(No Model.)

2 Sheets—Sheet 1.

H. A. FRENCH.

WINDMILL.

No. 500,483. Patented June 27, 1893.

Fig. 2.

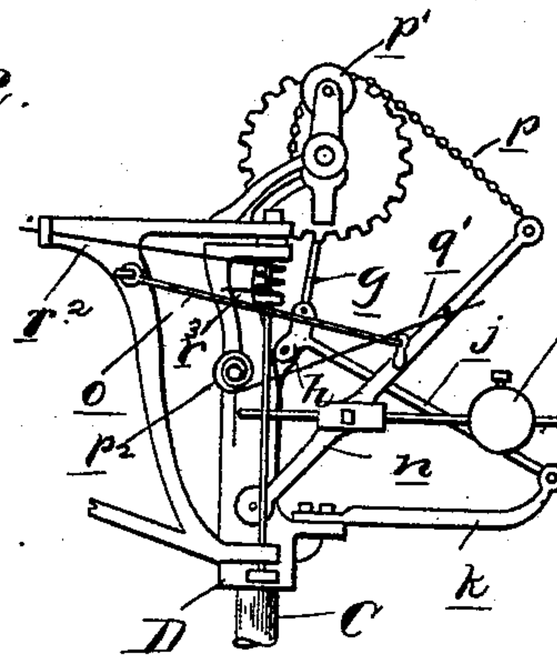
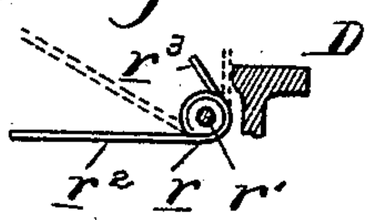


Fig. 10.



