Abstract: The invention provides a suspension assembly and hinge member for a foldable door or window having a pair of adjacent panels connected to one another via a hinge. The suspension assembly comprises support engaging and translating means, for engaging with and translating relative to an upper support, and hinge rod attaching means for attaching to a hinge rod to suspend it via the upper support, wherein the suspension assembly is arranged to at least partially suspend the weight of the panels via the hinge rod and upper support. The hinge rod extends substantially the height of the adjacent panels. The hinge member comprises hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes. The invention also provides a corresponding foldable door or window comprising the suspension assembly and hinge member. The invention also provides a foldable door or window comprising panels having a peripheral frame and connected via a hinge. Moveable bolts are housed within the peripheral frame of one of the panels. Actuation means are connected to the bolts. Translation of the actuation means relative to the frame effects movement of the bolts which are adapted to engage a fixed interlocking member separate to the panels to secure at least one of the panels.
BIFOLD DOOR AND WINDOW

FIELD OF THE INVENTION

The present invention relates broadly to a foldable door or window such as a bifold door.

BACKGROUND OF THE INVENTION

Folding doors and windows, sometimes referred to as bifold doors and windows, consist of a series of panels hinged together and supported from above and below by a rail upon which the panels travel. To open the door or window, the panels are concertinaed and in some cases pushed against a door or window jamb. Folding doors and windows are often used to separate the interior and exterior of a building because they enable an interior space to be opened to the exterior, thus giving an impression of space and light.

Folding doors or windows are typically used when a door or window opening is very wide and the use of a single wide panel hinged at the jamb requires an unacceptable amount of space reserved for the panel to swing into. Folding doors and windows are thus often used as a space saving door.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a suspension assembly for a foldable door or window having a pair of adjacent panels connected to one another via a hinge, the suspension assembly comprising support engaging and translating means, for engaging with and translating relative to an upper support, and hinge rod attaching means for attaching to a hinge rod to suspend it via the upper support, wherein the suspension assembly is arranged to at least partially suspend the weight of the panels via the hinge rod and upper support.

According to another aspect of the invention there is provided a foldable door or window assembly having two or more door or window panels connected to one another via a hinge, the foldable door or window assembly comprising a suspension assembly having support engaging and translating means, for
engaging with and translating relative to an upper support, and hinge rod attaching means for attaching to the hinge rod to suspend it via the upper support, wherein the suspension assembly is arranged to at least partially suspend the weight of the panels via the hinge rod and upper support.

The support engaging and translating means preferably comprise one or more wheels.

An end of the hinge rod which is remote of the hinge rod attaching means is preferably arranged for attachment to a bearing for movement along the lower support.

The upper and lower supports preferably comprise a respective rail and track.

According to another aspect of the invention there is provided a hinge member for a hinge of a foldable door or window having a pair of adjacent panels connected to one another via the hinge, the hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes.

According to another aspect of the invention there is provided a foldable door or window assembly having two or more door or window panels connected to one another via a hinge, the door or window assembly having a hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes. The hinge member is preferably arranged for connection, via the hinge rod, to a plurality of separate hinge tubes which are also arranged for receipt of the hinge rod so that the separate hinge tubes are spaced longitudinally along the hinge rod and positioned between adjacent hinge tubes of the hinge member.

According to another aspect of the invention there is provided a hinge for a foldable door or window having a pair of adjacent door or window panels connected to one another via the hinge, the hinge comprising:
a hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes;

a plurality of separate hinge tubes arranged to receive the hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod and positioned between adjacent hinge tubes of the hinge member; and

a hinge rod located through the connected and separate hinge tubes to couple the connected hinge tubes and separate hinge tubes together.

According to another aspect of the invention there is provided a foldable door or window assembly having two or more door or window panels connected to one another via a hinge, the door or window assembly having a hinge comprising:

a hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes;

a plurality of separate hinge tubes arranged to receive the hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod and positioned between adjacent hinge tubes of the hinge member; and

a hinge rod located through the connected and separate hinge tubes to couple the connected hinge tubes and separate hinge tubes together.

