

A PIVOTBACKGROUND OF THE INVENTION

5 This invention relates to a pivot, more particularly a window pivot. The pivot is primarily intended for use with large and consequently heavy openable windows.

In Asia in particular, large and heavy openable windows have
10 become common especially in high rise buildings. Due to regulation the windows in such buildings must be openable for (a) ventilation in the event the ventilation systems fails, and (b) egress in the event of emergency such as fire. These windows have come to be referred to as "curtain walling"
15 because typically they extend from floor to ceiling. Such windows can therefore typically be in the order of two metres wide and high and be double-glazed with, for example, 8mm panes of glass. Thus a single window can typically weigh about 150kg.

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Also due to regulation the window must be openable to a minimum of 300mm at the lowermost edge (the windows being awning hung). Thus typically the window is openable to about

15°. As a result of the limited degree of opening and the weight of the window it is usual to simply hinge the window sash to the window frame so that the top edge of the sash hinges about a fixed pivot. This, however, results in the
5 window rubbing or sliding over the window seals at final closing and initial opening of the window with consequential damage to the seals.

A further requirement with such windows is to hold the window
10 against negative pressures which can pull the window out under extreme wind conditions. Therefore, any hinge or pivot must be able to lock the head (ie the hinged side) of the window sash against negative pressures.

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SUMMARY OF THE INVENTION

The object of the present invention is to provide a pivot for the pivotal mounting of a heavyweight window sash.

20 A further object is to provide a pivot for a heavyweight window sash which provides control of the hinged side of the sash to minimise damage to window seals.

It is a further object to provide a pivot for a heavyweight window sash which provides resistance against the effect of negative pressures.

5 Broadly in one aspect of the invention there is provided a pivot for the mounting of a window sash and a window frame, the pivot comprising a link arm adapted for pivotal mounting at one end to the window frame and at the other end to the window sash, a sash guide adapted for mounting with a window
10 sash and a frame guide adapted for mounting with the window frame, said frame and sash guides having interacting guide surfaces which are in sliding contact and between which relative movement occurs during opening and closing of a window mounted by the pivot.

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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a plan view of the pivot in the fully closed position,

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Figure 2 is a plan view of the pivot in an open position,

Figure 3 is a perspective view of the pivot in an open position,

Figure 4 is a plan view of the pivot in the fully closed position as shown in Figure 1 but with the sash plate 11 removed,

Figure 5 is a plan view similar to Figure 2 but with the sash plate removed, and

Figure 6 is a plan view similar to Figure 2 of an opposite handed pivot to that of Figures 1 to 5 and showing various stages of the opening/closing action of the pivot.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The pivot comprises a frame plate 10 and a sash plate 11 which are joined by a link arm 12. The frame plate 10 is adapted for mounting to the frame of a window by mechanical fasteners (not shown) engaging through openings 13. Similarly, openings 14 are provided in the sash plate 11 for mounting of the sash plate to the window sash. With curtain

walling a pivot is mounted each side of the sash near the top of the sash so that the sash is mounted in an awning configuration.

5 While shown in one piece each of plates 10 and 11 could be formed (in a least preferred embodiment) in two separate pieces as is known in the art.

In a preferred form of the invention the sash and frame
10 plates are of die cast zinc while the link arm 12 is formed of stainless steel. Similarly, in a preferred form of the invention, the rivets 15 and 16 which couple the ends 12a and 12b of link arm 12 to the sash and frame plates are of stainless steel construction.

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In the preferred form of the invention the heads of the rivets 15 and 16 are formed as large as possible to provide maximum bearing surfaces so that the pivot bearings are robust and not prone to wearing. Because the head of the
20 rivet 16 projects beyond the surface of link arm 12 a groove 17 is formed in the face of the frame plate 10 to accommodate the head of the rivet as the pivot moves between open and closed positions.

The shank of the rivet 15/16 passes through aligned openings in the link arm 12 and plate 10/11 with the tail thereof enlarged in a counterbore in the plate 10/11. A wear
5 resistant washer, eg of nylon, locates about the shank and preferably between the opposing faces of the link arm 12 and plate 10 and 11 respectively to prevent surface to surface contact where surfaces move relative to one another. This is substantially in accordance with known window pivot bearing
10 techniques.

Substantial and positive end stops are provided to limit the degree of opening of the pivot. These are formed by an inclined edge 18 at end 12a of the link arm 12 (ie. that
15 mounted by the pivot bearing 15) engaging against a shoulder 19a formed by end 19 of the frame plate 10. Similarly, an inclined edge 20 at the other end of the link arm 12 abuts against surface 21 of sash guide 22.

20 A frame guide 23 is mounted at what, in use, is the upper end of the frame plate 10. An opening 24 in the frame guide 23 fits over a pin 25 projecting from the frame plate 10. The frame guide 23 also engages with an upstand 26 of the frame

plate 10, the upstand having a profiled edge 27 which engages with a similarly profiled edge 30 of the frame guide 23. Profiled edge 27 provides a recess 31 into which a tongue 32 of profiled edge 30 engages.

