

J. H. BAXTER.
WINDMILL.

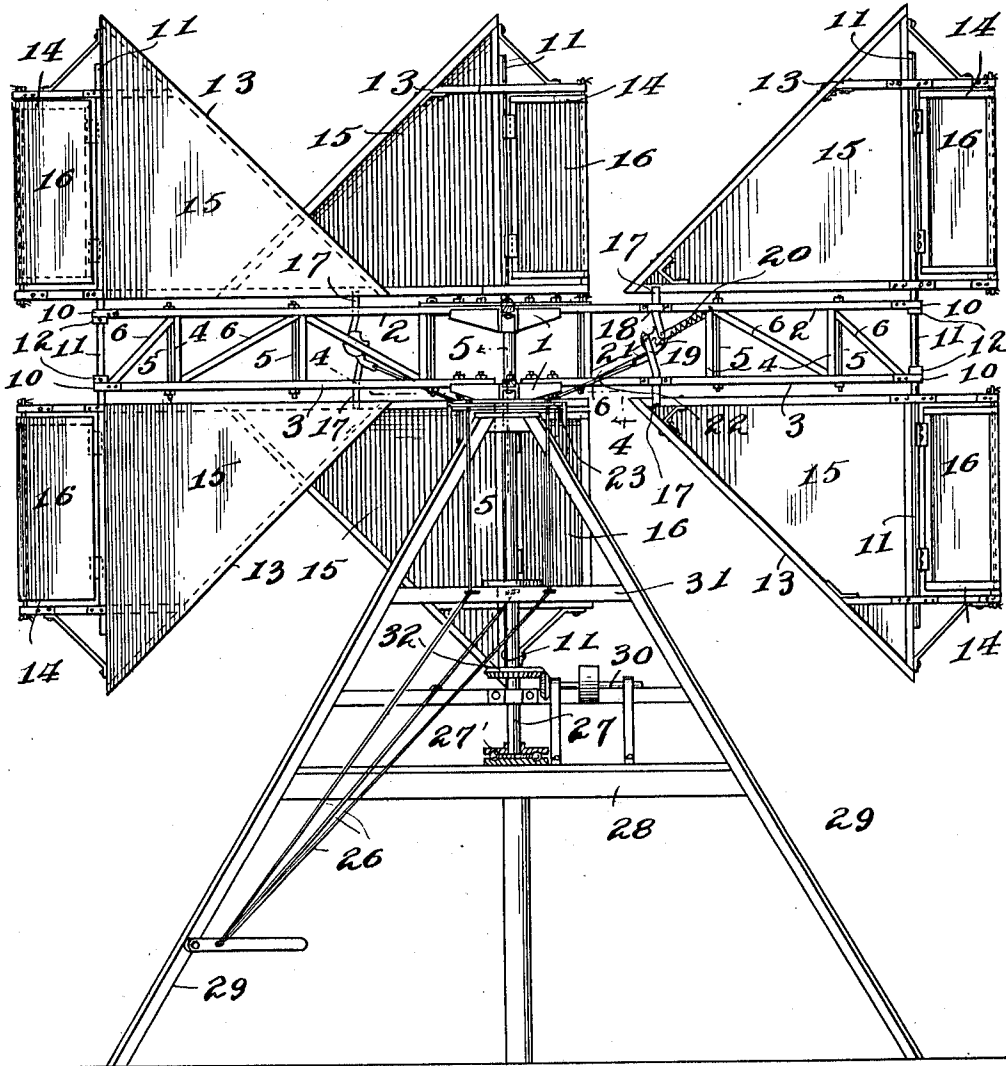
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1,020,957.

