United States Patent

[11] 3,632,987

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[54] **HEATING AND RADIATING UNIT FOR ELECTRICAL HEATERS**
4 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **219/530,** 165/182, 219/540, 219/544, 219/365
[51] **Int. Cl.** **H05b 3/50**
[50] **Field of Search** 219/530, 540, 544, 552, 365; 165/170, 171, 166, 57, 181, 182, 183, 165; 29/611

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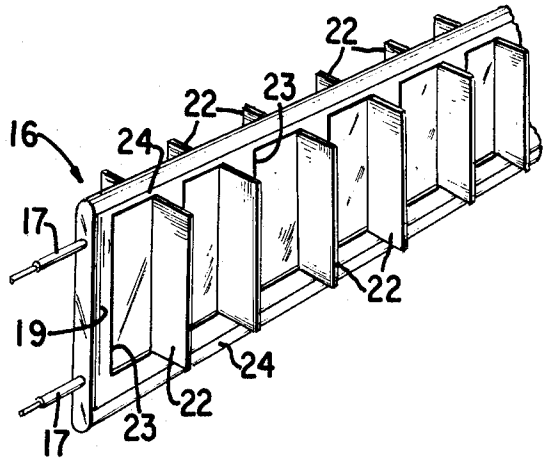
ABSTRACT: An electric heating element for baseboard heaters or the like wherein strips of supporting material, insulating strips and a heater element strip are fed to a forming and gathering apparatus and formed into a heating unit. The supporting material preferably has fins stamped thereon.



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SHEET 1 OF 2

FIG. 2

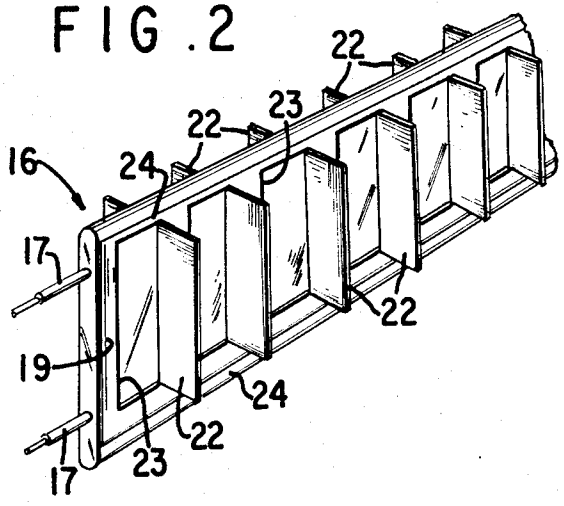
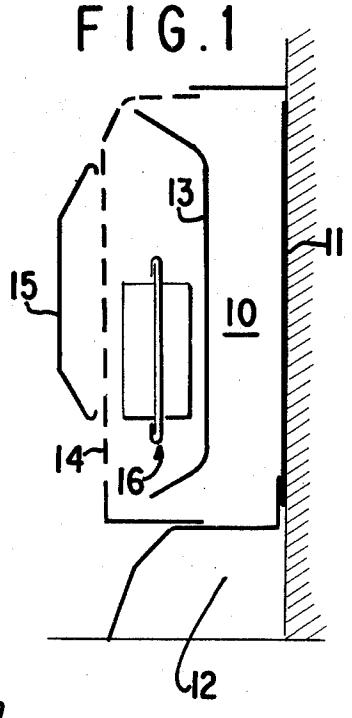


