Sept. 22, 1970 W. B. WILKINS 3,529,394

MODULAR WALL CORNER CONNECTOR

Filed Sept. 30, 1968 2 Sheets-Sheet 1

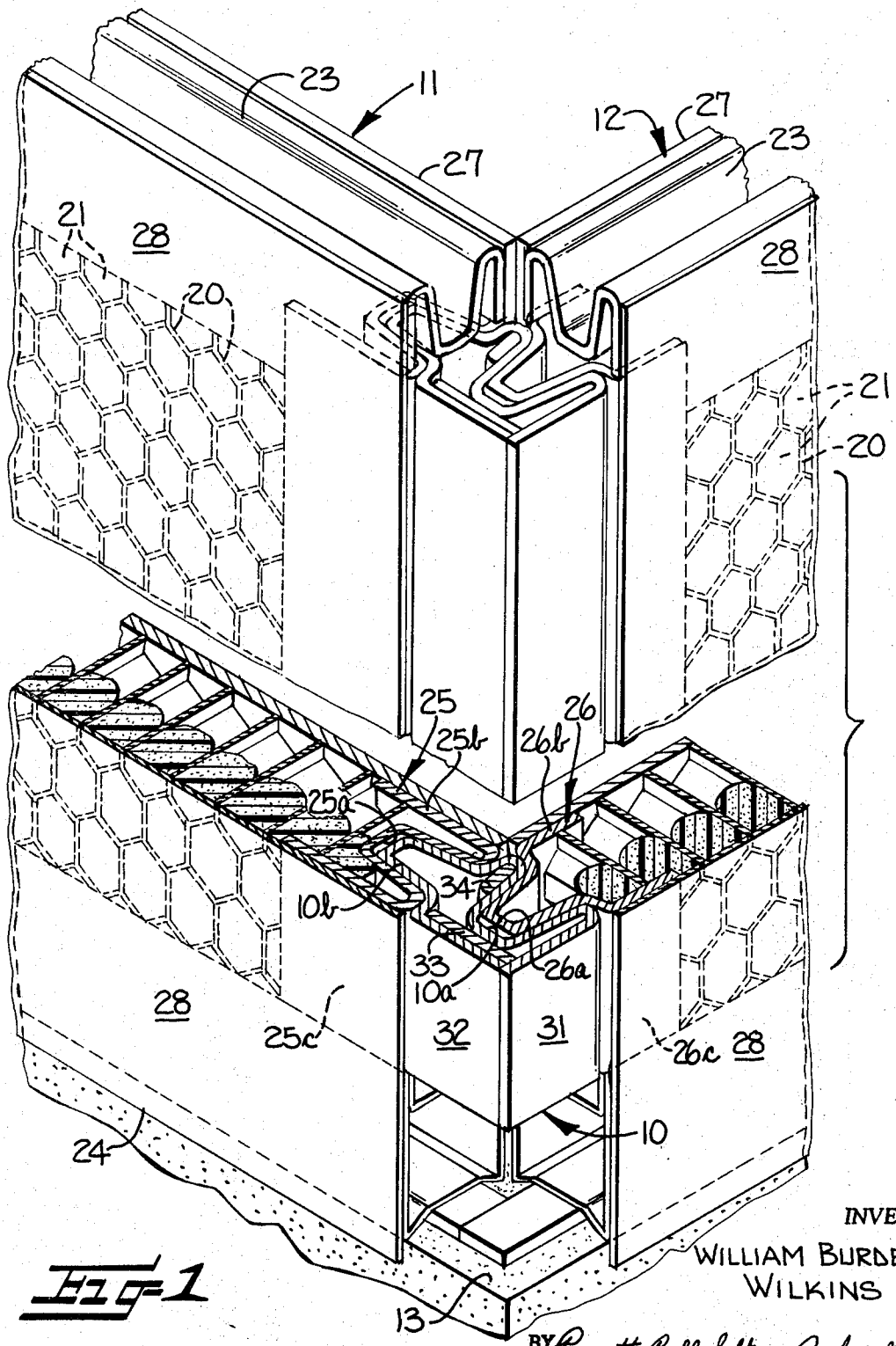


Fig-1

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Filed Sept. 30, 1968 2 Sheets-Sheet 2

