

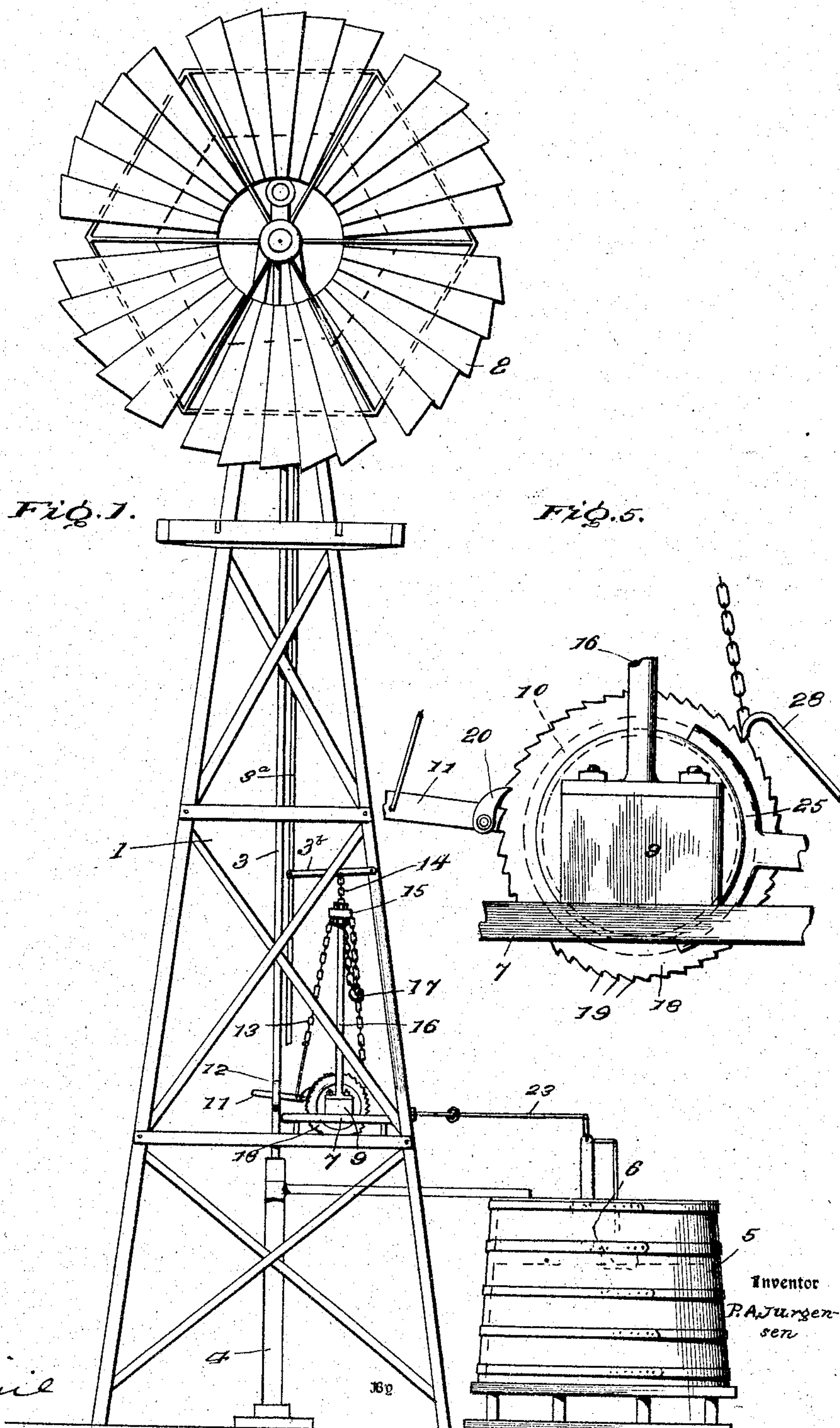
No. 781,075.

PATENTED JAN. 31, 1905.

P. A. JURGENSEN.
AUTOMATIC REGULATOR FOR WINDMILLS.

APPLICATION FILED SEPT. 3, 1904.

