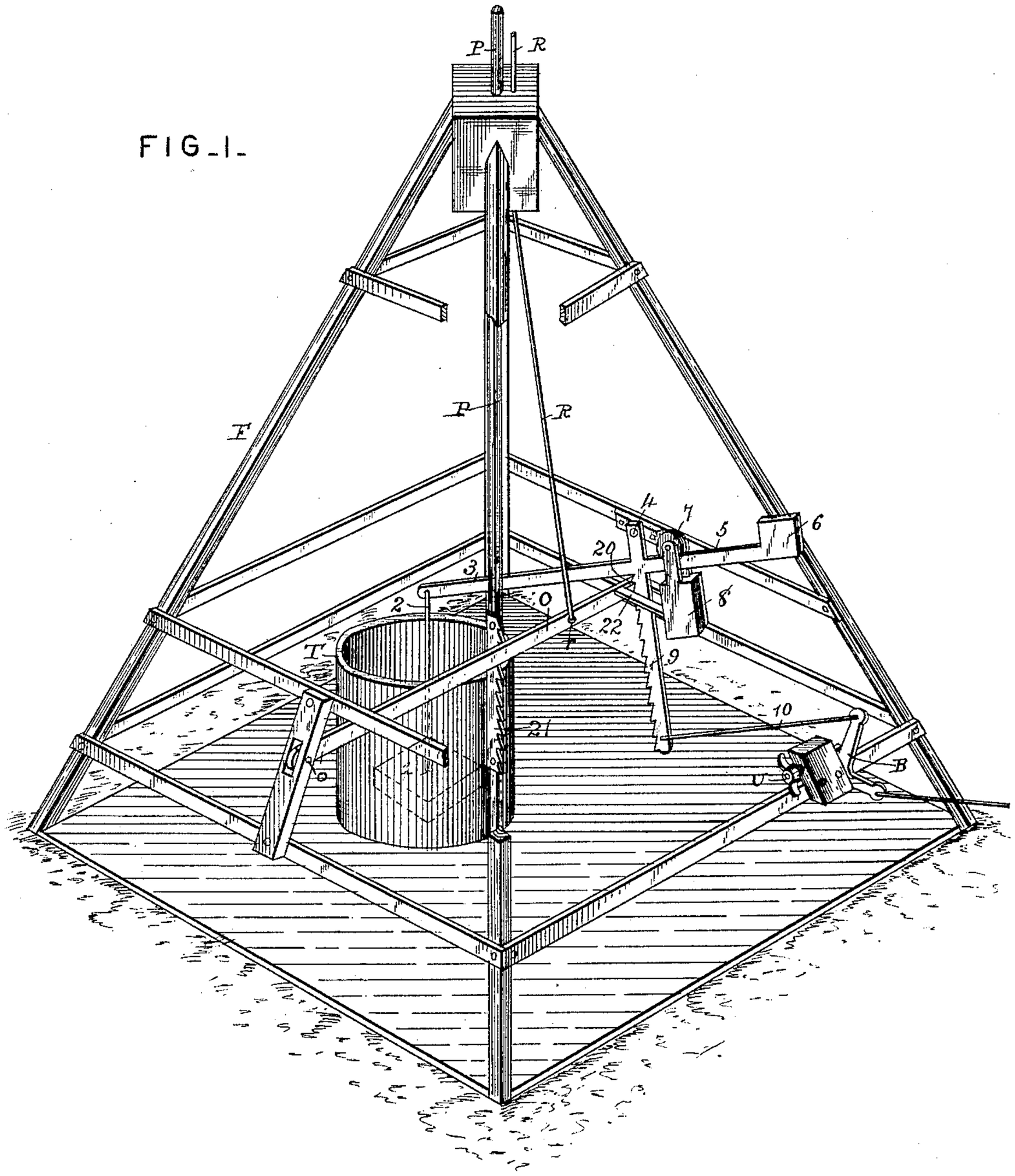
(No Model.) 2 Sheets—Sheet 1.

J. E. VAN SCHAICK.

AUTOMATIC WINDMILL REGULATOR.

No. 435,595. Patented Sept. 2, 1890.

FIG. 1.



Witnesses

Jas. K. McCathran

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Inventor

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By his Attorneys

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 4.

