May 4, 1948. A. ELMENDORF ET AL 2,440,936

PANEL WALL CONSTRUCTION

Filed April 8, 1943

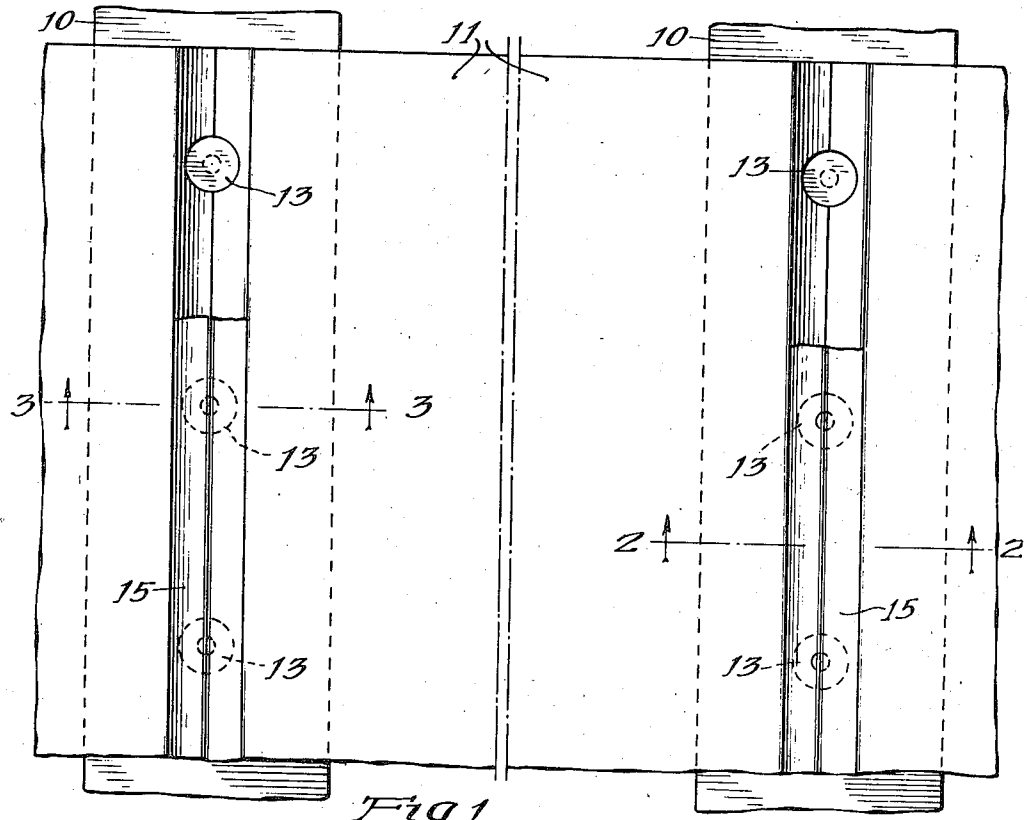


Fig. 1.

Fig. 3.

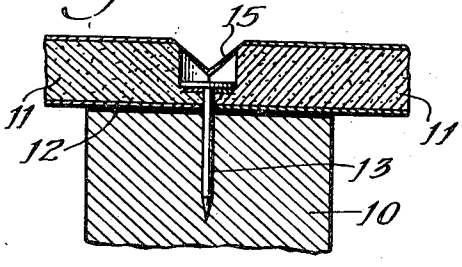


Fig. 2.

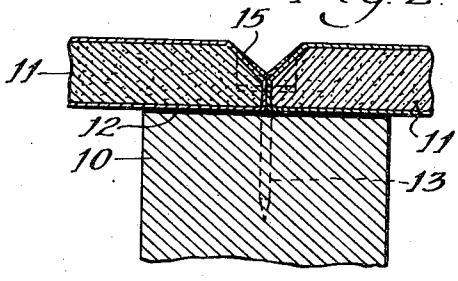


Fig. 4.

