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W. H. HUDSON
INFRARED OVEN STRUCTURE

2,559,249

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4 Sheets-Sheet 1

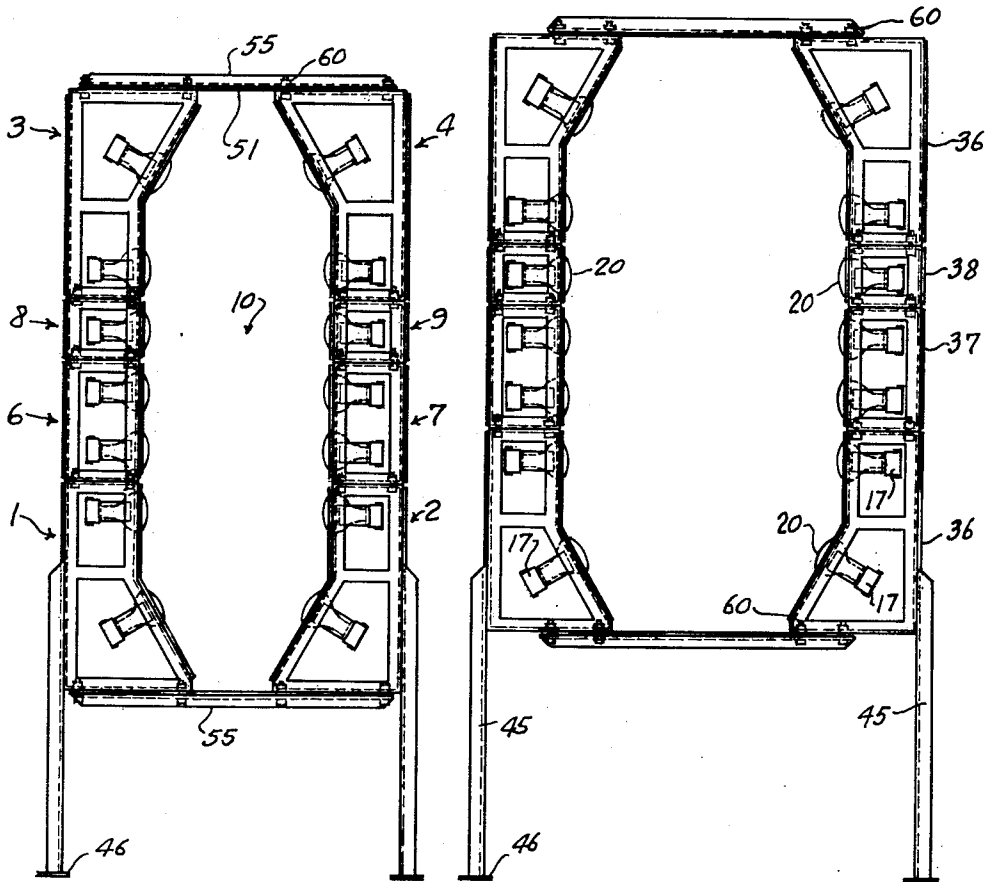


FIG. 1.

FIG. 2.

