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LATCHING MECHANISMS, A HINGE, BI-FOLD DOOR ASSEMBLIES AND METHODS FOR OPENING A BI-FOLD DOOR

FIELD OF INVENTION

The present invention relates to the field of doors and door fixtures.

BACKGROUND

In developed countries where there is high population density, it is typical for the populace to live in high-rise apartments which optimize the use of space. In such developed countries, it is typical for individual units in the high-rise apartments to utilize furniture and fixtures which are able to maximize the limited floor area in each individual unit. One of the ways of maximizing limited floor area in each individual unit is by using bi-fold doors.

Currently, a majority of the bi-fold doors utilize top and bottom tracks and operate like accordions. Such bi-fold doors are unable to operate in a desired manner if either one of the top and bottom tracks are damaged. In addition, such bi-fold doors will partially block a space defined by a door frame when the bi-fold doors are in an open configuration. This is undesirable as a width of access through the door frame is hampered by the folded doors when in an open configuration.

In this regard, it is desirable if bi-fold doors do not hamper access through the door frame when the bi-fold doors are in an open configuration and do not utilise top and bottom tracks which will may be damaged because of many reasons.

SUMMARY

In a first aspect, there is provided a method for opening a bi-fold door. The method includes securing a first portion of the bi-fold door to a door frame using at least one biased latching mechanism attached to the first portion; rotating a second portion of the bi-fold door about a central stem of the bi-fold door, the second portion being

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rotated to a first position, the first position being when the second portion is adjacent to the first portion; and actuating a latch of the at least one biased latching mechanism to release the first portion from the door frame when the second portion is at the first position.

Preferably, the method further includes rotating the first portion about an end edge of the first portion. The first face of the second portion may be configured to contact a first face of the first portion when the second portion is at the first position. The first face of the second portion may be configured to contact the at least one biased latching mechanism to actuate the latch.

In a second aspect, there is provided a bi-fold door assembly. The assembly includes a bi-fold door with a first portion and a second portion; and at least one biased latching mechanism attached to the first portion, the at least one biased latching mechanism being configured for securing the first portion to the door frame.

It is preferable that the second portion is configured to actuate a latch of the at least one biased latching mechanism to release the first portion from the door frame when the second portion is rotated about a central stem of the bi-fold door to a first position, the first position being when the second portion is adjacent to the first portion. The door assembly may further include at least one multi-joint door hinge.

In a third aspect, there is provided a latching mechanism for securing a door to a door frame. The mechanism includes a casing; a biasing mechanism located at a first part of the casing; a latch at a second part of the casing; a linkage assembly coupled to the latch, the linkage assembly being configured for applying a force to the biasing mechanism; and a contact portion protruding from an opening in the casing between the first part and the second part, the contact portion being coupled to the linkage assembly.

Preferably, the biasing mechanism is either a spring or an elastic foam stack. The linkage assembly and the contact portion are preferable made from metal.

In a fourth aspect, there is provided a multi-joint door hinge which includes a central portion; a first joint at a first end of the central portion, the first joint being attached to a first leaf of the hinge; and a second joint at a second end of the central portion, the second joint being attached to a second leaf of the hinge.

Preferably, the first leaf is configured to be attached to a door frame and the second leaf is configured to be attached to a door. It is also preferable that both the first leaf and the second leaf are configured to rotate angularly by 90^0.

In a fifth aspect, there is provided a latching mechanism for securing a door to a door frame. The mechanism includes a casing; a biasing mechanism located within the casing; a latch at a first part of the casing; a linkage assembly coupled to the latch, the linkage assembly being configured for applying a force to the biasing mechanism; and a sliding portion protruding from an opening in a second part of the casing, the sliding portion being coupled to the linkage assembly.

It is preferable that the biasing mechanism is either a spring or an elastic foam stack and that the linkage assembly is made from metal.

In a final aspect, there is provided a door which includes two plastic panels bordered by an aluminum rim, both the aluminum rim and the two plastic panels are coated with a film providing a wood finish. It is preferable that a cavity between the two plastic panels is configured to contain at least one material such as, for example, rockwool, fire retardant foam, dense foam and the like. Preferably, the two plastic panels are made from high pressure laminate.

