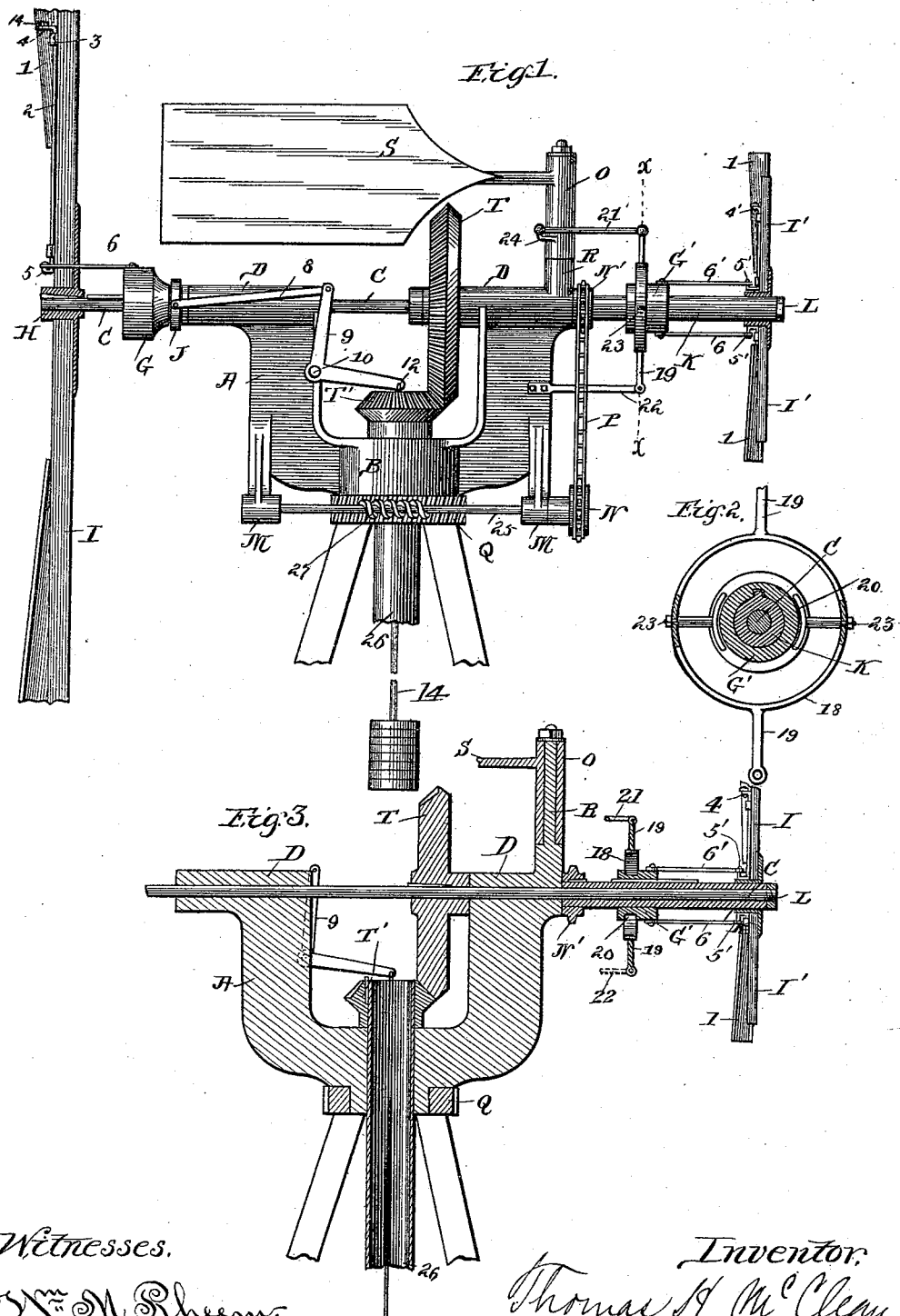


(No Model.)

T. H. McCLEAN.  
WINDMILL.

No. 490,359.

Patented Jan. 24, 1893.



Witnesses.

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# UNITED STATES PATENT OFFICE.

