

J. G. GARNER.
VENTILATING APPARATUS.
APPLICATION FILED MAY 17, 1909.

975,851.

Patented Nov. 15, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

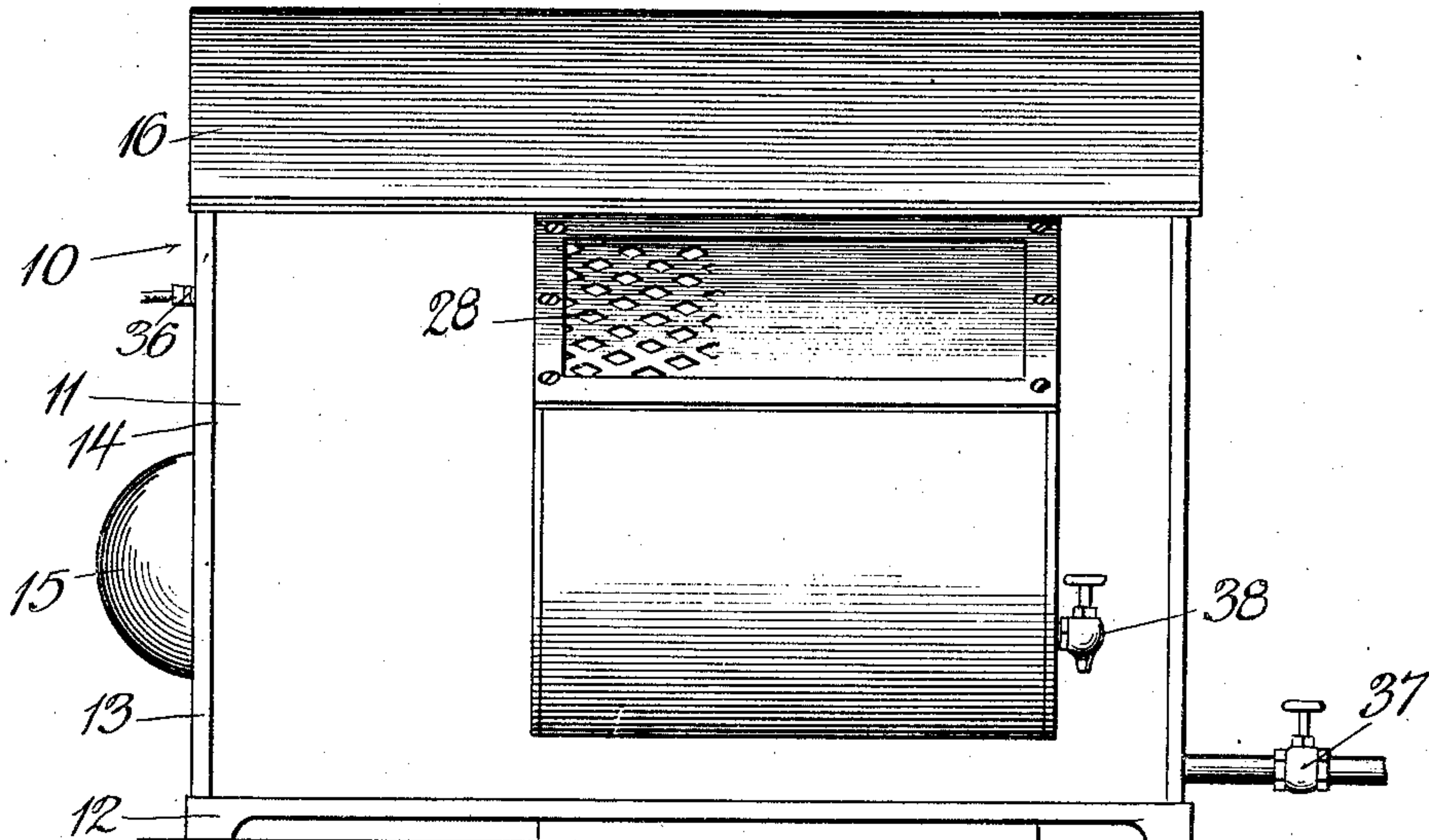
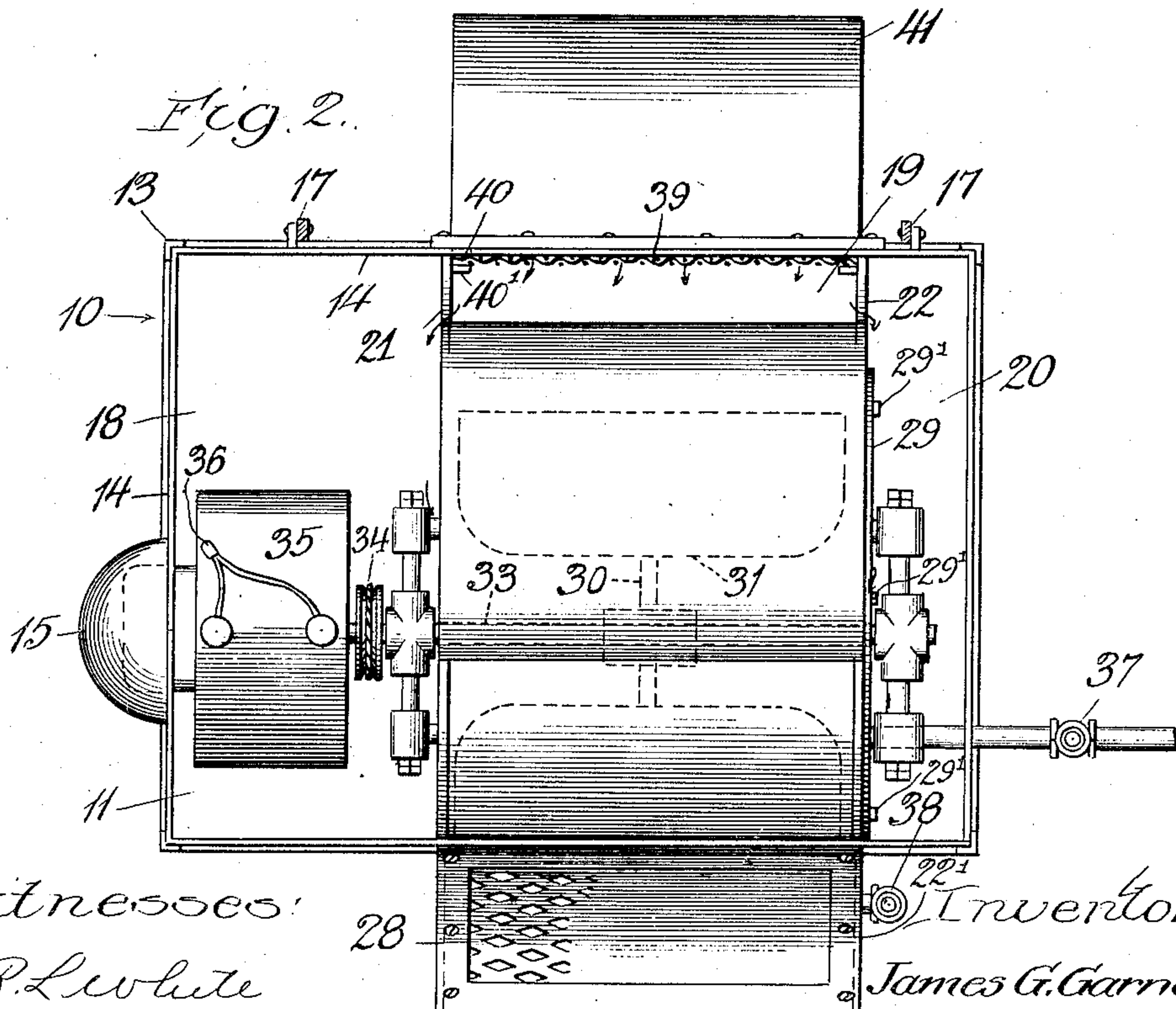


