J. W. CLELAND.
Wind-Engine.

No. 204,481. Patented June 4, 1878.

Fig. 1

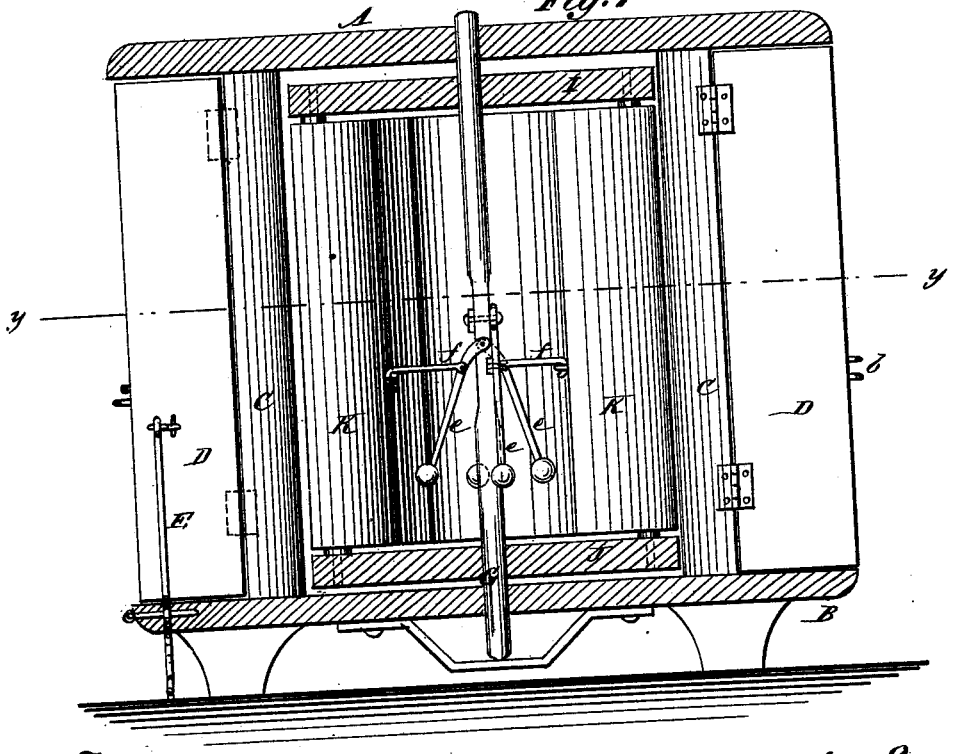


Fig. 3

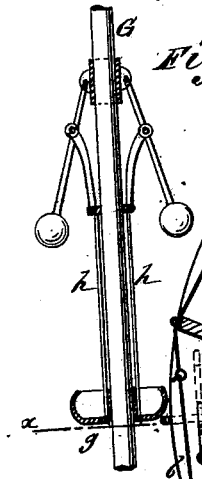
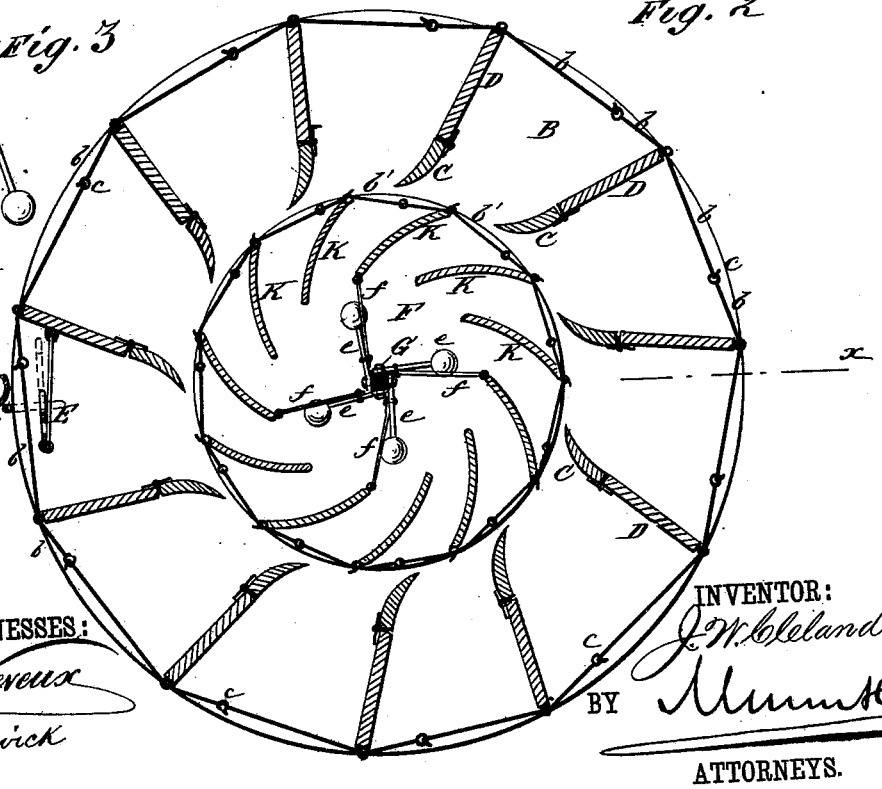


