(No Model.)

E. C. NORTON.

WINDMILL REGULATOR.

No. 483,080. Patented Sept. 20, 1892.

Fig. 1.

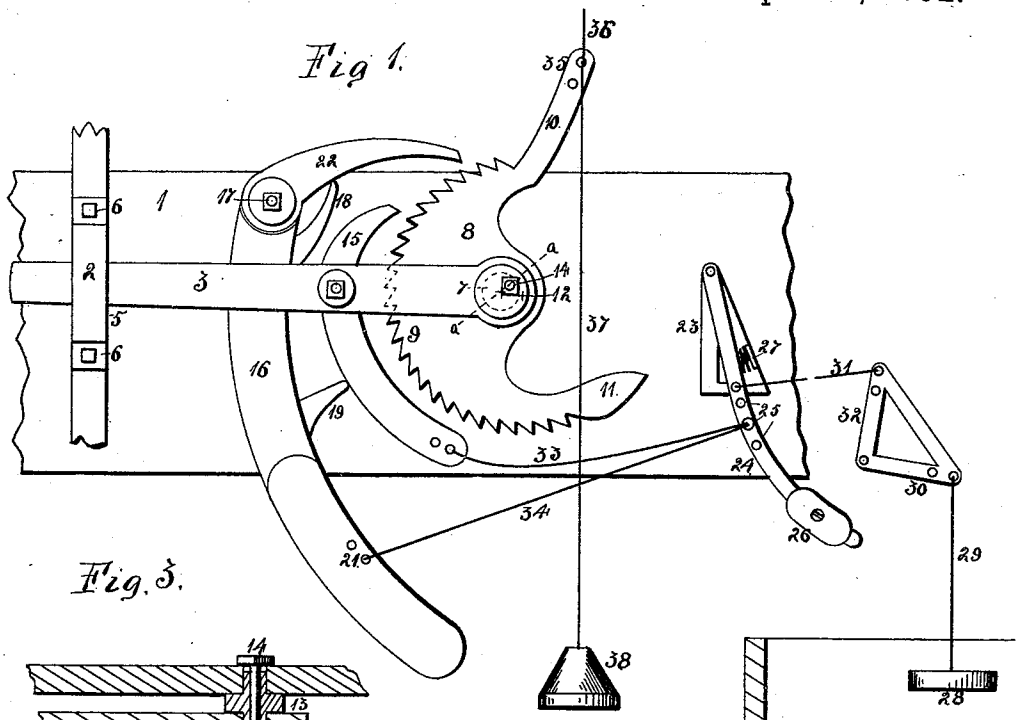

Fig. 3.

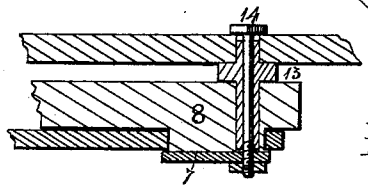

Fig. 2.

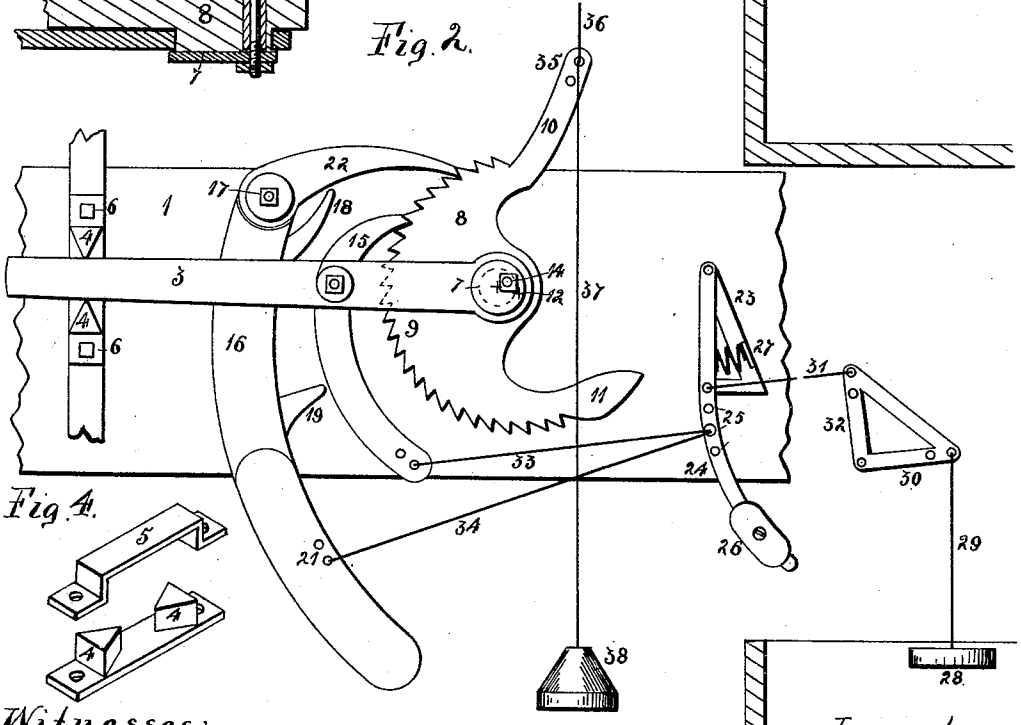

Fig. 4.

