

A SWING AND SLIDE DOOR ASSEMBLY

FIELD OF TECHNOLOGY

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The present invention relates generally to a swing and slide door assembly operable in a swing-then-slide manner.

BACKGROUND OF THE INVENTION

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A conventional hinged swing door encroaches on an entrance or exit space when opening or closing. A conventional sliding door offers saving in space because they slide open rather than swing outwards, however it involves additional installation of sliding tracks. A slide and swing door assembly combines slide and swing concept to offer advantages from a slide and a swing door.

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There are patented technologies relevant to slide and swing door assembly. For example, United States Patent No. US 6422287 B1 disclosed a slide/swing patio door comprising: a frame; a first panel pivotally mounted in the frame; a second panel slidingly mounted in the frame, in a plane adjacent to the first panel, wherein the first and second panels selectively move out of the frame around a pivot of the first panel; a latch to couple the first panel and the second panel together before the panels can be moved around the pivot; and a screen panel slidingly mounted in the frame, in a plane adjacent to one of the first and second panels, wherein the screen panel selectively moves out of the frame around the pivot of the first panel with the first and second panel. According to US 6422287 B1, the opening as shown in FIG. 3 is only achievable by sliding the second panel relative to the first panel (as shown in FIG.2), and then pivotally moving the first and second panel out of the frame.

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As an alternative, the present invention provides a swing and slide door assembly operable in a swing-then-slide manner.

5 SUMMARY OF THE INVENTION

One object of the present invention is to provide a swing and slide door assembly operable in a swing-then-slide manner. Advantageously, the door assembly of the present invention can provide an opening without necessarily sliding a door panel relative to one another.

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Another object of the present invention is to provide a swing and slide door assembly with concealed sliding mechanism. Advantageously, the swing and slide door does not require installation of ceiling nor floor sliding tracks. Further, the sliding mechanism used in the present invention is provided on the juxtaposed facing sides of both door panels and
15 therefore not entirely visible by a user upon installation.

Another object of the present invention is to provide a swing and slide door assembly which has a design simple for manufacturing and installation. For instance, ceiling or floor sliding tracks are not required. Further, the door panels are designed to have a similar top and
20 bottom portion.

At least one of the preceding aspects is met, in whole or in part, by the present invention, in which one of the embodiments of the present invention is a swing and slide door assembly comprising a door frame, a first door panel pivotally connected to the door frame
25 and a second door panel slidingly engaged with the first door panel by means of a complementary, embedded sliding mechanism provided on the juxtaposed facing sides of both door panels.

In one embodiment, the door assembly further comprises a locking mechanism configured to prevent sliding between the first door panel and second door panel during pivotal opening of the door.

- 5 In one embodiment, the sliding mechanism comprises a plurality of rollers and sliding tracks.

Preferably, the rollers are provided by one of the door panels and the sliding track is provided by the other of the door panels.

- 10 In one embodiment, the sliding mechanism is provided at a top and at a bottom portion of each of the door panels. Such arrangement ensures firm engagement between both door panels during sliding movement.

- In one embodiment, the locking mechanism is a magnet placed between the door frame
15 and the first door panel.

In one embodiment, the door assembly further comprising a stopper provided at the foot of the second door panel to secure the second door panel within the frame in a closed position.

- 20 Another object of the present invention is to provide a method of operating the swing and slide door in a swing-then-slide manner. At least one of the preceding aspects is met, in whole or in part, by the present invention, in which one of the embodiments of the present invention is a method of operating the door assembly comprising the step of unlatching the second door panel from the door frame to open the door and achieve a first entrance,
25 releasing the locking mechanism and sliding the second door panel relative to the first door panel to achieve a second entrance.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated, although not limited, by the following description of embodiments made with reference to the accompanying drawings in which:

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Figure 1 shows a top view an exemplary door assembly of the present invention in a closed position.

Figure 2 shows an exemplary swing and slide door assembly of the present invention, in
10 which both door panels are pivotally openable without sliding against one another.

