

June 13, 1961

E. C. HALLOCK
MULLION ARRANGEMENT

2,988,183

Original Filed March 30, 1955

2 Sheets-Sheet 1

FIG. 1

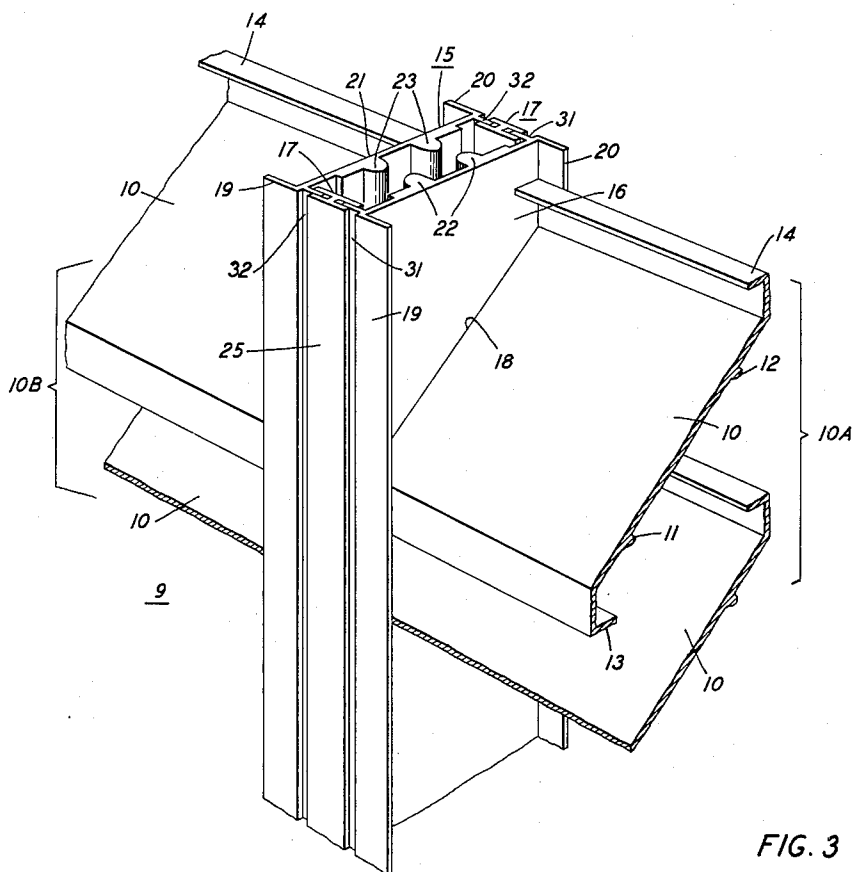


FIG. 2

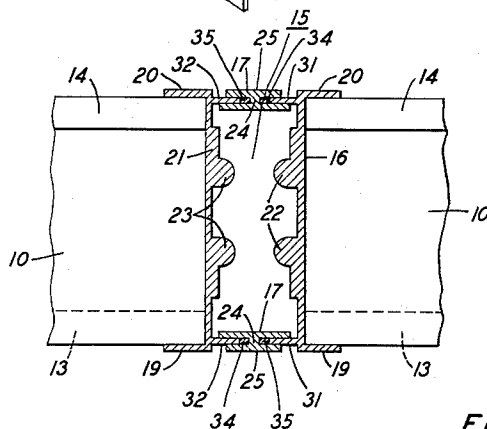
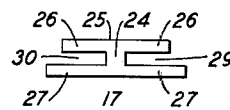


