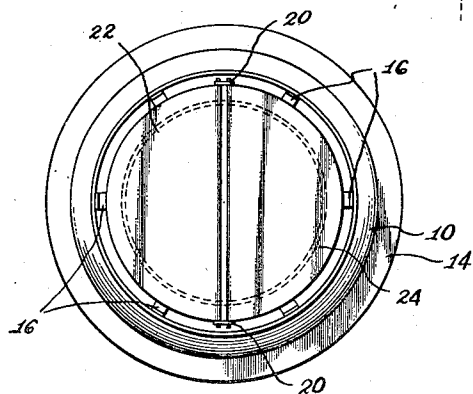
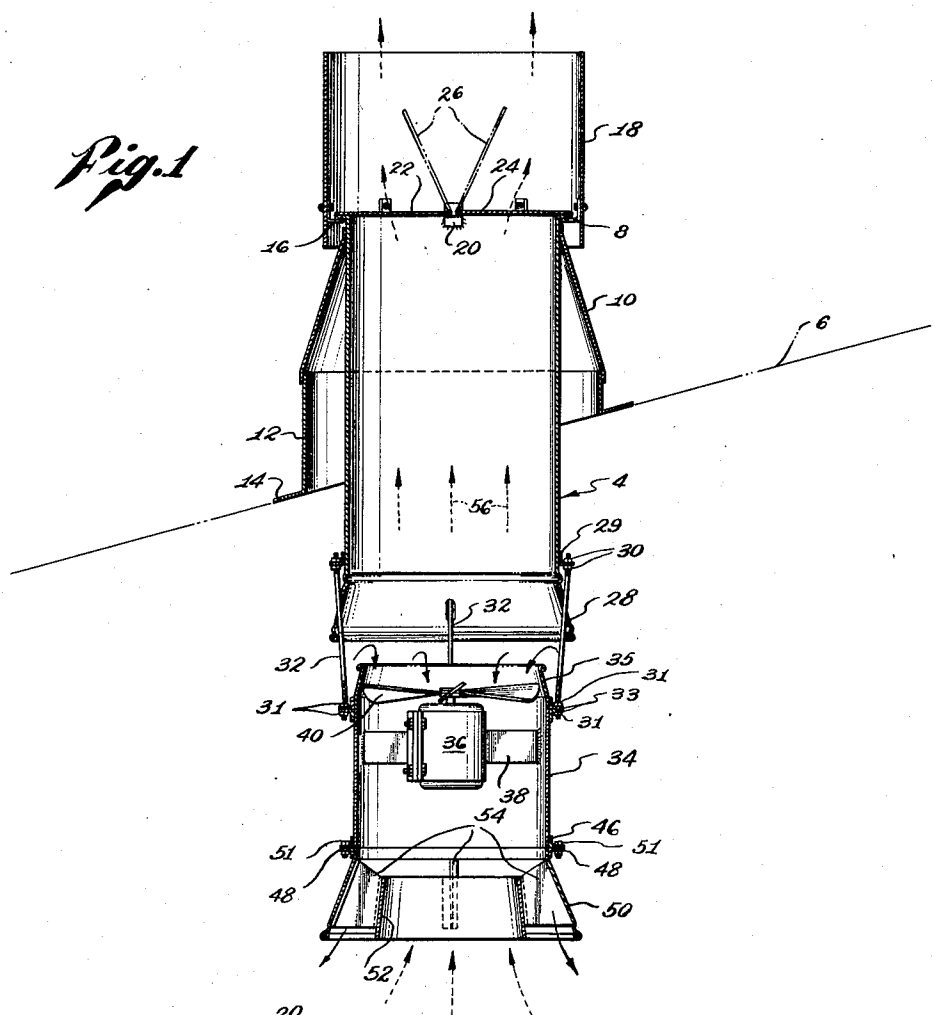


Jan. 25, 1955

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AIR CIRCULATING UNIT
Filed April 16, 1951

2,700,331



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AIR CIRCULATING UNIT

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Application April 16, 1951, Serial No. 221,173

4 Claims. (Cl. 98—116)

This invention relates to ventilators for exhausting the air from under the roof of a building or for recirculating the air within the building.

