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A. M. BROWN ET AL
VENTILATING APPARATUS

2,485,356

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2 Sheets-Sheet 1

Fig. 1.

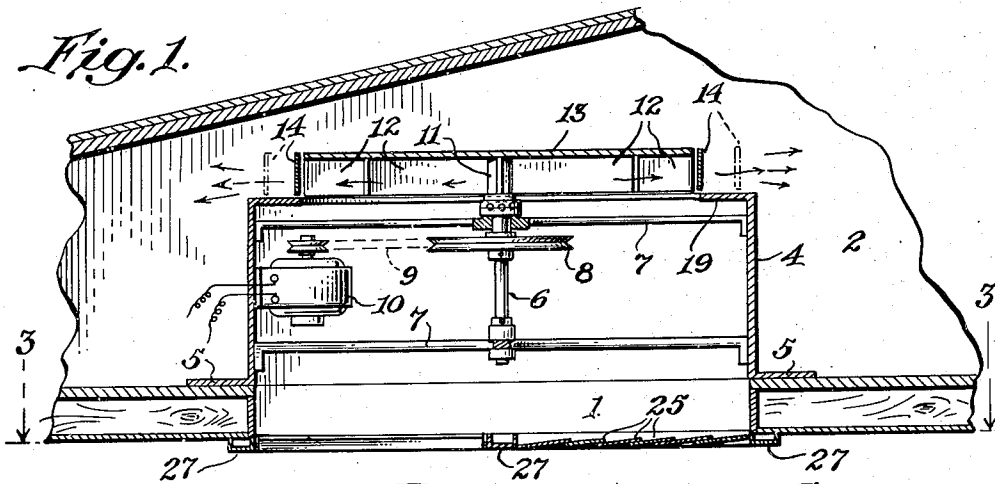


Fig. 2.

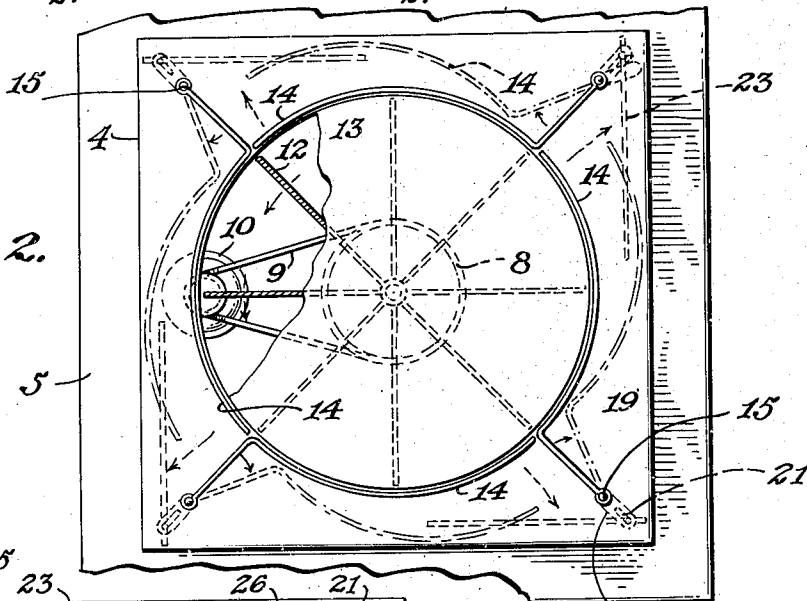
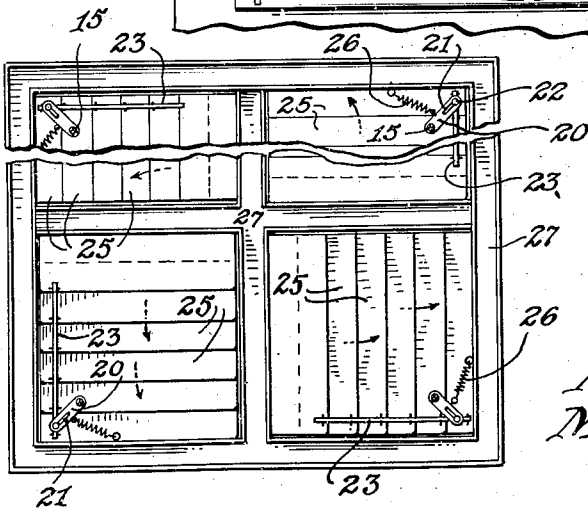


Fig. 3.

