June 5, 1956 H. J. WISER 2,749,262

HEAT INSULATION BLANKETS

Filed April 6, 1954

Fig. 1

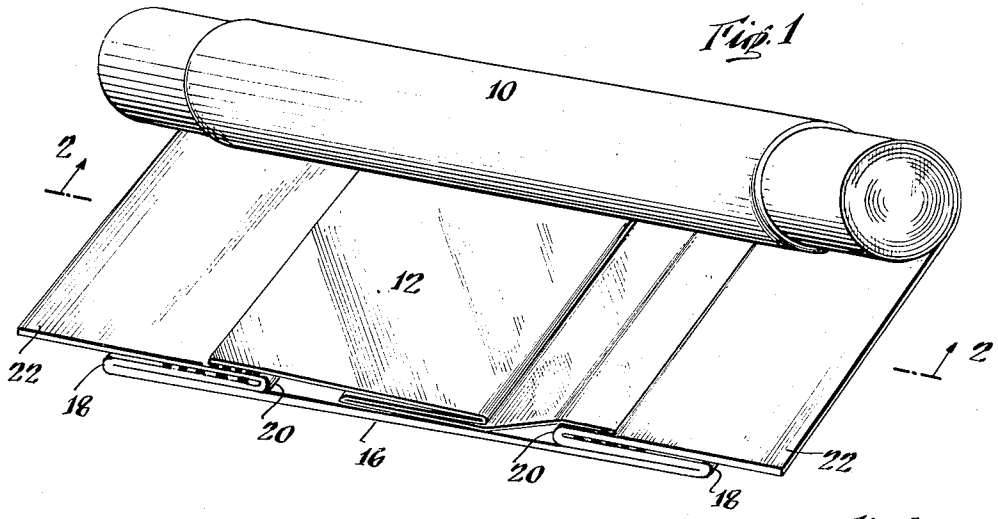


Fig. 2

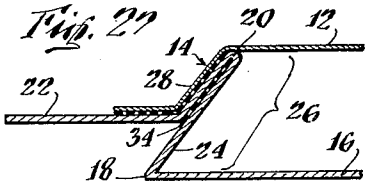
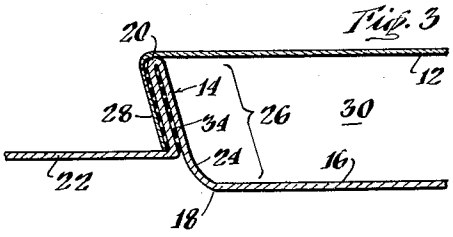


Fig. 3



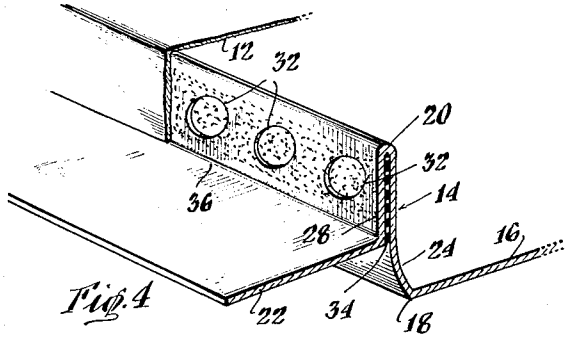


Fig. 4

Fig. 5

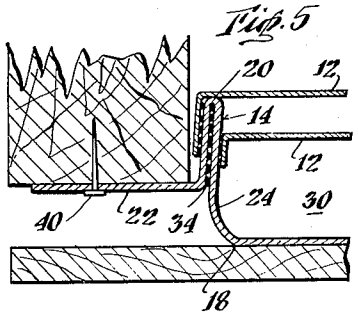


Fig. 7

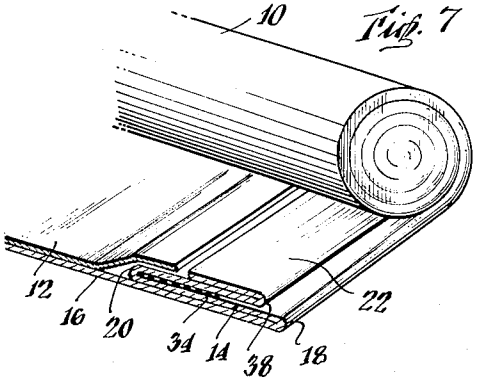
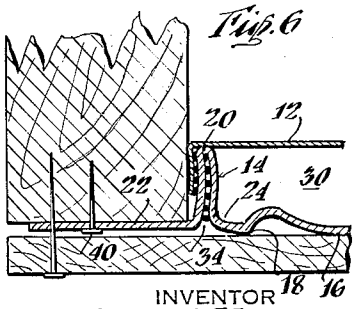


Fig. 6



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HEAT INSULATION BLANKETS

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4 Claims. (Cl. 154—45)

This invention relates to an improved heat-insulating material which comprises one or more sheets of heat-reflective metallized paper or metallic foil attached to a pair of supports formed in a base sheet in such manner that the heat-reflective sheets are held out away from the base sheet to form a continuous thermal barrier between the framing members of a building.

