

HINGES AND PARTS THEREFOR

The present invention relates to hinges for vents and parts therefor. In particular, the present invention relates to parallel opening hinges and improvements thereto.

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Parallel opening hinges are well known. For example, please refer to the current applicants' earlier European patent No. 0968349.

When a heavy window sash, say perhaps between 100-200 kilograms in weight, is to be supported for opening parallel to a fixed frame, a number of parallel opening hinges are typically used. For example, the long sides of the vent may use two or even more separate parallel hinges and the shorter sides of the vent may use one or two separate parallel hinges to support and control the opening of the vent. Although these systems work, it has been noted that the weight of a sash can cause a certain amount of dropping and falling out of the upper part of the sash relatively to the fixed frame. This can result in the vent opening out of parallel and being unsightly, and is certainly not ideal. Also, due to the weight of sashes now being carried by parallel hinges, a certain degree of "crabbing" can occur as a slider moves along a track of a parallel hinge during opening and/or closing of the vent. Once again, this is not ideal and essentially spoils the smooth running of the hinge system whether it be driven by manual operation or an electric motor. It has also been noted that too much free play in a central pivot joint between two links of a parallel opening hinge can also reduce the smooth operation of the hinge system.

25 The present invention aims to improve upon the above problems by providing a new parallel opening hinge arrangement and a number of component parts therefor.

In view of the foregoing, the present invention provides a parallel opening hinge comprising a first track, a second track and at least two pairs of pivotally connected crossing links, wherein each pair of crossing links is mounted to the tracks via a fixed pivot and a movable pivot in each track, wherein a connector joins two movable pivots in a track such that the movable pivots move together; and wherein the connector is situated and moves within the track.

By causing the two movable pivots of what are essentially adjacent parallel hinges to move together helps to prevent the top part of a sash from falling outwards. Indeed, the use of the connector results in both parallel hinges moving at the same time to the same
5 extent, thereby resulting in almost perfect parallel opening of a vent.

Although the present invention will function with only one connector acting in one track of a parallel opening hinge arrangement, improved opening may result if each track of a parallel opening hinge system has its own connector for joining movable pivots in its
10 respective track. Furthermore, if more than two parallel hinges are accommodated in a pair of tracks, a connector can act between two or more of the movable pivots in each parallel track.

In a typical parallel opening hinge, the movable pivots are preferably slider blocks which
15 are accommodated within the track. As will be appreciated, the connector is preferably a tie bar attached to the movable pivots.

Due to the connector being accommodated within a track, the connector preferably has slots to accommodate other components, such as other pivot points and screw mounting
20 heads for example, within the hinge.

The connector can be attached to a movable pivot via a rivet. Alternatively, the connector may be attached to a movable pivot via a shaped connection, such as a jigsaw type arrangement, or a snap-fit, for example. Other forms of connection will, of course,
25 be appreciated by those skilled in the relevant art.

The track preferably has a base and two side walls having inwardly facing flanges substantially parallel to the base. This is a typical C-shaped cross-section track known in the prior art. As will be appreciated, the flanges retain the movable pivots/slider blocks
30 within the track.

Specific embodiments of the present invention are now described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a parallel opening hinge according to the present invention in an open position;

- 5 Figure 2 is a perspective view of the hinge of figure 1 in a closed position;

Figure 3 is a perspective view of a mounting block;

- Figure 4 is a perspective view showing a part of a parallel opening hinge with one of the
10 tracks removed to show the mounting block of figure 3 in use;

Figure 5 is a perspective view of part of the parallel opening hinge of figures 1 and 2 showing a pivot mount;

- 15 Figure 6 is a perspective view of a pivot pin for use in the pivot mount shown in figure 5;

Figure 7 is a cross-sectional view through the pivot mount shown in figure 5; and

- 20 Figure 8 is a cross-sectional view through a pivot joining crossing links of a parallel opening hinge.

With reference to figures 1 and 2 of the accompanying drawings, a parallel opening hinge system 1 is shown. As will be seen, the hinge system effectively incorporates two
25 parallel hinge arrangements in a single product. The new parallel hinge includes a pair of parallel tracks 3, 5 each having essentially a c-shaped cross-section with a base and two side walls having inwardly facing flanges substantially parallel to the base. The hinge 1 further includes two pairs of crossing links 7, 9, wherein each pair of crossing links 7, 9 is pivotally connected at a pivot 11 and to each track 3, 5. The links 7 are
30 attached to track 3 at fixed pivot points 13 and to track 5 at movable pivot points 15. Similarly, the links 9 are attached to track 5 at fixed pivot points 17 and to track 3 at movable pivot points 19. Thus, as the parallel tracks 3, 5 are moved together or apart,

the movable pivots 15, 19 travel along the tracks whereas the fixed pivots 13, 17 remain fixed.

As will be seen in figure 1, the movable pivots 15 are carried by mounting blocks 21 shown in more detail in figures 3 and 4. These mounting blocks 21 are shaped to be received and retained within the c-shaped cross-sectioned tracks 3, 5. Between the two mounting blocks 21 in track 5, for example, a connector or tie rod 23 is provided for tying the two sliders 21 together, so that they move as one. The connector 23 is joggled at one end to ride over the mounting block 21 and be riveted thereto. The connector 23 then travels along the bottom of the track 5 avoiding pivot 17 by virtue of a slot 25 in the connector 23 before being connected to mounting block 21b in track 5. The connection with mounting block 21b can be a snap fit or a jigsaw type arrangement where the two components are shaped complementary, for example.

