July 16, 1957 W. W. HICKS 2,799,763

ELECTRIC BASEBOARD HEATER

Filed Aug. 27, 1953 3 Sheets-Sheet 1

Fig. 1.

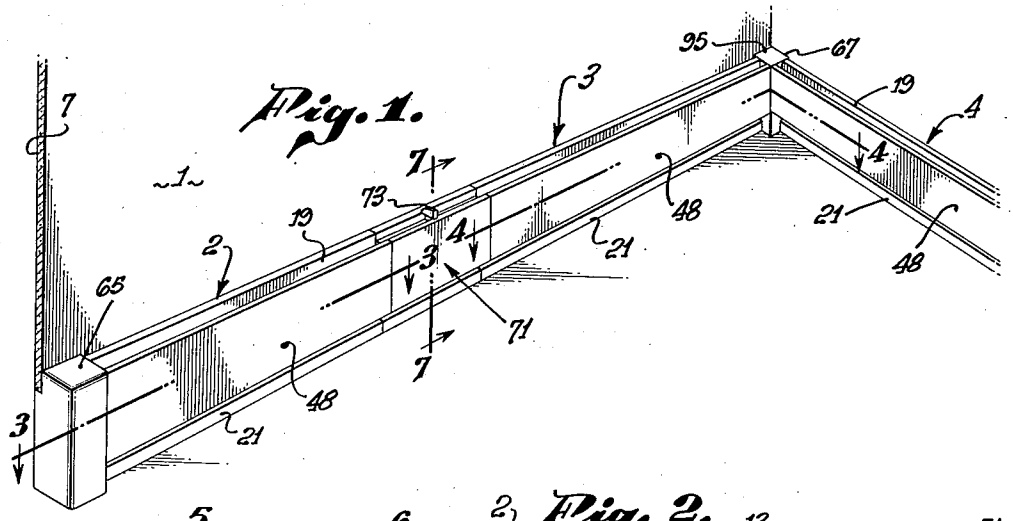


Fig. 2.

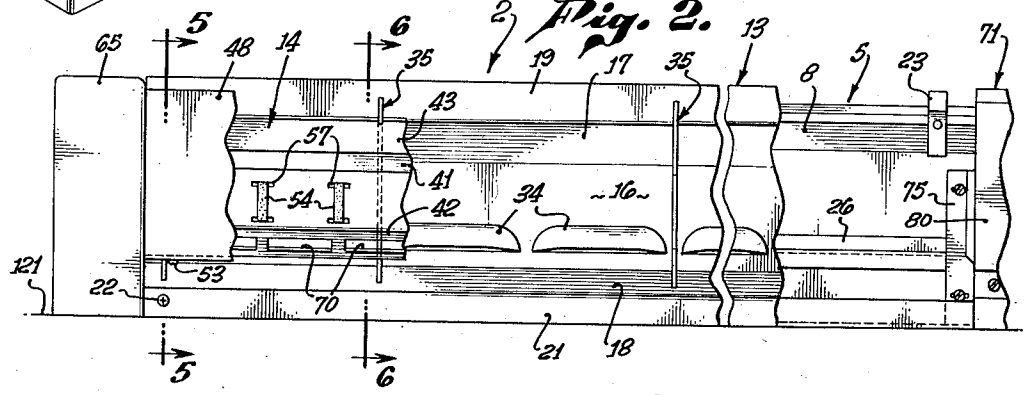


Fig. 3.

