No. 667,617. Patented Feb. 5, 1901.

A. R. DEMPSTER & W. D. RINEHART.

WINDMILL REGULATOR.

(Application filed Jan. 12, 1899.)

(No Model.)

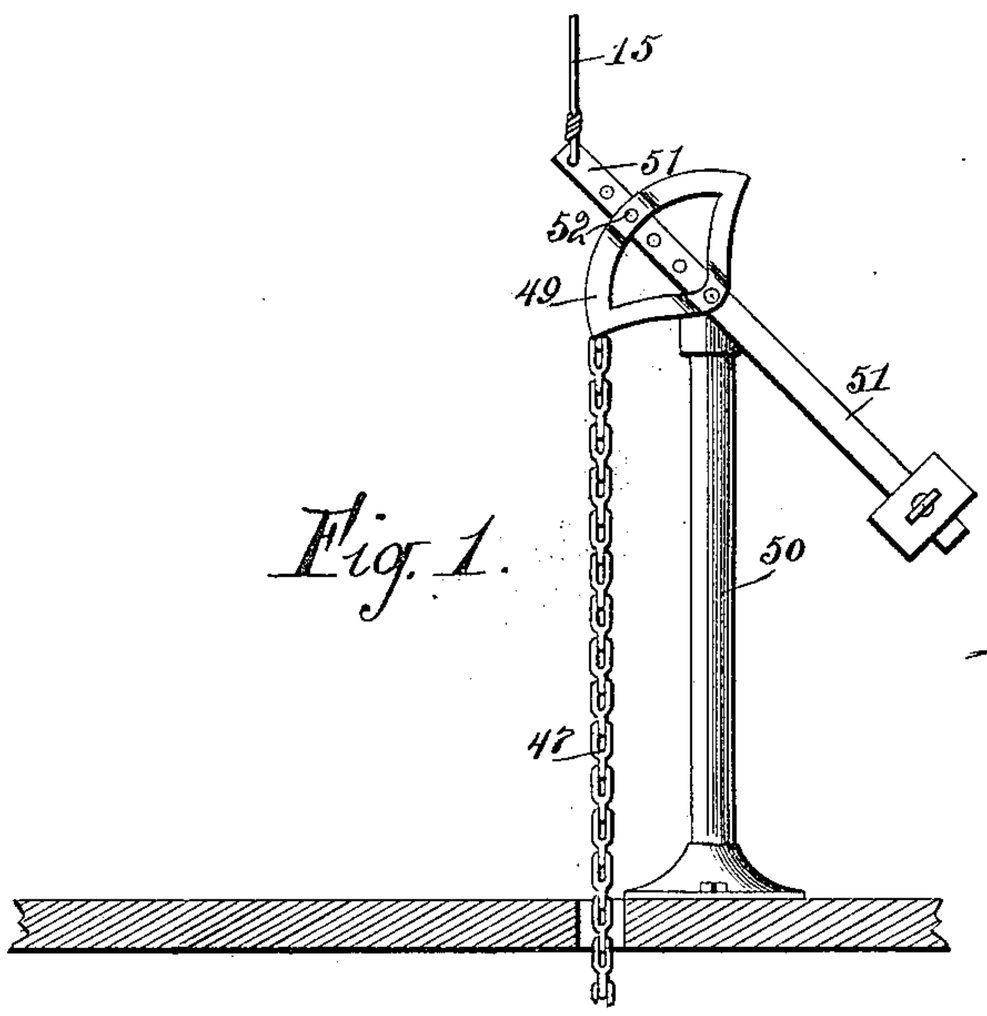


Fig. 1.

