

Ventilated window structure

Field and Background

5 The invention relates to a window, more particularly to a ventilated window structure.

Conventional windows may provide protection from the external environment. While many conventional windows may be opened to enable ventilation of a room or building, this may be at the expense of the environmental protection that they provide.

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It is desirable to provide a window which addresses at least one of the drawbacks of the prior art and/or to provide the public with a useful choice.

Summary

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In a first aspect, there is provided a ventilated window structure. The ventilated window structure comprises a first panel having a ventilation opening, and a second panel from the first panel and which occludes the ventilation opening to define an inner airflow passage in fluid communication with the ventilation opening. Thus, regardless of whether
20 the window is open or closed (or permanently closed) there is a ventilation opening which allows airflow to the room, and which prevents rain from getting in. A coupling member may be provided between the first and second panel.

Preferably, the first panel further comprises an openable window assembly. The second
25 panel may comprise an access opening in registration with the openable window assembly, the inner airflow passage being via the access opening. This permits easy access to the window assembly for opening, closing, locking and cleaning, etc.

In a specific embodiment, the ventilation opening may further comprise a net covering.
30 This may prevent small animals from entering via the opening. Advantageously, an insect net is further provided in the inner airflow passage, between the first and second panels. This may prevent insects from entering via the ventilation opening.

Preferably, the ventilated window structure further comprises a coupling member to
35 space the first panel from the second panel. The coupling member or the ventilated

window structure may comprise a surface defining a downward slope from the second panel to the ventilation opening. This may enable rain water entering via the ventilation opening to drain off. The slope may be defined by a coupling between the first and second panels.

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It is envisaged that the second panel may comprise a glass pane which occludes the ventilation opening. This may enable additional light to enter the building in which the window is installed.

10 In a specific embodiment, the ventilated window structure may further comprise a wall opening in which the first and second panels are installed.

In a second aspect, there is provided a method of assembling a ventilated window structure. The method comprises installing a first panel having a ventilation opening and
15 a second panel in a wall opening, wherein the first and second panels are installed in spaced relationship to occlude the ventilation opening with the second panel and define an inner airflow passage in fluid communication with the ventilation opening.

It is envisaged that the method may further comprise coupling the first panel to the
20 second panel prior to installing the panels simultaneously in the wall opening.

Preferably, the first panel further comprises an openable window assembly. Installing the first and second panels may comprise bringing the access opening into registration with the openable window assembly.

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In a specific embodiment, the method may further comprise installing a net covering to the ventilation opening. Advantageously, the method further comprises installing an insect net in the inner airflow passage, between the first and second panels.

30 In a specific embodiment, the method includes creating the wall opening.

In a third aspect, there is provided a method of fabricating a ventilated window structure, comprising: forming a first panel having a ventilation opening, a second panel and a coupling member between the first panel and the second panel to create a spaced
35 relationship between the first panel and the second panel to occlude the ventilation

opening with the second panel and to define an inner airflow passage in fluid communication with the ventilation opening; wherein the first panel, second panel and the coupling member are integrally formed as an unitary structure.

5 In a fourth aspect, there is provided a kit of parts for a ventilated window structure. The kit of parts comprises: a first panel having a ventilation opening for installation in a wall opening; and a second panel for installation in the wall opening in spaced relationship with the first panel and for occluding the ventilation opening and defining an inner airflow passage in fluid communication with the ventilation opening when installed. The kit of
10 parts may further include a coupling for coupling the first panel to the second panel in spaced relationship to occlude the ventilation opening with the second panel and to define an inner airflow passage in fluid communication with the ventilation opening.

It should be appreciated that features relevant to one aspect may also be relevant to the
15 other aspects.

