(No Model.)

E. S. CRAWFORD.

WINDMILL.

No. 542,146. Patented July 2, 1895.

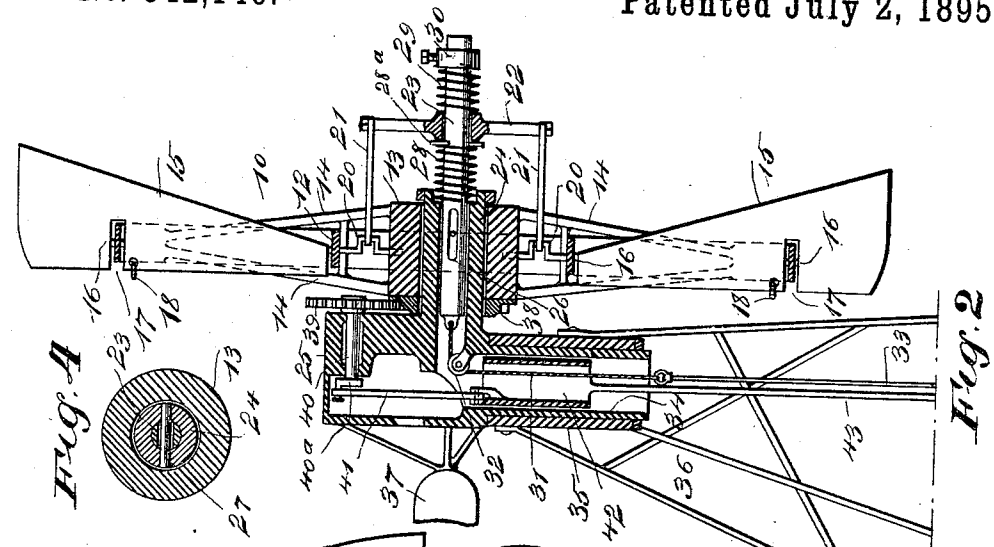

Fig. 2

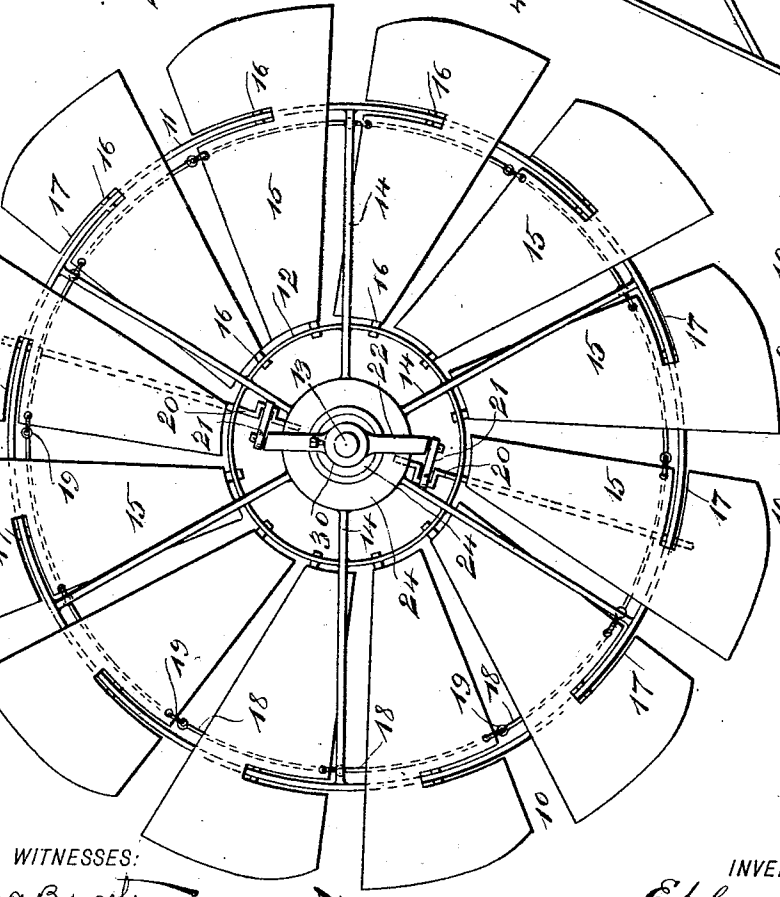

Fig. 1

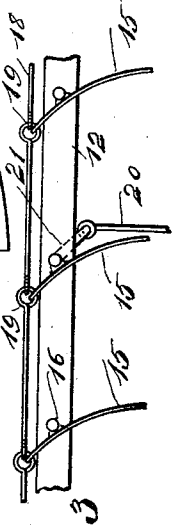

Fig. 3

Fig. 4

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EDWARD S. CRAWFORD, OF MILFORD, ILLINOIS, ASSIGNOR OF ONE-HALF TO LEWIS DOD JONES, OF SAME PLACE.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 542,146, dated July 2, 1895.

