M. S. NEWCOMER.

WINDMILL REGULATOR.

APPLICATION FILED AUG. 28, 1908.

931,140.

Patented Aug. 17, 1909.

2 SHEETS—SHEET 1.

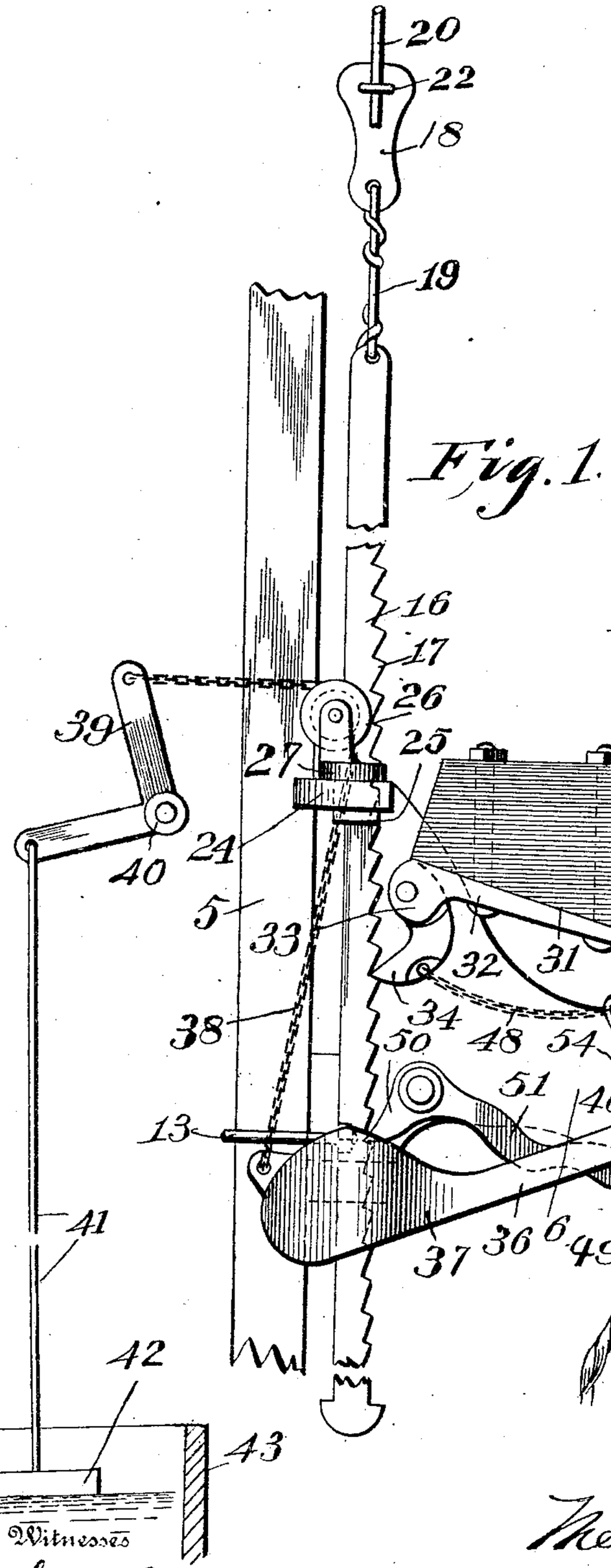

Fig. 1.

