Apr. 17, 1923. 1,451,884

T. I. MOEN

VENTILATOR

Filed April 17, 1922 3 Sheets-Sheet 1

FIG. 1.

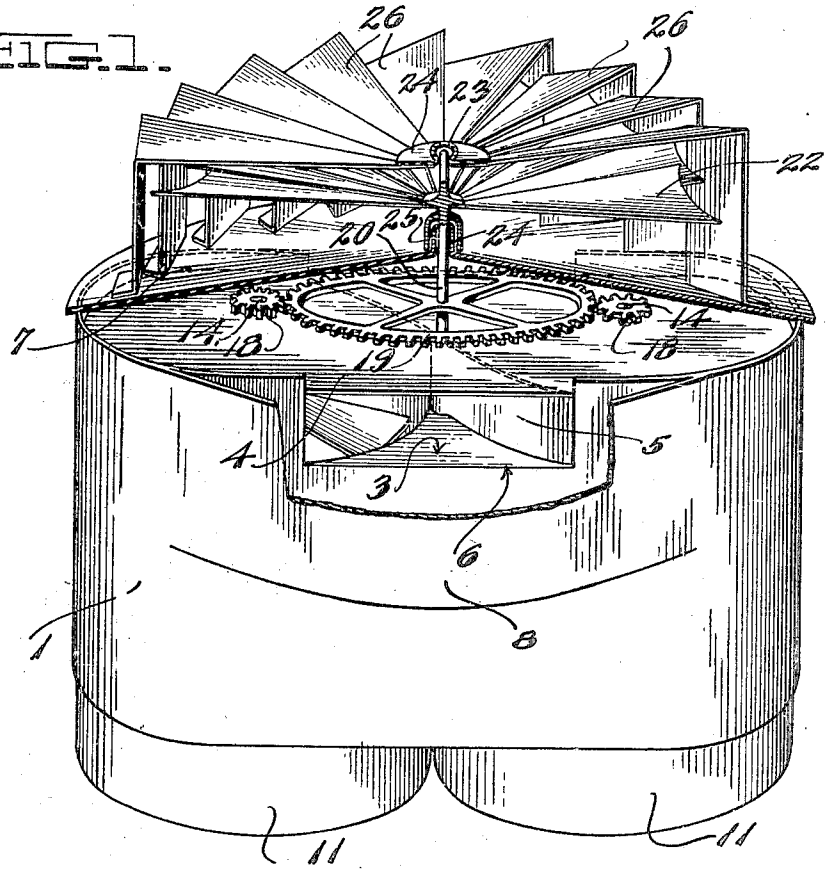
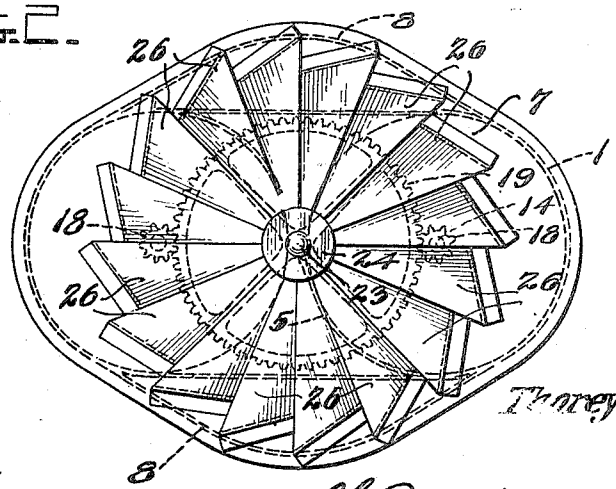


FIG. 2.



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FIG. 3.

