Sept. 3, 1963 F. L. LEFEBVRE 3,102,942

SECTIONAL OVEN UNIT

Filed Jan. 9, 1956 2 Sheets-Sheet 1

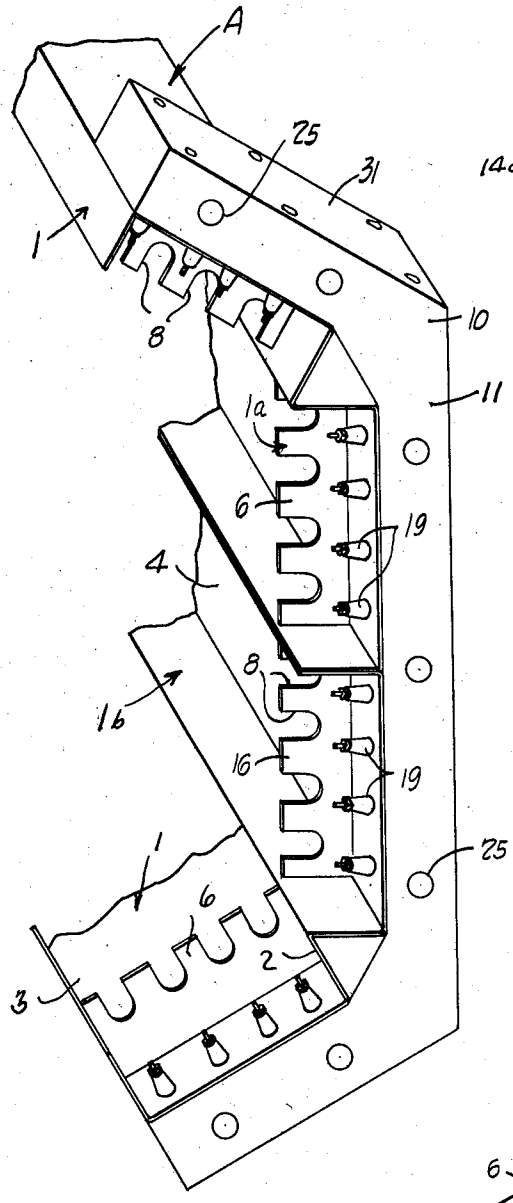


Fig. 1

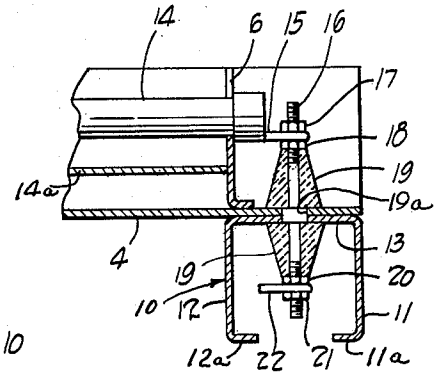


Fig. 5

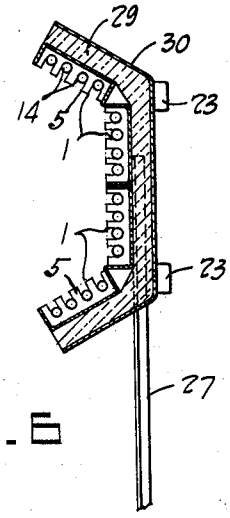


Fig. 6

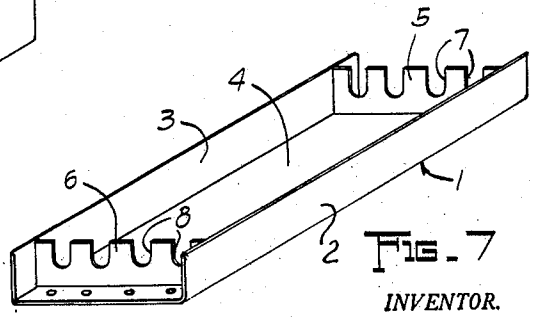


Fig. 7

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SECTIONAL OVEN UNIT

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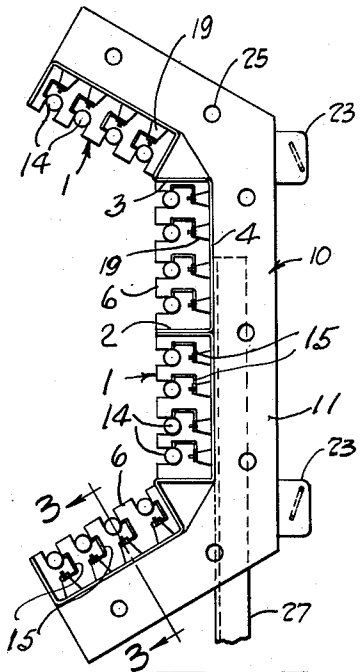