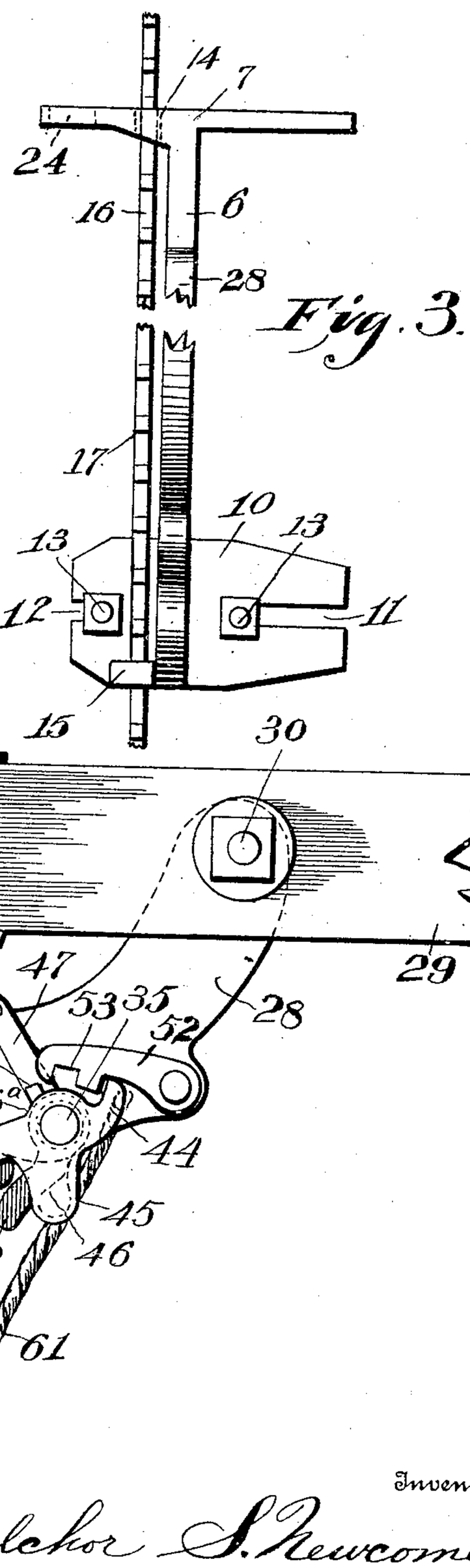

Fig. 3.

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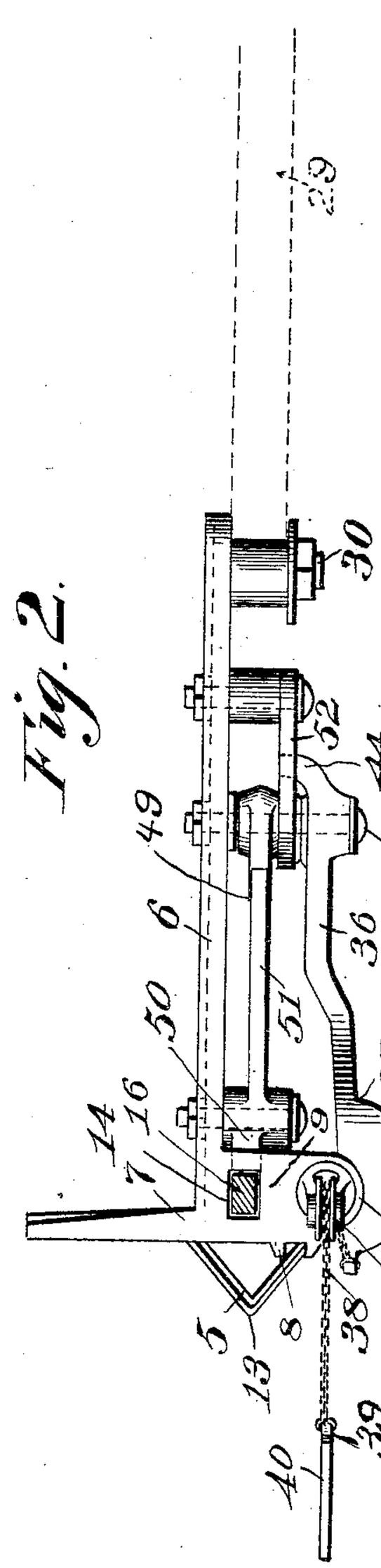

Fig. 2.