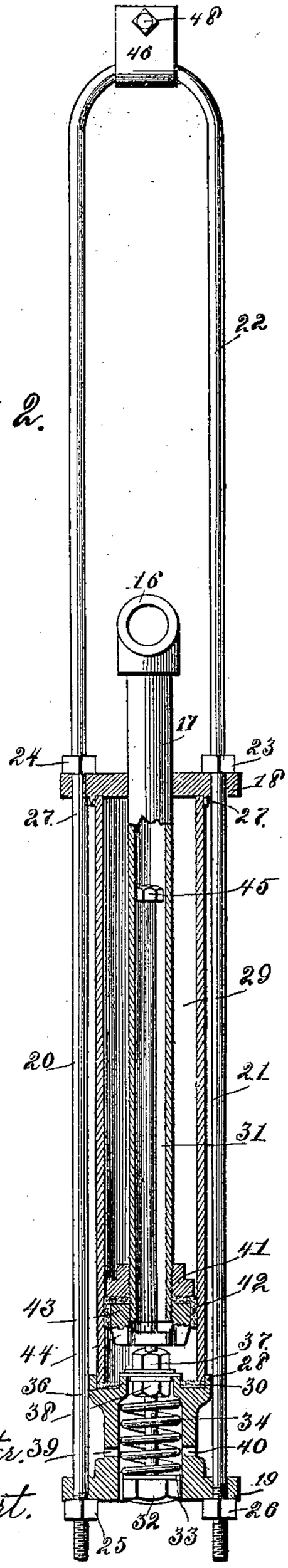
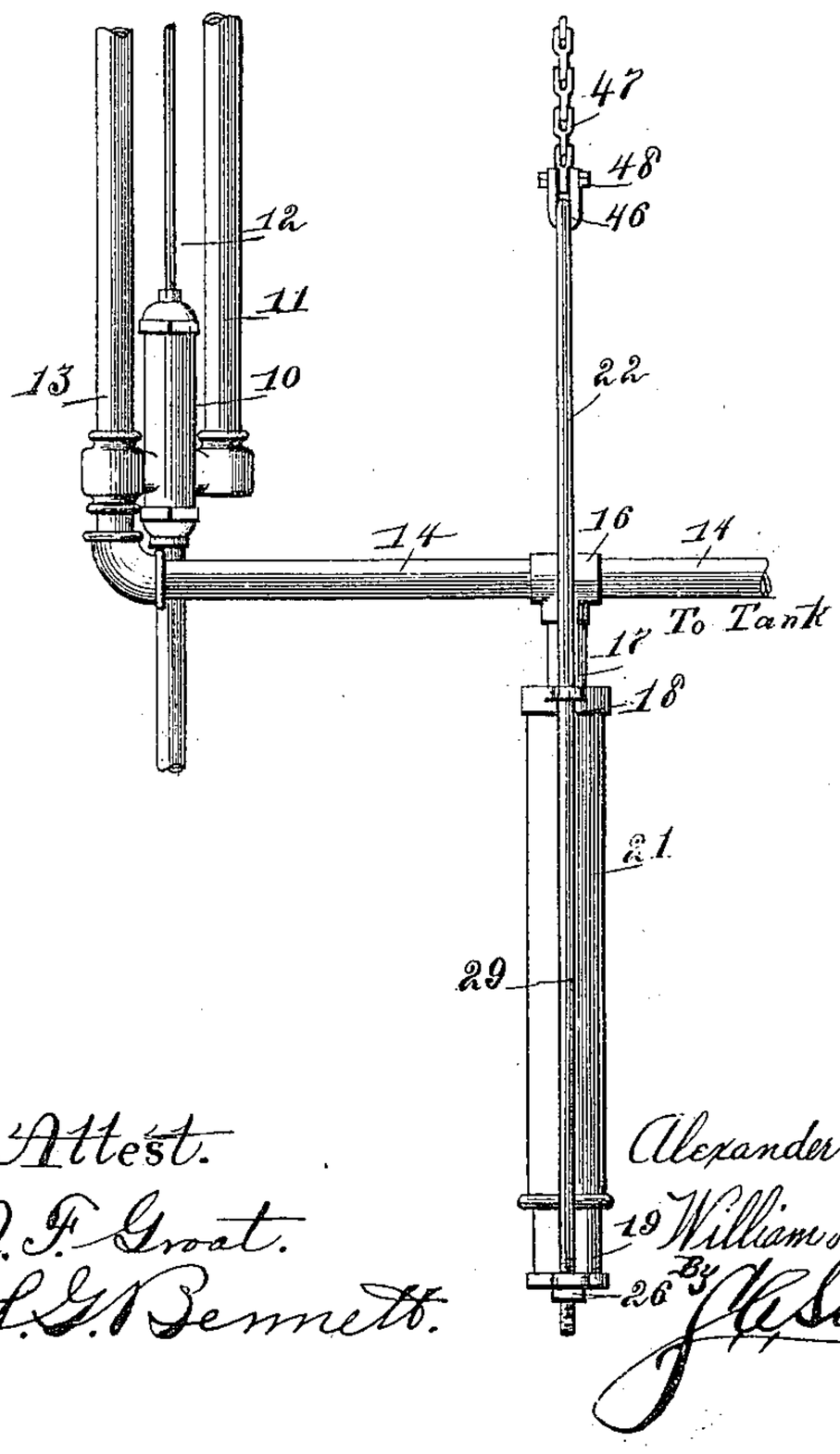


