

P. R. JORDAN.
 VENTILATOR APPARATUS.
 APPLICATION FILED AUG. 31, 1918.

1,394,735.

Patented Oct. 25, 1921.

Fig. 1.

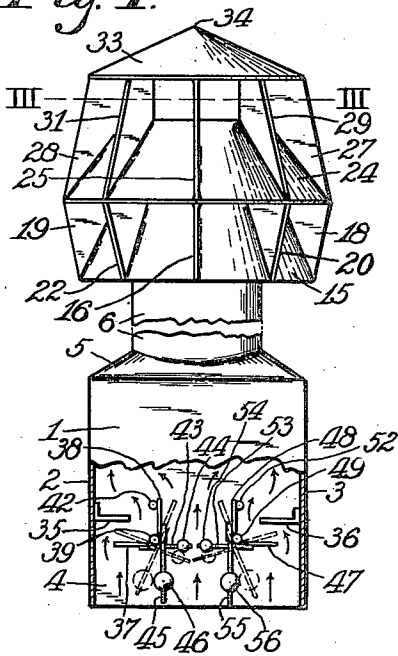


Fig. 2.

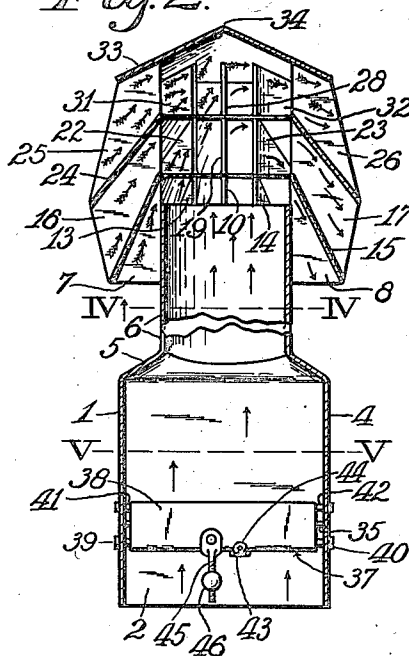


Fig. 3.

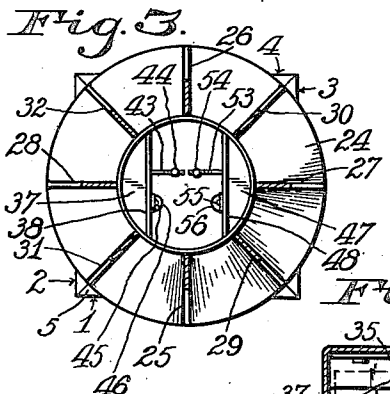


Fig. 4.

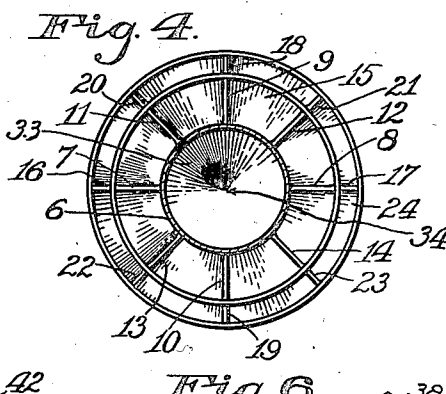


Fig. 5.

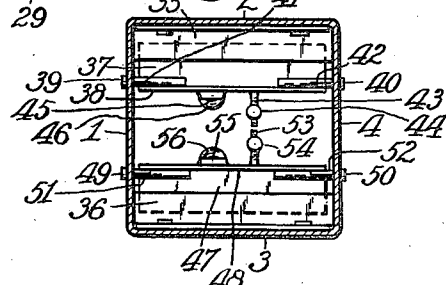
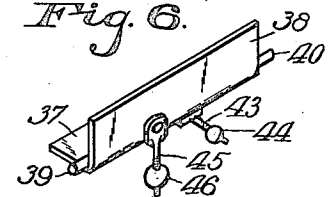


Fig. 6.



WITNESS:

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UNITED STATES PATENT OFFICE.

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VENTILATOR APPARATUS.

1,394,735.

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Application filed August 31, 1918. Serial No. 252,246.

To all whom it may concern:

Be it known that I, PAUL R. JORDAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Ventilator Apparatus, of which the following is a specification, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This invention relates to means for ventilating buildings and has reference more particularly to apparatus whereby the natural atmospheric air currents are taken advantage of to insure circulation of air through the building, or by which the flow of air from the building is accelerated, and the flow of air modified or regulated automatically under various or varying conditions.

