

TITLE OF THE INVENTION: Innovative Multi-Flap Hinge System and Method of Installation for Enhanced Door and Window Assemblies

TECHNICAL FIELD

Embodiments of the present invention generally relate to the field of door and window assemblies, and more specifically to a multi-flap hinge system and associated method of installation that enhances the functionality, versatility, and security of doors and windows.

BACKGROUND ART

As it is well known that after the completion of any building infrastructure, the installation of doors and windows takes centre stage. These essential components serve as openable and vented barriers within a structure. Doors, in particular, play a primary role in providing entry and exit points for buildings or specific areas within them. Meanwhile, windows contribute significantly by allowing natural light to illuminate interior spaces and facilitating proper ventilation. Whether in civil, commercial, or residential settings, doors and windows are ubiquitous features. Depending on the interiors and exterior of the building, doors and windows are assembled to match the purpose, feel, and overall aesthetic of the space. As a result, the selection of door and window designs, materials, finishes, and features are done with careful consideration to create a harmonious and cohesive look that complements the building's style and intended atmosphere.

Generally, the purpose of assembling doors and windows is to provide overall protection and security along with essential functionalities such as privacy,

insulation, and control over natural elements like light, air, and noise. Every now and then, we come across different designs and functionalities of doors and windows. However, in this realm, there exists a select few infrastructure solutions that fulfil multiple purposes simultaneously which combine the essential elements of privacy, transparency, ventilation, and protection against insects, all while ensuring optimal airflow. Some notable examples include doors or windows with wooden frames and glass panels, which combine wood with the transparency of glass and create an elegant and timeless look. There are also openings with an additional layer or set of doors, such as screen doors or double doors. These provide added security, insulation, and aesthetic appeal, giving homeowners more options to customize their entrances. However, windows and doors still fall short of being versatile enough to fulfil all the essential requirements of a home or commercial building. In many instances, customers find themselves facing a dilemma where they have to either prioritize one functionality at the expense of another or invest a substantial amount of money in creating custom made doors and windows which is tailored to their specific needs.

Generally, in the housing market, the development of doors and windows takes into consideration the overall living conditions of a specific country. This is particularly important in regions where the climate is typically hot and humid. In such areas, adequate ventilation becomes crucial for maintaining a comfortable living environment. Likewise, diverse climate areas create favourable conditions for the breeding and proliferation of insects and mosquitoes. As such, we often see governments taking initiatives to provide infrastructure and support measures to

combat mosquito-borne diseases and improve public health. These initiatives also encourage the installation of mosquito screens or net doors in homes. However, even if these net windows and doors are installed, they come with numerous limitations. For instance, improper installation can compromise their effectiveness, resulting in gaps that allow insects to enter. Wear and tear over time can also lead to damage or reduced functionality. Additionally, net windows and doors may restrict views and airflow compared to open windows or doors.

Apart from net doors, customers also seek doors with glass panels due to their ability to offer transparency and allow abundant natural light to enter the space. Glass panels have the added benefit of providing insulation, assisting in maintaining indoor temperature and reducing noise transmission. However, a potential drawback of using glass panels is the compromise of privacy, as the interior becomes visible from the outside, which may not be ideal in specific scenarios. To address this concern, individuals often opt to install additional curtains. Nevertheless, this can somewhat negate the purpose of installing glass panels, as the curtains may obstruct the transparency and natural light that the glass panels were intended to provide.

Recent developments have sought to address these concerns through the implementation of a solution known as dual door installation. This innovative process involves the addition of second or third doors onto a single door frame. This added door can be net or glass panel. However, it is important to note that this approach necessitates substantial modifications to the existing door, including the removal of the current door, hinges, and any hardware that might impede the

installation of the additional doors. Installing an additional door with options such as a net, glass, or blind within an existing door frame typically involves the construction of an additional layer of framing alongside the original one. Furthermore, it necessitates the installation of separate hinges for the new door.

5 While this approach ensures structural integrity, it can be a time-consuming process and may reduce the available space within the room. The process is labour-intensive which primarily stems from meticulous nature of the modifications required. Moreover, the complexities, limitations, and costs associated with these solutions make them less common compared to other alternatives.

