

# PATENT SPECIFICATION

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## (54) DUAL SASH WINDOW ASSEMBLY WITH WEATHERTIGHT SEALING MEANS

- (71) We, YOSHIDA KOGYO K. K., a corporation duly organized under the laws of Japan and existing at 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:—
- 10 This invention relates to a dual sash window assembly or to a window assembly in which a pair of sashes are mounted in parallel, closely spaced planes within a supporting frame for relative horizontal sliding movement. The invention has particular reference to weathertight sealing means in the dual sash window assembly of the type defined.
- 15 The weathertight sealing of window assemblies has been proposed in various forms. However, while windows having only one movable sash can admittedly be sealed relatively easily, it has been considered difficult to seal, in a truly simple and inexpensive manner, windows in which a pair of sashes are both movable relative to each other and to the supporting frame.
- 20 According to one aspect of the invention there is provided a dual sash window assembly comprising a supporting frame adapted to be fixed to a wall and including a header, a sill and jambs, and two horizontally movable sashes mounted within said supporting frame in parallel spaced planes, each of said sashes including a sash frame formed by top and bottom horizontal members and side vertical members, outwardly open channels extending along said top and bottom horizontal members of each sash frame and along that one of said side vertical members of each sash frame which is to be held against one of said jambs of said supporting frame when the sash is in a closed position; a plurality of rollers
- rotatably supported by the sash frame with their axes vertical internally of said channels; a plurality of flanges of the supporting frame protruding into said channels, respectively, when said sashes are in their closed positions; a plurality of raised roller-engaging surfaces formed on said flanges in such positions that said rollers ride on said roller-engaging surfaces when said sashes are moved to their closed positions, whereby said sashes undergo lateral displacement relative to said supporting frame; and a plurality of sealing strips which are fixed to the supporting frame in such a manner as to be pressed into substantially sealing engagement with the sash frame by said lateral displacement and/or which are fixed to the sash frame in such a manner as to be pressed into substantially sealing engagement with the supporting frame by said lateral displacement.
- 25 According to another aspect of the invention there is provided a dual sash window assembly comprising a supporting frame adapted to be fixed to a wall and including a header, a sill and jambs, and two horizontally movable sashes mounted within said supporting frame in parallel spaced planes, each of said sashes including a sash frame formed by top and bottom horizontal members and side vertical members, said side vertical members consisting of a first side vertical member to be held against one of said jambs of said supporting frame when the sash is in a closed position and a second side vertical member to meet the corresponding side vertical member of the other sash when the two sashes are in their closed position, outwardly open channels extending along said top and bottom horizontal members and said first side vertical member of each sash frame; a plurality of rollers rotatably supported by the sash frame with their axes vertical internally of said channels; a

(11) plurality of flanges of the supporting frame protruding into said channels, respectively, when said sashes are in their closed positions; a plurality of raised roller-engaging surfaces formed on said flanges in such positions that said rollers ride on said roller-engaging surfaces when said sashes are moved to their closed positions; said rollers and said roller-engaging surfaces being so arranged that each sash undergoes lateral displacement towards the other sash relative to said supporting frame when said sashes are moved to their closed positions; first sealing strips arranged along said header and sill of said supporting frame in the middle of the transverse dimension thereof whereby said top and bottom horizontal members of said sashes become pressed against said first sealing strips, respectively, upon the lateral displacement of said sashes when moved to their closed positions; a second sealing strip arranged along said second side vertical member of one of said sashes whereby said second side vertical member of the other sash becomes pressed against said second sealing strip upon the lateral displacement of said sashes when moved to their closed positions; and third sealing strips arranged internally of said channels along said first side vertical members of said sashes whereby said third sealing strips become pressed against the respective flanges protruding into the respective channels along said first side vertical members upon the lateral displacement of said sashes when moved to their closed positions.

