March 27, 1956 J. D. GILES 2,739,703

ROLL OF THERMAL INSULATION MATERIAL

Filed Dec. 23, 1953

Fig. 1

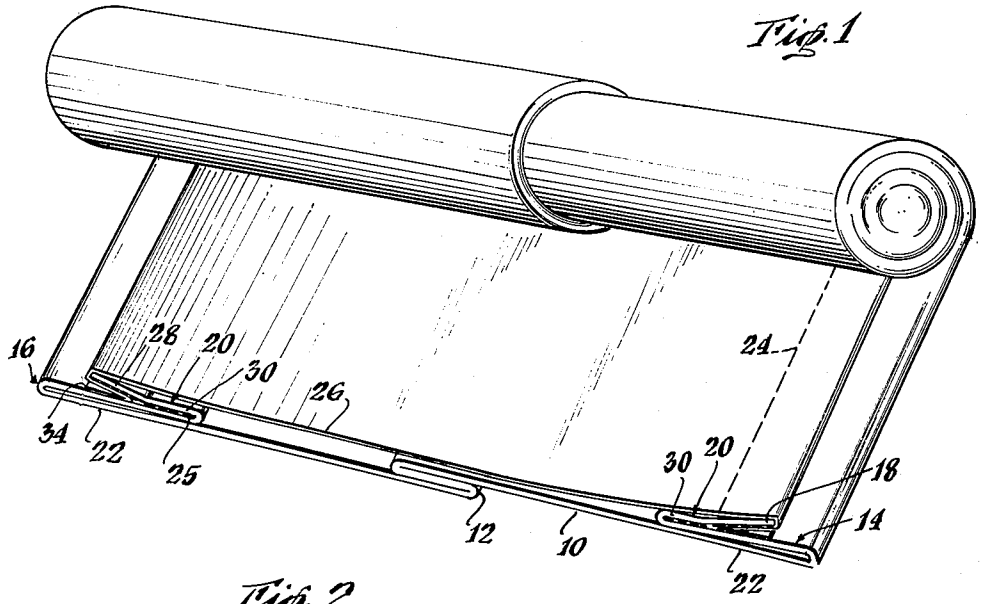


Fig. 2

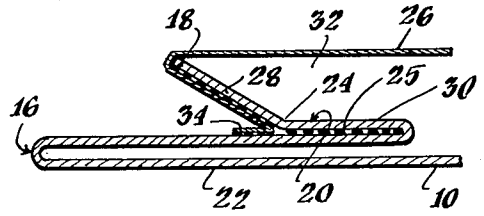


Fig. 3

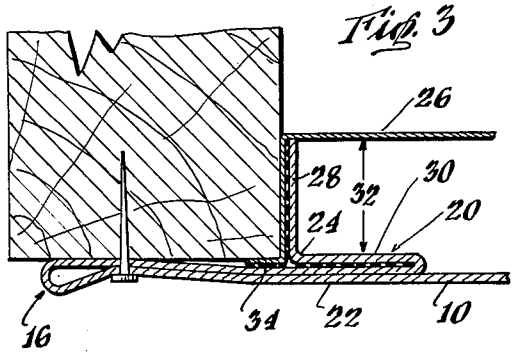


Fig. 5

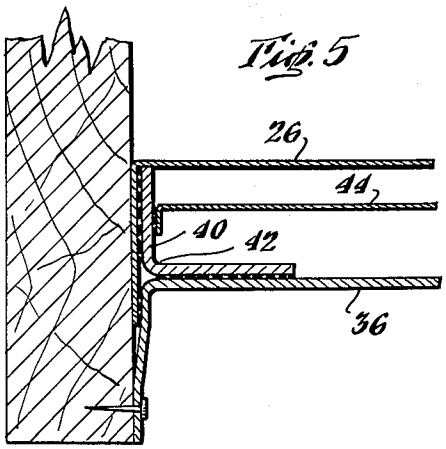
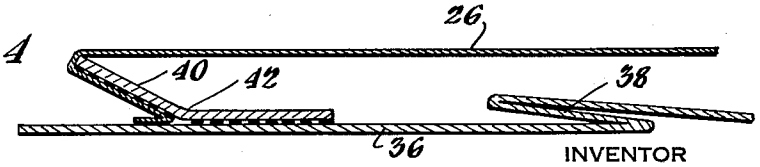


