

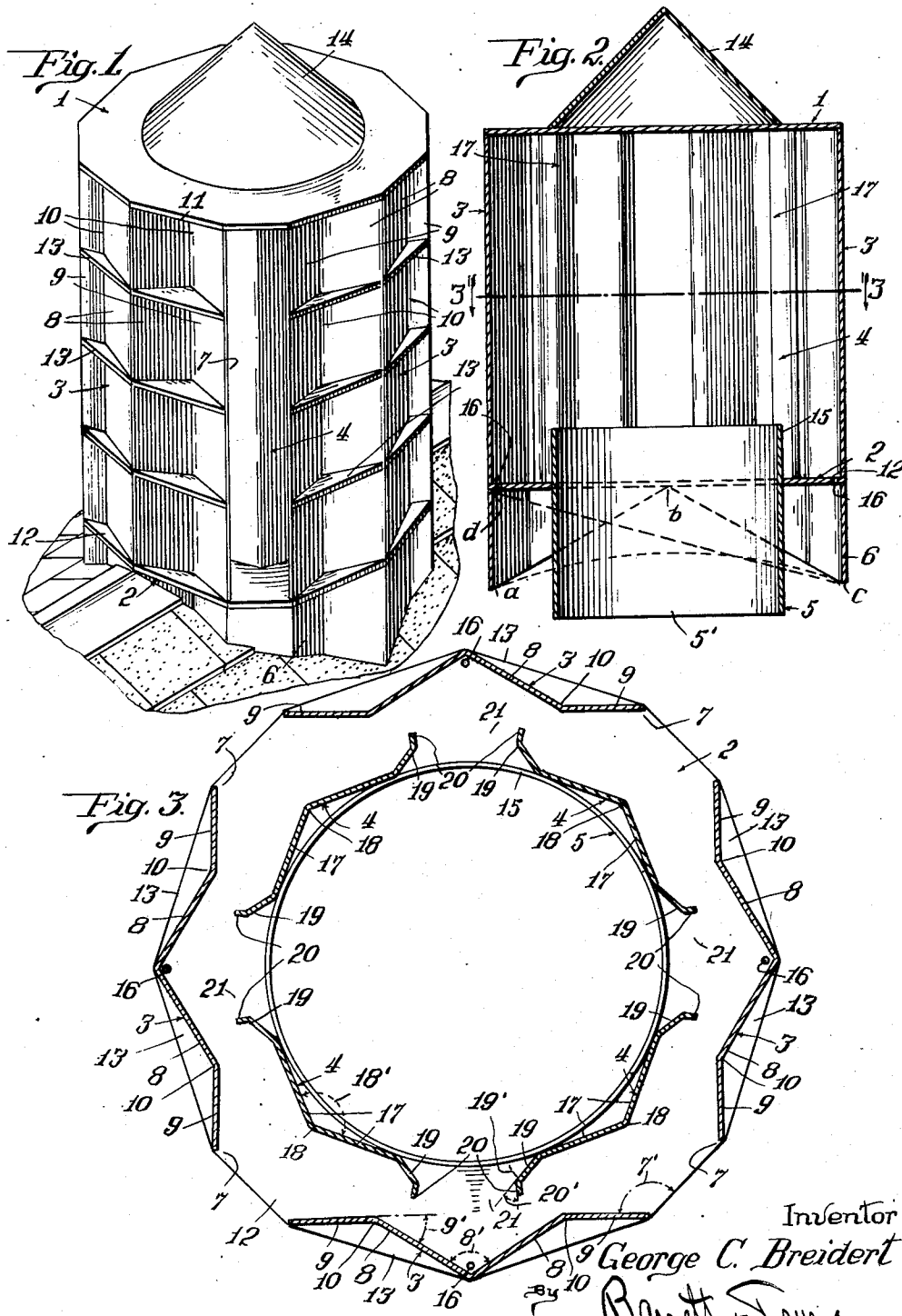
Jan. 13, 1942.

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2,269,428

VENTILATOR

Filed June 19, 1940



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UNITED STATES PATENT OFFICE

2,269,428

VENTILATOR

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Application June 19, 1940, Serial No. 341,325

6 Claims. (Cl. 98—66)

This invention is directed to new and useful improvements in ventilators of the type used in exhausting fumes and foul air from buildings.

