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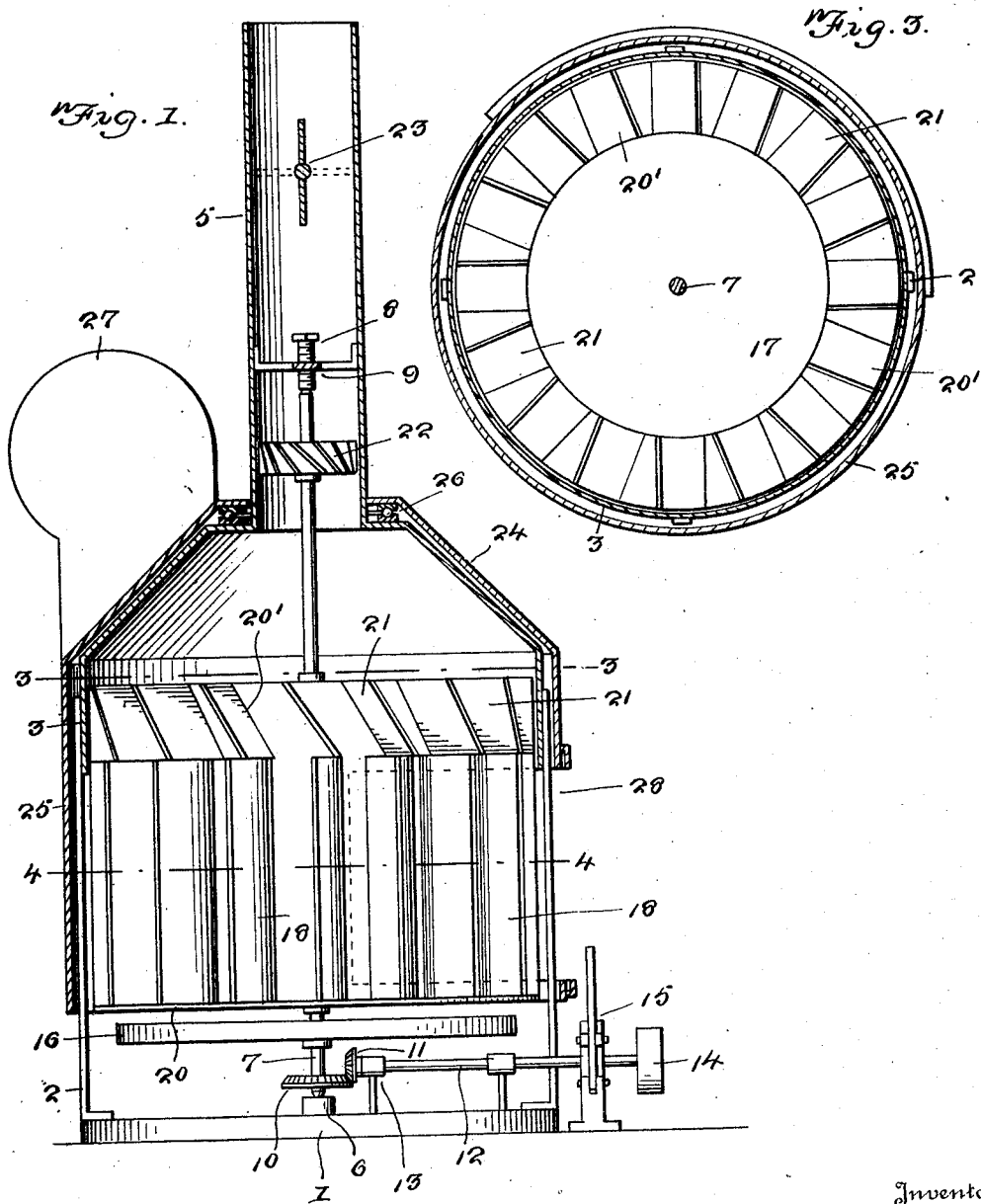
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A. BENDER