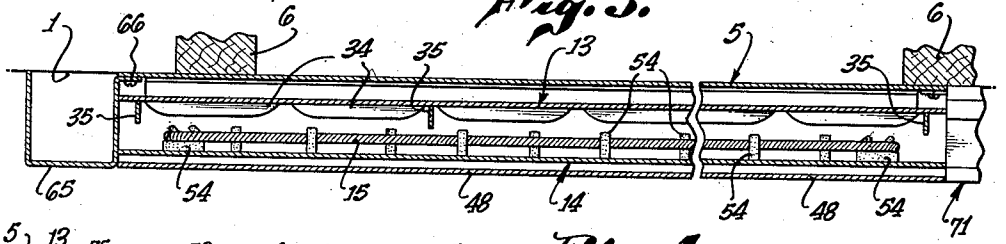
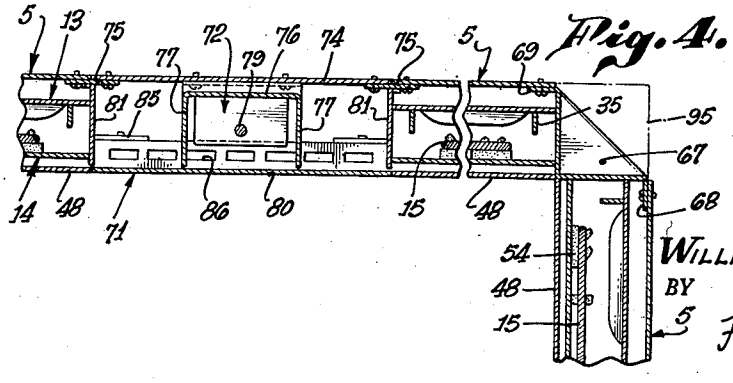


Fig. 4.



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Fig. 5.

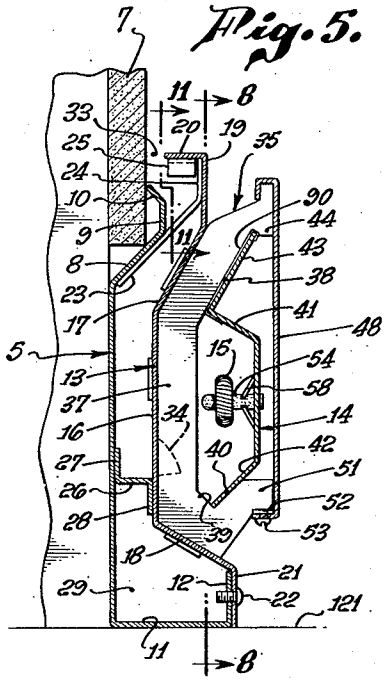


Fig. 6.

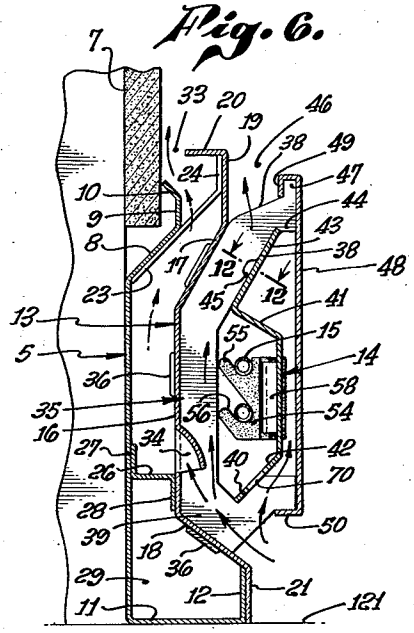


Fig. 8.

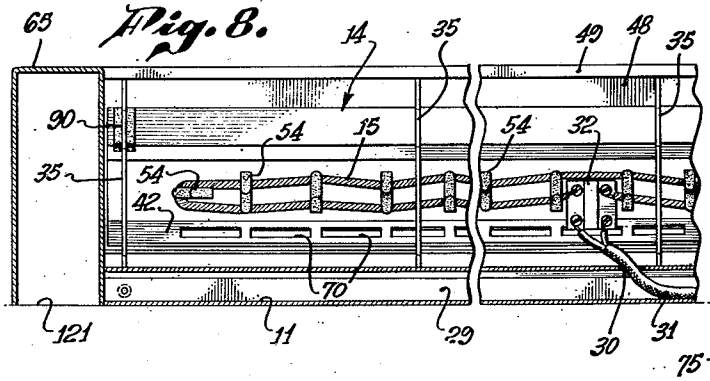


Fig. 7.

