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FRAME AND MULLION ASSEMBLY AND METHOD OF MAKING SAME

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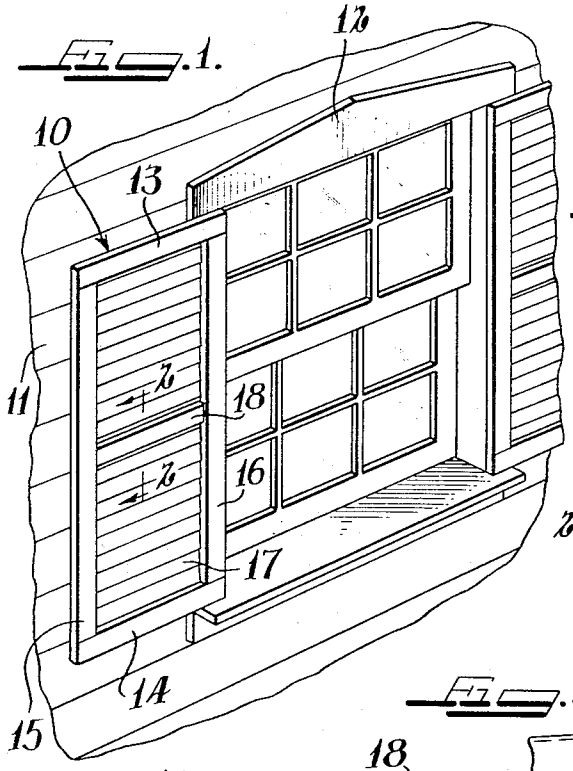


FIG. 1.

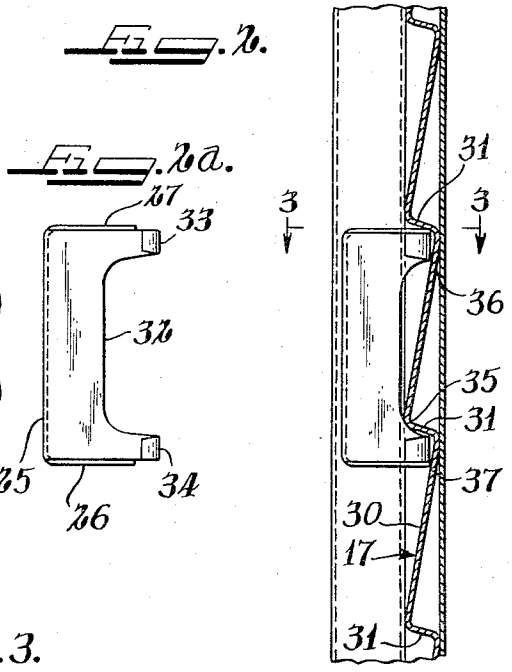


FIG. 2.

FIG. 2a.

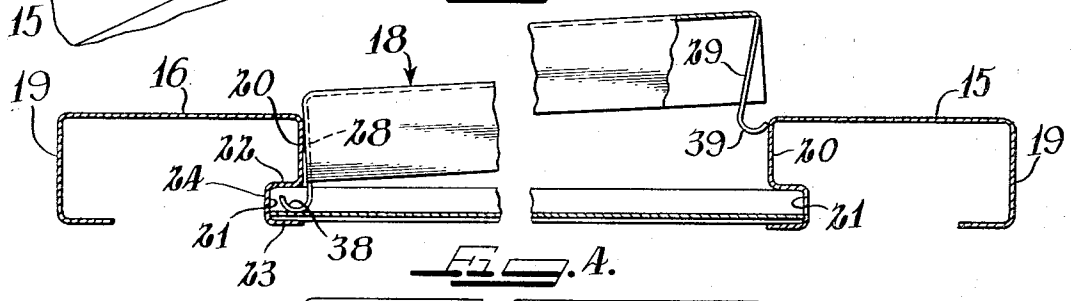


FIG. 3.

