

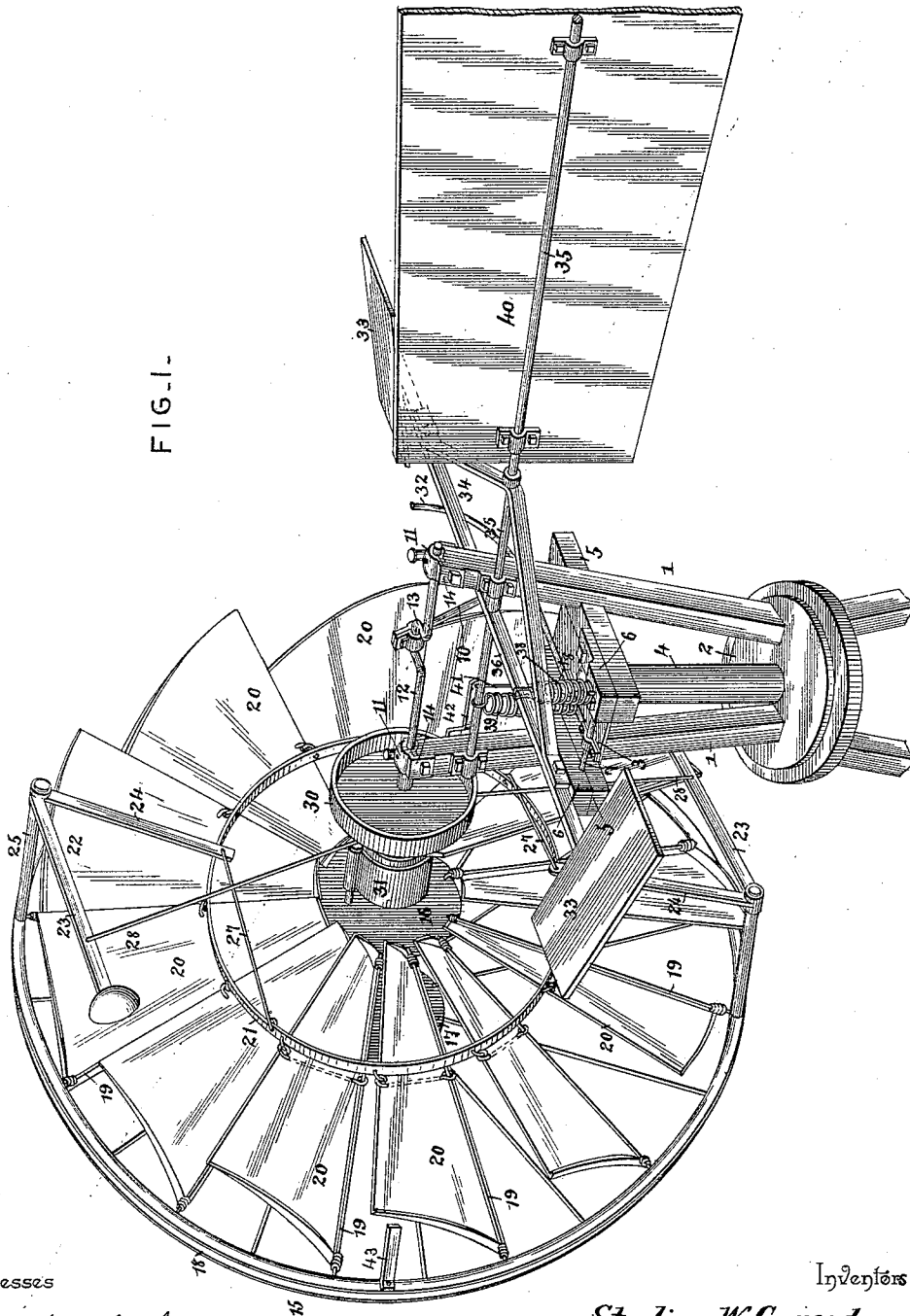
(No Model.)

2 Sheets—Sheet 1.

S. W. CONRAD & J. H. LAKE.
WINDMILL.

No. 460,430.

Patented Sept. 29, 1891.



