



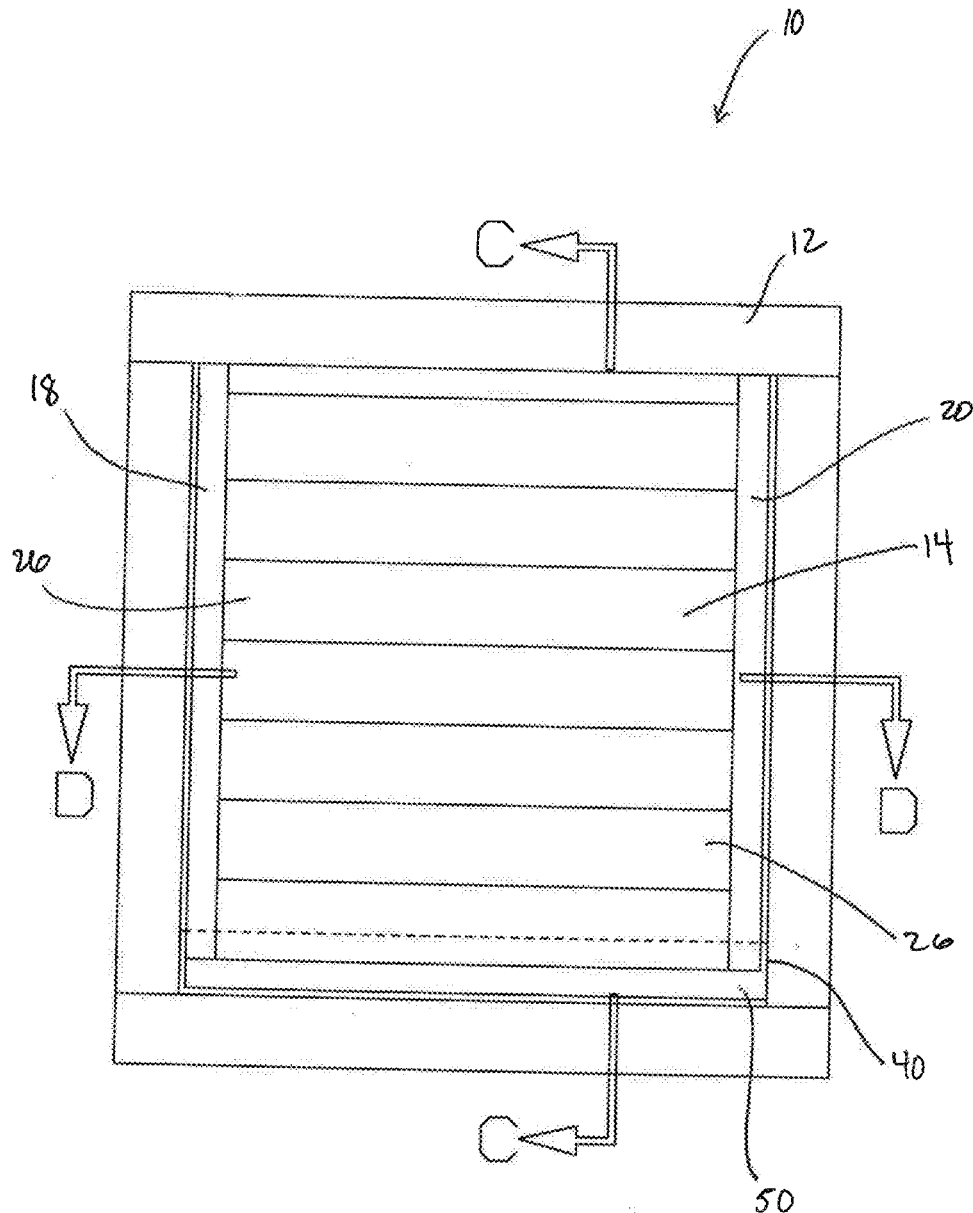
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(19) **United States**(12) **Patent Application Publication**
Moyer, JR.(10) **Pub. No.: US 2021/0003313 A1**(43) **Pub. Date: Jan. 7, 2021**(54) **LOUVER ASSEMBLY**(71) Applicant: **Mestek, Inc.**, Westfield, MA (US)(72) Inventor: **Kenneth L. Moyer, JR.**, Wyalusing, PA (US)(73) Assignee: **Mestek, Inc.**, Westfield, MA (US)(21) Appl. No.: **16/502,502**(22) Filed: **Jul. 3, 2019****Publication Classification**(51) **Int. Cl.****F24F 13/08** (2006.01)**F24F 7/007** (2006.01)(52) **U.S. Cl.**CPC **F24F 13/084** (2013.01); **F24F 7/007** (2013.01)

(57)

ABSTRACT

A louver assembly for placement in an opening for regulating the inlet of air includes a first blade stack having a plurality of elongated blades mounted within a frame having an upper frame member and a lower frame member, the lower frame member defining a sill, and a windbreak positioned adjacent to a front face of the louver assembly and extending from a point above the sill to a point below the sill. The windbreak is configured to divert wind at the front face of the louver assembly above the sill to facilitate draining of water from the louver assembly.