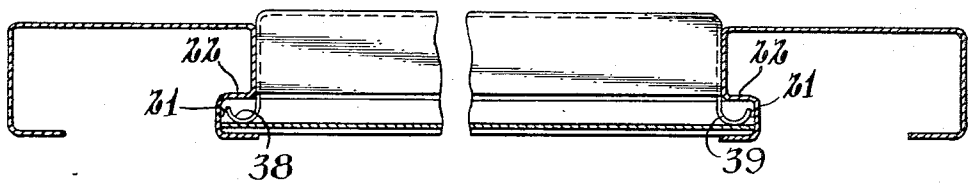


FIG. 4.

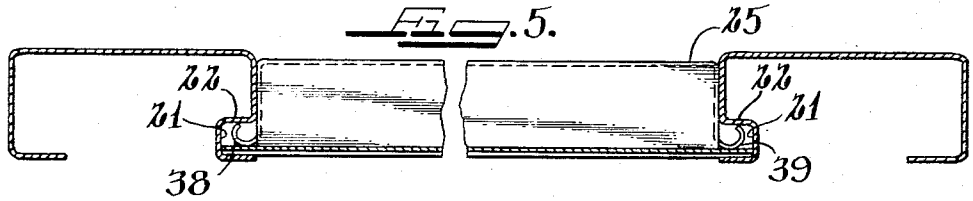


FIG. 5.

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FRAME AND MULLION ASSEMBLY AND METHOD OF MAKING SAME

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This invention relates to a frame and mullion assembly and to a method of making same. Throughout this specification the words "mullion" and "mull" are used interchangeably, the latter being an abbreviation for the former. For purposes of illustration, this invention will be described with reference to its application to shutters.

Many building structures such as doors and shutters, which were formerly made of wood, are now made of sheet metal for added rigidity and economy. Items such as shutters or shuttered doors, when made of wood, require a frame which is divided into two parts by a mullion, and require further the formation, and assembly with the frame, of a series of slats. Where the slats are largely ornamental, as in shutters mounted in permanently opened condition beside a window, the metal counterpart of the slats may comprise a single panel formed to have corrugations simulating slats, thus eliminating the labor and expense of forming individual slats and securing them in place. Where such panel is used, it is more economical to use a single panel rather than two panels separated by a mullion. From the standpoint of appearance, however, a single panel is less attractive than a double panel, since the latter resembles more closely its wooden counterpart.

An object of this invention, accordingly, is to provide a simple and economical construction of a metal frame having a single panel simulating horizontal slats, and having a mullion securely mounted on the frame across the panel to simulate a wooden shutter with two panels.

Another object of this invention is to provide a method of assembling a mullion on a frame on which has been mounted a corrugated panel wherein spaces created between the panel and frame by the corrugations are utilized to locate and accept flexible fingers on the mullion, which snap into said spaces, and which are then deformed to provide a permanent, tight lock with the frame.

As a more specific object, this invention has within its purview the provision of a mullion made of metal for use with a metal frame having a single panel simulating shutter slats, wherein the mullion is mounted over the panel at an appropriate location thereon and secured to the frame of the shutter by a simple snap action.

A specific object of this invention is the provision of a mull made of sheet metal and having fingers formed in the ends thereof which snap into appropriate openings in a frame and which are deformable by pressing upon the mull to lock the mull tightly and permanently in the frame.

These and other objects of this invention will become apparent from the following detailed description when taken together with the accompanying drawings in which

FIG. 1 is a perspective side elevational view of a fragment of a house including a window with shutters mounted on the sides thereof;

FIG. 2 is a side elevational view in section on a greatly enlarged scale of a fragment of the shutter shown in FIG. 1, the view being taken along line 2—2 thereof;

FIG. 2*a* is a side elevational view of the mullion;

FIG. 3 is a plan view in section taken along line 3—3 of FIG. 2, of the shutter fragment of FIG. 2 showing the mullion in a preliminary stage of assembly with respect to the shutter;

FIG. 4 is a section corresponding to FIG. 3 showing

the mullion in an intermediate stage of assembly with respect to the shutter, and

FIG. 5 is a section, also corresponding to FIG. 3, showing the mullion in its final stage of assembly.