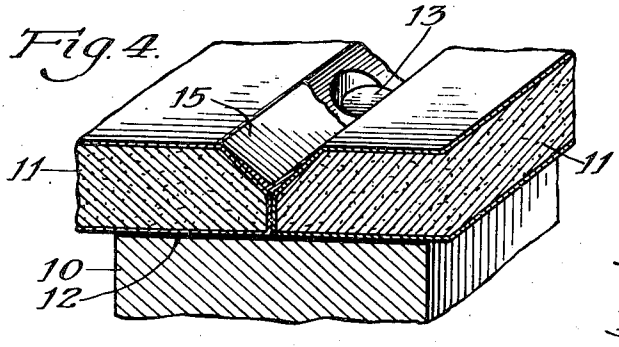
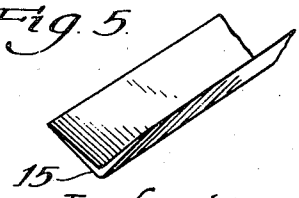


Fig. 5.



Inventors.
Armin Elmendorf,
Morris Lieff.
By: Edwd Hampson
Attorney

Published by AsbestosClaims.Law
asbestosclaims.law/library/23299/1

Patented May 4, 1948

2,440,936

UNITED STATES PATENT OFFICE

2,440,936

PANEL WALL CONSTRUCTION

Armin Elmendorf, Winnetka, and Morris Lieff, Chicago, Ill., assignors, by direct and mesne assignments, of one-half to The Celotex Corporation, Chicago, Ill., a corporation of Delaware, and one-half to Certain-Teed Products Corporation, Chicago, Ill., a corporation of Maryland

Application April 8, 1943, Serial No. 482,244

6 Claims. (Cl. 20—4)

1

This invention relates to a so-called dry wall construction, that is, a wall construction which does not involve plastering, and it deals particularly with such a wall construction, the joints of which are not visible, that is, they are concealed. The invention also deals with the method of erection of such wall construction, which method is of such simplicity that no particular skill is required for the erection of a wall incorporating the invention.

The principal object of the invention is the provision of a wall construction erected with concealed fastenings and which is a dry wall construction and in connection with which the sheets or panels comprising the wall structure may be pre-decorated before erection if desired. Other and further objects of the invention will be apparent to one reading the following description of the invention and method of application of the wall construction which is the subject matter thereof.

The inventions hereof will be particularly described in connection with a preferred construction and method of application, but it is to be understood that the such preferred construction to be described in detail is merely the preferred embodiment of the invention and that many variations thereof and therefrom, but nevertheless incorporating the such inventions, will be readily apparent to one skilled in the art to which the invention pertains. Further, many variations of the basic inventions hereof may be used as the conditions of the particular job involved may vary, and in particular depending upon the final result to be obtained. If the construction is to be a permanent one, then the installations should be of heavier material and carefully installed, whereas, for a more or less temporary construction lighter construction elements can be used and less care taken in making the installation.

In the accompanying drawings disclosing the preferred form of the invention,

Figure 1 is an elevation of a portion of a wall embodying the invention;

Figure 2 is a cross section taken on line 2—2 of Figure 1;

Figure 3 is a cross section taken on line 3—3 of Figure 1;

Figure 4 is a perspective of a portion of the wall construction at and adjacent a joint; and

Figure 5 is a perspective of the joint concealing strip.

In the drawing there is shown a suitable supporting element on which the wall construction is to be erected, shown particularly as stud 10,

2

but which however, it will be understood may be any equivalent erected construction to which the wall surface is to be applied.

The applied wall surface in the preferred form which is illustrated comprises units which are ½ inch gypsum wall boards 11, which may be conveniently 2 feet in width by suitable length and in connection with which it will of course be understood that such are to be erected on 2 foot centers.

