

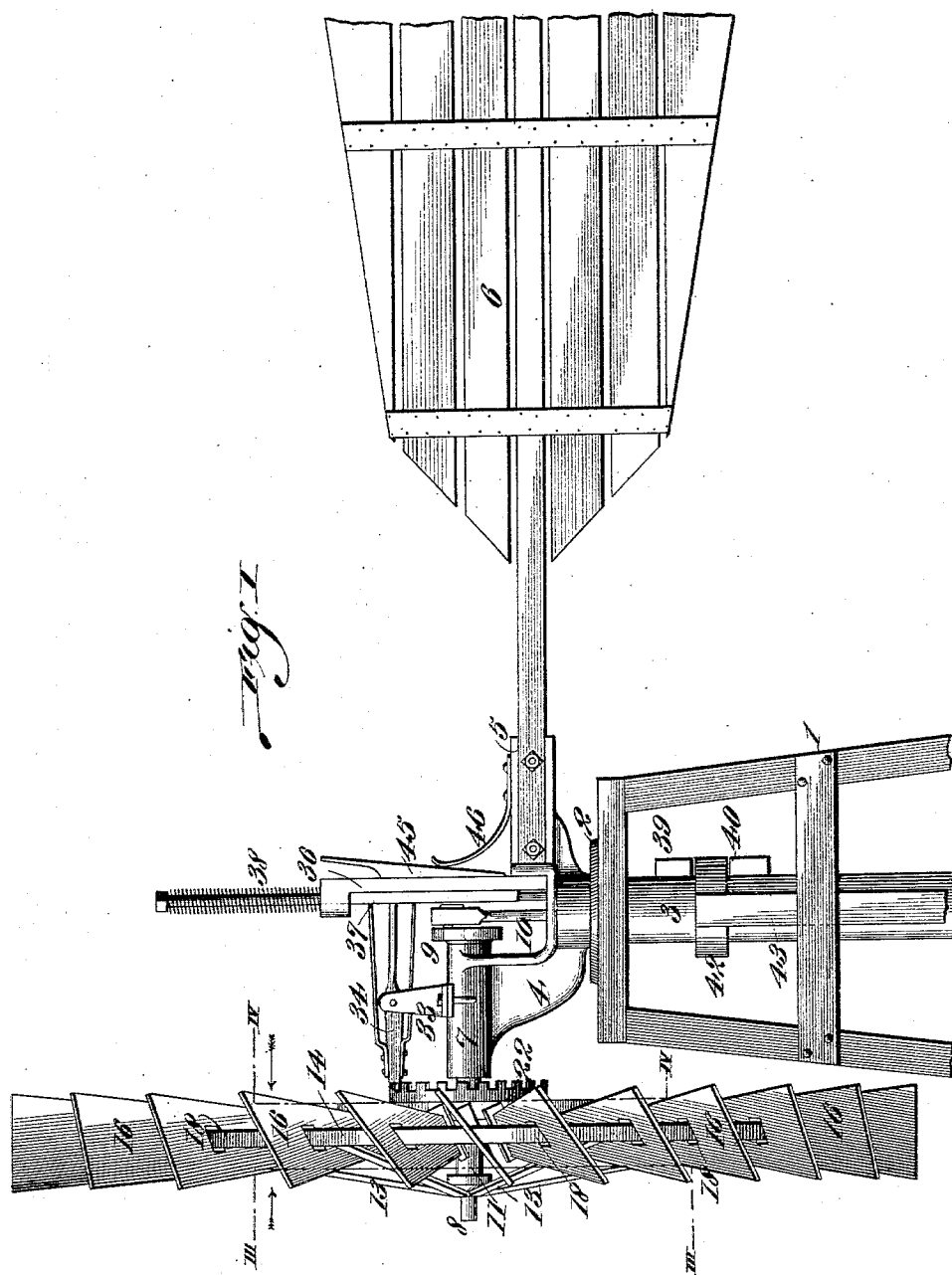
(No Model.)

3 Sheets—Sheet 1.

J. W. HENRY.
WINDMILL.

No. 564,927.

Patented July 28, 1896.



Attest
C. H. Lam
J. C. Yrargain

Inventor:
John W. Henry
By Wright & Co. Attys.

