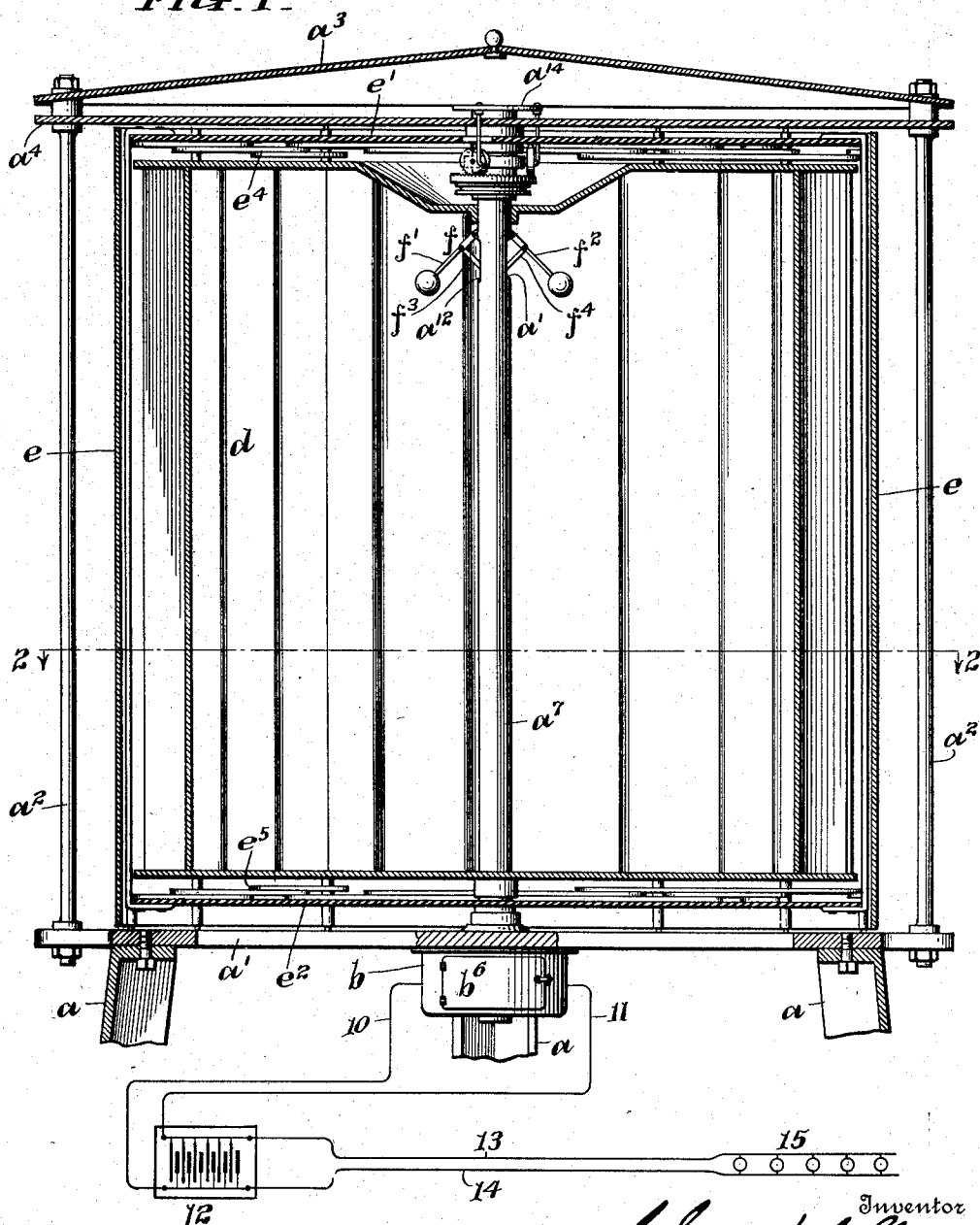


1,152,666.

2 SHEETS—SHEET 1.

FIG. 1.