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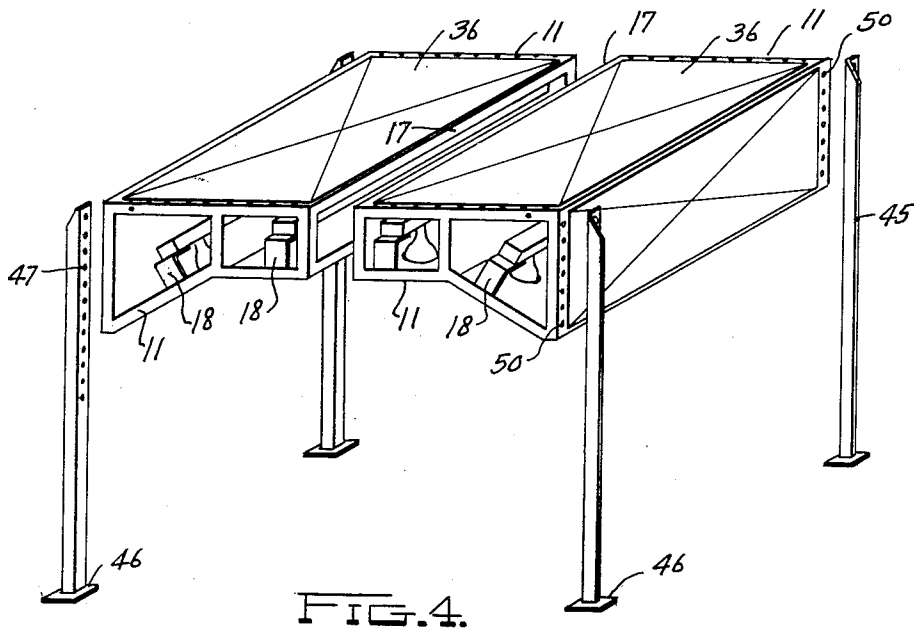
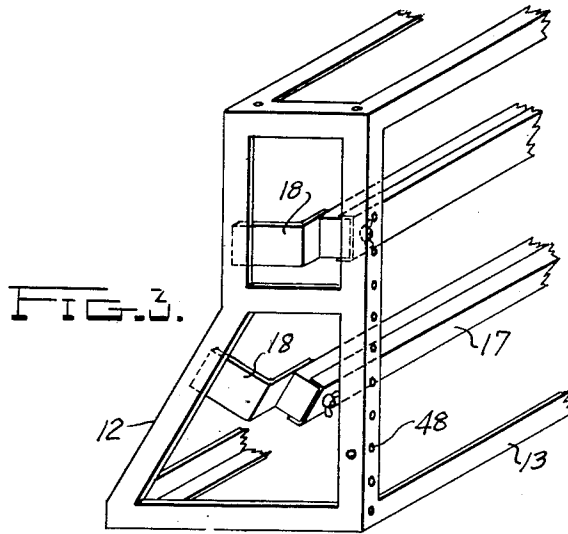
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INFRARED OVEN STRUCTURE

