(No Model.) 2 Sheets—Sheet 2.

G. M. BEARD.

WINDMILL REGULATOR.

No. 338,914. Patented Mar. 30, 1886.

Fig. 3.

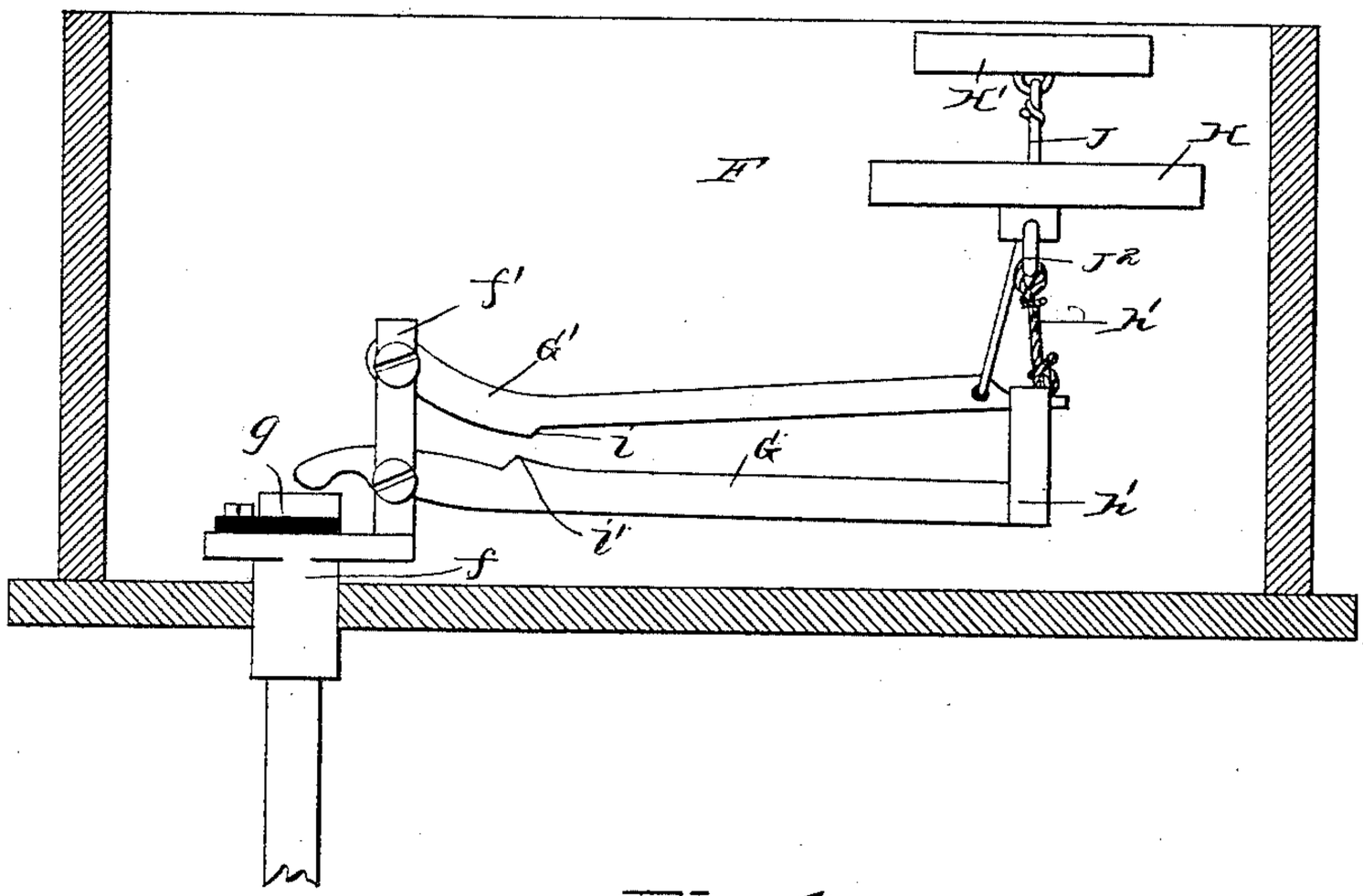


Fig. 4.

