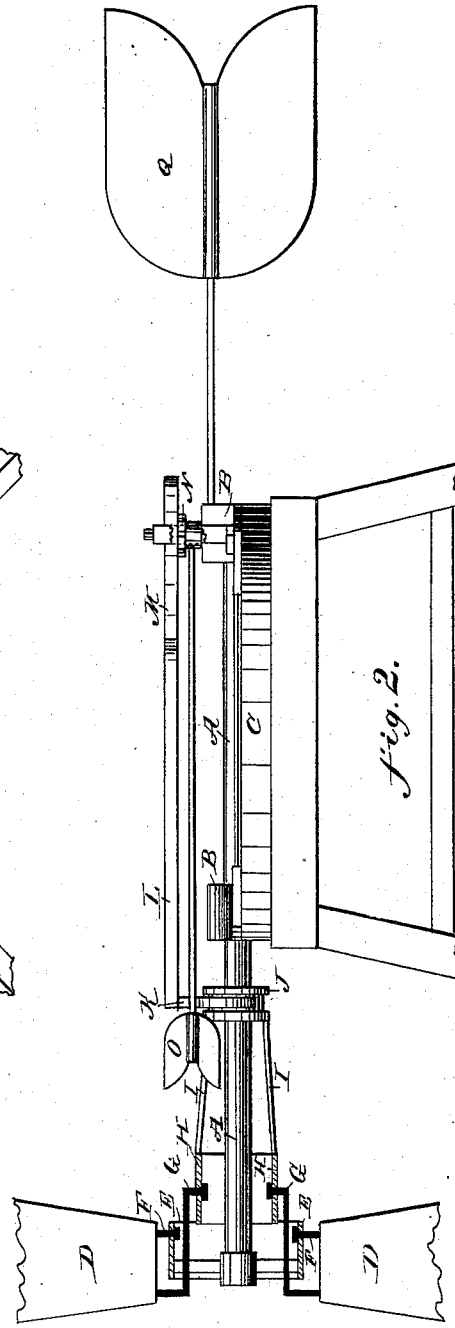
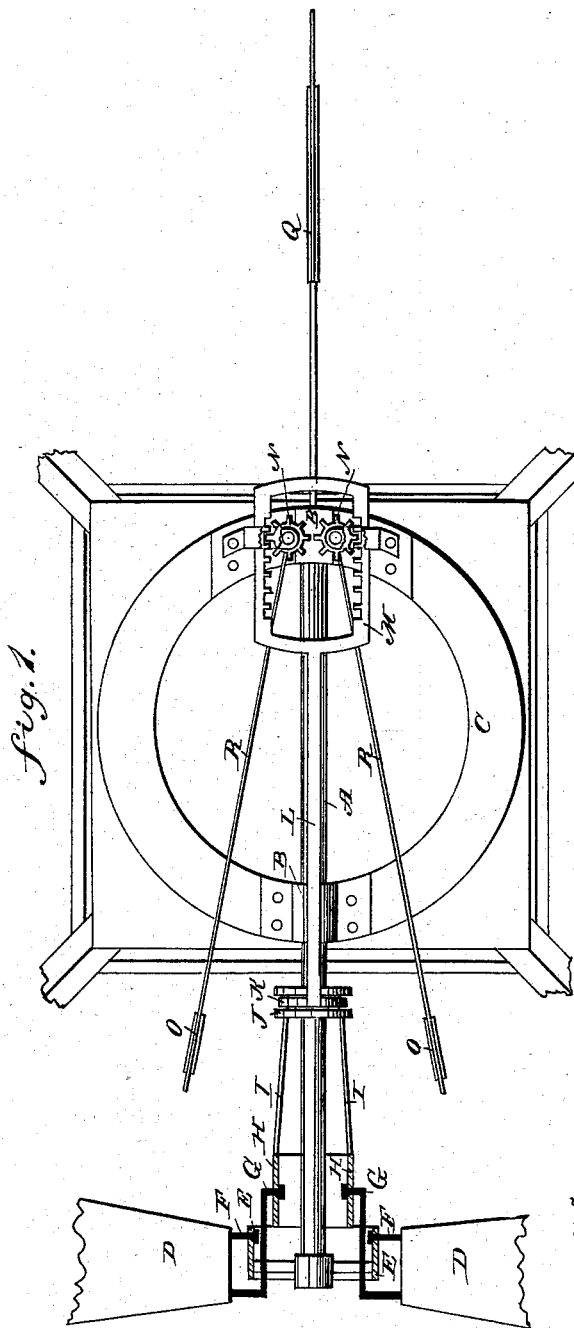


