United States Patent [19]

Matthews

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[54] **CORNER STRUCTURE FOR DOOR FRAMES AND THE LIKE**

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[52] **U.S. Cl.** ..... **403/292;** 52/753 C; 52/753 D; 52/758 H; 403/401; 403/409

[51] **Int. Cl.** **F16b 13/04;** F16b 12/32

[58] **Field of Search** ..... 403/292, 294, 295, 401, 403/409; 52/753 C, 753 D, 753 G, 758 H

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[57] **ABSTRACT**

A frame member of the type having four frame members interconnected at each of four corners. Each of the frame members includes a channel. A plurality of right angled corner keys are inserted into the channels at each of the corners to assist in securing the frame members together. The corner keys have a substantially flat shape with a thickness substantially equal to that of the internal height of said channel. At least two laterally projecting unitary barb portions are provided on the sides of each of the legs. The outermost of the barb portions has a lateral dimension at least slightly greater than the internal width of the channel. The outermost barb portions thereby bite into the material defining said channel. The inner pair of the barb portions has a progressively increasing lateral dimension so that each of the subsequent barb portions bites into the channel as each of said legs is inserted further into said channel. Upon full assembly, the outermost of the barb portions has bit into the material defining the channel, and the innermost of the barb portions is also biting into the material defining the channel even though the outermost barb portion has previously bit into the material defining the channel.

1 Claim, 5 Drawing Figures

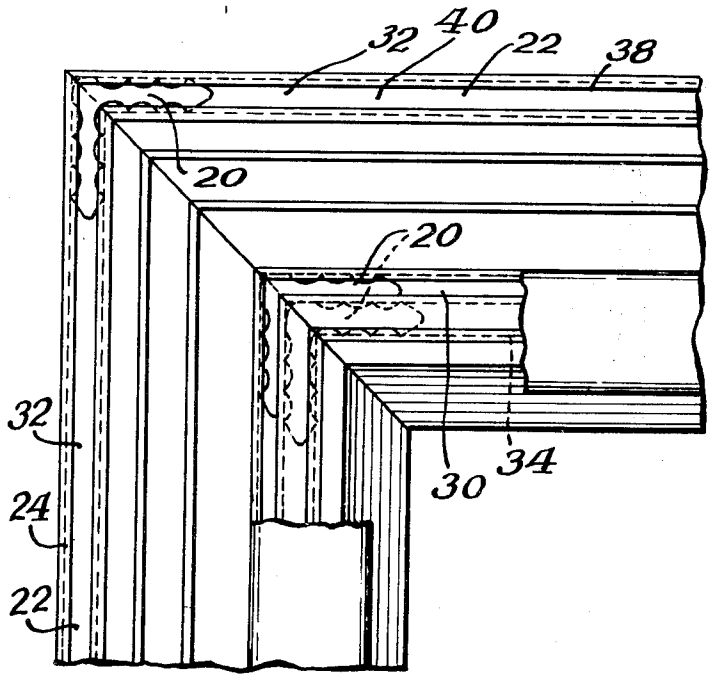


FIG. 1.

