

Jan. 13, 1970

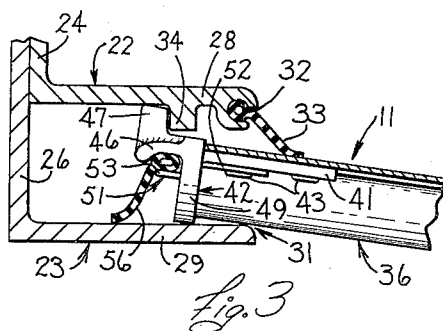
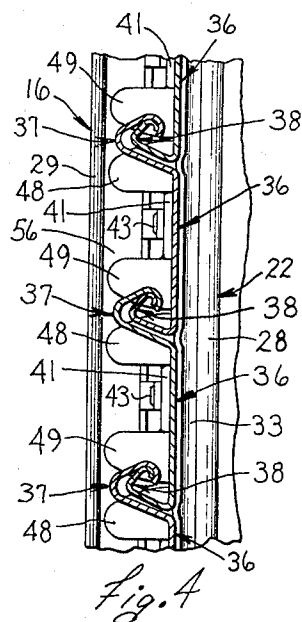
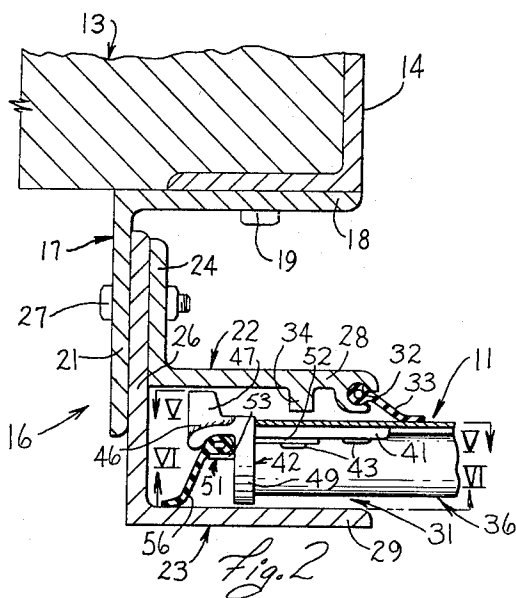
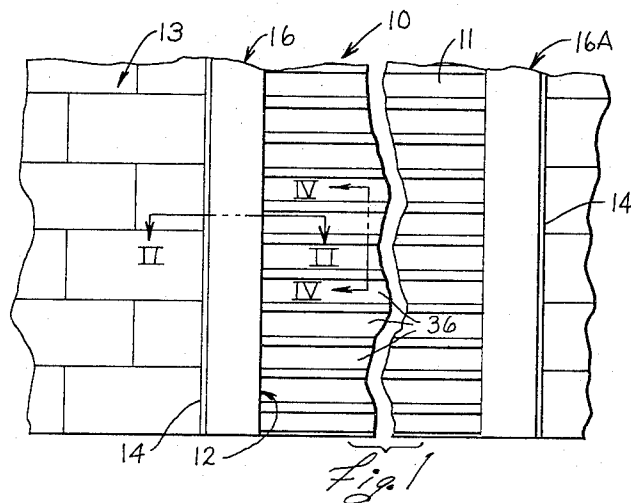
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3,489,200

