

(No Model.)

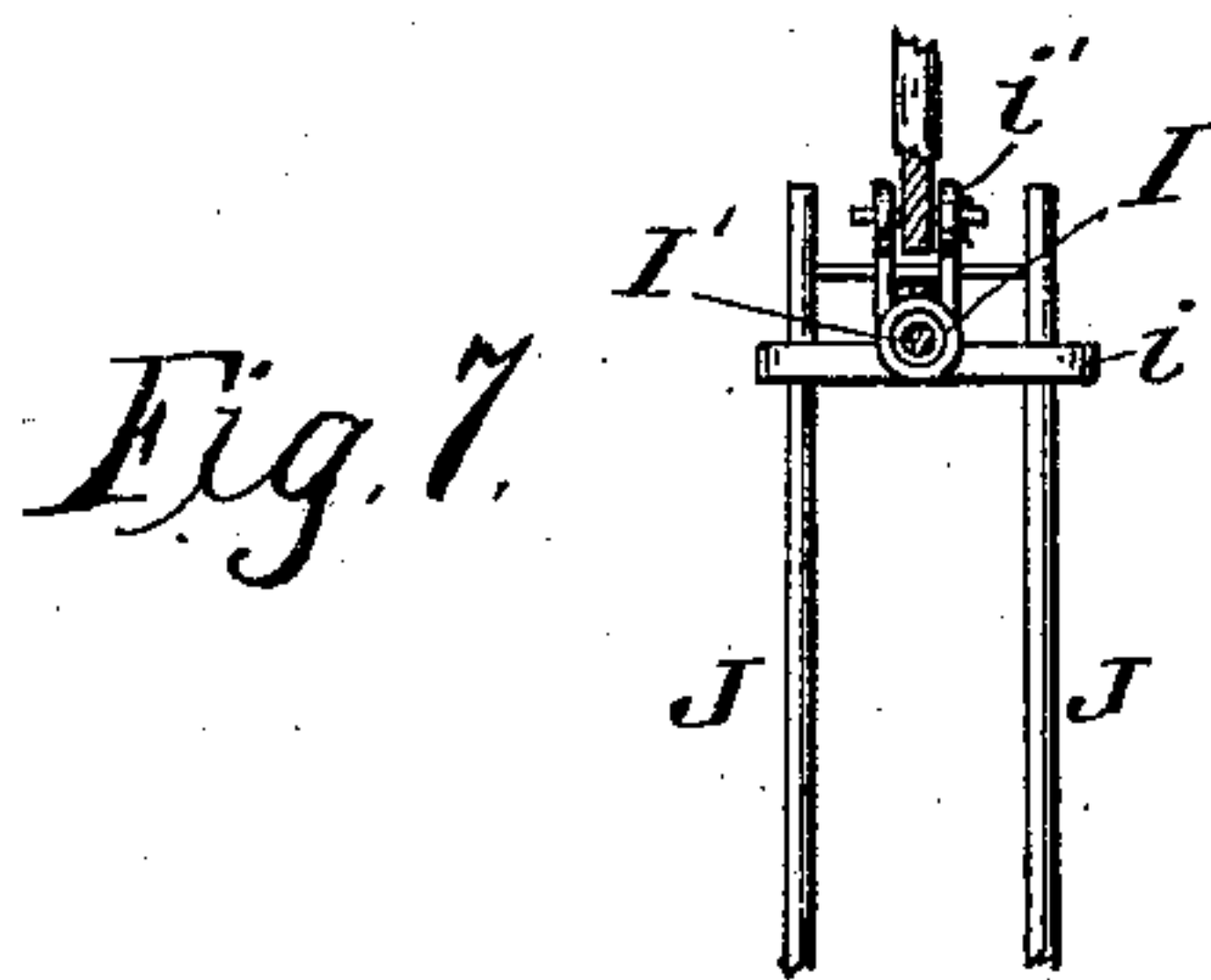
