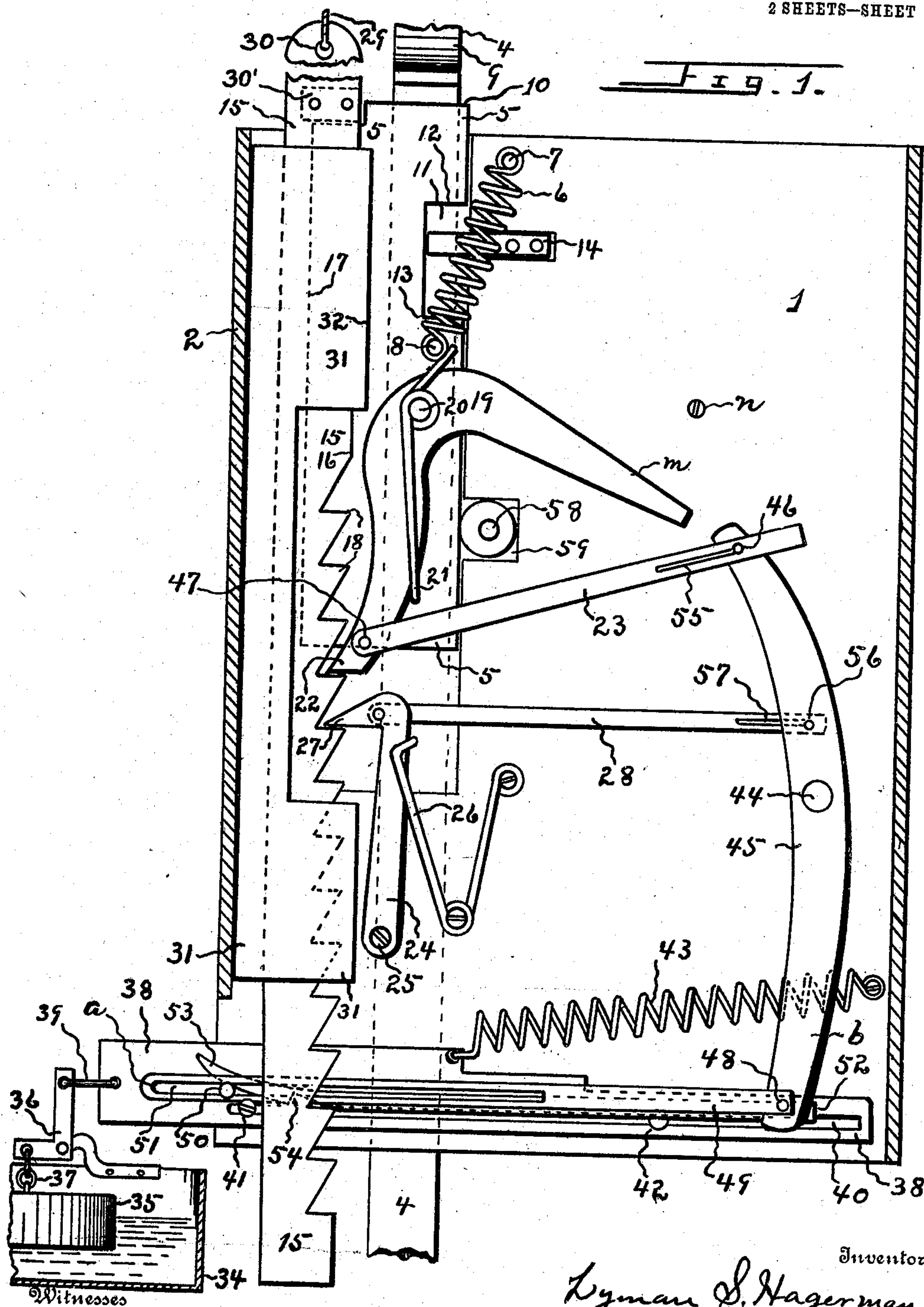


No. 885,844.

