No. 869,074. PATENTED OCT. 22, 1907.

P. EVANS.

VENTILATOR.

APPLICATION FILED JUNE 9, 1904.

Fig. 1.

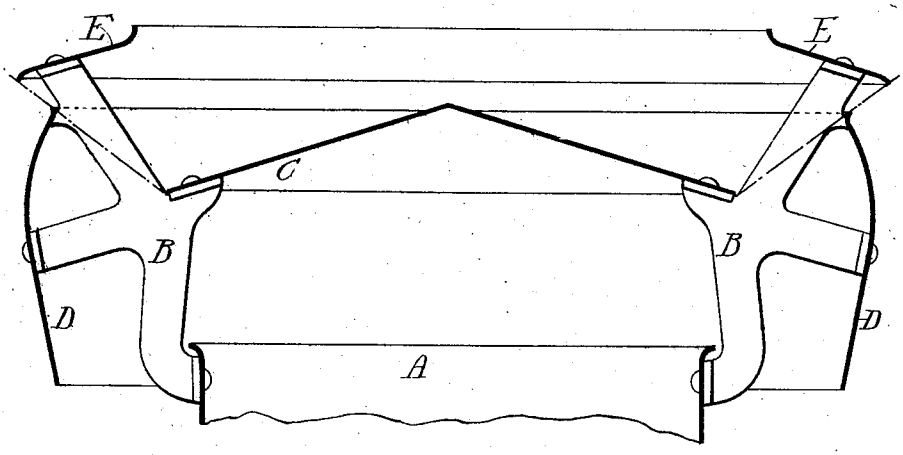



Fig. 3

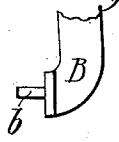
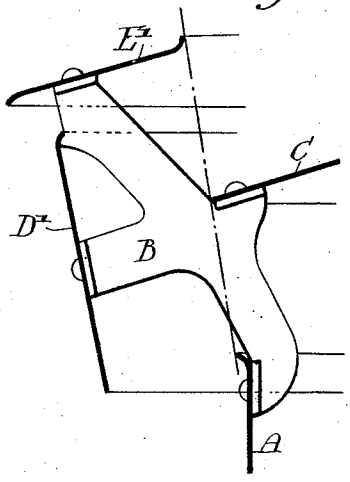



Fig. 2.




Witnesses:
Titus N. Lowe.
Walter Chism

Inventor:
Powell Evans,
by his Attorneys,
Howson & Howson

THE NORRIS PETERS CO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

POWELL EVANS, OF PHILADELPHIA, PENNSYLVANIA.

## VENTILATOR.

No. 869,074. Specification of Letters Patent. Patented Oct. 22, 1907.

Application filed June 9, 1904. Serial No. 211,829.

*To all whom it may concern:*

Be it known that I, POWELL EVANS, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Ventilators, of which the following is a specification.

My invention relates to certain improvements in that form of ventilator particularly designed to induce a draft in a stack or other conduit for gases;—having for its objects the provision of a structure which shall not only have its parts so arranged as to produce a draft in the conduit to which it is attached more efficiently than has hitherto been done, but shall also be of a relatively simple nature and less expensive to construct than has been the case with devices of the same general nature.

Another object of the invention is to provide improved means for connecting the various sections of the ventilator to the supporting brackets thereof.

These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figure 1, is a sectional elevation of one form of my improved ventilator, illustrating its detail construction; Fig. 2 is a sectional elevation of a modified form of my improved ventilator, and Fig. 3, is a side elevation of a portion of the brackets showing my improved means for attaching to it the various sections of the ventilator.

In the above drawings, A is the cylindrical bottom portion of a ventilator designed to connect directly with a pipe or other form of conduit for gaseous fluids, to which portion are riveted a plurality of brackets B. Each of these brackets has an inclined face to which is riveted a conical cover piece C of sheet material of a diameter greater than the diameter of the conduit A. For example, if said conduit is six inches in diameter the cover plate would preferably be given a diameter of seven inches.

In the case illustrated, the outermost portions of the brackets B have faces substantially at right angles to the face for the reception of the cover C, and to these a curved side section D is riveted or otherwise attached in any suitable manner. It will be seen that the lower edge of this section extends below the top of the bottom portion A and increases in diameter from said lower edge upwardly to substantially the point of its engagement with the brackets B or its line of intersection with an extension of the surface of the conical cover section C. From here it is curved inwardly until near its top edge at which point it is curved outwardly so as to present a substantially vertical edge.

