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Silvernail

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[54] **CURTAIN WALL WITH INTERNAL WEEP MEANS**

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[52] **U.S. Cl.** **52/235,** 52/209, 52/303

[51] **Int. Cl.** **E04b 2/88**

[58] **Field of Search** 52/302, 209, 235, 303, 52/264, 732, 97

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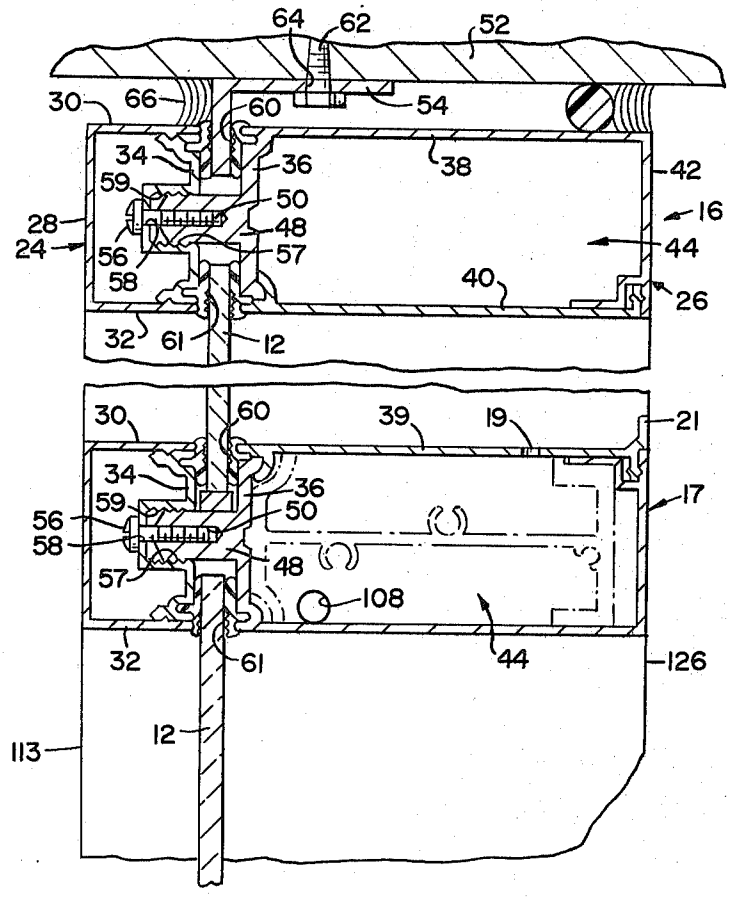
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Assistant Examiner—Leslie A. Braun
Attorney, Agent, or Firm—Arthur W. Fisher, III, Esq.

[57] **ABSTRACT**

A curtain wall comprising a substantially rectangular fixed casing configured to hold a plurality of windows in fixed side-by-side coplanar relation including internal moisture weeping means. The casing comprises a plurality of horizontal and vertical members held in fixed spaced relation relative to each other, the horizontal members including internal weep holes and the vertical member including internal feed passages and internal weep holes communicating with a reservoir means vented to the exterior of the curtain wall to channel moisture through the internal feed passages and internal weep holes to the reservoir means and thence to the exterior of the curtain wall through venting apertures.

