HEAT-INSULATING UNIT
Joseph L. Finck, Brooklyn, N.Y.
Application March 11, 1947, Serial No. 733,851

4 Claims. (Cl. 20—4)

1 This application is a continuation-in-part of my application Serial No. 693,946, filed August 30, 1946.

In the building of a structure such as a house, it is common practice to install heat insulation (such as rock wool, aluminum foil, etc.) between the series of parallel studs, beams or other framing members of the wall, floor and/or ceiling. After the insulation is applied, the wall, for example, is completed by applying a lathing material and then plastered or otherwise finished.

Attempts have been made heretofore to provide a prefabricated heat-insulating unit of the metallic-reflective air-cell type for such purpose, but none has been wholly successful, the units being unsatisfactory for one or more of the following reasons: difficulty (and consequent expense) of producing the unit; and instability of the installed unit; and insufficiency of the insulation afforded.

In the practice of this invention, these defects are overcome, an entirely satisfactory prefabricated heat-insulating unit being provided which is capable of commercial production and distribution at a reasonable price, easy to install, and is fully stable when installed. Moreover, by the use of this invention, it is possible to obtain an insulation effect equivalent to four, six and even more inches of rock wool, solely by the use of metallic-reflective surfaces.

Other objects and advantages of this invention will be apparent to those skilled in the art from a reading of the following specification and from the accompanying drawings showing illustrative embodiments of the invention.

In the drawings (wherein like numbers in the different figures represent like parts):

Fig. 1 is a diagrammatic cross-section of an applied heat-insulating unit embodying this invention.

Fig. 2 is a diagrammatic cross-section of the heat-insulating unit shown in Fig. 1, collapsed for storage and transportation.

Fig. 3 is a perspective view of the spreader element used in the applied heat-insulating units shown in Figs. 1, 4 and 6.

Fig. 4 is a diagrammatic cross-section of an applied heat-insulating unit representing another embodiment of the invention.

Fig. 5 is a fragmentary cross-section of the heat-insulating unit shown in Fig. 4, collapsed for storage and transportation.

Fig. 6 is a diagrammatic cross-section of an applied heat-insulating unit representing a further embodiment of the invention; and

Fig. 7 is a fragmentary cross-section of the heat-insulating unit shown in Fig. 6, collapsed for storage and transportation.

In the drawings, Fig. 1 shows a rigid base sheet (in this embodiment, a building board, such as gypsum board, fiber wallboard, etc.), nailed to the edge of two connective studs 2, 2 by means of nails 3, 3'. To this base sheet is attached two flexible sheets 4, 5, of either paper (coated on one or both surfaces with a bright metal) or metallic foil, the sheets being schematically shown in the drawing as single unbroken lines. These flexible sheets are connected to the base sheet by foldable side members 6, 6' (of paper or equivalent material), the arrangement being similar to a bellows. These side members are attached to the base sheet 1 at 1', 1', by gluing or stapling, for example. In Fig. 2 the bellows arrangement of the three sheets and the side members is shown in its collapsed form.

In Fig. 3 is shown one of the bracket-like spreader elements 8 used to expand the bellows arrangement when the unit is installed. These elements may be made of sheet iron or other stiff material, and are provided with a hole to receive the nails 3, 3' and with a reduced tip 9. The rigid base sheet 1 has suitably-shaped apertures (e. g. slots) 11, 11', to permit the spreader elements to slip through, and may be provided with suitable depressions on its outer surface to receive the arms of the spreader elements, so as to make the arms flush with that surface. On insertion of these elements, the tips 9 engage openings 10, 10' (see Fig. 2) or other grippable elements in extensions of the sheet 5, thus gripping the sheet and spreading and maintaining it and sheet 4 apart from the base sheet and from each other, as shown in Fig. 1. The openings 13, 18 may, if desired, be suitably reinforced; and the tip 9 of the spreader element may be detorally barbed, for retention in these openings. The spreader elements are desirably passed through the base sheet and positioned in the openings 10, 10' in the extension of sheet 5 before the base sheet is placed against the studs, thus avoiding “fishing” for the openings.

Since the base sheet is rigid in this embodiment, it may function as lathing material (which may be left as is, plastered, or otherwise finished). There is thus provided a building unit combining both heat-insulation and lathing, and hence reducing the number of building operations heretofore required.

Fig. 4 shows another embodiment of this invention, in which expanded-metal lath 12 (illus-
trated schematically by a heavy broken line) replaces the rigid building board shown in Fig. 1. In this embodiment the expanded-metal lath is backed by a sheet 13 of paper or equivalent material, which serves to prevent excess plaster from passing through the metal lath, and which may also carry a bright-metal coating on the side opposite from the lath. The two flexible sheets 4, 5 and foldable side members 6, 8', are the same as those shown in Fig. 1. In this embodiment, however, the side members are provided with extensions 14, 15, which together with the edges of sheet 13 are gripped by the metal lath as the latter is folded over and flattened as shown in Figs. 4 and 5, the flattened folds being so spaced as to rest directly on the studs. The spreader elements 8 shown in Fig. 3 are used here in the same manner as in Fig. 1, the elements being passed through suitably-shaped apertures in the metal lath and in sheet 13 to grip sheet 5 and open the bellows arrangement, and being nailed to the studs.

In Fig. 5 the bellows arrangement of the three sheets and side members of the embodiment of Fig. 4 is shown in its collapsed form.