The invention will be described by way of examples with reference to the accompanying drawings which illustrate, by way of example only, some preferred embodiments of the invention and in which like reference characters denote the corresponding parts of the several views, and wherein:

Figure 1 is a vertical sectional view of a dual sash window assembly constructed in accordance with this invention;

Figure 2 is a horizontal sectional view of the window assembly shown in Figure 1;

Figures 3 to 5 inclusive illustrate the details of raised roller-engaging surfaces used in the window assembly shown in Figures 1 and 2;

Figure 6 is a partial vertical sectional view of a dual sash window assembly forming another preferred embodiment of the invention; and

Figure 7 is a partial horizontal sectional view of the window assembly shown in Figure 6.

With particular reference to Figures 1 and 2, the dual sash window assembly illustrated therein by way of a preferred

embodiment of this invention broadly comprises a generally rectangular supporting frame 10 and a pair of sashes 11 of sliding or rolling type mounted within the supporting frame in parallel, closely spaced planes for relative horizontal movement. The supporting frame 10, which is intended to be rigidly set in the usual window-receiving opening of a building, consists essentially of a header 12, a sill 13, and jambs 14.

Each sash 11 comprises a sash frame formed by a top horizontal member 15, a bottom horizontal member 16, and side vertical members 17, those of the side vertical members lying along the lapping or meeting portions of the two sashes being not shown in Figure 2. Although also unshown in Figures 1 and 2, it is understood that each sash 11 has set within its constituent members 15, 16 and 17 a pane or panel of glass or other suitable material. The top and bottom horizontal members 15 and 16 of each sash 11, and one of its side vertical members 17 to be held against one of the jambs 14 when the sash is closed, are each integrally provided with a pair of opposed rims 18 adapted to define an outwardly opening channel which extends throughout the complete length of each sash member 15, 16 and 17.

Supported on the inside surface of one of the opposed rims 18 of each sash member 15, 16 and 17 is a sealing strip 19 of suitable nonmetallic material which extends throughout the complete length of the rim 18 and which includes one or more, two in the illustrated embodiment, tongues projecting laterally therefrom. At least one, preferably two or three, spaced-apart brackets 20 are supported on the inside surface of the other rim 18 of each sash member. These brackets 20 fixedly carry vertical shafts 21 adapted to rotatably support rollers 22, respectively.

Flanges 23 of the supporting frame 10 are disposed in the same planes as the sashes 11 and protrude into the respective channels between the opposed rims 18 of each sash member 15, 16 and 17. Raised roller-engaging surfaces 24, 24a and 24b, equal in number to the rollers 22, are formed on the flanges 23 in confronting relationship to the respective rollers. The relative positions of the rollers 22 and the raised roller-engaging surfaces 24, 24a and 24b are such that the former will ride on the latter when the sashes are moved to their closed positions within the supporting frame 10; all these roller-engaging surfaces can be conveniently formed by parts molded of plastics material.

Each of the molded plastics parts having the roller-engaging surfaces 24 on the flanges 23 projecting from the respective jambs 14 of the supporting frame 10 is of

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L-shaped cross section, with one of its limbs tapered toward the opposed side vertical member 17 of each sash 11, and is affixed to the supporting frame as by means of slotted-headed screws 25 as shown in Figure 3. Each of the moulded plastics parts having the roller-engaging surfaces 24a on the flanges 23 projecting from the header 12 of the supporting frame is also of L-shaped cross section, with both lateral edges of one of its limbs beveled as shown in Figure 4, and is likewise affixed to the supporting frame as by means of slotted-headed screws 25a. Each of the molded plastics parts having the roller-engaging surfaces 24b on the flanges 23 projecting from the sill 13 of the supporting frame is of flat shape, with both lateral edges thereof beveled as shown in Figure 5, and is similarly affixed to each flange.

