June 26, 1928. 1,675,226

T. B. MUNROE ET AL

METHOD OF SECURING FIBROUS SHEET MATERIAL

Filed June 4, 1927 2 Sheets-Sheet 1

Fig. 1.

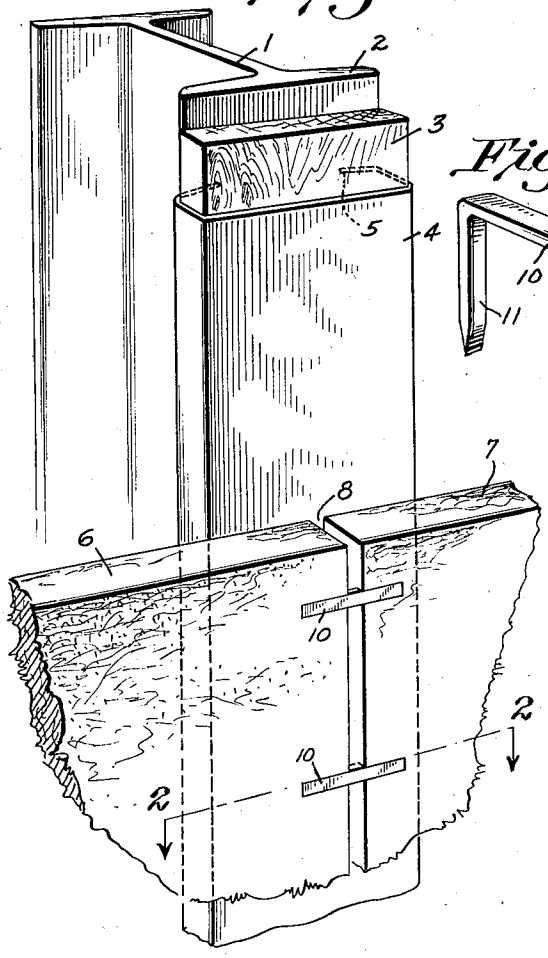


Fig. 5.

Fig. 3.

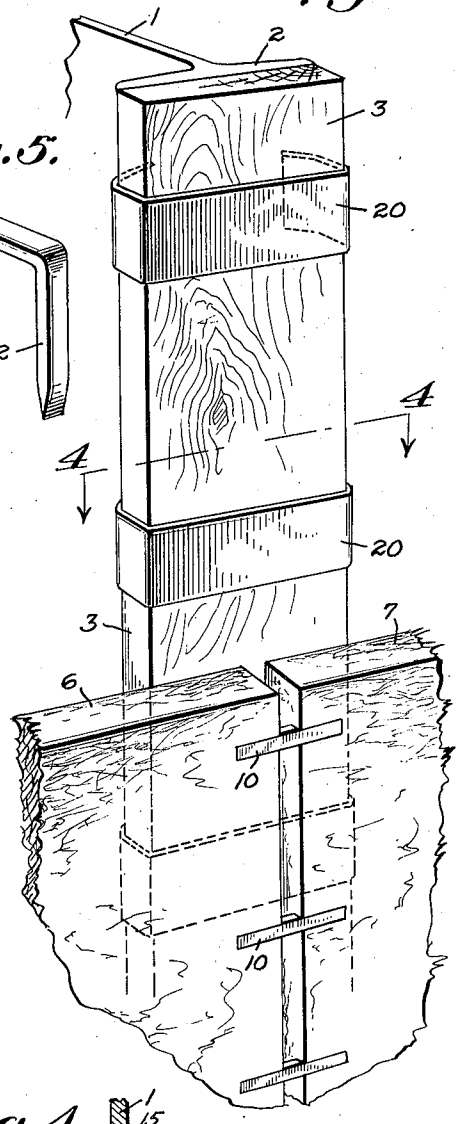


Fig. 2.

