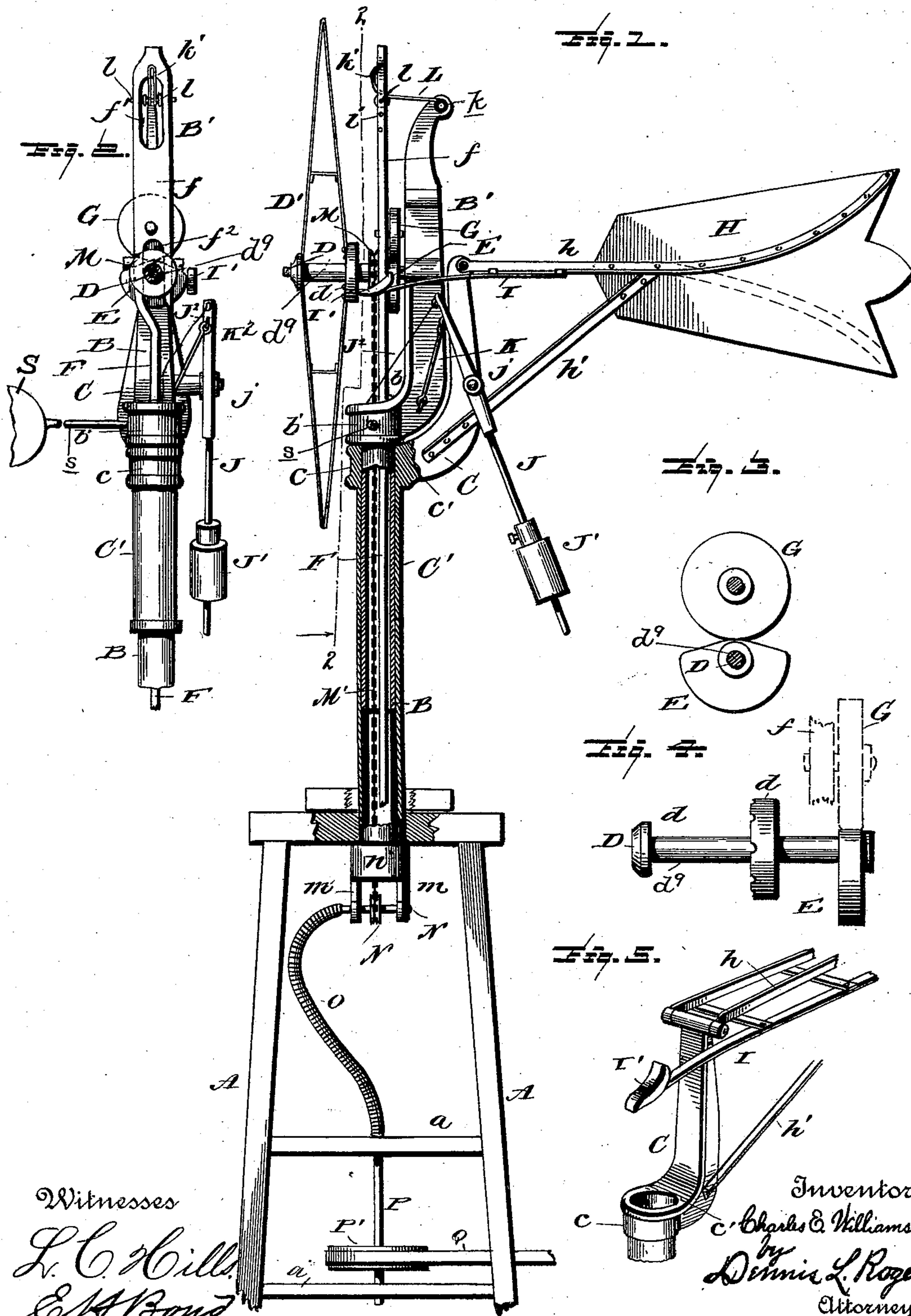


(No Model.)

C. E. WILLIAMSON.  
WINDMILL.

No. 517,674.

Patented Apr. 3, 1894.



Witnesses  
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# UNITED STATES PATENT OFFICE.

CHARLES E. WILLIAMSON, OF GRAND RAPIDS, MICHIGAN.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 517,674, dated April 3, 1894.

Application filed April 11, 1893. Serial No. 469,903. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. WILLIAMSON, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain 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 appertains to make and use the same.

This invention relates to certain new and useful improvements in wind wheels, and it has for its objects among others to improve generally the construction of the mill whereby the same is rendered less complex, more efficient in operation, and the cost reduced to a minimum consistent with satisfactory results.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation with parts broken away and others in section showing a wind wheel constructed in accordance with my invention. Fig. 2 is a vertical section on the line 2—2 of Fig. 1, looking in the direction of the arrows. Fig. 3 is a view of the cam and the wheel which it actuates. Fig. 4 is a detail in side elevation showing the wheel hub with its cam and in dotted lines the pitman and the wheel thereon. Fig. 5 is a perspective view of the main casting and turn table with its brake shoe.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the upper portion of the tower or support of any well-known construction, provided with the cross braces *a* for a purpose which will soon be made apparent.