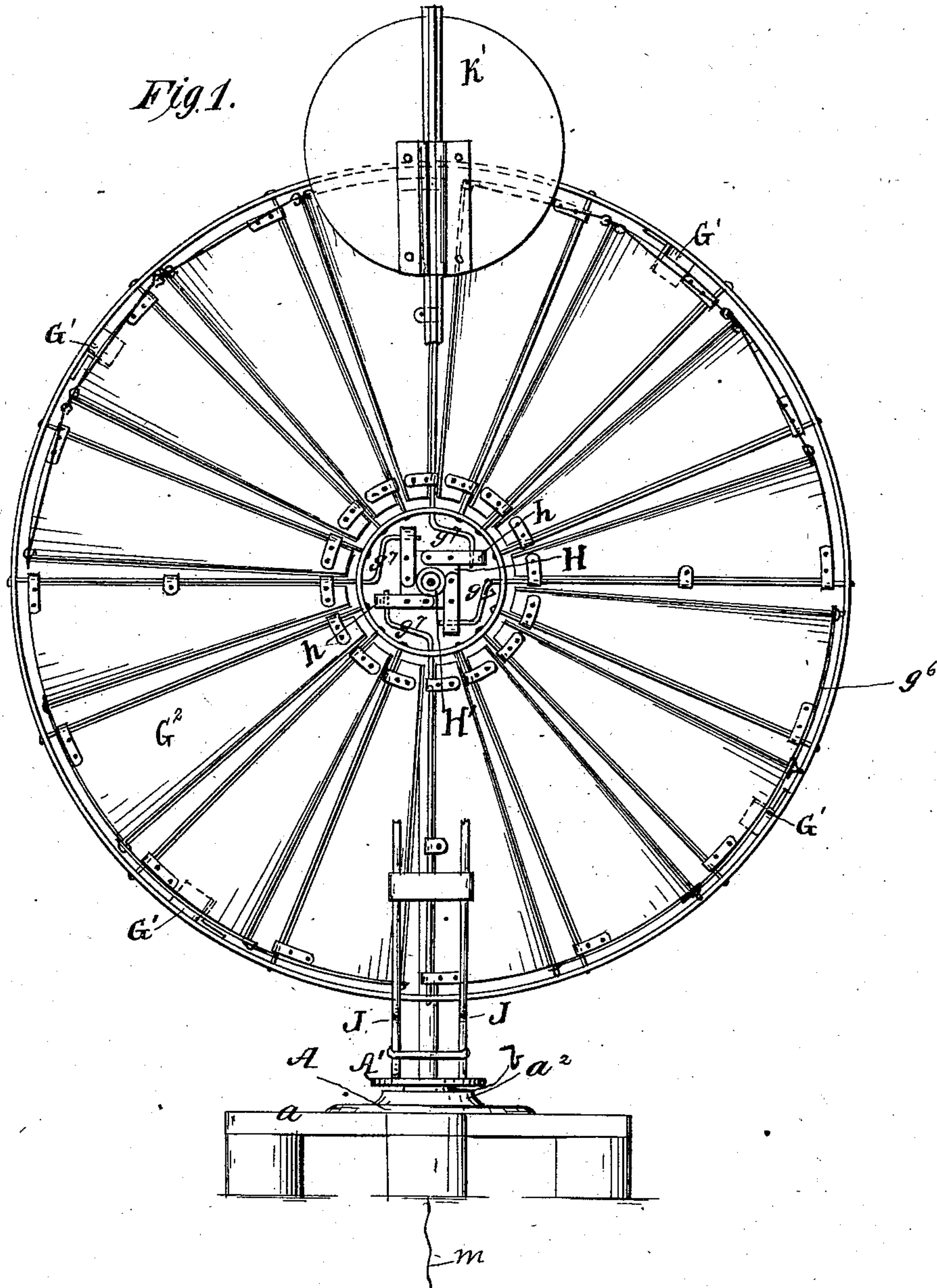
2 Sheets—Sheet 1.

