

Aug. 28, 1928.

1,682,402

H. A. MULVANY

HEATING ELEMENT SUPPORT

Filed Dec. 22, 1926

2 Sheets-Sheet 1

Fig. 1.

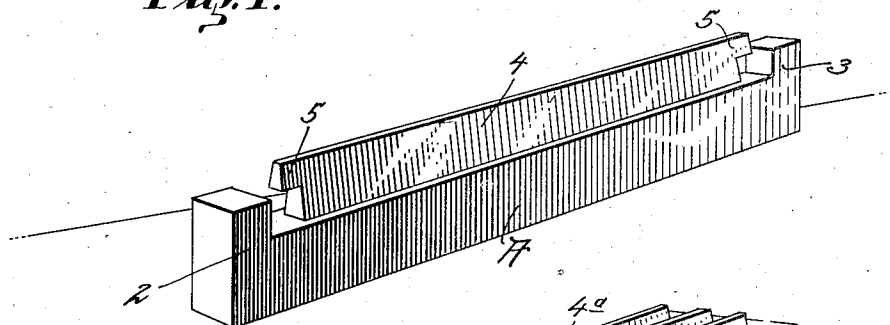


Fig. 2.

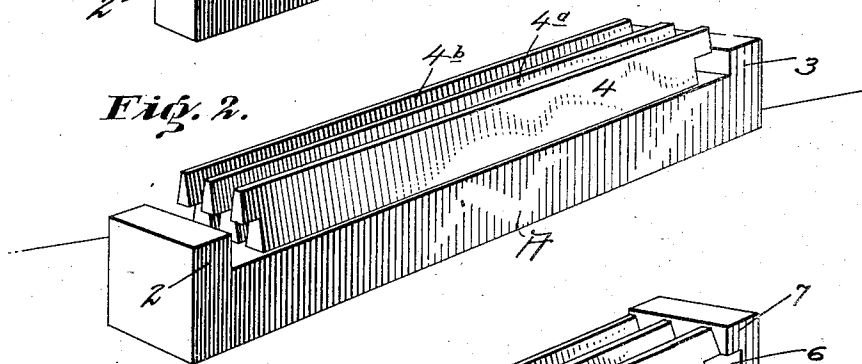


Fig. 3.

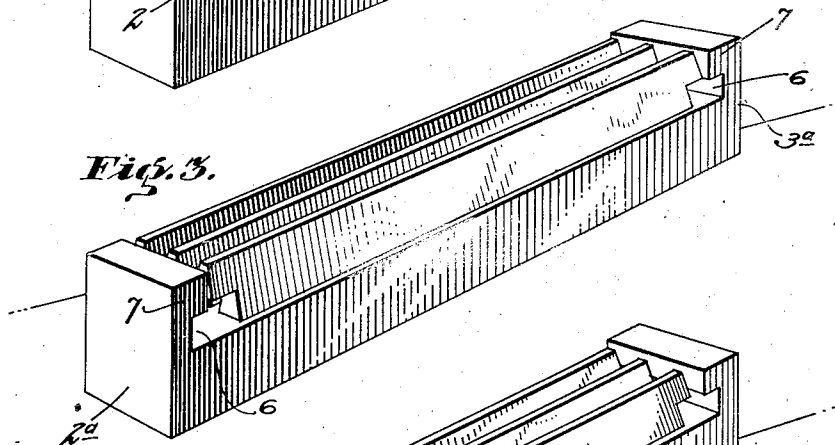
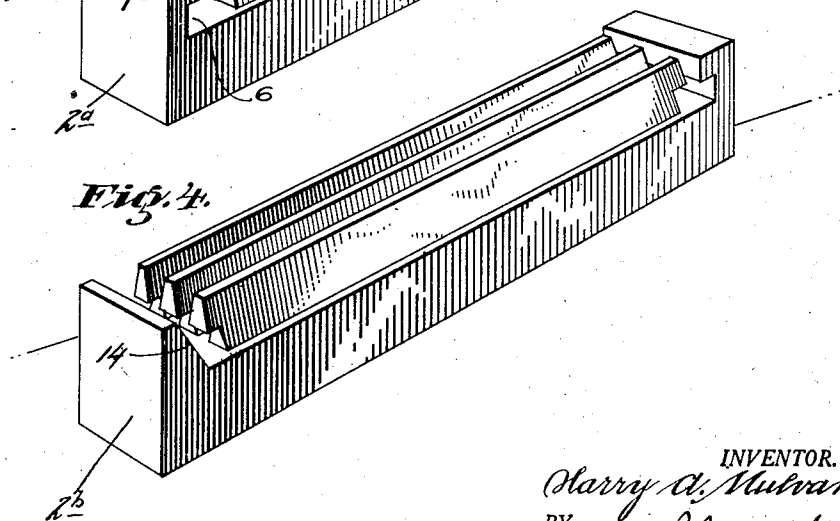


Fig. 4.