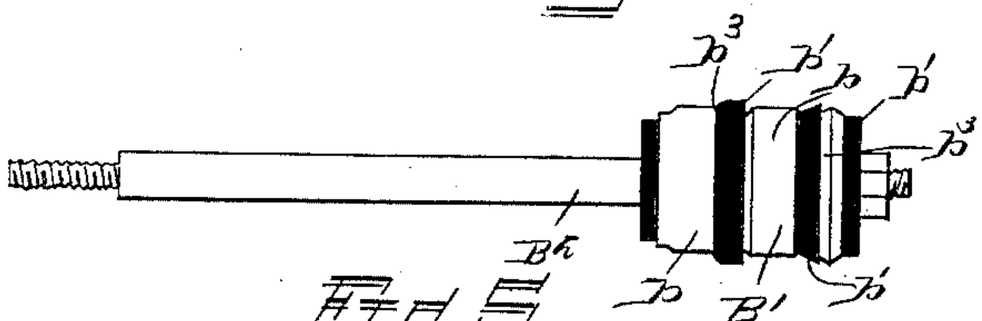
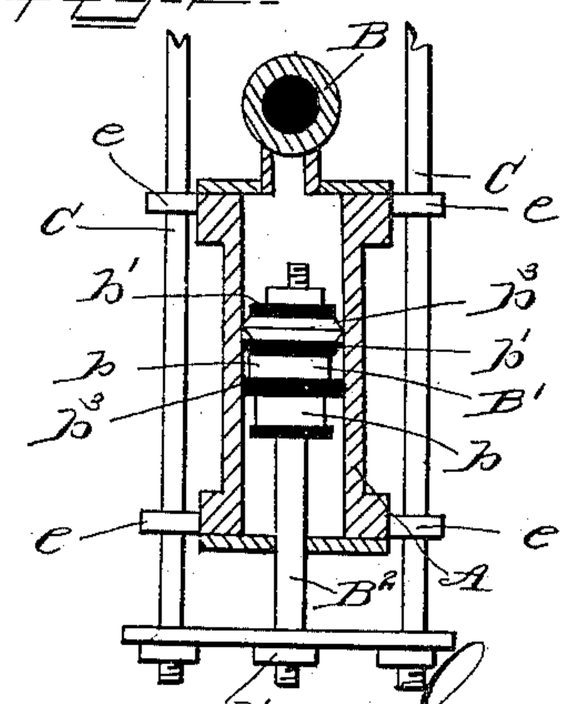


Fig. 5.



WITNESSES.

Conrad G. Schneider

Thos. A. McGill

INVENTOR.

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By Myers & Co

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 1.

G. M. BEARD.

WINDMILL REGULATOR.

No. 338,914. Patented Mar. 30, 1886.

Fig. 1.

