

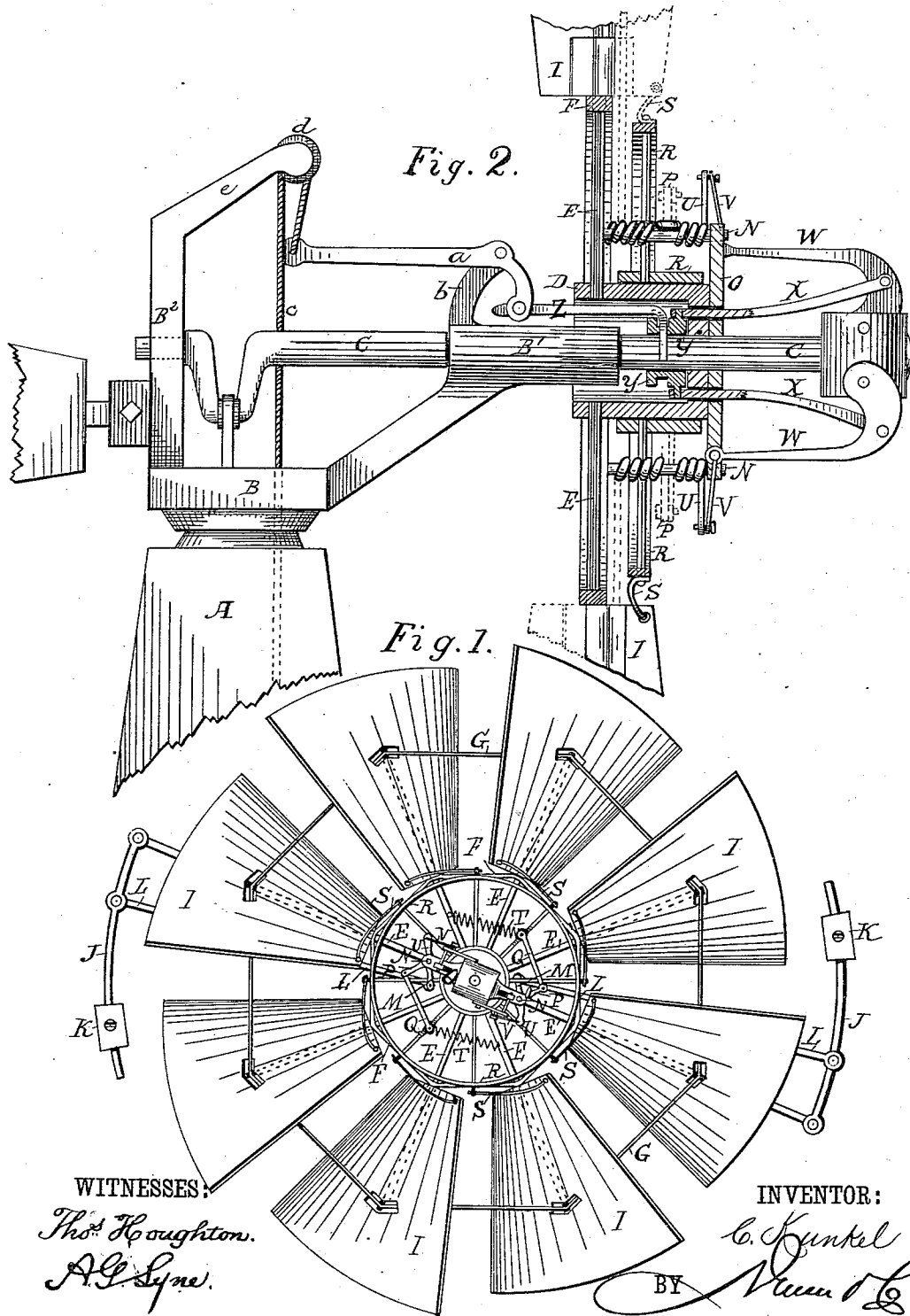
(Model.)