In the dual sash window assembly constructed as hereinbefore described with reference to Figures 1 to 5, it will be seen that upon movement of the sashes 11 away from each other to their closed positions, the rollers 22 ride on the respective surfaces 24, 24a and 24b. Thereupon the sashes 11 undergo lateral displacement relative to the outer supporting frame 10, toward the right as viewed in Figure 1 and downwardly as viewed in Figure 2, so that the sealing strips 19 of each sash become pressed against the respective flanges 23 thereby weathertightly sealing the gaps between the supporting frame and the sashes. Although the sashes 11 are displaced in the same lateral direction in this particular embodiment of the invention, it will be apparent that the weathertight sealing of the window can likewise be accomplished (with re-positioning of the sealing strips) if the sashes are laterally displaced in opposite directions, as will more clearly appear hereinbelow.

Figures 6 and 7 illustrate another preferred embodiment of the invention which is well calculated to ensure weathertight sealing of the lapping portions of the sashes in a dual sash window assembly which is substantially identical in construction with that shown in Figures 1 and 2. This second embodiment of the invention, therefore, will be shown and described only in regard to its features distinguishable from the preceding embodiment, the other features being substantially common to both.

As seen in Figure 6, at least one raised roller-engaging surface 24b is affixed to the inside surface of each of the flanges 23 projecting inwardly from the sill 13 of the supporting frame 10, the raised roller-engaging surface 24b being positioned at or adjacent the lapping portions of the sashes 11. Correspondingly, the rollers 22 are

rotatably supported on the inside surfaces of the inwardly positioned rims 18 extending downwardly from the bottom horizontal members 16 of the respective sashes 11, in confronting relationship to the respective raised surfaces 24b. As in the preceding embodiment, these rollers 22 are so positioned on the rims 18 that they will ride on the respective raised surfaces 24b when the sashes are moved to their closed positions.

As shown, two sealing strips 26 that are identical with the sealing strips 19 of the preceding embodiment are fixedly supported on the sill 13 along the middle of its transverse dimension. The sealing strips 26 are arranged opposite to the respective rims 18 supporting the rolls 22 and extend horizontally throughout the complete lengths of the bottom horizontal members 16 of the sashes 11, respectively.

With reference to Figure 7, a pair of interlockingly engageable L-shaped flanges 27 are formed on the respective opposed surfaces of the side vertical members 17a of the sashes 11 lying along their lapping portions. One of these side vertical members 17a, moreover, carries a sealing strip 28, also identical with the sealing strips 19 of the preceding embodiment, which extends vertically throughout the substantially complete length of the side vertical member. This sealing strip 28 is to be pressed against the flange 27 of the other side vertical member 17a upon closure of the window, as later described in more detail.

It is understood that the header 12 of the supporting frame 10 and the top horizontal members 15 of the sashes 11 are provided with substantially the same weathertight sealing means as shown in Figure 6. The jambs 14 of the supporting frame 10 and the opposed side vertical members 17 of the sashes 11 are also understood to be provided with substantially the same weathertight sealing means as shown in Figure 2 except for the fact that both side vertical members 17 are caused to move laterally inwardly of the frame 10 in the closed positions of the sashes.

The second preferred embodiment of the invention being constructed as above set forth in connection with Figures 6 and 7 in particular, the rollers 22 ride on the respective raised surfaces 24b at or adjacent the lapping portions of the sashes 11 upon movement of the sashes to their closed positions. The rollers 22 mounted on the side vertical members 17 of the sashes also ride on the respective raised surfaces 24 on the jambs 14 of the supporting frame 10. As a consequence, each of the sashes 11 becomes laterally displaced towards the other sash relative to the frame 10, so that the sealing strips 26 become pressed

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against the respective opposed rims 18 along the top and bottom horizontal members 15 and 16 of the sashes. The sealing strip 28 extending along the side vertical member 17a of one of the sashes also becomes pressed against the L-shaped flange 27 on the side vertical member 17a of the other sash to seal the lapping portions of the two sashes. Since the sealing strips arranged along the side vertical members 17 of the sashes become simultaneously pressed against the respective flanges projecting inwardly from the jambs 14 of the supporting frame 10, the weather-tight sealing of the complete window assembly can be realized.