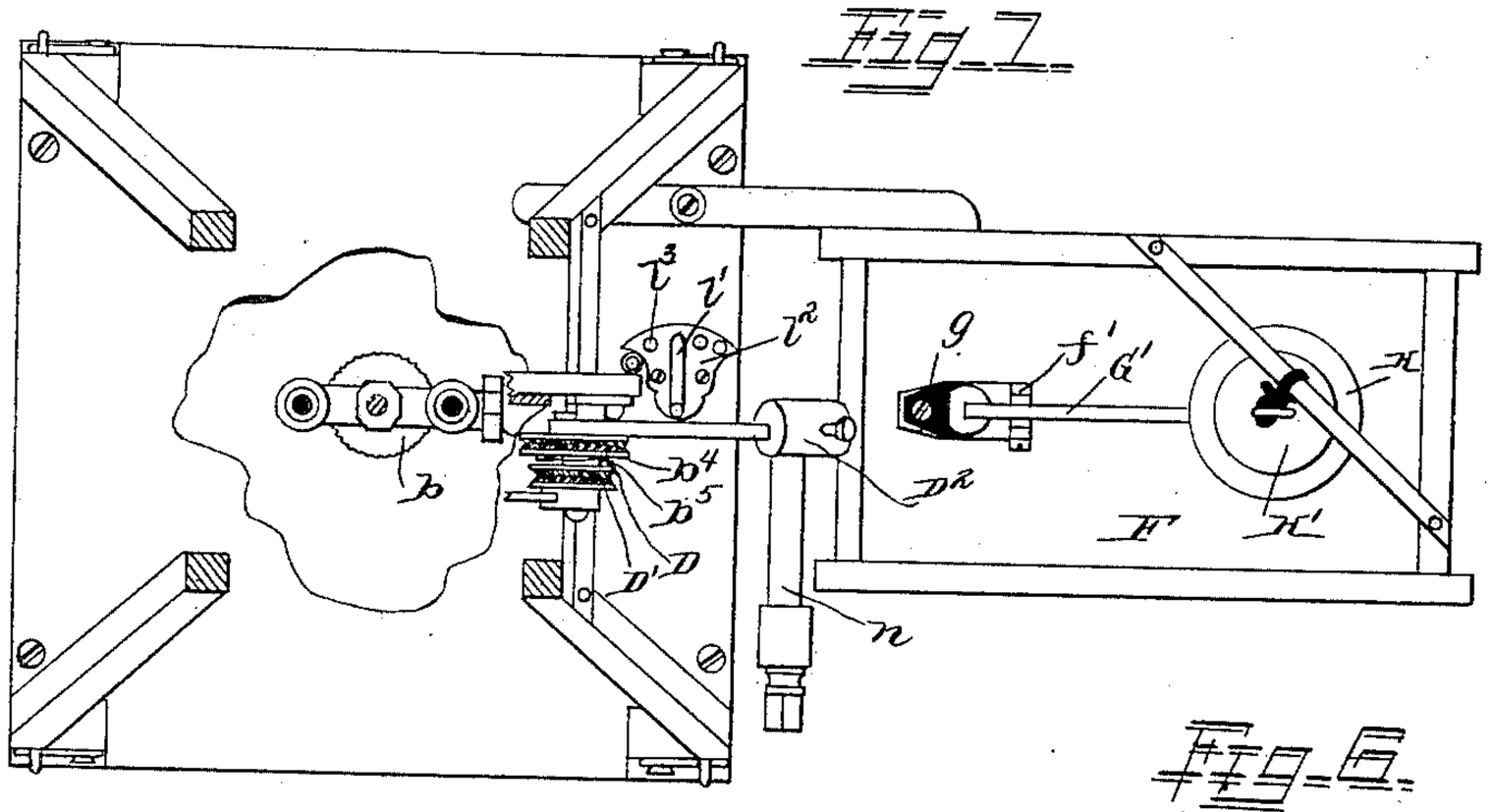


Fig. 6.

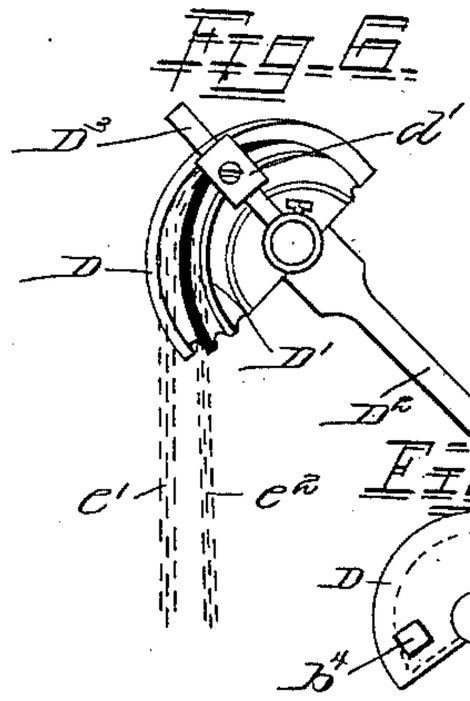


Fig. 2.