Fig. 2.



Witnesses:
H. R. LeWhite
R. A. White.

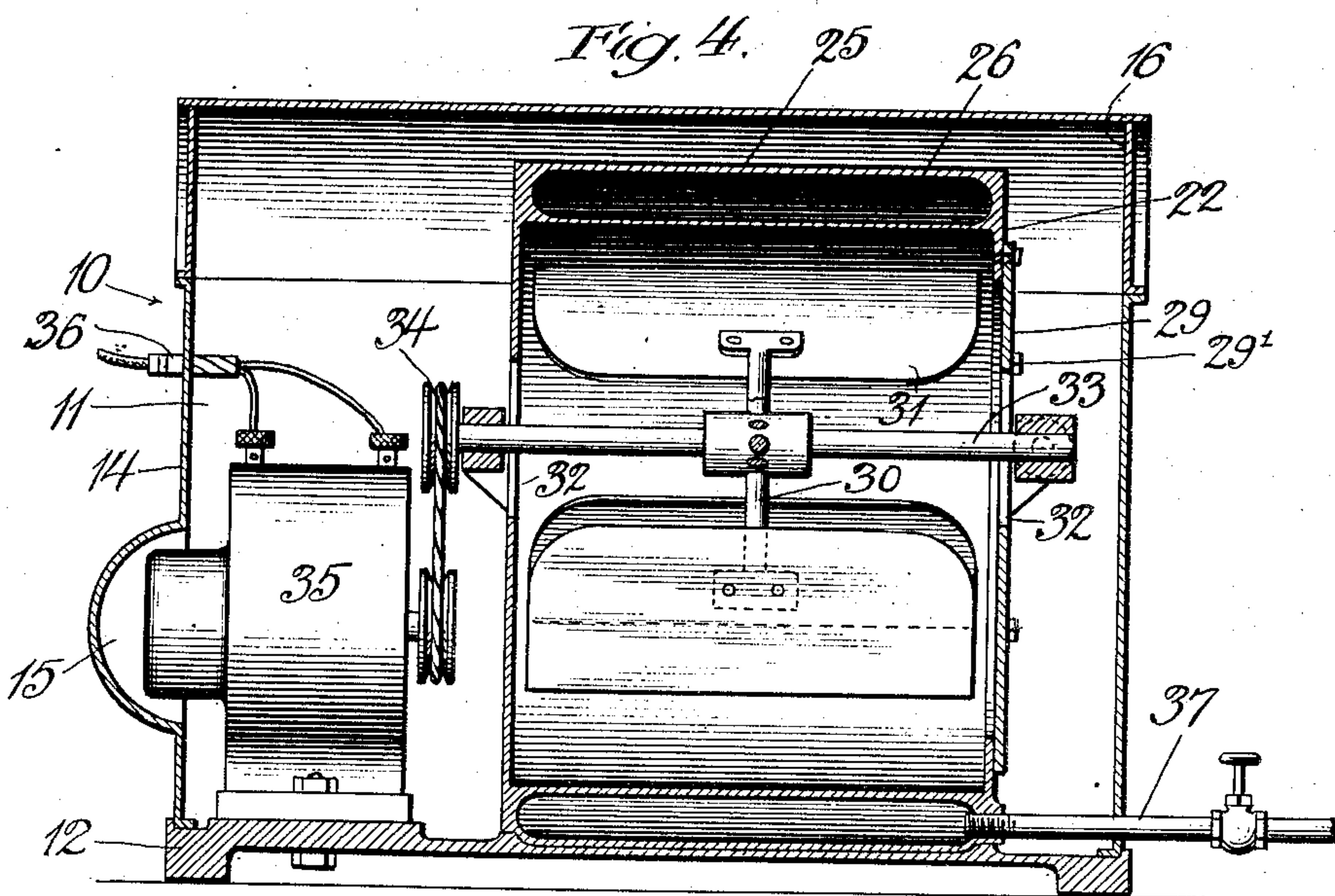
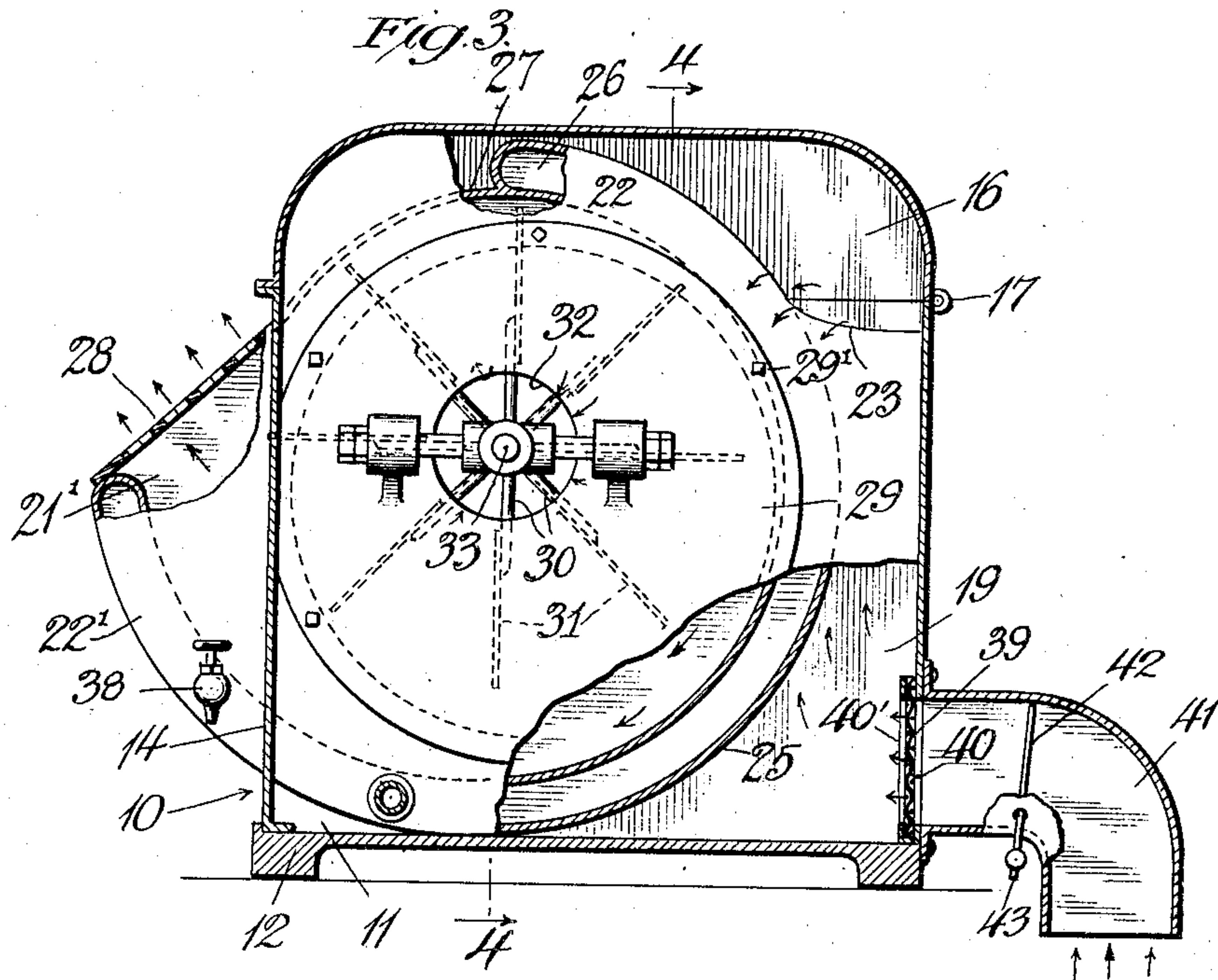
Inventor:
James G. Garner
By Forrester & May Attys

