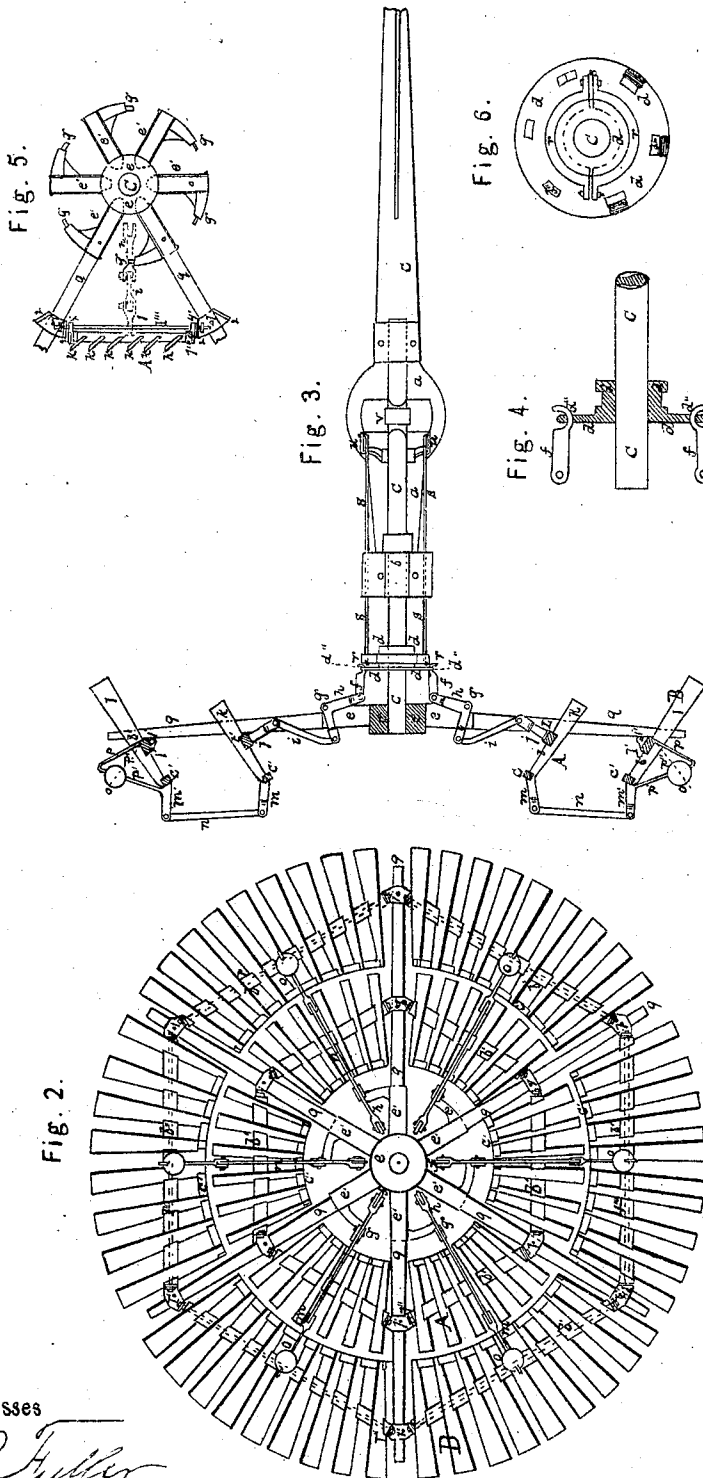


W. D. NICHOLS

Improvement in Wind Mills.

No 124,283.

Patented March 5, 1872.