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UNITED STATES PATENT OFFICE.

ELIPHALET C. NORTON, OF BELVIDERE, ILLINOIS.

WINDMILL-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 483,080, dated September 20, 1892.

Application filed April 20, 1892. Serial No. 429,962. (No model.)

To all whom it may concern:

Be it known that I, ELIPHALET C. NORTON, a citizen of the United States, residing at Belvidere, county of Boone, State of Illinois, have invented certain new and useful Improvements in Windmill-Regulators, of which the following is a specification.

The object of this invention is to provide for a windmill a device for automatically governing its action according to the supply of water in the water-tank, and also to make the mill more sensitive to the action of the safety device which throws the wheel "out of the wind" during heavy storms.

In the accompanying drawings, Figure 1 is a face elevation of the regulator with the float and connections, the pawl and detent being out of engagement with the toothed segment. Fig. 2 is a like view showing the pawl and detent engaging the teeth of the segment and in the position they occupy when the mill is to be thrown "out of gear." Fig. 3 is a section through the segment and its pivoted lever on dotted line *a*, Fig. 1. Fig. 4 is an isometrical representation of the bracket for connecting the lever 3 and the pumping-rod.

In the construction of this regulator I provide the supporting-beam 1, extending through the windmill-tower, beside the pumping-rod of the mill. A bracket 2 is secured to the rod on one side thereof, and through this bracket the free end of this oscillating lever 3 extends. This connecting-bracket is composed of a base portion having the steelyard-bearings 4, between which the lever 3 projects, and the cap 5 for confining the lever to its place, the two bolts 6 securing the two parts together and the whole to the pumping-rod. The inner end of the lever 3 is pivoted upon the projecting hub 7 of the segment 8, which hub is eccentric to the curving periphery of the segment. The periphery of this segment is serrated with the slanting teeth 9, and from its two extremities two horns 10 and 11 extend, the first outward from the center of the segment, the latter continuing in the curve of its periphery, but not being provided with the teeth 9, like the balance of the curving edge. The curve of this periphery is struck from a center 12; but the segment 8 oscillates not upon this point, but a tubular bushing 13, extending through the segment, and a bolt 14 extends through the eccentric hub 7 and the tubular bushing 13 to hold the several parts in place. A pawl 15 is pivoted to the lever 3 intermediate its ends and its point engages the ratchet-teeth 9 of the segment. The curving tripping-lever 16 has a pivotal connection with the supporting-beam 1 by means of the bolt 17, and the projections 18 and 19 extend from its concave side, their purpose to be explained hereinafter. The lower end of this tripping-lever is weighted and the holes 21 therein provide a point for attachment with the lever. The detent 22 is pivoted upon the bearing 17 and its free end, engaging the ratchet-teeth 9, acts as a detent for the same, releasable, however, by a forward movement of the lever 16 when the projection 18 thereof disengages the dog from the teeth. The same movement of the tripping-lever also releases the pawl 15 by the projection 19 striking its lower end, freeing the teeth 9 from any engagement whatever and permitting the free movement of the segment on its bearings.

It will be understood from the foregoing that the oscillations of the lever 3 will cause the segmental ratchet-plate 8 to turn on its bearing 13, the pawl 15 transmitting the upward movement and slipping on the downward movement, while the detent 22 prevents a backward oscillation of the segment until released by a movement of the lever 16.

A bracket 23 is secured to the supporting-beam 1 at a little distance from the segment 8, and the curved lever 24 is pivoted to its upper end. This lever is provided with several holes 25 in its length and at its lower end has an adjustable weight 26 and near its upper end the coiled compression-spring 27, extending between the lever and the bracket.

A float 28 is placed in the water-tank, and a flexible connection 29 extends therefrom to the horizontal arm 30 of a pivoted bell-crank lever, the other arm 32 of which has a like connection 31 with the lever 24, and the latter has connections 33 and 34 with the levers 15 and 16, respectively, whereby the former and the detent 22 are withdrawn from engagement with the ratchet-teeth 9. The arm 10 of the segmental ratchet-plate 8 is provided with the holes 35 for the attachment of the wire 36, by means of which the wind-wheel is thrown out of the wind, and a counterbal-

ance-weight 38 is connected to this arm by the wire 37, making the actions of this device more sensitive to the pulls upon the wire 36.