Patented Mar. 26, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



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Witnesses

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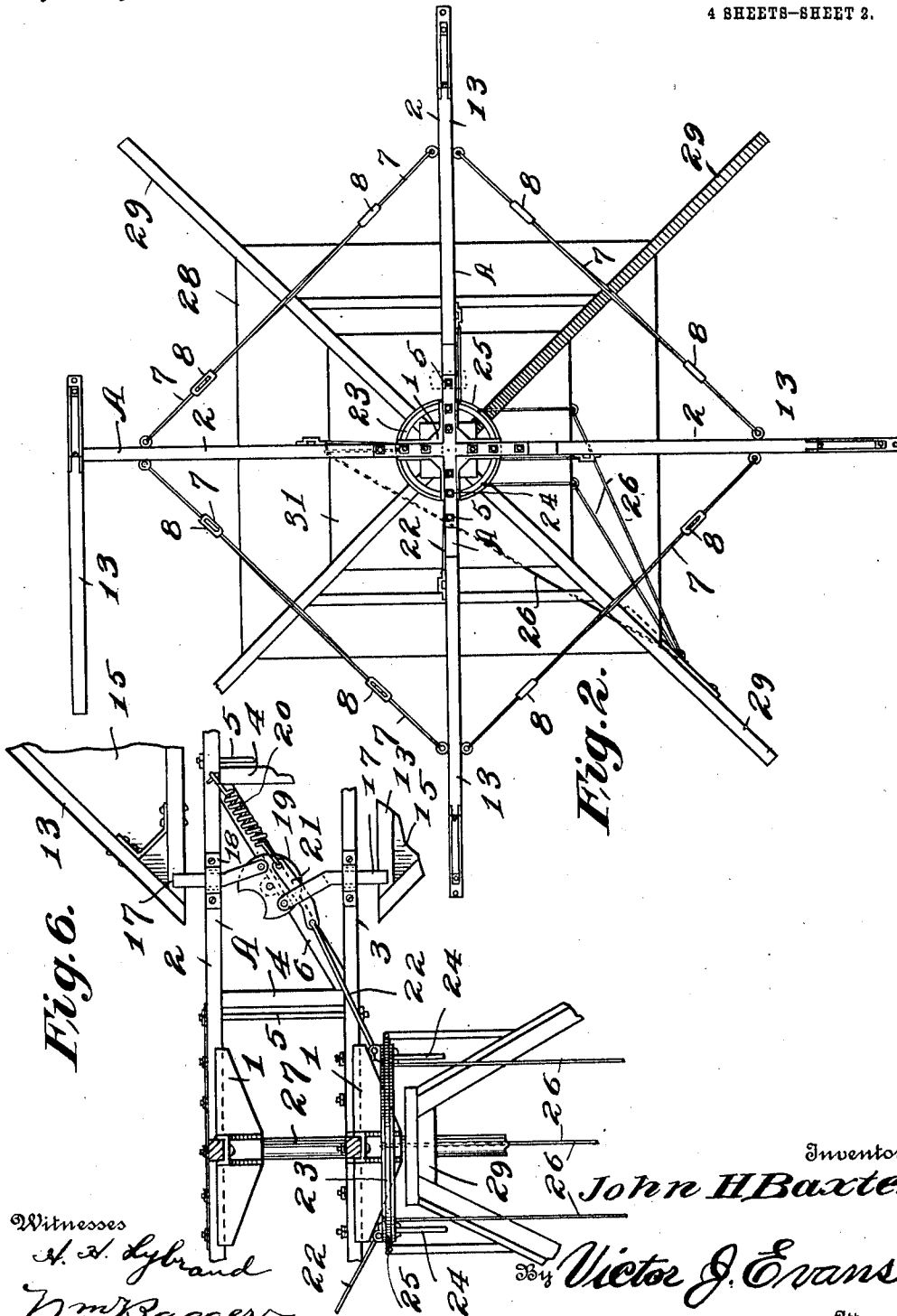
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4 SHEETS-SHEET 2.



Witnesses

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4 SHEETS—SHEET 3.