Fig. 4



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ROLL OF THERMAL INSULATION MATERIAL

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3 Claims. (Cl. 206—59)

This invention relates to an improved heat-insulating material adapted to be rolled upon itself into a compact cylindrical roll made up of one or more sheets of heat-reflective metallic foil or metallized paper which are held between supporting members positioned on a base sheet in such manner that the heat-reflective sheets are made to stand out away from the base sheet and form heat-insulating air pockets between the framing members in a building. The base sheet is made of heavy kraft paper or the like which is folded up 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 by manually stretching it out to its full width. This places the base sheet under considerable tension and causes separation of the several sheets. Since the heat-reflective sheet is thin, it cannot stand the force of the tension on the base sheet without tearing and yet in order to utilize its full insulating capacity, the heat-reflective sheet must be tensed between its supporting members so that it will fit snugly into the framework of the building. Accordingly, in my structure, the heat-reflective sheet is tensed independently of the direct force applied to the base sheet.

This is done by attaching the heat-reflective sheet to the base sheet in such manner that when the material is expanded, the heat-reflective sheet is forced to pull on the supporting members and bend them up away from the base sheet. Since the material along the line at which bending takes place in the supporting members has not previously been creased (though it may be scored) it is fully resilient and it resists the bending whereby the heat-reflective sheet is at all times tautly held under tension between the supporting members. The force of the tension thus brought to bear on the heat-reflective sheet is independent of the direct force applied to the base sheet and limited to the force necessary to overcome the resiliency of the material of the supporting members.

My invention can be readily understood by reference to the accompanying drawing in which—

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

Fig. 2 is a fragmentary sectional view showing the assembly in partially expanded form;

Fig. 3 illustrates the material of Fig. 2 as installed between framing members of a building in fully expanded form;

Fig. 4 is a fragmentary sectional view of another form of heat-insulating material in partially expanded form; and

Fig. 5 shows the material of Fig. 4 as installed in a building in fully expanded form.

Referring now to the drawings, the numeral **10** represents the base sheet which is made of paper, preferably

heavy kraft paper which may be treated with a suitable impregnating material such as asphalt. Alternatively, the paper may be metallized by spraying it with heat-reflective metal such as aluminum or by covering it with a heat-reflective metallic foil. As shown in Fig. 1, a double fold is made in the central part of the base sheet to form an expansible plait **12** which runs lengthwise along the entire length of the sheet preferably through its center portion and parallel to its sides. Double folds are also made in each side portion of the base sheet so that the side portions of the sheet are in the general form of a collapsed S as indicated at **14** and **16**. In this case the top legs **20** of the S form support members having outer edges **18**. Further along and adjacent the fold these support members are connected to the underlying material of the S up to a point which is here indicated by the line **24**, which is preferably made parallel to the said edges of the sheet and spaced a short distance inwardly from them. It will thus be seen that the support members have a fastened down portion **30** and a free portion **28**, but in the sheet as originally formed before being rolled up these two portions are flat and lie in their original plane without any crease being formed between them. The support members **20** and the bottom legs **22** of the S are of course joined by the material in the body of the sheet. Any convenient means may be employed for attaching the fastened-down portions **30** to the base sheet as, for example, adhesive, staples or the like as indicated at **25**.

It will be noted that the folds of the S are arranged symmetrically, that is, each of the folds has a uniform thickness throughout the length of the piece and the folds on the respective sides are of the same thickness and are arranged in substantially the same position at each side of the base sheet **10**. This means that the structure as a whole will be symmetrical about its longitudinal axis and may readily be rolled up into the tight cylindrical roll of Fig. 1. If the material were non-symmetrical about such longitudinal axis, making a uniform roll would be extremely difficult. The folds referred to are made by folding the paper at the side of the sheet along its length inward over the body of the sheet and then again outward over against the unfolded portion as clearly shown in Fig. 2.

For the purpose of illustration, the sheet of heat-reflective material **26** is shown as a thin sheet of aluminum foil. As best shown in Figs. 2 and 3, the foil is securely attached to the free portion **28** of support member **20** preferably along the free edge **18** so that when the assembled material is made to expand, the foil forces the outer end portions of the paper in the top legs **20** of each S to bend upwardly along the line at which it is attached to form a pair of supporting members **28**. As the supporting members lift up they separate the heat-reflective foil from the base sheet and since the paper in the top leg **20** of the S has not previously been creased, it is sufficiently resilient so that it resists the bending and places the foil under tension. An air pocket **32** is formed upon expansion of the material and this substantially increases the insulating value of the structure.

