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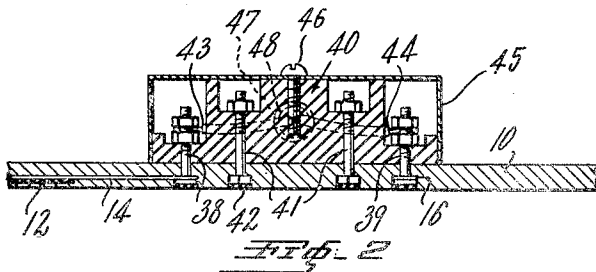
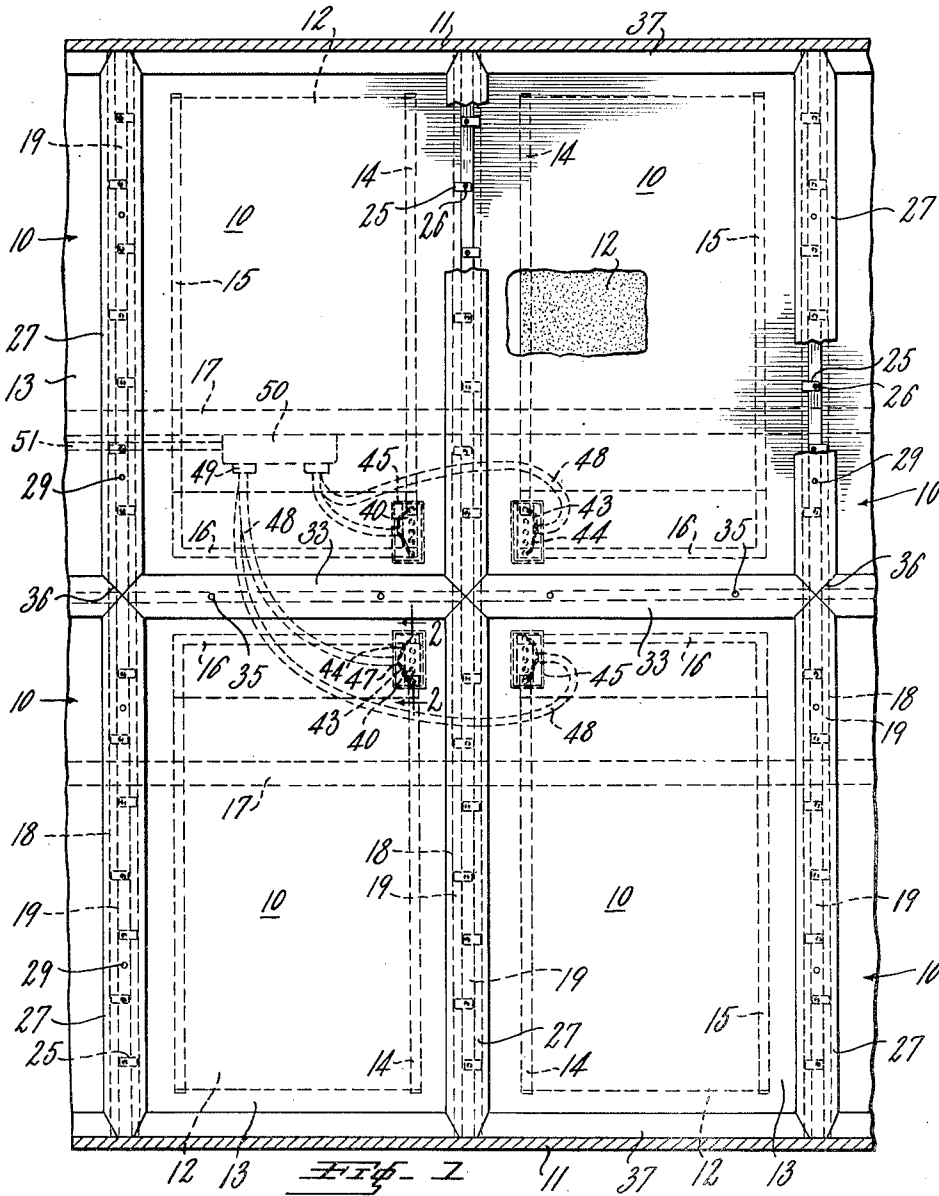
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2,609,474

