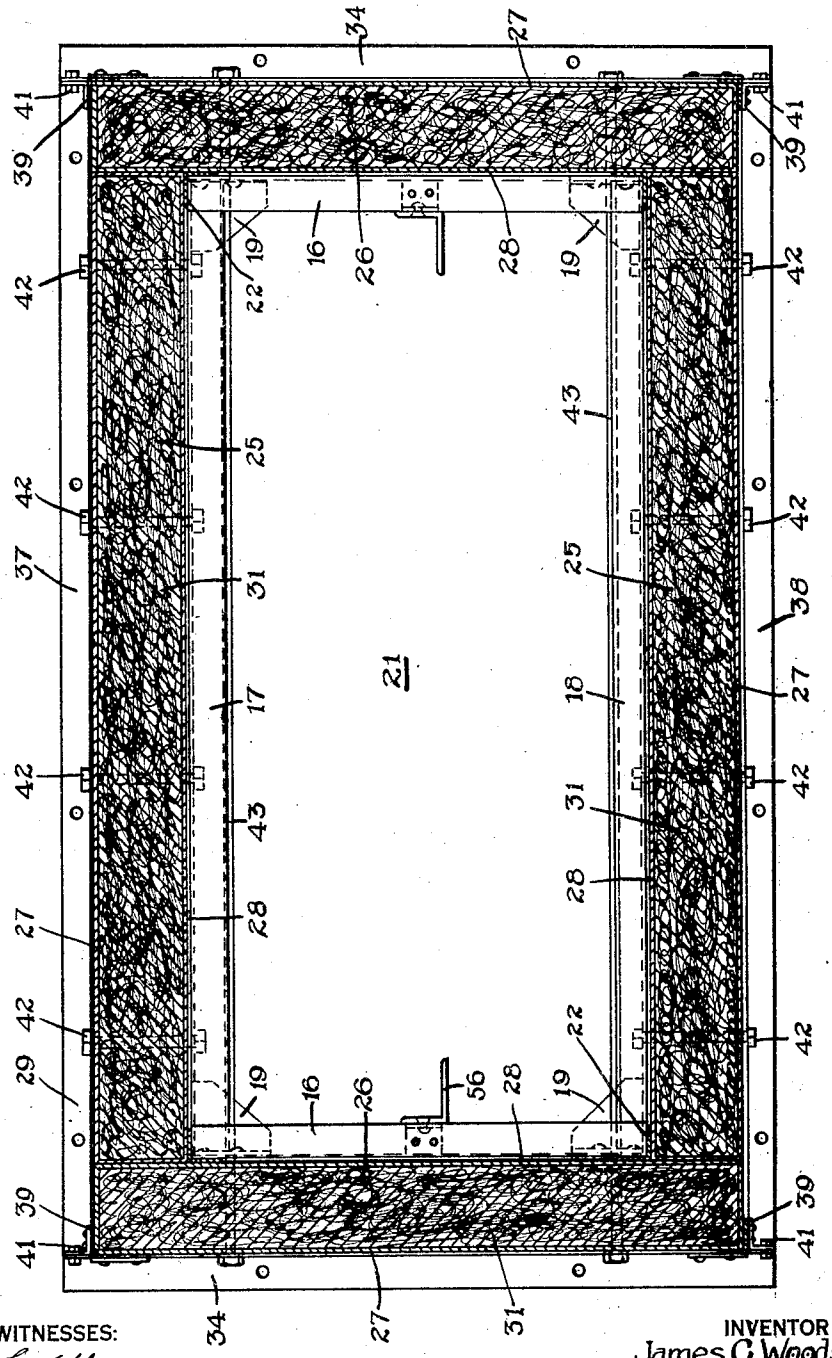


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SECTIONAL BAKE OVEN.

Application filed June 5, 1922. Serial No. 566,169.

To all whom it may concern:

Be it known that I, JAMES C. WOODSON, a citizen of the United States, and a resident of Mansfield, in the county of Richland and State of Ohio, have invented a new and useful Improvement in Sectional Bake Ovens, of which the following is a specification.

My invention relates to ovens and particularly to electrically heated tunnel-type baking ovens and it has for one of its objects to provide a relatively simple and compact tunnel-type oven comprising a plurality of individual units.