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Witnesses
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UNITED STATES PATENT OFFICE.

JAMES G. GARNER, OF CHICAGO, ILLINOIS.

VENTILATING APPARATUS.

975,851.

Specification of Letters Patent.

Patented Nov. 15, 1910.

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To all whom it may concern:

Be it known that I, JAMES G. GARNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ventilating Apparatus, of which the following is a specification.

My invention relates to improvements in ventilating apparatus, and has for its salient object to provide a small, relatively inexpensive, and efficient ventilator for offices, apartments, and the like, providing in a self-contained or collectively-housed apparatus air-propelling means, air-heating means, purifying devices, if desired, and, if desired, a power appliance for the air-propelling means.

Another object of my invention is to provide a ventilating and heating apparatus comprising a combined fan and attemperating means. And a further object of my invention is to provide a ventilating appliance of improved construction generally and in detail.

In the drawings, wherein I have illustrated an operative embodiment of my invention, Figure 1 is a front elevation; Fig. 2 is a plan view with the cover removed; Fig. 3 is a section through the right-hand end chamber of Fig. 2 with parts broken away; and Fig. 4 is a section on line 4—4 of Fig. 3.

In general the preferred embodiment of my invention, as adapted for the ventilation of small areas, such as offices, provides a casing of comparatively small size suitable for installation upon a window sill, and having an air inlet to be piped through the window to the outside air, and within the casing a motor, such as a small high-speed electric motor, and a centrifugal fan, driven by the motor, providing a shell the scroll or peripheral wall whereof is hollow and constitutes a chamber for the heating medium, such as steam; the arrangement being preferably such that the air entering the casing is directed into contact with the exterior of the heated fan-scroll before it reaches the fan inlet, and is delivered from the fan to the exterior of the casing, preferably in an upward direction.

In the specific embodiment shown, 10 indicates in general a suitable containing casing, the body 11 whereof may conveniently be constructed of a cast base plate 12, angle-iron corner-braces 13, and sheet metal plates

14 for sides and ends, one end of the body preferably being provided with a boss or extension 15 to accommodate the motor commutator.