FIG. 1



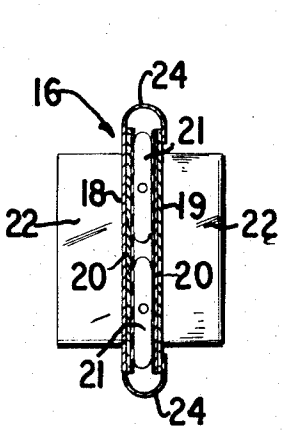


FIG. 4

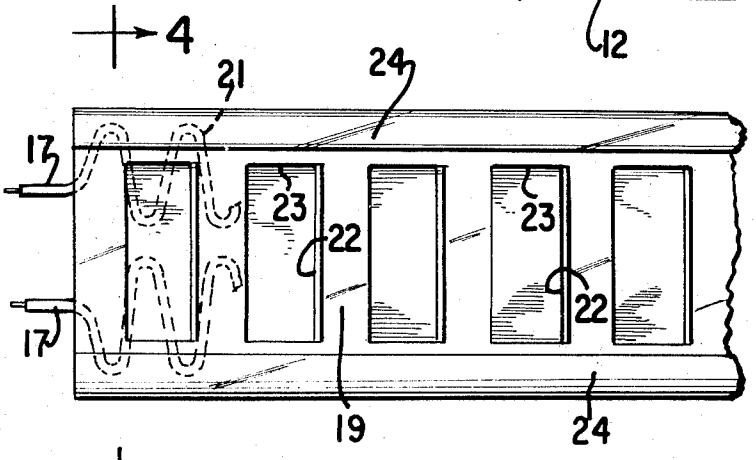


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FIG. 3

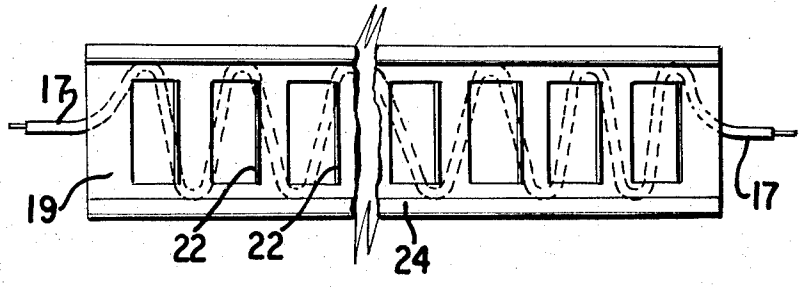

FIG. 5

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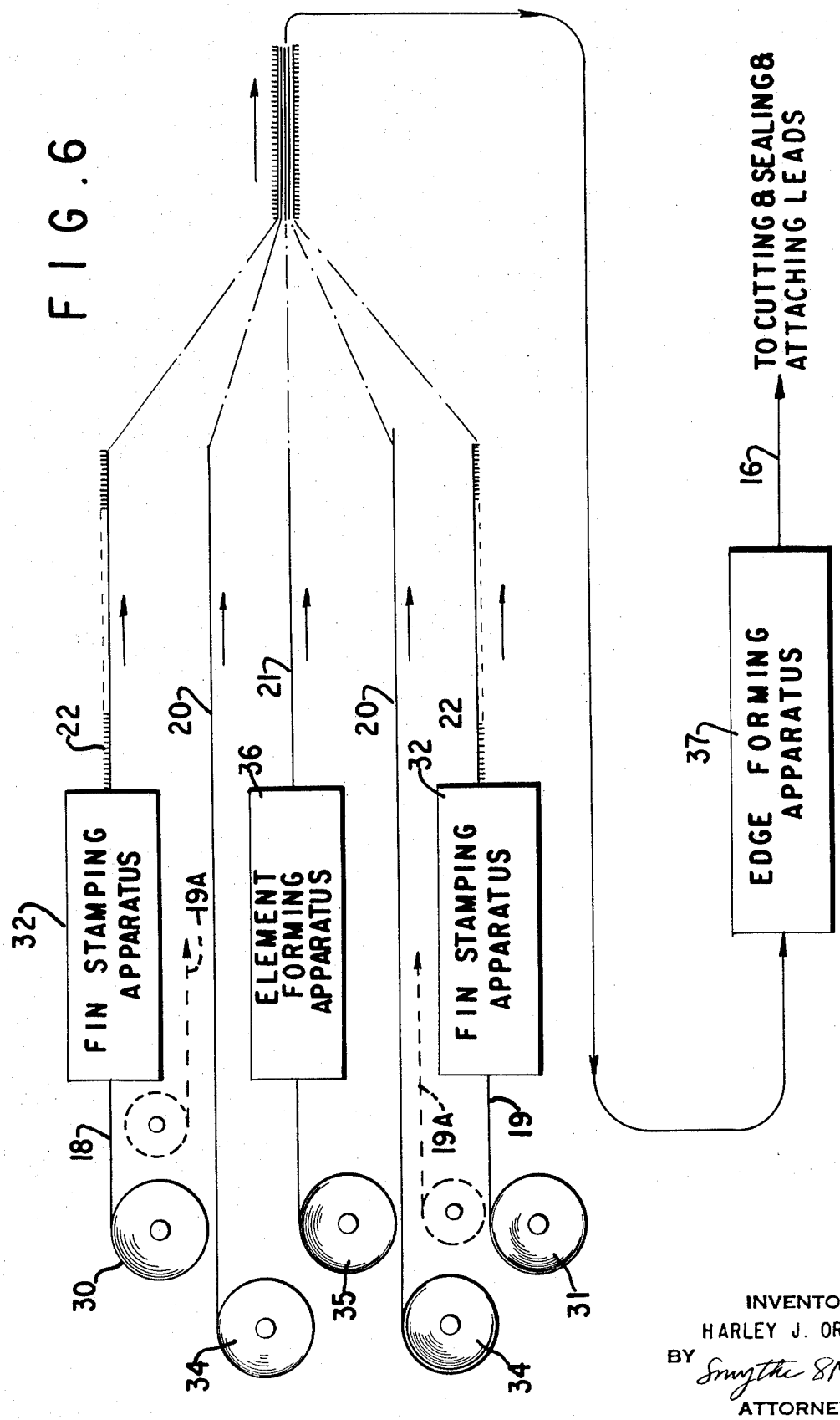
FIG. 6



