Nov. 27, 1934. G. W. HEINBUCH 1,982,386

OVEN

Filed May 4, 1931

Fig. 1.

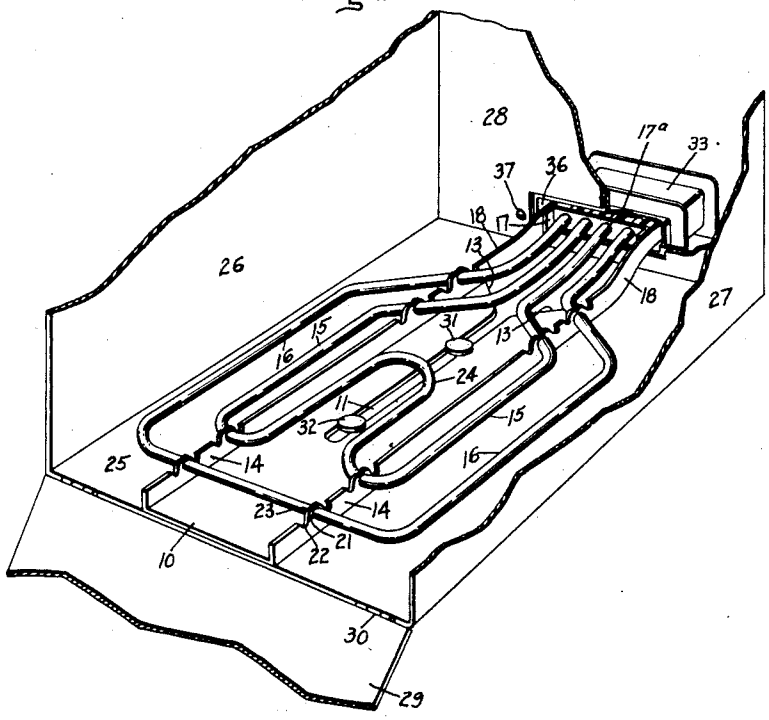
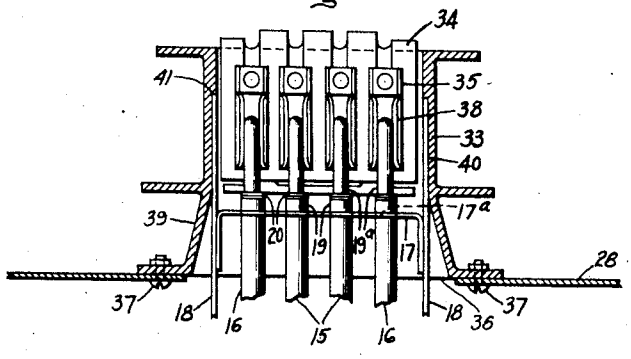


Fig. 2.



Inventor:
George W. Heinbuch,
by Charles V. Mullen
His Attorney.

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OVEN

George W. Heinbuch, Toronto, Ontario, Canada, assignor to General Electric Company, a corporation of New York

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13 Claims. (Cl. 219—35)

My invention relates to ovens, more particularly to electric ovens provided with removably mounted heating units, and has for its object the provision of an improved oven of this character and a heating unit therefor whereby the heating unit can be moved easily and accurately into its operative position.

Although it is not limited thereto my invention has special application to ovens provided with heating elements of the "sheathed wire" type, and has for a further object the provision of an improved support of simple, compact, rugged and inexpensive construction for the heating elements, together with means for guiding the support whereby the heating unit is moved accurately into its operative position in the heating chamber; and further, the provision of suitable means for insuring the establishment of an electrical connection between the heating elements and the oven current input terminal members when the heating unit is moved to its operative position in the heating chamber.

In carrying my invention into effect in one form thereof, I provide the heating unit with suitable means for guiding it into its operative position in the heating chamber, in which position the terminals of the heating elements are in engagement with the current input terminal members provided for the oven. In order to insure good electrical contact between the input terminals and those of the heating unit, I proportion the unit so that when it is mounted in its operative position in the heating chamber with its terminals in complete engagement with the input terminals the door will just be permitted to close. In other words, if the terminals are not in complete engagement the door in being closed will move the unit to complete the engagement between them.

Preferably the heating unit will be provided with heating elements of the "sheathed wire" type supported on a sheet metal frame. This frame preferably will be arranged to cooperate with suitable guiding and retaining means, whereby the unit is guided to and retained in its operative position in the heating chamber.