E. BUCKLEY.

WIND WHEEL.

No. 255,138.

Patented Mar. 21, 1882.



Witnesses:
Perry B. Turpin.
F. W. Wheat

Inventor
Edmond Buckley
By R. S. & A. P. Lacey
Attys.

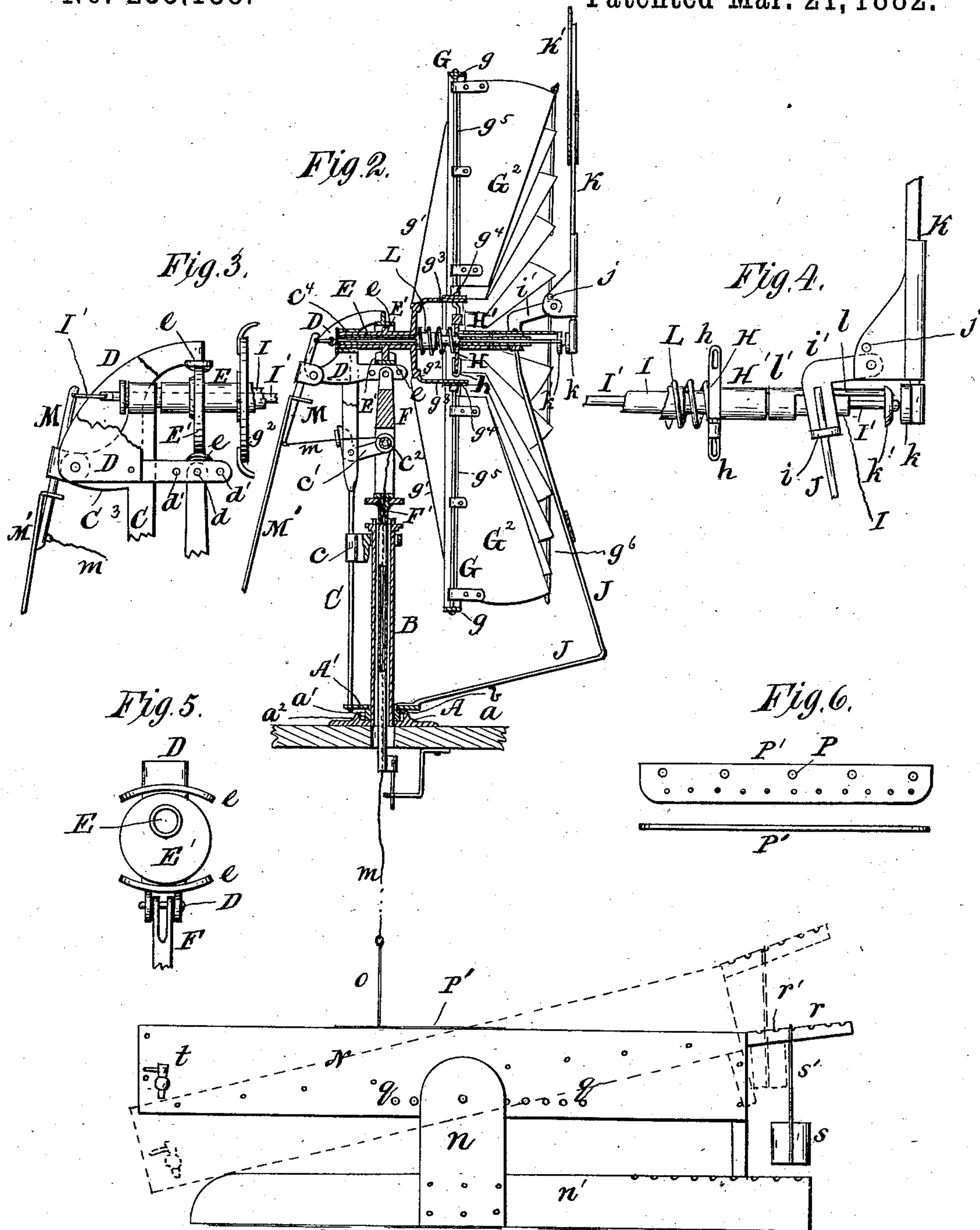
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2 Sheets—Sheet 2.

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WIND WHEEL.

