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DOOR WITH SELF-STORING PANEL

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This invention relates to a door with self-storing panels which is characterized by a screen automatically covering the open portions of the door when the panels are stored. The invention could also apply to windows wherein it is desired to utilize a self-storing window panel.

Heretofore it has been known that there have been many and various attempts to provide screen or storm doors or screen or storm windows which can be converted from one to the other in the simplest possible manner. Usually these doors involve removing a glass, or other panel and replacing it with a screen panel with the unused panel being stored at a remote area. Hence the safe storage of unused screens, or panels for a door has required special handling and usually tedious cleaning of the extra panels or screens, or it has been objectionable for other reasons.

It is the general object of the present invention to provide a door construction where screen and/or window glass panels are stored within or on the door, which screen and panels can be quickly and easily shifted from operative to stored positions.

A further object of the invention is to provide a door or window unit wherein one or more glass or other door panels may be completely, or only partially stored in the door with the openings left by the panels being covered by a screen to provide complete or partial conversion from glass panels to screened openings in the door.

Another object of the invention is to provide a door or window construction wherein the screen, which is moved into position when the glass panels are stored, is clamped into position to insure a stretched and tight fit in the positioning frame.

Another object of the invention is to provide a door construction wherein glass panels can be locked in operative positions but be released readily to slide within a bottom frame assembly on their mounting means so the glass panels may be moved adjacent to each other for side by side storage.

The aforesaid objects of the invention and other objects which will become apparent as the description proceeds are achieved by providing in a door assembly the combination of a frame, a first panel slidably mounted on the frame, a second panel slidably mounted on the frame, a storage compartment operatively affixed to the frame and adapted to receive and store the panels, means movably positioned on the frame to retain the panels in operative position but being releasable to allow the panels to slide on the frame into the storage compartment, and roll screen means on said frame and having one end operatively affixed to the top edge of the first panel so that when the first panel is moved into the storage compartment the screen is moved to cover the openings caused by the movement of the panels.

For a better understanding of the invention reference should be had to the accompanying drawings wherein:

FIGURE 1 is a front elevation of a door assembly incorporating the principles of the invention;

FIGURE 2 is an enlarged horizontal cross sectional view with the upper panel lowered, broken away at the panels, taken on the line 2—2 of FIGURE 1; and

FIGURE 3 is an enlarged vertical cross sectional view of the door assembly, with the panels broken away, taken on the line 3—3 of FIGURE 1.

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Although the principles of the invention are broadly applicable to a window assembly having one or more panel sections, or sashes made of glass or any other desired material, the invention is usually employed in a door assembly because of the greater height and hence it has been so illustrated and will be so described.

With reference to the form of the invention illustrated in the drawings, the numeral 10 indicates generally a door assembly composed of a rectangularly shaped frame 12, usually made from extruded aluminum, which describes a substantially rectangular opening 14. The opening 14 is filled by three equal rectangular parts composed of an upper panel 16, a lower panel 18, and a storage compartment 20. The invention contemplates that the storage compartment 20 will generally be hollow and made from metal members. In FIGURE 1, the panels 16 and 18 are shown to have centers made of conventional window glass. Thus, the door 10 represented in FIGURE 1 is essentially set up for a storm door usage.

In order to understand the construction of the door 10, reference should be had to FIGURE 3, wherein it is seen that a roll screen 30 is rotatably mounted by means of a pin 32 in a housing 34, with the housing 34 being mounted on the upper part of the frame 12 in any convenient manner. A length of screen material 36 from the screen roll 30 is threaded through a slot 38 in the housing 34 and is secured across its width to a strengthening edge frame 40. The invention contemplates that the screen roll 30 will be spring loaded onto pin 32 so that it tends to wind itself up unless it is held in position. The weight and friction of the panels 16 and 18 will hold the screen in position against the spring load. It should be noted that the edge frame 40 is too large to pass through the hole 38 and that a lip 42 on the edge frame snugly engages a protruding flange 44 of an upper frame member, or sash rail 46 for the top panel 16. A retaining flange 48 is provided on housing 34 to insure the proper positioning of the sash rail 46 at the top of its slide movement. The top panel 16 has a bottom meeting rail, or lower frame member 50 in which the center glass sheet of the panel is suitably secured.

