This Invention relates to leaded windows, and more particularly to the construction of the joints, that is the inter-sections of the lead came which hold the many small panes that are out of contact with the outer frame of the window sash or muntin.

The object is to provide for a more economical construction with respect to the assembly of the window as a whole, and to provide uniform strength at all joints.—and in particular the invention applies to what is known in the art as diamond pattern leaded glass windows.

In the accompanying drawings a specific embodiment of my invention is shown in a diamond pattern leaded glass window, in which:

Fig. I is an elevation of a complete window frame.

Fig. II is an elevation, on an enlarged scale, of a joint showing the construction at the intersection of two of the same or glass-holding members.

Fig. III is a section on line 3—3 of Fig. II, on an enlarged scale, showing in more detail the internal construction at a typical joint.

Fig. IV is a section, part perspective, of a stay-bar or gusset joint.

In this embodiment the frame or muntin A surrounds the window section which is sub-divided into a large number of diamond shaped panes which may be plain or stained glass in any usual desired character. These glass sections are held by came sections of which B—B—B are each of a length spanning one intersection, that is bordering four of the diamond shaped glass panes. The came sections C—C—C are half or less the length of came members B, and extend from joints at the middle of one of the came members B to the muntin. Thus the entire area of the window section, except around the edge adjacent the muntin, has the individual diamond panes supported by came sections which in every case extend through one of the inter-sections, and therefore form what may be termed a trussed joint.

The came sections used for this construction have the usual reinforcing steel member preferably a strip, steel, iron or other hard metal, embedded in the core or heart of the came, but such reinforcing steel bars, for use in my invention, are slid into a socket into which they fit tightly, which is a preformed pocket or opening in the came heart. This steel or reinforcing bar is preferably of a width exactly equal to the space between the inside surfaces of the leaves of the came, so that at each joint the laterally abutting came section will have its bordering reinforcing bar fit snugly between the leaves of the continuous came member at the intersection or joint, and abut tightly against the sides of the lead of the heart.

Thus in Figs. II and III, bar B is continuous with its reinforced steel insert through the joint, and came B abuts one side, while came C abuts the other side of the joint or intersection, while the glass panes D—D—D fit into the came at the joint corners. Each of the came sections having the reinforcing strip E, it will be seen that came section B has the reinforcing continuous through the joint, and by the arrangement, as described in Fig. I, every joint in the window has one double pane length came continuous through the joint. In addition, it will be noted that at each intersection or joint the continuous double pane length came is in opposite direction. Thus each joint is spanned by a double pane length came, which in turn is supported at its ends at the middle of another similar length of came at its middle where it joins at the intersection abutting the contiguous reinforcing bar in the heart of the other came section.

In this way an entire window is made up of came sections equal to the length of two panes, the lead came with its socket being readily cut to this uniform length, and the reinforcing strips being cut to their uniform exact length,—thus giving only one length of came and one length of reinforcing bar for the purpose of the entire assembly of the pane, except for the few short border sections abutting the muntin or frame of the assembly of the pane. This means that the assembly of such a window is made by the glazier with uniform length came with the lead easily cut to length, and into which the separately cut-to-length flat strips are inserted by the glazier—and with those reinforced came sections the entire window is assembled with the glass panes, with the greatest simplicity and economy. It will be seen, furthermore, that the leaves of the came bordering each pane register so that the glass panes D fit into the corners formed by the intersecting came at the weatherproof joint, and as each came bordering each glass has the reinforcing bar reaching to the junction of the intersection, a rigid came support is assured along all sides of the glass panes, thereby assuring the much desired strength that provides for durability in windows of this type. On account of such combination in the construction, the required strength of the window is attained without the
necessity of outside staybars, or any of the other devices heretofore employed. The Section of joint, Fig. III, shows how the came B has the lead portion cut away near the end with the protruding stiff bar E' closely fitting into, that is between the leaves b—b of the came member B. So soon as assembled with the panes, that is the individual glass sections, or if the leads c—c are soldered as at F, to the edge of the leaves b—b, and likewise the abutting ends of the leaves b' are soldered to the edge of the leaves b—b of the truss length B came forming the lateral supporting member for that joint. This soldering need in no way touch the glass, but immediately creates an integral joint as far as the lead came leaves are concerned, thereby holding each abutting came member with its reinforcing strip in its core permanently into the socket formed by the truss-length came at that joint.