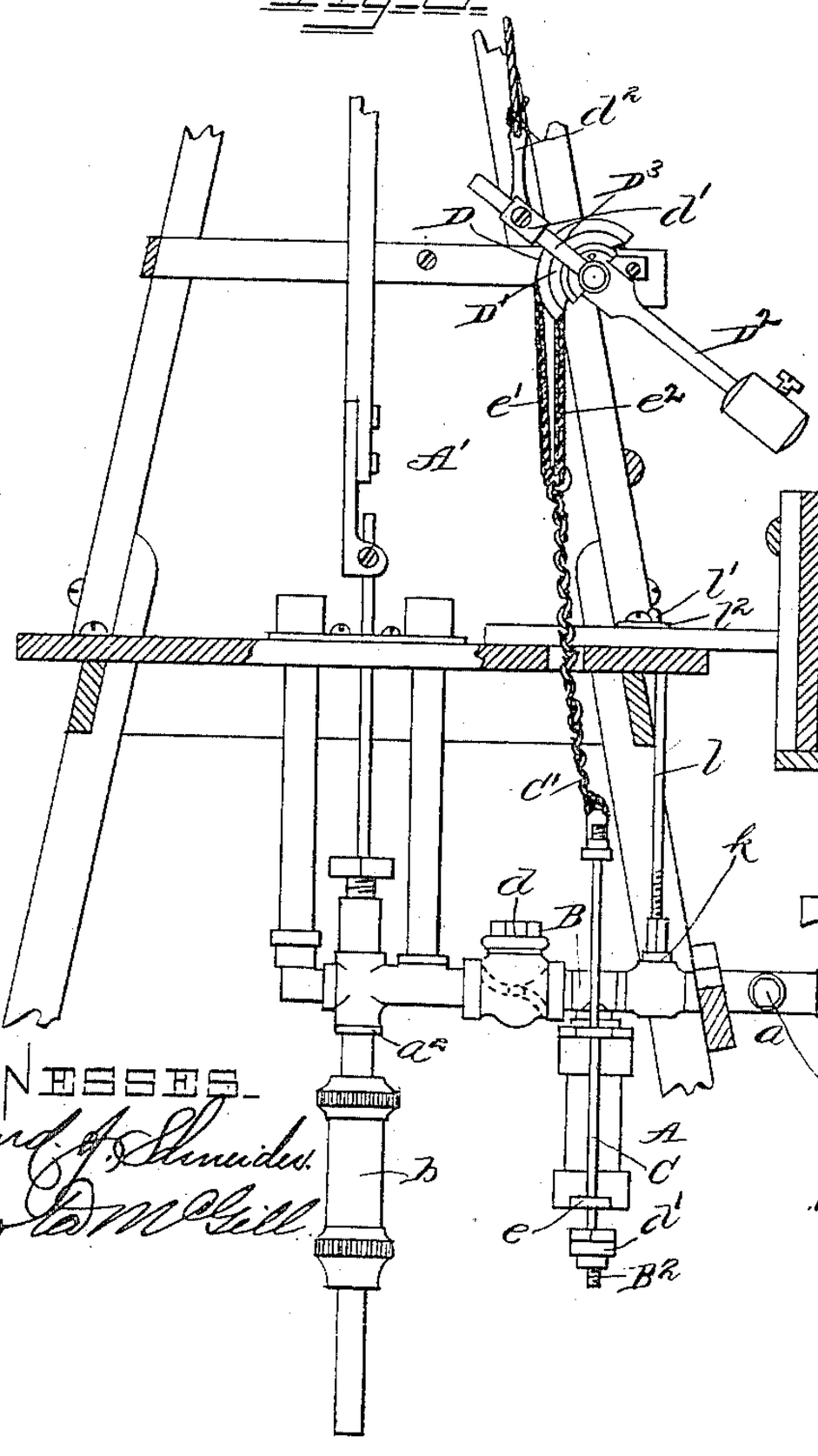
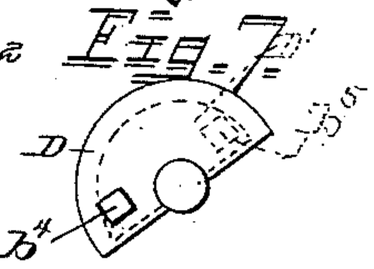
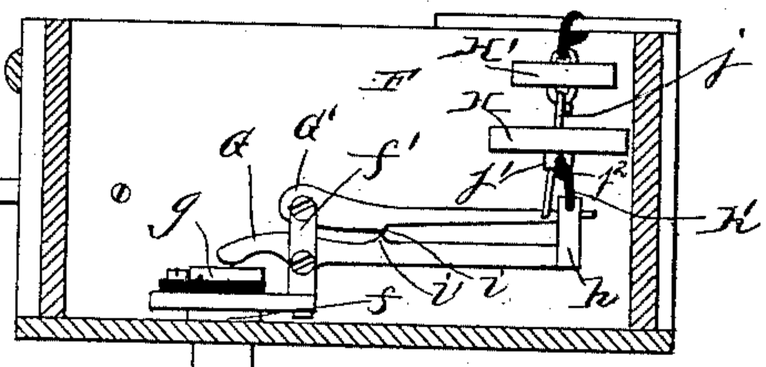