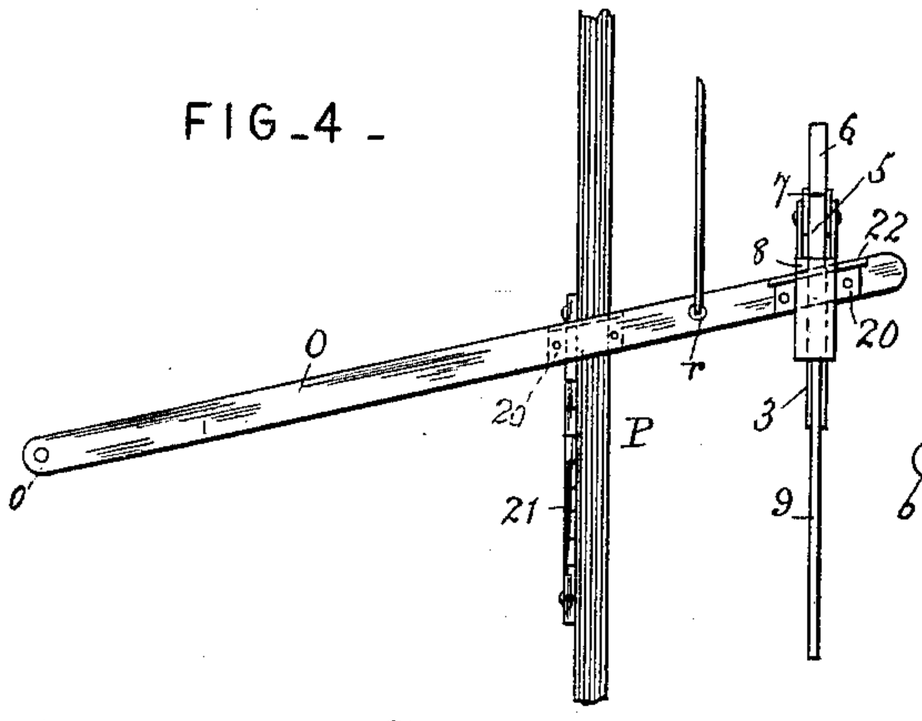


FIG. 5.

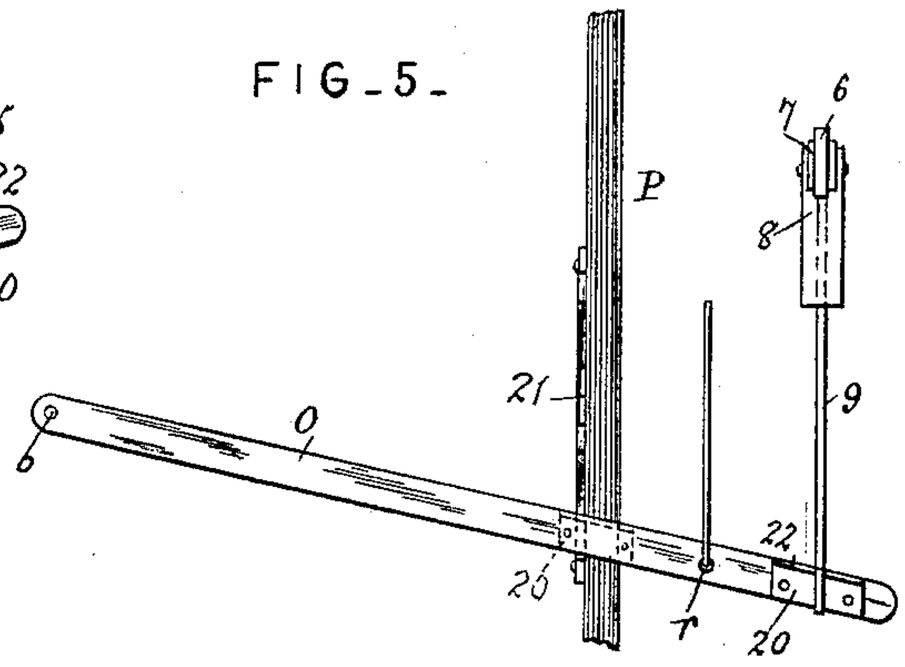


FIG. 2.