Referring now to FIG. 1, the embodiment of the invention chosen for illustrative purposes and shown therein is in the form of a window shutter 10, which is permanently secured in place against the wall 11 of a home in overlapping relation to the side trim of a window 12. The precise form of the window is not material to this invention, and hence the window will not be described herein in detail.

Shutter 10 is comprised of a rectangular frame having top and bottom rails 13 and 14, respectively, and side rails 15 and 16 disposed in vertical relation to the wall 11 and spaced from one another in a horizontal direction. Extending between the side rails 15 and 16 and from top rail 13 to bottom rail 14, are slat-like portions which, as will be described hereinafter, are merely simulated and are in fact a single panel 17 of sheet metal having horizontal corrugations of a size, form and disposition calculated to give the impression of genuine shutter slats.

Said shutter 10 is divided into an upper and a lower portion by a mull or mullion 18 extending horizontally from side rail 15 to side rail 16 and disposed substantially midway between top and bottom rails 13 and 14. Said mullion is not necessary for structural purposes, inasmuch as the panel simulating the slat-like portions is a single piece and is sufficiently strong to prevent the shutter from sagging. The purpose of said mullion 18 is therefore almost entirely to enhance the appearance of the shutter and to make it resemble more closely the wooden shutter which it is intended to replace. It may be noted for the present that mullion 18 extends from side rail 15 to side rail 16 and furthermore extends over a horizontal segment of the panel forming the shutter slats.

The details of construction of the shutter and mullion are shown more clearly in FIGURES 2 to 5 inclusive. Each side rail may be formed of sheet material which has been bent to simulate a solid member of rectangular cross-section having parallel sides 19 and 20. The inwardly facing sides 20 are each formed with a longitudinal groove 21 disposed towards the rear of the shutter (i.e. toward wall 11) and comprised of substantially parallel sides 22, 23 and a connecting wall 24 which may have any desired shape, but for purposes of illustration is shown as being flat and parallel with the planes of the sides 19 and 20.

Mullion 18 is also formed from sheet metal and has a substantially flat front face 25 which is rectangular in form, substantially parallel sides 26 and 27, and substantially parallel ends 28, 29 (FIG. 3). End 29 is independent of the sides 26 and 27, so as to be able to move relative thereto.

Panel 17, as stated above, is a single metal sheet which has been formed with horizontally disposed corrugations shaped to resemble shutter slits. Each corrugation has an inclined upper face 30 which is substantially of the same width as the width of a slat, and a connecting face 31 extending substantially at right angles to the face 30 and connecting the lower edge of one face 30 with the upper edge of the adjacent corresponding face. Since the corrugations are formed mechanically, they are uniform as to both width and depth.

Panel 17 is wider than the space between adjacent sides 20 of the side rails 15 and 16 and is held in place in the frame 10 by inserting it into the longitudinal grooves 21 in the rails, said grooves being of just sufficient width and depth to receive the longitudinal edge regions of said panel. Thus the spacing between the parallel sides 22 and 23 of the groove is substantially equal to the overall transverse dimension of the panel 17 from

the lower edge of one face 30 to the upper edge of the adjacent face 30. The panel 17 is therefore held tightly and frictionally in the grooves to prevent rattling in a strong or gusty wind.

The means by which mullion 18 is held firmly in place on the shutter will now be described.

Ends 28 and 29 of the mullion are substantially identical in form and are of a length, measured vertically, which is substantially equal to the distance between the inner surfaces of the sides 26 and 27, and of a width which is greater than the width of said sides. Said ends are formed with an elongated notch 32 to leave spaced legs 33 and 34 adjacent the sides 26 and 27. The length of the notch, that is, the spacing between the legs 33 and 34, is such that when the legs are placed over panel 17 in the manner shown in FIG. 2, the said legs will straddle the apex 35 formed between face 30 and connecting face 31. Said legs 33 and 34 are furthermore so spaced as to contact corresponding upper regions 36 and 37 of the faces 30. When thus proportioned, the mullion 18 may be uniformly and accurately located on the panel by causing the side 27 to abut upon the connecting face 31 of the panel, and the leg 34 will then abut upon the connecting face 31 immediately below the first said face 31.

