

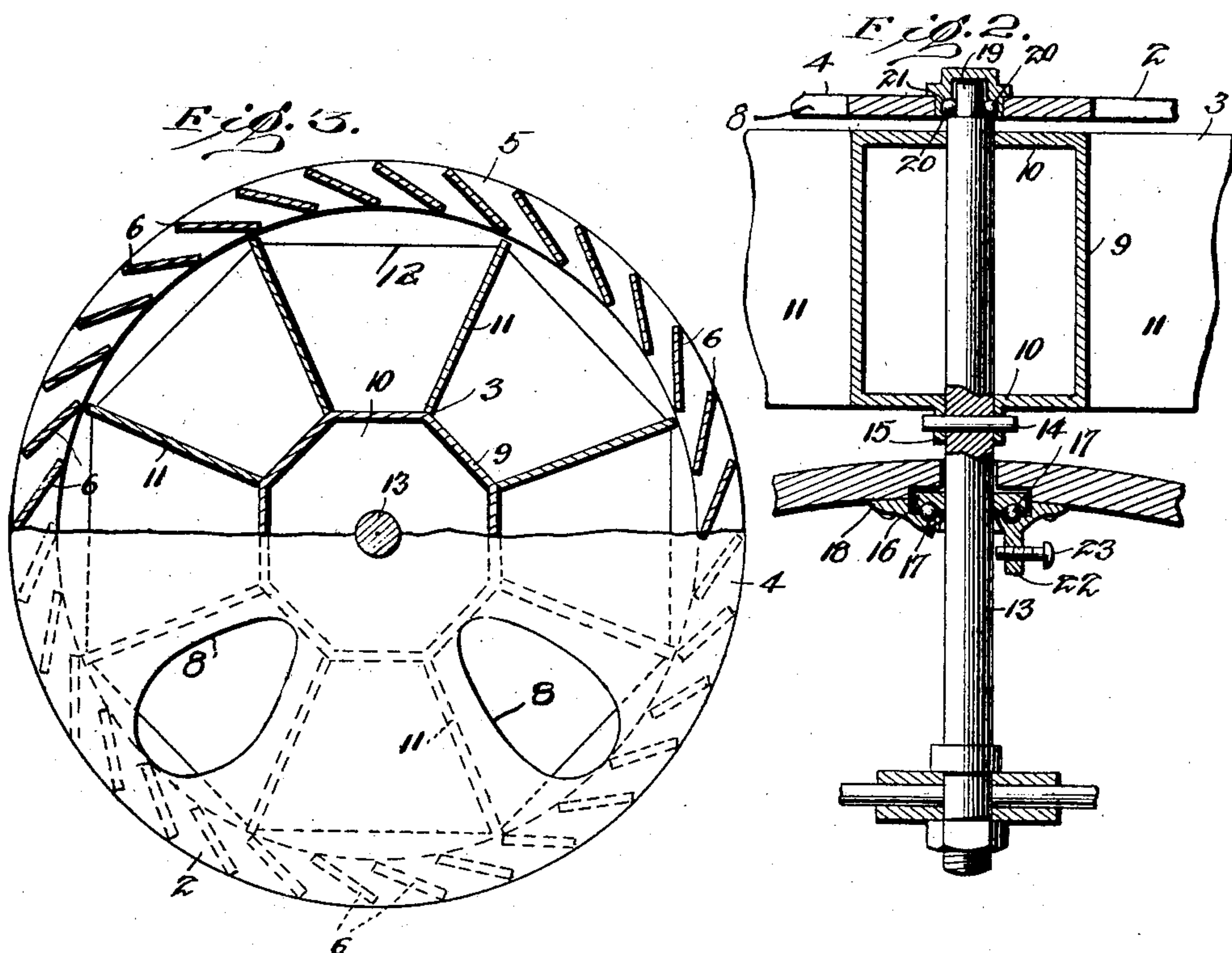