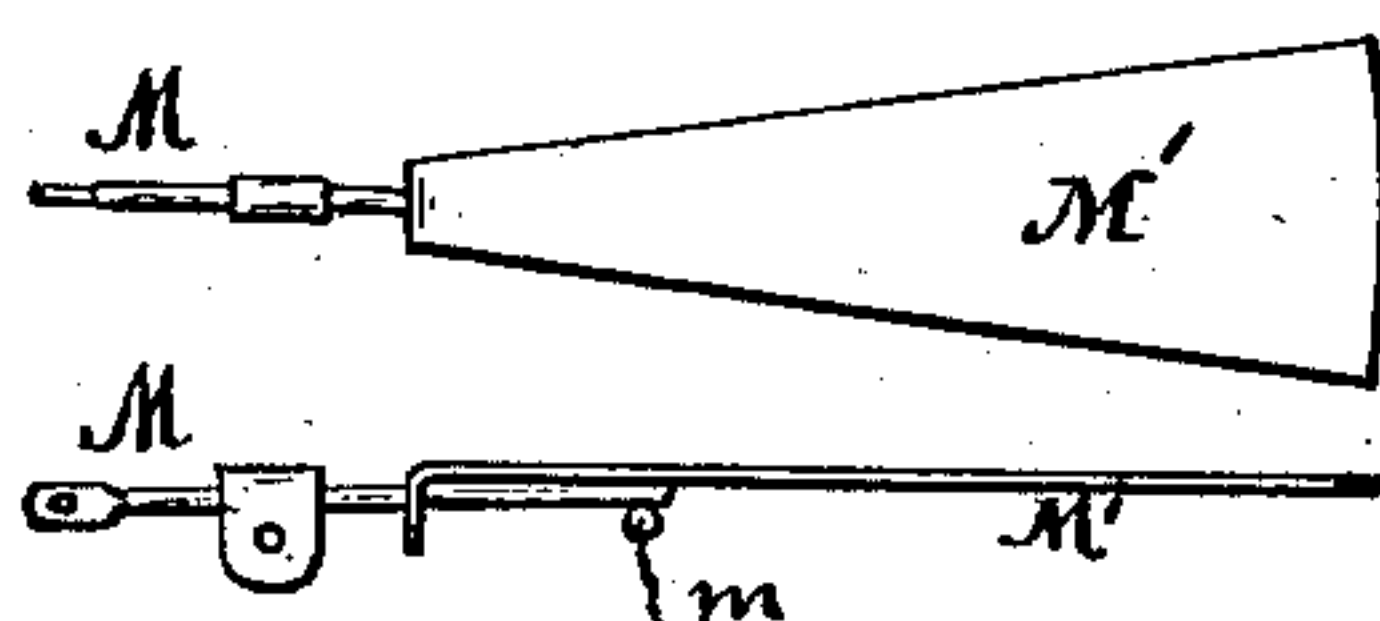
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Fig. 8.



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UNITED STATES PATENT OFFICE.

EDMOND BUCKLEY, OF SWAN, IOWA.

WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 255,138, dated March 21, 1882.

Application filed December 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDMOND BUCKLEY, a citizen of the United States, residing at Swan, in the county of Marion and State of Iowa, have invented certain new and useful Improvements in Wind-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification, and in which—

Figure 1 is a rear elevation of my improved windmill, and Fig. 2 is a vertical section thereof and the trough-lever. Figs. 3, 4, 5, 7, and 8 are detail views of the same. Fig. 6 is a plan and edge views of the adjusting-plate of the trough or lever.

This invention has relation to improvements in windmills, its object being to permit of the automatic adjustment of the sails according to the force of the wind to enable the wheel to maintain a uniform rate of speed, or different rate of speed, or to entirely arrest the motion of the wheel; and it consists of the combination and arrangement of mechanism substantially as hereinafter more fully set forth.

In carrying out my invention I employ a base or plate, A, fastened to an elevated support, *a*, and to which may be connected, or through it passed, a cylinder, B, extending considerable distance above the base A and through the base-support, to which it is secured. The upper surface of the base or disk A has a socket, *a'*, formed in an elevation, *a''*, cast upon the disk. A' is a second disk, fitted to revolve upon the tube or cylinder B, and provided with a bearing or boss, *b*, resting in the socket *a'* of the disk or base A.

C is a rod or upright fastened to the revolving disk A', provided with a bracket, *c*, collared to the tube B, provided with a second bracket, *c'*, farther up, having a pulley, *c''*, and provided with a third bracket, *c'''*, arranged near its upper end, and at the outer end of which are pivoted the convergent ends of a lever, D, while it supports one end of the wheel-shaft E at its extreme upper end within a tubular bearing, *c''''*.

To the lower arm of the lever D is connected by a pin, *d*, capable of adjustment through the coincident ones of a number of adjusting-holes, *d'*, the pitman F, preferably bifurcated, and connected by swivel-joint to the piston or pump rod F'. The divergent ends of the arms of the lever D are provided with slightly concaved plates *e*. The wheel-shaft E has an eccentric or cam, E', which bears against the plates *e* of the lever D, and thus as the shaft revolves actuates the lever, which in turn operates the pitman and the piston or pump rod.

