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DRAIN CONSTRUCTION FOR WINDOW SASH AND THE LIKE

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FIG. 1

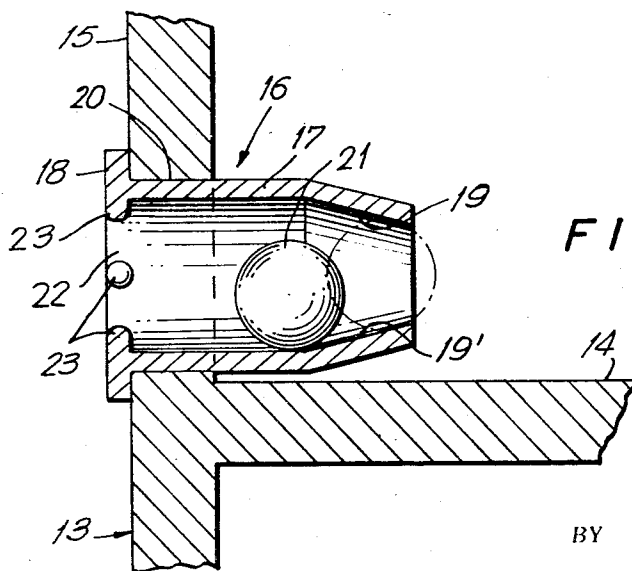
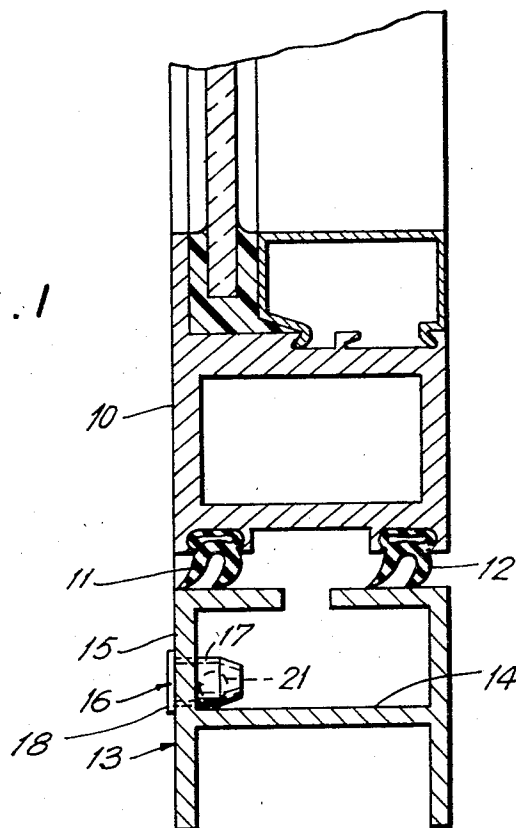


FIG. 2

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DRAIN CONSTRUCTION FOR WINDOW SASH AND THE LIKE

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1 Claim

ABSTRACT OF THE DISCLOSURE

Drain and evaporation discharge for water collected in window sashes, mullions and exterior curtain wall components comprising a ball check valve having an inclined seat portion directed toward the exterior of the building, the seat including inclined wall portions arranged to maintain the ball cleared from the seat to permit draining and evaporation except when ambient pressure conditions are such that the pressures at the exterior surface of the frame exceed the pressures internally of said frame.

BACKGROUND OF THE INVENTION

Field of the invention.—This invention is in the field of exterior windows, curtain walls and like frame structures wherein, due to exposure to the elements, water may collect within the frame structure. A problem frequently arising is the collection of water within the interior structures, such as window frames, curtain wall frames, etc. Water may be introduced into the interior of the frame structures through faulty weather stripping, improper interfit of the parts and like causes. When such water collects in the frame structures, it is obviously necessary to drain the same.

This invention is in the field of improved drain means for frames of the type described.

Description of the prior art.—It is known in window sashes or like framing components which are exposed to the elements to provide drain means to permit collected water to drain.

In the past, there have also been provided forms of flapper valves which are normally closed but which, under the weight of water collected behind the valve within the frame are forced open to permit water to drain clear.

Such prior art devices, however, while effective to permit draining where considerable quantities of water have been collected, are generally ineffective to drain off the entire quantity of collected water. This inability completely to drain the interior spaces is due to the fact that the valves are normally disposed in closed position (except when forced open under the influence of water pressure against the valve) and thus prohibit evaporation of the last remnants of water, which cannot drip clear through the drain openings.

Attempts have been made to permit evaporation through a valve by providing a valve structure which can never completely seal against its valve seat. The difficulty with such constructions is that external pressures, such as caused by gusty winds, will force water inwardly during a rainstorm.

It should be appreciated that in heavy rains, a steady curtain of water may flow across all exterior components, including the valve portion, and if an incomplete seal is effected at the valve portion, the high external pressure may force liquid through the valve into the interior of the frame.

Summary of the invention.—The present invention relates to a valve structure for use in external framing,

such as window sashes, curtain wall frames and the like, which will form a perfect seal under ambient high pressure conditions, such as encountered during a rain storm, to prevent the ingress of water through the valve, and which will, under normal conditions, be maintained in an open position, to permit outward flow of collected water and evaporation.