The dotted lines, indicated generally by numeral 49, show the movement of the roll screen, edge frame and upper panel, as the screen is moved downwardly in the direction indicated by arrow 49a into position as the door is converted from a storm door to a screen door.

The lower sash, or panel 18 includes a top meeting rail 56 and a bottom rail 58. In order to insure that the upper panel 16 is maintained in proper position, at least one lever 62 is slidably mounted in the meeting rail 56 so that its end 64 can slide under a flange, or lip 66 of the top panel meeting rail 50.

The storage compartment 20 of the door 10 includes a bottom cross stile 70 adjustably secured to the frame 12 by any suitable means, such as a screw 72 passing through a slot in the cross stile. A pair of covering panels 74 and 76 are received in slots or on internal flanges 78 of the cross stile 70. In order to provide a soft non-abrasive surface for the glass panel 18 to engage when it is lowered, a conventional fabric brush, or felt seal 80 is provided. The brush 80 is mounted on an inside center mullion 82 that is secured to the frame 12 and which also holds the upper end of the covering panel 74. As a feature of the invention, and in order to allow the lower panel 18 and/or the upper panel 16 to be slidably lowered into the storage compartment 20, a pivotally mounted mullion check rail 86 is provided. In the position shown in FIGURE 3, the mullion check rail 86 engages the lower portion of the bottom sash or panel rail 58 of the panel 18, and is held in position by an outside center mullion 88 engaging a flat

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cam surface 90 on the mullion check rail 86. The bottom rail 58 of the lower panel has an integral offset flange 59 of the thickness of the upper panel lip 59a thereon to receive and engage the upwardly extending lip or edge of the mullion check rail 86.

It should be noted that when the lever 62 is released, the lower panel can be raised slightly and the check rail 86 can be pivoted counter clockwise as indicated by arrow 92 to a position indicated by dotted lines at 94, thereby allowing the lower panel 18 to be moved downwardly into the storage compartment 20, as indicated by dotted lines 98. It should further be noted the meeting rails 50 and 56 will automatically engage when lowering the lower panel. Hence the roll screen will be pulled down as the upper panel is lowered. Then, if the lever 62 is released, the upper panel 16 may also slide down into the storage compartment 20. If, however, the lever 62, is in its locking position, the upper panel 16 will merely cover the central portion of the door 10 and rest in approximately the position as indicated by the dotted lines 100. Thus, it is seen that it is an extremely simple matter to move the upper panel 16 downwardly into adjacent relationship to the lower panel 18, or to move the lower panel 18 down into the storage compartment 20 or, further to move both panel 16 and 18 into the storage compartment 20 with the open area then covered by the screen 36 from the screen roll 30.

With reference to FIGURE 2 it is seen that the panels 16 and 18 are slidably mounted by means such as a plurality of channels 102 which comprise a portion of supplementary rails or tracks 104 that engage edge means or side rails on the panels. The tracks 104, usually extruded from a plastic material, are operatively carried by the frame 12. Preferably resilient means 105 urge the tracks 104 laterally inwardly in the frame. Any suitable means, such as a hinge 106, may be provided for mounting the door 10. In order to insure a tight relationship of the screen 36 when it is pulled from the roll 30 into position, a pair of extruded aluminum rods, or locking means 108 and 110, respectively, may be rotatably mounted in arcuate seats in strips or frames 112 and 114, respectively, as indicated, to engage the screen and stretch it across the frame 12 to insure that the screen 36 is retained fairly tightly over the door opening after the screen 1 is pulled into position as the panels 16 and 18 are moved downwardly into the storage compartment 20. These locking means 108 and 110, having feet, or protruding sections 109 and 111 thereon, extend the height of the opening 14 in the door and can be controlled by rams 113 suitably secured thereto and extending therefrom at their lower ends, which arms protrude from the lower ends of the cover strips 112 and 114 to move the locking means arcuately laterally outwardly of the door for screen tightening action. A resilient backing means, such as a foam rubber pressure pad 115, is secured to parts of the door frame 12 where the edges of the screen are received in the covers 112 and 114 to aid in engaging the screen by the rods 108 and 110.