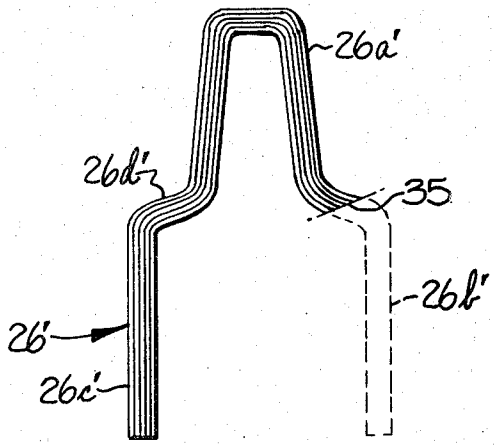


Fig-5

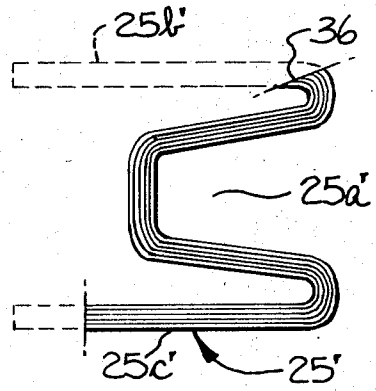


Fig-4

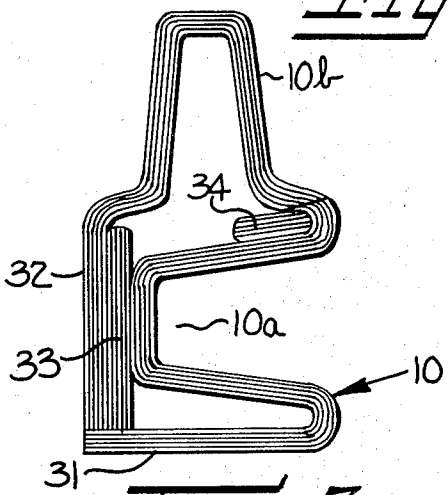


Fig-3

Fig-2

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United States Patent Office 3,529,394
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3,529,394

MODULAR WALL CORNER CONNECTOR

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Filed Sept. 30, 1968, Ser. No. 763,534
Int. Cl. E04b 2/18; E04c 1/10, 3/36
U.S. Cl. 52—731 9 Claims

ABSTRACT OF THE DISCLOSURE

An elongate four-sided, shell-like corner joint member, preferably formed of laminated paper, and having a tongue projecting from one side thereof, and a groove formed in an adjacent side thereof with the tongue and groove extending in substantially right-angular relationship to accommodate and support the proximal respectively grooved and tongued edges of a pair of relatively right-angularly disposed building wall panels. Also, a method of making such a corner joint member in which a tongue component and a groove component are formed separately and then adhesively interconnected with the tongue element and groove element extending in substantially right-angular relationship.

This invention relates to building wall structures and, more particularly, to an improved corner joint member for interconnecting the proximal ends of a pair of right-angularly disposed building wall panels.

It is an object of this invention to provide an improved corner joint member for interconnecting in substantially right-angular relationship a pair of building wall panels, wherein the corner joint member is provided with a longitudinal tongue at one side thereof and is formed with a longitudinal tongue-receiving groove therein at an adjacent side thereof extending at a substantially right angle to the longitudinal groove, and wherein the corner joint member is of lightweight construction, may be readily molded from laminated paper, and may be easily erected to interconnect the panels.

It is a more specific object of this invention to provide a corner joint member of the character described which is four-sided and wherein the four sides of the joint member include respective walls defining a continuous external profile cross-sectional configuration to the joint member, all of the walls being formed of a relatively thin rigid material, wherein the tongue-receiving groove formed in one side of the joint member is adapted to receive a tongue of the same configuration as the tongue disposed in right angular relation thereto, and also wherein the tongue-receiving groove is of such depth and so positioned that it extends completely behind the corresponding tongue with the bottom of the groove being positioned closely adjacent the opposing side of the corner joint member.