The hinge tube connectors are preferably arranged to increase the stiffness and/or strength of the corresponding hinge. The hinge tube connectors are further preferably arranged to at least partially transfer load longitudinally along the hinge.

The hinge tube connector preferably comprises a strap. They may however comprise connectors having cross-sections which differ to those of a strap. The hinge tube connector strap is preferably adapted to abut a resilient strip to form a weather proof seal.

The hinge member and separate hinge tubes each preferably comprise respective hinge member attaching members and hinge tube attaching members for
attaching the hinge member and separate hinge tubes to the door or window panels.

The hinge member attaching member preferably comprises one or more straps. The hinge tube attaching member preferably comprises a strap. The hinge tube connectors preferably comprise a single continuous connector. The hinge tube connectors preferably connect the hinge tubes of the hinge member via the hinge member attaching member. However, the hinge tube connector may alternatively comprise the hinge member attaching member in which case the hinge tube connector attaches directly to the hinge tubes of the hinge tube member.

The hinge rod preferably comprises, at its end remote of the hinge rod attaching means, hinge tube locating means for locating the hinge tubes, of the hinge member and the separate hinge tubes, relative to the hinge rod. The hinge tube locating means is preferably removably attached but could, for example, be integrally formed with the hinge rod or welded to the hinge rod.

The hinge rod is preferably arranged to extend substantially the height of the door or window panels.

Preferably the hinge tubes are capped at each end by a plug having an aperture for passage of the hinge rod. More preferably the hinge tubes of the hinge member are separated from the coupled separate hinge tubes by a bearing. In one preferred form the bearing is a washer.

According to another aspect of the invention there is provided a foldable door or window comprising:

- at least two panels connected via a hinge, each panel having a peripheral frame;
- a moveable bolt housed within the peripheral frame of one of the panels;
- and actuation means connected to the bolt and arranged for translational movement relative to the frame whereby translation of the actuation means effects movement of the bolt which is adapted to engage a fixed interlocking member separate to the panels to secure at least one of the panels.
The moveable bolt is preferably substantially parallel to the hinge. The hinge is preferably attached to the peripheral frame of the adjacent panels. The hinge preferably comprises the hinge member of one of the other aspects of the invention.

Preferably the bolt is a latching bolt. More preferably the actuation means is operable from both sides of the panel. Still more preferably the latching bolt is operatively coupled to biasing means for biasing the bolt towards the interlocking member. Still even more preferably the biasing means includes a coil spring housed within the peripheral frame.

Preferably the bolt is, either in addition to or instead of the latching bolt, a locking bolt. Actuation means of the locking bolt is preferably operable from only one side of the panel.

The actuation means preferable comprises a rod projecting away from the frame. Preferably the actuation means further includes a low profile knob or handle. More preferably the low profile knob or handle is dimensioned to permit close spacing of the panels when concerti πaed. Still more preferably the knob or handle is slidably mounted on the rod. Yet still preferably an escutcheon or plate having an aperture through which the rod passes is fixed to the frame. Even still more preferably the knob or handle is biased towards the escutcheon or plate. Yet still more preferably the knob or handle interlocks with the escutcheon to secure the locking bolt in either an engaged or disengaged relationship with the interlocking member.

Preferably the actuation means are remote to corners of the peripheral frame.