RADIANT HEATING INSTALLATION

Filed Jan. 19, 1950

2 SHEETS—SHEET 1



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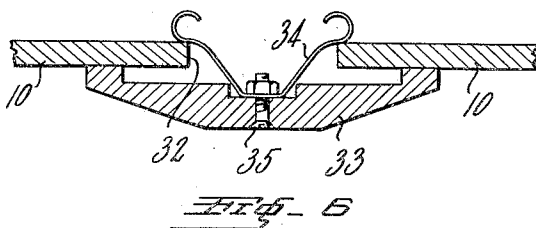
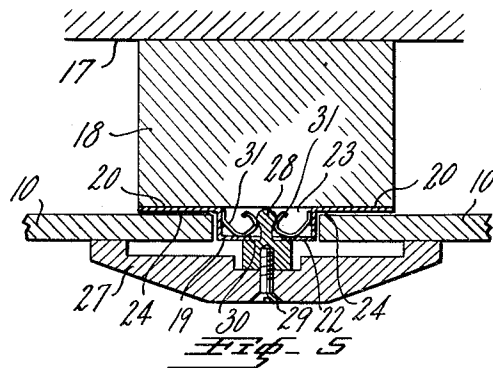
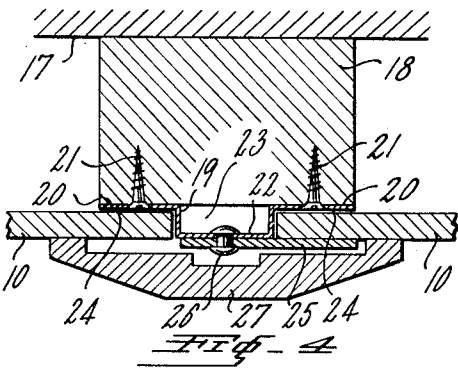
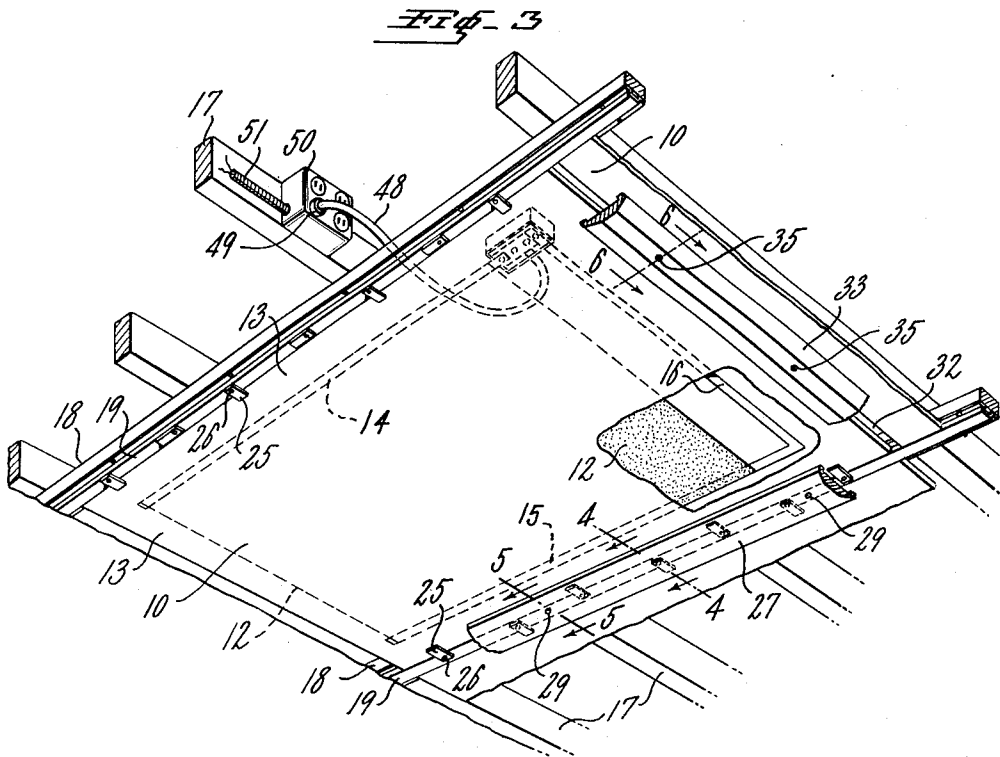
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RADIANT HEATING INSTALLATION

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2 SHEETS—SHEET 2



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# UNITED STATES PATENT OFFICE

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## RADIANT HEATING INSTALLATION

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1 Claim. (Cl. 219-19)

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This invention relates to radiant space heating installations, and more particularly it relates to electrical radiant heating systems which are incorporated in the ceiling or walls of a room.

A principal object of the invention is to provide a convenient means for connecting radiant heating elements in the form of panels to an electrical supply.

Another object is the provision of an electrical radiant heating panel installation permitting easy removal and replacement of the panels.