In carrying out my invention the material is folded in such a way that the finished product is in the form of an expansible but substantially flat unit which may be rolled up upon itself into a tight roll of any desired length or packaged in a compact mass for shipment. In use, a length of material is cut from the roll and expanded crosswise and then attached to adjacent studs in the framework of a building by affixing the side portions of the base sheet to the face of the studs. Stretching the material out in this way causes the supports in either side of the base sheet to lift up and carry the heat-reflective sheets away from the base sheet to form a heat-insulating air pocket in the material and a thermal barrier between the supports in the base sheet.

An important feature of my invention is the way in which the supports are made to lift up away from the base sheet. This is done by so forming the supports in the base sheet that when the material is expanded crosswise, a force is exerted against the supports resulting in a torque which tends to rotate the supports and lift them up away from the base sheet. Another important feature of my invention is that particularly effective means is provided whereby the heat-reflective sheets are held against the sides of the studs in the building so that there is a continuous span of heat-reflective material between them. I achieve this in my structure by forming the base sheet in such a way that a portion of the sheet when first attached projects out beyond the face of the studs in the building. Then when wallboard of the like is applied across the studs, the base sheet is pushed in and the supports are thereby rotated over against the sides of the studs so that the heat-reflective sheet forms a continuous thermal barrier from the side of one stud to the opposite side of the adjoining stud.

My invention is best understood by reference to the accompanying drawings, in which—

Fig. 1 is a perspective view of a roll of the preassembled heat-insulating material in substantially collapsed form;

Fig. 2 is a fragmentary sectional view taken on line 2—2 of Fig. 1 showing the assembly in partially expanded form;

Fig. 3 is the assembly of Fig. 2 in its fully expanded form;

Fig. 4 illustrates one way in which the material of Fig. 1 may be glued together to form the assembly;

Fig. 5 shows an assembly similar to that of Fig. 2 which includes a second sheet of heat reflective material positioned between the supports. In this figure the assembly is shown in fully expanded form installed across the face of adjacent studs in the framework of the building;

Fig. 6 shows the assembly of Fig. 2 when pressed into the space between the studs by wallboard; and

Fig. 7 is a fragmentary view of the assembly of Fig. 1 which has been folded over inwardly along its side edges to strengthen and reduce the size of the roll.

Turning now to the drawings, my heat-insulating material 10 comprises one or more heat-reflective sheets 12 carried by a pair of supports 14 preferably made out of the material of base sheet 16. The base sheet is made of paper, preferably heavy kraft paper which may be impregnated with asphalt or alternatively the paper may be sprayed with a coating of heat-reflective metal such as aluminum or it may be covered with a heat-reflective metallic foil.

Along each edge the base sheet is folded back towards the center of the sheet along crease line 18 and then again towards the edge along the crease line 20. It will be noted that the folds at each side of the sheet are symmetrically arranged, that is, each of the folds have the same thickness throughout and the folds are arranged in substantially the same position at each side of the base sheet so that the structure may be rolled up for shipment into the tight cylindrical roll of Fig. 1. The folds are made by folding the paper at the side of the sheet inwardly over against the body of the sheet and then again outwardly over against the infolded portion to give zigzag folds that form stiffened support members. The stiffened support members 14 are formed by attaching the middle layer of paper along a line spaced inwardly away from the fold lines at either side of the zigzag folds. The two layers of paper adjacent crease line 20 are glued or otherwise attached together but this attached area does not reach back as far as crease line 18. The layers thus attached together form the supports 14. The unattached portion of base sheet 16 lying outside of support 14 forms an outer panel member 22 and the unattached portion 24 of base sheet 16 which reaches from support 14 to crease line 18 forms an arm which serves to exert leverage to hold support 14 in erect position when the base sheet is pulled out to expanded position. That is to say, when the material is opened up, arm 24 and the inside layer of material of support 14 form a long leg 26 which cooperates with the short leg 28 formed by the outside layer of material in support 14 to hold the heat-reflective foil away from the base sheet.

When material made in this way is stretched by pulling on the two panel portions 22, it is obvious that since panel 22 and the main portion of base sheet 16 are not in line, a torque will be exerted tending to raise supports 14. As the supports lift they raise the heat-reflective sheet 12 from the base sheet 16 to form a heat-insulating air pocket 30 in the material.

A preferred way of installing this insulating material in a building is to staple or nail the panels 22 to the face of the studs. When this is done, supports 14 project inwardly adjacent the sides of the studs and arm portion 24 projects out beyond the ends of the studs (see Fig. 5). As shown in this figure the tension on the main portion of base sheet 16 pulling against arms 24 will tend to give them a slight curvature. In some cases the wall may be left in this form but ordinarily wallboard or the like will be attached to the edges of the studs. When this is done the pressure against the curved ends of arms 24 will increase the turning moment tending to hold supports 14 tightly against the sides of the studs as shown in Fig. 6. It will be noted that there has been no previous creasing of the material in the supports between crease lines 18 and 20 so that the natural stiffness of the paper will continue to maintain it as a spring-like member to keep the heat-reflective sheet 12 from sagging.