DESCRIPTION OF FIGURES

In order that the present invention may be fully understood and readily put into practical effect, there shall now be described by way of non-limitative example only preferred embodiments of the present invention, the description being with reference to the accompanying illustrative figures.

Figure 1 shows a perspective view of a first embodiment of a bi-fold door assembly.

Figures 2(a), 2(b) and 2(c) show a sequential cross-sectional top view of a method for opening the bi-fold door assembly of Figure 1.

Figure 3 shows a process flow of the method shown in Figure 2.

Figure 4 shows a perspective view of a first embodiment of a latching mechanism of the present invention.

Figure 5 shows a perspective view of a hinge of the present invention.

Figure 6 shows a perspective view of a second embodiment of a bi-fold door assembly.

Figures 7(a), 7(b) and 7(c) show a sequential view of a method for opening the bi-fold door assembly of Figure 6.

Figure 8 shows a process flow of the method shown in Figure 7.

Figure 9 shows a perspective view of a third embodiment of a bi-fold door assembly.

Figures 10(a), 10(b) and 10(c) show a sequential view of a method for opening the bi-fold door assembly of Figure 9.

Figure 11 shows a process flow of the method shown in Figure 10.

Figure 12 shows a perspective view of a second embodiment of a latching mechanism of the present invention.

Figure 13 shows a perspective sectional view of a door used in a bi-fold door assembly shown in the preceding Figures.

Figure 14 shows a cross-sectional top view (excluding latching mechanism) of a possible final position of the method for opening any of the bi-fold door assemblies of Figures 1, 6 and 9.

DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention relates to a bi-fold door assembly, and a method for opening the bi-fold door in the door assembly. The bi-fold door in the bi-fold door assembly is configured in a manner whereby the folded door does not hamper access through the door frame when the bi-fold doors are in an open configuration and the bi-fold doors do not utilize top and bottom tracks. The present invention also includes a method for constructing a door, a latching mechanism and a hinge used in the bi-fold door assembly.

Referring to Figure 1, there is shown a perspective view of a first embodiment of a bi-fold door assembly 20. Referring to Figures 2(a) to 2(c), there is shown a sequence of cross-sectional top views of the first embodiment of a bi-fold door assembly 20 undergoing use from a closed configuration (Figure 2(a)) to an open configuration (Figure 2(c)). Figure 2(a) is the cross-sectional top view corresponding to Figure 1. The bi-fold door assembly 20 includes a door frame 22. The door frame 22 is made from either wood or aluminum. In Figure 1, a top portion 19 of the door frame 22 is shown in a transparent view so that the bi-fold door assembly 20 can be more clearly shown. The assembly 20 also includes a bi-fold door 24 with a first portion 26 and a second portion 27. The bi-fold door 24 should not be heavy and is made from, for example, a wood material, a metal material, a plastic material, a glass material or any combination of the aforementioned. The assembly 20 further includes at least one biased latching mechanism 28 attached to the first portion 26. The at least one biased latching mechanism 28 is configured for securing the first portion 26 to the door frame 22 in a manner as shown in Figure 1. It is appreciated that the door frame 22 includes a receptor 30 to allow the at least one biased mechanism 28 to secure the first portion 26 to the door frame 22. It is appreciated that the second portion 27 is configured to actuate a latch 56 of the at least one biased latching mechanism 28 to release the first portion 26 from the door frame 22 when the second portion 27 is rotated about a central stem 32 of the bi-fold door 24 to a first position, the first position being when the second portion 27 is adjacent to the first portion 26. The first position is shown in Figure 2(b). The door assembly 22 can also include at least one multi-joint door hinge 21 which will be described in greater detail in a later portion of the description. Figure 1 also shows a top view of how the multi-joint door hinge 21 is configured when in the closed configuration.