#### WHAT WE CLAIM IS:—

1. A dual sash window assembly comprising a supporting frame adapted to be fixed to a wall and including a header, a sill and jambs, and two horizontally movable sashes mounted within said supporting frame in parallel spaced planes, each of said sashes including a sash frame formed by top and bottom horizontal members and side vertical members, outwardly open channels extending along said top and bottom horizontal members of each sash frame and along that one of said side vertical members of each sash frame which is to be held against one of said jambs of said supporting frame when the sash is in a closed position; a plurality of rollers rotatably supported by the sash frame with their axes vertical internally of said channels; a plurality of flanges of the supporting frame protruding into said channels, respectively, when said sashes are in their closed positions; a plurality of raised roller-engaging surfaces formed on said flanges in such positions that said rollers ride in side roller-engaging surfaces when said sashes are moved to their closed positions, whereby said sashes undergo lateral displacement relative to said supporting frame; and a plurality of sealing strips which are fixed to the supporting frame in such a manner as to be pressed into substantially sealing engagement with the sash frame by said lateral displacement and/or which are fixed to the sash frame in such a manner as to be pressed into substantially sealing engagement with the supporting frame by said lateral displacement.

2. A sash window assembly as claimed in claim 1, wherein at least one of said rollers is positioned in each of said channels of each sash.

3. A sash window assembly as claimed in claim 1 or 2, wherein both of said sashes undergo displacement in the same lateral direction as each other with respect to said supporting frame when moved to their closed positions.

4. A dual sash window assembly comprising a supporting frame adapted to be fixed to a wall and including a header, a sill and jambs, and two horizontally movable sashes mounted within said supporting frame in parallel spaced planes, each of said sashes including a sash frame formed by top and bottom horizontal members and side vertical members, said side vertical members consisting of a first side vertical member to be held against one of said jambs of said supporting frame when the sash is in a closed position and a second side vertical member to meet the corresponding side vertical member of the other sash when the two sashes are in their closed positions, outwardly open channels extending along said top and bottom horizontal members and said first side vertical member of each sash frame; a plurality of rollers rotatably supported by the sash frame with their axes vertical internally of said channels; a plurality of flanges of the supporting frame protruding into said channels, respectively, when said sashes are in their closed positions; a plurality of raised roller-engaging surfaces formed on said flanges in such positions that said rollers ride on said roller-engaging surfaces when said sashes are moved to their closed positions; said rollers and said roller-engaging surfaces being so arranged that each sash undergoes lateral displacement towards the other sash relative to said supporting frame when said sashes are moved to their closed positions; first sealing strips arranged along said header and sill of said supporting frame in the middle of the transverse dimension thereof whereby said top and bottom horizontal members of said sashes become pressed against said first sealing strips, respectively, upon the lateral displacement of said sashes when moved to their closed positions; a second sealing strip arranged along said second side vertical member of one of said sashes whereby said second side vertical member of the other sash becomes pressed against said second sealing strip upon the lateral displacement of said sashes when moved to their closed positions; and third sealing strips arranged internally of said channels along said first side vertical members of said sashes whereby said third sealing strips become pressed against the respective flanges protruding into the respective channels along said first side vertical members upon the lateral displacement of said sashes when moved to their closed positions.

5. A sash window assembly as claimed in claim 4, wherein at least one of said rollers is positioned in each of said channels of each sash, and wherein those of said rollers positioned in the channels

against the respective opposed rims 18 along the top and bottom horizontal members 15 and 16 of the sashes. The sealing strip 28 extending along the side vertical member 17a of one of the sashes also becomes pressed against the L-shaped flange 27 on the side vertical member 17a of the other sash to seal the lapping portions of the two sashes. Since the sealing strips arranged along the side vertical members 17 of the sashes become simultaneously pressed against the respective flanges projecting inwardly from the jambs 14 of the supporting frame 10, the weather-tight sealing of the complete window assembly can be realized.