Another object of the invention is to provide a method of making a corner joint member of the character described, which includes forming a flanged tongue component and a separate flanged groove component, modifying the two components thus formed by severing one of the flanges from each of the components, then adhesively interconnecting those edges of the two components from which the respective flanges were previously removed, and adhesively interconnecting other flanges of the two components, and wherein the two components are relatively positioned during the step of adhesively interconnecting the same with the groove of the groove component being disposed adjacent and in substantially right-angular relation to that side of the thus formed corner joint member which has the tongue thereon.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

FIG. 1 is a fragmentary view of a pair of adjacent upright and relatively right-angularly disposed wall panels, showing the same interconnected by means of the corner joint member of the instant invention, with the central portions of the panels and corner joint member being broken away;

FIG. 2 is an enlarged sectional plan view through the improved corner joint member and portions of adjacent relatively right-angularly disposed wall panels shown in FIG. 1;

FIG. 3 is a plan view of the corner joint member disassociated from the wall panels of FIGS. 1 and 2; and

FIGS. 4 and 5 are plan views of two components as modified to join them together in making a corner joint member such as that of FIG. 3, and which corner joint components may, before modification, be of the same identical configuration as the adjacent tongue joint and groove joint members of the panels shown in FIGS. 1 and 2.

Referring more specifically to the drawings, the numeral **10** broadly designates the improved corner joint member of the instant invention positioned at the juncture of and interconnecting the proximal vertical side edge portions of a pair of adjacent upright and relatively right-angularly disposed wall panels broadly designated at **11, 12**. Panels **11, 12** are suitably secured to and supported by a floor **13**. The wall panels **11, 12** are characterized by having a longitudinally extending groove in, and a longitudinally extending projecting tongue on, the proximal side edges thereof. More specifically, wall panels **11, 12** may be of the type disclosed in my copending application entitled Modular Building Wall Structure with Electrical Raceway Means, Ser. No. 763,508, filed of even date herewith, and to which reference is made for a more detailed disclosure thereof.

Essentially, each panel **11, 12** comprises a substantially rectangular core **20** which may be in the form of a honeycomb made from kraft paper, cardboard or other paper products, and the interstices of which may contain a suitable insulation material **21**, such as polyurethane foam molded integral therewith. As shown in FIGS. 1 and 2, insulation material **21** is substantially flush with the outside surface of core **20**, and may penetrate about halfway through core **20**. If desired, insulation material **21** may extend from the outside face to the inside face of core **20**. Further, core **20** also may be in the form of a sheet or laminated sheets of fiberboard or similar material.

Positioned about the core **20** of each panel **11, 12** is a peripheral framework, only the upper and lower framework members and one side framework member being shown in association with each of the panels in FIGS. 1 and 2. The framework of each panel **11, 12** may comprise an upper elongate structural member **23** and a lower structural member **24**, the lower structural member **24** being shown in the form of an elongate hollow raceway adapted for the installation therein of electric wires or conductors, not shown. The hollow raceway members **24** may be secured to floor **13** by any suitable means, not shown, but being clearly disclosed in said copending application.

The proximal upright side edges of the relatively right-angularly disposed panels **11, 12** are defined by respective vertically disposed elongate first and second side edge joint members **25, 26** of shell-like construction and which are of generally M-shaped and U-shaped cross-sectional configuration, respectively, so that they may be readily molded or extruded and so that their proximal edges de-

fine a groove **25***a* and a tongue **26***a*, respectively. Thus, the first and second side edge joint members **25**, **26** are respectively in the form of a groove member and a tongue member.

