

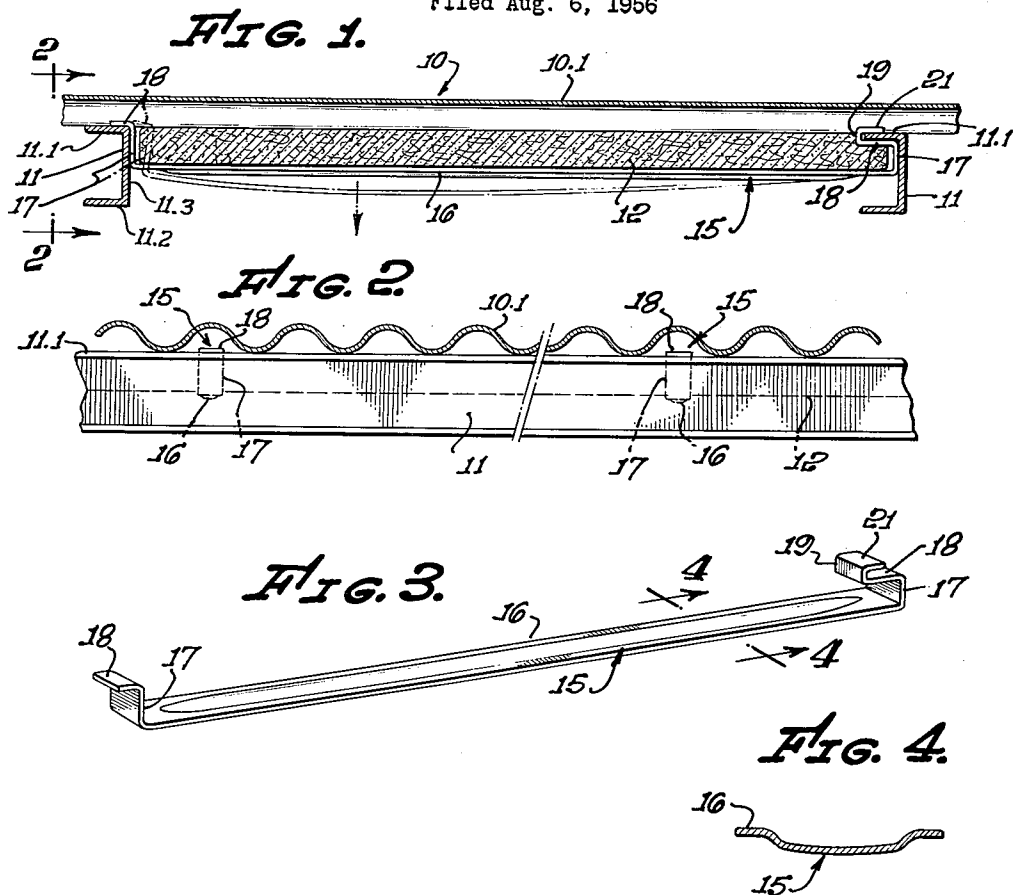
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INSULATION MOUNTING

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INSULATION MOUNTING

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This invention relates to mounting devices and more particularly to a mounting bracket for use in supporting sheet material in a building structure and designed for assembly to certain structural elements without the need for tools or fastening devices of any kind. The bracket is especially suitable for supporting sound- and heat-absorbing sheet material on the interior sides of roofs or ceilings of the type employing channel-shaped metal purlins.

The present application is a continuation-in-part of our application for Letters Patent Serial No. 367,932, filed July 14, 1953, for Insulation Mounting and now abandoned.

Sound- and heat-insulating materials are commercially available in granular, solid and fibrous forms and are conventionally positioned against or relatively close to a wall or roof surface. A common and well known use of such material is upon the underside of a roof or decking where the material serves the dual function of preventing the passage of exterior heat into the enclosure and of preventing the reflection back into the enclosure of sound waves emanating from therewithin. The problem of applying such sheet material to the undersides of an existing roof structure at low cost has been troublesome, particularly where the roof is supported by metal rafters or purlins as is frequently the case in modern construction practices. Desirably, the mounting bracket for the material should be designed for attachment to such purlins after the roof covering is in place since the need for the insulating material often becomes apparent only after the structure is in use. Preferably the bracket should be so designed as not to require nails, screws, rivets or other fastening devices. It should also provide adequate support for low strength sheet materials usually employed to absorb heat or sound. A satisfactory bracket meeting such requirements has not been available despite the continuing need and the efforts of designers.