10 According to the prior art disclosure, **CN2101727U**, the utility model pertains to the field of hinges for doors and windows, and specifically relates to a multi-leaf hinge that offers enhanced convenience and practicality. This multi-leaf hinge is capable of accommodating the installation of two or more doors or windows, while allowing them to be opened in a single direction. However, this invention does not exhibit
15 any improvement that can allow customers to customise the door or additional attachment as per their needs. As a result, the installation process for additional doors with options like net, glass, or blind is still limited.

Additionally, as per prior art disclosure, **US7458410B1**, a method of multiple doors joining assembly is provided wherein a joining assembly designed to connect
20 multiple doors in a manner where the movement of one door triggers the movement of others in synchronization. In scenarios where additional secondary doors need to be joined with the initial two doors, a connecting angle plate is utilized. However, this cited invention does not address the specific requirement of

incorporating mesh, net, glass, or blind materials into the assembly. While the mentioned invention enables the connection of multiple doors, its purpose and function differ from the requirement of accommodating these additional features.

Subsequently, there are number of prior art disclosure that provide structure for multiple doors. However, they often fail to address the evolving needs of the current environment. These doors do not adequately provide protection against hazardous substances which leads to compromise in human health. There is also limited options from homeowners to customize their entryways as per their needs. In the present scenario, doors primarily serve the purpose of facilitating entry and exit points, and homeowners encounter significant challenges when attempting to install additional doors or panels. As a result, the limited functionality of conventional doors leads to various inconveniences.

With regard to above mentioned problem, there is a need for innovative solutions that go beyond the conventional purpose of doors. There is a need for provision of adequate protection against hazardous substances while offering convenience and ease of installation for homeowners. There is also a need for a novel approach to facilitate the installation of various elements, including mesh, netting, glass, and blinds, while maintaining a cohesive structure. Additionally, there is a need for a unified framework that accommodates the installation of multiple doors, seamlessly integrating safety, transparency, protection against hazardous insects, and optimal ventilation. Accordingly, there remains a need in the art for innovative, novel, cost-effective and efficient solutions providing innovative multi-flap hinge system and method of installation for enhanced door and window assemblies.

SUMMARY OF THE INVENTION

It is an object of the invention to provide innovative multi-flap hinge system and method of installation for enhanced door and window assemblies.

In one embodiment, a multi-flap hinge system for use with a door assembly or a window assembly includes, a first flap designed for attachment to a door or window frame; a second flap designed for attachment to a door or window structure; a third flap providing a plurality of attachment options; and, a fourth flap designed for attachment to a gate or grill structure. In use, each of the flaps is integrated as a single unit and is able to rotate independently around a central stem.

The embodiments of the present disclosure have several features, no single one of which is solely responsible for their desirable attributes. Without limiting the scope of the present embodiments as expressed by the claims that follow, their more prominent features will now be discussed briefly. After considering this discussion, and particularly after reading the section entitled “Detailed Description”, one will understand how the features of the present embodiments provide advantages, which include innovative multi-flap hinge system and method of installation for enhanced door and window assemblies.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Various embodiments of the present invention are disclosed herein below, which relate to innovative multi-flap hinge system and method of installation for enhanced door and window assemblies. The multi-flap hinge, designed as a single integrated unit, includes four flaps: the first for attachment to the door or window frame, the

second to the door or window structure itself, the third providing multiple attachment options, and the fourth for attachment to a gate or grill structure. This inventive hinge system offers enhanced features, such as the ability to accommodate additional elements such as wire mesh, laminated glass panel, or a roller blind, providing additional ventilation, protection against insects, insulation, and privacy options. The door or window assembly secured with this hinge can move together in an angular path, supported by the door or window frame. The invention further includes a method for installing the door or window assembly, which involves the fitting of frames, attaching of multi-flap hinges, and securing of the door or window structure to a gate or grill structure. The system is also designed with a lockable entry mechanism for added security. Overall, this invention contributes to the field of door and window assembly systems by providing a more versatile, secure, and functional hinge design and installation method.