At the edge regions of panel 17 which are retained in grooves 21, the upper regions of the faces 30 leave a relatively large space or pocket between said faces 30 and the sides 22 of the said grooves 21. These spaces or pockets are utilized to receive outwardly curled ends 38 and 39 on legs 33 and 34 which extend beyond the sides 26 and 27 of the mullion and into grooves 21.

Inasmuch as the end 29 is independent of the sides 26 and 27, it is free to swing inwardly of the mullion. The opposite end 28 is identical to end 29 except that it may remain joined to sides 26 and 27. Said end 28 has therefore the same legs 33 and 34 and each has a curled end 38. Thus the mullion may be assembled with respect to shutter frame 10 by first inserting the curled ends 38 of one pair pair of legs on end 28 into the space formed between the panel end groove as shown in FIG. 3, and then bringing the curled ends 39 of the legs 33 and 34 of the opposite ends 29 to bear against the edge of the side rail 15. End 29 is then swung resiliently inwardly to allow the protruding curled end 39 to move downwardly along the side 20 of the side rail into alignment with the groove 21, whereupon the resilience of the said end 29 will cause the curled ends 39 to snap inwardly and into the groove 21. At this stage the assembly resembles that shown in FIG. 4.

Referring now to FIG. 4, it may be observed that the curled ends 38 and 39 terminate short of the walls 22 of the grooves 21, so that the mullion is still relatively free to move transversely of the plane of the shutter. The mullion also protrudes above the general plane of the side rails 15 and 16.

A final locking action is effected by pressing downwardly upon the ends of the mullion as viewed in FIG. 4 to push the mullion transversely of the plane of the shutter to the position shown in FIG. 5. In this position the front face 25 of the mullion is disposed slightly below the front faces of the side rails 15 and 16. In the process of pushing the mullion inwardly, the ends 38 and 39 were curled upward and around into contact with the walls 22 of the groove 21, so that the mullion is now firmly locked in the grooves 21. Inward movement of the mullion is limited by contact of the sides 26 and 27 with the faces 30 of the panel. The curled ends 38 and 39, as shown in FIG. 5, retain sufficient resilience to tend to open and thereby exert a continuous resilient pressure upon the walls 22 of the groove 21 on the one hand and upon the front faces 30 of the panel on the other.

It may be noted that in assembling the mullion to the shutter the curling action of the legs 33 and 34 is against the inclined surfaces of the shutter panel, which develops a component of force in an upward direction as viewed in FIG. 2, forcing the mull against the connecting faces 31, and thus locating and retaining the mull in a predetermined position. The resilience of the panel under the curled ends 33 and 34 assists in holding the end of the curl against the walls 22 after the pressure on the mull is released by the assembler.

The mullion and its method of assembly to a shutter result in a simple structure which is adequate for the purpose intended and yet requires no fasteners for its completion. The snap-in action is quick and certain, and in addition provides a resilient holding force for the mullion which eliminates rattling of the panel against the mullion under windy conditions.

The snap-in nature of the mullion makes possible the use of a basic shutter structure without the mullion which may be sold as such, and the customer may then modify the basic structure by adding the mullion, if he so desires. Since the assembly of the mullion to the shutter is accomplished by mere hand pressure, any workman can perform the assembling operation. Furthermore, if the specific location of the mullion relative to the top or bottom of the shutter frame is determined by the shape or proportions of the adjacent window or some other structural feature of the building, such location can, within reasonable limits, be readily selected by the workman on the building site.

It is understood that the foregoing description is merely illustrative of the preferred embodiment of the invention and that the scope of the invention therefore is not to be limited thereto, but is to be determined by the appended claims.

