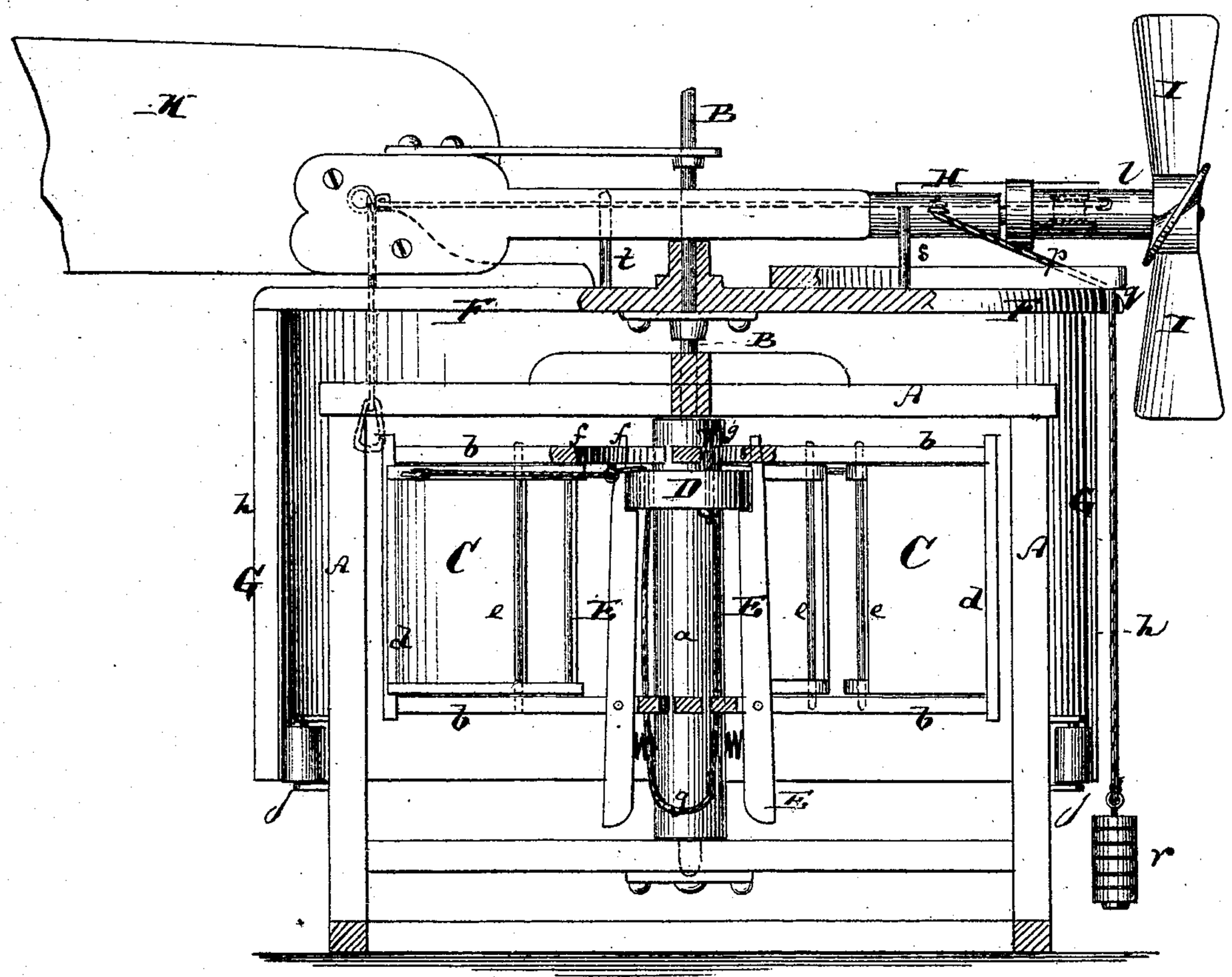
2 Sheets--Sheet 1.

