

PATENT SPECIFICATION (11) 1 567 709

(21) Application No. 51545/77 (22) Filed 12 Dec. 1977 (19)
 (31) Convention Application No. 51/166 113U
 (32) Filed 10 Dec. 1976 in
 (33) Japan (JP)
 (44) Complete Specification published 21 May 1980
 (51) INT. CL.⁸ E05F 5/00
 (52) Index at acceptance
 E1J FJ



(54) WINDOW STRUCTURE

(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 structure of a type comprising a window frame and a sash pivotally mounted in the frame on a horizontal axis which is below the level of the centre of gravity of the sash, so that the tendency of the sash is to pivot from a closed position to an open position defined by stopping means. Such a window structure is referred to hereinafter as a window structure of the type herein defined.

According to the invention there is provided a window structure of the type herein defined, wherein the stopping means comprises a bracket fixed to one side of the frame and a stopper member fixed to the bracket in a selected one of a plurality of alternative operative positions relative to the frame so that the position of the stopper member relative to the frame can be changed, the stopper member being formed so as to define a plurality of different "open" positions of the sash, each said open position corresponding to a respective one of the alternative positions in which the stopper member can be fixed relative to the frame, at least one portion of the bracket being adapted to define yet a further open position of the sash in the event of the stopper member not being in one of its operative positions.

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

Fig. 1 is a perspective view, illustrating the whole structure, partly broken away, of a window structure embodying the present invention,

Fig. 2 is a longitudinal sectional view of the window structure of Fig. 1, showing the main parts of the window structure, including the stopping means;

Fig. 3 is a view showing a lateral section of the parts shown in Fig. 2;

Fig. 4 is a perspective view, illustrating the shapes and mutual relations of the bracket, stopper member and screws constituting the stopping means of the window structure of Figs. 1 to 3; and

Figs. 5 to 7 are views showing the states where the window sash is open at different angles according to the position of the stopping means.

Referring now to the accompanying drawings, Figs. 1 and 2 illustrate a fixed lower window frame member 1, a window sash 2, a glass sheet 3 forming part of the window sash 2 and a lower frame member or lower rail 4 of the sash 2. A hinge 5 is mounted on the lower frame member 4 of the window sash 2 and is fixed to the window frame member 1 so that the window sash 2 can be rotated about a rotation shaft 6 of the hinge 5. A known latch (not shown) is attached to an upper frame member or upper rail of the window sash 2 for latching the window sash closed.

Two brackets 7 are attached one to each of left and right stiles 8, and a respective stopper member 9 is fixed to each bracket 7 through screws 10.

Each bracket 7 and stopper member 9 are shaped as shown in Fig. 4. The bracket 7 comprises a fixing portion 12a fixed through screws 11 to a lower end portion of the window stile 8, a fitting portion 12 bent in an L-shape from an end of the fixing portion 12a, parallel to the inner face of the window frame member 1, and a tongue piece 13 further bent in an L-shape.

Both the upper and the lower ends of the tongue piece 13 are bent at a prescribed angle, for example 45° inwardly, namely toward the rotation direction of the window sash 2, whereby stopper portions 14 for engaging the window sash 2 are formed.

As shown in for example Fig. 4, the stopper member 9 comprises a block, on one surface of which an inclined portion 15 of a large inclination angle and another inclined portion 16 of a small inclination angle are formed. This stopper member 9 is molded from aluminum or a synthetic resin, or is composed of wood, hard rubber or the like.

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The inclined portion 15 is formed to have, for example, an inclination angle of 30° to the vertical plane, and the inclined portion 16 is formed to have, for example, an inclination angle of 15° to the vertical plane. The stopper portions 14 formed on both ends of the tongue piece 13 are inclined at an angle of 45°.