Reference will be made to Figure 4 to describe a first embodiment of the at least one biased latching mechanism 28 to aid in understanding subsequent portions of the description. The at least one biased latching mechanism 28 is for securing the door 24 to the door frame 22, specifically the first portion 26 of the door 24. The mechanism 28 includes a casing 50, the casing 50 being made of metal like, for example, brass and steel. The mechanism 28 has a biasing mechanism 52 located

at a first part 54 of the casing 50. The biasing mechanism 52 is either a spring or an elastic foam stack. The mechanism 28 also includes a latch 56 at a second part 58 of the casing 50. The latch 56 is received in the receptor 30 of the door frame 22. There is also a linkage assembly 60 coupled to the latch 56, the linkage assembly 60 being made from metal for durability and the linkage assembly 60 being also configured for applying a force to the biasing mechanism 52. Finally, the mechanism 28 includes a contact portion 62 protruding from an opening 64 in the casing 50. The opening 64 is located between the first part 54 and the second part 58 and the contact portion 62 is also coupled to the linkage assembly 60. The contact portion 62 is made from a metal like brass so that the contact portion 62 is able to withstand impact forces. The contact portion can also be coated/sheathed by a material which is able to absorb impact forces. Such materials include rubber and silicone. In the mechanism 28, when a force is applied to the contact portion 62, the linkage assembly 60 causes the latch 56 to retract into the casing 50, and when the force is removed from the contact portion 62, the latch 56 extends from the casing 50 due to a force exerted by the biasing mechanism 52.

Reference will be made to Figure 5 to describe the multi-joint door hinge 21 to aid in understanding subsequent portions of the description. The door hinge 21 includes a central portion 70, a first joint 72 at a first end 74 of the central portion 70, and a second joint 76 at a second end 78 of the central portion 70. The first joint 72 is attached to a first leaf 80 of the hinge 21, and the second joint 76 is attached to a second leaf 82 of the hinge 21. The second leaf 82 is configured to be attached to the door frame 22 using screws/rivets passing through a plurality of second leaf holes 83 and the first leaf 80 is configured to be attached to the door 24 using screws/rivets passing through a plurality of first leaf holes 81. It should be appreciated that the second leaf 82 is configured to move from an adjacent position to the central portion 70 to a perpendicular position to the central portion 70, that is angularly through a range of 90^0 with reference to the central portion 70. Furthermore, the first leaf 80 is configured to move from a perpendicular position to the central portion 70 to a parallel position to the central portion 70, that is angularly through a range of 90^0.

In Figure 2(a), the bi-fold door assembly 20 is in a closed configuration. The second portion 27 of the door 24 is rotated about the central stem 32 of the door 24 in direction 90. Subsequently, the door 24 is in a semi-open configuration as shown in Figure 2(b). The semi-open configuration is also known as the first position. In the first position, the second portion 27 is adjacent to the first portion 26. A first face 100 of the second portion 27 faces a first face 102 of the first portion 26. In the course of rotating the second portion 27 to the first position, the contact portion 62 of the at least one biased mechanism 28 is contacted by the first face 100 of the second portion 27 and correspondingly, the latch 56 of the at least one biased mechanism 28 is actuated to retract into the casing 50 of the at least one biased mechanism 28. When the latch 56 is retracted into the casing 50, the first portion 26 is able to be rotated about an end edge 31 of the first portion 26 in the direction 90 to an open configuration of the bi-fold door assembly 20 as shown in Figure 2(c). The door 24 is able to be opened in a manner which is substantially perpendicular to the door frame 22 because of use of the multi-joint hinges 21. It should be appreciated that the door 24 does not rely on the use of any tracks. The bi-fold door assembly 20 is also useful when used in confined areas with a limited floor area. Referring to Figure 14, there is shown a possible fully open configuration of the bi-fold door assembly 20 during instances where there is sufficient floor area, whereby the door 24 is moved in the direction 90 (shown in Figure 2(a)) in a manner where the door 24 does not block an opening defined by the door frame 22.