Ventilators of this type are adapted to be positioned on the roof of a building and are joined with conduits leading through the roof to the space to be ventilated. Movement of the outside air is utilized to create a draft or suction in the conduit to remove the fumes from the space to be ventilated to the outside air.

This invention is directed to improvements in this kind of ventilator whereby due to the novel arrangement and configuration of the parts of the ventilator more efficient ventilation is obtained at all times.

The primary object of this invention is to provide a new ventilator so shaped that a stronger up-draft is caused by movement of the outer air striking the ventilator from any direction so as to more rapidly remove the foul air and fumes from the space being ventilated.

Another object of this invention is to provide such a ventilator so formed that down drafts cannot occur thus preventing rain, smoke, outside fumes and the like from entering the building through the ventilator.

Still another object is to provide such a construction that may be easily and inexpensively made.

A still further object is to provide a ventilator having the above stated features and advantages but likewise possessing a desirable outer appearance so that when added to or included in a building it shall not detract from the appearance of the building.

Other objects and advantages will become apparent from the following detailed description.

In the drawing:

Fig. 1 is a perspective view of a ventilator embodying the present invention, installed on the ridge of a sloping roof.

Fig. 2 is a vertical section view of such a ventilator.

Fig. 3 is a horizontal section view, somewhat enlarged, taken through line 3—3 of Fig. 2.

The ventilator comprises a top 1, a bottom 2, outer side pieces 3, inner baffle members 4, a collar 5, and a skirt 6. The top 1 and bottom 2 are of polygonal shape in plan view and are joined together by the four side pieces 3 which are positioned equidistant around the peripheries of the top and bottom members to form four exits 7 of equal size and shape and spaced equidistant around the ventilator. Each of the side members 3 is formed to provide a central external

V-shaped bulge portion 8 and substantially parallel outwardly pointing lateral deflecting portions 9 which with the bulge 8 form inwardly extending angular pockets 10 on each side of each exit 7. The sides of the V-shaped bulge part 8 extend outwardly at an angle of about 30° from the plane of the lateral portions 9, as shown at 9' and thus meet at a relative angle of 120°, see 8'. The top 1 and bottom 2 extend from the vertex of the V-shaped bulge to the corners of the portions 9 to form horizontal baffles 11 and 12 respectively. A plurality of similar horizontal baffle members 13 are positioned between the top and bottom across the pockets 10.

The central part of top 1 is cone-shaped as shown at 14 and it has been found that the size and shape of this cone portion is important to the efficient operation of the ventilator. The preferred dimensions of this cone are that its height should be about one-half its diameter and that its slant height, the distance from base to vertex, should be equal to the sum of the width of one leg of the V-shaped bulge portion 8 and the width of one edge portion 9, or one-half the total width of one side portion 3.

The cylindrical collar 5 is secured to and is positioned through bottom 2 and extends a short distance up into the ventilators as shown at 15 in Fig. 2. It extends downwardly below the bottom of the ventilator for attachment to a suitable conduit leading to the space to be ventilated forming entrance 5'.

The relative angles, dimensions and capacities are of great importance in constructing an efficient ventilator of this type so that adequate and unhindered ventilation is obtained and choking prevented. In this connection it should be noted that the effective height of the ventilator, that is the distance from top 1 to bottom 2, should be, preferably, one and one-half times the diameter of collar 5. In other words, if the collar diameter is twenty-four inches then the distance between top 1 and bottom 2 should be thirty-six inches. Furthermore the width of each exit 7 should be not less than one-quarter of the diameter of the collar 5 and preferably the total area of all four exits 7 should be one and one-half to two times the area of the entrance formed by the collar 5. For example if the diameter of collar 5 is twenty-four inches the width of each exit 7 should be not less than six inches. With the given height of thirty-six inches the total area of one exit would be two hundred and sixteen square inches and for all four exits would be eight hundred and sixty-four square inches. With the diameter

of collar 5 at twenty-four inches, the area of the entrance formed by collar 5 would be approximately four hundred and fifty-two and one-half square inches. Thus the total area of the exits 7 which is 864 square inches is well within the limits of being one and one-half to two times 452½ square inches, the area of the collar 5.