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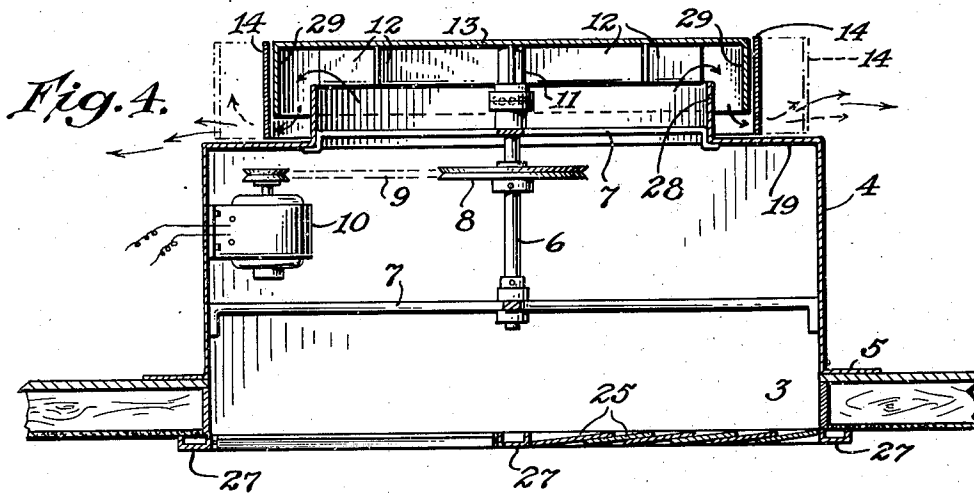
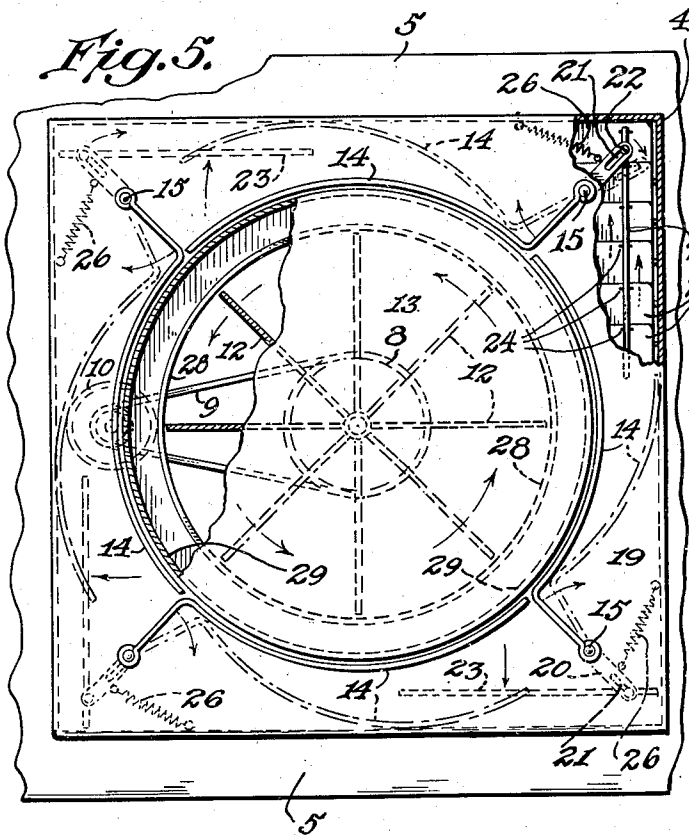
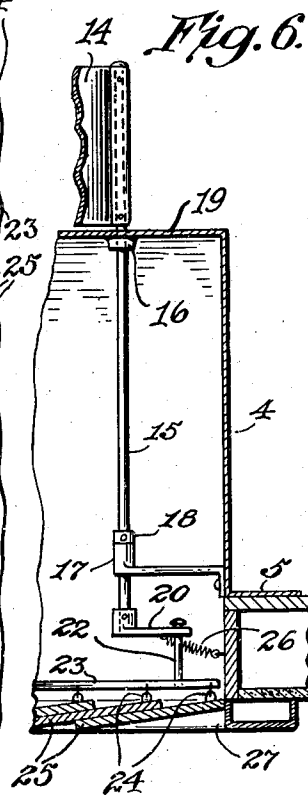
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VENTILATING APPARATUS

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2 Sheets-Sheet 2



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2,485,356

VENTILATING APPARATUS

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12 Claims. (Cl. 230—114)

1

The invention relates to ventilating and one of the objects of the invention is to provide an apparatus which is extremely simple in construction and inexpensive in manufacture.

