

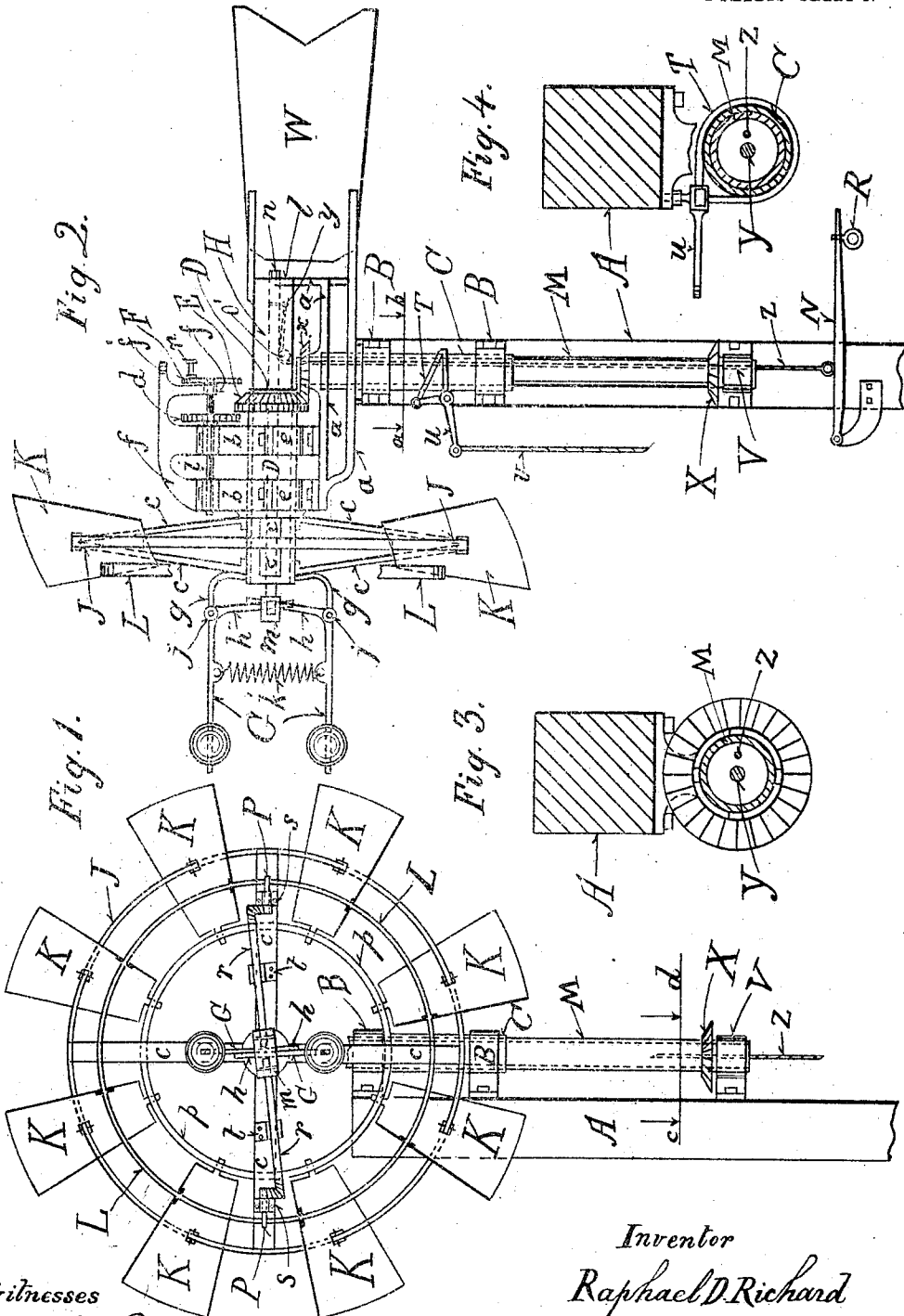
R. D. RICHARD.

WINDMILL.

APPLICATION FILED OCT. 9, 1909.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.



