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A MULTI-FLAP HINGE, DOOR/WINDOW ASSEMBLIES AND METHODS INVOLVING USE OF THE HINGE

FIELD OF INVENTION

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The present invention relates to the field of hinges for doors/windows and use of hinges for doors/windows.

BACKGROUND

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It is quite common to come across doors with a secondary gate. Even though the secondary gate provides an additional layer of security when the door is open, the secondary gate requires another key or access pass which causes inconvenience to users. For example, additional time is required to open the secondary gate before opening the door, loss of key or access pass for the secondary gate will hamper access to the door, and so forth.

Moreover, the secondary gate typically opens in a manner which obstructs the passage of human traffic along a corridor which each door is located at. As such, the secondary gate poses a hazard during instances when the corridor should be free of obstruction, such as, for example, evacuation of buildings, fire, terrorist attacks, and so forth.

In addition, windows in high rise developments typically have windows which open outwards and grills which are installed at an interior of units in the high rise developments. This aforementioned configuration of outward opening windows and interior grills has led to many dangers in relation to the cleaning of windows, and this is undesirable.

It would be preferable if the issues mentioned in the preceding paragraphs could be addressed.



SUMMARY

In a first aspect, there is provided a multi-flap hinge for use with a door assembly, the door assembly including a door frame, a door structure and a gate structure. The multi-flap hinge includes a first flap for attachment to the door frame; a second flap for attachment to the door structure; and a third flap for attachment to the gate structure. It is preferable that the multi-flap hinge is in a form of a one-piece unit.

In the multi-flap hinge, at least one of the first flap, the second flap and the third flap are attached at an installation location of the door assembly. The multi-flap hinge may further include at least one first additional flap for attachment to the door frame, at least one second additional flap for attachment to the door structure and at least one third additional flap for attachment to the gate structure.

In a second aspect, there is provided a door assembly including a door frame, a door structure and a gate structure. The door assembly uses a multi-flap hinge, the multi-flap hinge including a first flap for attachment to the door frame; a second flap for attachment to the door structure; and a third flap for attachment to the gate structure. Preferably, the multi-flap hinge is in a form of a one-piece unit.

It is advantageous that the door structure is configured to be releasably secured to the gate structure. In addition, the door structure and the gate structure are able to move together in an angular path when the door structure is releasably secured to the gate structure.

Preferably, the door frame is able to support a combined weight of the door structure and the gate structure. In addition, the gate structure may be lockable to the door frame. The multi-flap hinge may further include at least one first additional flap for attachment to the door frame, at least one second additional

flap for attachment to the door structure and at least one third additional flap for attachment to the gate structure.

5 In another aspect, there is provided a multi-flap hinge for use with a window assembly, the window assembly including a window frame, a window structure and a window grill structure. The multi-flap hinge includes a first flap for attachment to the window frame; a second flap for attachment to the window structure; and a third flap for attachment to the window grill structure. It is preferable that the multi-flap hinge is in a form of a one-piece unit.

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In the multi-flap hinge, at least one of the first flap, the second flap and the third flap are attached at an installation location of the window assembly. The multi-flap hinge may further include at least one first additional flap for attachment to the window frame, at least one second additional flap for attachment to the window structure and at least one third additional flap for attachment to the window grill structure.

20 There is also provided a window assembly including a window frame, a window structure and a window grill structure. The window assembly using a multi-flap hinge, the multi-flap hinge including a first flap for attachment to the window frame; a second flap for attachment to the window structure; and a third flap for attachment to the window grill structure. It is preferable that the multi-flap hinge is in a form of a one-piece unit.

25 It is advantageous that the window structure is configured to be releasably secured to the window grill structure. Furthermore, the window structure and the window grill structure are able to move together in an angular path when the window structure is releasably secured to the window grill structure.

30 It is preferable that the window frame is able to support a combined weight of the window structure and the window grill structure. Moreover, the window grill structure may be lockable to the window frame. The multi-flap hinge may further

include at least one first additional flap for attachment to the window frame, at least one second additional flap for attachment to the window structure and at least one third additional flap for attachment to the window grill structure.

- 5 A further aspect relates to a method for installing a door assembly, the door assembly including a door frame, a door structure and a gate structure. The method includes fitting the door frame; attaching at least one hinge to at least one of the door frame, the door structure and the gate structure; and securing the door structure to the gate structure.

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It is advantageous that the door structure and the gate structure are able to move together in an angular path when the door structure is secured to the gate structure. Furthermore, the at least one hinge includes a multi-flap hinge with at least three flaps.