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Fig. 6.

Fig. 7.

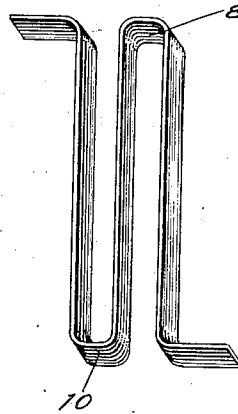
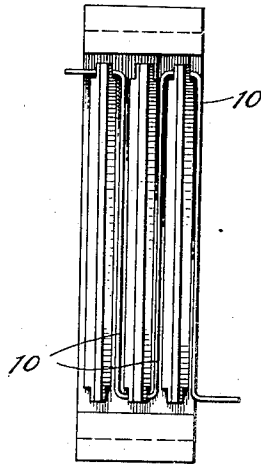


Fig. 9.

Fig. 10.

Fig. 8.

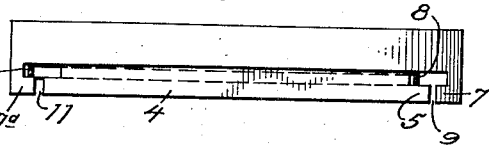
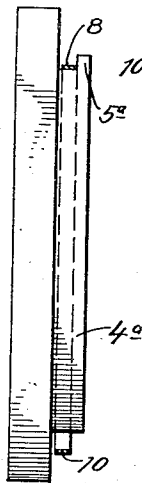
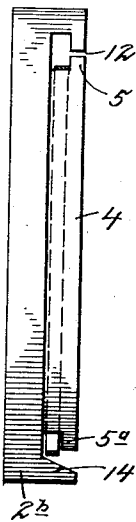
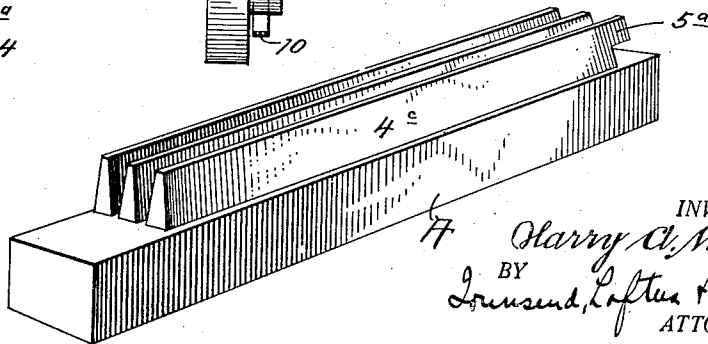


Fig. 5.



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HEATING-ELEMENT SUPPORT.

Application filed December 22, 1926. Serial No. 156,325.

This invention relates to a support for electric resistance heating elements and particularly to improvements on the type of support disclosed in my former patent entitled "Electric furnace," Number 1,529,368, issued March 10, 1925.

The object of the present invention is to generally improve and simplify the construction and operation of heating element supports of the character described; to provide a support which is adapted both for ribbon and coil types of electric resistance heating elements; to provide a support which may be employed in electric heaters and furnaces and which may be placed both in a vertical and horizontal position, when required and further to provide a support which will afford efficient insulation and insure that the temperature of the resistance elements will exceed the temperature of a furnace by as small an increment as possible.

The invention is shown by way of illustration in the accompanying drawings, in which:—

Figure 1 is a perspective view showing a single unit type of electric resistance heating element support,

Figure 2 is a perspective view showing a triple type of electric resistance heating element support,

Figures 3, 4 and 5 are perspective views showing modified forms of electric resistance heating element supports,

Figure 6 is a front view of the type of block shown in Figure 2, said view also showing a ribbon type of heating element applied,

Figure 7 is a perspective view showing a ribbon type of electric resistance heating element wound in a zigzag form and ready to be placed in position on the heating element support,

Figure 8 is a side elevation of the type of heating element support shown in Figure 3, said side elevation showing the position that the heating element support and the heating element assumes when placed in the roof or arch of a furnace,

Figure 9 is a side elevation of the type of support shown in Figure 4, said figure illustrating the position that the support and the heating element assumes when placed in the side wall of the furnace of an oven.

