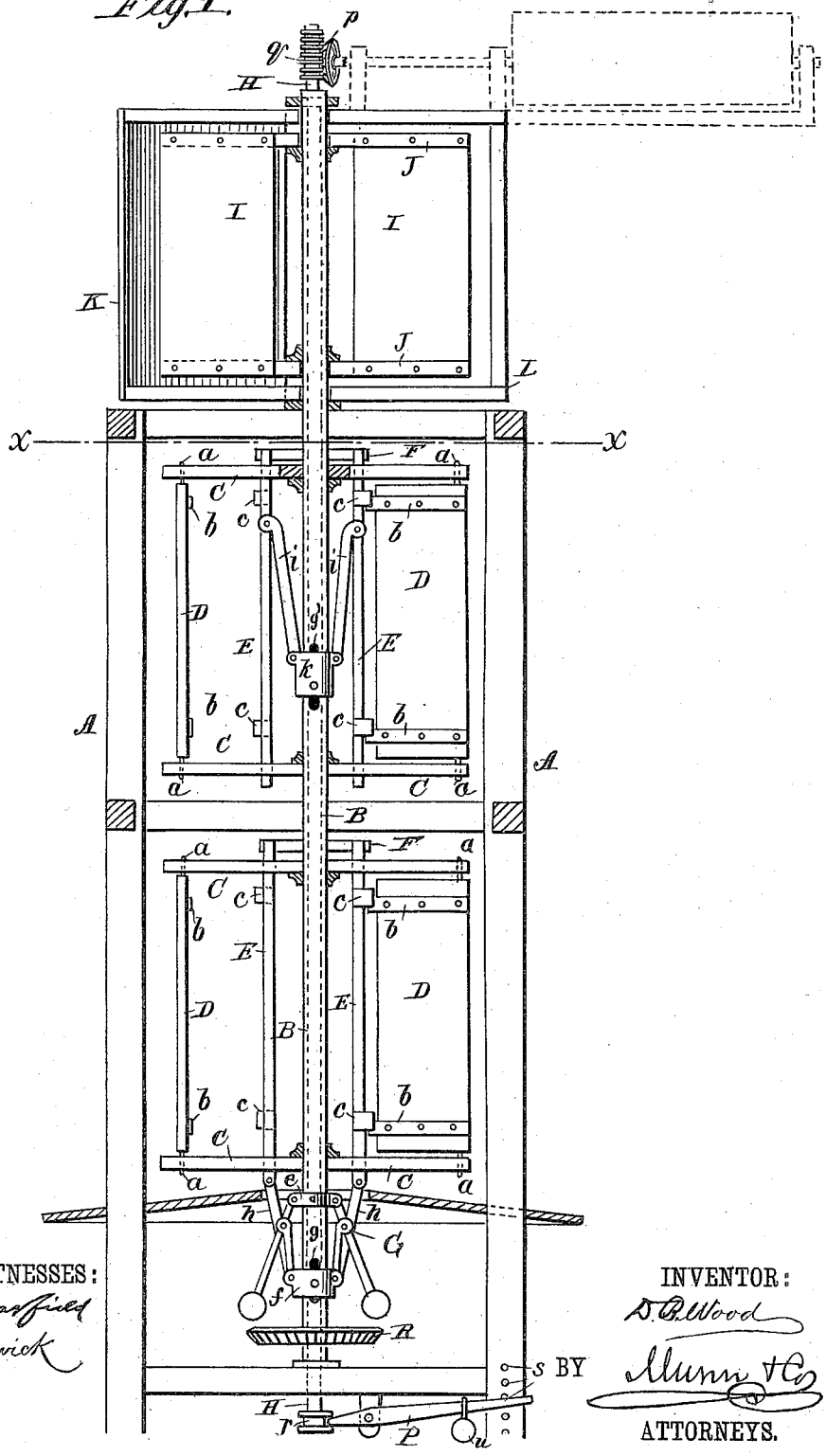
(No Model.) 3 Sheets—Sheet 1.

D. B. WOOD.

WINDMILL.

No. 343,786. Patented June 15, 1886.

Fig. 1.



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ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

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No. 343,786. Patented June 15, 1886.

