(No Model.) 2 Sheets—Sheet 1.

C. F. BATHAM.

AUTOMATIC REGULATING DEVICE FOR WINDMILLS.

No. 379,847. Patented Mar. 20, 1888.

Fig. 1.

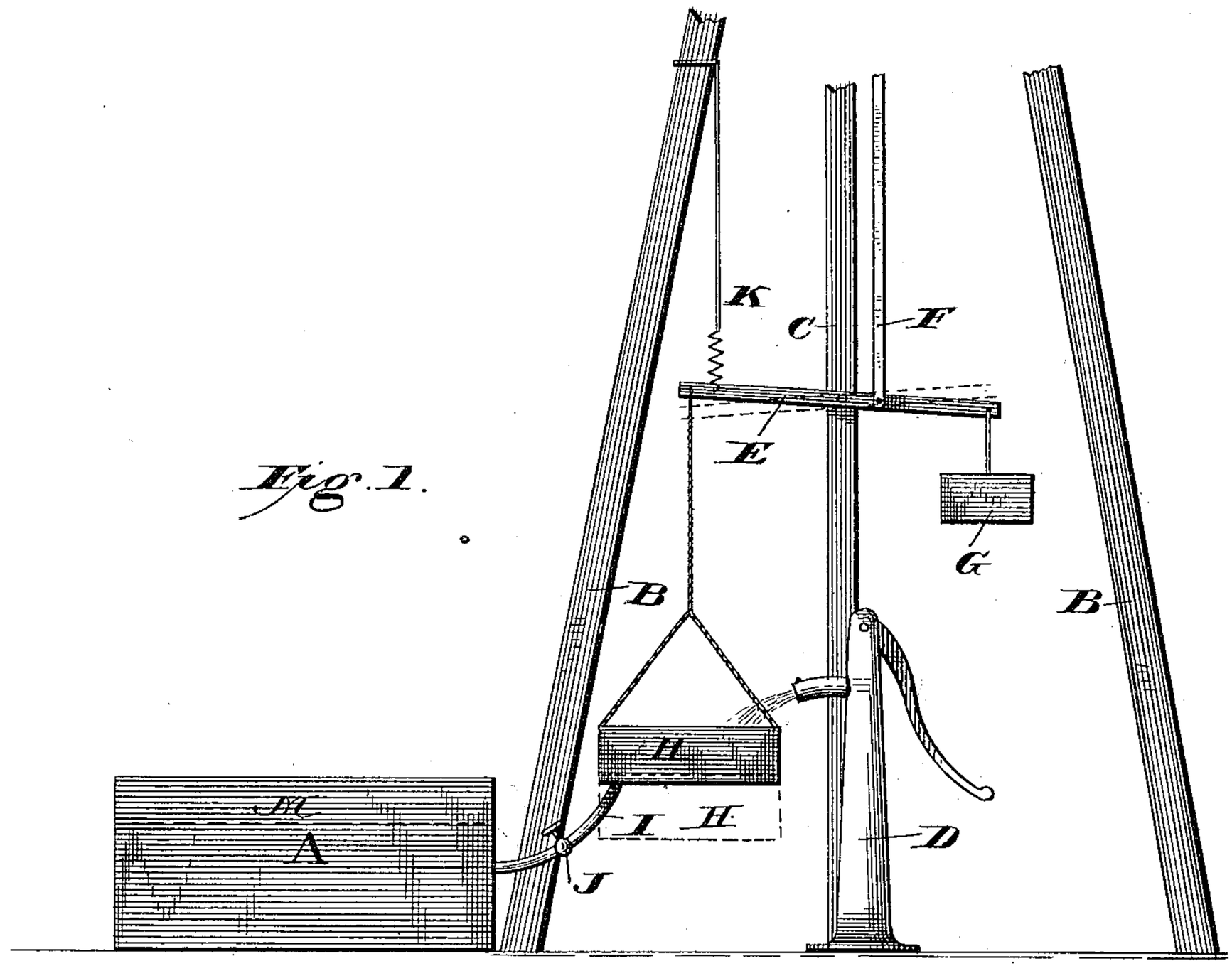
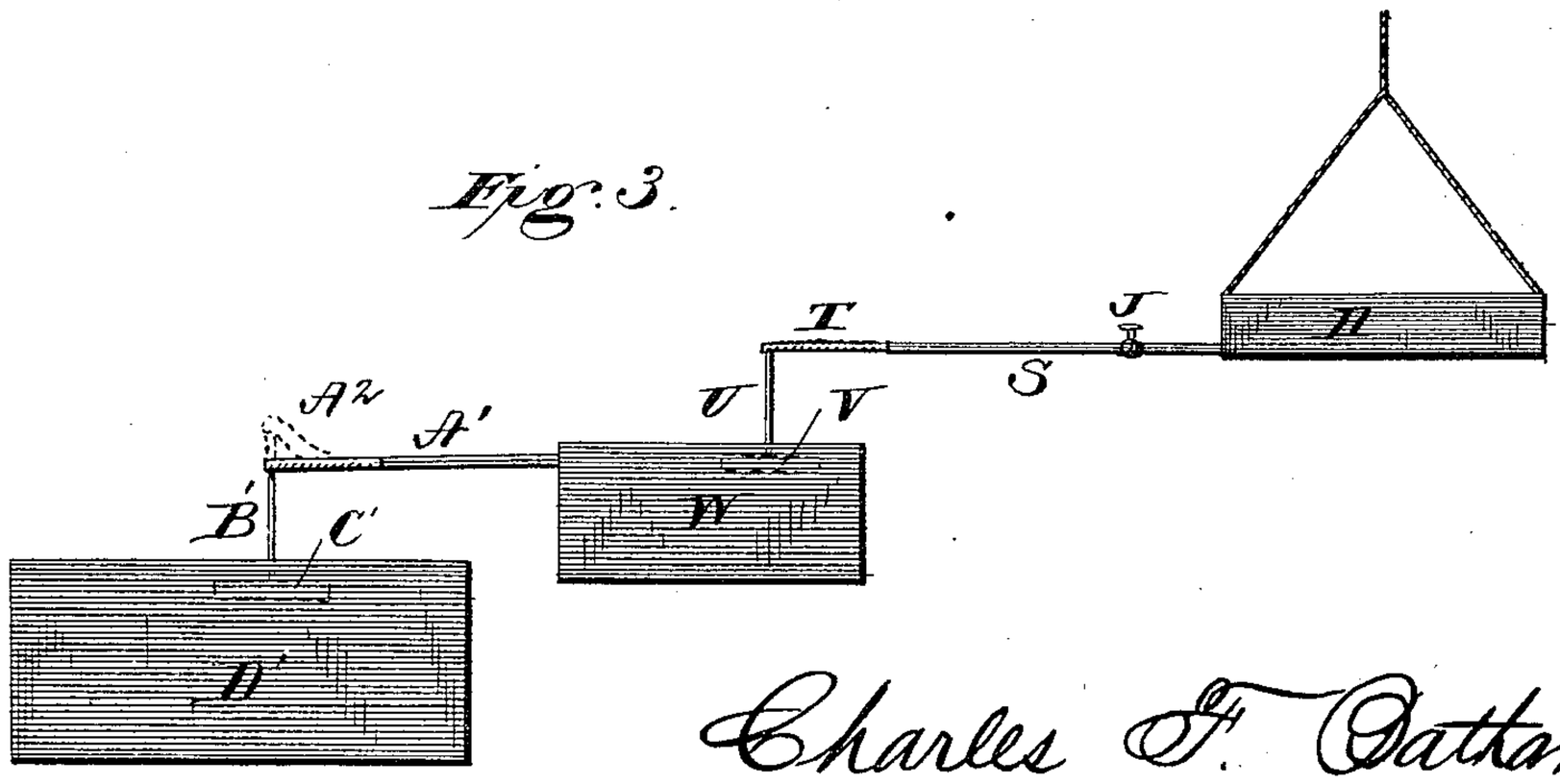