2 SHEETS—SHEET 1.



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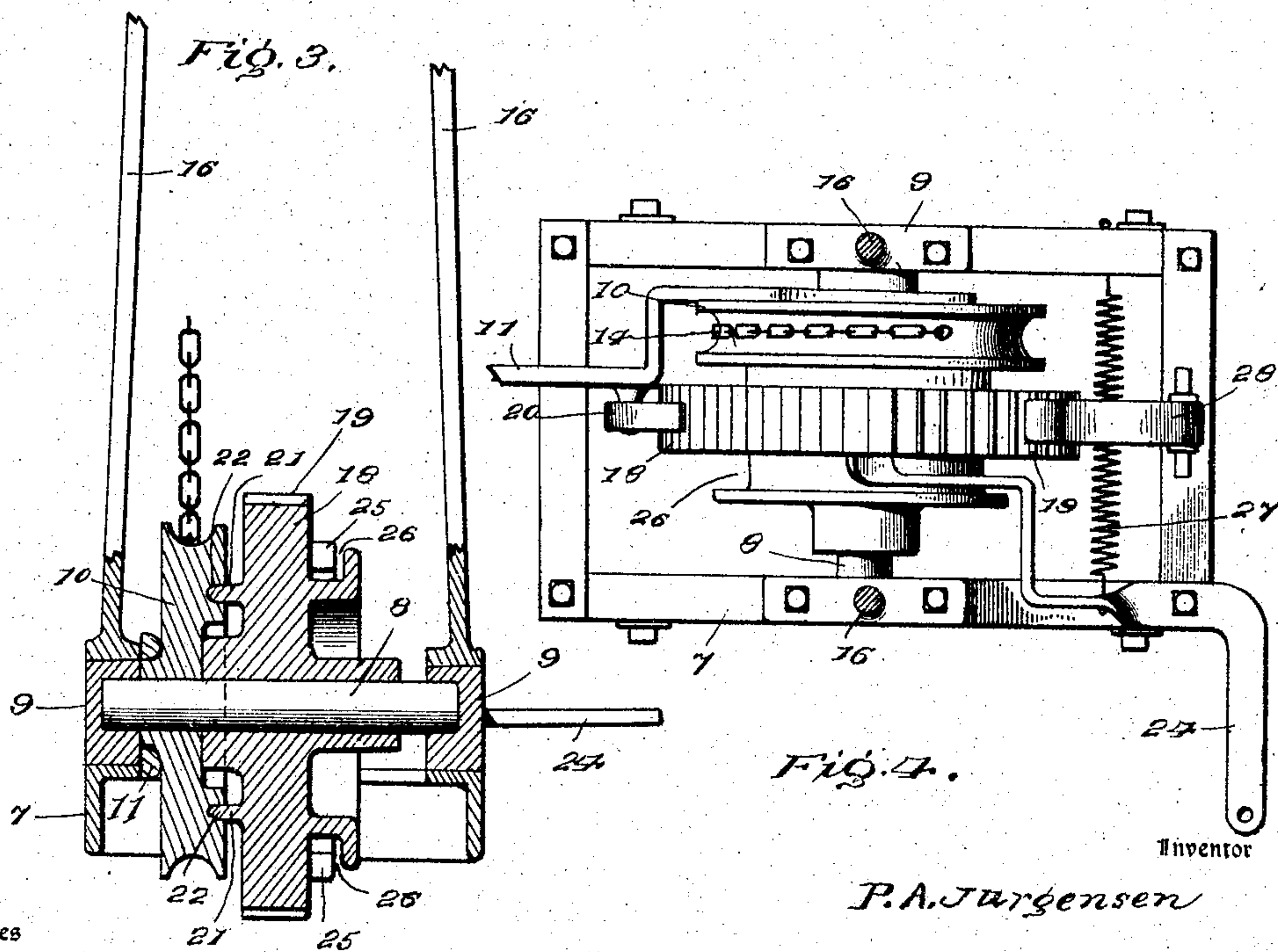
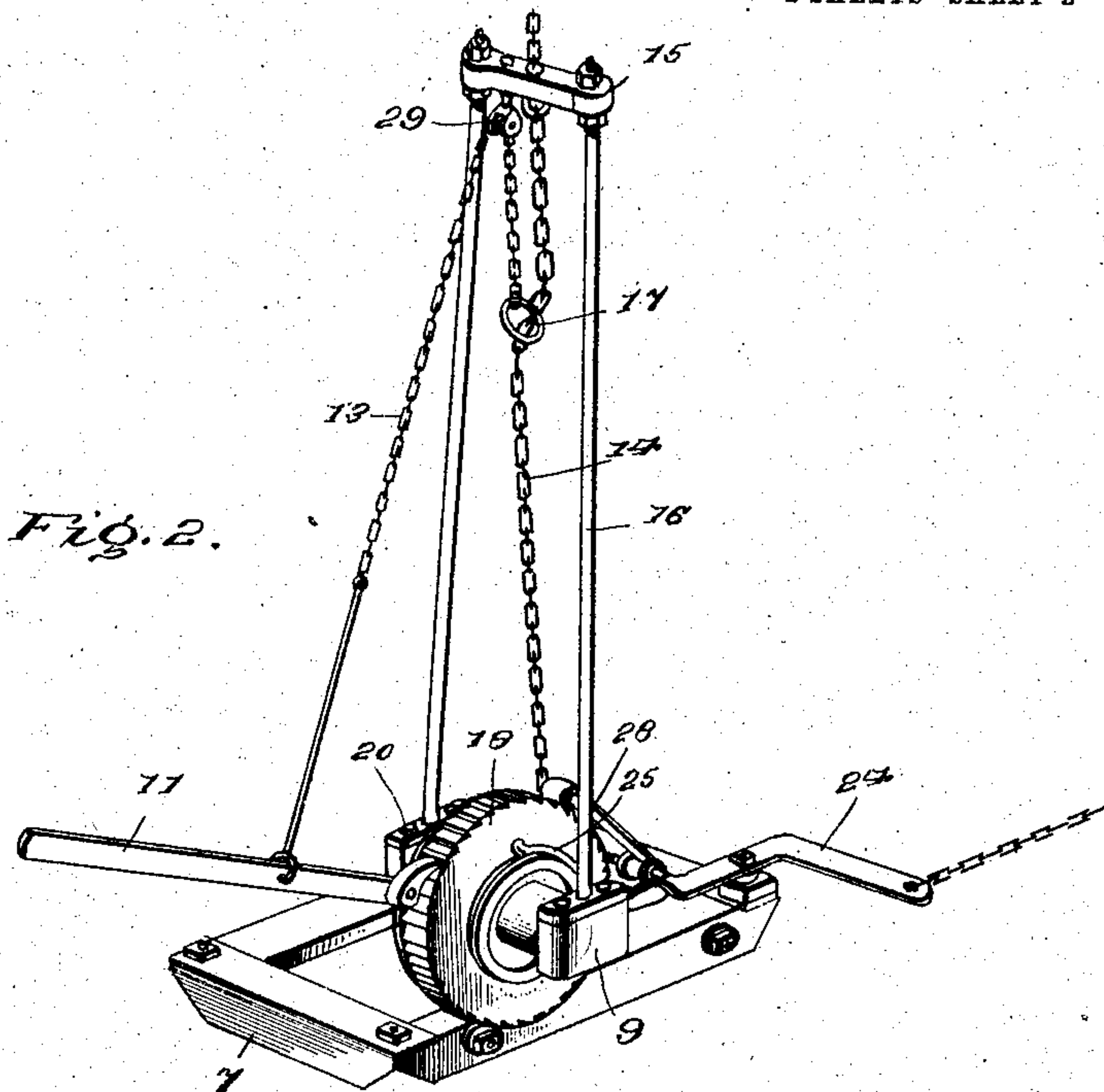


