(No Model.)

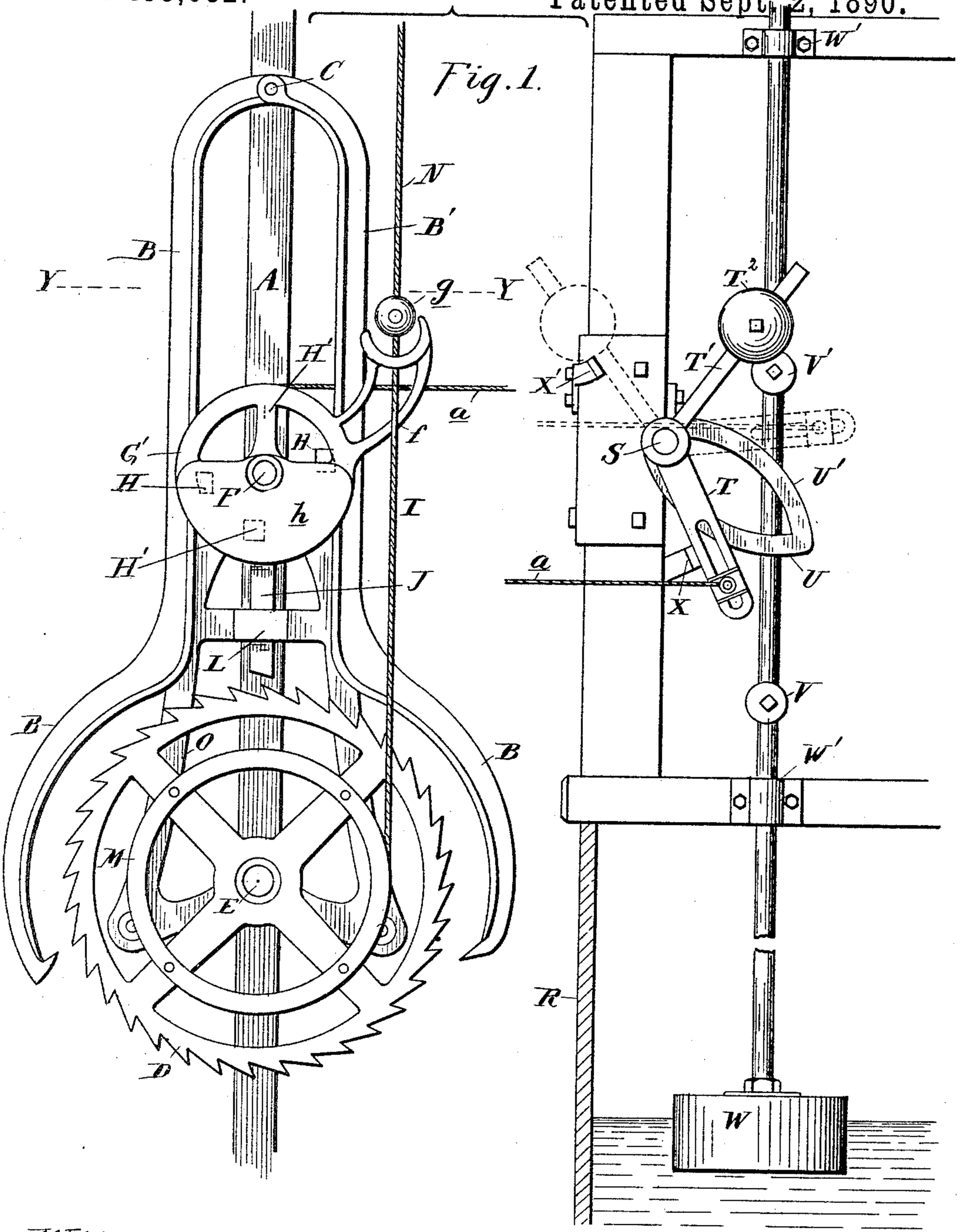
2 Sheets—Sheet 1.

A. M. CLARK.

ATTACHMENT FOR WINDMILLS.

No. 435,682. Patented Sept. 2, 1890.

Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. M. CLARK.

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Fig. 2.

