(No Model.) 2 Sheets—Sheet 1.

J. M. LOWE.

REGULATOR FOR WINDMILLS.

No. 442,487. Patented Dec. 9, 1890.

Fig 1

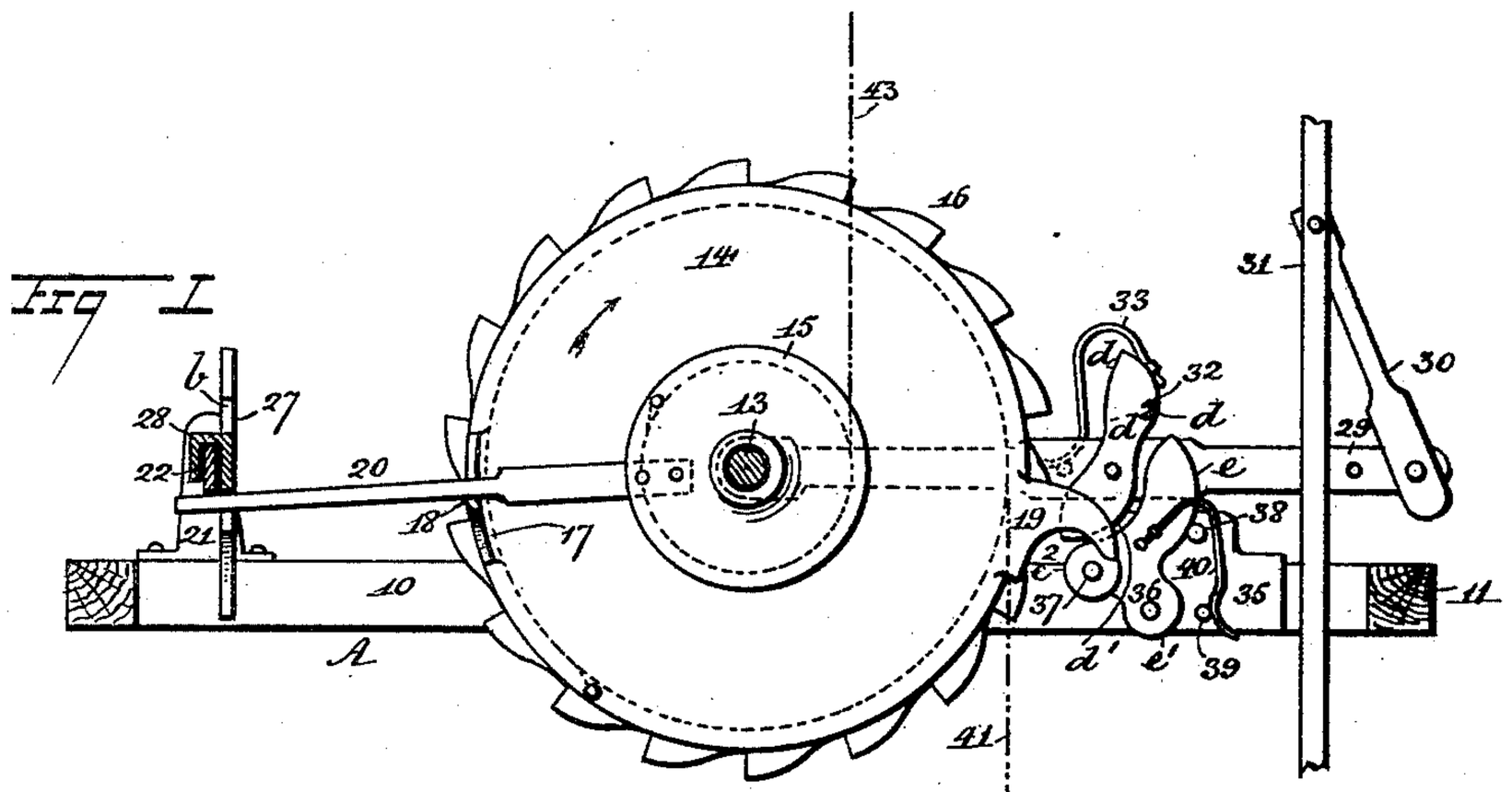


Fig 2

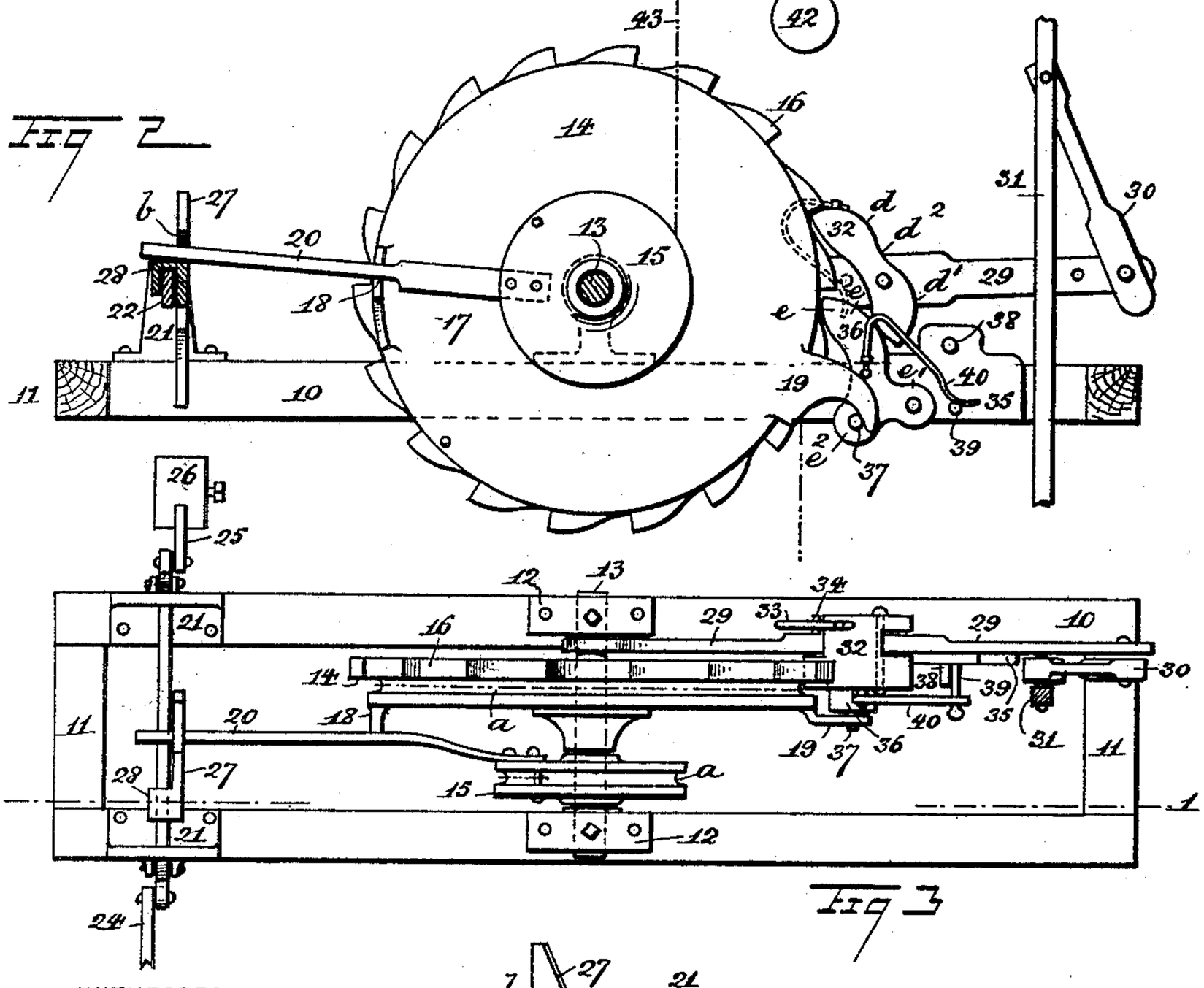
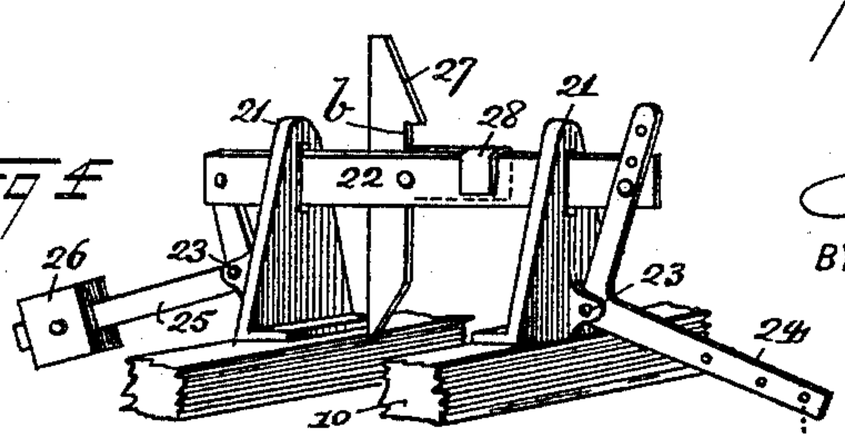