Figure 3 shows a process flow of a method 200 for opening the bi-fold door 24 as shown in Figures 2(a) to 2(c). The method 200 includes securing the first portion 26 of the bi-fold door 24 to the door frame 22 (202) using the at least one biased latching mechanism 28 attached to the first portion 26. This is shown in Figure 2(a). Then, the second portion 27 of the bi-fold door 24 is rotated about a central stem 32 of the bi-fold door 24, the second portion 27 being rotated to the first position (204), the first position being when the second portion 27 is adjacent to the first portion 26. The method 200 also includes actuating a latch 56 of the at least one biased latching mechanism 28 (206) to release the first portion 26 from the door frame 22 when the second portion 27 is at the first position. The first face 100 of the second portion 27 may be configured to contact a first face 102 of the first portion 26 when the second

portion 27 is at the first position. The first face 102 of the second portion 27 is configured to contact the at least one biased latching mechanism 28 to actuate the latch 56. This is shown in Figure 2(b). Finally, the method 200 also includes rotating the first portion 26 about an end edge 31 of the first portion 26 (208). Completion of the method 200 is shown in Figure 2(c) or Figure 14 during instances where there is sufficient floor area.

Referring to Figure 6, there is shown a perspective view of a second embodiment of a bi-fold door assembly 400. Referring to Figures 7(a) to 7(c), there is shown a sequence of cross-sectional top views of the second embodiment of a bi-fold door assembly 400 undergoing use from a closed configuration (Figure 7(a)) to an open configuration (Figure 7(c)). Figure 7(a) is the cross-sectional top view corresponding to Figure 6. The bi-fold door assembly 400 includes a door frame 422. The door frame 422 is made from either wood or aluminum. In Figure 6, a top portion 419 of the door frame 422 is shown in a transparent view so that the bi-fold door assembly 400 can be more clearly shown. The assembly 400 also includes a bi-fold door 424 with a first portion 426 and a second portion 427. The bi-fold door 424 should not be heavy and is made from, for example, a wood material, a metal material, a plastic material, a glass material or any combination of the aforementioned. The assembly 400 further includes at least one ball latch 428 attached to the first portion 426. The at least one ball latch 428 is configured for securing the first portion 426 to the door frame 422. It is appreciated that the door frame 422 includes a receptor 430 to allow the at least one ball latch 428 to secure the first portion 426 to the door frame 422. It is appreciated that the second portion 427 is configured to be rotated about a central stem 432 of the bi-fold door 424 to a first position, the first position being when the second portion 427 is adjacent to the first portion 426. The first position is shown in Figure 7(b). The door assembly 422 can also include at least one multi-joint door hinge 421 (identical to the multi-joint door hinge 21 of Figure 5). Figure 6 also shows a top view of how the multi-joint door hinge 421 is configured when in the closed configuration.

In Figure 7(a), the bi-fold door assembly 400 is in a closed configuration. The second portion 427 of the door 424 is rotated about the central stem 432 of the door 424 in

direction 490. Subsequently, the door 424 is in a semi-open configuration as shown in Figure 7(b). The semi-open configuration is also known as the first position. In the first position, the second portion 427 is adjacent to the first portion 426. A first face 500 of the second portion 427 faces a first face 502 of the first portion 426. When a force is applied to the first portion 426 in the direction 490, the ball latch 428 is retracted and the first portion 26 is able to be rotated about an end edge 431 of the first portion 426 in the direction 490 to an open configuration of the bi-fold door assembly 400 as shown in Figure 7(c). The door 424 is able to be opened in a manner which is substantially perpendicular to the door frame 422 because of use of the multi-joint hinges 421. It should be appreciated that the door 424 does not rely on the use of tracks. The bi-fold door assembly 400 is also useful when used in confined areas with a limited floor area. Referring to Figure 14, there is shown a possible fully open configuration of the bi-fold door assembly 400 during instances where there is sufficient floor area, whereby the door 724 is moved in the direction 490 (shown in Figure 7(a)) in a manner where the door 724 does not block an opening defined by the door frame 722.