In accordance with an embodiment of the present invention, a multi-flap hinge system for use with a door assembly or a window assembly includes, a first flap designed for attachment to a door or window frame; a second flap designed for attachment to a door or window structure; a third flap providing a plurality of attachment options; and, a fourth flap designed for attachment to a gate or grill structure. In use, each of the flaps is integrated as a single unit and is able to rotate independently around a central stem.

In accordance with an embodiment of the present invention, the third flap accommodates one of the following features: a wire mesh, a laminated glass panel,

or a roller blind. In use, the wire mesh option provides ventilation and protection against insects when the door or the window is open. Specifically, the laminated glass panel option acts as a barrier, preventing a leakage of air-conditioned or heated air while maintaining visibility.

5 In accordance with an embodiment of the present invention, the roller blind, when rolled up, allows for better ventilation by enabling air to pass through and when rolled down, it acts as a barrier, preventing insects and mosquitoes from entering the space. In use, the first flap, the second flap, the third flap, and the fourth flap are of identical thickness and are aligned together to make a compact configuration
10 of the hinge. Also, the door or window assembly, along with any accompanying grill structures, is configured to move together in an angular path when secured.

In accordance with an embodiment of the present invention, a method of installation of a door or window assembly utilizing the multi-flap hinge system, includes the steps of, fitting the door or the window frame; attaching at least one
15 multi-flap hinge to the door or the window frame, a door or a window structure, a mesh structure or a laminated glass panel or a roller blind; or a gate or a grill structure; and, securing the door or the window structure to the gate or the grill structure. In use, the door or the window structure is releasably secured to the gate or the grill structure using a deadbolt lock, a digital lock, a half deadbolt lock, or a
20 mortise lock case with lever handle. Also, the lockable entry mechanism to retract the deadbolt includes through a keyhole and / or a smart system such as a digital card reader, pin code, thumb print, voice, or facial recognition, and the like.

Description of Best Mode

Those of ordinary skills in the art will appreciate that the present invention discloses various embodiments relating to an innovative multi-flap hinge system and its method of installation, particularly useful for enhanced door and window assemblies. This invention represents a significant advancement in the design and functionality of hinge systems used in door and window assemblies.

The multi-flap hinge system, designed as a single integrated unit, comprises four unique flaps. The first flap is designed specifically for attachment to the door or window frame, which is the stationary structure installed in a wall opening or an existing door or window frame. This frame typically includes a header, sill, and jambs, and the first flap of the hinge system is designed to interface with these structural components.

The second flap is designed for attachment to the door or window structure itself. In this context, the term "door or window structure" refers to the movable component of the assembly which is designed to open and close within the frame. This second flap is thus designed to interface with the materials and structures of various types of doors and windows, including but not limited to wooden doors, metal doors, glass windows, and the like.

Fig. 1 illustrates various aspects of the innovative multi-flap hinge system, and Fig. 2 illustrates "wire mesh structure", one of the attachment options of the innovative multi-flap hinge system, as per one embodiment of the instant invention. The third flap of the hinge system is designed to provide a plurality of attachment options. This innovative aspect of the design enables the accommodation of additional

elements such as a wire mesh, a laminated glass panel, or a roller blind. These elements can be selectively used to provide additional features for the door or window assembly. For example, the wire mesh can provide ventilation while protecting against insects when the door or window is open. The laminated glass
5 panel can act as a barrier to prevent the leakage of conditioned air (either cooled or heated) while still maintaining visibility. Lastly, the roller blind can be rolled up to allow for better ventilation or rolled down to act as a barrier against insects and mosquitoes, while also providing privacy.

The fourth flap is designed for attachment to a gate or grill structure. This structure
10 is typically used for additional security or aesthetic purposes and can be made of various materials such as metal or plastic. The fourth flap of the hinge system allows for the secure attachment of such structures to the door or window assembly.

Another key aspect of the multi-flap hinge system is that each of the flaps is
15 integrated as a single unit and is able to rotate independently around a central stem. This design allows for the independent movement of each flap, providing a high level of flexibility and adaptability in the operation of the door or window assembly.

The invention also discloses a method for installing the door or window assembly
20 using the multi-flap hinge system. This method involves fitting the door or window frame, attaching the multi-flap hinges, and securing the door or window structure to a gate or grill structure. The system also includes a lockable entry mechanism for added security, which can be operated using a keyhole or a digital card reader.