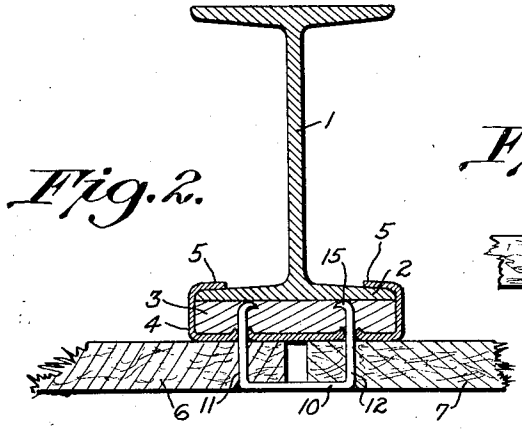
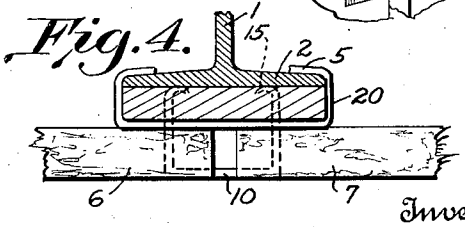


Fig. 4.



Inventor

and T. B. Munroe

A. Elmendorf

by W. E. Beaver

Attorney

June 26, 1928. 1,675,226

T. B. MUNROE ET AL

METHOD OF SECURING FIBROUS SHEET MATERIAL

Filed June 4, 1927 2 Sheets-Sheet 2

Fig. 6.

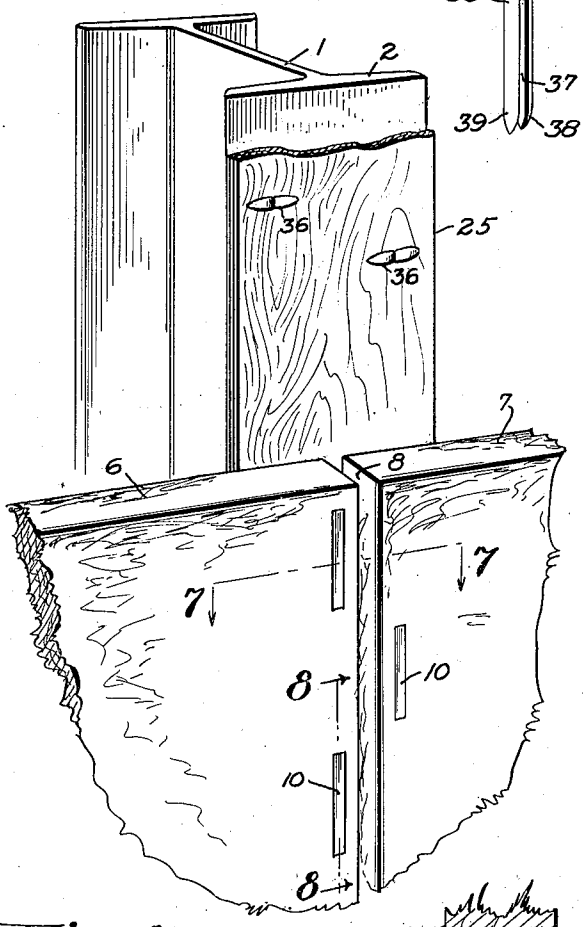


Fig. 10.

Fig. 9.

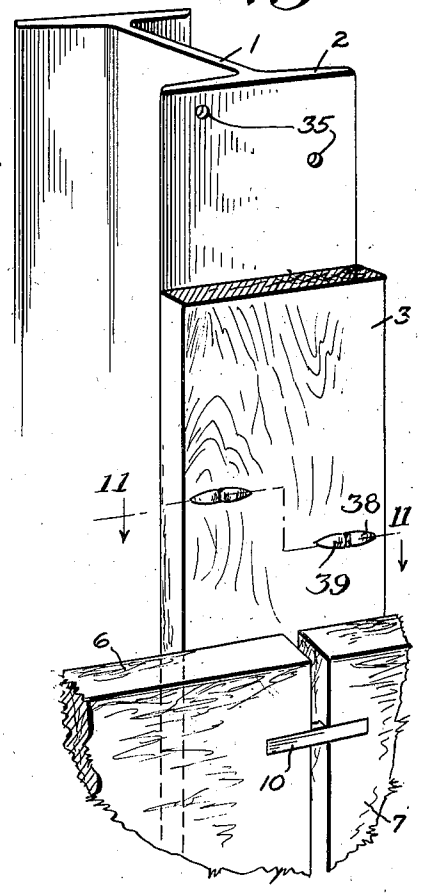


Fig. 11.

