

PATENT SPECIFICATION

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(54) SEALING APPARATUS FOR WINDOWS

(71) We, YOSHIDA KOGYO K. K., a Japanese body corporate, of No. 1 Kanda Izumi-cho, Chiyoda-Ku, Tokyo, Japan, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a window comprising a window frame, a window sash disposed pivotably in said window frame, and a sealing apparatus comprising a sealing member disposed around the edge or periphery of said window sash.

For a conventional sealing apparatus for a pivoted window or the like, there has heretofore been used a sealing member composed of a flexible and elastic material such as a rubber, and a synthetic resin or the like, which is fitted and fixed to an undercut groove formed on a frame of a window sash. This sealing member comprises a thin blade portion projecting from a base portion fitted and fixed to said undercut groove, and this projecting thin blade portion is brought into contact with the inner face of the window frame. Since the sealing member having the above structure is formed to have a certain width, if this sealing member is fitted and fixed to the undercut groove of the frame of the window sash, the above-mentioned blade portion of the sealing member projects from the base portion in parallel to the frame in the area where the frame is linear. This sealing member is continuously disposed also on a right-angle corner portion of the window sash. At this right-angle corner portion, the sealing member is attached along the right-angle corner portion of the window sash. Accordingly, the width of the sealing member at this corner portion is inevitably larger than in other portions, and the sealing member becomes more flexible at this corner portion than in other portions and the stiffness is

reduced on the other hand. Therefore, deformation of the sealing member at the corner portion is readily caused in a short time and close contact cannot be maintained between the sealing member and the window frame in this corner portion. Further, when the window is closed, the angular corner portion of the sealing member undergoes influences of flexion of vertical and lateral portions of the sealing member and is readily caused to yield significantly. Accordingly, even if the angular corner portion of the sealing member is not yet deformed by the use, the angular corner portion of the sealing member becomes unmatched with the shape of the angular corner portion of window frame.

For the reasons set forth above, in the conventional sealing apparatus for pivoted windows, an angular corner portion of a sealing member disposed around a window sash cannot be tightly and closely contacted with an angular corner portion of a window frame, and this insufficient contact state is worsened as the sealing apparatus is actually used. As a result, it becomes impossible to maintain good air tightness.

According to the present invention, there is provided a window comprising a main frame of which the corner is angular, a wing frame disposed pivotably in said main frame and being angular at the corner, and a flexible sealing member disposed around the outer periphery of said wing frame, wherein an angular corner portion of said flexible sealing member is rounded in an arcuate shape and has the same width as that of a linear portion of the sealing member and further wherein the inner face of an angular corner portion of said main frame with which the arcuately rounded corner portion of the sealing member is brought into contact is made up of a corner member formed independently from the main frame.

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The invention will be described by way of example with reference to the accompanying drawings, wherein:—

Fig. 1 is a front view showing a pivoted window to which the present invention is applied;

Fig. 2 is a view illustrating the section taken along the line A-A in Fig. 1;

Fig. 3 is an enlarged view, showing an angular corner portion of the pivoted window shown in Fig. 1;

Fig. 4 is a perspective view, illustrating an angular corner portion of a window frame to which a corner member is attached;

Fig. 5 is a perspective view, showing a preferred example of the corner member.

Referring to Fig. 1, therein the reference numeral 1 represents a pivoted window of the centrally pivoted type, and a respective elastic and flexible sealing member 2 is disposed around the edge or outer periphery of the window sash 1 of the pivoted window parallel to the end face portion thereof on each of the inside and the outside of the window so that the sealing member 2 has slidable contact with the inner peripheral surface of a window frame 3. This sealing member is formed of rubber or a flexible synthetic resin.

As shown in Figs. 2 and 3, the sealing member 2 comprises a base portion 2a and a blade-like portion 2b projected therefrom, and the base portion 2a is fitted in and fixed to a grooved portion 5 formed on the outer periphery of a window sash frame 4.

An angular corner portion 6 of the blade-like portion 2b of the sealing member 2 has, preformed thereon, an arcuate part 7 having the point P as the center and a curvature radius corresponding to the width W of the blade-like portion 2b. In short, the arcuate part 7 is formed to have the same width as that of the linear part.

When this sealing member 2 is attached, the base portion 2a of the sealing member 2 which has a length equal to or slightly longer than the length of each rail or stile constituting the window sash frame 4 is fitted in the grooved portion 5 formed on the rail or stile of the frame 4. In the angular corner portion, longitudinal and lateral sealing members are fusion-bonded together in such a manner that the blade-like portions of both the sealing members are butted to each other. In this case, the end faces of the blade-like portions to be butted to each other are preformed at 45° or an angle close to 45° so that they can be precisely butted to each other.

After the ends of the sealing members are fusion bonded together in the above-mentioned manner, an arcuate part 7 having a curvature radius corresponding to the width W of the blade-like portion 2b is

formed.

As shown in Fig. 3, an arcuate curved face 8 having the same curvature as that of the arcuate part 7 of the blade-like portion 2b of the sealing member 2 is formed on the inner face of the angular corner portion of the window frame 3.