Figure 8 shows a process flow of a method 600 for opening the bi-fold door 424 as shown in Figures 7(a) to 7(c). The method 600 includes securing the first portion 426 of the bi-fold door 424 to the door frame 22 (602) using the at least one ball latch 428 attached to the first portion 426. This is shown in Figure 7(a). Then, the second portion 427 of the bi-fold door 424 is rotated about a central stem 432 of the bi-fold door 424, the second portion 427 being rotated to the first position (604), the first position being when the second portion 427 is adjacent to the first portion 426. The method 200 also includes actuating the at least one ball latch 428 (606) to release the first portion 426 from the door frame 422 when a force is applied to the first portion 426 in a direction allowable by the at least one multi-joint door hinge 421. The first face 500 of the second portion 427 may be configured to contact a first face 502 of the first portion 426 when the second portion 427 is at the first position. This is shown in Figure 7(b). Finally, the method 600 also includes rotating the first portion 426 about an end edge 431 of the first portion 426 (208). Completion of the method 200 is shown in Figure 7(c) and Figure 14 during instances where there is sufficient floor area.

Referring to Figure 9, there is shown a perspective view of a third embodiment of a bi-fold door assembly 700. Referring to Figures 10(a) to 10(c), there is shown a sequence of cross-sectional top views of the third embodiment of a bi-fold door assembly 700 undergoing use from a closed configuration (Figure 10(a)) to an open configuration (Figure 10(c)). Figure 10(a) is the cross-sectional top view corresponding to Figure 9. The bi-fold door assembly 700 includes a door frame 722. The door frame 722 is made from either wood or aluminum. In Figure 9, a top portion 719 of the door frame 722 is shown in a transparent view so that the bi-fold door assembly 700 can be more clearly shown. The assembly 700 also includes a bi-fold door 724 with a first portion 726 and a second portion 727. The bi-fold door 724 should not be heavy and is made from, for example, a wood material, a metal material, a plastic material, a glass material or any combination of the aforementioned. The assembly 700 further includes at least one biased latching mechanism 728 attached to the first portion 726. The at least one biased latching mechanism 728 is configured for securing the first portion 726 to the door frame 722 in a manner as shown in Figure 9. It is appreciated that the door frame 722 includes a receptor 730 to allow the at least one biased mechanism 728 to secure the first portion 726 to the door frame 722. It is appreciated that the second portion 727 is configured to actuate a latch 756 of the at least one biased latching mechanism 728 to release the first portion 726 from the door frame 722 when the second portion 727 is rotated about a central stem 732 of the bi-fold door 724 to a first position, the first position being when the second portion 727 is adjacent to the first portion 726. The first position is shown in Figure 7(b). The door assembly 722 can also include at least one multi-joint door hinge 721 (identical to the multi-joint door hinge 21 of Figure 5). Figure 9 also shows a top view of how the multi-joint door hinge 721 is configured when in the closed configuration.

Reference will be made to Figure 12 to describe a second embodiment of the at least one biased latching mechanism 728 to aid in understanding subsequent portions of the description. The at least one biased latching mechanism 728 is for securing the door 724 to the door frame 722, specifically the first portion 726 of the door 724. The mechanism 728 includes a main casing 750, the main casing 750

being made of metal like, for example, brass and steel. The mechanism 728 has a biasing mechanism 752 located within the casing 750. The biasing mechanism 752 is either a spring or an elastic foam stack. The mechanism 728 also includes a latch 756 at a first part 758 of the casing 750. The latch 756 is received in the receptor 730 of the door frame 722. There is also a linkage assembly 760 coupled to the latch 756, the linkage assembly 760 being made from metal for durability and the linkage assembly 760 being also configured for applying a force to the biasing mechanism 752. Finally, the mechanism 728 includes a sliding portion 762 protruding from an opening 764 in the casing 750. The sliding portion 762 includes a plurality of joints, but only an outer joint 761 is shown. There is also a movable leaf portion 763 attached to the outer joint 761. The opening 764 is located at a second part 757 of the casing 750 and the sliding portion 762 is also coupled to the linkage assembly 760. The sliding portion 762 is made from a metal like brass so that the sliding portion 762 is able to withstand sliding forces and is able to slide through the opening 764. In the mechanism 728, when the sliding portion 762 is slid out from the casing 750 through the opening 764, the linkage assembly 760 causes the latch 756 to retract into the casing 750, and when the sliding portion 762 is slid into the casing 750, the latch 756 extends from the casing 750 due to a force exerted by the biasing mechanism 752. In Figure 9, the sliding portion 762 is shown for the sake of illustration, but the sliding portion 762 is preferably substantially within the casing 750 when the latch 756 is protruding from the casing 750.