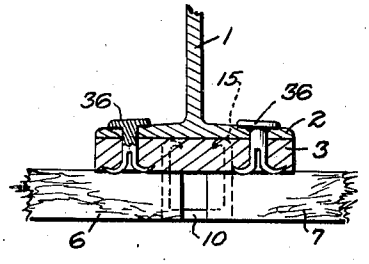
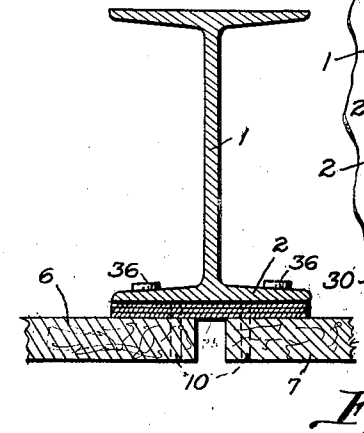


Fig. 7.



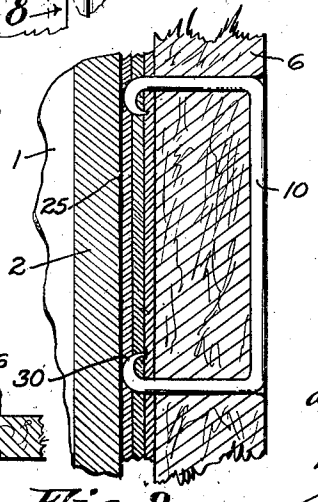


Fig. 8.

Inventor
T. B. Munroe
and A. Elmendorf
by
Attorney

Patented June 26, 1928. 1,675,226

UNITED STATES PATENT OFFICE.

TREADWAY B. MUNROE AND ARMIN ELMENDORF, OF CHICAGO, ILLINOIS; SAID ELMENDORF ASSIGNOR TO SAID MUNROE.

METHOD OF SECURING FIBROUS SHEET MATERIAL.

Application filed June 4, 1927. Serial No. 196,523.

This invention relates to a joint between fibrous sheet material and iron or steel framing members as well as to a method of forming the same, and has for its object to provide a joint by such a method which may be more efficient and less costly than those heretofore proposed.

With these and other objects in view this invention consists in the novel steps and combinations of steps constituting the method, and in the novel details of construction of the joint as will be more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:

Fig. 1 is a partial perspective view illustrating a method of securing the fibrous sheet material to a structural framing member;

Fig. 2 is a horizontal sectional view of the parts illustrated in Fig. 1, taken as on the line 2—2 of said figure and looking in the direction of the arrows;

Fig. 3 is a perspective view similar to Fig. 1 but illustrating a modified form of securement;

Fig. 4 is a horizontal sectional view taken as on the line 4—4 of Fig. 3 and looking in the direction of the arrows;

Fig. 5 is a perspective view of one of the staples used in connection with this invention;

Fig. 6 is a perspective view, similar to Figs. 1 and 3, but showing a still further modified form of securement;

Fig. 7 is a horizontal sectional view taken as on the line 7—7 of Fig. 6 and looking in the direction of the arrows;

Fig. 8 is a vertical sectional view taken as on the line 8—8 of Fig. 6 and looking in the direction of the arrows;

Fig. 9 is a perspective view similar to Figs. 1, 3 and 6 but showing a still further modified form of securement;

Fig. 10 is a perspective view of one of the rivets used in connection with the modification shown in Fig. 9; and

Fig. 11 is a horizontal sectional view taken as on the line 11—11 of Fig. 9 and looking in the direction of the arrows.

In order that this invention may be the better understood it is said that there is now on the market a wallboard made of interlaced fibers which has gained wide and extensive use because of its highly desirable qualities and features such as compressibility, durability, light weight, and flexibility. Further, its cellular construction well adapts it as a poor conductor of heat and sound, and its structure readily permits of sawing and nailing in a manner similar to lumber. That is to say, this wallboard is produced from the fibers of bagasse, which is the residue material of sugar cane after the sugar solutions have been abstracted therefrom, said fibers after suitable preparation being felted into sheet formation, subsequently dried, and then cut into suitable lengths and widths for application to building constructions. This wallboard constitutes a substitute for lumber and is to be preferred to other wallboards because the bagasse fibers from which it is made are exceptionally strong, well interlaced and relatively long, as contradistinguished from the short weak fibers from which paper pulp and wallboards of the same material have heretofore been made.