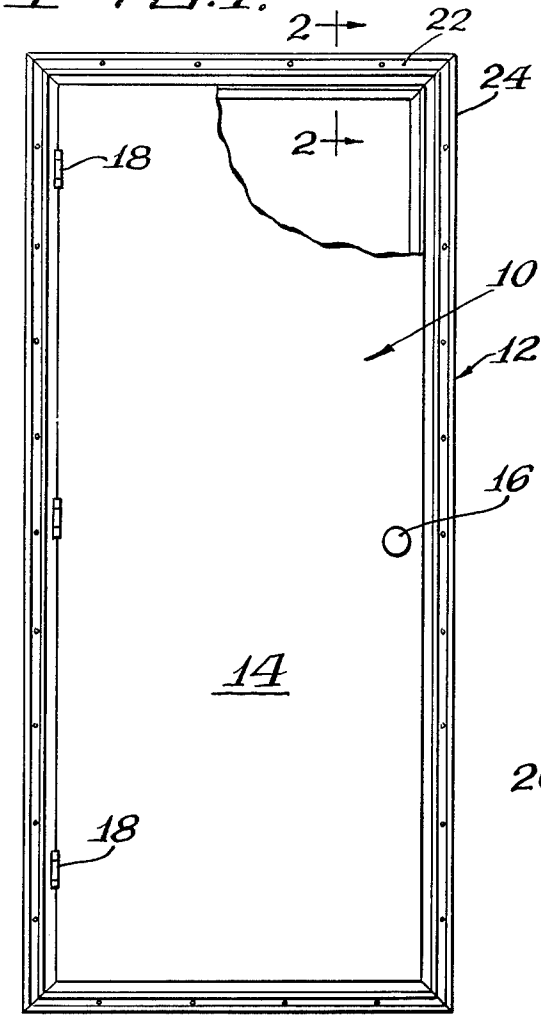


FIG. 2.

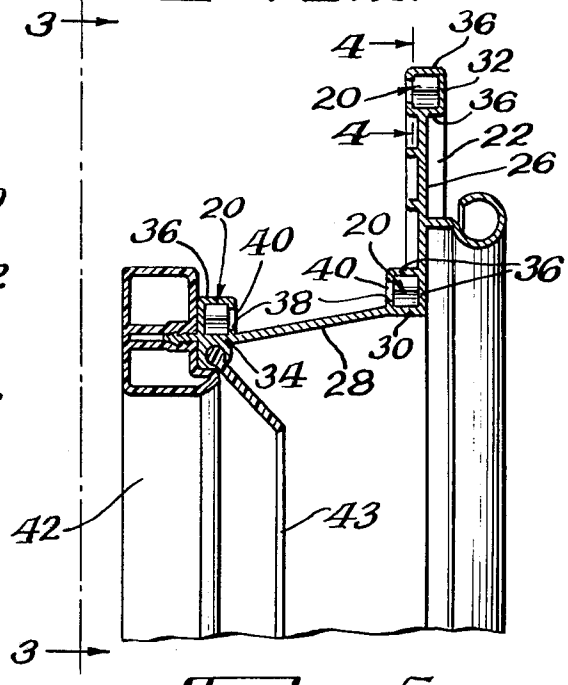


FIG. 5.

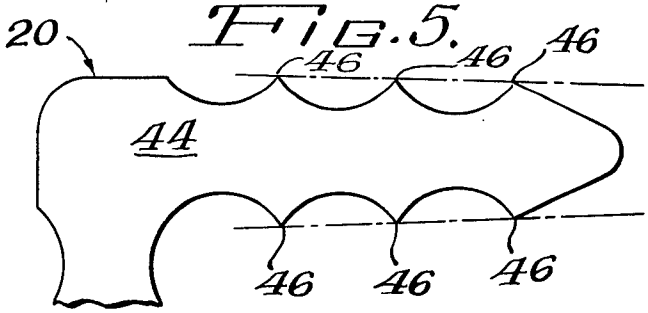


FIG. 3.