SEALING AND GUIDING STRUCTURE FOR A DOOR

Filed March 22, 1968

2 Sheets-Sheet 1



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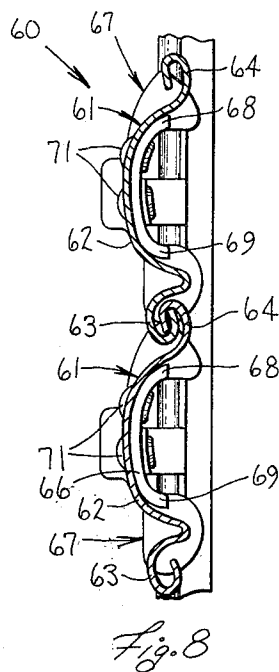
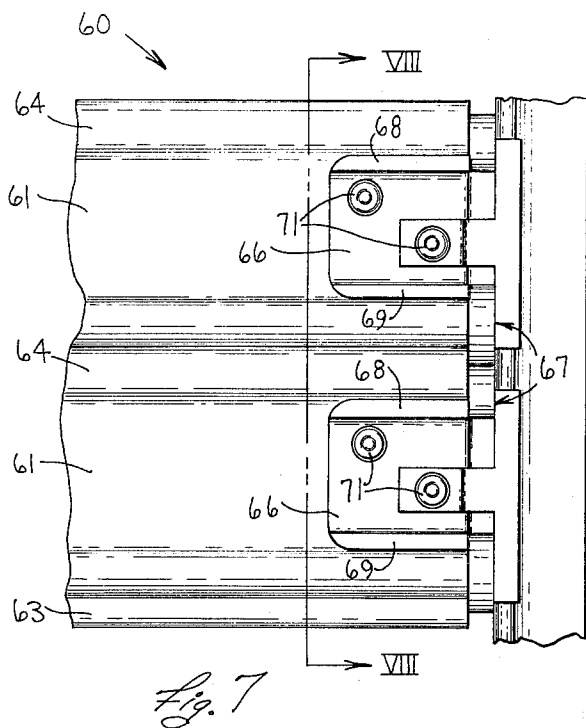
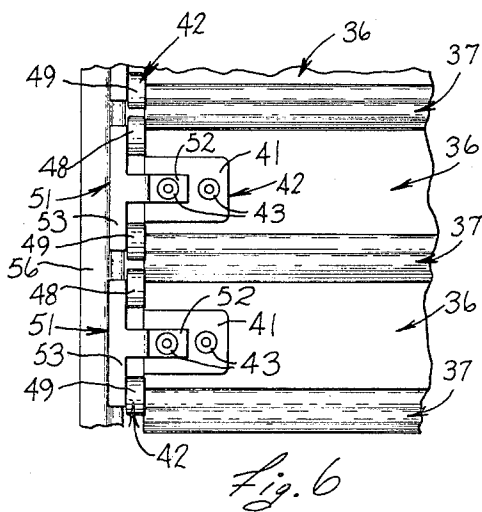
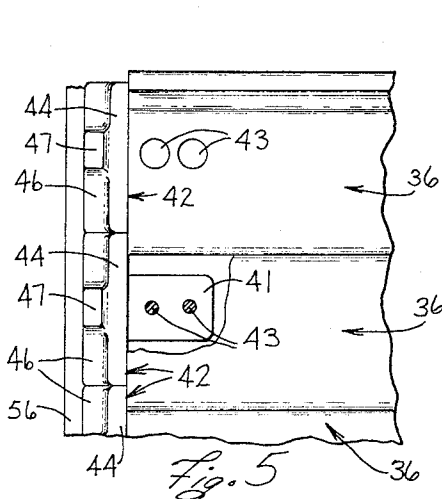
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SEALING AND GUIDING STRUCTURE FOR A DOOR

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2 Claims

ABSTRACT OF THE DISCLOSURE

Combined guide and weather seal structure for engagement with the lateral edges of an upwardly acting door and mountable upon the framework defining an opening in a wall. The opposite edges of the door are received in a pair of channels and appropriate seal means extend between the guide structure and the door to form a weather lock. Engageable abutment means in the same region positively opposes withdrawal of the door through the open side of the channel, without obstructing the sliding movement of the door lengthwise of the channels.

BACKGROUND OF THE INVENTION

This invention relates in general to upwardly acting doors having a plurality of horizontally hinged slots or panels which can be rolled upon a spindle above the door opening and, more particularly, to a guide and seal structure for the opposite lateral edges of the door.

Persons acquainted with the manufacture and use of upwardly acting doors, which are usually wound upon a spindle when in the open position, have long been aware of the serious need for, and the unsuccessful attempts to provide, a truly weathertight guide structure for the opposite lateral edges of the door. Existing guide and seal structures have been deemed unsatisfactory because they leak, especially when the wind is strong, because they lack a completely foolproof means for preventing dislodgment of the lateral edges of the door from the guide structure when the wind is strong or when other stresses are applied to the door. Moreover, they lack suitable protective devices on the guide structure or the edges of the door to avoid damage to the panels or slats, and particularly the hinge portions thereof, during relatively normal use.

Accordingly, a primary object of this invention has been the provision of a combined guide and seal structure for the edge of an upwardly acting door having a plurality of horizontally hinged slats or panels whereby a completely effective wind and weather seal is provided around the lateral edges of the door, whereby the door can flex inwardly or outwardly under heavy wind loads or other stresses without being dislodged from the guide structure and without injuring the hinge mechanisms between adjacent panels and without breaking the weather seal, and whereby the door is positively prevented from becoming dislodged from the guide structure by movement transversely thereof short of fracturing the entire structure.

It is a further object of this invention to provide a sealing structure which is easy to assemble and adapted for use with door components readily available on the market, thereby reducing the cost of manufacture.

Other objects and purposes of the invention will become apparent to persons familiar with this type of equipment upon reading the following descriptive material and examining the accompanying drawings, in which:

FIGURE 1 is a fragmentary, interior elevation of an upwardly acting door embodying the invention.

FIGURE 2 is a sectional view taken along the line II—II in FIGURE 1.