Fig 3

Fig 4



WITNESSES:

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C. Sedgwick

INVENTOR:

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BY Munn & Co

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

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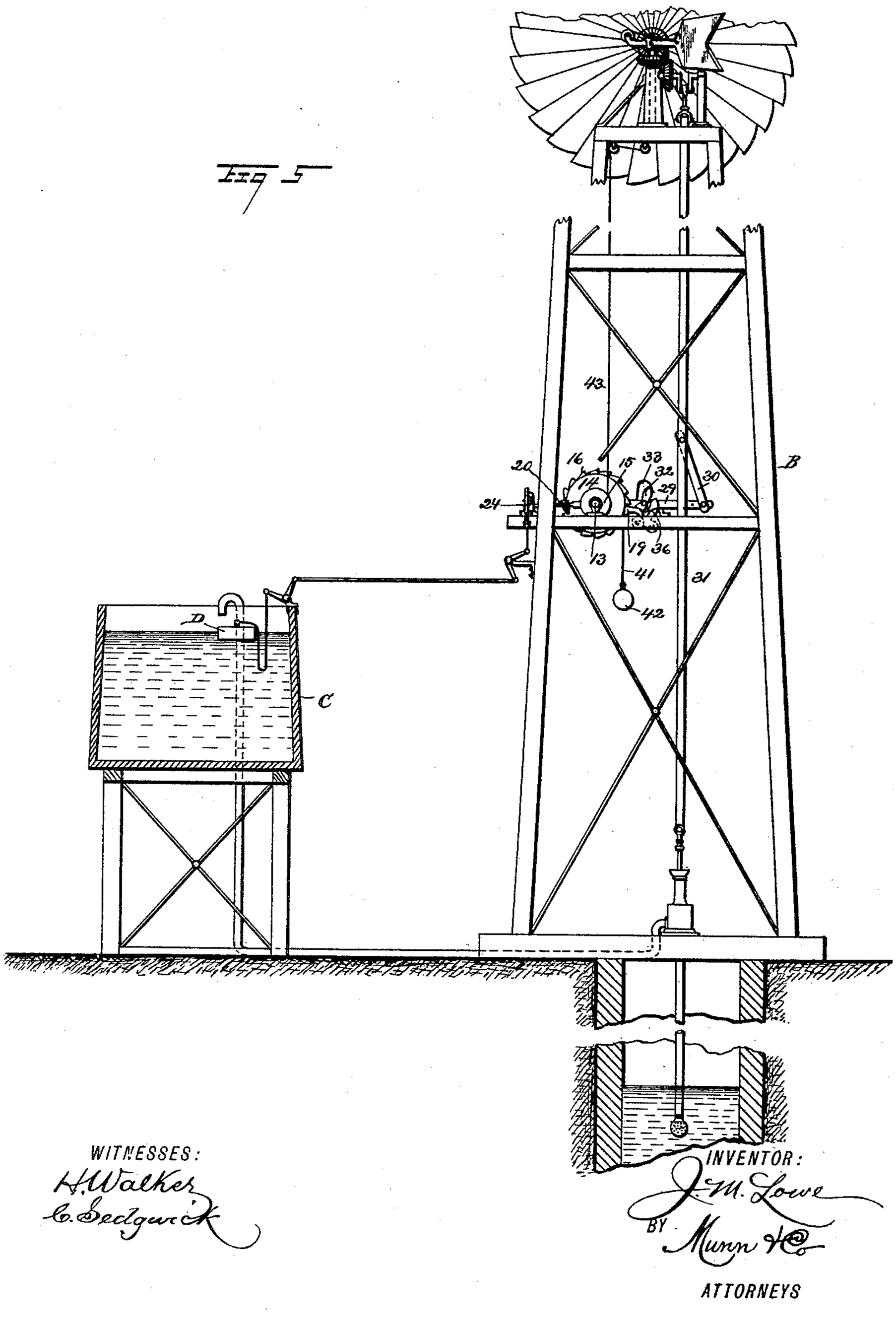
Fig 5