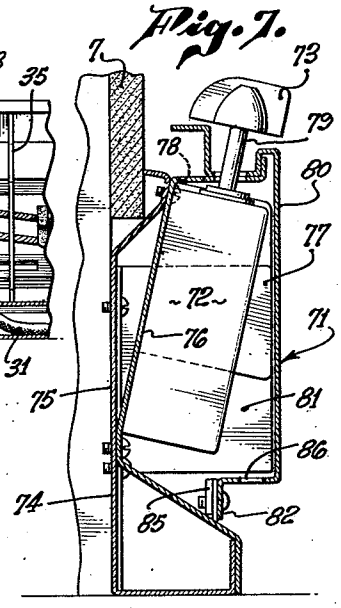
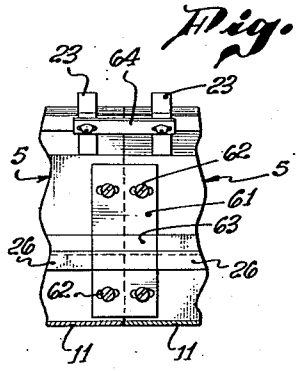


Fig. 9.



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Fig. 10.

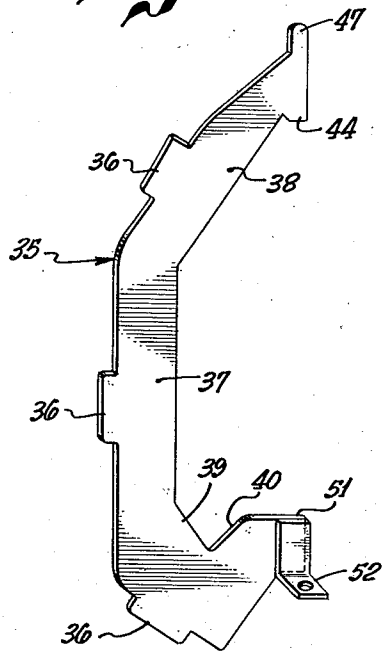


Fig. 11.

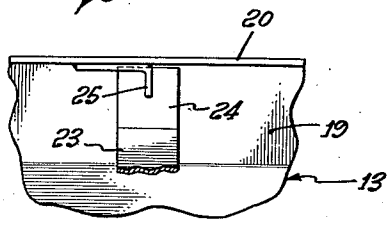


Fig. 12.

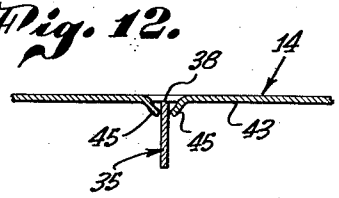


Fig. 13.

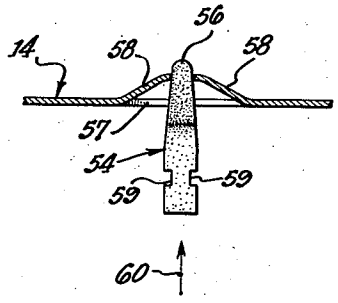
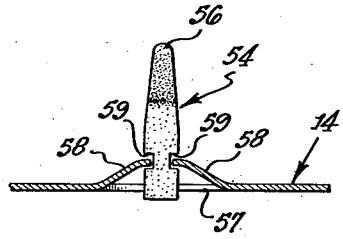


Fig. 14.



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ELECTRIC BASEBOARD HEATER

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Application August 27, 1953, Serial No. 376,872

12 Claims. (Cl. 219—34)

This invention relates to provisions for electrically heating a room or space.

One manner in which such heating is effected involves the instalaltion of heating units in a hollow baseboard, simulating the conventional wood or metal trim at the base of the walls. Usually, the heating units are coils of resistance wire, extending longitudinally within the baseboard and concealed by it. The units may extend either entirely around the lower edges of the walls of a room, or around a part only of the room perimeter, depending upon the heating requirements.

It is one of the objects of this invention to improve in general such baseboard heaters.

In order to provide an efficient and practical baseboard heater construction, it is essential that the exposed baseboard surface be kept at a temperature so that it may retain paint for matching an individual room. Furthermore, it is essential, for esthetic purposes, to provide a neat, smooth appearance, free of crevices or indentations in which dust may accumulate. To ensure these results, the heat produced by the heating coils is transmitted into the room both by circulation of air warmed by the heating coils, as well as by radiation from the outer exposed surface of the base board. Accordingly appropriate air passages around the heater units are provided, through which the warm air rises. The temperature of the baseboard is thus kept within tolerable limits, without danger of injury to furniture or drapes; and the appearance of the baseboard is not harmed by any warping or other effects that may be occasioned by excessive heat.