Fig. 2.



Attest.
J. F. Groat.
L. G. Bennett.

Alexander R. Dempster.
William D. Rinehart.
By J. H. Sweet
Atty.

UNITED STATES PATENT OFFICE.

ALEXANDER R. DEMPSTER AND WILLIAM D. RINEHART, OF DES MOINES, IOWA, ASSIGNORS TO THE DEMPSTER MANUFACTURING COMPANY, OF SAME PLACE.

WINDMILL-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 667,617, dated February 5, 1901.

Application filed January 12, 1899. Serial No. 702,012. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER R. DEMPSTER and WILLIAM D. RINEHART, citizens of the United States of America, and residents of Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Windmill-Regulators, of which the following is a specification.

One object of this invention is to provide improved means arranged and so shaped as to be attached to any form of water force-pump employed to elevate water from a well or similar source of supply for ordinary consumption, whereby the flow of water from said pump may be employed to control the mechanism actuating the pump.

A further object of this invention is to provide means whereby after the cutting off of the flow of water from a pump actuated by a windmill and the consequent stopping of the mill a safety-governor is applied to the mill to avoid breakage thereof by reason of excessive and impulsive air-currents.

This invention consists in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in our claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a detail elevation of a portion of a pump, discharge-pipe, air-cylinder, and our improved regulating device. Fig. 2 is an enlarged detail elevation, partly in section, of a portion of our improved regulating device.

In the construction of the device as shown and its application to a windmill and pump the numeral 10 designates a cylinder, 11 the air-chamber, 12 the pump-rod, 13 the discharge-pipe, and 14 the service-pipe of a pump, which may vary in form and construction as desired, provided it is arranged to employ the essential elements among those just recited. The service-pipe 14 is arranged to extend to a tank or receptacle, (not shown,) from whence water is drawn for use by the drinking of animals or any other desired purpose, and the pump-rod 12 is to be attached to and operated by a windmill and provided with mechanism, whereby the vane of the mill on the windwheel or the feathering-blades of the windwheel may be operated by means of a wire 15, depending within a convenient distance from the ground, to so adjust the mill that it will cease to be operatively acted upon by the air-currents, or, in other words, thrown out of the wind. The service-pipe from the pump is tapped into a T 16, intermediate of the ends of said pipe, and the lateral of said T is turned downwardly and carries a pipe 17, tapped therein at its upper end and depending therefrom. A cylinder-head 18 is mounted loosely for reciprocation on the pipe 17, and a cylinder-head 19 is located below and in alinement with the head 18. Ears on the cylinder-heads 18 19 are vertically apertured in alinement, and the arms 20 21 of a yoke 22 traverse the apertures in said ears and hold them against separation relative to each other. Nuts 23 24 are mounted on the arms of the yoke immediately above and engage the upper face of the cylinder-head 18, and nuts 25 26 are mounted on the extremities of the arms of the yoke below and engage with the lower face of the cylinder-head 19. A flange 27 of annular form is formed on and projects downwardly from the cylinder-head 18, and a flange 28, also of annular form, is formed on and extends upwardly from the cylinder-head 19. A cylinder 29 is positioned between the heads 18 19, is circular in cross-section, and fits immediately within the flanges 27 28. An annular packing ring or gasket 30 is interposed between the lower end of the cylinder 29 and the upper face of the head 19. By means of the nuts 25 26 the heads 18 19 may be approximated tightly to the ends of the cylinder to prevent leakage therefrom. A considerable cavity or chamber is formed in the cylinder-head 19, and a rod 31 is mounted in said cavity and extends within the bore of the pipe 17. A nut 32 and washer 33 are mounted on the lower end of the rod 31 approximately flush with the lower face of the head 19, and an expansive coil-spring 34 is mounted on the rod and impinges at one end against the washer 33 and at the other end against a shoulder extending into the upper portion of the cavity of said head. A washer-valve 35 is mounted on the rod 31 and engages upon the upper face of a shoulder 36