FIG. 3



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FIG. 4

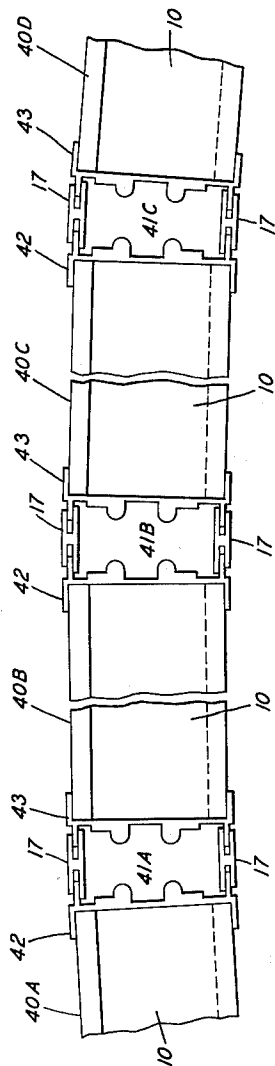


FIG. 5

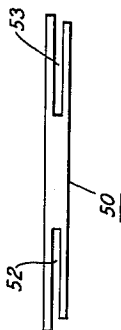


FIG. 6

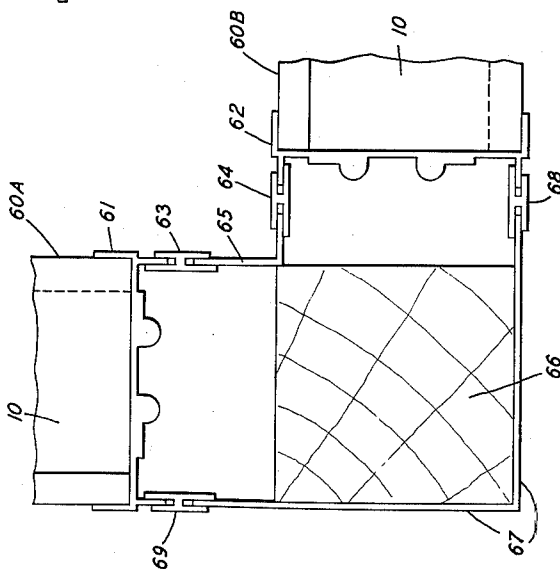
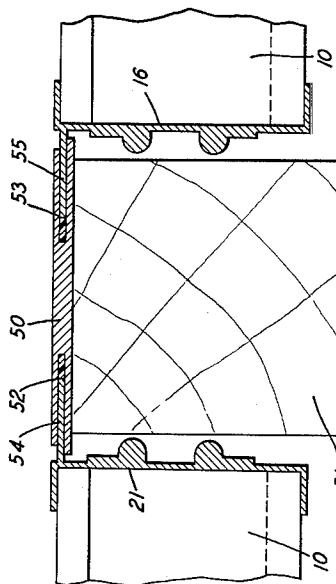


FIG. 7



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2,988,183

MULLION ARRANGEMENT

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Continuation of application Ser. No. 497,895, Mar. 30, 1955. This application Jan. 21, 1959, Ser. No. 788,237 1 Claim. (Cl. 189-63)

This invention relates to improvements in building structures and more particularly to improved means for mounting and supporting improved louvers to serve as ornamental and functional covers for ventilating openings and the like in industrial, commercial and residential types of buildings. This application is a continuation of application Serial No. 497,895, filed March 30, 1955, now abandoned.

Louvers have been used for many years for protecting ventilating openings, roof vent cupolas and the like against the entry of rain, heat and sunlight and their utility for this purpose is widely recognized. Usually, such ventilating louvers are formed of wood slats joined together as structural units in all except the smaller sizes of such louvers, which may be formed of metal for use as attic ventilators and the like.

Recently, the utility and attractive appearance of louvers has become more widely appreciated and prefabricated louver elements have been made in many different sizes from glass, rolled or stamped sheet steel, extruded aluminum and the like. The glass louvers are used primarily for relatively small installations, such as, for example, sun porches, residential windows and the like. The larger metal louvers have come into use in industrial and office buildings not only for functional purposes, such as, for example, covering the intakes and exhausts for air conditioning and ventilating units, but also for ornamental purposes in which the straight lines of the louvers harmonize with the straight lines of the more advanced and modern types of buildings.