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4 Sheets-Sheet 3

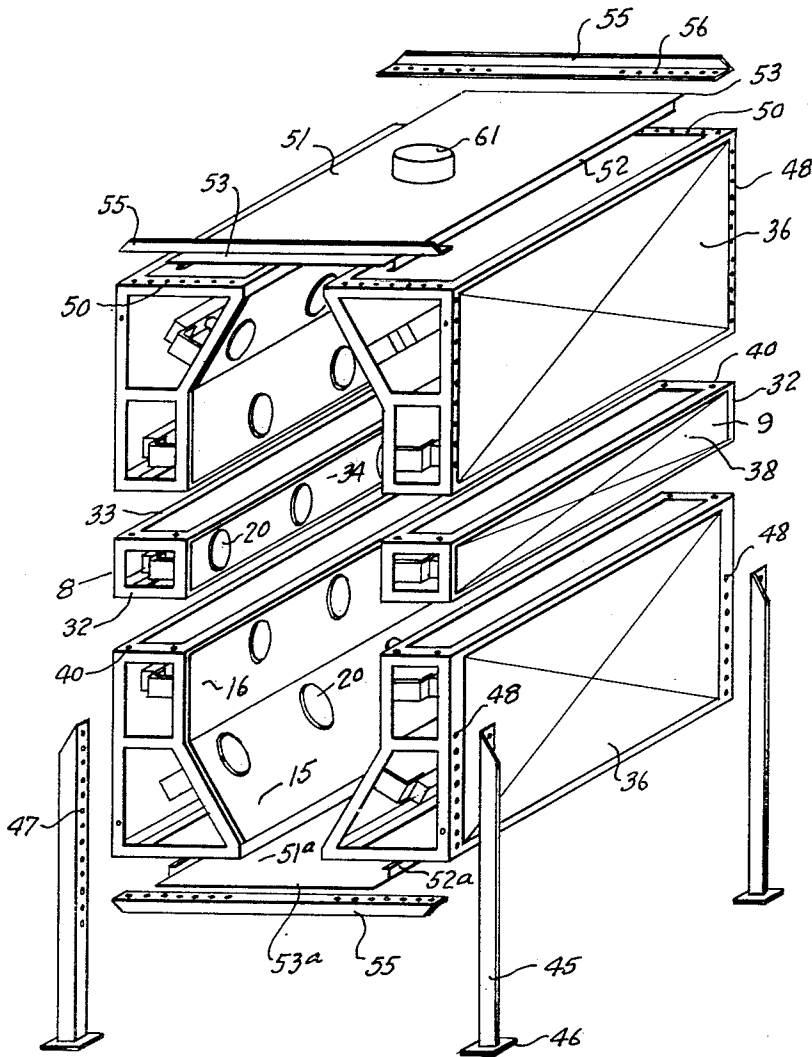


FIG. 5.

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4 Sheets-Sheet 4

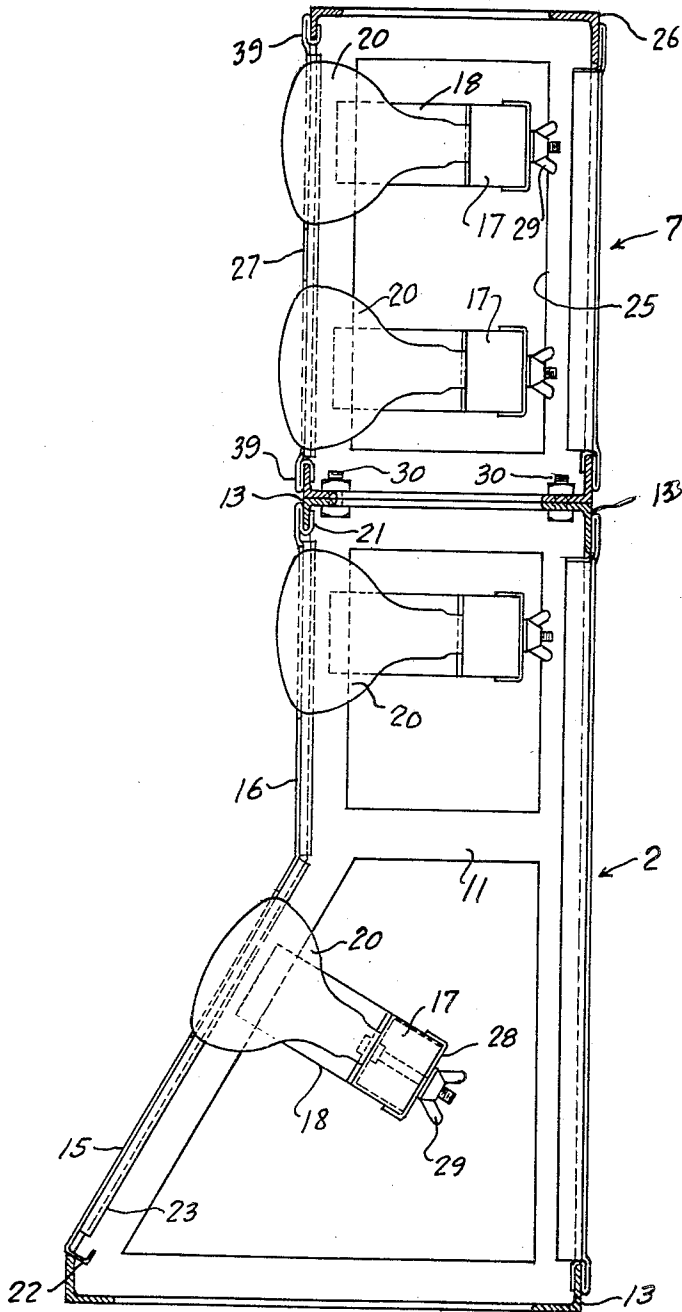


FIG. 6.

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INFRARED OVEN STRUCTURE

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5 Claims. (Cl. 219—35)

1

This invention relates to an infra-red oven and it has to do particularly with an oven through which work pieces may be passed and subjected to heat rays to treat the work.