**BRIEF DESCRIPTION OF THE FIGURES**

Preferred embodiments of a suspension assembly, hinge member, hinge and folding door or window of the invention will now be described, by way of example only, with reference to the accompanying figures in which:

Figure 1 shows a plan view of one embodiment of a closed foldable door or window having two panels;
Figure 2 shows a plan view of another embodiment of a foldable door or window having more than two panels and being partially open;

Figure 3 shows a cut away perspective view of the foldable door or window shown in figure 1 with associated jamb, sill and head;

Figure 4 is a perspective view of the foldable door or window shown in figure 1 disassembled into two panels;

Figure 5a is an exploded perspective view of one embodiment of a hinge for a foldable door or window;

Figure 5b shows an exploded perspective view of another embodiment of a hinge for a foldable door or window, the hinge being adapted to run along a rail;

Figure 6 is a cross sectional view of one embodiment of the hinge shown in figure 5a installed on a panel;

Figure 7 is a cross sectional view of the hinge of figure 5b;

Figures 8a and 8b are cross-sectional views of the hinge shown in figure 5a, dismantled and attached to adjacent panels;

Figures 9a and 9b are cross sectional views through knobs attached to an example of a panel; and

Figure 10 is an exploded view of a lock mechanism used on one embodiment of a folding door or window.

DETAILED DESCRIPTION OF THE INVENTION

One embodiment of a closed foldable door or window 10 (or bifold) is shown from above in Figure 1. This embodiment has two panels, 12 and 13, connected by a hinge 14. However, some embodiments, such as the foldable door or window 16 that is shown in Figure 2, have more than two panels 15, 17, 19, 21, 23, 25, 27, and 29. The hinge 14 allows adjacent panels to be folded together, thus opening the door or window 10. In Figure 1, a hinge 11 also connects panel 13 adjacent
the door or window jamb 28 thereto. In some embodiments, not shown here, the panel 13 is not connected to the adjacent door or window jamb 28 allowing the panels 12 and 13 to float.

Figure 3 shows a cut away perspective view of the foldable door or window 10 shown in Figure 1 as would be seen by an observer on the inside of the building to which the door or window 10 is fitted. The two panels 12 and 13 each have a peripheral frame 30 and 31 to which the hinge 14 is attached. The panels 12 and 13 have a central region 32 bounded by the peripheral frame 30 or 31 which in this embodiment, is made of a stainless steel mesh of a sort used to block insects. The central region 32 may be, however, any suitable mesh, stainless steel security screen, glass or metal or other sheet material, timber slats, grid or grill. The mesh 32 is attached to the peripheral frame 30.

Hand manipulatable actuation means in the form of low profile knobs 38, 40 and 42 are each attached to a translatable bolt concealed within the peripheral frame 31 for securing the door or window 10. Low profile knobs allow the concertinaed panels to be closely spaced when the bifold 10 or 16 is open. Figure 2 shows the partially open bifold 16 having concertinaed panels 23, 25, 27 and 29. The minimum spacing between the panels 23&25 and 27&29 is the depth of the knobs 132 and 134 respectively. Thus by using low profile knobs 132 and 134 the floor space occupied by bifold 16 when fully open is significantly reduced, diminishing their visual impact.

Figure 4 is a perspective view of the separate panels 12 and 13 of the foldable door or window shown in figures 1 and 3. The panel 13 has two translatable bolts 44 and 46 protruding out from the top of the frame 31. Bolt 46 is actuated by the knobs 40 and 48 which can be translated relative to the frame 31. Bolt 46 is for latching the bifold 10. Bolt 44 is actuated by knob 38 and is for locking the door. Knob 38 can be translated relative to the frame 31. The bolts 44 and 46 engage an interlocking member which in this case is a component of the beam 33 shown in figure 3 described further below.
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As shown in figure 3, above the door or window 10 is a head or beam 33 having a rail 34 which in this embodiment is fabricated from extruded aluminium. A suspension assembly in the form of wheel assembly 36 located above a panel 12 is attached thereto. The wheel assembly 36 can travel along the rail 34 which both guides the movement of the door or window 10 on its opening and supports the panels 12 and 13. In some embodiments, the wheel assembly 36 is located below the panel, supporting the panels from below. Below the door or window is a sill 88, which in this embodiment is fabricated from extruded aluminium.

