

Aug. 8, 1944.

H. M. BIRD

2,355,412

VENTILATOR SHUTTER

Filed Feb. 18, 1943

2 Sheets-Sheet 1

FIG-1-

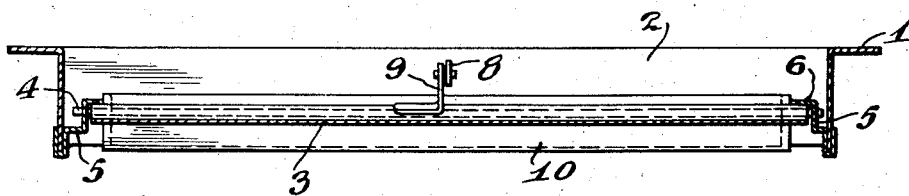
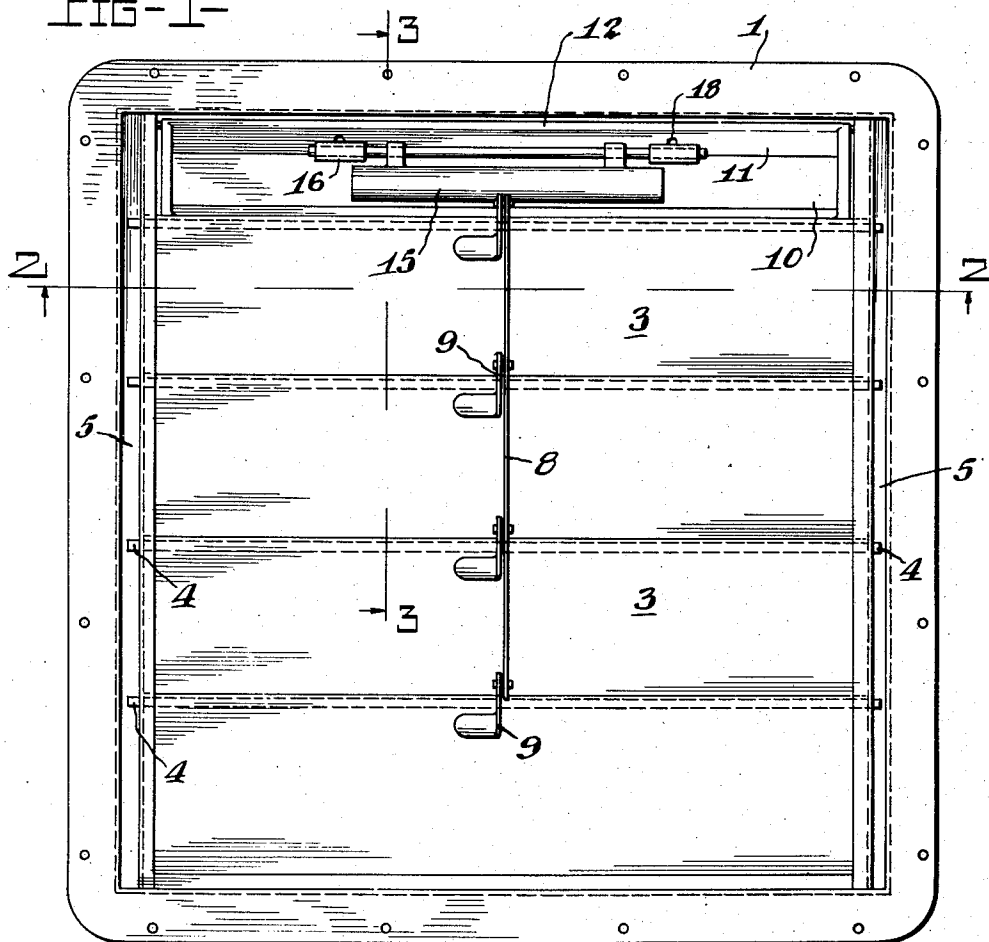


FIG-2-

Inventor
HOMER M. BIRD

By *Owen & Owen*

Attorneys

Aug. 8, 1944.

