

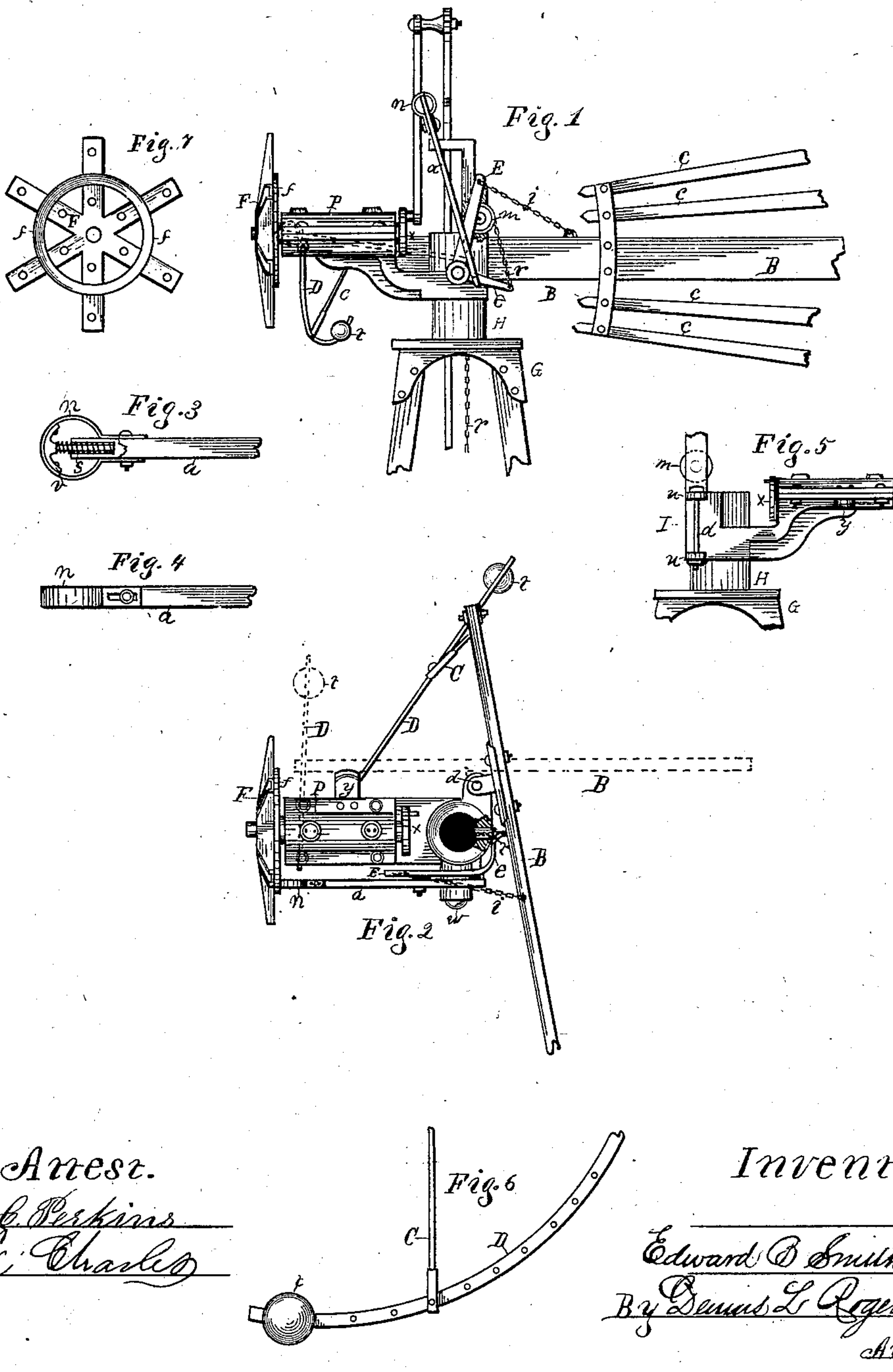
(No Model.)

E. B. SMITH.

WINDMILL.

No. 255,345.

Patented Mar. 21, 1882.



Attest.

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UNITED STATES PATENT OFFICE.

EDWARD B. SMITH, OF RICHLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
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WINDMILL.

SPECIFICATION forming part of Letters Patent No. 255,345, dated March 21, 1882.

Application filed July 30, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. SMITH, of Richland, Kalamazoo county, in the State of Michigan, have invented certain new and useful Improvements in Windmills, of which the following is a specification.

My invention relates to that class of windmills in which a tail-vane is hinged so as to swing horizontally out of the general direction of the wind-wheel shaft, or so that the wind-wheel and its shaft may swing horizontally out of the general direction of the vane, while the latter may remain pointing toward the wind, and with its fan or tail directed by the force of the wind to the quarter toward which the wind is blowing.

In the accompanying drawings, illustrating my improvements, Figure 1 is a side elevation of the main part of a windmill. Fig. 2 is a plan or top view of the same, and Figs. 3, 4, 5, 6, and 7 are views of detached parts of the structure.

My invention consists in certain improvements in the governor mechanism of what I will call "folding" windmills.

