June 7, 1966 F. C. BRENGMAN ETAL 3,254,465

DIVIDED LIGHT WINDOWS

Filed Jan. 9, 1964 3 Sheets-Sheet 1

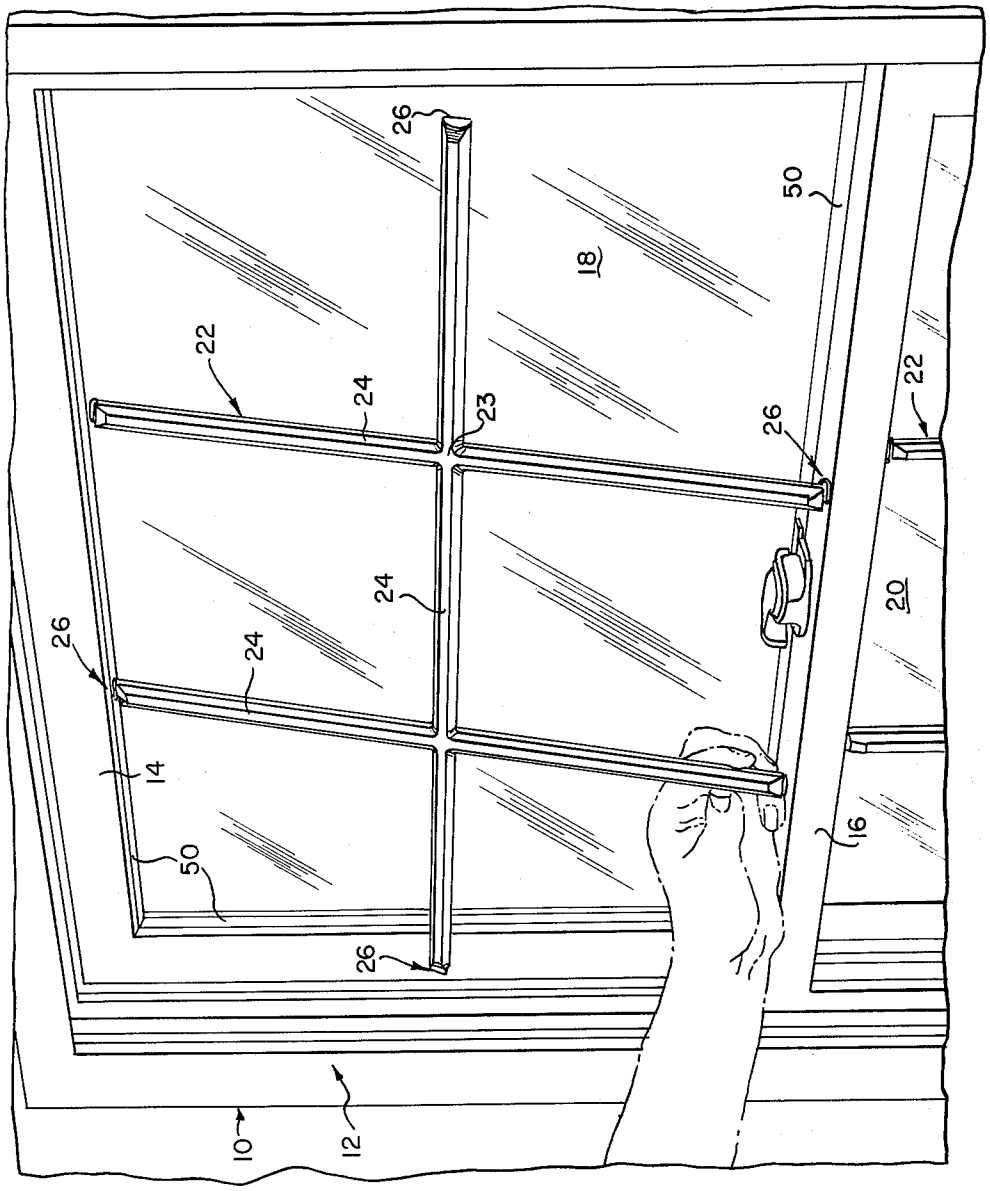


Fig. 1

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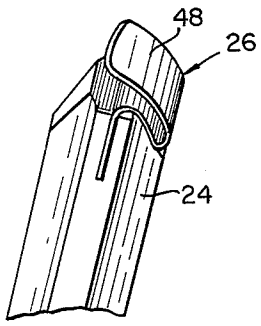
ATTORNEYS

