A COMBINATION OF SLIDE SWING DOOR

FIELD OF THE INVENTION

The present invention relates generally to door assemblies. More particularly, the present invention relates to a door with operation of a combination function of a sliding panel and swinging panel simultaneously while opening and closing the door.

BACKGROUND OF THE INVENTION

Conventional doors most often being used are hinged doors, sliding doors, bi-fold doors, folding doors, and pocket doors. These doors usually have advantages and disadvantages depending on the doorway size and door locations and applications. A single hinged door or a double hinged door traditionally require swing room approximately equal to the width of the individual door and then requires the same amount of wall space if the door is to be sometimes left in the open position and out of the way on one side of the doorway. The major drawback of the hinged doors is they are made of wood and often experience material expansion during periods of high humidity resulting in doors that stick or fail to close completely.

The traditional bi-fold door can be hinged on both sides of the inside bi-fold door panel connected to the vertical door frame with the outer panel running inside a non-weight bearing track mounted at the top of the doorway. The track provides alignment during opening and closing of the door panels and when the door is open and closed. However, with traditional interior bi-fold doors, support for all of the door collective panel weight is on the vertical hinges connected to the door jambs. Wide bi-fold doors therefore over time have a tendency to sag. Other problems with this door design is when the door is open, less than 100% full access through the doorway is achieved because the door is usually mounted inside the doorway and the alignment track restricts the door panels from opening beyond 90 degrees leaving the panels protruding into the room inconveniently in the way. Another problem often

experienced is with humidity fluctuations and other causes, the panels don't always meet together at ideal travel distances resulting in the panels leaving gaps between the door panels or not leaving enough space between the door panels so the doors have a tendency to pop open and not remain securely closed.

Sliding doors also have drawbacks. As in the case of most slide-by sliding doors, only ½ of the doorway is accessible with the door open making limited access less than desirable. If the door design allows for sliding all the way open, it usually runs along the outside wall and therefore blocks a corresponding large amount of wall space usually needed for furniture placement and/or blocks electrical switches and receptacles. Large wide sliding doors are usually heavy to operate.

Pocket doors built into the wall construction require inside wall space and therefore eliminate that section of wall for wiring, electrical switches and receptacles and plumbing use. It is also difficult and expensive to install as a retrofit in existing walls. Usually the latch or handle is built into the edge of the door and is flush with the edge of the door making it difficult to grasp the small latch to begin pulling the pocket door out of its wall socket. Pocket doors are also prone to coming off the hanging track. Wider pocket doors experience these problems and difficulties even more.

Therefore, there is a need for a combination of slide swing doors which allow to be installed where it is desirable to leave them open without blocking a large amount of wall space. In addition, the doors that are easier for wheelchair users to maneuver through and to solve other problems associated with convention doors such as doors sticking in door frames from wood swelling due to high humidity, sagging doors, and full 100% unrestrictive door opening access especially in wider than normal doors.

There are various prior arts which discloses about the combination of slide and swing door one such example is an United States of America grantedpatent number US7950439B2 discloses a door wherein the components forming a multi-panel unit assembly, a support & alignment mechanism, an automatic actuating panel action

locking and release mechanism, sliding mechanism and hinges, a dual action door assembly is achieved which assures component engagement that allows the door assembly to operate within controlled confines combining first a sliding action and then a swing action to open the door for full unobstructed access of a range of doorway widths from narrow to ultra-wide while overcoming the support problems, full open access problems and wide swing radii problems consistent with conventional doors.

Another prior art United States of America granted patent number US8756864B2 discloses a slideable and pivotable door assembly configured to selectively permit passage through an opening between a first side and a second side of the opening. The slideable and pivotable door assembly has a normally fixed door panel arranged to cover a first portion of the opening when in a normally closed fixed position. The door assembly also includes a slideable door panel slidable relative to the fixed door panel. The slideable door panel is slidable between a 1) closed position wherein the door panel covers a second portion of the opening and 2) an open position wherein the second portion of the opening is uncovered. A first pivot structure enables pivotal movement of the normally fixed door panel upon a pivoting actuation and a second pivot structure enables pivotal movement of the slideable door panel at any position relative to the normally fixed door panel while the normally fixed door panel remains in its normally fixed position.