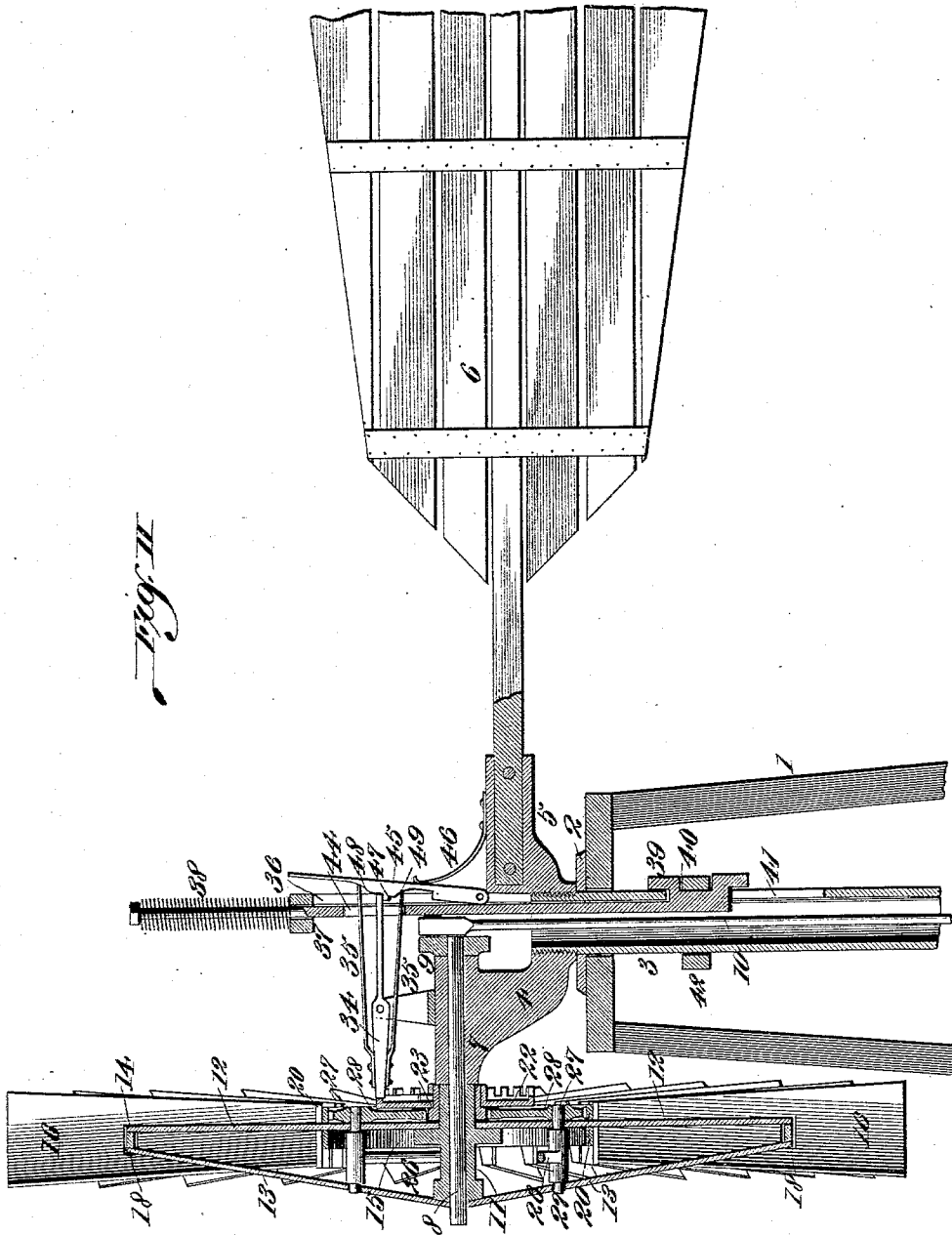
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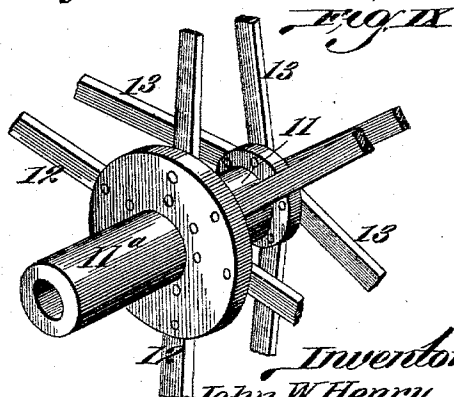
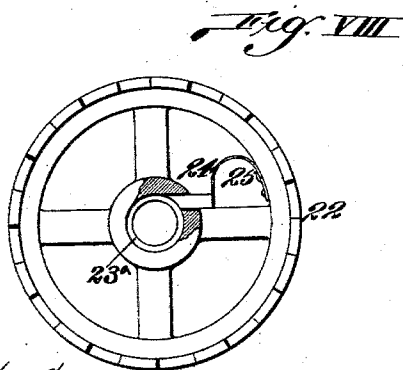
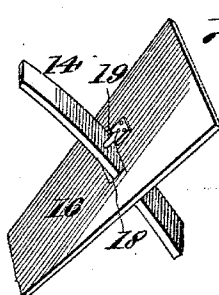