Witnesses
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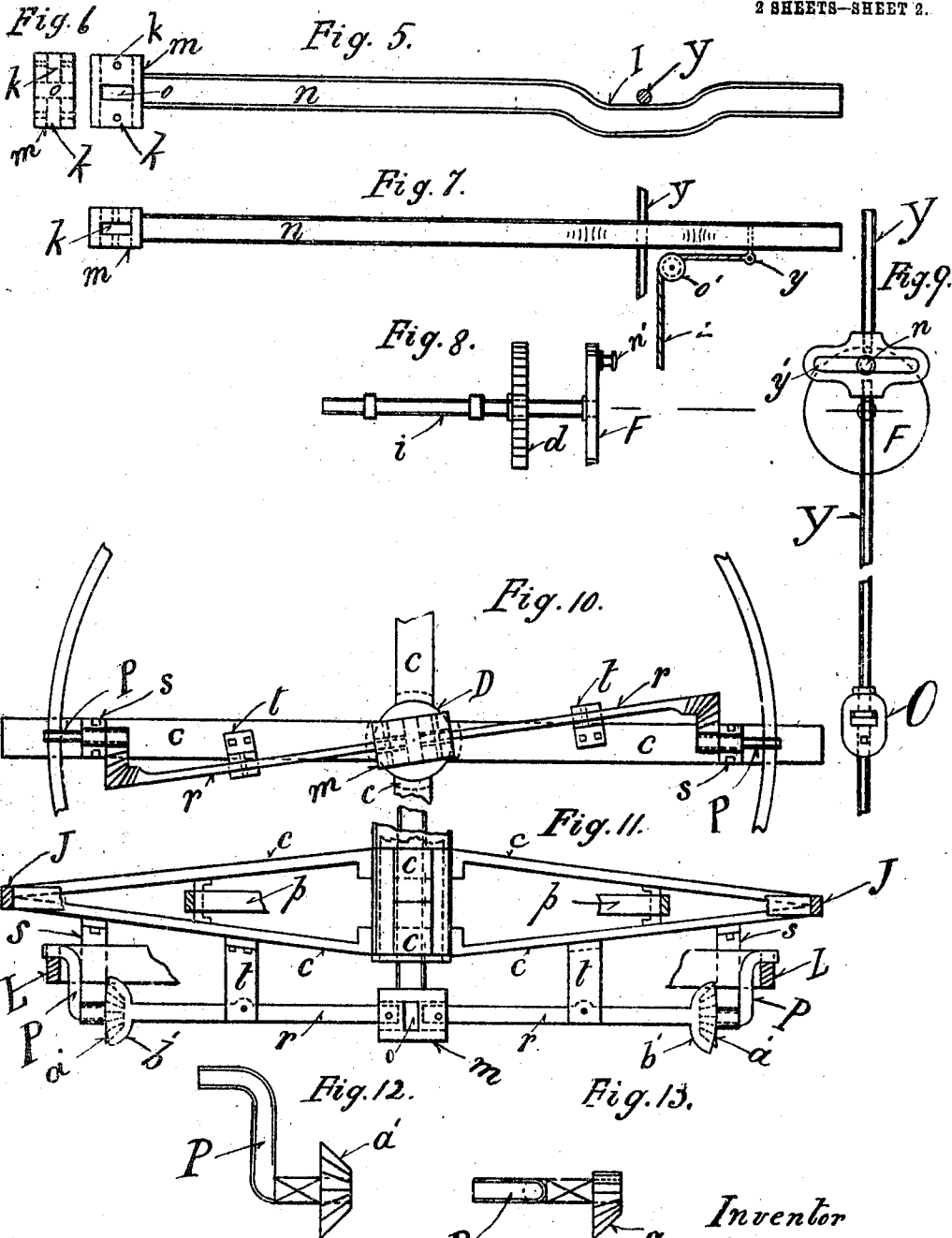
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UNITED STATES PATENT OFFICE.

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WINDMILL.

1,038,657.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed October 9, 1909. Serial No. 521,916.

To all whom it may concern:

Be it known that I, RAPHAEL D. RICHARD, a British subject, residing at Westchester Lake, in the county of Cumberland, in the Province of Nova Scotia, in the Dominion of Canada, have invented new and useful Improvements in Windmills, of which the following is a specification.

My invention relates to improvements in windmills the speed of which is controlled by the application of centrifugal governors and the objects of my invention are to provide a windmill that can be used either as a power mill or a pumping mill and can be readily changed from one to the other, also a mill in which the governor can be regulated by the operator while the machinery in connection is in motion, and a mill which is simple, efficient and economical in construction and operation. I attain these objects by the mechanism illustrated in the accompanying drawing in which—

Figure 1 is a front general view of my invention; Fig. 2 is a side view of the machine with the pump rod removed; Fig. 3 is an enlarged section on line *c. d.* showing the bevel cog wheel for the transmission of power; Fig. 4 is an enlarged section on line *a. b.* showing the friction brake by which the mill is held steadily in any desired position; Fig. 5 is a plan of the regulating rod showing a section of the pump rod; Fig. 6 is an end view of Fig. 5; Fig. 7 is an elevation of the same showing the connection of the regulating cord thereto; Fig. 8 is the pump rod shaft showing the driving cog wheel and pump disk in place; Fig. 9 is an end view of said shaft and disk showing the pump rod in position; Fig. 10 is a front elevation of the gear connecting the governor with the sails of the mill; Fig. 11 is a plan of the same; Fig. 12 is an enlarged plan of the crank and bevel wheel segment shown in Figs. 10 and 11 separated from the other gear; Fig. 13 is an elevation of the same.

Similar letters refer to similar parts throughout the several views.