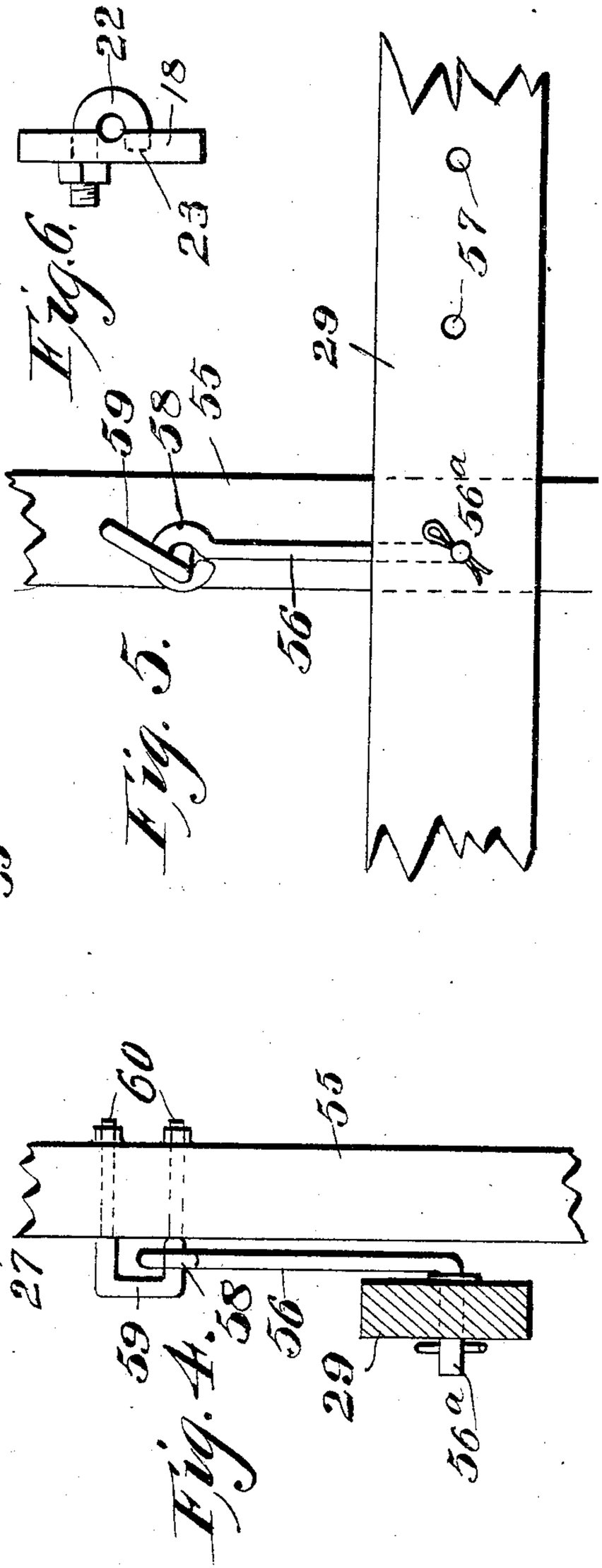

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

MELCHOR S. NEWCOMER, OF MOUNT MORRIS, ILLINOIS.

WINDMILL-REGULATOR.

No. 931,140. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed August 28, 1908. Serial No. 450,722.

To all whom it may concern:

Be it known that I, MELCHOR S. NEWCOMER, a citizen of the United States, residing at Mount Morris, in the county of Ogle and State of Illinois, have invented certain new and useful Improvements in Windmill-Regulators, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a windmill regulator or governor having an automatic operation to throw the wheel of the mill gradually out of and into the wind at times when a tank for receiving water from a pump operated by the mill has less than a certain predetermined quantity of water therein or is fully supplied with such quantity, without injury to the tower structure or operating organization of the mill.

The principal objects of the invention are to simplify the construction of windmill regulators or governors and render their operation positive and reliable; to provide a regulating mechanism that may be readily applied to any make of windmill and tower without requiring a modification of the structural components of the same; and to reduce the cost of equipment of windmills with regulators of an efficient type.

To the accomplishment of the recited objects and others coördinate therewith, the preferred embodiment of the invention resides in that construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and embraced within the scope of the appended claims.

In the drawings:—Figure I is a side elevation of a regulator or governor embodying the features of the invention, one of the windmill tower uprights or frames being shown, and the pump connecting lever illustrated as broken away. Fig. II is a top plan view of the parts shown by Fig. I, with ratchet bar in horizontal section and the pump connecting lever partially indicated in dotted lines. Fig. III is a front edge elevation of the bracket with the parts held thereby removed, a portion of the ratchet bar being shown applied. Fig. IV is a side elevation of a portion of the pump or plunger rod showing the lever in cross section. Fig. V is a front elevation of the parts shown by Fig. IV, and Fig. VI is a detail view showing a particular form of fastening bolt for coupling the pull wire to the coupling plate.