June 7, 1966 F. C. BRENGMAN ETAL 3,254,465

DIVIDED LIGHT WINDOWS

Filed Jan. 9, 1964 3 Sheets-Sheet 2

Fig. 2



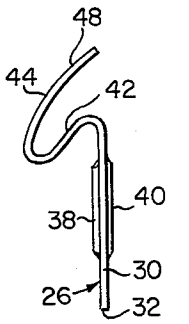


Fig. 3

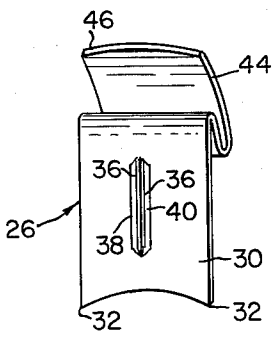


Fig. 4

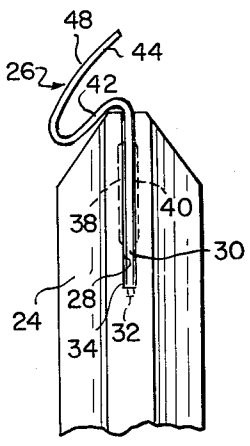


Fig. 5

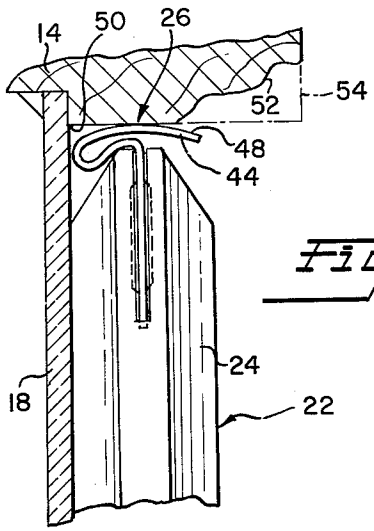


Fig. 6

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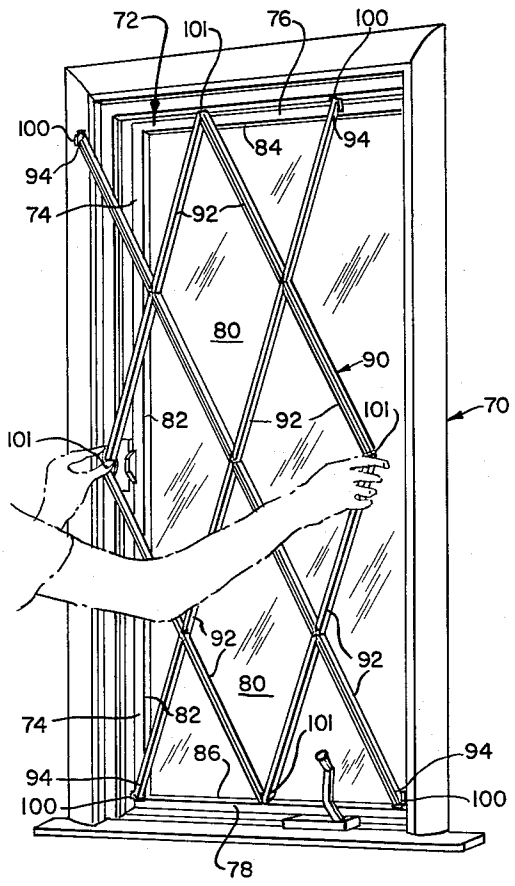
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June 7, 1966 F. C. BRENGMAN ETAL 3,254,465