Fig. 7.





WITNESSES.

Edward J. Shneider.

Jno. D. McGill.

INVENTOR.

George M. Beard

By Myers & Co.

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UNITED STATES PATENT OFFICE.

GEORGE M. BEARD, OF AUBURN, INDIANA, ASSIGNOR OF ONE-HALF TO WILLIAM H. RAKESTRAW, OF SAME PLACE.

WINDMILL-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 338,914, dated March 30, 1886.

Application filed August 27, 1885. Serial No. 175,469. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. BEARD, a citizen of the United States of America, residing at Auburn, in the county of De Kalb and State of Indiana, have invented certain new and useful Improvements in Windmill-Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

In this improvement the objects which I have in view are, principally, to render more certain and positive the action of the regulator, to remove all strain from the regulator, to remove all unnecessary strain from the regulator-cylinder, to readily vary the flow or supply of water to adapt it for use in connection with a tank or fountain or hydrant, and to effect the prompt cutting off of the water-supply, and to permit of the removal of a greater or less quantity of water without putting into action the pump; and the invention therefore consists of the sundry combinations of parts, including their construction, substantially as hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a plan view of my wind-wheel regulator, with parts of the supporting frame and platform broken away. Fig. 2 is a side elevation, with parts in section, of the same. Fig. 3 is a view in side elevation, also with parts in section somewhat enlarged, showing the floats and their valve. Fig. 4 is an enlarged detail view. Fig. 5 is an enlarged cross-sectional view of the regulator-cylinder, showing its piston; and Figs. 6 and 7 are detail views of the pulleys and their connections.

In the embodiment of my invention I employ, in connection with a wind wheel or mill, a regulator-cylinder, A, which in practice is disposed in the well or pit about four or five feet below the pump-supporting platform, and is suitably secured in position therein.

a is the water or discharge pipe, below which is arranged and to which is connected the regulator-cylinder A, by a T-pipe, B, connected at the lower end of its stem by a coupling to the upper cylinder-head. The pipe *a* is arranged to connect at one end by a pendent pipe or elbow, *a'*. To or near one end, and a short distance from said end of the pipe *a*, is connected by pipe-connections a^2 the pump-cylinder *b*, having in practice the usual pump-rod connection with the wheel shaft, eccentric, or crank, which, however, will not here be further described, the same forming no parts of these improvements.

In the pipe *a*, between the regulator and pump, is arranged a check-valve, *d*, to prevent the water escaping from regulator-cylinder and returning to the well through pipe or any other connections between the regulator and pump.

Other adjunctive parts of the water-pipe *a*—as, for instance, its means of connection to a fountain or hydrant, and for varying or regulating its supply or discharge—will be described hereinafter.

