(No Model.) 2 Sheets—Sheet 1.

A. ZWIEBEL.

WINDMILL.

No. 561,040. Patented May 26, 1896.

Fig. 1

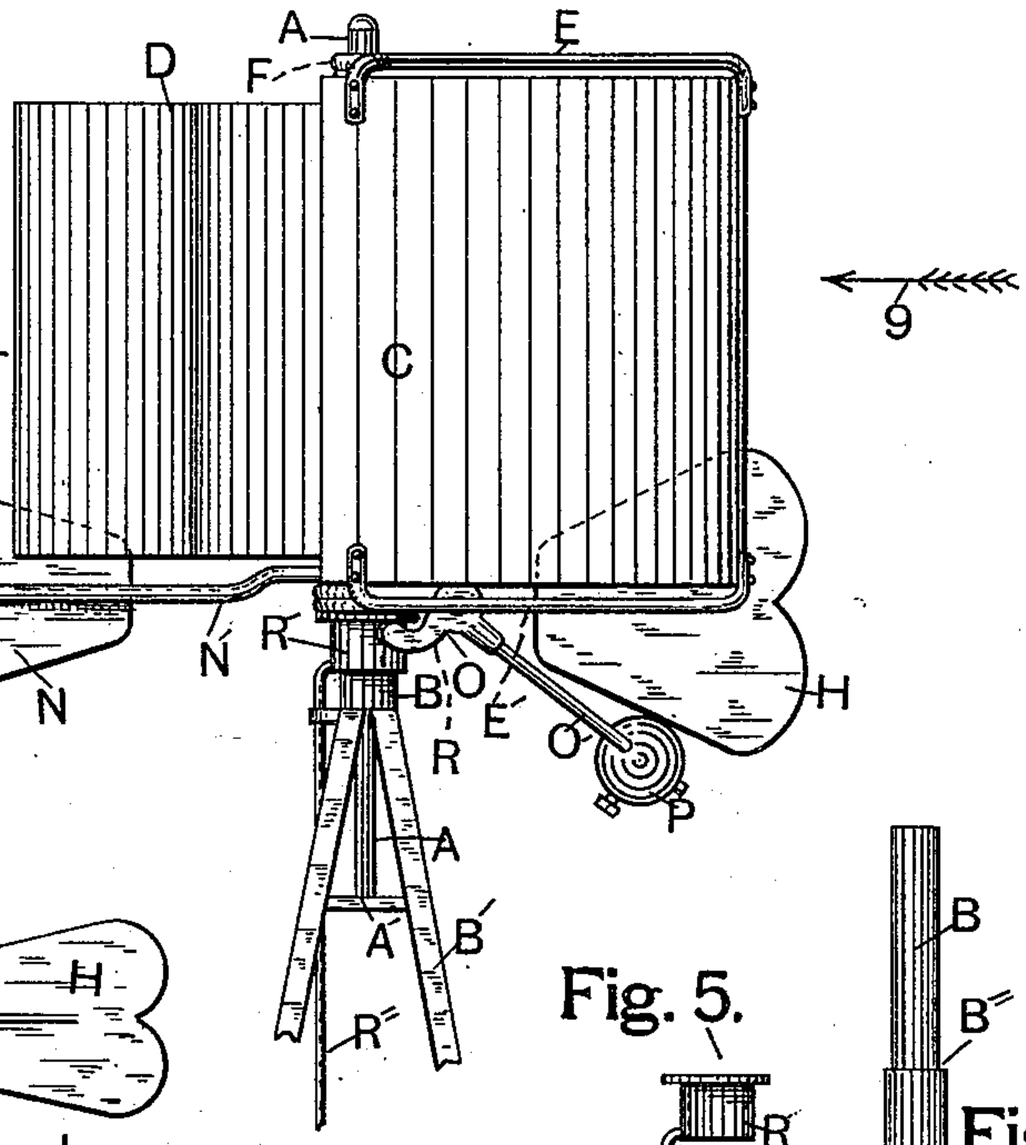


Fig. 3

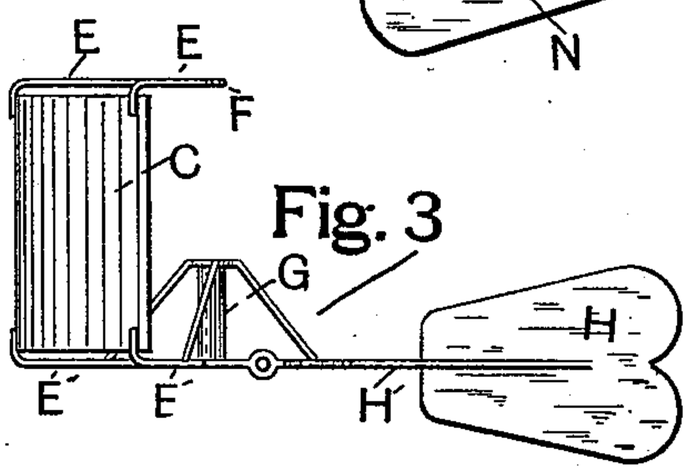


Fig. 5.

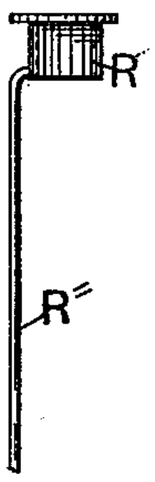


Fig. 6.

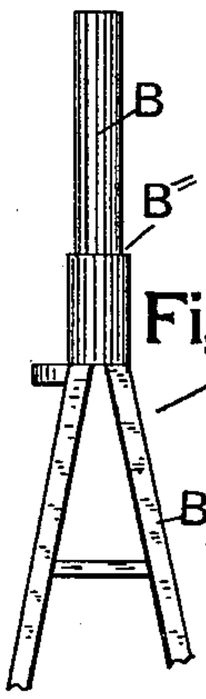


Fig. 2

Fig. 4.

WITNESSES:

W. A. Hale

W. H. Rose

INVENTOR:

Anton Zwiebel,

By his atty.

Oscar Snell.

(No Model.) 2 Sheets—Sheet 2.

A. ZWIEBEL.

WINDMILL.

No. 561,040. Patented May 26, 1896.

Fig. 7.