B designates a tube supported in the upper part of the tower or support A and at its upper end carrying the casting B' which is offset as at *b* on the same side as the tail vane and thus the center of gravity of the wheel is brought nearer the center of the mill as will be readily seen from Fig. 1.

C is the tail vane casting having a tubular depending portion surrounding the tube B as seen in Figs. 1 and 2, and an enlarged portion *c* at the junction of the offset *c'* with the upper end of the depending portion C' and upon which the enlargement *b'* of the tube B rests as seen in Fig. 1.

D is a stationary shaft supported in the casting B' and upon this shaft the hub *d*<sup>9</sup> of the wheel revolves. This wheel D' may be of any well known or approved forms of construction, its hub *d* being shown only in Fig. 4. Fast on this hub of the wheel is the cam E which is of novel contour, being practically half a circle with the upper face on slightly inclined lines as seen in Fig. 3; this is important for the reason that by this shape I get a quick up stroke on the pump rod, then a rest and then a quick down stroke, thereby gaining a strong draft on the water to prevent the water drawing back past the plunger of the pump and by being held on the up stroke while the wheel makes a half revolution it gives a chance for the vacuum or space below the plunger to fill up with water before the down stroke is made, thus doing away with the pounding of the mill.

F is the pitman designed for connection with the pump rod in any suitable manner, or it may be a continuation of the pump rod; it is formed at its upper end with a flattened portion *f* which, at its upper end, is provided with an elongated opening *f'* as seen best in Fig. 2 and the object of which will soon be explained. The lower portion of the flattened portion is provided with a vertical slot *f*<sup>2</sup> which is offset from the lower portion of the pitman as seen in Fig. 2 and is open at its lower end as is also shown in said Fig. 2. This open-ended slot permits of the ready removal of the pitman when desired or of its being replaced without disturbing any of the other parts. This pitman has journaled thereon a wheel G which is arranged in vertical line with and designed to rest upon the cam E as seen best in Figs. 1 and 3.

H is the tail vane; it is held to the casting C in any suitable manner, as by the arms *h* and the inclined braces *h'*. It also has secured thereto the spring arm I which at its free end carries a brake shoe I' having a



curved face as seen best in Fig. 5 to act upon the hub of the wheel as the latter is thrown around.

J is the governor pivoted at *j* on a stud projecting from the casting C and upon one side of its pivot provided with an adjustable weight *J'*, its other end being provided with the chain or cord *J<sup>2</sup>* which is designed to lead to any desired place for the purpose of pulling or throwing the mill out of gear when desired. This governor arm is pivotally connected with the casting B' by means of the rod or link K pivotally connected at its ends with the said casting and arm as seen best in Fig. 1.

L is a spring having its ends coiled or otherwise fastened around a pin *k* projecting from the upper end of the casting B', and coiled around a pin *l* held in the walls of the opening *f'* in the upper end of the pitman as seen best in Fig. 2, the spring being bent upon itself at its center to form the loop *k'* which extends through the said opening and bears against the flattened portion of the pitman as seen in Figs. 1 and 2. This forms a guide for the pitman and cushions it on the down stroke and aids materially in preventing pounding of the mill.

The operation will be readily understood from the foregoing description when taken in connection with the annexed drawings, and a further detailed description thereof is not deemed necessary.

The pin *l* on which the spring L is supported in the pitman may be readily adjusted into any one of the sets of holes *l'* shown in Fig. 1 to regulate the tension of the spring.

In order that power may be transmitted from the wheel shaft I have provided on the hub thereof a sprocket wheel M over which passes the sprocket chain M' which also passes over the sprocket wheel N on the shaft N' held in the depending lugs *m* which depend from the enlarged portion *n* of the tube *c* as seen in Fig. 1. This shaft is extended at one end and has connected therewith the coiled spring or flexible shaft O which communicates motion to the vertical shaft P supported

in the cross braces *a* of the tower and which carries the band pulley P' from which motion is conveyed to any desired place by means of the belt Q all as shown in Fig. 1. It will thus be seen how motion is imparted and that the flexible shaft or spring permits of the rotation of the shaft P regardless of the varying movements of the wind wheel.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

S is the auxiliary vane; it stands at a right angle to the tail vane and is carried by the arm *s* which is held in the casting B' as seen in Figs. 1 and 2. It is for the purpose of working automatically against the governor to carry the wheel more or less out of the wind as the pressure is against it to regulate the motion; it is placed at the bottom of the wheel instead of at the center; it is designed to be adjustable more or less away from the center according to the strength of the wind currents in different localities. It automatically controls and regulates the motion of the mill and in its action is similar to a governor on an engine.

What I claim as new is—

1. The combination with the main casting having an offset, to the rear only of the vane casting having a like offset, and the wind wheel carried by a shaft journaled in the first-mentioned casting whereby the center of gravity of the wheel is brought near the center of the mill, substantially as specified.

2. The combination with the wind wheel and its casting having offset to the rear only, of the tail vane and its casting having a like offset, the arm held in the said offset, and the auxiliary vane carried by the wind wheel casting at right angles to the tail vane near the bottom or lower edge of the wind wheel, substantially as shown and described.

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

CHARLES E. WILLIAMSON.

Witnesses:

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