In sum, this invention contributes significantly to the field of door and window assembly systems by providing a more versatile, secure, and functional hinge design and installation method.

Conditional language used herein, such as, among others, “can,” “could,” “might,”

5 “may,” “e.g.,” and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or steps. Thus, such conditional language is not generally intended to imply that features, elements and/or steps are in any way required for one or
10 more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or steps are included or are to be performed in any particular embodiment. The terms “comprising,” “including,” “having,” and the like are synonymous and are used inclusively, in an open-ended fashion, and do not
15 exclude additional elements, features, acts, operations, and so forth. Also, the term “or” is used in its inclusive sense (and not in its exclusive sense) so that when used, for example, to connect a list of elements, the term “or” means one, some, or all of the elements in the list.

While there has been shown and described the preferred embodiment of the
20 instant invention it is to be appreciated that the invention may be embodied otherwise than is herein specifically shown and described and that, within said embodiment, certain changes may be made in the form and arrangement of the parts without departing from the underlying ideas or principles of this invention as

set forth in the Claims appended herewith. Therefore, the appended claims are to be construed to cover all equivalents falling within the true scope and spirit of the invention.

CLAIMS:

1. A multi-flap hinge system for use with a door assembly or a window assembly, said system comprising:

- 5 a first flap designed for attachment to a door or window frame;
 a second flap designed for attachment to a door or window structure;
 a third flap providing a plurality of attachment options; and,
 a fourth flap designed for attachment to a gate or grill structure;

 wherein each of the flaps is integrated as a single unit and is able to rotate
10 independently around a central stem.

2. The multi-flap hinge system as claimed in claim 1, wherein said third flap accommodates one of the following features: a wire mesh, a laminated glass panel, or a roller blind.

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3. The multi-flap hinge system as claimed in claim 2, wherein said wire mesh option provides ventilation and protection against insects when said door or said window is open.

20 4. The multi-flap hinge system as claimed in claim 2, wherein said laminated glass panel option acts as a barrier, preventing a leakage of air-conditioned or heated air while maintaining visibility.

5. The multi-flap hinge system as claimed in claim 2, wherein said roller blind, when rolled up, allows for better ventilation by enabling air to pass through and when rolled down, it acts as a barrier, preventing insects and mosquitoes from entering the space.

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6. The multi-flap hinge system as claimed in claim 1, wherein said first flap, said second flap, said third flap, and said fourth flap are of identical thickness and are aligned together to make a compact configuration of said hinge.

10 7. The multi-flap hinge system as claimed in claim 1, wherein said door or window assembly, along with any accompanying grill structures, is configured to move together in an angular path when secured.

8. A method of installation of a door or window assembly utilizing said multi-
15 flap hinge system of claim 1, said method comprising the steps of:

fitting said door or said window frame;

attaching at least one multi-flap hinge to said door or said window frame, a door or a window structure, a mesh structure or a laminated glass panel or a roller blind, or a gate or a grill structure; and,

20 securing said door or said window structure to said gate or said grill structure.

9. The method of installation as claimed in claim 8, wherein said door or said window structure is releasably secured to said gate or said grill structure using a deadbolt lock, a digital lock, a half deadbolt lock, or a mortise lock case with lever handle.

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10. The method of installation as claimed in claim 9, wherein said lockable entry mechanism to retract said deadbolt, digital lock, half deadbolt lock, or mortise lock case with lever handle includes through a keyhole and / or a smart system such as a digital card reader, pin code, thumb print, voice or facial recognition, and the

10 like.

ABSTRACT**INNOVATIVE MULTI-FLAP HINGE SYSTEM AND METHOD OF
INSTALLATION FOR ENHANCED DOOR AND WINDOW ASSEMBLIES**

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A multi-flap hinge system for use with a door assembly or a window assembly includes, a first flap designed for attachment to a door or window frame; a second flap designed for attachment to a door or window structure; a third flap providing a plurality of attachment options; and, a fourth flap designed for attachment to a gate or grill structure. In use, each of the flaps is integrated as a single unit and is able to rotate independently around a central stem.

FIG.1