The main objects of this invention are: to provide a ventilator in the form of a tubular stack adapted to be installed through the roof of a building, usually of the industrial type, and being constructed and arranged so that by rotating the circulating fan in one direction, warm air banked under the roof of the building is blown downwardly and re-circulated and, when the circulating fan is operated in the opposite direction, the air will be exhausted from under the roof of the building and discharged into the atmosphere above the roof.

A further object of this invention is to provide an improved construction in which the amount of air intake, when used as a re-circulator, may be varied or adjusted according to the conditions present for the amount of recirculation desired under the circumstances present.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Fig. 1 is a vertical, medial, sectional view taken through the ventilating apparatus and shown installed on the roof of a building, the roof being shown in broken lines.

Fig. 2 is a top plan view of the same.

In the construction shown in the drawings, a main duct or stack of tubular construction generally designated 4 is shown mounted in a vertical position through the roof 6 of a building with its upper end terminating in an outwardly directed radial flange 8 in spaced relation above the roof. The mounting on the roof is accompanied by a frusto-conical skirt or band 10 having its upper and smaller end welded or otherwise secured to the outside of the stack 4 closely adjacent to and below the flange 8. The lower or larger end of the skirt 10 is welded or otherwise suitably secured to the top marginal edge of a cylindrical base 12. The base 12 has its lower end cut at an angle to conform to the pitch of the roof and terminates in an outwardly extending flange 14 by which it is secured to the roof top. The base 12 is of larger diameter than the stack 4 so as to be in spaced relation to the stack and minimize heat transfer from the stack to the roof 6.

The top flange 8 is provided with a plurality of circumferentially spaced angle clips 16, each having one leg thereof welded or otherwise suitably secured to the underside of the flange 8 and its other leg extending upwardly and bolted to a wind band 18. The wind band 18 is of larger diameter than the stack 4 and concentrically positioned with respect thereto so as to provide an annular space between the band and the outturned flange 8 of the stack. The top end of the stack is also provided with a pair of diametrically positioned clips 20 to which are freely hinged a pair of semi-circular butterfly damper valves 22 and 24 which are adapted to open outwardly as shown by the broken lines 26 in Fig. 1.

The lower end of the main stack 4 extends below the roof 6 into the interior of the building and may be positioned any suitable distance below the roof line, depending upon the structure of the building and the conditions present therein. The lower end of the stack 4 is flared outwardly and downwardly at an angle of approximately 6° to form a skirt 28. A plurality of circumferentially spaced angle clips 29 are welded to the outside of the stack close above the skirt 28.

A plurality of substantially, vertically disposed tie bolts 32, having threaded ends, have their upper ends passed through holes in the horizontal legs of the angle clips

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29 and anchored thereto by opposed nuts 30 which embrace opposite sides of the clips. The bolts 32 extend through registering slotted openings provided in the skirt 28 and have relatively long lower threaded ends adapted to pass through apertured ears 33 which are welded to the outside of a stack extension generally designated 34. Opposed nuts 31 are threaded on the lower ends of the tie bolts 32 for rigidly securing the extension 34 in axially adjusted position with respect to the main stack 4. The stack extension 34 is of cylindrical shape and of smaller size than the main stack 4 and in axial alignment therewith. The top end of the stack extension 34 is tapered inwardly as shown at 35 which cooperates with the skirt 28 to produce a jet or venturi action when the air is moved upwardly through the ventilator.

Means are provided for moving air in either direction through the stack extension 34 and comprise a reversible motor 36 mounted centrally of the stack extension 34 on a plurality of bracket arms 38 forming a spider within the extension. Fan blades 40 are secured to the armature shaft of the motor 36 and when rotated will either force the air downwardly through the extension or upwardly therethrough, depending upon the direction of rotation of the motor.

