

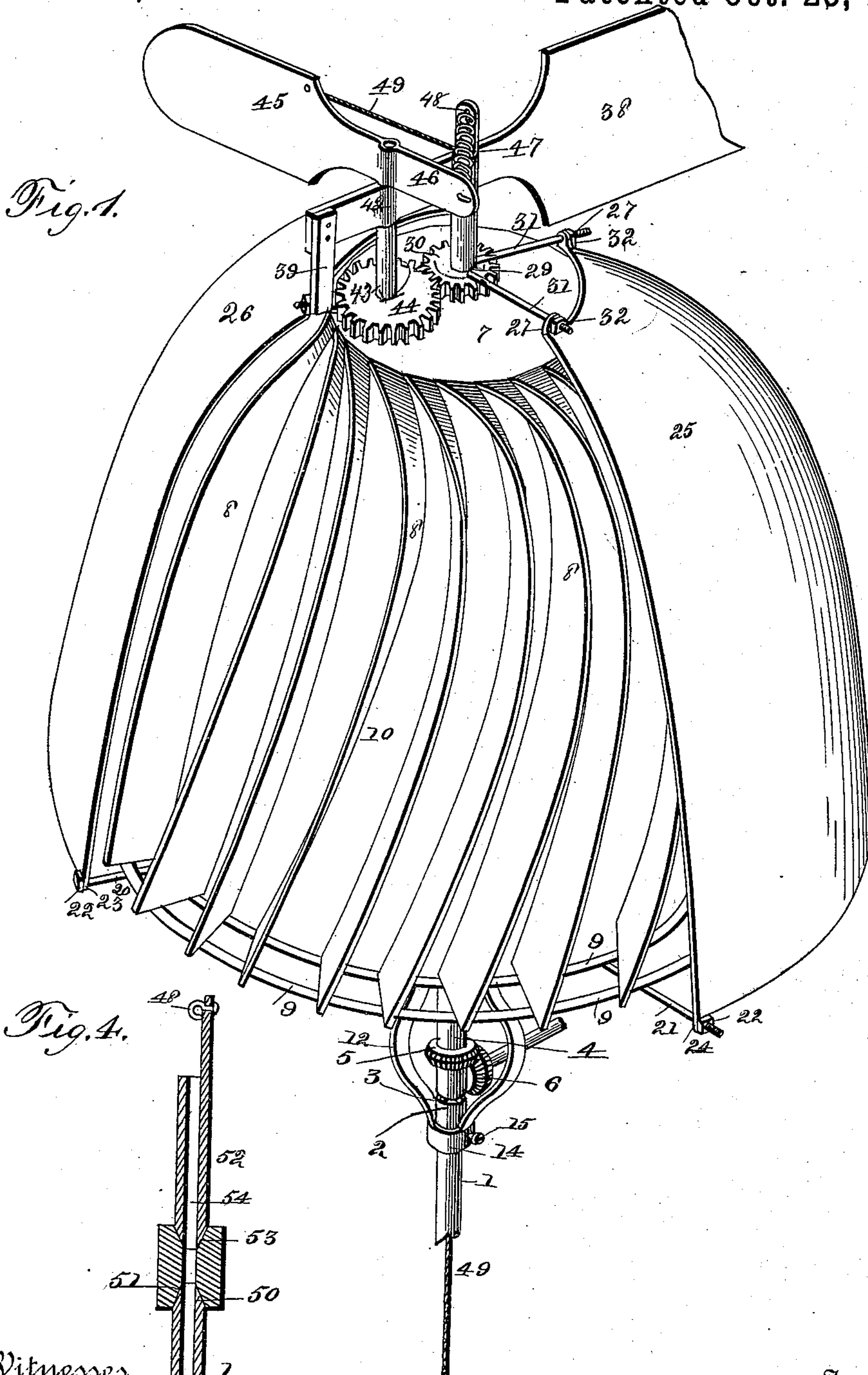
(No Model.)

2 Sheets—Sheet 1.

G. HENDERSON.  
WINDMILL.

No. 372,148.