Another object of my invention is to provide a simple construction for the individual units of the oven and simple means for maintaining them in closed abutting relation and in longitudinal alinement.

Another object is to provide means for continuously moving material through said oven without reducing the temperature in the end oven-chambers by any substantial amount.

In practising my invention, I provide a plurality of individual oven units located in close abutting relation, each unit comprising an inner skeleton frame, a plurality of heat-insulating panels located thereon, an outer skeleton frame and means for securing all of the parts in proper operative positions relatively to each other. I provide a closing panel at each end of the oven, each having a relatively shallow opening therethrough to permit of moving material through the entire oven.

I provide a plurality of electric heating elements in each oven chamber, suitably secured to the top and the bottom panels, and I further provide means for carrying material to be baked through the oven, the carrying means being supported by suitable means secured to the inner skeleton framework.

In the drawings,

Figure 1 is a view, in side elevation, of an oven embodying my invention;

Fig. 2 is an end view thereof;

Fig. 3 is a diagrammatic representation of the electric heating elements;

Fig. 4 is a view, partly in vertical longitudinal section and partly in side elevation, of an end oven unit, and

Fig. 5 is a view, in vertical lateral cross-section, of the oven illustrated in Fig. 4, taken on the line V—V thereof.

A combined oven, which may be designated generally by the numeral 11, comprises a plurality of individual oven units 12, each of which will be described in detail hereinafter, and end or closing panels 13 suitably secured against the outer ends of the end oven units. Each of the individual oven units 12 is mounted on a suitable frame 14 provided with supporting members 15. The supporting frame 14 is of a skeleton type of construction and may be of any suitable or desired type usually employed for such purposes.

Each oven unit 12 comprises an inner metallic skeleton framework which is built up of a plurality of laterally extending skeleton frames, each comprising two side angle bars 16, a top angle bar 17 and a bottom angle bar 18, the co-operating ends of which are secured together in proper operative positions by suitable metal gusset plates 19 bolted or riveted to the angle bars. One of the frames comprising the angle bars 16, 17 and 18 and the gusset plates 19 is located at the end of each of the oven chambers 21 constituted by the oven units 12, and a third frame is located at substantially the middle of the length of each of the oven units. These three frames are secured together, in spaced-apart position, by a plurality of longitudinally extending angle-bar members 22, one of which is located at each of the corners of the frames hereinbefore described. This construction provides a substantially rectangular skeleton framework. The longitudinally extending members 22 are secured to the laterally extending frames by means of gusset plates 23, which may be suitably secured against the co-operating angle-bar members by rivets 24.

Heat-insulating panels 25 are located at the top and at the bottom of the oven chamber 21, each with its inner surface in operative engagement with the hereinbefore described skeleton framework. The panels 25 are of substantially the same lateral widths as the skeleton framework. Heat-insulating side panels 26 are located at the sides of the oven chamber 21, the height

thereof being such as to bring the upper and lower edges substantially flush with the outer surfaces of the top and the bottom panel. Each of the panels 25 and 26 is built up of an outer relatively thin sheet-metal plate 27 and substantially similar inner sheet-metal plate 28 and side and end plates 29 which may be secured together in spaced-apart relation in any suitable or desired manner usually employed in the art. The space between the two plates in each panel is filled with a suitable heat-insulating material 31, such as mineral wool. If desired, a relatively thin channel member 32 may be placed between the inner and the outer sheet-metal plates intermediate the ends of each of the top, bottom and side panels to stiffen the construction.

In building up each of the individual oven units 12, the skeleton framework hereinbefore described is first constructed and is then placed upon the bottom panel 25, and located in proper operative position thereon, after which the top panel 25 is placed in its proper operative position on top of the skeleton framework. The two side panels 26 may now be placed in proper operative positions against the side of the framework and against the side edges of the top and the bottom panel and temporarily secured in place by laterally extending bolts 33 passing through suitable openings in the side panels 26 and the central portion of the skeleton framework.