DIVIDED LIGHT WINDOWS

Filed Jan. 9, 1964 3 Sheets-Sheet 3

Fig. 7



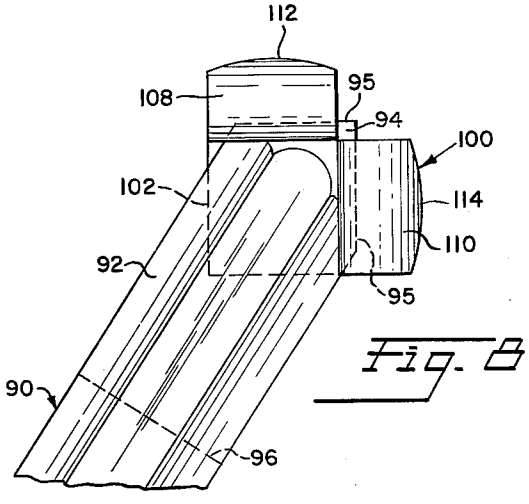


Fig. 8

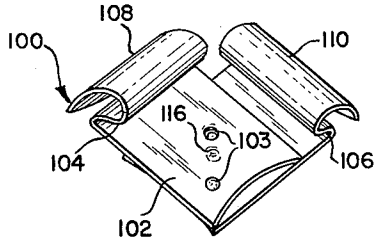


Fig. 9

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United States Patent Office

3,254,465

Patented June 7, 1966

3,254,465

DIVIDED LIGHT WINDOWS

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Filed Jan. 9, 1964, Ser. No. 336,772
7 Claims. (Cl. 52—455)

This invention relates to muntin structures which divide window openings into small pane areas to achieve an architecturally and aesthetically pleasing appearance, and more particularly to removable muntins used to so divide single-pane window openings.

For architectural and aesthetic reasons it is sometimes desirable to install windows which have a plurality, or an appearance of a plurality, of small window pane as, for example, in Cape Cod and colonial type homes, rather than large, unobstructed, single-pane windows such as picture windows. However, the cost of manufacturing window units having a plurality of small panes is greater because of an increase in the number of manufacturing operations, the number of component parts to be assembled, and the amount of labor required in assembling such a multi-pane window. Furthermore, a window having a plurality of small panes is much harder to clean, reputty, and paint, both in the original manufacture and the subsequent maintenance of the window.

As shown by United States Letters Patent No. 2,681,481 to Mason, a removable muntin having a grid fitting within the window opening adjacent the pane to effect a multi-pane, divided-light appearance without the above described disadvantages of multi-pane windows is known. However, in the Mason structure the ends of the grid bars must be accurately cut to the exact height or width of the window opening and must be shaped to conform to the surface profiles of the window sash members against which they abut. Thus, a grid for the upper sash of a window cannot be interchanged with out for the lower sash according to the Mason invention inasmuch as the surface profiles of the lower sill of upper and lower sashes are customarily different. Further, prior art removable muntins, such as shown in the Mason patent, require special modification of the sash members of the window or require the installation of special fixtures and hardware on the sash for the purpose of mounting the muntin.

Accordingly, it is a primary object of the present invention to provide improved removable muntins for windows which obviate the disadvantages of prior art devices.

To accomplish this object, the present invention provides unique muntin mounts positioned at the ends of the grid bars of removable muntins to frictionally engage the inner edges of the window sash or pane-framing members upon insertion of the muntin therein. These mounts retain the muntin in place because of their frictional engagement with the sash members and thus require no special hardware nor modification of the window sash.

The mounts are designed to have sufficient resilient give so that the mounts themselves accommodate minor variations in the dimensions of the window or pane opening so that the muntins are readily interchangeable between windows of the same approximate size and between windowns with sash members having differing inner edge surface profiles. Finally, the resilient mounts are constructed so that upon removal or attempted removal of the installed muntin, the mounts are effective to automatically increase the frictional forces between the mounts and the sash members to enhance the retaining characteristics of the frictional mounts.