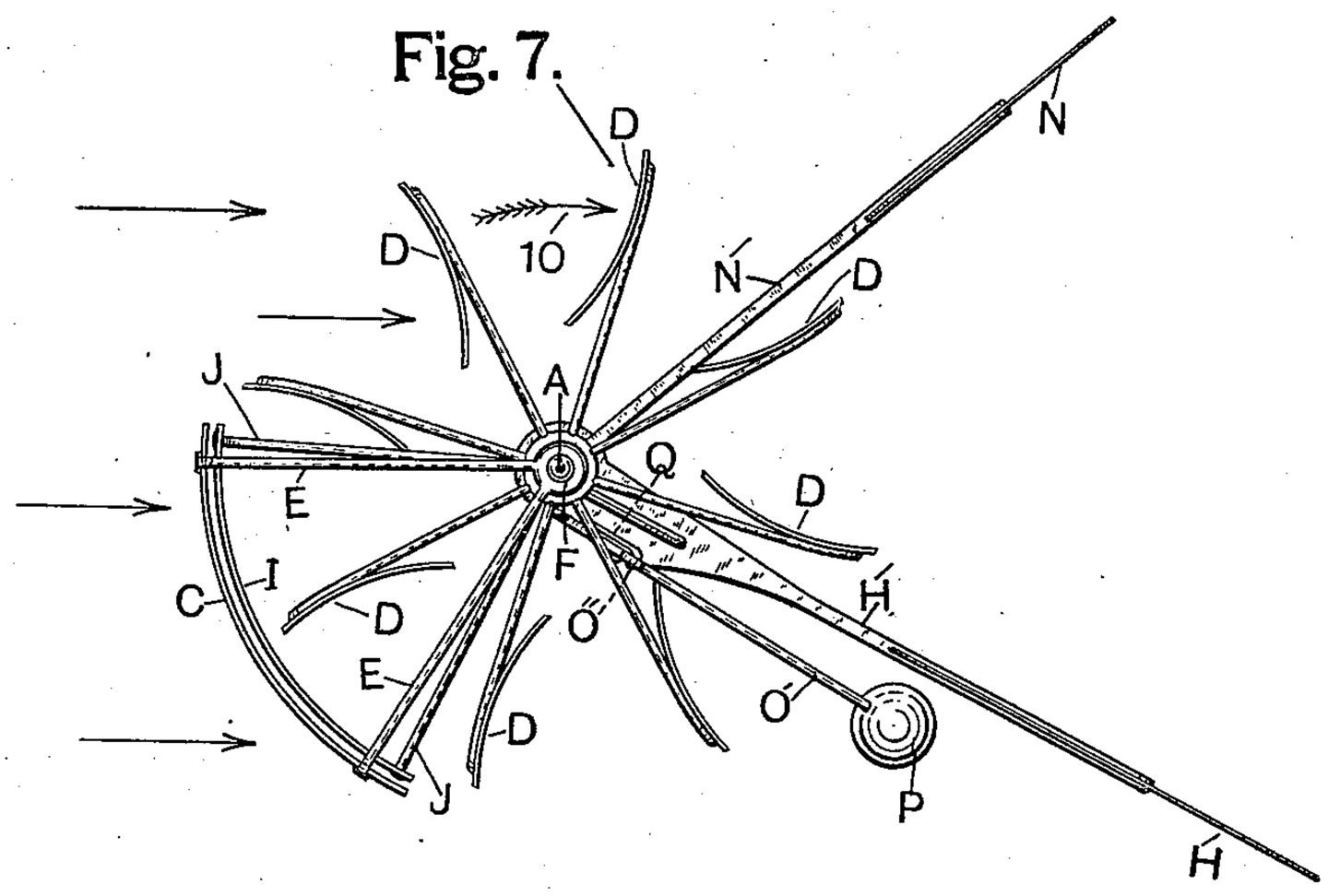