An outer skeleton framework comprises two substantially rectangular side frames, each of which comprise vertically extending angle members 34 and top and bottom longitudinally extending angle members 35, these members being suitably connected at their ends by gusset plates 36. The two above described outer skeleton side frames are connected together at each end of the oven units 12 by an upper laterally-extending angle bar 37 and a lower laterally extending angle bar 38, a relatively small angle-bar member 39 being suitably secured to the ends of each of the members 37 and 38 to permit of securing them to the side frames by means of suitable bolts 41. After the outer skeleton framework has been placed in proper operative position on each of the oven units, a plurality of bolts 42 may be placed in proper operative position extending through the side flanges of the outer angle bars 37 and 38, through the panels 25 and 26 and through the side flanges of the laterally extending angle bars 17 and 18. Top and bottom bolts 43, extending laterally through one flange on the angle bars 34, the side panels 26 and through one flange of the vertically extending angle bars 16, may now be placed in position adjacent the ends of each of the oven units to more tightly clamp the side panels 26 against the inner skeleton framework and against the sides of the top and bottom heat-insulating panels.

A plurality of electric heating elements 44 is located adjacent the bottom of each of the oven units in spaced-apart relation. A relatively less number of substantially similar heating units 44 are located adjacent the roof of the ovens and are suitably spaced apart longitudinally. The heating elements may be of any desired type but are here illustrated as of substantially the construction disclosed by Patent No. 1,335,483, issued March 30, 1920, to O. A. Colby. As this construction of heating element provides end supporting members of substantially channel form they may be easily mounted in proper operative positions on the top of the bottom panel and on the bottom of the top panel, substantially as illustrated in Fig. 4 of the drawing, where the bottom heating elements are shown as being secured in proper operative position by screws 45, while the top heating units are secured by means of angle-bar members 46 secured against the inner sheet-metal wall and against the end frames of the heating elements. As any suitable or desired method of connection and of bringing out the supply circuit conductors 47 may be employed, these features are not further illustrated as they form no part of my invention. In assembling the individual oven units, I have found it desirable to mount the heating elements 44 in proper operative positions on the top and on the bottom panel before the same are placed in proper operative positions on the skeleton framework.

The arrangement and control of the electric heating elements is more particularly described and claimed in my companion application Serial No. 566,170, filed concurrently herewith, to which reference may be had for further details.

In order to suitably close up the ends of the combined oven, the end panels 13, constructed substantially the same as the top, bottom and side panels, are provided and have an outer metal frame comprising vertically and horizontally extending angle-bar members 48, substantially the same as hereinbefore described in connection with the outer skeleton framework. Short bolts 41 serve to secure the panel 13 against the co-operating oven units 12, a sheet 49 of heat-insulating material, such as asbestos, being placed between the interengaging surface of the end panel 13 and the top, bottom and side panels to reduce the amount of heat which may flow into and through the end panels.

Means for moving material to be baked through the oven units 12 may comprise an endless belt 51, of any suitable or desired

construction, here illustrated generally as comprising a plurality of metal links 52, rods 53 and rollers 54, the links 52 and the rollers 54 being located at the two ends of the rods 53 which extend laterally of the oven structure. Suitable pulleys 55 are located at each end of the oven, supported by suitable means (not shown) to permit of moving the endless belt to carry material into and out of the assembled oven. Suitable means (not shown) may be provided upon which the material to be baked may be placed to be carried by the rods 53 through the oven chamber 21. I provide supporting means for each side of the endless chain 51 in the oven chambers, each comprising a suitable angle bar 56 which may be secured against the side members 16 by small angle members 57 secured thereto. While the members 56 may be of any suitable or desired length, I prefer to make them of such length that they extend from one oven into the next, or even extend through a plurality of individual oven units not only to reduce the number of joints over which the rollers 53 are required to pass, but also to more securely aline the individual units in proper operative positions relatively to each other. A relatively shallow opening 58 is provided in each of the end panels 13 to permit of extending the members 56 beyond the end of the assembled oven and to permit of the endless belt or chain 51 moving therethrough. Angle-bar members 59 may be mounted in suitable positions in the supporting members 15 of the supporting frames 14, upon which the endless chain 51 may rest in its return passage from one of the pulleys 55 to the other.

The individual units 12 may be suitably bolted together by bolts 41 placed through the side flanges of the horizontally extending angle-bar members of the outer skeleton framework, substantially as illustrated in Fig. 1 of the drawings.

