Feb. 12, 1929. 1,702,120

P. F. KIMBALL

AIR TURBINE

Filed June 1, 1925 2 Sheets-Sheet 1

Fig. 1.

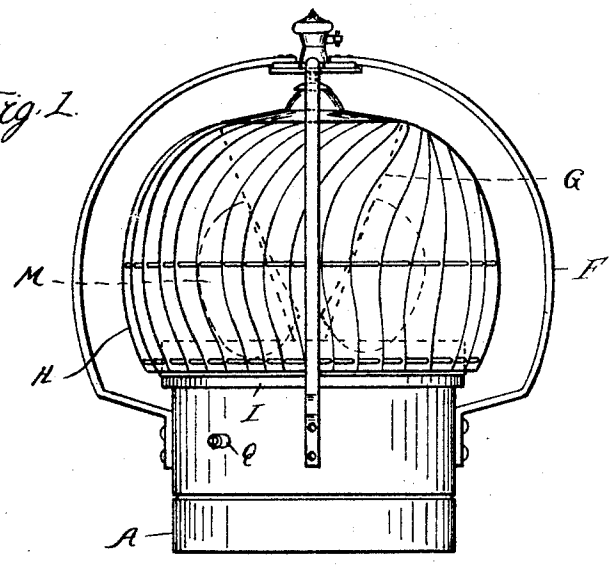
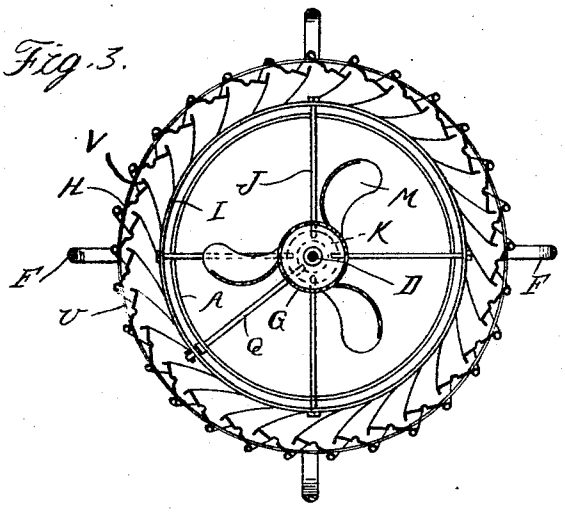



Fig. 3.