L. S. HAGERMAN. PATENTED APR. 28, 1908.
WINDMILL REGULATOR.
APPLICATION FILED NOV. 26, 1907.

2 SHEETS—SHEET 1.



Witnesses

Wm. Bentley.
George W. Covell

By

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No. 885,844.

L. S. HAGERMAN.
WINDMILL REGULATOR.
APPLICATION FILED NOV. 25, 1907.

PATENTED APR. 28, 1908.

2 SHEETS—SHEET 2.

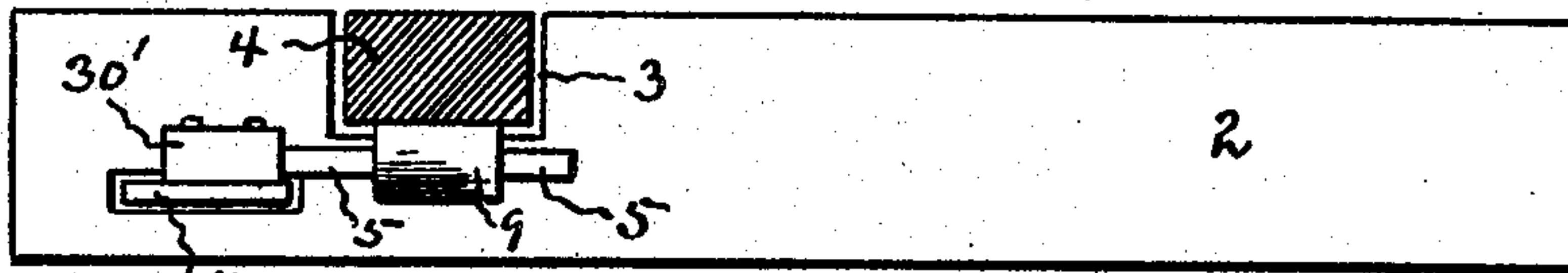


Fig. 2.

