E. G. BANNER.

VENTILATING COWLS.

No. 183,278. Patented Oct. 17, 1876.

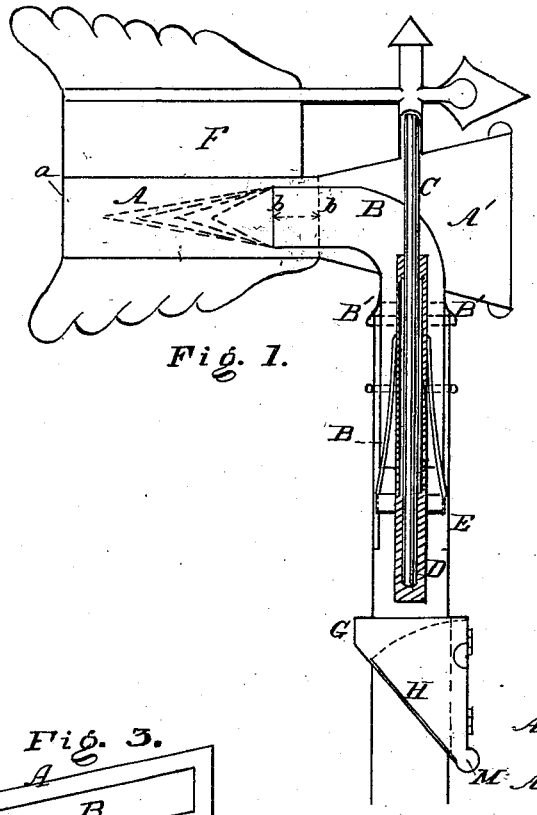

Fig. 1.

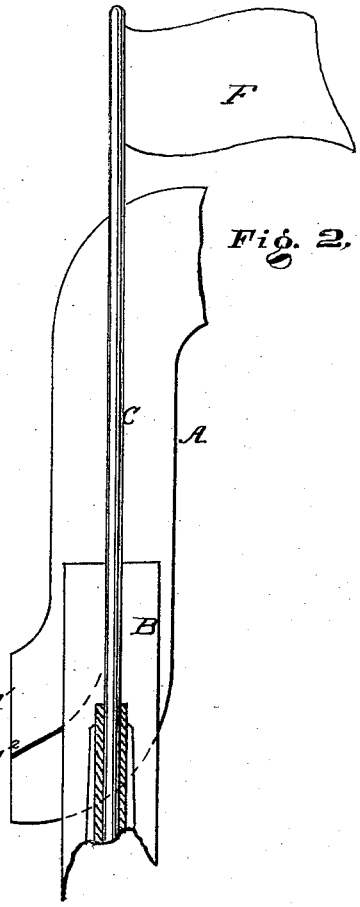

Fig. 2.

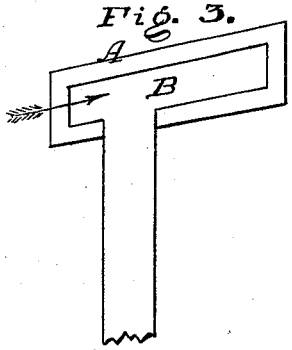

Fig. 3.

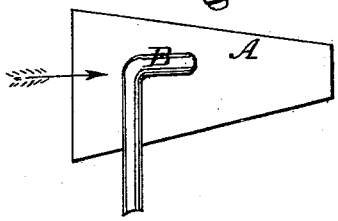

Fig. 5.

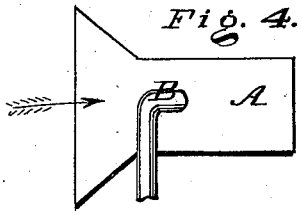

Fig. 4.

WITNESSES:

Solon O. Kenon

Chas. A. Pettit

INVENTOR:

E. G. Banner

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWARD G. BANNER, OF LONDON, ENGLAND.

IMPROVEMENT IN VENTILATING-COWLS.

Specification forming part of Letters Patent No. **183,278**, dated October 17, 1876; application filed September 27, 1876.

To all whom it may concern:

Be it known that I, EDWARD G. BANNER, of Billiter Square, in the city of London, England, have invented a new and Improved Ventilating-Cowl; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a vertical section of my improved ventilating-cowl; Fig. 2, a modification of the same. Figs. 3, 4, and 5 are old forms of cowls of a construction allied to mine.

This invention relates to a combined apparatus for ventilating soil-pipes, drains, sewers, carriages, ships' rooms, and other buildings, and preventing down-drafts.

In order to withdraw a current of air from soil-pipes, drains, sewers, ships, carriages, rooms, and other buildings, I carry up a shaft or pipe from the soil-pipe, drain, sewer, carriage, ship, room, or building, and upon the top of the shaft or pipe I mount a revolving cowl, constructed in the manner represented in the drawing hereinto annexed, and provide a valve of peculiar construction in said shaft or pipe for preventing any down-draft.