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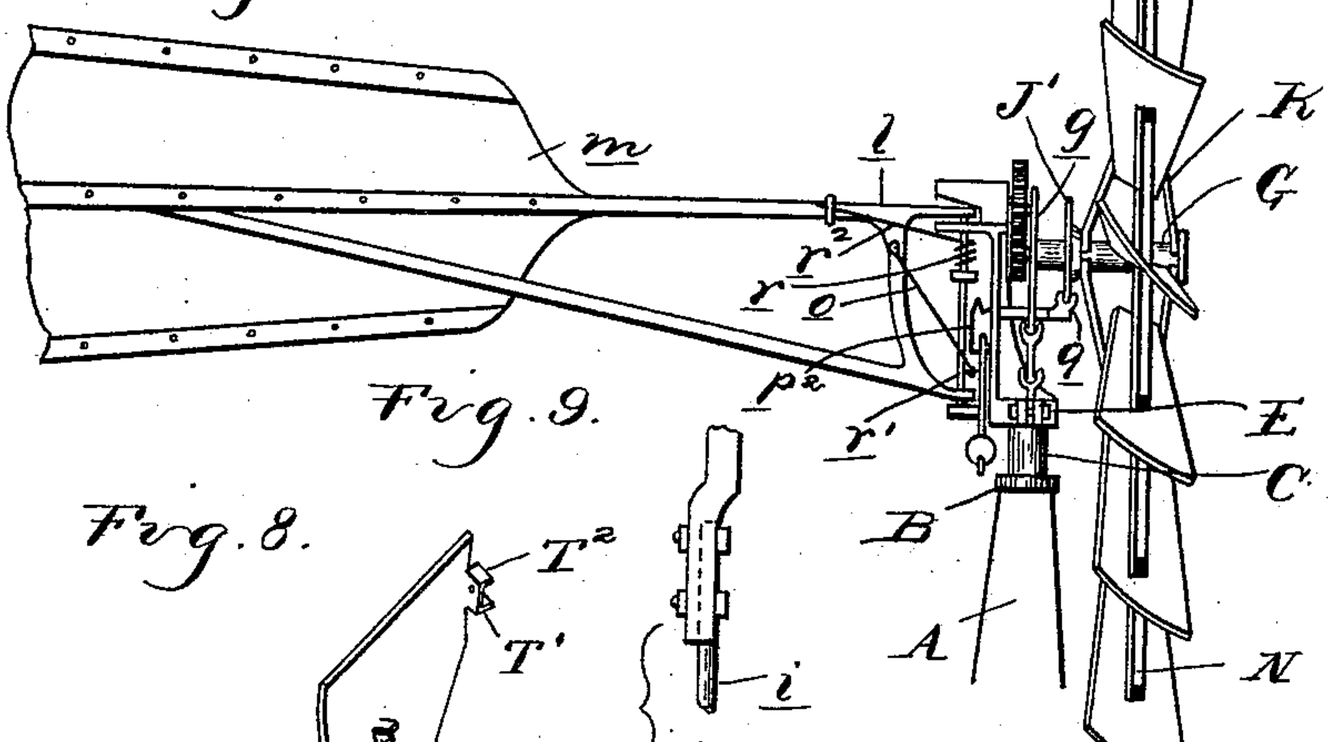
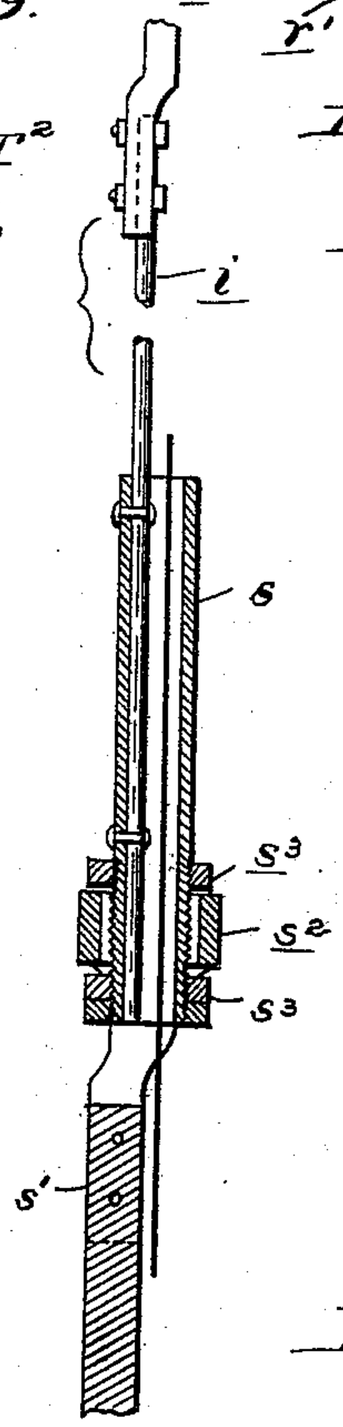


Fig. 9.