The drawback of the above-mentioned prior arts is that these doorsuses a support structure or track for alignment and slide movement of the panels which makes one of the panels to be in fixed closed position and other panel to slide with respect to the panel in closed position allowing the half of the doorway to access.

The present invention provides a door with operation of the panels to slide over the other panel and simultaneously allow the panels to swing while opening and closing of the door.

SUMMARY OF THE INVENTION

The present invention discloses about a door comprising: a first panel; a second panel; a plurality of hollow channel members arranged with the first panel and the second panel; and, a support structure having a first side to which the first panel is hinged, wherein the door further a slide member arranged with the hollow channel members of the first panel and the second panel to connect the second panel with the first panel and allow the second panel to slide with respect to the first panel simultaneously, allow the first panel to swing from one position to another position while opening and closing of the door; and, wherein the support structure includes a second side which is opposed to the first side of the support structure, the second side is of a generally L-shape cross section to allow the first panel and the second panel to swing without the need of sliding the panels towards each other.

Preferably, the slide member comprising: a slidable body; and a top channel member and a bottom channel member arranged with the slidable body on the top side and the bottom side of the slidable body.

Preferably, the top channel member and the bottom channel member is U-shaped channel member.

Preferably, the top channel member and bottom channel member are provided with plurality of protrusions in a pre-defined shape on its outer surface that extend outwardly in such a way that the protrusions allow the slide member to be interlocked inside the hollow channel members.

Preferably, the slidable body comprises at least one groove formed on the slidable body that extends along lengthwise of the slidable body.

Preferably, the top channel member and the bottom member are provided with at least one protuberance formed on inner side of it extends along the lengthwise of the

channel member.

Preferably, the protuberance of the top channel memberand the bottom channel member mates with the grooves of the slidable body allows the channel members and the slidable body to slide over each other.

Preferably, the slide member allows the second panel to slide parallel over the first panel while opening the door.

Preferably, the slide member allows the second panel to slide away from the first panel while closing the door.

Further, the door comprises at least one magnetic member arranged on the support member and the first panel prevents the movement of the first panel while in the closed position.

BRIEF DESCRIPTION OF DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood, when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

Fig. 1 is a perspective view of a two panel door unit in slightly open position.

Fig. 2 is a perspective view of the two panel door in fully closed position.

Fig. 3 is a perspective view of the two panel door in the slightly open position.

Fig. 4 is a perspective view of the two panel door in slightly open position

showing arrangement of magnets.

Fig. 5 is a perspective view of the two panel door with a slide mechanism.

Fig. 6 is a side view of the two panel door unit in open position.

DETAILED DESCRIPTION OF THE INVENTION

By referring to Figs. 1-6, along with the following detailed discussion, the construction and operation of several alternate embodiments for combination sliding and swinging door assemblies of the present invention can best be understood. Although this detailed disclosure provides a thorough discussion of the preferred embodiments of the present invention, further alternate constructions for implementing the present invention can be made without deviating from the scope of this invention. Consequently, it is to be understood that the following disclosure is provided for exemplary purposes only, and is not intended as a limitation of the present invention.

The present invention discloses a door panel assembly consisting of two or more individual door panel units connected together that function with a combination slide or multi-slide and swing action.

In Figs.1 to 6, a dual action two panel unit door assembly (100) is depicted comprises a first panel (110), a second panel (120), a support structure (130), a plurality of hollow members (140), a slide member (150) and, a magnetic member (160).