The construction of louvers of large area has encountered practical difficulties which have somewhat limited their size and greatly increased their cost. While louver blades of almost any desired length can be formed from aluminum and aluminum alloys by extrusion and they can be formed from other metals, such as stainless steel and the like, by rolling operations, such long louver blades are difficult to support in such a manner that they will not sag or warp. Moreover, the metals used in the louvers usually have an appreciably greater coefficient of thermal expansion than the building structures in which they are installed so that temperature variations may cause them to pull away from or buckle relative to the building structure. The structures heretofore provided for supporting the louvers are complicated and expensive, and, even so, have not completely overcome the difficulties set forth above.

It is, accordingly, an object of the present invention to make simpler and more efficient support means for louvers of the type employing long metal louver blades and more particularly to provide a strong, efficient combination of expansion mullions and flanged louvers.

The present invention relates to improved supports for louvers for building structures, these supports enabling sections or groups of louvers to be assembled in such a manner that sagging of the louvers is reduced to a minimum and, at the same time, enabling relative expansion and contraction without danger of buckling or of pulling the louvers loose from the building structure.

More particularly, in an exemplary embodiment of the invention, the improved supporting structure includes a multi-part mullion having channel-like side pieces or plates in which the ends of a series of flanged louver

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blades are received and supported and including a member or members making slidable joints between the channel-like plates which enable them to move toward and away from each other in response to expansion and contraction of the louver blades. Moreover, great strength is imparted to the combination by the flanges on the louvers contacting the flanges on the supporting plates.

The above-described mullion construction may be formed of the same kind of material as the louvers or a different material. Most desirably, it is formed of extruded aluminum or aluminum alloy sections which may be given a bright or oxidized finish or lacquered or otherwise treated to match or contrast with the louver blades. The provision of such independent mullion structures enables groups of louvers to be assembled in end-to-end relation, at right or other angles to each other, or to be assembled in approximately curved or zig-zag relation, for example, in forming dormer or bay-type louver assemblies on a building.

For a better understanding of the present invention, reference may be made to the accompanying drawings in which:

FIG. 1 is a perspective view, partly in section and partly broken away, of an expansion mullion and flanged louver combination in accordance with the present invention;

FIG. 2 is a plan view, partly in cross-section and partly broken away, of a portion of the mullion and louvers shown in FIG. 1;

FIG. 3 is a plan view of one of the connecting elements of the mullion for allowing expansion and contraction thereof;

FIG. 4 is a plan view of an assembly of a plurality of groups of louvers joined by expansion mullions of this invention in such a manner as to provide a substantially curved structure;

FIG. 5 is a plan view of a modified form of connecting member for an expansion mullion;

FIG. 6 is a plan view, partly in cross section and partly broken away, of a corner of a building structure including angularly related groups of louvers joined by expansion mullions embodying the present invention; and

FIG. 7 is a plan view, partly in cross section and partly broken away, of a portion of a building structure illustrating the use of expansion mullions in accordance with the invention for joining groups of louvers to a vertical beam.

Referring more specifically to the drawings, FIG. 1 shows, by way of example for illustrative purposes, a structural combination 9 in accordance with the invention comprising an expansion mullion 15 and flanged louver blades 10 arranged in groups 10A and 10B on respectively opposite sides of the mullion.

The louver blades 10 are formed preferably of metal, such as, for example, rolled sheet steel or an extruded aluminum alloy, which are suitably reinforced to impart the necessary strength. More specifically, each of the louver blades 10 may consist of extruded aluminum or aluminum alloy strips having reinforcing beads 11 and 12 formed on its back surface and having angularly formed edge portions or flanges 13 and 14 thereon. The flanges 13 and 14 may be of right-angular or L-shaped cross-section and are joined to the lateral edges of the blade, or shaped as a part thereof, so that their outer flanges are parallel. The flanges add both strength and appearance to the louvers. Moreover, the top flange 14 gives some protection to the louvers from rain water. As the louver blades 10 may be extruded or rolled elements, they can be formed in any length satisfying the requirements of the building structure. However, when used with mullion 15 of the type described hereinafter, the louver blades 10 will, in a typical installation, be

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about five feet long and their width will be suitable for imparting the desired appearance and form to the louvers and to assure proper shading and resistance to penetration by rain, without substantial diminution of the ventilating characteristics of the structure in which the louver is used.