G is the wheel, having its rim *g* provided with stops G', and connected by rods *g'* to its hub *g''*, consisting of a disk secured to the shaft E, and having horizontal arms *g'''*, connected to a ring, *g''''*. Its spokes *g''''''* are pivoted, to permit them to turn in their bearings in the ring *g''''* and the rim *g*, and have fixed to them the sails G'', preferably each of an approximate triangular form. The sails are connected together in groups of four, or more or less in number, by links *g''''''*, articulated or pivoted to their outer corner edges, which permits of the operation of all the vanes from four points, one spoke of each group being provided with a crank, *g''''''''*, of the form shown in Fig. 1. The outer end of each crank *g''''''''* is extended to the periphery, and forms one of the spokes of the wheel. The extension is made fast to one of the sails, which in turn is connected by the rod *g''''''''''* to each of the sails in the series of four, hereinbefore described. The crank and the rod *g''''''''''* give an instantaneous movement to all the sails in the series.

H is a head or follower fitted with a tube, H', to slide upon the sleeve I, inclosing a rod, I', and itself inclosed by the shaft E. The head H has an equal number of arms *h* with the cranks of the vane spokes or shafts, which they receive and permit of freedom of movement of the cranks therein, while at the same time operating the cranks so as to change the angle of presentation of the vanes to the wind as the head is moved longitudinally upon the sleeve I. The sleeve I rests at its outer end upon a cross-piece, *i*, of the right-angled frame or support J, the lower or inner end of which is fastened to the revolving disk A'. The cross-piece *i* is cast with an elbow or bracket, *i'*. K

is a governor-lever pivoted in the bracket i' , and limited in its forward movement to a perpendicular position by a stop j , as seen in Fig. 2. This lever has a disk or plate, K' , capable
 5 of adjustment thereon, to permit it to be raised or lowered to vary its resistance to the force of the wind. Among other ways to effect its adjustability, one is by providing the lever with a way or rail extending in the di-
 10 rection of its length, and the disk with a socket or flanges overlapping the rail of the lever, as clearly seen in Fig. 1, which allows the sliding of the disk thereon. The disk serves, in addition to affording a medium for
 15 the impingement of the wind, as a weight to increase or diminish its leverage, as above stated.

The extreme lower end of the lever K has a small disk, cushion, or other suitable surface,
 20 k , which bears against a similar disk, k' , or bar, which is affixed to and connects the rod I' to the arm l of a sleeve, l' , fitted and sliding upon the tube I , against the sleeve or tube H' of the head or follower H .

From the foregoing it will be observed that
 25 when the action of the wind is sufficiently strong to overcome, in a greater or less measure, the resistance of the governor K K' , the lower end of its lever will force the sleeve l' , act-
 30 ing as a piston, against the tube H' , carrying the follower or head H , which will compress the spring L , encircling a collar of the head H and the inner portion of the shaft E , and thus cause the arms of the follower to operate
 35 the cranks g' , which in turn vary the angle of presentation of the vanes G' to the wind, taking them more or less out of the wind. This action of the parts enables the wheel to revolve at a uniform rate of speed, however
 40 strong the wind may blow, or permit its vanes to automatically adjust themselves entirely out of the wind, and thus effect the stopping of the wheel in a violent wind or storm. The speed of the wheel may be varied, increased,
 45 or diminished by the adjustment of the governing disk or weight K' upon its lever K . The spring L holds the vanes in their working position or angle and as against being opened by the action of the governor K K' , unaided
 50 by the force of the wind.

M is a lever, called for convenience a "wind-lever," provided with a suitable lug and pivoted on the bracket C^3 , and has its upper end arranged just opposite to the end of the shaft
 55 of the wind-wheel. The lower end of this lever extends below the bracket, and is provided with a dovetail or other suitably shaped wind-board, M' . The upper end of the lever is connected to the rod I' , and the lower end has made
 60 fast to it one end of a cord, m , the other end of which is passed over an anti-friction wheel, c^2 , and thence down through the tube B , and is connected to a tilting trough, N , hereinafter more fully described. The end of the rod I'
 65 being disconnected from the arm K , the lever M may be drawn inward by the cord m without

affecting the position of the vane K' . This independent movement is effected when the sails are thrown out of the wind by the action of
 70 the tilting trough N . When the sails are thrown out by the action of the wind the latter acts on the vane K' and the wind-board M' , and thereby the movement of the sails is more easily effected.

It will be seen that the vane is placed in the
 75 rear and the wind-lever in front of the wheel, and that they both act in conjunction through the medium of the rod I' , which passes through the shaft, and control the sails when acted upon by the wind.