Witnesses

Jas. H. McElathran
H. F. Riley

Inventors

Sterling W. Conrad

By *their* Attorneys, *John H. Lake*

Chas. Snow & Co.

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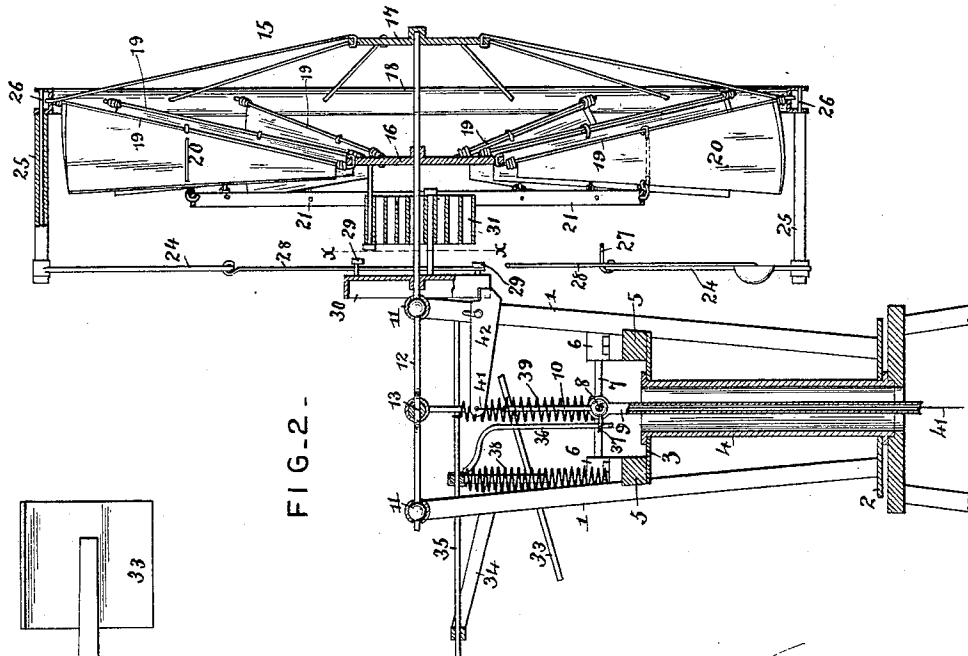


