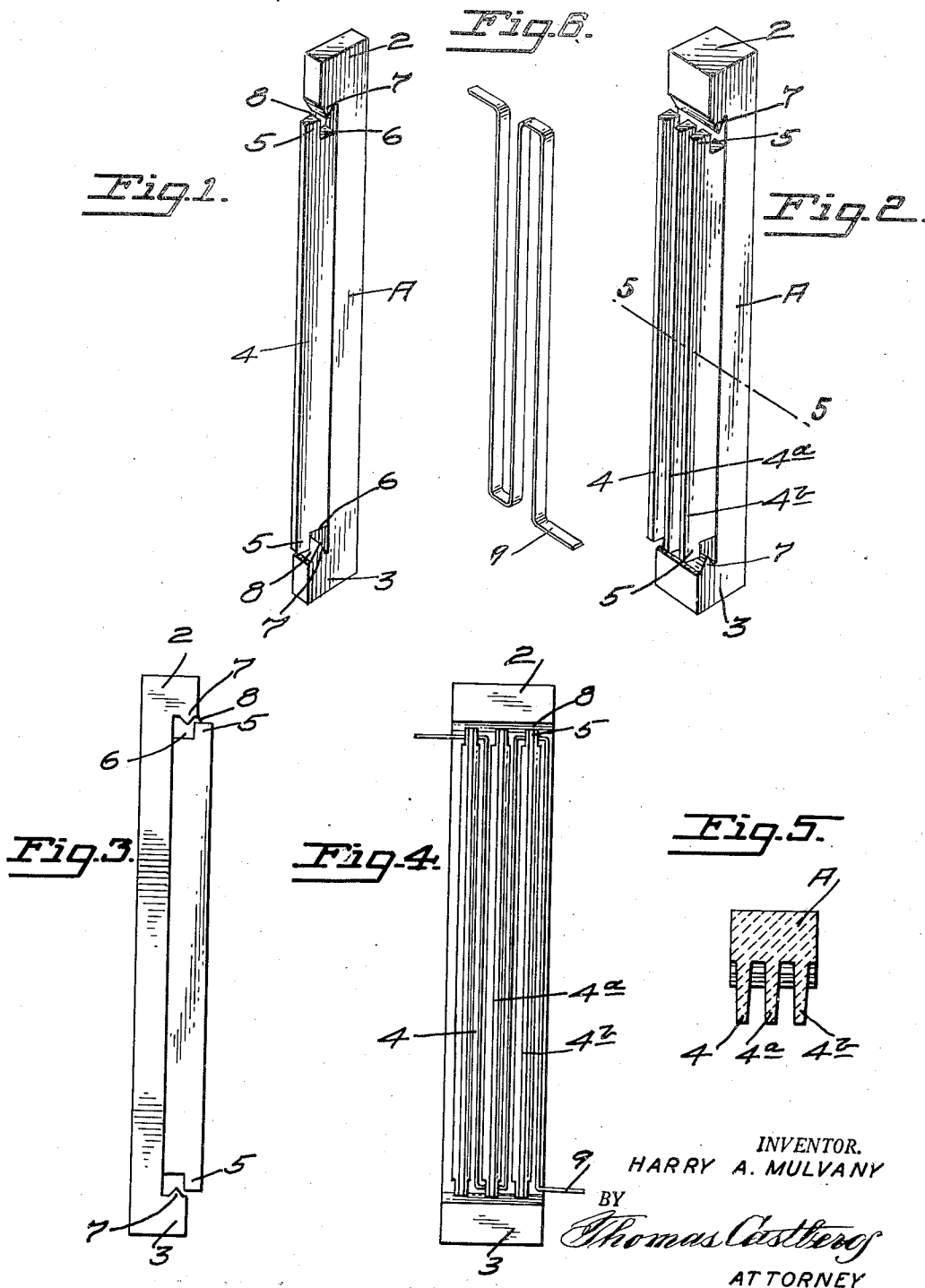


Sept. 21, 1948.