In Fig.1, the door assembly (100) in slight open position is illustrated. The first panel (110) and the second panel (120) is preferably in rectangular shape configuration and the hollow channel members (140) is arranged around the first panel (110) and the second panel (120) preferably confirming to the shape of the first panel (110) and the second panel (120). These hollow channel members (140) protect the first panel (110)

and the second panel (120) from being damaged and provide an aesthetic look. Further, a tubular member is arranged on the hollow channel members (140) on one side of the first panel (110) and the second panel (120). Preferably, the first tubular member is arranged on the hollow channel members (140) on front side of the first panel (110) and the second tubular member is arranged on the hollow channel members (140) on back side of the second panel (120). These tubular members act as the stop member to prevent the second slide (120) to completely slide over the first panel (110). Preferably, the tubular member is in shape of the hollow channel members (140) arranged on the either sides of the first panel (110) and the second panel (120).

The support member (130) is a frame kind of structure preferably formed by three support panel structural members which includes a top support panel structural member, and two side support panel structural members. These support panel structural members are hollow members ~~comprises a first side and the second side~~. On the first ~~side of the~~ side support panel structural member~~s~~, the first panel (110) is hinged to it. The second side support panel structural member which is opposed to the first side ~~of the~~ support panel structural member ~~(130)~~, the second side support panel structural member is of a generally L-shape cross section to allow the first panel (110) and the second panel (120) to swing open the door (100) without the need of sliding the panels (110 & 120) towards each other. Preferably, the L-shape cross section is a protrusion that extends in a lengthwise manner along ~~the lengthwise from one side of the each~~the second side support panel structural member to support and align the first panel (110) and the second panel (120) in the position. This arrangement prevents the backward movement of the first panel (110) and the second panel (120). While on one end of the first panel (110) is provided with the first magnetic member (160) and the second magnetic member is provided on a top support panel structural member of the support member (130) as shown in the Fig.4.

The slide member (150) as shown in Fig.5 and Fig.6 is slidably arranged with the hollow channel members (140) of the first panel (110) and the second panel (120).

Preferably, the slide member (150) is arranged at the top and bottom of the first panel (110) and the second panel (120) as shown in Fig.6. This arrangement connects the second panel (120) with the first panel (110) and allows the second panel (120) to slide with respect to the first panel (110) while opening and closing of the door (100) as shown in the Figs. 1 to 4. The slide member (150) comprises at least one slidable body, a top channel member and a bottom channel member. The top channel member and the bottom channel member are arranged on the top side and the bottom side of the slidable body. Preferably, the top channel member and the bottom channel member is a U-shaped channel member. Preferably, the top channel member and bottom channel member are provided with plurality of protrusions in a pre-defined shape on its outer surface that extend outwardly in such a way that the protrusions allow the slide member (150) to be interlocked and firmly fixed with the hollow channel members (140) of the first panel (110) and the second panel (120) as shown in Fig.6. The slidable body comprises at least one groove formed on the slidable body that extends along lengthwise of the slidable body. The top channel member and the bottom member are provided with at least one protuberance formed on inner side of the channel members extends along the lengthwise of the top channel member and the bottom channel member. The protuberance of the top channel member and the bottom channel member mates with the grooves of the slidable body allows the channel members and the slidable body to slide over each other as shown in Fig.5 and Fig.6.

Referring to Fig. 6, the cross-section view of the door assembly is illustrated. The first slidable body is arranged with the hollow channel member (140) of the first panel (110) and the second slidable body is arranged with the hollow channel member (140) of the second panel (120). The first slidable body and second slidable body slide over each other while opening and closing of the door assembly (100). One side of the first slidable body and the second slidable body includes a plurality of projections extending from it to be interlocked internally with the top channel member and the bottom channel member. By way of example, the slide member (150) is preferably formed by two slidable bodies attached to an inner surface of their respective hollow channel member (140). Each slidable body comprises two opposing longitudinal sides

with a groove profile that can be aligned with a complimentary groove profile on the inner surface of the hollow channel member (140) when the slidable bodies are each seated within their respective hollow channel member (140). One or more ball bearings are fitted in a space between the groove profile of the slidable bodies and the complimentary groove profile on the hollow channel member (140) to internally interlock the slidable bodies to the hollow channel members (140) but yet allow the slidable bodies to slide within the hollow channel members (140).