If desired, the inner metal skeleton framework may be built up, either partially or completely, at the factory, and the heat-insulating panels hereinbefore described may also be completely assembled at the factory, as also the outer metallic skeleton frame, and shipped to the place where they are to be erected. The individual oven units may be erected adjacent to their final location or they may be assembled substantially in their proper operative and final locations, and a complete oven may be constructed comprising any desired number of individual oven chambers or units. If it is desired to increase the length of an already assembled and operating oven it is only necessary to remove one of the pulleys 55, after having disconnected the endless belt 51, to remove the end panel and to then add to the already assembled oven any desired additional number of individual oven units, built up as hereinbefore described, without disturbing the rest of the structure. If desired, any installed oven may also be shortened in substantially the same manner.

The oven embodying my invention thus provides relatively simple individual oven units comprising inner and outer metallic skeleton frames and heat-insulating panels, any desired number of which may be built up or placed in close abutting relation to provide an oven chamber of any desired length, through which material to be baked may be moved. The relatively shallow openings provided in the end panels permit of introducing material into, and taking material out of, the oven, without reducing the temperature in the end oven chambers by any substantial amount, thus insuring uniformity of baking operations.

Various modifications may be made in the device embodying my invention without departing from the spirit and scope thereof, and I desire that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

I claim as my invention:

1. In a tunnel-type brake-oven, in combination, a plurality of horizontally extending oven chambers located in abutting relation, each chamber comprising an inner metallic skeleton frame, a plurality of heat-insulating wall panels on said framework, and an outer metallic frame work for securing said wall panels on said inner frame and for holding said abutting chambers in proper operative position relatively to each other.

2. In a tunnel-type bake-oven, in combination, a plurality of oven chambers located in abutting relation, each chamber comprising a metallic skeleton frame, top, bottom and two side wall heat-insulating panels operatively engaging said frame, means for clamping said side wall panels against said top and bottom panel and against said frame, and means located at the end of each oven chamber and on the outside of each of said panels for permitting the securing together of the adjacent abutting oven chambers.

3. In a tunnel-type bake-oven, in combination, a plurality of oven chambers located in abutting relation, each chamber comprising a metal skeleton frame, top, bottom and two side-wall, heat-insulating panels operatively engaging said frame, means for moving material through said oven chambers, and means secured to said skeleton frame for maintaining said oven chambers in alinement and in close abutting relation and for supporting said material moving means in said oven chambers.

4. In a tunnel-type bake-oven, in combi-

nation, a plurality of oven chambers, having open ends and located in abutting relation, means adjacent the ends of each of said chambers for permitting of securing them together in close operative engagement, and a closure panel at each end of the plurality of chambers, said panels having a relatively shallow aperture therethrough for permitting material to be moved into, through, and out of said oven while reducing the amount of air flowing through said oven.

5. In a tunnel-type bake-oven, a plurality of oven chambers, each comprising a metal skeleton frame substantially rectangular in lateral contour, a top and a bottom heat-insulating panel substantially coextensive laterally and longitudinally with said frame, side heat-insulating panels abutting the edges of said top and bottom panels, means for securing the top and bottom panels to said frame, and means for clamping said side panels against said frame and against the edges of the top and bottom panels.

6. In a tunnel-type bake-oven, in combination, a plurality of oven chambers, each comprising a metal skeleton frame substantially rectangular in lateral contour, a top and a bottom heat-insulating panel substantially coextensive laterally and longitudinally with said frame, side heat-insulating panels abutting the edges of said top and bottom panels, means located on the outside of said panels adjacent the ends of the chamber for securing the adjacent chambers in close abutting relation to each other, means for clamping said securing means, and top and bottom panels in proper operative relation on said skeleton frame, and means for clamping said securing means and said side panels in proper operative position against said skeleton frame.

7. In an electrically heated tunnel-type bake oven, in combination, a plurality of separable oven chambers each comprising an inner metal frame, a plurality of heat-insulating panels on said frame, an outer metal frame, and means for securing all of said members in proper operative positions relatively to each other, means operatively engaging said outer frame for securing said oven chambers in closely abutting relation, electric heating means in each of said oven chambers and means at each end of the oven for retaining the heat generated therein but permitting of moving material therethrough.

In testimony whereof, I have hereunto subscribed my name this 29th day of May, 1922.

JAMES C. WOODSON.