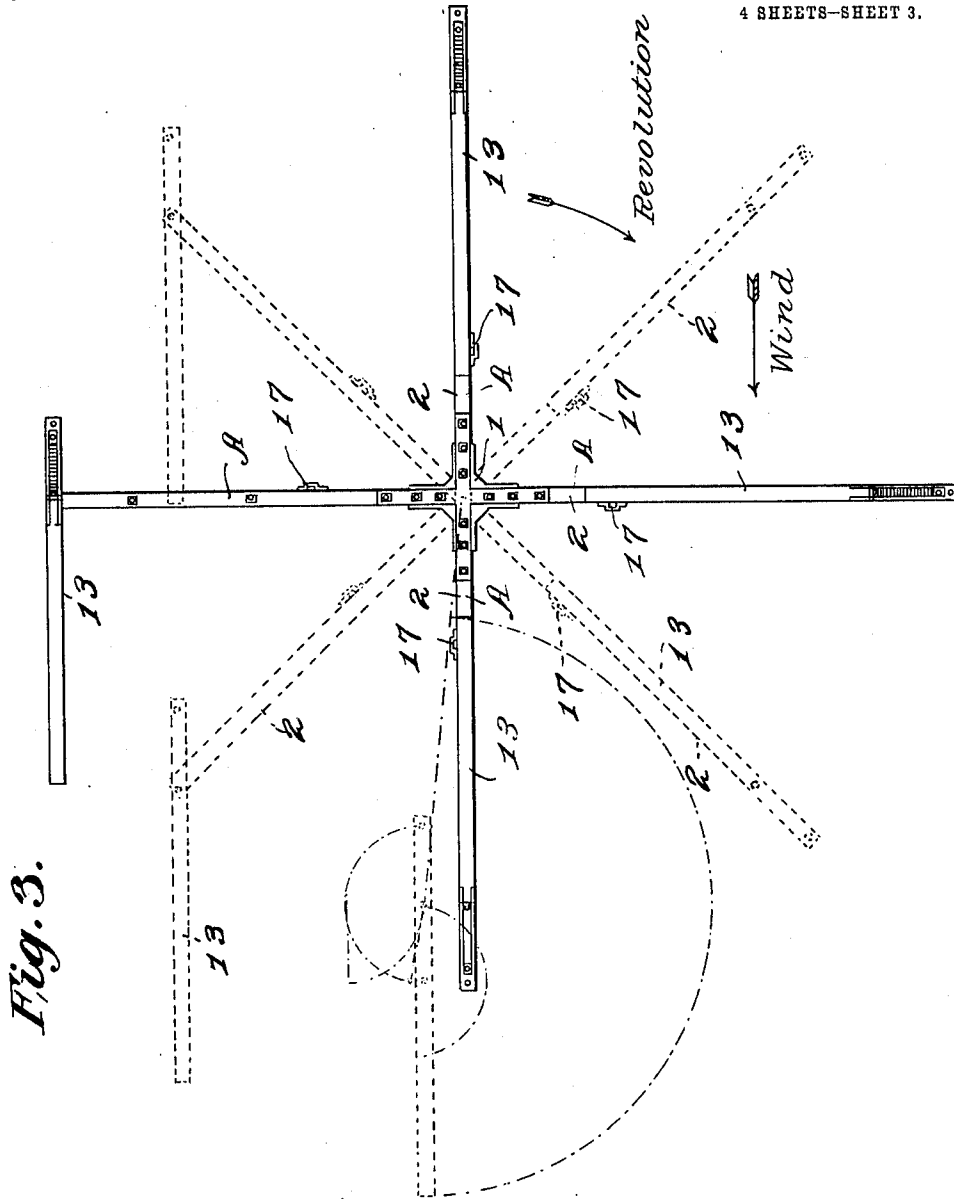


Fig. 3.

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4 SHEETS—SHEET 4.

Fig. 5.