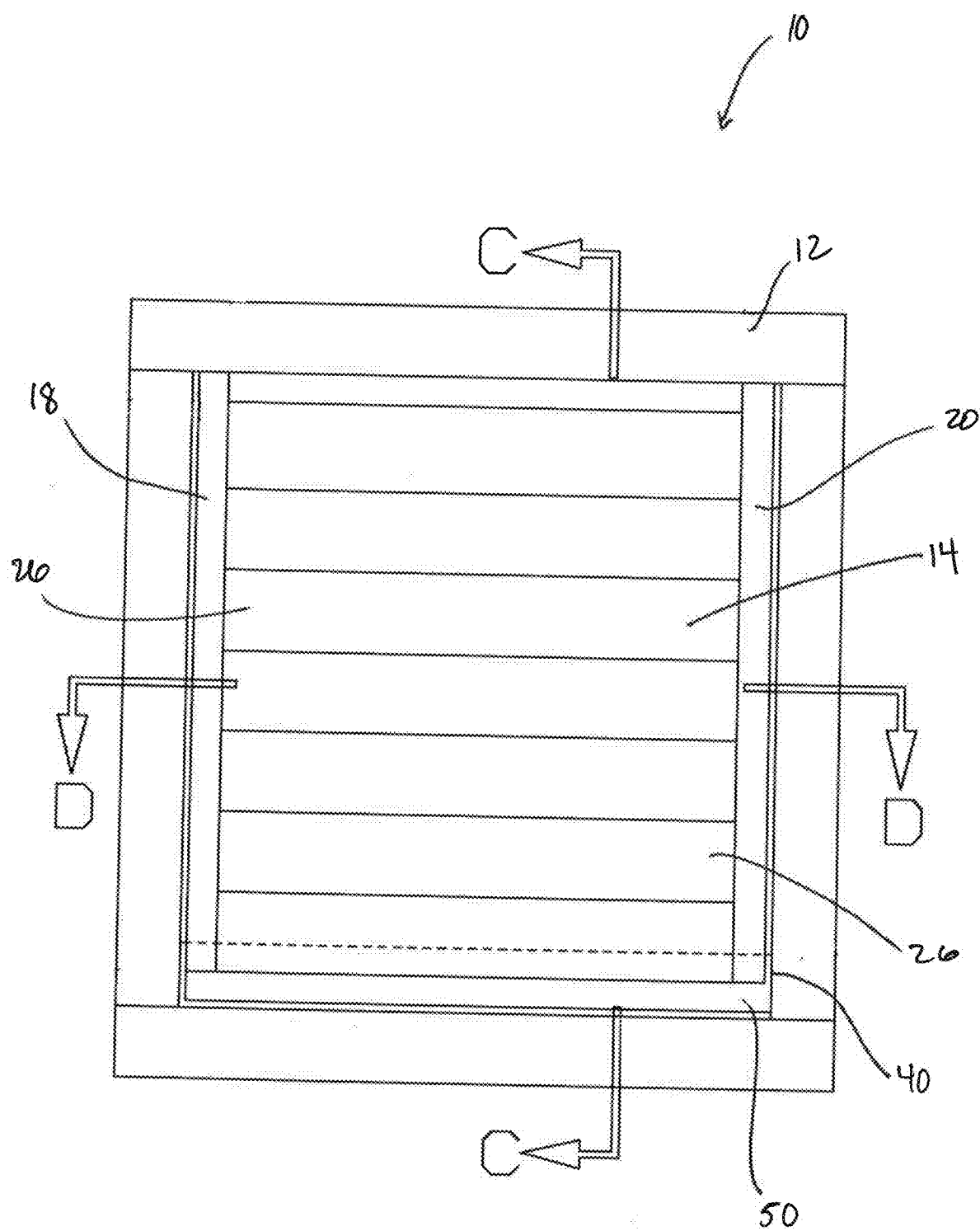


FIG. 1

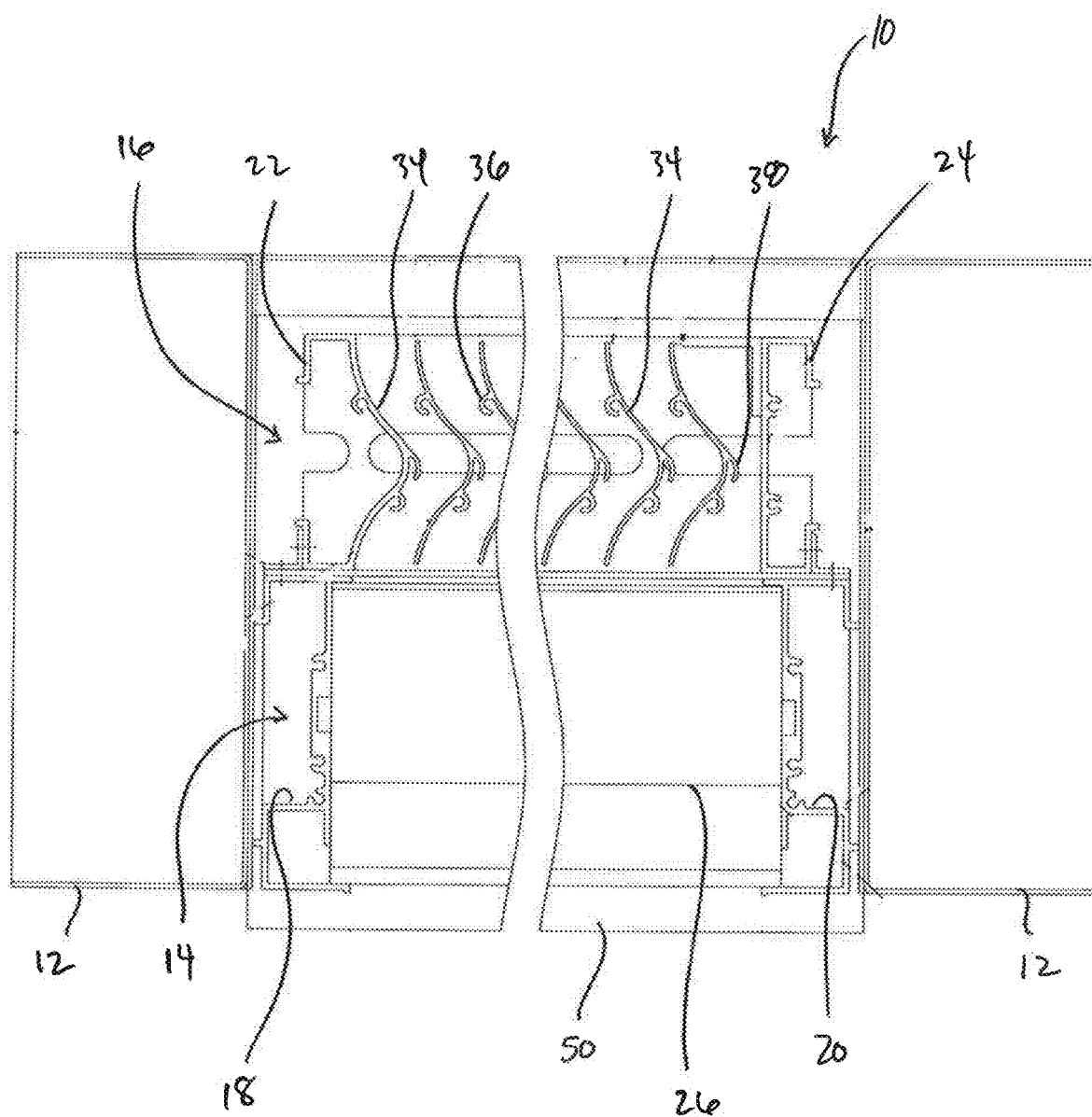


FIG. 2

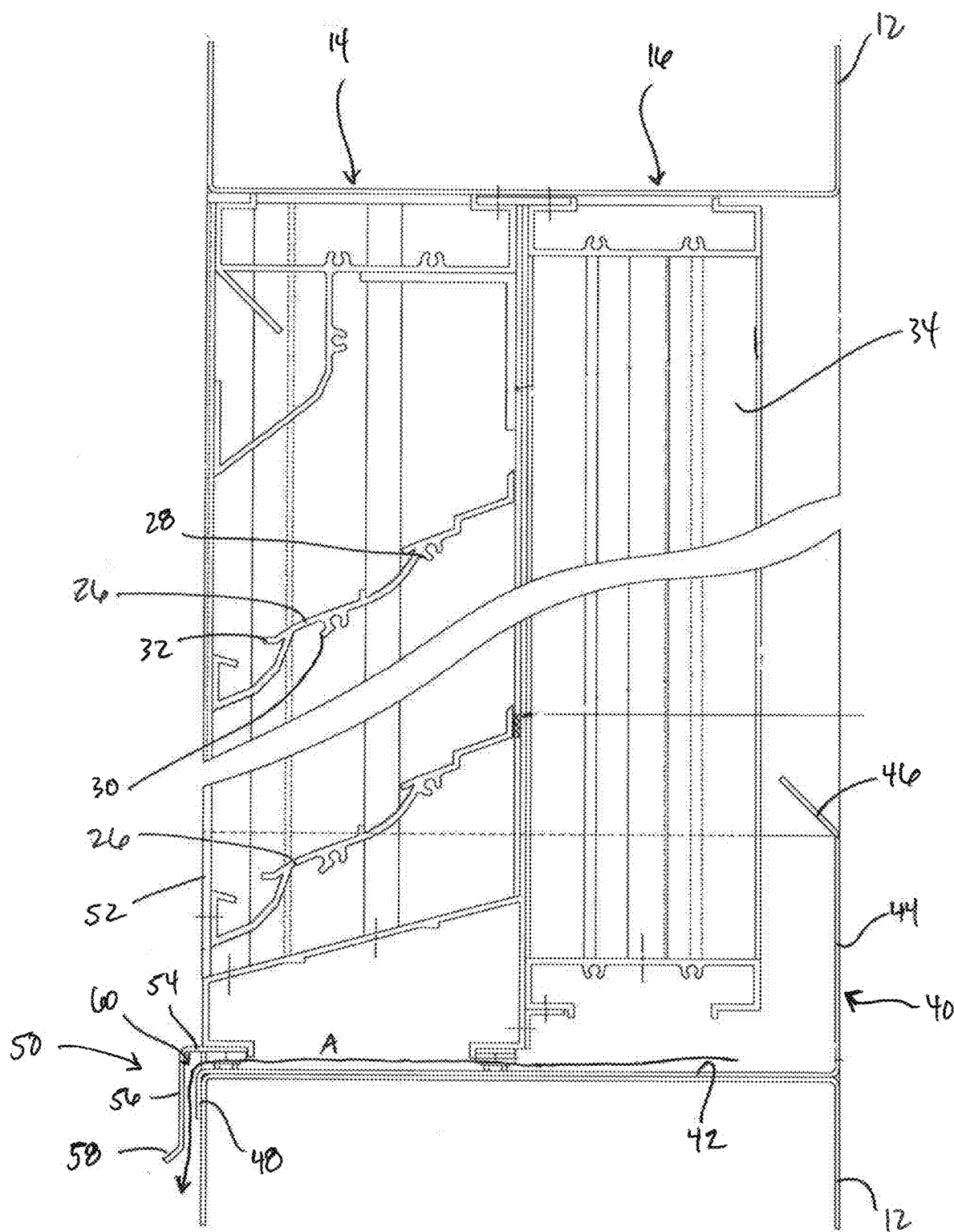


FIG. 3

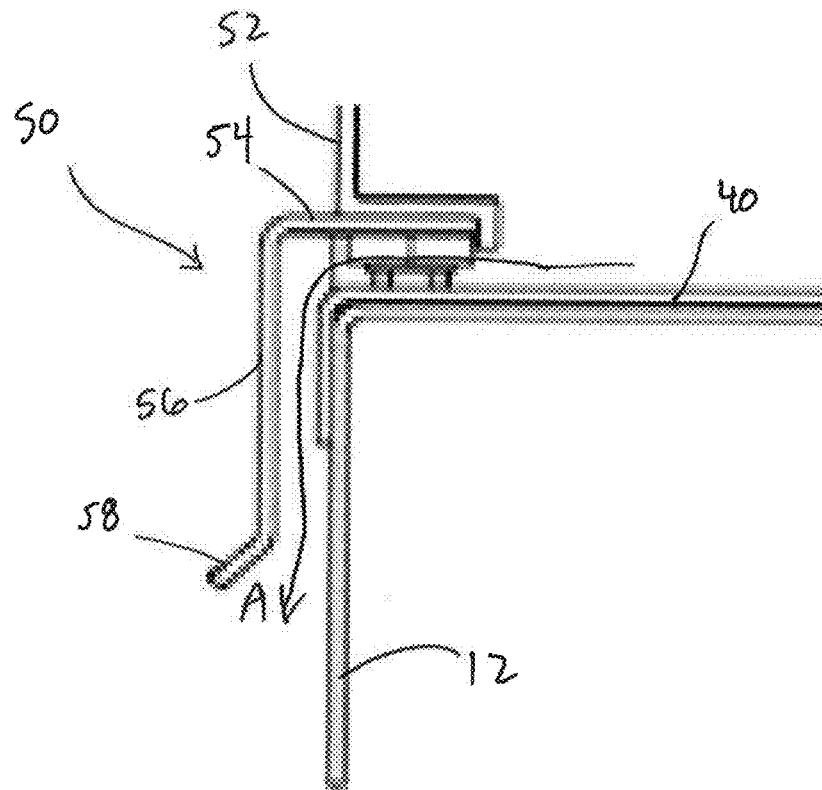


FIG. 4

LOUVER ASSEMBLY

FIELD OF THE INVENTION

[0001] The present invention relates generally to louver assemblies that helps regulate the inlet of outside ambient air and, more particularly, to a louver assembly which inhibits air-born particulates such as rain droplets that are entrained in the ambient air from passing through the louver assembly and into the building or enclosure with which the louver assembly is associated.

BACKGROUND OF THE INVENTION

[0002] Ventilation/HVAC systems for buildings and other enclosures are well known in the art. A core component of many ventilation systems is the need to regulate the influx of outside ambient air. One aspect of this regulation is the desired ability to prevent particulate matter from entering the ventilation system along with the outside ambient air, and louver assemblies have therefore been traditionally utilized to help control the flow of ambient air and any entrained particulate matter.