H. M. BIRD

2,355,412

VENTILATOR SHUTTER

Filed Feb. 18, 1943

2 Sheets-Sheet 2

FIG-3-

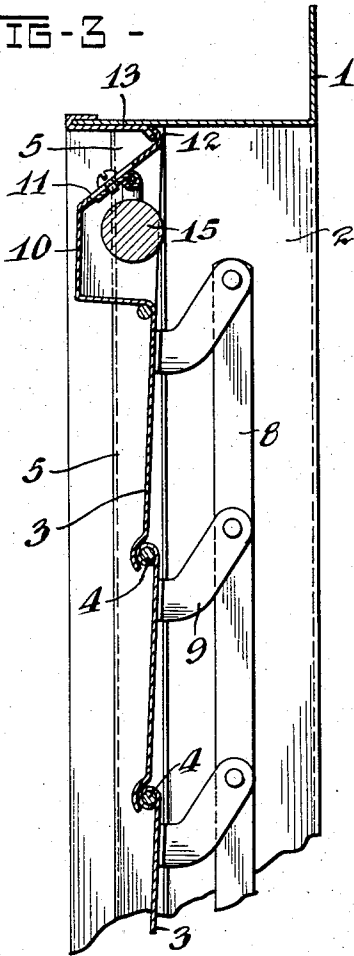


FIG-4-

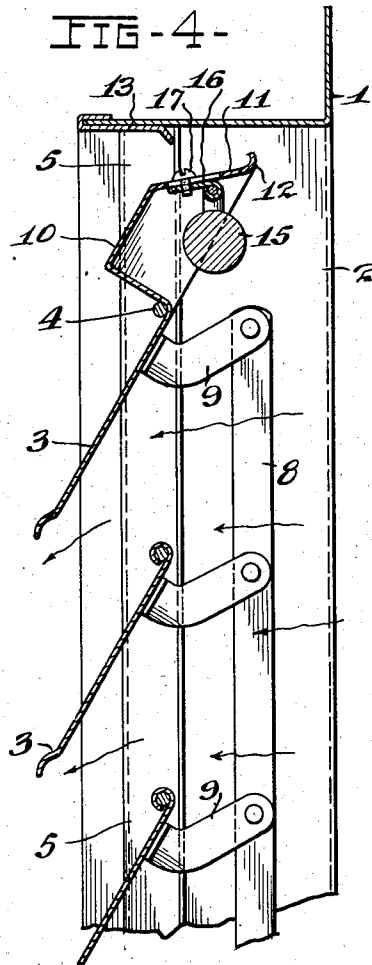
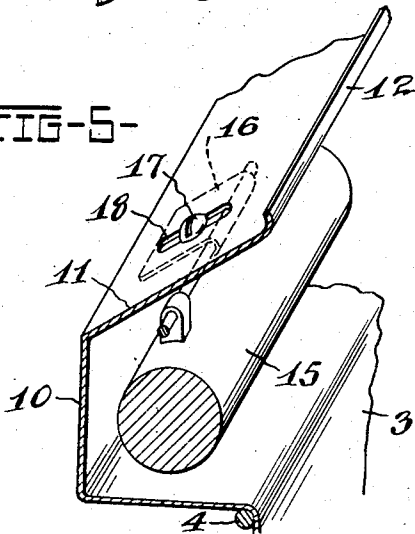


FIG-5-



Inventor
HOMER M. BIRD

By

Owen & Owen,

Attorneys

UNITED STATES PATENT OFFICE

2,355,412

VENTILATOR SHUTTER

Homer M. Bird, Maumee, Ohio

Application February 18, 1943, Serial No. 476,288

6 Claims. (Cl. 98-119)

This invention relates to shutters for use in connection with the ventilating of buildings, and particularly to those of the type which close by gravity action and open under air pressure from one side.

An object of the invention is the provision in a shutter of this character, of simple and efficient means for automatically counterbalancing the weight of the shutter blade or blades during an opening action, so as to maintain the closing tendency of the blades under gravity action substantially uniform during a full opening movement thereof.

A further object of the invention is the provision, in connection with a gravity closing shutter, of simple and efficient means which is adjustable to determine the air pressure required for an initial opening of the shutter and which is also operable to automatically increase the counterbalancing action of the shutter blade or blades substantially in proportion to an increasing tendency thereof to close as they are opened and approach a horizontal position.

The invention is fully described in the following specification, and a preferred embodiment thereof illustrated in the accompanying drawings, in which—

Figure 1 is a face view of the draft side of a ventilator embodying the invention, with the blades in closed position; Fig. 2 is a cross-section on the line 2-2 in Fig. 1; Fig. 3 is an enlarged fragmentary vertical section of the ventilator on the line 3-3 in Fig. 1; Fig. 4 is a similar section with the blades in partially open position, and Fig. 5 is a perspective fragmentary enlargement of the counterbalancing means embodying the invention, with the blade in closed position.

Referring to the drawings, 1 designates a ventilator frame for setting into a building structure and forming a ventilating opening 2 in which one or more shutter blades 3 are pivotally mounted in a manner to close by gravity action and to open by air pressure thereagainst at one side. The pivot rods 4 for the blades are horizontally disposed and mounted at their ends in respective side bars 5 set into the frame 1 and secured to its side members, as shown in Fig. 2, or in any other suitable manner. The free inner side edges of the bars 5 are turned inward relative to the frame opening to form flanges 6 which lap the blade ends at the draft side thereof when the blades are in closed position.

The pivot rods 4 are suitably spaced one above the other and each blade from the top down, 55

with the exception of the lower one, laps the upper edge of the next successive blade, so that the blades may cooperate to completely close the frame opening. If more than one blade is used, as illustrated in the present case, they are connected and caused to operate in unison by a bar 8 disposed at the draft side of the blades and pivoted to an arm 9 projecting from each blade near its top edge, and in the present instance centrally of its ends. These arms preferably angle upwardly, as shown, so that the point of connection of the bar with each arm is above the horizontal plane of the respective pivot when the blade is in its pendent or substantially vertical closed position.

