2 Sheets—Sheet 1.

Z. & F. M. COTTLE.
Windmill.

No. 220,751. **Patented Oct 21, 1879.**

FIG. 1

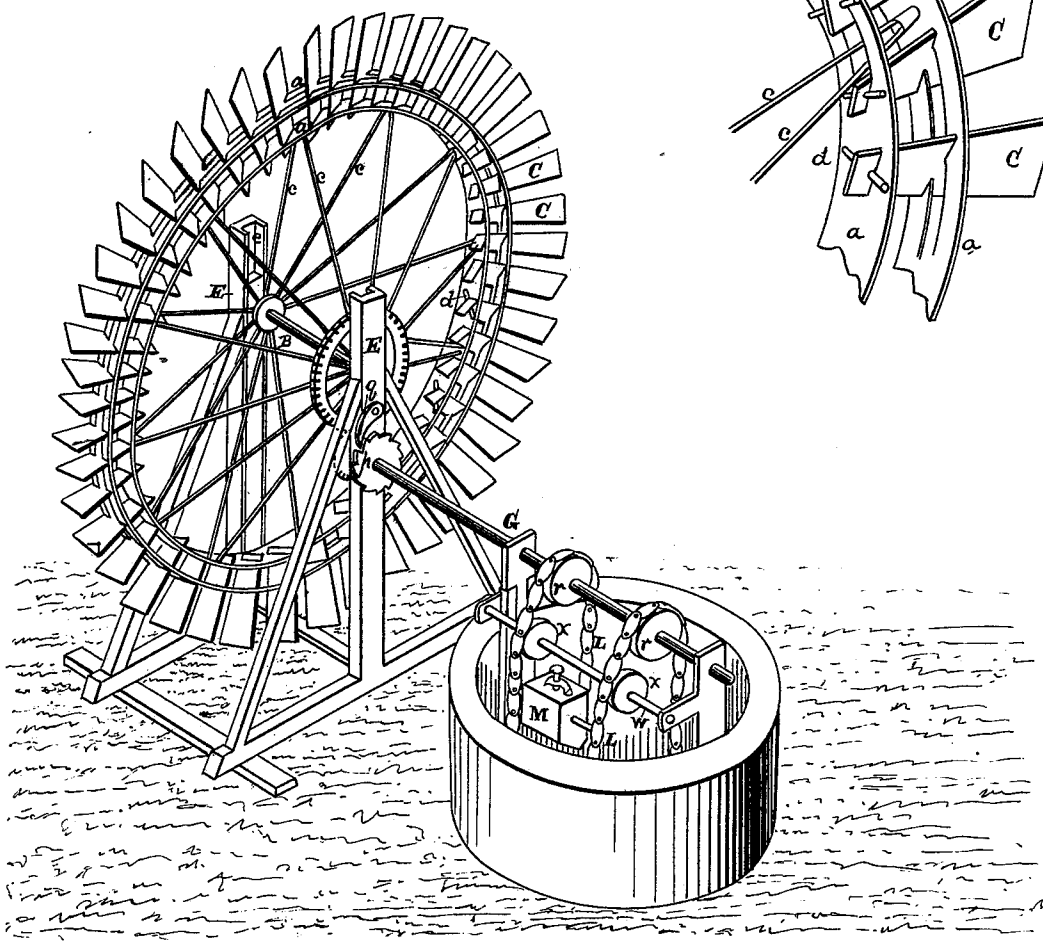


FIG. 2.

WITNESSES

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2 Sheets—Sheet 2.

Z. & F. M. COTTLE.

Windmill.

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Fig. 3.

