F. E. BLAKELY.

WINDMILL OR MOTOR.

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1,171,584.

Patented Feb. 15, 1916.

FIG. 1.

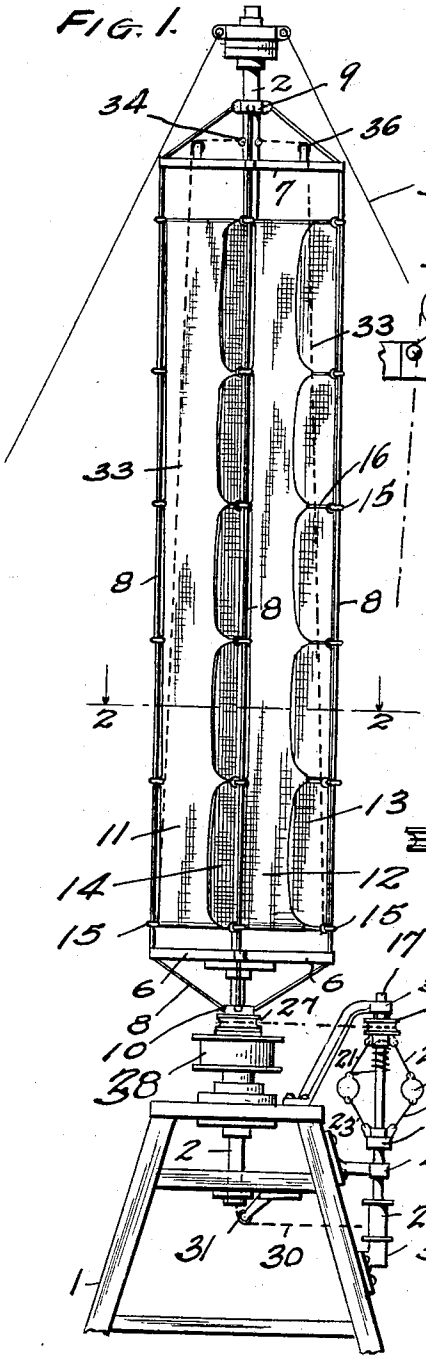


FIG. 3.

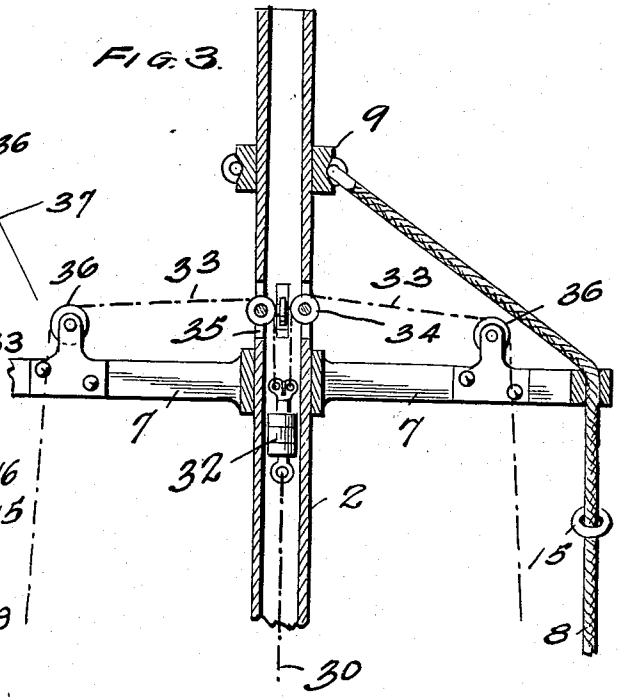


FIG. 4.