The upper blade 3 of a set, or the single blade of a ventilator, if only one is used, has its pivot 4 spaced from the top of the frame opening 2, and such space, when the blade is in closed position, is closed by a top extension 10 on the blade. This extension, in the present instance, extends forward relative to the direction of draft movement at or immediately above the pivot bar 4, thence upward and then rearward, preferably on an upward incline, to the plane of the blade body 3, thus forming the blade above its pivot with a rearwardly opening housing having the top portion 11. The top edge of this extension is formed with a forwardly turned lip 12, which, when the blade is in closed position, coacts with the complementary intumed edge of the top cross-bar 13 in the frame 1 to form a close joint.

A pendulum weight 15 is swingingly suspended within the housing from its top portion 11, with its center of gravity, when the blade is in closed position, positioned slightly forward of a vertical plane common to the swinging axis of the blade, whereby the weight acting through the extension 10 tends to hold the blades in closed position. The extent of such closing pressure is determined by an inward or outward adjustment of the weight pivot, and it is preferable to have such adjustment on an incline, so that as the weight pivot is moved outward from the vertical plane of the blade axis it approaches the horizontal plane of such axis. For the purpose of this adjustment, the top 11 of the blade extension is made on an incline and the weight is suspended from a pivot plate 16 that is held to the under side of said top by a screw 17 passing through a slot 18 therein, such slot being transverse to the blade and weight axes.

The purpose of the extension 10 and pendulum weight 15 is to partially but not entirely counterbalance the force tending to close the blades and

to automatically increase the counterbalancing force to compensate for the increase of the closing force which takes place as the blade or blades continue to swing toward a horizontal or full open position. This action is accomplished due to the weight 15 swinging rearward from the blade extension as the blades open, thereby increasing the counterbalancing action substantially the same extent as the closing force of the blades increases as they move toward full open position, and vice versa.

This provides a very sensitive acting ventilator and one that opens a very considerable extent even under a light draft force and which is also adjustable to vary the initial opening force required.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. In a ventilator having a vertically swinging blade normally standing at closed position and which swings from closed pendent toward a horizontal position when opening, an extension on the blade above its swinging axis, and means swingingly carried by said extension and automatically acting to progressively increase the counterbalancing action of said extension on the blade as it swings from closed toward full open position so that its resistance against opening remains substantially constant for any position of the blade.

2. In a ventilator having a vertically swinging blade normally standing at closed position and which swings from closed pendent position toward a horizontal position when opening, an extension on the blade above its swinging axis cooperating with the blade to close an opening in which disposed, and weight means swingingly carried by said extension above the swinging axis of the blade and automatically acting by its swinging action relative to the blade to progressively increase the counterbalancing action of said extension on the blade as it swings from closed toward full open position so that its resistance against opening remains substantially constant for any position of the blade, said means having its center of gravity in advance of a vertical plane common to the blade axis when the blade is in closed position.

3. In a ventilator of the class described, a ventilator blade mounted for vertical swinging movements and normally standing in closed pendent position and opening under air pressure from one side, an extension on the upper edge portion of the blade above its swinging axis, and a pendulum weight swingingly carried by said extension and cooperating therewith to counterbalance the blade a predetermined extent and acting by its swinging action relative to the extension to progres-

sively increase its counterbalancing force as the blade swings upward from closed toward horizontal position.

4. In a ventilator of the class described, a ventilator blade pivoted for vertical swinging movements and movable by gravity to pendent closed position and opening by fluid draft pressure against one side thereof, an extension on the blade above its swinging axis, and a pendulum weight swingingly carried by said extension and disposed forward in the direction of draft movement from a vertical plane common to the blade axis to tend to resist a predetermined extent an initial opening of the blade, said weight swingingly relative to the extension during an opening movement of the blade and thereby acting to progressively increase the blade counterbalancing force in correspondence with the increase of the closing force on the blade as it swings from closed toward a horizontal position.

5. In a ventilator of the class described, a ventilator blade pivoted for vertical swinging movements and movable by gravity to pendent closed position, said blade having an extension above its pivot in the form of a forwardly projecting rearwardly opening housing which cooperates with the blade to close a ventilating opening in which disposed, and a pendulum weight suspended within said housing extension from the top portion thereof and swinging rearwardly relative thereto during opening movement of the blade, said weight and extension having their center of gravity in advance of a vertical plane common to the axis of the blade pivot when the blade is in closed position and operating to progressively increase the counterbalancing force on the blade as it swings from closed toward horizontal position in substantial accordance with the increase of the closing force of the blade as it moves toward such position.

6. In a ventilator of the class described, a frame forming a ventilating opening, a plurality of shutter blades mounted in said opening for vertical swinging movements with their swinging axes disposed in spaced relation one above another in substantially a vertical plane whereby the blades are adapted to cooperate to close the opening, means connecting the blades to cause them to have opening and closing movements in unison, an extension on the upper blade above its swinging axis cooperating with the blades to close said opening, a pendulum weight swingingly carried by said extension above the axis of such blade and acting to impart a predetermined closing force to the blades when in closed position and also acting during a movement of the blades from closed toward horizontal position to progressively increase the counterbalancing force on the blades as they swing from closed toward horizontal position in substantial accordance with the increase of the closing force of the blades as they move toward such position.

HOMER M. BIRD.