#### WHAT WE CLAIM IS:—

1. A dual sash window assembly comprising a supporting frame adapted to be fixed to a wall and including a header, a sill and jambs, and two horizontally movable sashes mounted within said supporting frame in parallel spaced planes, each of said sashes including a sash frame formed by top and bottom horizontal members and side vertical members, outwardly open channels extending along said top and bottom horizontal members of each sash frame and along that one of said side vertical members of each sash frame which is to be held against one of said jambs of said supporting frame when the sash is in a closed position; a plurality of rollers rotatably supported by the sash frame with their axes vertical internally of said channels; a plurality of flanges of the supporting frame protruding into said channels, respectively, when said sashes are in their closed positions; a plurality of raised roller-engaging surfaces formed on said flanges in such positions that said rollers ride in side roller-engaging surfaces when said sashes are moved to their closed positions, whereby said sashes undergo lateral displacement relative to said supporting frame; and a plurality of sealing strips which are fixed to the supporting frame in such a manner as to be pressed into substantially sealing engagement with the sash frame by said lateral displacement and/or which are fixed to the sash frame in such a manner as to be pressed into substantially sealing engagement with the supporting frame by said lateral displacement.

2. A sash window assembly as claimed in claim 1, wherein at least one of said rollers is positioned in each of said channels of each sash.

3. A sash window assembly as claimed in claim 1 or 2, wherein both of said sashes undergo displacement in the same lateral direction as each other with respect to said supporting frame when moved to their closed positions.

4. A dual sash window assembly comprising a supporting frame adapted to be fixed to a wall and including a header, a sill and jambs, and two horizontally movable sashes mounted within said supporting frame in parallel spaced planes, each of said sashes including a sash frame formed by top and bottom horizontal members and side vertical members, said side vertical members consisting of a first side vertical member to be held against one of said jambs of said supporting frame when the sash is in a closed position and a second side vertical member to meet the corresponding side vertical member of the other sash when the two sashes are in their closed positions, outwardly open channels extending along said top and bottom horizontal members and said first side vertical member of each sash frame; a plurality of rollers rotatably supported by the sash frame with their axes vertical internally of said channels; a plurality of flanges of the supporting frame protruding into said channels, respectively, when said sashes are in their closed positions; a plurality of raised roller-engaging surfaces formed on said flanges in such positions that said rollers ride on said roller-engaging surfaces when said sashes are moved to their closed positions; said rollers and said roller-engaging surfaces being so arranged that each sash undergoes lateral displacement towards the other sash relative to said supporting frame when said sashes are moved to their closed positions; first sealing strips arranged along said header and sill of said supporting frame in the middle of the transverse dimension thereof whereby said top and bottom horizontal members of said sashes become pressed against said first sealing strips, respectively, upon the lateral displacement of said sashes when moved to their closed positions; a second sealing strip arranged along said second side vertical member of one of said sashes whereby said second side vertical member of the other sash becomes pressed against said second sealing strip upon the lateral displacement of said sashes when moved to their closed positions; and third sealing strips arranged internally of said channels along said first side vertical members of said sashes whereby said third sealing strips become pressed against the respective flanges protruding into the respective channels along said first side vertical members upon the lateral displacement of said sashes when moved to their closed positions.

5. A sash window assembly as claimed in claim 4, wherein at least one of said rollers is positioned in each of said channels of each sash, and wherein those of said rollers positioned in the channels



along said top and bottom horizontal members of each sash are adjacent the lapping portions of said sashes.

6. A sash window assembly as claimed 5 in claim 4 or 5 and further including a pair of interlockingly engageable flanges arranged along said second side vertical members of said sashes, respectively, said second sealing strip being arranged to be 10 pressed against one of said flanges upon the lateral displacement of said sashes when moved to their closed positions.

7. A dual sash window assembly substantially as herein described with reference to and as illustrated in Figures 1 to 5 of 15 the accompanying drawings.

8. A dual sash window assembly substantially as herein described with reference to and as illustrated in Figures 6 and 7 of 25 the accompanying drawings.

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