[0003] Recent natural disasters and code modifications have placed larger burdens on the performance of louver assemblies that are integrated into various ventilation systems. In particular, recent code modifications have centered on reducing or eliminating the amount of rain water that is permitted to pass through the louver assembly and into the ventilation system. On this issue, louver assemblies that attempt to separate water and other particles from air flowing into buildings are generally known in the art. As exemplified by U.S. Pat. No. 5,839,244, such prior art louver assemblies typically include a plurality of curved, spaced blades that define a plurality of spaced, serpentine-shaped air passageways therebetween. The air passageways direct air from the exterior of the building to the interior of the building for air conditioning of the building. When air passes into the building through the air passageways of the louver assembly, the water particles in the air, which are heavier than the gas molecules in the air, cannot turn through the serpentine-shaped contours in the air passageways. The water molecules therefore strike the walls of the blades, agglomerate into drops and flow by gravity down the blades and out of the louver assembly at the front face thereof.

[0004] Buildings in areas of the world that are especially prone to hurricanes, however, face much tougher problems with the design of louvers. In such hurricane zones, wind-driven rain may sometimes pass through the serpentine passageways and into the building, despite existing blades being designed to inhibit or prevent this. In other situations, the blades of the louver may be successful in capturing the entrained rainwater and directing it to the bottom of the louver. Sustained, direct, positive airflow due to wind at the front face of the louver, however, may inhibit draining of the captured rainwater, and in some situations may actually push accumulated water through the louver and into the building.

[0005] In hurricane zones, such as Miami-Dade County in the state of Florida, stringent building codes have recently been adopted which require louvers, dampers and the like to pass stringent tests for wind and wind-driven rain resistance. For example, AMCA 550 is a standard that establishes uniform laboratory test methods and minimum performance ratings for water rejection capabilities of louvers that keep water infiltration to a minimum. Tests conducted in accor-

dance with the requirements of this standard are intended to demonstrate the acceptability of the louver assembly for installation in facilities that will remain in operation during a high velocity wind condition and where water infiltration must be kept to manageable amounts.

[0006] In view of the above, there is a need for a louver assembly that substantially minimizes or prevents the accumulation and push-through of captured rainwater during high velocity wind conditions, and which meets the stringent high-velocity wind-driven rain resistance requirements imposed by various building codes.

SUMMARY OF THE INVENTION

[0007] In view of the foregoing, it is an object of the present invention to provide a louver assembly capable of resisting the influx of wind-driven water without the use of a damper.

[0008] It is another object of the present invention to provide a louver assembly that facilitates draining of accumulated water, even in the presence of direct, sustained winds at the face of the louver assembly.

[0009] It is another object of invention to provide louver assembly that is designed to meet the stringent criteria established by the Florida Building Code and Miami-Dade County Building Code, including providing high volume flow rate, impact resistance, and/or protection against water penetration and high wind-loads.

[0010] It is another object of the invention to provide a louver assembly that meets and/or exceeds the requirements of AMCA 550.