of annular form, formed on and extending upwardly from the upper face of the cylinder-head 19 within and concentric with the flange 28. The washer-valve 35 is confined between washers, which washers are in turn confined between jam-nuts 37 38, whereby the valve is retained in a given position longitudinally of the rod and may be adjusted thereon. Ports 39 40 are formed in and laterally of the central portion of the cylinder-head 19 and lead from the cavity in said head to the exterior thereof. A piston-plate 41 is mounted on the exteriorly-screw-threaded lower end portion of the pipe 17, and a leather valve 42, mounted concentric of said pipe, is held in a given position in contact with the valve-plate 41 by means of a piston-washer 43. The piston-washer 43 is formed with a yoke 44 depending therefrom, and vertically apertured in its central portion to admit the passage therethrough and reciprocation therein of the rod 31. A nut 45 is fixed to or mounted on the upper end of the rod 31 within the pipe 17. A stirrup 46 engages and supports the upper end or closed portion of the yoke 22, and a chain 47 is attached at its lower end to the bolt 48 of said stirrup. The chain 47 extends upwardly from the stirrup 46 to and around a grooved segment 49. The segment 49 is mounted for oscillation on a stand 50, designed to be located upon the windmill platform or base adjacent to the pump. Slide-bearings are formed in the segment 49, and a lever 51 is mounted for longitudinal adjustment in said bearings, one of the bearings being apertured and the lever being provided with a series of corresponding apertures arranged to receive a bolt or pin 52 for seating therein and transversely thereof to retain the lever at a given adjustment longitudinally. The lower end of the wire 15, hereinbefore mentioned as being attached to and controlling the wind-actuated mechanism, is fixed to the end of the lever 51 adjacent to and radiating from the grooved face of the segment 49.

In practical use and when the mill is in operation and the tank-valve open for the filling of the tank by the pump the several parts are adjusted as illustrated in the drawings. When the tank has been filled to the desired degree and the tank-valve or some other means operated to cut off the flow of water thereto, there being no further immediate need for the operation of the windmill, the water, having no other means of escape, flows through the lateral of the T into and through the pipe 17 and from thence into the lower portion of the cylinder 29. The continued flow of water into the cylinder depresses said cylinder relative to the pipe 17, stationarily positioned, and the piston on the lower end thereof. In the descent of the cylinder the yoke 22 is drawn downwardly, exerting a draft on the chain 47, and through the medium of said chain, attached at its upper end to the extreme upper end of the segment 49, oscillates said segment. In the downward movement of oscillation of the segment the lever 51 is oscillated and exerts a draft on the wire 15. The lever 51 should be so adjusted longitudinally relative to the length or distance of longitudinal movement of the wire 15 required to throw the mill out of the wind to such an extent as that when the cylinder is sufficiently depressed to bring the nut 45 on the rod 31 into close proximity with the upper face of the yoke 44 of the valve-washer 43 the mill will be thrown out of the wind and its rotation and operation will cease and determine. It may occur, by reason of excessive and impulsive air-currents acting upon the wind-actuated mechanism, that the windmill will be momentarily operated, and to avoid breakage under such conditions we have provided the safety mechanism illustrated in the lower portion of Fig. 2, which operates as follows: Upon the sudden and momentary starting of the mill more water would be discharged from the pump into the cylinder, resulting in the further depression of said cylinder and contact between the lower face of the nut 45 on the rod 31 and the upper face of the yoke 44 on the piston-washer 43 and a positive retention of the rod 31 against further longitudinal movement downwardly. The entrance of a further quantity of water to the cylinder would depress said cylinder to a still greater extent and move the flange 36 on the head 19 away from the washer-valve 35, and in the separation of said flange or valve-seat and the valve a vent or escape is provided for the surplus of water within the cylinder into the cavity or chamber of the cylinder-head 19 and from thence through the ports 39 40 and in leakage around the washer 33 and nut 32 to the exterior. Upon the passage of the excessive and impulsive air-currents and the reëstablishment of normal conditions the spring 34, operating expansively, will reseat the flange 36 against the washer-valve 35, as illustrated.