The numeral 5 designates one of the tower uprights having a V shaped form in cross section and made of suitable angle iron. To this upright a bracket (6) is applied and provided with an upper substantially horizontal beaming piece or brace (7) having a notched lug (8) to receive one edge of the upright and of such length to extend entirely across and beyond the sides of the upright. The notched lug (8) is located near one end of the brace where the greatest resistance to displacement is necessary, and to one side of the bracket (6) this brace is increased in width as at 9, in Fig. II for a purpose which will be presently explained. Below the brace (7) the bracket is provided with a coupling plate (10) which is disposed at right angles to the bracket and extends beyond opposite sides of the latter. This coupling plate has a greater length at one side of the bracket than the other, and in the longer member an elongated longitudinal slot (11) is formed and opens out through the free end thereof. In the opposite member a shorter longitudinal slot (12) is formed and opens out through the free end. These slots (11) and (12) are adapted to receive the nutted shanks of a V shaped securing bolt (13) which embraces the upright (5) and serves to clamp the bracket in secure position against the upright. The longer slot (11) permits the application of the plate (10) to uprights of various maximum widths. It is obvious that any form of clamping bolt may be used with the plate (10) and in accordance with the cross sectional contour of the upright. The longer portions of the brace (7) and plate (10) at one side of the bracket are of equal extent, but the shorter member of the brace (7) at the opposite side of the bracket is longer than the shorter member of the plate (10) on the same side of the bracket for clearance of a float chain engaging the brace as will be more fully hereinafter specified. The brace (7) has an angular guide opening (14) extending vertically through the widened portion (9) close to the bracket, and the coupling plate is provided with an apertured lug (15) in vertical alinement with said guide opening, and freely movable through the said opening (14) and lug (15) is a vertical ratchet bar or wheel controlling member (16) having ratchet teeth (17) in its inner edge terminating a suitable distance below the upper end of said bar so

that when the bar is drawn down a certain distance as when the wheel is pulled out of the wind, the pawl means coöperating with the bar will be out of engaging position with relation to the ratchet teeth or will be opposite the untoothed part of the bar. To the upper end of this bar or wheel controlling member (16) a frictional coupling plate or member (18) is secured by a wire or analogous means (19) to connect with the pull wire or rod (20) attached to and operating the mechanism for throwing the wind wheel into and out of the wind. The pull wire or rod (20) is secured to the upper end of the plate (18) by a frictional clamping hook bolt (22) having its long nutted leg passing through the plate and its shorter leg terminally seated in a cavity or recess (23) in the plate. It is obvious that by tightening up this bolt the pull wire or rod (20) may be firmly secured to the plate (18) by a very simple operation and in an expeditious manner. The brace (7) also has an opening (24) therethrough near the free end of the widened portion (9) of its shorter member in which is rotatably fitted the tubular shank (25) of a guide pulley or sheave (26), the said shank being provided with a bearing flange (27) which rests on the top surface of the brace.

The bracket (6) has an inner upper projecting arm (28) to which a lever or beam (29), preferably of wood, is movably attached by a fulcrum bolt (30) and extends away any suitable distance to the pump rod or plunger. The lower outer corner of this lever or beam (29) is cut away at an upward inclination, as at 31, and has a pawl support (32) bolted thereagainst and provided with an outer enlarged end (33) in which is fulcrumed the upper end of a depending feed pawl (34) held in movable engagement with the adjacent teeth of the rack bar or controlling member (16). The lower intermediate portion of the bracket is formed or provided with an outwardly extending trunnion (35) on which is movably mounted the rear end of a shank (36) of a weight member (37), a chain (38) being secured to the free end of this member and passed upwardly through the tubular shank (25) of the pulley or sheave (26) and over the latter, said chain extending away from the pulley any distance necessary and connected to the upper arm (39) of a bell-crank lever (40) fulcrumed on a suitable supporting means and having a wire or rod (41) secured to its remaining arm and to a float (42) in a suitable tank (43) supplied from the pump by the operation of the windmill. The inner end of the shank (36) is formed with an upwardly projecting foot or lifting projection (44) and a depending lifting arm (45) with a shoulder (46). On the trunnion (35) a pawl trip or crank (46ª) is movably mounted between the shank (36) and the bracket and has an upwardly projecting arm (47) terminally attached to the feed pawl (34) by a flexible connection or chain (48). This pawl trip or crank also has a lower forwardly projecting arm (49) close to the shoulder (46) so that an immediate engagement between the said shoulder and arm (49) may be effected. Adjacent the rack bar or controlling member (16) a stop or locking pawl (50) is fulcrumed on the bracket (6) and engages the teeth of said rack bar below the point of engagement therewith by the feed pawl (34). The stop pawl has an inwardly projecting tail (51) with its free end in engaging alinement with the front edge of the arm (49) of the trip or crank (46ª). In rear of the trunnion (35) a locking dog (52) is secured to the bracket (6) and has an angular notch (53) in the lower edge near its free end to engage a stud or projection (54) on the arm (47) of the trip or crank (46ª) to lock the latter when thrown or turned to disengage the pawls (34) and (50) and hold the regulating mechanism in inoperative condition when the wheel is automatically thrown into the wind at the time the water in the tank (43) is at a certain level below its maximum predetermined elevation. The dog (52) is raised or thrown out of disengaging position by the release foot or projection (44) contacting with the under edge of the dog (52) and actuated by the movement of the weight member when the tank will have received its full predetermined supply.