It is accordingly another object of this invention to obtain these advantages in a simple and effective manner.

It is still another object of this invention to provide air inlet and outlet openings such that they are left unobstructed by furniture.

It is still another object of this invention to ensure that the heating element is guarded by baffles to prevent contact with the fingers of an individual, or with bedding, such as sheets and blankets.

It is still another object of this invention to ensure against air turbulence within the baseboard, and thereby to effect clear passages for the air flow. In order to accomplish this, the various supports for the baffles and for the heating elements are made of relatively small or thin parts, presenting minimum obstruction to the flow of air.

It is still another object of this invention to provide a simple and effective manner of assembly of the baffles and brackets, especially by interlocking elements requiring few fastening means.

It is still another object of this invention to provide a thermostat for automatically regulating the heating current and made a part of the baseboard structure.

When heaters of this general character are used, smudging of the walls above the heater is often conspicuously produced. This smudging is due to precipitation of fine dust particles on the wall surface, and there are several

contributions to such precipitation. It may be caused by air turbulence, and thermal or electrical precipitation.

It is another object of this invention to overcome this smudging, and particularly by the aid of a secondary flow of relatively cool air, interposed between the wall and the flow of heated air.

In heating devices, temperature variations cause appreciable warping, expansion and contraction, creating annoying noises. It is another object of this invention to mount the longitudinal elements of the heater in such manner as to permit such expansion and contraction without any attendant warping and creation of noise.

It is still another object of this invention to provide a channel for wires connecting the elements to the system, that is maintained sufficiently cool to permit the use of insulated wire without any fire hazard.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of one embodiment of the invention. For this purpose there is shown a form in the drawings accompanying and forming part of the present specification. The form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a perspective view of a portion of a room in which a baseboard heater incorporating the invention is installed;

Fig. 2 is a fragmentary front elevation of a heater unit, some of the elements being partly broken away;

Fig. 3 is a sectional view taken along a plane corresponding to line 3—3 of Fig. 1; a portion of the length of the heating unit being omitted in order to reduce the size of the figure;

Fig. 4 is a similar sectional view taken along a plane corresponding to line 4—4 of Fig. 1;

Figs. 5 and 6 are enlarged sectional views taken along planes corresponding to lines 5—5 and 6—6 of Fig. 2;

Fig. 7 is an enlarged sectional view taken along a plane corresponding to line 7—7 of Fig. 1;

Fig. 8 is a sectional view taken along a plane corresponding to line 8—8 of Fig. 5;

Fig. 9 is a fragmentary detail sectional view showing the manner in which the wall enclosure portions of adjacent units may be joined;

Fig. 10 is a pictorial view of one of the brackets utilized in supporting the baffle and deflector elements of the heating unit;

Fig. 11 is a detail sectional view taken along a plane corresponding to line 11—11 of Fig. 5; and

Fig. 12 is a detail sectional view taken along a plane corresponding to line 12—12 of Fig. 6; and

Figs. 13 and 14 are enlarged sectional views illustrating the manner in which the coil supports may be mounted in one of the longitudinal elements of the unit.

In the present instance the baseboard heater system is shown as extending along the bottom edge of the wall 1 (Fig. 1) and around a corner of the room. Such a construction may extend around the entire perimeter of the room, exclusive of doorways, or may extend along only a portion of the perimeter, as required by the specific installation.

In the present instance, two heating units 2 and 3 are shown along the wall 1 and a portion of the unit 4 is indicated as extending along another wall of the room. However, as many connected units may be used as required.

A wall enclosure or housing 5 (Figs. 2, 3, 4, 5 and 6) serves as the main support for substantially all of the ele-

ments of the heating unit. In the installation shown in Fig. 1, each of the heating units 2 and 3 is provided with such a wall enclosure 5, as shown more particularly in Fig. 4. This wall enclosure may be attached by appropriate screws to studs 6, indicated in Fig. 3. As shown in Figs. 5 and 6, the plaster wall 7 may be removed in order to expose the studs 6 for the accommodation of the enclosure 5. Other means of providing a shallow recess within the wall may be utilized.