The regulator-cylinder A is provided with a piston, B', which is fitted therein water-tight, being made of several metallic rings or disks, *b*, and intermediate packing or leather washers, *b'*, secured centrally upon a rod, B^2, by a shoulder upon said rod and a nut screwed upon the upper screw-threaded end of the latter, jamming or forcing and securing the disks or rings and washers or packing solidly together. The ends of the piston are also packed with leather washers or disks, to prevent any leakage between the same and the heads of the cylinder around the piston-rod, should any leakage occur around the intermediately-packed portion of the piston. The upper surfaces of the lowermost ring or disk and the upper of the intermediate disks or rings are recessed or concaved, as at b^3, to receive the inner edges of the packing washers or rings *b'*, while the lower surfaces of the adjoining disks are convexed or rounded to force the packing-washers into the concavities of the aforesaid disks. The disk disposed next to the lowermost one may be rounded or convexed upon both its upper and lower surfaces and be of less diameter than the rest, thus leaving an annular space which may be extended by reducing the lower edge of the next upper disk, and which space receives the packing-washer as it is crowded by the sides of the cylinder. From this construction it will be seen that the leather or flexible packing can, by tightening

or screwing up the disks, be distended or project to compensate wear and to tightly pack the piston. The lower end of the piston-rod B^2, projecting through and beyond the lower cylinder-head, is connected centrally to a cross plate or bar, d', the ends of which extend beyond the outer sides of the cylinder A and are connected to parallel rods C, which are guided in ears or apertured lugs *e*, upon opposite points of the cylinder-heads. The upper ends of these rods are also tied or connected together by a cross plate or bar, to which is also centrally connected a wire, C', (or other suitable means,) extending up through the platform into tower A' and connecting with the contrivance for pulling the wheel out of the wind or gear. This disposition of the piston, with the piston-rod projecting downward through the bottom or lower head of the cylinder, dispenses with the use of packing-box around the piston-rod, it not being required to provide against leakage thereat, while the wheel will be permitted to come into action or gear whether water be taken from the tank or not.

D D' are two segmental pulleys or levers pivoted upon a common axis supported upon the frame or tower A' about in alignment with the regulator-cylinder A, and which are provided one, D, with a long weighted arm, D^2, and the other, D', with a short arm, D^3, which has an adjustable collar, d', upon whose adjusting-screw is loosely fitted a plate, d^2, connecting with the cord or line of the wheel-shifting contrivance. The weight of arm D^2 is adjustable by a set-screw to vary its leverage according to the distance and height the water is to be forced from the regulator-cylinder to the tank, the joint function of the said arm and weight being to effect the elevating of the piston by giving it the requisite amount of force or pressure to expel from its cylinder the water therein contained upon the opening of the tank-valve. The adjustable collar or slide of the arm D^2 is designed to adapt or effect the application of the same to different styles of windmills.

These pulleys or levers are of different-sized arcs, and are connected, preferably by chains e' e^2, to the wire C' of the piston B', and said chains are so connected to said pulleys or levers as to rest in grooves of the peripheries of the pulleys or levers, and the chain of one pulley (the larger one) is as much longer than the chain of its fellow pulley as its arc is greater than the arc of the other pulley, whereby one pulley or lever, (the larger one, D',) as the piston receives movement, as, for instance, in making its downstroke, will receive a limited movement, an upward one, in that case, before the other (the smaller pulley) or lever D begins its movement. Both pulleys, however, during the remainder of the stroke of the piston, will have movement at the same time, but at a different relative rate, throwing the short arm D^3 of the lesser pulley or lever D' down perpendicularly, and throwing the long arm D^2 of the greater pulley or lever D' in nearly a horizontal position, the result of which is to produce a dead-center at the end of the stroke of the piston, thus removing all strain from the piston-cylinder during the holding of the wheel out of the wind or gear, the wheel in the meantime having been swung around about parallel with the vane, or edgewise to or out of the wind.

Upon the inner surface or side of the larger segmental lever or pulley is a stud or projection, b^4, which is so disposed with relation to the movement of the other or smaller segmental lever or pulley as to permit of contact with a projection, b^5, of the latter. Soon after the weighted arm D^2 begins its movement (the projections b^4 b^5 of the two levers or pulleys D D' having then come together) the smaller pulley D' will be so acted upon as to be carried past its dead-center, after which it will be upwardly acted upon by the wind mill or wheel governor, carrying its arms upward and permitting the wheel to be put again into gear. Of course such an action or approximate action of the said parts will follow as the force of the wind may affect the wheel and its governor; but this is only incidental or permissible, and no part of the invention, the action of the wind having no bearing whatever upon the operation of the invention, and it is only as to the relation of the aforesaid operation of parts to the subsequent disclosures that the same has utility in effecting the objects of the invention.