Fig. 4.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC REGULATOR FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 781,075, dated January 31, 1905.

Application filed September 3, 1904. Serial No. 223,264.

To all whom it may concern:

Be it known that I, PAUL A. JURGENSEN, a citizen of the United States, residing at Farnhamville, in the county of Calhoun and State of Iowa, have invented certain new and useful Improvements in Automatic Regulators for Windmills, of which the following is a specification.

This invention relates to that type of windmills ordinarily employed for supplying water to an adjacent tank and usually embodying pumping mechanism operated by a vertically-movable pump-rod.

The invention consists of automatic means for regulating the operation of the mill, whereby when the tank, which is supplied with water pumped by the mill, is full the pumping mechanism will be thrown out of operation, so as to discontinue the supply. The regulator is also of such a nature as to automatically throw the pumping mechanism into operation when the contents of the tank are withdrawn and involves a special mechanism coöperating with the pump-rod in accomplishing the above-described functions.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of a windmill having my invention applied thereto. Fig. 2 is a detail perspective view of the automatic means embodied in the regulator alone. Fig. 3 is a vertical sectional view, partially broken away, of the regulator. Fig. 4 is a horizontal sectional view of the regulator, bringing out more clearly the relative arrangement of the parts thereof. Fig. 5 is an enlarged elevation of the lower portion of the operating mechanism of the regulator, parts being broken away.

Corresponding and like parts are referred to in the following description and indicated

in all the views of the drawings by the same reference characters.