When the stopping means is assembled, the screws 10 are first inserted in holes 17 of the stopper member 9 and the leading ends of the screws 10 are screwed into screw holes 18 formed in the fitting portion 12 of the bracket 7. Accordingly, the stopper member 9 is dismountably attached to the bracket 7 and the state of attachment of the stopper member 9 can be changed so that the inclined portion 15 is located on the upper side or the inclined portion 16 is located on the upper side.

The function of the illustrated stopping means will now be described with reference to Figs. 5 to 7.

When it is intended to open the window sash 2 to an angle of 45°, the stopper member 9 is dismounted and the window sash 2 can be fixed in the state opened at an angle of 45° by utilizing the stopper portions 14 of the bracket 7 (Fig. 5).

When it is intended to open the window sash 2 to an angle of 30°, the stopper member 9 is attached to the fitting portion 12 so that the inclined portion 15 is located on the upper side, and if the window sash 2 is opened inwardly in this state, it can be held in the open position at an angle of 30° (Fig. 6.)

Further, when it is intended to open the window sash 2 at an angle of 15°, the stopper member 9 is attached to the fitting portion 12 so that the inclined portion 16 is located on the upper side, and the window sash 2 is held in the open position at an angle of 15° (Fig. 7).

The foregoing embodiment has been illustrated only by reference to the bracket 7 fitted to the right window stile 8. However, the stopper portions 14 are formed one on each of the upper and the lower ends of the tongue piece 13 of the bracket 7, so that the bracket 7 can similarly be attached to the left window stile 8 and the same effects as mentioned above can similarly be attained.

In the foregoing embodiment, the stopping means is applied to a window structure of the type herein defined in which the rotation shaft 6 of the hinge 5 is located in the vicinity of the lower window frame member 1. As will be apparent to those skilled in the art, the present invention can similarly be applied to a window structure of the type herein defined in which the rotation shaft 6 is located at a much higher position, though still below the level of the centre of gravity of the sash.

Also, in the foregoing embodiment there are three open angles of the window sash 2,

namely 15°, 30° and 45°. Needless to say, the open angle of the window sash 2 can optionally be set by appropriately adjusting the angle of the stopper portions 14 of the bracket 7 and the inclination angles of the inclined portions 15 and 16 of the stopper member 9.

Preferably a pair of brackets and associated stopper members are attached to the left and right window stiles 8, respectively. However, even when a single bracket and associated stopper member are attached to only one of the two stiles 8, the above-mentioned function can be fully manifested.

The sash can have any one of at least three open angles by dismounting the stopper member or changing the attachment position of the stopper member. Further, the bracket and stopper member can each be formed in a compact shape and therefore, the appearance of the window structure is not significantly interfered with by these members. Moreover, the stopping means can be manufactured very easily at low costs, and it can be attached and dismounted very easily and simply by using one screwdriver and its adjustment can be accomplished very easily. Accordingly, the window structure of the present invention has a very valuable practical utility.

WHAT WE CLAIMS IS:—

1. A window structure of the type herein defined wherein the stopping means comprises a bracket fixed to one side of the frame and a stopper member fixed to the bracket in a selected one of a plurality of alternative operative positions relative to the frame so that the position of the stopper member relative to the frame can be changed, the stopper member being formed so as to define a plurality of different "open" positions of the sash, each said open position corresponding to a respective one of the alternative positions in which the stopper member can be fixed relative to the frame, at least one portion of the bracket being adapted to define yet a further open position of the sash in the event of the stopper member not being in one of its operative positions.

2. A window structure as claimed in claim 1 wherein the stopper member is formed with a plurality of surfaces each arranged to be engaged by the sash in a respective open position when the stopper member is fixed in the corresponding position to the bracket.

3. A window structure as claimed in claim 1 or 2 wherein said portion of the bracket is in the form of a tongue.

4. A window structure as claimed in claim 1, 2 or 3 wherein said plurality of open positions of the sash defined by the stopper member are 15° and 30° respectively from the closed position, which is vertical said yet

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The inclined portion 15 is formed to have, for example, an inclination angle of 30° to the vertical plane, and the inclined portion 16 is formed to have, for example, an inclination angle of 15° to the vertical plane. The stopper portions 14 formed on both ends of the tongue piece 13 are inclined at an angle of 45°.