Another means of controlling the sails is by a tilting trough, N , supported in proper position below the wheel. The trough is supported
 80 on its support or fulcrum n , and tilts in the direction shown in dotted lines, Fig. 2. Its bottom is inclined upward from the spigot t to the
 85 opposite end at r , where it projects, and is provided with corrugations or notches r' for holding the bail of a counterbalancing-weight, s . The declination of the bottom makes the trough
 90 deeper at one end than at the other, so that the weight of water will accumulate at the end which falls when the trough tilts. The trough is provided with a series of holes, q , on its
 95 side, so that it may be set one way or the other and require a greater or less quantity of water to tilt it. The weight s may be used to counterbalance the weight of water, so that more or less of the latter will be required to tilt the
 100 trough.

On the upper edge of the trough there is fastened a short plate, P' , perforated by a series of holes, P , in any one of which may be
 105 caught a hook, o , to the upper end of which is fastened the lower end of the cord m . The plate P' is arranged on that side of the fulcrum n , so that the hook o and the cord m , connected thereto, are drawn down by the tilting of the
 110 trough. It will be seen that when the trough tilts, as shown in dotted lines, Fig. 2, the cord m is drawn down and the lever M is drawn inward, and thereby the sails are thrown out of the wind. This trough is connected in any
 115 well-known manner with the main water tank or reservoir, so that when the latter is filled to any given point the water will flow over into and fill said trough.

It will be seen that there are provided three methods of adjustment—namely, the setting of
 120 the trough to the right or left on the fulcrum n , the setting of the counterbalancing-weight away from or near to the end of the trough, and the adjustment of the hook o along the plate P' , by which the power and action of the tilting trough are controlled.

On the outer rim, g , of the wind-wheel there are provided a series of stops, G' , which prevent the sails G^2 from being drawn back beyond the plane of said rim by the action of the
 130 retracting-spring L acting against the crank-head H .

Having thus fully described my invention, I

claim and desire to secure by Letters Patent—

1. The combination, with a wind-wheel supported on a hollow shaft and having its sails pivoted to turn into or out of the wind, of the vane placed in a vertical position in the rear of and pivoted to move to and from the sails, a wind-lever placed in front of the sails, a central connecting-rod put through the hollow shaft and connected to the arm of the wind-lever and bearing against the end of the arm of the vane, and the necessary mechanism connecting the central rod with the sails, substantially as set forth.

2. The combination, with the sails of a wind-wheel grouped in sections or series and pivoted to the spokes of the wheel to turn into or out of the wind, of the sliding head H, provided with arms *h*, cranks *g*⁷, extended and forming spokes in the wheel, and having sails fastened thereto, and rods or links *g*⁶, connecting the outer corners of the sails in the series, substantially as set forth.

3. The combination, with the wind-wheel having a hollow shaft, of the tilting trough N, cord *m*, lever M, pivoted to the frame, and pitman I', put through the hollow shaft of the wheel, and having one of its ends connected to the end of lever M and its other end connected by suitable mechanism to the pivoted sails in the wheel, substantially as set forth.

4. The combination of the shaft E, the wheel G, having the hinged sails G², with their spokes or shafts provided with cranks *g*⁷, the spring

L, the sliding head H, having arms *h*, the piston *l* *l'*, having the bar *h'*, and the governor K K', substantially as and for the purpose set forth.

5. The combination of the shaft E, the wheel G, having the hinged sails G², with their shafts provided with cranks *g*⁷, the spring L, the sliding head H, having arms *h*, the piston *l* *l'*, the rod I', connected to the piston *l* *l'*, governor K', and the wind-lever M, substantially as and for the purpose set forth.

6. The combination of the shaft E, having the wheel G and the eccentric or cam E', the lever D, having its pivotal point at the convergent ends of its arms, while their divergent ends are provided with concaved bearings *e*, and the pitman F, substantially as and for the purpose set forth.

7. The combination of the trough-lever N, having the several adjustments, with the wheel G, having the hinged sails provided with cranks, the armed sliding head H, the piston *l* *l'*, rod I', connected to the piston, lever M, and cord *m*, or its equivalent, substantially as and for the purpose set forth.

In testimony whereof I affix my signature, in presence of two witnesses, on this 5th day of December, 1881.

EDMOND BUCKLEY.

Witnesses:

ROBERT ANDERSON,
L. F. WILSON.