THOMAS H. McCLEAN, OF WASHINGTON, IOWA.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 490,359, dated January 24, 1893.

Application filed June 4, 1891. Serial No. 395,026. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS H. McCLEAN, a citizen of the United States, residing at Washington, in the county of Washington and State of Iowa, have invented a new and useful Improvement in Windmills, of which the following is a specification.

My invention relates to wind mills, and more particularly that class employed in grinding grain and for similar purposes; and its objects are to provide means for overcoming the resistance produced by the mechanism operated, and the material operated upon, which constantly tends to change the position of the fan wheel from a direct line before the wind, thereby causing it to lose considerable of its power. Also to automatically equalize the force and effect of the wind upon the fan wheel itself. I accomplish these results by the mechanism illustrated in the accompanying drawings in which:

Figure 1, represents a side elevation of my invention with portions of the principal fan wheel and the supplemental fan wheel cut away; Fig. 2, represents a cross sectional view of the collar G, and the various parts upon which it rests; Fig. 3, is a vertical longitudinal sectional view of Fig. 1, omitting the fan wheels.

Like letters and numerals of reference are used to designate similar parts in the several figures of the drawings.

In a companion application executed by me of the same date as this present application, and filed on the 4th day of June, 1891, Serial No. 395,026 I have described and claimed certain improvements in the construction of wind mills, the objects and purposes of which are more fully set out therein. The construction therein shown and described of the principal fan wheel is the same as that presented in this present application, with reference to the construction of the fan wheel, its blades and the various devices provided for keeping the fan wheel in position before the wind, and of automatically opening and closing the blades of the wheel before the wind. The construction of what I term the supplementary fan wheel in the invention described in this present application is identical with that of the main or principal wheel which is fully described in my said companion application

hereinbefore referred to; and it operates in the same manner as that just referred to, except that instead of employing the direct force of the wind upon the blades of the fan wheel, to cause them to open and be driven, I employ a tail, capable of being moved by the wind, and this performs practically the same function with reference to the supplementary fan wheel that the weight or spring does with reference to the principal fan wheel, as herein-after explained.

One of the difficulties heretofore experienced in grinding grain and other material by means of wind mills has been that the resistance to the motion of the fan wheel has caused it to shift around upon the gearing or other means provided for communicating power from the wind mill proper to the grinding mechanism, and, thereby to shift and change the position of the fan wheel before the wind. In my present invention I provide means whereby this resistance may be automatically overcome, and the principal fan wheel which communicates power, is kept constantly before the wind, and thereby operated to its maximum energy.

The letter A represents the frame provided with brackets M, M, having journals for a shaft 25, carrying a screw thread 27, which engages with a wheel Q. The frame A is also provided with bearings D, D, supporting the shaft C, which carries at each end respectively the principal and supplemental fan wheels. There is in this case, and in the pending application already referred to, located upon the shaft C a sliding collar G, which operates to close the blades of the fan wheels by means of connections, rods, levers, 8, 9, and pendent rod 14 which supports a weight, so that when the wind blows with sufficient force to overcome to a greater or less extent the suspended weight or spring, as the case may be, attached to the rod 14, the blades of the principal fan wheel open at an angle and power is at once applied through it to the grinding mechanism. This is accomplished by a gearing T which is rigidly fixed upon the shaft C and meshes with another bevel gear 26 extending below and being connected with the grinding or other mechanism in the usual manner. The toothed wheel Q is rigidly at-

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attached to the ordinary and usual frame work, upon which the whole frame A and superstructure may revolve. The frame A is also provided with a projection R upon which is fitted a sleeve O supporting a tail or blade S; this sleeve O being capable of revolving around the projection R.

