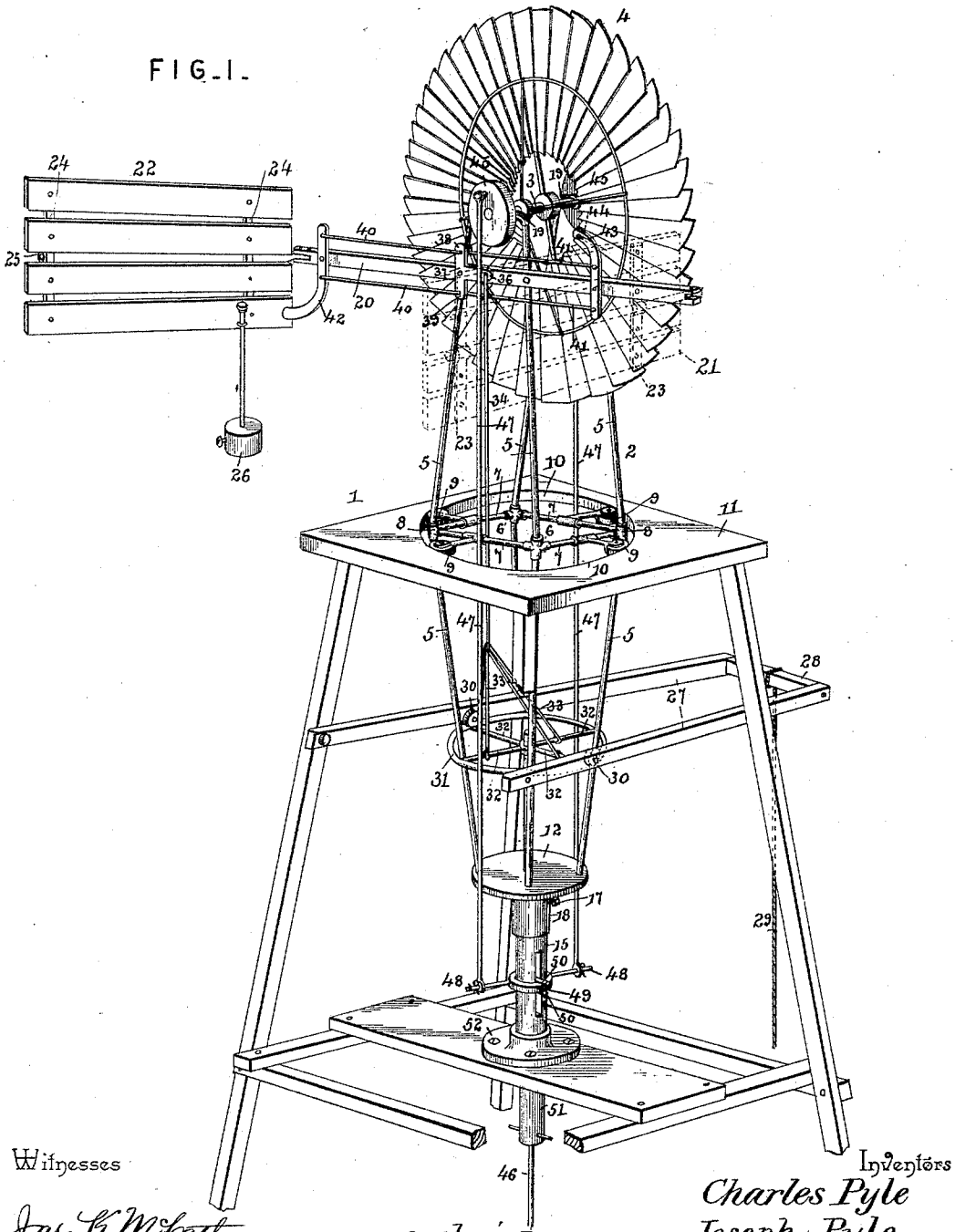
(No Model.) 2 Sheets—Sheet 1.

C. & J. PYLE.

WINDMILL.

No. 491,663. Patented Feb. 14, 1893.

FIG. 1.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 2.

