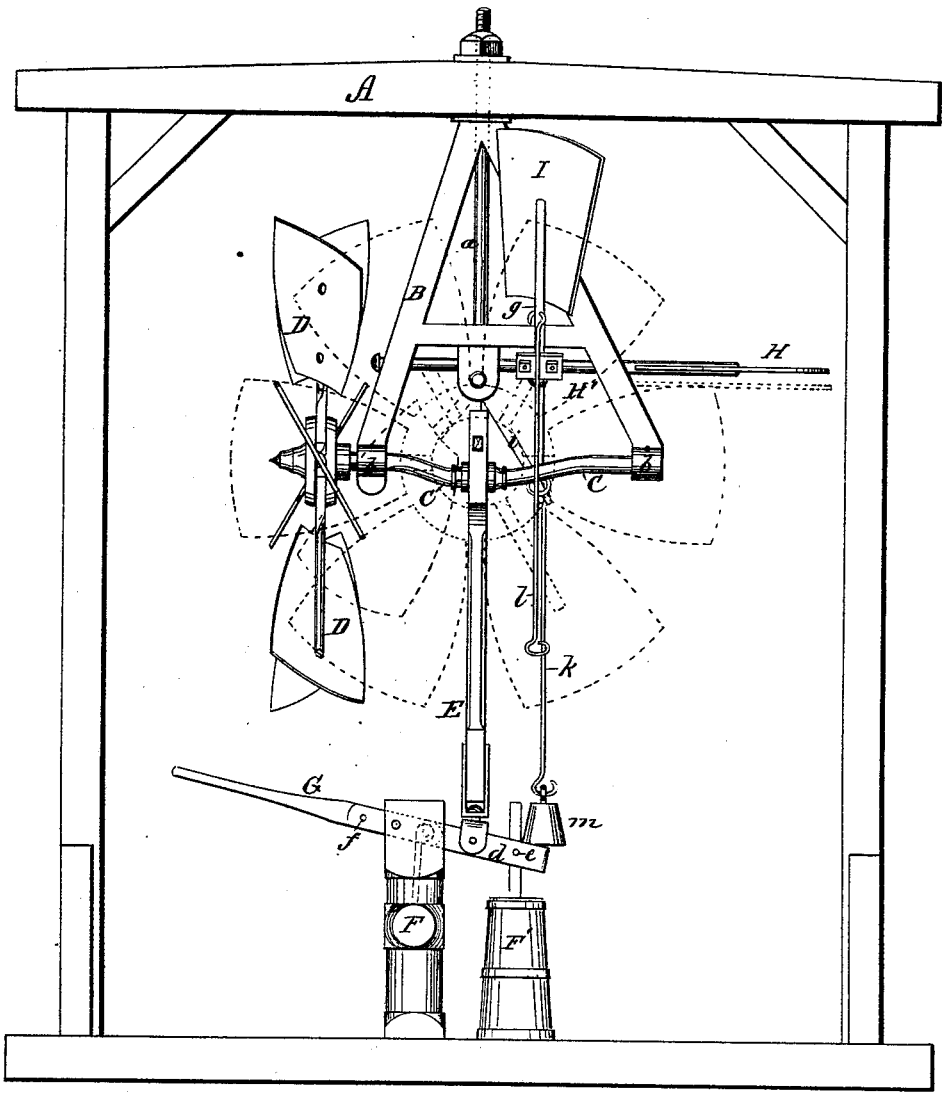
2 Sheets—Sheet 1.

A. J. BALL.

WIND-MILL.

No. 183,622. Patented Oct. 24, 1876.

Fig. 1.



WITNESSES:

W. W. Hollingsworth

Solon C. Kemon

INVENTOR:

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2 Sheets—Sheet 2.