Upon the exhaustion of water from the tank from any cause and the opening of a port between the service-pipe and said tank either through the operation of a tank-valve or otherwise the extraordinary pressure within the cylinder 29 will become relaxed and the weight on the lever 51 will operate to reposition the parts, as illustrated, and slacken the wire 15 and permit the wind-actuated mechanism of the mill to assume its normal operative position and again normally operate the pump.

We claim as our invention—

1. In a windmill-regulator a cylinder, a pipe on which said cylinder is telescoped, a piston on the lower end of said pipe and fitting the interior of the cylinder transversely, a safety-valve on the lower end of said cylinder, a stem rising from the said valve and traversing the piston, an abutment on the upper end of said stem so shaped and arranged as to be engaged and retained by said piston in the downward movement of the cylinder whereby said safety-

valve is opened, and means for supplying water to the said pipe and cylinder whereby the cylinder is moved downwardly.

2. In a windmill-regulator a cylinder, a yoke carrying said cylinder, a pipe extended within said cylinder, a piston on said pipe and fitting the interior of the cylinder transversely, a yoke on said piston, a safety-valve in the said cylinder and spring-held in one direction, a stem on the safety-valve, a head on the stem and arranged to be engaged and held by the yoke on the piston, whereby the safety-valve is unseated.

3. In a windmill-regulator a cylinder having one of its heads formed with a cavity or chamber and ports leading laterally therefrom, a stem traversing said cylinder and the cavity of the head, a valve on the stem and normally seated on and closing one end of the chamber in the head, a spring located within the chamber of the head and arranged to hold the valve to its seat by yielding pressure, a nut on the stem, a pipe entering the cylinder, a piston on the pipe and fitting the interior of the cylinder transversely, a yoke on said piston which is stationarily positioned and arranged for engagement with and retention of the nut on the valve-stem, in which engagement and retention the valve is unseated for the release of water from the cylinder.

4. In a windmill-regulator, a cylinder having one of its heads formed with a cavity or chamber and ports leading laterally therefrom, a stem traversing said cylinder and the cavity of the head, a valve on the stem seated on and closing one end of the chamber in the head, a spring located within the chamber of the head, and arranged to seat the valve, and a nut on the stem arranged to engage a fixed abutment and unseat the valve.

5. A cylinder, a yoke carrying said cylinder, a pipe extended within said cylinder at one end and carrying a piston fitting the cylinder interiorly, a yoke on said piston, a safety-valve in said cylinder and spring-held in one direction, a stem carried by said valve, a head on said stem arranged for engagement and retention by the yoke on the piston, and arranged to be operated by the water-pressure in the other direction from the spring operation of the valve, in combination with a lever mounted for oscillation and adapted for attachment to the controlling mechanism of a windmill, a weight on the lever and flexible connections between said yoke on the cylinder and the lever, whereby the pressure of water within the cylinder will act to throw the mill out of gear and the excess pressure be provided for.

6. In a windmill-regulator a cylinder composed of the head 18, the cylinder 29 and the head 19 formed with the chamber and discharge-ports 39, 40, the yoke 22 rigidly connecting the heads and cylinder, means for connecting said yoke to the wind-operated mechanism of a mill, a pipe extended within the cylinder and provided with a piston, a stem mounted in the pipe, cylinder and chamber of the cylinder-head 19, a head on said stem so shaped and arranged as to be engaged and detained by the piston, a valve on said stem seating over the chamber in the head 19, a nut on the lower end of said stem and a spring on said stem between said nut and the upper portion of the head 19.

ALEXANDER R. DEMPSTER.
WILLIAM D. RINEHART.

Witnesses:
W. L. SCHAFER,
F. E. SHANE.