Fig. 2



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN W. CLELAND, OF NEVADA, MISSOURI.

IMPROVEMENT IN WIND-ENGINES.

Specification forming part of Letters Patent No. **204,481**, dated June 4, 1878; application filed March 12, 1878.

To all whom it may concern:

Be it known that I, JOHN W. CLELAND, of Nevada, in the county of Vernon and State of Missouri, have invented a new and Improved Windmill, of which the following is a specification:

Figure 1 is a vertical section taken on line *x x* in Fig. 2. Fig. 2 is a horizontal section taken on line *y y* in Fig. 1. Fig. 3 is a detail view of the governor.

Similar letters of reference indicate corresponding parts.

The object of my invention is to provide a compact, simple, and easily-controlled windmill, which will utilize to the fullest extent the power of the wind.

The invention consists in a vertical wheel having curved vanes or blades that are connected with a governor carried by the wheel-shaft. It also consists in a number of hinged deflectors that direct the wind upon the vertical wheel.

Referring to the drawing, A B are the top and bottom pieces of the mill-frame, between which are secured the vertical standards C. These standards are curved slightly in a transverse direction, and to their outer edges the deflectors D are hinged.

The outer edges of these deflectors are connected by rods *b*, which are jointed together at *c*, and one of the deflectors is connected with a lever, E, that is pivoted in the lower part B of the mill-frame. By moving this lever all of the deflectors are moved simultaneously.

A vertical wheel, F, is secured to a shaft, G, that is journaled in the top and bottom pieces A B, and passes down any desired distance for the purpose of receiving band or cog wheel, or other means by which to apply the power of the windmill.

The wheel F consists of two disks, I J, secured to the shaft G. Between these disks a number of curved blades or vanes, K, are pivoted, the pivots being near the outer edges of the vanes. The outer edges of the vanes are connected together by rods *b'*, in the same manner as the deflectors D are connected by the rods *b*.

Four weighted governor-arms, *e*, are pivoted to the shaft G, and connected with the inner edges of the curved vanes K by rods *f*. An increase in the speed of the wheel F results in the raising of the governor-weights by centrifugal force, and, by virtue of the connection of the arms *e* with the pivoted vanes K, the vanes are turned so as to offer more or less effective surface to the wind entering between the deflectors.

An annular cup, *g*, surrounds the shaft G, and is connected with the governor-arms *e* by rods *h*. It is designed to contain weights for varying the speed of the wheel by offering more or less resistance to the raising of the weighted arms.

The supply of wind to the wheel is controlled by the hinged deflectors, and the wind, on entering the wheel, acts on the outer surface of the vanes on one side of the wheel and upon the inner surface of the vanes on the other side of the wheel. The force of the wind is thus twice utilized.

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

1. In a windmill, the deflectors D, hinged to standards C, and connected near the outer edges by rods *b* jointed at *c*, as and for the purpose described.

2. In a windmill, the curved vanes K, pivoted near their outer edges between disks I J, and connected by rods *b'*, to operate as and for the purpose set forth.

JOHN W. CLELAND.

Witnesses:
JOHN T. BIRDSEYE,
BRON H. MCDONALD.