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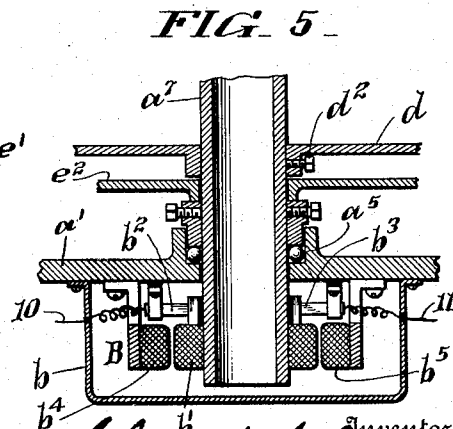
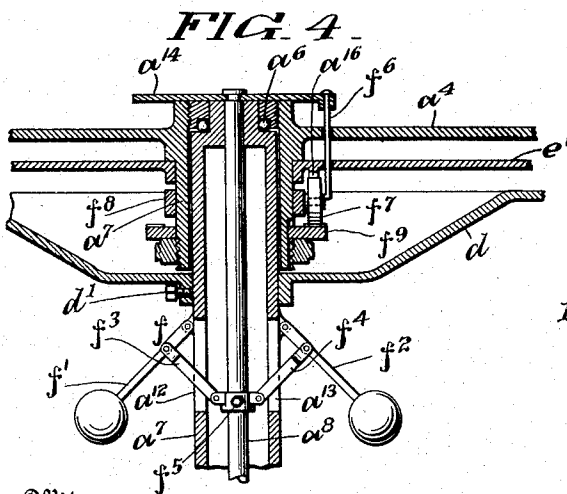
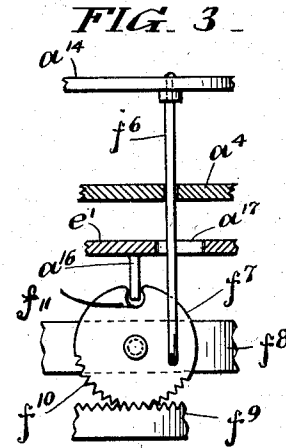
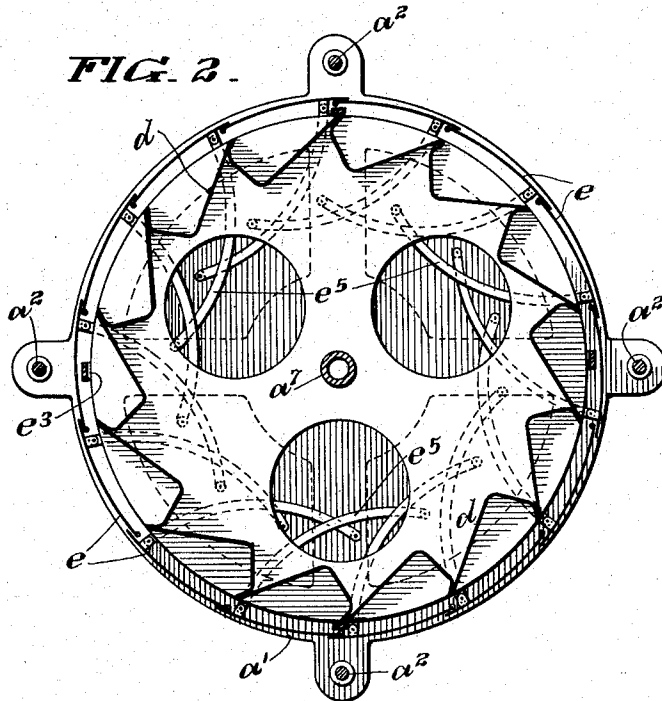
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C. A. STERNER.
WINDMILL CONTROL FOR ELECTRICAL EQUIPMENT.
APPLICATION FILED APR. 26, 1913. RENEWED JAN. 28, 1915.

1,152,666.