The lower end of the stack extension 34 is also provided with an outwardly extending radial flange 46 to which is secured the complementary flange 48 of a downwardly and outwardly flaring frusto-conical dispersing cone 50. A plurality of bolts 51 secure the flanges together. An interior frusto-conical member 52 is also provided and mounted on radial webs 54 for distributing and dispersing the air moved downwardly through the stack extension 34.

When it is desired to re-circulate air banked up against the underside of the roof of a building, the motor 36 is rotated in a direction which will cause the fan blades 40 to blow or move air downwardly through the stack extension 34. During such operation, the valve dampers 22 and 24 remain closed by gravity and air is supplied to the fan through the opening formed by the axial spacing of the extension 34 from the main stack 4. The effective area of the intake may be varied and adjusted by moving the nuts 31 on the threaded mounting studs 32 and this adjustment will, of course, vary the amount of air drawn in through the space between the upper end of the stack extension 34 and the underside of the frusto-conical skirt 28.

As the air is forced and moved downwardly through the stack extension 34, a portion thereof strikes the upper surface of the distributing member 52 and is diffused outwardly in the usual manner of air distributors of this character.

When it is desired to exhaust the air accumulated under the roof to a point outside the building, the motor is rotated in the opposite direction and the circulating fan blows the air upwardly through the main stack 4 as indicated by the arrows 56. The force of the air opens the valve dampers 22 and 24 to the position shown in broken lines 26 and the air is exhausted to the atmosphere above the roof 6. Immediately upon stoppage of the fan 40, the valve dampers 22 and 24 close by gravity to the position shown in full lines in Figs. 1 and 2.

Due to the inwardly tapered portion 35 on the upper end of the stack extension 34 and the flared skirt portion 28 on the lower end of the main stack 4, the air passing upwardly through the stack will, by venturi action, draw in a supply of air through the space between the main stack and the stack extension and due to the threaded lower ends of the tie bolts 32, the amount of this venturi action and the quantity of air drawn therein may be adjusted and varied to suit the conditions and circumstances.

Although but one embodiment of the invention is disclosed herein, it is capable of taking other specific forms and it should be understood that various changes can be made in the form and details without departing from the spirit of the invention.

I claim:

1. In a ventilator of the class described, a vertically disposed open-ended cylindrical main stack adapted to be installed through the roof of a building with its upper

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end outside the building and its lower end inside the building and having a medial roof line portion, an open-ended cylindrical stack extension, means affixed to said main stack for dependently carrying said extension in spaced axial relation to said main stack and defining an air inlet opening therebetween, an upwardly opening normally closed one-way valve damper mounted in the upper end of said main stack, and a reversible circulating fan mounted in said stack extension.

2. In a ventilator of the class described, a vertically disposed open-ended cylindrical main stack adapted to be installed through the roof of a building with its upper end outside the building and its lower end inside the building and having a medial roof line portion, an open-ended cylindrical stack extension, means affixed to said main stack for dependently carrying said extension in spaced axial relation to said main stack and for varying the distance between said stack and the extension and defining an air inlet opening therebetween, an outwardly opening normally closed one-way valve damper mounted in the upper end of said main stack, and a reversible circulating fan mounted in said stack extension.

3. In a ventilator of the class described, a vertically disposed open-ended cylindrical main stack adapted to be installed through the roof of a building with its upper end outside the building and its lower end inside the building and having a medial roof line portion, an open-ended cylindrical stack extension, means affixed to said main stack for dependently carrying said extension in spaced axial relation to said main stack and for varying

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the distance between said stack and the extension and defining an air inlet opening therebetween, an upwardly opening normally closed one-way valve damper mounted in the upper end of said main stack, and a reversible circulating fan mounted in said stack extension, said means comprising a plurality of circumferentially spaced supporting rods affixed to the main stack, a plurality of apertured ears affixed to said stack extension and each receiving therethrough one of said supporting rods, and a nut threaded upon the lower end of each of said rods.

4. A device as defined in claim 2 wherein the lower end of said main stack is provided with an outwardly flaring skirt, and wherein the upper end of said stack extension is inwardly tapered and receivable in said skirt when said stack extension is moved toward said main stack.

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