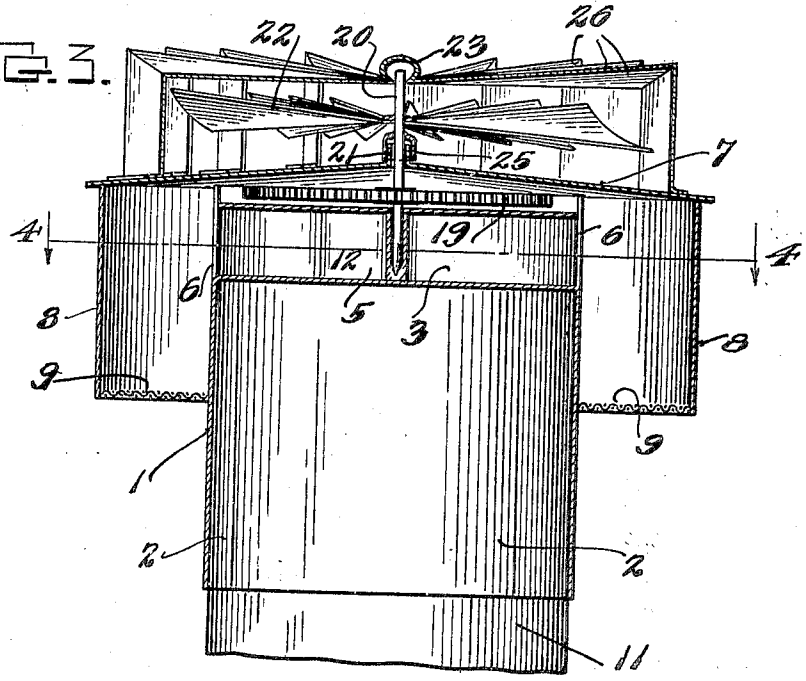
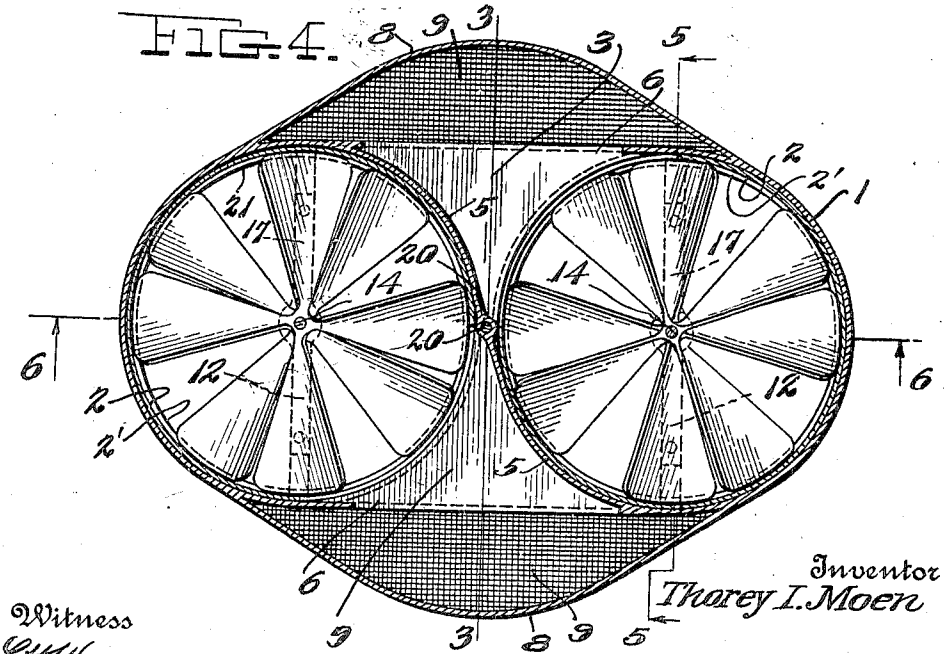


FIG. 4.



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FIG. 5.