Another object of the invention is to provide a ventilator which, though it may be used wherever desired, yet is particularly adapted to use in low attics.

A further object of the invention is to provide a ventilator embodying a centrifugal fan or pump, by reason of which the air is delivered laterally, and by reason of which, in manufacturing ventilators of different volume it is only necessary to employ blades of different width.

Still another object of the invention is to provide a ventilator embodying a centrifugal fan or pump in combination with means operated by the laterally delivered air for controlling louvers.

A further object of the invention is to provide a novel louver arrangement by which the louvers initially give a whirling action to the air in the direction in which the fan is rotating.

Another object of the invention is to provide a ventilator which will afford protection against rain and snow; and which ventilator, while particularly adapted to outdoor use, yet is so simple in construction that it provides a single unit which is adapted to either indoor or outdoor use.

Various other objects and advantages of the invention will be apparent to those skilled in the art, from the following detailed description when taken in connection with the accompanying drawings, in which:

Figure 1 is a vertical sectional view of the apparatus, shown as mounted in a low attic;

Figure 2 is a plan view of the apparatus, parts being broken away to more clearly show the construction;

Figure 3 is a broken away horizontal sectional view taken on line 3—3 of Figure 1;

Figure 4 is a vertical sectional view of another form of the invention, particularly adapted for outside use;

Figure 5 is a plan view of the form of the apparatus shown in Figure 4, with parts broken away to more clearly show the construction; and

Figure 6 is a detail view further illustrating the louver operating mechanism shown in connection with both forms of the invention.

Referring to the drawings in more detail, and particularly to Figure 1, numeral 1 indicates an opening provided in the ceiling of a room beneath an attic 2, which in this particular instance is very low, as is quite common. In Figure 4 a similar opening 3 is provided in the roof

2

of a house or other building to be ventilated. Of course, the ventilators of the present invention are adapted for use wherever desired, and the drawings merely illustrate two adaptations.

Numeral 4 refers to the ventilator casing which is mounted over the openings mentioned, and which may be provided at its base with an outwardly extending flange 5 for mounting purposes.

Numeral 6 indicates a vertical shaft which in the specific embodiments illustrated is journaled for free rotation in vertically spaced spiders 7 attached to the casing 4. Fixed to the shaft is a pulley 8 driven by a belt 9 leading from a motor 10 mounted in the casing. Of course, the means for mounting and driving the shaft may be varied as desired.

The upper end of the shaft 6 carries a centrifugal fan or pump 11 comprising fan blades 12 which may be of variable number and width. Above the fan blades is a plate or disc 13 extending the full length of the blades. This plate rotates with the fan and therefore it is preferably made integral with the blades.

A fan of this character operates noiselessly and discharges the air laterally, which is a very distinct advantage in low attics, as illustrated in Figure 1, as distinguished from the screw type of fan which discharges the air directly against a low attic roof. And further, it will be understood that in different installations requiring different volume discharge, it is only necessary to change the width of the fan blades; the remainder of the ventilator remaining the same, except of course that in some installations motors of different power would be required.

The invention includes in combination with the centrifugal fan a mechanism controlled by the laterally discharged air for operating the louvers, and also an improved arrangement of the louvers, now to be described.

Arranged around the periphery of the centrifugal fan are a number of arcuate plates 14; four of these plates being shown in the forms illustrated. Each plate has one end free, to permit a swinging action, and the other end is secured to a rod or shaft 15 extending downwardly through the ventilator casing 4. The shafts are mounted in appropriate bearings, such as indicated by numerals 16 and 17 in Figure 6, and a collar 18 secured to the shaft, above the bearing 17, determines the vertical position of the shaft; the position being such that a slight clearance is provided between the lower edges of the arcuate

plates 14 and the top or intumed flange portion 19 of the ventilating casing.

Secured to the lower end of each shaft is a crank arm 20 having a longitudinally extending slot 21 provided therein. A pin 22 is mounted in the slot of each crank arm, and each pin carries at its lower end a rod 23. Each rod is connected by short links 24 to the louvers 25 of the particular set it is to operate. Coil springs 26, connected to the crank arms 20, are provided to move the arcuate plates 14 to position closely surrounding the periphery of the fan 11 and at the same time close the louvers 25.