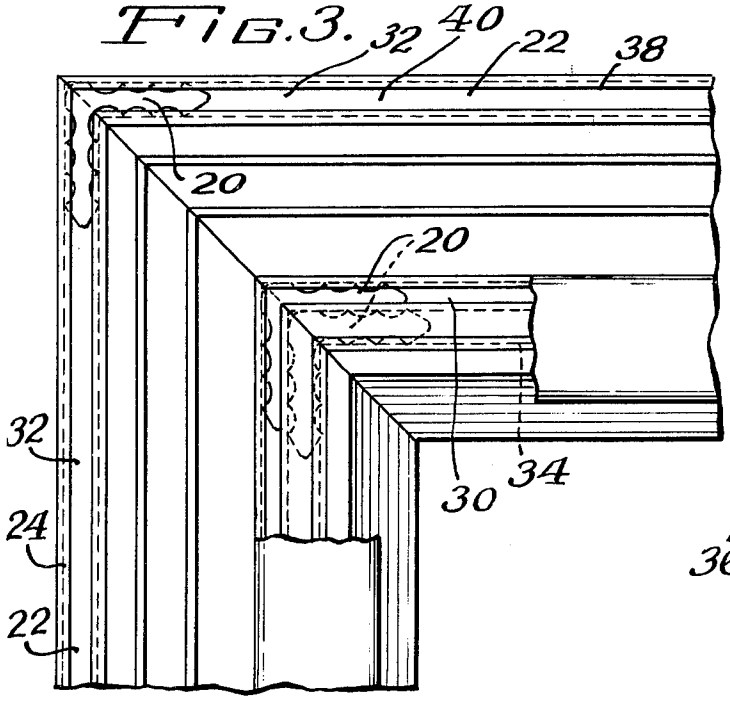
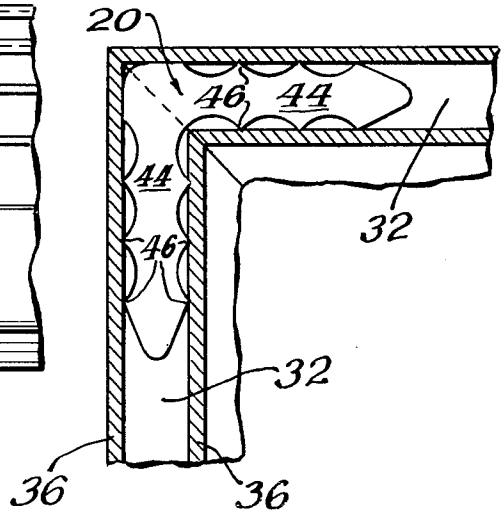


FIG. 4.



CORNER STRUCTURE FOR DOOR FRAMES AND THE LIKE

BACKGROUND OF THE INVENTION FIELD OF THE INVENTION AND DESCRIPTION OF THE PRIOR ART

This invention relates to an improved frame construction for doors and windows, particularly of the type commonly used on mobile homes, campers and the like, and it particularly relates to an improved frame construction wherein the improvement is in the design of the corner keys which are used at least initially to interconnect the four corners of the frame together.

Aluminum doors, door frames, windows and window frames are commonly used in houses, campers, mobile homes, and the like structures. The aluminum doors themselves are commonly constructed with an outer frame having upright, spaced side frame members and upper and lower frame members, the frame members being interconnected to support the door defining portions, as glass and/or aluminum panels. The door frames in which the doors themselves are received include a top and two side frames, jambs, or in some applications include two jambs and a top and bottom.

In the described structures, at least the initial interconnection at a corner is made by means of an L-shaped or right angular member which is inserted into channels in each of the frame members. Generally, the corners are mitered, and the corner members or corner keys are inserted into adjacent channels of mitered ends of right angle abutting frame members. Conventionally, a plurality of corner keys, as three in number, are used for securing the corners together. The corner keys initially have a principal use of securing the frame members together for further and later processing of the door. In the completed structure, the corner keys may or may not be the sole mechanical interconnection between two right angle abutting frame members.

Corner keys which have been commonly used for the construction of doors, door frames and the like, generally comprise a substantially flat right angular member having two legs, each of which were inserted into a channel of a frame member. These corner keys include at each end of a leg a separate spring member which is springably secured to the outer end of the leg. The spring member includes projecting wings which are designed to dig or bite into the metal defining the channels. One problem encountered with this type of corner key is that the spring member, during assembly in particular, can become loose on the corner key itself. After assembly was complete, the corner section would become loose because of the loosening of the spring member on the corner key. This loosening problem is considered particularly acute in the case of campers and other types of vehicles which undergo road vibrations, and particularly wherein no other means are provided for holding the abutting ends of the door frame together. Not only is the loosening of the corner key a problem after the door is completely assembled, but a loose spring on a corner key could raise a problem during the assembly thereof.

SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide an improved structure for securing the corners of metal, as aluminum doors, door frames, windows, window frames, and the like together wherein the disadvantages of certain prior art structures are avoided.

It is also an object of this invention to provide an improved corner key structure for securing the corners of structural frame members for doors and the like together wherein the corner key provides a more positive interconnection between the corner key and the frame members of the door.

It is a further object of this invention to provide an improved corner key for securing the corners of aluminum doors and the like together wherein the corner key is provided with unitary barb portions for positively securing the corners of the frame members together.

