

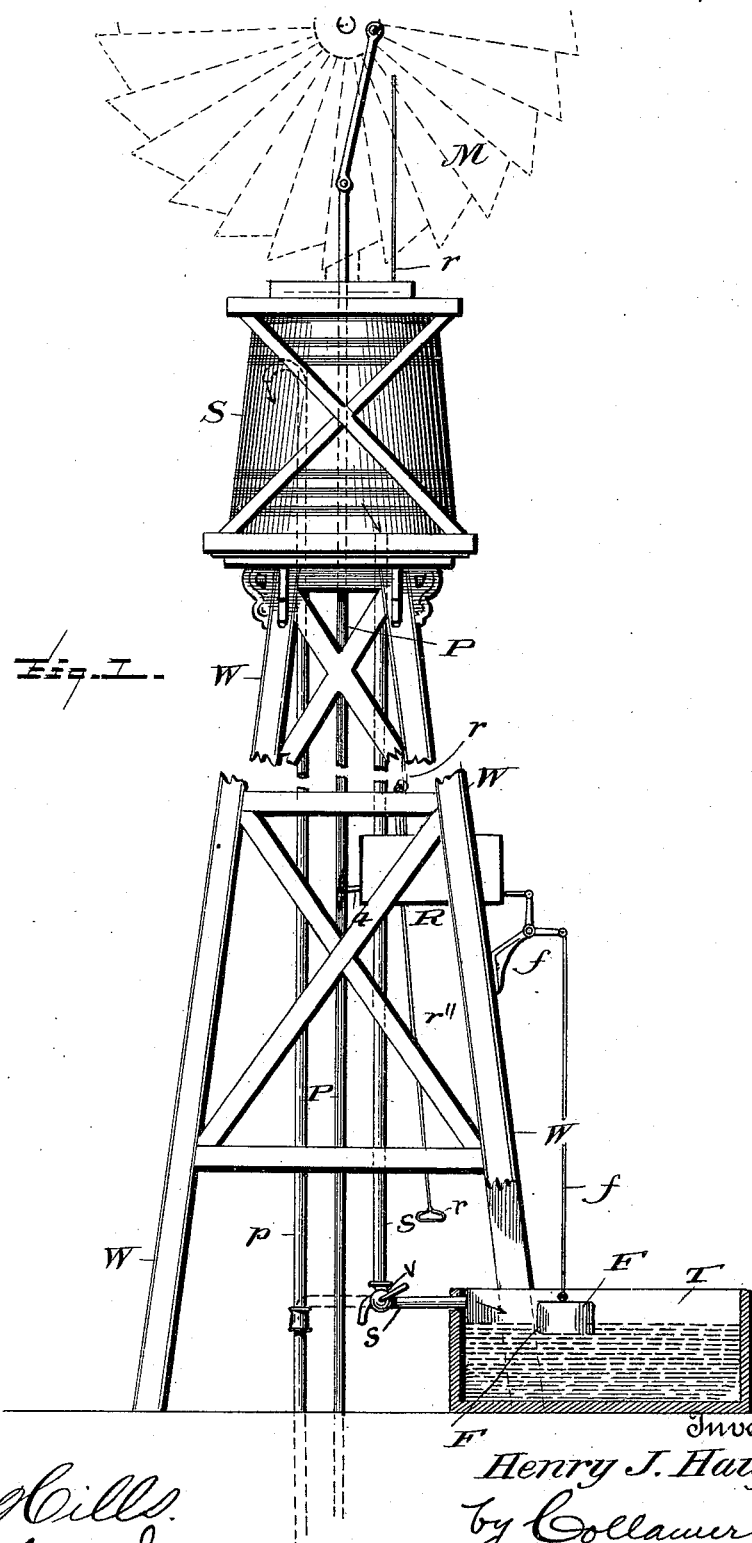
(No Model.)

2 Sheets—Sheet 1.

H. J. HAUFF.
WINDMILL REGULATOR.

No. 493,163.

Patented Mar. 7, 1893.



Witnesses:

L. C. Hills.
J. M. Jochims, Jr.

Inventor:
Henry J. Hauff,
by Collamer & Co.,
Attorneys.