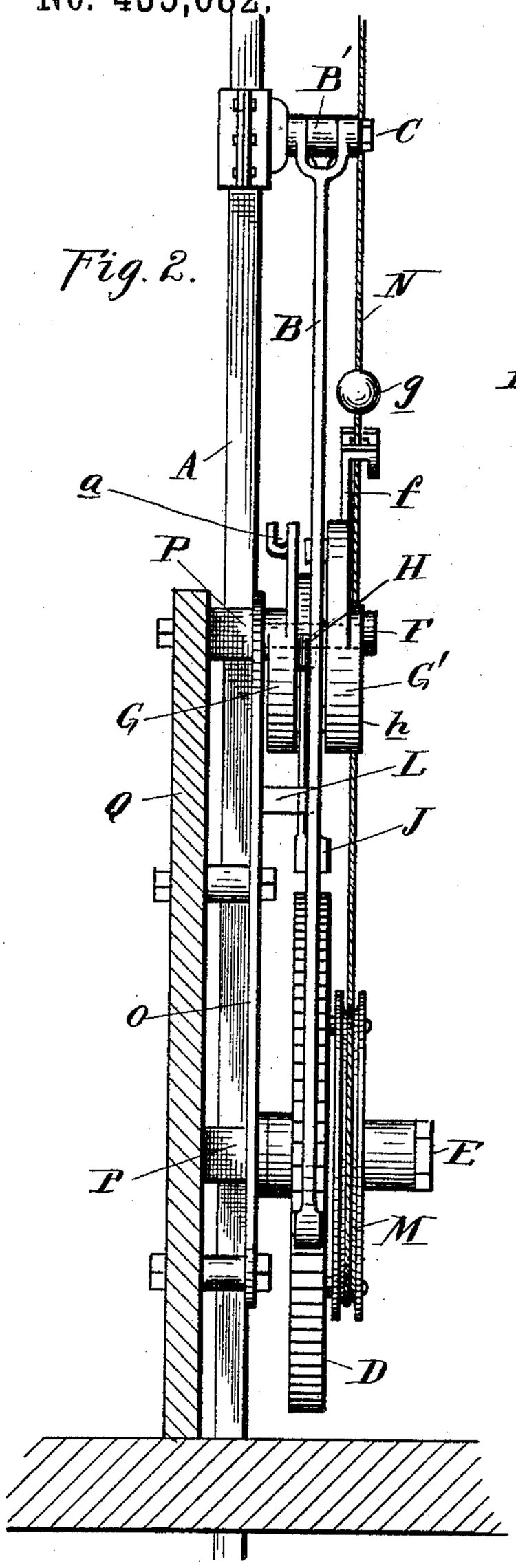


Fig. 4.

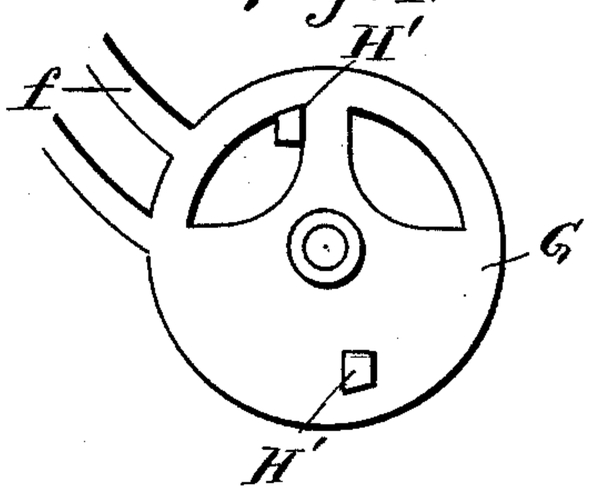


Fig. 3.