J. P. DAVIE & A. MORGAN.

Wind-Mills.

No. 145,158. Patented Dec. 2, 1873.

Fig. 1



Witnesses
John Becker
Fred Haynes

J. P. Davie
Asa Morgan
by their Attorneys
Brown & Allen

2 Sheets--Sheet 2.

J. P. DAVIE & A. MORGAN.

Wind-Mills.

No. 145,158. Patented Dec. 2, 1873.

Fig. 2.

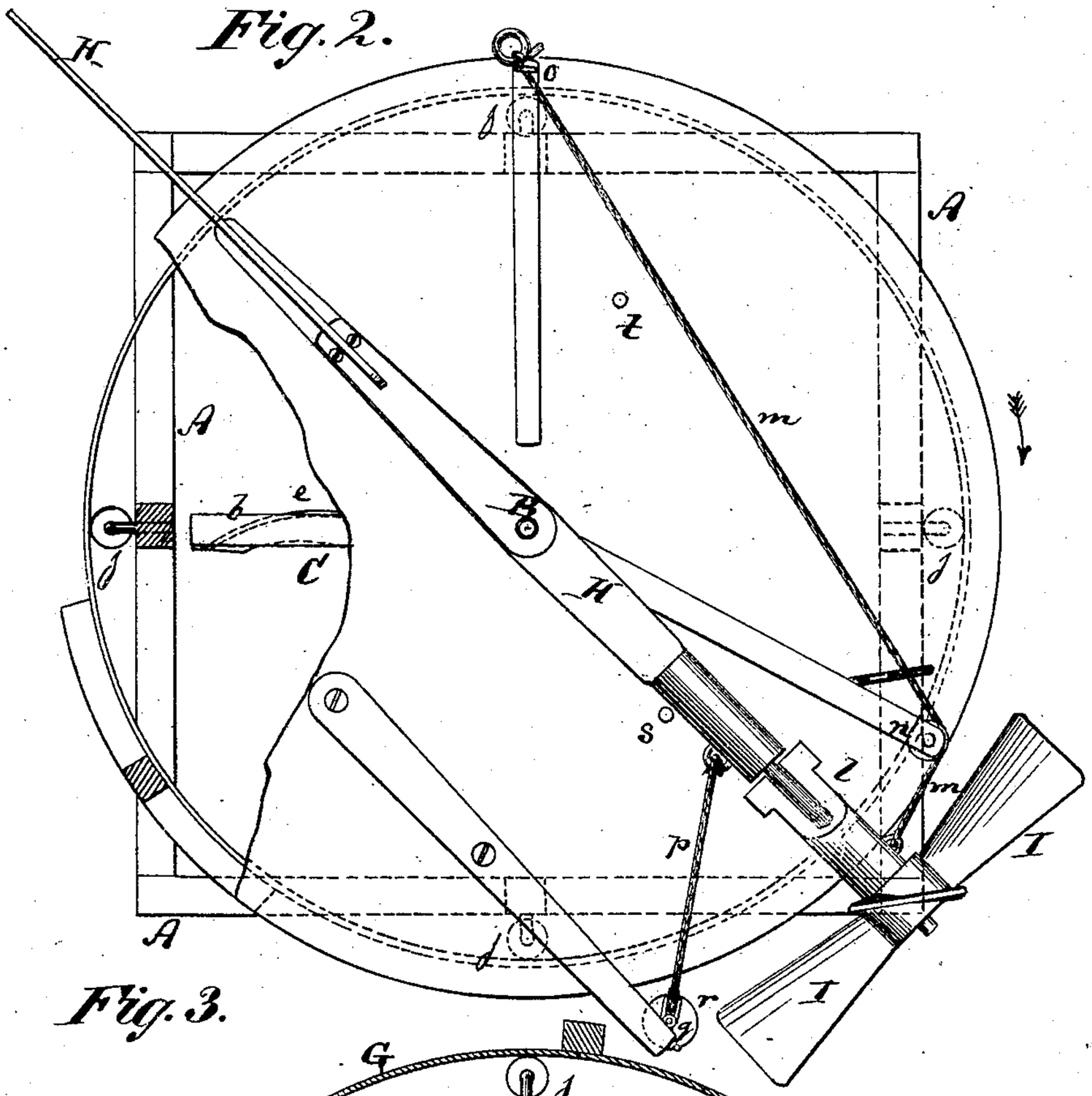
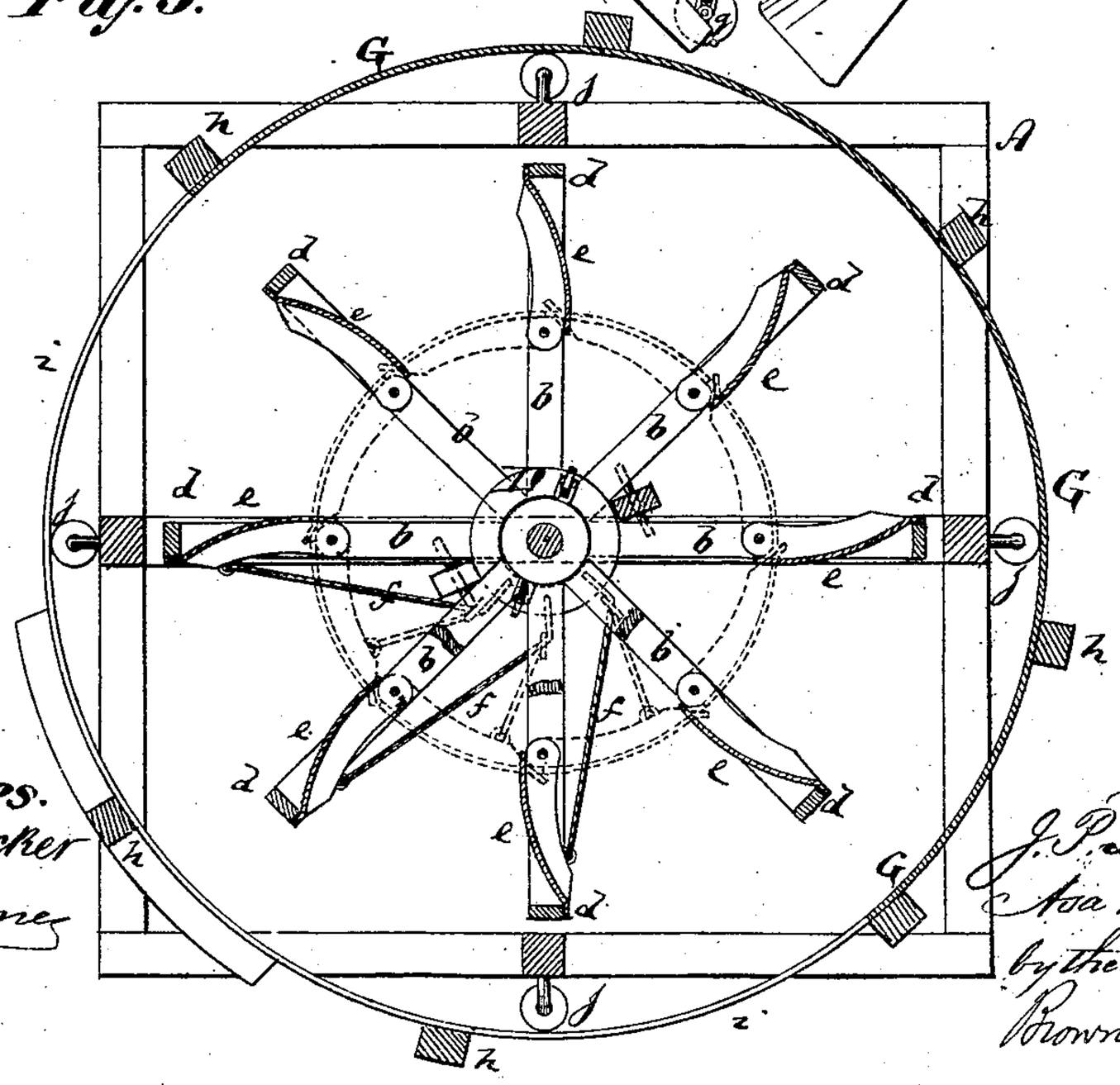


