

W. Zimmerman,

Wind Wheel.

N^o 2,104.

Patented May 29, 1877.

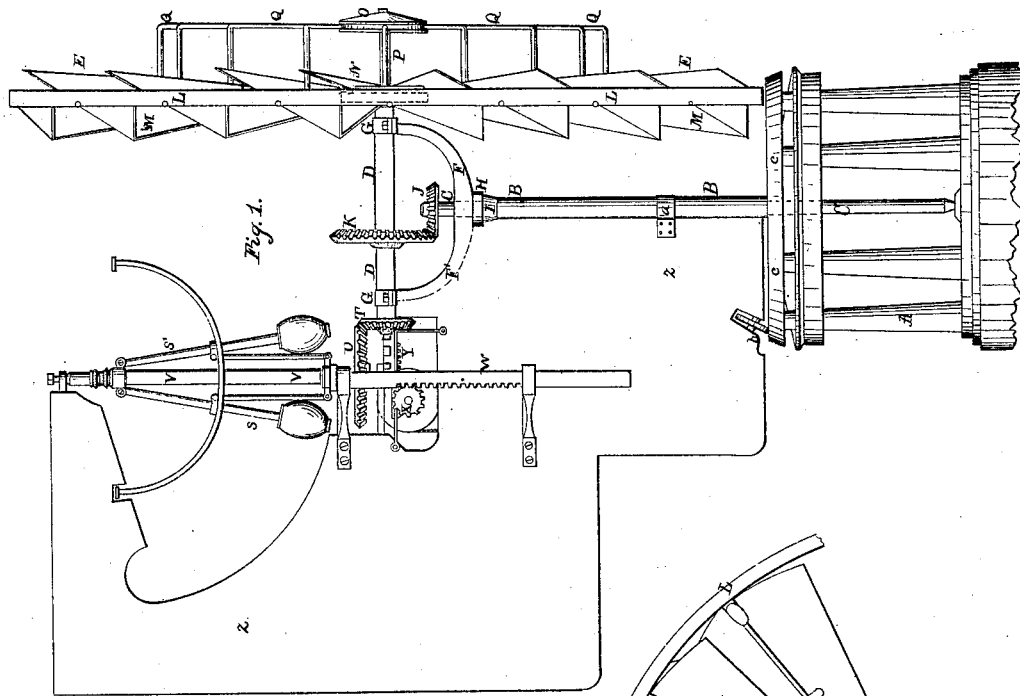


Fig. 2.

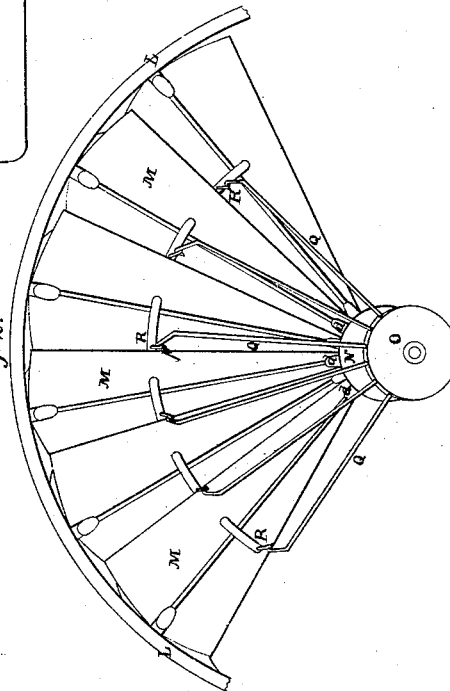
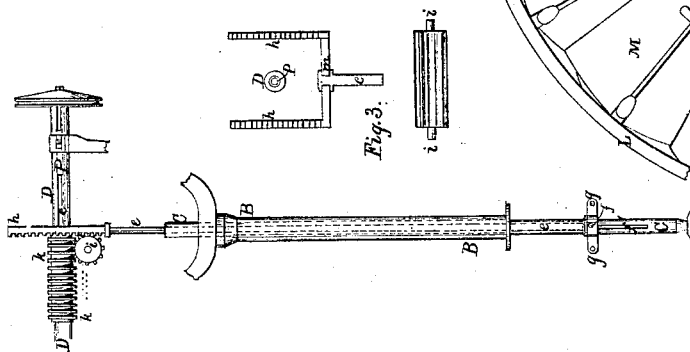


Fig. 3.



UNITED STATES PATENT OFFICE.

WILLIAM ZIMMERMAN, OF STEPHENSON, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. 2,107, dated May 29, 1841.

To all whom it may concern:

Be it known that I, WILLIAM ZIMMERMAN, of Stephenson, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full and exact description thereof.

In the accompanying drawings, A A, Figure 1, is the frame-work of a portion of the house or structure containing the millstones or other machinery to which motion is to be communicated by the power of the wind. This part will of course be constructed in such manner as may be best adapted, to the purpose to which it is to be applied and does not admit of or require description. B B is a hollow column of cast-iron which is securely fixed at its lower end to the frame-work of the mill-house A A. Through this column a vertical shaft C C (shown by dotted lines) is to pass, which is the driving-shaft of the machinery, being geared at its upper end to the horizontal main shaft D D of the wind or vane wheel E E. The shaft D D has its bearings in boxes G G, which are sustained by the iron arms F F, and these are permanently fastened to and rise from a hub or socket H, which surrounds and revolves upon the upper end of the column B B, being supported upon a permanent collar I, formed on the hollow column B. The arms F F may be turned round, therefore, upon said column independently of the revolving shaft C C. A bevel-wheel J is affixed to the upper end of the shaft C C and gears into the bevel-wheel K on the horizontal shaft D D. The shaft D D is also hollow, as shown by the dotted lines on it, and through it passes a sliding bolt or piston P for the purpose of weathering the sails or wings in a manner to be presently described.