WITNESSES:
H. Walker
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INVENTOR:
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UNITED STATES PATENT OFFICE.

JOHN M. LOWE, OF BUTLER, INDIANA.

REGULATOR FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 442,487, dated December 9, 1890.

Application filed April 15, 1890. Serial No. 347,974. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. LOWE, of Butler, in the county of De Kalb and State of Indiana, have invented a new and Improved Regulator for Windmills, of which the following is a full, clear, and exact description.

My invention relates to a regulator for windmills, and has for its object to provide a simple, durable, and effective device whereby when the water becomes low in the tank the mill will be automatically thrown into gear to supply the deficiency, and when the water has been restored to its proper level wherein the device will also automatically throw the mill out of gear and stop the water-supply.

A further object of the invention is to accomplish the above results without strain either upon the mill or upon the pump.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters and figures of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal section through the device, taken on line 1 1 of Fig. 3, illustrating the position of the parts when the mill is out of gear. Fig. 2 is a similar view illustrating the position of the parts when the mill is thrown into gear and the pump is in operation. Fig. 3 is a plan view of the device with the parts in the position illustrated in Fig. 2. Fig. 4 is a perspective detail view of the sliding trip-bar and its attached levers; and Fig. 5 is a side elevation, broken away and partly in section, of a windmill having my improvement applied.

B is a windmill, which may be of any well-known form, and C is the tank which is to be supplied with water by the windmill.

A is a frame, consisting of the side bars 10 and end bars 11, for supporting the regulator. This frame is attached to the derrick of the mill, across the center of derrick at the point where the band-boards of derrick cross from post to post.

At or near the center of the frame, upon the upper face of each of the side bars 10, a bracket 12 is secured, in which the ends of a shaft 13 are fixed. Upon this shaft 13 a large wheel 14 and a smaller wheel 15 are loosely mounted, each of the said wheels being provided with a peripheral groove *a;* and the larger wheel, at its outer edge, is provided upon the periphery with a series of teeth 16.

Upon the inner side face of the wheel 14 a keeper 17 is cast on wheel, the outer edge of which keeper extends outward flush with the periphery, and the said keeper is recessed to form a shoulder 18.

Upon the nearly-diametrically-opposite side edge of the wheel 14 a hook-like trip or bumper 19 is cast, which extends beyond the periphery and is curved downward, or it may be straight or otherwise formed than illustrated.

To one side of the smaller wheel 15, contiguous to the larger wheel, one end of a spring-bar 20 is attached, the said spring-bar being of sufficient length to extend beyond the peripheral surface of the larger wheel, and at one end of the frame a vertical standard 21 is attached to each side bar 10, which standards are provided near their upper ends with slots, and in said slots a transverse trip-bar 22 is held to slide. Each standard is preferably provided upon its upper face with lugs 23, and in the lugs of one standard an angled lever 24 is pivoted, the upper member of which lever is adjustably connected to the end of the trip-bar immediately above it, and the lower end of the said lever is connected with the float D in the tank C, in which the depth of water is to be regulated by bell-crank levers connected together and to the said lever and float, as shown in Fig. 5, or it may be connected in any other suitable or approved manner.

Between the lugs 23 of the opposite standard another angled lever 25 is fulcrumed, the vertical member of which lever is also connected at one end with the end of the trip-bar 22, and upon the horizontal member of the lever an adjustable weight 26 is held to slide. In operation the forms of these levers may be changed, or the lever 24 may be dispensed with, if the situation of the tank requires such changes.