[0011] These and other objects are achieved by the present invention.

[0012] According to an embodiment of the present invention, a louver assembly for placement in an opening for regulating the inlet of air includes a first blade stack having a plurality of elongated blades mounted within a frame having an upper frame member and a lower frame member, the lower frame member defining a sill, and a windbreak positioned adjacent to a front face of the louver assembly and extending from a point above the sill to a point below the sill. The windbreak is configured to divert wind at the front face of the louver assembly above the sill to facilitate draining of water from the louver assembly.

[0013] According to another embodiment of the invention, a louver assembly for regulating air passage through an opening includes a first stack of blades having a housing defined about said blades, said housing being supported upon a bottom sill of said opening, a water passage defined between said housing and said bottom sill, said water passage allowing water entering said louver assembly and impacting said blades to drain from said housing, and an air deflection shield arranged adjacent to said water passage, said air deflection shield being fixed to said housing and extending across said water passage in a spaced-apart relationship, thereby permitting water to drain from said housing.

[0014] According to yet another embodiment of the present invention, a method of ensuring proper drainage in a louver assembly oriented within an opening includes the steps of arranging a first stack of louver blades within a housing, mounting the housing within the opening, the housing being supported on a bottom sill of the opening and defining a water passageway therebetween, and arranging an air deflection shield adjacent the water passageway, the air

deflection shield being disposed in a spaced-apart relationship from the water passageway and permitting water to drain from the housing via the water passageway.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The present invention will be better understood from reading the following description of non-limiting embodiments, with reference to the attached drawings, wherein below:

[0016] FIG. 1 is a simplified schematic front plan view of a louver assembly according to an embodiment of the present invention;

[0017] FIG. 2 is a cross-sectional view of the louver assembly, taken along line D-D of FIG. 1.

[0018] FIG. 3 is a cross-sectional view of the louver assembly, taken along line C-C of FIG. 1.

[0019] FIG. 4 is an enlarged detail view of a forward windbreak of the louver assembly of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] With reference to FIGS. 1-3, a louver assembly 10 according to an embodiment of the invention is illustrated. The louver assembly 10 is designed to be inserted within an opening in a wall of a building to permit outside air to flow therethrough into the building while removing water particles from the air to prevent excess moisture from entering the building. While the louver assembly 10 is disclosed herein as being disposed within an opening in a wall of a building or other structure, it will be readily appreciated, however, that the louver assembly 10 may be integrated into any known ventilation system, including those systems having stand-alone components, without departing from the broader aspects of the present invention.

[0021] As illustrated in FIGS. 1-3, the louver assembly 10 includes a generally rectangular outer frame 12 formed from generally U-shaped sleeves (including, for example, top, bottom, left and right sleeves). The sleeves, and thus the frame 12, may be formed from aluminum, although other materials known in the art may also be utilized. The sleeves of the outer frame 12 are configured to receive therein the walls defining an opening in a building or structure, for securely positioning and retaining the louver assembly 10 within the opening. Within the outer frame 12 are mounted left and right jamb members that receive and contain therebetween one or more blade stacks, as discussed hereinafter. In an embodiment, as illustrated in FIGS. 2 and 3, the louver assembly 10 includes first and second blade stacks 14, 16 arranged one behind the other. The first blade stack 14 is bounded by left and right jamb members 18, 20, while the second blade stack 16 is bounded by left and right jamb members 22, 24 positioned directly behind the left and right jamb members 18, 20. While FIGS. 2 and 3 illustrate two blade stacks 14, 16 more or fewer than two blade stacks may be utilized without departing from the broader aspects of the invention.

[0022] In an embodiment, as shown in FIGS. 2 and 3, the first blade stack 14 includes a plurality of horizontally-extending blades 26 having one or more hooks, tabs, projections or contours (e.g., tab 28, hook 30, projection 32) that are configured and positioned to inhibit the inflow of rain-driven rainwater through the first blade stack 14. A variety of horizontal blade configurations having any

arrangement of hooks, tabs, projections and/or contours may be utilized without departing from the broader aspects of the invention.

[0023] The second blade stack 16, for its part, includes a plurality of vertically-extending blades 34 likewise having one or more hooks, tabs, projections or contours (e.g., hook 36, projection 38) that are configured and positioned to similarly inhibit the inflow of rain-driven rainwater through the second blade stack 16. Like the blades 26 of first blade stack 14, the blades 34 of the second blade stack 16 may have any desired arrangement of hooks, tabs, projections and/or contours. The blades 34 of the second blade stack 16 define a plurality of spaced, serpentine-shaped passageways therebetween configured to permit the inflow of air, but inhibit the inflow of rainwater.