The side pieces 3 hereinbefore described are secured to the top 1 and bottom 2 and are each positioned with the vertex of the V-shaped bulge portion 8 and the corners of lateral portions 9 on the perimeters of the top and bottom pieces. The bulge being shaped as described the lateral portions 9 will, in plan view, intersect a line drawn across entrances 7 at angles of 135° as shown at 7'.

Small drain openings 16 may be positioned in bottom 2 adjacent the apex of bulge portions 8 to permit water drainage should same be driven in the ventilator or if it is not installed in a level position.

Positioned opposite each exit 7, spaced inwardly from side pieces 3 and extending from top 1 to bottom 2 are four inner baffle members 17 which are spaced equidistant around the upwardly extending portion of collar 5. Each baffle member 17 comprises an outwardly extending V-shaped bulge portion 18, outwardly pointing lateral portions 19 and deflector tips 20.

These baffle members 17 are each of such width that the exits 21, between tips 20 of adjacent members are of the same width as the exits 7 and of course the height of the exits are the same.

The shortest distance between the deflector tips 20 and side pieces 3 is not less than one-half the width of exits 7. This is necessary to insure unobstructed movement of air from the collar 5 out of the ventilator. There are four exits 21 and for each exit there are two passageways leading to exits 7. Thus by making the narrowest width of these passageways not less than one-half the width of exits 21 there can be no choking or compressing of the air moving out through the ventilator. Thus all openings are balanced and it has been found that when a ventilator is so constructed smoke moving upwardly through collar 5 emerges equally from all exits of the ventilator.

The vertices of bulge portions 18 should be positioned a distance from the exits or openings 7 equal to the width of openings 7. The bulge portions 18 form obtuse angles of about 135° as at 18' and the lateral portions 19 extend outwardly at angles of about 60° relative to a line drawn across the widest part of exits 21 as at 19'.

Deflector tips 20 bend outwardly from lateral portions 19 at about 45° angles as shown at 20' and aid materially in increasing the suction or up-draft in the ventilator by creating a sharp resistance to currents of air to deflect them away from exits 21. They also aid materially in keeping rain from blowing in exits 21.

The skirt 6 is an important part of the ventilator unit for it increases its operativeness and adds to its appearance. The skirt 6 is shaped to conform with the outer configuration of side members 3 and extends below bottom 2 in alignment with members 3 as shown in Fig. 1 and is shaped to conform to the pitch of the roof on which the ventilator is to be positioned. Fig. 2 illustrates by lines a, b, c the form taken by a skirt to fit the ridge of a peaked roof and line d, c illustrates the form the skirt will take when the ventilator is to be installed on the side of

a sloping roof. Likewise the curve a, c shows the form it will take if it is to be positioned on an arched roof.

The skirt prevents the packing or choking of wind currents under the ventilator which would materially interfere with its efficient operation. It further gives the ventilator a greater wind resisting surface so shaped as to create a suction at the exits. The greater such a surface the greater the suction.

Furthermore the skirt causes the ventilator to blend in with the building so that its appearance is greatly improved and in addition obviates the necessity of a base and extra collar.

Thus is produced a ventilator which as a unit will effectively and automatically exhaust the fumes and odors from the space ventilated by the movement of the outside air and which due to its construction will prevent down-drafts and the entry of rain, snow, and the like.

The shapes of the various parts, the size of the openings, the relative angles and relative position of the parts all work to the improved results obtained.

The outer conformation of the side pieces 3 is such that an impinging breeze will be deflected in such a manner as to move past exits 7 to create a suction or upward draft through the ventilator. The horizontal baffles 11, 12 and 13 will break up air currents moving up or down when they strike the ventilator to direct them across the exits 7 to increase the velocity of the air moving across the exits with the resultant increase in up-draft in the ventilator.

The cone shaped top is so proportioned as to deflect downwardly moving air across the exits 7 to add to the suction thus produced.

The skirt prevents pocketing of air under the ventilator and increases the up-draft by adding to the wind resisting surface of the ventilator.

The balancing of the areas of exits 7 and 21 and the air passageways between the inner baffles 17 and side pieces 3 as well as the definite relationship between the area of the exits and the collar 5 all add together to produce the improved ventilator herein described.

It is obvious that if desired a damper of any type can be installed in the collar 5 or in the conduit leading to the collar and likewise that if increased exhaust volume is desired a fan can be installed in the collar or conduit to increase the up-draft and capacity of the ventilator.

