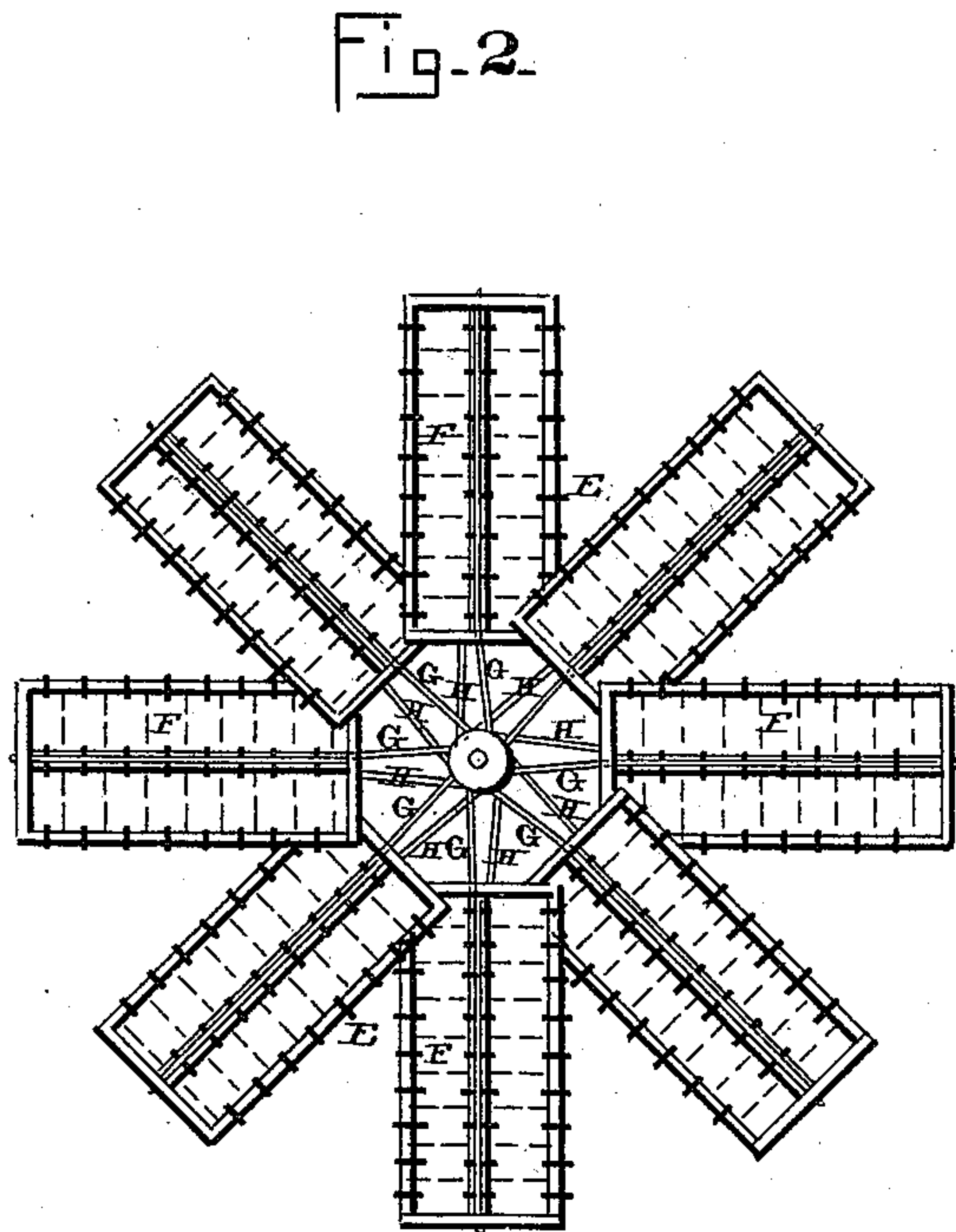