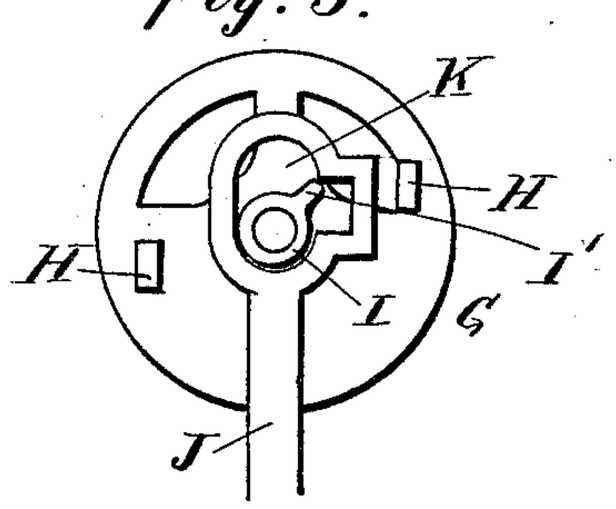
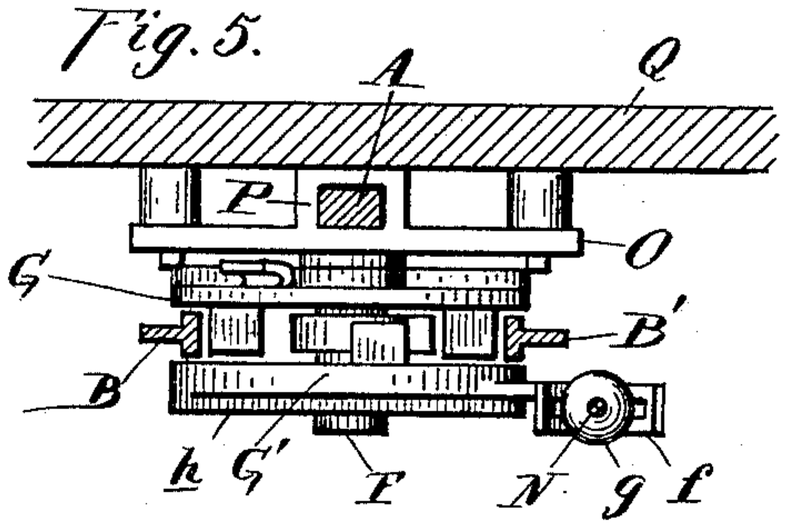


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALBERT M. CLARK, OF ANN ARBOR, MICHIGAN.

ATTACHMENT FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 435,682, dated September 2, 1890.

Application filed May 20, 1890. Serial No. 352,504. (No model.)

To all whom it may concern:

Be it known that I, ALBERT M. CLARK, a citizen of the United States, residing at Ann Arbor, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Attachments for Windmills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a new and useful improvement in automatic water-supply regulators for tanks of windmills; and the invention, which is applicable to any construction of windmill, consists in an attachment which automatically winds or unwinds the rope or cable by means of which the wheel is stopped from revolving, either by throwing the sails or the wind-wheel itself out of the wind, or which operates in any other manner, according to the peculiar construction of the mill, said attachment being operated by the pump-rod under the control of a float, all so arranged that when the water in the tank has reached a prescribed height the float throws the attachment into gear and winds the rope until the wheel stops pumping, and then when the water in the tank has been again lowered to any desired level the rope is permitted to unwind, which enables the wheel to resume pumping.

In the drawings which accompany this specification, and in which like letters of reference indicate like parts, Figure 1 is a front elevation of my improved attachment. Fig. 2 is a side elevation thereof. Figs. 3 and 4 are detached elevations of the two spiders or wheels which carry the spreader-blocks. Fig. 5 is a horizontal section on line *y y* in Fig. 1.

A is the pump-rod of a windmill, (not shown,) and which may be of any known construction.

B and B′ are two pawls pivotally suspended from a pivot-pin C, secured in any suitable manner to the pump-rod. These pawls are adapted to engage a ratchet-wheel D, journaled in the same vertical plane on a fixed pin E below the pawls, one of said pawls being adapted to engage on one side at the upstroke and the other on the opposite side on the downstroke of the pump-rod. Between the legs of the pawls are journaled upon a fixed pivot-pin F two spiders or wheels G and G′. (Shown detached in Figs. 3 and 4, respectively.) Each of these spiders carries at two diametrically-opposite points spreader-blocks H and H′, which project from the inner faces of the spiders at such distances from the center that either set of spreader-blocks, when in a horizontal line, is adapted to part the legs of the pawls sufficiently to hold them out of engagement with the ratchet-wheel. The spider G carries a gravity-dog J, which is adapted to engage with the ratchet-wheel D to form a stop. To this end the gravity-dog is slidingly secured to the hub I on the spider G and has a slot K, into which said hub engages. The dog also engages in a vertical guide-bearing L, fixed on the frame, and is held normally raised out of engagement by the projecting lug I′ engaging in an offset on the dog.