An object of the invention is to provide ventilator apparatus which shall be so constructed as to be highly efficient in removing foul air from a building, and which shall be of simple and reliable construction and yet permit of manufacture at low cost.

Another object is to provide an improved and simple top for ventilator flues which shall be adapted to induce draft through the flue and at the same time exclude rain and snow from the flue, and to also prevent back draft.

A further object is to provide an improved regulator for the flow of air through the ventilator flue that shall be so constructed as to automatically operate while the pressure of the passing air varies as the square of its velocity, and not operate unreliably as do plain valves which are liable to close too much as velocity increases and not in proportion to the increased velocity of passing air, a particular aim being to obtain a very high velocity or strong draft through the ventilator flue to insure thorough ventilation under adverse conditions, and at the same time automatically regulate the flow of air through the flue to prevent unnecessarily strong or rapid flow under the more favorable conditions for natural draft.

With the above-mentioned and other objects in view the invention consists in an improved ventilator top or cowl of the ejector type, and also in an improved balanced regulator adapted to automatically act under the influence of air flowing through the flue and

to be adjusted to various requirements imposed by different conditions in a building affected by more or less quantity of air admitted to the building; and, the invention consists also further in the parts and combinations and arrangements of parts as hereinafter particularly described and further set forth in the accompanying claims.

Referring to the drawings,—

Figure 1 is an elevation of the improved ventilator appliance, partially broken away; Fig. 2 is a central vertical section of the ventilator appliance; Fig. 3 is a section approximately on the line III—III in Fig. 1; Fig. 4 is a section on the line IV—IV in Fig. 2 looking upward; Fig. 5 is a section on the plane of the line V—V in Fig. 2; and, Fig. 6 is a perspective view of the improved regulator valve.

Similar reference characters on the different figures of the drawings indicate corresponding elements or features of construction herein referred to.

In practically carrying out the objects of the invention a suitable flue or duct is provided which may vary in length to suit requirements, a common form comprising a base portion which is preferably rectangular in cross section so as to have vertical sides 1, 2, 3, and 4, the base portion being open at its bottom so that it may be connected with the roof of a building or with a duct in the building extending up to the roof. The base has a tapering neck thereon from which extends a hollow cylindrical flue portion 6 to constitute a ventilator stem. A ventilator nozzle is arranged at the top of the stem and comprises vertical partitions radially arranged on and secured to the exterior of the stem, there being preferably 8 partitions 7, 8, 9, 10, 11, 12, 13 and 14 on the outer edges of which a nozzle shell or tube 15 is secured, the shell being in the form of the frustum of a cone, the smaller end of which is arranged above the top of the stem 6 and being approximately equal to the diameter of the stem, the larger portion of the shell extending downward and flaringly about the exterior of the stem. Preferably a second nozzle is provided and comprises a suitable number of partitions 16, 17, 18, 19, 20, 21, 22 and 23 that are secured to the exterior of the shell 15 in radial arrangement and extend upward therefrom, a nozzle shell 24 being secured upon the upper edges

of the partition, the shell 24 having a different degree of conical taper from that of the shell 15. A suitable number of partitions 25, 26, 27, 28, 29, 30, 31 and 32 are secured radially upon the shell 24 and extend upward therefrom, a conical cap 33 being secured to the upper edges of the partitions so that the apex 34 of the cap shall be central relatively to the stem 6 and the shells. The degree of taper or inclination of each of the shells is different from the other one and from that of the cap, the upper one of the shells being more obtuse than the lower shell, the cap being more obtuse angled than the upper shell, so that the ejectors shall focus or tend to direct the air current from the stem 6 toward the apex 34 of the cap which forms the geometrical apex of the cones of the several ejector shells.

Within the flue or duct at a suitable point the appliances are arranged for modifying the air current which may be induced by reason of the construction of the ejector device. Preferably the regulator comprises two regulating valves which are so constructed and arranged as to divide the interior of the flue into a plurality of passage-ways, two of the passage-ways having each a baffle plate therein, one baffle plate 35 being secured to the side 2 of the base portion of the flue or duct, another baffle plate 36 being secured to the opposite side 3 of the base, both baffle plates extending from the side 1 to the opposite side 4 of the base. The two valves are of similar construction but oppositely arranged, one of the valves comprising a wing 37 and a wing 38 arranged at right angles each to the other and provided with trunnions 39 and 40 which are mounted in the side 1 and 4, the sides being provided with stop studs 41 and 42 respectively that are arranged to prevent the wing 38 from being moved from the vertical over toward the baffle plate 35, the trunnions being so located as to be a suitable distance below and beyond the baffle plate and permit the wing 37 to swing up to the under side of the baffle plate or to normally extend horizontally below the plate. A rod 43 is secured to the valve and has a counter-weight 44 adjustably arranged thereon to counter-balance the wing 37 of the valve. Another rod 45 is secured also to the valve and has a relatively heavier weight 46 connected thereto to counter-balance the wing 38 of the valve. The companion valve comprises relatively angular wings 47 and 48 and is provided with trunnions 49 and 50 mounted in the sides 1 and 4 of the base, so as to be on one and the same horizontal plane with the trunnions 39 and 40, and to support the wing 47 below the baffle plate 36 with the wing 48 extended upward to engage stop studs 51 and

