May 3, 1966 E. H. JOHNSON 3,249,038

AIR INTAKE

Filed Sept. 16, 1963

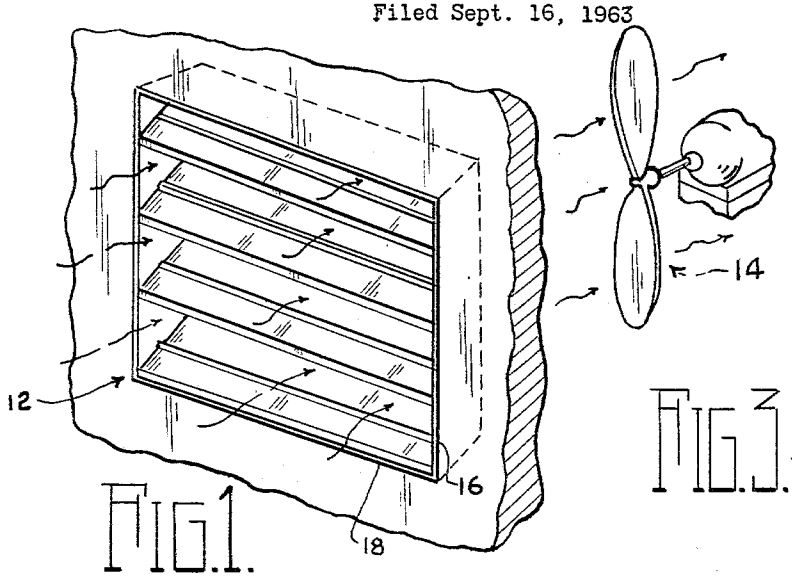


FIG. 1.

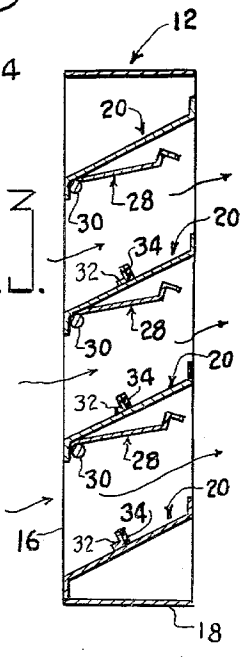


FIG. 3.

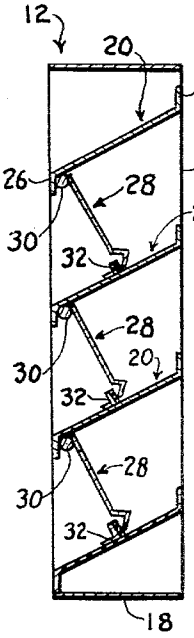


FIG. 2.

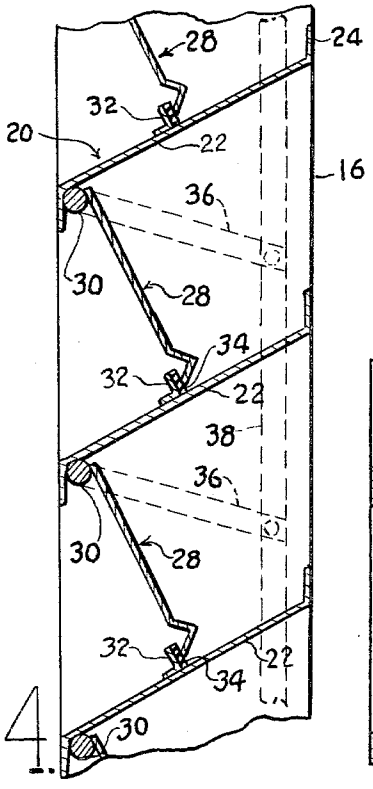


FIG. 4.

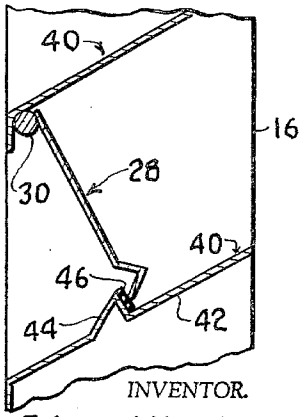


FIG. 5.