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN P. DAVIE, OF GALVESTON COUNTY, AND ASA MORGAN, OF CEDAR BAYOU, TEXAS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **145,158**, dated December 2, 1873; application filed October 7, 1873.

To all whom it may concern:

Be it known that I, JOHN P. DAVIE, of Galveston county, Texas, and ASA MORGAN, of Cedar Bayou, in the county of Chambers and State of Texas, have invented an Improved Windmill, of which the following is a specification:

Figure 1 is a side elevation, partly in section, of our improved windmill. Fig. 2 is a plan or top view, partly in section, of the same. Fig. 3 is a horizontal section of the same.

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

The object of this invention is to produce a self-regulating windmill, so arranged that it will automatically exclude the wind from the wheel during storms and irregular or sudden squalls of wind, while it will equally enlarge the opening through which the wind is admitted to the wheel, whenever the power of the wind is reduced. Another object of the invention is to so construct a wind-wheel that its buckets can be readily put into or out of operation. Our invention consists, first, in arranging the vertical wind-wheel within a shell or shield of semi-cylindrical form, said shield being hung on the wind-wheel shaft to turn readily thereon, and in so connecting the vane, which is fitted upon the same shaft, above the shield, with said shield that a small wind-wheel mounted upon the vane will control the position of the shield, turning it over the wind-opening during heavy gusts or squalls of wind, allowing it, however, to enlarge the wind-opening during comparative lulls. Our invention also consists in a novel construction of wind-wheel proper, the same being composed of a series of concave buckets pivoted on radial arms, and so shaped that when folded together they will constitute a complete cylinder around the wind-wheel shaft. These buckets are connected, by suitable springs, with a weight embracing the shaft, said weight being locked in its uppermost position by spring-levers. When disengaged from these levers the weight drops and draws the buckets closed, preventing the wheel from operating, while, when the weight is again raised by suitable cords with which it is connected it will allow the buckets to be free and to present their concave surfaces to the action of the wind.

In the accompanying drawing, the letter A represents a stationary frame, in which the windmill-shield, &c., are arranged. B is a vertical shaft or spindle firmly secured in the frame A, so that it cannot revolve, but will constitute a pivot or fulcrum for the wind-wheel shield and weather-vane. The wind-wheel proper, C, is constructed with a central shaft, *a*, loosely embracing the stationary shaft B, and carrying a series of radial horizontal arms, *b b*, that are at their outer ends connected by vertical rods *d*, which more fully appears from Figs. 1 and 3. Each rod *d* connects the ends of the two radial arms *b*, that are in line with each other, vertically, and between every such pair of radial arms is pivoted a concave bucket, *e*, there being, therefore, as many buckets as there are pairs of radial arms *b*. The buckets *b* are made of sheet metal or other suitable material, and are of such form that when they are folded against each other, in the manner indicated by dotted lines in Fig. 3, they will form a complete circle round the shaft *a*. When thus folded together they offer no resistance to the wind, and will, therefore, leave the mill stationary. When, however, they are unfolded with their outer edges against the vertical rods *d*, as shown by full lines in Fig. 3, their concave surfaces will be in the path of the wind successively, and will, under the influence of the wind, cause the wheel to revolve. Each bucket *e* is, by a cord or string, *f*, that passes over a suitable pulley in the upper radial arm *b*, connected with an annular weight, D, that embraces loosely the shaft *a*. This weight, when the wheel is operating, is held elevated between two notched spring-levers, E E, as is more clearly shown in Fig. 1. When the lower ends of the spring-levers E E are contracted, or drawn toward each other by suitable mechanism, the weight will be released from the supporting-shoulders of the upper parts of such levers, and will drop, and will, therefore, draw the buckets *e* together in the shape of a cylinder, as indicated by dotted lines in Fig. 3. By means of a rope, *g*, which passes over the pulleys hung at the upper part of the shaft *a*,