In the drawing, A is a horizontal cylinder, with a funnel-head, A^1, at one end. B is a short tube passing downward from the funnel A^1. The tube B rises up into the funnel, and is bent round to bring it parallel and concentric with the cylinder A, or nearly so, and is carried along for a distance within the cylinder A, as shown, in order to cause a stream of air entering the funnel A^1 to travel forward in a straight course before it arrives at the end of the tube B. C is a spindle, which is fixed to the funnel A^1 and tube B, and passes downward through the center of this tube. The spindle C is received within a supporting-tube, D, and rests upon a bearing at its lower end. The supporting-tube D, bushed to lessen friction, is carried by arms from the sides of a short tube, E. This tube is placed at the top of the shaft or pipe, which is carried up from the soil-pipe, drain, or sewer, or other place to be ventilated. B′ is a rain-guard around the tube B, to prevent rain passing into the tube E. A vane, F, is fixed to the top of the cylinder A and funnel A^1, so as always to keep the mouth of the funnel directed toward the wind. By this means any current of air entering the funnel A^1 will be directed through the annular space between the cylinder A and pipe B, and, as it passes beyond the end of this pipe B, will induce a current through it, and, consequently, an upward current from the shaft or pipe leading from the place to be ventilated.

The above construction of cowl affords a simple, cheap, and effectual arrangement for employing the force of the wind to induce an upward current of air through any pipe leading from a soil-pipe, sewer, or drain, or from a room or other building, or the cowl may be employed for ventilating railway-carriages, or ships' holds, cabins, and such like, or may be employed for inducing an upward current through a chimney.

Having described the construction of the cowl generally, I would observe that I am aware that cowls of somewhat similar construction have already been designed to act on the above principle, but have proved almost failures in practice.

My improved cowl differs from all these chiefly in the particular proportions of its parts, which are of the first importance, and are, in fact, absolutely essential to the efficient action of the cowl.

I will proceed to indicate the more important proportions of the cowl. The cross-sectional area of the annular space between A and B should equal about one-third the sectional area of the cylinder A, or, in other words, the diameter of the inner tube B should be about four-fifths the diameter of cylinder A. The horizontal portion *b* to *b* of the tube B, which passes along cylinder A, should not be more than three or four inches in length, while the length of the cylinder A should be about equal to nearly three times its diameter, and might be longer—that is to say, it must be of such length that the current of air passing through the annular space between A and B, and which tends more or less, according to the velocity of the wind, to converge toward the center of the tube A as soon as it escapes from the annular passage, should so

converge at a point well within the cylinder A. The dotted lines give an idea of this convergence with different velocities of the wind. The diameter of the large end of the funnel A^1 should not be more than twice the diameter of the cylinder A, and for the larger sizes should be less.

In order to still further point out the distinction between my improved cowl and other cowls intended to act on a similar principle heretofore invented, I will proceed to point out some of the defects of the latter cowls. In one form of cowl, Fig. 3, the mouth and outer end of the inner cylinder B are in the same, or nearly the same, plane with the mouth and outer end *a* of the outer cylinder A, and the current of air converging beyond or outside of the cylinder A is therefore without any useful effect whatever, and, consequently, such a cowl is practically useless. In another cowl, Fig. 4, the tube A is so short and of such large diameter relatively to the diameter of the inner tube B that it would require a gale of wind to produce more than very slight effect. In a cowl of another form, Fig. 5, the outer tube A is of smaller area at the outlet end *a* than the annular passage around the inner tube B, the result being a down-draft in the shaft, as the air, entering at the large end and passing too freely through the annular space, cannot all escape at the contracted outlet end *a*, so that the cowl is not merely ineffective, but produces the reverse effect to that sought to be attained. Fig. 2 shows another form of cowl, which is a modification of my invention. In this case the outer cylinder A is vertical, and its lower end, which is funnel-shaped, opens toward one side, so as to present itself toward the wind. This opening may have a horizontal division-plate, A^2, to insure the more equal distribution of the current of air passing through the cowl by compelling the air which enters beneath the division-plate to pass up behind the inner tube B. The upper end of the said cylinder is bent over toward the opposite side, the opening being in the direction in which the wind is blowing. The inner tube B is straight and vertical, and passes up into the outer tube A a certain distance, as described in reference to the horizontal cowl. The same letters of reference apply to the different parts of this cowl, and the proportions of its parts are the same as before described in reference to Fig. 1, so that further description is unnecessary.

The valve which I use in combination with either form of cowl is represented at G. It consists of a chamber, G, into which the air pipe or shaft is led, and from which the tube E rises, as shown. The under side of this chamber, into which the air-pipe is led, is inclined obliquely at an angle of about fifty-five degrees, and upon it rests a plate of mica, H, or other light material, which is placed loosely in the chamber G without being attached in any way. Its lower end rests in the lower angle of the chamber, and it rises and falls as on a hinge. Being very light, it is raised by the slightest upward current, but falls immediately the upward current ceases, and effectually prevents any down-draft. A stop is provided in the chamber G to prevent the valve H rising to a vertical position to insure its falling by its own gravity immediately the upward current ceases. At the back of the chamber G is a hinged door for easy inspection, &c., and below it, at the point at which the valve of mica or other material rests, are openings into a dust-receiver, M, from which any dust which may accumulate can be readily removed.

Having thus described my invention, what I claim as new is—

The improved combined ventilating apparatus consisting of a cowl constructed and proportioned as herein specified, in combination with a valve for preventing down-draft, constructed substantially as described.

The above specification of my invention signed by me this 21st day of July, 1876.

EDWARD GREGSON BANNER.

Witnesses:

WILMER M. HARRIS,

JOHN DEAN,

Both of No. 17 *Gracechurch street, London, E. C.*