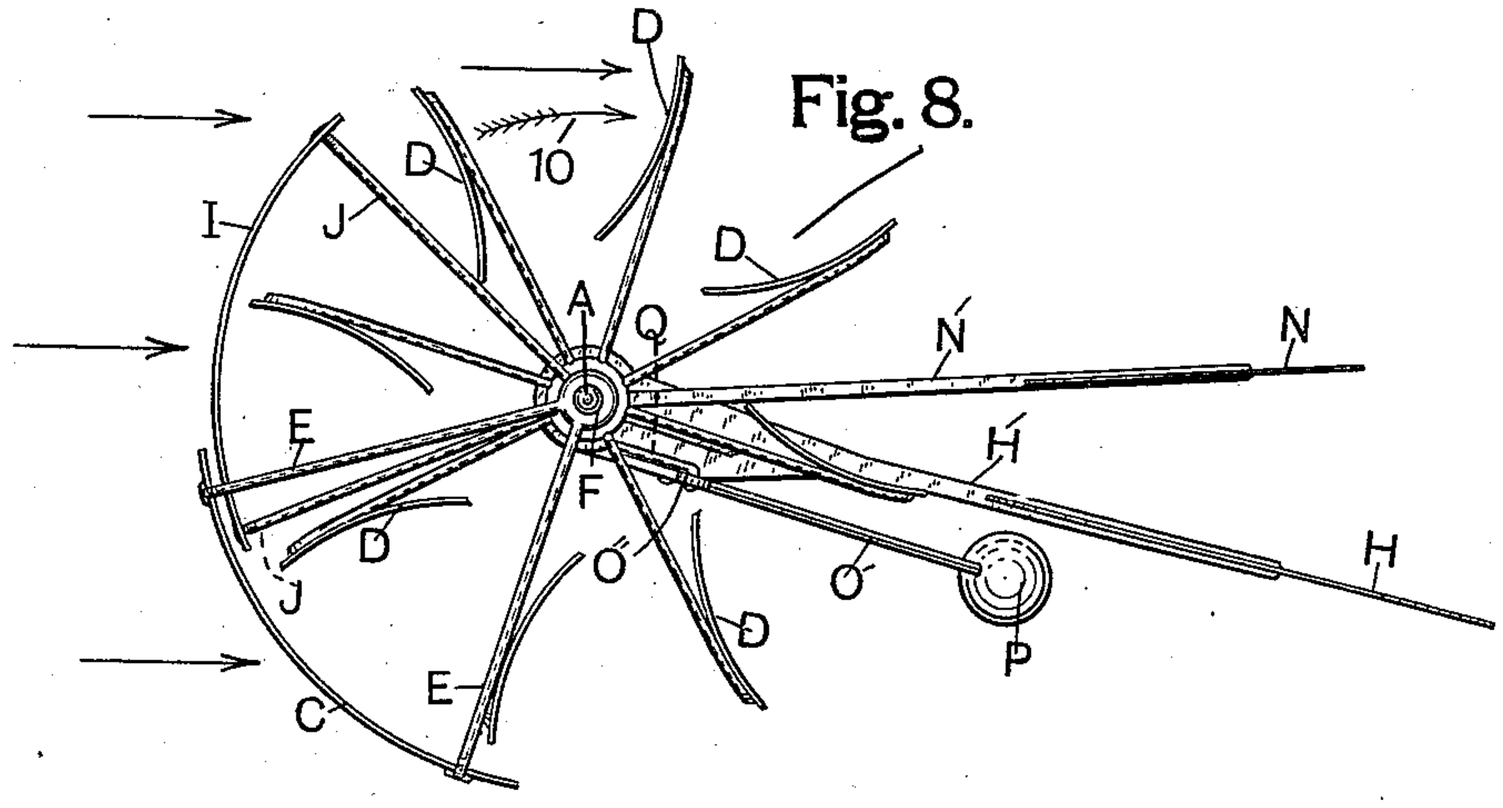