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HEATING AND RADIATING UNIT FOR ELECTRICAL HEATERS

This invention relates to convection heaters and more particularly to electric heaters of the wall or baseboard type.

Heaters of this type are well known in the heating art but, in general, have radiating fins so attached to the sheath member as to produce noise and poor heat transfer.

One of the objects of the present invention is to provide a heating unit for a baseboard or wall type of heater which is simple and inexpensive in its method of manufacture.

A further object of the invention is to provide a heating unit for wall or baseboard type of electric heaters which is made from strip material and in which the radiating fins are integrally attached to the sheath containing the heating element.

A further object is to provide a heating unit in which the heating element, sheath and radiating fins comprise one unitary, composite, striplike member easily installed and economically manufactured.

In one aspect of the invention, the wall or baseboard heater comprises elongated housing members enclosing a wireway, a heat-deflecting baffle, and a heating and radiating member suspended by hangers or the like. The heating and radiating member comprises a composite unitary strip composed of two strips or sheets of aluminum or suitable material having fins formed therefrom and having a heating element with mica or similar insulating material on each side thereof contained within the aluminum sheets. The entire composite strip is preferably formed in a simple, automatic operation in the which strips of thin metal such as aluminum, strips of thin insulating material such as mica, and a preformed heating element are fed to forming and edge-bending dies to provide the composite strip. The invention also can be practiced without fins.

As a second aspect of the invention, the composite heater and fin strip may comprise a single strand of preformed heater resistance wire or material extending longitudinally of the strip, or it may comprise a multiple strand of resistance wire extending through the upper portion of the strip and bent backwardly to extend through the lower portion of the strip. The strip may or may not be sealed against entrance of moisture at each end thereof.

As a third aspect of the invention, a third strip of aluminum or suitable metallic material may be interposed between one of the stamped metallic strips and its adjacent insulating strip, or such a strip may be positioned between each of the outer stamped sheets and its adjacent insulating strip.

The above and other objects, advantages and features of the invention will become apparent from the following description taken in conjunction with the accompanying drawings which illustrate exemplary embodiments of the invention.

In the drawings:

FIG. 1 schematically illustrates the type of heater in which the unitary heating and fin assembly of the invention may be utilized;

FIG. 2 is a perspective view of the unitary and composite heater and fin unit;

FIG. 3 is an elevational view of the unit of FIG. 2;

FIG. 4 is a cross-sectional view taken on the line 4—4 of FIG. 3;

FIG. 5 is a view similar to FIG. 3 but illustrating a modified form of the heating element; and

FIG. 6 illustrates the method for forming the composite or unitary heating and fin strip of FIG. 2;

referring to the drawings and more particularly to FIG. 1, there is shown a housing **10** comprising a back plate **11** adapted to attach the baseboard to a wall, a wireway **12**, a deflector plate **13**, a grille or screen guard **14**, a front member **15**, and a heating and radiating unit or member **16**. Electric wiring for the heating element is adapted to extend through the wireway **12** and connect with the leads **17** (FIGS. **2**, **3** and **5**) of the heating element. Suitable thermostatic and "fail-safe" control elements (not shown) may also be incorporated in the housing **10** in a well-known manner.