Fig. 5 shows an irregular-shaped main frame or casting, I, which rotates upon a centrally-arranged hollow pivot, (better shown in Fig. 2,) and rests upon a collar, H, which is supported upon the cap G. The rudder-stem B projects forward of the point of attachment, and is hinged about its middle, instead of at its inner end, and to one side of the main casting, in such a manner that the vane or rudder will be at one side of the vertical and horizontal axis of the wheel. At the forward end of the stem so elongated an adjustable pendulous regulating-weight, *t*, is applied, being suspended by a curved arm, D, from the forward part of the main casting, and connected with the forward projecting end of the rudder-stem by means of the link C. This link is adjustable upon the arm D, as shown in Fig. 6, for the purpose and in such a manner as ordinarily to keep the vane or rudder nearly parallel with the horizontal axis of the wind-wheel when in use.

I employ in connection with the eccentrically-arranged rudder, with its elongated stem

and regulating-weight, the rope or chain *r* and the lever E, (having its lower arm, *e*, curved so as to bring the end opposite to a pulley-slot in the middle of the back of the main casting,) connecting-chain *i*, pulley *m*, brake *a*, and circular metallic brake-band *f*, for the purpose of throwing the edge of the wheel to the wind and stopping the rotary motion of the wind-wheel when not desired to be used.

The object of the above-described arrangement of parts is to enable the rudder and the wind-wheel to be readily brought around to a position parallel, or nearly so, with each other by the wind or by hand when it is not desired to have the mill operate, and to enable them to return to their original position. In their normal positions the wheel sets nearly at a right angle to the sides of the rudder, presenting its face at a slight angle to the wind. If the wind increases in force beyond a certain velocity, the vane will remain substantially in line with the wind, and the wheel will incline to the direction of the wind more or less, according to the force of the wind. If the velocity of the wind becomes so great as to endanger the mechanism, the edge of the wheel will be presented to the wind, and its face and the sides of the rudder will be brought nearly parallel, and the rotary motion will cease or be maintained only at a moderate speed. By this mechanism an even steady rotary motion of the wheel is secured which is substantially unaffected by temporary gusts or lulls of wind, and the mill is hung so evenly balanced upon its cap as to prevent any sagging of the rudder. Upon the forward part of the main casting is fixed the bumper *y*, Fig. 2, which meets the end of the stem as the wheel springs back into the wind and prevents its passing beyond its proper angle without shock or disarrangement of the other parts.

Figs. 3 and 4 show the end of the brake provided with an adjustable covering stiffened by the spiral spring and plunger, as shown. This brake is attached to both arms of the lever E, which is attached to a chain passing over the pulley *m* and extending down through the hollow pivot, so that pulling upon this chain throws the rudder around and brings the end of the

brake-lever in contact with the brake-band, and thus stops the rotary motion of the wheel. Whenever the mill is folded, so to speak, the pendulous weight is raised. If the folding is caused by the action of the wind in blowing with violence, (and also if caused by hand,) the more the wheel is turned out of the wind the higher the weight rises and the greater force it exerts, tending to swing the rudder and the horizontal axis of the wheel into nearly the same line—in other words, tending to bring the wheel-face to the wind. Being applied in the manner shown, the weight acts with great delicacy and efficiency to automatically regulate the velocity of rotation of the wind-wheel. As the rudder and face of the wheel do not ordinarily in practice stand (when the wind is blowing and the mill in operation) exactly at right angles, but with the wheel slightly inclined to the wind, no side vane is necessary to turn the wheel out of the wind.

I am aware that self-regulating windmills operated by hinged rudders and regulating-weights are common, and have been for a long time in use, but I am not aware that the device having the stem of the vane project forward of its hinge, and the vane hinged at one side of the vertical and horizontal axis of the wind-wheel, and a pendulous regulating-weight applied to the end of the elongated rudder-stem, combined together, has ever before been used.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a windmill constructed and arranged as above described, the combination of elongated rudder-stem B, pendulum-weight D *t*, connecting-rod C, bumper *y*, connecting-chain *i*, lever E *e*, brake *a*, circular brake-band *f*, rope or chain *r*, and pulley *m*, substantially as described, and for the purposes set forth. 35 40

2. The combination of the rudder-stem B, pivoted about its middle and projecting forward and to one side of the vertical axis of the wind-wheel, pendulous weight D *t*, constructed as described, and applied to the forward end of the stem, as set forth, and connecting-rod C, with the main supporting frame or casting, substantially as set forth. 45

3. The combination of the rudder-stem B, pendulous weight D *t*, connecting-rod C, and bumper *y* with the main supporting frame or casting, substantially as set forth. 50

4. The combination of lever E *e*, pulley *m*, brake *a*, chain *r*, and metallic circular brake-band *f*, substantially as described, and for the purposes set forth. 55

5. The combination of the cap G, collar H, main casting I, rudder-stem B, pivoted about its middle and projecting forward and to one side of the vertical axis of the wind-wheel, pendulous weight D *t*, constructed as described, and applied to the forward end of the stem and connecting-rod C, substantially as set forth. 60

EDWARD B. SMITH.

Witnesses:

C. H. NEWCOMB,
WM. PROSEUS.