Accordingly, it is an object of the invention to provide an improved drain for a window sash, curtain wall or like structure members which are exposed to the elements.

A further object of the invention is to provide an improved framing structure of the type described which is inexpensive and is not subject to fouling due to collected dirt, scale, etc.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, reference is made to the accompanying drawings, forming a part hereof, in which:

FIGURE 1 is a vertical sectional view taken through a window assembly employing a drain structure in accordance with the invention;

FIGURE 2 is a magnified vertical section taken on through the window frame and valve assembly of FIGURE 1.

In accordance with the invention, a sash 10 for a window or the like, of essentially conventional construction, is provided with weather stripping portions 11, 12 for sealing connection with a supportive frame structure 13. While the invention will be described in conjunction with a window construction, it will be readily recognized that the combination of frame and drain may be utilized in a multitude of situations not restricted to windows. For instance, the drain may be used in connection with curtain wall installations, doors, etc.

Similarly, while the combination has been illustrated in conjunction with a frame for a window or the like, it will be understood that such drains may be advantageously employed in the supportive sash for holding the window and not merely in the frame in which the sash is mounted.

The frame 13 which, in accordance with standard practice may be comprised of four rectangular extruded sections, mitred at their corners and connected together, includes a horizontally disposed base wall 14 and an exterior vertical wall 15. The valve assembly 16 is mounted in the wall 15 as close as possible to the base wall 14.

The valve includes a cylindrical body portion 17 having at its outer end an annular flange 18, the inner end of the valve being formed into a frusto-conic seat portion 19.

The valve assembly 16 is installed in an aperture 20 formed in the wall 15 by any desired means, such as press fitting. It will be understood, however, that if desired, the cylindrical portion 17 may be threaded adjacent the flange 18 so as to form a threaded connection between the valve and a complementary thread formed at the aperture 20.

A light weight ball member 21 is disposed within the body of the valve, the ball being prevented from travelling outwardly through the open mouth 22 of the valve by a series of radially extending protuberances. The valve is positioned in the aperture 20 with the flange 18 lying adjacent the face of the front wall 15 of the frame.

From the foregoing it will be evident that the ball 21 is permitted a range of movement within the body of the valve limited by the frusto-conic portion 19 and the protuberances 23.

When the ball 21 is seated within the frusto-conic portion, a tight seal is effected. When the ball is positioned at any other point within the valve body, free air circulation through the valve is permitted.

The ball is advantageously made of a light weight material having a very low coefficient of friction. Nylon or other long chain polyamides are suitable materials since they are relatively light in weight and, while resilient, are not too easily deformed. A material which is too easily deformed should be avoided in most instances since it is possible for the material to become wedged or jammed within the frusto-conic seat 19 of the valve.

An ideal material for the ball structure is Teflon, a registered trademark of the DuPont Corporation, signifying a fluorine containing plastic having an exceedingly low coefficient of friction. This material has the additional advantage that, due to its very low coefficient of friction, scale and slime will not readily adhere to its surface, adversely to affect the efficiency of the valve.

It is an important feature of the invention that the inclined lowermost surface 19' of the frusto-conic section is disposed in such relation to the front wall 15 of the frame that the ball 21 will normally be rolled from the seated position to an intermediate position within the cylindrical body section of the valve.

In operation, the ball will normally be disposed at or near the solid line position shown in FIGURE 2. However, in the event of ambient pressure conditions wherein the pressures at the exterior of a building exceed the interior pressures, the light weight ball will be shifted into tight sealing relation (shown in dot and dash lines, FIGURE 2), preventing the ingress of water into the interior of the frame.

During heavy rains it is common for a sheet of water draining down the side of a building to drain across all exposed surfaces of a building. Under these circumstances, in the event of the simultaneous presence of moisture over the valve opening and exterior pressures which exceed the interior pressures, considerable quantities of water will be forced into the interior of a frame which is equipped with valve devices heretofore known. The device of the present invention provides a substantially complete seal.

Further, the valve of the present invention has the advantage of being disposed in a normally open position, to permit water which leaks through the weather stripping, for instance, to drain clear through the valve when

a sufficient collection of water exists, or to evaporate through the space provided by the normally open valve, when the quantity of water is not so great as to be able to force the valve open.

Having thus described the invention and illustrated its use, what is claimed as new and is desired to be secured by Letters Patent is:

1. A self-draining sash construction or the like comprising a frame having exterior and interior surfaces and having a floor portion, a weep aperture in a generally vertically disposed exterior portion of said frame adjacent said floor portion, a drain valve member in said weep aperture having a generally frusto-conic valve seat, the axis of said frusto-conic seat being disposed in a horizontal plane with the larger base of said seat being closer to the exterior of said frame than the smaller base, said valve seat being disposed above the level of said floor portion, a light weight, resilient plastic ball member disposed in said valve member, said ball member being normally maintained clear of sealing position of said frusto-conic seat portion by the inclination of lower portions of said seat, said ball being shifted to sealing position of said seat responsive to ambient pressure conditions wherein pressures at the exterior surface of said frame exceed pressures to the interior of said frame.

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52—209, 303, 400; 137—519.5