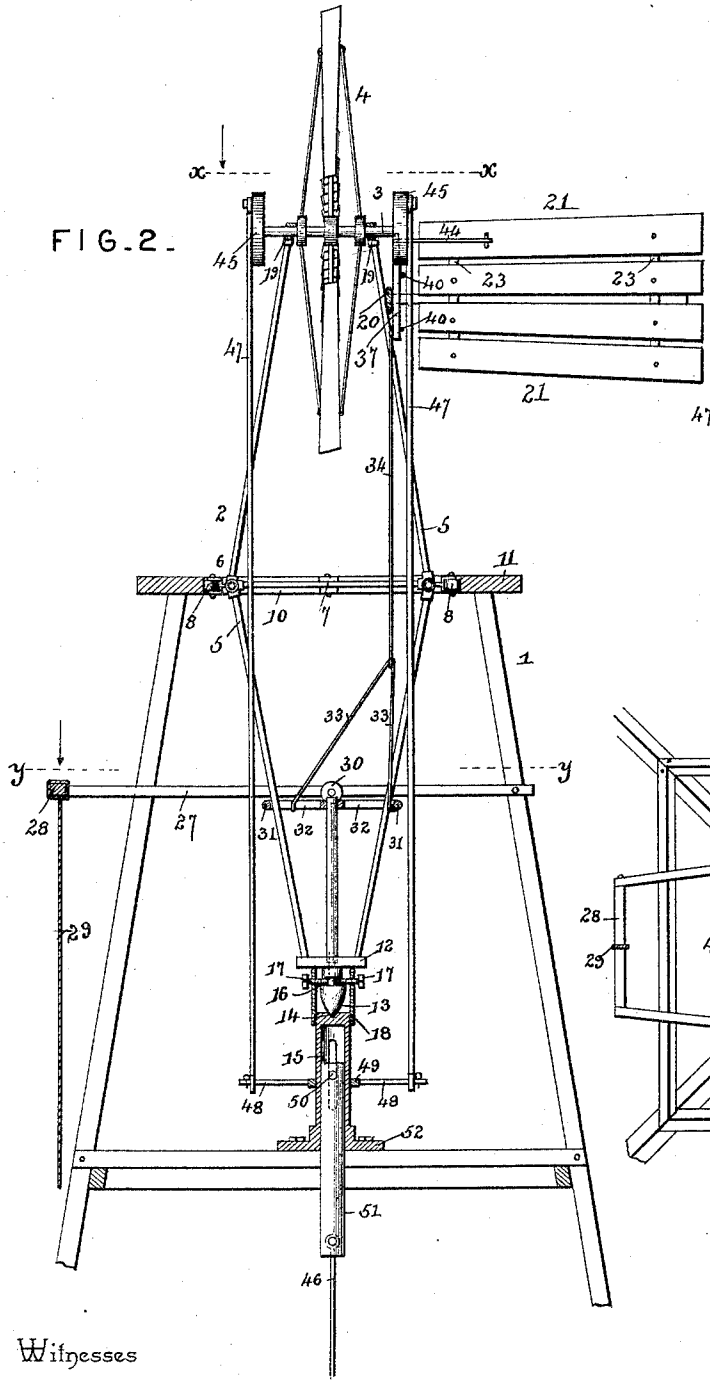


FIG. 3.

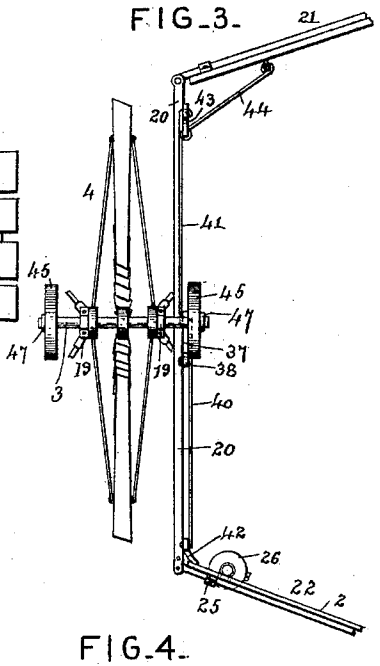
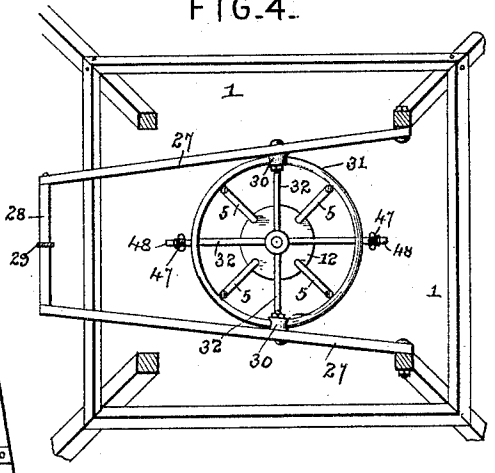


FIG. 4.