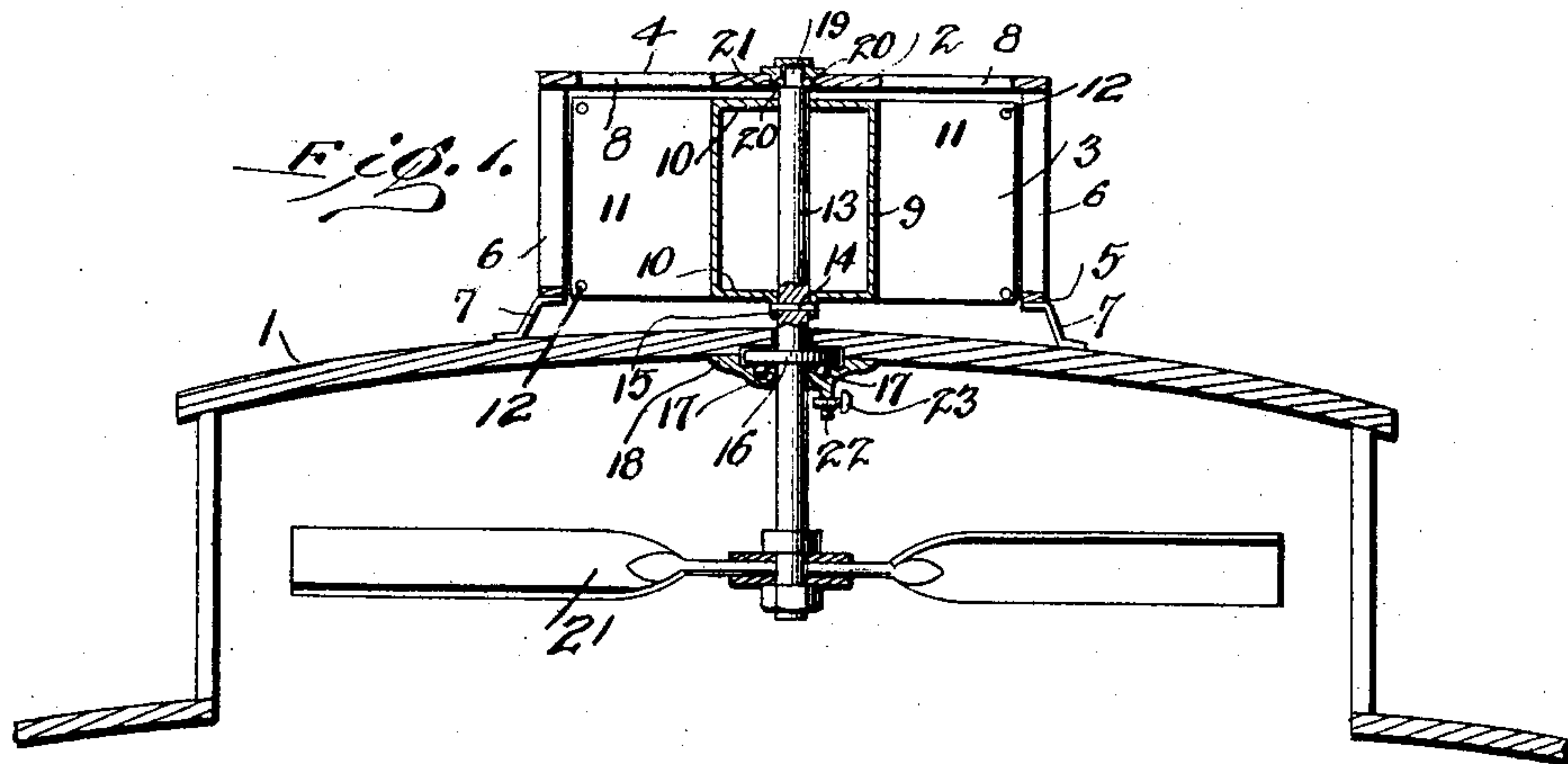
No. 765,035.