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

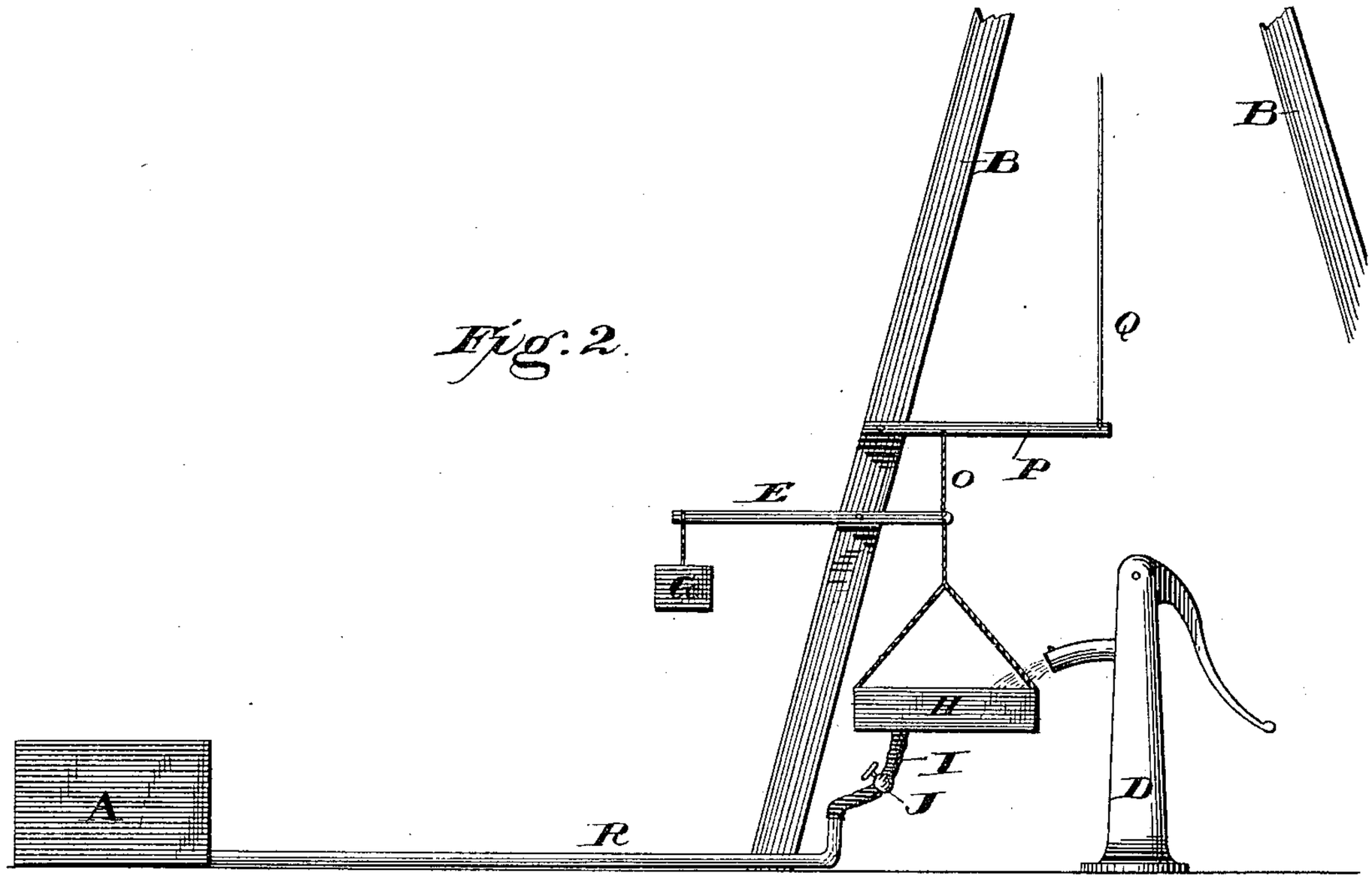
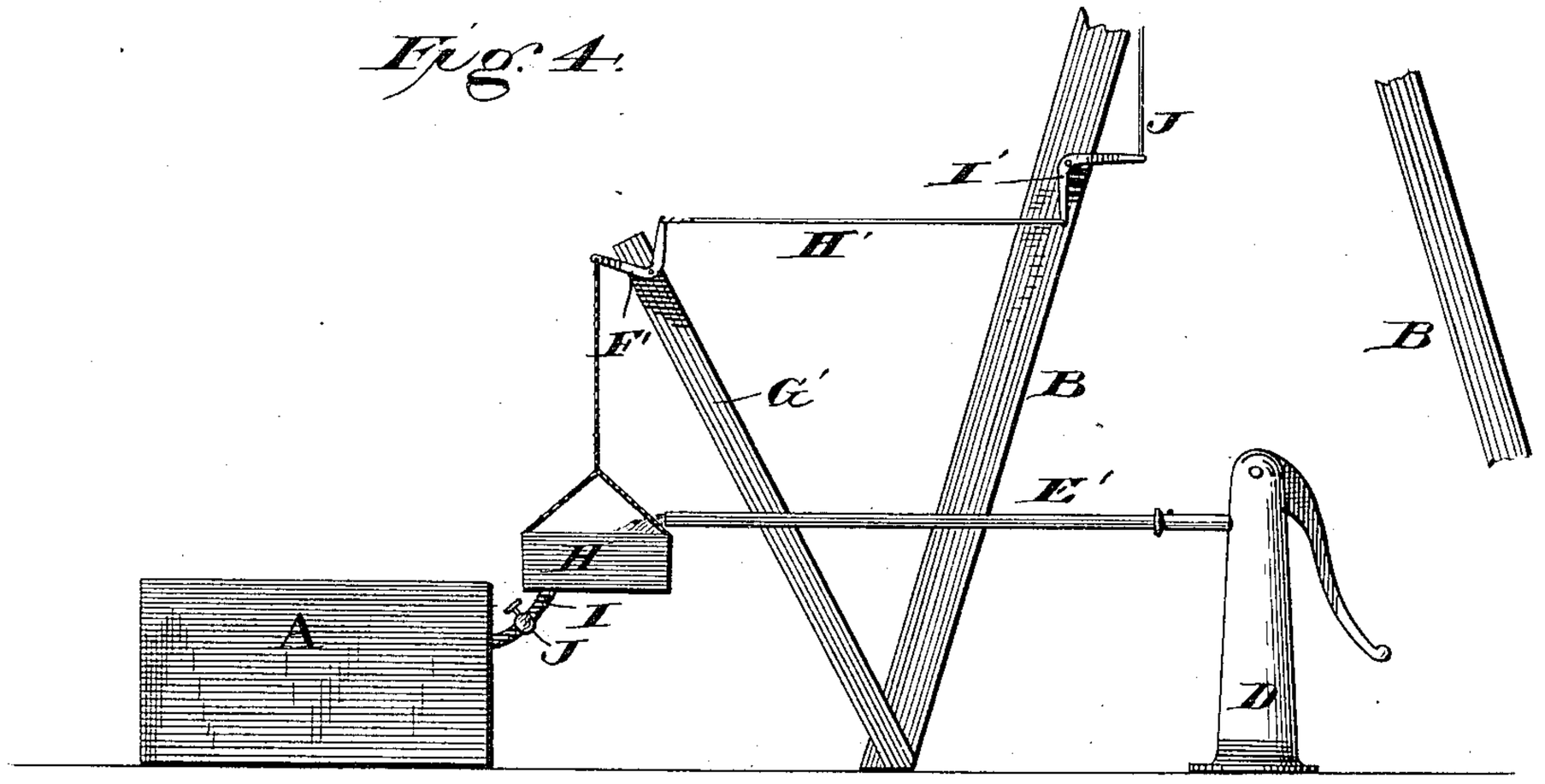


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES F. BATHAM, OF NEW CHILLICOTHE, KANSAS.