N represents a sprocket wheel rigidly attached to one end of the rod 25, and N' represents another sprocket wheel rigidly attached to the sleeve K, which supports and carries the supplementary fan wheel; the sleeve K being adjusted to fit upon the shaft C and may rotate independently thereof. The two sprocket wheels N and N' are connected by a sprocket chain P. The supplementary fan wheel is rigidly located upon the end of the sleeve K and the blades are constructed in the same manner as those of the principal fan wheel, and are provided with means for opening and closing. The rods 6 and 6' provided with projections or crank arms, 4' and 5', are connected respectively to cross bars uniting the series of the fan blades and to straps 6' which are pivotally connected to the sleeve or sliding collar G' located upon the sleeve K. The sleeve G' is held in position and caused to rotate with the sleeve K by a spline, as shown in Fig. 3, but is capable of longitudinal movement upon said sleeve. It is provided with a groove in which are held the shoes 20 supported in a circular band 18, which band is provided with the arms 19. The band 18 is supported upon the shoes pivoted as shown at 23. One of the arms 19 is pivotally connected to an arm or strap 22 which is rigidly attached to the frame A. The upper arm 19 is pivotally attached to a rod 21 which is in turn pivotally connected with a projection or crank 24 on the sleeve O.

The arrangement and construction of the various parts connecting the rods that operate the fan blades of the supplemental fan wheel with the sleeve G and the projection or crank arm 24 of the sleeve O are such that when the tail or blade S is in a direct line with the axis of the shaft C, the blades of the supplemental fan wheel will also be in planes that are in a direct line with said axis, and the wind in passing through the supplemental fan wheel will have no effect thereupon.

Having thus described the construction of my invention, I now proceed to describe its mode of operation: When the principal fan wheel presents its inner face to the wind directly, its blades are forced open by the pressure thereof, and it rotates with the maximum force of the wind. When the resistance from the grinding mechanism below cause it to veer or shift from directly facing the wind, it changes the relative position of the shaft C to that of the tail or plate S. The moment this occurs, or the wind varies or changes from a direct line with the shaft C, which throws the plate S to the right or left as the case may be, it operates the sliding collar G' which is forced upon bars 6 operating upon

projections or crank arms 5, causing blades of the supplemental fan wheel to partly close to an angle to the wind, and it at once begins to revolve to the right or left as directed by plate S which communicates motion to the sprocket wheels N, N', and operates the screw 27 that engages in the toothed wheel Q and causes the frame A to swing around on its bearings the toothed wheel Q, until it brings the shaft C in direct line with the plate S which plate always remains in line with the wind. It is also evident that when the wind is not blowing with sufficient force to operate the principal fan wheel, it may still have force enough operating upon the tail or plate S to cause the supplemental fan wheel to rotate and keep the principal fan wheel constantly before the wind. It is further evident that when the wind blows with so great a violence as to be dangerous to the structure, or communicates too rapid revolutions to the wheels, so that they are in a direct line with the wind, and also controls the tail or blade S in such a manner that the blades of the supplemental wheel are also in a direct line with the wind; it being understood that in their normal position, and when the principal fan wheel is directly in the face of the wind, the blades of the supplemental fan wheel are open and in direct line with the wind so that the latter receives no motion therefrom.

It is evident that there may be many changes and variations in the details of the construction of my improvement without departure from the spirit of my invention, and I do not desire to limit myself to the precise details of construction shown. For instance it is evident that instead of the power received from the wind through the principal fan wheel being communicated to the operative mechanism of the wind mill by means of a gearing, T, T', other well known means such as a crank &c., may be employed; and, also, instead of employing sprocket wheels, N, N', and the sprocket chain P to communicate the motion of the supplemental wheel to the screw threaded rod 25 and thence to the toothed wheel Q and the frame A gearing or other well known means may be employed for accomplishing the same purpose and so in other parts.

Having thus described my invention, what I claim as new and desire to secure by Letters- Patent of the United States, is:—

1. In a wind mill a principal fan wheel provided with means for automatically opening and closing its fan blades depending on the force of the wind in combination with a supplementary fan wheel; a tail or blade, a shaft supporting both of said fan wheels, a frame carrying said shaft in bearings and supporting said tail or blade, and means whereby the movement of said tail or blade changes the planes of the fan blades of the supplemental fan wheel before the wind, and the latter fan wheel overcomes the resistance of the power applied by the principal fan wheel and keeps

the former fan wheel constantly before the wind; all substantially as shown.