We claim:

1. A shutter and mullion assembly, said shutter comprising a frame having spaced side rails, longitudinal grooves in the adjacent sides of said side rails, a panel in said grooves, said panel having a series of inclined surfaces extending from one side rail to the other side rail and into said grooves to form pockets with said grooves, a mullion extending over an inclined surface between said rails with the ends of the mullion abutting upon the adjacent sides of said side rails, means on one end of the mullion extending therefrom snugly into a pocket to hold said one end thereat, and resiliently deformable means extending outwardly from the other end of the mullion into a pocket to hold the other end thereat, said resiliently deformable means cooperating with the adjacent side of a side rail to deform upon transverse movement of the mullion relative to said side rail incident to assembly of the mullion with said shutter.

2. A shutter and mullion assembly, said shutter comprising a frame having spaced side rails, means having a plurality of slat-like surfaces extending across the shutter from one side rail to the other and with the ends of the slat-like surfaces overlapped by the adjacent margins of the rails, said slat-like surfaces being inclined with respect to said margins to form spaced pockets therewith, and a mullion extending over a slat-like surface between said rails, said mullion comprised of formed sheet metal having a front face, top and bottom sides extending transversely from the front face toward said slat-like surfaces, and ends also extending transversely from the front face toward said slat-like surfaces and in proximity to the sides of said rails, one of said ends being substantially free of said sides so as to be swingable longitudinally of said mullion relative to said spaced pockets, and means on said ends extending snugly into said pockets and held resiliently in said pockets by said swingable end to lock said mullion in place in said frame.

3. A shutter and mullion assembly as described in claim 2, said ends being cut away to form spaced legs adapted to straddle a slat, and said means on said ends comprising outwardly curled regions on said ends.

4. The method of assembling and locking in place a mullion in a grooved frame having spaced side rails and a corrugated sheet simulating slats in said grooves, said

sheet forming pockets with said grooves, said method comprising resiliently distorting an end of the mullion to reduce its length, pushing said mullion between the side rails until said end is aligned with and springs into a pocket, and then exerting pressure upon the said end against said panel to curl the end in the pocket.

5. The method of fixing a mullion between side rails having inwardly facing pockets in the adjacent sides thereof, said method comprising forming legs in the corner of the mullion which extend transversely of the plane of the mullion, curling the ends of said legs outwardly of the ends of the mullion through approximately 180° to lengthen the mullion beyond the space between said side rails, resiliently bending the legs inwardly of the mullion and forcing said mullion between said rails until the said curled ends snap into the pockets, and then exerting transverse pressure upon the mullion and the legs to curl said ends further until they fill the pockets.

6. A shutter and mullion assembly, said shutter comprising a substantially rectangular frame having parallel side rails, the adjacent sides of said rails having confronting longitudinal grooves, a panel in said frame and extending into said grooves, said panel having transverse corrugations therein simulating angularly disposed slats, said panel substantially filling said grooves and forming pockets with the walls thereof at corresponding sides of the slats, a mullion extending over and along a simulated slat from one side rail to the other, and means on the ends of said mullion extending snugly into said pockets, said means on the ends of said mullion comprising spaced

legs overlying corresponding regions of adjacent simulated slats, and outwardly curled ends on said legs and engaging the panel and groove in a pocket to hold said mullion in place in the frame.

7. A shutter and mullion assembly, said shutter comprising a substantially rectangular frame having parallel side rails, the adjacent sides of said rails having confronting longitudinal grooves, a panel in said frame and extending into said grooves, said panel having transverse corrugations therein simulating angularly disposed slats, said panel substantially filling said grooves and forming pockets with the walls thereof at corresponding sides of the slats, a mullion extending over and along a simulated slat from one side rail to the other, and means on the ends of said mullion extending snugly into said pockets, said mullion comprised of sheet metal formed to have a front face, top and bottom sides extending toward said panel and ends overlying the grooved sides of said rails, one of said ends being independent of said sides and swingable toward and away from the rail nearest thereto.

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