Thus, it is seen that the objects of providing a door with self-storing panels are achieved, as either one or both of the panels 16 and 18 may be stored in the compartment 20 and that the screen 36 will cover whatever area is opened by the storage of the panels. Means are provided to insure the screen is tightly positioned after storage of the glass panels. The screen is spring loaded onto the screen roll so that it does not overcome the weight and friction of the panels when they are moved to a downward position, but so that when the panels are moved to an upward position, the screen will re-roll itself. Shifting from glass to screen is quickly and easily accomplished with no storage problems for the glass panels or the screen.

While in accordance with the patent statutes one best known embodiment of the invention has been illustrated and described in detail it is to be particularly understood

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that the invention is not limited thereto or thereby, but that the inventive scope is defined in the appended claims.

What is claimed is:

1. In an assembly to cover window or door openings the combination of
 - a rectangularly shaped outer frame defining a substantially rectangularly shaped opening,
 - at least one glass panel mounted to said frame to cover a portion of said opening,
 - a storage compartment provided in said frame below said glass panel and adapted to receive at least one glass panel for storage,
 - means releasably holding said glass panel in position but being releasable to selectively allow said glass panel to slide into said storage compartment,
 - roll screen means rotatably mounted to said frame and having one end operatively affixed to said glass panel so that when said glass panel is selectively moved into the storage compartment the roll screen is unrolled to cover the open portion of said opening, and
 - means on said outer frame to resiliently clamp said roll screen means into position when it has been unrolled to cover the open portion of said opening, said means comprising,
 - resilient means mounted along the parallel longer sides of said outer frame, and
 - locking means pivotally and operatively carried by the outer frame to force the edges of the screen over at least substantially the full exposed length thereof against the resilient means with a wiping action to effect stretching across the width of the screen.
2. In an assembly to cover window or door openings the combination of
 - a rectangularly shaped outer frame defining a substantially rectangular shaped opening,
 - a first glass panel slidably mounted to said frame to cover approximately the top one third of said opening,
 - a second glass panel slidably mounted to said frame to cover approximately the middle one third of said opening,
 - a storage compartment operatively affixed to said frame covering approximately the bottom one third of said opening and adapted to receive said glass panels in side by side adjacent relationship for storage,
 - means releasably holding said second glass panel in position, said means when released allowing said second glass panel to slide in said frame into said storage compartment,
 - mean releasably holding said first glass panel in relation to said second glass panel, said means when released in conjunction with last said releasable means allowing said first glass panel to slide in said frame into releasable means allowing said first glass panel to slide in said frame into said storage compartment adjacent said second glass panel,
 - roll screen means rotatably mounted to said frame and having one end operatively affixed to said first glass panel so that when said glass panels are moved into the storage compartment the roll screen is unrolled to cover the open portion of said opening, caused by the storage of said glass panels, and
 - means to clamp said roll screen means into position when it has been unrolled to cover the open portion of said opening, said means comprising
 - resilient means mounted along the parallel longer sides of said outer frame, and
 - locking means pivotally carried by the frame to force the edges of the screen over the full length thereof against the resilient means with a wiping action to effect stretching across the width of the screen.

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3. In an assembly to cover window or door openings the combination of

a rectangularly shaped outer frame defining a substantially rectangular shaped opening,

a first glass panel slidably mounted to said frame to cover approximately the top one-third of said opening, 5

a second glass panel slidably mounted to said frame to cover approximately the middle one-third of said opening, 10

a storage compartment provided in said frame covering approximately the bottom one-third of said opening adapted to receive said glass panels for storage, means releasably holding said glass panels in position but being releasable to selectively allow one or both of said glass panels to slide into said storage compartment, 15

roll screen means rotatably mounted to said frame and having one end operatively affixed to said first glass panel so that when said glass panels are selectively moved into the storage compartment the roll screen is unrolled to cover the open portion of said opening caused by the storage of said glass panels, and 20

means on said outer frame to resiliently clamp said roll screen means into position when it has been unrolled to cover the open portion of said opening, said means comprising 25

a cover member extending vertically of said outer frame adjacent each side of said opening,

a vertically extending locking means journaled on each said cover member and having a locking foot extending therefrom, 30

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the edges of said roll screen means when operatively positioned being received between a portion of each said cover members and said outer frame,

resilient means positioned on said outer frame adjacent the edges of said roll screen when positioned over said opening, and

said locking means being movable to bring said locking foot into engagement with said roll screen and force a portion against said resilient means by a laterally outwardly directed arc to secure said roll screen tightly in position.

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