

A VENT

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This invention relates to vents.

Various sorts of vent exist wherein an opening member moves relative to
5 a fixed frame member between a position closing the vent and an open position.
Often the opening member is supported by two hinges on opposite sides of the
opening member and one free side of the opening member swings outwardly
from the fixed frame whilst the other free side of the opening member remains
close to the fixed frame. Such arrangements are satisfactory in most instances
10 and are well known.

Another form of vent requires the opening member to move away from
the fixed frame whilst remaining substantially parallel at all times to the fixed
frame. Parallel hinges are known which, when attached to opposite sides of the
opening member, enable both free sides of the opening member to move away
15 from the fixed frame during opening of the vent. However, if a drive means,
such as a motor driven plunger, drives one free side of the opening member
away from the fixed frame, misalignment and crabbing of the opening member
can occur due to only three sides of the opening member being supported.
Hence, to try to overcome this type of problem associated with the prior art
20 vents of this kind, it has been known to apply a second drive means to the
second free side of the opening member to assist in driving the opening
member away from the fixed frame during opening of the vent. Although this
arrangement has overcome the problem highlighted above, the cost of a second
drive means is not insubstantial.

25 With the foregoing in mind, the present invention aims to improve upon
the known prior art vents of the parallel hinge type. More particularly, the
present applicant has found that a relatively simple alternative arrangement
overcomes the problems associated with the prior art without incurring
significant expense.

30 More particularly, the present invention provides a vent comprising a
fixed frame and an opening member attached to the fixed frame by hinges, the
opening member being movable between a position closing the vent and an
open position by drive means, wherein three hinges support three sides of the

opening member and a fourth side is driven by the drive means. As a result, smoother opening of such a vent occurs without the need for a second drive means.

Although the arrangement may appear relatively straight forward once
5 the invention has been explained, it was not obvious to those skilled in the art because it was thought that a hinge on the side of the opening member opposite to the drive means would simply collapse during opening, thereby resulting in misaligned opening as with the prior art vents which used only one drive means.

10 Preferably the opening member is four sided. In theory, however, an opening member with more sides, and perhaps with more hinges but only one drive means, could also take advantage of the present invention.

Preferably the drive means is motor driven. In theory, however, the drive means could be activated by a manual drive device, for example, or by hand. If
15 the drive means is motor driven, it preferably has an electric motor.

The hinges are preferably parallel hinges such that the opening member, when moving, is constantly substantially parallel to the fixed frame. With this in mind, the present invention further provides a hinge comprising a pair of parallel tracks and a pair of diagonally crossing links which are pivotally connected to each
20 track and to each other, wherein each track accommodates a sliding shoe which carries a pivot connected to a respective link.

According to another aspect of the present invention, there is provided a vent comprising a fixed frame and an opening member attached to the fixed frame by parallel hinges, the opening member being movable between a
25 position closing the vent and an open position, wherein three hinges support three sides of the opening member such that the opening member, when moving, is constantly substantially parallel to the fixed frame.

If parallel hinges are used, each hinge preferably comprises two mounts and a pair of diagonally crossing links which are pivotally connected to each
30 mount and to each other. More preferably, the mounts are tracks, possibly C-sectioned, which each accommodate a sliding shoe (or lipped slider) which carries the pivot connected to the respective link.

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If a slider is used in a track or mount, the friction between the slider and the track or mount is preferably adjustable.

Following significant use of a vent according to the present invention, one or more of the hinges may begin to sag, thereby placing unwanted stresses in the vent system. Hence, it may be desirable to include an adjustment means for repositioning at least one of the hinges after initial installation, thereby assisting smooth operation of the hinges. Such a hinge adjustment means is described in detail in U.K. patent application GB-2313405. Other devices may of course alternatively be used.

10 A guidance means is preferably included for guiding the opening member during closing of the vent to assist in weathersealing of the vent. Such a guidance means may comprise a roller and keep mechanism which assists in pulling-in the opening member during closing of the vent. In a particular embodiment, a roller may be provided on the opening member and a keep
15 provided on the fixed frame or hinge to guide the roller via a camming action.

The opening member is preferably a window, but other forms of vent, such as a simple air vent, could also take advantage of the present invention.

Preferably the drive means acts, in use, on the lower or bottom side of the opening member. In theory, however, the drive means could alternatively
20 act on the top or upper side of the opening member. In any event, the drive means preferably acts on the upper or lower side of the opening member, rather than the right or left side of the opening member.

A specific embodiment of the present invention is now described, by way of example only, with reference to the accompanying drawings, in which:-

25 Figure 1 is a schematic perspective view of a prior art vent;

Figure 2 is a schematic perspective view of a vent according to the present invention; and

Figure 3 is a schematic plan view of a parallel hinge for use in a vent according to the present invention.

30 With reference to the drawings, a prior art vent 1 comprises a fixed frame 3, an opening member 5, a pair of parallel hinges 7 and a pair of motor drives 9. The parallel hinges 7 are mounted between the fixed frame 3 and the opening member 5 on the right and left sides of the vent. The two motor drives 9 are

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mounted on an upper and lower edges of the fixed frame 3 and engage upper and lower sides of the opening member 5. During opening of the vent 1, the motor drives 9, when activated, each drive a plunger 11 away from the fixed frame 3 and force the opening member 5 to travel outwardly from the fixed frame. Due to the use of two motor drives 9, the opening member 5 is held substantially parallel to the fixed frame throughout the opening process. The parallel hinges 7 obviously assist in this regard.