In the drawing A is the mast on which the machine is mounted, the bearings B, B, on the mast A carrying the upright cylinder C and the frame *a a a* constitute the turntable; the tube D is the hub to which the arms *c* are attached and which carries the combination bevel and face gear wheel E; *e e* are bearings secured to the turntable and in which the hub D revolves; *i* is the pump

shaft which carries the pump disk F and the face gear wheel *d* and revolves in the bearings *b b* which are carried by the bearings *e e*; the supplementary bearing *f* which support the overhang of the pump shaft is supported on the bearings *b b*.

g g are brackets secured to two of the arms *c* for the purpose of carrying the governor G and to which it is pivoted at *j j*; *k'* is a coiled spring attached to two of the governor arms and which serves as a check on the centrifugal force of the balls.

H is a tube, one end of which is rigidly fixed to the turntable at *l* the other end passing through the hub D to its opposite end.

n is the regulating rod having the offset I and the rigid slotted head *m* which has the slots *o* and *k k*. Through the slots *o* the arms *h h* of the governor G pass freely; in the slots *k k* one end of the levers *r r* is secured.

The ring J is secured rigidly to the arms *c* passing through the sails K which are pivoted thereto, the ring *p* is also rigidly secured to the arms *c* the inward end of the sails K being pivoted thereon. The ring L is carried by the sails K each one of which is hinged to it.

P P are cranks which carry a segment of a gear wheel *a'* on one arm, the opposite arm engaging with the movable ring L.

s s are bearings carried by the arms *c* and in which the cranks P P have a partial revolution.

The levers *r r* are pivoted on the stands *t t* secured to the arms *c* and carry a segment of a wheel *b'* which engages with the segments carried by the cranks P P.

W is the vane.

M is the upright power shaft which consists of a tube which revolves in the bearing V on the mast A and on the interior of the turntable tube C and carries the bevel gear wheels X and *x*, the wheel *x* engages with the combination bevel and face gear wheel E on the hub D and from the wheel X power is taken off as desired.

T is a brake band passing around the turntable tube C and is operated by the cord *v* depending from the brake lever *u* and is for the purpose of holding the mill steady in any one position.

Attached to the mast A is the weighted regulating lever N carrying the movable weight R and connected to the regulating rod *n* by the cord *z* which passes up through

the shaft M over the sheave o' in the rigid tube H and is connected with the rod at y ; the purpose of this lever is to assist and regulate the action of the governor.

5 y' is the race way in which the pump disk pin n' plays and to which is attached the pump rod Y Y, the upper end of which is guided in the supplementary bearing f at f' .
O is swivel coupling in the pump rod
10 Y Y.

The operation of the machinery is as follows: The governor is adjusted to a certain required speed of the windmill by means of the regulating lever N through the cord z
15 and the regulating rod n , when this speed is exceeded the governor through the arms h , the slotted head m , the levers r , the cranks P and the wheel segments a' and b' operating on the ring L causes it to revolve
20 and turn the connected sails to a more acute angle with the wind thus removing a portion of the pressure and reducing the speed. If for any cause the governor failed to check the speed of the mill the regulating
25 lever N being near the operator could be made available for that purpose. When the mill is used for ordinary power purposes the combination gear wheel E moving on a spline is engaged with the bevel wheel x ,
30 and when desirable to use the mill for pumping the combination gear wheel E is disengaged from the wheel x moved along on the hub D and engaged with the face gear wheel d on the pump shaft i .

5 I am aware that previous to my invention windmills have been made using centrifugal governors, I therefore do not broadly claim such as my invention, but

I claim—

0 1. In a windmill, in combination, a turntable, a wheel rotatably mounted on the turn-table and including arms and fixed rings and a movable ring, sails pivotally secured to the fixed rings and having connection with the movable ring, crank-arms journaled on the aforesaid arms, and at one end engaging said movable ring and at their opposite ends carrying a gear segment,

levers pivoted on the first-mentioned arms and each having a segment gear for mesh 50 with one of the aforesaid gear segments of the crank-arms, and means for moving said levers on their pivots to effect operation of the meshing gear segments of the levers and crank arms to cause movement of the movable ring and shift the sails on their pivots.

2. In a windmill, in combination, a turntable, a wheel rotatably mounted on the turn-table and including a hub, arms radiating from the hub, fixed rings secured 60 to said arms and a movable ring mounted for cooperation with said fixed rings, sails pivotally secured to the fixed rings and having connection with said movable ring, crank arms journaled on the aforesaid arms 65 and having engagement with said movable ring and each carrying a gear, a regulating bar journaled through the hub of said wheel, levers having connection with said regulating bar and with said arms and each of 70 the levers carrying a gear for mesh with the aforesaid gears of the crank arms, and means for moving said levers to effect operation of the said meshing gears of the levers and crank arms to cause movement of the 75 movable ring and to shift the sails on their pivots.

3. In a windmill, in combination, a turntable, a wheel rotatably mounted on the turn-table and including arms and fixed 80 rings and a movable ring, sails pivotally secured to the fixed rings and having connection with the movable ring, crank arms journaled on the aforesaid arms and each carrying a gear, levers movably mounted on 85 the first mentioned arms and each having a gear for mesh with the aforesaid gears of the crank arms, and means for moving said levers to effect operation of the meshing gears of the levers and crank arms to cause 90 movement of the movable ring and thereby shift the sails on their pivots.

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