For a more complete understanding of my invention reference should be had to the accompanying drawing, in which Fig. 1 is a perspective view showing an electric oven and heating unit arranged in accordance with my invention, the side walls and rear wall of the heating chamber being broken away for the purpose of showing more clearly certain details of construction; and Fig. 2 is a sectional view on a somewhat larger scale than Fig. 1 and illustrating certain of the elements of Fig. 1.

Referring to the drawing, I have shown my invention in one form as applied to an electric oven. As shown, the support for the resistance heating element indicated generally at 10 is blanked out from a sheet of metal. A slot 11 is provided extending longitudinally of this member midway between its sides; from the open end of the slot the edge 13 of the metal extends at an angle toward the sides 14. These sides, as shown, are bent substantially at right angles to the main portion of the member so as to form supports for the resistance heating elements 15 and 16. The sides 14 extend somewhat beyond the main body of the support, and as shown a cross-bar 17 is secured as by welding to the projecting ends 18 of these sides so as to complete the supporting member. This cross-bar is provided with spaced openings 17*a*.

Preferably, heating elements of the "sheathed wire" type such as described and claimed in the United States Patent No. 1,367,341, granted to C. C. Abbott, dated February 1, 1921, will be used. Briefly each element comprises a resistance conductor (not shown) enclosed in an outer metallic sheath 19 and embedded in a compacted insulating material, such as powdered magnesium oxide (not shown). It will be understood that such heating elements can be bent easily into any desired shape but have sufficient rigidity to retain the formed shape under ordinary handling and use. The ends of the elements are provided with terminals 19*a* which are electrically connected to the resistance conductors and insulated from the sheath in any suitable manner as indicated at 20.

The edges of the sides 14 each are provided with recesses 21 for the reception of the sheathed wire heating elements. At each side of and spaced from each recess, a notch 22 is provided. This arrangement provides a deformable finger 23 at each side of the recess. When the heating element is placed in the recess and is in proper position these fingers are deformed to grip the element and hold it securely in position.

I have shown in the embodiment of my invention illustrated a pair of sheathed heating elements 15 and 16, each having a terminal 19*a* at each end. The outer element 16 is bent in a loop as shown, and is located in the frame by passing its end through the two outer holes 17*a* provided in the cross-bar 17, the loop being supported at four points along its lengths where it rests in the recesses 21. The other element 15 is bent in a similar loop having an inturned portion 24 and

lies within the first loop. The ends of the second element are passed through two inner openings 17a of the cross-bar 17 and it also is supported at four points along its length by the sides 14. When the fingers 23 at the sides of the recesses are deformed as above described the sheathed heating elements are securely held in position on the support. The loop formed by the outer element is of considerably greater width than the frame; likewise, the loop formed by the inner element is of greater width than the frame. By providing the inturned bend 24 in the inner loop the same element may be used either as the inner or the outer heater by reason of the fact that the overall lengths of the two are the same.

By the construction above described I have provided a rugged heating unit with a minimum number of parts, the supporting member 10 consisting of a single sheet metal blank bent to the desired shape and strengthened by the cross-bar 17 which is in position to support the ends of the heating elements in fixed relation to one another. The ends 18 of the sides extend beyond the cross-bar; these projecting ends which lie parallel to the terminals, one on each side, constitute a means for aligning the unit and for guiding the terminals into their respective contacts, and further serve to protect the terminals when the unit is being handled.

The oven has a bottom wall 25, side walls 26 and 27, rear wall 28 and door 29 which is hinged as indicated at 30 to the front lower edge of the bottom. A top, not shown, completes the oven. The side walls and door have been shown partly broken away for clearness of illustration. A pair of headed studs 31 and 32 project above the bottom of the oven, the heads being spaced from the bottom a distance slightly greater than the thickness of the sheet metal used in the unit supporting frame. The heads of the studs are of sufficient size with reference to the width of the slot in the supporting frame to prevent upward movement of the supporting frame when it has engaged the studs. The studs are located in a line from front to rear of the oven approximately centrally or any intermediate position measured from the side wall so that when engaged by the supporting frame the heating unit will be located in its operative position.