It has been found that the efficiency of ventilators constructed in accordance with this invention increases in direct proportion with the size. The greater the wind resisting area the greater the suction of up-draft obtained.

I claim:

1. A ventilator comprising a top provided with a cone shaped upper surface, a bottom, spaced side pieces extending between the top and bottom adjacent their perimeters to form outer exits, each of said side pieces formed to provide a central outwardly extending bulge portion and deflecting lateral portions forming pockets at each side of each exit, horizontal baffle members extending across the pockets so formed, a collar leading through the bottom to form an entrance to the ventilator, baffle members extending between top and bottom opposite said outer exits and around and adjacent the collar and spaced to form inner exits opposite the central bulge portions of the side pieces, each of said baffle members formed with a central bulge portion positioned opposite the outer exits, two outwardly

extending lateral portions and deflector tips, the inner exits being of about the same area as the outer exits and the total area of the outer exits being greater than the area of the entrance formed by the collar.

2. A ventilator comprising a top provided with a cone shaped upper surface, a bottom, spaced side pieces extending between the top and bottom adjacent their perimeters to form outer exits, each of said side pieces formed to provide a central outwardly extending bulge portion and deflecting lateral portions forming pockets at each side of each exit, horizontal baffle members extending across the pockets so formed, a collar leading through the bottom to form an entrance to the ventilator, baffle members extending between top and bottom opposite said outer exits and around and adjacent the collar and spaced to form inner exits opposite the central bulge portions of the side pieces, each of said baffle members formed with a central bulge portion positioned opposite the outer exits, two outwardly extending lateral portions and deflector tips, the inner exits being of about the same area as the outer exits and the total area of the outer exits being greater than the area of the entrance formed by the collar, and a skirt extending downwardly from the outer edges of the bottom and following substantially the conformation of the side pieces and terminating in a shape to conform to the pitch of the roof where the ventilator is to be positioned.

3. A ventilator comprising a top and a bottom, spaced side pieces extending between the top and the bottom to form outer exits, said side pieces formed to provide concave pockets, horizontal baffle members extending across the pockets so formed, said bottom provided with an opening forming an air entrance, baffle members extending between the top and bottom opposite said outer exits and spaced to form inner exits opposite the central portions of the side pieces, said baffle members formed with deflector tips, the inner exits being of about the same area as the outer exits and the total area of the outer exits being greater than the area of the air entrance.

4. A ventilator comprising a top provided with a cone shaped upper surface, a bottom, spaced side pieces extending between the top and bottom to form outer exits, said side pieces formed to

provide pockets near the exits, horizontal baffle members extending across the pockets, a collar leading through the bottom to form an entrance to the ventilator, baffle members extending between top and bottom opposite said outer exits and spaced to form inner exits opposite the central portions of the side pieces, the inner exits being of about the same area as the outer exits and the total area of the outer exits being greater than the area of the entrance formed by the collar.

5. A ventilator comprising a top provided with a conical upper surface, a bottom, four spaced side pieces extending between the top and bottom adjacent their perimeters to form four outer exits, each of said side pieces formed to provide a central outwardly extending bulge portion and deflecting lateral portions forming pockets at each side of each exit, horizontal baffle members extending across the pockets so formed, a collar leading through the bottom to form an entrance to the ventilator, four baffle members extending between top and bottom opposite said outer exits and spaced from each other and from said side pieces to form four inner exits of about the same size as the four outer exits, the total area of the outer exits being greater than the area of the entrance formed by the collar, and a skirt extending downwardly from the outer edge of the bottom and terminating in a shape to conform to the pitch of the roof where the ventilator is to be positioned.

6. A ventilator comprising a top and bottom, spaced side pieces extending between the top and bottom adjacent their perimeters to form outer exits, said side pieces formed to provide pockets on their outer faces, horizontal baffle members extending across the side pieces, said bottom provided with an opening forming an entrance to the ventilator, spaced baffle members extending between the top and bottom and spaced inwardly from the side pieces and positioned opposite the outer exits to form inner exits, the inner exits being about the same size as the outer exits, the total area of the outer exits being greater than the area of the entrance to the ventilator, the spaced baffle members being spaced from the side pieces a distance not less than one-half the width of the exit.

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