F is a tank suitably supported at the desired distance or height for holding water, and with the end of the upturned portion or arm of the water-pipe *a* entering or passing through its bottom. Upon the upper end of the discharge-pipe is screwed a short tubular portion or flange upon the under side of an apertured plate or valve-seat, *f*, upon which and over its aperture rests a valve, *g*, flexibly hinged or connected to the upper surface of said plate or seat at one end, while upon the said plate or seat at its other end is formed or cast a short slotted upright or post, *f'*.

G is a lever pivoted near one end in the slot of the post of the plate *f*, the end of the shorter arm being disposed directly over and adapted to act upon the valve *g*, while to the end of the longer arm is rigidly connected a narrow bail or bridle, *h*, to the upper end of which bail or bridle is connected a float or disk, H, by a chain or wire, *h'*, contiguously to the said end of lever. The chain or wire *h'*, however, may be shortened or lengthened to vary the depth of submergence of the disk or float H, to permit the holding of the valve closed until a greater or less quantity of the water in the tank has been removed, as may be desired.

The primary object of the joint action of the lever and the float or disk will be described further on, when their action will be more fully appreciated.

G′ is a second lever or dog with one end (its elevated or upwardly-bent end) pivoted in the upper end of the slotted post of the plate *f*, and having a shoulder or projection, *i*, on its under side at its bend or angle, which engages or abuts against a coincident shoulder or offset, *i′*, of the lever G, directly above which the lever G′ is arranged, and so as to rest thereon by gravity when not separately acted upon, and to hold the inner or acting end of the lower lever off or out of contact with the valve *g*. The free end of the lever or dog G′ enters and has a limited movement in the bail or bridle *h* of the free end of the lever G, and is also connected to a float or disk, H′, of less diameter and thickness than the float H, the wire or chain *j*, connecting the lever G′ to its float H′, passing preferably through a metallic eye or tube, *j′*, seated in the center of the float H, and connected to a ring, *j²*, of said float G′, to which tube or eye is fastened the chain *h′* of the float H. The wire or chain *j* is of sufficient length to permit the float or disk H′ to rise with the water entering the tank to the maximum height of the containing capacity of the latter.

It will be seen that with the lever or dog G′ resting upon the lever G, when their shoulders will be in engagement, as already stated, and have no effect upon the valve *g*, the float H, as it is carried to its height of flotation by the incoming water through the valve *g* from the pipe *a*, will have no effect to disengage its lever from the other lever or to separate the levers, which would effect the closing of the valve, and thus as the water continues to rise in the tank said float or disk will be submerged and remain so. When the point or flotation of the float or disk H′, which, of course, also rises with the rising water, is reached, the upper lever or dog, G′, will be separately acted upon, which will cause its disengagement from the lower lever and permit the float H, by reason of the greater pressure to which it is subjected through its sub mergence, to forcibly and promptly act upon the lever G, which will in like manner act upon the valve and thus insure the certain and prompt closing of the valve, as well as its retention against opening. It will be also seen that the valve will not open simply upon removing a pail or so of water from the tank, but that water can be removed until the point of submergence of the float H has been reached, and that by moving and connecting the said float still closer to the lever it is obvious that the water can still further be taken from the tank, or the latter can be nearly emptied. The float H′ has no function after releasing the dog or lever G′ from the lever G. It will have further been observed that upon the instant of the closing of the valve *g*, cutting off the entrance of the water to the tank F, the reaction will cause the water to enter the regulator-cylinder B, and thus force down its piston, when the hereinbefore first-described action of the segmental levers or pulleys, with their adjunctive parts, will take place, causing the taking of the wheel out of the wind or gear and stopping the pumping operation.

