

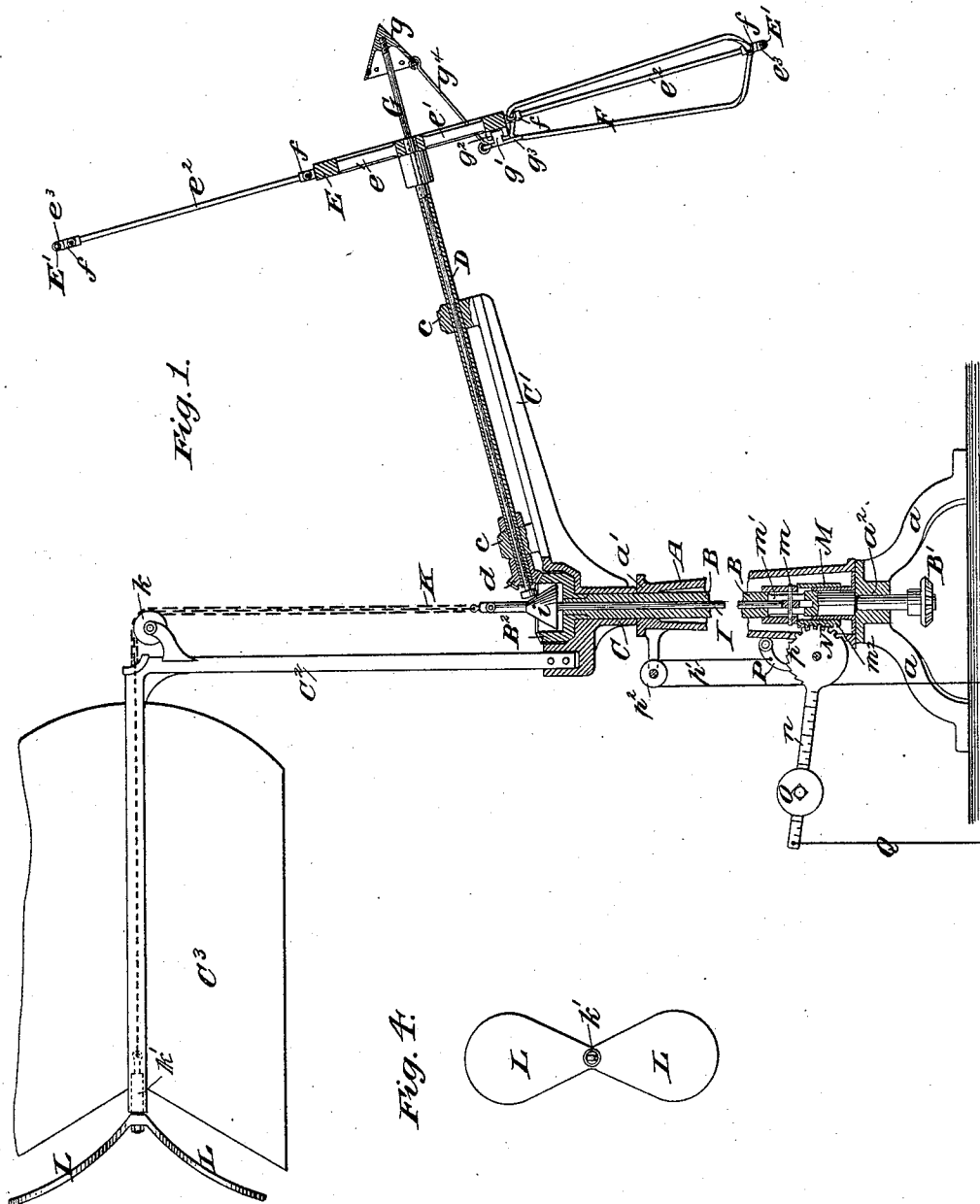
(No Model.)

2 Sheets—Sheet 1.

T. J. HARRISON.
WIND WHEEL.

No. 485,380.