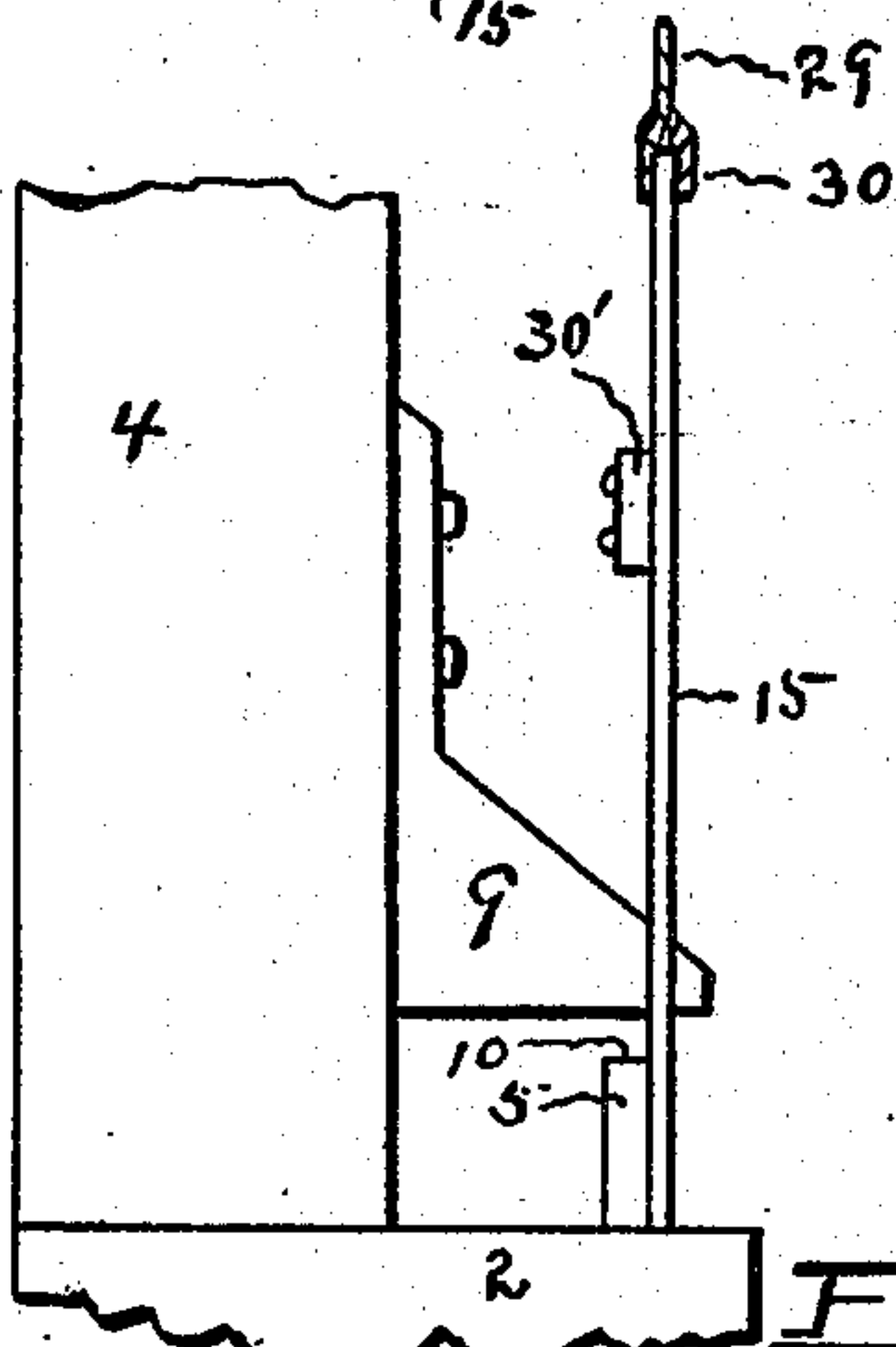


Fig. 3.