Patented Oct. 25, 1887.



Witnesses  
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Inventor  
George Henderson,  
By his Attorney,  
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(No Model.)

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Fig. 2.

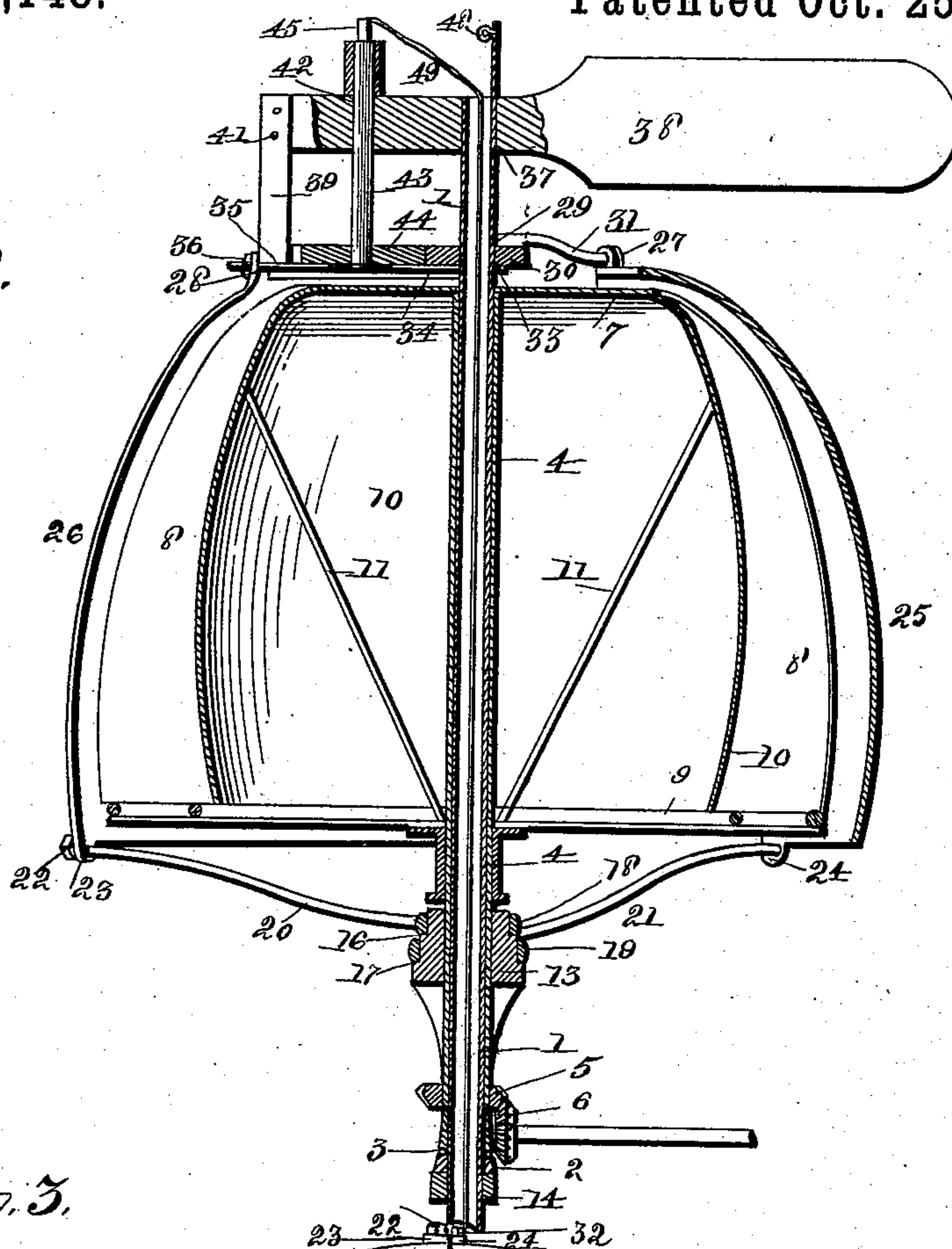
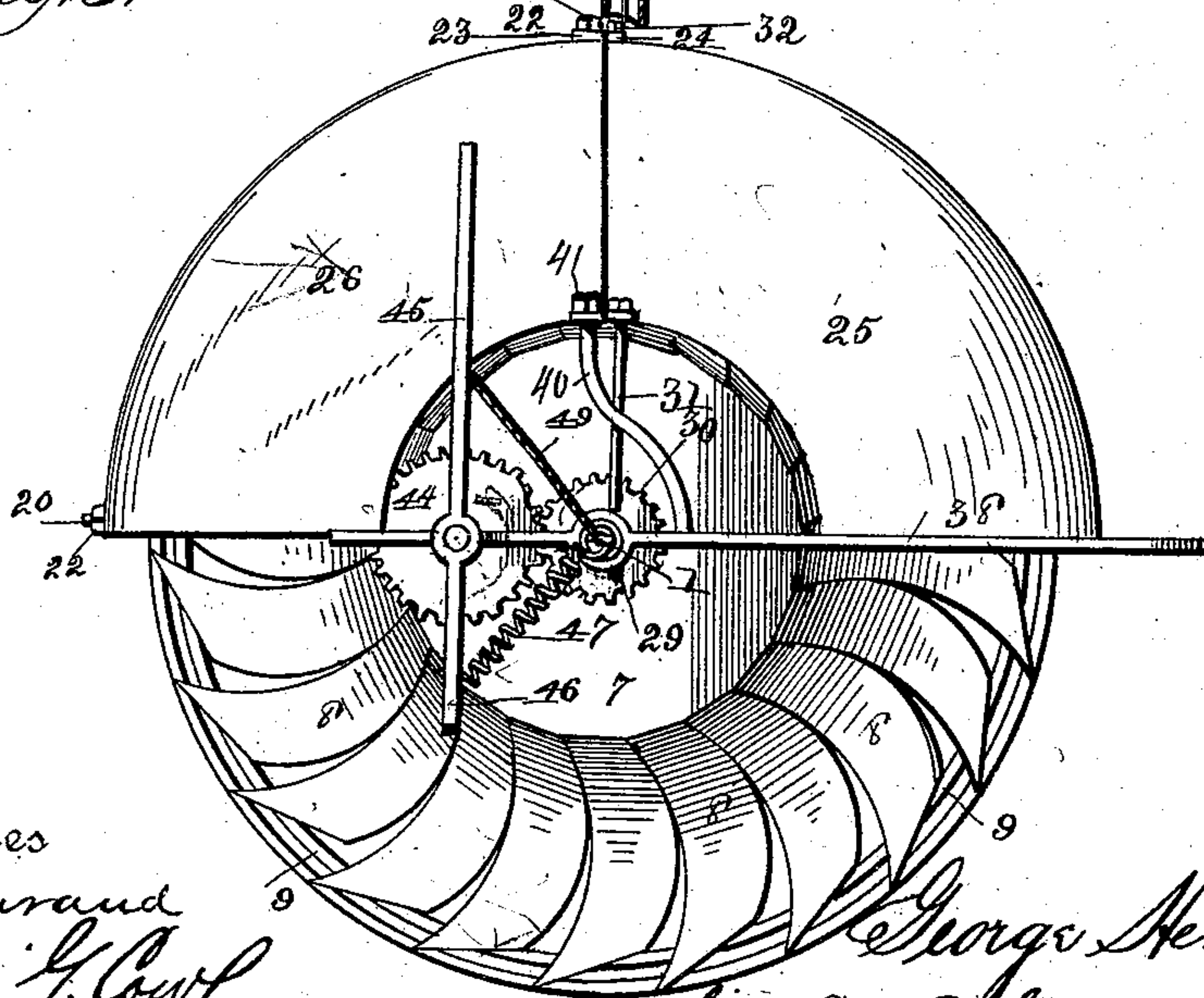