Fig. 2

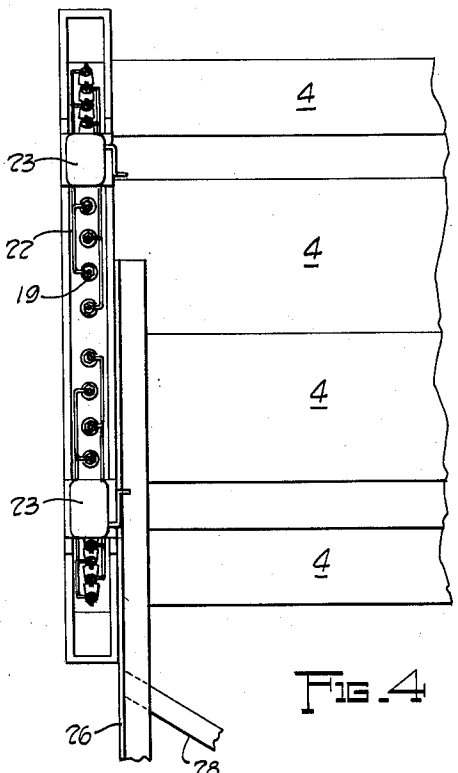


Fig. 4

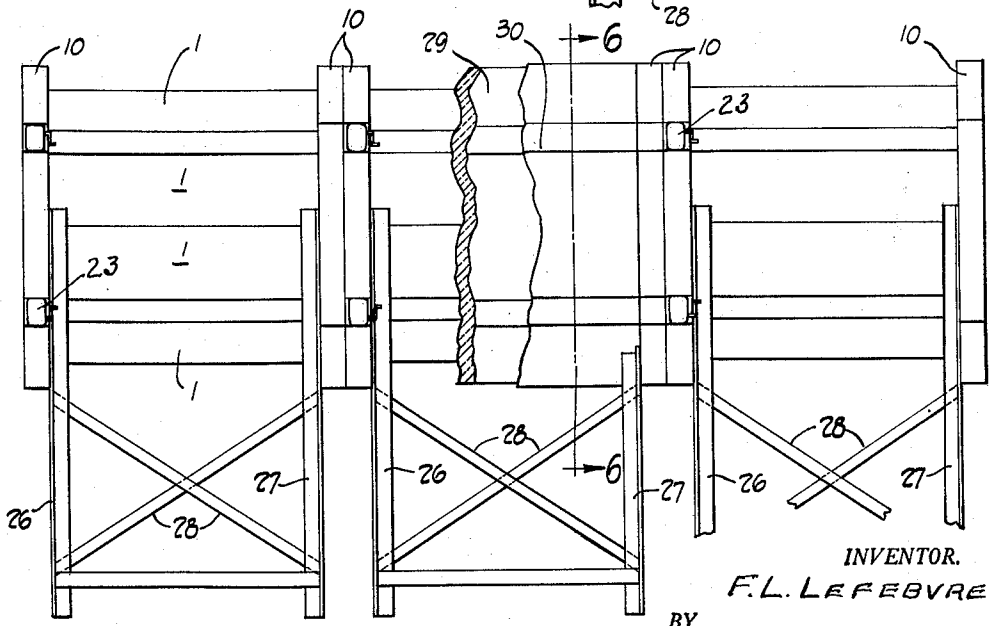


Fig. 5

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3,102,942

SECTIONAL OVEN UNIT

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2 Claims. (Cl. 219—35)

This invention relates to ovens and primarily those suitable for baking purposes in industrial applications, and more particularly sectional ovens.

Generally speaking ovens in the class to which this invention is directed are presently being furnished on the basis of custom design for a specific application and as a result are products of costly engineering and design for each individual set of conditions.

The broad purpose of this invention is to provide standard heating units which may be combined in a manner to meet widely varying conditions, such conditions being largely predetermined and thus reduce or eliminate the necessity of expending engineering and design time or skill. The foregoing is possible because such skills may be availed of to initially determine conditions which can be met and provide tabulation of combinations required to meet the same, obviating subsequent resort thereto.

Simply stated, the object of this invention is to make possible the provision of quantities of basic elements and units which may be combined in accordance with predetermined calculations to produce results usually only possible after custom production of a complete oven.

In carrying out the foregoing, it is an object hereof to provide a single basic heating unit which may be arranged with duplicates thereof to provide an oven section, and the oven section in turn simply aligned and connected with a similar one or ones so as to produce a complete oven with substantial savings in labor and material.