Fig. 8.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

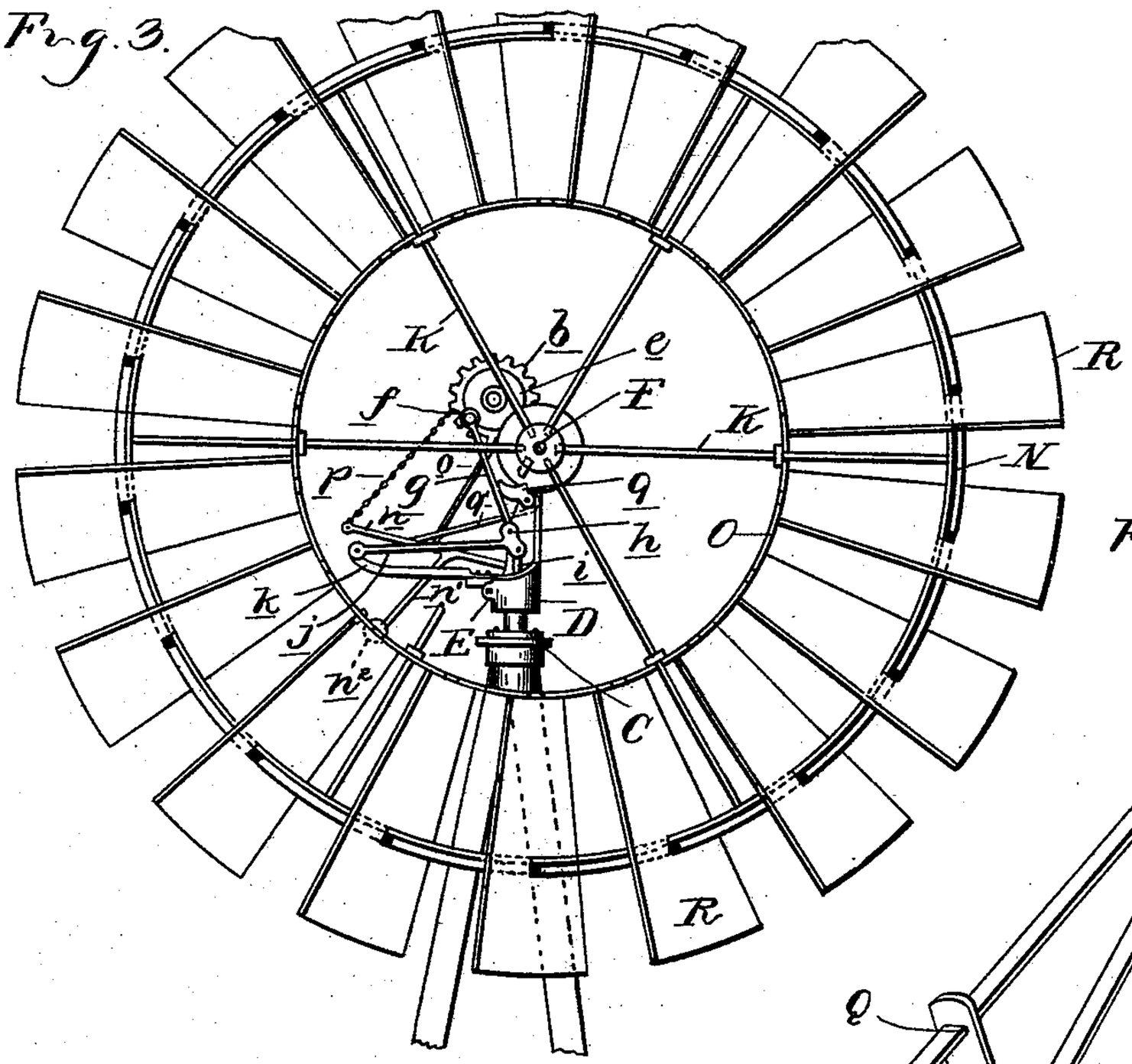

Fig. 1.