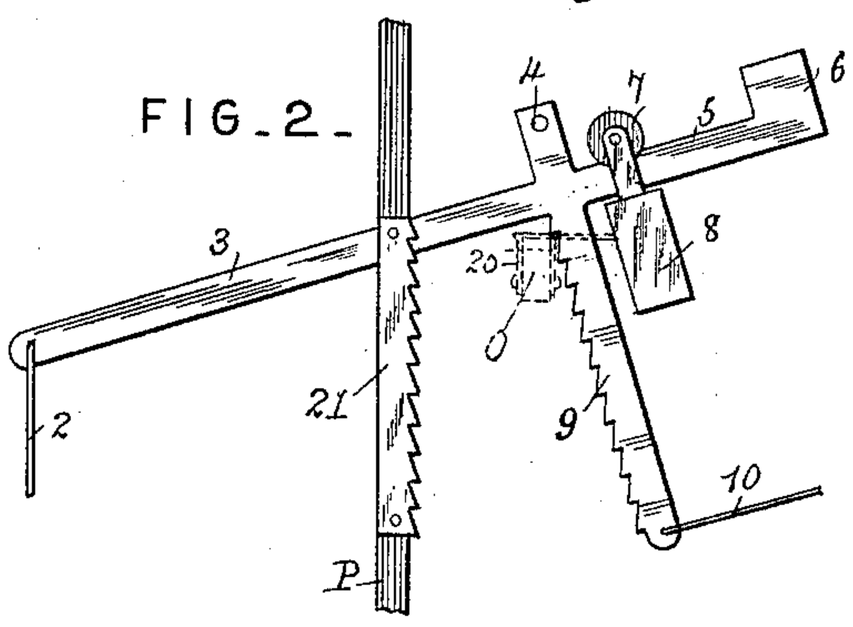


FIG. 3.

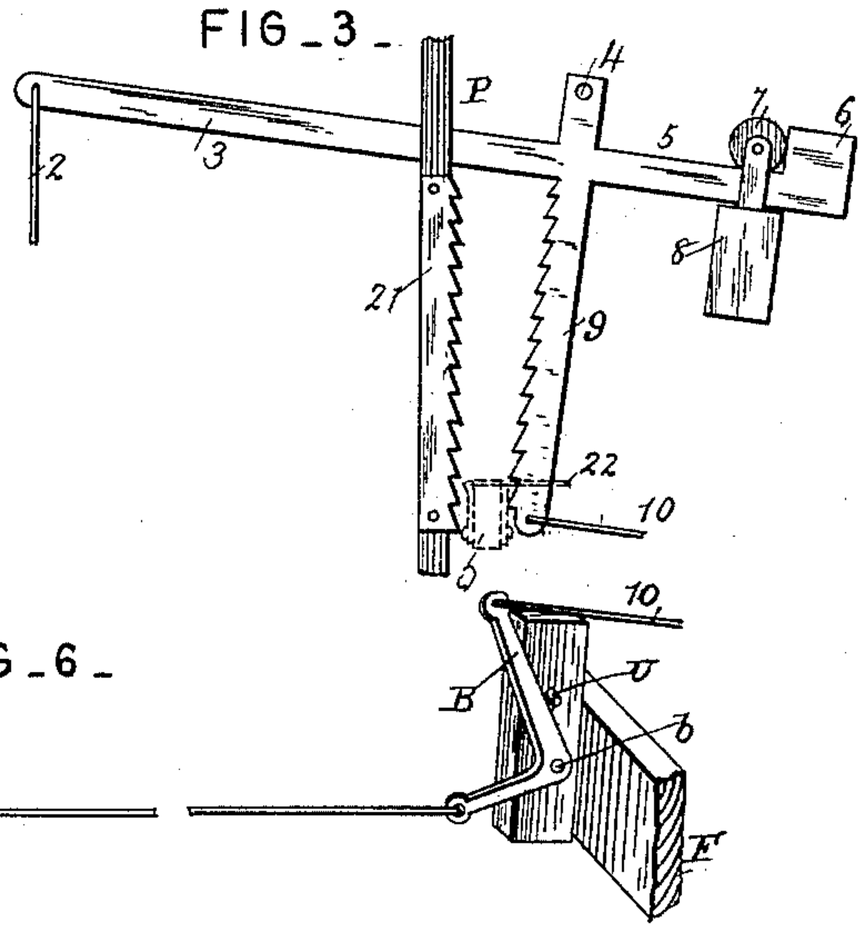
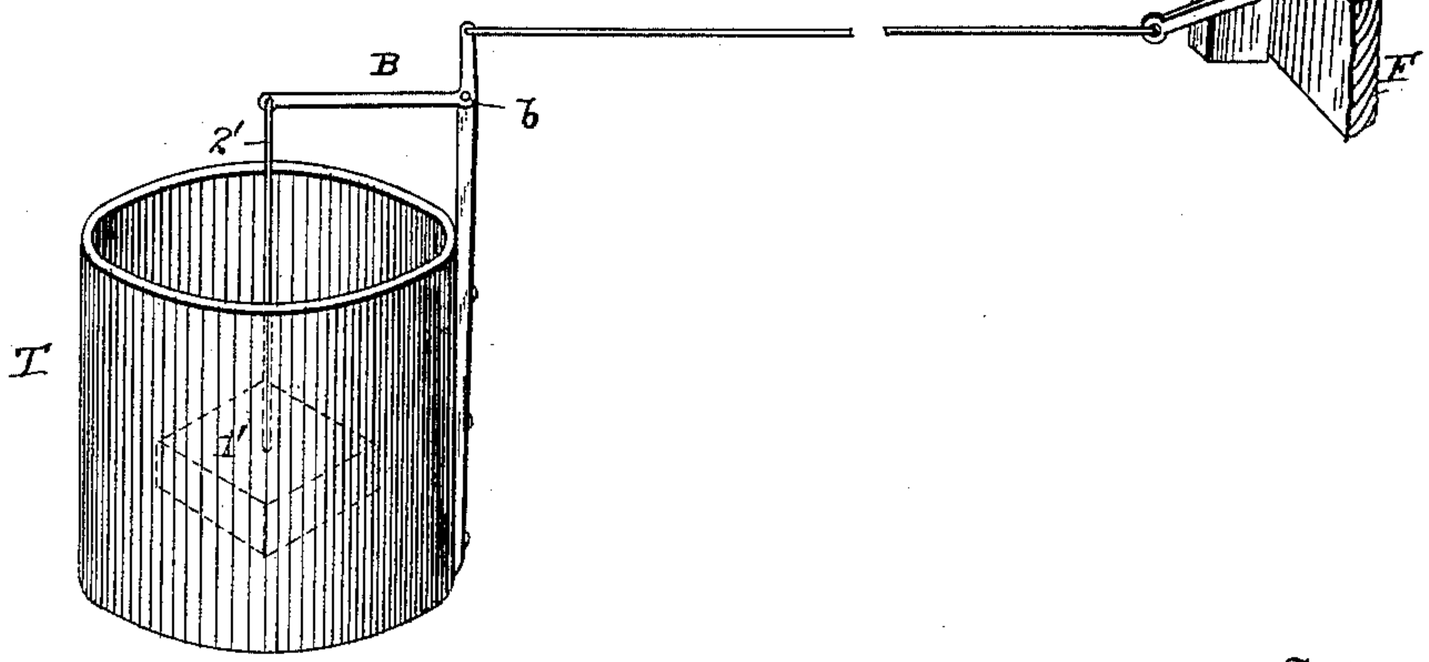