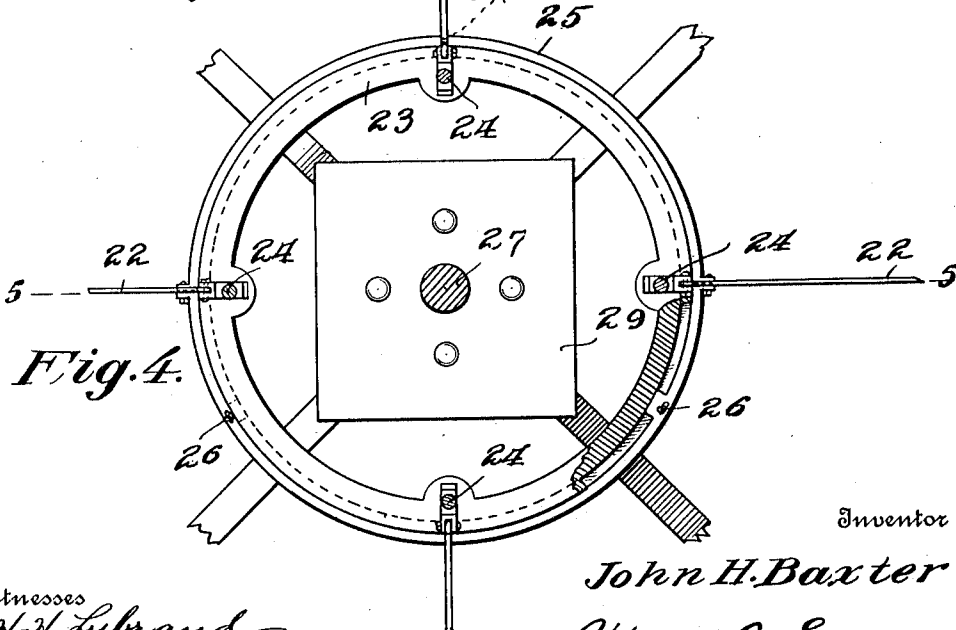
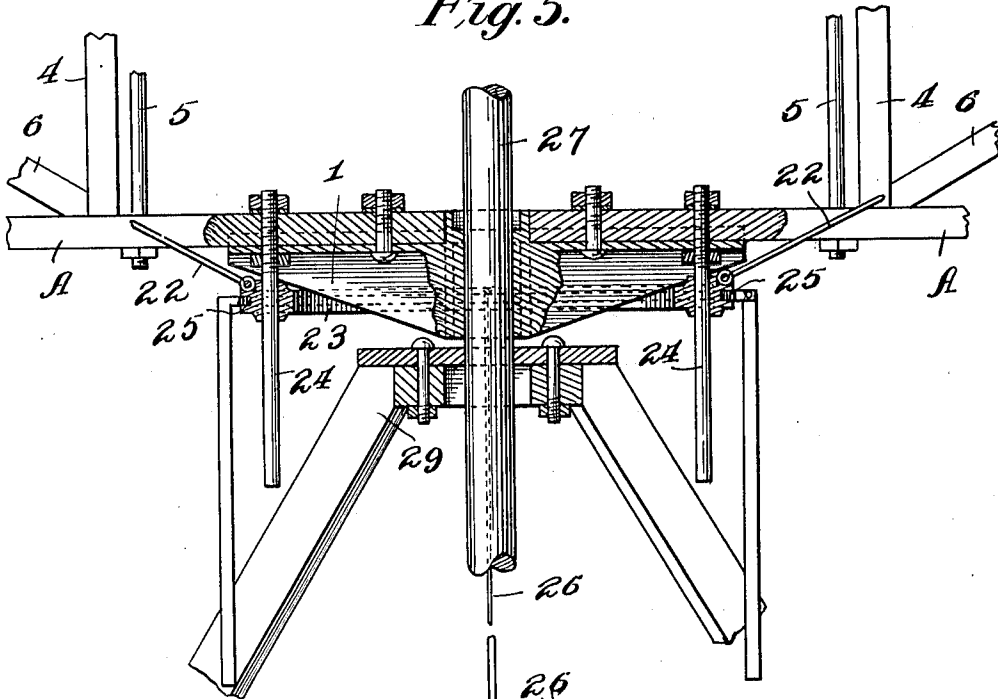


Fig. 4.

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UNITED STATES PATENT OFFICE.

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WINDMILL.

1,020,957.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN H. BAXTER, a citizen of the United States, residing at Berthoud, in the county of Larimer and State of Colorado, have invented new and useful Improvements in Windmills, of which the following is a specification.

This invention relates to that class of wind mills which are known as vertical wind mills and in which a wheel is provided that rotates about an approximately vertical axis.

The principal object of the invention is to provide a vertical wind wheel of simple and improved construction equipped with feathering vanes or sails so arranged that while the full surface of the sails shall be exposed to the force of the wind at one side of the vertical axis, the sails at the opposite side of said axis will be feathered and exposed edgewise to the wind, thus enabling the device to operate efficiently without regard to the direction of the wind.

