F. EMERSON.

Injecting Ventilator.

No. 5,182. Patented July 3, 1847.

Fig. 2

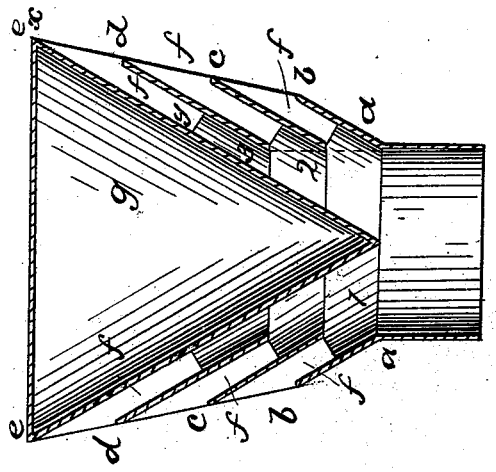
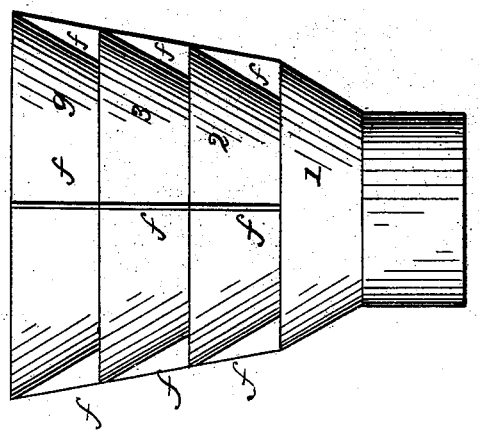


Fig. 1



UNITED STATES PATENT OFFICE.

FREDERICK EMERSON, OF BOSTON, MASSACHUSETTS.

VENTILATOR.

Specification of Letters Patent No. 5,182, dated July 3, 1847.

To all whom it may concern:

Be it known that I, FREDERICK EMERSON, of Boston, in the county of Suffolk and State of Massachusetts, gentleman, and a citizen of the United States, have invented a new and useful Ventilator, which I denominate the Injecting-Ventilator, which has not been before known or used, of which the following is a full and true description.

The object of the injecting ventilator is the introduction of atmospheric air into the interior of ships and buildings and into any other places where a continuous supply of pure air is required. The general outline of this ventilator, as shown in the accompanying drawings to which I have reference in the verbal description of the same, presents a series of conical frustums, the smaller end of the smallest frustum being produced more or less in a cylindrical tubular form, and in applying the ventilator the smaller end thus produced is put toward the apartment passage or space to be ventilated, that is, into which the atmospheric air is to be introduced. I shall, for the sake of clearness, describe the ventilator as standing vertically upon its smaller end, over the apartment passage or space into which the air is to be introduced, the ventilator to be well fitted and supported, so that the orifice of the tube at that end shall open into the space to be ventilated though the ventilator may, in fact, be applied to the side of or underneath the space to be ventilated, and may thus be inverted in position, or put horizontally, or at any angle to the horizon, the orifice of the tube at the smaller end being always put toward the space into which air is to be introduced.

Upon the upper end of the tube (*a*) (see drawings) is fitted and closely adapted and joined to it, a hollow frustum of a cone (1), the edge of the smaller end of the frustum being joined to the tube and forming one piece with it. Another similar hollow frustum (hollow frustum 2), is placed partly within, and projecting above the first and another (hollow frustum 3) in like manner partly within the second and projecting as far above the second as that does above the first. The sides of each of these hollow frustums are at an angle of thirty degrees with the vertical line passing through their centers, and consequently being frustums of cones of an angle of sixty degrees. These shell-frustums are parallel to each other; and the relative distance of the first and second is the same with that of the second and third, partly above and partly extending down within these shell frustums, is an inverted cone (*g*) the center of which is in a line with that of the cylindrical tube and of the shell-frustums, the apex of which cone extends down to the upper end of the cylindrical tube, the sides of which cone are parallel to the shell-frustums, and the perimeter of the base of which cone is as far above the perimeter of the base of the upper shell-frustum as that is above the perimeter of the base of the middle shell-frustums. This inverted cone and the three shell-frustums have all the same conical angle. The diameter of the base of the inverted cone, is equal to twice that of the tube, and the perimeters of the base of the inverted cone and those of the three shell-frustums, all present and coincide in the outline of an inverted frustum of a cone, whose base is that of the inverted cone, and whose section is at the perimeter of the base of the lower shell-frustum; that is, a vertical central section of the ventilator will cut those perimeters at points in the same line (see No. 2, *a*, *n*). The inverted cone may be solid, or if hollow, it must have a continued and entire superfices of base and sides.

The transverse dimension or oblique height from *a*, to *b*, of the first shell-frustum as the same would be cut by a central vertical section of the ventilator is equal to the radius of the tube. The height of the tube is not material. The central openings of the shell-frustums, for the admission of air, are all of the same area, their diameter at their smaller ends being the same as that of the tube. The diameter of the base of the inverted cone is equal to twice that of the tube, and the open space between the lower shell-frustum and the second, and between this and the third, and between this last and the side of the inverted cone, are all of equal horizontal thickness, that is, parallel perpendiculars drawn from the base of the respective shells, viz—from the first shell at (*b*) to the second (*c*) and from the second to the third (*d*), and from the third to the inverted cone, at (*e*) will be of equal length.

Accordingly the radius of the tube being given, the figure and structure of this ventilator are thence determined.

The spaces for the admission of air between the shell-frustums, and between the

third shell-frustums and inverted cone, are successively and severally divided into four or more equal compartments by four or more series of partitions each consisting of four or more thin vertical partitions (*f*), the precise number of series not being important, provided they are not put so frequent and near each other, as materially to obstruct the current of air inward. As there are four of these open spaces, each series of partitions will consequently consist of four partitions, which should all be in the same vertical plane, and the lower one should terminate at the lower edge of the second shell-frustum, the next higher one, at the lower edge of the third shell-frustum, and the upper one should extend downward two thirds of the vertical breadth of the upper shell-frustum from *x* to *y*. These partitions support the shell-frustums and the inverted cone. The second shell-frustum as already mentioned, will extend partially into, and be partially inclosed by the first, and so the third into the second, and the distance to which they will thus extend, will be governed by the elements of construction already given.

When the ventilator is made of such material that the partitions, the shell-frustums, and the cone cannot be sufficiently united to one another to hold the structure together, then the whole may be bound together by small rods extending from the lower frustum through the two higher frustums to the side of the cone.

The angles, relative dimensions, and form, and modes of construction, and number of the several constituent parts of this ventilator above given, are such as from experiments on various structures, I have ascertained to operate most successfully, but some variation may be made from them, as will be obvious without destroying the effect, and I include as being part of my invention such approximations and equivalent similar constructions, as may be considered to be substantially the same.

I claim as my invention and ask a patent for—

The combination of the inverted cone partitions and hollow frustum or frustums and tube as herein specified for directing a current of air into the place to be ventilated.

FREDERICK EMERSON.

Witnesses:
WILLARD PHILLIPS,
A. D. PARKER.