In one specific embodiment of the present invention, the frictional mounts are spring-like clips fabricated from resilient strips of spring metal. The clips are configured

so as to have a generally flat base section adapted to be retained in a slot provided in the ends of the grid bars of the muntin. Generally ogee or S-shaped intermediate body sections adjoin the base section to resiliently flexibly connect with outer arcuate sections of the clips which are adapted to contact and to frictionally engage the inner edge surfaces of the sash members.

Accordingly, other objects of the present invention include:

(1) The provision of improved, removable window muntins which require no modification of, or installation of hardware on, the window sashes in which they are to be mounted;

(2) The provision of improved removable muntins which are interchangeable between windows of the same approximate size and between windows having differing inner edge surface profiles;

(3) The provision of improved removable-muntin window combinations in which the muntins are frictionally held in place;

(4) The provision of improved removable muntins which allow for greater tolerances in the manufacture thereof;

(5) The provision of improved window muntins which may be more cheaply and simply manufactured and installed than prior art devices;

(6) The provision of improved window muntins which are frictionally retained in place and which automatically increase the retaining friction upon application of a force tending to remove the muntin from the window; and

(7) The provision of improved, novel spring clips for frictionally mounting removable-muntins in windows.

These and other objects of the present invention will more fully appear from the following description and appended claims when read in conjunction with the accompanying drawings wherein:

FIGURE 1 is a fragmentary perspective view of a window unit and a removable muntin in position for insertion in the unit in accordance with the present invention;

FIGURE 2 is a perspective view of a spring clip in the end of one of the grid bars of the removable muntin of FIGURE 1;

FIGURE 3 is a side view of the spring clip of FIGURE 2;

FIGURE 4 is substantially a front view of the spring clip of FIGURE 2;

FIGURE 5 is a side view of the grid bar and spring clip of FIGURE 2;

FIGURE 6 is a fragmentary section through the window unit of FIGURE 1 with the removable muntin mounted therein;

FIGURE 7 is a perspective view of a window unit and a removable muntin in position for installation in the unit in accordance with a modified embodiment of the present invention;

FIGURE 8 is a view of the back or exterior of a spring clip in the end of one of the grid bars of the muntin of FIGURE 7; and

FIGURE 9 is a perspective view of the spring clip of FIGURE 8.

As shown generally in FIGURE 1, a window unit **10** is mounted in a building structure **12** and includes an upper sash **14** and a lower sash **16** each of which has a single pane **18** and **20**, respectively, mounted therein. In order to create a divided-light or multi-pane effect in window unit **10**, or in any other style window unit, a removable muntin **22** is installed in one or both sashes. Removable muntin **22** includes a grid **23** of bars **24** which may be configured in any conventional pattern such as a single bar, parallel bars, single or multiple crosses (FIGURE 1), diagonal bars, or diagonal crosses (FIGURE 7), or any

other desired pattern. Grids **23** are provided with spring clips **26** at their peripheral portions where they abut the pane-framing members of the sash or window.

As shown in greater detail in FIGURES 2 to 5, the end of grid bars **24** are each provided, in the specific grid configuration illustrated, with a slot **28** in a plane parallel to the window pane. In one preferred embodiment, spring clip **26** is configured from a sheet or strip of resilient, spring-like metal such as copper alloy to have a substantially flat base section **30** to fit into slot **28** in the grid bar. Lower corners **32** of base section **30** are pointed to dig into the grid bar at the bottom **34** of slot **28**.

Base section **30** is further provided with a longitudinally extending cut **36** in the central portion thereof and the sheet material on either side of the cut is permanently deformed in opposite directions to define elongated protrusions **38** and **40**. These protrusions bite into and grip the opposite side walls of slot **28** to retain the spring clip therein.

The outer or upper end of base section **30** is interconnected with an ogee or S-shaped intermediate clip section **42** which in turn integrally terminates in an arcuate terminal section **44** of the clip. Arcuate section **44** terminates in a smooth rounded edge **46**. Intermediate section **42** and terminal section **44** are so shaped that the convex surface **48** of arcuate section **44** is disposed to face obliquely outwardly and rearwardly (from the point of view of a person installing the muntin on the inside of a window unit) from the base section and grid bar.