FIG. 6.



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UNITED STATES PATENT OFFICE.

JOHN E. VAN SCHAICK, OF DARIEN, WISCONSIN.

AUTOMATIC WINDMILL-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 435,595, dated September 2, 1890.

Application filed March 31, 1890. Serial No. 346,050. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. VAN SCHAICK, a citizen of the United States, residing at Darien, in the county of Walworth and State of Wisconsin, have invented a new and useful Automatic Windmill-Regulator, of which the following is a specification.

This invention relates to windmills, and more especially to the regulating devices therefor adapted to be operated automatically.

The object of the invention is to provide mechanism connecting a float in the water-tank with the regulator-rope of the windmill, whereby the falling of the water within the tank will start the windmill moving, and vice versa. This object I accomplish by my improved regulator, which consists, essentially, of an operating-lever adapted to engage a notched plate on one side of the pump-rod, a pivoted tripping-arm having a float at one end and a moving weight at the other and carrying a downwardly-projecting notched plate adapted to engage the opposite side of the operating-lever, and the ordinary regulator-wire connected to said lever, as well as of adjunctive and specific details of construction and relative arrangements of these parts, whereby said object is carried out, and certain auxiliaries whose employment in connection with the machine is optional but preferable, all as hereinafter described at length with reference to the accompanying drawings, in which—

Figure 1 is a general perspective view of the base of the windmill-supporting frame, partly broken away, the devices being shown in position to permit the vertical reciprocation of the pump-rod. Fig. 2 is a side elevation of the tripping-arm in the same position as shown in Fig. 1. Fig. 3 is a similar view in its opposite or locked position. Figs. 4 and 5 are diagrammatic elevations of the operating-lever at the moment when it engages the two notched plates and when it reaches its lowermost position, respectively. Fig. 6 is a perspective detail of the supplemental devices for operating the tripping-arm.