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UNITED STATES PATENT OFFICE.

CHARLES PYLE AND JOSEPH PYLE, OF LEBANON, ASSIGNORS OF ONE-THIRD TO WILLIAM B. BRADSBY, OF GREENVILLE, ILLINOIS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 491,663, dated February 14, 1893.

Application filed June 6, 1892. Serial No. 435,673. (No model.)

To all whom it may concern:

Be it known that we, CHARLES PYLE and JOSEPH PYLE, citizens of the United States, residing at Lebanon, in the county of St. Clair and State of Illinois, have invented a new and useful Windmill, of which the following is a specification.

The invention relates to improvements in wind mills.

The object of the present invention is to simplify and improve the construction of wind mills, to equalize the strain and to enable them to be readily controlled.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended.

In the drawings—Figure 1 is a perspective view of a wind mill constructed in accordance with this invention. Fig. 2 is a vertical sectional view. Fig. 3 is a horizontal sectional view on line *x*, *x* of Fig. 2. Fig. 4 is a similar view on line *y*, *y*.

Like numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a tower in which is journaled a vertically disposed rotating frame 2 provided at its upper end with suitable bearings in which is journaled a shaft 3 carrying a centrally arranged wind wheel 4, which is supported at both sides thereby greatly equalizing the strain, and enabling the vertical frame 2 to rotate freely without friction. The rotating frame 2 is composed of four corner rods 5 bent outward intermediate of their ends at 6 and connected by a rectangular frame formed by horizontal bars or rods 7 which have their ends secured to the corner rods by couplings 8, and which carry intermediate their ends anti-friction rollers 9 which are arranged to bear against the walls of a circular opening 10 of the top 11 of the tower, whereby the frame 2 is enabled to rotate freely. The lower ends of the corner rods are connected by a circular plate 12 and is provided with a depending journal 13 which is arranged in a conical bearing 14 of a tube 15, and which is approximately conical to conform to the bearing and to enable the bearing of the frame 2 to be without friction. The journal 13 is provided with an annular groove 16 which is engaged by horizontal screws 17 of a sleeve 18 secured to the upper end of the tube 15 and preventing the journal rising from the conical bearing of the tube 15. The upper end of the bulged corner rods are connected by horizontal top pieces 19, and two of the corner rods support a horizontal vane bar 20 to the outer ends of which are attached vanes 21 and 22 composed of blades secured to bars 23 and 24, the former of which has its inner end pivoted in a bifurcation of the vane bar, thereby hinging the vane. The blade of the vane 21 is rigidly secured to the vane rod 23; and the blade of the vane 22 is provided with bearings 25 in which the vane rod 24 is journaled, whereby the vane 22 may turn on the rod to allow the wheel to swing out of the wind, or partially so. The vane 22 is held in a vertical position by a weight 26, and when the wind increases in force the vane is turned by it against the action of the weight. The vane 21 is the main vane, and is hinged, and is adapted to be arranged at an angle of forty-five degrees to the wheel to hold the latter into the wind, and to be turned parallel or in align with the wind wheel, to throw the latter out of the wind. The vane 22 is a supplemental one, and extends from the vane bar at an angle to the wheel.