C. KUNKEL.

WINDMILL.

No. 259,557.

Patented June 13, 1882.



WITNESSES:
Thos. Houghton.
A. G. Syre.

INVENTOR:
C. Kunkel
BY *Wm. L.*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CORNELIUS KUNKEL, OF OREGON, MISSOURI.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 259,557, dated June 13, 1892.

Application filed July 29, 1881. (Model.)

To all whom it may concern:

Be it known that I, CORNELIUS KUNKEL, of Oregon, in the county of Holt and State of Missouri, have invented a new and useful Improvement in Windmills, of which the following is a full, clear, and exact description.

In the accompanying drawings, Figure 1 is a sectional side elevation of my improvement partly broken away. Fig. 2 is a front elevation of the same with the braces removed.

Similar letters of reference indicate corresponding parts.

The object of this invention is to increase the reliability of self-regulating windmills.

The invention consists in the combination, with the frame and wings of the wind-wheel and the shaft, of the weighted levers and their connecting-rods, the angle-levers, and the loose wheel and its connecting-rods and springs, whereby the wind-wheel will be made to revolve at a uniform velocity; also, in the combination, with the frame and wings of the wind-wheel and the shaft, of the bent lever and its connecting-rod, the sliding head and its connecting-rods, the bent levers and their connecting-rods, the loose wheel and its connecting-rods, and springs, whereby the wind-wheel can be readily stopped and started; and, also, in the wind-wheel hub, countersunk from its rear end, whereby the weight of the wind-wheel can be brought over the main bearing and the overhanging of the wheel prevented, as will be hereinafter fully described.

In the drawings, A represents the frame or tower that supports the wind-wheel, and upon which is mounted a turn-table, B, in the ordinary manner. In bearings B' B², attached to the turn-table B, revolves the wheel-shaft C, to which is attached the hub D of the wind-wheel frame.

To the rear part of the hub D are attached the spokes E, which are connected and strengthened at a little distance from their inner ends by a rim, F, and at their outer ends by a rim, G. The wheel-frame D E F G may be strengthened against the wind-pressure by braces attached to the outer ends of the spokes E and to the forward end of the shaft C. The hub D is countersunk from its rear end to receive the forward or main bearing, B', of the shaft C, so as to bring the main weight of the wheel

directly over the said bearing, and thus prevent any overhanging of the wheel. I are the wings, which are hinged to the spokes E a little at the outer side of their center lines, so that when exposed to the wind they will stand at an angle of thirty degrees (more or less) to the direction of the wind. The wings I can be interposed between the rims F G; or they can be made of such a length as to project beyond the outer rim, G. In the latter case the wings I should have slots formed through them for the passage of the rim G, as shown in Fig. 2.

To the outer ends of two or more of the spokes E, and a little beyond the outer ends of the wings I, are hinged the ends of levers J, which are placed in the plane of the wheel-frame, and have weights K secured to their outer or free parts adjustably by set-screws or other suitable means. To the levers J at a little distance from their hinged ends are hinged the outer ends of the rods L, which pass inward along the sides of the wings I, and their inner ends are hinged to the arms M, rigidly attached to the rods N. The rear ends of the rods N are connected with the spokes E, and their forward ends are connected with the ends of a cross-bar or frame, O, attached to the forward part of the shaft C.

To the rods N are also attached arms P, which project at an angle with the arms M, so that the arms M P and the rods N will form bent levers. The two arms P are connected by rods Q with two spokes of the wheel R, placed loose upon the hub D of the wind-wheel. The movement of the loose wheel R upon the hub D is limited by pins or other suitable stops, so that the said wheel can move no farther in one direction than to throw the wings into the wind, and no farther in the other direction than to throw the said wings out of the wind.

