Dec. 11, 1928. 1,695,002

S. A. XIPPAS

ELECTRIC FAN

Filed Nov. 29, 1926 2 Sheets-Sheet 1

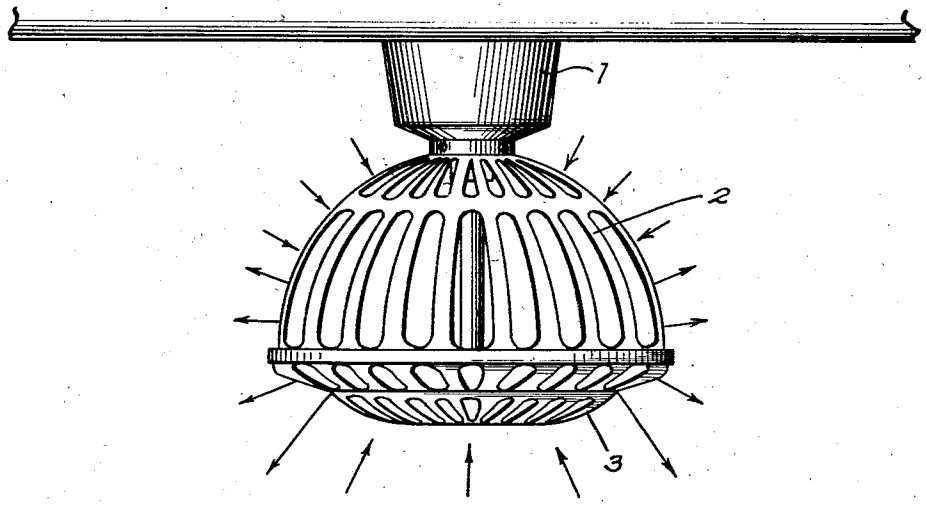


Fig. 1.

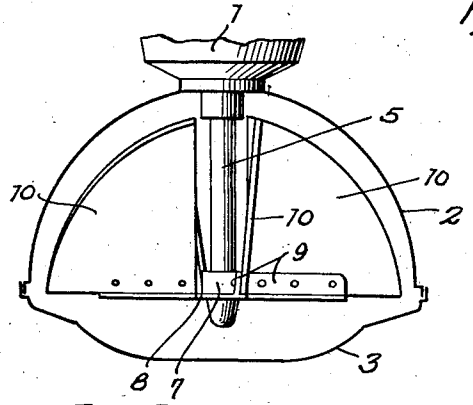


Fig. 2.

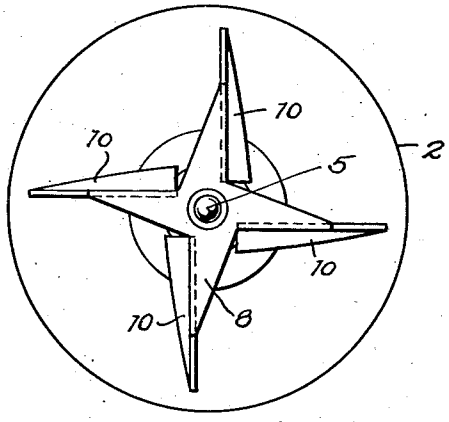


Fig. 3.

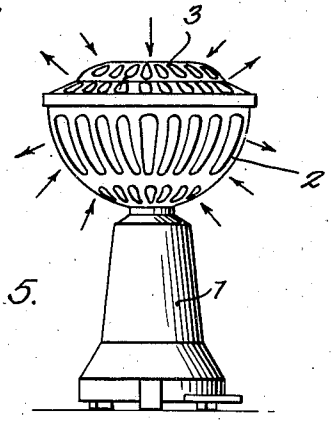


Fig. 5.

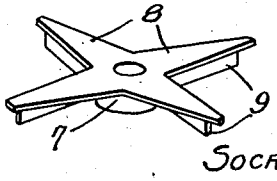


Fig. 4.

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Dec. 11, 1928.