The wall facing units 11 have beveled edges which are shown as beveled at 45° and extending about half the depth of the thickness of the sheets. It will, of course, be understood that the units 11 may be thicker or thinner than ½ inch if desired, as for example, they may be ⅜ inch or ¾ inch plaster wall board, they may be composed of fiber insulation board, plywood, or other suitable material and they may be of any other usual or desired width, as for example, the units may be 16 inches in width or 32 inches in width, which would be standard, or they may be of any odd width, it being of course understood in connection therewith that the studs 10 or other suitable supports will be suitably spaced to receive such units in accordance with their width. Preferably as the spacing of the support members 10 becomes greater, the facing units 11 are thicker and more rigid, but as mentioned, the requirement depends largely upon the particular construction involved, and it will be understood that the matter of the thickness of the units, their width and the like has no particular bearing upon the inventions hereof and that these constitute matters of design and may be varied within any reasonable limitation.

In erecting a wall in accordance with the inventions hereof, there is applied to the faces of adjacent studs, or support, 10, a coating of a suitable glue, which preferably should be one which remains unset for a period varying from 10 minutes to 30 minutes approximately to allow time for the erection of the wall units 11 thereto. The glue may, as mentioned, be any suitable glue, as for example, a casein glue, fish glue, hide glue, soy bean adhesive, or an adhesive such as is used for applying linoleum, many of which have a lignin base etc., almost without end. As suitable glues may be bought already prepared, the glues as such have no particular bearing upon the inventions.

After a suitable layer 12 of glue has been applied to the outer faces of adjacent studs a wall unit 11 is applied thereto in the usual manner with the edges of the wall unit 11 falling sub-

Published by AsbestosClaims.Law
asbestosclaims.law/library/23299/2

stantially medially of the faces of the adjacent stud members 10. A coating of glue 12 is then applied to the next adjacent supporting member 10 and a second wall unit is similarly applied next to the wall unit 11 previously applied. After the two wall units 11 have been applied as described, they are secured by nails driven at the adjacent edges of the two applied sheets. These nails are indicated by the numeral 13 and it is to be noted that they are large headed nails, the function of which will be more fully described.

The nails 13, which are used to secure the wall units 11 in place, are large headed nails, the heads of which are preferably of a diameter which is slightly less than the width across the V which is formed by the meeting of the contiguous beveled edges of two adjacent wall units 11. In the preferred form of the invention using ½ inch gypsum wall boards having ¼ inch, 45° bevels, the width across the V formed at contiguous edges of adjacent wall units will be ½ inch and preferably the diameter of the head of the nail which is glued for securing the units will be ⅜ inch, which if the nail is accurately centered in the V will provide a $\frac{1}{16}$ inch clearance on each side of the nail head so that it will readily enter into the V. An important feature of the invention is that the relationship between the diameter of the nail head and the width across the V between adjacent wall units shall be such that the nail head can be driven down into the V without injury to the face of the wall unit, that is, the edge of the head of the nail must clear the line where the bevel on the edge of the wall unit merges into the face of the wall unit. The nail head, however, on the other hand should be of the maximum diameter which will clear the outer edge of the V since the nail head should have as much area as possible in order that the wall unit may be securely clamped or pressed against the face of the studs or supports 10, upon which the wall facing is being erected.

After nails 13 have been driven down to about the outer surface of the wall units they should then be driven up tight and solid by the use of a suitable nail set or the like, and in this connection, while it is not absolutely essential it is nevertheless an important feature that the nail head shall be driven down to a point below the base of the V which is formed by the contiguous bevels of the adjacent wall units 11. This particular feature is especially apparent in Figure 3 of the drawing wherein it is clearly shown that the nail head has been driven down below the base of the V. In driving the nail head down below the base or point of the V groove the head of the nail cuts out the underlying portions of the cover sheet of the gypsum board, and this cushion or wad of paper and the nailhead serve to securely compress the core portion under the nailhead so that the required pressure is developed for the development of the glue bond between the back of the panel and the face of the stud.