When the stopping means is assembled, the screws 10 are first inserted in holes 17 of the stopper member 9 and the leading ends of the screws 10 are screwed into screw holes 18 formed in the fitting portion 12 of the bracket 7. Accordingly, the stopper member 9 is dismountably attached to the bracket 7 and the state of attachment of the stopper member 9 can be changed so that the inclined portion 15 is located on the upper side or the inclined portion 16 is located on the upper side.

The function of the illustrated stopping means will now be described with reference to Figs. 5 to 7.

When it is intended to open the window sash 2 to an angle of 45°, the stopper member 9 is dismantled and the window sash 2 can be fixed in the state opened at an angle of 45° by utilizing the stopper portions 14 of the bracket 7 (Fig. 5).

When it is intended to open the window sash 2 to an angle of 30°, the stopper member 9 is attached to the fitting portion 12 so that the inclined portion 15 is located on the upper side, and if the window sash 2 is opened inwardly in this state, it can be held in the open position at an angle of 30° (Fig. 6.)

Further, when it is intended to open the window sash 2 at an angle of 15°, the stopper member 9 is attached to the fitting portion 12 so that the inclined portion 16 is located on the upper side, and the window sash 2 is held in the open position at an angle of 15° (Fig. 7).

The foregoing embodiment has been illustrated only by reference to the bracket 7 fitted to the right window stile 8. However, the stopper portions 14 are formed one on each of the upper and the lower ends of the tongue piece 13 of the bracket 7, so that the bracket 7 can similarly be attached to the left window stile 8 and the same effects as mentioned above can similarly be attained.

In the foregoing embodiment, the stopping means is applied to a window structure of the type herein defined in which the rotation shaft 6 of the hinge 5 is located in the vicinity of the lower window frame member 1. As will be apparent to those skilled in the art, the present invention can similarly be applied to a window structure of the type herein defined in which the rotation shaft 6 is located at a much higher position, though still below the level of the centre of gravity of the sash.

Also, in the foregoing embodiment there are three open angles of the window sash 2,

namely 15°, 30° and 45°. Needless to say, the open angle of the window sash 2 can optionally be set by appropriately adjusting the angle of the stopper portions 14 of the bracket 7 and the inclination angles of the inclined portions 15 and 16 of the stopper member 9.

Preferably a pair of brackets and associated stopper members are attached to the left and right window stiles 8, respectively. However, even when a single bracket and associated stopper member are attached to only one of the two stiles 8, the above-mentioned function can be fully manifested.

The sash can have any one of at least three open angles by dismantling the stopper member or changing the attachment position of the stopper member. Further, the bracket and stopper member can each be formed in a compact shape and therefore, the appearance of the window structure is not significantly interfered with by these members. Moreover, the stopping means can be manufactured very easily at low costs, and it can be attached and dismantled very easily and simply by using one screwdriver and its adjustment can be accomplished very easily. Accordingly, the window structure of the present invention has a very valuable practical utility.

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2. A window structure as claimed in claim 1 wherein the stopper member is formed with a plurality of surfaces each arranged to be engaged by the sash in a respective open position when the stopper member is fixed in the corresponding position to the bracket.

3. A window structure as claimed in claim 1 or 2 wherein said portion of the bracket is in the form of a tongue.

4. A window structure as claimed in claim 1, 2 or 3 wherein said plurality of open positions of the sash defined by the stopper member are 15° and 30° respectively from the closed position, which is vertical said yet



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further open position of the sash being 45° hereinbefore described with reference to and
from the closed position. as illustrated in the accompanying drawings.

5. A window structure substantially as MARKS & CLERK.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1980.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.