Patented Nov. 1, 1892.



Witnesses:-

D. H. Haywood
H. C. Rembleton.

Inventor:-

Thomas J. Harrison
by his attorneys
Brown & Howard

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

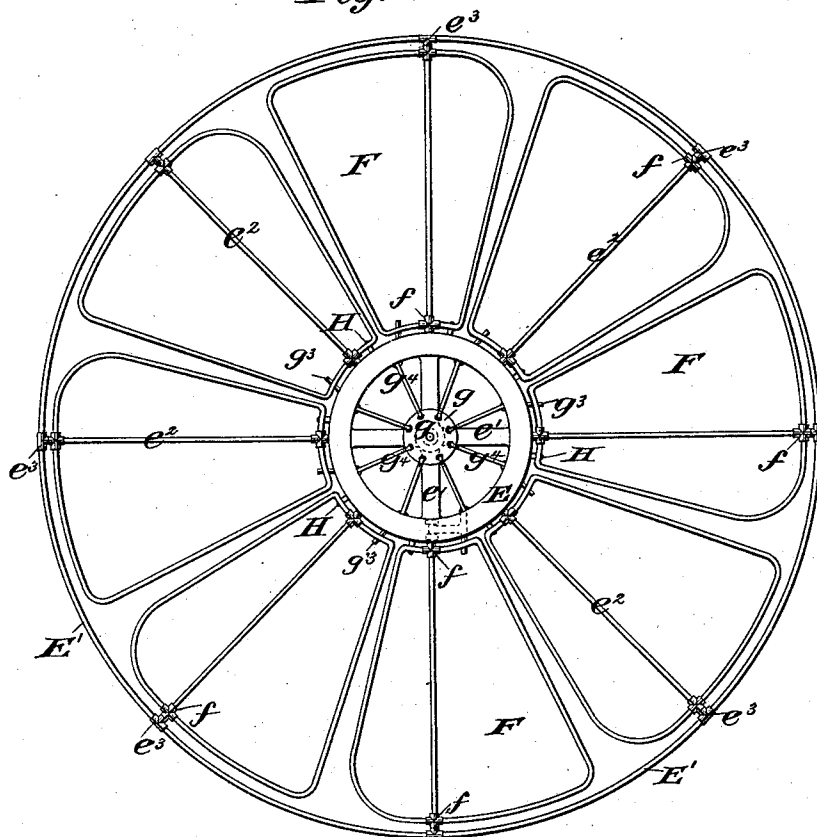
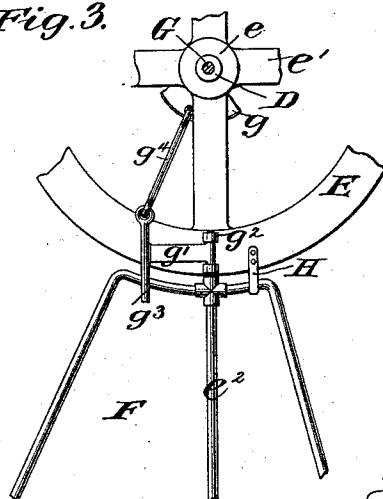


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS J. HARRISON, OF BROOKLYN, NEW YORK.

WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 485,380, dated November 1, 1892.

Application filed October 20, 1890. Serial No. 368,634. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. HARRISON, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Wind-Wheels, of which the following is a specification.

My invention relates to an improvement in wind-wheels in which wheels are arranged upon shafts which diverge from each other as they extend from the upright column or post outwardly toward the wheels, said shafts being at the same time inclined upwardly and serving to transmit motion from the wheels to a vertical driving-shaft. The general arrangement of the wheels, the wheel-shafts, the vertical driving-shaft, and the vane is the same as that shown and described in Letters Patent No. 320,624, granted to me June 24, 1885, the object of my present invention being to provide means for automatically regulating the speed of the wheel and to simplify and improve various parts of the structure.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the wind-wheel in side elevation, partly in section, and the means for transmitting its motion and for regulating it. Fig. 2 is a front view of the wheel proper. Fig. 3 is an enlarged view, in detail, showing the connection between the regulating-shaft and the sail or fan frame; and Fig. 4 is a rear view, in detail, of the regulating-wings.

