(No Model.) 2 Sheets—Sheet 1.

C. A. NORCROSS.

WINDMILL.

No. 535,956. Patented Mar. 19, 1895.

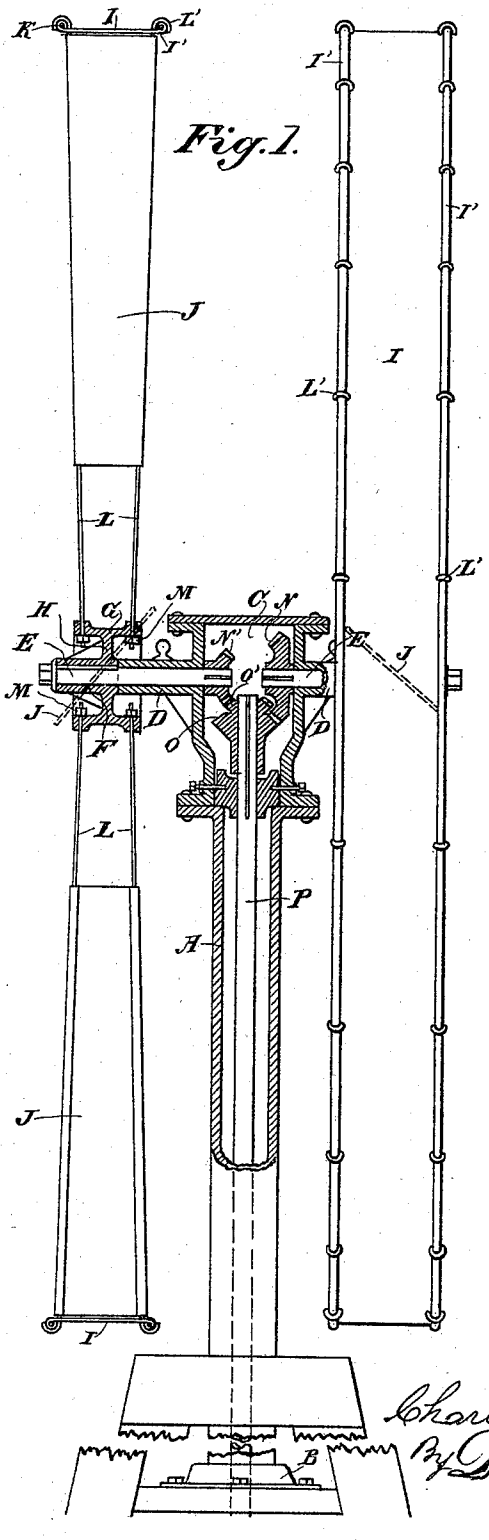

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

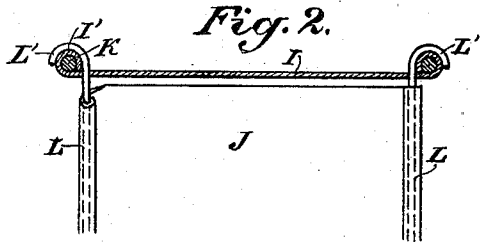


Fig. 3.