The internal sidewalls of groove **25***a* of first side joint member **25** are tapered or converge inwardly toward the respective core **20** so as to tightly receive therein a similarly tapered tongue **10***b*, to be later described, on the corner joint member **10**. The tongue **26***a* of second side edge joint member **26** also has external sidewalls which are tapered or diverge inwardly toward core **20** of panel **12** so as to complement and be tightly received in the similarly tapered groove **10***a* on the corner joint member **10**.

The outer edge portions of the sidewalls of groove **25***a* in side edge joint member **25** curve outwardly in opposing relation to each other and then curve back generally upon themselves to form a pair of opposing side flanges **25***b*, **25***c* on the first side edge joint member **25** associated with panel **11**. Similarly, the inner end portions of opposed side walls of tongue **26***a* of second side edge joint member **26** flare outwardly in opposing relationship to each other to form wing portions **26***d* thereon which have opposing side flanges **26***b*, **26***c* formed on the ends thereof. The pairs of side flanges **25***b*, **25***c* and **26***b*, **26***c* straddle adjacent side edge portions of, and fit in suitable recesses formed in, opposing faces of the cores **20** of the respective wall panels **11**, **12**.

As shown in FIG. 1, each of the upper structural members **23** may be of substantially the same cross-sectional configuration as that of the first side edge joint member **25**. It is preferred that upper structural member **23** and side edge joint members **25**, **26** are of shell-like construction and molded from paper laminations impregnated with and/or bonded together with a phenolic resin or other suitable adhesive.

Facing members or sheets **27**, **28** overlie opposing sides of each core **20**. Peripheral portions of facing members **27**, **28** at least partially overlie the framework members **23**, **24** of the respective panels **11**, **12**. The adjacent substantially straight vertical edges of facing members **27** on panel **11** preferably are substantially flush with the outer edge of first side edge joint member **25** (FIG. 2). Also, the adjacent edges of those facing members **27**, **28** of panel **12** preferably are substantially flush with those wing portions **26***d* of second side edge joint member **26** where the flared sidewalls of tongue **26***a* are connected to flanges **26***b*, **26***c*. The proximal side edges of the adjacent inner facing members **27** may be trimmed, if necessary, so that such side edges may fit in abutting or other desired relation to each other.

Any suitable adhesive material may be employed for bonding facing members **27**, **28** of each panel to opposing sides of the corresponding frameworks and, of course, facing members **27**, **28** also may be bonded to opposing sides of the respective cores **20**. Thus, it can be appreciated that all the elements **20**, **21**, **23**, **24** of each panel **11**, **12**, as well as the respective side edge joint members **25**, **26**, are integral parts of the respective panels **11**, **12**.

Facing members **27**, **28** may be made from sheet material which is appropriate to the building; such material may differ as between that on the outside of the building and that on the inside surface of a wall. Facing members **27**, **28** may be made of any suitable self-sustaining material such as rigid or semi-rigid plastic material, wood veneer, sheet metal, etc. The facing members **28** form outside wall surfaces and are, therefore, preferably made of water-impervious material such as fiber glass sheets. The material may be finished to simulate wood graining, tile, marble, linen or any other attractive finish. Corner joint member **10** will now be described in detail.

Corner joint member **10** is of four-sided shell-like construction and comprises first and second adjacent sides **31**, **32** positioned in substantially right-angular relationship. The longitudinal tongue **10***b* of corner joint member **10** is of lesser thickness than the first side **31** and defines a third side of the joint member located in opposing relation to the first side **31**. Tongue **10***b* extends substantially throughout the length of corner joint member **10**. The fourth side of corner joint member **10** is located in opposing relation to the second side **32** and has the longitudinally extending tongue-receiving groove **10***a* formed therein, which is of a depth greater than one-half the width of the first side **31** and extends substantially completely behind tongue **10***b* with the bottom of groove **10***a* being positioned closely adjacent the second side **32** of corner joint member **10**. It will be noted that the four sides of corner joint member **10** include respective walls defining a continuous external profile cross-sectional configuration to the joint member **10**, with all of the walls being formed of a relatively thin rigid material; preferably laminated paper.