A designates a vertical hollow column or post having suitable feet or a base a , and forms in the present instance the fixed support for the wind-wheel and its operative parts. It is understood that this frame may be modified in any way desired to adapt it to the situation in which the machine is to be used. Within the hollow column A is a shaft B, through which the motive power derived from the wind-wheel is transmitted. The shaft B is hollow and is fitted in a bearing a' in the

upper part of the column and in a bearing a^2 in the base thereof, the shaft being shouldered above the bearing a^2 . Upon the lower end of the shaft is a beveled gear-wheel B' and upon its upper end, which projects above the top of the column A, is a beveled gear-wheel B².

To the shaft B above the column A is fitted a sleeve or hub C, which rests upon the top of the column and is free to turn on the shaft B, and, as here shown, the upper end of the sleeve or hub C receives within it the hub of the beveled gear-wheel B². From the sleeve or hub C radiate arms C', which stand at an angle of about ninety degrees or one hundred degrees to each other. This angle may of course be varied, as found necessary or desirable. From the sleeve or hub also projects an arm C², to the upper end of which is secured a vane C³, which is intended to stand about midway between and above the arms C'. The relative positions of the vane and the arms C' will remain unchanged, because of their being fixed to a common support C, and they, together with the parts carried thereby, may rotate freely about the shaft B. Each arm C' has bearings c , to which a shaft D, here shown as hollow, is fitted. The shafts D have at their inner ends pinions d , which gear with the wheel B² on the shaft B.

The several parts thus far described are quite similar to the corresponding parts in my patent, No. 320,624, hereinbefore referred to.

The frame of the wind-wheel consists of a central circular band E, connected with its hub e by arms e' and connected with an outer circular rim E' by means of rods or bars e^2 . As a matter of construction, I find a light, cheap, and durable structure may be made by forming the exterior rim E' and the rods e^2 of common gas-pipe and connecting the rods e^2 to the rim by means of T-joints e^3 .

The sails or fans F are provided with bearings f at the inner and outer ends, by means of which they are loosely secured upon the rods or bars e^2 , so as to swing freely in a lateral direction. The general shape of the vane F is quite similar to that shown in my patent above referred to, the part upon one side of the rod e^2 on the line of its bearings being

wider than the portion upon the other side, so that the pressure of the wind thereon will turn it obliquely to the plane of its face. A sail or fan operating rod G extends longitudinally within the wheel-shaft D from a point above the upper end of the shaft B to a point a short distance in front of the wheel, where it is provided with a cap *g*, preferably of conical form, as shown. The rod G is allowed a longitudinally-sliding movement within the shaft B and is acted upon by the device which will be hereinafter explained. A set of fan-operating levers *g'* (one for each fan) are journaled at one end to the circular rim E, as shown at *g*², and at their opposite ends are provided with projections *g*³, which extend over the edge of the inner end of the fan upon the side of the support upon which the area of the fan is the greater, the swinging movement of the lever *g'* being in a direction lateral to the plane of the wheel. The free ends of the levers *g'* are connected with the rim of the conical cap *g* by means of links *g*⁴. The sliding movement of the rod G is of such extent that when the rod is at the outermost limit of its movement the end *g*³ of the lever *g'* in engagement with the fan will hold the fan in the plane of the wheel. From this it follows that the obliquity which the fan assumes to the plane of the wheel depends upon the distance to which the rod G is allowed to slide inwardly or toward the vertical shaft B. A stop H is secured to the rim E for the purpose of preventing the fan from swinging beyond a position in the plane of the wheel, either under the impulse of the lever *g'* or from any other cause.