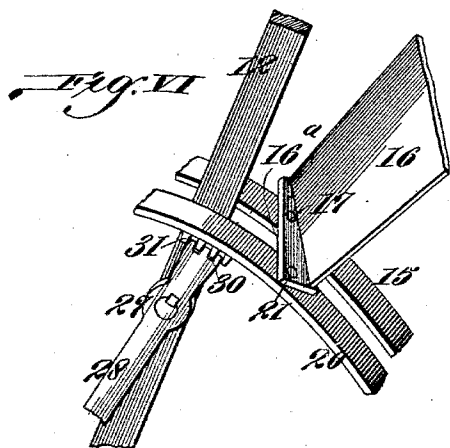
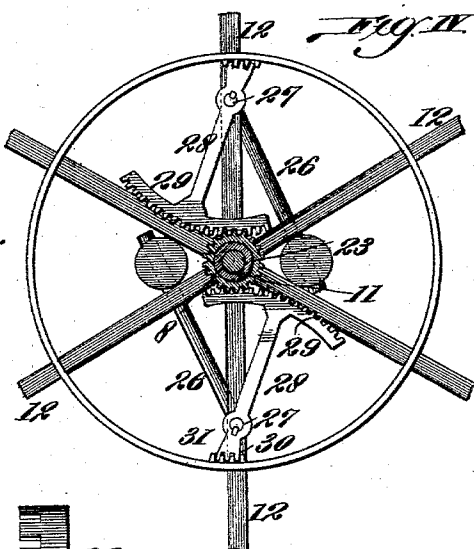
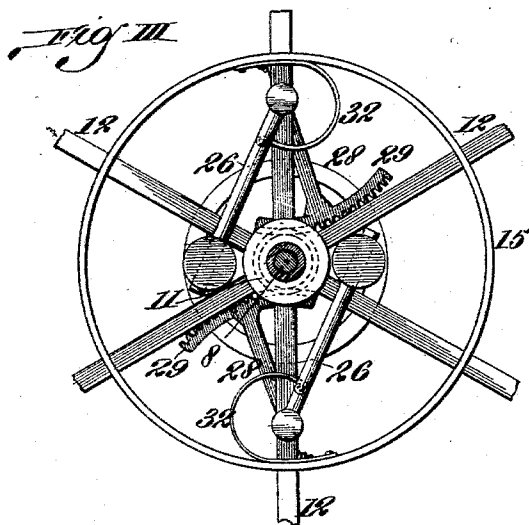
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WINDMILL.