As more particularly shown in FIGS. **2** to **4**, the heating and radiating unit or member **16** comprises a unitary composite strip formed from two sheets **18** and **19** of aluminum or the like encompassing a pair of strips or sheets **20** of mica or similar insulating material overlying a preformed heating element **21**. The strips **18** and **19** are stamped or pressed to form the fins **22**, the fins of one strip extending in one direction and those of the other in the opposite direction, as illustrated in FIGS. **2** and **4**. If desired, a third sheet or strip of aluminum **19A** (dashed lines, FIG. **6**) may extend between the sheet **19** and its associated mica strip **20** to protect the insulating strip **20** at the openings **23** from which the fins **22** are punched. The aluminum sheet or strip **18** is wider than the strip **19** to provide upper and lower portions adapted to be folded or crimped as shown at **24** in FIGS. **2** to **4** to clamp or secure the heating and radiating unit **16** into one unitary composite strip or structure. The heating element **21** preferably comprises a wirelike resistance preformed into a relatively flat, open loop or cyclelike formation as shown in FIGS. **3**, **4** and **5**.

In FIGS. **2** to **4**, the open loop or cyclelike resistance wire or heating element **21** extends through the upper portion of the heating unit **16** and then bends backwardly to extend through the lower portion of the heating unit. Depending upon the heating wattage desired, however, the heating element or resistance wire **21** may comprise a single or multiple strand extending continuously through the unit **16** and having terminals at each end thereof as illustrated in FIG. **5**. The ends of the unitary heating and radiating unit **16** may also, if desired, be sealed against the entrance of moisture by a suitable silicon or ceramic compound. As is also known in the wall or baseboard heating art, there is a tendency for heat to concentrate in the central portion of the heating unit. To avoid this, the invention also contemplates the spreading of the convolutions of the open loop or cyclelike heating element **21** to provide a greater density of heat at the ends of the unit **16**.

In FIG. **6** there is illustrated a method for the automatic, simple and economical forming of the composite and unitary strip or heating unit **16**. Referring to FIG. **6**, sheets or strips **18** and **19** in roll forms **30** and **31** are fed to fin-stamping apparatus or dies **32** wherein the fins **22** are formed from the relatively thin sheets of metallic or suitable material. The formed strips are then fed to a composite strip forming or gathering apparatus or element **33**. Also fed to the gathering apparatus **33** from rolls **34** or the like are two sheets or strips **20** of mica or insulating material and a strip of electrical resistance or heating wire **21** supplied from a coil **35** and preformed by apparatus such as dies **36** into a substantially flat open loop or cyclelike formation as shown in FIGS. **3** and **5**. The outer portions of the wider strip **18** are then folded or crimped around the strips **19**, **20** and **21** by a suitable forming apparatus or dies **37** to provide a unitary composite heating and radiating strip or unit assembly **16**. Thereafter the composite strip is cut into predetermined lengths and the cut ends may be sealed against entrance of moisture by a suitable silicon compound or the like. Also, the terminal leads **17** are attached. If a third metallic strip is desired between one of the finned strips and an insulating strip, as above described, it would be fed to the gathering apparatus **33** from a roll of the strip material (not shown).

The heating element may be of resistance wire, graphite deposit on insulating material, or a printed circuit type element. Also, the fins may be omitted and the element sheath may be metallic or insulating material.

What is claimed is:

1. A unitary composite striplike heating unit for baseboard or like electric heaters comprising at least two strips of relatively thin metallic material each having a plurality of integral continuous radiating fins stamped to extend laterally outward from one face of each strip generally throughout the entire width of said strip so as to expose substantially the entire areas thereof, two relatively thin strips of insulating material positioned between said metallic strips adjacent the inner surfaces thereof, a wirelike electric heating element positioned

between said insulating strips and extending along the length of said strips, the upper and lower edges of one of said metallic strips being folded over the outer face of the other of said metallic strips throughout substantially its entire length tightly to clamp said insulating strips and said heating element within said metallic strips, and sealing means at the ends of the striplike heating unit to guard against entrance of moisture.

2. In a heating unit according to claim 1 wherein said heating element is of substantially flat open loop cyclelike formation, with said formations being closer spaced toward the ends of said heater unit to distribute heat more evenly along the length of the unit.

3. In a heating unit according to claim 1 wherein a third thin strip of metallic material is positioned between one of said metallic strips and one of said insulating strips.

4. In a heating unit according to claim 1 wherein the composite striplike heating unit is of predetermined length, and the sealing means is a compound.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,632,987 Dated January 4, 1972

Inventor(s) Harley J. Orr

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Patent front page, [73], insert --Sola Basic Industries, Inc., Milwaukee, Wisconsin--; Patent front page, [60], insert --Division of Serial No. 666,063, filed September 7, 1967, now Patent No. 3,510,940, issued May 12, 1970.

Signed and sealed this 21st day of November 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

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