By driving down the nail head to below the base of the V formed between adjacent wall units 10, there is provided a slight air pocket, the purpose of which will be apparent as the description of the invention proceeds and which will be particularly referred to herein and the reasons therefor particularly set out. The driving home of the nails as has just been described serve to force the back faces of wall units 11 along the edge thereof firmly against the layer of glue 12 which has been applied to the outer surfaces of the studs or supports 10 and to securely hold such faces in firm contact therewith, so that when the glue sets the wall units 11 on their back faces along their edges will be firmly adhered to the studs or supports 10 by the glue 12. The nails may be applied at any convenient spacing, but for a resonably permanent construction, such as that of the preferred form described and using ½ inch gypsum wall board units, the nail should be spaced about three to four inches apart, but for less permanent construction, or if such is deemed sufficient for the purposes for which the wall facing is being erected the nailing may be on six inch centers or other convenient spacing.

This procedure of erection, such as has been described, is continued by repetition until the entire area of the wall has been applied. After the wall units 11 have been applied as described, then in order that the joints between the adjacent units will be covered the following steps are taken.

In each of the V-shaped recesses which have resulted from the application of the beveled edge wall units 11, there is applied a masking strip which may conveniently be a narrow strip of tough paper. Preferably this strip which is used for obscuring the joint between adjacent wall units is a strip of kraft paper of about .007 to .009 inch thick, of a width sufficient to cover the faces of the contiguous bevels and it is a strip which preferably has been beveled or chamfered from its center toward its edge and has been creased down its center. Even though the masking strip 15 may be only from .007 to .009 inch in thickness, it would be expected that it would bridge the cut-out or recess formed by countersinking the nail 13, that is, that it would sag over such recess. Surprisingly such does not happen. Either due to the fact that one side of the V-shaped strip reinforces the other side, or due to the angularity of the bevel on which the strip is adhered, it either does not sag into the recess, or if there is any such sag due to the angularity of the surface, such sag is not noticeable.

No further description of the masking strip which is designated by the numeral 15 is thought to be necessary for a further understanding of its form since the description above given is believed sufficient to convey a clear idea of the form of the strip. The masking strip 15, however, is preferably provided on one face with a dried layer of glue such as is commonly applied to the back of postage stamps, to envelope flaps, tape and the like, and in which condition such would be commonly referred to as gummed.

Gummed tape 15, which has been described and which may have the same decorative finish as the face surfaces of the panels or a suitable contrasting finish, is moistened to activate the gum or glue which is applied to its back face and this tape is then suitably applied in the V formed by contiguous bevels of adjacent wall units 11. The tape is suitably pressed firmly into the base of the V and against the beveled surfaces and other than for desired decoration the wall face is finished. When the masking tape 15 is applied in the V between adjacent sheets it will, of course, extend over the heads of the nails 13, and if the heads have been countersunk as was above directed it will be seen that there will be provided a narrow air space between the head of the nail and the back surface of the tape 15, which air space serves to insulate or separate the nail head from the tape 15. By providing this insulating or separated spacing between the nail head and the back of the strip 15 it has been found that

Published by AsbestosClaims.Law
asbestosclaims.law/library/23299/3

spotting of the tape over the nail head, such as would occur were the back of the tape in contact with the nail head, is avoided, and therefore, it is for such reason that it is preferable that the head of the nail 13 be countersunk slightly below the base of the V formed between adjacent wall units 11.

The above description is all that is required for a clear understanding of the inventions hereof, but for the purpose of pointing out some of the possibilities of the construction involved and some of the departures which may be made therefrom but yet within limitations of the invention, attention is directed to the following.

The spacing of the support members 11 may be varied as was previously mentioned and the nature, width and thickness of the wall units 11 may likewise be varied, and it is, of course, not necessary that the units 11 be of a uniform width. It will, of course, be understood that the wall facing may be applied as random widths or according to any regular or irregular variation such as may be desired, but in this connection it must of course, be also understood that the support or stud members 10 must be spaced in accordance with the width of the facing units which are to be applied thereto.

The size and spacing of nails 13 which are used to secure the wall units 11 to the stud or support members 10 may also vary, but such variation must be kept within the confines of the limitations which have previously been mentioned, that is, the heads should not be sufficiently wide to break down the line of merger of the face of the wall unit 11 and its edge bevel and the head must not be so narrow that it will not securely clamp or force the back face of the wall unit 11 against the glue 12 which has been applied to the face of the stud or support 10.