PATENTED JULY 12, 1904.

W. P. McCREARY.
CAR VENTILATOR.

APPLICATION FILED NOV. 29, 1901.

NO MODEL.



Witnesses
E. J. Stewart
R. M. Swift

W. P. McCreary, Inventor.
by *Chas. Snow*
Attorneys

UNITED STATES PATENT OFFICE.

WILLIS PEARSON McCREARY, OF HASTINGS, NEBRASKA.

CAR-VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 765,035, dated July 12, 1904.

Application filed November 29, 1901. Serial No. 84,103. (No model.)

To all whom it may concern:

Be it known that I, WILLIS PEARSON McCREARY, a citizen of the United States, residing at Hastings, in the county of Adams and State of Nebraska, have invented a new and useful Car-Ventilator, of which the following is a specification.

This invention relates to wind-motors for car-ventilators.

The object of the invention is to utilize the force of a current of air resulting either from the movement of a body through the air or from the natural movement of the air itself to drive a fan or blast device located within an inclosed space at a rate of speed which will increase but little after a certain predetermined rate has been reached, though the velocity of the air-current may be increased greatly after the establishment of the predetermined rate of speed of the fan above referred to. In this way the blast produced by the fan will be kept from becoming so violent as to be objectionable to persons occupying the space ventilated thereby, and with an air-current of velocity greater than that necessary to set up in the fan a predetermined rate of speed above referred to the variations in the speed of the fan will be slight in amount and will be brought about gradually.

With the above and other objects in view, as will appear when the nature of the invention is better understood, the same consists, generally speaking, in a wind-wheel having a fan operatively associated therewith and an inclosing casing or housing of circular cross-section for the wind-wheel having means for directing an impinging current of air against the blades of the wind-wheel, the said air-directing means consisting of a plurality of stationary guiding members disposed substantially at right angles to the radii of the housing and operating also as a means to control the escape of air from the casing, which increases in effectiveness with the increase in velocity and pressure of the air-current, and means for permitting the discharge from the casing of air in such quantities as to

cause the speed of the fan to increase but slightly as the velocity of the air-current increases above a predetermined rate.

The invention consists, further, in the novel construction and combination of parts of a wind-motor for a car-ventilator hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate corresponding parts throughout, there is illustrated one form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the elements therein shown may be varied or changed somewhat as to shape, proportions, and the exact manner of assemblage without going beyond the scope of the invention or departing from the spirit thereof.

In the drawings, Figure 1 is a view in sectional elevation exhibiting the clearstory of an ordinary railway-car and showing a ventilator having a motor constructed in accordance with this invention applied thereto. Fig. 2 is a fragmentary detail view, on an enlarged scale, exhibiting certain parts of the invention not shown in Fig. 1. Fig. 3 is a view in plan, the casing or housing being partly broken away to expose to view the wind-wheel housed therein.

Referring to the drawings, 1 designates the clearstory of a car, in this instance of passenger type, to the roof of which is secured the housing 2, in which is mounted for rotary movement the wind-wheel 3. The housing comprises a circular top 4, a base-annulus 5, and a plurality of guide members 6, rigidly secured to the annulus and disposed substantially tangential to its inner margin. As exhibited in the drawings, the guide members 6 are not exactly tangential to the inner margin of the annulus, but are at a very slight angle to the tangents thereto, and inasmuch as the departure from the true tangential position is very slight and guide members tangentially disposed to said inner margin of the annulus would operate in the same manner and produce the same effects as those shown

the phrase "substantially tangential" is used as covering more accurately than any other brief expression the relation which the planes of the guide members 6 should bear to the inner margin of the annulus.

The casing 2 is by preference constructed of galvanized iron on account of its non-corrosive properties and is secured to and spaced a short distance above the level of the clear-story by a plurality of legs or supports 7, of which there may be any desired number. As shown in Fig. 1, the bottom of the casing is open to permit the escape of snow, rain, water, or any foreign substance that might enter the same. The top of the casing is provided in this instance with four large openings 8, disposed equidistant from each other and radiating from the center of the top. These openings are shown as ovoid in form, although they may be otherwise contoured, and are of a length approximately equal to that of the wheel-blades, their size being that which is found by experiment to permit the escape of air from the casing in such quantity as to cause the wind-wheel to rotate at a rate of speed which never greatly exceeds that attained under the action of an air-current of moderate velocity.