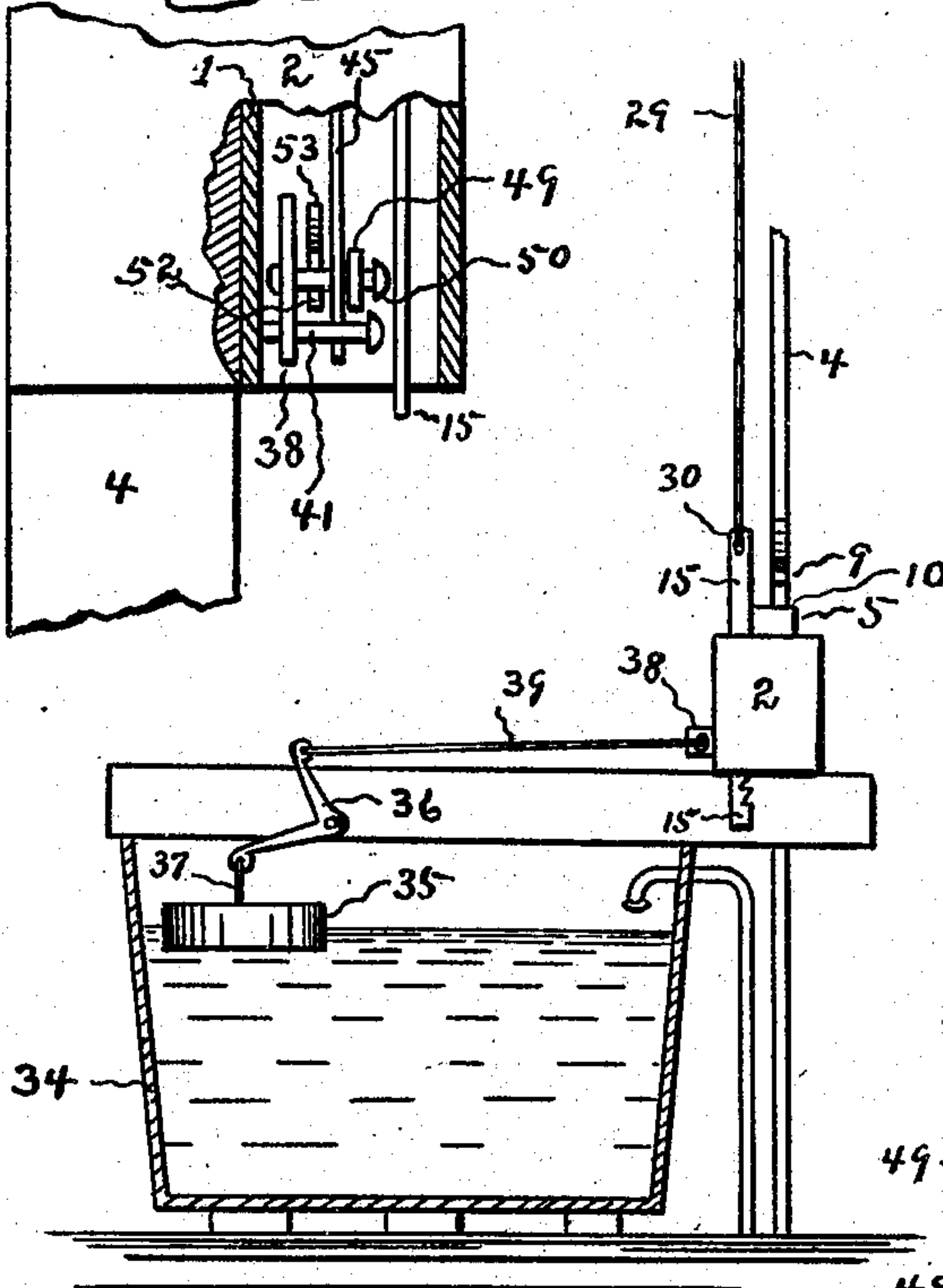


Fig. 5.

Witnesses

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George W. Goodell

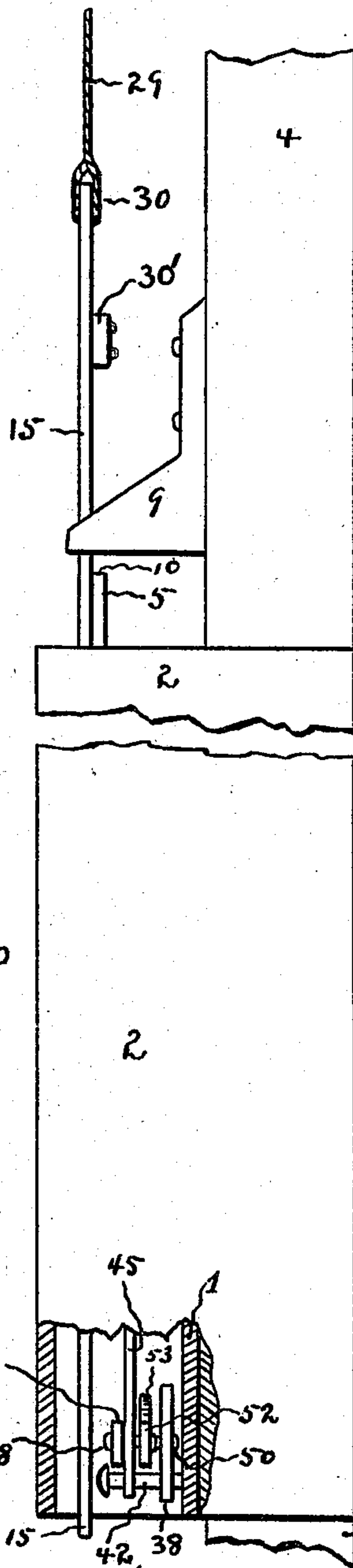


Fig. 4.

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UNITED STATES PATENT OFFICE.