Brief Description of the drawings

An exemplary embodiment will now be described with reference to the accompanying
20 drawings, in which:

Fig. 1 illustrates a ventilated window structure 100 according to a described embodiment in a closed configuration, with Fig. 1a illustrating a rear (or interior) view, Fig. 1b illustrating a side view, Fig. 1c illustrating a front (or exterior) view, Fig. 1d illustrating a
25 front perspective view, and Fig. 1e illustrating a rear perspective view;

Fig. 2 illustrates the ventilated window structure of Fig. 1 in an open configuration, with Fig. 2a illustrating a rear (or interior) view, Fig. 2b illustrating a side view, Fig. 2c illustrating a front (or exterior) view, Fig. 2d illustrating a front perspective view, and Fig. 2e illustrating a rear perspective view;

30 Fig. 3 illustrates the ventilated window structure of Fig. 1 and 2 when installed in a wall opening, in particular highlighting an inner airflow passage defined by components of the ventilated window structure of Figs. 1 and 2, with Fig. 3a illustrating a front perspective view of the installed ventilated window structure, Fig. 3b illustrating a rear perspective view of the installed ventilated window structure and Fig. 3c illustrating a sectional view
35 of the installed ventilated window structure; and

Fig. 4 illustrates a method of assembling and installing the ventilated window structure of Figs. 1 and 2.

Detailed Description of Preferred Embodiment

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Figs. 1 and 2 illustrate a ventilated window structure 100 according to a described embodiment, specifically in the form of an openable window structure suitable for installation in a rectangular opening of a substantially vertical wall 10 separating a building interior from a building exterior. Figs. 1a-e illustrate the ventilated window structure 100 in a partially closed configuration, showing rear (or interior), side, front (or exterior), front perspective and rear perspective views, respectively, while Figs. 2a-e illustrate the ventilated window structure 100 in an open configuration, showing rear (or interior), side, front (or exterior), front perspective and rear perspective views, respectively. Horizontal (x, z) and vertical (y) axes indicating the intended orientation of installation are illustrated in Figs. 1 and 2 for reference. Note that some reference numerals are omitted from certain figures for clarity.

In an example, the ventilated window structure 100 is configured for mounting in a wall opening with a height (i.e. the distance along the major rectangular axis of the wall opening) of approximately 1500mm at an exterior edge, while a width of the wall opening (i.e. the distance along the minor rectangular axis of the wall opening) may be approximately 800mm. A depth of the wall opening may be approximately 150mm. The ventilated window structure 100 includes two panels 101, 103: a first panel 101, and a second panel 103 spaced from the first panel 103. In the described embodiment, the ventilated window structure 100 includes a coupling member 500 arranged to create the spaced arrangement between the first panel 101 and the second panel 103. In a specific example, the coupling member 500 may be a glass panel, or the coupling member 500 may be made with the same material as frames of the first or second panels 101, 103 or any other type of suitable material. The coupling member 500 is slanted with respect to a longitudinal axis of the first panel 101 (as well as the second panel) to create a sloped surface between the first panel 101 and the second panel 103, with the first and second panels 101, 103 fixedly mounted in substantially parallel, spaced relationship at either end. Specifically, the coupling member 500 is substantially planar and is arranged to couple a lower edge of the first panel 101 to a lower edge of the second panel 103 along the full lengths of both of the respective lower edges, with the second panel 103 being

slightly shorter than the first panel 101. In this embodiment, a gradient of the sloped surface is about 15 degrees from the horizontal axis, and the gradient is created by raising the coupling member 500 at one end (see portion indicated by 501 in Fig. 3c) when the coupling member is assembled or formed ventilated window structure 100. It is envisaged that other gradients such as 5 to 20 degrees (and anything in between) are possible as long as the sloped surface causes or directs liquid flow down the sloped surface. As such, the ventilated window structure 100 according to the described embodiment is formed as a single unitary structure, which is approximately U-shaped in profile (see, for example, Fig. 1b).

In the described embodiment, the first panel 101 and the second panel 103 are in the form of rectangular panels for mounting at opposing ends of the wall opening. In this arrangement, the first panel 101 is arranged to face the building exterior, while the second panel 103 is arranged to face the building interior with a base of the wall opening being occluded by the sloped surface of the coupling member 500. The ventilated window structure 100 is configured to extend the full height and width of the wall opening when mounted and, as such, the first panel 101 and the second panel 103 are both mounted to the sloped coupling member 500 with their major rectangular axes in alignment, as illustrated.