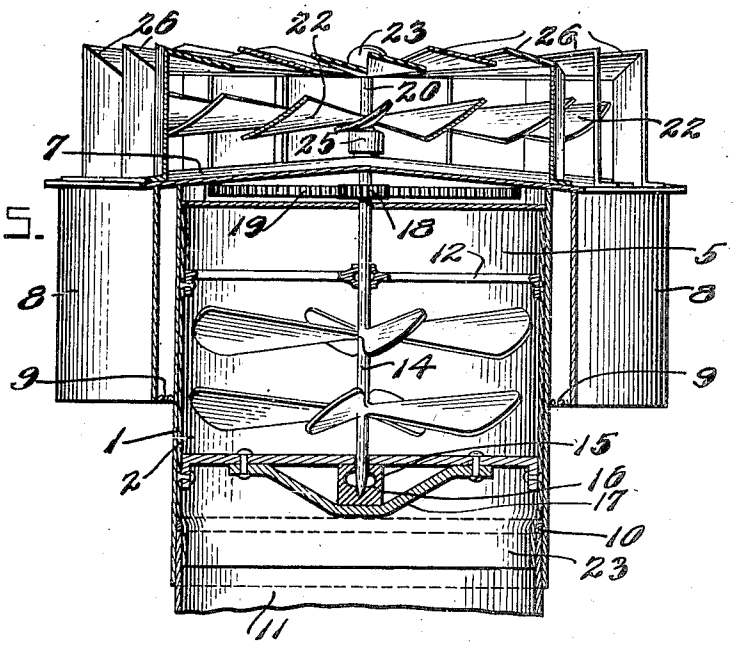
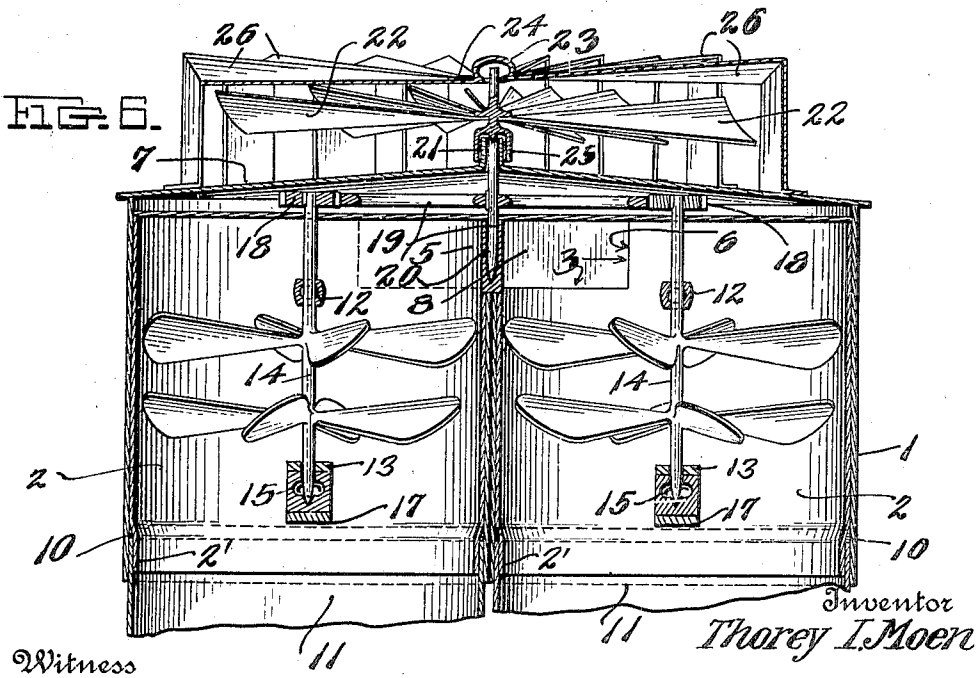


FIG. 6.



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Patented Apr. 17, 1923. 1,451,884

UNITED STATES PATENT OFFICE.

THOREY I. MOEN, OF BELOIT, WISCONSIN.

VENTILATOR.

Application filed April 17, 1922. Serial No. 553,943.

To all whom it may concern:

Be it known that I, THOREY I. MOEN, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Ventilators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved ventilator and one object of the invention is to provide a ventilator which may be operated by the action of wind upon the wind wheel forming part of the ventilator and which is so constructed that the ventilator may serve both as means for forcing fresh air into a mine, building or to any other place where it is desired to have fresh air supplied and which may further serve as means for withdrawing foul air from the mine or building.

Another object of the invention is to provide a ventilator in which the two fans for forcing in fresh air and drawing out foul air may be operated from the same wind wheel, the blades of one fan being pitched at an opposite angle to the blades of the second so that the air operated upon by the fans will be moved in opposite directions.

Another object of the invention is to provide the ventilator with an improved type of cage fitting about the wind wheel so that the wind wheel will always be rotated in the desired direction no matter from which direction the wind blows.

Another object of the invention is to provide a ventilator having an improved housing construction so constructed that air may be easily forced out of one portion of the housing and drawn into a second portion without either fan interfering with the operation of the second.