It will be understood that in both forms of the invention, when the centrifugal fan or pump is started, the lateral discharge of the air is directly against the arcuate plates 14, and hence these plates will be swung outwardly, as indicated by dotted lines in Figures 1, 2, 4 and 5, by the positive air pressure to instantly open the louvers 25 by the mechanical connections between the arcuate plates and the louvers. And of course, when the fan motor is stopped the springs 26 close the louvers and move the arcuate plates back to their original positions by the same mechanical connections.

The frame for the louvers, mounted beneath the opening in the ceiling or roof, or wherever the ventilator may be positioned, is indicated by numeral 27, and it will be noted, particularly by reference to Figure 3, that the frame is constructed to provide four openings, and of course the louvers are pivotally mounted in the frame to control the four openings. And as previously described, there are four operating mechanisms for opening and closing the four sets of louvers.

As clearly shown in Figure 3, the louvers of each set are arranged at an angle to the adjacent sets of louvers; the angle being 90 degrees in the embodiment illustrated. This louver arrangement very materially improves the appearance of the device, and also facilitates the operation of the louvers, but the main purpose is to start the air circulating in the direction of rotation of the fan or pump. As indicated by the arrows in Figure 3, air rushing in through each of the four sets of tilted louvers must turn to the left, and of course this sets up a column of air which is swirling left before it reaches the fan 11 which is rotating in a counterclockwise direction, as indicated by arrows in Figures 2 and 5. By reversing the louvers the incoming air would be made to circulate to the right, in case a fan rotating clockwise were employed.

The apparatus described up to this point is common to both forms of the invention. Both forms of the invention may be employed wherever desired indoors, but the form shown in Figures 4 and 5 is particularly designed for use outdoors, and the manner in which this form differs structurally from the form of Figures 1 and 2 will now be described.

As shown in Figures 4 and 5, the top or intumed flange 19 of the ventilator casing 4 is provided with an upstanding annular flange or collar 28. In the specific form illustrated this collar ends at just about the plane of the lowered edges of the fan blades 12, and of course the air will be centrifugally discharged through the space between the upper edge of the collar and the bottom of the disc or plate 13 rotating with the fan.

Also, the disc or plate 13 is provided at its periphery with an annular downwardly extending flange or collar 29. This preferably extends

downwardly a substantial distance below the upper edge of the upstanding flange or collar 28, as clearly shown in Figure 4. But it will also be noticed that the flange 29 terminates well above the top 19 of the ventilator casing, to permit the lateral discharge of the air directly against the arcuate plates 14 to operate the louvers.

Thus when this form of the invention is employed outdoors, as on a roof, the stationary collar 28 and the rotating collar 29 will function as baffles to make it practically impossible for rain or snow to enter. As previously mentioned, this form, which is extremely simple in construction, possesses the further advantage that a single form of construction can be used either indoors or outdoors.

The operation will be clearly understood from the foregoing description of the structures. In either form, when the motor is started the centrifugal fan will discharge the air laterally, which is particularly desirable when used in low attics. And further, by the use of this centrifugal fan or pump, any desired volume of air discharge can be obtained by merely using fan blades of different width and without making other changes in the construction, except to use a different size motor where necessary.

The laterally discharged air impinges directly on the arcuate plates 14, and there is thus provided a positive air pressure to move the plates, and by a mechanical connection to thereby open the louvers. These louvers are preferably arranged to start the air circulating in the direction of rotation of the fan, before it reaches the fan, as previously described. Of course the springs 26 will close the louvers and return the arcuate plates to their original position when the motor is switched off to stop the fan.

And by the provision of the cooperating baffles 28 and 29 the entrance of rain or snow is prevented, thereby providing a ventilator which is particularly adapted to outdoor use, but which is also very simple and inexpensive and thus provides a single unit which may be used either indoors or outdoors.

Having fully described the invention, what we claim is:

1. A ventilator including a casing, a centrifugal fan associated with the casing, a disc covering the upper side of the fan, an arcuate movable plate adjacent the periphery of the fan, said plate so positioned that the air discharged laterally from the centrifugal fan will impinge directly thereon, louvers at the entrance end of the ventilator casing, and a mechanical connection between the movable plate and the louvers to open the louvers when the fan is operated.