Figure 3 shows a perspective view of an exemplary door assembly of the present invention with the locking mechanism.

15 Figure 4 shows a perspective view of another exemplary door assembly of the present invention with the locking mechanism.

Figure 5 shows another perspective view of the exemplary door assembly of the present invention with the sliding mechanism.

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Figure 6 shows a side view along direction View A-A from Figure 4.

Figure 7 shows an exploded view of the sliding mechanism in the preferred embodiment.

25 Figure 8 shows an embodiment of the present invention including a stopper.

Figure 9 shows a method of operating the door assembly of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Exemplary, non-limiting embodiments of the invention will be disclosed. However, it is to be understood that limiting the description to the preferred embodiments of the invention is merely to facilitate discussion of the present invention and it is envisioned that those skilled in the art may devise various modifications without departing from the scope of the appended claim.

A swing and slide door assembly in accordance to the present invention is shown in Figure 1 to 9. According to Figure 2, the door assembly (100) comprises a door frame (101); a first door panel (102) and a second door panel (103). It shall be understood that the dimension and material of the door frame are suitable for the dimension and the material of the door panels. The door panels can be made of one or a combination of material. For example, as shown in Figure 2, the first door panel (102) is made of horizontal bars (201a, 201b), vertical bars (202a, 202b) and a center panel (203). Similarly, the second door panel (103) can be made of another horizontal bars (204a, 204b), another vertical bars (205a, 205b) and another center panel (206). Preferably, the horizontal and vertical bars are made of metals, such as aluminium, but not limited thereto. Preferably, the center panel can be made of wood, plastic, glass, metal, or any other suitable material. The aforementioned bars and panel can be joined by suitable physical joint, welding and/or adhesive method known in the art.

According to Figure 2 and 5, the first door panel (102) comprises a vertical bar (202a) pivotally connected to the door frame via hinges (109) while the horizontal bars (201a, 201b) and the other vertical bar (202b) slidably engages with the second door panel (103). Similarly, the second door panel (103) comprises another vertical bar (205a) slidably engages with the horizontal bars (201a, 201b) of the first door panel (102), and another vertical bar (205b) having a free end which can be configured to latch on the door frame

(101). In an embodiment, the second panel (103) can be configured with a handle and latches (not shown) for latching or securing it against the door frame (101).

In the present invention, the first (102) and the second door panel (103) are engaged to one another via a sliding mechanism (104) provided at a top and at a bottom portion of each of the door panels. According to the preceding description, the top and the bottom portion are represented by the horizontal bars (201a, 201b, 204a, 204b) of each door panel. For example, the top portion of the first door panel (102) refers to the horizontal bar (201a) while the bottom portion of the first door panel refers to another horizontal bar (201b). Similarly, the top portion of the second door panel (103) refers to the horizontal bar (204a) while the bottom portion of the first door panel refers to another horizontal bar (204b). The horizontal bars can be configured hollow, or configured with channels in order to fit in the sliding mechanism (104). Such arrangement ensures firm engagement between both door panels, whether they are in a sliding position or not. Further, such arrangement can conceal sliding tracks of the door assembly, hence avoiding installation of tracks at the door frame nor the floor. The channels can be configured partially, or wholly, along the length of the horizontal bars. The depth of the channels may vary according to the thickness of the door panels or the dimensions of the sliding mechanism (104). In one embodiment, according to Figure 3, 5 to 7, the sliding mechanism (104) comprises a plurality of rollers (106) and sliding tracks (107). Accordingly, the rollers are provided by one of the door panels and the sliding track is provided by the other of the door panels. For example, the rollers (106) can be provided at the first door panel (102) while the sliding track (107) can be provided at the second door panel (103), or *vice versa*. Figure 6 shows a side view from the direction of View AA of Figure 5, where the rollers (106) and sliding track (107) are embedded within the door assembly. An exploded view of the rollers (106) and sliding track (107) is shown by Figure 7. Accordingly, due to simplicity of the rollers (106) and track (107), they can be disassembled easily for replacement or maintenance purpose. In further embodiment, the sliding mechanism (104) can be configured with rail stopper (not shown) to prevent

derailing. In another embodiment, the sliding mechanism (104) can be further configured with soft-close mechanism (not shown).