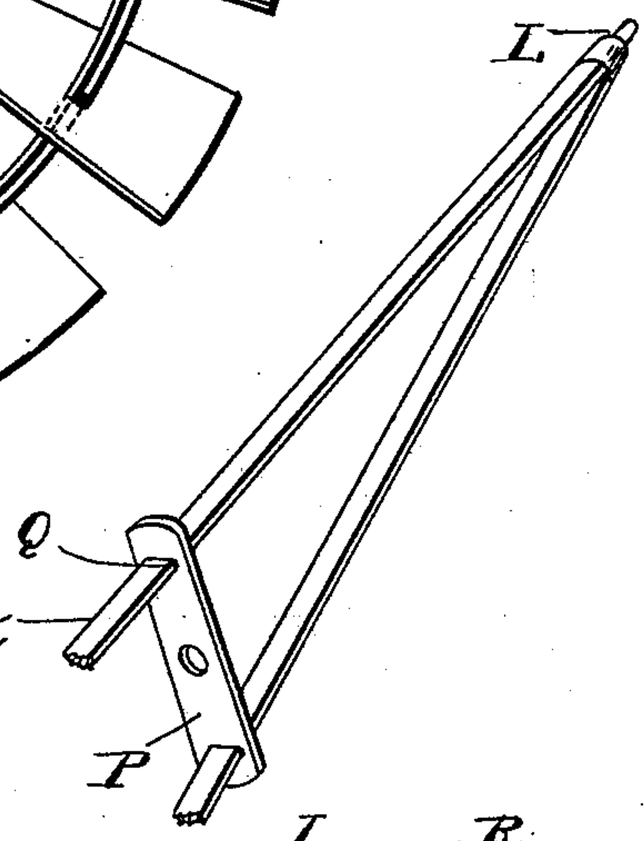

Fig. 6

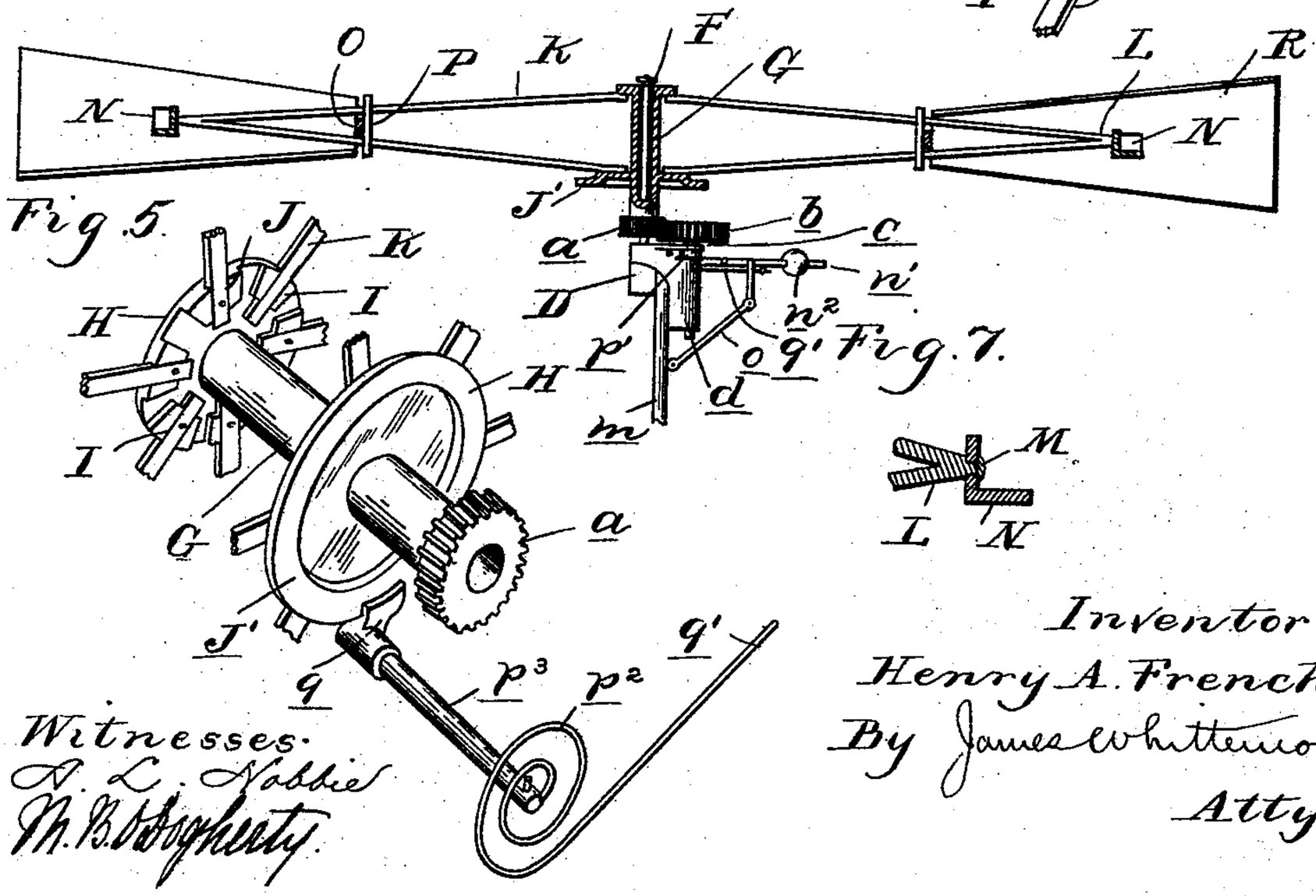

Fig. 5.