In the drawings a windmill 1 of any conventional construction is illustrated, the wind-wheel 2 being operably connected with the pump-rod 3. The pump-rod 3 is likewise connected with the pumping mechanism 4 at the lower extremity of the mill, any approved means being employed which admits of throwing the wheel into and out of the wind. A tank 5 is situated adjacent the mill, and for purposes of this description said tank is shown to one side thereof.

The automatic regulator, which comprises the invention, is float-operated, the float being designated 6 and located in the tank 5, so that the regulator will be sensitive to and operated by the rise and fall of the water within the tank. The regulator is mounted in the lower portion of the mill 1 and consists, preferably, of a frame or like support 7, substantially secured in place upon the uprights of the mill, and this frame 7 carries the operating mechanism utilized for governing the operation of said mill. Mounted transversely of the frame 7 is a shaft 8, which shaft is suitably supported in bearings 9 at the sides of the frame. A winding-drum 10 is keyed or otherwise attached to the shaft 8 for rotation therewith, and pivoted adjacent said drum 10 is a lever 11, the latter being preferably mounted upon the shaft 8, which carries the said drum. The lever 11 is pivoted at one end, and the opposite end thereof is operably connected with the pump-rod 3, so that upon actuation of the lever the wind-engine will be thrown into and out of gear. The lever 11 has slidable or loose connection with the pump-rod 3 for purposes which will appear hereinafter, an end of said lever being passed between a bar or keeper 12, rigidly attached to one side of the pump-rod and the pump-rod itself. The bar 12 is secured to the pump-rod adjacent the point of connection of the same with the pumping mechanism, and said bar is secured at its ends to the pump-rod, being spaced therefrom throughout its length in order to effect loose connection of the lever 11, as above mentioned. The lever 11 is connected with the drum 10

by means of a chain 13, which latter connects with a main chain 14, directly attached to said drum at one end. The opposite end of the main chain 14 is connected with a lever 3^b, pivoted to an adjacent upright of the mill. The lever 3^b has pivotal connection at one end with a vertical rod 3^a, operably connected with the shipper mechanism of the windmill in the usual manner, so as to throw the engine out of gear when the water in the tank reaches the predetermined level. The chain 14 is provided with a certain amount of slack between its ends, so that the drum 10 may be actuated to cause said chain 14 to be tightened by being wound thereon. The chain or connection 13 is connected with the main chain 14 at a point between the ends of the latter, as shown at 17, and when the chain 14 is wound upon the drum 10 the connection 13 will be so actuated as to elevate the lever 11. It will be understood that the parts 13 and 14 may be rods, chains, or any similar flexible connections.

The means for actuating the drum 10 and for imparting movement to the lever 11 to cause the latter to throw the pump mechanism into and out of gear or operation consists, mainly, of a gear-wheel 18, the peripheral portion of which is provided with the teeth 19, and a pawl 20 is pivoted to the lever 11, so as to engage the teeth 19 of the wheel 18 in order to rotate the latter. The wheel 18 not only coöperates with the lever 11, as above described, but said wheel 18 forms a clutch for throwing the drum 10 into operation. As a clutch the wheel 18 is provided upon one of its sides with clutch members 21 in the form of projections adapted to engage in recesses 22 in the adjacent side of the drum 10. The wheel 18 is normally held out of clutch with the drum 10 when the windmill is in operation and the pumping mechanism operated by the pump-rod 3. The float 6 in the tank 5 is connected, by means of a connection 23, with a bell-crank lever 24, pivoted to the frame 7, and this lever 24 constitutes a shifting lever for actuating the clutch-wheel 18. The lever 24 is connected at one end with the float, the opposite end being bifurcated, as shown at 25, so as to coöperate with a groove 26 in the side of the wheel 18, said groove 26 receiving the bifurcated portions of the lever. A spring 27 is connected with the bifurcated arm of the lever 24 at one end, and the opposite end of said spring 27 is connected with the remote portion of the frame 7, the normal tension of the spring being to force the wheel 18 into clutching engagement with the drum or pulley 10. When the water lowers in the tank 5, however, the float 6 because of its connection 23 with the lever 24 overcomes the normal tension of the spring 27 and holds the wheel 18 out of clutch with the drum 10. A second pawl, 28, is pivoted to the frame 7 and

is adapted to engage the teeth 19 of the wheel 18, so as to prevent backward revolution of said wheel when the latter is in clutched engagement with the drum 10 and the chain 14 is being wound upon said drum.