Still another object is to provide means for incorporating radiant heating panels in the walls or ceiling of a room in a manner which is efficient yet inconspicuous.

A further object of the invention is the provision of an electrical heating panel assembly which can be connected to, and disconnected from, a building wiring system without necessity for making splices or disturbing the wiring.

Still a further object is to provide means for easily connecting a single panel, or a plurality of adjacent or spaced panels, to a building wiring system.

Additional objects and advantages of the invention will be made evident in the following detailed description when read with reference to the accompanying drawings, wherein:

Fig. 1 is a partial sectional view of the ceiling of a room, viewed from below, showing an electrical radiant heating assembly comprising a plurality of heating panels installed thereon in accordance with the present invention;

Fig. 2 is a fragmentary sectional elevation of a portion of the panel assembly taken along line 2-2 of Fig. 1 and showing a manner of attachment of electrical wiring to the panel;

Fig. 3 is a perspective view of a part of the installation of Fig. 1, showing certain of the panels and marginal moldings removed;

Fig. 4 is a fragmentary sectional elevation taken along line 4-4 of Fig. 3 showing a manner of attachment of the panels;

Fig. 5 is a fragmentary sectional elevation taken along line 5-5 of Fig. 3 showing a manner of attachment of the marginal moldings; and

Fig. 6 is a fragmentary sectional elevation taken along line 6-6 of Fig. 3 showing another manner of attachment of the marginal moldings.

Referring to Fig. 1 of the drawings, the installation shown therein comprises a plurality of rectangular electrical radiant heating panels 10 arranged substantially adjacently in the ceiling of a room, the distance between the side walls 11 of the room being equal to the length of two panels 10.

As shown most clearly in the perspective view, Fig. 3, each of the panels 10, which are constructed of electrically insulating material, such as cementitious building board, contains an embedded film or layer 12 of electrically conductive material which serves as the heating element. Such heating element is preferably composed of

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a dispersion of finely divided conductive material, such as conductive carbon black, in a plastic medium, such as rubber. Electrical heating panels of this character are commercially available. The conductive layer 12 is spaced from the marginal edges of the panel 10, leaving non-conducting marginal areas 13 therein.

For the purpose of distributing electric current to the embedded element 12, embedded feeding tapes 14 and 15 of conductive material, such as strips of copper or aluminum foil, are disposed along the longitudinal edges of the layer 12 in electrical contact therewith. A similarly embedded feeding tape 16 extends transversely through the panel from one of the longitudinal tapes 15 to the location where electrical connections are made to the panel in a manner which will be described below.

For the purpose of attaching the panel 10 to the ceiling beams 17 running longitudinally of the room, there are applied to the beams 17 spaced transverse strips or stringers 18. A metal channel piece 19 is applied to the front face of each stringer 18. The channel piece 19, as indicated most clearly in Figs. 4 and 5, has a marginal flange 20 along each edge thereof through which screws 21 (Fig. 4) are passed for fastening the channel to the beam. The central area 22 of the channel piece 19 is raised so as to form a longitudinal recess 23 within the channel piece. The marginal flanges 20 and the raised central portion 22 of the channel 19 define longitudinal grooves or recesses 24 into which the longitudinal marginal edges of the panels 10 fit snugly, so that the front surface of the panel is substantially flush with the front face of the channel 19.

A plurality of rotatable cleats 25 (Figs. 3 and 4) are fastened along the raised front face 22 of each channel 19 by means of rivets 26. The cleats 25 are rotated alternately in opposite directions so as to engage the front marginal surfaces of the panels on opposite sides of the channels 19, thereby supporting the panels in position in the ceiling. By making the cleats rotatable in opposite directions, it is possible to remove one panel without disturbing the other.

For the purpose of concealing the panel-supporting channels 19 and cleats 25, longitudinal masking moldings or cover strips 27 of suitable shape are placed thereover. In order that the masking moldings 27 may be easily removable they are preferably held in place by snap-on fasteners disposed along the length of the moldings at suitable intervals. Such snap-on fasteners, as indicated in detail in Fig. 5, may comprise an upwardly extending male prong member 28 secured to the inner face of the masking molding 27 by means of a screw 29, and adapted to pass through an opening 30 in the center piece 22 of the channel 19 into frictional engagement with suitably shaped spring clips 31 which are fastened within the recess 23 on the inside of the channel 19 for this purpose.