Upon the trip-bar an essentially T-shaped

latch 27 is fulcrumed, the fulcrum-point being at or near the center of the head of the T, a portion of which head extends above the trip-bar and a portion below. The shank member of the T, which is parallel with the trip-bar, is provided with an ear 28 at its upper edge, the said ear being bent downward over the trip-bar to prevent the upper portion of the head of the T being carried out of a perpendicular position when pressure is exerted against the lower end. The upper end of the vertical member of the latch 27 is formed with the recess *b*, through which recess the end of the spring-rod 20 is adapted to pass, as shown in Fig. 2, and when the said rod is in the said recess it is prevented from moving vertically until the trip-bar 22 is manipulated. If in practice it is found desirable, the form of the latch 27 may be changed.

Upon the shaft 13, between its bearings and near the outer face of the large wheel, one end of a lever 29 is fulcrumed, the outer end of which lever has pivoted thereto the lower end of a swing-beam 30, which beam is adapted at its upper end for attachment to the pump rod or plunger 31 of the mill.

Upon the lever 29, between its ends, a dog 32 is pivoted, the said dog being provided with a slot in its lower end, through which the lever passes, whereby the dog at the inner side will extend over or be in alignment with the toothed surface 16 of the large wheel 14. This dog 32 is controlled by a spring 33, which spring is secured at the rear of the upper end of the dog, and is carried downward in front of the dog and made to bear upon a pin 34, secured to the lever. The contour of this dog is somewhat peculiar, the upper, front, and rear surfaces being convexed, as illustrated at *d*, and likewise the front and rear lower surfaces, as illustrated at *d'*, and the front and rear intermediate surfaces are concaved, as shown at d^2.

At the rear of the larger wheel 14 an offset-plate 35 is held upon the inner face of the side bar 10, contiguous to the outer face of the larger wheel, and upon this plate a dog 36 is pivoted at its lower end. This dog is provided with a hook-like upper end *e*, and at its base with two lateral circular extensions *e'* and e^2, the extension e^2 being the thinner, and the pivotal pin of the dog is located practically at the center of the extension e^2. From the center of the side face of the extension e^2 a pin 37 is laterally projected, and two practically aligning pins 38 and 39 are laterally cast to the plate 35 of the side beam at the rear of the dog 36, the upper pin 38 being adapted to act as a buffer or stop-pin for the dog and the lower pin as a bearing for the lower extremity of a spring 40, the upper end of which spring is attached to the inner face of the dog.

Upon the grooved surface of the larger wheel one end of a wire or chain 41 is secured, the lower end of which wire or chain is provided with a weight 42, sufficiently large to compel the wheel to revolve when the said wheel is released, and upon the peripheral surface of the smaller wheel 15 one end of a wire or chain 43 is secured, which wire or chain is attached to the pull rope or chain of the windmill, as best shown in Fig. 5.

When the parts are in the position illustrated in Figs. 1 and 5, the mill is out of gear, and the parts are brought into this position by reason of the tank C being filled with water to its proper level; but the moment the water has fallen below a predetermined point in the tank the float D of the tank will have descended so low as to draw sufficiently hard upon the horizontal member of the angled lever 24 to cause the bar 22 to slide in the direction of the said lever, whereupon the lower end of the T-latch 27 is brought to bear against the outer end of the spring-bar 20, secured to the smaller wheel, and when sufficient pressure has been exerted against said bar to carry the latter out of engagement with the keeper 17 upon the larger wheel the tension of the pull rope or chain of the windmill will cause the wheel 15 to revolve and the rod 20 to travel around and contact with the upper surface of the sliding bar, as illustrated in Fig. 2, where it is brought in engagement with the keeper surface of the upper portion of the latch 27. This movement puts the mill in gear, and the very moment that the keeper of the large wheel is freed from the spring-bar 20 the weight 42, acting upon the said wheel, causes it to revolve in the direction of the arrow, whereupon the outer extremity of the hook-plate 19, contacting with the pin 37 of the lower dog 36, forces the said dog into engagement with one of the teeth of the wheel. The pump-piston at this moment may be at any point either upward or downward or at any intermediate point. Upon the downward movement of the pump-piston the inner convexed surface of the upper dog is brought in contact with the outer convexed surface of the lower dog, and the said upper dog is thereby thrown in contact also with the teeth of the larger wheel. As the pump-piston operates, the wheel 14, by means of the engaged dog 32, is turned to the rear, and when one revolution of the wheel has been made the weight 42 is sufficiently wound up, and the hook or trip 19, coming into contact with the under side of the pin 37 of the dog 36, disengages the said dog, whereupon on the downward stroke of the pump-rod the lower end of the dog 32 passes on the inside of the dog 36, and is disengaged while the wheel 14 is held by the keeper 18 and the weight 42 is held in place and the mill continues to pump. When sufficient water is in the tank, the float rising to its greatest height releases the pressure upon the lever 24, and the weight upon the opposite lever 25 acting, draws the sliding bar 22 in the direction thereof, whereupon the latch 27 is carried out of engagement with the spring-rod 20. The weight 42, when sufficiently wound up, is held