A vent 10 according to the present invention is shown in Figure 2 of the drawings. Although the general arrangement of the fixed frame 3, opening member 5 and parallel hinges 7 mounted on opposite sides of the opening member 5 are substantially the same as the corresponding components in the prior art vent 1 shown in Figure 1, the two motor drives 9 of the prior art are not included. Rather, the upper and lower sides of the opening member 5 are attached to the fixed frame 3 by means of only one motor drive 9 and a third parallel hinge 12. This third parallel hinge 12 is the same type of hinge as the parallel hinges 7 used elsewhere in the vent 10.

Although all four sides of the opening member 5 are once again supported either by a parallel hinge 7,12 or the motor drive 9 as in the prior art vent 1, the applicant has found surprisingly that the second motor drive 9 can be replaced by the third parallel hinge 12. This arrangement was in no way an obvious arrangement to try, because those skilled in the art considered that the alignment of the opening member 5 could not be held in the desired orientation without the use of a second motor drive 9. Accordingly, the significant advantage provided by only requiring one expensive motor drive 9, rather than two, can be realised by means of the vent arrangement according to the present invention.

A typical parallel hinge for use in a vent 10 according to the present invention comprises two mounting plates 13 joined by two links 15 which are both pivotally attached to each mounting plate 13 and pivotally attached to each other at a central pivot 17. One of the mounting plates 13 is for attachment to the fixed frame 3 and the other mounting plate 13 is for attachment to the opening member 5.

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A preferred novel form of parallel hinge 12, which helps to improve the performance of a vent 10 according to the present invention, has mounting plates 13 which are C-shaped in section. These C-shaped tracks 13, which are shown in Figure 3 of the drawings, each carry a sliding shoe 19 (or slider),
5 which carries one end of a link 15. More particularly, one end of each link 15 is pivotally mounted to a sliding shoe 19, thereby allowing the end of the link 15 to move back and forth along the track 13 during use of the hinge 12.

Each sliding shoe 19 includes a device (not shown) for adjusting the friction between the sliding shoe 19 and its respective track 13. As a result, the
10 opening and closing of the hinge 12 can be controlled more accurately.

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.

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CLAIMS

1. A vent comprising a fixed frame and an opening member attached to the fixed frame by hinges, the opening member being movable between a position closing the vent and an open position by drive means, wherein three hinges support three sides of the opening member and a fourth side is driven by the drive means.
2. A vent as claimed in claim 1, wherein the drive means is motor driven.
3. A vent as claimed in claim 2, wherein the drive means is an electric motor.
4. A vent as claimed in any preceding claim, wherein the drive means acts, in use, on the lower or bottom side of the opening member.
5. A vent as claimed in any preceding claim, wherein the hinges are parallel hinges such that the opening member, when moving, is constantly substantially parallel to the fixed frame.
6. A vent comprising a fixed frame and an opening member attached to the fixed frame by parallel hinges, the opening member being movable between a position closing the vent and an open position, wherein three hinges support three sides of the opening member such that the opening member, when moving, is constantly substantially parallel to the fixed frame.
7. A vent as claimed in any preceding claim, wherein the opening member is four sided.
8. A vent as claimed in any preceding claim, wherein each hinge comprises two mounts and a pair of diagonally crossing links which are pivotally connected to each mount and to each other.

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9. A vent as claimed in claim 8, wherein the mounts are tracks which each accommodate a sliding shoe which carries the pivot connected to the respective link.
- 5 10. A vent as claimed in claim 8, wherein the tracks are C-sectioned.
11. A vent as claimed in claim 9 or claims 10, wherein the sliding shoes are lipped sliders.
- 10 12. A vent as claimed in any one of claims 9 to 11, wherein friction between each sliding shoe and its respective track is adjustable.
13. A vent as claimed in any preceding claim, further comprising adjustment means for repositioning at least one of the hinges after initial installation.
- 15 14. A vent as claimed in any preceding claim, further comprising guidance means for guiding the opening member during closing of the vent to assist in weathersealing of the vent.
- 20 15. A vent as claimed in claim 14, wherein the guidance means comprise a roller and keep mechanism.
16. A vent as claimed in any preceding claim, wherein the opening member is a window.
- 25 17. A vent substantially as hereinbefore described with reference to and as shown in Figures 2 and 3 of the accompanying drawings.
18. A hinge comprising a pair of parallel tracks and a pair of diagonally
30 crossing links which are pivotally connected to each track and to each other, wherein each track accommodates a sliding shoe which carries a pivot connected to a respective link.

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19. A hinge as claimed in claim 18, wherein the tracks are C-sectioned.
20. A hinge as claimed in claim 18 or claim 19, wherein the sliding shoes are lipped sliders.
- 5
21. A hinge as claimed in any one of claims 18 to 20, wherein friction between each sliding shoe and its respective track is adjustable.
22. A hinge substantially as hereinbefore described with reference to and as
- 10 shown in Figure 3 of the accompanying drawings.

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