Because of the louver blades 10 are preferably formed of a metal such as aluminum or an alloy thereof, they can expand and contract lengthwise a very substantial amount due to the extreme ranges of temperatures normally encountered throughout the country. Thus, the louvers may be subjected to temperatures below 0° F. and above 100° F. when used in the North Temperate Zone. Such a wide range of temperatures presents difficulties in mounting the louvers so that they are rigid and do not vibrate when subjected to strong winds or pull loose as they contract or buckle as they expand. The mullion 15 for the louver blades 10 overcomes the above-mentioned difficulties.

The outer ends of the one group of louver blades 10A are fixed, for example, to a suitable frame fitting in the opening in the building wall. The adjacent inner ends of this group of louver blades 10A are joined to a suitable channel-like plate 16, which forms a side member of the expansion mullion 15. The end edges 18 of the louver blades 10 abut and are secured to the channel-like member 16 in the usual way as by welding, bolts or sheet metal screws. The plate 16 has right-angularly arranged flanges 19 and 20 which engage the parallel outer surfaces of the right-angle flanges 13 and 14. The ends of the louver blades in the group 10A are secured to the flanged plate 16 so that the latter moves with the blades as they expand and contract in response to the variations in temperature.

Other blades 10 of an adjacent group of louver blades 10B are joined in a similar manner to a flanged plate or channel 21 forming the opposite side of the mullion 15. The plates 16 and 21 are identical or mirror images. In order to avoid flexing and to impart strength and rigidity to the flanged plates 16 and 21, they may be provided with reinforcing ribs 22 and 23, respectively, which may be secured to or formed during extrusion of the plates. The presence of the ribs 22 and 23 prevents twisting or appreciable buckling of the plates.

Inasmuch as the plates 16 and 21 must move toward and away from each other during expansion and contraction of the groups of louvers, means is provided to permit such movement while firmly supporting the louvers and preventing leakage of wind or rain between them. As shown in FIGS. 1, 2 and 3, this connecting means comprises one or more members 17 formed of metal, such as extruded aluminum or an aluminum alloy, each of these members 17 being of generally H-shaped cross-section and having spaced apart members 26 and 27 connected by means of a neck 24 to form oppositely facing grooves 29 and 30 therein parallel to the outer surface of the strip. Grooves 29 and 30 receive the opposed flanges 31 and 32 located at opposite edges of the flanged plates 16 and 21. The flanges 31 and 32 are received slidably in the grooves 29 and 30 so that the flanged plates 16 and 21 can move toward and away from each other. Preferably, the flanges 31 and 32 are set back from the outer surfaces of the flanges 19 and 20, for example, so that the outer surface 25 of each member 17 is substantially flush with the outer surfaces of an adjacent pair of flanges 19 or 20.

In order to prevent leakage between the flanges 31 and 32 and the strips 17, strips 34 and 35 of compressible packing material or caulking compound are mounted in the bottoms of the grooves 29 and 30 in position to engage the edges of the flanges 31 and 32, as best shown in FIG. 2.

It will be understood that mullions 15 may be provided at intervals along a very long opening covered or protected by such louvers. Due to the rigidity of the mullions in a vertical direction, they provide the necessary

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support for the louvers to hold them against appreciable sagging while, at the same time, enabling them to expand and contract freely. The expansion mullions 15 also enable groups of louvers to be joined together to form the corners of building structures or to form bowed or substantially curved louver sections.

As shown in FIG. 4, a plurality of groups of louvers 40A, 40B, 40C and 40D (similar to the groups 10A and 10B in FIG. 1) are joined by a series of mullions 41A, 41B and 41C, each of which is like the expansion mullion 15 described above. The sliding connection between the flanged plates 42 and 43 of a mullion 41A, B or C and the connecting member 17 allows the flanged plates 42 and 43 to be disposed at a slight angle to each other thereby enabling the groups of louvers 40A, 40B, 40C and 40D also to be arranged at angles to each other and form the outer surface of a polygonal figure or an approximately curved outer surface. Despite the angular relation of the flanged plates 42, 43, the connecting members 17 permit the louvers to expand and contract without binding.