WIND AND DRAFT MOTOR

Filed Dec. 23, 1924

2 Sheets-Sheet 1



Inventor
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Attorney

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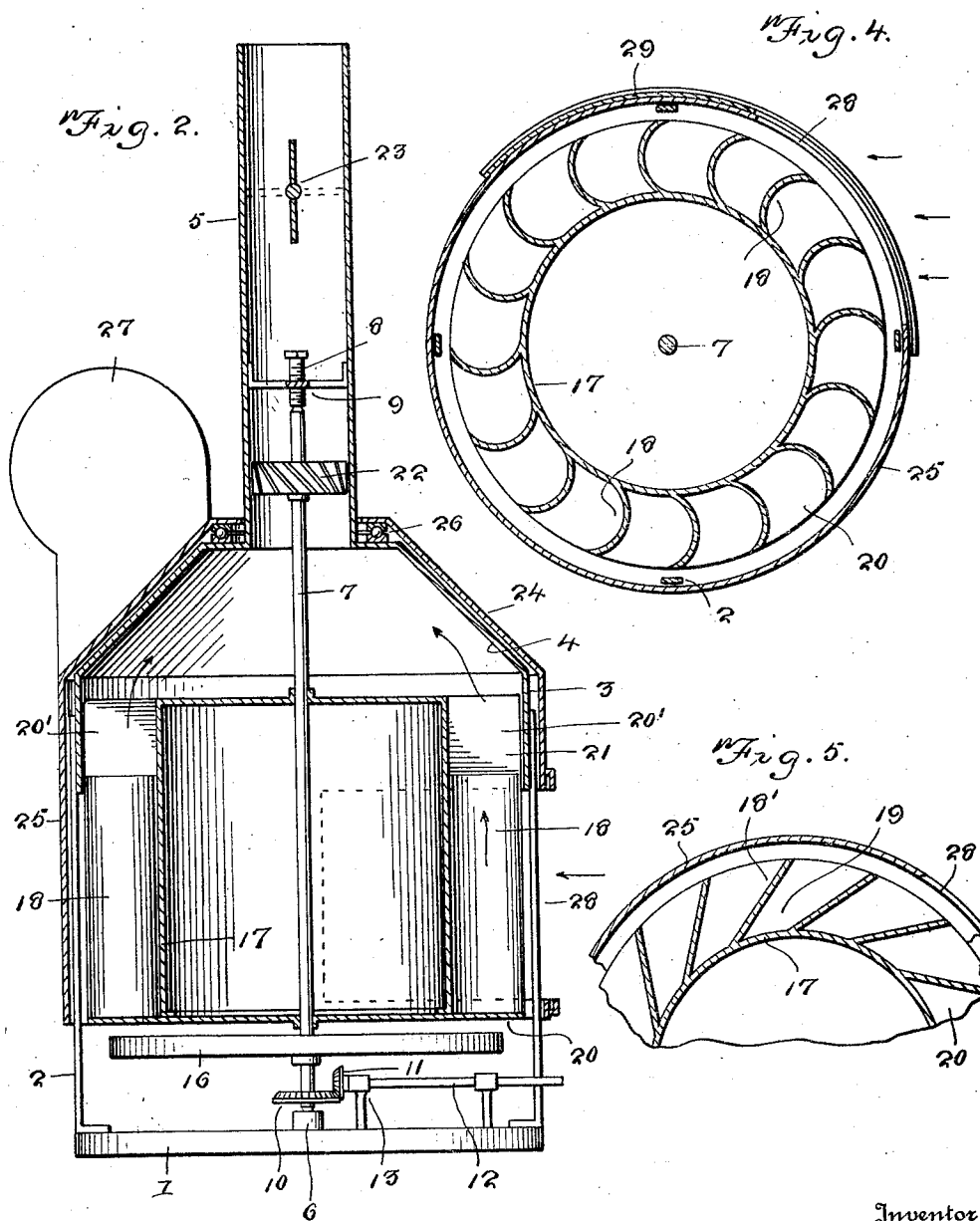
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UNITED STATES PATENT OFFICE.

ANDREW BENDER, OF WASHINGTON, DISTRICT OF COLUMBIA.

WIND AND DRAFT MOTOR.

Application filed December 23, 1924. Serial No. 757,706.

To all whom it may concern:

Be it known that I, ANDREW BENDER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Wind and Draft Motors, of which the following is a specification.

My present invention has reference to an air engine and has for its object to produce a construction whereby outside air and draft created therefrom are utilized for imparting motion to a shaft.

A further object is the provision of an air engine in which outside currents of air are caused to contact with and rotate a propeller having vertically disposed radial blades and to be directed therefrom onto the blades of a propeller of the helical type and from thence directed into a stack in which there is arranged an axial flow propeller designed to be actuated by the currents of air created by the draft through the stack, all of the propellers being secured upon a suitable shaft which is, of course, rotated with the propellers and which is designed to impart motion to a power shaft.

A further object is the provision of an air engine in which both outside air and currents of air directed through a stack are utilized for imparting a continuous movement to a shaft, and in which means is provided for directing the outside air against one of the propellers, means regulating the amount of air contacting such propeller, and means being also provided for regulating the speed of the shaft operated by the propellers.

To the attainment of the above broadly stated objects and others which will appear as the nature of the invention is better understood, the improvement further resides in the novel construction, operative association and arrangement of parts such as is disclosed by the drawings which accompany and which form part of this application and pointed out with particularity in the appended claims.