Witnesses

D. P. Fuller
W. J. VanHouten

Inventor

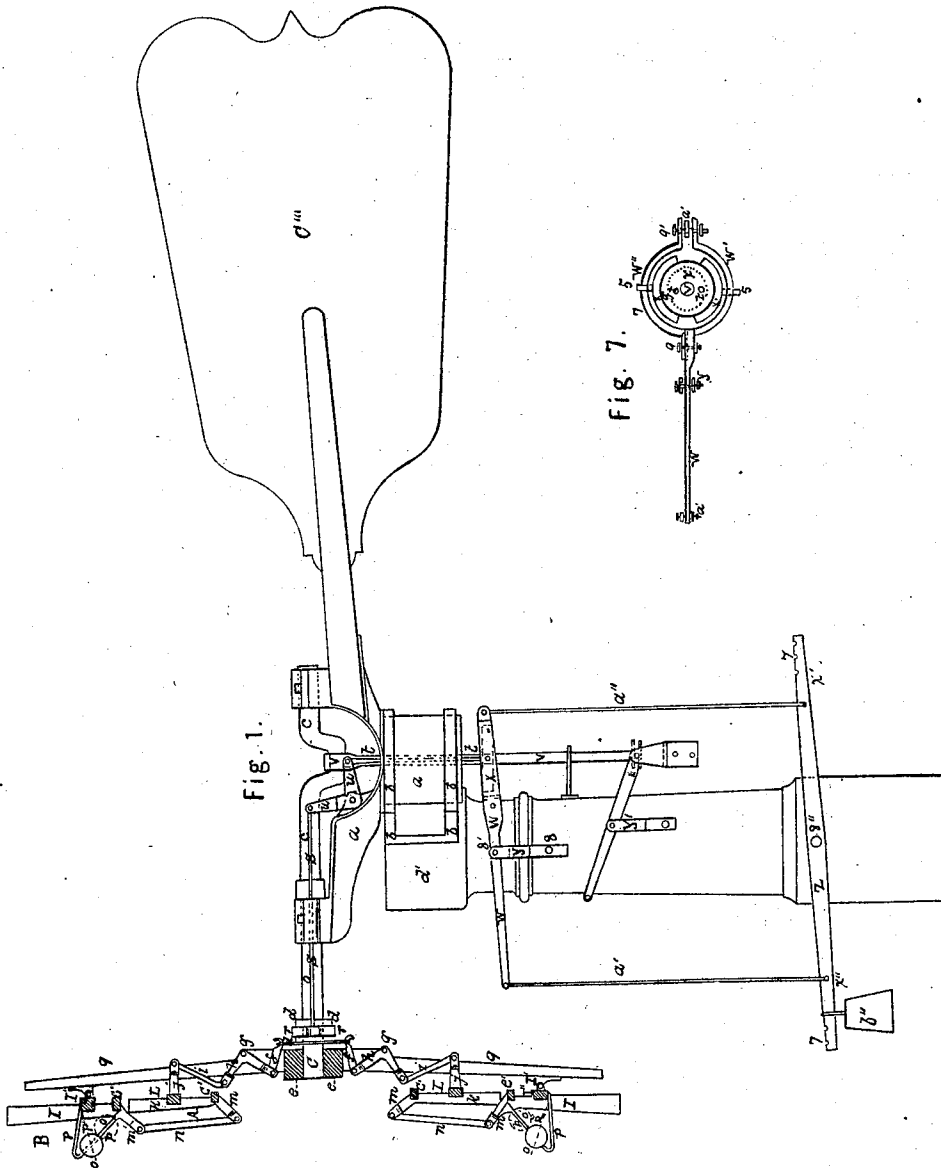
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UNITED STATES PATENT OFFICE.

WILLIAM D. NICHOLS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. 124,253, dated March 5, 1872.

I, WILLIAM D. NICHOLS, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Windmills, of which the following is a specification:

The nature of my invention consists in providing a rosette windmill with governing-weights, so connected with the pivoted sections of sails as to be operated by the centrifugal force of the revolving mill, to open and close the sails and to present them in full surface or edge to the wind, thus automatically governing and regulating the speed of the mill to be the same in either a hard or a light wind, and not liable to be jarred by sudden gusts and squalls. It further consists in a peculiar mechanism for connecting the above weights with an adjustable weighted lever through a series of jointed levers, and a head-block arranged to slide upon the horizontal main shaft of the mill, as will be more fully hereinafter set forth. It further consists in connecting the sails of each section of a rosette by a single head-bar in addition to the ordinary pivoting-bar, whereby a great strength of construction is attained with other advantages, as will be shown more at length hereinafter.

Description of the Accompanying Drawings.

Figure 1 is a side elevation of my invention, with a vertical view of the sails. Fig. 2 is a front view of the sails full in the wind. Fig. 3 is a plan or top view of the same, the sails being turned out of the wind. Fig. 4 is a sectional view of the sliding head. Fig. 5 is a front view of the spider, with one section thrown out of the wind. Fig. 7 is a top or plan view of the shifting-lever.

General Description.

Like letters of reference designate corresponding parts in the different figures.

a is the support or standard of the windmill. *b* is a chain or bearing attached to the side of said support, and in which sits and veers the center main frame *a*. *c* is the horizontal driving-shaft, from which the power is transmitted by the crank *v* to the machinery. The spider *e* is rigidly attached to the projecting end of the shaft *c*, and back of this spider the sliding head *d* is fitted to slide easily on the said shaft. This sliding head is provided with holes *d'*, corresponding in number to the