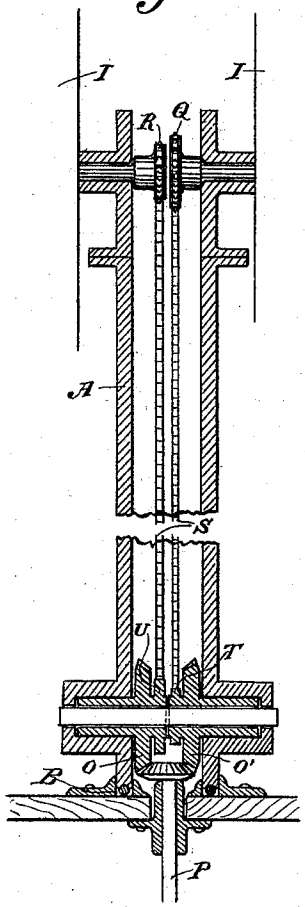
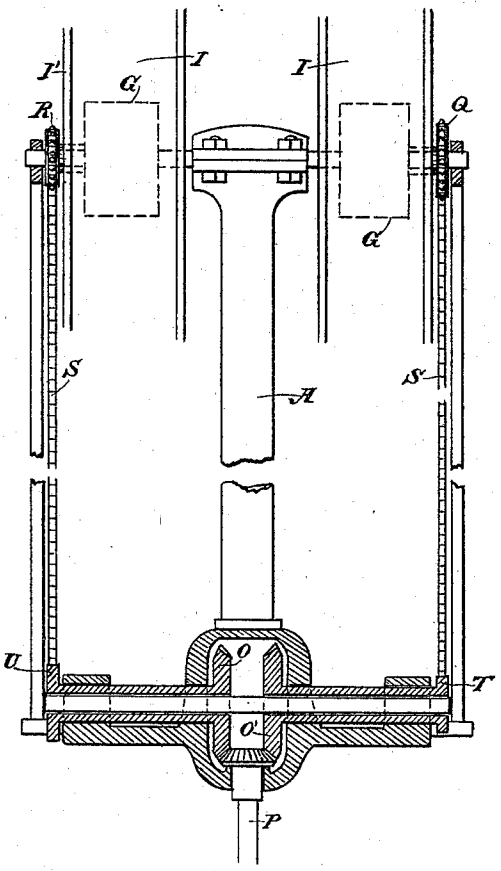


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES A. NORCROSS, OF RENO, NEVADA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 535,956, dated March 19, 1895.

Application filed April 20, 1894. Serial No. 508,360. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. NORCROSS, a citizen of the United States, residing at Reno, Washoe county, State of Nevada, have invented an Improvement in Windmills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in wind engines.

It consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is an elevation of the apparatus, with part broken away to show the construction of the wheel hubs. Fig. 2 is a detail section of the rim and vane connection. Figs. 3 and 4 are modifications of power transmitting device.

The lower or principal support of the apparatus may be in the form of a tower or any other suitable device. Upon this is supported a vertical tubular post A which is stepped at any convenient distance below the head, resting upon a properly constructed step B, upon ball or other antifrictional bearings, if desired, so that the post may turn into any position necessary to throw the wheels into or out of the wind. Upon the top of the post is formed or attached the head or casing C having extending outwardly upon opposite sides journal-boxes D. This head is preferably a closed one and is formed with the extensions from opposite sides which form the journal boxes. Within these journal-boxes the shafts E are adapted to rotate, the inner ends projecting through into the head as shown, and the outer ends extending sufficiently beyond the journal-boxes to receive the hubs F of the wheels which are keyed to the shafts so that the wheels and shafts rotate together.

The flanges G are connected with the inner ends of the hubs by ribs H, and the flanges project in each direction parallel with the hub, extending over the journal-boxes at the inner ends, so that when the wheels are in position, they rotate very closely to the vertical, tubular post, and their effective work is greatly increased by running them so nearly together.

The wheels consist of exterior hoops or rims I and radial vanes J extending between the rims and the hubs, the vanes of one wheel being set at the opposite angle to the vanes of the other wheel so that wind striking one of the wheels acts to rotate it in one direction, and being deflected as it passes through the vanes of the first wheel, strikes the vanes of the other wheel and rotates it in the opposite direction.

The rim of the wheel consists of light metal like aluminum or of other suitable and sufficiently stiff material, and its edges are preferably turned or rolled into a tubular form as shown at I′, and may have a rod K fixed in each of these edges to stiffen them.

The wheel is essentially a trussed wheel having two series of radial straining rods L which converge to, and pass through holes in the hub F, being held in place and tightened by means of nuts M on the inner ends. The outer ends of these rods are attached to the rim in any suitable manner. I have found that by turning them over in the hook form as at L′, they may be hooked over the turned over edges of the rim or the rods which pass through these edges, and thus be easily attached, and easily disengaged if desired.