Operation

As shown in FIGURES 1 and 6, removable muntin **22** is inserted in a sash of window unit **10** with convex surfaces **48** of spring clips **26** toward the window and away from the person installing the muntin. Convex surfaces **48** contact the inner edges **50** of the sash members of sash **14** or **16** and are resiliently urged to flex to the installed configuration of the clip as shown in FIGURE 6. Inner edges **50** of sash **14** may have a configured profile as shown at **52** or may be straight as shown by the dot-dash line **54**, the operation of the spring clip being substantially the same in either case.

The sliding friction between arcuate terminal section **44** and sash edge **50** during installation is applied to the clip in a direction which tends to flexibly collapse the clip and thus relieve the frictional resistance to ease installation. However, friction between the spring clip and the sash upon attempted removal of the muntin, either accidental or intended, tends to open up the spring clip and thus increase the frictional force between the clips and the sash with a wedging action to enhance the holding capability of the clips.

As illustrated by FIGURES 5 and 6, the clearance between the ends of grid bars **24** and inner edges **50** of the window is not critical as the spring clips have sufficient flexibility to retainingly grip the sash throughout a range of clearances between the grid bar ends and the pane-framing members.

Modification

As shown in FIGURES 7 to 9, a window unit **70**, in this instance a casement type window, has an outwardly opening sash **72** comprising side sash rails **74** (only one shows) top sash rail **76**, and bottom sash rail **78** and a single pane of glass **80** mounted within the sash rails. The sash rails **74**, **76**, and **78**, respectively have inner edges **82**, **84**, and **86** which extend substantially perpendicularly inwardly away from the interior surface of pane **80**.

A removable muntin **90** is positioned in sash **72** to create a diamond divided light appearance. Muntin **90** has a plurality of grid bars **92** arranged in a diamond shaped pattern with four ends **94** of the grid bars shaped to terminate in surfaces **95** fitting parallel to the inner sash rail edges **82**, **84**, and **86** at the corners of the sash.

In order to accommodate corner spring clips **100**, each terminal end **94** is provided with an internal slot **96** (the end of the slot being shown by a dashed line in FIGURE 8) in a plane parallel to the window pane in the same manner that slot **28** is provided in the embodiment of FIGURE 5. In some installations it may be desirable to provide spring clips similar to those illustrated in the embodiment of FIGURES 1 to 6 at the peripheral intersections **101** of grid bars **92** in addition to the corner clips **100** described in detail below.

In the preferred form of this embodiment, each spring clip **100** is configured with a substantially flat base section **102** which fits into slot **96** of the grid bar. Base section **102** is provided with prick-punched deformations **103** to bite into and grip the sides of slot **96** to assist in retaining the clip therein.

Two independent ogee-shaped intermediate strip-like sections **104** and **106** are connected to base section **102** and integrally terminate in arcuate terminal sections **108** and **110** having rounded outer edges **112** and **114**. Intermediate sections **104** and **106** and terminal sections **108** and **110** are configured so that the convex surfaces of arcuate terminal sections **108** and **110** are disposed to face obliquely outwardly and rearwardly (from the viewpoint of a person installing the muntin on the inside of a window unit) from the base section and grid bar.

The spring clip **100** of this embodiment may preferably be made from two spring clips **26** of the embodiment of FIGURES 1 to 6 which are spot welded at **116** or otherwise suitably secured at their base sections with their ogee sections mutually positioned at substantially 90 degrees, as required by the rectangular corners of the sash of FIGURE 7. However, the clip and/or base of this embodiment, as well as that of FIGURES 1 to 6, may be constructed in other forms so long as the sash rail engaging surfaces of the clips are properly positioned and resiliently supported to frictionally engage the sash rails upon installation in a window as described below.