11 Claims, 5 Drawing Figures



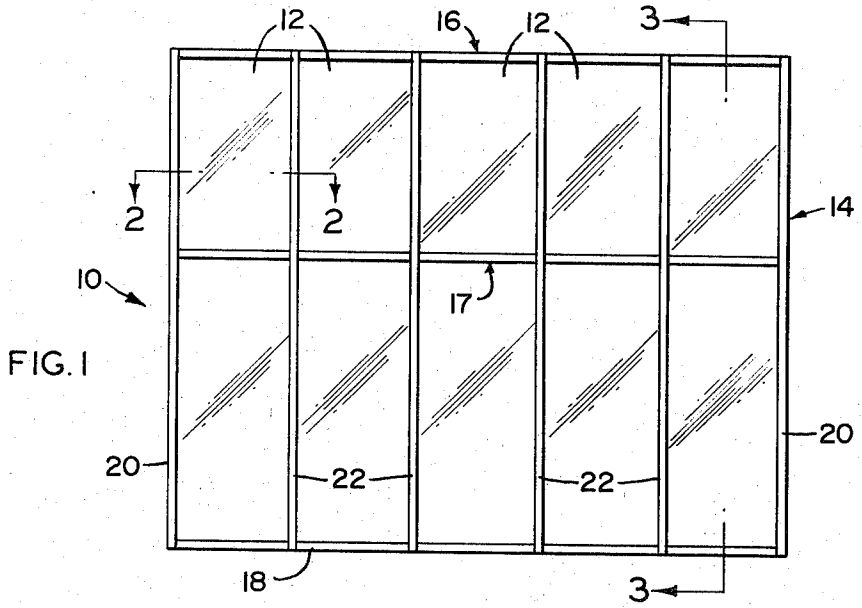


FIG. 1

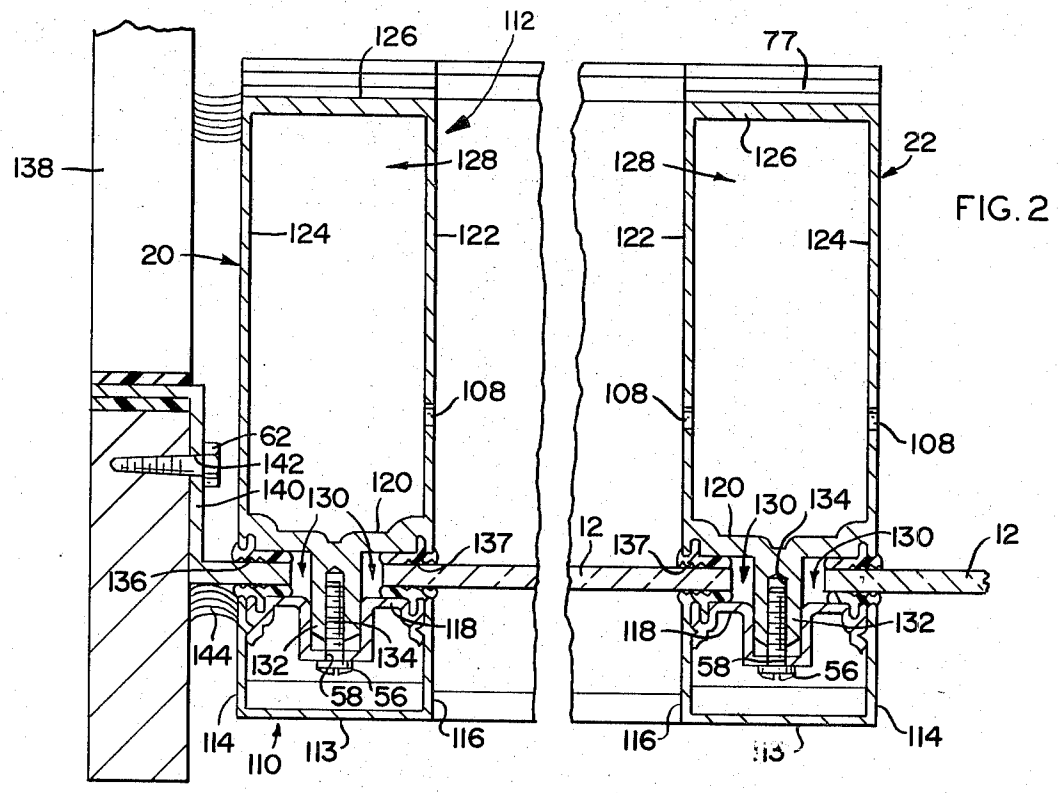


FIG. 2

FIG. 4

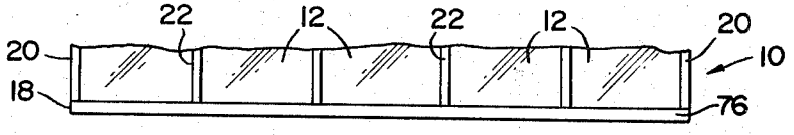


FIG. 3

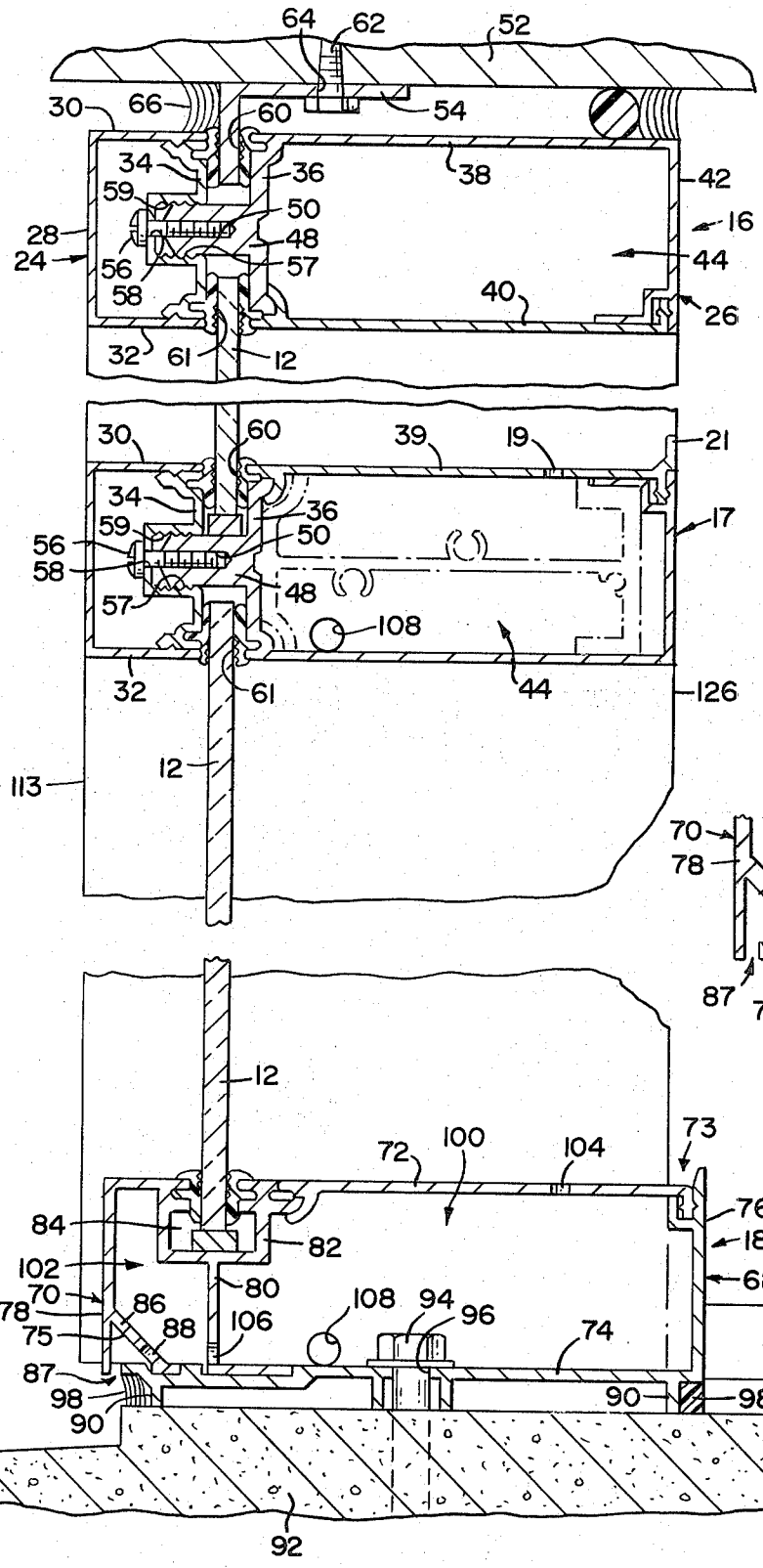
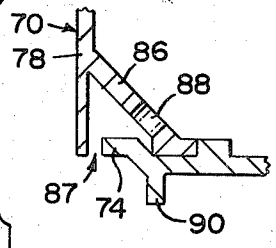

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FIG. 5


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CURTAIN WALL WITH INTERNAL WEEP MEANS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a curtain wall including a plurality of horizontal and vertical members including internal feed passages and weep holes to channel moisture from the interior of the enclosure to the exterior thereof.