Fig. 8.



WITNESSES:
H. A. Hale.
W. H. Rose.

INVENTOR:
Anton Zwiebel
By his atty.
Oscar Snell

UNITED STATES PATENT OFFICE.

ANTON ZWIEBEL, OF BURLINGTON, WISCONSIN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 561,040, dated May 26, 1896.

Application filed December 12, 1895. Serial No. 571,872. (No model.)

To all whom it may concern:

Be it known that I, ANTON ZWIEBEL, a citizen of the United States, residing at Burlington, in the county of Racine and State of Wisconsin, have invented a new and useful Improvement in Windmills, of which the following is a specification.

My invention relates to windmills, and more especially to that class whose motor-wheels revolve in a horizontal plane, and my object is to provide a simple and efficient means for controlling the speed thereof without the use of a complicated and costly train of mechanism, the construction embodying my new improvements being described hereinafter and is illustrated in the accompanying drawings, in which—

Figure 1 is an elevation looking in the direction of the side presented to the wind. Fig. 2 is an elevation as if seen at a right angle to that shown in Fig. 1 in the direction indicated by arrow 9. Figs. 3 and 4 are respectively side elevations of the principal and regulator shields and the vanes connected therewith as they appear when detached from the mill, these two figures being shown on a scale one-half the size of Figs. 1 and 2. Fig. 5 is a vertically-sliding flanged sleeve and a pendent rod attached thereto, which form part of the stop and starting mechanism and are hereinafter more fully described. Fig. 6 is a side elevation of the top portion of the tower or support upon which the mill is mounted. Fig. 7 is a plan of the operative mechanism as it appears when the principal and the regulator shields are at the initial position, when the blades of the wind-wheel are adapted to receive the full force of the wind. Fig. 8 is a plan similar to Fig. 7, except that the regulator-shield is shown in an opened position, whereby but a small portion of the outer edges of the wind-wheel blades extend into the current of air, whose direction is indicated by the arrows at the left-hand side of Figs. 7 and 8, the direction of the revolution of the wind-wheel being shown by arrows 10.

Similar letters indicate like parts throughout the several views.

The vertical shaft A, to which the wind-wheel is secured, is in this instance mounted to revolve within a hollow vertical arm B, Fig. 6, which latter is secured to the top of tower B′, or any other elevated support, the shaft having the lower end mounted in a step-bearing at A′ or in any other manner, as practice may require.

The principal shield or baffle C is in the form of the segment of a circle and is longer than the length of the blades D of the wind-wheel, and is intended to cover a section of the wind at one side only of the wind-wheel, more in vertical dimension than the length of the blades of the wind-wheel, and in width equal to half the diameter of the circle the blades describe. Shield C is held in position concentric with the wind-wheel shaft by being attached to the outer ends of upper and lower radially-disposed arms E E and E′ E′, the inner ends of upper arms E E being secured to a hub F, through which the top of shaft A is loosely mounted. The lower radial arms E′ E′ have their inner ends secured to a long sleeve G, which is loosely mounted to revolve on the reduced portion of arm B, Fig. 6, the lower end of sleeve G resting upon shoulder B″. Projecting rearwardly from sleeve G is a strong arm H′, to whose outer end is attached the vane H. Several rods are shown, which serve as braces to hold the top of sleeve G in position. The regulator-shield I is similar in form to shield C, but is the segment of a circle of smaller diameter, so that it may vibrate laterally at the rear of shield C, Figs. 7 and 8. Shield I is held in position by being attached to the outer ends of radially-disposed upper and lower arms J and K, the inner ends of upper arms J terminating in a hub L, through which the top of shaft A is loosely mounted, and the lower radial arms K have their inner ends attached to a long sleeve M, Fig. 4, which is loosely mounted to revolve on long sleeve G, Fig. 2.