Referring to the accompanying drawings, F is the supporting frame-work of a windmill of any improved construction, and P is the pump-rod thereof, which is vertically reciprocated by a crank in the wind-wheel shaft, as will be clearly understood without illustration.

T is a tank or cistern, which is shown in the present instance as mounted upon the ground within the frame-work F, although it will be understood that this tank may be located at any suitable point, and the vertical reciprocation of the pump-rod P forces water into this tank to be drawn therefrom as necessity requires.

The letter O designates a lever pivoted at *o* in the frame, and R is the ordinary regulator-wire, which is connected, as at *r*, to the operating-lever O, and leads thence upwardly through suitable guides in the frame-work to the wind-wheel, and a downward pull upon this rope throws the wheel (or its blades) out of the wind and stops its rotation, all as is common in windmills now upon the market.

Coming now to the present invention, 1 designates a float resting upon the surface of the water within the tank T, and 2 is a wire or chain connecting this float with one end of a pivoted tripping-arm 3, which is mounted, as at 4, upon a bolt or other pivot in the frame-work. The other member of this arm is provided with a track 5 and has a weight 6 at its outer end, and upon the track runs a grooved roller 7, carrying a depending weight 8, for a purpose to be hereinafter described, the weight 6 being sufficient to raise the arm as rapidly as the rising of the float will permit.

The operating-lever O is provided with angular plates 20, one of which engages a toothed plate 21, secured to the front side of the pump-rod P, and the other of which engages a downwardly-projecting notched plate 9, rigidly secured to and carried by the tripping-arm 3, and the operating-lever also has a loop 22, embracing said notched plate 9, whereby the parts are kept in proper relative position.

With the above construction of parts and the wind-wheel revolving in the wind it will be understood that the pump-rod P is reciprocating and the water in the tank T is rising. If it should occur that the water should not be drawn off as rapidly as it was pumped up by the wind-wheel, the float 1 will rise and the parts will move from the position shown in

Fig. 1 to their opposite extremes, when the machine will be at rest, thus automatically checking the pumping before the tank overflows. This change of the position of the parts takes place as follows: As the float 1 rises tension on the wire 2 is released, and the weight 6 turns the arm 3 upon its pivot 4 with a speed just equal to the rising of the water-level. The arm 3 having reached the position a little beyond the horizontal, the grooved roller 7 runs down the track 5 and suddenly adds the gravity of the weight 8 to that of the weight 6, and this addition lifts the float 1 a trifle in the water and tips the tripping-arm 3 considerably on its pivot. This sudden tipping of the tripping-arm throws its downwardly-projecting notched plate 9 against the outer angular plate 20 upon the operating-lever O and moves the body of this lever so that its inner angular plate 20 engages the toothed plate 21, carried by the pump-rod P, when the parts will be in the position shown in Fig. 4. The pump-rod P continuing its vertical reciprocation, the operating-lever O is forced downwardly thereby a short distance at each stroke and held against returning by the notched plate 9 until this operating-lever has moved so far that it has drawn upon the regulator-wire R sufficiently to throw the wheel out of the wind.

A sufficient amount of water having been drawn from the tank to considerably lower the level therein, the float 1 descends and draws upon the wire 2 with the following result: The tripping-arm 3 is slowly turned upon its pivot 4, and the lower end of its notched plate 9 is disengaged from the angular plate 20 and moved through the length of the loop 22 from the position shown in Fig. 5 to the outer end of said loop. A further falling of the float raises the tripping-arm 3 a little beyond the level, and the grooved roller 7 runs down the track 5 to the inner end thereof, near the pivot 4. The tripping-arm being thus relieved of a considerable portion of its counterbalancing-weight, the float now sinks to its normal position in the water-level, and a sudden outward movement is thereby imparted to the lower end of the notched plate 9. This movement draws the inner angular plate 20 of the operating-lever O out of engagement with the toothed plate 21 on the pump-rod P, and the lever and regulator-wire are allowed to rise to permit the resumption of the motion of the wind-wheel. It will thus be seen that the rising of the float permits the tipping of the tripping-arm to a position a little beyond the level; but the sudden running down the track of the weighted roller 7 is the power that directly engages the operating-lever with the pump-rod and causes the stopping of the wheel. It will also be seen, on the other hand, that it is the sudden inward movement of this weighted roller that removes a large portion of the counterbalance and permits a sudden sinking of the float, thereby bringing into play the power that directly disengages the operating-lever from the pump-rod and causes the starting of the wheel.