The partially dismantled hinge of figure 4 comprises a hinge rod 50 that passes through a plurality of longitudinally spaced hinge tubes in the form of tubes 52 and hinge member tubes in the form of tubes 54 that are coaxial when the hinge is assembled. The hinge rod 50 of this embodiment is stainless steel. The tubes 52 are each attached to hinge tube attaching members in the form of hinge straps 56 fixed to the outer edge 35 of the frame 30 by screws such as 60. The tubes 54 are each attached to a hinge member attaching members in the form of hinge straps 58. The hinge straps 58 are connected to each other by hinge tube connectors in the form of a connector strap 62 that runs along the length of the frame 31 forming an integrated hinge 63 comprising the tubes 54, the hinge straps 58 and the connector strap 62. The connector strap 62 and tubes 54 are attached on opposite sides of the hinge straps 58. In this embodiment screws such as 65 fix the integrated hinge component 63 to the frame 31 by passing through the hinge straps 58, however, in other embodiments not shown here screws pass through the connector strap 62 to fix the integrated hinge component 63 to the frame 31.

During manufacture of the hinge 14 the integrated hinge is formed by extrusion, casting or moulding as a single piece of uniform cross sectional shape identical to that through a tube 54, a hinge strap 58 and the connector strap 62. The single piece extrusion is then cut away to form the integrated hinge with the cutaway pieces forming the tubes 52 and hinge straps 56 and 58.

An exploded view of the hinge 14 is shown in figure 5A. Both ends of each tube 52 and 54 are capped by a plug such as 64, which in this embodiment is fabricated of acetal. The plugs 64 have an aperture for passing the hinge rod 50.
The tubes 52 and 54 are separated by bearings or washers such as 66. The ends 68 and 70 of the hinge rod 50 are threaded. Aluminium top 72 and bottom 74 caps are threaded onto the ends 68 and 70 and secured with grub screws 76 and 78. The caps 72 and 74 keep the hinge rod 50 in place and the hinge 14 together.

Figure 5b shows an exploded schematic view of a hinge 80 of similar construction to the hinge 14 of figure 5a. This hinge 80 has a suspension assembly in the form of a wheel assembly 82 at the top 68 of the hinge rod 50 held in place by a nut 84. The wheel assembly supports the weight of the panels. This hinge 80 also has a cap 85 at the other end 70 of the hinge rod 50 adapted to have a bearing 87 press fitted onto it. In this hinge design, the weight of the panels attached to the hinge 80 are supported by the cap 85 contacting the bottom most of the tubes 54. Consequently, the hinge rod 50 is in tension. Prior art hinge rods do not transfer a force along their longitudinal axis being neither in compression or tension. In some embodiments the wheel assembly supports the weight of the panels from below in which case the hinge may be in compression. The force exerted by the cap 85 on the bottom most of the tubes 54 is distributed by the connector strap 62 to each of the hinge straps 58 to reduce the maximum load on any one hinge plate.

Hinges of type 14 (Figure 5a) and 80 (Figure 5b) alternate in doors or windows 16 having more than two panels such as the door or window shown in Figure 2.

Figure 6 is a cross sectional view through the hinge 14 shown in figure 1 looking towards panel 13, the view being indicated by "6" in Figure 1. Also visible in Figure 6 is the hinge 11 connecting the panel 13 to the door or window jamb (not visible), and the beam 33 incorporating the rails 34 along which the wheel assembly 36 travels.