In order that the corner joint member **10** retains its external configuration as heretofore described, a reinforcing strip **33**, of about the same thickness as and preferably formed of the same material as the walls of the joint member **10**, extends parallel with and is adhesively secured to the inner surface of that wall defining the second side **32** of the corner joint member **10**. Any suitable adhesive, such as a phenolic resin, may be employed for adhesively securing the reinforcing strip **33** to the inner surface of that wall defining the second side **32** of corner joint member **10**. The wall of corner joint member **10** which defines the bottom of the groove **10***a* also preferably abuts and is adhesively secured to the inner surface of reinforcing strip **33**.

Opposing sidewalls of tongue **10***b* diverge relative to each other toward the second side **32** of corner joint member **10**, and toward the third side thereof defined by groove **10***a*, and the exterior surfaces of those walls defining opposite sides of the groove **10***a* are rounded at their juncture with the first side **31** and the tongue **10***b*. If so desired, and to lend further rigidity to the corner joint member **10**, an additional reinforcing strip **34** may be adhesively secured to the inner surface of that sidewall of groove **10***a* adjacent tongue **10***b*, with the second reinforcing strip **34** being positioned in engagement with the inner surface of the corresponding rounded portion of the corner joint member at the juncture of those adjacent walls defining groove **10***a* and tongue **10***b*.

In the process of erecting wall panels **11**, **12** and interconnecting the same through the medium of the corner joint member **10**, the mating surfaces of the corresponding tongues and grooves on the panels **11**, **12** and corner joint member **10** may be coated with a suitable adhesive, whereupon either one of the panels **11**, **12** may be erected in upright position, the corresponding side of the corner joint member placed in mating relation thereto, and then the other of the two panels may be erected in upright position and moved along the floor **13** to position the proximal edge of the latter panel in mating relation to the other corresponding side of corner joint member **10**. For example, assuming that panel **11** is first installed in an upright position as shown in FIG. 1, the tongue **10***b* on corner joint member, with a suitable adhesive applied thereto, may be positioned in mating relation with the groove **25***a* in the first side edge joint member **25** of panel **11**. Thereupon, panel **12** may be placed in upright position in right-angular relation to panel **11**, and with a suitable adhesive applied to the tongue **26***a* of second side edge joint member **26**, the latter tongue **26***a* may be moved into mating relation with the groove **10***a* in the corresponding side of corner joint member **10**, thus providing fixed mating connections between the panels **11**, **12** and corner joint member **10**.

In order to make a corner joint member **10** according to the method of the present invention, there will be observed in FIGS. 4 and 5 a pair of first and second elongate thin-walled corner joint components **25'**, **26'**. Components **25'**, **26'** also may be termed as groove and tongue

elements, respectively. Components **25'**, **26'** are of substantially M-shaped and substantially U-shaped cross-sectional configuration, respectively.

By comparing FIGS. 4 and 5 with FIGS. 1 and 2, it will be observed that components **25'**, **26'** are of the same configuration as the respective first and second side edge joint members **25**, **26** of panels **11**, **12**. Accordingly, components **25'**, **26'** will bear the same reference characters as the respective side joint members **25**, **26** of FIGS. 1 and 2, with the prime notation added to avoid repetitive description.

Although there are no cores or other panel components associated with the corner joint components, it will be noted that the elongate first component **25'** (FIG. 4) is characterized by a pair of opposing side flanges **25***b'*, **25***c'* straddling the U-shaped portion therebetween, the latter of which defines a tongue-receiving groove **25***a* with the ends of the legs of the U-shaped portion being rounded and integrally connected to corresponding side edge portions of flanges **25***b'*, **25***c'*.

It will also be noted that the second component of FIG. 5 is of generally U-shaped cross-sectional configuration and has a tongue **26***a'* in the form of a relatively small U-shaped portion adapted to fit in the groove **25***a* of the first panel **11** in FIGS. 1 and 2. The legs of the substantially small U-shaped portion defining tongue **26***a'* also flare outwardly in the form of diverging wing portions **26***d'*. The opposing side flanges **26***b'* and **26***c'* are formed integral with and extend outwardly from the distal ends of the wing portions **26***d'* and away from the tongue **26***a'*. The components **25'**, **26'** are preferably made from laminated paper.