It has been common heretofore to connect the regulator-wire with a float in the tank; but the general objection existed that a motion was thereby imparted to the operating lever which was not as quick as was desired, and this objection I have overcome by the use of the traveling weighted roller in connection with the other devices above described.

In Fig. 6 I have illustrated a tank, which may be located at some distance from the pump and which may be used in addition to or independent of a tank located within the frame-work. This tank, located at some distance, has a float 1′, connected by a wire 2′ to one arm of a bell-crank lever B, pivoted at *b* in the frame-work when the distant tank is sufficiently near to admit, and pivoted at the upper end of a support mounted on the side of the distant tank when said tank is not sufficiently near to admit of the bell-crank lever being pivoted to the frame-work. The other arm of this bell-crank lever is connected by a wire 10 to the body of the depending notched plate 9. It will be obvious without a more detailed explanation that the rising and falling of the float in the distant tank will control the tripping-arm the same as will the rising and falling of the float in the tank within the frame-work. The float in the distant tank can of course be used simultaneously with or independently of the float in the tank within the frame-work, as desired. In some instances, where the tank is located at a considerable distance from the windmill-frame and the wire 10 is of a considerable length, the effect of the wind thereon may deflect it from a straight line and retard the action of the device to some extent. To overcome this I provide a set-screw U through the support of the bell-crank lever B, whose point extends a short distance into the path of one of the arms of the bell-crank lever, and which set-screw may be adjusted so as to slightly retard the movement of the bell-crank lever as the float rises or falls; but when sufficient weight is brought into play the lever will move by the point of the set-screw with a sudden motion, which has been shown to be desirable in devices of this character. This set-screw may be used as an auxiliary to the weighted roller 7 or independently under all ordinary conditions and under the influence of the wind and of gravity the bell-crank lever will not be caused to move past the tip of the set-screw.

What I claim is—

1. The combination, with the wind-wheel pump-rod having a toothed plate, the regulator-wire, and the operating-lever therefor, pivoted at one end to the frame, standing at right angles to the pump-rod, and adapted to engage said toothed plate, of a tripping-arm having a weight at one end and a wire at the other end leading to a float in the tank, and connections, substantially as described, be-

tween said arm and lever for throwing the latter into and out of engagement with said plate, the whole operating as set forth.

2. The combination, with the wind-wheel pump-rod having a toothed plate, the regulator-wire, and the operating-lever therefor, pivoted at one end to the frame, standing at right angles to the pump-rod, and having an angular plate adapted to engage said toothed plate, of a tripping-arm having a plate extending downwardly at the other side of said lever from the pump-rod, a weight at one end of said arm, and a wire connecting its other end with a float in the tank, the whole operating substantially as described.

3. The combination, with the wind-wheel pump-rod having a toothed plate, the regulator-wire, and the operating-lever therefor, having an angular plate adapted to engage said toothed plate and having a second angular plate near its outer end with a loop projecting therefrom, of a tripping-arm having a weight at one end and a wire at the other leading to a float in the tank and a notched plate depending from said arm and passing through said loop, the whole operating substantially as described.

4. In a windmill-regulator, substantially as described, the centrally-pivoted tripping-arm connected at one end to a float in the tank and having a weight secured to its opposite end, in combination with a grooved roller traveling on said arm between its pivot and said fixed weight and a weight carried by said roller, as and for the purpose set forth.

5. In a windmill-regulator, substantially as described, the centrally-pivoted tripping-arm having a weight at one end, a main float in the tank connected to the other end, and a downwardly-extending notched plate carried by said arm, for the purpose set forth, in combination with an auxiliary float located in another tank and connections between said auxiliary float and said notched plate, the whole operating substantially as set forth.

6. In a windmill-regulator, substantially as described, the combination, with a float, a bell-crank lever, and cords connecting one arm of the lever with the float and the other arm thereof with the regulator-tripping mechanism, of a friction-stop whose tip extends partially into the path of one of said arms, as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN E. VAN SCHAICK.

Witnesses:

RODNEY SEAVER,

E. E. PARK.