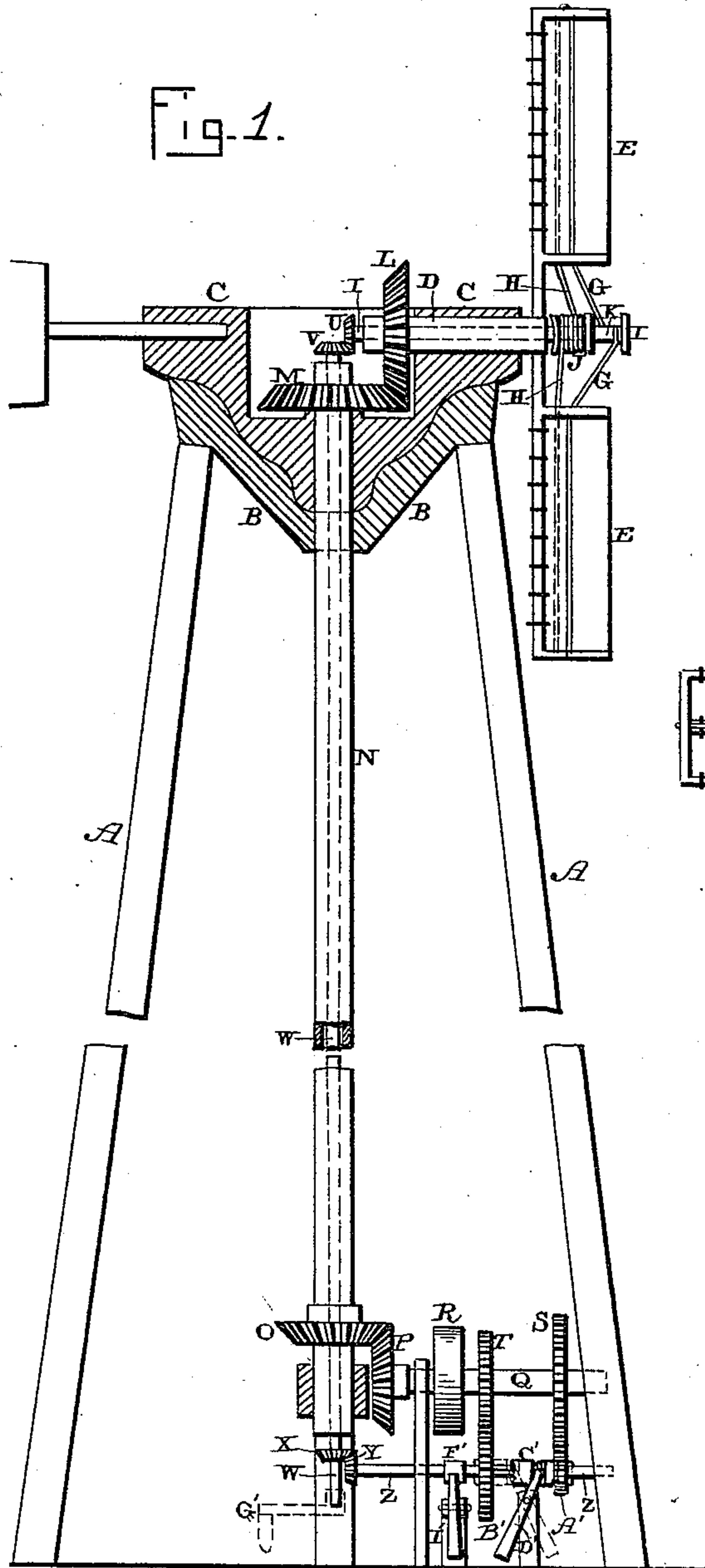