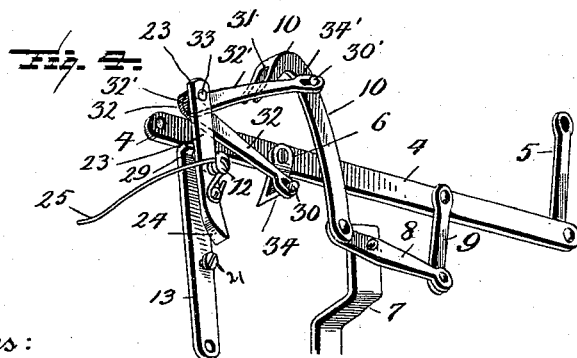
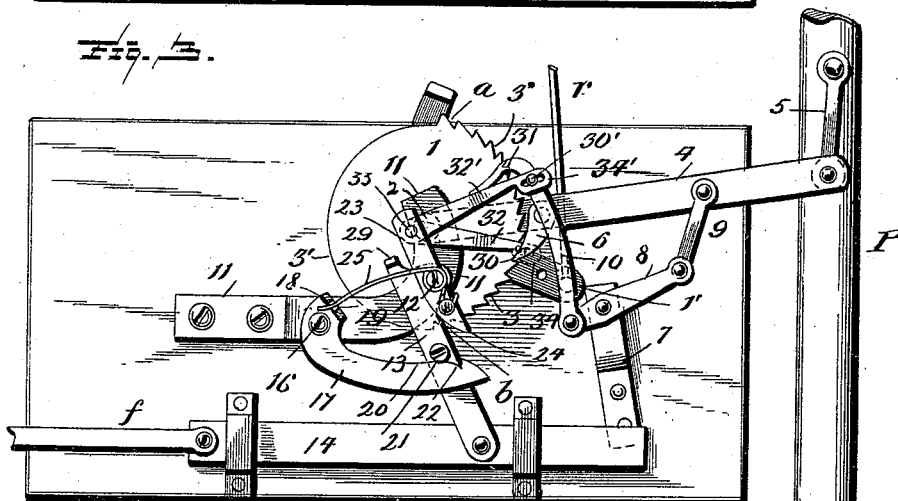
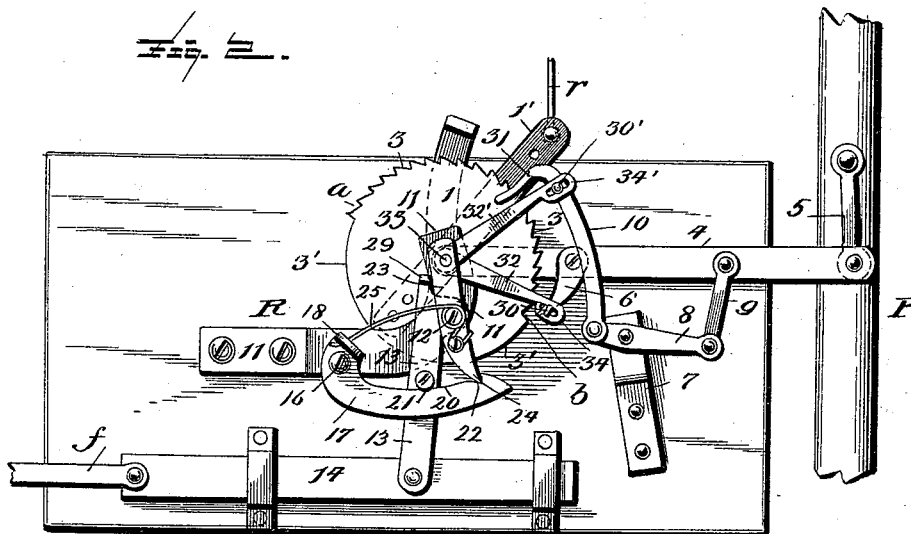
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UNITED STATES PATENT OFFICE.

HENRY J. HAUFF, OF MAGNOLIA, IOWA.

WINDMILL-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 493,163, dated March 7, 1893.

Application filed November 10, 1892. Serial No. 451,540. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. HAUFF, a citizen of the United States, and a resident of Magnolia, Harrison county, State of Iowa, have
5 invented certain new and useful improvements in Windmill-Regulators; and my preferred manner of carrying out the invention is set forth in the following full, clear, and exact description, terminating with claims
10 particularly specifying the novelty.

This invention relates to wind mills, and more especially to the regulators therefor; and the object of the same is to construct a device wherein the operating pawls will be
15 caused to engage the ratchet teeth on the drum suddenly when the float rises to a given point, instead of moving slowly into engagement therewith as heretofore.