A cover 16 of suitable contour is preferably hinged as at 17 to the body 11, so that when the cover is closed the casing is closed throughout save for the inlet and outlet provided for the passage of air.

Interiorly the casing 10 is preferably divided into three compartments, to-wit, a motor compartment 18 at one end, a fan compartment 19, and an air passage 20 at the other end, such division being conveniently effected by means of two vertical parallel plates 21 and 22, which constitute also parts of the fan shell-structure to be described. The edges of plates 21 and 22 conform to the contour of the casing except that each has a cut away portion 23 toward the upper rear corner of the casing, so that the fan compartment 19 communicates with the air passage 20 and the motor compartment 18.

The combined fan and attemperator may conveniently be constructed by providing a peripheral scroll 25, made hollow to provide throughout a suitable extent a heating chamber 26, the construction which I prefer incorporating the side plates and scroll in a unitary casting, so that the scroll and side plates together form the fan shell. The hollow portion of the scroll 25 preferably starts at the top of the casing at the vertically highest point of the scroll, thence continues downward at a suitable distance from the rear wall of the casing to leave an air passage, and then forward and out through a suitable aperture in the front wall of the casing to about the level of the fan axis. A plate 27 of suitable curvature connects the upper end of the hollow portion of the scroll with the front wall of the casing, as best shown in Fig. 3. The walls 21 and 22 form the sides of the fan casing and have forwardly projecting portions 21', 22', respectively, protruding from the front of the casing in conformity with the shape of the outlet end of the scroll, the outlet being covered with a grill 28. The side wall 22 of the fan has an aperture therein sufficiently large for the introduction of the fan wheel, and a cover plate 29 therefor secured by screws 29'. The fan wheel, generally indicated at 30, may be made of any suitable construction, providing blades 31 adapted

to receive air at the axial inlets 32 in the side plate 21 and cover plate 29 and to deliver air to the grilled outlet 28, said fan being carried by a shaft 33 journaled in suitable bearings carried by the side plates 21 and 22 and connected as by a belt-and-pulley connection 34, or otherwise, to the shaft of a small electric motor 35, set in the motor compartment 18, and having its external connections wired to a suitable socket 36 in the end wall of the casing for convenient connection to an exterior source of current supply.

The heating medium may be introduced into the chamber 26 in any suitable manner, the construction herein shown being adapted for steam heating installations, and providing a steam connection 37 and a suitable air relief valve 38.

For admitting air to the casing, an inlet opening 39 is made in the rear wall of the casing, of any suitable height, and preferably of width coextensive with the fan chamber 19, such inlet being preferably covered by a removable air-purifying screen 40 slidable in vertical guides 40'. An inlet pipe 41 is connected to the opening, to extend thence through the window to the outside of the building, such pipe preferably having its exterior end down-turned and being preferably provided with a damper such as an automatic valve 42 hinged at its lower edge and provided with an adjustable counter weight 43, so that it stands normally in upright position but offers little resistance to depression. The valve, however, is a mere closure for the air passage through the machine, and any closure for said air passage at any point therein may be used.

When the fan is started in rotation it draws air through the inlet pipe 41, depressing valve 42 and filling the chamber 19 with air, so that the air is directed against the exterior surface of the heating chamber 25 and passes upward over the cut-away portions 23 of the walls 21 and 22 into the passages 18 and 20 and thence through the fan inlets 32 and through the fan to the outlet 28, escaping in a generally upward and outward direction. It will be observed that the centrifugal action of the fan positively forces the air into intimate contact with the interior surface of the scroll or peripheral wall of the fan shell, which is heated by the medium within the hollow wall, and I have found by experience that a machine so constructed efficiently heats the air in its transit through the structure. The screen 40 serves to a practically satisfactory degree to purify the air and remove dust therefrom, and obviously, the screen may readily be taken from the machine for purposes of cleaning and the like. As soon as the rotation of the fan is stopped, the automatic valve 42 closes the inlet pipe so that at

night and other times of inactivity, the machine is not subjected to the passage of cold outside air and the heating apparatus is not, therefore, liable to freeze.

While the structure above described is especially as a small and relatively cheap self-contained or housed ventilator, it is obvious that the teachings of my invention might be applied to constructions other than that described, and I do not desire, therefore, to be understood as limiting myself to the particular construction and arrangement herein described further than as specified in the claims.