A weather strip or seal 86, such as a pile weather strip, is located between the beam 33 and peripheral frame 31 of panel 13. The strip or seal 86 is attached to the beam by a double tongue-in-groove arrangement. The sill 88 under the panel 13 has an attached weather strip or seal 90. The weather strips 86 and 90 prevent the panel 12 from rattling against the beam 33 and sill 88 respectively.
Figure 7 is a cross section view through the panel 13 shown in figure 1, being a cut through the knobs 38, 40, 42 and 48 as indicated by "7" in Figure 1. The hinge 14 is omitted for clarity. Escutcheons or plates 108 and 110 are placed around the knobs. This figure shows the moveable locking bolt 44, latching bolt 46 and locking bolt 92 connected to the knobs 38, 48 and 40, and 42 respectively. The knobs can be hand manipulated to cause an end of each bolt to slide out of the peripheral frame 13 (as bolts 44 and 46 are in Figure 4) or to be withdrawn into the frame 13. In Figure 7, the bolts 44, 46 and 92 are slid out, protruding from the frame 13. Locking bolt 44 and latching bolt 46 are received by rectangular slots 94 and 96 cut into the beam 33. Weather strips or seals such as 98 line the slots 94 and 96. The strips prevent the bolts 44 and 46 rattling against the edge of the slots 94 and 96 respectively. The downwardly directed locking bolt 92 is received by a rectangular slot 102 cut into the sill 88. When any one of the bolts 44, 46 or 92 are received by their respective slot, the panel 13 cannot swing around hinge 14 and is thus secured.

In Figure 7, the cap 85 and the bearing 87 connected to the bottom of the rod 50 are received by a track formed by a slot 106 of the sill 88, the slot 106 running the length of the sill 88. The slot 106 guides the bearing 87, and thus the panel, during folding of the door or window 10. A suspension assembly in the form of wheel assembly 36 of figure 7 is attached adjacent an edge 45 of panel 12 (figure 1) that is not connected to an adjacent panel. Consequently, the rod 50 attached to the wheel assembly 36 is not housed within a hinge but rather within a single piece 49 of uniform cross sectional shape identical to that through a tube 54, a hinge strap 58 and the connector strap 62.

Figure 8A shows a hinge strap 56 attached to the peripheral frame 30 of panel 12 by a screw 60. The frame 31 is extruded to have an aperture with teeth such as 112 to receive the screw 60 thus removing the requirement of drilling and tapping a hole. The hinge strap 56 has a V-shaped line 114 that runs its length for locating the screw hole. A resilient strip or weatherproof seal 116 is attached to the frame 30. The strip 116 has a T-shaped base comprising two tongues 117 which each engage a groove in the frame 30, such as 119, for securing the strip 116 to the frame 30.
Figure 8B shows a hinge strap 58 attached to the peripheral frame 31 of the adjacent panel 13. This hinge strap 58 is attached to the connector strap 62 which contacts the weather strip 116 on closure of the door 10 to seal the gap between the adjacent panels 12 and 13 against wind and rain. This strip 116 is hidden from view by the hinge 14 when the door is closed.

Figures 9a are cross sectional views through the knob 38, locking bolt 44, escutcheon 108, and frame 31. The escutcheon 108 has an irregular slot comprising two end aperture regions that can receive the base 118 of the knob 120 as shown in the top figure, and an intermediate aperture region that is more narrow than the base of the knob 118, as shown in the bottom figure. The knob 38 is slidably mounted on a rod or screw 120 projecting away from the frame 31. The knob 38 is pulled to clear the base of the escutcheon 108 allowing movement of the knob 38 from one end aperture region to the other. The knob 38 is then released and urged into the end aperture region by a spring 122 interlocking the knob 38 with the escutcheon 108 which secures the locking bolt 44 in either an engaged or disengaged relationship with the slot 94 shown in figure 7. As the knob 38 is placed on the inside of the door it allows the door to be locked shut from inside. The knob 42 functions in a similar fashion to the knob 38 just described.

Figure 9b is a cross sectional view through the knobs 40 and 48, the frame 31, bolt 44 and escutcheons 108 and 110 which are attached to frame 31. The operation of the knobs 40, 48 and bolt 44 are best understood with reference to Figure 10. A rod in the form of a screw 126 connects the knobs 42 and 40, the screw 126 being biased upwards by a spring 124 operatively coupled to it, the spring 124 being housed within the frame 31 (not visible). Knobs 40 and 42 can freely slide along their slots 128 and 130 in escutcheons 108 and 110 respectively. The spring also urges the bolt 46 upwards into the slot 96, engaging or latching it with the beam 33 and securing the door. Bolt 46 can be disengaged from the beam by pressing down on the outside knob 42 or the inside knob 40.
Because it is easier to translate or slide a knob such as 40 than to rotate it, the translating action of the bolts and attached knobs in the described embodiments allows the use of low profile knobs rather than large knobs or handles.