In order to modify the first and second components **25'**, **26'** of FIGS. 4 and 5 so that they may be assembled and collectively form a corner joint member of the form indicated at **10** in FIGS. 1–3, one of the wing portions **26***d'* and its corresponding flange (flange **26***b'* in this instance) are severed from the second component **26** as indicated in dotted lines in FIG. 5. Such severance preferably is effected diagonally across and about midway of the corresponding wing portion **26***d'* and defines a free edge **35** thereat.

In a manner similar to that of flange **26***b'*, it will be noted that flange **25***b'* of first component **25'** is severed from the first component, as represented by the dotted line in the upper portion of FIG. 4, and such severance is preferably effected diagonally across flange **25***b'* adjacent the rounded outer end of a corresponding sidewall of the groove **25***a'* to form a free edge **36** adjacent that side of component **25'** having groove **25***a'* therein. If necessary, the other flange **25***c'* of first component **25'** may have a relatively short portion removed therefrom, as indicated by the dotted lines in the lower left-hand portion of FIG. 4, so that when the two components **25'**, **26'** are assembled, the outer surface of flange **26***c'* may be flush with the free end edge of flange **25***c'*.

Thereafter, the two components **25'**, **26'** are placed in proper relation to each other, as represented by the relative positions of the groove **10***a* and the tongue **10***b* of corner joint member **10** (FIGS. 1, 2 and 3). A suitable adhesive is applied to the edge **35** of the still intact severed wing portion **26***d'* of second component **26'** and/or to the severed edge **36** of the first component from which the flange **25***b'* has been removed. Additionally, a suitable adhesive is applied to the free end edge of flange **26***c'* of second component **26'** and/or to a portion of the inner surface of flange **25***c'* of first component **25'** adjacent the free end thereof. Thereupon, the free edge **35** of that portion of the second component **26'** from which a wing portion **26***d'* has been partially severed is adhesively connected to the free edge **36** of that portion of the first component **25'** from which a corresponding flange has been severed. Also, the intact flanges **25***c'*, **26***c'* of the first and second components are adhesively interconnected to thereby form a corner joint member having the external profile configuration of that corner joint member indicated at **10** in FIGS. 1, 2 and 3.

It is apparent that reinforcing strips corresponding to the strips **33**, **34** of corner joint member **10** may be applied to the inner surface of flange **26***c'* of second component **26'** and to the outer surface of that wall of groove **25***a'* of first component **25'** remote from flange **25***c'*, and adjacent the curved outer end of the latter wall, so as to reinforce the corresponding portions of the corner joint member being made from the first and second components **25'**, **26'**. Such reinforcing strips may be made from the flanges **25***b'*, **26***b'* previously severed from the respective components **25'**, **26'**.

It is thus seen that I have provided an improved corner joint member for interconnecting the respectively tongued and grooved edges of a pair of relatively right-angularly disposed wall panels, wherein the corner joint member is of shell-like construction and includes a pair of relatively right-angularly disposed first and second sides with a pair of third and fourth sides having a groove therein and a tongue thereon, respectively, for mating engagement with the tongued and grooved adjacent side edges of the two panels. It is seen further that I have provided a method of making such a corner joint member in which first and second components of respectively substantially M-shaped and U-shaped cross-sectional configuration are modified by removing one of the flanges from each of the same and then adhesively interconnecting the severed edges of the first and second components, as well as adhesively interconnecting intact flanges of the first and second components, and wherein the M-shaped component defines a tongue-receiving groove then positioned in fixed substantially right-angular relation to a tongue defined by the U-shaped component.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. An elongate corner joint member for interconnecting in substantially right-angular relationship a pair of building wall panels having a longitudinally extending groove and a longitudinally extending tongue on respective proximal edges thereof; said corner joint member comprising first and second unitary and continuous shell-like elements, each element defining two adjacent sides of said member, one of said elements defining a planar side and a longitudinally extending groove of a depth greater than one half the width of said other element planar side, the corresponding free ends of said elements being secured together in generally diagonally opposed relationship with said planar sides abutting and in substantial right-angular relationship and with said groove extending substantially completely behind said tongue with the bottom of the groove being positioned closely adjacent said one element planar side.