A further object is to produce improvements in details to effect the better working of the whole, prevent sticking of parts, and reduce friction to a minimum.

To this end the invention consists in a wind mill regulator constructed substantially as set
25 forth below and as illustrated in the drawings, wherein—

Figure 1 is a rear elevation of the wind mill tower, illustrating the tank in section and showing the connection between the float
30 therein and the regulator proper. Fig. 2 is an enlarged front elevation of the regulator proper, showing the pawls disengaged from the drum so that the wheel will rotate to fill the tank. Fig. 3 is a similar view, showing
35 the pawls engaged with the drum and the latter turned so as just about to stop the motion of the wheel—the tank being nearly full. Fig. 4 is a perspective detail of the trigger, the arm for turning it in one direction, the spring
40 for turning it in the opposite direction, the two pawls and their operating levers, and the rods connecting the trigger with the pawls.

Referring to the said drawings, the letter W designates the tower of the mill supporting
45 a wind wheel M and preferably also supporting a storage reservoir S at some distance from the ground. The wheel causes the vertical reciprocation of the pump rod P whereby water is pumped up the pipe *p* into the res-
50 ervoir, whence it flows through pipe *s* into the tank T when a valve V is opened to per-

mit: or, the reservoir S may be omitted and the pipe *p* connected directly with that lettered *s*, when the water will pass directly into the tank. The latter contains a float F con-
55 nected by rods and levers *f* (or other suitable devices) with the regulator R, and from the drum of this regulator leads the regulator wire *r* which throws the blades of the wheel M into or out of the wind, as is common in
60 devices of this character and needs no further explanation here.

Coming now to the present invention, the regulator R consists of a drum 1 journaled on a shaft 2 and having a portion of its periph-
65 ery struck on a slight eccentric decreasing in diameter from *a* to *b* and provided with ratchet teeth 3, while the balance of its periphery is untoothed as at 3'. The regulator wire *r* passes around this drum or is attached
70 to an arm 1' of the drum as shown, and leads thence to the wheel. Pivoted on the shaft 2 is a lever 4 connected by a link 5 with the pump rod P, this lever carrying the main pivoted pawl 6 capable of engaging the teeth 3.
75 Pivoted between its ends to a support 7 is a rock lever 8, one end of which is connected by a link 9 with the main lever 4 and the other end of which carries a long pawl 10 capable of engaging the teeth 3 on the drum at
80 a point above where the pawl 6 engages them. When the pump rod is reciprocated by the rotation of the wind wheel, the levers cause their pawls to move simultaneously and op-
85 positely, and when the pawls are engaged with the teeth the drum is turned with an increasing force as the longer teeth at *a* come under the tip of the long pawl 10. The shaft
90 2 is preferably mounted at its forward end in a bracket 11, and pivoted on a pin 12 in this bracket is an arm 13 whose lower end is pivoted to a slide 14 which is moved inward by the rise and outward by the fall of the float
95 F—the arrangement effecting these movements being that shown or any similar construction which will produce them.

Pivoted at 16 to the bracket 11 is a trip 17 whose upper arm is turned forward as at 18 and provided with an eye 19, and whose lower arm has a cam-shaped upper edge 20 resting
100 under a pin or stud 21 in the arm 13, and a notch 22 near its extremity.

Pivoted on the pin 12 is a trigger 23 having a sharpened lower end 24 adapted to engage the notch 22 when the slide 14 is moved outward by the descent of the float, as seen in Fig. 2.

25 is a spring coiled on the pin 12 with one extremity passing through the eye 19 of the trip and holding its lower arm normally raised against the stud 21, and its other extremity bearing the lower end of the trigger normally to the right. At the upper end of the arm 13 is a heel 29 which engages against the trigger, when the slide is moved outward, and turns said trigger against the force of the spring 25 so as to permit its sharpened lower end 24 to be brought over the notch 22 of the trip and engaged thereby.

The main pawl 6 is of the ordinary construction except that it has a lug 30 projecting outward from its tip; but the long pawl 10 preferably has a forked tip 31, as seen in Fig. 4, which engages the edge of the drum, and a pin or lug 30' projects outward from this pawl also near its tip.