This fibrous wallboard, made in sheet formation of about one-half inch thickness, can be readily applied to the studdings forming the walls of a room as well as to the ceiling joists, as a result of which a complete room can be made with this material to which a decorative finish may be applied. Heretofore this material in its use as wall surfaces, has been nailed to the wooden studdings and joists, but with the advent of buildings of metallic parts, it now becomes necessary to secure this fibrous material to the metal forming the I-beams, angles, and other structural framing members of the building. Therefore this invention is directed to the securement of this fibrous material to said metal framing members.

Referring to the drawings, there is disclosed in Fig. 1 a metallic substitute for the wooden studding comprising an I-beam 1 to the outer flat surface of the flange 2 of which there is applied a filler strip 3 of the same width as the flange 2 and of a length coextensive with the surface to be covered with the wallboard. This filler strip 3 is secured to the flange of the I-beam by a metal sheathing 4 covering the exposed surfaces of said strip, the side portions of the sheathing being tightly bent around the

edges of the flange 2 to clamp the strip 3 rigidly thereto as clearly indicated at 5. That is to say, the metal sheathing is formed considerably wider than the filler strip 3, so that the extending side portions may be wrapped around the edges of said strip to clamp the same to the I-beam. This can be readily done with the assistance of a hammer or the like, as the sheathing is quite thin. The sheets of fibrous material indicated by the numerals 6 and 7 are then cut to such a length and so applied to the framing that the joint 8, made by their abutting edges, is disposed substantially centrally of a framing member.

In practice, it is preferred to use thin sheet steel for the sheathing because of its strength and cheapness. As to the filler strip, the same can be a continuous piece of relatively soft wood or a plurality of scrap or short lengths of said wood, whereby the cost is materially reduced. It is to be understood, however, that sheet metals other than steel may be employed for the sheathing, such as galvanized iron, copper, zinc, tin, etc. according to the prevailing conditions. And it is further to be understood that other material than wood may be employed for the filler, such as fibrous masses including pieces of the wallboard itself, spongy material, plastic material, etc., the chief requirements of both the sheathing and the filler material being a lightness in weight and ready permeability by the means for securing the wallboard thereto.

To hold the fibrous sheets securely to the framing members, there is provided a staple 10 preferably made of steel, which may be coated with another metal such as copper or the like to prevent the formation of rust, said staple having the depending prongs 11 and 12 the ends of each of which are suitably tapered to produce a deflectable point sharp enough to cut through the sheathing 4. These staples are then driven through the fibrous sheets and the sheathed filler strips in line with each framing member and preferably straddling each joint 8, as shown in Fig. 1. The result is illustrated in Fig. 2 from which it will be readily understood that the fibrous sheet supports the prongs of the staple 10 while the same are being driven therethrough so that when the points of the prongs reach the thin sheathing 4 they will penetrate the same and pass through the filler strip 3. The prongs are made of a length slightly in excess of the combined thickness of the filler strip 3, the sheathing 4 and the sheet of fibrous material, so that when the staple is further driven, the points of the prongs will strike the flat surface of the flange 2 of the I-beam. The tapering of the ends of the prongs will make the same smaller in dimensions than the main body portion thereof, with the result that said pointed ends will be bent upon coming in contact with the surface of the flange 2, or in other words, will be so laterally deflected as to form a hook-like end 15 which will securely clinch the staple to the filler strip 3, preventing the ready removal of the former.

In Fig. 3 is disclosed a modification of the invention wherein it will be seen that the filler strip 3 is secured to the flange 2 of the I-beam 1 by a plurality of clips 20 of the same or different material and thickness as the sheathing 4 above disclosed, the purpose being to provide a larger exposed surface area of the filler strip to directly receive the staples 10. In other words, if difficulty was experienced in obtaining a sheet metal through which the staples 10 could readily be driven, then a heavier sheathing might have to be employed which would be formed into a plurality of clips, applied in spaced relation as shown in Fig. 3 to the I-beam, and the staples driven to avoid the clips. On the other hand, under certain conditions, it would be desirable to purposely employ a fastener for the filler strip of greater thickness, rigidity or strength than the material used as illustrated in Fig. 1 and through which it would be very difficult to drive such a staple as described without tearing or otherwise deforming the fibrous sheet material. That is to say, the relative strength of the fibrous material might be insufficient to support the prongs of the staple in an attempt to drive the same through said heavier sheathing with the result that the staple would flop or move laterally under continued hammer blows, with a resultant mashing of the fibrous material and weakening thereof. Under these conditions it would be very desirable if not necessary to provide a plurality of spaced clips with exposed filler strip surfaces therebetween in order to secure the fibrous material with the staple 10. The result of course would be that the prongs of the staples would have only the fibrous sheet and the filler strip to penetrate. As in the former case, the extreme points of the prongs of the staple 10 are deflected or turned over as at 15 upon coming in contact with the surface of the flange 2 of the I-beam to provide the clinching effect desired.