In the described embodiment, the first panel 101 includes a first rectangular perimeter frame 105 for sealing engagement with a perimeter wall surface of the wall opening. The perimeter frame 105 includes an upper transverse edge 105a, a lower transverse edge 105b, a first extended lateral edge 105c, and a second extended lateral edge 105d. Each one of the four edges 105a, 105b, 105c, 105d is suitable for sealing engagement with the perimeter wall surface. Two transverse beams 109, 115, specifically a first transverse beam 109 and a second transverse beam 115 are also comprised within the first panel. The two transverse beams 109, 115 are mounted perpendicularly to and extend between the two extended lateral frame edges 105c, 105d. The second transverse beam 115 is mounted in spaced relationship and vertically above the first transverse beam 109 with respect to the intended installation orientation of the window structure 100. Specifically, a lower edge of the first transverse beam 109 is positioned at a distance of approximately 1/10 of a height of the first panel 101 from the sloped coupling member 500, for example 150mm from the sloped surface of the coupling member 500. An upper edge of the second transverse beam 115 is positioned at a distance of approximately 1/3 the height

of the first panel 101 from the sloped surface of the coupling member 500, for example about 500mm from the sloped surface of the coupling member 500.

5 The first panel 101 further includes a ventilation opening 107 in the form of a rectangular opening extending transversely across the base of the first panel 101, with edges of the ventilation opening 107 defined by the lower transverse edge 105b, the two extended lateral edges 105c, 105d, and the first transverse beam 109. As such, the ventilation opening 107 occupies just under 1/10 of the height of the first panel 101. The ventilation opening comprises a net covering 111, for example a plastic net covering, including a
10 plurality of substantially square perforations and which spans the area of the rectangular opening.

Also included in the first panel 101 is a rectangular glass pane 113 fixedly framed by the first lateral edge 105c, the second extended lateral edge 105d, the first transverse beam
15 109, and the second transverse beam 115.

Finally, the first panel 101 includes an openable window assembly, in the form of a casement window assembly, extending from the second transverse beam 115 to the upper edge 105a, i.e. approximately two thirds of the height of the first panel 101. In the
20 described embodiment, the openable window assembly 118 includes two opposing rectangular-shaped window panels 117, 119, specifically a first window panel 117 and a second window panel 119. Each of the two window panels 117, 119 comprises respective framed window glazing. The first window panel 117 is mounted to the first lateral edge 105c, specifically via a pivotable connection, for example a hinge. Likewise,
25 the second window panel 119 is mounted to the second lateral edge 105d via a pivotable connection. The pivotable connections enable the first window panel 117 and the second window panel 119 to be opened outwards (i.e. towards the exterior of the building).

The openable window assembly further includes a longitudinal beam 121 mounted
30 perpendicularly to and extending between the upper edge 105a and the second transverse beam 115 parallel to, and approximately half way between the first and second extended lateral edges 105c, 105d and arranged so that the first and second window panels 117, 119 abut the longitudinal beam 121 when closed to at least partially seal the openable window assembly. Two opposing handles 125 are provided, one on
35 each interior surface of the two window panels 117, 119 as part of the openable window

assembly for convenience of manual opening and closing, as well as locking of the two window panels 117,119. In the described embodiment, the handles are positioned approximately half way between the upper edge 105a and the lower edge 105b, i.e. the centres of the two opposing handles 125 are spaced approximately 750mm from the
 5 sloped coupling member 500.

The second panel 103 also includes a second rectangular perimeter frame 127 for sealing engagement with the perimeter wall surface of the wall opening but, in contrast to the first rectangular perimeter frame 105, the second rectangular perimeter frame 127
 10 is open at its lower end, i.e. includes only three edges, specifically an upper transverse edge 127a, a first extended lateral edge 127b, and a second extended lateral edge 127c. Each of the transverse edge 127a, the first extended lateral edge 127b, and the second extended lateral edge 127c are in registration with their counterparts in the first panel 101 (upper transverse edge 105a, first extended lateral edge 105c, and second extended
 15 lateral edge 105d, respectively). The second panel 103 further includes a transverse beam 129 mounted perpendicular to and extending between the first extended lateral edge 127b, and the second extended lateral edge 127c. The transverse beam 129 is in registration with the second transverse beam 115 of the first panel 101.

20 The second panel 103 further includes a rectangular glass pane 131 fixedly framed by the transverse beam 129, the first extended lateral edge 127b, the second extended lateral edge 127c and the sloped coupling member 500. Thus, the second panel 103, specifically the glass pane 131 of the second panel 103, occludes the ventilation opening 107 of the first panel.