In Fig. 6 is shown a further embodiment of the invention, which, though sacrificing the advantage of having heat-insulation combined with lathing in a prefabricated building unit, gains the compensating advantage of simplicity and greater adaptability. In this embodiment, the base sheet 16 is of flexible material (e.g. of paper, which may be coated on its inner surface with a bright metallic surface foil), the sheet being nailed (while taut) to the edges of two consecutive studs 2, 2 by means of nails (not shown). To this base sheet is attached two flexible sheets 4, 5 by means of foldable side members 6, 8', these and their attachment and operation being the same as in Fig. 1. In Fig. 7, the bellows arrangement of the three sheets and the side members of the embodiment of Fig. 6 is shown in its collapsed form (which, because of the flexibility of sheet 16, can be stored or transported in rolled form). The spreader elements 8 (cf. Fig. 3) are used here in the same manner as in Fig. 1, the elements being passed through suitably shaped apertures 17 in sheet 16 to engage sheet 5 and open the bellows arrangement, and being nailed to the studs (by nails 3, 3').

In Figs. 1, 4 and 6 are shown only two sheets besides the base sheet. If the inter-stud space is closed on the opposite side (as by bricks, sheathing, clapboards, etc. not shown), three separate parallel air cells are provided; and if each air cell is bounded on one side at least by a bright metallic surface, the resulting wall is of high heat-insulating value. This invention however, is not limited to the provision of this number of air cells; thus three or more sheets can be readily attached to the base sheet in a bellows arrangement (the spreading elements being made sufficiently rigid so as to open such bellows arrangement and hold it permanently in its expanded form). If the spreading elements are placed at sufficiently frequent intervals along the studs, collapsing of the bellows arrangement is prevented, and the resulting air cells are stable. Although the illustrated embodiments of the invention are adapted to provide heat-insulation between one pair of studs only, it should be obvious that the base sheet could be of such size as to extend over two or more inter-stud spaces, and have attached thereto separate heat-insulation units for each of the interstud spaces.

The invention may be variously otherwise embodied within the scope of the appended claims. I claim:

1. In a structure, a series of parallel framing members, a heat-insulating unit between the framing members comprising a base sheet fastened to the edges of two consecutive framing members, a second sheet extending substantially parallel to and spaced from the base sheet between the two consecutive framing members, flexible side sheets, spaced and oppositely disposed with respect to each other and connective with the aforementioned sheets and connecting them together so as to provide an air cell, the second sheet extending beyond the side members and having grippable elements on the extensions, and the base sheet having apertures in register with said grippable elements, and stiff spreader elements securely fastened to the two consecutive framing members, said spreader elements extending through the apertures in the base sheet and engaging the grippable elements on the second sheet, whereby the second sheet is maintained taut and spaced from the base sheet.

2. In a structure, a series of parallel framing members, a heat-insulating unit between the framing members comprising a base sheet fastened to the edges of two consecutive framing members, a second sheet of flexible material extending substantially parallel to and spaced from the base sheet between the two consecutive framing members, flexible side sheets, spaced and oppositely disposed with respect to each other and connective with the aforementioned sheets and connecting them together so as to provide an air cell, the second sheet extending beyond the side members and having grippable elements on the extensions, and the base sheet having apertures in register with said grippable elements, and stiff spreader elements securely fastened to the two consecutive framing members, said spreader elements extending through the apertures in the base sheet and engaging the grippable elements on the second sheet, whereby the second sheet is maintained taut and spaced from the base sheet.

3. In a structure, a series of parallel framing members, a heat-insulating unit between the framing members comprising a base sheet of flexible material fastened tautly to the edges of two consecutive framing members of a structure, a second sheet of flexible material extending substantially parallel to and spaced from the base sheet between the two consecutive framing members, flexible side sheets, spaced and oppositely disposed with respect to each other and connective with the aforementioned sheets and connecting them together so as to provide an air cell, the second sheet extending beyond the side members and having grippable elements on the extensions, and the base sheet having apertures in register with said grippable elements, and stiff spreader elements securely fastened to the two consecutive framing members, said spreader elements extending through the apertures in the base sheet and engaging the grippable elements on the second sheet, whereby the second sheet is maintained taut and spaced from the base sheet.

4. In a structure, a series of parallel framing members, a heat-insulating unit between the framing members comprising a base sheet fastened to the edges of two consecutive framing members, a second sheet extending substantially parallel to and spaced from the base sheet.
between the two consecutive framing members, flexible side sheets, spaced and oppositely disposed with respect to each other and coextensive with the aforementioned sheets and connecting them together so as to provide an air cell, the second sheet extending beyond the side members and having grippable elements on the extensions, and the base sheet having apertures in register with said grippable elements, and bracket-like spreader elements each having one arm securely fastened to one of the two consecutive framing members, the other arm extending through one of the apertures in the base sheet and engaging one of the grippable elements on the second sheet, whereby the second sheet is maintained spaced from the base sheet.

JOSEPH L. FINCK.

REFERENCES CITED

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

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,236,829</td>
<td>Evans</td>
<td>Aug. 14, 1917</td>
</tr>
<tr>
<td>1,913,312</td>
<td>Lines</td>
<td>June 6, 1933</td>
</tr>
<tr>
<td>2,312,301</td>
<td>Turner et al</td>
<td>Mar. 2, 1943</td>
</tr>
</tbody>
</table>