The present invention provides a simple one-piece mounting bracket designed and arranged to span the distance between adjacent purlins and interfitting therewith to provide a highly effective support for the sheet insulating material at conveniently spaced points along its length. An important feature of the mounting bracket is a terminal appropriately shaped to frictionally engage a flanged portion of one purlin in a manner assuring the retention of the bracket assembled to the flange and an opposite terminal formed to overlie the corresponding flange of the adjacent purlin. Being formed of resilient sheet metal stock, the bracket is especially adapted for easy and expeditious assembly to the purlins of an existing roof. The frictional engagement of its opposite ends with the associated purlins assures its retention in a desired position without the need for fasteners of any kind, and tools are not required for the assembly operation. The main body of the bracket is offset to lie in a plane intermediate the upper and lower flanges of the purlins with the result that when sheet material having a width corresponding to the length of the main body is supported thereagainst, the edges of the sheet material cooperate with the bracket and with the purlins to virtually lock the sub-unit in assembled position.

Another feature is the provision of a second friction

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clip on the bracket formed to resiliently engage over a lateral edge of the sheet material to hold the bracket anchored to the sheet during its assembly between a pair of purlins.

It is therefore a primary object of this invention to provide an improved mounting bracket for use in supporting sheet material between the structural elements of a building structure.

Another object of the invention is to provide a mounting bracket especially adapted for use in supporting sheet, sound- and heat-absorbing material between spaced apart structural elements of a building and so designed as to require no tools or fastening devices for its assembly and retention between adjacent structural elements.

A further object of the invention is the provision of an improved building construction employing spaced channel-shaped structural elements together with a mounting bracket for securing sheet material therebetween, the bracket having one end shaped to frictionally engage a flange portion of the structural element and its other end shaped to rest against and be supported by an adjacent element.

Still a further object of the invention is the provision of a mounting bracket for sheet construction material formed to span the distance between adjacent structural elements and having its opposite ends formed to engage these elements and be held in position thereon without the need for fastening devices.

Another object of the invention is the provision of a mounting bracket for sheet material having a double resilient friction clip at one end, one of the clips being adapted to engage over the flange of a structural element and the other of the clips being formed to frictionally engage the edge of sheet material to hold the bracket in place while a panel unit is being assembled between a pair of structural elements.

An additional object of the invention is the provision of a new method of assembling sheet material to an interior surface of a previously erected building structure.

Still another object of the invention is the provision of a sheet material mounting bracket arranged to be first assembled to the sheet after which this sub-assembly is insertable as a self-locking unit between the structural elements of a conventional building.

Another object is the provision of a self-clamping mounting bracket for sheets of finishing material adapted to bridge and conceal the joint between the sheets and to support the adjoining portions thereof in assembled position in a building structure.

These and other objects and advantages of the invention will be more fully set forth in the following specification and claims considered in connection with the attached drawing to which they relate.

Referring to the drawing:

FIGURE 1 is a partial section through a roof illustrating sheet insulation supported below the roofing by a mounting bracket according to the present invention;

FIGURE 2 is a view looking in the direction of the arrows upon the line 2—2 of FIGURE 1;

FIGURE 3 is a perspective view of one of the mounting brackets; and

FIGURE 4 is a transverse section upon the line 4—4 of FIGURE 3.

Referring to the drawing and particularly to FIGURES 1 and 2 illustrating one mode of practicing the present invention there is shown a roof or a building side wall designated generally 10 and comprising an outer weather-proof covering provided by corrugated sheet metal panels 10.1 laid in overlapping relation in accordance with conventional practice. Panels 10.1 are supported by suitable rafters or studding members such as the C-shaped channel members 11 arranged parallel to one another and having

their opposite ends suitably supported in a manner well known to those familiar with building design. Inasmuch as the supports for the purlins form no part of the present invention they have not been illustrated. The channel-shaped members 11 herein designated purlins have upper and lower parallel flanges 11.1 and 11.2, respectively, interconnected by a wide web 11.3 lying at right angles to the flanges. As is clearly shown in FIGURE 1, the open sides of purlins 11 face in the same direction for a purpose which will become evident in connection with the description of the mounting brackets.