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The interfitting of edges 27 and 30 and tongue 32 in recess 31 combined with the interaction of opening 24 and pin 25 locks the frame guide 23 against lateral movement as a consequence of the opening or closing action of a window 10 mounted by the pivot. The frame guide 23 is further locked in place by a mechanical fastener which passes through opening 13' in the frame guide 23 which is aligned with an opening 13 in the frame plate 10 this fastener being installed at the time of fitment of the frame mounting plate 15 10 to the window frame.

The frame guide 23 has a curved guide surface 28 while sash guide 22 has a curved guide surface 29. In the preferred form of the invention the guide surfaces 28 and 29 are of the same radius though the centre of radius of the two surfaces 20 do not coincide. As a consequence, there is only part contact between surfaces 28 and 29 when the pivot is in the fully closed position and throughout relative movement

between the guides 22 and 23 during opening and closing of the pivot.

The sash guide 22 is similarly mounted to the sash plate 11 by a pin (not shown) engaging in a correspondingly shaped elongate opening 33 in the sash guide 22. An opening 14' enables a mechanical fastener to engage through the sash guide 22 and an aligned opening 14 in the sash plate 10 and into the sash of the window when the sash plate 10 is mounted thereto.

As can be seen in Figure 6, the interaction of the sash guide 22 and frame guide 23 via the sliding guide surfaces 28 and 29 controls the head of the sash and provides the necessary pull-in characteristics at final closing to ensure that the sash contacts window seals with minimal or no sliding action. Thus, not only is damage to the seals minimised but also a good sealing action between the head end of the sash and the seals is achieved. Furthermore, the contact of the sliding guide surfaces 28 and 29 when the window is in the closed position provides a maximum resistance against movement of the head of the window in negative pressure situations.

The end stops at the open position formed by the interaction of edges 18 and 20 of the link arm 12 with shoulder 19a and surface 21 provide substantial end stops in the event that the window is rapidly forced under windy conditions to its
5 fully open position.

The pivot according to the present invention thus provides a substantial mounting for the hinged end of a heavy window frame and provides for good control of the head of the window
10 in both negative pressure situations and during final closing and initial opening of the window so as to minimise damage to window seals.

CLAIMS

1. A pivot for the mounting of a window sash and a window frame, the pivot comprising a link arm (12) adapted at one end (12a) for mounting to the window frame and at the other end (12b) to the window sash, a sash guide (22) adapted for mounting with the window sash and a frame guide (23) adapted for mounting with a window frame, said frame and sash guides having interacting guide surfaces (28 and 29) which are in sliding contact and between which relative movement occurs during opening and closing of a window sash mounted by the pivot.
2. A pivot as claimed in claim 1 wherein the link arm (12) is coupled at said other end (12b) to a sash mounting member (11).
3. A pivot as claimed in claim 1 wherein the link arm (12) is coupled at said one end (12a) to a frame mounting member (10).



4. A pivot as claimed in claim 2 wherein the sash guide
(22) is carried by said sash mounting member (11).
5. A pivot as claimed in claim 3 wherein the frame guide
5 (23) is carried by said frame mounting member (10).
6. A pivot as claimed in claim 5 wherein the guide surfaces
(28 and 29) are curved but are not in full surface to
surface contact.
- 10 7. A pivot as claimed in claim 5 wherein the guide surfaces
(28 and 29) are curved and are of the same radius of
curvature but the centres of radii of the guide surfaces
do not coincide.
- 15 8. A pivot as claimed in claim 5 wherein the frame guide
(23) is engaged with an upstand (26) and is at least in
part thereby restricted from movement relative to the
frame mounting member (10).
- 20 9. A pivot as claimed in any one of claims 3 to 8 wherein
there is included stop means (18, 19a and 20, 21) to



limit the extent to which the pivot can move in one direction.

10. A pivot as claimed in claim 9 wherein the stop means
5 includes an end surface (18 or 20) of the link arm (12)
engaging with a surface (19a or 21) fixedly located with
the sash mounting member (11) or frame mounting member
(10).

10 11. A pivot for the mounting of a window sash and a window
frame, the pivot comprising an elongate frame mounting
member (10), a sash mounting member (11), a link arm
(12) pivotally mounted by a first end (12a) to the frame
mounting member (10) and by a second end (12b) to the
15 sash mounting member (11), a sash guide (22) carried by
the sash mounting member (11) said sash guide (22)
having a sliding surface (29) disposed beyond the second
end of the link arm (12), said sliding surface (29)
being in sliding contact with a fixed contact surface
20 (28) which extends across at least part of the width of
the elongate frame mounting member (10).



12. A pivot as claimed in claim 11 wherein the sliding surface (29) and contact surface (28) are both of curved configuration.
- 5 13. A pivot as claimed in claim 11 wherein the sliding surface (29) and contact surface (28) are curved and are of the same radius of curvature but the centres of radii of the surfaces do not coincide.
- 10 14. A pivot as claimed in claim 11 wherein the contact surface (28) is formed with a frame guide (23) which is engaged with a mounting means (26) of the frame mounting member (10), said contact surface projecting substantially normal to a surface of the frame mounting member (10) and extending substantially at an angle across the width of the frame mounting member (10).
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15. A pivot as claimed in claim 14 wherein the contact surface (28) and sliding surface (29) are only partially in surface to surface contact.
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16. A pivot as claimed in claim 15 wherein the contact surface (28) and sliding surface (29) are curved and are