The enclosure 5 is preferably made of sheet metal. It has a forwardly and upwardly sloping portion 8 terminating in a vertical portion 9 and a rearwardly bent overhanging lip portion 10. This lip portion 10 is arranged to lie quite closely to the interior surface of the plaster wall 7.

The lower portion of the wall enclosure 5 has a horizontal end member or base 11 adapted to rest on or near the floor 121. This portion 11 has an upright flange 12 at its forward edge.

The heating unit proper, which is supported by the aid of the wall enclosure 5, includes a baffle member 13 and a deflector member 14. These members 13 and 14 extend horizontally and each has a length corresponding to the horizontal length of the enclosure 5. They are held in spaced apart relationship to form a warm air passage or path between them past a heating coil 15. This heating coil 15 is appropriately supported in the air space.

The manner in which the members 13 and 14 are held in this spaced apart relationship will be described hereinafter. It is sufficient for the present to note that the baffle 13 is provided with a vertical central portion 16 and diverging edge portions 17 and 18 to form a trough-like configuration. The upper edge portion 17 is formed with a vertical portion 19 provided with a horizontal flange 20. The lower portion 18 is provided with a lower edge flange 21 adapted to overlie flange 12 of the enclosure 5. The flange 21 may be attached as by the aid of screws 22 (see also Fig. 2) to the flange 12. Only two such screws need be used, one adjacent each end of the member 13.

The member 13 is suspended by the aid of its flange 20 upon support members or bars 23. Three such support members may be used in connection with each unit and attached to the inner surface of the wall enclosure portion 8. Two of these may be disposed at opposite ends of the enclosure 5 and one near the central portion thereof.

Each of the supporting members 23 is provided with an upright portion 24 upon which the flange 20 rests. Movement of the baffle member 13 outwardly of the support members 23 is prevented by the aid of an abutment 25 attached to the lower surface of the flange 20 (see particularly Fig. 11). Furthermore, the members 5 and 13 are mounted in spaced apart relationship by the aid of a strut or flange member 26 which is attached as by welding to the interior of the closure 5 by the aid of the upright leg 27. This member 26 is formed with a depending leg 28.

In this manner a longitudinal conduit space 29 is formed between the members 5 and 13, and adjacent the lower edge of the unit. This conduit space is provided with one or more openings 30 (Fig. 8) to permit the passage of conductors 31 into the conduit space 29. These conductors 31 are joined to the heating coil 15 as by the aid of a connector block 32.

By thus isolating the wires forming the connections to the heating units, standard insulated wiring can be used without fire hazard, since the conduit space 29 is quite well isolated and separated from the heat of the coil 15.

Furthermore, by suspending the member 13 upon the supports 23, relative longitudinal movement between the wall enclosure 5 and the heating unit proper, including the members 13 and 14, is permitted. Thus substantial freedom is permitted for the expansion or contraction of the longitudinally extending elements forming the heating unit proper.

As shown in Figs. 5 and 6, the upper edges of the members 5 and 13 define a cool air opening 33 directed toward the wall surface formed by the plaster 7. This opening thus extends upwardly and toward the rear of the baffle 13. Furthermore, the elements 8 and 17 of the members 5 and 13 define a path leading upwardly from the space between these two elements. Cool air flows through these spaces and is transmitted through the opening 33. This flow of air is indicated by arrows in Fig. 6. Thus air flows above the lower diverging member 18 upwardly through openings formed by the louvre portions 34 in the vertical wall 16. The air thence flows upwardly between the members 5 and 13 and ultimately outwardly out of the opening 33. This cool stream of air proceeds upwardly adjacent the wall surface 7, retarding or preventing precipitation of fine dust particles carried by the warmed air, which passes between the baffle 13 and the deflector 14.

The baffle 13 and the deflector 14 are held in spaced apart relationship by the aid of a plurality of brackets 35 (see Fig. 10). These brackets are shown also in Figs. 2, 3, 4, 5 and 6. They are made of flat sheet metal. Five such brackets may be used for each unit.