Fig. 3.



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# UNITED STATES PATENT OFFICE.

GEORGE HENDERSON, OF PORTLAND, OREGON.

## WINDMILL.

SPECIFICATION forming part of Letters Patent No. 372,148, dated October 25, 1887.

Application filed April 18, 1887. Serial No. 235,189. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE HENDERSON, a citizen of the United States, and a resident of Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of my improved windmill. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a top plan view, and Fig. 4 is a vertical sectional view, of a modified form of the shaft of the mill.

Similar numerals of reference indicate corresponding parts in all the figures.

My invention has relation to that class of windmills in which the wheel revolves in a horizontal plane, and in which inclined vanes are arranged in a rounded cone having one side covered so as to allow the wind only to bear against the vanes of one side; and it consists in the improved construction and combination of parts of such a windmill, as hereinafter more fully described and claimed.

In the accompanying drawings, the numeral 1 indicates a vertical shaft secured suitably in the supporting frame of the mill, and this shaft has a collar, 2, provided with anti-friction rollers 3 in its upper edge, against which the lower end of a sleeve, 4, turning upon the shaft, bears. The lower end of this sleeve is provided with a suitable beveled gear, 5, meshing with another pinion, 6; or the sleeve may be provided with any other suitable means for conveying and converting motion imparted to the sleeve. The sleeve is provided at its upper end with a disk, 7, to which the upper narrower ends of the twisted vanes 8 are secured, the lower wider ends of the vanes being secured at an angle to the radii of the wheel to hoops or rings 9, supported by means of radiating arms upon the sleeve, two hoops or rings being preferably supported upon the arms in the same horizontal plane. The inner side of the rounded cone formed by the vanes is covered with a rounded conical lining, 10, which bears against the inner edges of the vanes and is braced by means of oblique braces 11, supported at the inner ends of the radiating arms

and projecting to the disk at the upper end of the wheel. An open frame, 12, is secured upon the vertical shaft below the collar supporting the sleeve of the wheel, and the upper and lower ends of this frame are formed into vertical bearings 13 and 14, the upper bearing having the sleeve journaled within it, and the lower bearing being secured to the vertical shaft by means of a suitable set-screw, 15. The upper bearing of the frame is formed with two annular steps, 16 and 17, the upper step, 16, being of a less diameter than the lower step, 17, and two collars, 18 and 19, are journaled, respectively, upon the upper and lower step. These collars are provided each with two radiating arms, 20 and 21, and the outer ends of these arms are provided with nuts 22, and are secured, respectively, in eyes 23 and 24, projecting from the lower edges of two shields, 25 and 26, fitting each over one-fourth of the surface of the conical wheel, and having upwardly-projecting eyes 27 and 28 at their upper ends. The one 25 of the shields is formed with a vertical bearing, 29, in the center of a pinion, 30, to which pinion two arms, 31, are secured, and have their outer ends provided with nuts 32, and secured in the eyes of the shield, thus securing the bearing to the shield, the said bearing being journaled upon the upper end of the vertical shaft, and a vertical bearing, 33, is formed at the inner end of a flat bar, 34, and is journaled upon the shaft below the pinion, and has an outwardly-projecting screw-threaded arm, 35, to which one of the eyes 28 of the other shield, 26, is secured by means of nuts 36. The upper end of the vertical shaft has a sleeve, 37, journaled upon it, and a guide-vane, 38, is secured to this sleeve, and has its forward end secured to the upwardly-projecting arm 39 of the flat bar, and has the inner end of an arm, 40, secured to its rear portion, the outer end of which arm has the other eye of the shield 26 secured upon it by means of nuts 41.

The forward arm of the guide-vane or steering-vane is formed with a vertical bearing, 42, in which a shaft, 43, is journaled, and the lower end of this shaft has a cog-wheel, 44, secured upon it, meshing with the pinion upon the central shaft, the lower end of the eccentric-shaft having the cog-wheel being journaled in the radiating-arm.

The upper end of the eccentric-shaft is provided with a regulating-vane, 45, which nor-



mally stands at a right angle to the steering-vane, and this vane is provided with a forwardly-projecting arm, 46, to which a coiled spring, 47, is secured, the said spring having its other end secured to an eye, 48, upon the upper sleeve or thimble upon the vertical shaft, the spring thus serving to keep the regulating-vane at a right angle to the steering-vane, the latter vane being considerably larger than the regulating-vane, so that it will at all times overcome the effect of the wind upon the regulating-vane.