It will be noted that the lead came with its pocket can be cut in uniform lengths with the exact bevel desired for the needs, as required for the particular design of the diamond pattern of the window, and that these need not be rights and lefts, because each lead came section being similar on each side, can be reversed to fit its position in the assembly of the job. Likewise the exact length of the rigid reinforcing strip, such as a steel bar, can be readily provided by cutting them in quantity to the required length and cutting them separate from the lead, and without in any way disturbing the came these reinforcements can be made very economically, and in fact the ends can be finished if desired in order to make the desired accurate fit at the point of their engagement with the side of the lead bar forming the lead came being assembled.

It will also be noted that the advantages incident to this invention, are not dependent upon the exact diamond pattern or its angularity, and that rectangular patterns may be built up with similar advantages in production and strength of the finished window. Should the patterns be oblong, or if in any way the sides of panes are uneven length, though uniform throughout the window, it would only mean two uniform lengths of came sections and reinforcing strip sections, still providing the economy in production and assuring the advantages in form finish and strength of the assembled window.

A modified form of the invention is shown in a part perspective sectional view of a joint, Fig. IV, in which each of the came is of staybar construction. This is illustrated with respect to applicant's invention of a protected staybar set forth in his pending United States application Serial No. 406,546, issued Patent No. 1,858,775. It may be desirable in certain cases to use came sections of applicant's staybar construction form, in which the staybar, instead of a small reinforcing in a came heart, protrudes far above the leaves on one side of the came and as an integral lead casing forming a considerable protrusion on that side of the came. As illustrated in Fig. IV, the intersection when using such encasing came staybar structure, requires modification at the joint. Of the staybar H is cut so that the end of the staybar ends between the leads L and M of the intersecting came member G. As shown, the similar members G' and G2 are joined at the intersection, and the integral casing J on the member G' and G2 are cut away so as to permit the restricted end H' of the staybar H to fit the joint, while the lead portion of G' and G2 are pinched as at K, around the beveled portion h of the staybar H, so as to enclose the staybar and make the seal weatherproof, with the soldering O at the junction between the lateral came with the leads L—L of came G. The staybar H is so cut as to permit its end H' to enter and abut the heart end of the came G, and the lead on its sides may also enter between the leaves, that the pane inserted between the leaves of the intersecting came will be closely enclosed with lead at its corners.

It will thus be seen that should staybar enclosed came be desired for this type of window the intersecting joints may be completely weatherproof, and in the assembly of the window the staybars, such as H—H on the lateral came, abutting the joint, may be cut and fashioned entirely separate from the lead portion of the staybar came. Likewise, the lead portion of the came may be so cut to length as to provide for the insertion of the pre-cut staybar section, so that the assembly will be quick and economical, and still provide for all necessary soldering without the chance of cracking the glass, and with convenience for soldering and manipulating the lead casings during the assembly, without any difficulty.

Various other modifications may be made in the practice of my invention, and it must be noted that among the variations my invention lends itself to form the joints with the lead leaves overlapping so that they provide an appreciable surface contact between them together. Thus if the members C and B', in Fig. II, may have the lead extend the same length as the reinforcing E', and the leaf or leaves b—b, may be easily spread where the lateral came abut, and after spreading them may be bent down to form an appreciable surface contact with the top of the lead leaves of the abutting came ends. The leaves of the lateral came sections may also be slightly beveled in order that the came and its reinforcement shall fit snugly between the leaves of the through came, and still assure the reinforcing end substantially abutting the heart of the through came.

In the case of staybar construction in which one leaf on each side extends from the middle of the staybar pocket casing, a further modification may be made in the use of the reinforcing in the joint so that the laterally abutting reinforced staybar came is let into the through section of came to a sufficient extent for the staybar end of full breadth to abut against the heart of the through member and against the entire casing of that member which surrounds its staybar portion. Such form permits the casings of both through and abutting came sections to be on the same level, and the adjacent ends of the lead leaves may be bent to effect the close union at the joint, and then peened down for a desirable contact for most effective soldering above the came being assembled.