Each side of the span of foil is securely attached to the supporting members on the base sheet and in the preferred form of my invention the heat-reflective foil is carried over the top of the support and attached to the base sheet as indicated at **34**. Of course, the span of heat-reflective material between the supports must be of such width that it will lift the supports to a certain extent before the base sheet is fully expanded. When the supports are thus lifted up away from the base sheet they may be inserted between the studs of the building and it is clear that the natural resilience of the support

members will cause them to press against the studs and it will be clear that it is not necessary to have a ninety degree angle between the supports and base sheet for any lesser angle that is permitted still tensions the foil towards the building stud.

In Figs. 4 and 5 I show another form of my invention in which the base sheet **36** has only a single double fold running lengthwise through the center portion of the sheet which forms an expansible plait **38**. The side portions of the sheet are not folded into the form of an S as previously described for the first form of my invention and the supports for the heat-reflective sheet are made of separate strips of paper **40** which are attached to the base sheet by any suitable means such as by an adhesive, gummed tape or the like. In order to stiffen the supports the strips of paper may be made of a material that is heavier than the material in the base sheet. The sheet of heat-reflective material is attached to the supporting members or carried over it and attached to the base sheet and as in the first form of my invention, the span of heat-reflective material is of such length that it will lift and bend the supports along the line at which they are attached.

The expanded material of both forms of my invention may be fastened to the studs in the framework of a building by any convenient means and one of the most convenient ways of doing this is to staple that portion of the base sheet which extends beyond the base of the supports to the face or side of the stud as shown in Fig. 3 or 5.

As previously described hereinabove, the finished product may be shipped in the form of a cylindrical roll and for best results I prefer to roll the material up along its longitudinal axis so that any bending or distortion of the supports will be perpendicular to the line along which the supports bend when the material is expanded. If desired, the paper in the supports may be scored along the line at which it bends when the material is expanded in order to sharply define the line of bending as at **42** in Fig. 4. It is, however, important that the score line does not break the fiber of the paper as occurs when the paper is creased by bending it back all the way over on itself since this destroys the resiliency of the material.

My material is of simple construction so that it can be economically made and if desired one or more additional sheets of heat-reflective metallized paper or metallic foil as indicated at **44** in Fig. 5 may be attached to the supports to increase the heat-insulating capacity of the material.

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 compact cylindrical roll of thermal insulation adapted to be shipped in roll form and adapted to be opened up to form an insulating structure comprising spaced layers of material for resisting the flow of heat which structure will be held so as to run from the face of one stud of a building to the face of an adjacent stud, such roll comprising a base sheet, a pair of support members running lengthwise of the base sheet each of which comprises a strip of paper connected throughout part of its width to the base sheet along a line spaced inwardly from the outside edge of the sheet to form a support member with its free portion projecting outwardly from said line of attachment towards an edge of the sheet, each of said strips of paper being substantially identical and so positioned in the structure that the whole is symmetrical so that it may be rolled up upon itself into a tight cylindrical roll with said support members pressed flat and unfolded against the base sheet without forming a crease along the line of attachment, an expansible longitudinal plait positioned in the body of the base sheet between said support members, and a heat reflective sheet attached at each side along the free edge of one of the said support members, the span of said heat-reflective sheet being short enough so that when the base sheet is expanded the support members will be tensioned and bent upwardly for the first time against the natural resilience of the paper along the line of attachment at the base of such members to lift the heat-reflective sheet from the base sheet, whereby those portions of the base sheet which extend out beyond the support members may be attached to adjacent studs in a building so that the support members will project in along the sides of the studs and press outwardly against the studs to form a continuous span of thermal insulation between them.

2. A structure as specified in claim 1 in which the support members are formed integral with the base sheet by folding the edges of the base sheet in towards the center of the base sheet.

3. A structure as specified in claim 1 in which the heat-reflective sheet passes over the edge of the supporting members and down to the base sheet between the side of the base sheet and the line of attachment of the supporting members.

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