Within the hollow shaft B is a vertically-movable operating-rod I, provided on its upper end with a cone-shaped enlargement *i*, so located that when the rod I is elevated the inclined surface of the cone *i* will engage the inner ends of the regulating-rods G and slide them longitudinally outwardly. At a point above the conical enlargement *i* the said rod I is attached to the end of an operating-chain K, which extends up and over the guide-pulley *k*, and thence along the central portion of the vane C³ to a plunger *k'*, seated in the rear end of the vane and having a longitudinal movement therein. To the rear end of the plunger *k'* a pair of wings L is secured, the said wings being so disposed that their flat surfaces will present themselves toward the direction from which the wind is blowing. I prefer to give the wings a curved form, substantially as shown in Fig. 1. As the force of the wind increases, the tendency will be to carry the wings L before it, and such movement of the wings will produce a strain upon the chain K, which in turn will lift the operating-rod I, and, through its engagement with the inner ends of the regulating-rods G, will throw the fans F out of the wind, and so diminish the speed of the wheel.

The lower end of the operating-rod I is se-

cured to a vertically-movable sleeve M conveniently by means of a pin *m*, which extends through the sleeve and rod and through an elongated slot *m'* within the shaft B. The sleeve M is provided upon one side with a rack-bar *m*², with which a toothed sector N engages. The toothed sector N is pivotally secured to a suitable support upon the column A and is provided with an outwardly-extended arm *n*, on which slides a weight O. A gravity-pawl P is pivotally secured to the column in position to engage ratchet-teeth *p* upon the sector N for the purpose of holding the sector in desired adjustment. The pawl P may be conveniently operated from a point at a distance by means of a cord *p'*, extending therefrom up and over a guide-pulley *p*² and thence downwardly within convenient reach of the operator. A cord Q may also be attached to the outer end of the arm *n* for the purpose of operating it and throwing the fans out of the wind and stopping the machine whenever it is desired.

The operation of the gravity-pawl P, toothed sector N, and the rack *m*², in connection with the operating-rod I and the wings L, is as follows: The weight upon the arm *n* may be set at such a point that when the wind is at a certain velocity the wings L will act upon the rod I to such an extent as to throw the fan wholly out of the wind and cause it to stop. If now the gravity-pawl be left in engagement with the ratchet-teeth upon the sector, it will lock the operating-rod I in its lifted adjustment and will prevent the wheel from turning until it has been positively lifted. On the other hand, if it is desired to have the machine continue its work and automatically regulate itself the gravity-pawl P may be permanently secured out of engagement with the ratchet-teeth, and in such position the operating-rod I, under the influence of the wings L, will rise and fall as the wind increases or diminishes and the wheel will continue to rotate.

What I claim as my invention is—

1. In a wind-wheel, the combination, with a suitable support, a wind-wheel shaft radiating therefrom, a wind-wheel secured on the shaft, and a vane for holding the wind-wheel toward the wind, of a longitudinally-movable rod for adjusting the fans on the wind-wheel, a vertically-sliding operating-rod having a cam engagement with the fan-adjusting rod, a pair of wings located at the rear end of the vane, a sliding rod or plunger forming a support for the wings, and a flexible connection between the said sliding rod or plunger and the vertically-sliding operating-rod, substantially as set forth.

2. The combination, with the hollow support, the driving-shaft journaled therein, a vertically-movable operating-rod seated within the shaft and connected with the wings, the wind-wheel, and means for communicating the movements of said operating-rod to

the fans of the wind-wheel, of a rack-bar secured to the vertically-movable operating-rod, a toothed sector pivoted to the supporting-frame in engagement with the rack-bar
5 and provided with a graduated arm, a weight adapted to slide along the graduated arm, a gravity-pawl in engagement with teeth

upon the sector, and means for positively operating the gravity-pawl, substantially as set forth.

THOMAS J. HARRISON.

Witnesses:

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