Different effects from the standpoint of ornamentation can be obtained by varying the sizes of the connector plates 17. As shown in FIG. 5, a connecting member 50 may be made of substantially greater width than the width of any of the connecting members 17 described above, so that the mullion can be made relatively wider and thus maintained in proper proportion to louver installations of relatively great length and height. Moreover, such wide connecting strips 50 are useful in connecting louver sections to vertical beams present in a building structure. As shown in FIG. 7, the connecting strip 50 may be screwed or otherwise connected to a vertical structural beam 51 and the slots 52 and 53 positioned to receive the opposed flanges 54 and 55 of the flanged plates 16 and 21, respectively. In this modification, if the beam 51 is of greater thickness than the distance between the flanges of the flanged plates 16 and 21, the connecting flanges corresponding to the flanges 54 and 55 can be omitted from the opposite edges of the flanged plates or sawed therefrom prior to installation of the louvers to avoid interference between the beam and the plates.

Expansion mullions of the type described above may also be used for joining groups of louvers at an angle to form the corners of buildings or corner louver assemblies. As shown in FIG. 6, groups of louvers 60A and 60B are joined to the outer flanged plates 61 and 62 of expansion mullions somewhat similar to the mullions 15 described above. An inner corner mullion member 65 joins connecting members 63 and 64 and it may be secured to a structural element such as a beam 66 extending vertically at the corner of the building structure. An outer corner mullion member 67 joins the outer connecting members 68 and 69 for the full height of the louver. In this way, a continuous sheath may be formed around the outside of the beam 66 thereby forming a continuous metal louver connecting structure which enables expansion and contraction of the louver sections 60A and 60B, without applying the stresses produced by much expansion and contraction to the beam 66.

From the preceding description of typical louver and mullion constructions, it will be apparent that the new expansion mullion may be used in many different locations in the building structure and it enables louvers to be assembled in long, flat units, to form curved walls, corners and reentrant recesses in the sides, roofs or ventilating penthouses of buildings of commercial, industrial and residential types. It will also be apparent that improved and easier erection will be provided by the use of this invention. Successive units will slip together making unnecessary the use of bolted or screwed-on mullion covers.

Inasmuch as the louver and mullion constructions described herein are susceptible to a wide variety of uses

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and have the ability to be assembled in many different relations, the forms of the invention described herein should be considered as illustrative of the invention and not as imposing limitations on the claim.

What is claimed is:

In combination, a pair of vertically-disposed parallel plates of metal, each plate having a first pair of parallel, vertically-disposed, metal end flanges projecting toward the other plate and a second pair of parallel, vertically-disposed, metal end flanges projecting away from the other plate, two sets of metal louvers each of which has a long flat surface slanted downwardly from rear to front and the louvers in each set being fixedly supported in spaced, parallel, relation one above another from the parallel plates in such a way that each plate supports one end of each louver in a set, supporting means for the other end of each louver in each set, each of said louvers being of such length that temperature changes in the surrounding atmosphere make appreciable variations in the distance between the ends thereof, each louver having a front flange projecting downwardly and then inwardly and a rear flange projecting upwardly and then inwardly, the upwardly and downwardly projecting portions of said

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rear and front flanges, respectively, being parallel to and making engagement with the respective ones of said second pair of flanges of the plate from which the louver is supported, and loose coupling means between the flanges of the first pair of one plate and the flanges of the first pair of the other plate for permitting said parallel plates to move toward and away from each other as the louvers expand and contract with temperature changes and thus move the plates to which the louvers are attached, said coupling means comprising a pair of generally H-shaped metallic members each having oppositely facing grooves parallel to, and receiving slidably and making tongue-and-groove contact with, a pair of oppositely positioned flanges, one from each of said plates.

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