(No Model.)

C. KUNKEL.  
WINDMILL.

No. 262,058.

Patented Aug. 1, 1882.



**WITNESSES :**

Chas Meyer  
C Sedgwick

INVENTOR:

BY *G. Kunkel*  
*Mumford*  
ATTORNEYS.

# UNITED STATES PATENT OFFICE.

CORNELIUS KUNKEL, OF OREGON, MISSOURI.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 262,058, dated August 1, 1882.

Application filed May 19, 1882. (No 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.

The invention consists of the application of a vane or vanes to windmills in a manner to counterbalance the tendency of the wind to change the angle of the vanes of the wheel, so that a governor employed to regulate the said angle will be relieved of the duty of holding the vanes to the wind and will only be required to shift the angle of the vanes as the wind varies, the tendency of the wind to shift the vanes being counterbalanced by the equalizing-vanes of my invention at all times and in all positions, as hereinafter fully described, and pointed out in the claim.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a windmill with my improved equalizing-vanes applied, a part being in section; and Fig. 2 is a side elevation of the said windmill with a part sectioned.

A represents the shaft of the wind-wheel, which is mounted in bearings B of the turntable C, and carries the vanes D, which are pivoted to the hub E at F, and are connected by crank G to the ring H, which is connected by rods I to the hub J, mounted on the shaft so as to slide toward and from the vanes, said hub being connected by forked head K of rod L to the toothed yoke M, which is geared with pinions N, to which I apply the equalizing-vanes O by attaching the stems R of said vanes to the hubs or shafts of the pinions, the pinions being mounted on the turn-table each side of the shaft, at the rear end, or at a distance back from the turn-table on the stem to the main vane and the vanes O, ranging forward therefrom nearly to the vanes of the wheel and slightly divergent from the shaft when the wheel is at rest. The equalizing-

vanes, being mounted on long arms, have such leverage that comparatively small vanes O will be equal to the larger areas of the vanes D for the purpose required, which is to equalize or balance the vanes D in whatever angle to the wind they may be adjusted by the regulator. The said vanes O are so geared with vanes D as to oppose the tendency of said vanes D to be turned on their axes F by the wind. They are to be so adjusted as to their leverage and with respect to the vanes D that they will balance vanes D in whatever position the latter may be caused to assume by the governor or other device employed to determine the angle of said vanes to the wind, no matter how much the wind may vary because of the counterbalancing effect of the one on the other, both being alike subject to the variations of the wind, so that the governor employed to regulate the speed of the wheel by centrifugal weights or other devices is relieved of stress by the wind, and has only to overcome the friction of the parts in regulating the speed, and thereby is more sensitive and effects greater regularity of motion. I have represented two vanes, O, in this example, which is the arrangement that I prefer, and they are located on opposite sides of the shaft; but they may be arranged above and below; or I may use only one, placing it either above or below the shaft. With the pinion and yoke arrangement the equalizing-vanes may swing round to or nearly to the tail-vane Q.

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

In a windmill, the combination, with the hub E, the vanes D, pivoted thereto and provided with the cranks G, the sliding ring H, the rods I, and the hub J, of the forked head K, the rod L, the toothed yoke M, the pinions N, and the equalizing-vanes O, substantially as and for the purpose set forth.

CORNELIUS KUNKEL.

Witnesses:

JAMES R. BROWN,  
JOHN E. PHILBRICK.