Fig. 4 illustrates means for forming such arcuate curved face 8. The end portion of a lip 10 of a stile 9 constituting the window frame 3 is cut off to form a notch 11. A notch 14 continuous to this notch 11 is formed on the end portion of a lip 13 of a rail 12 of the window frame 3. In this state, the lips 10 and 13 of the stile 9 and rail 12 constituting the window frame 3 are cut off in the angular corner portion where both the stile 9 and rail 12 are combined together.

A corner member 15 is inserted into the so formed notches 11 and 14. This corner member 15 has a shape as shown in Fig. 5 and a concave section including arcuate curved faces 8. Steps 16 are formed on both the sides of each arcuate curved face 8 and several screw holes 17 are formed. The steps 16 are portions to be caused to bear against the lips 10 and 13 so that the contact face of the step 18 is located on the back face of the lip and the front face 19 of the step is in contact with a web 20 of the stile 9 or rail 12.

Attachment of the corner member 15 is accomplished, as shown in Fig. 4, by fitting both the ends of the corner member 15 between the webs 20 and lips 10 and 13 of the stile 9 and rail 12, inserting screws 21 into the holes 17 formed on the corner member 15 and screwing the screws 21 into holes of the webs or clamping the screws 21 by means of nuts.

When in the state shown in Fig. 4 the ends of the stile 9 and rail 12 are butted to each other and the corner member 15 is fitted in the angular corner portion formed by the butted ends of these stile 9 and rail 12, the arcuate curved face 8 is formed continuously between the lips 10 and 13. The corner member 15 is ordinarily composed of a synthetic resin molded article. According to need, the corner member 15 may be formed from a metallic material such as aluminium or a wooden material.

In forming the arcuate portion 8, it is possible to use a corner member having the same curvature as that of the arcuate portion 6 of the sealing member 2 disposed on the outer periphery of the window sash frame 4 and acting also as a member bonding the stile and rail.

The sealing member 2 attached to the frame 4 of the window sash 1 is rounded in the angular corner portion 6 so that an arcuate portion 7 as shown in Fig. 3 is formed. The arcuate

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portion 7 is arranged so that the curvature radius of the arcuate portion 7 is substantially equal to the width W of the linear portion of the sealing member 2. Further, an arcuate portion 8 having a curvature corresponding to that of the arcuate portion 7 is also formed in the angular corner portion of the window frame 3.

Accordingly, when the window sash 1 is opened and closed, the flexure of the top end of the blade-like portion 2b of the sealing member 2 on contact with the linear parts of the lips 10 and 13 of the window frame 3 is equal to or substantially equal to the flexure of the top end of the blade-like portion on contact with the arcuate portion 8 of the corner member 15. As a result, occurrence of an undesirable phenomenon observed in the conventional sealing apparatus for windows, namely the phenomenon that the sealing member is locally bent excessively in the angular corner portion, can be effectively prevented. Further, since the width of the corner portion is substantially the same as the width of the linear portion in the sealing member of the present invention, the corner portion can retain appropriate elasticity and flexibility as well as the other portions. Therefore, permanent deformation of the angular corner portion of the sealing member can be prevented and the sealing member is uniformly pressed to and contacted with the window frame. As a result, very good air tightness can be attained.

Further, in the case where the sealing member comprises a plurality of blade-like portions as shown in Fig. 2, or in the case

where a plurality of sealing members are disposed parallel to the window sash frame, an arcuate portion of the sealing member may be formed only in the angular corner portion on the open side or outside of the window sash. Further, when the window is opened and closed by rotating it in one direction, lips differing in the height may be formed on the window frame and arcuate portions may be formed in various angular corner portions differing in height.

WHAT WE CLAIM IS:—

1. A sealing apparatus for windows comprising a main frame of which the corner is angular, a wing frame disposed pivotably in said main frame and being angular at the corner, and a flexible sealing member disposed around the outer periphery of said wing frame, wherein an angular corner portion of said flexible sealing member is rounded in an arcuate shape and has the same width as that of a linear portion of the sealing member and further wherein the inner face of an angular corner portion of said main frame with which the arcuately rounded corner portion of the sealing member is brought into contact is made up of a corner member formed independently from the main frame.

2. A window as claimed in claim 1 wherein the arcuate portion of the sealing member is formed in the angular corner portion on the open side or outside of the window sash.

3. A window as claimed in claim 1 or 2 wherein said corner member is a molded article of a synthetic resin.

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WHAT WE CLAIM IS:—

1. A sealing apparatus for windows comprising a main frame of which the corner is angular, a wing frame disposed pivotably in said main frame and being angular at the corner, and a flexible sealing member disposed around the outer periphery of said wing frame, wherein an angular corner portion of said flexible sealing member is rounded in an arcuate shape and has the same width as that of a linear portion of the sealing member and further wherein the inner face of an angular corner portion of said main frame with which the arcuately rounded corner portion of the sealing member is brought into contact is made up of a corner member formed independently from the main frame.

2. A window as claimed in claim 1 wherein the arcuate portion of the sealing member is formed in the angular corner portion on the open side or outside of the window sash.

3. A window as claimed in claim 1 or 2 wherein said corner member is a molded article of a synthetic resin.

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