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AIR INTAKE

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3 Claims. (Cl. 98—116)

This invention relates to an air intake for a plenum chamber or the like and more specifically to an air intake which employs both fixed louver blades and pivotable damper blades.

An air intake according to the instant invention is particularly designed for large rooms employing fans for air conditioning purposes and into which room outside air is drawn. For example, grocery stores may have equipment rooms in which air conditioning units and various motor and compressor units for refrigerated display cases are located. To dissipate the tremendous amount of heat associated with such rooms, a large fan is often used to pass large quantities of air through the room. The room, in effect, then constitutes a large plenum chamber with the fan often being located a substantial distance from the air intake.

The new air intake employs both fixed blades and pivotable blades which are opened when the fan is operating but otherwise closed. In this manner, maximum protection is provided against wind, rain, undesirable cold air, and weather elements in general. The new air intake embodies both fixed and movable blades in a single frame assembly which is little, if any, thicker than a fixed louver blade assembly by itself. The relatively thin air intake is more adapted to be installed in existing walls without requiring a special framework and, being one piece, is also easier to ship. Of particular importance is the fact that the new air intake can be installed in a wall with a minimum amount of field labor.

It is, therefore, a principal object of the invention to provide an improved air intake which provides maximum protection against undesirable elements.

Another object of the invention is to provide an air intake having the advantages outlined above.

Other objects and advantages of the invention will be apparent from the following detailed description of preferred embodiments thereof, reference being made to the accompanying drawing, in which:

FIG. 1 is a somewhat schematic view in perspective of an air intake embodying the invention in combination with a fan located therebehind;

FIG. 2 is an enlarged, somewhat schematic view in vertical cross section of the air intake of FIG. 1;

FIG. 3 is a view similar to FIG. 2 of the air intake but with the movable blades in open positions;

FIG. 4 is a further enlarged view of a portion of an air intake similar to that of FIG. 2 but with a connecting linkage for operating the movable blades; and

FIG. 5 is a view in cross section similar to FIG. 4 of a slightly modified air intake.

Referring to the drawing, and more particularly to FIG. 1, an air intake embodying the invention is indicated at 12 with a motor-driven fan 14 located some distance therebehind. With most large air intakes of this type, all of the blades are in fixed positions with openings therebetween for the passage of air. With such air intakes, wind-driven rain, snow or ice will occasionally be forced therethrough and excessive cold air will pass through the intake in the wintertime. To minimize such leakage, the new air intake 12 is provided with both fixed louver blades and movable damper blades. The movable blades are designed to open only under conditions when the fan 14 is operating so as otherwise to keep out all but strong wind.

Referring more particularly to FIG. 2, the air intake 12 includes side frame members 16 and top and bottom frame members 18, which frame members are mounted in a wall of the fan room, after being shipped to the site as a single unit. Extending between the side members 16 are a plurality of fixed louver blades 20 including main slanted portions 22 extending substantially the width of the side frame member 16 and disposed on an angle of from approximately 30° to 45° to the horizontal. The fixed blades 20 also have upper ridges 24 and lower, depending lips 26 which establish a more devious path of wind blowing through the intake 12. The ridges and lips also tend to reduce the chances of rain or snow being blown through the intake.

In accordance with the invention, movable damper blades 28 are positioned between the fixed blades 20 and are fixed to axles 30 which are pivotally mounted in the side frame members 16 and which extend the length of the fixed blades 18 behind the lower lips 26. The blades 28 close against angle stops 32 which are suitably affixed to the fixed blades 20 and which preferably extend the length of the fixed blades. The stops 32 also help to restrict the travel of rain or snow up the surfaces of the fixed blades 20. The angle stops 32 are positioned so that the blades 28 are approximately perpendicular to the main portions 22 of the fixed blades 20 when the movable blades 28 are closed against the stops. If desired, however, the blades 28 can form a larger angle with the fixed blade portions 22 so that more pressure is required to open them. Preferably, a resilient strip 34 is suitably adhered to each of the stops 32 for the purposes of quieting the action of the blades 28 as they swing closed and also for the purpose of providing a more effective seal. If a good seal is not required between the movable blade 28 and the blade 20, only one or a few short stops need be employed along the length of the fixed blade 20 for the purpose of preventing movement of movable blade 28 past the closed position.