It is yet another object of this invention to provide an improved corner key for securing frame members together at a corner of a door or the like, wherein the corner key is characterized by its simplicity of construction and economy of assembly, with efficiency in holding the door frame sections together.

Further purposes and objects of this invention will appear as the specification proceeds.

The foregoing objects are accomplished by providing, in a frame member of the type having four frame members interconnected at each of its corners by at least one right angled corner key and wherein each of the frame members includes channel means for receiving one leg of each of the corner keys at each of the corners, the legs assisting in positively securing the corner members together, an improvement which comprises a corner key having a pair of legs with a substantially flat shape and at least two laterally projecting barb portions on each of the legs, the outermost of the barb portions having a lateral dimension at least slightly greater than the lateral internal dimension of the channel means receiving the leg whereby the outer barb portions bite into the material defining the channel means and the inner barb portions have a progressively increasing lateral dimension so as to positively bite into the material defining the channel means, so that both of the barb portions bite into the material to hold the frame members together at the corners thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Particular embodiments of the present invention are illustrated in the accompanying drawings wherein:

FIG. **1** is a front elevational view of an aluminum door and door frame wherein the door and door frame use the improved corner key of my invention;

FIG. **2** is an enlarged cross-sectional view taken along the line **2—2** and showing a lateral section of the door frame itself, but not of the door;

FIG. **3** is an enlarged, broken plan view of the corner of the embodiment of FIG. **2**, as viewed along the line **3—3** of FIG. **2**;

FIG. **4** is an enlarged, broken view taken along the line **4—4** of FIG. **2** showing a corner key received within a pair of adjacent channels of a pair of interconnected frame members; and

FIG. **5** is an enlarged broken plan view of my improved corner key showing the leg of a corner key having a progressively increasing lateral dimension for each of the barbs.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the embodiment of FIG. **1**, there is shown the front of an aluminum door, generally **10**, and

an aluminum door frame, generally **12**. The door **10** includes a front panel **14**, a door knob **16**, and hinges **18** which hingedly secure the door **10** to the frame **12**. In the embodiment of FIG. **1**, the door **10** is not illustrated in detail, although it is to be understood that the door **10** is constructed of four outer frame members (not shown) which are interconnected at the corners by my improved corner key, generally **20**, preferably aluminum, as illustrated in FIGS. **2 – 5**.

It is to be understood that the improved corner key **20** of my invention may be used in conjunction with any suitable frame members used for making doors, door frames, windows, window frames, combination storm doors and windows, and the like. Although the material from which the frames in question are made is generally an extruded aluminum, it is conceivable that other materials, including plastics, may be used, depending on the particular application. Also, the frame members with which the corner keys **20** are used are generally interconnected at four corners, although as in a door frame of a home, the door frame may only have two sides and a top and not include a bottom frame portion.

For purposes of simplicity in description, the manner of using the corner keys **20** will be described in connection with the frame **12** surrounding the door **10**. It is to be understood, however, that the corner key **20** is used at each of the corners, as on the frame of a door itself, on the frame surrounding the door, on screens and the like, in the same manner as will be shown and described in connection with the securement of the top frame member **22** and side frame member **24** shown in the embodiments of FIGS. **2 – 4**.

Each of the frame members **22** and **24** is preferably constructed of an extruded aluminum and has a cross-sectional shape such as that shown best in FIG. **2**. Each of the extruded frame members **22** and **24**, as seen in FIG. **2**, has a substantially L-shaped cross section which includes an upright portion **26** and a lateral portion **28**, the portions **26** and **28** being at an angle slightly greater than **90°** relative to each other. At the juncture **30** between the frame portions **26** and **28**, there is provided a first channel **30**. The extremities of each of the frame portions **26** and **28** are provided with similar channels **32** and **34**.

Each of the channels **30, 32** and **34** are formed in substantially the same way and are unitary with the frame members **22** or **24**. Each channel **30, 32** and **34** has a substantially hollow interior with a rectangular cross-section. The channels are each defined by three continuous walls **36** and an interrupted wall **38**. Although the interrupted wall **38** has an opening **40** therein, it is to be understood that the walls **36** and **38** cooperate to securely receive and hold each of the corner keys **20** as best seen in FIGS. **3** and **4**.