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UNITED STATES PATENT OFFICE.

JOHN W. HENRY, OF PALOMA, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 564,927, dated July 28, 1896.

Application filed March 12, 1896. Serial No. 582,849. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HENRY, of Paloma, Adams county, Illinois, have invented a certain new and useful Improvement in Windmills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improved construction of windmill in which the sails are feathered automatically to permit the passage of air through the sails, and also to a novel construction of clutch, through means of which mechanism is operated to feather the sails when the clutch members are engaged.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Referring to the drawings, Figure I is a side elevation. Fig. II illustrates a vertical section. Fig. III illustrates a section taken on line III III, Fig. I, showing the sail-feathering operating mechanism. Fig. IV illustrates a section taken on line IV IV, Fig. I. Fig. V is an edge view of the clutch-wheel and pinion carried thereby. Fig. VI is an enlarged detail perspective of portions of the sail-carrying rings, one of the sails, and operating segment-bar. Fig. VII is an enlarged detail perspective showing the means of attachment between the sails and the outer ring on which they feather. Fig. VIII is an enlarged detail side elevation of the clutch-wheel. Fig. IX is an enlarged detail perspective of the central portion of the wind-wheel.

In the drawings, 1 designates the tower, which may be of any common construction.

2 designates a bushing set in the top of the tower, in which a tube 3 is loosely seated. Formed with the tube 3 is a frame 4, provided with an arm 5, that carries a vane 6, and a hollow arm 7, in which the wheel-shaft 8 has bearing. On the inner end of the shaft 8 is a crank-pin disk 9, connected to a pitman 10, that connects with the machinery to be operated.

11 designates the hub of the wind-wheel, by which hub radial arms 12 and radial brace-arms 13 are carried. The outer ends of these arms are connected to and carry a ring 14.

15 designates a ring rigidly secured to said

arms 12 intermediate of their ends. To this ring 15 the sails 16 are pivoted by pins 17, passing through angle-lips 16^a on the inner ends of the sails. The sails 16 at their outer ends are provided with openings 18, that receive the ring 14, and carried by each sail is a pin 19, that enters the ring 14 and forms a pivot on which the sail turns in feathering or in turning into the operative position.

20 designates a hoop with which the sails 16 have pivotal connection at their inner ends by means of pins 21.

22 designates a toothed wheel loosely mounted on a hollow spindle 23^a, carried by a pinion 23, loosely mounted on an extension 11^a of the hub 11.

24 is a block movably seated in the hub of the wheel 22 in such manner that its inner end comes in contact with the spindle 23^a to form a brake to retard the movement of the toothed wheel. Against the outer end of the block 24 the free end of a spring 25 bears to hold the block in frictional contact with said spindle.

26 designates weight-carrying arms supported by shafts 27, integrally formed on the arms, said shafts being loosely mounted in the radial arms 12 and brace-arms 13.

28 designates bars keyed to the shafts 27. The inner end of each bar 28 is in the form of a segmental rack 29, the teeth of which engage in the teeth of the pinion 23. The outer ends of the bars 28 are provided with teeth 30, that engage teeth 31 on the inner side of the hoop 20.

Each of the weight-carrying arms 26 has connection with a spring 32, rigidly connected to the ring 15, the tendency of said springs being to hold said weighted arms with their free ends inward toward the axis of the wind-wheel.

33 designates a bracket supported on the arm 7, and pivotally mounted in this bracket is a rocking bar 34, one end of which is adapted to be thrown into engagement with the clutch-wheel 22. The opposite end of the bar 34 extends some distance beyond the pivotal point for a purpose to be presently set forth. On the upper and lower sides of the bar 34 are secured flat springs 35, the free ends of which extend a little beyond the end of the bar away from the wheel 22.

36 designates an upright secured to the arm 5, in the upper end of which a rod 37 is loosely held, and on this rod above the upper end of the upright is a coiled spring 38. The lower end of the rod 37 extends downward into the tube 3 and is provided with a head 39, having a notch 40, which head is permitted to move in a slot 41 in the side of the tube 3. Around the tube 3 and fitting in the notch 40 is a collar 42, that carries a bar 43, by means of which the collar may be moved from a distance to operate the rod 37 and rock the bar 34. The rod 37 is provided with a slot 44, that receives the ends of the rocking bar 34 and springs 35.

45 designates a pawl pivoted to the upright 36, that is held toward the upright by means of a spring 46, secured to the arm 5. On the inner side of the pawl 45 is a nib 47, above which is an incline 48, and beneath which is an incline 49.

The operation of the windmill is as follows: When the parts are in the positions illustrated in Figs. I and II, the sails are in the position in which a wind blowing against them will cause them to feather and allow the wind to pass through between them instead of operating upon them to turn the wind-wheel.

The feathering is accomplished in the following manner: The wind acting upon the sails causes the wind-wheel to revolve, and as the toothed clutch-wheel 22 is held from movement by the rocking bar 34 the pinion 23, which is carried by the wheel 22, is likewise prevented from turning, and the result is that the turning of the wind-wheel in carrying bars 28 causes the segmental racks 29 to travel over the pinion 23, in which action the opposite ends of the bars 28, through means of the teeth 30, engaging with the teeth 31, move the hoop 20 until the sails have been thrown into a parallel feathering position, and the wind may then pass freely through between the sails without operating the wind-wheel.