Each of the brackets has a contour fitting the trough-shaped forwardly facing surface of the element 13. It is provided with a plurality of tongues 36 interfitting in appropriate slots formed through the member 13. Accordingly, these brackets can be snapped into place by merely urging the brackets against the baffle 5. The resilience of the diverging members 17 and 18 maintains the brackets in place.

The right-hand edge of each of the brackets 35 has a vertical portion 37 and diverging portions 38 and 39. Extending at an angle with respect to the lower portion 39 is a slanting edge 40. The edge portions 38 and 40 serve to support the deflector 14 in a detachable manner. Thus the deflector 14 includes the diverging elements 41 and 42. The lower diverging element 42 rests against the surface 40. Diverging portion 41 is provided with an angled portion 43 which fits against the surface 38. A shoulder 44, formed on the bracket 35, engages the outer edge of the portion 43.

In order to install the deflector 14, the diverging portions 41 and 42 may be urged toward each other so as to permit insertion of portions 42 and 43 against the edge portions 40 and 38 of the bracket 15. It is thus snapped into place.

In order to position the deflector 14 properly a pair of ears 45 (Figs. 6 and 12) are struck up from the portion 43 of deflector 14 to engage the central one of the brackets 35, as indicated in Fig. 6.

Interposed between one or more of the brackets 35, and edge 43, there is a thin layer 90 of yielding material, for reducing noise attendant upon contraction and expansion of the deflector or baffle members.

The brackets 35 are properly made thin so as not to obstruct the flow of air upwardly between the baffle 13 and the deflector 14. The edge portion 17 of the baffle 13 and the edge portion 43 of the deflector 15 form a channel or passage for the heated air to pass upwardly, as indicated by the arrows in Fig. 6. This air passage is open both at the top and bottom since the lower edge of the deflector 14 is spaced away from the diverging member 18 of the baffle 13. Furthermore, the edge portion 42 is provided with rectangular apertures 70 (Figs. 2 and 6) for passage of air past element 15.

Heated air thus rises upwardly through the opening 46 formed at the upper edge, between the baffle 13 and the deflector 14.

Each of the brackets 35 is provided with an upwardly extending projection 47. This projection 47 can be received in a channel formed at the upper edge of a front cover plate 48. This channel is formed by the depending spaced flange 49 formed on the cover plate 48. A corresponding horizontal flange 50 engages the lower edges of the horizontal projections 51 of the brackets 35.

Those brackets 35 which are adjacent the ends of the

unit are provided with ears **52** (Figs. 2, 5 and 10) for accommodation of screws **53** for holding the cover plate **48** in position. These are the only fastening means required to provide a complete assembly.

The heating element **15** is formed of convoluted resistance wire strung lengthwise of the unit. In order to support this heating element in the warm air space defined by the baffle **13** and deflector **14**, a series of coil supports **54** is provided. These coil supports are mounted upon the deflector **14** in a manner to be hereinafter described. They are formed of refractory material and include the spaced arms **55**, **56** which define recesses for both reaches of the element **15**. As shown most clearly in Figs. 3 and 8, alternate supports **54** are turned so that the arms **55**, **56** extend upwardly and then downwardly. The looped portion of the heater **15**, as shown most clearly in Fig. 3, is mounted upon a horizontally turned coil support **54**.

Each of the coil supports **54** is mounted on the vertical wall of the deflector **14** in a manner shown most clearly in Figs. 2, 5, 13 and 14. An aperture **57** of general rectangular configuration is formed in the deflector **14**. From the vertical edges of this aperture project the integral projections or extensions **58**. The length of these projections is somewhat less than the length of the aperture **57**. These projections serve as resilient arms for engaging grooves **59** formed on opposite sides of the support **54**. Accordingly, in order to insert the support **54** into operative position with respect to the deflector **14**, it is merely necessary to urge the support **54** inwardly as indicated by the arrow **60** of Fig. 13. When this support **54** is urged inwardly to a position where the edges of the projections **58** engage the grooves **59**, the support **54** is held effectively in place (Fig. 14). The upper and lower edges of aperture **57** restrain substantial vertical movement of the support **54**.