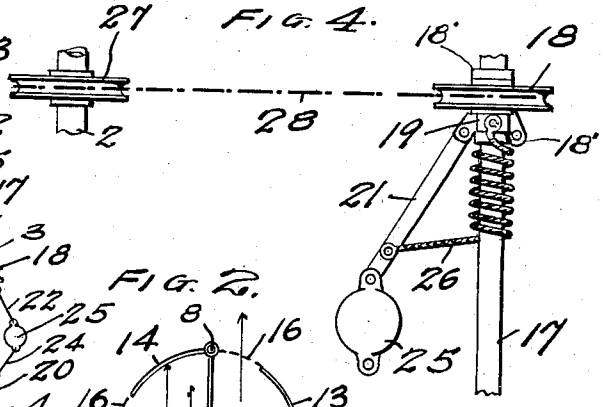
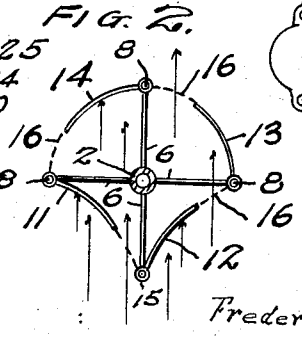


FIG. 2.



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WINDMILL OR MOTOR.

1,171,584. Specification of Letters Patent. Patented Feb. 15, 1916.

Application filed May 1, 1915. Serial No. 25,145.

To all whom it may concern:

Be it known that I, FREDERICK E. BLAKELY, a citizen of the United States, residing at Douglas, in the county of Cochise and State of Arizona, have invented an Improvement in Windmills or Motors, of which the following is a specification.

My invention relates to improvements in windmills or motors, and more particularly to a type wherein are employed a plurality of flexible sail members.

The object of the present invention is the provision of an improved machine which will be simple in construction, inexpensive to manufacture, durable and efficient; to so construct and dispose the sail members that they will catch the lightest breeze; and to provide novel means by which the sail area will be automatically reduced when the speed of the mill becomes too great for safety due to excessively high winds.

With these ends in view my invention consists in the combination, construction, and arrangement of parts hereinafter fully described and claimed.

Referring to the drawings, Figure 1 is a view showing the complete mill in elevation. Fig. 2 is a view taken on the line 2—2 of Fig. 1. Fig. 3 is an enlarged sectional view of the upper portion of the sail carrying, supporting, and controlling means; and, Fig. 4 is an enlarged elevation showing the governor arrangement for preventing the machine from running at excessive speed.

Referring more specifically to the drawings in which like reference characters designate like parts in the several views, the numeral 1 indicates a stand or supporting structure which may be of any suitable design, upon which is mounted the revoluble hollow shaft 2, and the governor supporting brackets 3, 4, and 5. The shaft 2 extends above the stand 1 as shown and has fixedly attached thereto the four lower radial arms 6 and the corresponding upper arms 7. Four steel cables 8 are secured to the collar 9 on the shaft 2 near its upper end and extend outward and downward, being connected to the outer ends of the said upper and lower arms 6 and 7 and the collar 10 also on the shaft 2 near its lower end. The four sail members 11, 12, 13, and 14, are secured to the said cables 8 by means of the loose rings 15 and the sheets or cords 16, the latter being fastened to the rings on the cables next following in direction of motion the cables to which their respective sail members are secured.

Revolubly mounted in the brackets 3, 4 and 5, on the stand 1, is the shaft 17 of the governor mechanism by means of which excessive speed of the motor is controlled. This shaft 17 has revolubly mounted thereon the pulley 18 which is integral with the collar 19, and the revoluble and sliding collar or member 20. Bearing sleeves 18′ prevent vertical movement of the integral pulley and collar. The arms 21, 22, 23, and 24, and fly-balls 25 are connected to said revoluble collar and sliding collar or member in the well known manner shown. Passing loosely around shaft 17 with its ends attached to arm 21 and collar 19 is the flexible line or rope 26. The foregoing elements (the pulley 18, collar 19, sliding member 20, arms 21, 22, 23, and 24, fly-balls 25, and line 26) all rotate together when the motor is in motion, the said pulley 18 being operatively connected with the pulley 27 on the shaft 2 by the belt 28. Drum 29 is fixed to the shaft 17 as shown having secured thereto one end of the swivel-line 30. This line 30 passes over the sheave 31 and up through the hollow shaft 2 to the swivel 32 (Fig. 3) to which are made fast the four ring-lines 33 which in turn pass over their respective sheaves 34 in the openings 35 in the shaft 2 and the sheaves 36 upon the arms 7 secured to said shaft, thence extending down to the lowermost rings 15 on the cables 8.