Inventor
Perry F. Kimball

By Whittemore Hulbert Whittemore
& Belknap Attorneys

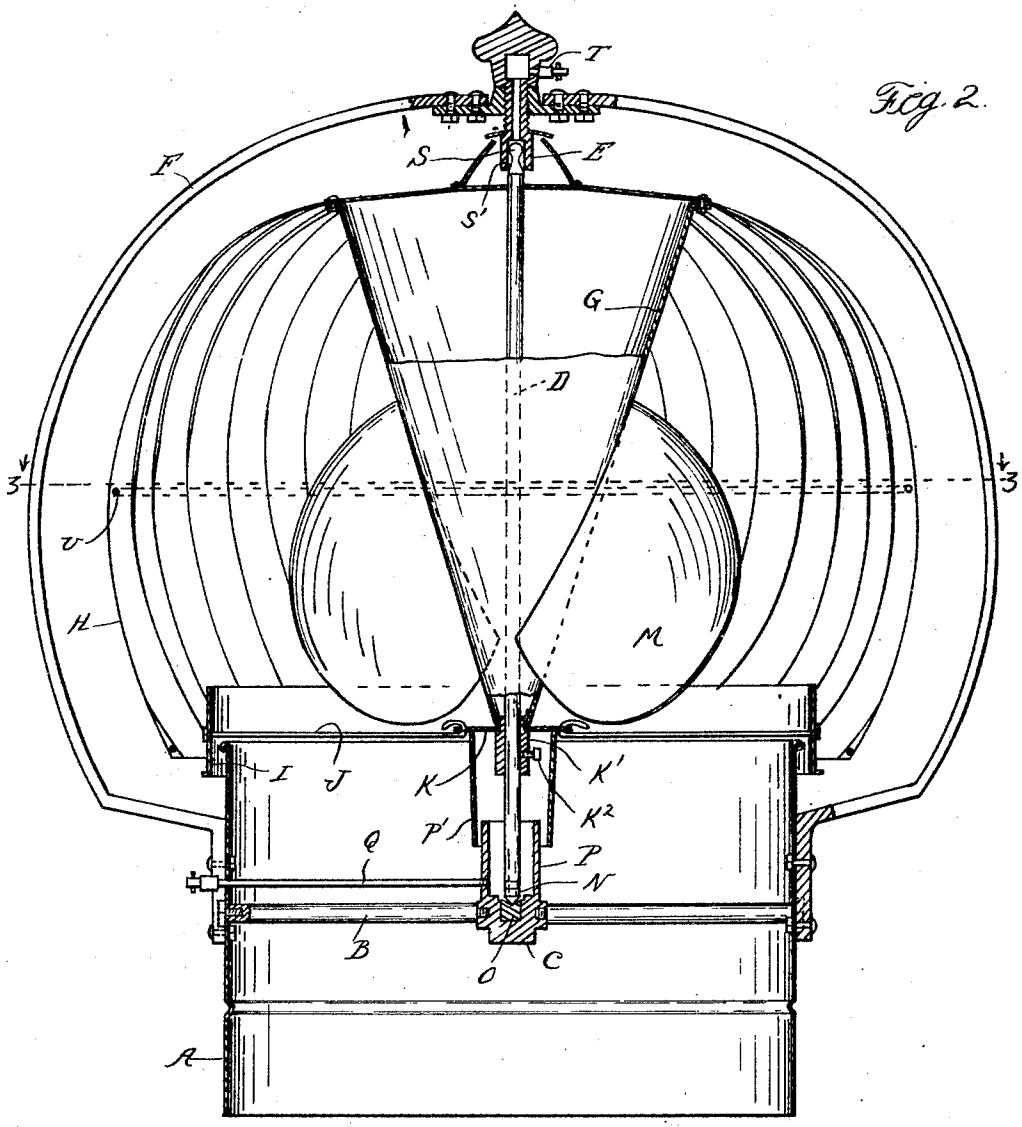
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Fig. 2.




Inventor
Perry F. Kimball

By Whittemore Hulbert Whittemore
& Belknap Attorneys

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# UNITED STATES PATENT OFFICE.

PERRY F. KIMBALL, OF DETROIT, MICHIGAN.

## AIR TURBINE.

Application filed June 1, 1925. Serial No. 34,254.

The invention relates to air turbines of that type in which the action of external air currents will simultaneously revolve the turbine and eject air from within the same. It is the object of the invention to simplify the construction and to increase the efficiency thereof and to this end the invention consists in various features as hereinafter set forth.

In the drawings:

Figure 1 is a side elevation of a turbine.

Figure 2 is a vertical central section therethrough.

Figure 3 is a cross section on the line 3—3 of Figure 2.

A is a base or ventilator flue at the upper end of which my improved turbine is applied. B is a spider within the base for supporting a central thrust bearing C for a vertical spindle D. The upper end of this spindle is journaled in a bearing E which is carried by a plurality of segmental frame bars F attached at their lower ends to the base A. The spindle D has mounted thereon the inverted cone G and to the upper end of this cone are attached spiral blades H which together form a spheroidal rotor or body. The lower ends of the blades are attached to a ring or band I which is of a diameter sufficiently in excess of that of the base A to provide adequate running clearance. This band also overlaps the base A and is connected by the tie rods J with a central anchor plate K supported on the shoulder of a hub member K'. This hub is secured to the spindle D by a set screw $K^2$ and forms the support of the lower end of the cone G. U is a central ring or band secured to the blades.

With the construction as thus far described, air currents flowing across the turbine will operate differentially on the diametrically opposite sides thereof, the blades on one side catching the air current and being propelled thereby to revolve the rotor. Each revolution of the rotor produces a partial vacuum in the wake of the blades with the result that air from within the rotor is ejected outward. This in turn causes an upward draft through the base A which may be used either for increasing the draft of the flue or for ventilating, inducing air circulation or other similar purpose. The inverted cone assists in this effect by deflecting and ejecting the ascending air current radially outward.

To increase the efficiency of the construction I have arranged within the rotor and affixed to the cone G a series of spiral concave blades M. These are so fashioned as to lift and eject the air radially outward so that in cooperation with the blades H a larger volume of air is displaced than with the blades alone.