For concealing the opening or joint 32 (Fig. 3) between the short edges of adjacent panels, masking molding 33, of form similar to molding 27 is provided, such molding being fastened in place by suitably shaped spring clips 34 (Fig. 6) spaced along the molding 33. Each clip 34, as indicated in Fig. 6, is fastened to the molding 33 by means of a nut and bolt 35, and is adapted to fit through the opening 32 between the short edges of the panels 10, and to frictionally engage the rear edges of adjacent panels, thereby holding the molding 33 in place. As indicated in Fig. 1, the various moldings are suitably jointed at the intersections 36 to give a neat finished appearance, and the edges of the panel assembly are provided with a suitable molding 37 applied adjacent the side walls 11 of the room.

For the purpose of connecting electrical supply wires to the embedded heating element 12, terminal bolts 38 and 39 (Fig. 2) pass through the panel from the feeding tapes 14 and 16 respectively. The terminal bolts pass through an insulating terminal block 40 which is fastened to the rear face of the panel by means of bolts 41 which pass through a thickened portion of the block. The upper face of the block is provided with recesses adapted to accommodate the nuts on the ends of the terminal bolts 38 and 39 and on the fastening bolts 41, as indicated in Fig. 2. The heads of the terminal bolts 38 and 39 and of the fastening bolts 41 are countersunk at the front surface of the panel and covered with a suitable insulating compound 42. Electrical supply wires 43 and 44 are connected to the terminal bolts 38 and 39 by means of nuts on the threaded ends thereof.

A protective cover 45 is provided for the purpose of enclosing the terminal bolts and connections. Such cover may be fastened to the insulating terminal block 40 by means of a screw 46 threaded through the top of the cover 45 and through the thickened portion of the terminal block 40. The supply wires 43 and 44 pass out through an opening 47 (Fig. 1) in the side of the cover plate 40, and are provided with the usual insulation and outer protective covering thereby constituting a flexible appliance cord 48 (Figs. 1 and 3).

The end of the appliance cord 48 is provided with a plug connector 49 (Figs. 1 and 3) preferably of the twist-locking type, which is plugged into a multiple outlet box 50 mounted behind the panels on one of the ceiling beams 17. The outlet box 50 is connected to the building wiring system through the usual armored cable 51. As shown in Fig. 1, a plurality of adjacent panels 10 may be connected thus to the multiple outlet box 50. It will be understood that the usual thermostat and switch (not shown) may be associated with the electrical circuit for turning the system on and off and for controlling the degree of heat emitted by the panels.

In operation, the radiant heating panels 10 are installed between the supporting channels 19 on the stringers 18 and the cleats 25 are rotated to support the panels in place. The plug connectors 49 on the supply cables 48 are plugged into the multiple outlet box 50. Current fed through the supply wires 43 and 44 of the cord 48 passes, by means of terminal bolts 38 and 39, into the embedded distributing tapes 14, 16 and 15. The embedded layer of conductive rubber 12 completes the circuit across the distributing tapes 14 and 15, with the result that the desired radiant heat is produced in the panel by reason

of the resistance to flow of current offered by the conductive rubber film 12. The radiant heat thus produced is emitted from the surface of the panel 10 and is absorbed by occupants and objects in the room.

From the foregoing, it is evident that the invention provides a radiant heating installation in which electrical connections may be made to the panels in a most convenient manner, it being unnecessary to make splices or disturb the wiring to install or remove the panels.

Similarly, the manner of attachment of the panels to the ceiling, or other room surface, permits a maximum of convenience in installing the panels, and, if desired, the panels may be removed with equal ease without injuring the panels or the structure of the room, ceiling or walls.

The method of installation adapts itself to placement of the panels over an entire ceiling or wall, or over portions thereof either adjacently or in spaced relation, to obtain virtually any desired effect.

The manner of concealment of the panel supporting means and joints with decorative molding permits installations having attractive appearance adaptable to various architectural and decorative environments.

Because the electrical wires are essentially enclosed and protected, but still readily accessible for inspection or repair, the installation of this invention is particularly safe.

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

An electrical radiant heating panel installation in a room surface comprising in combination a flat heating panel, stringers secured to said room surface in parallel relation spaced according to the width of the panel, a channel piece on the surface of each stringer, said channel piece having flange portions along its marginal edges for fastening to the stringer, and said channel piece having a central raised portion, the rear edge surfaces of the panel fitting against said flange portions of the channel and the side edge surface of the panel fitting against said raised portion of the channel, the front face of said raised portion of the channel being substantially flush with the front face of the panel, cleats rotatably fastened to said front face of the channel for movement into engagement with the front face of the panel to maintain the panel in place in said room surface, the said channel having a recess in its interior, and a snap-on masking molding covering the edge of the panel and said cleats, said molding having prongs extending from its interior surface into holes in the front face of the channel, and spring means disposed within the recess in said channel at said holes for engaging the prongs to maintain the molding in place.

ELBERT DE F. TIDD.

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