The lever (29), see Figs. IV and V, is connected to the pump rod or plunger (55) by a swinging hanger (56), the latter having a lower outwardly projecting angular or hooked end (56ª) removably secured in the lever and adjustable through the medium of a plurality of openings (57) formed in said lever and whereby the stroke of the lever may be varied. The upper end of the hanger (56) is formed with an eye (58) which loosely engages a staple (59) having legs (60) inserted through and secured in the rod or plunger (55). The head (59) of the staple is angularly deflected, or one leg is straight and the other bent to dispose the staple head at an angle. The object of this construction is to permit different applications of the lever to the pump rod or plunger in accordance with variations in features of construction of the tower and pump organizations, and the manner in which it may be necessary to apply the regulator. If the lever extends straight across the pump rod the said parts will be positioned as shown, but if the lever cross the pump rod corner, or diagonally the hanger (56) may be caused to readily assume a correct position with relation to the staple owing to the angular head of the latter without

binding or becoming cramped, as the bent portion of the staple under these conditions is placed at the bottom or occupies a lower position. The preliminary preparation of the staple as specified avoids the necessity of bending the same at the time the regulator is applied and facilitates the application of the lever in various positions with relation to the pump rod.

As a reinforcing means to resist strain, a stay wire (61) may be secured to the bracket (6) and extend to and be suitably attached to the tower post or upright. All connecting bolts or fulcrums will be equipped with suitable washers, especially those engaging the lever (29), and simple securing means will be adopted at all points. The number of fastening devices however is reduced to a minimum. It will be noted that it is only necessary to secure the bracket (6) by the bolt (13), connect the pull wire or rod (20) to the plate (18), attach the chain (38) to the bell-crank lever (40), connect the float wire or rod to said bell-crank lever, and couple the lever (29) to the pump rod or plunger, in order to apply the regulator in working position. The chain (38) in its slack movement clears the adjacent end or member of the coupling plate (10) which is shorter than the opposite end thereof, and thus the said chain will be untrammeled in its operation.

Assume that the water in the tank (43) shall have fallen and carried the float (42) downwardly therewith. This will cause the weight member (37) to be raised owing to the downward pull on the bell-crank lever (40) by the wire or rod (41) and an upward drawing on the chain (38). Such upward movement of the weight member causes the shoulder (46) to move outwardly and forcefully bear against the projecting arm (49) of the trip or crank (46[a]) and throw the upper arm (47) inwardly and release the feed pawl (34) from the rack bar (16) through the chain (48), and simultaneously the tail (51) of the locking pawl (50) is engaged by the projection (49) and said latter pawl released from the rack bar. The pawls are held in disengaged relation to the rack bar by the dog or latch (52) which takes over the lug (54). The rack bar (16) being liberated as just explained permits the wind wheel to be turned into the wind as all restraint to such movement of the wheel has been relieved, and the pump rod or plunger is free. To operate the pump to supply the tank, the rack bar (16) at this time being drawn upwardly and the lever (29) will freely oscillate without affecting the rack bar. As the water in the tank gradually rises toward a predetermined level, the float (42) ascends and the weight member (36) gradually lowers, thus relieving projection (49) of pressure and bringing the foot (44) into contact with the under edge of the dog or latch (52), and eventually raise said latch to clear the lug (54). This release of the dog or latch unlocks the trip or crank (46[a]) and permits the latter to turn outwardly to engage the rack bar (16) which at this time will be fully elevated. Both pawls will now be in working engagement with the teeth of the rack bar, and, through the oscillation of the lever (29) due to the continued reciprocation of the pump rod, the said rack bar will be gradually fed downwardly, and at the time tank is filled, the rack bar will have reached its maximum lower position.