25 Above the transverse beam 129, the second panel 103 includes an opening 132 defined by the transverse beam 129, the upper transverse edge 127a, the first extended lateral edge 127b, and the second extended lateral edge 127c and extending approximately two thirds of a height of the second panel. The opening 132 is in registration with the
 30 openable window assembly 118 of the first panel 101 to permit access to the two window panels 117, 119 for manual opening and closing via the handles 125. As such, the opening 132 could be said to define an access opening of the second panel 103.

It should be appreciated that the coupling member 500 defining the sloped surface is
 35 configured to extend substantially the entire width of the wall opening when installed to

define a downward gradient towards the base of the wall opening. It should be appreciated that this downward gradient may permit water entering the wall opening via the ventilation opening 107 (for example, rainwater) to drain back out of the wall opening via the ventilation opening 107.

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By virtue of the spacing between the first panel 101 and the second panel 103, it will be appreciated that the ventilated window structure 100 comprises a central cavity 135 between the glass pane 113 of the first panel 101 and the window pane 131 of the second panel 101 ventilated window structure 100. The central cavity 135 further includes an
 10 insect net 133, for example a mosquito net, mounted to and between the glass pane 113 of the first panel 101 and the glass pane 131 of the second panel 101 to prevent incursion of insects via the ventilation opening 107 through the cavity 135. For example, an adhesive may be employed to affix edges of the insect net 133 to each of the two transverse beams 115, 129 or alternatively, directly on the two glass panes 113,131. As
 15 described above, in the ventilated window structure 100, the second panel 103 is spaced from the first panel 101 and occludes the ventilation opening 107. Fig. 3 illustrates the ventilated window structure 100 when installed in the opening of a wall 10. As illustrated in Fig. 3, the arrangement of the second panel 103 with respect to the first panel 101, specifically the ventilation opening 107, defines an inner airflow passage 301 in fluidic
 20 connection with the ventilation opening 107. Specifically, Fig. 3a illustrates a front perspective view of the ventilated window structure 100 when installed, Fig. 3b shows a rear perspective view of the ventilated window structure 100 when installed and Fig. 3c illustrates a sectional view of the ventilated window structure 100 when installed showing that there is a fluidic path from the building exterior to the building interior via the
 25 ventilation opening 107, the central cavity 135 and the opening 132 of the second panel 103.

Specifically, air from the exterior of the ventilated window structure 100 may enter via the ventilation opening 107. As the glass pane 131 occludes the ventilation opening 107 of
 30 the first panel, the air is forced upwards through the central cavity 135 via the insect net 133 towards the opening 132 which permits airflow to and from the interior of the building. At the same time, occlusion of, equivalently overlap of the ventilation opening 107 by the second panel 103 provides a barrier against rain, or other external environmental conditions.

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Fig. 4 illustrates a method of assembling and installing the ventilated window structure 100 according to the described embodiment.

It would be appreciated that the ventilated window structure 100 is fabricated off-site as
5 a single unit prior to installation on-site.

As illustrated in Fig. 4, in one example, the off-site fabrication comprises, in step 1401 fabricating the first panel 101, the second panel 103 and also the coupling member 500 to space the first panel 101 and the second panel 103 integrally as one unitary structure.
10 The structure of the first panel 101, the second panel 103 described above, and of the mountings described including their mounting to the coupling member 500, may be achieved using conventional window fabrication techniques and materials. It will be appreciated that technique and material selection may made according to preference, for example aesthetic, durability and/or cost considerations. The insect net 133 and net
15 covering 111 may also be mounted to the two panels 101, 103 during off-site fabrication of the ventilated window structure 100.

On-site, at step 401, the wall opening is created. Step 401 may be achieved using conventional construction techniques and may include building a wall including the wall
20 opening or creating the wall opening in an existing wall. In the described embodiment, as visible in Fig. 3c, the wall opening may be of substantially uniform height and width throughout its depth.

In step 403, the ventilated window structure 100 is installed as a single unit in the wall
25 opening as illustrated in Fig. 3 and discussed above. Specifically, the first rectangular perimeter frame 105 is sealed to the perimeter wall surface of the created wall opening. Further, the second rectangular perimeter frame 127 is sealed to the perimeter wall surface, with the ventilated window structure 100 installed so that the first panel 101 and the second panel 103 face the exterior and interior of the building, respectively.
30 Conventional window installation techniques may be employed in order to install the ventilated window structure 100 in the window opening.