arms of the mill, said holes being at a proper distance from the outside edge of the disk of the sliding head, so as to leave metal for the levers *f* to hook around, as clearly shown at Figs. 4 and 6. This method of attaching the levers *f* to the sliding head is simple and strong, and they cannot be detached so long as the quadrant *h*, to which the outer ends of the levers *f* are attached, remains pivoted upon *g*, as shown at Fig. 3. The spider *e* has arm-seats *e'*, corresponding to the number of arms used, and upon each corresponding side of the arm-seats *e'* are the pivots *g g*, having the center of each equidistant from the facing sides of the arm-seats *e'*. In each arm-seat *e'* are attached wooden arms *q q*, made of a proper size and length to correspond with the number of sets of sails used. At Fig. 2 are shown a set of sails, *A*, pivoted at *1* upon the arms *q*, and a set, *B*, pivoted at *1'*, outside the first set. Other sets may be added, if required, or only one set used. The pivoting-box *L* is made with a flange, *2*, on each converging side thereof, of sufficient depth to make a bearing for the pivoting brace-rod *1'''*, which is made with a thread and nut on each end, thus forming, with the boxes *L*, one continuous circle of brace-rods, which prevents the force of the wind from bending the arms back. They also serve as a fulcrum for the sails *A*, Fig. 5, and *B*, Fig. 2. Each sail is made of a pivoting-bar, *b'*, a head, *c'*, and a number of slats of uniform thickness fitted to said bar and head at a uniform angle. A set of them makes what I call a rosette sail. To the end of each pivoting-bar *b'* is fitted a pivoting-socket, *4*, shown at Fig. 5, with a lug, *4'*, cast on its rear side, of sufficient size to make a bearing for the pivoting brace-rod *1'''*. To each pivoting-bar *b'* of the first set of sails is attached the lever *J*, the end of which is attached to the quadrant *h* by the rod *i*. When I use more than one set of sails, I attach a lever, *m m'*, to the head of each sail, and connect them with the rod *n*, so when either set of sails tips the other turns a corresponding distance. By coupling the sets of sails in this manner I am able to have the ends of the slats or sails in each set connected together, which makes them much stronger, and at the same time I pivot each set of sails on a pivoting-bar, *b'*. At the front of the sails is attached a governing-rod, *P P'*, to the pivot-

ing-bar b' and the head c' , and on this rod is placed governing-balls o , made so as to be adjusted upon the rod, thus becoming more or less powerful at the will of the operator. By making this rod so as to connect b' and c' , the mechanism is strengthened very materially. The leverage of the governors is greatest when in a line drawn forward from point i perpendicular to the plane of motion, and diminishes as it varies from it in either direction. The balls o being placed upon P' , their momentum causes them to vibrate on both sides of a line drawn forward from point i perpendicular to the plane of motion of the sails, as shown in Figs. 1 and 3. This same result can be obtained by attaching the governing-balls o to a rod, P'' , as shown by dotted lines at Fig. 3, the rod being bent toward the head c' . To a groove in the hub of the sliding head d is fitted a collar, r , to which are fastened two rods, s , running back through the box 6 and attached to the quadrant u . The rods t are attached to the lower arm of quadrant u and to clutch-wheel x , Fig. 1, and are made rigid thereto by a nut above and below it. On the vertical sides of said clutch-wheel x , Fig. 7, is a recess, 3, with capacity to hold the clutch-lugs x' , which are fitted thereto. Each lug has a pivot, 5, which passes through the lever w , and serves as a fulcrum for operating the clutch-wheel x , through the center of which the pump-shaft v works. w is a shifting-lever pivoted on the vibrating fulcrum y , and as it is worked the clutch-wheel x rises and falls vertically, and as the mill veers by the changing of the wind the clutch-lugs x' slide in the groove 3, and the pivots 5 allow the shifting-lever w to work without tipping the clutch-wheel. a' a'' are two vertical shifting-rods connecting the levers w and z at equal distance from their fulcrums $8'$ $8''$. The advantage of these shifting levers and rods is found in the fact that to hang the weight b'' on x' it pulls on the rod a'' , and holds the mill out of the

wind; but to change b'' to x'' , it pulls down on a' and pushes up on x and t , and the quadrant u forces the rods s and sliding head d out to the spider, the levers f throw the quadrant h forward, and this, through the rod i , throws the sail-lever j , as shown in Fig. 1. The sail k being thrown flat in the wind, and the sail l being connected to it by the levers m , the sails l are thrown in the same position. The governing-balls o being in front of the sails, as they revolve their centrifugal force causes them to describe a larger circle, thereby tipping the head of the sails forward, thus presenting less surface to the wind. If the centrifugal force of the governors exceeds the weight of b'' the said weight rises, but if less it falls. z has notches for weighing the power used.

Claims.

I claim as my invention—

1. The connecting-rod f , in combination with the quadrant h and sliding head d , the arms m and m' , rod n , and head-bar c' , when constructed and arranged so as to operate the sets of sails A and B, substantially as and for the purposes described.
2. The shipping-levers w and z , rods a'' and a' , the clutch x , pivoting-lugs x' , rods t , quadrants u , rods s , when constructed and arranged substantially as and for the purposes described.
3. The arrangement, in combination with the subject-matter of the foregoing clauses, of the governing-weights o , when placed within the angle described by a line drawn forward from the pivoting-bar b' perpendicular to a line drawn from b' to c' , as and for the purpose described.

WILLIAM D. NICHOLS.

Witnesses:

D. P. FULLER,
M. MORRISON.