The supporting brackets forming an important feature of this invention and designed to interfit with and to be supported by adjacent purlins are illustrated in FIGURE 3 wherein they are seen to comprise an elongated strip of resilient sheet metal generally designated 15. Brackets 15 have a straight main body portion 16 formed with a longitudinal bead or rib here shown as being of arcuate shape in cross-section and serving to reinforce the main body and provide greater support for the mid-portion of the sheet material to be supported thereon.

The opposite terminal ends of the brackets 15 are especially formed to cooperate with the purlins in providing a firm support for sheet material without need for fastening devices of any character. The right-hand end of the brackets as viewed in FIGURE 3 will be seen to include an upright portion 17 having a U-shaped clip portion 19 spaced above and lying parallel to the main body 16 thereby forming a second and oppositely facing U-shaped clip adapted to seat frictionally over the edge of the sheet material. These two U-shaped clips considered together are S-shaped as is made clear by FIGURES 1 and 3. The spacing between legs 18 and 21 of clip 19 is such as to form a snug frictional fit with upper flange 11.1 of purlin 11 as is made clear by FIGURE 1. The left-hand terminal end of the bracket is of L-shape and includes an upright leg 17 and a short terminal leg 18 lying parallel to main body 16 but extending away therefrom so as to overlie upper flange 11.1 of the left-hand purlin. It will be understood that the upright portions 17 of the terminals at the opposite ends of the bracket lie at right angles to the main body and are so spaced that their exterior faces lie flush against the juxtaposed walls of the purlin webs 11.3. For this reason, the brackets must be properly positioned at right angles to the length of the purlins for assembly thereto. Moreover, once assembled, the opposite vertical edges of portions 17 interact with the purlin webs to prevent displacement of the brackets by pivotal movement about one terminal end in a plane parallel to the purlins.

The manner of assembling sheet material between purlins 11 by means of the self-clamping brackets of the present invention is simple and readily performed without the aid of tools, although some workmen prefer to use a light hammer or mallet. The first step is to assemble the brackets to individual precut strips of the sheet material by clipping the inner of the double U-shaped clips forming one of the bracket terminals over a longitudinal edge of the strips. This operation is greatly facilitated due to the fact that the width of the inner U-shaped clip is somewhat less than the thickness of the sheet material embraced by this clip, as is clearly illustrated in FIGURE 1. By virtue of this fact, the resiliency of the bracket material and the spongy character of conventional insulating material, the clips, upon being pressed over the edge of the sheet, are effective to hold the main body 16 against one surface of the sheet and the bracket as a whole firmly anchored and accurately positioned in a desired location on the strip.

After the required number of brackets has been assembled in this manner, the panel and bracket sub-unit is mounted between a pair of purlins by inserting the open end of the outer U-shaped bracket clips over the edge of an outer purlin flange 11.1 until upright portions 17 of the brackets rest firmly against the inner surface of purlin

web 11.3. At this time the opposite longitudinal edge of the panel or strip 12 will lie close to the inner flange 11.2 of the left-hand purlin as viewed in FIGURE 1. While holding the panel unit in this position, the main body 16 of each bracket is arched downwardly away from the panel surface in the manner indicated by the dot-and-dash line showing in FIGURE 1 so that the left-hand end of leg 18 of the L-shaped terminal can be pressed past the vertical face of the purlin. The panel and arched brackets are then pushed toward the corrugated panels 10 until legs 18 slip past the outer edge of the purlin and snap to their fully assembled positions across the outer face of flange 11.1 as shown in full lines in FIGURE 1. When so positioned, the panel unit, including sheet 12 and brackets 15 spaced therealong, are virtually locked permanently assembled between the purlins with sheet 12 spaced closely parallel to panels 10. The spongy nature of the sheet material permits the portions of the edges adjacent terminal uprights 17 to be temporarily compressed to the extent necessary for the lengthwise arching of the brackets incident to the above described assembly operation. This property of the sheet material is also found to aid in the snapping of leg 18 past the outer purlin flange as the panel unit is pressed home as well as in locking the panel unit in its assembled position. It will be understood that the mounting of the panel units is facilitated by so locating the brackets along sheets 12 that legs 18 and 21 of the terminals register with troughs of the corrugated panels 10 for reasons made evident by a consideration of FIGURE 2.