In the present invention, the door assembly of the present invention further comprises a locking mechanism (105) configured to prevent sliding between the first door panel (102) and second door panel (103) during pivotal opening of the door (101). Such arrangement prevents unintentional sliding movement between both panels when the door assembly is in a closed position. It is in contrary to a conventional slide-and-swing door as the present invention offers a way to preserve privacy of a user while saving space. The locking mechanism (105) is a magnet placed between the door frame (101) and either one of the door panel (102 or 103). In one embodiment according to Figure 3, the locking mechanism (105) is a magnet placed between the door frame (101) and the top portion of the first door panel (102). Alternatively, the magnet can be placed between the door frame (101) and the top portion of the second door panel (103). In another embodiment according to Figure 4, the locking mechanism (105) may be a push-pin lock (110) located between the first door panel (102) and the second door panel (103) to prevent sliding thereof.

In another embodiment, the door assembly further comprises a stopper (108) to prevent unintentional opening of the door. The stopper (108) can be provided at the door frame (101) to secure the second door panel (103) within the frame (101) in a closed position. Alternatively, the stopper (108) can be placed at the top or at the foot of the second door panel (103). The stopper (108) can be a pair of magnets as shown in Figure 8. The magnetic stopper (108) can also be placed at the top of the second door panel as shown in Figure 3.

Accordingly, as shown in Figure 9, the method of operating the door assembly (100) according to the present invention comprising the step of: unlatching the second door panel (103) from the door frame (101) to pivotally open the door and achieve a first entrance; releasing the locking mechanism (105); and sliding the second door panel (103) relative to

the first door panel (102) to achieve a second entrance. As mentioned above, such method offers opening of the door assembly without necessarily sliding it first.

5 The present invention may be embodied in other specific forms without departing from its essential characteristics. The described embodiments are to be considered in all aspects only as illustrative and not restrictive. The scope of the invention is therefore indicated by the appended claims rather than by the foregoing description. All changes, which come within the meaning and range of equivalency of the claims, are to be embraced within their scope.

CLAIMS

1. A swing and slide door assembly (100) comprising:
a door frame (101);
a first door panel (102) pivotally connected to the door frame (101); and
a second door panel (103) slidingly engaged with the first door panel (102) by means of a complementary, embedded sliding mechanism (104).
2. The door assembly according to claim 1, further comprising a locking mechanism (105) configured to prevent sliding between the first door panel (102) and second door panel (103) during pivotal opening of the door (101).
3. The door assembly according to claim 1, wherein the sliding mechanism (104) comprises a plurality of rollers (106) and sliding tracks (107).
4. The door assembly according to claim 3, wherein the rollers (106) are provided by one of the door panels and the sliding track (107) is provided by the other of the door panels.
5. The door assembly according to any one of the preceding claims, wherein the sliding mechanism (104) is provided at a top and at a bottom portion of each of the door panels.
6. The door assembly according to any one of claims 1 to 5, wherein the locking mechanism (105) is a magnet placed between the door frame (101) and either one of the door panel (102 or 103).

7. The door assembly according to any one of claims 1 to 6, further comprising a stopper (108) provided at the foot of the second door panel (103) to secure the second door panel (103) within the frame (101) in a closed position.
8. A method of operating the door assembly (100) according to any one of claims 1 to 7, the method comprising the step of:
unlatching the second door panel (103) from the door frame (101) to pivotally open the door and achieve a first entrance;
releasing the locking mechanism (105); and
sliding the second door panel (103) relative to the first door panel (102) to achieve a second entrance.