LYMAN S. HAGERMAN, OF MONDAMIN, IOWA.

WINDMILL-REGULATOR.

No. 885,844.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed November 25, 1907. Serial No. 403,681.

To all whom it may concern:

Be it known that I, LYMAN S. HAGERMAN, a citizen of the United States, residing at Mondamin, in the county of Harrison and State of Iowa, have invented certain new and useful Improvements in Windmill-Regulators, of which the following is a specification.

This invention relates to improvements in windmill regulators of the class where the windmill is automatically started when the water in the tank is lowered, and is stopped when the tank has been supplied with water.

The object of the invention is to provide means for a control of the water supply for windmills which will be strong and durable in construction, housed from the weather, and reliable for the purposes designed, and consists of the novel combination and arrangement of parts described herein, pointed out by the claims and illustrated by the drawing, wherein,—

Figure 1 is a vertical front view of a housing box, the cover being removed, and showing the invention operatively mounted upon the rear wall of the box, a float and water-tank being shown diminutive and partly broken away. Fig. 2 is a plan view of the housing box, the pump-rod being in section. Figs. 3 and 4 are broken away views, partly in section, of the respective vertical ends of the housing box with my invention operatively mounted, and showing relative arrangement of parts; and Fig. 5 shows the invention operatively mounted, the water tank being in section.

Referring now to the drawing for a more particular description, numeral 1 indicates the inner side of the rear wall of a vertically-disposed housing-box 2, secured stationary in any suitable manner to contain and protect from the weather the devices or mechanism employed, said housing-box, for convenience, being hereafter designated as the frame, while describing the parts. The housing-box is constructed, preferably, to provide the longitudinal recess or slot 3 within which pump-rod 4 makes its limited vertical stroke. I construct the vertically-disposed sliding-plate 5, resiliently mounted as by spring 6, the upper end of the spring being secured upon the frame as at 7, its lower end being secured at 8, the effect of the spring being to hold plate 5 with an upward tendency. Pump rod 4 is provided with lug 9, which engages the upper end 10 of plate 5 to cause the latter to move downward in op-

position to the force of spring 6, for purposes hereafter described. A recess 11 is formed in the inner edge of plate 5 having transverse end-walls 12 and 13 and, secured upon the frame is stop-lug 14 which enters recess 11 and limits the vertical movement of the sliding-plate.

I construct the vertically-disposed rack-bar 15 passing longitudinally of the housing-box, its inner edge 16 and its teeth preferably overlapping the outer edge 17 of the sliding plate, whereby the sliding-plate operates as a guide to cause a true presentation of teeth 18 of the rack-bar; and I employ the pawl 19 pivotally mounted at 20 upon the sliding-plate and resiliently mounted as by spring 21 to cause a contact of its tooth 22 upon the teeth of the rack-bar at all times except when forced rearwardly under operation of link 23, presently to be explained; and I employ dog 24 pivotally mounted upon the frame as at 25 and resiliently mounted as by spring 26 to normally hold its tooth 27 in contact with the teeth of the rack-bar except when forced rearwardly under operation of link 28, as will be hereafter explained. A cable 29 is connected, as at 30 upon the end of the rack-bar, and at the opposite end is connected to the wheel of the windmill and is adapted to draw the wheel out of the wind by the downward movement of the rack-bar.

I construct upon and near the upper end of the rack-bar, the rearwardly-extending lug 30' adapted to engage, on occasion, the upper broad end of the sliding-plate, and in order that the rack-bar may make a true presentation of its teeth to the pawl and dog 24, it is inclosed within sheath 31 upon one side, said sheath being inturned at 32 along its inner edge to form a lengthwise bearing for the inner edge of said rack-bar, it being important to prevent undue vibration, and as constructed, a trackway is provided within which the rack-bar may slide smoothly, its teeth making a true presentation, as above described.

