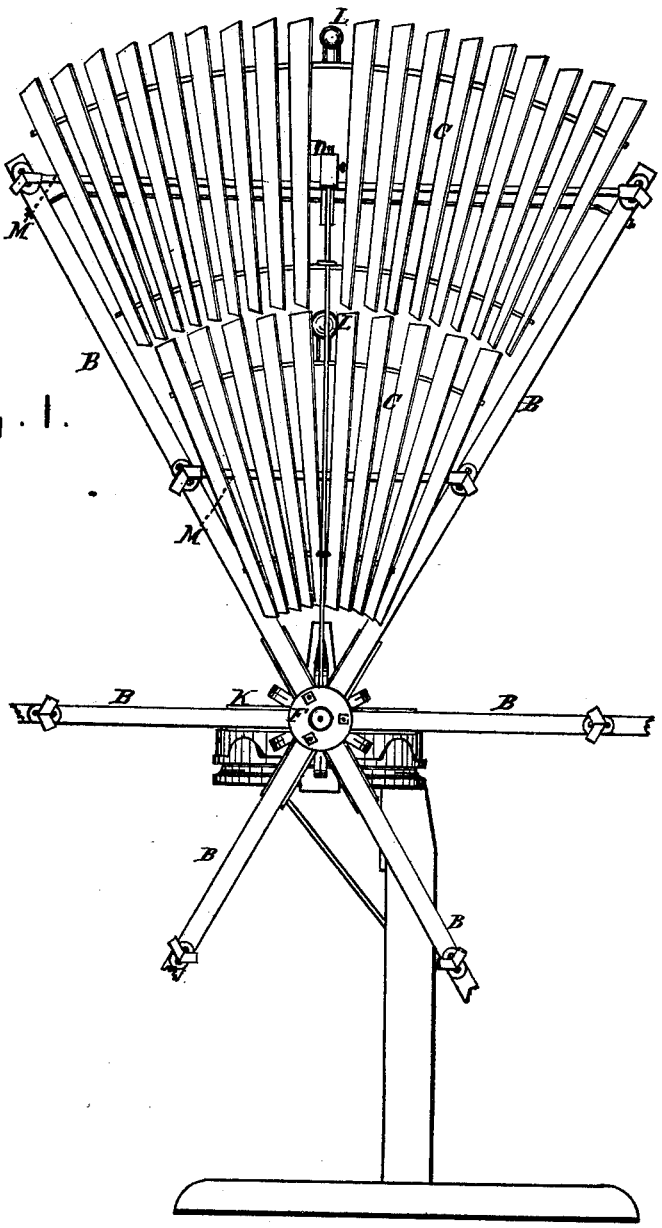
2 Sheets—Sheet 1.

J. BURNHAM & B. H. RUGGLES.

WIND-MILL.

No. 183,123. Patented Oct. 10, 1876.

FIG. 1.



ATTEST:
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2 Sheets—Sheet 2.

J. BURNHAM & B. H. RUGGLES.

WIND-MILL.

No. 183,123. Patented Oct. 10, 1876.

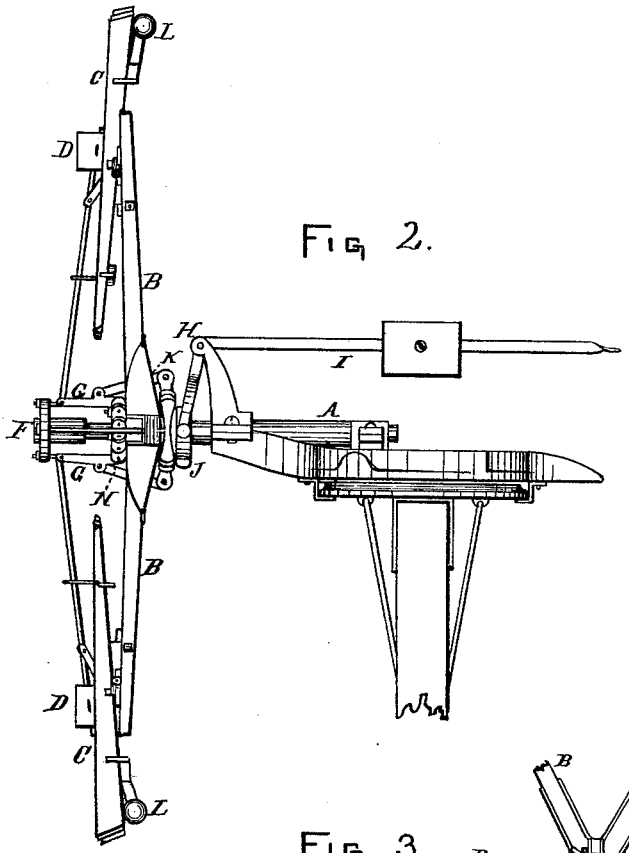

FIG. 2.

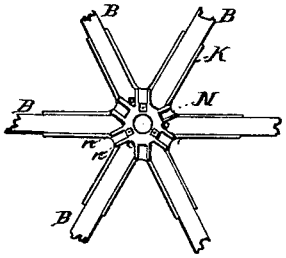

FIG. 3.