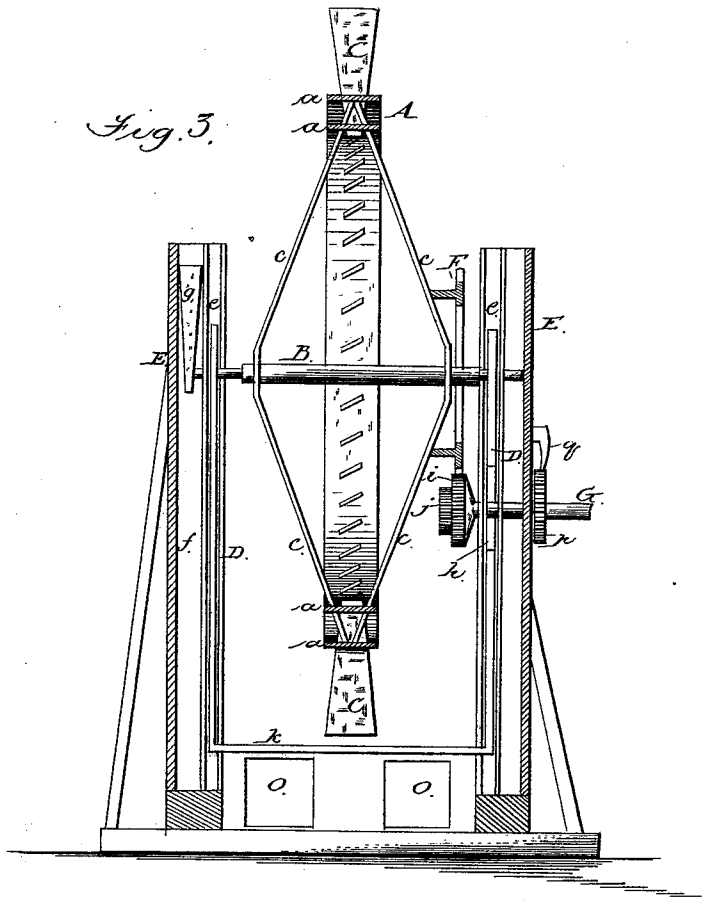
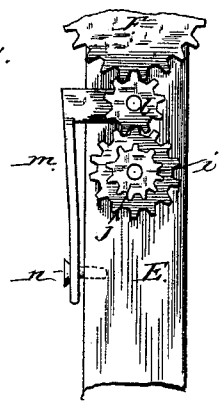


Fig. 4.



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UNITED STATES PATENT OFFICE.

ZORAH COTTLE AND FRANCIS M. COTTLE, OF OAKDALE, CALIFORNIA.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **220,751**, dated October 21, 1879; application filed August 8, 1879.

To all whom it may concern:

Be it known that we, ZORAH COTTLE and FRANCIS M. COTTLE, of Oakdale, county of Stanislaus, and State of California, have invented an Improved Windmill Water-Elevator; and we hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to an improved windmill; and our improvements consist in certain details of construction of the wheel itself and certain devices for altering the speed of the mill, as well as controlling the machinery which the movements of the mill operate, as is more fully described in the accompanying drawings, in which—

Figure 1 is a perspective view. Fig. 2 are details of construction. Fig. 3 is a vertical section. Fig. 4 shows the supplemental pinion.

The wind wheel or mill A is made of very large diameter, the double rims *a* being supported on the shaft B by means of extended braces *c*, as shown.

The fans C are made somewhat wider at the top than at the bottom, so as to be bevel-shaped, and slots are formed in both rims, so the fans can be placed in position, and when once in place are held by the keys or bolts *d*, which pass through the lower end of the fan.

If at any time it is desired to reduce the power of the wheel, every other fan may be removed by taking out the keys and lifting the fans out of the slots in the rims; or when it is necessary to lay the mill up in winter all the fans may be removed and the frame left standing, so the force of the wind will not wreck the mill or cause any damage.

The bearings of the shaft B are in the sliding bars D, which slide vertically in the guides *e* on the frame or uprights E. The shaft has a certain amount of lateral motion in the slides, for the purpose hereinafter described.

One of the uprights E has a vertical slot, *f*, formed lengthwise in it behind the slide D, into which a wedge, *g*, may be inserted, so as to prevent lateral motion of the shaft when necessary, for the purpose hereinafter described.

On one side of the main-wheel shaft is fixed the spur-gear F, for imparting motion to the chain or bucket shaft G. The end of this chain-shaft passes through the upright and through a slot, *h*, in the slide D, so that the slide may move up and down without reference to said shaft.

On the end of the chain-shaft inside the upright or frame are two pinions, *i j*, one smaller than the other, which mesh with the spur-wheel on the wheel-shaft, so that different speeds may be maintained according to the force of the wind.