The joint masking strip 15 may be of almost any desired material so long as it is not so limp or flexible that it will sink into the slight recesses which are formed in countersinking the heads of the nails 13, as has been previously referred to. The masking strip 15 does not necessarily have to be chamfered from its center towards its edges as it will be readily understood that it may be of a uniform thickness and that after it is applied the outer edges may be lightly rubbed down with a fine sandpaper so that the outer edge of the strip 15 will actually or at least have the appearance of merging with the face of the wall unit 11. Further, the strip 15 need not necessarily be gummed since a suitable adhesive may be applied, either to the back of the strip or may be applied in the V, but however, it is believed that the pre-gummed strip is a most convenient form for use and therefore such pre-gumming is preferred.

After the wall surface has been erected, as it has been herein described, such continuous wall surface without visible joint or visible securing means may be decorated as is desired. About the most simple decoration of the wall surface is that of painting it with one of the commercial casein paints of the type readily available on the market, but any desired decoration may be applied, as for example, lead and oil paint can be applied, the surface may be papered, etc., almost endlessly depending only upon the desires and skill of the one applying the decoration. While it has not been mentioned it is to be understood that in referring to nails 13, these are not necessarily limited to conventional nails, that is, such may be any variation from the conventional nail,

providing that such variant will serve the purpose of firmly drawing the wall unit 11 against the face of the stud or support 10 in order that the back face of the wall unit will be firmly pressed against the glue which has been applied to the outer face of member 10. Any variant however, of the nail 13 will probably involve a head of some character and a shank or stem which will generally correspond to the shank of the nail, and in any case the head of the fastener should be slightly countersunk as has been particularly described in connection with the use of the nail 13 in order that the air space may be provided so that the strip 15 does not actually contact the securing member. The provision of a glue layer between the outer face of the stud or support 10 and the back face of the wall unit 11 is not absolutely essential and a wall can be erected without this gluing as will be readily understood, but in any permanent wall construction following the inventions which have been described and even in but semi-permanent construction it is however recommended that the glue be used since by the use of the glue a much stronger and substantial construction is obtained.

A surprising feature of the invention, as such was discovered in working out the details of the above application, is that contrary to known practices common in gluing, adequate gluing pressure is obtained in proceeding as has been above set out. It was determined that even though the nailing along the joint between adjacent panels 11 might be conventional, about 6 inches or even so much as 8 inches spacing between nails that sufficient pressure was developed in the glue joint to bring about continuous and satisfactory bonding of the paper sheet on the back of the panel to the face of the support or stud 10.

The preferred form of the invention having been described in detail and numerous variants thereof having been indicated so that the wall construction and the method of its application should be readily apparent, we claim as our invention the following.

What we claim is:

1. A concealed nailing construction comprising a supporting member, sheet form members secured thereto along their edges, the contiguous edges of the sheet form members beveled, the bevel extending substantially half way through the thickness thereof, a V-shaped recess formed by contiguous bevels of adjacent sheet form members, a film of adhesive between the supporting member and the sheet form members secured thereto, headed securing means having shank portions, the shanks thereof extending into the supporting member and securing the sheet form members thereto, the headed portions of the securing means, of less width than the extreme opening of the V-shaped recess positioned within the widthwise limits of the extreme width thereof and sunk below the apex of said recess, and a thin joint concealing strip secured in said V-shaped recess.

2. In a blind nailed wall construction, spaced wall facing receiving support members, wall facing units erected thereon and secured thereto by adhesive, the supports spaced apart a distance equal to the width of the facing units mounted thereon, the facing units of rectangular sheet form and along opposite edges provided with bevels extending from a face through substantially one half the thickness of the sheet, a substantially V-shaped recess formed between con-

Published by AsbestosClaims.Law
asbestosclaims.law/library/23299/4

tiguous bevels of adjacent facing units, spaced nails driven substantially between the contiguous edges of adjacent facing units and securing the contiguous edge portions of adjacent facing units to a support member, the head of a securing nail of a diameter less than the extreme width of the V-shaped recess but not less than one half thereof, a head of a securing nail in part overlapping the aforesaid bevels but driven therethrough and countersunk below the apex of said V-shaped recess and a tape adhered, in said V-shaped recess to the faces of the aforesaid bevels, whereby the joint between adjacent facing units and the securing nails are covered and a visually continuous wall surface results.