One of the most important reasons for treating work with heat rays is to dry coating material on the work such as paint, lacquer, or other substance. It will be readily appreciated that manufacturers of various kinds of goods which are to be thus passed through an infra-red oven require ovens of different sizes, shapes and capacity depending largely upon the size, shape and type of the work to be handled. The size of oven may also depend upon the type of surface coating to be dried and other factors such as the mass of metal in the work piece.

The principal object of the present invention is to provide an improved oven structure and more especially to provide oven sections of a standardized nature, to the end that the sections may be selected and assembled together to provide an oven of the desired shape, size or capacity.

Heretofore, it has been the practice to ascertain the manufacturers' particular needs and then build an oven designed to fit these needs. This, of course, is an expensive way in which to operate as each oven is built to order, so to speak. In accordance with the present invention, the sections of ovens may be made on a production basis with all sections of like form having the same dimensions and being similarly provided with attaching devices. These sections may be made up and held in stock and an oven of specific requirements can be assembled by using the requisite number and arrangement of prefabricated sections and assembling these sections together. In this way, a large variety of ovens can be had while using standardized sections. Thus, a manufacturer of ovens can quickly and economically select the sections to provide a large variety of different sizes and shapes of ovens and ovens of different capacity.

An oven structure made in accordance with the invention is shown in the accompanying drawings:

Fig. 1 is a front elevational view of an oven constructed of standardized units.

Fig. 2 is a view of an oven of different size and shape which is constructed of the same standardized units.

Fig. 3 is a partial perspective view of an end portion of one of the sections.

Fig. 4 is a view showing parts separated and indicating a different arrangement of some of the sections.

2

Fig. 5 is a perspective view with sections separated illustrating a different combination of sections than that shown in Figs. 1 and 2.

Fig. 6 is a view partly in section showing the details of construction.

As illustrated in the drawings, the sections include what may be termed corner sections and intermediate sections. In Fig. 1, a furnace structure is made up of three different sections. There is one corner section 1, a second corner section 2, these two sections being located at the lower part of the oven, and upper corner sections 3 and 4. The four corner sections are identical in construction. There are two intermediate sections 6 and 7 and two further intermediate sections 8 and 9. When these are disposed as shown, an interior oven space 10 is provided through which the work may be passed on a suitable conveyor, or the like (not shown).

Each corner section, as indicated in Figs. 3 and 4, may be made up of suitable angle iron construction having an end frame 11 with an angularly disposed portion 12 and lengthwise extending frame members 13. Mounted on the inner face of the frame and particularly on the angular frame portions, is a panel of sheet metal having a portion 15 which is mounted on the angular parts 12 and a vertical portion 16. These two panels may be separate or integral as desired. Within the frame structure and specifically back of the panels 15 and 16 are conduit structures 17 for containing electrical conductors. These conduits may be carried by brackets 18 mounted on the end frames and the conduits support heat lamps 20, as shown in Fig. 6. The panels 15 and 16 are provided with openings for receiving the lamps so that the rays therefrom may be directed into the oven cavity 10 and be applied to the work.

As shown in Fig. 6, the panels 15—16 comprise a single sheet of material formed with a hook formation 21 along its upper edge for engagement with one of the angle members 13 and may be fashioned with an inturned foot portion 22 at its lower edge for engagement with a frame member. The edges of the panels may be turned inwardly to form flanges 23 for fitting within the opposite end frames 11.

A section 6—7 is made to provide two horizontal lines or columns of lamps, as shown in Fig. 6. This section has an end frame structure 25 and longitudinal frame members 26 with a sheet metal facing 27 provided with apertures for the lamps 20. Each row of lamps is carried by the conduit 17, the structure of which is the same as the conduit 17 in the corner sections.

The conduits may be closed by plates 28 held by bolts and wing nuts 29. The flanges of the frame members where they meet each other as shown in Fig. 6, are provided with holes so that the flanges can be bolted together by bolts 30.