It should be appreciated from the method of Fig. 4 that the ventilated window structure 100 may alternatively be produced as separate components off-site from the building in
35 which ventilated window structure 100 is to be installed and supplied as a kit of parts, for

example comprising the two panels 101, 103 and the coupling member 500 to be both assembled and installed in the building by an on-site installer.

5 The ventilated window structure 100 may enable ventilation of a room even when the window panels 117, 119 are closed while at the same time providing protection from exterior conditions by, for example, keeping water out. This is achieved by an overlap of the two glass panes 113, 131 which enables an airflow both in and out of the building but prevents rainwater, for example, splashing in through the window. This is further assisted by the slope of the sloped coupling member 500 which may assist excess water
10 to drain off and prevent water build up. Further, the net cover 111 and insect net 133 may provide protection against the incursion from the exterior of small animals and smaller insects such as mosquitos, respectively.

As will be appreciated from Figs. 1 to 3, the above advantages are achieved while
15 enabling the two window panels 117, 119 to be opened and closed like a conventional window. Further, easy access to all glass panels is maintained via the opening 132, thereby enabling easy cleaning.

Further, as the ventilated window structure 100 may be fabricated and installed using
20 conventional window installation techniques, no specialist skills or training outside of those required for installing conventional windows may be needed and therefore the ventilated window structure 100 may be straightforward to construct and install.

The described embodiment should not be construed as limitative.
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For example, it is envisaged that other types of openable window assembly, for example a sash window assembly, or a permanently closed window assembly may be employed in place of the openable window panels 117, 119. It should be appreciated that the only ventilation possible via the ventilated window structure 100 in a variation including a
30 permanently closed window assembly may then be via the ventilation opening 107. In such a variation, in which easy access to the window panels of the first panel 101 is less advantageous, it is envisaged that the opening 132 may be smaller and may not enable full access to the window assembly.

It is envisaged that the configuration of each of the first and second panels may be varied according to preference and requirements. For example, ventilation opening 107 may not be located at the base of the ventilated window structure 100 but higher up with respect to the perimeter frame 105, for example at the top of the first panel 101, with the other components of the first panel 101 rearranged accordingly. In such a variation, it is envisaged that the position of the glass panel 131 will be adjusted and/or its size varied accordingly to maintain occlusion of the ventilation opening 107 by the second panel 103 while maintaining an opening 132 in the second panel 103 to permit airflow both inwards and outwards.

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It is envisaged that one or more of the glass panes 113, 131 may be replaced with, for example respective opaque panels.

It is envisaged that one or both of the net cover 111 and the insect net 133 may be omitted. Whether to omit the net cover 111 and/or the insect net 133 may be determined based on the local conditions in which the ventilated window structure 100 is installed. Although the net cover 111 is described above as having square perforations, it is envisaged that the net cover 111 may have perforations of any shape.

It should be appreciated that the dimensions described above in relation to the described embodiment are intended to be exemplary only and that the dimensions may be adjusted according to preference and building constraints, for example an available size for the wall opening given the dimensions and construction of the building.

Although the ventilated window structure 100 is described above as a single unit in which the first panel 101 and the second panel 103 are joined by the sloped coupling member 500, it is envisaged that the ventilated window structure 100 could be instead provided simply as the two separate panels 101, 103 without any linkages between the two and each of the two panels 101, 103 installed separately onsite. It should be appreciated that the order in which the first panel 101 and the second panel 103 are installed is variable in this variation may be chosen based on ease of access to the site. Further, while it is envisaged that in such a variation the separate first panel 101 and second panel 103 would typically be fabricated off-site prior to installation in the wall opening, alternatively, they may be constructed as they are installed, i.e. by building up the individual components of each of the two panels 101, 103 in the wall opening.

It is envisaged that linkages between the first panel 101 and second panel 103 in addition to the coupling member 500 may be provided, for example a single outer frame encompassing both of the two panels 101, 103 may replace the two individual perimeter frames 105, 127 with remaining components of the first panel 101 and second panel 103
5 mounted at respective positions within the single outer frame.