It should be understood that in its broader aspect the invention comprehends the employment not only of the various means described, but of equivalent means for performing the recited functions. While the arrangement shown is thought, at the present time, to be preferable, it is desired to reserve the right to effect such modifications and variations thereof as may come fairly within the scope of the appended claims.

What is claimed as new is:—

1. A regulator of the class specified, comprising a vertically movable controlling member, a pump actuating device having a lever operatively associated therewith and provided with a pawl to separably engage said controlling member, a pawl for limiting the movement of the member, a crank connected to the lever pawl and adapted to engage the limiting pawl for disengaging both pawls from the member, a weight member, a float connected to the weight member and disposed in a tank adapted to be supplied with water by the operation of the windmill, and a locking device for holding the pawls in a disengaged position and adapted to be released by a portion of the weight member.

2. A windmill regulator of the class specified comprising a vertically reciprocating member operating to throw a windwheel into and out of the wind, a bracket having an upper brace extending thereacross and a lower transverse coupling plate, the brace and plate having guide means for the member to move therethrough and the plate provided with longitudinal slots opening out through opposite ends, one slot being longer than the other, a clamping bolt engaging said plate, an upright to which said bolt is fitted, and means carried by the bracket for controlling the operation of the member.

3. A windmill regulator of the class specified, comprising a vertically reciprocating member operating to throw a windwheel into and out of the wind, a bracket supporting said member and carrying substantially all of the mechanism of the regulator and including a lever having a feeding device engaging the member, a feed limiting device

for the member and a weight member for disengaging the feed and limiting devices, a float having a flexible connection with the weight member, a guide pulley for the flexible connection movably disposed on the bracket and having a tubular shank through which the connection has movement, and means actuated by the weight member for disengaging the feed and limiting devices from the member.

4. A windmill regulator of the class specified, comprising a vertically reciprocating member, a pump rod having a lever for operating said member, a pull wire running the wind wheel mechanism to control the position of said wheel with relation to the wind, a coupling plate attached to the upper end of the member, a hooked clamping bolt engaging the coupling plate and frictionally securing the pull wire to the plate, and means for feeding and releasing said member.

5. A regulator of the class specified, comprising a vertically movable controlling member, a pump actuating device having a lever operatively associated therewith and provided with a pawl to separably engage said controlling member, a pawl for limiting the movement of the member, a crank connected to the lever pawl and adapted to engage the limiting pawl for disengaging both pawls from the member, a weight member, a float connected to the weight member and disposed in a tank adapted to be supplied with water by the operation of the windmill, and means common to both pawls for holding the latter in disengaged position and adapted to be released by a portion of the weight member.

6. A regulator of the class specified, comprising a vertically movable ratchet bar, a pump actuating device having a lever operatively associated therewith and provided with a pawl to separably engage said ratchet bar, a pawl for limiting the movement of the ratchet bar, a crank connected to the lever pawl and adapted to engage the limiting pawl for disengaging both pawls from the ratchet bar, a weight member, a float connected to the weight member and disposed in a tank adapted to be supplied with water by the operation of the windmill, and a locking dog device for holding the pawls in a disengaged position and adapted to be released by a portion of the weight member.

7. In a mechanism of the class described, the combination with a vertically-reciprocating member operating to throw a windmill out of or into the wind, a pump-rod operated by the windmill, a lever carrying means to engage the member and automatically actuate the same, of a substantially U-shaped staple mounted upon the pump-rod and provided with an upper and a lower leg, a rod pivotally secured near its upper end to the lower leg of said staple, and said rod carrying means for pivotally securing the lever thereto.

8. In a mechanism of the class described, the combination with a vertically-reciprocating member operating to throw a windmill out of or into the wind, a pump-rod operated by the windmill, a lever carrying means to engage the member and automatically actuate the same, of a substantially U-shaped staple mounted upon the pump-rod and provided with an upper and a lower leg, a rod provided at its upper end with an eye, the eye positioned over the lower leg of the staple, said rod provided at its lower end with an outwardly-extending, horizontal, integral extension projecting through said lever, and means carried by the extension for detachably securing the lever thereon.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

MELCHOR S. NEWCOMER.

Witnesses:

JOSEPH L. RICE,

JOHN SHARER.