It will be appreciated that the invention in at least its preferred form has at least the following advantages.

1. the low profile knobs allow for the panels of an open bifold to be closely spaced when closed, reducing the area occupied by the panels.

2. the connector strap results in a door or window of enhanced strength, safety, and security;

3. the hinge hides the strip or weatherproof seal from view when the bifold is closed;

4. the bolts can be of arbitrary length so that the associated knobs can be placed away from the corners of a panel;

5. the bolts are hidden from view which is aesthetically pleasing;

6. the wheel assembly enables a door or window to be at least partly suspended via an upper support; and

7. the door or window is locked without the use of a key.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. For example the knobs may be handles. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.
The Claims Defining The Invention Are As Follows

1. A suspension assembly for a foldable door or window having a pair of adjacent panels connected to one another via a hinge, the suspension assembly comprising support engaging and translating means, for engaging with and translating relative to an upper support, and hinge rod attaching means for attaching to a hinge rod to suspend it via the upper support, wherein the suspension assembly is arranged to at least partially suspend the weight of the panels via the hinge rod and upper support.

2. A foldable door or window assembly having two or more door or window panels connected to one another via a hinge, the foldable door or window assembly comprising a suspension assembly having support engaging and translating means, for engaging with and translating relative to an upper support, and hinge rod attaching means for attaching to the hinge rod to suspend it via the upper support, wherein the suspension assembly is arranged to at least partially suspend the weight of the panels via the hinge rod and upper support.

3. A suspension assembly or foldable door or window assembly as claimed in claim 1 or claim 2 wherein the support engaging and translating means comprise one or more wheels.

4. A suspension assembly or foldable door or window assembly as claimed in any one of the preceding claims wherein the hinge rod which is remote of the hinge rod attaching means is arranged for attachment to a bearing for movement along a lower support.

5. A suspension assembly or foldable door or window assembly as claimed in claim 4 wherein the upper and lower supports comprise a respective rail and track.

6. A hinge member for a hinge of a foldable door or window having a pair of adjacent panels connected to one another via the hinge, the hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge
tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes.

7. A foldable door or window assembly having two or more door or window panels connected to one another via a hinge, the door or window assembly having a hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes.

8. A hinge member or foldable door or window assembly as claimed in claim 6 or claim 7 wherein the hinge member is arranged for connection, via the hinge rod, to a plurality of separate hinge tubes which are also arranged for receipt of the hinge rod so that the separate hinge tubes are spaced longitudinally along the hinge rod and positioned between adjacent hinge tubes of the hinge member.

9. A hinge for a foldable door or window having a pair of adjacent door or window panels connected to one another via the hinge, the hinge comprising:

a hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes;

a plurality of separate hinge tubes arranged to receive the hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod and positioned between adjacent hinge tubes of the hinge member; and

a hinge rod located through the connected and separate hinge tubes to couple the connected hinge tubes and separate hinge tubes together.

10. A foldable door or window assembly having two or more door or window panels connected to one another via a hinge, the door or window assembly having a hinge comprising:
a hinge member comprising hinge tubes arranged to receive a hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod, and hinge tube connectors adapted to connect the longitudinally spaced hinge tubes;

a plurality of separate hinge tubes arranged to receive the hinge rod, so that the hinge tubes are spaced longitudinally along the hinge rod and positioned between adjacent hinge tubes of the hinge member; and

a hinge rod located through the connected and separate hinge tubes to couple the connected hinge tubes and separate hinge tubes together.

11. A hinge member, hinge or foldable door or window assembly as claimed in any one of claims 6-10 wherein the hinge tube connectors are arranged to increase the stiffness and/or strength of the corresponding hinge.