AUTOMATIC REGULATING DEVICE FOR WINDMILLS.

SPECIFICATION forming part of Letters Patent No. 379,847, dated March 20, 1888.

Application filed September 9, 1887. Serial No. 249,216. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. BATHAM, a citizen of the United States, and a resident of New Chillicothe, in the county of Dickinson and State of Kansas, have invented certain new and useful Improvements in Automatic Regulating Devices for Windmills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation showing my invention applied to the form of windmill known as the "Challenge" windmill, in which the mill is stopped by raising the connecting or gearing rod, and in which arrangement the tank or reservoir is placed comparatively close to the pump which is operated by the windmill. Fig. 2 is a side elevation showing the arrangement of parts when the tank or reservoir is at a distance from the pump, and in which the mill is stopped by pulling down upon the wire or gearing-rod. Fig. 3 is a side elevation showing the arrangement of parts when two reservoirs or main tanks are employed placed at different levels, and Fig. 4 shows another slight modification in the arrangement of the several parts.

The same letters of reference indicate corresponding parts in all the figures.

My invention consists in a new and improved apparatus for automatically regulating the speed of windmills which are employed for pumping water, and which will also automatically stop the windmill when the tank or reservoir is filled and start the same when the water in the tank or reservoir is lowered a few inches, thus making the windmill entirely self-regulating and automatic in its operation, and obviating the necessity of any attention whatever on the part of the owner, thus enabling the night winds to be utilized when the days are calm, always keeping the mill ready for the wind day or night, except when the tank or reservoir is full, and never running the water over in the tank or running too fast, no matter to what height the wind may rise.

My new and useful invention will be hereinafter fully described and claimed.

Referring to the several parts by letter, A indicates the main water tank or reservoir, which in Fig. 1 of the drawings is shown located comparatively near to the pump and mill.

I will first describe the particular arrangement shown in Fig. 1 of the drawings.

B indicates a section of the windmill-tower, and C the center post of the same, as used in that form of windmill known as the "Challenge" windmill.

E indicates the gearing-lever of this form of windmill, which is centrally pivoted upon the central post, C, as shown, at a suitable distance above the level of the top of the pump D, which is of the usual construction.

F indicates the gearing-rod, which is pivoted at its lower end to the centrally-pivoted gearing-rod E, to one side of the central pivotal point thereof, as shown, and which is so connected at its upper end that as it is gradually raised up it slows, decreasing the speed of the mill, and when raised up to its farthermost point will entirely stop the mill, as will be readily understood. I have not burdened the drawings with an illustration of the upper part of the windmill and its connections, as this is old and forms no part, *per se*, of my invention.

Upon the extreme right-hand-end portion of the centrally-pivoted gearing-lever E, as seen in the drawings, is suspended a weight, G, of sufficient weight to balance the regulating-tank H when the same is empty, in connection with the slight assistance afforded by the spring K. This weight G is secured to the end of the centrally-pivoted lever E on the same side of its pivotal point as the lower end of the rod F is pivoted. From the opposite end of the centrally-pivoted lever E is suspended the regulating-tank H, which, when empty, is held by the action of the weight G on the opposite end of the lever E and the slight action of the spring K at such a height that its bottom is about one inch below the level of the top of the main tank or reservoir A. The regulating-tank H is supported between the pump D and the main tank in such a position that the water from the spout of

the pump D will always run into it, and it is so connected at its bottom, at the side nearest the reservoir A, to the said reservoir by the flexible rubber pipe or tube I, which communicates with the reservoir, preferably, below the "low-water" line of the same, and this flexible connecting-pipe is provided with the stop-cock J, for the purpose hereinafter specified.