52 secured to the sides of the base to prevent the wing 48 from being moved from the vertical over toward the plate 36. So arranged a passage-way is provided between each valve and the opposite side of the base and another passage-way between the two valves. The valve wing 47 is provided with a rod or arm 53 which has a counter-weight 54 adjustably arranged thereon, the wing 48 being provided with a rod 55 which has a relatively heavier counter-weight 56 thereon. The counter-balancing weights may be adjusted during installation of the apparatus so that the pressures under which the valves should operate may be conformable to the existing condition. The weights counter-balancing the horizontal wings of the valves will effect low velocity movement of air, the weights counter-balancing the vertical wings being designed to effect high velocity movements; so that a condition involving seepage of air into the building or involving any other variation in intake or exhaust of air may be provided for to suit the existing conditions. One of the angle valves and its correlated baffle plate may in some cases be omitted.

In practical use the atmospheric air currents may enter the stationary ejector top of the ventilator flue from any direction and pass out from the opposite side of the top, for example as indicated by feathered arrows in Fig. 2, the air current from the flue being indicated by plain darts. As the air currents enter the tubes on the windward side and pass out the opposite side ejector impulses are given to the air coming up out of the flue, and the suction resultingly draws the air out through the leeward side of the top, causing a steady and accelerated suction in the flue. This construction is such as to insure impulses in every case in the same direction as the natural flow of the flue air, thereby giving the maximum of impulses without any eddying tendencies, which is accomplished by having all the lines of all the cones and all partitions or baffles focused on the common point or apex 34. The foul air passes through the three passage ways in the flue and the current is automatically regulated by the two angled valves. The valve wings remain in neutral position until the pressure under the valves 37 and 47, due to increased velocity of current, swing upward toward the baffle plates and partially cut off the flow of air, while the wings 38 and 48 swing each toward the other and partially cut off the flow; but as the vertical wings swing closer together the air pressure on them becomes greater and offsets the tendency of the valves to close too quickly or too much under the increased pressure. Thus the atmospheric air currents are utilized to cause rapid and uniform

movement of foul air under regulation upward and out of the ventilating flue while overcoming tendency to back draft in case of such tendency existing.

5 Having thus described the invention, what is claimed as new is—

1. A ventilator apparatus including a vertical draft flue, two separate baffle plates horizontally arranged stationarily in the flue on one and the same plane at its opposite sides respectively, and two regulating valves spaced apart and pivotally supported in the flue at two other side portions thereof and below the plane of the baffle plates, the valves being adapted to automatically cooperate each with the other and with the baffle plates respectively to variably limit the draft area between the valves and also between the valves and the respective baffle plates.

2. In a ventilator apparatus, the combination of a flue having a base comprising four vertical straight side portions, a baffle plate fixedly secured to the inner side of one of said side portions and extending therefrom, a valve comprising two trunnions rotatively supported by two other opposite ones of said side portions below the plane of said baffle plate and beyond the end of the plate, a wing connected with the trunnions and extending below said plate approximately horizontally, a wing connected with the

trunnions and extending upward past the end of said baffle plate at a distance therefrom, and a weight device connected with said wings to yieldingly hold them in their respective positions.

3. In a ventilator apparatus, the combination of an upright flue comprising a base portion, two baffle plates arranged on one and the same plane in said base portion and fixedly secured separately to opposite portions respectively of the wall of the flue, two valves spaced apart oppositely in said base portion and having trunnions supported by other opposite portions of the wall of the flue on one and the same horizontal plane which is below the plane of said plates, the trunnions being located beyond the ends of said plates, each of said valves comprising a wing extending from the trunnions and below the adjacent one of said plates and a wing extending upward past the end of the plate, two weight devices on said valves respectively and extending each toward the opposite valve, and two relatively heavier weight devices on the said valves respectively and extending downward therefrom.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL R. JORDAN.

Witnesses:

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