When it is desired to release the sails and return them to operative position, the rocking bar 34 is released from engagement with the toothed wheel 22 by drawing downward upon the bar 43, through means of a connection reaching to a convenient location at the foot of the tower, the connection being fastened in any ordinary manner.

In drawing downward upon the bar 43 the rod 37 is operated, which acts upon the upper spring 35 on the rocking bar 34, and said upper spring pressing against the incline 48 forces the pawl 45 outward against the action of the spring 46, which allows the end of the rocking bar 34 to pass the nib 47, after which it engages beneath the nib, and it is held with its opposite end out of contact with the toothed wheel 22 until such time as the rod 37 is moved upward under the influence of the spring 38, when the connection at the foot of the tower is released. At this time the lower spring 35 rides against the incline 49 and

presses the pawl 47 outward, which allows the rocking bar 34 to be thrown into engagement with the wheel 22. When the rocking bar 34 is out of engagement with the toothed wheel 22, and the wind-wheel is in operative position, the sails feather by the action of weighted arms 26 being thrown outward by centrifugal force, owing to the high velocity of the wind-wheel under a strong current of air, and the shafts 27 of the weighted arms being keyed to the bars 28 cause the bars to move with the weighted arms and move the hoop 20 and feather the sails in the same manner as first described.

In the event of a very strong wind, if rocking bar 34 should engage with toothed wheel 22 cog-wheel 23 would be held fast by frictional block 24 until segmental toothed bar 29 should pass over it and feather the sails. Then should velocity of wind-wheel be such as to cause wind-wheel to continue to revolve cog-wheel 23 would then take motion of wind-wheel, spindle 23^a turning in toothed wheel 22, while toothed wheel 22 would remain stationary, held by rocking bar 34, thereby preventing the breakage of any part.

I claim as my invention—

1. In a windmill the combination of a stationary ring, a movable hoop, sails pivoted to said hoop and said ring, a toothed wheel carried on the wind-wheel hub, a rocking bar adapted to be thrown into engagement with said toothed wheel, a pinion carried by said toothed wheel, and a connection from said pinion to said movable hoop, substantially as described.

2. In a windmill the combination of a stationary ring, a movable hoop, a toothed wheel mounted on the wind-wheel hub, a pinion carried by said toothed wheel, and a pivoted bar carrying a segmental rack adapted to engage the teeth of said pinion, said bar being provided with connection at its opposite end to said hoop, substantially as described.

3. In a windmill, the combination of a stationary inner ring, sails pivoted thereto, an outer ring, said sails being provided with pivotal connection with said outer ring, a movable hoop to which said sails are pivoted, a toothed wheel mounted on the wind-wheel hub, a pinion carried by said toothed wheel, and a pivoted bar carrying a segmental rack adapted to engage the teeth of said pinion, said bar being provided with connection at its opposite end to said hoop, substantially as described.

4. In a windmill the combination of an inner ring and outer ring, sails provided with pivotal connection to both the said rings, a movable hoop also provided with pivotal connection to said sails, a toothed wheel, a pinion carried by said wheel, segment-carrying bars forming connection between said pinion and said hoop, and spring-controlled weighted arms pivoted to said segment-carrying bars, substantially as described.

5. In a windmill, the combination of a wind-

5 wheel having sails pivoted thereto, a movable hoop also pivoted to said sails, a toothed wheel, means of connection between said toothed wheel and said movable hoop, and a
10 rocking bar adapted to be thrown into and out of engagement with said toothed wheel, and means for operating said rocking bar, substantially as described.

6. In a windmill, the combination of a wind-
10 wheel having sails pivoted thereto, a movable hoop also pivoted to said sails, a toothed wheel, means of connection between said toothed wheel and said movable hoop, a rock-

ing bar adapted to be thrown into and out of engagement with said toothed wheel, springs 15 carried by said rocking bar, a spring-actuated pawl in contact with said rocking bar, and a spring-controlled rod through means of which said rocking bar is held either into engage-
20 ment or out of engagement with said toothed wheel, substantially as described.

JOHN W. HENRY.

In presence of—

C. S. HORN,

J. C. YEARGAIN.