in suspension by the keeper, which is under the spring-bar 20, and is so held until sufficient water has been pumped, whereupon the said spring-bar is released from the recess in the latch 27, and the weight 42, acting upon the large wheel, which is now free to revolve in the direction of the dogs, carries with it the spring-bar, and when the complete revolution of the wheel has been made the said bar will be in its original position—in contact with the under side of the sliding bar 22—and the wire or chain 43 will have been wound sufficiently upon the smaller wheel 15 to throw the mill out of gear. As the large wheel is revolved backward by the dogs, the wire or chain 41 is wound up thereon.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a regulator for windmills, the combination, with a fixed shaft having a toothed wheel and a smaller plain wheel held to turn thereon, the smaller wheel being provided with a radially-extending spring-bar, a weighted chain attached to the toothed wheel, and a chain attached to the smaller wheel adapted for connection with the pull-chain of the windmill, of a sliding latch adapted for contact with the radial spring-bar of the smaller wheel, a lever fulcrumed upon the shaft and adapted for connection with the pump-piston of the mill, and a spring-controlled dog pivoted upon said lever for engagement with the teeth of the larger wheel, substantially as shown and described.

2. In a regulator for windmills, the combination, with a frame, a shaft fixed to the said frame, a toothed wheel held to turn upon said shaft, and a smaller wheel, also held to turn upon the shaft, provided with a radially-extending spring-arm, of a lever pivoted upon the shaft and adapted for connection with the pump-piston of the mill, a spring-controlled dog pivoted upon said lever for engagement with the teeth of the larger wheel, a spring-controlled dog pivoted to the frame, and also adapted for engagement with the teeth of the larger wheel, and means, substantially as shown and described, for latching the radial arm of the smaller wheel and connecting the said wheel with the pull rope or chain of the windmill, substantially as and for the purpose specified.

3. In a regulator for windmills, the combination, with a frame, a shaft secured upon said frame, a toothed wheel provided with an attached weighted chain held to revolve upon the shaft, a smaller wheel likewise held to revolve upon the shaft and provided with a radially-extending arm, a hook attached to the periphery of the wheel at one side, a keeper-plate secured to the said wheel essentially diametrically opposite to the hook, and a latch mechanism, substantially as described, adapted for engagement with the spring-arm of the smaller wheel, of a lever fulcrumed at one end upon the shaft and adapted for engagement at its other end with the pump-piston of the mill, a spring-controlled dog pivoted upon said lever to engage with the teeth of the larger wheel, having convexed end surfaces and concaved intermediate surfaces, a second spring-controlled dog pivoted to the frame and also adapted for engagement with the teeth of the larger wheel, the said lower dog being provided with a double-curved front and rear face and a pin projected out from one side, and mechanism, substantially as specified, for connecting the smaller wheel with the pull rope or chain of the windmill, as and for the purpose specified.

4. In a windmill-regulator, a trip mechanism consisting of a sliding bar having a weighted lever attached at one end and an angled lever connected with the opposite end, and an essentially T-shaped latch pivoted upon the sliding bar and having the upper end of its vertical member recessed, substantially as specified.

JOHN M. LOWE.

Witnesses:
THOMAS H. SHOUB,
WALTER S. MAXWELL.