12. A hinge member, hinge or foldable door or window assembly as claimed in any one of claims 6-11 wherein the hinge tube connectors are arranged to at least partially transfer load longitudinally along the hinge.

13. A hinge member, hinge or foldable door or window assembly as claimed in any one of claims 6-12 wherein the hinge tube connector comprise a strap.

14. A hinge member, hinge or foldable door or window assembly as claimed in claim 13 wherein the hinge tube connector strap is adapted to abut a resilient strip to form a weather proof seal.

15. A hinge member, hinge or foldable door or window assembly as claimed in any one of claims 6-14 wherein the hinge member and separate hinge tubes each comprise respective hinge member attaching members and hinge tube attaching members for attaching the hinge member and separate hinge tubes to the door or window panels.

16. A hinge member, hinge or foldable door or window assembly as claimed in claim 15 wherein the hinge member attaching member comprises one or more straps.
17. A hinge member, hinge or foldable door or window assembly as claimed in claim 15 or claim 16 wherein the hinge tube attaching member comprises a strap.

18. A hinge member, hinge or foldable door or window assembly as claimed in any one of claims 6-17 wherein the hinge tube connectors comprise a single continuous connector.

19. A hinge member, hinge or foldable door or window assembly as claimed in any one of claims 15-18 wherein the hinge tube connectors connect the hinge tubes of the hinge member via the hinge member attaching member.

20. A suspension assembly, foldable door or window assembly, hinge member, hinge, or foldable door or window assembly as claimed in any one of claims 1-19 wherein the hinge rod is arranged to extend substantially the height of the door or window panels.

21. A foldable door or window comprising:
   at least two panels connected via a hinge, each panel having a peripheral frame;
   one or more moveable bolts housed within the peripheral frame of one of the panels; and

actuation means connected to the one or more bolts and arranged for translational movement relative to the frame whereby translation of the actuation means effects movement of the one or more bolts which are adapted to engage a fixed interlocking member separate to the panels to secure at least one of the panels.

22. A foldable door or window as claimed in claim 21 wherein the one or more moveable bolts are substantially parallel to the hinge.

23. A foldable door or window as claimed in claim 21 or claim 22 wherein the hinge is attached to the peripheral frame of the adjacent panels.
24. A foldable door or window as claimed in any one of claims 21-23 wherein the hinge comprises the hinge member of any one of claims 6-19.

25. A foldable door or window as claimed in any one of claims 21-24 wherein the one or more bolts are latching bolts.

26. A foldable door or window as claimed in any one of claims 21-25 wherein the actuation means is operable from both sides of the panel.

27. A foldable door or window as claimed in claim 25 or claim 26 wherein the one or more latching bolts are operatively coupled to biasing means for biasing the one or more bolts towards the interlocking member.

28. A foldable door or window as claimed in any one of claims 21-24 wherein the one or more bolts are locking bolts.

29. A foldable door or window as claimed in claim 28 wherein the actuation means is operable from only one side of the panel.

30. A foldable door or window as claimed in claim any one of claims 25-27 wherein further comprising one or more locking bolts.

31. A foldable door or window as claimed in claim 30 wherein the actuation means of the locking bolt is operable from only one side of the panel.

32. A foldable door or window as claimed in any one of claims 21-31 wherein the actuation means comprises a rod projecting away from the frame.

33. A foldable door or window as claimed in claim 32 wherein the actuation means further includes a low profile knob or handle.

34. A foldable door or window as claimed in claim 32 or claim 33 wherein an escutcheon or plate having an aperture through which the rod passes is fixed to the frame.
35. A foldable door or window as claimed in claim 34 wherein the knob or handle is biased towards the escutcheon or plate.

36. A foldable door or window as claimed in claim 35 wherein the knob or handle interlocks with the escutcheon to secure the locking bolt in either an engaged or disengaged relationship with the interlocking member.

37. A foldable door or window as claimed in any one of claims 21-36 wherein the actuation means are remote to corners of the peripheral frame.