Also not shown in figure 1, a similar connector 23 can be used between the movable pivots 19 in track 3.

Turning now to figures 3 and 4, the mounting block 21 is shown in more detail.

As will be appreciated, a metal body portion 27 is shaped to be received in a c-section track 3, 5 and is partially encased in plastics skin 29. This arrangement is not dissimilar to that described and claimed in the present applicant's UK patent 2281098. The difference here, however, is that the plastics skin 29 has four cut out regions 31 for receiving metal roller balls 33. The roller balls 33 are sized to be received in a space between the flanges and the base of track 3, 5. The roller ball 33 stand slightly proud of the plastics skin 29, thereby abutting and running along the tracks 3, 5. Smoother running of the mounting blocks along the tracks 3, 5 thereby results. More roller balls 33 could, of course, be used in additional cut outs 31, if necessary.

Each mounting block 21 includes two apertures, 35, 37. One aperture is used to accommodate the pivots 15, and the other aperture is used to connect to the connector 23. Thus, the two mounting blocks 21a, 21b face each other in track 5 with their free apertures facing each other as shown in figure 1.

Moving on to a further inventive aspect of the present parallel opening hinge system, a pivot mount is shown in figures 6 and 7. The pivot mount of figure 5 is an enlarged view of the area surrounding pivot 17 in figure.1 As will be seen, a pivot pin 41 retains
5 a link 9 on a support block 43, which is fixed within track 5. The support block 43 is fixed to the track 5 by means of a rivet 45 seen more easily in figure 1. The pivot pin 41 is fixed to the support block 43, but free to rotate relative thereto about a shaft 47. The pivot pin 41 also includes a cam surface 49 for rebutting an aperture (not shown) in the link 9. A head 51 is provided on the pivot pin to retain the link 9 connected to the
10 support block 43. The head 51 includes a recess 53 for accommodating an allen key or the like to rotate the pivot pin 41 relative to the support block 43.

During installation of a parallel hinge according to the present invention, the sash mounted on the track 5 may drop slightly due to its weight and become non-parallel to
15 the fixed frame, and thereby look unsightly. To overcome this, an allen key can be applied to the recess 53 in the head 51 of each pivot mount to rotate the pivot pin 41 about shaft 49, thereby bringing the cam surface 49 to bear against the link 9. Relative motion of the link 9 and support block 43, and hence track 5 and the sash thereby results, lifting (or lowering) the sash as required. Essentially perfect parallel positioning and
20 alignment of the sash relative to the fixed frame can thereby result.

With reference to figures 1 and 8, the pivot 11 between the crossing links 7, 9 comprises a rivet 55, a bush 57 and a nylon washer 59. As will be seen, the rivet has a head 61 accommodated within a recess 63 in link 9 and the fastener passes through the bush 57.
25 The other link 7 also includes a recess 65 for accommodating a shoulder 67 of the bush 57 and the free end 69 of the rivet 55 when crushed over the shoulder 67 of the bush 55. Following crushing of the rivet 55, the rivet is accommodated within the combined thickness of the two links 7, 9 and the washer 59. Further, due to the shoulder 67 of the bush 57 bearing against a surface 71 in the recess 65 of link 7, the location of the bush
30 57 is defined and the active length of the rivet 55 is fixed due to the axial length of the bush 57. With this in mind, as will be seen in figure 8, the free end of the bush 57 abutts the head 61 of the rivet 55, so the distance between the two links 7, 9 can be predefined by choosing the length of the bush 57. The thickness of the nylon washer 59 can also be

selected to ensure that the two links 7, 9 are able to rotate freely about the phosphor bronze bush 57 with little axial free play along the rivet 55. An improved pivot joint having less friction is thereby produced, which results in the opening and closing forces of the vent being reduced. Larger and heavier vents can therefore be manually operated.

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As will be appreciated, there are a number of novel and inventive features described herein which, when used in a hinge, such as a parallel opening hinge, will result in significantly improved opening and usage of the hinge.

- 10 It will of course be understood that the present invention has been described above purely by way of example, and that modifications of detail can be made within the scope of the invention as claimed.

CLAIMS

1. A parallel opening hinge comprising a first track, a second track and at least two pairs of pivotally connected crossing links, wherein each pair of crossing links is mounted to the tracks via a fixed pivot and a movable pivot in each track, wherein a connector joins two movable pivots in a track such that the movable pivots move together; and wherein the connector is situated and moves within the track.
2. A parallel opening hinge according to claim 1, wherein the movable pivots are slider blocks.
3. A parallel opening hinge according to claim 1 or claim 2, wherein the connector is a tie bar attached to the movable pivots.
4. A parallel opening hinge according to any preceding claim, wherein the connector has slots to accommodate other components within the hinge.
5. A parallel opening hinge according to any preceding claim, wherein the connector is attached to a movable pivot via a rivet.
6. A parallel opening hinge according to any preceding claim, wherein the connector is attached to a movable pivot via a shaped connection or snap fit.
7. A parallel opening hinge according to any preceding claim, wherein the track has a base and two side walls having inwardly facing flanges substantially parallel to the base.