Upon installation of the removable muntin of FIGURE 7, the four spring clips **100** on grid bar ends **94** resiliently but independently flex upon contact with the sash rails to slide across the inner edges **82**, **84**, and **86** of the rails until grid **90** abuts glass pane **80**. Considering specifically the upper left-hand corner of the muntin, arcuate terminal sections **108** and **110** of the clip contact and slide across inner edges **84** and **82**, respectively, of the top and side sash rails. The friction gripping action of each of the clips independent terminal sections is substantially the same as described above for the embodiment of FIGURES 1 to 6.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A unitary spring mounting clip defined by a configured sheet of resilient material for use with removable window muntins comprising:

(a) a base section adapted for fixed connection to a muntin, said base section being generally flat and including mounting protrusions adapted to retainingly engage the sides of a slot in said muntin to retain said clip therein;

(b) an arcuate terminal section having its convex surface facing away from said base section and being adapted to smoothly contact a framing member around a window pane; and

(c) an intermediate section interconnecting said terminal and base sections adapted to permit said arcuate

terminal section to resiliently flex toward said base section upon insertion of said muntin in a window.

2. A clip as defined in claim 1, said base section having terminal mounting points adapted to engage the bottom of a slot in said muntin to retain said clip therein.

3. A unitary spring mounting clip defined by a configured sheet of resilient material for use with removable window muntins comprising:

(a) a base section adapted for fixed connection to a muntin;

(b) a first arcuate terminal section having its convex surface facing away from said base section and being adapted to smoothly contact a framing member around a window pane;

(c) a first intermediate section interconnecting said terminal and base sections adapted to permit said arcuate terminal section to resiliently flex toward said base section upon insertion of said muntin in a window;

(d) a second arcuate terminal section disposed at an angle to the first arcuate terminal section and having its convex surface facing away from said base section and being adapted to smoothly contact another framing member adjacent a corner of a windor pane; and

(e) a second intermediate section interconnecting said second terminal section and said base section adapted to permit said second arcuate terminal section to resiliently flex toward said base section upon insertion of said muntin in a window.

4. In a removable-muntin and window combination:

(a) a window comprising interconnected, elongated window framing members having their inside edges defining the window opening, said edges having substantially uniform cross-sectional surface profiles throughout their lengths adjacent the opening, and a pane of glass mounted within said framing members to close the opening; and

(b) a removable muntin comprising a grid adapted to fit removably within said framing members adjacent said pane, and spring mounting clips defined by configured resilient sheet material mounted upon said grid at the ends of the grid members to retain it in place against said pane, said spring mounting clips being the only means retaining said grid in place against said pane and each clip comprising:

(1) a generally flat base section fitted in a slot in the muntin,

(2) an arcuate terminal section having its convex surface facing away from said base section to smoothly contact one of said uniform-profiled inside edges of said framing members to secure said grid in said window, and

(3) a resilient ogee-shaped section interconnecting said terminal and base sections to permit said arcuate terminal section to resiliently flex toward said base section when said grid is installed.

5. A unitary spring mounting clip defined by a configured sheet of resilient material for use with removable window muntins comprising:

(a) a base section adapted for fixed connection to a muntin, said base section being generally flat and including mounting protrusions adapted to retainingly engage the sides of a slot in said muntin to retain said clip therein;

(b) a terminal section adapted to smoothly contact a framing member around a window pane; and

(c) an intermediate section interconnecting said terminal and base sections adapted to permit said terminal section to resiliently flex toward said base section upon insertion of said muntin in a window.

6. A combination as defined in claim 4, each said clip including:

(a) a second arcuate terminal section disposed so as to smoothly contact another of said uniform profiled inside edges of said framing members at a corner of said window to secure said grid therein; and

(b) a second resilient ogee-shaped section interconnecting said second terminal section and said base section to permit said arcuate terminal section to resiliently flex toward said base section upon installation of said grid.

7. A combination as defined in claim 4 wherein said ogee-shaped section is oriented to interconnect said arcuate and base sections so that sliding friction between said arcuate section and said framing members upon insertion of said muntin tends to resiliently flex said arcuate section toward said base section whereas sliding friction between said arcuate section and said framing members upon removal of said muntin tends to flex said arcuate section away from said base section to thereby increase frictional resistance to removal of said muntin.

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