In Figure 10(a), the bi-fold door assembly 700 is in a closed configuration. The second portion 727 of the door 724 is rotated about the central stem 732 of the door 724 in direction 790. Subsequently, the door 724 is in a semi-open configuration as shown in Figure 10(b). The semi-open configuration is also known as the first position. In the first position, the second portion 727 is adjacent to the first portion 726. A first face 800 of the second portion 727 faces a first face 802 of the first portion 726. In the course of rotating the second portion 727 to the first position, the sliding portion 762 of the at least one biased mechanism 728 is slid out through the opening 764 and correspondingly, the latch 756 of the at least one biased mechanism 728 is actuated to retract into the casing 750 of the at least one biased mechanism 728. When the latch 756 is retracted into the casing 750, the first portion

726 is able to be rotated about an end edge 731 of the first portion 726 in the direction 790 to an open configuration of the bi-fold door assembly 720 as shown in Figure 10(c). The door 724 is able to be opened in a manner which is substantially perpendicular to the door frame 722 because of use of the multi-joint hinges 721. It should be appreciated that the door 724 does not rely on the use of any tracks. The bi-fold door assembly 700 is also useful when used in confined areas with a limited floor area. Referring to Figure 14, there is shown a possible fully open configuration of the bi-fold door assembly 700 during instances where there is sufficient floor area, whereby the door 724 is moved in the direction 790 (shown in Figure 10(a)) in a manner where the door 724 does not block an opening defined by the door frame 722.

Figure 11 shows a process flow of a method 900 for opening the bi-fold door 724 as shown in Figures 10(a) to 10(c). The method 900 includes securing the first portion 726 of the bi-fold door 724 to the door frame 722 (902) using the at least one biased latching mechanism 728 attached to the first portion 726. This is shown in Figure 10(a). Then, the second portion 727 of the bi-fold door 724 is rotated about a central stem 732 of the bi-fold door 724, the second portion 727 being rotated to the first position (904), the first position being when the second portion 727 is adjacent to the first portion 726. The method 900 also includes actuating a latch 756 of the at least one biased latching mechanism 728 (906) to release the first portion 726 from the door frame 722 when the second portion 727 is at the first position. This is shown in Figure 10(b). Finally, the method 900 also includes rotating the first portion 726 about an end edge 731 of the first portion 726 (908). Completion of the method 900 is shown in Figure 10(c) or Figure 14 during instances where there is sufficient floor area.

Referring to Figure 10, there is shown a perspective sectional view of a door that can be used as door 24, 424, 724 as mentioned in the preceding paragraphs. For the sake of illustration, the door shown in Figure 10 will be labeled "24". The door 24 includes two plastic panels 8, 10 held together using an aluminum rim 12. The aluminum rim 12 is secured to all edges of each of the two plastic panels 8, 10 in a manner whereby the aluminum rim 12 forms a frame for the door 24. The aluminum

rim 12 can be coated with a film which provides a wood finish. A cavity 6 between the two plastic panels 8, 10 is able contain rockwool (for sound proofing), fire retardant foam (for fire retardency), and dense foam (for providing weight). The plastic panels 8, 10 can be coated with a film which provides a wood finish. It should be appreciated that the door 24 is able to repel insects and is also able to act as a water barrier. The plastic panels 8, 10 can be made from high pressure laminate which demonstrates some degree of fire retardance.

It should be appreciated that the bi-fold door assembly 20/400/700 provides a bi-fold door 24/424/724 which does not rely on the use of any tracks and does not block an opening defined by the door frame 22/422/722 when the door assembly 20/400/700 is in a fully open configuration. The at least one biased latching mechanism 28/428/728 and the multi-joint hinge 21/421/721 both contribute to the bi-fold door assembly 20/400/700 being able to function in a desired manner. It should also be appreciated that the methods 200/600/900 describe a manner of opening a bi-fold door 24/424/724 which does not rely on the use of any tracks and can also lead to an opening defined by the door frame 22/422/722 which is not blocked by the door 24/424/724.