It will be recognized that the bracket construction described above provides a construction in which the upright portions 17, 17 cooperate with the edges of the sheet material 12 to reinforce the main body 16 against flexure away from the sheet as may result where used to form ceilings, thereby increasing the strength and ability of the bracket to provide support for the central portion of the sheet. Further assistance in preventing downward flexure of the center of the main body is provided by the ribbed or arched construction of the main body. Although the bracket forming the present invention is preferably made of stamped sheet material, it will be appreciated that it may be formed from non-flat stock such for example as from heavy wire stock.

It will be recognized that the width of brackets 15 makes it feasible to employ the same to conceal the transverse joints between abutting strips of sheet material, it being understood that such a joint is present beneath the bracket near the left-hand end of FIGURE 1. When so positioned, it will be apparent that the bracket serves both to conceal the joint and to support the adjacent ends of abutting sheets of insulating material.

While the particular building construction and mounting bracket herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

We claim:

1. In a previously erected building of the type having a covering structure including spaced parallel channel-shaped purlins underlying and supporting a covering layer and having the flanges thereof extending in the same direction, that improvement for supporting a layer of relatively thin lightweight sheet material on the interior side of said covering structure, which improvement comprises; a plurality of elongated, thin, narrow, metal strips each having at its opposite ends an upwardly and outwardly extending L-shaped terminal end and an S-shaped terminal end projecting from the same face side of said strip, said brackets having a length spanning the distance between adjacent purlins with one leg of said L-shaped end resting on the upper flange of one purlin and with the

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upper one of the U-shaped portions of said S-shaped terminal end opening outwardly and embracing the upper flange of the other adjacent purlin, said brackets being spaced apart lengthwise of said purlins and cooperable with one another underlying and supporting panels of lightweight sheet material spanning the distance between adjacent purlins.

2. In a previously erected building of the type having an overlying covering structure supported by spaced-apart channel-shaped purlins having the flanges thereof projecting laterally from the web portions thereof, that improvement for suspending thin lightweight paneling beneath and closely parallel to said purlin supported covering structure which improvement comprises; a plurality of identical brackets spanning the distance between adjacent purlins and adapted to be assembled to the flanges of said purlins without fasteners or tools, said brackets comprising an elongated, thin, wide, metal strip formed with a purlin-flange-engaging L-shaped lug at one end and an S-shaped lug at its other end, said L-shaped lug facing outwardly toward and resting on the adjacent purlin flange and one of the openings provided by said S-shaped lug opening toward and embracing a flange of an adjacent purlin with a snug frictional fit and cooperating with the flange to resist displacement of the bracket from a selected assembled position thereon, said brackets being spaced apart lengthwise of said purlins and providing the sole essential means supporting an interior panel covering for the underside of said previously erected covering structure.

3. That improvement for a building as defined in claim 2 characterized in that the purlin flange engaging portions at the opposite ends of said brackets are spaced substantially equally from the same side of the midportion of said brackets, said last mentioned spacing accommodating the thickness of the paneling being supported by said brackets.

4. That improvement for a building as defined in claim 2 characterized in that the inner one of said recesses of the S-shaped lug embraces one lateral edge of the paneling supported by said bracket.

5. In combination with a building having an overlying covering supported by spaced-apart channel-shaped parallel purlins; that improvement which comprises a plurality of identical brackets formed to be assembled to said purlins after the erection of said overlying covering and supporting thereon lightweight sheet material spanning the distance between the webs of adjacent purlins, said brackets being formed from elongated metal stripping and having a long, straight, main body reaching from web to web of said adjacent purlins, one end of said stripping having an inverted L-shaped end the free leg end of which projects away from the main body of said bracket and rests on a purlin flange with the other leg lying flush against the web portion of the same purlin, the other end of said stripping being S-shaped to provide oppositely facing recesses, one of said recesses projecting away from said L-shaped lug and embracing the flange of an adjacent one of said purlins and the other recess of said S-shaped lug opening toward said L-shaped end and embracing one lateral edge of said sheet material.