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In a final aspect, there is provided a method for installing a window assembly, the window assembly including a window frame, a window structure and a window grill structure. The method includes fitting the window frame; attaching at least one hinge to at least one of the window frame, the window structure and the window grill structure; and securing the window structure to the window grill structure.

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It is advantageous that the window structure and the window grill structure are able to move together in an angular path when the window structure is secured to the window grill structure. Preferably, the at least one hinge includes a multi-flap hinge with at least three flaps.

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DESCRIPTION OF FIGURES

- 30 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 preferred embodiment of a triple flap hinge.

Figure 2 shows a perspective view of a door/window assembly using the triple flap hinge of Figure 1.

Figure 3 shows a process flow of a first method using a triple flap hinge.

Figure 4 shows a process flow of a second method using a triple flap hinge.

Figure 5 shows a perspective view of a securing portion between a door structure and a gate structure of the door assembly of Figure 2.

Figure 6 shows a frontal view of a locking portion between a gate structure and a door frame of the door assembly of Figure 2 in a direction of "A" as shown in Figure 5.

Figure 7 shows a perspective view of a preferred embodiment of a multi-flap hinge.

DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention relates to a hinge, door/window assemblies using the hinge and a method which enables ease of using doors and windows with gates and grills respectively. Some advantages of the invention, which will be evident from the disclosure of the subsequent paragraphs, include providing ease of operating the doors and the windows, as well as safety reasons.

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Referring to Figure 1, there is shown a perspective view of a triple flap hinge 20 for use with either a door assembly or a window assembly. The door assembly includes a door frame, a door structure and a gate structure. Similarly, the window assembly includes a window frame, a window structure and a window grill structure. Referring to Figure 2, there is shown a perspective view of the triple flap hinge 20 when in use in a door assembly 100. Both Figures 1 and 2

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will be referred to from hereon and further details of the door assembly 100 will be provided in subsequent paragraphs.

It should be appreciated that while flaps 22, 24, 26 of the triple flap hinge 20 shown in Figure 1 are all rectangular in shape, this is not a mandatory shape for each flap 22, 24, 26. Each flap 22, 24, 26 may have curved edges and not straight edges. Thus, the triple flap hinge 20 shown in Figure 1 is merely illustrative and does not represent a definitive appearance of the triple flap hinge 20.

The triple flap hinge 20 is in a form of a one-piece unit and includes a first flap 24 for attachment to the door frame 102. The first flap 24 is attached to the door frame 102 using a plurality of screws placed located at first flap holes 28. There is also a second flap 26 for attachment to the door structure 104. The door structure 104 can be a fire proof rated door structure or a lightweight ornamental/aesthetics door. The second flap 26 is attached to the door structure 104 using a plurality of fasteners (screws for heavier door structures, rivets for lightweight door structures) located at second flap holes 30. The triple flap hinge 20 also includes a third flap 22 for attachment to the gate structure 106. The third flap 22 is attached to the gate structure 106 by either using a plurality of fasteners (screws for heavier gate structures, rivets for lightweight gate structures) located at third flap holes 32 or welding the third flap 22 to the gate structure 106 (if the gate structure 106 can be welded). At least one of the first flap 24, the second flap 26 and the third flap 22 are attached to respective parts of the door assembly 100 at an installation location of the door assembly 100.

The first flap 24, the second flap 26 and the third flap 22 all share a central stem 34. The first flap 24, the second flap 26 and the third flap 22 all are of identical thickness. In the event if there is any difference in thickness of each of the first flap 24, the second flap 26 and the third flap 22, the difference is not significant. Each of the first flap 24, the second flap 26 and the third flap 22 is able to rotate

independently about the central stem 34. The third flap 22 includes a first opening 40 which allows passage of the first flap 24. Similarly, the first flap 24 includes a second opening 42 which allows passage of the second flap 26. It should be appreciated that when the first flap 24 is located within the first opening 40, the first flap 24 becomes flush with the third flap 22. Similarly, when the second flap 26 is located within the second opening 42, the second flap 26 becomes flush with the first flap 24. When the first flap 24 becomes flush with the third flap 22 and the second flap 26 becomes flush with the first flap 24, the triple flap hinge 20 is considered to be in a compact configuration, which aids in ease in packing and transportation of the triple flap hinge 20.