FIGURE 3 is a fragment of FIGURE 2 showing parts thereof in different positions of operation.

FIGURE 4 is a sectional view taken along the line IV—IV in FIGURE 1.

FIGURE 5 is a sectional view taken along the line V—V in FIGURE 2.

FIGURE 6 is a sectional view taken along the line VI—VI in FIGURE 2.

FIGURE 7 is a fragmentary side view of a modified door.

FIGURE 8 is a sectional view taken along the line VIII—VIII in FIGURE 7.

For convenience in description, the terms "upper," "lower," "internal" and "external" will have reference to the door and associated parts thereof as appearing in FIGURE 1 which disclose the internal surface of the door. The terms "inner," "outer" and derivatives thereof will have reference to the geometric center of the guide and seal structure of the invention and parts associated therewith.

SUMMARY OF THE INVENTION

The objects and purposes of the invention have been met by providing a pair of seals, one of which is secured to the door guide structure and slidably engages the exterior of the door and the other of which is secured to the edge of the movable door and slidably engages the door guide structure to provide a weathertight seal for the door. Interacting abutment means positively prevent dislodgment of the door from the guide structure.

DETAILED DESCRIPTION

An upwardly acting door assembly 10 (FIGURE 1) comprises a door 11 which is movable into and out of a position closing an opening 12 defined by a door frame 14 (FIGURE 2) in a building wall 13.

A pair of guide structures 16 and 16A extend along the vertical edges of the door frame 14. The guide structure 16 is comprised of an elongated, upright angle member 17 having an L-shaped cross section with one flange 18 thereof secured to the door frame 14 by bolts 19. The other flange 21 projects perpendicularly away from the internal surface of the wall 13. A pair of elongated angle members 22 and 23 having L-shaped cross sections are arranged so that their flanges 24 and 26, respectively, are parallel and secured to the flange 21 by bolts 27. The flanges 28 and 29 of the angle members 22 and 23, respectively, are horizontally spaced and parallel so that they, in combination with the flange 26 of the angle member 23, define a channel 31.

The free edge of the flange 28 (FIGURE 2) of the angle member 22 has an elongated groove 32 which extends the full vertical length of the angle member 22 adjacent the exterior surface of the door 11. An elongated and resiliently flexible seal 33 has one lengthwise edge recessed and held within the groove 32, and the other lengthwise edge slidably engages the exterior surface of the door.

An elongated ridge 34, which is integral with and projects from the inner surface of the flange 28, extends parallel with the groove 32 and is spaced substantially from the flange 26 of angle member 22.

The two guide structures 16 and 16A are preferably mirror images of each other. Thus, a detailed description of the guide structure 16A is believed unnecessary.

The door 11 comprises a plurality of horizontally hinged panels or slats 36 which extend across the opening 12 in the wall 13 and are engaged by the structures 16 and 16A. In this embodiment, the hinge elements 37 and 38 are integral parts of adjacent panels which are interengaged. It is recognized, of course, that other types of hinge structures, which would not interfere with the opera-

tion of the door, could be used. The door 11 is moved upwardly from its closed position and rolled upon a spindle (not shown) located above the opening 12 and mounted upon the internal surface of the wall 13.

The stems 41 of a plurality of T-shaped end members 42 are secured respectively to the door panels 36 by rivets 43. The crossbar 44 of the T-shaped member 42 has a broad lip 46 projecting in the opposite direction from the stem 41. An abutment 47 projects from the exterior surface of the lip 46 toward the flange 28. The crossbar also has a pair of spaced projections 48 and 49 which project toward the flange 29. The distance between the outer edges of the abutment 47 and projection 48 in a direction perpendicular to the flange 29 is slightly less than the perpendicular distance between the flanges 28 and 29.

A plurality of T-shaped clips 51 each have a stem 52 secured to the stem 41 of an end member 42 by at least one of the rivets 43 (FIGURE 6). The cross member 53 of each clip 51 extends along and is spaced from the lip 46 and has a length which is slightly less than the distance between the remote surfaces of a pair of the projections 48 and 49, respectively.

A resiliently flexible and elongated seal 56 has one lengthwise edge gripped between each lip 46 and the cross member 53 of the corresponding clip 51. The other lengthwise edge of the seal 56 is slideably engaged with the inner surface of the flange 29.

OPERATION

Although the operation of the invention will be readily apparent from the foregoing description to those skilled in the art, said operation will now be summarized for convenience.

The door 11 is movable upwardly and downwardly in the channels, such as channel 31 (FIGURE 2), provided by the guide structures 16 and 16A (FIGURE 1). The overall thickness of the end member 42 at the projections 48 and 49 and the abutment 47 is slightly less than the width of the channel 31. Thus, the abutment 47 will be engageable with the ridge 34 to prevent disengagement of the door 11 from the structure 16 when a load is applied to the door 11 whereby it is urged out of such engagement as illustrated in FIGURE 3.