2. Description of the Prior Art

In the construction of modern day multi-story buildings, numerous curtain wall structures have been developed. Unfortunately such curtain wall structures are subject to leakage from wind and rain. In addition internal condensation of moisture often results in water damage to the interior of the building.

Generally these curtain walls are constructed of metal, having relatively high coefficient of expansion of the metal. The inherent problem of permanently sealing the various building elements in such a way as to prevent leakage due to contraction and expansion of the curtain wall remains unresolved.

It is common to provide a frame support for the glass panels using a glazing compound between the glass panels and frame support to prevent leakage. Unfortunately, the glazing compound must be properly applied to the initial installation which requires a substantial amount of labor. In addition the glazing compounds deteriorate thereby requiring periodical inspection and application of additional glazing material when required.

In addition, a number of structural complex frames include a variety of interlocking members designed to prevent leakage. Unfortunately these are generally expensive to fabricate and install. Some of these frames include external weep holes at each horizontal level. As a result, the windows weep at each level causing unsightly streaking and discoloration.

Internal condensation also remains a problem even where external leakage is minimized. In existing curtain walls moisture condenses on the interior surface of the glass. As the moisture accumulates it flows downward onto the floor causing water damage when present in sufficient quantities.

Thus it is readily apparent that a need exists for a curtain wall to effectively prevent leakage and condensation damage.

SUMMARY OF THE INVENTION

This invention relates to a curtain wall comprising an internal weeping means. More specifically, the invention comprises a substantially rectangular fixed casing configured to hold a plurality of windows fixed in side-by-side coplanar relationship relative to each other.

This structure is configured to channel moisture from the curtain wall to the exterior of a multi-story building. The rectanular casing includes an upper horizontal header and lower horizontal sill held in fixed parallel spaced relationship by a plurality of vertical members. The windows are enclosed within the framework of the horizontal and vertical members.

The horizontal and vertical members include a plurality of weep holes. The horizontal and vertical members are configured to comprise horizontal and vertical moisture feed channels respectively. The weep holes and feed channels cooperatively form internal weeping means to channel moisture from the upper portion of the curtain wall to a reservoir means formed in the sill. The reservoir means comprises a condensation reservoir and pressure equalization reservoir in communication therewith.

The condensation reservoir is arranged relative to the internal feed channels and weep holes such that moisture flows downward through the internal weeping means into the condensation reservoir through the pressure equalization reservoir and is discharged from the building.

This invention accordingly comprises the features of construction from the combination of elements, said arrangement of parts which may be exmplified in the construction hereinafter forthwith and the scope of the invention will be included in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing in which:

FIG. 1 is a front view of an assembled curtain wall.

FIG. 2 is a cross-sectional top view taken along line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional side view taken along line 3—3 of FIG. 1.

FIG. 4 is a partial review view of an assembled curtain wall.

FIG. 5 is a detailed view of a baffle.

Similar reference characters refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1, this invention comprises a wall curtain, generally indicated as **10**, having a plurality of fixed windows **12** arranged in side-by-side coplanar relation within a substantially rectangular curtain wall frame **14**.

As best shown in FIG. 1, curtain wall frame **14** comprises an upper horizontal header **16**, intermediate horizontal member **17** and a lower horizontal sill **18** held in fixed parallel spaced relation by a plurality of vertical members. The vertical members comprise vertical jambs **20** attached to each end of header **16** and sill **18** and a plurality of vertical mullion **22** spaced at equal intervals between jambs **20**.

As shown in FIG. 3, header **16** comprises a substantially U-shaped channel **24** and substantially rectangular channel **26**. Channel **24** comprises front wall **28** with top and bottom walls **30** and **32** respectively, extending perpendicularly therefrom and rear wall **34**. The rectangular channel **26** comprises front wall **36** with top and bottom walls **38** and **40** respectfully extending perpendicularly therefrom and rear wall **42**. Channel **26** is hollow such that walls **36, 38, 40** and **42** cooperatively form horizontal feed channel **44**. Extending outwardly from front wall **36** is a tongue-like member **48** including screw groove **50** formed therein. Channel **24** is fixedly attached to channel **26** by passing threaded screw **56** through aperture **58** and into screw groove **50**. A plurality of teeth **57** and **59** are formed on tongue **48** and U-shaped portion of wall **34** respectively to cooperatively engage one another to lock channels **24** and **26** together when assembled to provide additional locking between the channels. When

operatively assembled the rear wall **34** and front wall **36** cooperatively form pane groove or channel **61.**