A further object of the invention is to provide heating units which are substantially rectilinear, being somewhat elongated, arranged with sides in alignment, the ends being fastened to common structural members, one at each end. The structural members are in turn so arranged as to enable alignment thereof with a corresponding structural member of an adjacent similar section and thus provide a long row if desired and a complete oven thereby.

Yet another object of the invention is to provide the units and sections above described, where the structural members or certain of them may comprise a raceway or raceways as the case may be, thus serving a dual purpose thereby.

Another object of the invention is to provide the raceways described, whether a single one for each unit or a pair as will usually be the case, one at each end of each section, arranged so as to receive therebetween, suitable insulation, and further of such shape as to enable the covering of the insulation and retaining of the same in place.

While it will be understood that the purposes and objects hereof particularly relate to and are primarily designed for use in connection with electric heater elements, other similar conditions may be met where different sources of heat are desired. Further to the above, the invention is most suitable for use in radiant heat source applications and more particularly with tubular radiant heater elements.

Yet a further object of the invention is to provide the units capable of assembly as stated, to structural members which are raceways, where the means for connecting the units and structural members are comprised of insulating units or devices, mounted in the members and including insulating parts, and conducting parts which are equivalent to bolts, the necessary nuts being used as required.

Other and further objects of the invention will be understood from a consideration of the specification appended hereto and shown in the drawings wherein:

FIGURE 1 is a perspective view showing an oven section constructed in accordance with the invention with certain of the parts omitted and indicating more particularly the structural members provided.

FIGURE 2 is an end view of an oven section, similar to FIGURE 1, with certain of the supporting means therefor being illustrated.

FIGURE 3 is an enlarged sectional view, fragmentary in nature taken about on the line 3—3 of FIGURE 2 looking in the direction of the arrows.

FIGURE 4 is a view in elevation of a single section showing the relationship of the parts and structural members as well as the electrical conductors availed of therein.

FIGURE 5 is a view in elevation, on a somewhat reduced scale showing one form of oven as involving the assembly of three sections shown in other views in individual parts and suggested means for supporting said sections in alignment.

FIGURE 6 is a vertical sectional view taken about on the line 6—6 of FIGURE 5.

FIGURE 7 is a perspective view of one of the basic structural parts comprising a heater unit body.

Referring now to FIGURES 1 and 7 initially, the oven section generally denoted A is seen as being comprised of a number of rectilinear bodies 1, the same being in the form of relatively long narrow and somewhat shallow pan-like parts including longitudinal sides 2 and 3, a bottom 4 and the ends 5 and 6 of substantially duplicate conformation including as they do the notches or openings 7 and 8 respectively.

Whereas the illustrations of the several figures herein show that the oven section A is comprised of four heater units 1 it will be understood that units designated 1*a* and 1*b* may be more widely spaced as to their side to side relationship so that a further unit may be inserted therebetween and thus three units in alignment will be provided.

In order to support the units 1 in alignment and with the sides thereof in substantial engagement at least as to those illustrated in the position 1*a* and 1*b* of FIGURE 1, structural members denoted 10 may be provided, these members being U-shaped in cross section as illustrated in FIGURE 3 including sides 11 and 12 with a bottom 13, the sides 11 and 12 being equipped with inturned flanges 11*a* and 12*a* for strength increasing purposes, the structural member 10 as a whole being a truncated V in elevation or what may be described as a modified U-form.

It will be understood that the structural member 10 herein being described is composed of metal, formed in the transverse and longitudinal shape shown or substantially similar thereto with any preferred manner of fabrication being resorted to so that a rigid unitary element is provided.

Since the contemplation hereof is one in which electric energy is preferred as the source of heat generated, and further tubular electric elements are furnished, the said elements being indicated at 14 in FIGURE 2, it is necessary to provide suitable electrical connections therefor in order to arrange the same in any preferred circuit manner. For this purpose with the tubular heating elements 14 in place, suitable connections are made as by means of the wires 15 for example as shown in FIGURE 2, the wires 15 being conductors and illustrated also in FIGURE 3 as extending from each end of each tubular element 14 into engagement with an insulator part equivalent to a bolt and denoted 16 the said conductor 15 being maintained in conjunction with the bolt 16 by means of the nuts 17 and 18. A preferred form of ceramic insulator may be furnished, indicated at 19, the bolt or

threaded member **16** extending through the bottom **4** at the end of the unit **1**, the bolt further extending through the opening **19***a* and through a corresponding opening formed in the bottom **13** of the structural member **10** previously mentioned. A similar or duplicate ceramic insulator **19** may be provided on the inner side of the bottom **13** and other nuts **20** may be furnished engaging the bolt or threaded member **16**, a further nut **21** being provided to connect a conductor **22** thereto, the conductor **22** leading to any suitable source of electric energy under the control of a switch **23** such as shown in FIGURE 4, the conductor such as **22** being illustrated likewise therein.