FIG. 2 -

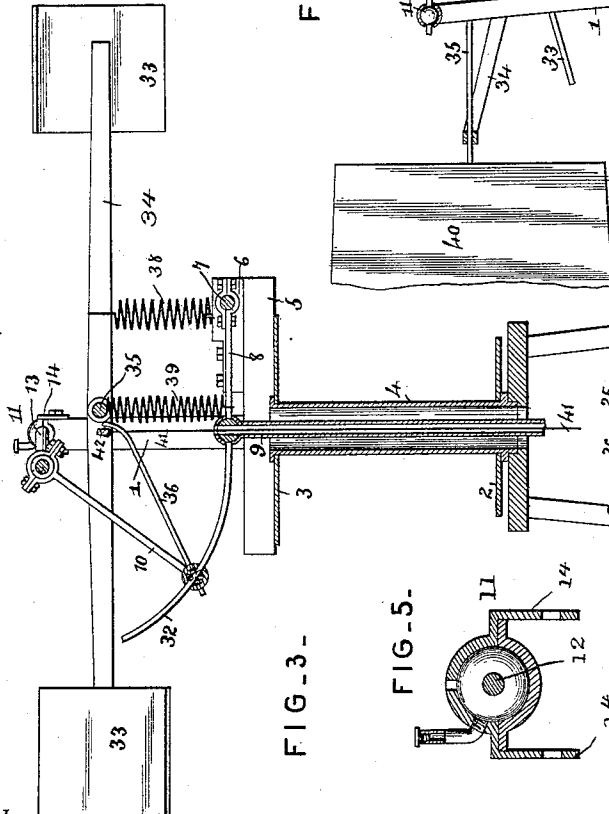


FIG. 3 -

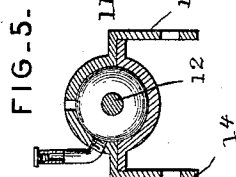


FIG. 5 -

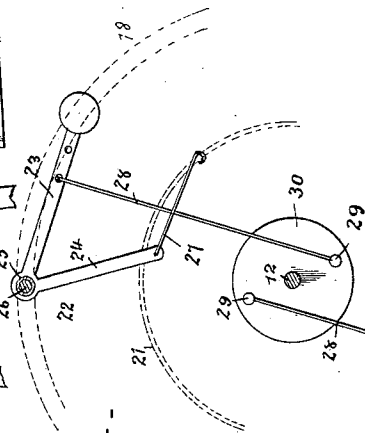


FIG. 4 -

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UNITED STATES PATENT OFFICE.

STERLING WALTER CONRAD AND JOHN HENRY LAKE, OF HANFORD,
CALIFORNIA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 460,430, dated September 29, 1891.

Application filed February 13, 1891. Serial No. 381,301. (No model.)

To all whom it may concern:

Be it known that we, STERLING WALTER CONRAD and JOHN HENRY LAKE, citizens of the United States, residing at Hanford, in the
5 county of Tulare and State of California, have invented a new and useful Windmill, of which the following is a specification.

The invention relates to improvements in windmills.

10 The object of the present invention is to simplify and improve the construction of windmills and provide means for automatically regulating the same to the force of the wind.

15 A further object of the invention is to provide means for automatically regulating the length of the stroke of a mill according to the strength of the wind, so that when in a heavy wind or storm the mill will have a long stroke
20 and in a light breeze vice versa.

The invention consists in the construction and novel combination and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and pointed
25 out in the claims hereto appended.

In the drawings, Figure 1 is a perspective view of a windmill embodying the invention. Fig. 2 is a vertical sectional view taken longitudinally of the vane. Fig. 3 is a similar
30 view taken at right angles to Fig. 2. Fig. 4 is a sectional view on line *xx* of Fig. 2. Fig. 5 is a detail sectional view of one of the bearings.

Referring to the accompanying drawings, 1
35 1 designate a pair of slightly-diverging uprights connected at their lower ends and at a point intermediate their ends by plates 2 and 3, which are secured to a tubular shaft 4, designed to be rotatively mounted in a tower.
40 The lower plate 2 is circular, and the upper plate is rectangular and supports horizontal bars 5, which are secured to the plate and to the uprights and provided with bearings 6, and journaled in the bearings 6 is a short
45 shaft 7, to which is secured one end of a governor-arm 8, connected with a pump-rod 9 and a pitman 10. The upper ends of the uprights 1 are provided with bearings 11 to receive a
50 main shaft 12, which is provided with a crank-loop 13, to which is attached a pitman 10, and the bearings of the shaft and those of the pit-

man and pump-rod are ball-bearings, which are covered to prevent oil being blown therefrom. The coverings or caps of the bearings 11 are provided with depending flanges 14, 55 which are secured to the sides of the uprights.

Arranged upon one end of the main shaft 12 is a wheel 15, consisting of a hub composed of inner and outer disks 16 and 17, a rim 18, and wire spokes 19, secured in perforations of 60 the disks and rim, and mounted upon the inner set of spokes are hinged blades 20, which are transversely curved to catch the wind, and are connected at their free edges with a ring 21, adapted to be turned to open and 65 close the blades to decrease or increase the speed of the wheel.

The speed of the wheel is automatically regulated by weighted bell-crank or angle levers 22, which are composed of arms 23 and 24, arranged at an angle and secured at their
70 apexes to sleeves 25, which are arranged upon stub-shafts 26, extending inwardly from the rim 18 of the wheel. The end of the arm 24 is connected with the ring 21 by a wire 27, 75 and the outer end of the arm 23 is weighted, and the said arm is connected at a point intermediate its ends to one end of a wire 28, which has its other end secured to a pin 29, extending laterally from a wheel 30, mounted 80 upon the main shaft between the wheel and the adjacent upright. The stub-shafts are arranged at diametrically-opposite points on the rim and the small wheel 30 is provided with two laterally-extending pins 29, which are ar- 85 ranged at diametrically-opposite points, and arranged upon the shaft between the small wheel 30 and the wind-wheel is a coiled spring 31, which has its outer end connected to the inner plate 16 of the hub and its inner 90 end to the small wheel 30, and the said spring is adapted to hold the blades normally closed and in position to run the mill. As the force of the wind increases and the windmill increases in speed, the weighted arms 23 of the 95 angle-levers 22 will be thrown outward, thereby opening the blades and decreasing the speed of the wheel, and as the speed is decreased the weighted arms 23 will be drawn inward and will close the blades, and it will 100 thus be seen that the speed of the wheel is automatically regulated. The governor-arm