M is a winding drum or pulley secured to the ratchet-wheel D, and N is the chain or cable which throws the mill into and out of the wind, and the lower end of this rope is secured to the winding-drum M. The ratchet-wheel and the spiders are supported in fixed relation to each other by means of a vertical frame O, which is provided with the pins F and E, upon which the spiders and ratchet-wheel are journaled, and on the rear side this frame is preferably provided with guide-bearings P, through which the pump rod passes. This frame O is secured in any suitable manner to a plank or bed-timber Q, which in turn is firmly secured to the derrick of the mill.

R is the tank of the mill, and to a suitable upright secured within the tank is pivotally secured at S the bell-crank lever T, one arm of which is provided with the curved bearings U and U′, which are adapted to impinge with the stops V and V′, adjustably secured to the upright on the float W, which is adapted to rise and fall with the level of the water in the tank in suitable vertical guide-bearings W′. The curved bearings U U′ are preferably slotted to form vertical guide-bearings, through which the stem of the float loosely passes.

To the upright which carries the bell-crank lever are secured suitable stops X X′ to limit

the motion of the bell-crank lever, as will be more fully hereinafter described. To the other arm of the bell-crank lever is adjustably secured one end of the rope or cable *a*, the other end being secured to the periphery of the spider G.

The bell-crank lever is provided with an arm T′, to which a weight T″ is adjustably secured. This arm and weight acts as an automatic throw to move the bell-crank lever from the position shown in full lines into the position shown in dotted lines, and vice versa, after the movement of the weighted float W has carried the weight over the center in either direction. The cable N passes through a slotted guide-arm *f* on the spider G′ and has a button *g* adjustably secured and adapted to impinge on the guide-arm when the cable is wound upon the drum M. The spider G′ is unbalanced by counterweighting it or increasing its body at *h*, whereby it will normally assume the position shown in Figs. 1 and 4.

The parts being thus constructed, as described and shown, they are intended to operate as follows: The normal position of the parts while the mill is pumping water is shown in Fig. 1, from which it will be seen that the spreader-blocks H H of the spider G hold the legs of the pawls in parallel relation to each other and out of engagement with the ratchet-wheel, so that the ratchet-wheel maintains the position in which the chain N is unwound from the drum M and the wheel is in the wind. Now, if the water in the tank increases, the float W will rise and its lower stop V impinge against the bearing U and turn the bell-crank upwardly, and through the connection with the rope *a* the spider G will begin to rotate, but not enough to allow the pawls to engage with the ratchet-wheel. As soon, however, as the weight T″ is carried over the center it will throw the bell-crank lever automatically into the position shown in dotted lines, and thereby turn the spider G sufficiently to allow the pawls B B′ to collapse by their weight, (or by the tension of a spring placed between the two,) and thus cause them by the reciprocatory movement of the pump-rod to engage the ratchet D and turn it in a direction to wind the chain N, thus throwing the wheel out of the wind. While the chain N is thus wound upon the drum M, the button *g* on said chain comes in contact with the slotted guide-arm *f* on the spider G′, and impinging thereon will turn the spider in such a way as to bring the spreader-blocks H′ H′ into a horizontal line, whereby the legs of the pawls are again spread apart and thrown out of engagement with the ratchet-wheel D, which thus ceases to revolve. The gravity dog J, which has been previously lowered by the turning of the spider G, will now act as a back-stop and prevent the ratchet-wheel from turning back. Now suppose the water in the tank to be decreasing. The stop V′ on the float in falling will engage on the bearing U′ of the bell-crank and carry the latter in a downward direction, and as soon as the weight T² has passed over the center it will throw the bell-crank into its first position, and thereby impart enough slack to the cable *a* to allow the spider G to follow its tendency to turn back and withdraw the back-stop J out of engagement with the ratchet-wheel D, which is thereby rendered free to unwind the cable N. A strain to assist this unwinding is caused by the weight of the spider G′, which acts through the guide-arm *f* on the button *g* on the cable. The ratchet-wheel D will thus be revolved and unwind the cable N until the wheel is again in the wind, and the spider G′ will turn back by its weight to its normal position, and thus all the parts will be restored again into the normal position shown in Fig. 1 and the mill set to pumping.