Fig. 7.

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UNITED STATES PATENT OFFICE.

HENRY A. FRENCH, OF LANSING, MICHIGAN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 500,483, dated June 27, 1893.

Application filed March 11, 1892. Serial No. 424,523. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. FRENCH, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented certain new and useful Improvements in Windmills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in windmills, and the invention consists in the peculiar construction, arrangement and combination of the various parts all as more fully hereinafter described.

In the drawings, Figure 1 is a side elevation of my improved mill. Fig. 2 is a rear elevation showing the parts with the tail vane turned to one side and broken away. Fig. 3 is a front elevation. Fig. 4 is a plan view partly in section. Fig. 5 is a detached perspective view of the wheel, spider and brake. Fig. 6 is a detached perspective view of the braces for connecting the fans to the spider. Fig. 7 is a section through the connection between such braces and the circular frame of the wheel. Fig. 8 is a detached perspective view of one of the fans of the wheel. Fig. 9 is a vertical central, longitudinal section through the pump rod. Fig. 10 is a detail more specifically referred to hereinafter.

A is the tower, at the top of which my windmill is secured. B is the cap secured at the top of the tower. C is a pipe standard stepped in the tower and turning in the cap B, these parts being of any known and usual construction.

To the top of the pipe C is secured the main casting D of the windmill, being preferably a split casting clamped upon said pipe by means of the clamping bolt E. At the top of the casting is secured the forwardly extending shaft F, upon which is journaled the wind wheel. The wind wheel consists of a tubular sleeve G journaled upon the shaft F and having separated flanges H formed thereon, as shown in Fig. 5. These flanges are provided with lugs I having radially extending slots J between them in which the ends of the braces K are secured, these braces being inclined toward each other and at their outer ends L secured together, as plainly shown in Fig. 7 and preferably having the rivet M formed integral therewith, which rivet passes through one leg of the circular angle iron frame N.

O is an inner circular frame arranged between the two braces and secured to the cross braces P which braces are provided with apertures Q and sleeved upon the braces K.

The construction so far described makes a rigid frame of metal to which the fans or vanes R are secured. These fans are made of sheets of metal tapering from the outer end toward the inner with a gradually increasing angle of resistance from the inner end to the outer. This latter arrangement gives me the greatest power at the widest part of the fan which is at the end and thereby enables me to get the most benefit from the wind. These fans are secured to the frame by striking out a lug T near the outer end thereof, forming an aperture through which the angle metal frame is passed, the fan being riveted to that frame through the lug T, as plainly shown in Fig. 1; at the lower end of the fan a lug T′ is formed preferably with flanges T^2 on the side adapted to embrace the circular frame O and riveted thereto, as plainly shown in Figs. 3 and 4. This gives me a construction of wheel, trussed to withstand strains in all directions, light and best calculated to obtain the greatest power from the wind.

At the inner end of the sleeve G is secured a pinion *a*, which meshes with a gear wheel *b* journaled upon the shaft extension *c*, secured to the extension *d* of the main casting D. This gear wheel it will be observed is arranged slightly to one side of the center of the tower with the section *e* arranged substantially over such central point and it is provided with a crank pin *f*, to which a pitman *g* is pivoted. This pitman at its lower end is connected to the shackle *h* which is pivoted to the upper end of the pump rod *i*. The shackle *h* is formed at the inner end of the lever *j* which is pivoted to the arm *k* secured to the lower end of the main casting, as plainly shown in Fig. 3.

It is evident that the rotation of the wind wheel will turn the pinion and gear wheel, which through the medium of the crank pin and the pitman will vertically reciprocate the pump rod, it being observed that when the crank pin is passing through the section *e*

which is the point in which it is doing its work of lifting the water, it will be drawing in an almost perfectly straight line upon the pump rod.

In passing from the section *e* through the rest of its movement, the crank pin will cause the pitman to assume an abnormal degree of angularity in relation the pitman rod, and this is prevented from affecting the pump rod by the use of the lever *j*, which prevents the upper end of the pump rod from moving laterally except to an amount equal to the arc of the circle of which the lever *j* is a radius.