The water tank is indicated at 34 and a float 35 is placed therein upon the water, and above the float is mounted, in any suitable manner, the bell-crank 36, and any flexible member 37 has end-connections between one end of the bell-crank and float, the opposite end of the bell-crank being connected to the outer end of the regulating-plate 38 by means of flexible member 39. The regulating-plate is formed with a longitudinal

slot 40 and is horizontally disposed, being lengthwise slidable and sustained upon studs 41 and 42, these studs being secured to the frame by passing through slot 40, and said regulating-plate is resiliently detained from a forwardly sliding movement by means of spring 43. Near the outer edge of the frame is pivotally mounted, as at 44, the rock-lever 45, its upper end having the pivotal mounting 46 upon link 23, the opposite end of said link having the pivotal mounting 47 upon pawl 19. Upon the lower end of rock-lever 45 is pivotally mounted, as at 48, the slot-bar 49; and upon regulating-plate 38 is secured stud 50, and the slot bar is adapted to have a lengthwise horizontal movement from actuation of rock-lever 45, being sustained upon stud 50 seated within the longitudinal slot 51 of the slot-bar; but the only movement imparted to the slot-bar by the rock-lever is a rearwardly sliding movement, as will be seen.

An outwardly sliding movement of the slot-bar is caused from an outwardly sliding movement of regulating-bar 38. When bar 38 slides outward from actuation of the float and bell-crank, stud 50 will, of course, move outward until it makes contact with the outer end *a* of slot 51, and a further outward movement of plate 38 will cause an outward movement of slot-bar 49 since stud 50 will carry the slot-bar outwardly, thereby causing a forwardly swinging movement of the lower end *b* of rock-lever 45, and this last-named movement causes the release of the pawl and dog from the teeth of the rack-bar.

The mechanism just described is for the purpose of throwing the windmill in gear, automatically, whenever the water has been withdrawn from the tank sufficiently to require a new supply, and, to accomplish this the rack-bar must be automatically released from the pawl and dog, so that it may slide upward. This release is effected through a movement of rock-lever 45, and, in operation, as the water is gradually drawn from the tank, the float occupies a lower altitude which, as already explained, causes the outwardly sliding movement of regulating-plate 38. Now, upon the lower end of the rock-lever is pivotally mounted at 48, the locking-bar 52 having the upwardly curved outer end 53; and upon the lower edge of this locking-bar, near its curved end, a hook 54 is transversely formed. The curved portion normally rests upon stud 50 of the regulating-plate, but when the latter slides outward under actuation of the float, stud 50 passes from under the locking-bar, and the latter then, from gravity, rests upon stud 41, and a further outward sliding movement will cause an outward movement of the locking-bar until hook 54 passes over stud 41, and becomes locked thereon. The parts are so adjusted that the pawl and dog are both withdrawn

from the teeth of the rack-bar after hook 54 becomes locked in above manner, and thereupon, the rack-bar is drawn upward and the windmill is then in gear.

In order that the pawl and dog will be withdrawn in a manner so that neither of them will be caught upon the upwardly-moving teeth of the rack-bar at the time the latter moves upward, certain devices are employed, now to be explained. It will be understood that the upward movement of the rack-bar when it is released is one of considerable velocity and force, and from the explanation, now to be made it will be seen that the construction is such that no breakage can occur, and that the parts are positive and reliable in action.

Link 23 is provided with the longitudinal slot 55 which allows an independent movement of pawl 19 with relation to the rock-lever, and the outer end of link 28 has a mounting, as by means of stud 56 upon and intermediate the upper end of the rock-lever and mounting 44 of said rock-lever; link 28 is formed with the longitudinal slot 57 traversed by stud 56 which allows a movement of dog 24 without a corresponding movement of the rock-lever. Since the pivotal mounting 46 of link 23 is at a greater distance, radially considered, from the pivotal mounting 44 of the rock-lever than is the pivotal mounting 56 of link 28, it follows that an outward movement of slot-bar 49 will cause a release of pawl 19 before dog 24 is released, and this is the desired operation.