The vanes are made of strips of sheet metal or other suitable material J which will best serve the purpose, such as aluminum, sheet iron, or steel, and of a width which varies in accordance with the size of the wheel. I have found that vanes about thirteen inches wide in a wheel twelve feet in diameter, are very suitable. The longitudinal edges of the vanes are turned over or rolled in a tubular form so as to clasp the radial straining rods, upon opposite edges of the wheel, and by them they are held in the desired diagonal position and made as rigid as desired by the tension of the rods. By this construction I have an extremely light, rigid and cheap wheel.

When wheels are mounted so that the rear wheel receives the air deflected through the front wheel, the tendency of the rear wheel is to revolve considerably faster than the front wheel.

If gears of equal size are employed to transmit the motion of the two wind wheels to a common shaft, it will be manifest that the power of the faster running wheel will be practically absorbed by the slower one, and little or no benefit will be derived from it.

In order to apply the power of the two wheel

shafts to the vertical driving shaft P, and derive the advantage of their varying rates of rotation, I employ gear wheels N and N′ upon the inner ends of the wind wheel shafts which mesh with corresponding bevel gears O and O′ upon the vertical shaft P. In order to equalize the power of the wheels upon these shafts, these gears differ in size so as to allow the wind wheels to revolve at their normal and different speeds, while applying the power of both wheels equally to the vertical shaft.

The relative sizes of the bevel gears N and N′ to each other, as compared with the relative sizes of the double gear O O′ upon the shaft P, with which they respectively engage, are such that the miter gear N, in making one revolution, will operate the portion O of the double gear with which it engages, and this bears the same proportion to the speed of the gears N′ and O′ that the revolution of the front wind wheel bears to the revolution of the rear one. Thus the power of both wheels is equally applied to drive the power shaft, while if the gears were of the same size one wheel would hold the other back, without any resulting gain of power or speed.

In some cases it may be found desirable to transmit the power a certain distance from the wind wheel shafts, before applying it to the vertical shaft which might in such a case be situated close to the step at the lower end of the tube. For such an application I have shown in Figs. 3 and 4, a construction in which sprocket-wheels Q and R of different sizes are fixed upon the wind wheel shafts and chains S from these wheels are carried down, either within the tubular shaft or if preferred exterior to it, or even exterior to the wind wheels themselves, and the chains pass around sprocket-wheels T and U of proportionate sizes fixed upon horizontal shafts in the lower part of the apparatus, and these have bevel gears fixed to them which engage the vertical driving shaft as previously described. In this case, the proportion of the sprocket-wheels to each other is made similar to that described for the bevel-gears employed in the first instance.

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

1. In a wind engine, a vertical tubular turning post, a closed head fitted to the upper end of the same and having extensions from its opposite sides forming journal boxes, independent shafts adapted to turn in said boxes, wind wheels of the same diameter fixed to the outer ends of said shaft and placed in close proximity, with their vanes set in opposite directions, hubs on the wheels adapted to turn on said shafts and to be fitted against the ends of the journal boxes, a vertical driving shaft, and mechanism between the driving shaft and wind wheel shafts for driving one of the latter shafts faster than the other whereby different rates of speed of the wheels are transmitted to the single driving shaft, substantially as herein described.

2. Wind wheels consisting of hubs with concentric projecting flanges, exterior hoops or rims having the edges turned around peripheral rods upon each side, radial straining rods having the outer ends hooked over these flanges, and the inner ends secured and adjusted to the hub flanges by nuts, and vanes consisting of metal sheets having the edges turned into tubular form to clasp the straining rods.

3. A tubular turning post, wind wheels of the same diameter journaled in close proximity upon opposite sides of the post having their vanes so fixed that the wheels turn in opposite directions, a vertical power shaft journaled within the hollow turning post, having a bevel-gear fixed to it and intermediate connections between this shaft and the wind wheel shafts whereby the different rates of speed of the two wheels are transmitted equally to the power shaft.

In witness whereof I have hereunto set my hand.

CHARLES A. NORCROSS.

Witnesses:
R. E. MORROW,
JOHN SUNDERLAND.