A further object of the invention is to provide simple and improved stop means for retaining the sails or vanes against rotation in one direction, while permitting them to rotate freely in the opposite direction for the purpose of feathering at the proper time.

A still further object of the invention is to provide simple and improved means for actuating the stops to move them out of operative position when desired, for the purpose of removing obstruction to the rotation of the vanes or sails, thereby permitting all of the sails to swing into a feathered position at any one time, thereby suspending the operation of the device when desired.

Still further objects of the invention are to simplify and improve the general construction and operation of a wind mill of the character outlined above.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claim.

In the accompanying drawings has been illustrated a simple and preferred form of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and

modifications within the scope of the claim may be resorted to when desired.

In the drawings,—Figure 1 is a sectional elevation of a wind mill constructed in accordance with the invention. Fig. 2 is a top plan view. Fig. 3 is a diagrammatic top plan view of the wheel indicating the swinging or feathering movement of the vanes or sails. Fig. 4 is a horizontal sectional view taken on the line 4—4 in Fig. 1. Fig. 5 is a vertical sectional detail view taken on the line 5—5 in Fig. 4. Fig. 6 is a detail view, enlarged, of the means for actuating the stops.

Corresponding parts in the several figures are denoted by like characters of reference.

The wheel of the improved wind mill is composed of a hub portion including suitable castings 1 with which a plurality of radiating arms A, A are suitably connected. Each of the arms A is adapted to carry feathering sails or vanes, as will be hereinafter more fully described, and in the accompanying drawings four such radial arms have been shown with the understanding, however, that within the scope of the invention any desired number of such arms may be employed. Each of the arms A is composed of top and bottom bars or members 2 and 3 which are spaced apart and connected by means of struts 4 and bolts 5. Inclined braces 6 are also employed to reinforce the construction. The arms A are mutually connected by truss wires 7 including turn buckles 8 which may be tightened when necessary to take up slack. In this manner an extremely stiff and rigid construction is assured, as is obviously necessary in a device of this kind.

As regards the manner of connecting the top and bottom bars 2 and 3 of the individual arms of the hub members 1, it is desired to be understood that the top bars of at least one pair of arms may be extended diametrically across the top member of the hub, as shown. In other respects, any suitable and approved construction may be employed whereby the necessary strength and rigidity shall be assured.

Each of the arms A is provided at the outer ends of its top and bottom members with sleeves or boxes 10 affording bearings for a vertical shaft 11 which may be provided with one or more set collars 12 to hold it in position against displacement. Each of the shafts 11 is equipped at its up-

per and lower ends adjacent to the upper and lower bars or members 2 and 3 of the arm A with frames 13, 14 supporting, respectively, a main sail 15 and a back sail or balance wheel 16. The sail carrying frames 13 and 14 are rigidly associated with the shaft 11, and said frames may be of any desired and appropriate construction, it being merely noticed that the frame 13 of the main sail is preferably of approximately triangular shape, and of large area, while the frame 14 is of relatively small area and of approximately rectangular shape. The triangular shape of the frame 13 is desirable in order to enable a frame of largest possible area to be used and to enable such frame to clear the wind mill tower and such obstructing parts as may be associated therewith. In other respects the precise construction of the sail carrying frames may be varied to suit the nature of the sails employed which may be of canvas, sheet metal or any other suitable material.

Each of the arms A is provided with stop members 17 slidably supported by means of keepers 18 and adapted to be projected in the path of the large sail carrying frames 13 so as to obstruct the rotation of the shafts carrying said frames in one direction. The stop members 17 are pivotally associated with a disk 19 supported for rotation upon one of the inclined braces 6, the stop members upon the upper and lower bars or members 2 and 3 of the arm A being pivotally connected with diametrically opposite sides of the disk 19 so that by turning the latter about its axis the two stop members may be simultaneously retracted or projected, as the case may be. A suitably arranged spring 20 is arranged to operate upon the disk 19 to rotate the latter in one direction so as to maintain the stop members 17 in projected position. Pivottally associated with the disk 19 is an arm 21 which is so arranged that pulling strain exercised upon said arm will operate to rotate the disk 19 and to place the spring 20 under tension, thereby retracting the stop members 17 from the path of the sail carrying frames, it being readily seen that by releasing the pulling strain upon the arm 21, the disk 19 will be restored by the action of the spring 20 to its initial position, thereby projecting the stops in the path of the sail carrying frames.