H. A. MULVANY
HEATING ELEMENT SUPPORT

2,449,712

Filed April 26, 1946



UNITED STATES PATENT OFFICE

2,449,712

HEATING ELEMENT SUPPORT

Harry A. Mulvany, Berkeley, Calif.

Application April 26, 1946; Serial No. 665,076

6 Claims. (Cl. 201-74)

1

This invention relates to a heating element support, and especially to improvements in the heating element support disclosed in my former Patent Number 1,682,402, entitled "Heating element support," issued August 28, 1928.

The heating element support disclosed in my former patent consisted of an elongated base member in the form of a brick which was constructed of a ceramic or refractory material, and which was provided with a plurality of spaced apart ribs on one face and extending from end to end thereof. A ribbon form of electric heating element was wound in zigzag form about the ribs and supported thereby and lugs were formed at each end of each rib to retain the ribbon elements from slipping or working off the ends of the ribs. In actual practice it was, however, found that the elements would gradually lengthen during prolonged use due to the intermittent heating and cooling effects, and as they gradually lengthened, they would work off the ends of one or more lugs and finally contact each other with a short circuit as the result, this being particularly the case when the elements were mounted in the ceiling or vertical walls of an electric furnace or heater.

The object of the present invention is to improve on the form of heating element support disclosed in my prior patent, and particularly to lock or secure the ribbon formed heating elements from working off the ends of the ribs, and more specifically stated, to provide a lug at the end of each rib and in conjunction therewith a V-shaped lug which limits elongation movement of the ribbon elements with relation to the first named lugs to such an extent that the ribbon elements cannot work off or over the first named lugs.

The heating element support forming the subject matter of the present invention is shown by way of illustration in the accompanying drawings in which:

Fig. 1 is a perspective view showing a single unit type of electric resistance heating element support;

Fig. 2 is a perspective view showing a triple type of electric resistance heating element support;

Fig. 3 is a side elevation of Fig. 1 or 2;

Fig. 4 is a front view of Fig. 2;

Fig. 5 is a cross-section taken on line V—V of Fig. 2; and

Fig. 6 is a perspective view of the ribbon form of electric resistance heating element employed.

Referring to the drawings in detail, and particularly Fig. 1, A indicates the base portion of a heating element support and 2 and 3 end or head members 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

2

rib. A finger 5 is formed at each end of the rib, and these fingers are spaced from the base to form a recess 6 at each end of the rib for the reception and retention of a heating element hereinafter to be described. The fingers 5 are also spaced with relation to a V-shaped lug 7 formed on each head member, and a restricted space 8 or passageway is thus formed at the end of each finger to permit application of the heating element, heretofore referred to.

In Fig. 1 the base section is illustrated as being comparatively long and narrow and as supporting a single rib such as indicated at 4. In Fig. 2 the base has been widened and three ribs are employed as indicated at 4, 4a and 4b. The base may, however, be materially widened when desired, and any number of ribs may be employed.

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, radiant 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 Fig. 1 or 2 are placed vertically side by side and are secured within the heater in this position by metal clamps or by any other suitable means. The heating element supports when thus installed are ready for the reception of the electric resistance heating element. The type preferably employed is a ribbon form of element such as shown in Fig. 6. It is comparatively wide in proportion to its thickness and as such is almost as flexible as a ribbon, hence the name ribbon form of electric resistance heating element.

By referring to Fig. 4 the ribbon element is indicated at B. The widening of the element may start at the point 9. It is then run up alongside of the rib 4b and the edge of the ribbon is then slipped edgewise through the space 8 formed between the finger 5 and the V-shaped lug 7. It thus enters the recess 6 at the upper end of the rib 4 and is pulled tightly into said recess and then it is passed down between the ribs 4a and 4b where it is again pulled through the space between the lower finger and the rib 4b and the V-shaped lug so as to enter the recess at the lower end of the rib 4a. It is then run upwardly between the ribs 4 and 4a and then through the recess at the upper end of the rib 4. This method of winding of the ribbon is continued until the entire series of heating element supports are wound. The opposite ends of the ribbon are then connected to terminal members, not shown, to which electric current is supplied in any suitable manner.