2. A ventilator including a casing, a centrifugal fan associated with the casing, a disc covering the upper side of the fan, a plurality of arcuate movable plates surrounding the periphery of the fan, said plates so positioned that the air discharged laterally from the centrifugal fan will impinge directly on the arcuate plates, a plurality of sets of louvers at the entrance end of the ventilator casing, and a mechanical connection between each movable plate and a set of louvers to open the louvers of each set when the fan is operated.

3. A ventilator including a casing, a centrifugal fan associated with the casing, a disc covering the upper side of the fan, a plurality of movable members adjacent said fan and operated by the direct pressure of air discharged laterally by said centrifugal fan, a plurality of sets of louvers

at the entrance end of the ventilator casing, and a mechanical connection between each of said movable members and a set of louvers to open the louvers when the fan is operated.

4. A ventilator including a casing, a centrifugal fan associated with the casing, a movable member adjacent the fan and operated by the direct pressure of air discharged laterally by said centrifugal fan, louvers associated with the ventilator, said louvers arranged to direct the inflowing air in the same circular direction as the direction of rotation of the fan, and a mechanical connection between said movable member and the louvers by which the louvers are opened when the fan is operated.

5. A ventilator including a casing, a centrifugal fan associated with the casing, a plurality of sets of louvers associated with the ventilator, and said sets of louvers so arranged with respect to each other as to cooperate to direct the inflowing air in the same circular direction as the direction of rotation of the fan.

6. A ventilator including a casing, a centrifugal fan associated with the casing, a plurality of sets of louvers associated with the ventilator, said sets of louvers so arranged with respect to each other as to cooperate to direct the inflowing air in the same circular direction as the direction of rotation of the fan, and means by which the louvers are opened when the fan is operated.

7. A ventilator including a casing, a centrifugal fan associated with the casing, a shaft, an arcuate movable member in the path of air discharged laterally by said centrifugal fan, said member having one end secured to said shaft, whereby movement of said member will rotate the shaft, louvers at the entrance end of the ventilator casing, and an operative connection between said louvers and said shaft to open the louvers when the fan is operated.

8. A ventilator including a casing, a centrifugal fan associated with the casing, a plurality of shafts, a plurality of movable members in the path of air discharged laterally by said centrifugal fan, said members having one end secured to said shafts, whereby movement of said members will rotate the shafts, a plurality of sets of louvers associated with the ventilator, and operative connections between the sets of louvers and the shafts.

9. A ventilator including a casing, a centrifugal fan associated with the casing, a plurality of shafts, a plurality of movable members in the path of air discharged laterally by said centrifugal fan, said members having one end secured to said shafts, whereby movement of said members will rotate the shafts, a plurality of sets of louvers associated with the ventilator, and operative connections between the sets of louvers and the shafts, and said sets of louvers arranged to direct the incoming air in the same circular

direction as the direction of rotation of the fan.

10. A ventilator including a casing, a top for the casing having an opening, a centrifugal fan associated with the opening, a disc covering the top of the fan and rotating therewith, a collar depending from the periphery of said disc to baffle the entrance of rain or snow, said baffle terminating above the said top of the casing to provide an annular passage for the discharge of air, a movable member adjacent said annular discharge opening, louvers associated with the ventilator, and means operated by said movable member to open the louvers.

11. A ventilator including a casing, a top for the casing having an opening, an upstanding collar surrounding said opening, a centrifugal fan associated with the opening, a disc covering the top of the fan and rotating therewith, a collar depending from said disc and terminating above the said top of the casing to provide an annular passage for the discharge of air, said upstanding collar and said depending collar being in spaced overlapping relation to baffle the entrance of rain or snow, a movable member adjacent said annular discharge opening, louvers associated with the ventilator, and means operated by said movable member to open the louvers.

12. A ventilator including a casing, a top for the casing having an opening, an upstanding collar surrounding said opening, a centrifugal fan associated with the opening, a disc covering the top of the fan, a collar depending from the periphery of said disc and terminating above the said top of the casing to provide an annular passage for the discharge of air, said upstanding collar and said depending collar being in spaced overlapping relation to baffle the entrance of rain or snow, a plurality of movable members adjacent said annular discharge opening, a plurality of sets of louvers associated with the ventilator, said movable members being operatively connected with the sets of louvers, and the sets of louvers arranged to direct the incoming air in the same circular direction as the direction of rotation of the fan.

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