The wind-wheel 3, which is also to be constructed of a non-oxidizable metal, comprises a hollow hub 9, in this instance an octagonal structure, closed at its top and bottom by plates 10 and having secured at the angles of the sides the blades 11, which are connected with the hub in any suitable manner, as by the employment of rivets or of solder. Extending through the hub 9 is a shaft 13, the same being held associated therewith by a pin 14, passing through a tubular extension 15 at the lower end of the hub. The shaft adjacent to the under side of the car-roof has rigidly secured to it a circular disk 16, constituting a bearing, the under side of which is adapted to engage hollow bearings 17, carried by the raceway bolted to the under side of the roof, the upper end of the shaft being reduced at 19 to engage the hollow bearings 20, carried by the raceway 21, secured to the top of the casing. The bearings 17 support the weight of the shaft, and its attached fan-wheel bearings 20 hold the shaft against lateral movement at its operating end, the fan being of the usual four-blade type and held assembled with the shaft in any preferred manner. The raceway 18 has depending from it a rib or boss 22, through which passes a binding-screw 23, adapted to be brought into engagement with the shaft 13 when desired, thereby to lock the same against rotation.

The operation of the wind-motor is as follows: When a current of air, whether natural or artificial, enters the casing between the guide members 6 and impinges the blades of the wind-wheel, motion is thereby imparted

to the wind-wheel and through its shaft to the fan 21. Owing to the position of the guide members 6 in relation to the blades of the wind-wheel, it will readily be seen that there is but little tendency for air to escape from the casing between the guide members, for when the wind-wheel is set in motion the air driven forward by its blades strikes against the guide members 6 and the angle of incidence is such that the air is almost completely directed back into the casing when reflected from the guide members. Hence as air enters the casing through the passages between the guide members the air that is displaced from within the casing must pass outward through the open bottom and the ovoid openings provided in the top of the casing. Owing to the fact that the casing is spaced but a short distance above the car-roof, the downward escape of the air is not free, and the openings at the top of the casing must be depended upon to permit the escape of the greater portion of the air-current. The amount of air which escapes between the guide members 6 after the wind-wheel has been set in rotation at moderate speed is so small as to be negligible, and in considering the effects produced by currents of increased velocity upon the apparatus no account need be taken of the air which escapes from the casing between the guide members. In considering the rate of escape of air from the casing through the openings at the top and the space between the lower margin of the casing and the car-roof it is to be noted that the openings at the top are in a plane parallel to the direction of movement of the blades of the wind-wheel, the openings 8 being so placed, therefore, that the movement of the wind-wheel does not tend to force air directly through said openings, but past them. Consequently with the increase of speed of the wind-wheel there is not a corresponding escape of air from the casing through the openings at the top thereof, nor at the bottom, for the same conditions apply there. On the contrary, in order for air swept inward by the vanes of the wind-wheel to escape from the casing it must be deflected from its course either downward or upward. So as the rate of movement of the wind-wheel within the casing increases the escape of air from the casing does not increase correspondingly, and in consequence there is some compression of the air within the casing, which has the double effect of retarding the movement of the wind-wheel by backward pressure against its blades and also of opposing the entrance of air from the outside into the casing. When the velocity of the current of air becomes sufficient to impart to the wind-wheel a rate of rotation such that the escape of air from within the casing through the open bottom and the openings at the top just bal-

ances the entrance of air through the passage between the guide members without any material compression of the air within the casing, the increase of velocity of the air-current beyond this point will have but little effect upon the speed of the wind-wheel for the reasons above set forth, and any increase of speed of the wind-wheel will be so slight and be brought about so gradually that to the average person in the space ventilated by the fan driven by the wind-wheel the increase of force in the blast produced will not be noticeable.