Pivoted to the rear of the main casting is the frame *l* forming the support for the tail vane *m*.

n is a lever pivoted at the lower end of the main casting and extending laterally therefrom, as shown in Fig. 3, provided with an arm *n'* upon which a weight n^2 is adjustably secured. The lever *n* being connected by the connecting link *o* with the tail vane frame, the weight acts to hold said tail vane normally at right angles to the plane of the wheel. The tail vane being set one side of the center of the wheel an unequal pressure is brought upon one side of the wheel, which causes the wheel to turn out of the wind, lifting the weight n^2 into the position shown in Fig. 2, the inner end of the arm *n'* forming a stop to limit the motion of the tail vane toward the wheel.

p is a chain secured to the outer end of the lever *n* and passing over the sleeve *p'* journaled at the upper end of the frame, and downward to the ground, by means of which the mill may be drawn out of the wind from below.

In order to prevent the turning of the wheel when out of the wind I apply a brake by means of a spring p^2 coiled about the shaft p^3 journaled in the side of the frame and carrying the brake head *q* at its other end, this shoe having a groove adapted to embrace the flange of the disk, J' of the wind wheel. This spring has an arm *q'* engaging with the lever *n* whereby when said lever is raised by the turning out of the wind of the wheel, the spring will turn the shaft p^3 and cause the brake head *q* to impinge upon the flange of the disk J' and prevent the wheel from turning while in this position.

r is a spring sleeved upon the pivotal shaft *r'* of the tail vane and having the arm r^2 engaging with said vane and another arm r^3 standing in such relation to the main casting that the wheel may be turned partially out of the wind without causing the spring to act, but where it approaches the proper relation to the tail vane the spring will be pressed against the main frame, and as soon as the wind has diminished will act to restore the parts to their normal position; (as shown in Fig. 10.) Thus the wheel may be turned partially out of the wind to avoid damage in sudden gusts of wind with comparative ease, but when the wind is heavy enough to move it clear it will need to be sufficient to compress the spring which will act to promptly move it into the wind as soon as the wind has diminished to a safe point. The pump rod *i* is secured to the tubular head *s* which passes inside of the main pipe C of the wheel, and is swiveled in the upper end of the wooden pump rod *s'*, the collar s^2 being formed therein slightly at one side, and the head being journaled in the collar, rings s^3 engaging the screw portion of the head *s* above and below the collar to prevent its disengagement.

What I claim as my invention is—

1. A wind wheel blade consisting of a sheet metal blade having a struck up flange at or near its center and an aperture beside the flange, and a right angle securing flange integral with its lower end having struck up side flanges T^2, substantially as described.

2. In a windmill, the combination of the main casting, the wheel journaled therein and having a drive pinion turning therewith, a drive gear journaled slightly to one side and meshing therewith, a crank pin thereon, a pitman pivoted at its upper end to the pin, a shackle at the lower end of the pitman, the pump rod connected to the lower end of the shackle, and a laterally extending lever on which the shackle is formed and a fixed pivotal connection for the outer end of the lever, substantially as described.

3. In a windmill, the combination of the hub, separated flanges thereon, braces secured to each flange, and extending outwardly from the hub, and inclined inwardly with the ends of each pair secured together of the rivet M formed integral with the outer ends of braces, and the circular frame N to which the braces are secured by said rivet, substantially as described.

4. In a windmill, the combination of the main casting, the tail vane pivoted thereon, the wheel, the lever *n*, the rod *o* connecting said lever to the tail vane, the rod *n'* engaging with the lever, and the weight adjustably secured thereon, substantially as described.

5. In a windmill, the combination with the main casting, the tail vane pivoted thereto, the wheel, the brake *q* on the shaft p^3 and the spring p^2 connected to the throwing-out lever, and to the shaft p^3, substantially as described.

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

HENRY A. FRENCH.

Witnesses:
M. B. O'DOGHERTY,
N. L. LINDOP.