In a strong breeze the spur-wheel will engage with the pinion *i*, so the chain-shaft will be rotated at a moderate speed. Should the wind decrease and more speed be needed, the gear is dropped into the pinion *j*. To do this a lever is put under the cross-bar *k*, joining the two slides, and by lifting this bar the slides carrying the axle are lifted slightly, so as to lift the gear out of the pinion *i*; then the wheel is pushed over to the opposite side, its shaft sliding laterally in the bearings in the slides, and by lowering the slides the gear will mesh with the pinion *j*.

When the gear is meshed with the larger pinion *i* the wedge *g* is dropped into the slot *f*, and the said wedge prevents the shaft moving laterally; but when the gear is to be meshed into the small pinion this wedge is renewed, and the shaft can then be pushed over on its bearings, so as to be lowered, as described.

This wheel is intended for pumping water in such localities as have prevailing winds from one direction for a length of time.

In the great valleys of California the prevailing winds of the summer months are westerly, and the windmill is set up so as to face the westward. Occasionally, however, the wind will blow from an opposite direction for a short time, and the motion of the wheel would then be reversed. In order, however, not to have the shaft also reverse, we use a supplemental pinion, *l*, which is placed between the spur-wheel and the pinion *i*, so as to change the motion. This pinion *l* is journaled on an arm on a plate, *m*, the plate being secured to the upright or frame by screws or bolts *n*. When not in use it hangs beside the frame. To use it the bolts or screws are removed, and the plate *m* put in proper position so the pinion *l* will come between the spur and

pinion *i*. The bolts or screws then secure the plate to the upright, and the pinion *l* is held in place so as to give proper motion to the chain-shaft.

Wedges *o o* are provided to set inside the cross-bar joining the two slides, so as to sustain the weight of the wheel and not cause too much friction between the gear and pinion. The large ends of wedges *o* are placed under the bar when the gear is meshed with the pinion *i*, and the small ends of wedges *o* are placed under the bar when the gear or spur is meshed with the smaller pinion *j*. In this way the weight of the wheel is sustained without too much pressure on the pinion.

On the chain-shaft, outside the frame or upright, is placed a ratchet, *p*, and a pawl, *q*, on the frame engages with this to prevent the weight on the shaft rotating it backward in case the mill should stop at any time for want of wind; and at any time the gear is being changed to the other pinions the ratchet and pawl hold the chain-shaft and keep the shaft from turning back. On the shaft we have shown toothed rollers *r*, over which chains may pass.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The wind mill or wheel A, made adjustable by means of its shaft B being journaled in the sliding supports D, moving in the guides *e* of the frame E, said shaft being provided with the gear F, in combination with the pinions *i j*, whereby power is transferred from said wheel to the chain-shaft G, substantially as herein described.

2. The supporting-posts E, with their guides *e* and sliding bars D, with boxes supporting the wind-wheel A and spur-gear F, in combination with the pinions *i j*, mounted on the chain-shaft G, with its ratchet and pawl *p q* and toothed rollers *r*, substantially as and for the purpose herein described.

3. The sliding bars D, moving in the guides *e* in the standards E, the standards being provided with the slot *f* and wedge *g*, in combination with the wheel A, with its gear F, whereby the shaft B may be moved endwise, so that the gear F may mesh with either pinion *i j*, as desired, to give more or less speed to the chain-shaft G, substantially as herein described.

4. The wheel A, with its gear F, made to move vertically by means of the sliding bars D, with the slot *h*, cross-bar *k*, and supporting-wedges *o*, in combination with the pinions *i j* and supplemental pinions *l*, with its plate *m* and screws *n*, whereby the motion of the shaft may be made to conform to the direction of the wheel, substantially as herein described.

5. The wind mill or wheel A, with its shaft B, extended braces *c*, double rims *a*, and tapering removable fans C, with their keys *d*, substantially as and for the purpose herein described.

6. In combination with the windmill A, with its slotted double rims *a*, the tapering or wedge-like removable fans C, with their fastening-keys *d*, whereby the power of the mill is regulated, substantially as herein described.

In witness whereof we have hereunto set our hands.

his
ZORAH × COTTLE.
mark.
FRANCIS M. COTTLE.

Witnesses:
S. H. NOURSE,
FRANK A. BROOKS.