Extending longitudinally the length of ceiling **52** is an L-shaped header mount **54.** The lower portion of header mount **54** is press-fitted into channel **60.** When curtain wall **10** is mounted in a building, header mount **54** is held in engagement with ceiling **52** by screws **62** extending through apertures **64** and into ceiling **52.** Perimeter sealant **66** is applied between header **16** and ceiling **52** to prevent moisture from passing therebetween and also to enhance insulation.

As shown in FIG. **3** sill **18** comprises continuous channel **68** and front plate **70.** Channel **68** includes top and bottom walls **72** and **74** interconnected by rear wall **76** extending perpendicularly therebetween. Wall **76** extends upwardly over wall **72** to form retainer means or lip **75.** Front plate **70** includes front and rear walls **78** and **80** respectively and upper portion **82.** Formed on the lower portion of wall **78** is inclined member **86** having a plurality of weep hole **88** formed therein. The forward edge of wall **74** and the lower edge of wall **78** cooperatively form continuous weep slot **87.** Walls **86, 78** and leading edge of **74** cooperatively form baffle **75** which prevents or minimizes blow back from the exterior of the curtain wall **10.** The upper portion **82** includes a groove **84.** Extending inwardly longitudinally the length of bottom wall **74** is a plurality of ribs **90.** When the curtain wall **10** is mounted in the building, ribs **90** are held in engagement with floor **92** by screws **94** extending through apertures **96.** Perimeter sealant **98** is applied between floor **92** and sill **18** to prevent moisture from passing therebetween and also to enhance insulation.

Sill **18** includes a fluid receiving means comprising condensation reservoir **100** and pressure equalization reservoir **102.** Top wall **72** is removable to allow cleaning and repair of reservoir **100.** Weep holes **104, 106** and **108** are formed on walls **72, 80** and **122** respectively permitting moisture to flow into reservoir **100** and from thence into reservoir **102** as more fully described hereinafter. Sill **18** extends rearward relative to vertical members **20**/22 and horizontal members **16**/17 to comprise offset means **73.** Condensation feed aperture **77** is formed in the upper wall **72.**

Intermediate members **17** are identical in construction to header **16** and similar parts are similarily identified. In addition, a plurality of internal weep holes **19** are formed along the upper wall **39** such that the exterior of the intermediate member **17** communicates with the interior channel **44.** Wall **42** extends upward to form retainer means or lip **21.**

As best shown in FIG. **2,** jamb **20** comprises hollow substantially U-shaped channel **110** and substantially rectangular channel **112.** Channel **110** includes front wall **113** with side walls **114** and **116** extending perpendicularly therefrom and rear wall **118.** Weep holes **108** are formed in walls **122** in communication with channels **44** and reservoir **100** as more fully described hereinafter. Extending outwardly from front wall **120** is a tongue-like member **132** including screw groove **134** formed therein. Channel **112** includes front wall **120,** side walls **122** and **124,** and rear wall **126.** Channel **112** forms primary vertical moisture feed channel **128.** Secondary vertical moisture feed channel **130** is formed between walls **118** and **120** on each side of tongue **132.** Channel **110** is fixedly attached to channel **112** by passing threaded screw **56** through aperture **58** and into screw groove **134.** When operatively assembled rear wall **118** and front wall **120** form pane groove **136.**

Extending vertically the length of wall **138** is a Z-shaped jamb mount **140.** When curtain wall **10** is mounted in a building, mount **140** is secured to wall **138** by a plurality of screws **62** extending through apertures **142** and into wall **138** and into groove **136.** Sealant **144** is applied between wall **138** and jamb **20** to prevent moisture seepage and enhance insulation. Jamb **20** is attached to header **16,** intermediate member **17** and sill **18** by means of screws threaded therethrough and into screw groove (not shown).

Vertical member **22** is similar in construction to vertical jamb **20** and similar parts are similarly identified.