Patented Sept. 7, 1915.
2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CLEMENT A. STERNER, OF ALLENTOWN, PENNSYLVANIA, ASSIGNOR TO HELEN L. STERNER, TRUSTEE, OF ALLENTOWN, PENNSYLVANIA.

WINDMILL CONTROL FOR ELECTRICAL EQUIPMENT.

1,152,666.

Specification of Letters Patent.

Patented Sept. 7, 1915.

Application filed April 26, 1913, Serial No. 763,778. Renewed January 28, 1915. Serial No. 4,952.

To all whom it may concern:

Be it known that I, CLEMENT A. STERNER, a citizen of the United States, residing at Allentown, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Windmill Control for Electrical Equipments, of which the following is a specification.

My invention has relation to a turbine type of windmill forming the subject-matter of a separate application for United States Letters Patent, filed by me under date of April 18th, A. D. 1913, Serial No. 761,888, whereby is imparted increasingly developed power, in the present instance to electrical equipments, for their operation; and in such connection it relates more particularly to the general arrangement thereof, and to means for governing operations of the mill, to control uniformly the electric motive force generated through the electrical equipment actuated and regulated by such mill, for use in lighting and for other purposes.

The nature and scope of my present invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which—

Figure 1, is a view in sectional elevation of a turbine type of windmill, showing the constructive arrangement of the turbine rotor of such mill, pivotal shutters or blinds and centrifugal type of governor and its actuating mechanism, controlling the movement of the shutters or blinds of the mill in respect to their opening and closing by variable wind currents and also in diagram, an electrical distribution system, controlled by the said mill. Fig. 2, is a cross-sectional view through the mill, taken on the line 2—2, of Fig. 1. Fig. 3, is an enlarged sectional elevation of the automatic opening and closing mechanism for the shutters or blinds controlled by the centrifugal governor carried by the main driven member of the mill under variable wind currents, to regulate imparted energy developed by the mill to the electrical equipment for the utilization thereby of such derived power or energy. Fig. 4, is an enlarged detail sectional view of the centrifugal governor and the shutter or blind automatic operating mechanism; and Fig. 5, is an enlarged sectional detail of the dynamo with its armature carried directly by the main driven

member of the mill, and field-coils and brushes incased adjacent to said armature and showing also lead wires from said brushes.

Referring to the drawings with reference to the mill, a , represents in broken section a series of vertical standards bolted to a bed-plate a^1 , supporting a series of vertical tie-supports a^2 , for the roof a^3 , of the mill. In the bed-plate a^1 , and top-plate a^4 , respectively, are arranged ball-bearings a^5 and a^6 , engaging a vertical sleeve a^7 , in which is placed a shaft a^8 . This sleeve extends beyond the bed-plate a^1 , and carries in an incasement b , a dynamo B , having its armature b^1 , directly applied to the said sleeve and rotating therewith. The brushes b^2 and b^3 , therefor, being located adjacent to said armature and suspended from the underside of said bed-plate, as are also the field-coils b^4 and b^5 , as clearly shown in Fig. 5. From the brushes lead wires 10 and 11, extend to a storage battery 12, and then by line wires 13 and 14, to a series lighting system 15, as shown in Fig. 1. The incasement b , for convenience of access thereto, is provided with a latch-door b^6 .

In the upper portion of the mill, as illustrated in Fig. 1, is located a circular tooth-like turbine rotor d , as clearly shown in Fig. 2. This rotor is removably connected with the sleeve a^7 , by means of set-screws d^1 and d^2 , in a manner as clearly illustrated in Figs. 4 and 5. Surrounding the rotor d , and outside thereof, are arranged a series of shutters or blinds e , pivoted to the top-plate a^4 , and the bed-plate a^1 . The series of shutters or blinds e , is pivotally connected by two sets of connecting rods e^4 and e^5 , with the top and bottom disks or plates e^1 and e^2 , and are held together by means of vertical connecting rods, to form as it were, a cage e^3 , within which the said rotor d , revolves in the respective ball-bearings a^5 and a^6 . The upper part of the sleeve a^7 , is slotted at a^{12} and a^{13} , as illustrated in Fig. 4, and adjacent to the said slots is attached a centrifugal governor f , provided with suspended weighted arms f^1 and f^2 . These arms by links f^3 and f^4 , are connected with a sleeve f^5 , which latter is fixed to the shaft a^8 and revolves with the said sleeve.