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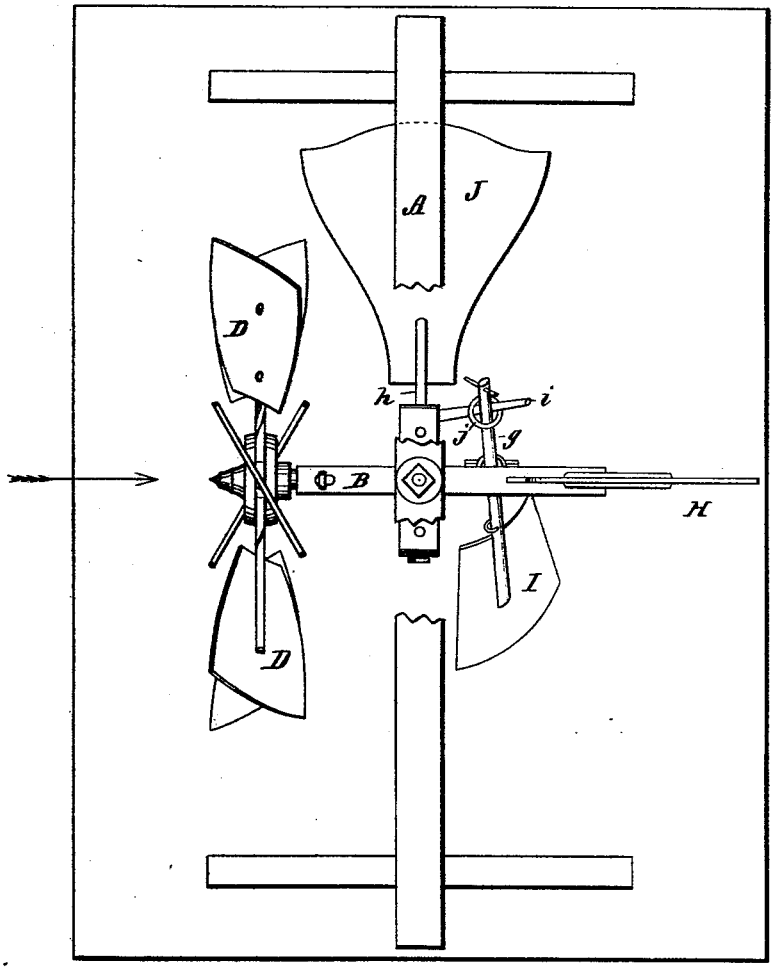
Fig. 2.



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UNITED STATES PATENT OFFICE.

ANDREW J. BALL, OF MOUNT VERNON, OHIO.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **183,622**, dated October 24, 1876; application filed September 18, 1876.

To all whom it may concern:

Be it known that I, ANDREW J. BALL, of Mount Vernon, in the county of Knox and State of Ohio, have invented a new and Improved Windmill; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a side elevation, showing the vanes thrown out of wind; Fig. 2, a plan view with parts broken away, showing the vanes presented fairly to the wind when in operation.

My invention relates to certain improvements in windmills designed to render the vanes of the same automatically adjustable in their position to the wind, to diminish their areas of resistance in proportion to the increased strength or force of the wind, and thus equalize its power.

The invention consists mainly in the arrangement of an oscillating tail-blade with a supplemental tail and a "deflector" blade, which together effect the desired result in a perfect and sensitive manner, as hereinafter more fully described.