Another object of the invention is to provide improved means for rotatably mounting the two fans.

Another object of the invention is to provide a ventilator so constructed that birds may be prevented from building nests in the ventilator and interfering with proper operation of the same.

Another object of the invention is to provide a ventilator of the double action type which will be compact in its construction and strong and durable.

This invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a view showing the ventilator in perspective with portions of the same broken away to disclose the interior construction.

Figure 2 is a top plan view of the ventilator.

Figure 3 is a vertical sectional view through the ventilator taken along the line 3—3 of Fig. 4.

Figure 4 is a horizontal sectional view through the ventilator taken along the line 4—4 of Fig. 3.

Figure 5 is a transverse sectional view taken along the line 5—5 of Fig. 4.

Figure 6 is a vertical longitudinal sectional view through the ventilator taken along the line 6—6 of Fig. 4.

This improved ventilator is provided with a housing 1 which is substantially oblong in top plan but provided with curved ends. Inner casings 2 which are tubular in shape and circular in cross section are mounted in the end portions of the housing. Closure plates 3 are provided for the spaces between the side walls of the housing and the adjacent side portions of the inner casings 2 as shown in Fig. 4. A head or upper wall 4 is provided for the housing in spaced relation to the plates 3 and upper ends of the inner casings 2 and a partition 5 extends transversely and diagonally through the housing above the plates 3 and below the head 4 thus dividing the housing between the plates 3 and head 4 into end compartments. The side walls of the housing are provided with openings 6 thus permitting air to pass into and out of the end compartments. A hood 7 is carried by the housing and is provided with depending side extensions 8 which enclose the side openings 6 in order to prevent wind from blowing directly into the openings 6 and thus interfering with proper operation of the ventilator. Screening 9 is provided at the lower ends of these guards 8 so that birds will be prevented from entering the ventilator and building nests which would prevent proper operation of the ventilator.

In the end portions of the housing, there has been provided inner casings as previously stated and from an inspection of Fig. 6, it will be seen that each of these casings is provided with a reduced lower end portion 2′ thus providing space between the

lower ends of the inner casings and the walls of the housing as well as providing abutment shoulders against which will fit a filler 10. The reduced lower ends of the inner casings fit within the end portions of conduit pipes 11 which will lead to the point where it is desired to supply fresh air and draw off foul air. Upper and lower cross-bars 12 and 13 are secured in each of the inner casings and are provided with alined openings so that the shaft 14 of a fan positioned in the inner casing or fan housing may be rotatably mounted. The lower end of the shaft 14 fits into a pocket 15 formed in a bearing block 16 supported beneath the lower cross-bar 13 upon a supporting bar 17. It should be noted that this pocket 15 is enlarged intermediate its height thus providing an annular grease pocket in which grease may be placed to keep the fan properly lubricated. The two shafts 14 extend upwardly through the end compartments and through the upper wall or closure plate 4 and are provided with gears or pinions 18 which are engaged by a large driving gear 19 mounted upon a wind wheel shaft 20 which has its lower end portion journalled in the partition 5 and has its upper end portion extending through the neck 21 of the hood 7. From an inspection of Fig. 4, it will be seen that the blades of one of the fans are pitched at an opposite angle to the blades of the second fan and that therefore although the two shafts 14 will rotate in the same direction, one of the fans will serve to force fresh air through one of the conveyor pipes to a room and that the second will serve to draw foul air out of the room through the conveyor pipes. It will be further noted that each of these fans is of a compound construction and provided with two sets of blades, one set being positioned above the other and having its blades positioned in staggered relation to the blades of the second set.