The shutters or blinds e , are automatically regulated as to their movements under variable wind currents in the manner hereafter

fully described. The shaft a^8 , is provided with a swiveled top-plate a^{14} , and depending therefrom is arranged a series of rods f^6 , engaging cams f^7 , journaled to a sleeve f^8 , loosely surrounding the upper part of the sleeve a^7 . The sleeve a^7 , is in connection by a ball-bearing a^9 , with the top-plate a^4 , and this top-plate a^4 , is carried by a series of vertical supports a^2 , the latter also carrying the roof a^3 . The said sleeve a^7 , also carries below the cams f^7 , a rack f^9 , with which mesh the ratcheted surface portion f^{10} , of each of the cams f^7 . Each of these cams f^7 , is provided with a notch f^{11} , as clearly illustrated in Fig. 3, for a depending pin a^{16} , of the upper disk or plate e^1 , to engage and to be actuated by said cams in the rack f^9 , when the shutters or blinds e , are operated by wind currents. The disk or plate e^1 , is provided with an enlarged opening a^{17} , in portions as clearly shown in Fig. 3, for the depending cam-rods f^6 , to travel in the rotary movements of the disks or plates e^1 and e^2 , to thus, by the opening or closing of said shutters or blinds regulate the speed of the sleeve a^7 , of the mill, under the control of the governor f , as well as the dynamo armature b^1 , rotated thereby. Unless the speed of the windmill can be positively regulated its use for operating an electrical distribution system would be unreliable because the mill must develop not only sufficient power for such purpose but be able to maintain the same substantially uniform at all times to fulfil requirements. By my invention it has been found in practice to be so, under the described automatic control of the shutters or blinds by the centrifugal governor as applied and operating in Figs. 1, 3 and 4.

Having thus described the nature and objects of my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A wind power controlling means, comprising a turbine type of rotor carried on a sleeve rotatable therewith, shutters or blinds movable independently of said rotor, a governor operatively connected with said sleeve and with a slotted cam and pin device and the latter in connection with a disk or plate in positive movable connection with said shutters or blinds, to automatically regulate

movement of said shutters or blinds under variable wind conditions controlled by said governor, substantially as and for the purposes described.

2. A wind power controlling means, comprising a turbine type of rotor carried by a sleeve rotatable therewith, shutters or blinds pivotally supported in connection with a rotatable disk independent of the action of said rotor, a centrifugal governor in fixed connection with a shaft located within said sleeve and actuated thereby, a rack and notched cams suspended from means connected with said shaft and having devices to engage the notches of said cams to actuate the same in regulating under variable wind conditions by means of said governor said rotatable sleeve, substantially as and for the purposes described.

3. A wind power controlling means, comprising a windmill having shutters or blinds in pivotal connection with a rotatable disk, a slotted sleeve carrying a turbine type of rotor, said shutters or blinds and disk operable independently of said rotor, a governor fixed to said sleeve and the weighted arms fixed to a shaft located within said sleeve and rotatable therewith, a rack and a cam and pin means actuated by the disk of said shutters or blinds to regulate by means of said governor the speed of said sleeve, substantially as and for the purposes described.

4. A wind power controlling means having a rotatable sleeve, a turbine type of rotor carried thereby, pivoted shutters or blinds automatically controlled by means operable independently of said rotor, a governor connected with said sleeve and fixed to a shaft movable within said sleeve, and a rack and cam and pin means controlled by said shutters or blinds to regulate by means of said governor the speed of said sleeve substantially as and for the purposes described.

In witness whereof, I have hereunto set my signature in the presence of the two subscribing witnesses.

CLEMENT A. STERNER.

Witnesses:

THOMAS M. SMITH,
HELEN F. MILLER.