A casting 33 is provided which accommodates a receptacle consisting of an insulating body 34 which carries fixed current input contacts 35. The casting is secured to the rear wall of the oven over an opening 36 therein, and is secured to the rear wall by means of screws 37. The fixed contacts are adapted to be connected to any suitable current supply and have terminal receiving members 38 projecting towards the oven to be engaged by the terminals of the heating unit when it is moved rearwardly in the oven.

The forward part 39 of the side walls of the casting are shown as slightly converging for a portion of their length, and the width between them at the rear part is approximately that between the sides 18 of the supporting frame. The location of the studs 31 and 32 and receptacle casting 33 on the oven are related to the shape and size of the frame in such a manner that when the heating unit is placed on the bottom in an approximately central position and slid rearwardly, the edge 13 engages the front stud 32 and the unit is guided to its correct position where the front stud enters the slot. On further rearward movement of the frame the second stud 31 likewise engages the sloping edge and is guided toward the slot. When both studs have entered the slot the unit is properly lined up and further rearward movement causes the unit to be guided so that the projections 18 of the frame sides engage the walls of the receptacle and guide the terminals 19a into the fixed contacts 38. The sloping sides 39 of the casting serve to accurately position the unit.

Preferably the side walls of the casting 33 will be provided with shallow recesses 40 for receiving the projecting portions 18 when the heating unit is in its operative position in the heating chamber; the end walls 41 of the recesses serve to engage the ends of the projecting portion to limit the movement of the heating unit in the heating chamber and therefore to define its operative position in this chamber.

It will be observed that the length of the support 10 with respect to the oven is such that when the terminals 19a are fully home in their sockets 38 the door indicated broken away in Fig. 1 may be closed. If the element is inserted and not fully pushed home the operation of closing the door engages the end of the support and completes the operation of pushing it home.

In the drawing I have shown an oven in fragmentary fashion and illustrated a heating unit in the bottom only. Customarily a similar unit will also be provided in the top wall of the oven. As this unit and its connection to the oven will be identical with that illustrated in the bottom it is not thought necessary to illustrate it. It is apparent that similar units, if desired, could be mounted on the side walls in a similar manner.

The construction illustrated offers no obstruction between the heating element, which becomes hot on the application of current, and the material which may be placed in the oven.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination with an oven having walls defining a heating chamber provided with a front opening therein and a door constituting when closed the front wall of said heating chamber, of a current input contact receptacle mounted in the rear wall of said heating chamber having a plurality of contact input terminals and recesses of determined depth formed in its walls opposite said terminals, and a heating unit removably mounted in said heating chamber having terminals arranged to be projected into said receptacle to contact said input terminals, and further, having members arranged to be received in said recesses, said heating unit being of such length that when it is within said heating chamber with its contacts engaging said terminals and said members extending into said recesses and abutting the ends thereof, the forward end of said unit just permits said door to close, whereby in the event said terminals are not in complete engagement with said contact receptacles, the door when it is moved to its closed position will engage the unit to move it into said position wherein said contacts engage said terminals and said members abut the ends of said recesses.

2. An oven comprising walls defining a heating chamber, a contact socket member located in said heating chamber provided with contacts and hav-

ing walls converging toward each other inwardly from the mouth of said receptacle toward said contacts, a heating unit provided with terminals adapted to be received by said socket member and means including members carried by said heating unit for engagement with said converging walls for guiding said heating unit so that said terminals align themselves with and are received in said socket member so as to engage said contacts when said heating unit is moved to its working position in said heating chamber.

3. The combination with an oven having walls defining a heating chamber, a current input socket in one wall of said chamber, a headed stud projecting inwardly from one wall of said chamber and a heating unit comprising a heating element provided with terminals and a frame supporting said heating element and terminals, said frame being provided with a member having a slot therein for receiving said stud to guide said heating unit to its working position in said heating chamber wherein said terminals electrically engage said input socket, the head of said stud retaining said unit in said position.

4. An oven comprising walls defining a heating chamber, a current input socket having converging walls located at the rear of said heating chamber, a headed stud projecting from a wall of said heating chamber, a heating unit comprising a frame, a heating element having terminals supported on said frame, guide members on said frame and a member in said frame provided with a slot for receiving said stud, whereby said heating element is guided to its operative position in said heating chamber by the engagement of said stud in said slot and by said guide members with said converging walls.