My attachment has certain advantages over other constructions for like purposes, one of which is that the pump after being stopped will not be set to working until the water has lowered to a prescribed level, which point can be determined at will by adjusting the stop V′ on the stem of the float. On the other hand, the prescribed height of the water in the tank at which the pump shall stop is also adjustable at will by means of the stop V on the float.

A further advantage is that if the wheel should be occasionally revolved when out of work by a heavy gust of wind it will not disturb the position of the parts, as the pawls B and B′ are held out of engagement with the ratchet-wheel D.

A further advantage of my device is that it may be used for obtaining a continuous rotary motion by the reciprocatory motion of the pump-rod for driving light farm machinery, for it will be seen that by adjusting the spiders so as to withdraw their spreader-blocks from between the legs of the pawl and detaching chain N from drum M the reciprocating motion of the pump-rod acting through the pawls will impart to the ratchet-wheel D a practically continuous motion, which may be applied through any suitable gearing and balance-wheels for the purpose. One of the two pawls may be left off, as either one of the two alone will operate the device, and in connection with that only one spreader-block on each spreader-wheel is needed. If my device is constructed in this manner, it is obviously within the spirit of my invention, and its operation is in no way different from that described, except that the motion of the ratchet-wheel and drum would be intermittent and the device could not be used for producing continuous rotary motion.

What I claim as my invention is—

1. In combination with the pump-rod and the cable for drawing the mill out of the wind, a ratchet-wheel provided with a winding-drum to which the aforesaid cable is secured, one or more pawls carried by the pump-rod and adapted to engage said ratchet-wheel to

wind the cable, and two sets of spreader-blocks secured to wheels journaled between the legs of the pawl or pawls and adapted to control the engagement of the pawl or pawls with the ratchet-wheel under the control of a float and of the cable which draws the mill out of the wind, respectively, substantially as described.

2. In combination with a pump-rod and the cable for drawing the mill out of the wind, a ratchet-wheel provided with a winding-drum to which the aforesaid cable is secured, two pawls pivotally suspended from the pump-rod and adapted to engage with the ratchet-wheel upon opposite sides thereof, a pair of spreader-blocks carried by a weighted wheel, which in its normal position causes the spreader-blocks to hold the pawls out of gear, a back-stop for the ratchet-wheel controlled by the weighted wheel, a cable controlled by a float to impart a partial rotation to the weighted wheel, and a second pair of spreader-blocks carried by a second weighted wheel under the control of the cable for drawing the mill out of the wind, whereby the pawls are thrown out of gear by the spreader-blocks when said cable is wound, substantially as described.

3. The combination, in a device for automatically throwing a wind-wheel out of the wind, consisting of a ratchet-wheel provided with a winding-drum to which the cable for drawing the mill out of the wind is secured, two pawls pivotally suspended from the pump-rod, a weighted wheel connected by a cable with the rising and falling float, two spreader-blocks, and a back-stop carried by said weighted wheel, whereby its partial rotation caused by the rise or fall of the float is adapted to throw the pawls and back-stop into or out of engagement with the ratchet-wheel, substantially as described.

4. In an automatic water-supply regulator for windmills, the combination of the ratchet-wheel carrying the winding-drum to which the cable is secured for drawing the mill out of the wind, the pawls pivotally suspended from the pump-rod, the weighted wheel controlled by the float and carrying spreader-blocks and a back-stop for the ratchet-wheel, the weighted wheel controlled by the cable and provided with spreader-blocks and a slotted arm through which said cable loosely passes, and the button on said cable, substantially as described.

5. In an automatic water-supply regulator for windmills, the combination, of the ratchet-wheel carrying the winding-drum to which the cable is secured for drawing the mill out of the wind, the pawls pivotally suspended from the pump-rod, the weighted wheel controlled by the float and carrying spreader-blocks and a back-stop, the weighted wheel controlled by the cable which draws the mill out of the wind, the float having the adjustable stops, the bell-crank actuated by said float, and the weighted arm on said bell-crank, all substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 24th day of March, 1890.

ALBERT M. CLARK.

Witnesses:
M. B. O'DOGHERTY,
GEO. A. GREGG.