A valve or cock, *k*, is arranged in the pipe *a* between the tank and the regulator-cylinder or pump-cylinder, (its relation to the regulator-cylinder simply as a question of position has no significance or utility,) to regulate the flow of water to the tank if a greater or less amount should be desired to be pumped thereinto within a limited or certain time. This cock or valve has a long stem or rod, *l*, affixed thereto and reaching up through the platform of the frame or tower A, and bearing therein. The end of said stem or rod above the platform is bent down into an elongated staple or bail shaped handle, *l′*, the free bent-down end of which is adapted to serve as an index or pointer to register with a scale or a plate, *l²*, secured to said platform and enter any one of a series of segmentally-arranged apertures, *l³*, in said plates, whereby the supplying or feeding capacity of the pipe *a* can be gaged or regulated to any extent required.

m is a stop-cock arranged in the pipe *a* near the tank to completely cut off the water from the latter—as, for instance, when it may be desired to effect a connection with a hydrant or fountain, for which latter purpose I also employ a pipe, *n*, which, when not in use, is cut off by stop-cock or hydrant, and which is connected with pipe *a* between the said stop-cock *m* and the regulator-cylinder B or valve *l*.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a wind-wheel regulator, the water-pipe connected to a pump-cylinder, a regulator-cylinder, and a tank, and having the check-valve, regulating valve, and stop-cock, substantially as and for the purpose set forth.

2. In a wind-wheel regulator, the water-pipe having connection with the pump-cylinder and the tank and provided with the valve, and having its stem adapted to engage with a scale or plate having a series of segmentally-arranged apertures, subtantially as and for the purpose set forth.

3. In a wind-wheel regulator, the water-pipe connecting with the pump-cylinder by a T-pipe connection and having the stop-cock and the fountain or hydrant attachment pipe-arm, substantially as and for the purpose set forth.

4. In a wind-wheel regulator, the regulator-cylinder and its piston, in combination with the segmental pulleys or levers of different-sized arcs having studs or projections on their inner surfaces and connected to said piston by means substantially as described, whereby the small segmental pulley or lever will stand in a dead-center when the wheel is pulled out of the wind or gear, substantially as and for the purpose set forth.

5. In a wind-wheel regulator, the combina-

tion, with the regulator or cylinder and its piston, of the segmental levers or pulleys of different-sized arcs, and connected by chains or cords of different lengths to the said piston, the larger lever or pulley carrying a weighted arm and the smaller lever being connected to the wheel-shifting contrivance, substantially as and for the purpose set forth.

6. In a wind-wheel regulator, the combination, with the water-pipe with its tank end provided with a valve, of the float-levers having independent movement relatively to each other, one lever being temporarily held to its fellow lever and having a float adapted to be held in submergence, and released from its fellow lever, also provided with a float, the whole arranged to operate substantially as shown and described, and for the purpose set forth.

7. In a wind-wheel regulator, the combination, with the water-pipe with its tank end provided with a valve, of the lever pivoted near one end in a post and having a narrow bail or bridle at its other end, and the second lever also pivoted in said post and having a shoulder or projection on its under side which engages with a coincident shoulder or offset of the other lever, said levers having floats secured thereto, and the whole arranged to operate substantially as shown and described.

8. In a wind-wheel regulator, the combination, with the water-pipe with its tank end provided with a valve, of the float-levers adapted to have temporary engagement and separated as the float of one lever reaches the limit of its movement by the rising action of the water in the tank, the float of the other lever remaining submerged, and the regulator-cylinder connected to said pipe and with its piston connected to the differentially-moving segmental levers or pulleys, one carrying a weighted arm and the other being connected to the wheel-shifting contrivance, substantially as and for the purpose set forth.

9. In a wind-wheel regulator, the water-pipe with its tank end provided with a valve, in combination with the levers, one acting upon the said valve and having a rigid bail or bridle at one end to which is connected a float, the other lever or dog being pivoted at one end and having a bend near said end and having its opposite end movable in the said bridle or bail and also connected to a float, each of said levers having an abutting shoulder, substantially as and for the purpose set forth.

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

GEORGE M. BEARD.

Witnesses:
N. J. SLEUFER,
W. H. RAKESTRAW.