[0024] With specific reference to FIG. 3, the louver assembly 10 includes a drain pan 40 defining a sill, that is received on the bottom sleeve of the outer frame 12, and above which is positioned the bottom edges of the respective blade stacks 14, 16. The drain pan 40 extends between the left and right sleeves of the outer frame 12 and includes a generally planar portion 42 that sits atop the bottom sleeve of the outer frame 12, a generally vertically extending leg member 44 located rearward of the second blade stack 16, and an angled leg member 46 extending from the vertical leg member 44 generally upwards and towards the front of the louver assembly 10. In an embodiment, the drain pan 40 may also include a downwardly depending leg member 48 that is folded or bent over the front edge of the bottom sleeve of the outer frame 12. It is contemplated that the planar portion 42 may be angled slightly from back to front (i.e., the back of the planar portion 42 adjacent to the vertical leg member 44 is at a vertical height above the front of the planar portion 42 adjacent to the leg member 48) to facilitate draining of sequestered rainwater from the louver assembly 10, as discussed hereinafter.

[0025] As further illustrated in FIG. 3, the louver assembly 10 also includes forward leg member 50 that extends forwardly and downwardly from a front face 52 of the louver assembly 10. In particular, the forward leg member 50 includes a generally horizontal leg portion 54 that is mounted to the louver assembly 10 at a position spaced vertically from the top surface of the drain pan 40, a downwardly depending leg portion 56 that extends from the horizontal leg portion 54 at a generally 90 degree angle to a point below the drain pan 40 and the planar portion 42 thereof, and a drip edge 58 that extends downwardly and outwardly from the downwardly depending leg portion 56. The configuration and position of the forward leg member 50 defines a channel 60 at the front face of the louver assembly 10 between the forward leg member 50, and the drain pan 40 and bottom sleeve of the outer frame. As discussed below, the forward leg member 50 functions as a windbreak or air deflection shield, which extends from above the drain pan 40 to below the sill, which facilitates draining of sequestered rainwater from the louver assembly 10. The configuration and position of the forward leg member 50 is more clearly illustrated in FIG. 4. In an embodiment, the horizontal leg portion 54 is spaced between about 0.5 inches to about 12 inches, and more preferably about 1 inch to about 2 inches, in a vertical direction, from a top surface of the drain pan or sill.

[0026] In an embodiment, the blades of the first blade stack and the second blade stack, the drain pan, and the

forward leg member forming the windbreak/air deflection shield may be formed from aluminum or other metals, although other materials known in the art may also be utilized without departing from the broader aspects of the invention.

[0027] In operation, air is permitted to travel through the louver assembly 10 and into a building or structure within which the louver assembly 10 is positioned through the passageways defined by the blades 26 of the first blade stack 14, and then through the passageways defined by the blades 34 of the second blade stack 16. As is known in the art, as the air traverses the passageways defined by the spaced-apart blades of the first and second blade stacks 14, 16, the water particles in the air, which are heavier than the gas molecules in the air, cannot turn through serpentine-shaped contours. The water molecules therefore strike the walls of the blades 26, 34 and are otherwise caught by the hooks, tabs and/or projections on the blades and removed from the air, thereby preventing the water molecules from passing through the assembly 10 and into the building. The water molecules have been trapped by the blades 26, 34 eventually agglomerate into drops and flow by gravity down the faces of the blades to the drain pan 40.

[0028] Typically, the accumulated water is allowed to drain from the drain pan 40 and out of the front of the louver assembly 10, away from the opening in which the louver assembly 10 is installed. As discussed above, however, in high wind conditions, sustained and direct wind pressure at the front face of the louver assembly 10 can inhibit or prevent draining of the rainwater collected on the drain pan 40 at the sill, and can even push the collected water through the louver assembly 10 and into the structure. Importantly, however, the forward leg member 50 serves as a windbreak, substantially minimizing or preventing wind at the forward face of the louver assembly 10 from acting on the rainwater accumulated on the drain pan 40. In particular, wind at the front of the louver assembly 10 is directed over and above the forward leg member 50, above the accumulated water on the drain pan 40, allowing the water accumulated on the drain pan 40 to drain through the channel 60 in the direction of arrow A, even where direct, sustained wind at the forward face of the louver assembly 10 is present.

[0029] In addition, the forward leg member 50 allows water to run down the face of the building, and across the face of the louver assembly 10, while keeping direct positive wind pressure from blowing this water back into the louver assembly 10.