The operation of my invention is as follows: As the pump is operated by the revolution of the fan of the windmill, the water will pass from its spout into the regulating-tank, which is usually constructed about three feet square by eight inches deep, and the water runs from this tank through the connecting-pipe I into the main water tank or reservoir A. Now, as the water rises in the reservoir near the top of the same, as it gradually rises above the level of the bottom of the regulating-tank, which it does after it reaches within one inch of the top of the main tank, the weight of water will gradually pull the regulating-tank down, thereby gradually raising the gearing-rod F, so as to lessen the speed of the mill, until, when the water has nearly reached the top of the reservoir, and just before it overflows, sufficient water has gathered in the regulating-tank to pull the same down by its weight, so as to raise the rod F sufficiently high to completely stop the windmill, as will be readily understood. In dotted lines in Fig. 1 I have shown the regulating-tank drawn down when the weight of water accumulates in it, and the weighted end of the lever E accordingly raised, the spring K being at the same time extended by the lowering of that end of the centrally-pivoted lever E to which the regulating-tank is attached. The water in the main and regulating tanks then stands at the line M. As the water is used from the reservoir and is gradually lowered therein until it reaches the level of the bottom of the regulating-tank, (indicated by the dotted line M,) the weight G overbalances the weight of the empty regulating-tank and raises the same, being assisted by the tension of the spring K, and as it thus raises the empty regulating-tank it of course draws down the gearing-rod F, so as to automatically start the windmill again.

The stop-cock J of the flexible connecting tube or pipe I serves as a speed-regulator, as it can be set, opened, or closed to the desired point, so as to allow any desired quantity of water to pass through it in a given time, and the windmill can only run just fast enough to pump that amount, no matter how high the wind may rise or how much it may vary in that given time, as every additional pound of water that is pumped more than the regulating stop-cock calls for is applied by its weight in the regulating-tank to "shorten sail" and reduce the speed of the mill, the spring K preventing the variations of speed from being too sudden or marked.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and many advantages of my invention will be readily seen and understood. It will be seen that it is simple in construction, can be applied to any form of windmill by slight and unimportant changes, and is thoroughly automatic in its operation, regulating the speed of the mill so as to pump any desired amount of water into the reservoir in a given time, and stopping it entirely when the reservoir is full, to prevent overflow and waste, and again starting the mill when the water-level in the reservoir has sunk a few inches. It thus enables the night winds to be utilized when the days are calm, always keeping the mill ready for the wind day or night, except when the tank or reservoir is full, and never permitting the water to run over in the tank, no matter how high the wind may rise. It will thus be seen that my invention is of the greatest utility and advantage, and will serve a most important purpose, saving much time, labor, and money.

I will now describe the changes which may be made in applying my invention to other forms of windmills, &c.

In Fig. 2 of the drawings I have shown my invention applied to those forms of windmills—such as the Halliday, Standard, Adams, &c.—in which the mill is slowed up and stopped by pulling down upon a wire, and in the said view I have also shown the reservoir A removed some distance from the pump and regulating-tank. The regulating-tank is here suspended from the inner end of the centrally-pivoted lever E, from the other (outer) end of which the weight G is suspended, and the inner end of this centrally-pivoted lever E, from which the regulating-tank H is suspended, is connected by a cord or chain, O, with the center of an auxiliary lever, P, which is pivoted at one end to the same support of the windmill-tower to which the lever E is centrally pivoted, and to the inner end of this auxiliary lever P is secured the lower end of the gearing or connecting wire Q, by drawing down upon which the speed of the mill is decreased and finally stopped. The reservoir A is here shown as placed at some distance from the pump D and regulating-tank H, and a rigid pipe, R, runs from the lower part of the reservoir A to a point near the regulating-tank, where its upper end is connected to the bottom of the said tank by the flexible tube or pipe I, having the central stop-cock, J, as before described, for the purpose set forth. It will be seen that this form and arrangement of parts operates the same, substantially, as that shown in Fig. 1, the regulating-tank being pulled down by the weight of the water which accumulates in it when the water reaches the top of the main reservoir, thus, through the two connected levers, drawing down the wire Q, so as to decrease the speed, and finally stop the windmill, until the regulating-tank is freed from water, and is

then raised by the weight G, permitting the wire Q to rise, and throwing the mill into operation.