In the accompanying drawing, A represents the supporting-frame of the windmill, to which is suspended upon a vertical pivot-rod, *a*, an A-shaped frame, B. This A-shaped frame is provided with bearings *b* in the lower extremity of its branches, in which revolves the main shaft C carrying at one end the rigidly-attached and radially-arranged vanes D. This shaft is bent to form a double crank at *c*, with which is connected a vertically-reciprocating pitman, E, the lower end of which operates a lever, G, that drives both a pump, F, and a churn, F′. The said lever G is detachably connected with a bifurcated metallic bar, *d*, to which the pitman is attached with a swiveling connection, and to which also the churn-dasher is also connected, so that the same reciprocation of the pitman drives both the churn and the pump. The said churn may be detached, however, by removing pin *e* without stopping the operation of the pump, and the lever may be also disconnected from the bar *d* by removing pin *f*, and the pump operated independently by hand without stopping or interfering with the operation of the churn and either or both may be disconnected without stopping the windmill. To the windmill, as thus described, is attached an automatic adjusting attachment for throwing the vanes out of the wind when the latter is blowing too hard. A main tail, H, is fixed upon an oscillating shaft, H′, which is arranged in bearings in the A-shaped frame just above and parallel with the main shaft. This tail ordinarily serves to hold the vanes of the windmill fairly against the wind, except when affected by the adjusting devices about to be described. To the shaft H′ of the main tail is firmly attached the stem *g* of a deflector-blade, I, which latter is suspended in such a manner, and at such an angle, as to be elevated by the wind coming in the direction of the arrow in Fig. 2, and by oscillating shaft H′ to turn the main tail horizontally. Pivoted at right angles to the shaft H′, and upon the opposite side from the deflector-blade, is a supplemental tail, J, which, like the main tail, is arranged to oscillate in bearings in supports attached to the A-shaped frame. The shaft *h* of the supplemental tail is provided with a projecting arm, *i*, which is loosely coupled by a ring, *j*, to the projecting stem of the deflector-blade, so that the elevation of the said blade turns the main tail to a horizontal position, and the supplemental tail to a vertical one, while the gravity of the deflector-blade tends to reverse this action.

The automatic operation of the devices is as follows: The wind coming in the direction of the arrow in Fig. 2, rotates the vanes, which are held fairly opposed to the same by the main tail. When the force of the wind becomes too great, however, it lifts the deflector-blade I, turns the main tail H horizontal, and the supplemental tail vertical, thus shifting, as it were, the position of the tail. The effect of this is to cause the vanes of the wheel to veer around edgewise to the wind, as shown in Fig. 1, in which position they afford less resistance to the wind, and thus obviate the increased velocity. As soon as the wind lulls, the weight of the deflector-blade reverses the position of the tails, and the wheel is brought with its front to the wind again, as in Fig. 2, thus compensating for the varying velocities of the wind in an automatic and sensitive

manner. To the stem of the deflector-blade are attached two rods or cords, *k l*, located upon opposite sides of the shaft H′, and to the bottom of either of these rods may be suspended a weight, *m*. When this weight is attached to the rod *k* the deflector-blade will be held up, and the vanes of the wheel will be thrown edgewise to the wind, as in Fig. 1. The weight therefore is applied to rod *k* when it is desired to prevent the windmill from operating. When it is desired to make the same run faster, the weight is applied to the other rod *l*, where it operates to hold the deflector-blade down, and by rendering the devices less sensitive enables the vanes to take more wind and run faster.

Having thus described my invention, what I claim as new is—

1. The combination of the swiveling A-shaped frame B, and the crank-shaft C, having vanes D, with the pitman E, the pivoted bar *d*, having a swiveling-connection with the pitman, and the lever G, having an independent pivot-bar, *d*, and adapted to be worked simultaneously therewith or independently thereof, as and for the purpose described.

2. The combination, with the main shaft and vanes of a windmill arranged upon vertical pivots, of the oscillating main tail H, the suspended deflector-blade I, rigidly attached to the main tail for oscillating the same, and the oscillating supplemental tail J at right angles to the main tail, and loosely connected with the deflector-blade, so as to be oscillated thereby, substantially as and for the purpose described.

3. The combination, with the main tail and the supplemental tail, arranged as described, of the deflector-blade rigidly fastened to the shaft of the main tail, and having upon each side of the same a suspended rod or cord adapted to receive a weight, as and for the purpose described.

ANDREW J. BALL.

Witnesses:
DAVID F. EWING,
E. M. WRIGHT.