In order to effectually prevent the entrance of rain through the annular space between the cover C and the top of the part A, I mount a ring E upon extensions of the brackets B, supporting it above and overhanging the side section D. This ring is preferably formed as part of a conical surface, having its inner edge turned upwardly and its outer edge turned down; it being noted that said outer edge is preferably, though not necessarily, extended at least to a straight line drawn from the edge of the cover C tangent to the upper edge of the section D. Similarly the inner edge of said ring E is preferably limited by a straight line drawn from the upper edge of the part A and tangent to the edge of the cover C.

The various parts are so proportioned that the area of the annular opening between the end of the cylindrical portion A and the cover C is about 25% larger than the area of cross section of said cylindrical portion, while the area of the opening between the cover C and the wall of the side section D is about 50% greater than that of the conduit A.

It is to be noted that the side section D is made in a single piece, which is preferably so placed with regard to the cylindrical section A and to the cover C as to cause the air issuing through the opening between them to have its direction of flow changed gradually, its design being such that the air flows over a smooth uninterrupted curved surface without angular depressions or projections so that a minimum of resistance is offered to its flow.

If for any reason it should be found advisable to make the side section of the ventilator in the form illustrated at D′ in Fig. 2;—that is, as a portion of a conical surface, the ring E′ would be correspondingly extended so as to overhang the upper edge of said section;—being, as before, preferably limited by a line drawn from the edge of the cover C and tangent to the said upper edge of the side section D .

In order to construct the above described device with a minimum of labor and material, I form lugs *b* integral with the brackets B at the places where the various sections of the ventilator are to be attached thereto. These lugs project through suitable holes in the sheet material of said sections and are riveted over as indicated at *b′*.

By the use of surfaces such as those offered by the parts D and D′ it will be seen that a current of gas moving upwardly through the cylindrical portion A after passing between its top edge (which is preferably flanged outwardly as shown) and the cover C will then have its direction changed by the side section D in such a manner that a minimum of resistance is offered to its flow. If said side section should be given an angular form, there are necessarily spaces in which eddy currents are formed, so that the main current of gas passing through the structure is retarded to a greater or less extent and the efficiency of the device is materially impaired;—it being well known that there is a minimum frictional loss in a moving body of fluid when the direction of motion of said fluid is changed gradually.

As is customary in devices of the class to which my invention belongs, the upwardly flowing current of gas

from the conduit A sucks in air through the annular space between the bottom edge of the side section and said conduit and the combined currents escape through the opening of the ring E as well as between said ring and the upper edge of the side section, which openings have a combined area at least 50% greater than that of the section A.

It is further to be noted that in addition to the above described advantageous action caused by the use of a side section D having an uninterrupted surface, I am enabled, by constructing said side section of a single piece of material, to secure a very material decrease in the cost of manufacturing the device, since I have found it to be less expensive to make a single section of the design shown than to form two pieces of material and unite them at an angle as is customarily done. Further, the outside surface of the side section D offers an uninterrupted surface to the flow of external currents of air and thereby secures the maximum vacuum possible therefrom as said currents flow upwardly around the top of the ventilator.

The form of bracket B preferably employed to hold the various sections in position is shown in Fig. 1, in which it will be noted that said bracket is attached to the outside surface of the conduit A and is so formed that it is altogether outside the lines of the side of said conduit. By this construction any moisture collecting on the brackets is kept from falling within the interior of the ventilator conduit.

I claim as my invention:

1. The combination in the ventilator of a substantially cylindrical bottom section, a cover section therefor, a side section extending around the upper end of the said bottom section and the cover section, the surface of said side section being inwardly curved, with a ring section supported some distance above said side section so as to form an annular opening between said two latter sections, with a plurality of multiple-armed brackets each having one arm fixed to the bottom section, another arm fixed to the side section, a third arm fixed to the cover section, and a fourth arm engaging both the upper edge of the side section and the ring section, substantially as described.

2. The combination in the ventilator of a substantially cylindrical bottom section, a cover section therefor, a side section extending around the upper end of the said bottom section and the cover section, the surface of said side section being inwardly curved, with a ring section supported some distance above said side section so as to form an annular opening between said two latter sections, with a plurality of multiple-armed brackets each having one arm fixed to the bottom section, another arm fixed to the side section, a third arm fixed to the cover section and a fourth arm engaging both the upper edge of the side section and the ring section, each of said arms having an integral projection extending through the section engaged thereby and said projection being riveted to hold the sections in place, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

POWELL EVANS.

Witnesses:
M. ELVA NEVILLE,
WILLIAM E. BRADLEY.