In the embodiment of FIGS. **1** and **2**, the frame members **22** and **24** are shown with rigid sealing members **42** which are designed to abut against the door **10** in a conventional manner. The sealing portions **42** are of plastic material and are interconnected to the metal projecting portions of the lateral portion **28** of the frame members **22** or **24**. The sealing members **42** have no bearing on the invention as set forth herein. A flexible seal **43** is also desirably provided for providing a more weather tight seal for the door in the frame.

Each of the channels **30, 32** and **34** receive one leg **44** of the substantially right angular corner key **20**. As seen best in FIG. **2**, each corner key **20** has a substantially rectangular cross-sectional shape which is substanially equal to the cross-sectional shape of the inner portions of each of the channels **30, 32** and **34**. The top and bottom sides of the corner keys **20** are in close proximity to the inner surfaces of the lip portions of the interrupted wall **38** of each of the channels **30 – 34** and are also adjacent to the inner surface of the wall **36** which is opposite the interrupted wall **38**.

Referring to FIGS. **3 – 5**, each leg **44** of the right angled corner key **20** includes a plurality of laterally projecting barb portions **46**. The outermost of the plurality of barbed portions **46** on each of the legs **44** has a lateral dimension at least slightly greater than the internal dimension between a pair of opposed continuous walls **36**. By having the lateral dimension slightly greater than the internal dimension of the channels **30–34**, the lateral edges of the barbed portions **46** bite into the walls defining the channels. As seen best in FIG. **5**, it is important to have the lateral dimension of the subsequent barbed portions **46** progressively increase so that each subsequent barbed portions will continue to bite into the metal defining the channels **30 – 34** even though preceded therein by the outermost of the barbed portions. In this way, a plurality of sets of barbed portions spaced from each other bite into the metal defining the channels which receive the corner keys. A plurality of connection points between the corner keys **20** and the frame members are provided by having a gradually increasing dimension for each of the barbed portions **46**. A more rigid connection is thereby provided for securing frame members **22** and **24** together at the mitered portions between abutting or adjacent frame members.

Conventionally, a plurality of corner keys **20** are used at each intersection or corner of a frame. As seen in FIGS. **2** and **3**, three corner keys **20** are used at each corner. By providing corner keys with unitary barbed portions **46** for securement to the frame members, in contrast to the prior art wherein separate spring members were commonly used between the corner key and the frame member to secure the parts together, the construction herein provides greater assurance that the frame members will remain in a fixed relationship, whether during assembly or during actual use.

While in the foregoing, there has been provided, a detailed description of a particular embodiment of the present invention, it is to be understood that all equivalents obvious to those having skill in the art are to be included within the scope of the invention as claimed.

I claim:

1. A frame comprising a plurality of metallic elongated frame members, said frame members having mitered ends and having channel means defined therein, said channel means having a first pair of channel defining walls spaced a first distance apart, and a second pair of channel defining walls spaced a second distance apart, said mitered ends being in abutting relationship, a corner key for securing two elongated frame members together at said abutting ends to define corners, said corner key being of unitary, completely solid construction and being devoid of apertures therein, each corner key having a pair of legs at right angles to each other, each leg being rectangular in cross section and having a pair of opposite sides and a pair of opposite edges, said sides being spaced apart a distance which is substantially equal to said first distance and being re-

ceived in said channel means in close sliding proximity to said first pair of channel defining walls, and a plurality of unitary sets of barbs on each of said edges of said legs, each of said barb sets including an outermost barb set with the spaced apart dimension of said outermost set being at least slightly greater than said second distance so as to provide for positive biting interengagement of said outermost set with the metal defining said second walls of said channel means, and also including an innermost set of barbs with the spaced apart dimension of said innermost barb set being greater than said spaced apart distance of said first barb set to assure positive biting interengagement of said innermost barb set with the metal defining said second spaced walls, the biting interengagement of said barbs with the metal of said walls defining the sole means for securing said frame members together.

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