It will be noted that in the modifications described, the overlapping ends of the leaves assure soldering with a minimum chance of the solder reaching the glass, thereby assuring efficiency in the glazing of windows in accordance with my invention. The staybar H is cut so that the encased staybar came is used with its leaf projecting from the side, and not from the top and bottom of the heart. I may, if desired, cut the end of the staybar sections with a notch, instead of beveling them as in Fig. IV, and in so doing I preserve the full width of the lateral came sections to abut the entire casing of the through.
came section, with the lead leaves suitably pried or bent and peened to finish the joint. This is particularly practical in view of my staybar came joints so that the staybar may be inserted after the lead came has been cut to length, so that the machining of the hard metal may be done separately just as conveniently as cutting it to length.

Various other modifications may be made without departing from my invention, but what I claim and desire to secure by Letters Patent is:

1. A structure for leaded glass windows having border members, interior generally diamond pattern leaded glass having sub-divided panes supported by came in which each intersection of came has one continuous came with the lateral came abutting substantially at its middle, and having for the continuous came section a continuous reinforcement within the leaded came through one joint and having the end of the reinforcement abutting and held by engagement between the leaves of the abutting came at the proximate joints.

2. A leaded window having generally regular diamond or like shaped panes, came supporting said panes having substantially throughout the window uniform sections of came each spanning one intersection and abutting an adjacent intersection or joint, and having a stiff reinforcing core in said came lengths projecting beyond the lead casing of the came and between the leaves of the adjacent came casing with which it abuts.

3. A came structure for leaded glass windows comprising a came-intersecting or joint structure in which a leaded came with heart and leaves incorporating a rigid reinforcing bar extends through each joint and abuts the proximate joints, and has at the intersect-an abutment of lateral reinforced came, the abutting reinforced came having their reinforcements protruding into the leaves of the through came and having their leaves soldered to the leaves of the through came.

4. A leaded glass window having a quadrilateral pattern series of glass panes, the entire field of which except the border comprises uniform length came sections with reinforced hearts, and having at each intersection one continuous heart reinforcement and laterally abutting came reinforcement ends engaging the leaves of the through came and held rigidly therein by soldering the came casing junctions.

5. In a leaded glass window a came joint or intersection comprising a came with a heart reinforcement extending continuously through the joint, and lateral heart reinforcing members abutting the through came member, the terminal of the lateral came reinforcements forming a close union with the interior of the leaves and the side of the heart of the通过 came section, and soldered joints uniting the through came leaves and the lateral came lead casing.

6. In a leaded glass window, a came intersection or joint comprising a junction of encased came staybar structure having a continuous encased staybar came extending through the joint, lateral staybar member structures abutting the through staybar member and having their staybar member restricted at the joint, whereby the lateral encased staybar came have their staybars fit between the leaves of the through staybar section, and having their constricted and soldered to the edge of the through staybar leaves forming a weatherproof joint.

7. A leaded glass window having an exterior frame with channels facing the field of the window, a sub-divided field having a series of parallel came to support the individual panes, came sections having sockets adapted to receive reinforcing bars, the lead portion of said came being cut to uniform determined lengths to substantially provide for the entire window field structure, reinforcing bars for said came precut as to substantially uniform length to fit the sockets in the lead came, and assembled whereby uniform reinforcing strip lengths serve substantially to provide the reinforcement for came throughout the field of the window, including intersections whereby the end of reinforcing bar abuts the middle of a came having a continuous reinforcing bar throughout the joint, as and for the purpose described.

8. In a leaded glass window, a came intersection or joint comprising a came section passing through the joint having a lead casing and a rigid reinforcement enclosed therein, an abutting came section terminating at the joint comprising a lead casing and a rigid reinforcement in the heart thereof terminating between the leaves and adjacent the heart of the through came section, the lead casings of both of said came sections being formed to abut and be soldered forming a weatherproof flush joint at the intersection.

9. In a leaded glass window, a came joint formed with two came sections one having its lead casing and rigid reinforcement through the heart extending through the joint, the other came section having a rigid reinforcement through the heart terminating in engagement between the leaves of the other section and having its lead casing abutting the members of the lead casing of the through section, whereby a weatherproof joint is formed at the intersection completely encasing the reinforcements in both sections of came forming the joint.

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