8 is connected at a point intermediate its ends to the pump-rod 9 and has its outer portion 32 curved, and the lower end of the pitman 10 slides upon the curved portion 32 to and from the pump-rod to increase and decrease the stroke of the pump, thereby enabling the windmill to have a long stroke during a heavy wind and a short stroke in a light wind and increasing the regularity of the mill. The movement of the lower end of the pitman is regulated by a pair of wings 33, arranged at a slight inclination and at the end of a frame 34, which is centrally mounted on a vane-rod 35, and is adapted to tilt to shift the position of a rod 36, secured to the frame 34 at its inner end and having its outer end free and engaging a loop 37 of the pitman 10. The wings 33 are reversely inclined, so that when blown by the wind one will be raised and the other will be lowered, thereby tilting the frame 34, and the said wings are arranged behind the wind wheel, and are operated upon by the wind when the same increases in force and opens the blades of the windmill. The frame is normally held horizontally or at any desired inclination to give the proper normal stroke to the windmill by a spring 38, which is interposed between one of the horizontal bars 5 and one side of the frame 34, and is mounted upon the former. The ease of the windmill is increased by a spring 39, which is interposed between the governor-arm and the vane-rod and secured to them, and prevents a too-rapid stroke. The vane 40 is rigidly mounted upon the vane-rod 35.

It will be seen that the windmill is adapted to readily run in any wind or heavy storm, and it will automatically regulate itself both as to the speed of the wheel and the length of the stroke.

The windmill is controlled from below by a cork 41, which extends to the ground, and has its upper end connected to the lever 42, fulcrumed on one of the uprights 1 and arranged to engage the small wheel 30 to partially rotate the same and open the blades. The uprights 1, tubular shaft 4, and the plates form rotating frame, which is adapted to be turned in the usual manner by the rigid vane to keep the wind-wheel into the wind. The blades of the wind-wheel are prevented closing too tightly by stops 43, projecting from the rim of the wheel. The caps of the bearing are provided with filling-tubes and have

openings to permit the passage of air and allow the oil to fill the bearings. (See Fig. 5.)

What we claim is—

1. In a windmill, the combination of the frame designed to be rotatively mounted on a tower, the main shaft provided with a crank-loop, the governor-arm having one end hinged to the frame and connected at a point intermediate its ends to a pump-rod and having the curved portion 32, and the pitman connected to the crank-loop and having its lower end sliding upon the curved portion 32, substantially as described.

2. In a windmill, the combination of the frame, the main shaft, the governor-arm having one end hinged to the frame and provided with a curved portion 32, the pitman having its upper end connected with the main shaft and its lower end sliding upon the curved portion 32, and the frame provided with wings and connected with the pitman, substantially as and for the purpose described.

3. In a windmill, the combination of the frame, the main shaft, the governor-arm having the curved portion 32, the pitman having its upper end connected to the main shaft and its lower end sliding upon the curved portion 32, the tilting frame 34, fulcrumed intermediate its ends and provided with wings, and the rod extending from the frame and engaging the pitman, substantially as described.

4. In a windmill, the combination of the frame, the main shaft, the governor having the curved portion 32, the pitman having its lower end to slide upon the curved portion 32, the frame 33, mounted on the frame and provided with wings and connected with the pitman, and the spring secured to the frame, substantially as described.

5. In a windmill, the combination of the frame, the main shaft, the governor, the pitman connecting the main shaft and the governor, and the spring 39, connected with the governor-arm, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

STERLING WALTER CONRAD.
JOHN HENRY LAKE.

Witnesses:

C. S. COOPER,
C. M. BRYAN.