Figure 10 is a side elevation of a type of heating element support shown in Figure 5, said figure showing the position that the support and the heating element assumes when

placed in the side wall of a furnace or the like.

Referring to the drawings, in detail, and particularly Figure 1, A indicates a base portion of a heating element support and 2 and 3 end or head sections formed at opposite ends of the base. Also formed on the base and extending substantially from end to end thereof is a rib 4. This rib tapers in cross section from the top to the bottom so as to present inclined side surfaces and to reinforce and increase the strength of the rib. The ends of the rib are interspaced with relation to the head members 2 and 3 and projecting tongs or lugs are formed as at 5 to retain the heating elements against displacement when applied. In Figure 1 the base section is illustrated as being comparatively long and narrow and as supporting a single rib such as indicated at 4. In Figure 2 the base has been widened and three ribs are employed, as indicated at 4, 4^a and 4^b. The base may, however, be materially widened when desired and any number of ribs may be employed, if desired.

In actual practice, it will be understood that the heating element support described and illustrated may be employed in numerous electric heating installations, such as domestic electric air heaters, electric furnaces and the like. Where the heating element support is employed in an ordinary domestic electric air heater, one or more blocks such as shown in Figure 1 or Figure 2 are placed vertically and side by side and a ribbon type of element such as shown in Figures 6 and 7 is wound in zigzag form around and between the ribs, the tongs 5 serving the function of retaining the ribbon element against displacement. The heating element supports or blocks shown in Figures 1, 2 and 6 are particularly adapted for electric heaters, while the blocks shown in Figures 3, 4, 5, 8, 9 and 10 are particularly adapted for electric furnace construction. The block or heating element support shown in Figure 3 is substantially identical to the type of block shown in Figures 1 and 2, the only difference being that the head sections 2^a and 3^a are channeled, as indicated at 6, so as to form an inwardly projecting lug or support 7 which acts as a support for one end of the heating element as illustrated in Figure 8. For instance, in the construction of an electric furnace, where it is desired to place the heating elements in the roof or arch of the furnace, the type of block shown in Figures 3 and 8 is preferably employed.

The heating element of the ribbon type is bent or wound into zigzag form, as shown in Figure 7 and may be placed in position on the heating element support as shown in Figure 8 by passing the upper ends of the ribbon indicated at 8, through the slot indicated at 9 and then shoving the upper ends in under the lug 7. When this has been done, the lower ends 10 of the heating element will register with the slot 11 and may thus be inserted. The heating element is then pulled in the opposite direction and it will thus assume a position where the ends 8 are supported by the lugs 5 of the ribs and the ends 10 of the ribbon will be supported by the lug 7. This type of support permits a heating element of the ribbon type to be bent into form and to be readily placed in position on the heating element supports, particularly in the roof or arch section and it also permits ready removal of these elements for repair, renewal or otherwise. This is particularly important in electric furnace work as the ribbons are usually bent up or formed of heavy metal and as such cannot be easily wound or bent into position on the supports. With the present type of support, this is obviated as the ribbon is bent into shape before it is applied and placed in position.

The blocks shown in Figures 4, 5, 9 and 10 are also particularly suited for electric furnace work where heavy ribbon types of elements are employed. The type of supports shown in Figures 4, 5, 9 and 10 being usually placed in the side walls of the furnace. With a type of block or support shown in Figures 4 and 9, the heating element shown in Figure 7 is placed in position by passing the upper looped ends 8 through the slot indicated at 12 and then dropping the element down behind the retaining lugs 5. The lower looped ends 10 of the heating element may then be swung inwardly and will clear the lower lugs 5 which, in that instance, serves no useful function. The lower head member indicated at 2^b is provided with a slanting surface as shown at 14. This is important particularly in annealing furnaces, as actual practice has determined that scale tends to collect at the lower ends of the heating element supports, but by providing a slanting surface, collection of scale is prevented. The type of block or heating element support shown in Figures 5 and 10 is also intended for side wall construction in electric furnaces and the like.

The head members 2 and 3 are, in this instance, entirely eliminated that is, the heating element merely consists of a base section such as shown at A and the base carries one or more ribs such as shown at 4^a. The tongs 5^a are formed on the upper ends of the ribs and as they are not required on the lower ends of the ribs, they are entirely eliminated. The heating elements are also wound or bent in

shape as shown in Figure 5 and are merely hung over the ribs, as shown in Figure 10.