In the preferred form, each of the movable blades 28 can pivot individually about its associated axle 30 so that each can swing upwardly to an open position as shown in FIG. 3 when the fan 14 is running. In the open position, the blades may actually move up slightly above the horizontal position, as shown in FIG. 3, due to the upward movement of the wind through the fixed blades 20.

The blades 28 can be interconnected for simultaneous movement, if desired, as is known in the art. For this purpose, as shown in FIG. 4, the blades 28 have lever arms 36 affixed to the axles 30 beyond one or both of the side frame members 16 with the arms 36 pivotally attached to a connecting link 38. The link 38 can be either manually or power operated in a generally vertical path to swing the blades 28 open and closed. If side seals are used on the blades 28 to contact the side frame members 16, there usually is sufficient friction that the blades 28 cannot be operated by gravity. In such an instance, the arms 36 and the links 38 are particularly important in the operation of the air intake 12.

Rather than employing the angle stops 32, modified fixed blades 40 can be employed, as shown in FIG. 5. In this instance, main portions 42 of the blades 40 each have a brake or ridge 44 which forms the stop as an integral part of the blade 40. A sealing strip 46 again can be employed with the ridge stop 44.

Various modifications of the above described embodiments of the invention will be apparent to those skilled in the art, and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the tenor of the accompanying claims.

I claim:

1. An air intake through which air can flow from an outside space under higher pressure into an inside space under lower pressure, said intake comprising a plurality of frame members including two side frame members, a plurality of parallel, fixed blades extending between said side frame members, said fixed blades extending horizontally and being uniformly spaced, each of said blades adapted to slope toward the higher pressure space at an angle of from approximately 30° to approximately 45°, each of said fixed blades having a main portion and an upper lip extending upwardly from an upper, longitudinal edge of the main portion of the blade, each of said blades also having a lower lip extending downwardly from a lower longitudinal edge of the main portion of the blade, an axle extending between said side frame members behind each of said lower lips, a movable blade affixed to each of said axles and rotatable therewith, stop means extending longitudinally of each of said fixed blades for limiting the downward pivotal movement of said movable blades, said movable blades being substantially perpendicular to said main portions when against said stops, said movable blades contacting said stop means when in their closed positions and substantially blocking the space between the adjacent fixed blades, and resilient means associated with said stop means forming a seal for said movable blades when closed.

2. An air intake through which air can flow from an outside space under higher pressure into an inside space under lower pressure, said intake comprising a plurality of frame members including two side frame members, a plurality of parallel, fixed blades extending between said side frame members, said fixed blades extending horizontally and being uniformly spaced, each of said blades adapted to slope toward the higher pressure space at an angle of from approximately 30° to approximately 45°, each of said fixed blades having a main portion and a lower lip extending downwardly from a lower longitudinal edge of the main portion of the blade, an axle extending between said side frame members behind each of said lower lips, a movable blade affixed to each of said axles and rotatable therewith, stop means affixed to each of said fixed blades and extending longitudinally of each of said fixed blades for limiting the downward pivotal movement of said movable blades, said movable blades contacting said stop means when in their closed positions and substantially blocking the space between the adjacent fixed blades, and resilient means associated with said stop means forming a seal for said movable blades when closed.

3. An air intake through which air can flow from an outside space under higher pressure into an inside space under lower pressure, said intake comprising a plurality of frame members including two side frame members, a plurality of parallel, fixed blades extending between said side frame members, said fixed blades extending horizontally and being uniformly spaced, each of said blades adapted to slope toward the higher pressure space at an angle of from approximately 30° to approximately 45°, each of said fixed blades having a main portion and a lower lip extending downwardly from a lower longitudinal edge of the main portion of the blade, an axle extending between said side frame members behind each of said lower lips, a movable blade affixed to each of said axles and rotatable therewith, stop means integral with the main portion of each of said fixed blades and extending longitudinally of each of said fixed blades for limiting the downward pivotal movement of said movable blades, said movable blades contacting said stop means when in their closed positions and substantially blocking the space between the adjacent fixed blades, and resilient means associated with said stop means forming a seal for said movable blades when closed.

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