The operation of my regulator is as follows, the various parts being located as described: The windmill to which my device is attached, being "in gear," pumps as the wind drives it until the supply of water in the tank rises to a predetermined level, when the float 28, rising also, slackens the wire 29, allowing the bell-crank lever to turn on its pivot, the lever 24 to swing back by the force of the spring 27 and the weight 26, and permitting the pawl 15 to engage the ratchet-teeth 9. Owing to the engagement between the pumping-rod and the lever 3, the latter, with the pawl 15 pivoted thereon, will engage the teeth 9, and at each upward movement of the lever the segment 8 will be rotated a little distance on its pivot, the detent 22 preventing any backward movement of the segment, and, assisted by the weight 38, the arm 10 will thus be caused to pull down upon the wire 36, throwing the sail of the windmill against the wind-wheel and holding it out of the wind.

When the supply of water in the tank is diminished, the float descends, oscillating the bell-crank lever, moving the weighted lever 16, which latter by its projection 18 causes the detent 22 to be disengaged from the ratchet-teeth 9 and by the spur 19 insures the withdrawal of the pawl 15 from the same teeth.

The force of the wind brings the sail of the mill and its wheel into proper relative positions for pumping, rotating the segment 8 on its pivot 13 to its first position.

The power necessary to throw the mill out of the wind is materially lessened by the eccentricity of the bearings 7 and 13, for as the sail of the mill is drawn toward the wind-wheel the driving power is diminished, and this is counteracted by an increase of leverage on the teeth 9, those at the bottom of the plate being at a greater distance from the pivotal center 13; also, the pawl 15 has been brought nearer to the ratchet-teeth by the pivot of the lever 3 swinging rearward of the pivot of the segment.

When the mill is thrown entirely out of gear, it may still have a limited pumping movement, and when the pawl 15 has oscillated the ratchet-segment as far as is possible it is at liberty to slide upon the periphery of the arm 11 during any movement the mill may then have.

The weight 38 is added to counterbalance the resistance of the sail of the mill, which of course makes it more easy to operate and more sensitive in its automatic closing in high winds.

Should the lower bearings 4 of the bracket forming the connection between the lever 3 and the pumping-rod of the mill become worn, the whole bracket may be inverted, bringing the unworn upper edge in contact with the lower side of the lever 3.

The bell-crank lever, the lever 24, the lever 16, the pawl 15, and the arm 10 are provided with several holes, by which the connections between these various parts are adjusted, varying the relative movements.

Fig. 3 illustrates the form of bearing used in the pivots 13 and 17, and the same, slightly modified, is used in the bearing of the pawl 15 with the lever 3. I demonstrate this a "tubular bearing," it comprising a tubular shank divided into two parts by a shoulder near its middle. One end of this shank extends into an opening in the supporting-beam 1, and the outer end forms the bearing for the pivotal part. A washer covering the outer end of the shank prevents displacement of the moving member, and a bolt extending through the bearing-tube holds the pivot rigidly to the supporting-beam.

I claim as my invention—

1. A windmill-regulator having a supporting-frame, an eccentrically-pivoted toothed segment, a lever, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, and a connection between the segment and the windmill and between the lever and the pumping-rod.

2. A windmill-regulator having a supporting-frame, an eccentrically-pivoted toothed segment, the teeth being of substantially uniform depth, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, and a connection between the segment and the windmill and between the lever and the pumping-rod.

3. A windmill-regulator having a supporting-frame, an eccentrically-pivoted toothed segment, a lever pivoted off the center of the segment, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, and a connection between the segment and the windmill and between the lever and the pumping-rod.

4. A windmill-regulator having a supporting-frame, a pivoted toothed segment, a lever pivoted off the center of the segment, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, and a connection between the segment and the windmill and between the lever and the pumping-rod.

5. A windmill-regulator having a supporting-frame, an eccentrically-pivoted toothed segment, a lever, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, a float, an intermediate lever, a spring for this lever, a connection between the float and the intermediate lever, and connections between the lever and the pawl and the detent, and a connection between the segment and the windmill and between the first-mentioned lever and the pumping-rod.

6. A windmill-regulator having a supporting-frame, an eccentrically-pivoted toothed segment, a lever, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, a connection between the seg-

ment and the windmill, and a bracket for the lever on the pumping-rod, the bracket composed of a base having two V-shaped bearings and a cap removably held in position over the bearings.

7. A windmill-regulator having a supporting-frame, an eccentrically-pivoted toothed segment, a lever, a pawl on the lever for engaging the teeth of the segment, a detent for the segment, a float, an intermediate lever, a connection between the float and the intermediate lever, and connection between the intermediate lever and the pawl and the detent, a connection between the segment and the windmill, said connections made adjustable, and a connection between the first-mentioned lever and the pumping-rod.

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