The vanes are controlled by horizontal levers 27, which are fulcrumed at one side of the frame and have their ends at the opposite side of the frame connected by a cross-bar 28 to which is attached a rope 29 or the like, which extends from the parallel levers 27 to the base of the tower. The parallel levers 27 are provided intermediate their ends with rollers 30 which are arranged on the inner faces of the levers, and which bear upon the upper face of a ring 31 to depress the ring and to allow the ring which is carried by the vertical frame 2, to rotate without friction. The ring is provided with diametrically arranged bars 32 to which are attached wires 33, which are connected with a wire 34 extending to an arm 36 of a bell-crank lever 37. The bell-crank lever is T-shaped, and has the said

arm 36, which is arranged at right angles to the arms 38 and 39, and extends horizontally and adapted to be drawn down by the wire 33. The vertical arms 38 and 39 are connected by rods 40 and 41 with levers 42 and 43 which are fulcrumed intermediate their ends on the vane bar. The levers 42 and 43 are slightly curved at one end; the lever 42 has its curved end arranged below the vane bar and adapted to engage the vane 22 below the vane bar 24 to turn the vane to a horizontal position and lift the weight; and the lever 43 has its curved end arranged above the vane bar and connected by a rod 44 with a vane 21, and adapted to turn the vane to hold the wind wheel into the wind, and to throw the same out of the wind. The upper connecting bar 41 extends from the arm 38 of the T-shaped lever to the upper end of the lever 42, and the lower connecting rod 41 extends from the arm 39 to an intermediate point of the lever 42. The lower connecting rod 40 connects the lower end of the lever 43 with the arm 39, and the upper connecting rod extends from an intermediate point of the lever 43 to the arm 38. By this arrangement the main vane, and the supplemental vane are simultaneously operated by means of the parallel levers. The shaft 3 carries disks 45, which are arranged at the ends of the shaft and are provided with wrist pins; and motion from the shaft is communicated to a pump rod 46 by a pair of pitmen rods 47, which have their upper ends connected to the wrist pins of the disks 45, and their lower ends attached to outwardly extending arms 48 of a ring 49 arranged on the tube 15, and connected with the pump rod by transverse pins 50 arranged in vertical slots of the tube 15, and disposed above and below the ring 49. The ring is connected by a rod 51 with the pump rod 46, and the tube is provided with an annular flange 52 which is secured to a horizontal board of the tower.

It will be seen that the upper ends of the corner rod of the rotating frame are connected by the top pieces and form two sides between which the wind wheel rotates, and that the wind wheel is supported at both sides, thereby equalizing the strain and greatly facilitating the operation of the wind mill.

What we claim is—

1. In a wind mill, the combination of a tower, a vertical frame rotatively mounted therein, a wind wheel mounted on the frame, a vane bar secured to the frame and arranged parallel with the wind wheel, a horizontally swinging main vane hinged at one end of the vane bar, a supplemental vane journaled at the other end of said bar, and means for controlling the vanes, substantially as described.

2. In a wind mill, the combination of a tower, a vertical frame rotatively mounted therein, a wind wheel centrally arranged at the top of the frame, a vane bar secured to the vertical frame and arranged parallel with the wheel, a main vane hinged at one end of the vane bar, a supplemental vane journaled at the other end of the vane bar and provided with a depending weight, the curved levers fulcrumed on the vane bar and extending above and below the same, one of the levers being arrranged to engage the supplemental vane and the other lever being connected with the main vane, a T-shaped lever fulcrumed on the vane-bar and connected by rods with the curved lever, and means for connecting the T-shaped lever with the base of the tower, substantially as described.

3. In a wind mill, the combination of a tower, a vertical frame rotatively mounted therein, a wind wheel arranged at the upper end of the frame, a vane bar secured to the frame and arranged longitudinally of the wind wheel, a main vane hinged to one end of the vane bar, a supplemental vane journaled at the other end of the vane bar, levers fulcrumed on the vane bar and adapted to turn the vanes, a ring arranged on the lower portion of the vertical frame and connected with said levers, and parallel levers each having one end fulcrumed on the tower and provided intermediate its ends with an anti-friction roller arranged on the ring and having its other end connected with a base of the tower, substantially as described.

4. In a wind mill, the combination of a tower, a vertical frame tapering from its middle to its end and rotatively mounted in the tower and carrying a wind wheel, a tube provided with a conical bearing at its upper end and having a securing flange at its lower end, a conical journal depending from the bottom of the vertical frame, and fitting in the conical bearing and provided with an annular groove, and a sleeve secured to the upper end of the tube and receiving the journal and provided with screws arranged in said annular groove, substantially as and for the purpose described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CHARLES PYLE.
JOSEPH PYLE.

Witnesses:
LOUIS ZERWECK,
JAMES T. ROGERS.