The wind wheel which is to act as a driving means for the fans consists of the wind wheel shaft 20 and blades 22, the shaft 20 extending above the neck 21 and having its upper end portion journalled in a bearing 23 carried by the center disk 24 of a cage carried by the hood 7. A cup 25 is carried by this shaft 20 below the blades 22 and fits about the neck 21. The cage is provided with radiating arms 26 which have their end portions bent down and secured to the hood thus providing a circular cage formed of spaced arms. These arms are pitched at an incline so that they will provide a cage permitting the air to enter only from one side no matter in which direction the wind is blowing. The blades of the wind wheel are also pitched at the proper angle so that the wind entering the housing between the radiating arms thereof will strike the blades of this wind wheel and thus rotate the wind wheel. As the wind wheel rotates, rotary movement will be transmitted to the two fan shafts 14 through the medium of the gear 19 and gears 18. These two fans which are driven from the wind wheel will be rotated in the same direction but as previously stated, the blades of the two fans are pitched in opposite directions so that one fan serves to draw air into its inner casing through the side openings 6 of the housing and the second fan serves to force air out of its inner casing through the second side opening of the housing. Therefore, fresh air may be forced through one of the conduits 11 and foul air may be drawn from a room through the second pipe or conduit. There has thus been provided a ventilator which may serve for supplying fresh air and for drawing off foul air with the fans operating from a common wind wheel.

I claim:

1. A ventilator comprising a housing closed at its upper end having side openings adjacent its upper end, inner casings in the housing terminating short of the upper and lower ends of the housing, the lower portions of the casings being reduced to provide abutment shoulders, a partition extending transversely through the housing above the casings and dividing the upper portion of the housing into end compartments, each having a side opening, conduit pipes extending into the housing and fitting upon the reduced lower ends of the casings, rotary fans in the casings having shafts extending up through the end compartments, and wind operated driving means for imparting rotary movement to the fan shafts.

2. A ventilator comprising a housing, inner casings in the end portions of said housing terminating short of the upper end of the housing, means for closing space between the side walls of the housing and adjacent portions of the upper ends of said casings, a closure plate for the upper end of said housing, a partition extending transversely through the housing between the closure plate and upper ends of the casings and dividing the upper portion of the housing into end compartments, the end compartments having side openings for communication with the outer atmosphere, conduits leading from the lower ends of the casings, rotary fans in said casings having shafts extending upwardly through the end compartments, a rotatably mounted wind-wheel above the housing, and means for transmitting rotary movement from the wind-wheel to the fan shafts.

3. A ventilator comprising a housing, inner casings in the housing, a closure plate in the housing above the casings, a partition extending transversely through the housing between the casings and closure plate to divide the upper portion of the housing into

end compartments, the compartments having air passages in their side walls, fan shafts journalled in the casings and extending upwardly through the closure plate, fan blades carried by the shafts with the blades of one shaft pitched at an opposite angle to the blades of the second shaft, a wind-wheel mounted above the housing, means for transmitting rotary movement from the wind-wheel to the fan shafts, and conduits leading from the inner casings.

4. The structure of claim 3 and a hood for the housing provided with depending side portions engaging the walls of the housing about the openings therein and open at their lower ends, and a cage carried by the hood and positioned about the wind wheel and provided with air passages admitting passage of air into the cage in operative relation to the wind wheel.

5. A ventilator comprising a housing closed at its upper end, inner casings in the housing terminating short of the upper end of the housing, a partition extending transversely in the housing above the casings and dividing the upper portion of the housing into end compartments above the inner casings, the housing having air passages communicating with the end compartments, upper and lower cross bars extending through the inner casings and having alined openings, rotary fans in the inner casings each having a shaft passing through the openings of the cross bars and extending up through the end compartments, a supporting bar connected with the lower cross bar, a bearing block carried by the supporting bar and having a pocket receiving the lower end of the fan shaft and enlarged intermediate its height to provide an annular grease pocket in the shaft receiving pocket, and wind operated means for imparting movement to the fan shafts.

6. A ventilator comprising a housing having side openings, an upper wall for the housing, a partition extending transversely through the housing and dividing the upper portion of the housing into end compartments each having one of the side openings providing communication with the outer atmosphere, a hood for said housing having depending side wings providing side chambers open at their lower ends and having communication with the end compartments through the side openings, inner casings in the end portions of the housing communicating with the end compartments, conveyor pipes communicating with the inner casings, rotating fans journalled in the inner casings and having shafts extending up through the end compartments and upper wall of said housing, a cage carried by said housing and having radiating arms extending in spaced relation and pitched at an incline to direct air into the cage in an operative direction, a wind wheel rotatably mounted in the cage and rotated by air entering the cage, and means for transmitting rotary movement from the wind wheel to the fan shafts.

In testimony whereof I have hereunto set my hand.

THOREY I. MOEN.