32 and 32' are rods whose inner ends are flattened and pivoted as at 33 to the upper end of the trigger 23, and whose outer ends have slotted eyes 34 and 34' loosely engaging the lugs 30 and 30' respectively. The parts are of the desired shapes, sizes, and materials, and considerable departure may be made from the exact construction shown.

The wind wheel being rotated by the breeze and the pump rod P reciprocated vertically, water is pumped up the pipe *p* into the reservoir S and may be drawn therefrom through valve V into the tank T; or the water may flow directly from pipe *p* to pipe *s* and into the tank, as in dotted lines Fig. 1. When the tank has become sufficiently full the float F will have risen to the position shown in Fig. 1 and the slide 14 will have been moved inward. Such inward movement of the slide turns the arm 13 on its pivot from the position shown in Fig. 2 to that shown in Fig. 3, and as it so turns the stud 21 passes along the cam face 20 of the trip 17 until the notch 22 is disengaged from the lower end 24 of the trigger; and—the heel 29 having meanwhile moved away from the trigger—the latter is freed. Its spring 25 then causes it to turn to move its upper end to the left, and the tips of the pawls are drawn into engagement with the teeth 3, after which the continued reciprocation of the pump rod P will turn the drum 1 on its pivot 2, and the arm 1' will draw down on the regulator wire until the blades of the wheel M are thrown out of the wind in the usual manner and the wheel ceases to rotate. Water being now drawn from the tank, as by stock drinking therefrom, the float F falls and the slide 14 is moved outward. The stud 21 passes down the cam face 20 so as to allow the notched end 22 thereof to rise, and the heel 29 finally engages the trigger and turns it until its lower end 24 is caught in said notch. Such move-

ment of the trigger pushes on the rods 32 and 32' until their slotted eyes 34 and 34' engage at their inner ends against the lugs 30 and 30' and push the tips of the two pawls out of engagement with the teeth 3; then the spring which actuates the regulator wire draws on the same to throw the blades again into the wind and cause the wheel to resume its rotation, the drum turning back to the position shown in Fig. 2.

It will be noticed that when the tank is full and the parts at rest the wheel cannot be set in motion from the ground. As the float falls and the arm 13 turns, the stud 21 passes down the cam face to first release the trip, then the heel 29 engages behind the trigger and turns the latter so that the slotted eyes 34 and 34' move over their pins 30 and 30', and finally both pawls are suddenly disengaged from the teeth 3, the drum turns upward to slacken the regulator wire, and the wheel resumes its rotation at full speed. If it is desired at this time to clean the tank T, the handle *r'* at the lower end of the regulator wire extension *r''* is drawn upon and the wheel ceases to rotate—what little water remains then in the tank being drawn off or dipped out as will be understood. When tension on this wire *r* is released, the wheel commences to rotate, and the tank is filled again. As the float rises, also, the arm 13 turns to move its heel out of the way and the stud 21 along the cam face 20 until the trigger is suddenly released and its spring 25 turns it to draw the two pawls simultaneously and fully into engagement with the teeth—after which the continued reciprocation of the pump rod positively turns the drum until the regulator wire throws the wheel blades out of the wind. The lost motion in the eyes 34 and 34' permits each pawl as it moves upward to slide over the teeth 3, while the other pawl is moving downward and in full engagement with them.

What is claimed as new is—

1. In a windmill regulator, the combination with a toothed drum connected with the regulator wire, a swinging lever pivotally connected with the pump rod, and a pawl thereon adapted to engage the teeth of the drum; of a rock-lever, a link connecting one end of the rock-lever with said swinging lever a long pawl pivoted to the other end of said rock-lever and also standing adjacent said teeth, a tank, a float therein, and connections substantially as described between this float and the tips of the pawls, as and for the purpose set forth.

2. In a windmill regulator, the combination with a toothed drum connected with the regulator wire, a lever moved by the pump-rod, a pawl pivoted to this lever and having a lug near its tip, a long pawl also having a lug near its tip, and means for moving the long pawl simultaneously with and oppositely to the movements of the short pawl; of a trigger, rods pivoted thereto and having slotted eyes in their outer ends loosely engaging said

lugs, a float in the tank, and connections substantially as described between the float and the trigger, as and for the purpose set forth.

3. In a windmill regulator, the combination
5 with a toothed drum connected with the regulator wire, a lever moved by the pump-rod, a pawl pivoted to this lever and having a lug near its tip, a rock-lever connected at one end with said lever, and a long pawl pivoted to
10 the other end of the rock-lever and also having a lug near its tip; of two rods each having a slotted eye engaging one of said lugs a float in the tank, and connections substantially as described between the float and the rods, as
15 and for the purpose set forth.