Although my material may be folded and held together in a number of ways such as for example with a suitable

adhesive, gummed tape, stitching, staples or the like, one of the most convenient and satisfactory ways of doing this is to use glue as illustrated in Fig. 4. As there shown, a series of holes **32** are formed in the outer leg **28** of the paper in supports **14**. When this done and the two layers of paper are pressed together to form the supports, some of the glue seeps through the holes and is spread over the outer surface of the support by means of a plow, roller or the like. The heat-reflective sheet **12** may then be pressed in place against the side of the support where it is held by the glue seepage. As a result of this, only a single application of glue is required for forming the supports and for fixing the heat-reflective sheet in position on the supports.

In the form of my invention shown, the supports are stiffened by gluing the two layers of paper together throughout the entire area of the supports as indicated at **34**. However, this is not necessary and a single line of glue may be applied along the base of the supports, or depending upon the type of material employed in the base sheet, the supports may be sewed together along a line at their base.

In the drawings the distance between the base of the supports and crease lines **18** is made approximately equal to the height of the support in upright position and although this is preferred, it is not necessary and crease line **18** may be positioned just far enough away from the base of the support so that the support will lift up when the material is expanded. In this connection, it is to be noted that tension on the heat-reflective sheet may be controlled by changing the length of the sheet. For example, if the sheet is made approximately equal to the distance between crease line **18**, then the heat-reflective sheet can only be subjected to that amount of tension necessary to stretch the heat-reflective sheet out flat. This is particularly important for metallic foils since they cannot stand any appreciable amount of tension without tearing. It is also to be noted that lateral forces applied to the base sheet are applied across the base of the supports and little of the force, if any, is transmitted to the heat-reflective sheet. In some cases it may be desirable to position a score line **36** (Fig. 4) or even a crease in the outer panel members **22** along the base of the supports. This tends to increase lifting action of the panel members on the supports as the base sheet is stretched out.

As previously described hereinabove, the heat-reflective sheet **12** may be made of heat-reflective metallized paper or heat-reflective foil such as aluminum foil. The foil may be attached to the supports in any convenient way, for example with an adhesive, gummed tape or the like. In general, I prefer to carry the heat-reflective sheet down over the support and attach it to the outer panel members **22** as shown in the drawings. Of course, one or more heat-reflective sheets may be positioned on the supports as shown in Fig. 5.

In use, the finished material is rolled up upon itself into a tight roll as shown in Fig. 1. If desired, a portion of the material along the sides may be folded inwardly as at **38** of Fig. 7 which tends to strengthen and reduce the size of the roll. In order to install the material in a building a length of it is cut from the roll and expanded crosswise and then attached to adjacent studs in the building by any convenient means such as by tacking side panels **22** to the face of the studs as at **40** in Fig. 5. Another important advantage of my insulating material is that it fits the space between studs even though they are unevenly spaced in the building. For example, with studs spaced at normal intervals apart, the material is expanded to the position shown in Fig. 5. For studs spaced abnormally far apart the material may be further expanded to increase its span as illustrated in Fig. 3.

It will be understood that various substitutions and modifications may be made in the above described materials and construction without departing from the scope of my invention, some of the novel features of which are defined in the claims.

What I claim is:

1. A thermal insulation material of extended length adapted to be shipped in rolled form from which an appropriate length of material may be cut as desired, comprising a base sheet having a pair of zigzag folds each of which is symmetrically arranged adjacent a side of the sheet with the paper in said zigzag folds being folded inwardly over against the body of the base sheet and then folded again outwardly over against the infolded portion with the top layer of paper being attached to the middle layer along a line spaced inwardly from the fold lines at either side of the zigzag fold to hold the connected portions of the top and middle layers in face to face relationship and thereby to form stiffened support members, said line of attachment being arranged to leave portions of paper in both the middle and top layers of the zigzag fold free and unattached from each other which unattached portions are free to separate and bend relative to the stiffened support members, said unattached portion of paper in the middle layer forming a lever arm that connects the base of the stiffened support members with the body of the base sheet, said unattached portions of paper in the top layer forming panel sections adjacent the side edges of the top layer of paper in the zigzag fold for nailing the structure to the respective faces of adjacent studs in a building, a heat reflective sheet attached near its edges to the respective stiffened support members to form a substantially flat and flexible heat insulating structure with zigzag folds of paper symmetrically arranged therein so that the structure may be rolled up into a tight symmetrical roll for shipment and whereby when a length of the structure is cut from the roll and the unattached edges of the sheet are pulled apart the pull will cause the unattached portions of paper in the middle layers of the zigzag folds to act as lever arms to force the stiffened supports and heat reflective sheet to separate from the base sheet and be lifted up to form a dead air space in the structure.

2. A structure as specified in claim 1 in which the top layer of paper in each zigzag fold is glued in face to face relationship to the middle layer of paper over a substantial portion of the width of the zigzag fold.

3. A structure as specified in claim 1 in which the heat reflective sheet in the opened structure extends across the top, down along the surface of the stiffened support members and out along the surface of the panel sections where the heat reflective sheet is attached.

4. A structure as specified in claim 1 which when opened includes a plurality of heat-reflective sheets stretched across the space between the supports and attached at each end to said supports.

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