3. The method of erecting a visually continuous wall surface of edge beveled panels mounted on support members and comprising the steps: applying adhesive to a support member, applying adjacent panels to a support member with contiguous edges overlying the adhesive thereon, driving nails into the support member with the head of the nail overlying the edge bevels, countersinking the nail head to below the depth of said bevels and thereby securely clamping the edges of the panels for adhesion upon setting of the adhesive and adhesively securing to contiguous bevels a center creased joint covering tape.

4. A wall construction comprising a supporting structure, wall facing panels mounted thereon, said wall facing panels having opposite edges parallel and beveled from the face thereof to be exposed, through less than the full thickness of the panel, toward the back face thereof, said panels being mounted on said structure with said beveled edges thereof adjacent to form V-shaped recesses therebetween extending rearwardly from the exposed face of the panels, securing members securing the wall panels at their edges to said structure, said securing members having a head portion and a shank portion, said head portion of said securing members comprising an annular outwardly directed flange like part positioned in said V-shaped recess and countersunk below the beveled edges with said shank portion extending into the supporting structure and securing the wall facing panels, at their edges, to said structure between the flange like head portion of the securing members and a surface of the supporting structure.

5. A wall construction comprising a supporting structure, wall facing panels mounted thereon, said wall facing panels having opposite edges parallel and beveled from the face thereof to be exposed, toward the back face thereof, said panels being mounted on said structure with said beveled edges thereof adjacent to form V-shaped recesses therebetween extending rearwardly from the exposed face of the panels, securing members having a head portion and a shank portion, said head portion of said securing members being positioned in said V-shaped recess and bearing on said adjacent beveled edges with said shank portion extending into the supporting structure, said wall panels being formed of a material which may be slightly crushed under the pressure of said head of said securing member to form a substantially flat bearing surface for said head portion to hold said wall facing panels at their edges against said structure and to form above said head an air pocket with the exposed surface of said headed portion below the planes of said beveled edges of said adjacent wall panels.

6. A wall construction comprising a supporting structure, wall facing panels mounted thereon, said wall facing panels being formed of a slightly crushable frangible core material between cover papers which provide tension members to resist bending and breaking of the panel, said wall facing panels having opposite edges parallel and beveled from the face thereof to be exposed, toward the back face thereof, said cover papers extending over said opposite parallel edges of said wall facing panels, said panels being mounted on said structure with said beveled paper covered edges thereof adjacent to form V-shaped recesses therebetween extending rearwardly from the exposed face of the panels, securing members having a shank portion and a head portion extending generally in a plane transversely to the shank portion, said head portion of said securing members being positioned in said V-shaped recess and bearing on said adjacent beveled edges with said shank portion extending into the supporting structure, the core material beneath said head portion being slightly crushed and the cover paper upon said beveled surfaces thereon being partially ruptured to form beneath said headed portion a substantially flat bearing surface to receive the pressure of said head portion of said securing member to hold said wall facing panels at their edges to said structure.

ARMIN ELMENDORF.
MORRIS LIEFF.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,357,350	Schumacher	Nov. 2, 1920
1,559,134	Utzman	Oct. 27, 1925
1,660,834	Erola	Feb. 28, 1928
1,672,099	Schumacher	June 5, 1928
2,031,275	McLaurin	Feb. 18, 1936
2,093,261	Willson	Sept. 14, 1937
2,109,448	Welch	Feb. 22, 1938
2,240,256	Elmendorf	Apr. 29, 1941
2,391,052	Hauptli	Dec. 18, 1945

FOREIGN PATENTS

Number	Country	Date
436,415	Great Britain	Oct. 10, 1935

Published by AsbestosClaims.Law
asbestosclaims.law/library/23299/5