The sections 8 and 9 are similar to the sections 6 and 7 except these are smaller sections, as shown in Fig. 1, arranged to provide one horizontal row of lamps. The sections 8 and 9 have end frame members 32 connected by longitudinal frame members 33 with a sheet metal facing 34 having apertures to receive the lamps as shown in Fig. 5. The sheet metal panels or facings 27 and 37 may be secured to the respective frames at their edges as shown at 39.

Each of the sections is closed in its outer portion by suitable sheet metal panels 36 for the corner sections, panels 37 for the sections 6 and 7 and panels 38 for the sections 8 and 9. The apertures for the bolts 30 are illustrated at 40, the same character being applied to like apertures in all sections.

In order to mount the oven a leg 45 advantageously of angle iron construction may be provided for each corner, with each leg having a foot 46 and each leg having a plurality of bolt holes 47. The frame structure of each corner section may have a plurality of bolt holes 48. Accordingly, the legs may be bolted to the corner sections to provide various heights, as shown in Figs. 1 and 2. The corner sections likewise have their end frames 11 provided with a plurality of bolt holes 50 by means of which the top and bottom panels may be applied.

The upper panel 51 is a sheet of metal with turned down edges 52 for fitting between the end frames 11 and with an extending lip 53 which rests upon the frame members 11. To secure the panel in place, an angle iron strip 55 is placed over the extending lip 53. The securing strip has a plurality of bolt holes 56 by means of which bolts may be passed through the holes 56 and 50 to secure the holding strips 55 in position. Thus, the lips 53 are clamped in position. The bottom panel may be the same or similar structural element, namely, the sheet metal panel 51a with its flanges 52a and the extending lips at the end 53a to be clamped against the end frame 11 by the angle strip 55. It will, therefore, be apparent that the end sections may be placed at various distances spaced relative to each other and bolted in position by bolts 60 passing through the holes 56 and 50.

The versatility of the structure is demonstrated in Figs. 1 and 2. In Fig. 1 the oven is comprised of a bank of sections including two end sections and a large and small intermediate section 6 and 8 and an opposing bank of sections, namely, two corner sections 2 and 4 and intermediate sections 7 and 9. The furnace structure shown in Fig. 2 has the same number of sections but it will be noted that the oven is in a higher position because the two lower corner sections are attached to the legs in a higher position. Also, the two banks of sections have been spread apart and secured by the bolts 60. The elements 55 not only serve to hold the top and bottom panels in position but serve to hold the sections rigidly in assembly.

In the separated view of Fig. 5, a smaller oven is shown. This comprises four like corner sections and two of the smaller intermediate sections 8 and 9. The upper panel may have a flue or outlet 61 for venting the oven chamber.

The arrangement in Fig. 4 demonstrates how an oven of a horizontal nature, as distinguished

from a vertical nature, can be provided. In this case, however, the corner sections are disposed horizontally and the bolt holes 50 are employed for attachment to the legs while the bolt holes 48 may be employed for the top panels. Fig. 4 demonstrates two corner sections in separated relationship which may be bolted directly together or may have one or more intermediate sections disposed between them to thus make a wider oven. An arrangement of this kind may be used where the work is passed underneath the bank of lamps.

While only a few different forms of ovens have been indicated, it is believed that from the description given above, that it will be clear how, by the use of these standardized sections, many ovens of different sizes can be made. Also, the length of the oven can be determined as desired by the simple expedient of placing a plurality of like assemblies of sections in end to end relationship.

We claim:

1. An infra-red oven composed of a plurality of standardized pre-fabricated elongated sections comprising, a corner section having end frames and lengthwise extending frame members, said end frames having parts disposed substantially at right angles to each other and a part disposed angularly relative to both of the first said two parts, there being four of such corner sections with one at each corner of the oven and with some sections positioned reversely and reversed end to end relative to other sections, sheet metal paneling on the inner portions of the frame sections including the angularly disposed frame members, said sheet metal paneling having apertures therein, lamps for emitting infra-red rays carried by the frame members and exposed through said openings, the parts of the end frames which are substantially at right angles to each other having a plurality of bolt holes therein, a leg for each corner of the oven, each leg having a plurality of bolt holes whereby the corner sections may be adjustably secured to the legs, top and bottom panels, and connector strips having a plurality of bolt holes therein for connection to the lower and upper corner sections by bolts passing through the holes in the connector strips and in the end frame members for positioning the end sections relative to each other and for holding the top and bottom panels in position.