Whether the ventilated window structure 100 is provided as a single unit, or otherwise, it is envisaged that the coupling member 500 may be omitted and the slope feature may be provided by a bottom edge of the perimeter wall surface which may or may not be
10 exposed.

It is envisaged that the ventilated window structure 100 may not be installed in a vertical wall, for example it may be installed in a sloping wall such as in a roof of a building. The slope or slant of the coupling member 500 may be adjusted accordingly to enable water
15 run-off. It is envisaged that the slope may also be omitted entirely, for example the coupling member 500 may not define a slope. It may be preferable to employ additional means of dealing with water incursion the case that the slope is omitted entirely.

It is envisaged that features of one variation or embodiment may be combined with those
20 of other variations or embodiments.

Having now fully described the invention, it should be apparent to one of ordinary skill in the art that many modifications can be made hereto without departing from the scope as claimed.

Claims

1. A ventilated window structure, comprising:
 - (i) a first panel having a ventilation opening; and
 - 5 (ii) a second panel spaced from the first panel and which occludes the ventilation opening to define an inner airflow passage in fluid communication with the ventilation opening.
- 10 2. A ventilated window structure according to claim 1, wherein the first panel further comprises an openable window assembly.
3. A ventilated window structure according to claim 2, wherein the second panel comprises an access opening in registration with the openable window assembly, the inner airflow passage being via the access opening.
- 15 4. A ventilated window structure according to claim 1 or 2, wherein the ventilation opening further comprises a net covering.
- 20 5. A ventilated window structure according to any one of the preceding claims, further comprising an insect net positioned in the inner airflow passage, between the first and second panels.
- 25 6. A ventilated window structure according to any one of the preceding claims, wherein the second panel comprises a glass pane which occludes the ventilation opening.
- 30 7. A ventilated window structure according to any one of the preceding claims, further comprising a coupling member to space the first panel from the second panel.
8. A ventilated window structure according to any one of the preceding claims, further comprising a surface defining a downward slope from the second panel to the ventilation opening.

9. A ventilated window structure according to any one of the preceding claims, further comprising a wall opening in which the first and second panels are installed.
- 5 10. A method of assembling a ventilated window structure, comprising:
installing a first panel having a ventilation opening and a second panel in
a wall opening;
wherein installing the first and second panels comprises installing them in
spaced relationship in the wall opening to occlude the ventilation opening
10 with the second panel and to define an inner airflow passage in fluid
communication with the ventilation opening.
11. A method of assembling a ventilated window structure according to claim 10,
wherein the first panel further comprises an openable window assembly.
- 15 12. A method of assembling a ventilated window structure according to claim 11,
wherein the second panel comprises an access opening and wherein installing
the first and second panels further comprises bringing the access opening into
registration with the openable window assembly.
- 20 13. A method of assembling a ventilated window structure according to any one of
claims 10 to 12, further comprising installing a net covering to the ventilation
opening.
- 25 14. A method of assembling a ventilated window structure according to any one of
claims 10 to 13, further comprising mounting an insect net in the airflow passage,
between the first and second panels.
- 30 15. A method of assembling a ventilated window structure according to any one of
claims 10 to 14, further comprising coupling a coupling member between the first
panel and the second panel prior to installing the first panel and the second panel.
- 35 16. A method of assembling a ventilated window structure according to any one of
claims 10 to 15, wherein the second panel comprises a glass pane which
occludes the ventilation opening.

17. A method of assembling a ventilated window structure according to any one of claims 10 to 16, further comprising: creating the wall opening.

18. A method of fabricating a ventilated window structure, comprising:

5 forming a first panel having a ventilation opening, a second panel and a coupling member between the first panel and the second panel to create a spaced relationship between the first panel and the second panel to occlude the ventilation opening with the second panel and to define an inner airflow passage in fluid communication with the ventilation opening; wherein the first
10 panel, second panel and the coupling member are integrally formed as an unitary structure.

19. A kit of parts for a ventilated window structure, comprising:

15 (i) a first panel having a ventilation opening for installation in a wall opening;
 and
 (ii) a second panel for installation in the wall opening in spaced relationship with the first panel and for occluding the ventilation opening and defining an inner airflow passage in fluid communication with the ventilation opening when installed.

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