In proportioning the openings in the top of the casing and determining the height above the car at which to support the casing no attempt has been made to follow mathematically-expressed laws of pneumatics; but instead these measurements have been determined empirically as those which cause the wind-wheel to attain, under the influence of air having a velocity of twenty-five miles an hour, a speed which is suitable for the operation of a fan of the type illustrated. It is obvious that by increasing the area of the openings in the top of the casing without altering the dimensions of the other elements of the casing or the dimensions of the wind-wheel a higher speed of the wind-wheel with an air-current of given velocity will be made possible. It is also obvious that by raising the bottom of the casing to a greater height above the car-roof without altering the dimensions of the casing a similar effect would be produced.

By means of a wind-wheel and fan constructed and associated as hereinbefore described it will readily be seen that an effective ventilating apparatus for railway-cars is produced, also that the apparatus will never cause a blast within the car of sufficient violence to be objectionable to the passengers, and that the structure has no parts requiring adjustment after it is once placed in position, all of the parts of the casing and the wind-wheel being rigidly associated, except of course that the wind-wheel is mounted for rotation within the casing. The freedom of the apparatus from adjustable members is one of special importance, because of the tendency of adjustable parts of metal when exposed to the weather to become rust-bound and useless, in a measure at least, for that reason.

It will be obvious that with the ordinary means for the admission of air into the interior of a car or other structure provided with the ventilating members hereinbefore described sufficient agitation of the air therein will be produced to effect a satisfactory ventilation thereof. Should the blast of air at any time be objectionable, as when the temperature within the car or other structure is too low, the rotation of the fan can be in-

stantly stopped by turning the binding-screw 23 until it is brought into firm engagement with the fan-shaft.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A wind-motor comprising a casing having the side wall thereof composed of fixed overlapping guide members so disposed as to permit air to enter said casing when a breeze strikes said side wall at any point and having the top provided with a plurality of air-escape openings of limited area, and a wind-wheel arranged for rotation in said casing and having a plurality of fixed radial blades whose ends barely escape contact with the guide members in the casing-wall, said guide members being each disposed substantially perpendicular to the radius of the casing passing through the inner margin thereof.

2. The combination in a wind-motor for car-ventilators, of a casing of substantially circular contour having the top thereof provided with air-escape openings of limited area arranged substantially equidistant and spaced from the center of the casing and having the side wall composed of a plurality of fixed overlapping guide members each arranged substantially perpendicular to the radius of the casing which passes through its inner margin, and a wind-wheel having fixed blades arranged for rotation within the casing, the edges of said blades barely escaping contact with the guide members of the side wall of the casing and with the top of the casing.

3. The combination in a wind-motor for car-ventilators, of an open-bottom casing of substantially circular contour and having air-escape openings of limited area in the top thereof spaced from the center of the casing; and having the side wall composed of a plurality of overlapping guide members spaced equidistant and each arranged substantially perpendicular to the radius of the casing which passes through its inner margin, means for supporting said casing at a slight distance above a car-roof, and a wind-wheel having a plurality of fixed blades disposed radially and arranged for rotation within said casing, the ends of said blades barely escaping contact with the guide members in the casing-wall and the upper edges of said blades barely escaping contact with the top of the casing.

4. The combination in a wind-motor for car-ventilators, of a casing of substantially circular outline having a top provided with air-escape openings of limited area and having the side wall thereof composed of a plurality of overlapping spaced guide members each disposed substantially perpendicular to the radius of the casing which passes through its inner margin and arranged at intervals not exceeding twelve degrees of arc, and a wind-wheel

having a plurality of fixed radially-disposed blades arranged for rotation within said casing, the ends of said blades barely escaping contact with said guide members and the upper margins of said blades barely escaping contact with the top of the casing.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in the presence of two witnesses.

WILLIS PEARSON McCREARY.

Witnesses:

F. P. OLMSTEAD,

R. J. WHITE.