With the foregoing arrangement of sails, lines, shafts, pulleys, sheaves, and governor in mind, the operation of the speed controlling mechanism may be readily comprehended, and is substantially as follows: During a normal rate of rotation of the motor the governor members 18, 19, 20, 21, 22, 23, 24, 25, and 26 revolve about the shaft 17 by reason of the belt 28 and the pulleys 18 and 27. As stated the line 26 is normally loose about the shaft 17 but when the speed of the motor becomes too great the fly-balls 25 spread out by reason of the centrifugal force exerted thereon, causing the said line to grip securely upon the shaft 17, and in consequence thereof the latter is made to revolve with the governor. It is evident that the swivel-line 30 will then wind upon the drum 31 on the shaft 17, and the shortening of this line acting upon the aforementioned ring-lines which connect the swivel 32 and the lowermost rings 15 on the cables

8 will serve to raise the sails, thus causing the mill to run slower on account of there being less canvas spread to the wind. In other words the result is substantially the same as when reefing sail.

Stays or guy ropes 37 extend from the top of the vertical shaft 2 to suitable anchoring means not shown, and power from the mill may be transmitted by means of belting and the pulley 38.

A most important feature of my wind mill and to which I desire to call especial attention inasmuch as it constitutes a necessity in providing an efficient and thoroughly practicable machine of this character, is the particular manner in which the flexible sail members are disposed and mounted by means of the arms, cables, rings, and sheets. By my arrangement (clearly shown in the drawings) the sails will present their broadsides to the wind when traveling with the wind and when returning against the wind perform a "tacking" movement. In so doing they first turn slantwise; then directly edgewise; then again slantwise, the wind being on the reverse side of the sail to what it was in the former slantwise position. By this natural automatic and self-tacking movement considerable power is derived and the minimum of resistance encountered.

In Fig. 2 is shown the position of the sails when the wind is in the direction indicated by the arrows, the mill revolving clockwise. The advantage of the sail arrangement is readily apparent as it will be seen that the greatest possible force and effect of the wind is obtained and utilized, thus assuring a powerful, continuous, and smooth-running machine.

It will be understood that the weight of the sails is sufficient to overcome the resistance on the swivel-line 30 and to readjust themselves to a normal fully extended position after a "reefing" movement induced by excessive speed of the mill due to high winds.

I desire it to be understood that I do not confine or limit myself to the specific construction herein described; but, on the other hand I reserve the right to make various changes in arrangement and detail, as long as they do not depart from the spirit of the invention as set forth in the annexed claims.

Having described my invention, I claim:

1. A wind mill or motor, consisting of a vertical revoluble shaft, a support for the shaft, upper and lower sets of radial arms mounted thereon, vertical cables or their equivalents connecting said sets of arms, sail members slidably mounted on said cables, a governor coöperating with the revoluble members of the motor and operatively connected therewith, and connecting lines between the slidably mounted sail members and the said governor.

2. A wind mill or motor, consisting of a hollow vertical revoluble shaft, a support therefor, upper and lower sets of radial arms secured to the said shaft, vertical cables or their equivalents connecting said sets of arms, sail members slidably mounted on said cables; a centrifugal governor cooperating with the revoluble members of the motor; a shaft on which the governor revolves; a swivel and a swivel-line secured thereto and to the said shaft upon which the governor revolves, the said line extending upward within the said hollow vertical shaft, and ring-lines connecting said swivel and sail members.

3. A wind mill or motor, consisting of a revoluble shaft and a sail-carrying means and support therefor; a speed controlling governor device for the aforementioned elements comprising a revolubly mounted vertical shaft, a pulley revolubly mounted thereon, a slidable collar carried thereby, a collar integral with said pulley, arms and fly-balls connecting said collars, a line having its ends attached to one of said arms and collar; a pulley on the revoluble shaft, and a connecting power-belt between said pulley and the governor pulley.

FREDERICK E. BLAKELY.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."