The heating element supports, as previously stated, are placed side by side when installed in a furnace, heater or otherwise. They may be clamped or mortared into position or otherwise secured and a single unit block such as shown in Figure 1 or multiple unit blocks, such as shown in Figure 2, may be employed as conditions may demand. In any instance, where the blocks are placed side by side, a series of parallel interspaced ribs will be presented and the heating element will be supported by the ribs and will be either bent or wound to form a zigzag type of unit. While a ribbon type of heating element is illustrated, it should be understood that a helically wound coil or any other suitable type of element may be employed. The brick or heating element support illustrated may be constructed of any refractory insulating material. It is exceedingly simple and substantial in construction and permits ready application of a heating element. The ribs form the support for the heating elements in certain instances and the ribs together with the head sections or lugs 7 formed thereon serve as supports. In other instances the vertical height of the ribs is in practically every instance greater than that of the diameter of the heating element coil or the width of the ribbon. This is also important as the ribs form shields or spacers between each section of the heating element, thus shielding adjacent coils or sections of the heating elements against radiation. By such shielding the excess temperatures in the elements proper is avoided and the temperature of the electric elements will, furthermore exceed the temperature of the furnace or heater by an exceedingly small increment. On the other hand where shielding is eliminated, the temperature of the adjacent elements is materially raised by radiation from one to the other and the amount of electric motive force which may be passed through the heater is materially reduced.

The head members formed on the supports serve a number of functions: first that of reinforcing the supports; secondly that of assisting in supporting the heating elements, particularly as shown in Figures 3 and 8, and third that of shielding the end sections of the coils from the radiant energy of the end sections of adjacent coils. The head members may, however, be entirely eliminated in domestic air heaters and the like where a single row of supports is employed (see, for instance, Figure 10), as the shielding action of the end sections of the heating element is in that instance, entirely unnecessary.

While certain features of the present invention are more or less specifically described I wish it understood that various changes may be resorted to within the scope of the ap-

pendent claims. Similarly that the materials and finishes of the several parts employed may be such as the manufacturer may decide or varying conditions or uses may demand.

5 Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A device of the character described, comprising a rectangular shaped base plate, a
10 vertically disposed rib extending substantially from end to end thereof, and a lug projecting from one end of the rib and forming a recess between the base plate and the end of the rib.

15 2. A device of the character described, comprising a rectangular shaped base plate, a vertically disposed rib extending substantially from end to end thereof, said rib tapering in cross section from top to base and
20 being widest at the base, and a lug projecting from one end of the rib and forming a recess between the base plate and the end of the rib.

3. A device of the character described, comprising a rectangular shaped base plate,
25 a vertically disposed rib extending substantially from end to end thereof, said rib tapering in cross section from top to base and being widest at the base, and a projecting lug formed on each end of the rib and forming
30 a recess between the base plate and each end of the rib.

4. A device of the character described, comprising a rectangular shaped base section,
35 a head member on each end of the base section, a narrow rib extending substantially from end to end of the base between the head members and separated from the same, and a projecting lug on each end of the rib and forming
40 a recess between the base plate and each end of the rib.

5. A device of the character described, comprising a rectangular shaped base section, a head member on each end of the base section, a narrow rib extending substantially

from end to end of the base between the head
45 members and separated from the same, a projecting lug on each end of the rib and forming a recess between the base plate and each end of the rib, and a lug on one of the head
50 members.

6. A device of the character described, comprising a rectangular shaped base section, a head member on each end of the base section, a narrow rib extending substantially
55 from end to end of the base between the head members and separated from the same, a projecting lug on each end of the rib and forming a recess between the base plate and each end of the rib, and a lug on each head member in
60 alignment with the adjacent lugs on the rib.

7. A device of the character described, comprising a rectangular shaped base member, a plurality of parallel interspaced vertically
65 disposed ribs formed on the base, said ribs being shorter than the base, and a retaining lug formed on one end of each rib and forming a recess between the base plate and one end of each rib.

8. A device of the character described, comprising a rectangular shaped base member,
70 a plurality of parallel interspaced vertically disposed ribs formed on the base, said ribs being shorter than the base, and a retaining lug formed on each end of each rib and forming a recess between the base plate
75 and each end of each rib.

9. A device of the character described, comprising a base member, a plurality of parallel interspaced vertically disposed ribs
80 formed on the base and extending substantially from end to end thereof, a retaining lug formed on each end of each rib and forming a recess between the base plate and each end of each rib, and a head member formed
85 on each end of the base and separated with relation to the ends of the ribs and the retaining lugs formed thereon.

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