2. A corner joint member according to claim **1**, wherein said integral elements of said joint member include respective walls defining a continuous external profile cross-sectional configuration to said joint member, and wherein all of said walls are formed of a relatively thin rigid material.

3. A corner joint member according to claim **2**, wherein said walls are formed of laminated paper.

4. A corner joint member according to claim **2**, including a reinforcing strip extending parallel with and adhesively secured to the inner surface of that wall defining said one element planar side, said reinforcing strip being about the same thickness as said walls, and that wall defining the bottom of said groove being adhesively secured to the inner surface of said reinforcing strip.

5. A corner joint member according to claim **2**, wherein opposed sidewalls of said tongue diverge relative to each

other toward said other element and wherein the exterior surfaces of those walls defining opposite sides of said groove are rounded at their juncture with said other element planar side and said tongue.

6. A corner joint member according to claim 5, including a reinforcing strip extending parallel with and adhesively secured to the inner surface of that side wall of said groove adjacent said tongue and being positioned in engagement with the inner surface of the corresponding rounded portion of the joint member at the juncture of those adjacent walls defining said groove and said tongue.

7. A corner joint member according to claim 2, wherein those walls of said corner joint member defining said second side and said tongue constitute a first component, and wherein those walls defining said first side and said groove constitute a second component, wherein said walls of the first and second components defining said first and second sides are adhesively interconnected, and also wherein those walls of said first and second components defining said tongue and said groove are adhesively interconnected at their juncture.

8. A corner joint member for connecting together adjacent side edges of a pair of first and second building wall panels in substantially right-angular relationship and wherein the adjacent side edges of said first and second panels have a longitudinally extending groove therein and a longitudinally extending tongue of lesser thickness than that of said panels projecting outwardly therefrom respectively; said joint member comprising an elongate, thin-walled hollow unitary structure having an external profile defining a tongue and a groove extending in substantially right-angular relation to each other, said tongue having outwardly converging opposing side surfaces substantially throughout its length, and said groove being defined by opposing outwardly diverging side surfaces extending substantially throughout the length of said joint member, said hollow unitary structure comprising first and second integral continuous elements, one of which defines said tongue and the other of which defines said groove, each of said elements also defining a respective relatively narrow planar side and said elements being secured together with said groove extending substantially completely behind said tongue for abutment of said elements adjacent the bottom of said groove and with said planar sides in substantially right-angular relation to each other.

9. A four-sided corner joint member for connecting together adjacent side edges of a pair of first and second wall panels in substantially right-angular relationship and wherein the adjacent side edge of said first panel has a longitudinally extending groove therein and the adjacent side edge of said second panel has a longitudinally extending tongue of lesser thickness than that of said panels projecting outwardly therefrom; said joint member comprising

(a) an elongate thin-walled tongue element,

(b) an elongate thin-walled groove element,

(c) a pair of elongate, thin-walled, planar first and second sides interconnected in substantially right-angular relationship to each other,

(d) said tongue and groove elements extending in substantially right-angular relationship to each other,

(e) said tongue element being of lesser width than each of said first and second sides and being spaced from said first side with one elongate side edge portion of said tongue element integrally connected to said second side, and

(f) said groove element being disposed between said first side and said tongue element and having opposing flanged edge portions remote from said second side integrally connected to said tongue element and said first side respectively at points remote from said second side.

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HENRY C. SUTHERLAND, Primary Examiner

U.S. Cl. X.R.

52—282, 618

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,529,394 Dated September 22, 1970

Inventor(s) W. B. Wilkins

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6 line 50 after "extending" insert --tongue, the other of said elements defining a planar side and a longitudinally extending--.

SIGNED AND
SEALED
NOV 17 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334