In the drawings:—

Figure 1 is a side elevation of my improvement, with parts in section.

Figure 2 is an approximately central vertical longitudinal sectional view through the improvement.

Figure 3 is a sectional view on the line 3—3 of Figure 1.

Figure 4 is a sectional view on the line 4—4 of Figure 1.

Figure 5 is a fragmentary sectional view substantially similar to Figure 4 but illustrating a slight modification.

As disclosed by the drawings, I make use of a suitable base 1. On this base I secure a skeleton frame, the same comprising any desired number of spaced uprights 2. On the frame uprights 2, at the outer portions thereof I secure the depending skirt portion 3 of a dome 4. The dome is round in plan and has a flat top provided with a central opening that is surrounded by an outstanding stack 5. On the base 1 there is centrally secured a bearing 6 for one of the conical ends of a vertically disposed shaft 7. The second or upper end of the shaft is journaled in a conical recess in the end of an adjustable bearing 8, the said bearing being preferably in the nature of a threaded element which is screwed through a brace 9 arranged transversely in the stack 5.

On the shaft 5 above the bearing 6 there is fixed a gear wheel 10 that is in mesh with a pinion 11 on one end of a driven shaft 12. The shaft 12 is journaled in suitable bearings 13 supported from the base 1, and has on its outer end a pulley 14 for an endless belt that is designed to be connected to a suitable machine to be driven. The turning of the shaft 12 is regulated by hand operated brake mechanism broadly indicated by the numeral 15.

Above the gear 10 there is fixed on the shaft 7 a fly wheel 16 and above the fly wheel there is fixed on the said shaft 7 the hollow central portion or core 17 of two propellers. The lower propeller has spaced radial blades 18 the planes of which are vertical. These blades are secured to the core 17, and these blades may be concavo-convex in cross section, as illustrated in Figure 4 or the same may be straight, as disclosed in Figure 5. The straight blades, indicated for distinction by the numeral 18', are arranged at outward angles which are differently pitched so as to provide a flared mouth for the pockets 19 provided between each pair of blades. This arrangement is also true with respect to the cross sectionally rounded blades 18, that is, the inner ends thereof are

disposed closer to the tubular core 17 than are the outer ends thereof. In each instance, the lower ends of the blades are secured upon a flange 20 that extends a suitable distance from the sides of the core 17.

The deflector propeller is of a helical type and is broadly indicated by the numeral 20' and is, as previously intimated, formed on the top of the radial propeller. The blades 21 of the helical type propeller are extended from the core 17 in the same direction but at slightly different angles whereby the lower edges of the adjacent blades 21 are spaced away from each other a greater distance than are the upper edges of the said blades. Also the blades of the deflector propeller 20' are disposed over the pockets provided between the blades of the radial propeller so that the currents of air received between the blades of the radial propeller will be directed between each pair of blades of the deflector propeller to further assist in the simultaneous turning of both propellers by the currents of air thereagainst.

Secured on the shaft 7, at the portion thereof received within the stack 5 there is an axial flow propeller 22. The blades of this propeller rotate angularly from the hub thereof and the suction created by the air in its passage through the stack, which is accelerated by the outside currents of air above the stack creates a suction which materially adds to the effectiveness of the propeller 22 in assisting the radial and helical type propellers in turning the shaft 7. Thus with my improvement the shaft 7 will be propelled both by the influence of outside air and by air suction created through the stack. The parts constituting the improvement, as above described, may be cheaply constructed and assembled, and the shaft 7 will continue to operate as long as there is sufficient air or wind to operate the several propellers. The turning of the shaft 12, as previously stated, may be regulated by the means 15, but in addition to this, I arrange in the stack 5 a valve 23 to regulate, and if desired, to wholly close the air passage through the stack, and in this manner likewise regulate the turning of the shaft 7 and consequently the turning of the shaft 12.

The dome has arranged thereover the crown portion 24 of a casing 25. The casing does not fully enclose the skeleton frame, but has its lower edge disposed slightly below the radial propeller. Between the crown and the dome 4 there are anti-frictional bearings 26 to insure the free turning of the casing on the device. The crown portion is provided with a vane 27 designed to be influenced by outside currents of air to turn the casing to bring an opening 28 therein opposite certain of the blades of the radial propeller. The air inlet opening 28 may be closed by a slidable door 29 or may

be partly closed so that the flow of air to the radial propeller may be shut off or may be regulated. In certain instances the casing 25 may be dispensed with, but by its employment, it will be noted that a full volume of air currents will be directed against certain of the vanes of the vertical propeller, the vane 27 influencing the casing so that the opening 28 therein is caused to face the direction of the wind currents. The currents of air, after contacting with the blades of the vertical propeller will, as previously stated, be directed upwardly therefrom between the blades of the deflector propeller. This action is assisted by the draft in the stack as also previously intimated, so it will be seen that both outside and inside air currents are caused to influence the blades or vanes of all of the propellers so that a constant and rapid rotary motion is imparted to the shafts 7 and 12.