While the triple flap hinge 20 shown in Figure 1 only has three flaps 22, 24, 26, it is possible that each of the three flaps 22, 24, 26 are broken up into separate portions as shown in Figure 7 such that the triple flap hinge 20 becomes a six-flap hinge 600. In the six-flap hinge 600, a fourth flap 602, a fifth flap 604, a sixth flap 606, a seventh flap 608, an eighth flap 610 and a ninth flap 612 all share a central stem 614. The six-flap hinge 600 shows each of the three flaps 22, 24, 26 of the triple flap hinge 20 being broken into two parts. It should be appreciated that there may be hinges which have a number of flaps between three and six when not every flap 22, 24, 26 of the triple flap hinge 20 is separated into two parts. Furthermore, even though the six-flap hinge 600 appears to be formed from the triple flap hinge 20 by breaking up each of the three flaps 22, 24, 26, this need not be the case and each flap 602, 604, 606, 608, 610, 612 can be independent and need not be in contact with each other.

In the door assembly 100, the door structure 104 is configured to be releasably secured to the gate structure 106. Referring to Figure 5, the door structure 104 is secured to the gate structure 106 using a deadbolt 110. The gate structure 106 should be located adjacent to the door structure 104 when the door structure 104 is secured to the gate structure 106 and should also include an opening 150 to locate the deadbolt 110. The door structure 104 includes an entry mechanism 112 which retracts the deadbolt 110 so that the door structure

104 can be separated from the gate structure 106. When the door structure 104 is secured to the gate structure 106, the door structure 104 and the gate structure 106 are able to move together in an angular path. Referring to Figure 6, the gate structure 106 is also lockable to the door frame 102 using a lockable entry mechanism 120. The lockable entry mechanism 120 is a typical lock with a deadbolt 124 for gate structures and can include either a keyhole 122 or a digital card reader (not shown). The gate structure 106 may also include a handle 160 to allow a user to move the gate structure 106 when the lockable entry mechanism 120 is unlocked.

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The door frame 102 of the door assembly 100 is able to support a combined weight of the door structure 104 and the gate structure 106. Similarly, the triple flap hinge 20 should be made of either steel or stainless steel which is able to repeatedly sustain loads from being attached to the door assembly 100.

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When the door assembly 100 includes use of the triple flap hinge 20, the door structure 104 is able to move together with the gate structure 106 in an angular path when the door structure 104 is secured to the gate structure 106. In such an instance, a user only needs to unlock the lockable entry mechanism 120 of the gate structure 106 and is able to open both the door structure 104 and the gate structure 106 to gain entry to premises installed with the door structure 104 and the gate structure 106. This is convenient for users as only a single key/access pass is required, and also saves time for users since only a single entry mechanism is being unlocked. In addition, since the gate structure 106 moves along the same angular path as the door structure 104, the gate structure 106 will not obstruct a corridor where the door assembly 100 is located at.

It should be appreciated that the triple flap hinge 20 is also usable in a window assembly. Figure 2 can also be used to show a perspective view of the triple flap hinge 20 when in use in a window assembly 200. When the triple flap hinge 20 is used in the window assembly 200, the first flap 24 is attached to a window

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frame 202. The first flap 24 is attached to the window frame 202 using a plurality of screws placed located at first flap holes 28. The second flap 26 is attached to a window structure 204. The window structure 204 can be a casement window. The second flap 26 is attached to the window structure 204 using a plurality of fasteners (screws for heavier window structures, rivets for lightweight window structures) located at second flap holes 30. The third flap 22 is attached to the window grill structure 206. The third flap 22 is attached to the window grill structure 206 by either using a plurality of fasteners (screws for heavier grill structures, rivets for lightweight grill structures) located at third flap holes 32 or welding the third flap 22 to the grill structure 206 (if the grill structure 206 can be welded). At least one of the first flap 24, the second flap 26 and the third flap 22 are attached to respective parts of the window assembly 200 at an installation location of the window assembly 200.

In the window assembly 200, the window structure 204 is configured to be releasably secured to the grill structure 206. Referring to Figure 5 which also can show a perspective view of a securing portion between the window structure 204 and the grill structure 206 of the window assembly 200, the window structure 204 is secured to the grill structure 206 using a deadbolt 210. The grill structure 206 should be located adjacent to the window structure 204 when the window structure 204 is secured to the grill structure 206 and should also include an opening 250 to locate the deadbolt 210. The window structure 204 includes an entry mechanism 212 which retracts the deadbolt 210 so that the window structure 204 can be separated from the grill structure 206. When the window structure 204 is secured to the grill structure 206, the window structure 204 and the grill structure 206 are able to move together in an angular path. The grill structure 206 is also lockable to the window frame 202 using a lockable entry mechanism 220. The lockable entry mechanism 220 is a typical lock with a deadbolt 224 for grill structures and can include either a keyhole 222 or a digital card reader (not shown). The grill structure 206 also includes a handle 260 to allow a user to move the grill structure 206 when the lockable entry mechanism 220 is unlocked.