[0030] It has been discovered through testing that the louver assembly 50 containing a forward leg member 50 that functions as a windbreak substantially minimizes the amount of water that is pushed through the louver assembly 10 in high velocity wind conditions. Accordingly, such a louver assembly 10 has been shown to meet the requirements of AMCA 550 for wind-driven rain resistance.

[0031] Although this invention has been shown and described with respect to the detailed embodiments thereof, it will be understood by those of skill in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed in the above detailed

description, but that the invention will include all embodiments falling within the scope of this disclosure.

What is claimed is:

1. A louver assembly for placement in an opening for regulating the inlet of air, comprising:
 - a first blade stack having a plurality of elongated blades mounted within a frame having an upper frame member and a lower frame member, the lower frame member defining a sill; and
 - a windbreak positioned adjacent to a front face of the louver assembly and extending from a point above the sill to a point below the sill;
 wherein the windbreak is configured to divert wind at the front face of the louver assembly above the sill to facilitate draining of water from the louver assembly.
2. The louver assembly of claim 1, further comprising:
 - a drain pan positioned on the lower frame member, the drain pan being configured to receive water sequestered by the plurality of elongated blades.
3. The louver assembly of claim 1, wherein:
 - the windbreak includes a generally horizontal leg portion that is mounted to the louver assembly at a position spaced vertically from the top surface of the drain pan and a depending leg portion that extends downwardly from the horizontal leg portion.
4. The louver assembly of claim 3, wherein:
 - the horizontal leg portion is spaced between about 1 inches to about 2 inches, in a vertical direction, from a top surface of the drain pan.
5. The louver assembly of claim 4, wherein:
 - the windbreak further includes a drip edge that extends outwardly and downwardly from the depending leg portion.
6. The louver assembly of claim 1, wherein:
 - the windbreak extends across substantially an entire width of the louver assembly.
7. The louver assembly of claim 1, further comprising:
 - wherein the plurality of elongated blades are mounted within the frame in a horizontally-spaced and vertically-extending configuration.
8. The louver assembly of claim 7, further comprising:
 - a second blade stack having a plurality of elongated blades mounted within the frame in a vertically-spaced and horizontally-extending configuration.
9. The louver assembly of claim 1, wherein:
 - the windbreak and the sill define a passageway therebetween for the outflow of water from the louver assembly.
10. A louver assembly for regulating air passage through an opening, said louver assembly comprising:
 - a first stack of blades having a housing defined about said blades, said housing being supported upon a bottom sill of said opening;
 - a water passage defined between said housing and said bottom sill, said water passage allowing water entering said louver assembly and impacting said blades to drain from said housing; and
 - an air deflection shield arranged adjacent to said water passage, said air deflection shield being fixed to said housing and extending across said water passage in a spaced-apart relationship, thereby permitting water to drain from said housing.

- 11.** The louver assembly of claim **10**, wherein:
the air deflection shield includes a generally horizontal leg portion that is mounted to the housing at a position spaced vertically from the top surface of the bottom sill and a depending leg portion that extends downwardly from the horizontal leg portion.
- 12.** The louver assembly of claim **11**, wherein:
the horizontal leg portion is spaced between about 1 inch to about 2 inches, in a vertical direction, from a top surface of the bottom sill.
- 13.** The louver assembly of claim **12**, wherein:
the air deflection shield further includes a drip edge that extends outwardly and downwardly from the depending leg portion.
- 14.** The louver assembly of claim **13**, wherein:
the air deflection shield extends across substantially an entire width of the louver assembly.
- 15.** A method of ensuring proper drainage in a louver assembly oriented within an opening, said method comprising the steps of:
arranging a first stack of louver blades within a housing;
mounting said housing within said opening, said housing being supported on a bottom sill of said opening and defining a water passageway therebetween; and

arranging an air deflection shield adjacent said water passageway, said air deflection shield being disposed in a spaced-apart relationship from said water passageway and permitting water to drain from said housing via said water passageway.

- 16.** The method according to claim **15**, wherein:
the air deflection shield includes a generally horizontal leg portion that is mounted to the housing at a position spaced vertically from the top surface of the bottom sill and a depending leg portion that extends downwardly from the horizontal leg portion.
- 17.** The method according to claim **16**, wherein:
the horizontal leg portion is spaced between about 1 inch to about 2 inches, in a vertical direction, from a top surface of the bottom sill.
- 18.** The method according to claim **17**, wherein:
the air deflection shield further includes a drip edge that extends outwardly and downwardly from the depending leg portion.
- 19.** The method according to claim **18**, wherein:
the air deflection shield extends across substantially an entire width of the louver assembly.

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