(No Model.)

C. E. KITTINGER.
WINDMILL.

No. 428,495.

Patented May 20, 1890.



Witnesses:
E. P. Ellis,
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per
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UNITED STATES PATENT OFFICE.

CHARLES E. KITTINGER, OF POWELL, SOUTH DAKOTA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 428,495, dated May 20, 1890.

Application filed November 29, 1889. Serial No. 331,911. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. KITTINGER, of Powell, in the county of Edmunds and State of South Dakota, have invented certain
5 new and useful Improvements in Windmills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it,
10 reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in windmills; and it consists in the combination and arrangement of parts which will be
15 more fully described hereinafter, and particularly pointed out in the claims.

The objects of my invention are to form the wind-wheel of skeleton frame-work and the sails from any suitable flexible material
20 which can be opened or closed, according to the amount of power required, and to provide a suitable mechanism by which the flexible sails can be opened or closed over the frame-work at the will of the operator.

25 Figure 1 is a side elevation, partly in section, of a windmill which embodies my invention. Fig. 2 is a detail view of the wheel.

A represents the timbers of the tower or derrick, to the upper ends of which is secured
30 a suitable U-shaped frame-work B. Upon this frame B is journaled the frame C, which revolves freely around and has a vane secured to its opposite end from the wheel in the usual manner. Journaled in this casting
35 C is a short hollow shaft D, to the outer end of which the wheel E is rigidly secured. This wheel consists of skeleton frame-work, the different portions of which are set at about an angle of thirty degrees, and to this frame-
40 work are secured the different sails F, made of any suitable textile fabric or other suitable material which will answer the purpose. Each one of these sails is fastened to the inner end of the frame-work, and secured
45 to the outer end of each of the sails is a cord, wire, or chain G for closing the sails, and a corresponding cord, wire, or chain H for drawing the sails outward over the frame-work when the wheel is to be set in motion.

50 Passing through the hollow shaft D is a smaller shaft I, and secured to the outer end of this shaft I are the two spools J K. To the

outer spool K the cords, wires, or chains G are connected, and to the spool J the cords, wires, or chains H are fastened. These cords,
55 wires, or chains are fastened around the spools J K in opposite directions, so that the same shaft may be made to open or close the sails, as may be desired. At the same time that one set of cords, wires, or chains are wrapped
60 around one spool the other set of cords, wires, or chains are unwinding from the other spool.

Secured to the inner end of the shaft D is a large gear-wheel L, which gears with a corresponding gear-wheel M, secured rigidly
65 to the vertical hollow shaft N, and upon the lower end of this shaft N is secured a wheel O, which gears with a corresponding wheel P upon the shaft Q, which is provided with a pulley R, from which the power is taken. Upon
70 this shaft Q are placed the large gear-wheel S and the smaller one T.

To the inner end of the small shaft I, which passes through the hollow shaft D, is secured a small beveled wheel U, which meshes with
75 a corresponding wheel V, secured to the upper end of the small shaft W, which passes down through the hollow vertical shaft N. Upon the lower end of this shaft W is secured a bevel-wheel X, which meshes with a bevel-
80 wheel Y, which is secured to the inner end of a shaft Z, which extends parallel with the shaft Q.

Placed upon the shaft Z is a small gear-wheel A' and a large gear-wheel B', both of
85 which are idle-wheels. Feathered upon this shaft, between the two wheels A' and B', is a sliding clutch C', which is made to engage either one of the wheels and thereby lock them to the shaft Z for the purpose of caus-
90 ing the said shaft to be revolved by either the wheel S or T upon the shaft Q and thereby impart to the shaft W, through the wheels W X, a revolving motion uniform with that of the sails or a faster motion than that of
95 the sails, for the purpose hereinafter described.

Rigidly secured to the shaft Z at any desired point is a friction-wheel F', which is engaged by a brake-lever I for stopping or re-
100 tarding the revolution of the shaft Z when both the wheels A' and B' are left free by moving the clutch C' between them and out of engagement with either, which will allow

the shaft Z to be stopped or revolved independently of them, for the purpose herein-after described.