It is obvious that the efficiency of my device may be further increased by reducing frictional losses to the minimum and this I have accomplished first by supporting the spindle D on a point bearing and second by maintaining both this bearing and the upper bearing well lubricated at all times. The point bearing is preferably formed by a hardened insert N secured to the lower end of the spindle which rests in a conical cup O in the bearing C. Surrounding these parts is an upwardly extending cylindrical housing P mounted on the spindle and connected with a tube Q which extends outward through one wall of the stack providing means for the insertion of lubricant into the bearing. An annular housing P' depending from the anchor plate K overlaps but clears the housing P. At the upper end the bearing E is provided with a cylindrical recess into which the upper end of the spindle projects, said spindle having a spherical head S for loosely fitting said recess. Below this spherical portion the spindle flares outward sufficiently to engage with the lower end of the bearing E in case there is any lifting of the spindle. Valve controlled fittings T are preferably attached to the upper bearing and to the external end of the tube Q so that lubricant under pressure may be injected therein and into the lubricant containing cups.

In operation a very slight wind pressure is sufficient to revolve the rotor and at sufficient velocity to create a suction on all sides thereof. This, as previously stated, will eject the air from within the rotor while the spiral blades M revolving with the rotor will lift, deflect and eject air from the stack. The only frictional contacts are, first the point bearing N at the lower end of the spindle and the ball S engaging the cylindrical bearing E both of these parts being well lubricated. These parts are also the only parts subject to wear and by forming them of hardened metal they can be given a long length of life.

To prevent the entrance of rain through the spaces between the blades, the inner edges of the latter are formed with outwardly extending flanges V. These are insufficient to mate-

rially reduce the open area but serve to interrupt any inward passage of water and to deflect it into the outwardly directed air current.

In case of extreme wind velocities it is desirable to control the rotation of the rotor. This is automatically accomplished by the construction described. Inasmuch as the ejection of air has a slight lifting effect on the rotor this will raise the spindle D until the flaring portion S′ thereof contacts with the bearing E increasing the frictional resistance and thereby slowing the rotation of the rotor.

What I claim as my invention is:

1. In an air turbine the combination with a series of spaced spiral blades forming a spheroidal rotor and an inverted cone arranged centrally within said rotor, of one or more spiral vanes adjacent to said cone for cooperating with said blades in the lifting and ejecting of air.

2. In an air turbine the combination with a series of spaced spirally arranged blades together forming a spheroidal rotor adapted to be revolved by external air currents and slightly lifted by excessive wind velocities, of a spindle having a point bearing at its lower end forming an anti-friction support for the load, a bearing for the upper end of said spindle and a conical portion on said spindle for engaging said bearing on the lifting of the rotor to produce a brake effect for checking the velocity of rotation.

3. In an air turbine, the combination of a series of spaced spiral blades forming a spheroidal rotor, an inverted cone arranged centrally within said rotor, fan blades on said cone, a point bearing depending from the lower extremity of said cone for supporting the load and a bearing at the upper end only of said rotor for holding the same from lateral deflection while premitting vertical lifting thereof.

4. In an air turbine, the combination of a series of spaced spiral blades forming a spheroidal rotor, an inverted cone arranged centrally within said rotor, a point bearing depending from the lower extremity of said cone for supporting the load, a ball at the upper end of said rotor and a cylindrical bearing surrounding said ball and holding the same from lateral movement while permitting vertical lifting of said rotor.

5. In an air turbine the combination of a series of spaced spiral blades forming a spheroidal rotor, an inverted cone arranged centrally within said rotor, a point bearing depending from the lower extremity of said cone for supporting the load, a bearing at the upper end of said rotor for holding the same from lateral deflection while permitting vertical lifting thereof and cooperating surfaces on said bearing and rotor for engaging upon the lifting of the rotor to form a brake.

6. In an air turbine the combination of a series of spaced spiral blades forming a spheroidal rotor, an inverted cone arranged centrally within said rotor, a point bearing depending from the lower extremity of said cone for supporting the load, a shaft projecting upward from said rotor and provided with a spherical end portion and a conical portion, a bearing surrounding the spherical end portion of said shaft and holding the same from lateral movement while permitting vertical lifting thereof, and a conical face on said bearing for engaging the conical portion of said shaft upon the lifting of the latter to form a brake.

In testimony whereof I affix my signature.

PERRY F. KIMBALL.