To the rim of the loose wheel R are attached the forward ends of rods S, the rear ends of which are attached to the forward parts of the inner ends of the wings I. With this construction, as the velocity of the wind-wheel increases the weighted ends of the levers J K are thrown outward by centrifugal force and draw the rods L outwardly, operating the bent levers M N P, turning the loose wheel R and drawing the wings I out of the wind. As the velocity of the wind-wheel decreases the loose

wheel R is turned back, drawing the wings I into the wind by the springs T, attached at one end to a spoke of said wheel R and at the other end to a spoke of the wind-wheel.

5 The springs T may be provided with eye-screws and nuts, so that their tension can be regulated to keep the wind-wheel at any desired velocity. With this construction, as the velocity of the wind-wheel increases beyond
10 the desired rate the centrifugal force of the weighted levers J K overcomes the tension of the springs T and the wings I are turned out of the wind; and as the velocity of the said wheel decreases beyond the required rate the
15 tension of the springs T overcomes the centrifugal force of the weighted levers J K and the wings I are turned into the wind.

To the rods N are attached arms U, which project at an angle with the arms P, and
20 have their outer ends connected by rods V with the outer ends of the curved levers W, which are pivoted to a suitable projection on the forward end of the shaft C. Connected to the bars W in the curves thereof are the
25 outer ends of the rods X, which rods pass through holes in the bar O and hub D of the wind-wheel, and are attached at the inner ends to the head Y, that slides upon the shaft C within the cavity of the said hub D, between
30 the bearing of the said hub and the main bearing B' of the shaft C. Upon the rear part of the head Y is formed a ring-groove to receive the forked end of a connecting-rod, Z, which passes out between the shell of the
35 hub D and the bearing B', and to its rear end is hinged the end of an arm of the bent lever *a*. The bent lever *a* is pivoted at its angle to a support, *b*, formed upon or attached to the turn-table B. To the other end of the bent
40 lever *a* is attached the end of a cord, *e*, which passes over a guide-pulley, *d*, pivoted to an arm or other support, *e*, formed upon or attached to the turn-table B. From the pulley *d* the cord *e* passes down into such a position
45 that it can be conveniently reached and operated by the attendant. To the rear arm of the bent lever *a* may be attached a weight to bal-

ance the gravity of the cord or chain *c* and prevent the wind-wheel from being turned out
50 of the wind by the weight of the said cord or chain *c*. With this construction the attendant, by drawing down upon the cord or chain *c*, can turn the loose wheel R and throw the wings I out of the wind, stopping the wind-wheel. When the cord or chain *c* is released
55 the springs T will turn the loose wheel R in the other direction, starting the wind-wheel.

I am aware that weights to be operated by centrifugal force have before been combined with mechanism for feathering the wings of a
60 wind-wheel to prevent too great velocity of rotation, and I therefore do not broadly claim such a construction.

Having thus described my invention, I claim as new and desire to secure by Letters Patent— 65

1. In a windmill, the combination, with the frame D E F G, the wings I of the wind-wheel, and the shaft C, of the weighted levers J K, the connecting-rods L, the angle-levers M N P, the loose wheel R, the connecting-
70 rods S, and the springs T, substantially as herein shown and described, whereby the wind-wheel will be made to revolve at a uniform velocity, as set forth.

2. In a windmill, the combination, with the
75 frame D E F G and the wings I of the wind-wheel, and the shaft C, of the bent lever *a* and its connecting-rod Z, the sliding head Y and its connecting-rods X, the bent levers W, the connecting-rods V, and the bent levers U N P,
80 the loose wheel R, the connecting-rods S, and the springs T, substantially as herein shown and described, whereby the wind-wheel can be readily stopped and started, as set forth.

3. In a windmill, the wind-wheel hub D,
85 countersunk from its rear end, substantially as herein shown and described, whereby the weight of the wind-wheel can be brought over the main bearing and the overhanging of the wheel prevented, as set forth.

CORNELIUS KUNKEL.

Witnesses:

M. H. RICHARDS,
DANIEL ZACHMAN.