By referring to Fig. 3 it will be noted that the V-shaped lugs 7 extend partially into the recesses 6 formed at the opposite ends of the rib 4, hence when the ribbon starts to elongate, it will finally reach a point where it rests on or contacts the

V-shaped lugs 7, and if further elongation takes place, the ribbons will merely buckle or bow to a certain extent in the spaces between the ribs. Obviously, if the heating element supports are vertically disposed, the ribbon form of element which is wound in zigzag form around the ribs will tend to hang in loop-like form from the upper ends of the ribs. Hence, the greater tendency when elongation takes place is to work off the fingers 5 at the lower ends of the ribs but the loops formed at the lower ends of the ribbon cannot reach the lower ends of the fingers 5 as they contact the V-shaped lugs which project partially into the recesses 6 and as there is little, if any, chance of the looped lower ends of the ribbons becoming cocked or tilted to such an extent as to work out of the spaces 8, it is obvious that no matter how much elongation takes place, there is little or no chance for the ribbon form of element to ever free itself with relation to the fingers 5 and the lugs 7.

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 Fig. 1 or multiple unit blocks, such as shown in Fig. 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 members 2 and 3 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, and while this and other features of the invention have been more or less specifically described and illustrated, it should be understood that changes may be resorted to within the scope of the appended claims and that the materials and finish of the several parts employed may be such as the experience or judgment of the manufacturer may dictate or varying conditions or uses may demand.

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

1. An electric heating element support comprising a rectangular shaped base member, a ver-

tically disposed rib formed on one face of the base member and extending substantially from end to end thereof, a finger formed at each end of the rib and spaced from the base member to form a recess at each end of the rib, a head member at each end of the base and spaced away from the adjacent finger, and a lug on each head member extending partially into the recess at the adjacent end of the rib.

2. An electric heating element support comprising a base member, a vertically disposed rib formed on one face of the base member and extending substantially from end to end thereof, a finger formed at each end of the rib and spaced from the base member to form a recess at each end of the rib, a head member at each end of the base and spaced away from the adjacent finger, and a V-shaped lug formed on each head member and extending partially into the recess at the adjacent end of the rib.

3. An electric resistance heating element and a support therefor comprising a rectangular shaped base member, a plurality of vertically disposed spaced ribs formed on one face of the base member and extending substantially from end to end of the base member, a finger formed at each end of each rib and spaced from the base to form a recess at each end of each rib, a flexible electric heating element wound in zigzag form about the ribs and seated in the recesses formed at the ends of the ribs, and means at each end of the base projecting partially into the recesses formed at the ends of the ribs, said means engaging and retaining the heating element in the respective recesses when said element becomes elongated.

4. An electric resistance heating element and a support therefor comprising a rectangular shaped base member, a plurality of vertically disposed spaced ribs formed on one face of the base member and extending substantially from end to end of the base member, a finger formed at each end of each rib and spaced from the base to form a recess at each end of each rib, a flexible electric heating element wound in zigzag form about the ribs and seated in the recesses formed at the ends of the ribs, and a supporting member at each end of the base, said supporting members forming a substantial closure for the recesses formed at the ends of the ribs to prevent the heating element when elongated from working out of the recesses.

5. An electric heating element support comprising an elongated base member, a longitudinal rib thereon, a finger formed at each end of the rib and spaced from the base member to provide a recess, and lugs projecting from the base member and substantially overlying the recesses leaving only restricted passageways.

6. An electric heating element support comprising a base member, a rib thereon, a finger formed at each end of the rib and spaced from the base member to provide a recess, head members projecting from the base member and overlying the recesses, and lugs projecting from the head members into the recesses.

HARRY A. MULVANY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,087,198	Steward	Feb. 17, 1914
2,076,485	Streysman et al.	Apr. 6, 1937