Projecting rearwardly from sleeve M is an arm N′, to whose outer end is attached the regulator-vane N. A bell-crank lever O is pivotally mounted upon the side of arm H′ of vane H, the long arm O′ of this lever having mounted thereon a weight P, which is adjustably secured thereto. The short arm O″ of lever O is connected by a rod Q to an eye attached to long sleeve M, so that the vibration of the bell-crank lever O will cause shield I to move out from or move in behind shield C. At R is an arm projecting from bell-crank le-

ver O, which contacts the under side of the flange of sliding sleeve R′, and attached to the sleeve is a pendent rod R″, which may be pulled downwardly to operate bell-crank lever O and open the shield I, the same being closed by the descent of weight P after rod R″ is released. It will be understood that the action of weight P is for the purpose of holding the regulator-shield I in the closed position (shown in Fig. 7) behind shield C, and that any effort to open shield I is resisted by this weight in proportion to its distance from the pivotal center of the bell-crank lever O. Since the shields and vanes are loosely mounted, by means of the sleeves G and M, upon the stationary cylindrical vertically-disposed arm B, these parts may be revolved in a horizontal plane in any direction, and since sleeve M is loosely mounted upon sleeve G the regulator-shield I and its vane N may be vibrated laterally to an amount limited by the movement of bell-crank lever O or the width of the shield laterally. In this instance the blades D of the wind-wheel are fixed in position and the wheel is always free to revolve.

In operation if the parts are in the normal position with a current of wind moving in the direction indicated by the arrows at the left-hand side of Fig. 7, with the shields C and I, as shown, in a position adapted to baffle the wind at one side of the wheel, the other side is exposed to revolve in the direction indicated by arrow 10. The two vanes N and H with an ordinary pressure of wind and the weight P in the position shown are not closed together as much as is shown in Fig. 8; but as the wind increases in force the gravity of the weight P is gradually overcome until it is possible to open the shields out to almost their full extent, when but a small part of the outer edge portion of blades D is exposed to the current. Any decrease in the force of the wind causes weight P to descend and expose more of the surface of blades D, so that the velocity of the revolution of the wind-wheel is thus regulated, and since the weight P may have its position changed along arm O′ of bell-crank lever O different rates of speed may be attained. Springs may be used instead of weight P for presenting an adjustable yielding resistance to the pressure of the wind against vanes N and H; but I prefer the weight on account of its greater reliability.

It is obvious, as hereinbefore indicated, that in case of a very high wind or when it is desired to stop the mill the regulator-shield may be closed or partially closed from a position within easy reach of the surface of the ground by means of the pendent rod R″, which may be extended to such position and be provided at the lower end with notches and a pawl or some similar device, whereby it may be held in the operated position.

I claim as my invention—

1. The combination in a windmill of the class described, having a segmental shield at one side of the windward side of the wind-wheel, of a second shield normally disposed at the lee side of the first-mentioned shield, the shields adapted to move one past the other from the normal position and be maintained on the windward side of the wind-wheel by the action of the wind on vanes connected to the same, and means for returning the shields to the normal position independent of the action of the wind substantially as shown and described.

2. The combination in a windmill of the class described, having a shield maintained at one side of the windward side of the wind-wheel by the action of the wind on a vane connected therewith, of a second shield normally at the lee side of the first-mentioned shield, the second shield moved out from the lee side of the first shield by the action of the wind upon a vane connected therewith, and means connected between the two shields for presenting a yielding resistance to such movement and for returning the shields to the normal position substantially as stated.

3. In a windmill of the class described, a two-part shield at one side of the windward side of the wind-wheel one of the shields normally at the lee side of the other, each shield provided with a vane, which by the action of the wind opens the shields, a weighted lever mounted on the support of one of the shields, the lever having an arm connected to the support of the other shield, and adapted by the gravity of the weight to yieldingly hold the shields in the closed position against the pressure of the wind against the vanes, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand, this 2d day of December, 1895, in the presence of witnesses.

ANTON ZWIEBEL.

Witnesses:

GEO. L. PROUT,

F. REUSCHLEIN.