The window frame 202 of the window assembly 200 is able to support a combined weight of the window structure 204 and the grill structure 206. Similarly, the triple flap hinge 20 should be made of either steel or stainless steel which is able to repeatedly sustain loads from being attached to the window assembly 200. In addition, the triple flap hinge 20 is able to be used in either a vertical or horizontal configuration in the window assembly 200.

When the window assembly 200 includes use of the triple flap hinge 20, the window structure 204 is able to move together with the grill structure 206 in an angular path when the window structure 204 is secured to the grill structure 206. In such an instance, a user only needs to unlock the lockable entry mechanism 220 of the grill structure 206 and is able to open both the window structure 204 and the grill structure 206 to clean both the window structure 204 and the grill structure 206. This is safe for users as the window structure 204 and the grill structure 206 both open inwards into the premises and correspondingly, cleaning is safely carried out within the premises.

Referring to Figure 3, there is provided a method 300 for installing the door assembly 100. The door assembly 100 includes the door frame 102, the door structure 104 and the gate structure 106.

The method 300 includes fitting the door frame 102 at a door way (302). Then, at least one hinge is attached to at least one of the door frame 102, the door structure 104 and the gate structure 106 (304). The attachment of the at least one hinge can be carried out at an installation site of the door assembly 100. The at least one hinge can include triple flap hinges 20 as well as double flap hinges. There is a possibility of using only a single triple flap hinge 20 while a minimum of two double flap hinges are required for the door assembly 100. The method 300 also includes securing the door structure 104 to the gate structure 106 (306). The door structure 104 is secured to the gate structure 106 in a manner as described in an earlier portion of the description.

In the method 300, when the door structure 104 is secured to the gate structure 106, the door structure 104 and the gate structure 106 are able to move together in an angular path. In such an instance, a user only needs to unlock
5 the lockable entry mechanism 120 of the gate structure 106 and is able to open both the door structure 104 and the gate structure 106 to gain entry to premises installed with the door structure 104 and the gate structure 106. This is convenient for users as only a single key/access pass is required, and also saves time for users since only a single entry mechanism is being unlocked. In
10 addition, since the gate structure 106 moves along the same angular path as the door structure 104, the gate structure 106 will not obstruct a corridor where the door assembly 100 is located at.

Referring to Figure 4, there is provided a method 400 for installing the window
15 assembly 200. The window assembly 200 includes the window frame 202, the window structure 204 and the grill structure 206.

The method 400 includes fitting the window frame 202 at a window site (402). Then, at least one hinge is attached to at least one of the window frame 202,
20 the window structure 204 and the grill structure 206 (404). The attachment of the at least one hinge can be carried out at an installation site of the window assembly 200. The at least one hinge can include triple flap hinges 20 as well as double flap hinges. There is a possibility of using only a single triple flap hinge 20 while a minimum of two double flap hinges are required for the window
25 assembly 100. The method 400 also includes securing the window structure 204 to the grill structure 206 (406). The window structure 204 is secured to the grill structure 206 in a manner as described in an earlier portion of the description.

30 In the method 400, when the window structure 204 is secured to the grill structure 206, the window structure 204 and the grill structure 206 are able to move together in an angular path. In such an instance, a user only needs to

unlock the lockable entry mechanism 220 of the grill structure 206 and is able to open both the window structure 204 and the grill structure 206 to clean both the window structure 204 and the grill structure 206. This is safe for users as the window structure 204 and the grill structure 206 both open inwards into the premises and correspondingly, cleaning is safely carried out within the premises.