The resiliently flexible seal 33 is slideable along the external surface of the door 11 and is arranged to maintain a continuous sealing engagement with said external surface even when a load is applied to flex the door, as is illustrated in FIGURE 3. The resiliently flexible seal 56 slideably and continuously engages the inner surface of the flange 29, even when a load is applied to flex the door as is illustrated in FIGURE 3.

The contiguous arrangement of the adjacent end members 42 and their location with respect to the seal 33 and the flange 28, when the door 11 is in its closed position, are such that inclement weather cannot move through these members under any foreseeable conditions, even if the door is exposed to excessive stresses of wind or the like. Furthermore, the seals 56 and 33 positively prevent the movement of heat around the edge of the door 11 from within the building defined by the wall 13.

The abutment 47 and the projections 48 and 49 constantly space the slats 36 from the flanges 28 and 29, respectively, whereby wear of said slats and/or damage to their hinge elements 37 and 38, especially during operation under adverse conditions of weather or use.

Thus, the door assembly 10 is capable of withstanding relatively high stress loads, short of fracturing the structure, without breaking the weather lock provided by the seals 33 and 56, and without dislodging the door from the guide structures 16 and 16A.

The modified door 60 disclosed in FIGURES 7 and 8 has slats 61, each of which is curved transversely of its length to provide a convex exterior surface 62. The resultant door structure has greater resistance to forces

urging flexion than does the door 11 with flat slats. Also, the distance between the central plane of the door 60 and the hinge axes of the hinge elements 63 and 64 is less than the distance between the corresponding parts of the door 11. This also reduces the opportunity for door flexion when, for example, it is exposed to a strong wind.

The stem 66 of the modified end member 67 has lengthwise flanges 68 and 69 which preferably lie adjacent the concave edge portions of the slat 61, to which the member 67 is secured by rivets 71. This arrangement also tends to stiffen the slat, at least near the end member 67.

In general, the operation of the door 60 and the performance of its combined weather, wind and end lock structures may be and preferably are substantially the same as described above with respect to the door 11 and its corresponding structures.

Although particular preferred embodiments of the invention has been disclosed above for illustrative purposes, it will be understood that variations or modifications thereof which lie within the scope of the appended claims, are fully contemplated.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In an upwardly acting door comprising a plurality of elongated and horizontally hinged members adapted to be stored in a roll above the opening to be closed by said door, a combined guide, end lock, weather lock and wind lock structure for the door comprising:

wall means including first and second substantially parallel flange members defining an elongated channel in which one edge of said door is slideably received for movement lengthwise of said channel;

first seal means coacting between the door and said wall means for opposing movement of air from one side of said door to the other side thereof through said channel, said first seal means including a first elongated resilient seal member extending lengthwise of said channel, said first seal member having one lengthwise extending edge thereof secured to said first flange member substantially adjacent the free edge thereof, the other lengthwise edge of said first seal member being free and being resiliently urged into sliding and sealing engagement with one side of said door;

a plurality of end members secured to the hinged members of said door along one lengthwise edge of the door, each end member having abutment means extending transversely of said door beyond one side thereof and projection means projecting from said end member beyond the other side of said door for spacing said hinge members from said flange members, said projection means being offset with respect to said abutment means toward the center of said door, and said end members having a width transversely of said door slightly less than the width of said channel as defined between said first and second flange members whereby said abutment means and said projection means coact with said flange members to protect said hinge members;

second seal means coacting between said wall means and said door for opposing movement of air from one side of said door to the other side thereof through said channel, said second seal means including a second elongated resilient seal member extending lengthwise along said one edge of said door, said second seal member having one lengthwise edge thereof secured to said end members between said projection means and said abutment means, said abutment means extending outwardly of said one lengthwise edge of said second seal means with the other lengthwise edge thereof being free and being resiliently urged into sliding and sealing engagement with said wall means; and

5

elongated ridge means fixedly secured to and extending lengthwise of said channel and projecting laterally from one of said flange members into said channel, said ridge means being positioned between said abutment means and said first seal means from engagement by said abutment means on each of said end members whereby dislodgement of said one edge of said door from said channel is positively opposed.

2. A structure according to claim 1, wherein said end member has a central portion fixedly interconnected between and laterally spacing said projection means and said aboutment means; and

including clip means fixedly secured to each of said end members, said clip means having a portion thereof adjacent to but spaced from said central portion for defining a groove therebetween, said one lengthwise edge of said second seal member being held within said groove so that the other lengthwise edge of said

6

second seal member is resiliently urged into engagement with said second flange member.

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