In Figs. 6, 7 and 8 is shown a further modification of the invention wherein the I-beam has applied to the flange 2 thereof a strip of laminated material 25 such as plywood, or in other words, a strip comprising layers 26, 27 and 28 of relatively thin wood secured together as by gluing with their grains crossing. The laminated material 25 may be secured to the I-beam with a continuous sheathing as illustrated in Fig. 1 or with a plurality of clips as shown in Fig. 3, said securing means being applied as above

described. On the other hand, it has been found expedient under certain conditions to rivet the filler material 25 to the flange 2 of said beams, as indicated at 36. The same type of staple 10 as above described may be applied so as to straddle the joint 8 between two adjacent boards such as 6 and 7 as was the case illustrated in Figs. 1 and 3, or the staples may be placed in staggered relation along the adjacent edges of the boards 6 and 7 as disclosed in Fig. 6. In either case, the distance from the exposed surface of the fibrous material to the flat face of the flange 2 of the I-beam will determine the size of the staples used, so that the same staple as described above may be used, or a staple may be used of the same material only smaller, the difference residing in the length of the prongs. All that is required is that the extreme points of the prongs, upon coming in contact with the surface of the flange of the I-beam, will be sufficiently deflected or turned over to provide a lateral extending portion 30 like the hook-ends 15 shown in Fig. 2 which would interlock with one or more of the layers comprising the laminated material 25 as clearly illustrated in Fig. 8 to anchor the fibrous material thereto.

Figs. 9, 10 and 11 are illustrative of still another modification of means for securing the fibrous board to an I-beam, wherein a plurality of holes 35 are drilled in the flanges of said beam, and holes are provided in the filler strip adapted to register with the holes in said flange, whereby the strip may be secured to the flange by means of either split or solid rivets. In the particular illustration of this modification, relatively soft copper rivets 36 provided with the usual split 37 are shown which, after being driven through the apertures 35 in the flange of the I-beam and through the holes in the filler strip 3, have their prongs 38 and 39 spread in the usual manner to firmly secure the strip to the I-beam. In this connection it might be stated that the copper rivets have been found well adapted for this purpose in that the same can be pressed through the apertures in the flange in such manner that the same are fairly rigidly supported therein by virtue of the jamming effect had between the sharp shouldered edge of the aperture 35 and the fillet 40 formed between the head portion 41 and the shank of the rivet. In other words, when a rivet is inserted through the aperture 35 of the flange, a sharp blow by a hammer or other instrument on the head 41 of said rivet will force the same against the flange so that the metal of said flange will bite into the relatively soft copper and thus secure the rivet in the aperture 35 until the filler strip 3 has been positioned and the prongs 38 and 39 turned over for clinching action.

This form of securement is as applicable to a filler strip of laminated material such as shown at 25 in Fig. 6, as it is to a unitary filler strip such as indicated by the numeral 3 in Figs. 1, 3 and 9. With either filler strip thus riveted to the I-beam the fibrous sheets 6 and 7 may be secured to the strip in a manner similar to that illustrated in Figs. 1 and 3. That is to say, staples 10 will be utilized which, when driven through the sheets of fibrous material and the filler strip, will have their pointed prongs deflected upon contacting with the flange of the I-beam to form a hook-like anchor, as will be readily understood.