Connected with the lower end of the small shaft W is a crank G', which is used by the operator in opening the sails when it is desired to start the wheel. After the wheel is once started this crank is removed.

When the crank G' is first applied to the shaft W, the sails F are supposed to all be closed inward, so that the wheel is not being operated by the wind. By turning the crank G' in the proper direction motion is communicated through the wheels U V to the shaft I, which causes the spools J K to unwind one set of cords, wires, or chains H at the same time that the other set of cords, wires, or chains H draw the sails outward over their skeleton frames. As soon as the mill starts, the clutch C' is moved so as to lock the wheel B' to the shaft Z, thereby causing the said shaft to revolve through the medium of the wheel T, which engages it and which causes the sails to remain just where they were left by the operator, since by this operation the shaft Z is made to operate the shaft W, and this in turn operates the shaft I at the same rate of speed that the wheel is revolving, and hence the spools will be made to revolve with the wheel so as to neither open or close the sails. If it is desired to open the sails their full distance, the clutch C' is thrown into gear with the wheel A', which is thereby locked to the shaft Z and made to revolve with the wheel S, and as the wheel S is much larger than the wheel A' the shafts Z, W, and I will be made to revolve faster than the shafts Q N D, and thus the spools will be made to revolve faster than the wheel and open the sails to their full extent.

In order to take in the sails when the mill is running, the clutch C' must be left midway between the wheels A' and B', so as to engage with neither one, and then friction is applied to the wheel F' upon the shaft Z, and this friction causes the two spools J K to cease revolving with the wheel, and thus the cords, wires, or chains will be made to close the sails upon their frames. If so desired, a governor may be attached to the shaft Z for the purpose of regulating the speed; but this is not regarded as absolutely necessary, and therefore may be dispensed with, if so desired.

Having thus described my invention, I claim—

1. In a windmill, the combination of the wind-wheel composed of radial wings, flexible sails secured at their inner ends to the inner

ends of the wings, a shaft provided with spools at the center of the wheel, and a cord for each sail having its center secured to the center of the outer end of each respective sail and passing over a guide or sheave at the center of the outer end of the wing, one end of each cord being wrapped around one spool in one direction and its opposite end around the other spool in the opposite direction, and shafts provided with gearing for revolving the spools from the foot of the tower, whereby the sails are run out and drawn in, substantially as shown and described.

2. In a windmill, the combination of the wheel, a hollow horizontal shaft, to the outer end of which the wheel is secured, a bevel-gear upon its inner end, a vertical hollow shaft having a bevel-gear engaging the said gear upon the said horizontal shaft, and a gear upon the lower end of said vertical shaft for transmitting power, a shaft passing through the vertical hollow shaft having a bevel-gear upon the upper end, a shaft passing through the hollow horizontal shaft having a gear upon its inner end engaging the said gear upon the shaft passing through the vertical shaft, spools upon its outer end, flexible sails upon the wheel, and cords secured to the sails, passing over suitable guides at the periphery of the wheel, and having their ends wrapped around the spools in opposite directions, whereby the sails are run out and drawn in by revolving the vertical shaft W, substantially as described.

3. In a windmill, the combination of the hollow shaft D, the wind-wheel secured to its outer end, the gear L, secured to its inner end, the hollow shaft N, the gear M upon its upper end engaging the gear L, the gear O upon the lower end of the shaft N, the shaft Q, the gears P T S, secured thereto, the shaft Z, having the loose gears B' A' engaging the gears S T, the sliding clutch C', which engages and locks either wheel to the said shaft, the shaft W, the gears X Y, the shaft I, the gears U V, the spools upon the outer end of the shaft I, the flexible sails, and the cords which are wrapped around the spools and secured to the sails, whereby the motion of the mill is made to run out the sails or draw them in, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. KITTINGER.

Witnesses:

JOHN BUTMAN,
F. P. SMITH.