Whilst there has 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 multi-flap hinge for use with a door assembly, the door assembly including a door frame, a door structure and a gate structure, the multi-flap
5 hinge including:
 a first flap for attachment to the door frame;
 a second flap for attachment to the door structure; and
 a third flap for attachment to the gate structure,
 wherein the multi-flap hinge is in a form of a one-piece unit.
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2. The multi-flap hinge of claim 1, wherein at least one of the first flap, the second flap and the third flap are attached at an installation location of the door assembly.
- 15 3. The multi-flap hinge of either claim 1 or 2, further including at least one first additional flap for attachment to the door frame.
4. The multi-flap hinge of either claim 1 or 2, further including at least one second additional flap for attachment to the door structure.
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5. The multi-flap hinge of either claim 1 or 2, further including at least one third additional flap for attachment to the gate structure.
6. A door assembly including a door frame, a door structure and a gate
25 structure, the door assembly using a multi-flap hinge, the multi-flap hinge including:
 a first flap for attachment to the door frame;
 a second flap for attachment to the door structure; and
 a third flap for attachment to the gate structure,
30 wherein the multi-flap hinge is in a form of a one-piece unit.

7. The door assembly of claim 6, wherein the door structure is configured to be releasably secured to the gate structure.

8. The door assembly of claim 7, wherein the door structure and the gate structure are able to move together in an angular path when the door structure is releasably secured to the gate structure.

9. The door assembly of any one of claims 6 to 8, wherein the door frame is able to support a combined weight of the door structure and the gate structure.

10. The door assembly of any one of claims 6 to 9, wherein the gate structure is lockable to the door frame.

11. The door assembly of any one of claims 6 to 10, the multi-flap hinge further including at least one first additional flap for attachment to the door frame.

12. The door assembly of any one of claims 6 to 10, the multi-flap hinge further including at least one second additional flap for attachment to the door structure.

13. The door assembly of any one of claims 6 to 10, the multi-flap hinge further including at least one third additional flap for attachment to the gate structure.

14. A multi-flap hinge for use with a window assembly, the window assembly including a window frame, a window structure and a window grill structure, the multi-flap hinge including:

- a first flap for attachment to the window frame;
 - a second flap for attachment to the window structure; and
 - a third flap for attachment to the window grill structure,
- wherein the multi-flap hinge is in a form of a one-piece unit.

15. The multi-flap hinge of claim 8, wherein at least one of the first flap, the second flap and the third flap are attached at an installation location of the window assembly.
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16. The multi-flap hinge of either claim 14 or 15, further including at least one first additional flap for attachment to the window frame.
17. The multi-flap hinge of either claim 14 or 15, further including at least one
- 10 second additional flap for attachment to the window structure.
18. The multi-flap hinge of either claim 14 or 15, further including at least one third additional flap for attachment to the window grill structure.
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19. A window assembly including a window frame, a window structure and a window grill structure, the window assembly using a multi-flap hinge, the multi-flap hinge including:
- a first flap for attachment to the window frame;
 - a second flap for attachment to the window structure; and
 - 20 a third flap for attachment to the window grill structure,
- wherein the multi-flap hinge is in a form of a one-piece unit.
20. The window assembly of claim 19, wherein the window structure is configured to be releasably secured to the window grill structure.
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21. The window assembly of claim 20, wherein the window structure and the window grill structure are able to move together in an angular path when the window structure is releasably secured to the window grill structure.
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22. The window assembly of any one of claims 19 to 21, wherein the window frame is able to support a combined weight of the window structure and the window grill structure.

23. The window assembly of any one of claims 19 to 22, wherein the window grill structure is lockable to the window frame.

5 24. The window assembly of any one of claims 19 to 23, the multi-flap hinge further including at least one first additional flap for attachment to the window frame.

25. The door assembly of any one of claims 19 to 23, the multi-flap hinge
10 further including at least one second additional flap for attachment to the window structure.

26. The door assembly of any one of claims 19 to 23, the multi-flap hinge further including at least one third additional flap for attachment to the window
15 grill structure.

27. A method for installing a door assembly, the door assembly including a door frame, a door structure and a gate structure, the method including:
fitting the door frame;
20 attaching at least one hinge to at least one of the door frame, the door structure and the gate structure; and
securing the door structure to the gate structure.

28. The method of claim 27, wherein the door structure and the gate
25 structure are able to move together in an angular path when the door structure is secured to the gate structure.

29. The method of either claim 27 or 28, wherein the at least one hinge includes a multi-flap hinge with at least three flaps.

30 30. A method for installing a window assembly, the window assembly including a window frame, a window structure and a window grill structure, the

method including:

fitting the window frame;

attaching at least one hinge to at least one of the window frame, the window structure and the window grill structure; and

5 securing the window structure to the window grill structure.

31. The method of claim 30, wherein the window structure and the window grill structure are able to move together in an angular path when the window structure is secured to the window grill structure.

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32. The method of either claim 30 or 31, wherein the at least one hinge includes a multi-flap hinge with at least three flaps.