When the entire curtain wall **10** is assembled and mounted in place, glass or panels **12** are fixedly mounted in grooves **61** and **137** as shown as FIGS. **2** and **3.** When installed, condensation and fluids may accumulate on the interior of glass or panel **12.** The fluid flows downward onto wall **39** and through weep holes **19** into channel **44.** The fluid then flows through weepholes **108** into vertical feed channels **128** and into primary reservoir **100** through aperture **109.**

In addition, moisture captured in secondary vertical channel **130** flows vertically into reservoir **102.** Condensation forming on walls **126** and **42** flows vertically downward on wall **126** to upper wall **72** then through aperture **77** (FIG. **2**) or **104** into condensation reservoir **100.** As fluid accumulates in condensation reservoir **100** it passes through weep hole **106** to pressure equalization reservoir **102** and from thence through weep hole **88** and continuous weep slot **87** into the surrounding atmosphere.

This combination of feed channels and weep holes comprise an internal weep means which prevents the accumulation of fluids and moisture on the interior of the building. At the same time no fluid is expelled at the upper levels staining and discoloring the upper windows.

It will thus be seen that the objects made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention, which as a matter of language, might be said to fail therebetween.

Now that the invention has been described:

What is claimed is:

1. A curtain wall comprising: a fixed casing comprising a plurality of substantially horizontal members including an upper horizontal header and a lower horizontal sill held in fixed spaced relation relative to each other, a plurality of vertical members arranged in spaced relation relative to each other interconnected between said horizontal members, said vertical members including vertical jambs attached to corresponding ends of said header and said sill, said curtain wall further including internal weep means, said internal weep means comprising a condensation reservoir means formed in said lower horizontal sill, vertical channel means formed in said vertical members, weep apertures formed in said vertical members, said lower horizontal

sill member including at least one drain aperture formed on the upper surface thereof in communication with said condensation reservoir means formed therein, said condensation reservoir means and said vertical channel means communication through said weep apertures and said drain aperture, said condensation reservoir means comprising a lower and upper wall held in spaced relation relative to each other by a front and rear wall, the lower portion of said vertical members extending downwardly into said condensation reservoir means, the lower end of said vertical channel means adjacent said lower wall, said vertical members being disposed forwardly of said rear wall such that fluids flow from the upper portion of said curtain wall through said weep apertures into said vertical channel means into said condensation reservoir means including a discharge orifice to discharge moisture accumulated in said condensation reservoir means to the exterior of said curtain wall.

2. The curtain wall of claim **1** wherein said rear wall comprises a continuous element extending substantially the entire length of said curtain wall.

3. The curtain wall of claim **2** wherein said reservoir means further includes a pressure equalization reservoir arranged in communication with said first reservoir means, said pressure equalization reservoir arranged in communication with said first reservoir means, said pressure equalization reservoir in open communication with the exterior of said curtain wall.

4. The curtain wall of claim **3** wherein said vertical members comprise a first and second element in operative relationship relative to another which cooperatively form a second feed channel communicating with said pressure equalization reservoir.

5. The curtain wall of claim **3** wherein said condensation reservoir and said pressure equalization reservoir cooperatively form a weep slot therebetween through which moisture is vented to the exterior of said curtain wall.

6. The curtain wall of claim **5** wherein said condensation reservoir and said pressure equalization reservoir cooperatively form a baffle means between said weep slot and said pressure equalization reservoir to minimize blow back.

7. The curtain wall of claim **1** further including at least one intermediate horizontal member substantially parallel to said header and said sill, said intermediate horizontal member including horizontal channel means formed therein and at least one drain aperture formed on the upper surface thereof in communication with said horizontal channel means.

8. The curtain wall of claim **7** wherein said intermediate members comprise a plurality of substantially rectangular members spaced in end to end relationship relative to each other.

9. The curtain wall of claim **1** wherein said horizontal members further include a lip means formed on the rear portion thereof extending upward relative to the forward surface to retain the moisture formed thereon.

10. The curtain wall of claim **1** wherein the upper surface of said sill member is removable to expose the interior of said reservoir means.

11. The curtain wall of claim **1** wherein said sill includes offset means extending rearward relative to said vertical means and said header whereby the moisture condensing on said vertical and horizontal members flows downward onto said offset means, said sill further includes at least one condensation weep aperture formed on said offset, condensation feeding through said condensation weep aperture into said condensation reservoir.

* * * * *