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1,695,002

ELECTRIC FAN

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2 Sheets-Sheet 2

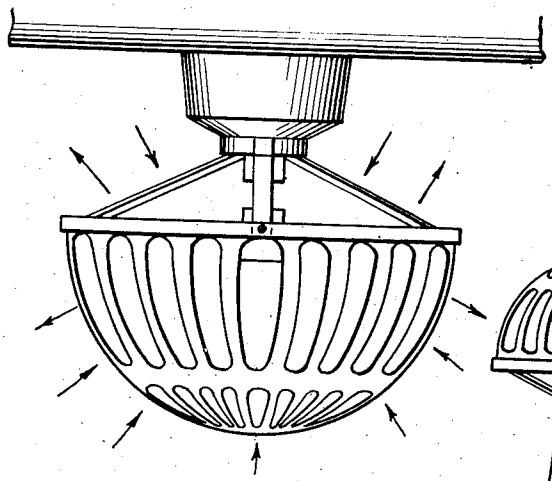


Fig. 6.

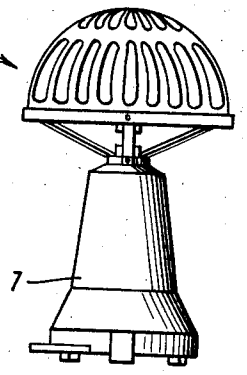


Fig. 9.

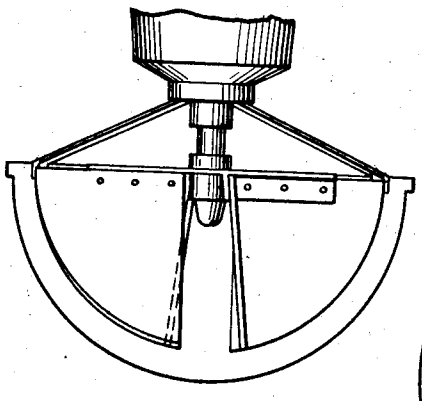


Fig. 7.

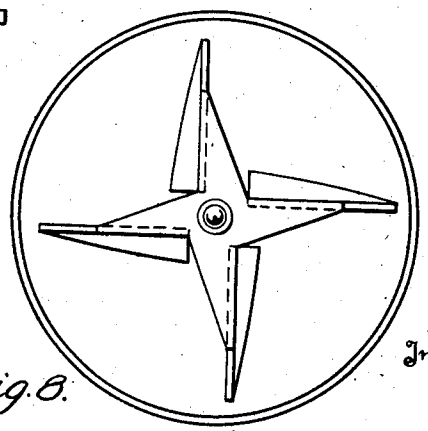


Fig. 8.

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Patented Dec. 11, 1928. 1,695,002

UNITED STATES PATENT OFFICE.

SOCRATES A. XIPPAS, OF PITTSBURGH, PENNSYLVANIA.

ELECTRIC FAN.

Application filed November 29, 1926. Serial No. 151,427.

This invention relates to improvements in vertical fans of the general type shown and described in Reissue Patent No. 71,453 and Patent No. 1,577,280.

The main object of this invention is to alter the construction of the vertical fans shown in the above patents whereby a more compact assembly is provided such as may be more suitable to application to walls and ceilings and for use in railway cars, coaches, Pullman cars, boats, and other public conveyances.

The foregoing is produced by arranging the blades all within one half of a sphere, the blades being in quadrant form and being pitched to secure the desired ventilating result, i. e., a two direction suction and a central annular discharge.

The present assemblies are enclosed as in prior structures in safety cages which eliminate the possibility of injury to persons or to the fan elements.

Other features and objects will more clearly hereinafter appear by reference to the accompanying specification and drawing, in the latter of which similar characters of reference designate corresponding parts throughout the several views, in which—

Figure 1 is a side elevation of one form of the invention in position on a wall or ceiling.

Figure 2 is a side elevation with the cage in section to show the fan blades.

Figure 3 is a plan view of the fan with the cage shown diagrammatically.

Figure 4 is a perspective of the spider or fan blades carrier.

Figure 5 is a side elevation showing the assembly on a standard base.

Figure 6 is a side elevation of another form supported from a wall or ceiling.

Figure 7 is an elevation with the cage in section.

Figure 8 is a plan view of the blades and

Figure 9 is a side elevation of the latter form on a standard base.

The base or stand of both forms of fans shown are substantially identical in form being designed mainly to enclose the motor and support the fan elements and cage. In Figures 1 and 6 the base or supports are shown extending into the wall or ceiling and in Figures 5 and 9 the form is standard for resting on any convenient stand. Reference character 1 indicates this base and 2 the spherical section of the cage which may be completely enclosed as by end section 3. The section 3, or in fact the entire assembly may be of mesh in lieu of the perforated sheet metal arrangement shown.