4. In a windmill regulator, the combination with a toothed drum connected with the regulator wire, a lever moved by the pump-rod, a pawl on said lever having a lug near its tip,
20 and a retaining pawl for said drum; of a centrally-pivoted trigger, a rod pivoted to the upper end thereof and having a slotted eye engaging the lug on said pawl, a spring normally turning the trigger to engage the pawl
25 with the teeth, a float in the tank, an arm connected with said float for turning the trigger against the force of said spring when the float falls, and means substantially as described for holding the trigger in turned position
30 and for releasing it when the float rises, as and for the purpose set forth.

5. In a windmill regulator, the combination with a toothed drum connected with the regulator wire, a lever moved by the pump-rod, a
35 pawl on the lever having a lug near its tip, a long pawl also having a lug near its tip, and connections between the lever and long pawl for moving the latter simultaneously with and oppositely to the movements of the pawl on
40 the lever; of a centrally-pivoted trigger, rods pivoted to the upper end thereof and having slotted eyes loosely engaging said lugs, a spring normally turning the trigger to draw on said rods, a trip adapted to hold said trigger
45 against movement by its spring, a pivoted arm having a heel adapted to turn the trigger to one position and a stud adapted to disengage the trip from the trigger and allow the latter to move to the other position, a float in
50 the tank, and connections between the float and arm, as and for the purpose set forth.

6. In a windmill regulator, the combination with a toothed drum connected with the regulator wire, a retaining pawl therefor, a lever
55 moved by the pump-rod and carrying a pawl, lugs on said pawls, and rods connected with said lugs; of a trigger mounted on a pivot and having a sharpened lower end, its upper end being connected with said rods, an arm also
60 mounted on said pivot and having a heel engaging the trigger, a float in the tank connected with said arm, a spring-actuated trip having a notch adapted to engage the lower
65 end of the trigger when the latter has been

ger against such movement, and a stud in the arm for depressing said trip, substantially for the purpose and in the manner described.

7. In a wind mill regulator, the combination with a toothed drum connected with the regulator wire, a lever moved by the pump rod, a
70 pawl on said lever engaging the teeth of the drum, and a rod connected to said pawl; of a pivoted trigger connected with said rod, a trip mounted between its ends on a pivot, its upper
75 arm being turned out and provided with an eye and its lower arm having a notch adapted to engage the lower end of said trigger, a spring coiled on the trigger-pivot with one end engaging said eye and the other end
80 engaging the trigger, a float in the tank, and connections from said float, substantially as described, for moving said trip and trigger against the force of said spring, as and for
85 the purpose set forth.

8. In a wind mill regulator, the combination of a stub-shaft mounted in a bracket, a toothed
90 drum journaled on said shaft and connected with the regulator wire, a pawl moved by the pump rod, and a rod connected to said pawl; with a pin in said bracket, a trigger pivoted thereon and connected at its upper end with
95 said rod, its lower end being sharpened, an arm also pivoted on said pin and having an outturned heel engaging behind the upper end of the trigger, a slide connected with the
100 float in the tank, the arm being pivoted to said slide, a trip pivoted on said bracket and having a notch adapted to engage the lower end of the trigger and also having a cam-shaped upper edge, a stud in the arm over
105 said cam-face, and a spring coiled on said pin with one arm bearing the trigger against said heel and the other arm bearing the trip against said stud, as and for the purpose set forth.

9. In a windmill regulator, the combination with a toothed drum part of whose periphery is plain, an arm connected with said drum, a
110 regulator wire leading from said arm to the wind wheel, two pawls adapted to engage said teeth or the plain edge of the drum, and means for reciprocating said pawls simultaneously and oppositely by the movements of the pump-rod; of a spring-actuated trigger connected
115 with said pawls and normally engaging them with said teeth, a spring-actuated trip having a notch adapted to hold said trigger out of its normal position, and an arm connected
120 with and operated by the float in the tank, the opposite movements of said arm alternately bearing the trip and the trigger against the forces of their respective springs, as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my signature on this the 28th day of
125 October, A. D. 1892.

HENRY J. HAUFF.

Witnesses:

JOHN C. HAUFF,

FRED W. HAUFF, 3rd.