The arms 21 associated with the disks 19 of the several arms A of the wheel are connected by links 22 with a ring or annulus 23, said ring being supported for rotation with the wheel by means of guides 24 associated with the lower hub member 1. Suitably connected with the ring or annulus 23 is a relatively stationary ring 25 which is suitably supported for vertically slidable movement, it being understood that the ring 25 is connected with the ring 23 in such a manner

that when the ring 25 is raised or lowered the ring 23 will follow the movement thereof. Means, such as pull ropes 26, are provided whereby the ring 25 may be pulled in a downward direction. It will be seen that by pulling the ring 26 downward, the revolving ring 25 will likewise be pulled downward, thus exercising a pulling strain upon the link 22 and pulling the arms 21 and disks 19 against the tension of the springs 20, thereby retracting the stops 17 from the path of the sails. When the strain upon the rods or members 26 is released, the springs 20 will serve to restore the parts to initial position.

The wind wheel is supported by means of a shaft 27 suitably associated with the hub members 1, 1, said shaft being supported for operation by means of a ball bearing 27' upon the platform 28 of a suitably constructed tower 29. A counter shaft 30 supported between platforms 28 and 31 is adapted to receive motion by means of suitable gearing 32 from the shaft 27, said motion being transmitted in any suitable and convenient manner to a pump or other machinery that is to be driven.

In the operation of this invention, it will be seen that the sails or vanes at one side of the axis of the shaft 27 will be wholly exposed to the action of the wind. When the sail that is thus exposed swings into a position at which the edge of the main sail 15 is presented to the wind, it is obvious that the sail will present no resistance, and when this line is passed, the main sail will receive the action of the wind in such fashion as to cause the rotation of the carrying shaft 11 about its axis, the turning movement being gradual and free from shock, owing to the fact that the large main sail is counterbalanced by the relatively small back sail 16. When a one-half revolution of the shaft 11 is completed the sail will be presented edgewise to the wind, it being, however, the edge of the back sail that is presented to the direct action of the wind, the position of the sail being thus maintained until the frame of the main sail engages the stop 17. The continued movement now gradually swings the entire surface into a position where it is exposed to the action of the wind, the sail being maintained in proper position by the action of the stop 17 against the frame of the main sail which, as it presents a larger surface area than that of the back sail, will obviously prevent the sail carrying frame from turning about the axis of the shaft carrying said frame.

A wind mill constructed in accordance with the invention as herein described may be manufactured and erected at a very moderate expense, and it requires but slight attention, the mill being equally active and efficient without regard to the direction of

the wind. If it shall be desired to suspend the operation of the mill, the ropes or pull members 26 may be operated to retract the stops 17 from the path of the sail carrying frames which will thus all be permitted to swing edgewise to the wind, the edges of the back sails being obviously presented to the wind. To restore the mill to an active condition, it is only necessary to relieve strain upon the members 26 when the springs 20 will serve to restore the stop members 17 and related parts to initial position.

Having thus described the invention, what is claimed as new, is:—

15 In a wind mill of the character described, a wheel comprising upper and lower hub members and radial arms associated therewith, said arms being each composed of top and bottom bars and suitable spacing and
20 connecting means, truss wires including turn buckles connecting the several arms, a vertical shaft associated for rotation with each

radial arm, said vertical shafts having sail carrying frames, relatively large main sails and relatively small back sails supported 25 by said frames, said main sails and back sails being disposed at opposite sides of the axes of the vertical shafts, slidably supported stop members carried by the radial arms and adapted to be projected in the path of 30 the main sail carrying portions of the sail carrying frames, spring actuated disks supported for rotation and connected pivotally with the stop members, means connected with said disks to rotate them against the 35 tension of the springs to retract the stop members, and means for actuating the retracting means.

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

JOHN H. BAXTER.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."