2. An infra-red oven composed of a plurality of standardized pre-fabricated elongated sections comprising, a corner section having end frames and lengthwise extending frame members, said end frames having parts disposed substantially at right angles to each other and a part disposed angularly relative to both of the first said two parts, there being four of such corner sections with one at each corner of the oven and with some sections positioned reversely and reversed end to end relative to other sections, sheet metal paneling on the inner portions of the frame sections including the angularly disposed frame members, said sheet metal paneling having apertures therein, lamps for emitting infra-red rays carried by the frame members and exposed through said openings, an intermediate section disposed between each corner section with the intermediate sections being of the same structure but reversed as to position, means for bolting the intermediate section and corner sections together, the parts of the end frames which are substantially at right

5

angles to each other having a plurality of bolt holes therein, a leg for each corner of the oven, each leg having a plurality of bolt holes whereby the corner sections may be adjustably secured to the legs, top and bottom panels, and connector strips having a plurality of bolt holes therein for connection to the lower and upper corner sections by bolts passing through the holes in the connector strips and in the end frame members for positioning the end sections relative to each other and for holding the top and bottom panels in position.

3. An infra-red oven composed of a plurality of standardized pre-fabricated elongated sections comprising, a bank of sections including a lower corner section and an upper corner section with the corner sections being of the same structure and reversed as to position, at least one intermediate section disposed between the corner sections, said sections each including individual end frames of fixed size and shape and longitudinal frame members connecting said end frames to form said elongated sections, the opposite sides of said intermediate sections being of substantially the same size and shape and said corner section having one side thereof of substantially the same size and shape as one pair of opposite sides of the intermediate section, means for securing the sections together at the matching sides thereof, an opposing bank of like sections, the corner sections at their ends having a plurality of bolt holes in both vertical and horizontal parts thereof, a leg for each corner of the oven having a plurality of bolt holes for adjustable attachment to vertically extending parts of the lower corner sections, and connector strips for connecting the two lower corner sections and the two upper corner sections having a plurality of bolt holes therein for connecting the banks together in different spaced relationship.

4. An infra-red oven composed of a plurality of standardized pre-fabricated elongated sections comprising, a bank of sections including a lower corner section and an upper corner section with the corner sections being of the same structure and reversed as to position, an intermediate section disposed between the corner sections, said sections each including individual end frames of fixed size and shape and longitudinal frame members connecting said end frames to form said elongated sections, the opposite sides of said intermediate sections being of substantially the same size and shape and said corner section having one side thereof of substantially the same size and shape as one pair of opposite sides of

6

the intermediate section, means for securing the sections together at the matching sides thereof, an opposing bank of like sections, the corner sections at their ends having a plurality of bolt holes in both vertical and horizontal parts thereof, a leg for each corner of the oven having a plurality of bolt holes for adjustable attachment to vertically extending parts of the lower corner sections, connector strips for connecting the two lower corner sections and the two upper corner sections having a plurality of bolt holes therein for connecting the banks together in different spaced relationship and top and bottom panels for closing the space between the upper and lower corner sections having parts underlying the connector strips.

5. A pre-fabricated elongated section of an infra-red oven comprising, a pair of end frames, each frame having an outside frame member and an inside frame member, the inside frame member, for a portion of its length, paralleling the outside frame member and for a portion of its length being angularly disposed relative to the outside frame member, whereby the end frame members have a greater dimension on one side than the other, lengthwise extending frame members connecting the end frames, sheet metal paneling over the inside frame members having apertures therein for receiving lamps for emitting infra-red rays, the outside frame members having a plurality of bolt holes therein, a leg for each outside frame member adapted to be bolted thereto, whereby the section may be bolted at different positions on the legs, the side of the section having the greater cross dimension having a plurality of bolt holes in the end frame adapted to be connected to the legs whereby the section may be disposed in a horizontal position.

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