When more than one unit **2** or **3** (Fig. 1) is installed in lengthwise relation, they may be joined by the aid of an alignment plate **61** (Fig. 9). This alignment plate joins adjacent wall enclosures **5** by the aid of fastening means **62** passing through slotted apertures in the alignment plate **61**. Alignment plate **61** may have a flange or strut **63** corresponding to flange **26** of the adjacent units. Furthermore, the supports **23** adjacent the congruent ends of the units may be joined by a bar **64**.

The end of a series of heater units may be covered by the aid of an end member **65** (Figs. 1, 2, 3 and 8). This end member **65** has a flange **66** (Fig. 3) by the aid of which it may be fastened to the wall enclosure **5**.

Similarly a corner structure **67** (Figs. 1 and 4) may be utilized where two units, such as **3** and **4**, meet at a corner. This corner structure is provided with appropriate flanges **68** and **69** securing them to the adjacent wall enclosure **5**. The corner structure includes a top plate **95** of general rectangular configuration. Appropriate apertures can be formed in the sides of the corner plate for the passage of connecting wires between adjacent heater sections.

Intermediate the heating units **2** and **3** is located a thermostatic switch section **71** (see particularly Figs. 1 and 7). This switch section **71** serves to accommodate a thermostatic switch mechanism **72** having an operating knob **73** projecting above the structure. This switch **72** is so arranged that it is subjected to the temperature of the circumambient air near the floor of the room being heated, and inappreciably affected by the heat radiated from the heating elements **15**.

For this purpose a wall enclosure section **74** is provided having generally the same contour as the wall enclosure sections **5**. These wall enclosure sections may be joined as by the aid of alignment plates **75** (Figs. 4 and 7), attached to the members **5** and **74**.

A frame member **76** is provided formed of sheet metal and mounted upon the well enclosure **74**. The back wall of this frame element is sloping. It is provided with two flanges **77** forming a space for the accommodation of the switch **72**. This frame member **76** has a perforated horizontal flange **78** for circulation of air, as well as an aperture for the passage of the stem **79** of the switch **72**.

A front cover plate **80** serves to enclose the switch **72**. It is provided with the side flanges **81** for shielding the switch section from the heat of the adjacent units. The front plate **80** is supported by the aid of the vertical flange **82** joined to the ear **85**, formed on the shell **76**. The side flanges **81** are attached to the rear alignment plates **75**.

The upper edge of the cover **80** has a conformation corresponding to the upper edge of the baffle **13**. Apertures **86** at the bottom of the cover **80** permit free circulation of air past the switch **72**.

The structure of the heating units permits ready adaptation to any baseboard design. By virtue of the inwardly sloping portion **38** of deflector **14**, and the location of the heating units below the diverging portion **41**, danger of contact of any foreign material with heating coil **15** is obviated.

The units can be easily and simply assembled. In this assembly operation, the wall enclosure **5** is first installed. The previously assembled heating element **15**, the baffle **13** and deflector **14** can then be attached to the wall enclosure **5**.

Heating is effected not only by the aid of the warm current of air passing upwardly from the heater, but also by radiation from the front cover **48**. This front cover is heated to some extent by its proximity to the deflector **14** and element **15**.

The inventor claims:

1. In a baseboard electric heater: a deflector; a baffle; means for maintaining said deflector and baffle in spaced-apart relationship; a heating element supported within the space defined by the baffle and the deflector; there being openings at the longitudinal opposed edges of the baffle and deflector to provide communication between said space and the external air; and a wall enclosure supporting said baffle at the opposed edges of the said baffle; said wall enclosure having a wall spaced from the baffle, to define a path for secondary air flow; said baffle having openings communicating with said space for passing air from the space into said path.

2. In a baseboard heater unit: a barrel; a deflector made from resilient material; said deflector and baffle defining an open air path between them; brackets for maintaining the baffle and deflector in spaced relationship; said deflector having an intermediate portion, an edge portion defining an air passage with the baffle, and an opposite edge portion, said edge portions being oblique to the intermediate portion; said brackets having edge surfaces facing the deflector and contacting said deflector edge portions, said edge portions being sprung against satid edge surfaces, said brackets having other surfaces restraining said deflector against removal; and a heater element supported by the deflector in said space.