Application filed August 4, 1894. Serial No. 519,462. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. CRAWFORD, of Milford, in the county of Iroquois and State of Illinois, have invented a new and Improved Windmill, of which the following is a full, clear, and exact description.

My invention relates to improvements in windmills; and the object of my invention is to produce an extremely light and simple, but very strong and durable, machine, which is adapted to run very easily, may be thrown quickly into and out of gear, and may be regulated so as to run with the utmost smoothness and nicety.

To these ends my invention consists of a windmill, the construction of which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of the windmill embodying my invention. Fig. 2 is a broken central vertical section of the same. Fig. 3 is a diagrammatic view showing the arrangement of the fans and the means of changing their position on the wheel; and Fig. 4 is a detail cross-section of the wheel-hub, the tubular spindle within it, and the slide-shaft for throwing the wheel into and out of gear.

The wind-wheel 10 is provided with a suitable framework, comprising the outer and inner concentric rims 11 and 12, a central hollow hub 13, and braces 14, extending radially outward from the hub and converging toward their outer ends, the braces being secured to both rims of the wheel. The wheel is also provided with radially-extending fans 15, which, when viewed in cross-section, are slightly curved, as shown in Fig. 3, and these fans are journaled on the rims 11 and 12, as shown at 16, and near their outer ends are slotted laterally on one side, as shown at 17, the slots being adapted to receive the rim 11 and permit the fans to be locked in their pivots. The fans are connected together by rods 18, which have eyes or loops 19 bent in them at their opposite ends, one of said eyes 19 on each rod 18 passing through an eye or perforation formed near the edge of one of the fans 15 and the other eye being interlocked with the adjacent eye of the next rod 19, as will be readily understood by reference to Figs. 1 and 3. In this way great freedom of movement is attained and the fans are caused to move in unison.

On diametrically-opposite sides of the hub 13 are crank-shafts 20, which are journaled in the hub and in the rim 12 and also secured to the fans 15, and to the crank-shafts are pivoted the connecting-rods 21, which lie parallel with the hub and are pivoted to the cross-arm 22, which is adapted to slide on the slide-shaft 23, used for throwing the machine into and out of gear, and it will be seen that when the arm 22 is moved toward the hub 13 the fans are turned so as to be in position to receive the force of the wind and cause the wheel to revolve, and when the cross-arm moves in the opposite direction the reverse movement is had and the fans are thrown out of the wind.

The slide-shaft 23 is held in the horizontal hollow spindle 24 of the head 25, which forms the support for the wind-wheel and a frame to carry the mechanism hereinafter described. The movement of the shaft 23 is limited by a pin 27, which extends through a slot 26 in the shaft and is held in the hollow spindle 24. The shaft 23 is pushed out by a spiral spring 28, which is coiled around the shaft 23 between a pin 28^a, on which the spring presses, and the spindle 24, the spring entering one end of the spindles lightly, as shown in Fig. 2. Outside the cross-arm 22 is a cushioned spring 29, the tension of which is regulated by the sliding collar 30 on the shaft. A cable 31 is secured to the inner end of the slide-shaft and extends over a guide-pulley 32 and is made fast to a depending rod 33 extending to within easy reach of a person on the ground, and by pulling on the rod 33 the shaft may be moved inward so as to throw the wheel into gear. By releasing the shaft the spring 28 pushes out the arm 22 and throws the wind-wheel out of gear. The rod 33 may be operated by hand, or any usual automatic devices may be connected with it.

The head 25 has on its under side a hollow bearing 34, which turns in the supporting-sleeve 35, which is arranged in a vertical po-

sition on the usual supporting-tower 36. The head 25 has on the side opposite the wheel an ordinary vane 37, and the wind, acting on the vane, keeps the wheel 10 in position to be acted on by the wind, when desired. On the hub 13 of the wind-wheel is a gear-wheel 38, which meshes with a gear-wheel 39 on a countershaft 40, which has at one end a crank 40^a connecting by means of a link or rod 41 with the enlarged hollow upper end 42 of the pitman 43, which is moved up and down by the crank 40^a and is adapted to connect with a pump in the usual way.

It will be seen that when the wind-wheel revolves movement is imparted to the pitman through the connection described, and it will be observed that the arrangement of the wheel and support is a very compact one and permits the wheel to be held very near the head 25. It will also be seen that the construction is very simple and that the whole apparatus may be made very light.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In a wind-mill, the combination of a head having a laterally extending hollow spindle, a wind-wheel having a boss mounted to turn on said spindle and having pivoted fans provided with crank shafts connected to their pivots, a slide-shaft longitudinally movable in the hollow spindle, a cross-arm mounted on the outer end of said slide-shaft, a spring arranged between said arm and the end of the hollow spindle, a spring connected to the outer end of the shaft and adapted to bear on the outer face of the cross-arm, rods connecting the ends of the said cross-arm to the cranks of the pivoted fans, and means for moving said slide-shaft longitudinally in the hollow spindle, substantially as set forth.

EDWARD S. CRAWFORD.

Witnesses:
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