From the foregoing description and bearing in mind that there is no other mechanical connection of the structural members **10** with the units **1**, except those just described and actually comprising insulator units as well as mechanical connections, a rigid structure is nevertheless provided. This rigid structure results from the fact that there are four insulator units at each end of the members or units **1**, connected as they are to the structural members **10**, the conductors **22** being mounted within the structural members **10** and thus the structural members **10** acting as raceways therefor.

It is readily understood that the provision of the notches **7** and **8** is for the express purpose of positioning the tubular heating elements **14** therein and they may be retained in such notches in any preferred manner, not particularly further disclosed herein.

As will be further appreciated, the structural members **10** or raceways as same may be preferably designated, are provided, one at each end of a group of heater units which basically comprise the members **1** described in detail heretofore, with the bodies **1** suitably fastened thereto by the insulating units in the manner described, and as shown in FIGURE 2 in end elevation, the configuration of the structural member or raceway is such as to provide vertical heating units as well as upper and lower angularly positioned units.

In addition the sides **11** of the structural elements **10** are provided with suitable openings such as **25** through which fastening members such as nuts and bolts may be introduced, whereby when a series of sections which are indicated by the notation A are placed in alignment lengthwise as illustrated in FIGURE 5, adjacent corresponding sides **11** of similar and correspondingly arranged raceways **10** may be fastened together. At the inner sides, fastened to the parts **12** and extending downwardly therefrom so as to support the sections A at any preferred height are vertical angle iron members such as **26** and **27**. Longitudinal brace members **28** may be furnished to stiffen the parts **26** and **27** and while no transverse members are shown they obviously may be provided readily and without any particular engineering calculation being required.

Since it will be obvious that suitable reflector members **14***a* may be provided within the heater units and the bodies **1** thereof, adjacent and behind the tubular elements **14** provided, it will also be understood that a substantial amount of heat is present and therefore it is desirable to insulate the sections at the rear thereof and for that purpose FIGURE 6 is referred to as well as FIGURE 5 illustrating the insulation material **29** and being in place therein a cover such as **30** being provided thereover to retain the insulation material between the raceways or structural members **10**, the said cover **30** being fastened in any suitable manner to such raceways.

Whereas FIGURE 5 illustrates the possibility of arranging oven sections in longitudinal series, it will be further understood that an increase or decrease in the

number of units **1** may be provided by increasing or decreasing the size of the structural members **10** correspondingly. Thus in order to provide for a large variation in requirements, the basic elements such as the units **1** may be provided as standard parts and large numbers thereof fabricated in advance of use, similarly structural members or raceways **10** being fabricated to accommodate a range of units **1**.

It will therefore be understood that when certain conditions of use are to be met, by predetermining the output of the heating elements which may be accommodated and thus ascertaining how many heating elements are required, rapid assembly may be availed of and a number of oven units provided so as to be assembled into a complete oven as shown in the FIGURE 5 example. It is further understood that the illustration of that figure is of one half of the oven and where more are required a mating section opposite thereto may be furnished so that the material to be subjected to the heat is passed between the respective oven portions as will be apparent.

It is particularly pointed out that for the insulating units including the bolts or threaded members **16**, the nuts **17** and **18**, and the ceramic parts **19**, additional nuts **20** and **21** are provided to not only act as insulating parts but further to mechanically fasten the units **1** to the raceways **10** without resorting to other fastening means therefor. It will also be clear that suitable cover portions may be provided for the raceways such as illustrated at **31** in FIGURE 1 in the form of a plate fastened to the flanges **11***a* and **12***a* of the raceways **10**.

While the illustrations in the various figures, particularly FIGURES 2, 4 and 6 show angle iron support members such as **26** or **27**, it will be apparent that the oven sections may be supported in any preferred manner, and that the provision of the openings or parts **25** of the respective raceways may enable the connection in longitudinal alignment of the oven sections to provide a complete oven as will be desirable to meet certain conditions.

I claim:

1. In oven construction of the class described, in combination, a series of identical heating units, each unit comprising a relatively long narrow box-like body, at least one electric heating element having electrical terminal means mounted in each body, said bodies being arranged in substantially aligned parallelism, a pair of structural support members of substantially channel-like cross section and generally U-shaped in elevation, said members each located at respective ends of said bodies and extending generally transversely of the bodies, at least one of said structural members comprising a wiring raceway, electrically insulated fastening means securing said bodies and structural members together, said fastening means including electrical conductor means secured to said terminal means and extending into the interior of said structural members.

2. In an oven construction as set forth in claim 1, and additional electrical conductor means in said raceway connected to said first-mentioned electrical conductor means and to an electrical power supply.

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