The motor and motor mounting is substantially the same as in the prior patents, the motor shaft 5 extending into the cage to carry the fan assembly. In the fan illustrated in Figures 1 to 5 the shaft 5 extends to a point close to the upper end of the cage as in this form the fan blades extend inwardly. In the form shown in Figures 6 to 9 inclusive the fan shaft 5 terminates just without the base a sufficient distance to carry the blade supporting element or spider.

Referring now to Figures 1 to 5 inclusive, attention is directed to the spider or fan carrying element. This element includes a hub 7 from which radiates four arms 8 substantially at right angles to each other, each arm being formed with a flange 9 at one edge thereof to which is attached a fan blade. It will be noted that all four flanges extend in the same direction, inwardly, so that when the blades 10 are attached thereto they will revolve in a hemisphere. The blades 10 are each arranged at a pitch reverse to that of the one diametrically opposite and the pitch of the various blades may be changed as found necessary or desirable to produce the necessary or desired velocity.

Referring now to Figure 1 attention is directed to the fact clearly illustrated in the drawings, that air enters the fan cage or casing at the polar zones and is discharged at the medial zone. A co-mingling of the air currents results from the foregoing producing advantageous ventilating qualities.

In that form of fan shown in Figures 6 to 9 inclusive of the drawings the arrangement of the cage and fan blades is practically the reverse to that of Figures 1 to 5. In this form the shaft 5 of the motor extends out of the casing 1 only a sufficient distance to permit the arrangement of the hub of the spider on fan carrying element. This element is identical in this form to that of the previous form and accordingly no additional description is necessary. It will be noted that the spider is arranged on the stub shaft with the flanges extending outwardly which is reverse to the arrangement in the form heretofore described. This arrangement of the spider produces a reverse arrangement of blades i. e., the curved

peripheral edges of the blades are turned outward. The cage for this blade arrangement presents a hemispherical surface.

Obviously the travel and velocity of the air currents is practically identical to the former type inasmuch as the blades are merely reversed as an entirety.

As previously suggested the present development is based on the idea of producing a neat, compact structure such as may be adapted for use in limited spaces or such as may be positioned in a wall or ceiling.

Changes in details of construction, such as the method of bracing, or the construction of the perforated cage, it being obvious to one skilled in the art that such design may be altered to facilitate ventilation or application of the arrangement as may be desired.

What I claim as new and desire to secure by Letters Patent is—

1. In a device of the class described, a rotary impeller and an enclosing casing therefor, said casing having a medial zone and two polar zones of openings therein, said impeller including means whereby the air is drawn into said casing through the openings in the polar zones, and forced toward the medial zone, said impeller means serving to discharge the air through the openings in the medial zone, and including a rotatably mounted support, a series of horizontal arms carried by said support, and a plurality of blades attached to said arms and all extending in a direction to one side of said horizontal arms, the impeller being unbladed at the opposite side of said horizontal arms.

2. In a device of the class described, a rotary impeller, and a hemispherical enclosing casing therefor, said casing having a medial zone and two polar zones of openings therein, said impeller including means whereby the air is drawn into said casing through the openings in the polar zones, and discharged through the openings in the medial zone, said impeller comprising a rotatably mounted support, a series of arms carried by said support, and a plurality of blades attached to said arms and all extending in a direction to one side of said arms, the impeller being unbladed at the opposite side of said arms, and the blades forming the means for drawing the air into and forcing the air out of said casing.

3. In a device of the class described, a rotary impeller, and an enclosing casing therefor, said casing being of substantially hemispherical shape and having a medial zone and two polar zones of openings therein, said impeller including a rotary shaft, horizontal arms carried by the shaft, and blades fixed to the arms and projecting axially in a direction to one side of said horizontal arms, the blades being shaped to draw air into the casing through the openings in the polar zones, and to discharge the same through the openings in the medial zones of the casing, the impeller being unbladed at the opposite side of said arms.

4. In a device of the class described, a rotary shaft, and an impeller on said shaft, comprising blades having portions adapted to force air axially from one end of the impeller toward the opposite end of the same, the portions of the blades at the last mentioned end being shaped to mix the air from the opposite ends of the impeller and to force the air away from said shaft, said impeller including horizontal arms carried by the shaft, the blades being attached to said arms and all extending in a direction to one side of said arms, the impeller being unbladed at the opposite side of said arms.

In testimony whereof I affix my signature.

SOCRATES A. XIPPAS.