It is manifest that in view of their size, with respect to the axial flow propeller 22, and also incident to the fact that the radial propeller is subjected to the direct force of outside air, the combined radial and helical type propellers exert a great amount of power in rotating the shaft 7, but this power is materially accelerated by the suction of the air through the stack and the action of such air on the comparatively small horizontal suction propeller 22.

The improvement is, of course, susceptible to such changes and modifications as fairly fall within the scope of what I claim and therefore I am not to be limited to the structural features herein set forth and disclosed by the drawings.

Having described the invention, I claim:—

1. An air engine including a dome supported at an elevation and having a stack extending therefrom, a vertical shaft having one end journaled in the stack and projecting through the dome, a vertically disposed radial propeller on the shaft, a helical type air deflecting propeller on the top of the radial propeller and arranged in the dome, and an axial flow suction propeller on the part of the shaft in the stack.

2. An air engine including a dome supported at an elevation and having a stack extending therefrom, a vertical shaft having one end journaled in the stack and projecting through the dome, a radial propeller on the shaft, a helical type air deflecting propeller on the top of the radial propeller and arranged in the dome, an axial flow suction propeller on the part of the shaft in the stack, and means for regulating the speed of the propellers.

3. An air engine including a dome supported at an elevation and having a stack extending therefrom, a vertical shaft having one end journaled in the stack and projecting through the dome, a radial propeller

on the shaft, a helical type air deflecting propeller on the top of the vertical propeller and arranged in the dome, an axial flow suction propeller on the part of the shaft in the stack, means for regulating the speed of the propellers, and means for preventing air currents contacting the radial propeller.

4. A wind engine including a skeleton frame, a dome supported on the top thereof and having a stack extension, a shaft journaled between the bottom of the frame and the stack, a hollow core secured on the stack, vertically disposed blades extending therefrom and providing a radial propeller, angularly arranged horizontally disposed blades extending from the core and disposed over the vertical blades and providing a deflector propeller which is arranged in the dome, and an axial flow suction propeller fixed on the shaft at the portion thereof in the stack.

5. An air engine including a base, a skeleton frame projecting vertically therefrom, a dome on the top of the frame having a stack extension, a shaft journaled in bearings between the base and the stack, a fly wheel on the shaft, a core on the shaft above the fly wheel, vertically disposed blades extending from the core and providing a radial propeller and forming angle air pockets between the blades, horizontally disposed angularly arranged blades extending from the core, arranged over the blades of the radial propeller and providing a helical type deflector propeller which is received in the dome, an axial flow propeller fixed on the shaft in the stack and defining angularly disposed blades.

6. An air engine including a base, a skeleton frame extending therefrom, a dome on the top of the frame having a stack extension, a shaft journaled in bearings on the base and in the dome, a fly wheel on the shaft, a hollow core on the shaft, angularly arranged vertically disposed blades radiating from the core and providing a radial propeller, angularly arranged horizontal

disposed blades also radiating from the core and disposed above and between the blades of the radial propeller and providing a deflector propeller, an axial flow propeller fixed on the part of the shaft in the stack and defining angularly disposed blades, a horizontal shaft operated by the turning of the first mentioned shaft, brake means therefor, and a damper in the stack.

7. An air engine comprising an upright skeleton frame having a dome at the top thereof and a stack extending from the dome, a vertically disposed shaft journaled centrally between the bottom of the frame and the stack, and the bearing for the shaft in the stack being adjustable, a radial propeller carried by the shaft, a helical type propeller disposed over the radial propeller and arranged in the dome, an axial flow propeller on the shaft arranged in the stack, a partly open casing surrounding the frame having a crown disposed over the dome, anti-frictional bearings between the crown and dome, and a vane on the casing.

8. An air engine comprising an upright skeleton frame having a dome at the top thereof and a stack extending from the dome, a vertically disposed shaft journaled centrally between the bottom of the frame and the stack, and the bearing for the shaft in the stack being adjustable, a radial propeller carried by the shaft, a helical type propeller disposed over the radial propeller and arranged in the dome, an axial flow propeller on the shaft arranged in the stack, a partly open casing surrounding the frame having a crown disposed over the dome, anti-frictional bearings between the crown and dome, a vane on the casing, a door for closing or partly closing the opening in the casing, means for regulating the passage of air through the stack, and means for regulating the speed of the shaft when the latter is turned by the propellers.

In testimony whereof I affix my signature.

ANDREW BENDER.