5. An oven comprising walls defining a heating chamber, a socket in one of said walls, a stud projecting from the surface of another of said walls, and a removable heating unit comprising a heating element provided with projecting terminals and a supporting frame for said heating element, said frame having a substantially flat portion with a portion cut away to provide a slot and guide edges converging to said slot, the guide edges being engaged by said stud during the insertion of said heating unit for positioning said unit and guiding it so that its terminals enter said socket.

6. An oven comprising walls defining a heating chamber, a socket with converging side walls in a wall of said chamber, a stud projecting from the surface of another wall of said chamber, a heating unit comprising a heating element provided with projecting terminals and a frame for supporting said heating element, said frame having a substantially flat portion with a part thereof cut away to provide a slot and guiding edges converging to said slot, the guiding edges and slot being adapted to be engaged by said stud during the insertion of said heating unit for centering and guiding said unit, said frame having projections one on each side thereof for engagement with said converging socket walls.

7. The combination with an oven comprising walls defining a heating chamber, of a current input socket in the rear of said heating chamber, a pair of studs projecting from a wall of said chamber and located in alignment with each other from front to rear, the heating unit comprising a heating element, terminals for said heating element and a frame for supporting said heating element and said terminals, said frame having a portion with a slot therein arranged to cooperate with said studs for guiding said unit into its operative position in said oven with said terminals engaging said socket.

8. The combination with an oven comprising walls defining a heating chamber, a current input socket in the rear wall of said chamber, a pair of studs projecting from the bottom wall of said chamber and located midway between its side walls and in alignment with each other from front to rear, and a heating unit comprising a heating element, terminals for said heating element and a supporting frame for said heating element and said terminals, said frame having a substantially flat metal member with upturned sides on which said element rests, the substantially flat portion being cut away to provide a slot with edges converging toward the slot, said edges and slot being arranged to cooperate with said studs for guiding the heating unit into its operative position in said oven with said terminals engaging said socket.

9. In an oven, a heating unit comprising a sheet metal frame having flanges projecting from the sides thereof at an angle to the general plane of the frame, said flanges extending beyond the ends of said frame, and a member mechanically connecting said extending ends at a point a substantial distance from their ends, the main body of said frame being cut away to provide a slot and guiding edges leading to said slot and a heating element secured to said frame.

10. In an oven, a heating unit comprising a frame consisting of a substantially flat rectangular sheet metal member with its longer edges turned up to form supports, the said supports projecting beyond the ends of said flat portion, the end of the flat portion between the projecting ends being cut away to provide edges which converge centrally in a longitudinal slot and a sheathed heating element secured to said supports and having its terminals projecting parallel to and between said extending ends.

11. In an oven, a heating unit comprising a sheet metal frame and a sheathed wire heating element secured on said frame, said frame consisting of an elongated rectangular portion with integral flanges turned up at its sides, said flanges extending beyond one end of the rectangular portion, a cross-bar uniting the extended flange portions and spaced from their ends, said one end of said rectangular portion having a relatively large V-shaped notch and said rectangular portion being provided with a slot extending longitudinally thereof in the bottom of said notch.

12. In an electric oven, a heating unit comprising a sheet metal frame and a sheathed wire heating element secured in said frame having its ends at one end of said frame, terminals carried by the ends of said heating element, said frame consisting of an elongated rectangular portion with integral flanges turned up at its sides, the said flanges extending beyond one end of said rectangular portion, a cross-bar provided with apertures uniting the extended flange portions and spaced from its ends, the said one end of said rectangular portion having a relatively large V-shaped notch and said rectangular portion having a slot extending longitudinally thereof from the bottom of said notch, said sheathed heating element being secured to said flanges at a plurality of points and having its terminal bearing ends projecting through the apertures of said cross-bar and lying parallel to and between said extending ends of said flanges.

13. In an electric oven, a heating unit comprising a sheet metal elongated frame work and a sheathed wire heating element secured to said

framework and having terminals projecting from one end thereof, said framework consisting of a rectangular bottom portion provided at one end with a notch and having a slot extending longitudinally of said bottom portion from the bottom of said notch, sides extending upwardly from said bottom and also projecting lengthwise beyond the notched end parallel to said terminals, a cross-bar connecting the projecting ends of said sides, said sheathed wire heating element being formed as a grid substantially wider than the supporting frame and secured in notches of said sides.

GEORGE W. HEINBUCH.