Describing specifically the coöperation of the parts of the regulator, the pump-rod 3 operating the pumping mechanism, said rod reciprocates vertically in the usual manner. In its reciprocating movement the rod 3 when connected with the pumping mechanism constantly actuates the lever 11, which latter transmits motion to the wheel 18 through its pawl 20. The wheel 18, however, being held out of clutch with the drum 10 by the weight of the float 6, connected with the bell-crank lever 24, loosely rotates upon the shaft 8 without effecting operation of the main mechanism of the regulator. As soon, however, as the tank 5 is filled the weight of the float 6 is removed from the lever 24, and the spring 27 actuates said lever 24, so as to cause the wheel 18 to be clutched with the drum. As above stated, the wheel 18 is constantly being revolved by the operating-lever 11, and as soon as said wheel 18 is clutched with the drum said drum is also rotated. As soon as the drum 10 begins to rotate the connection 14 is wound thereon, the slack in said connection being taken up.

As the connection 14 is wound upon the drum the connection 13, which latter moves freely over a pulley 29 upon the cross-head 15, is tightened and pulled upon, so as to cause the lever 11 to move upwardly a short distance. When the connection 14 has been wound tight, the rod 3^b will have been actuated to throw the wheel 2 out of the wind in the usual manner and the connection 13 will have been so actuated as to elevate the lever 11 a short distance. This having been done, the mill will cease pumping the water into the tank 5, the chain 14 having been so tightened as to suspend the lever 11 and hold the wind-engine out of the wind. As soon as the water in the tank 5 lowers, having been drawn off for one purpose or another, the float 6 correspondingly lowers until said float has reached an ascertained point, when due to its connection 23 the lever 24 will be caused to actuate the wheel 18 and throw same out of clutch with the drum 10. The above permits the drum to revolve, due to the automatic throwing of the engine into gear in the well-known manner, and said lever will automatically resume its normal position, permitting the operation of the pumping mechanism, whereupon water will again be forced into the tank 5.

The use of the bar or keeper 12 is important, since should the wind-wheel 2 turn after being thrown out of the wind, and it often does this in actual use, the pump-rod 3 may move without actuating the lever because of the loose or slidable connection of the last two

parts, and no likelihood that the chain 14 will be tightened abnormally, and thus broken, is incurred.

5 Having thus described the invention, what is claimed as new is—

1. The combination of a windmill embodying a movable pump-rod, a regulator therefor comprising a shaft, a winding-drum, a chain connecting the winding-drum with the wind-
10 wheel to draw the latter into and out of the wind, a lever operably connected with the pump-rod, a connection between the lever aforesaid and the chain connecting the drum and the wind-wheel, and means operable by
15 the lever for effecting actuation of the drum.

2. In a regulator comprising a lever operably connected with the pump-rod, a shaft, a winding-drum, connecting means between the winding-drum and the lever, a wheel normally
20 out of clutch with the drum and mounted upon the shaft for actuation by the lever, means for clutching the wheel to the shaft, and a float coöperating with said wheel for actuation thereof.

25 3. In an automatic regulator comprising a lever adapted to be loosely connected with a pump-rod, a shaft, a winding-drum upon said shaft, connecting means between the drum and the lever, a toothed wheel mounted upon the
30 shaft, a pawl carried by the lever and engaging the teeth of the wheel, means for clutching and unclutching the wheel to the drum, and a float governing the clutching of the wheel.

4. In an automatic regulator comprising a
35 lever adapted to be loosely connected with a pump-rod, a shaft, a winding-drum upon said shaft, connecting means between the drum and the lever, a wheel mounted upon the shaft and provided with teeth, a pawl carried by the lever
40 and engaging the teeth of the wheel, a clutch between the drum and the wheel aforesaid, a shifting lever for throwing the wheel into and out of clutch with the drum, and a float operating the shifting lever aforesaid. 45

5. In an automatic regulator comprising a support, a shaft journaled in said support, an operating-lever adapted to be loosely connected with a pump-rod, a winding-drum mounted upon the shaft, connecting means be-
50 tween the drum and the operating-lever, a toothed wheel upon the shaft, a pawl carried by the operating-lever and engaging the teeth of the wheel aforesaid, a clutch between the toothed wheel and the drum, a shifting lever
55 coöperating with the toothed wheel to clutch and unclutch the same with the drum, means for preventing backward rotation of the toothed wheel, a float connected with the shifting lever for operation thereof, and spring
60 means normally tending to clutch the toothed wheel with the drum.

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

PAUL A. JURGENSEN. [L. s.]

Witnesses:

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J. A. WYATT.