In Fig. 3 I have shown two main water tanks or reservoirs employed instead of one, placed at different levels. In this arrangement the regulating-tank, which is suspended above the level of the upper reservoir of the two, is provided with the rigid pipe S, leading from its bottom, having the stop-cock J, and having its outer end, T, of flexible rubber tubing. The outer end of this flexible length is supported on the upper end of the rod U of a float, V, in the first reservoir, W, and this first reservoir is in turn provided with a rigid conducting-pipe, A′, at a suitable height, the outer end portion of which is formed of a short length of flexible rubber tubing or pipe, A^2, the outer end of which is supported by the upper end of the vertical rod B′ of the float C′ in the second reservoir, D′. Now, in operation, when the water in the lowermost reservoir, the second one, D′, rises to the top thereof it will raise the float C′, which in turn, through its rod B′, will elevate the extremity of the flexible tube A^2 above the level of the top of the first reservoir, W, so that the water will cease to flow from the first reservoir into the second. The water will now accumulate in the first reservoir until it reaches to top of the same, and when it rises to the top of the first reservoir it will lift the float V, which in turn, through its vertical rod U, will elevate the outer end of the flexible tube or pipe T until the said end is above the level to which the water must rise in the regulating-tank to pull down the said tank by its weight, when the water will accumulate in the regulating-tank until it pulls down the same, and thus stops the windmill. As the water is used from the several reservoirs, the floats fall, and, the water running from the regulating-tank, the latter, when empty, is raised by the weight G, and the windmill again starts.

In Fig. 4 of the drawings I have shown both the regulating-tank and reservoir at a distance from the pump and windmill and the manner in which the parts are then arranged. In this arrangement a pipe, E′, leads from the pump to the regulating-tank H, the tank being connected by flexible tubing with the reservoir A, as in Fig. 1; but the regulating-tank is here suspended from one arm of a stout bell-crank lever, F′, which is centrally pivoted upon a post or support, G′, and the other arm of which is connected by a wire, H′, with one arm of a bell-crank lever, I′, which is pivoted centrally upon the support of the windmill-tower, as shown, and the other end of this second bell-crank lever is connected by a wire, J′, with one end of the weighted lever which operates the connecting wire or rod of the windmill, and which may be readily arranged to stop the mill either by being elevated or drawn down, according to the style of windmill to which this form of my invention is applied.

The operation will be readily understood from the foregoing descriptions. When the water accumulates in the regulating-tank, as the reservoir is filled to the top its weight pulls down the said tank, and through the bell-crank levers and connecting-wires stops the mill, which starts when the regulating-tank is emptied and raised by the weight G. These different forms and arrangements may be found convenient and even necessary under different circumstances.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

In an apparatus for automatically regulating windmills, substantially as set forth, the combination, with the controlling wire or rod, of the windmill, the pump operated by said windmill, the weighted lever, the regulating-tank suspended from said lever, the reservoir, the metallic delivering-pipes for said reservoirs, flexible pipes upon the outer ends of said metallic pipes, floats in the reservoirs, and rods connected to said floats and to the flexible pipes, whereby the rising of the floats bends the flexible pipes and causes the flow of water to cease and the operating-tank to drop, thereby throwing the controlling-rod out of gear with the wind-wheel through the medium of the weighted lever, and vice versa, as set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

CHARLES F. BATHAM.

Witnesses:

E. G. PRITCHARD,

R. ALSOP.