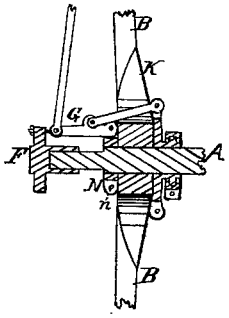

FIG. 4.

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UNITED STATES PATENT OFFICE.

JOHN BURNHAM AND BURTON H. RUGGLES, OF BATAVIA, ILL., ASSIGNORS TO THE UNITED STATES WIND ENGINE AND PUMP COMPANY, OF SAME PLACE.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **183,123**, dated October 10, 1876; application filed May 10, 1876.

To all whom it may concern:

Be it known that we, JOHN BURNHAM and BURTON H. RUGGLES, both of Batavia, in the county of Kane and State of Illinois, have invented new and useful Improvements in Windmills, of which the following is a specification:

The nature of the present invention consists, first, in a detachable center plate, which is bolted to the spider, and used to support the levers connecting the centrifugal governors. Heretofore the said levers have been attached directly to ears on the spider; but as the ears become worn an entirely new spider has to be substituted, involving the expense of taking the wind-wheel down and the delay in its use. By means of our improvement, at small cost, a new center plate can be substituted for the worn one, by removing only the outer sleeve of the sliding head, thereby saving much time, labor, and cost, also the inconvenience of taking the wind-wheel apart at a great height from the ground.

The second part of our invention consists in a weight or weights placed on the wings of hinged sails of windmills, outside of the tilt-bars, to counteract the pressure of the wind upon that part of the sail outside of the tilt-bar, and which has the greatest area of wind-surface, and also to counteract the too rapid movement of the centrifugal governors, and to provide a balance or governor at such points as will hold the sails steady in the wind, and avoid their too great oscillation, which is greatly detrimental to attaining power and a uniform steady motion.

In the construction of hinged-sail windmills, as they are ordinarily built, their sails, in increasing velocities of the wind, are gradually turned edgewise to the wind by the combined action of centrifugal governors, weights, and the pressure of the wind upon the sides of the sails having the greatest area of wind-surface. The safety of all hinged-sail windmills in a great measure depends upon an extra area of wind-surface on one side of their tilt-bars. Never to our knowledge before have governor-weights been attached to the sides of the sails having the greatest area of wind-surface to counteract the wind's pressure. In our experiments with windmills now in common use on the railroads of the west, and as used to drive farm machinery, we have discovered that one weight, equal to one pound and ten ounces, added to the outer side of each wing, has in a most surprising manner added very greatly to the speed, power, and value of the mills thus weighted; also, a much more uniform, steady motion of the wind-wheel was produced in dangerous flawy winds, never before attained in our near twenty years' experience in building and erecting hinged-sail windmills. We do not confine ourselves to any peculiar shape of these governor-weights. Sometimes, for convenience' sake, a strip of wrought or cast iron is screwed to the wood tie that unites the slats near their outer ends; but the best shape and most commonly used is, as represented in the drawings, described as follows, as the farther the weight is placed on the sail away from the tilt-bar, the more effectual it is to produce the desired result. The weight or size of these governor-weights must be decided by the amount of extra wind-surface. If this increased sail-surface is proportionately large, the counteracting weight must be increased.

Figure 2, Sheet 2, represents the side of Fig. 1 with outer section of sail removed. Fig. 3, Sheet 2, is a face view of the central part of the radial arms, showing also the spider for supporting the arms, and the removable center plate for attaching the levers of the centrifugal governors. Fig. 4 shows a section of the sliding head, spider, and removable center plate.

A represents the main shaft of the wind-wheel; K, the spider supporting the radial arms B. F is the sliding head; G, the levers connecting the spider with the centrifugal governors D E; M, the tilt-bars, and I the weighted governor, of an ordinary rosette windmill as manufactured by the United States Wind Engine and Pump Company, of Batavia, Illinois.

Instead of casting the ears *n n*, Figs. 3 and 4, solid to the spider K, a metal center plate, N, is provided with ears or lugs *n n*, and is fitted to pass onto the main shaft A, and is bolted to the spider, as shown in Fig. 4, that it may be removed from spider when the ears

become worn, and replaced by a new plate by simply detaching the levers G and sliding head F, thereby saving the cost and loss of time in taking down the arms B and sails G.

The centrifugal governors D are to turn the sails out of the wind as the wind increases in power; but to steady the sails as against the too rapid movement of these governors, and to counteract the pressure of the wind upon that portion of the sail outside of the tilt-bar, metal weights L are attached to sails outside of the tilt-bars M, and near ends of the slats, as shown. It is proper here to state that our device is only adapted to wind-wheels whose sails are fastened to tilt-bars pivoted to radial arms.

We claim and desire to secure by Letters Patent of the United States—

1. The removable center plate N, provided with ears *n n*, in combination with the spider K, levers G, and shaft A, and radial arms B, in one or more sections, as set forth.

2. The weight L, attached to the end of the sail which has the largest area, in combination with the governing-weight arranged in rear of the sail, substantially as and for the purpose set forth.

3. The weight L, applied on the largest area of the sail, in combination with the sliding removable ring or collar, substantially as and for the purpose set forth.

JOHN BURNHAM.
BURTON H. RUGGLES.

Witnesses:
MATTHEW BURTON,
GEORGE BURTON.