In Fig.2 and Fig.3 the door assembly (100) in closed and open position is illustrated. The slide member (150) allows the second panel (120) to slide away from the first panel (110) closes the passageway and lock the second panel (120) with the support member (130). In closed position, the first magnetic member (160) and the second magnetic member (160) are attracted together allows the alignment of the first panel (110) with the support member (130) and prevents the automatic movement of the first panel (110). This arrangement allows the first panel (110) to be in locked position with the support member (130) due to magnetic attraction force between the first magnetic member (160) and the second magnetic member (160). The first panel (110) and the second panel (120) are at zero degrees allows to be locked together with the support member (130).

To open the door (100) from the closed position the first action would comprise is to push the second panel (120) slightly to slide over the first panel (110) at a pre-defined distance to provide partial passageway for the access. The second action would comprise is to pull the second panel (120) in such a way that the first panel (110) is released from the locked position by the release opening of the magnetic attraction force between the first magnetic member (160) and the second magnetic member (160). Further, pull the second panel (120) to ninety degrees/one hundred eighty degree angle position which simultaneously causes the first panel (110) to swing in the same direction to provide complete passageway for the access. To close the door from the opened position, the same multi-action needs to be performed in reverse manner.

The present disclosure includes as contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be resorted to without departing from the scope of the invention.

CLAIMS

1. A door (100) comprising:

a first panel (110);

a second panel (120);

a plurality of hollow channel members (140) arranged with the first panel (110) and the second panel (120); and

a support structure (130) having a first side support panel structural member to which the first panel (110) is hinged,

wherein the door (100) further comprises

a slide member (150) arranged with the hollow channel members (140) of the first panel (110) and the second panel (120) to connect the second panel (120) with the first panel (110) and allow the second panel (120) to slide with respect to the first panel (110) simultaneously, allow the first panel (110) to swing from one position to another position while opening and closing of the door (100); ~~and,~~

wherein the support structure (130) includes a second side support panel structural member which is opposed to the first side support panel structural member of the support structure (130), the second side support panel structural member is of a generally L-shape cross section to allow the first panel (110) and the second panel (120) to swing open the door (100) without the need of sliding the panels (110 & 120) towards each other; and

wherein a top support panel structural member of the support structure (130) and the first panel (110) each comprises at least one magnetic member to secure the panels in a closed position.

2. The door (100) according to claim 1, wherein the slide member (150) comprising:

a slidable body; and

a top channel member and a bottom channel member arranged with the slidable body on the top side and the bottom side of the slidable body.

3. The door (100) according to claim 2, wherein the top channel member and the bottom channel member is U-shaped channel member.

4. The door (100) according to claims2 to 3, wherein the top channel member and bottom channel member are provided with a plurality of protrusions in a pre-defined shape on its outer surface that extend outwardly in such a way that the protrusions allow the slide member (150) to be interlocked inside the hollow channel members (140).

5. The door (100) according to claims 2 to 4, wherein the slidable body comprises at least one groove formed on the slidable body that extends along lengthwise of the slidable body.

6. The door (100) according to claims 2 to 5, wherein the top channel member and the bottom channel member are provided with at least one protuberance formed on inner side of it extends along the lengthwise of the channel member.

7. The door (100) according to claims ~~2 to~~ 6, wherein the protuberance of the top channel member and the bottom channel member mates with the grooves of the slidable body allows the channel members and the slidable body to slide over each other.

8. The door (100) according to anyone of the above claims, wherein the slide member (150) allows the second panel (120) to slide parallel over the first panel (110) while opening the door.

9. The door (100) according to anyone of the above claims, wherein the slide member (150) allows the second panel (120) to slide away from the first panel (110) while closing the door.

~~10. The door (100) according to anyone of the above claims, further comprising at least one magnetic member (160) arranged on the support member (130) and the first panel (110) prevents the movement of the first panel (110) while in the closed position.~~