the weight D can be lifted again to bring it once more between the notched parts of the levers E, to allow of the expansion of the buckets and the operation of the wheel. Thus, when it is desired to stop the wheel it is only necessary to contract the lower ends of the spring-levers E and drop the weight D; while, when it is desired to cause the operation of the wheel it is only necessary to elevate the weight D by means of a rope, *g*, and thus to liberate the buckets. Above the wheel C is hung, upon the stationary spindle B, a disk, F, which carries at its edge a pendent semi-cylindrical shield, G, that embraces about half the wheel C. This shield may be made of sheet metal or other suitable material, strengthened by upright or other bars *h h*, and, if desired, may also be connected at its lower end with a hoop, *i*, that forms a complete circle around the lower part of the wheel, such hoop, however, when used, being only employed for the purpose of giving greater strength to the shield. At the lower part of the frame A there may be arranged friction-pulleys J J, bearing against the inner circumference of the shield G and hoop *i*, to give greater steadiness during the rotary motion thereof. Above the spindle F is further hung, loose upon the spindle B, a weather-vane, H, which carries at its front end, at the end directed toward the wind, a small wind-wheel, I, whose spindle *l* is connected, by a cord, *m*, with the disk F, said cord *m* passing over the edge of a friction-pulley, *n*, that is connected with the shank of the weather-vane, and thence through an eye, *o*, fastened upon the disk F, near the edge thereof. A knot or other obstruction is formed on that part of the cord *m* that is without the eye *o*. On the side opposite to that on which the rope *m* is arranged, the shank of the vane is connected with another rope, *p*, that passes through an eye, *q*, formed on the disk F, said cord *p* being weighted, as shown at *r*, at its lower end. The weight *r* has the tendency to draw the vane against a stop or pin, *s*, that projects from the disk F, as shown in Fig. 1, and when the vane is in this position it will be about in line with the ends of the shield G, as will be more fully understood by comparing Figs. 2 and 3, and the respective positions of vane and shield therein shown. The weight *r* should be so adjusted that under an ordinary or particular kind of wind it will counterbalance the effect of such wind upon the wheel I, keeping the shield also in the same position, and admitting the wind to the exposed concave parts of the buckets of the wind-wheel C, but preventing it from obstructing the turning buckets on the other side.

During a violent storm or gust of wind, however, the wheel I will obtain power that will overcome that of the weight *r*, and will wind upon its shaft *l* the rope *m*, and thereby draw and turn the disk F and shield G in the direction of the arrow, shown in Fig. 2, and place more or less of such shield in the way of the wind, according to the greater or less force of the wind. When thus placed, the shield will keep the excessive amount of wind away from the wind-wheel C, and will thus regulate the apparatus to an equal and steady motion.

During the most violent wind the shield will be so far turned that another stop, *t*, of the disk F, will strike the vane, in which position there will be no wind at all admitted to the wheel C.

When desired to arrest the motion of the mill, this may also be done by merely pulling on the rope *m*, and thereby carrying the shield in the way of the wind, and preventing the latter from reaching the wheel C.

What we claim as our invention is—

1. The semi-cylindrical shield G, combined with the wind-wheel I on the weather-vane, and arranged to partly embrace the operating wind-wheel C, substantially as described.

2. The combination of the rope *m*, weighted rope *p*, and wind-wheel I, with the vane H, disk F, and shield G, to operate as specified.

3. The buckets *e* of a wind-wheel connected with the annular weight D, and combined with the notched spring-levers E, substantially in the manner herein shown and described.

J. P. DAVIE.
ASA MORGAN.

Witnesses:
S. D. GOLDER,
A. A. HUTT.