The steering-vane being turned by the wind, will bring the shield 26 to cover the fourth of the surface of the wheel at one side of the line of the direction of the wind, and when the regulating-vane is in its normal position the other shield will cover the other fourth of the wheel to the rear of the first shield, so that one side of the wheel is covered and the other half is uncovered and open for the action of the wind, which in this manner will pass along the said uncovered side, and will, by striking the vanes, revolve the wheel.

When the wind becomes strong enough to force the regulating-vane backward, the cog-wheel, meshing with the pinion, will cause the said pinion and the shield to be revolved, bringing the shield around upon the formerly unprotected side, and as the shield is brought forward by the wind increasing in strength it will gradually cover the exposed side of the wheel, and consequently prevent the wind from acting upon the vanes, so that the speed of the wheel may not be too much increased, the spring being adjusted to allow the shield to be turned forward and to cover the wheel in such a manner that the speed of the wheel will not be increased by the increasing force of the wind. It follows that as the wind will decrease in force after the shield has been turned forward the said shield will be turned back by the force of the spring.

The central vertical shaft is hollow, and a cord or chain or wire, 49, is passed through the shaft from the upper end and passes to the long arm of the regulating-vane, where it is secured; and it will thus be seen that by drawing downward upon the said cord or wire the regulating-vane may be tilted or drawn around, turning the shield to cover the side of the wheel facing the wind, so that the wheel may be stopped.

If desired, the central vertical shaft may be formed with a conical upper end, 50, upon which fits a correspondingly-shaped socket, 51, secured within the tube of the wheel, and a short vertical central shaft, 52, has its lower conical end pivoted in a socket, 53, formed in one with the other socket, and has the guide-vane secured to it and the pinion turning upon it. The shafts are formed with an axial bore, 54, similar to the axial bore of the vertical central shaft of the other form, and has the cord or wire passing through it in the same manner.

The parts of the above-described form operate in the same manner as in the first-described form; but in this form the friction of the wheel is carried upon the conical point of the shaft, instead of upon the anti-friction rollers in the collar upon the central shaft.

If desired, the inner lining of the conical wheel may be omitted, the said lining merely serving to exclude the wind from the interior of the wheel, although it will operate with nearly the same ease without the lining.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A wind-wheel shaped as a rounded cone and having inclined vanes secured at the top and bottom of the cone, in combination with a shield at one side of the cone, covering the same, said shield being in two parts, which are adapted to be moved toward or away from each other around the wheel, as and for the purpose shown and set forth.

2. In a wind-wheel, the combination of a rounded cone having vanes secured obliquely to its surface and journaled to revolve in a horizontal plane, a rounded shield covering one-fourth of the surface of the cone and pivoted to the central shaft to revolve around the cone, and having a guide-vane connected to it and standing in the same plane as the forward edge of the shield, and another shield covering one-fourth of the surface of the cone and pivoted upon another shaft and adapted to revolve around the cone, and having means, substantially as described, for bringing it forward by the increasing strength of the wind, as and for the purpose shown and set forth.

3. In a windmill, the combination of a rounded cone having vanes secured obliquely to its surface and journaled to revolve in a horizontal plane, a frame radiating from the upper end of the central shaft of the cone and journaled upon the same, having a rearwardly-projecting vane, and having a rounded shield supported from it, covering one-fourth of the surface of the cone, a vertical shaft journaled in the frame and having a cog-wheel upon its lower end, a pinion journaled upon the upper end of the central shaft and having arms supporting a shield covering one-fourth of the surface of the cone and meshing with the cog-wheel, and a regulating-vane secured upon the upper end of the eccentric vertical shaft and having a spring for holding it at a right angle to the guide-vane when not influenced by the wind, as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

GEORGE HENDERSON.

Witnesses:  
S. M. GILMAN,  
JOHN GIBSON.