3. In a baseboard heater unit: a baffle; a deflector; said deflector and baffle defining an open air path between them; brackets for maintaining the baffle and deflector in spaced relation; and a heater element supported in said path; the baffle and deflector having spaced edges; said brackets having an upper edge extending beyond the deflector edge; and a front cover plate having a recess accommodating said upper edge.

4. In a baseboard heater unit: a baffle, a deflector; said deflector and baffle defining an open air path between them; brackets for maintaining the baffle and deflector in spaced relation; and a heater element supported in said path; the baffle and deflector having spaced edges; said brackets having opposed edges extending beyond the deflector edges; and a front cover plate having a recess accommodating one of the bracket edges, and a flange at the opposite edge of the plate and engaging the other of the bracket edges.

5. In a baseboard heater unit: a baffle; a deflector; means for supporting said baffle and deflector in spaced relationship to define an upper and a lower air passage

into the space between the deflector and the baffle; a heater element supported in said space; and a wall enclosure spaced from the baffle and having an upper edge spaced below the upper edge of the baffle; said baffle having openings leading into said space from below the heating element into the space formed between the enclosure and the baffle; said upper edges defining an opening upwardly directed and to the rear of the baffle.

6. In a baseboard heater unit: a baffle; a deflector; means for supporting said baffle and deflector in spaced relationship to define an upper and a lower air passage into the space between the deflector and the baffle; a heater element supported in said space; and a wall enclosure spaced from the baffle and having an upper edge spaced from the upper edge of the baffle; said enclosure having a flange intermediate its height, contacting the baffle and defining a conduit space for connections for the element, said conduit space being located at the lower portion of the space between the baffle and the enclosure.

7. In a baseboard heater structure: a wall enclosure; and a longitudinal heating unit having a sheet metal enclosure; said unit having a baffle, and means for supporting the baffle upon the wall enclosure, including a support at the top upon which the upper edge of the baffle rests, and means preventing lateral movement of the baffle with respect to said support, while permitting longitudinal movement.

8. In a baseboard heater structure: a longitudinal heating unit having a front deflector, a rear baffle, and one or more brackets between the deflector and the baffle, said brackets having an upper portion extending beyond the deflector; and a cover plate having a flange forming a groove in which said upper portion rests.

9. In a baseboard heater unit: a baffle member; a deflector member; said baffle member being made from resilient material; spaced brackets interposed between the members, and having opposite edges respectively contacting said members for maintaining an air passage between the members, said passage extending transversely of the members; said baffle member having divergent edge portions fitting corresponding edge surfaces of the brackets; the resilience of the baffle member serving to restrict movement of the brackets in one direction; and means forming a restraint against relative movement transverse to said direction between the brackets and one of said members.

10. In a baseboard heater unit: a baffle member; a deflector member; said baffle member being made from resilient material; spaced brackets interposed between the members, and having opposite edges respectively contacting said members for maintaining an air passage between the members, said passage extending transversely of the members; said baffle member having divergent edge portions fitting corresponding edge surfaces of the brackets; the resilience of the baffle member serving to restrict movement of the brackets in one direction; and tongue connections between one of the members and the brackets.

11. In a baseboard heater unit: a baffle member; a deflector member; said members being made of resilient material; spaced brackets interposed between the members, and having opposite edges respectively contacting said members for maintaining an air passage between the members, said passage extending transversely of the members; said members having divergent edge portions fitting corresponding edge surfaces of the brackets; the resilience of the members serving to restrict movement of the brackets in one direction; and means restraining relative movement transverse to said direction, between the brackets and one of the members.

12. In a baseboard heater unit. a wall enclosure; a baffle member spaced from the wall enclosure; a deflector member spaced from the baffle member; an electric heating element disposed between the members; said deflector and baffle defining a through air passage; and an upwardly directed projection forming a continuation of the upper edge of the enclosure and inclined away from the baffle member; said baffle member having an edge spaced above said projection, and defining, with said projection, an air passage past said edges of the enclosure and the baffle.

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