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

1. An air heating and propelling instrumentality comprising a centrifugal fan wheel, a fan casing surrounding said wheel providing a hollow scroll for receiving a heating medium to heat the interior and exterior surfaces of the scroll, and an exterior casing surrounding the fan casing, said exterior and fan casings having non-registering inlet openings, and the fan casing having an outlet in its periphery leading to outside the exterior casing.

2. In a ventilating apparatus, a fan providing a hollow shell for the reception of a heating medium, said fan having an air inlet to its interior and means constituting a containing casing for the fan as a whole providing an inlet and a path from the casing inlet to the fan inlet, arranged to direct air into contact with the heated exterior of said shell before it reaches the fan inlet.

3. In a ventilating apparatus, an exterior casing having an inlet opening therein, an interior fan casing having an axial inlet opening, and having an outlet opening leading to outside the exterior casing, a fan in the interior casing for driving the air through said casings and forcing it into contact with the circumferential wall of the fan casing, and means for heating the interior and exterior surfaces of the circumferential wall of the fan casing.

4. In a self-contained ventilating apparatus, a scroll-shaped fan shell with a heating chamber in its peripheral wall, said shell having its outlet end at the greatest radial distance from its axis, and having an inlet, a motor for driving the fan, and an exterior casing for the fan enveloping part of the shell, and having protruding therefrom the outlet portion of the scroll, said casing providing an air inlet, and being otherwise substantially closed.

5. In a self-contained ventilating apparatus, a casing internally divided into a plurality of transverse compartments and provided with an air inlet to the fan compartment, a centrifugal fan in one compartment, having its inlet within the casing and an

outlet to the exterior air, said fan being provided with a chamber in its shell to receive a heating medium, and a motor for driving said fan arranged in another compartment.

5 6. In a self-contained ventilating apparatus, a fan shell comprising a scroll portion chambered for the reception of the heating medium, and side plate portions one of which is provided with an inlet opening, 10 otherwise closing the sides of said scroll, a casing inclosing said fan, having an inlet to its interior, and means for directing air in transit from the casing inlet in a path partially bounded by the exterior of the scroll.

15 7. In a self-contained ventilating apparatus, a casing, a fan within the casing comprising a steam chest forming a scroll portion of the fan shell, side plate portions providing a fan inlet and otherwise closing the 20 sides of the fan shell, arranged to divide the casing into three compartments, viz., a middle fan compartment and two end compartments, one of said end compartments into which the fan inlet opens communicating 25 with the fan compartment, a fan-wheel within the shell, and a motor for driving the fan-wheel in one end compartment; there being provided an air outlet through the casing from the fan compartment.

30 8. In a ventilating apparatus, an exterior casing comprising a body and a cover, a centrifugal fan within the casing, extending substantially from the bottom to the cover, the outlet of said fan opening to the exterior 35 of the casing, and the opposite side thereof being somewhat removed from the rear wall of the casing, the fan shell being peripherally hollow throughout a portion of its extent to provide a chamber for the heating 40 medium there being an inlet from the casing to the fan, and an inlet to the casing in the rear wall thereof.

9. In a ventilating apparatus, a centrifugal fan-wheel, a shell therefor, means upon the exterior of the shell for heating a peripheral portion thereof to impart heat to 45 the air forced into contact with the said peripheral shell portion by the action of the wheel, said shell providing a side inlet and a peripheral outlet; and a containing casing 50 surrounding the fan shell, open to the outlet thereof, and providing an inlet and means for directing air from said casing inlet to the fan shell inlet.

10. In a ventilating apparatus, a fan providing a shell having an inlet and an outlet 55 and comprising an air directing wall arranged to constitute a heating means, and a casing through which the fan outlet opens, otherwise enveloping the fan shell, said casing providing an inlet and defining a path 60 of air flow from said casing inlet to the shell inlet partially bounded by the heating wall of the shell whereby the air in flow to the fan may be partially heated by the heating wall 65 before it reaches the fan inlet and further heated thereby in passage through the fan.

11. In a ventilating apparatus, a centrifugal fan providing a scroll shell formed in part with double walls, inclosing a heating chamber apertured for ingress and egress of heating fluid, said fan providing an inlet and an outlet, a casing providing an inlet and defining a path of air flow from said casing inlet 70 to the fan inlet partially bounded by said heating chamber wall, means for cleansing air in passage through the apparatus, and 75 means for driving said fan.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

JAMES G. GARNER.

In the presence of—

W. LIME ALLEN,
MARY F. ALLEN.