6. The combination defined in claim 5 characterized in that said brackets are formed in one integral piece and in that the said main body thereof is provided with elongated beading extending substantially the full length of said main body and effective to reinforce and strengthen said bracket.

7. The combination defined in claim 5 characterized in that the recess which embraces the lateral edge of said sheet material has a vertical wall lying substantially flush against the web of the adjacent supporting purlin, said sheet material having a width substantially spanning the distance between the vertical wall portion of the L-shaped lug and a vertical wall portion of the S-shaped portion and being cooperable therewith in holding said brackets in assembled position with respect to said purlins.

8. The combination defined in claim 5 characterized

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in that said sheet material possesses marked heat insulating characteristics and forms a substantially continuous covering underlying said building covering supported by said purlins.

9. In combination with a building having an overlying covering supported by spaced-apart channel-shaped parallel purlins; that improvement which comprises a plurality of identical brackets formed to be assembled to said purlins after the erection of said overlying covering and supporting thereon lightweight sheet material spanning the distance between the webs of adjacent purlins, said brackets being formed from elongated metal stripping and having a long, straight, main body reaching from web to web of said adjacent purlins, one end of said stripping having an inverted L-shaped end the free leg end of which projects away from the main body of said bracket and rests on a purlin flange with the other leg lying flush against the web portion of the same purlin, the other end of said stripping being S-shaped to form oppositely facing recesses one of which faces away from the body portion of said stripping and is shaped to frictionally embrace the flange of the adjacent purlin and the other of which recesses faces in a direction to embrace the adjacent lateral edge of said sheet material, said sheet material having a width substantially corresponding to the length of the main body of said bracket and to the spacing between the webs of adjacent purlins whereby the lateral edges of the sheet material lie closely against the juxtaposed portions of said L and S-shaped ends and cooperate in holding the same engaged with the flanges of said purlins.

10. In a building, a plurality of parallel channel-shaped purlins with the flanges extending in the same direction, spaced brackets supported between pairs of purlins, each of said brackets comprising a body portion, upright portions extending upwardly from opposite ends of said body portion, one of said upright portions terminating an outwardly directed flange resting on the upper flange of one of said purlins, the other of said upright portions being shorter than said first mentioned upright and terminating in a flange which extends inwardly and then outwardly to form an outwardly open clip, said clip portion frictionally engaging the inwardly directed upper flange of one of said channel-shaped purlins, the upright portions contacting the web of a corresponding purlin, and insulating sheets supported by said brackets, said sheets having a width corresponding substantially to the distance between uprights.

11. In combination, a building structure comprising a plurality of spaced-apart C-shaped purlins all facing in the same direction, a continuous covering supported on the upper flanges of said purlins, a plurality of independent spaced-apart brackets arranged crosswise between and supported on the flanges of said purlins on the interior side of said continuous covering, each of said brackets having a main body portion offset to lie in a plane between the flanges of said purlins and closely parallel to the interior surface of said continuous covering and providing a support for sheet insulating material separate from said brackets, said brackets each having a U-shaped terminal end with both legs thereof parallel to the main body of said bracket and formed to clip over and resiliently and frictionally grip the opposite faces of a purlin flange to hold the bracket in place while insulating sheets are being laid across the main body of said bracket, the opposite ends of said brackets having short-length upright portions lying parallel to one another with their exterior faces lying flush against the facing surfaces of the web portions of said purlins and with the upright portion at one end being connected to said U-shaped terminal end, and a strip of sheet insulating material having a width corresponding generally to the distance between said purlins and supported on the inner surface of the main body portions of said brackets.

12. The combination defined in claim 11 wherein the

opposite lateral edges of said sheet of insulating material lie flush against the facing interior surfaces of the upright portions of said brackets and cooperate with said upright portions to hold the ends of said brackets engaged with the flanges of said purlins.

13. The combination defined in claim 11 wherein said U-shaped clip lies generally parallel to the main body of the bracket and offset therefrom by a distance less than the thickness of said sheet material.

14. The combination defined in claim 12 wherein said brackets extend under and in alignment with the joints between abutting strips of sheet material and wherein said main body portion of the bracket is of sufficient width to bridge and conceal said joints.

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