In addition, even though the at least one biased latching mechanism 28/728 and the multi-joint hinge 21/421/721 are described as used in the bi-fold door assembly 20/400/700, they can be used in other applications without the rest of the bi-fold door assembly 20/400/700.

Whilst there have been described in the foregoing description preferred embodiments of the present invention, it will be understood by those skilled in the technology concerned that many variations or modifications in details of design or construction may be made without departing from the present invention.

CLAIMS

1. A method for opening a bi-fold door, the method including:

securing a first portion of the bi-fold door to a door frame using at least one biased latching mechanism attached to the first portion;

rotating a second portion of the bi-fold door about a central stem of the bi-fold door, the second portion being rotated to a first position, the first position being when the second portion is adjacent to the first portion; and

actuating a latch of the at least one biased latching mechanism to release the first portion from the door frame when the second portion is at the first position.

2. The method of claim 1, further including rotating the first portion about an end edge of the first portion.

3. The method of either claim 1 or 2, wherein a first face of the second portion is configured to contact a first face of the first portion when the second portion is at the first position.

4. The method of claim 3, wherein the first face of the second portion is configured to contact the at least one biased latching mechanism to actuate the latch.

5. A bi-fold door assembly, the assembly including:

a bi-fold door with a first portion and a second portion; and

at least one biased latching mechanism attached to the first portion, the at least one biased latching mechanism being configured for securing the first portion to the door frame.

6. The door assembly of claim 5, wherein the second portion is configured to actuate a latch of the at least one biased latching mechanism to release the first portion from the door frame when the second portion is rotated about a central stem of the bi-fold door to a first position, the first position being when the second portion is adjacent to the first portion.

7. The door assembly of either claim 5 or 6, further including at least one multi-joint door hinge.

8. A latching mechanism for securing a door to a door frame, the mechanism including:

a casing;

a biasing mechanism located at a first part of the casing;

a latch at a second part of the casing;

a linkage assembly coupled to the latch, the linkage assembly being configured for applying a force to the biasing mechanism; and

a contact portion protruding from an opening in the casing between the first part and the second part, the contact portion being coupled to the linkage assembly.

9. The mechanism of claim 8, wherein the biasing mechanism is either a spring or an elastic foam stack.

10. The mechanism of either claim 8 or 9, wherein the linkage assembly is made from metal.

11. The mechanism of any one of claims 8 to 10, wherein the contact portion is made from metal.

12. A multi-joint door hinge, the hinge including:

a central portion;

a first joint at a first end of the central portion, the first joint being attached to a first leaf of the hinge; and

a second joint at a second end of the central portion, the second joint being attached to a second leaf of the hinge.

13. The door hinge of claim 12, wherein the first leaf is configured to be attached to a door frame and the second leaf is configured to be attached to a door.

14. The door hinge of either claim 12 or 13, wherein both the first leaf and the second leaf are configured to rotate angularly by 90^0.

15. A latching mechanism for securing a door to a door frame, the mechanism including:

a casing;

a biasing mechanism located within the casing;

a latch at a first part of the casing;

a linkage assembly coupled to the latch, the linkage assembly being configured for applying a force to the biasing mechanism; and

a sliding portion protruding from an opening in a second part of the casing, the sliding portion being coupled to the linkage assembly.

16. The mechanism of claim 15, wherein the biasing mechanism is either a spring or an elastic foam stack.

17. The mechanism of either claim 15 or 16, wherein the linkage assembly is made from metal.

18. A door including two plastic panels bordered by an aluminum rim, both the aluminum rim and the two plastic panels are coated with a film providing a wood finish, wherein a cavity between the two plastic panels is configured to contain at least one material selected from a group consisting of: rockwool, fire retardant foam and dense foam.

19. A door as claimed in claim 18, wherein the two plastic panels are made from high pressure laminate.