From the foregoing it will thus be clear that by this invention there is provided a wall structure comprising a base which is the metallic member 1. In combination with this base there is a non-metallic filler strip 3 or 25 which is secured to the base 1, and a fibrous wall 6 secured to the strip 3 by means of the staples 10. In all of the figures of the drawings it should be observed that the head of the staple 10 is embedded in the fibrous material substantially flush with the exposed surface thereof. This is made possible without damage to said material because of the yieldable, compressible nature of said material, the fibers of which are unconfined as contradistinguished from the so called plaster or wallboards now on the market which would not possibly permit such a means of securement without breaking and thus weakening the body of the material at the points of securement. It will further be clear that the fastener 10 cooperates with the base 1 by forming therewith a clinched anchor for the wall surface. In other words, the staple 10 is a deflectable metallic means passing through and supported by both the wall member and the filler strip so that upon continued driving of the staple through these members the same will be substantially rigidly held in position by the material of the combined members so that only the points of the staple will be turned or deflected out of driving alignment when said points come in contact with the framing members. The filler strip 3 as well as the laminated material 25 constitute a pervious member through which the staple may be driven, and the I-beam 1 is an impervious member so far as said staple is concerned, with the result that when a staple is driven through a pervious member and strikes the impervious member it must of necessity be deflected. This invention differs from prior known inventions in that the fastener is clinched or anchored within the wall as a result of being driven from a source outside the wall.

It is obvious that those skilled in the art may vary the details of construction and the arrangements of parts of the joint as well as the steps of the method without depart-

ing from the spirit of the invention and therefore it is not desired to be limited to the foregoing except as may be demanded by the claims.

What is claimed is:

1. In a structure of the character described the combination of a base metallic framing member; a non-metallic filler strip secured to said base; and a fibrous wall clinchably secured to said strip.

2. In a structure of the character described the combination of a metallic framing member constituting a base support; a non-metallic filler strip secured to said base; a fibrous wall; and means cooperating with said base to clinchably secure said wall to said strip.

3. In a structure of the character described the combination of a metallic framing member constituting a base support; a non-metallic filler strip secured to said base; a fibrous wall; and deformable means passing through said strip and cooperating with said base to secure said wall to said strip.

4. In a structure of the character described the combination of a metallic framing member constituting a base support; a filler strip secured to said base by a metallic strip passing thereabout; a fibrous wall; and metallic means supported by and passing through said fibrous wall, metallic strip and filler strip, and cooperating with said base to secure said wall to said filler strip.

5. In a structure of the character described the combination of a framing member having an impervious surface constituting a base support; a filler strip clamped to said base by a metallic strip; a fibrous wall; and means comprising a plurality of staples the prongs of which are rigidly supported by said metallic strip and the ends of which are adapted to cooperate with said impervious surface to secure said wall to said base.

6. In a structure of the character described the combination of an impervious framing member constituting a base support; a filler strip metallically secured to said base; a fibrous wall; and means comprising a plurality of staples having deformable ends adapted to be driven through and rigidly supported by said wall, said filler strip and the metallic securement therefor whereby the ends of said staples will be deflected by said impervious framing member to secure said wall in place.

7. In a wall structure the combination of an impervious member constituting a base; a pervious member constituting a wall; a pervious member disposed between said base and wall and adapted to be secured to said base; and deformable means cooperating with said members to secure the same together to form said structure.

8. In a wall structure the combination of an impervious member constituting a base; a pervious member constituting a wall; a pervious member constituting a support for said wall, said member disposed between said base and wall and adapted to be secured to said base; and pressure deformable means cooperating with all of said members to secure the same together to form said structure.

9. A wall structure comprising a framing member, a support for a surface member secured to said framing member, and a surface member secured to said support by a fastener anchored within the wall.

10. A wall structure comprising a framing member, a support for a surface member secured to said framing member, and a surface member secured to said support by a deformable fastener driven therethrough and anchored within the wall.

11. A wall structure comprising a framing member, a support for a surface member secured to said framing member, and a surface member secured to said support by a fastener driven therethrough and anchored by the framing member within the wall.

12. A wall structure comprising a framing member, a support for a surface member secured to said framing member, and a surface member secured to said support by a fastener within the wall clinched by the framing member when driven through said surface member and its support.

13. The method of securing fibrous material to metallic framing members which consists in securing to the latter a pervious member interposed between the same and adapted to serve as an anchor for a fastener for the fibrous material through the instrumentality of said framing member.

14. The method of securing fibrous material to metallic framing members which consists in utilizing an intermediate supporting member adapted to be secured to the framing member and to receive a fastener for said material clinched by said framing member.

15. The method of securing fibrous material to metallic framing members which consists in utilizing said framing member as a means for clinchingly deforming a fastener driven through said material and a support therefor, said support carried by said framing member.

In testimony whereof we affix our signatures.

TREADWAY B. MUNROE.
ARMIN ELMENDORF.