Fig. 2 is a representation of a portion of the fore part of the wind-wheel E E, exhibiting the manner in which the sails are arranged, and are acted upon by the weathering apparatus. L L is a rim or hoop which constitutes the periphery of the wind-wheel, and which receives the gudgeons on the outer ends of the sails M M. The gudgeons on their inner ends are received in holes drilled around the periphery of the hub or disk N, which is made fast on the end of the shaft D D. These gudgeons are made strong and

enter the hub N to a depth sufficient to hold the sails securely in their radiating position, by which they serve also to hold the rim L L in place without its being necessary to employ braces for that purpose. The sails are hung by their centers, and are enabled, therefore, to turn freely when they are to be weathered, the force of the wind being equal on each half of their faces. O is a disk which is fixed on the end of the sliding bolt or piston P, which extends out beyond the hub N on the front of the shaft D D. To the periphery of the disk O are attached the rods by which the sails are weathered. These rods extend out radially from the disk, as shown at Q Q Q, and are at their outer ends connected by staples or eyed rods R R R with the sails, and it is manifest, therefore, that by the drawing in of the sliding bolt or piston P the sails will be weathered. When the motion of the wind-wheel is accelerated by the force of the wind, a governor S S of the ordinary construction is made to operate upon the sliding bolt or piston in a way to be now described. T and U are beveled wheels by which the shaft D D and the governor-shaft V V are geared together. W is a vertical rack which is raised and lowered by the action of the governor, and which gears into the wheel X. Upon the shaft of this wheel is a second wheel or pinion, which gears into the horizontal rack Y, which is attached to and operates the sliding bolt or piston P for weathering the sails. When the arms of the governor are thrown out to their greatest extent, the sails will be turned edgewise to the wind and its force therefore entirely taken off. Z Z is the vane or tail-board, by means of which the wind-wheel is made at all times to present its face to the wind. This vane or tail-board is firmly attached to the arm F' at the upper end of the column B B and the clasp or band *a*, which is made fast to the vane or tail-board, and encircles and moves round upon the column B near its lower end and thus leaves the vane or tail-board free to revolve when acted upon by the wind. To brace the column B B, I place a friction-wheel *b* so as to turn on gudgeons in the lower side of the vane or tail-board, and to bear against a circular rail *c c*, placed on the top of the mill-house for that purpose. Said column

may be braced laterally also, if found necessary, by braces extending out from the clasp or band *a*, such braces carrying friction-rollers at their outer ends which bear on the railway *c c*. The clasp *a* in this case must be made of suitable size and strength for that purpose. In the drawings the governor is represented as attached to and supported by the vane or tail-board; but when so situated it will be exposed to the weather, which may be found objectionable, and this situation is not necessary to its proper action. In wind-mills, as well as when used with steam-engines, it has been usual to place the governor within the building, and I intend in most cases so to place it. The particular arrangement of the respective parts for weathering the sails, as above described, will then have to be so modified as to adapt the movements to the particular situation of the governor, and for this purpose a sliding bolt or piston similar to that marked *P*, which has been described as passing through the shaft *D D*, must be passed up through the shaft *C C*, when it may be made, by means of a rack and pinion suitably arranged for the purpose, to operate upon the sliding bolt or piston *P*, which will still occupy a place in the fore end of the shaft *D D*. The particular arrangements for effecting this may be varied, but in Fig. 3 I have given an exemplification of a mode of constructing the movement for attaining this end. *B B* is the vertical hollow column through which passes the revolving shaft *C C*. This also is hollow and has a sliding bolt *e e* (shown by dotted lines) passing through it. The lower end of this is attached by a pin at *f* to the sliding collar *g g*, which collar is raised and lowered by the governor. The pin *f* passes through a slot *f'*. The upper end of the bolt *e e* carries a double rack *h h*, which embraces the horizontal shaft *D D*. This double rack gears into a toothed roller *i i*, which roller gears into the sliding collar *k k* on the shaft *D D*. This collar is turned with grooves in such a manner as to constitute a circular rack, and it is attached

to the sliding rod or piston *P* by a pin passing through a slot *c*. The double rack *h h* swivels on the upper end of the rod *e* at *m*. It will be seen that by this arrangement the sails may be weathered by the action of the governor when placed below and within the building. The arrangement for weathering the sails may also be variously modified. Instead of employing the disk *O*, the sliding bolt or piston *P*, and the rods *Q Q*, as described, on the front of the wind-wheel, rods acting in a similar manner may be placed at the back of it and may be acted upon by the governor under arrangements adapting them to this situation. The use of the rods for weathering the sails may also be dispensed with and the weathering effected in other modes analogous to that described, one exemplification of which I will now give. At the inner end of each sail, just above the gudgeon which enters the hub *N*, as at *d d d*, there may be toothed pinions, and into each of these a rack affixed to the inner side of the disk *O* and extending back horizontally from said disk may gear into these pinions, there being a separate rack to each of them. When the disk is drawn in by the action of the governor, it will be evident that under this arrangement the sails will be weathered.

Having thus fully described the manner in which I construct my windmill and shown the operation of the respective parts thereof, what I claim therein as of my invention, and desire to secure by Letters Patent, is—

The weathering of the sails by the action of the sliding rod or piston *P* and the disk *O*, operated upon by the governor, substantially in the manner herein set forth, whether said disk be made to operate upon the sails by means of the rods *Q Q*, by racks and pinions, or by any other device which is the same in principle and producing a like effect by means substantially the same.

WM. ZIMMERMAN.

Witnesses:

THOS. P. JONES,
M. E. JONES.