The outward sliding movement of slot-bar 49 will cause the withdrawal of the pawl from the range of the rack-bar teeth while dog 24 still retains its hold upon said rack-bar; but during the swift upward trend of the rack-bar at time of its release, dog 24 remains out of range of the rack-bar teeth. As soon, however, as the float raises in the tank sufficiently, regulating-plate 38 begins to slide inward of the housing-box, and after passing inward a certain distance stud 50 makes contact with the curved end 53 of slot-bar 49 and raises said end 53, thereby automatically unlocking it from stud 41; the end *b* of the rock-lever thereupon moves rearwardly, which movement causes the pawl and dog to again engage the rack-bar. The devices thus described are therefore effective to automatically place the windmill out of gear when the supply of water in the tank is sufficient, and of placing it in gear when such supply is deficient. To cause less friction in movement of sliding-plate 5, I employ roller 58, pivoted adjacent said sliding-plate, for this purpose providing any suitable opening 59 incised in the frame, as a seating for said roller.

When the rack-bar is released and passes upward and after lower arm *b* of the rock-lever has its rearward movement from actuation of the bell-crank and regulating-plate, as

described, sliding-plate 5 moves upward by force of spring 6 to again make contact with lug 9 of the pump-rod. At each downward stroke of the pump-rod sliding-plate 5 will be moved vertically downward, and as pawl 19 during this movement contacts with rack-bar 15, the latter at each downward stroke of the pump-rod, is forced to slide downward a limited distance. At each upward stroke of the pump-rod sliding-plate 5 follows upward, and this operation is continued until lug 30', near the upper end of the rack-bar, engages the upper end of the sliding-plate after which time the sliding-plate will not move upward under force of spring 6, but will be held in its lowered position by said lug 30', and therefore will not be actuated by lug 9 of the pump-rod, and this is a desired result and a necessary construction, otherwise the rack-bar would be forced downward too far, as is evident, and endanger breakage of cable 29.

I have given details of construction, but do not limit myself to exactness of details, nor to proportions, and it is considered that many details could be omitted or changed, without departing from the scope of the invention, the latter being determined by the claims.

What I claim as my invention is,—

1. In a windmill regulator, the combination with the pump-rod having an engaging-lug thereon, of a sliding-bar adapted to have a downward vertical movement from contact with said engaging-lug at the time of the downward stroke of said pump-rod; a vertically-disposed rack-bar; a tank having a float therein; a regulating-plate having a connection with and to have a forwardly sliding movement from actuation of said float; a pawl mounted upon said sliding-bar and hav-

ing means for normal engagement with said vertically-disposed rack-bar, said pawl making engagement with said rack-bar during the downwardly vertical movement of said sliding-bar; said regulating-plate having a connection with said pawl to release the engagement of said pawl with said rack-bar by the forwardly sliding movement of said regulating-plate.

2. In a windmill regulator, the combination with the pump-rod having an engaging-lug thereon, of a sliding-bar adapted to have a downward vertical movement from contact with said engaging-lug at the time of the downward stroke of said pump-rod; a vertically-disposed rack-bar; a tank having a float therein; a regulating-plate having a connection with and to have a forwardly-sliding movement from actuation of said float; a pawl mounted upon said sliding-bar and having means for normal engagement with the vertically-disposed rack-bar, said pawl making engagement with said rack-bar during the downwardly vertical movement of said sliding-bar to cause said vertically-disposed rack-bar to have a downwardly-slidable movement; a dog having means for normal engagement with the vertically-disposed rack-bar, said dog making engagement with and during the downwardly-sliding movement of said rack-bar; said regulating-plate having connections with said pawl and with said dog to release engagement of the pawl and dog with said rack-bar by the forwardly-sliding movement of said regulating-plate.

In testimony whereof he has affixed his signature in presence of two witnesses.

LYMAN S. HAGERMAN.

Witnesses:

FRANK KING,
S. A. SPOONER.