2. In a wind mill a principal fan wheel whose fan blades are provided with means for automatically closing and opening before the pressure of the wind; a frame rotating upon a toothed wheel and provided with a rod or shaft having a screw thread engaging with said toothed wheel; a shaft held in said frame and carrying said principal fan wheel; means for communicating the motion and power of said shaft to the operative mechanism of said wind mill; and a tail or blade and a supplemental fan wheel with connections between said tail or blade and said supplemental wheel and means whereby forward or reverse motion may be given by the wind to the screw threaded shaft and its engaging toothed wheel and the principal fan wheel kept directly before the wind; all substantially as shown.

3. In a wind mill the combination of a frame rotatable upon a toothed wheel on the frame work of the mill and provided with journals and a screw threaded rod or shaft; a shaft held in journals of said frame; a principal fan wheel rigidly held upon one end of said shaft; means for communicating the power and motion of said principal fan wheel to the operative mechanism of said mill; a supplementary fan wheel supported on a sleeve on the other end of said shaft; a tail or blade movably supported by a sleeve upon a projection of said frame; and means connecting the sleeve of said fan or blade with the fan blades of the supplementary fan wheel whereby any change in direction of the axis of said tail or blade from that of the axis of the shaft changes the planes of the fan blades of the supplementary wheel; sprocket wheels rigidly located upon the shaft and the screw threaded rod or shaft, provided with an endless sprocket chain whereby the revolutions of the supplementary fan wheel caused by the wind operate the screw threaded shaft and toothed wheel engaging therewith, overcome the resistance of the operative mechanism and bring the tail or blade and the axis of the shaft into alignment in the direct course of the wind, all substantially as shown.

4. In a wind mill the combination of a frame having journals, a shaft supported in said journals, a fan wheel rotatable thereon; a sliding sleeve or collar upon the sleeve of said fan wheel provided with connections with the respective series of fan blades in said fan wheel whereby the movement of said sliding sleeve or collar on said main sleeve may open or close said fan blades; a ring or band pivotally supported by shoes moving in a groove in said sliding sleeve or collar and provided

with arms one of which is pivotally attached to the frame by a strap or rod; a tail or blade supported by a sleeve held and rotatable on a projection from the frame and provided with a crank arm which is pivotally connected by a strap or rod with the second arm of said ring or band; a toothed wheel supporting said frame, and a rod held in brackets having a screw thread engaging with said toothed wheel, and means for connecting and communicating the motion of the rotatable sleeve of the fan wheel to the screw threaded rod; whereby any change in the direction of the tail or blade with reference to the axis of the shaft changes the planes or faces of the fan wheel from direct lines to angles to the course of the wind and the forward or reverse motion of the fan wheel is communicated to the toothed wheel and the frame and the latter caused to rotate until the shaft and the tail or blade are again in line in the direction of the wind; substantially as shown.

5. In a wind mill the combination of a tail or blade S held by a sleeve rotatable upon a projection of the frame, said sleeve provided with an arm or crank having pivotal connections with the band J supported in a groove in the sliding sleeve G', said sliding sleeve being located upon the sleeve K, which carries the fan wheel and is rotatably held upon one end of the shaft C; connections between the sliding sleeve G' and the respective series of fan blades in the fan wheel whereby the change in direction of the tail or blade S with reference to the axis of the shaft changes the direction of the planes of the blades of the fan wheel and enables the wind to give a direct or reverse motion to said fan wheel; all substantially as shown.

6. In a wind mill, a frame and a shaft supported therein, a fan wheel supported on a sleeve held rotatably upon one end of said shaft, a sprocket wheel held rigidly upon the sleeve of said fan wheel, and a toothed wheel rigidly attached to said frame, and a rod supported in brackets attached to said frame provided with a screw thread engaging said toothed wheel; a sprocket wheel and sprocket chain engaging said two sprocket wheels, a tail or blade supported upon said frame and connections between said tail and blade and said fan or wheel whereby the motion of said fan wheel is communicated to said toothed wheel and frame and the latter caused to revolve upon its axis; all substantially as shown.

THOMAS H. McCLEAN.

Witnesses:

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