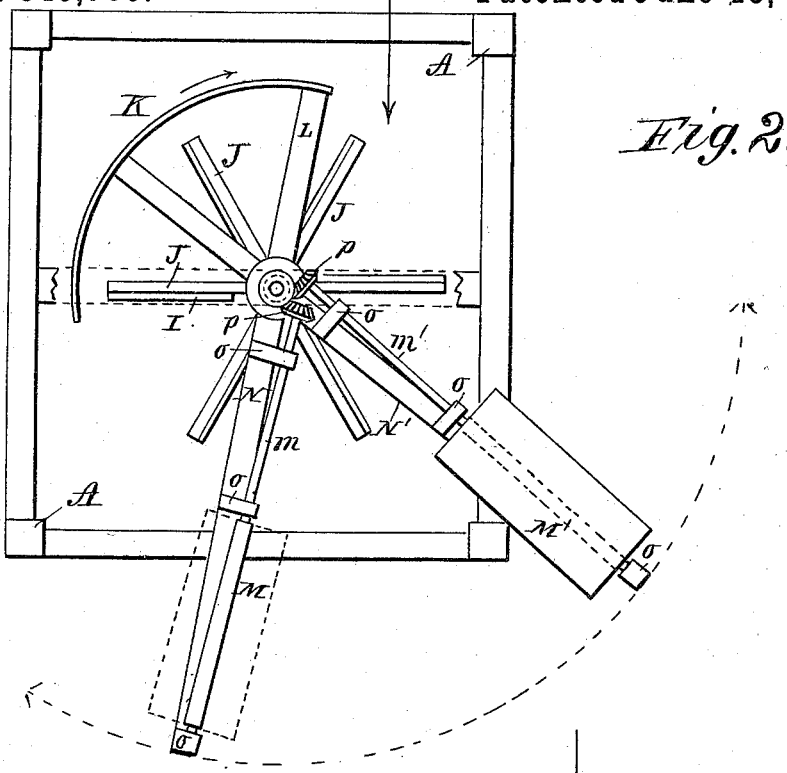
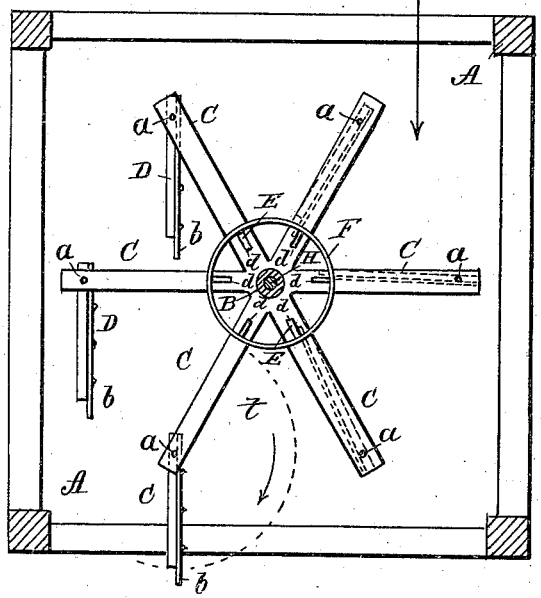


Fig. 2.

Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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WINDMILL.

No. 343,786. Patented June 15, 1886.

Fig. 4.

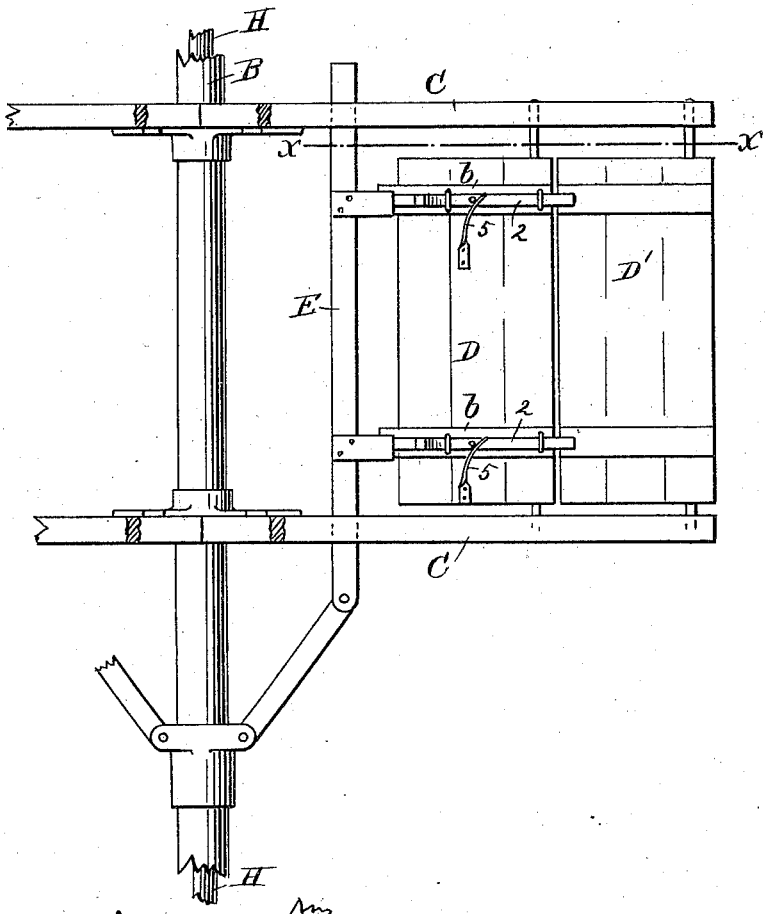
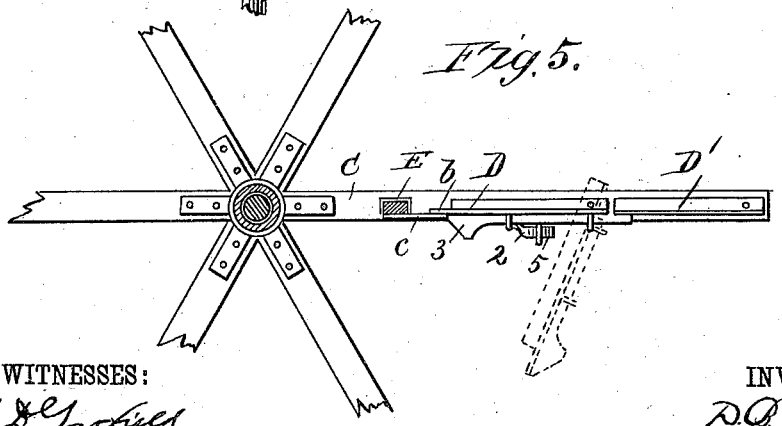


Fig. 5.



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UNITED STATES PATENT OFFICE.

DAVID B. WOOD, OF SIBLEY, IOWA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 343,786, dated June 15, 1886.

Application filed April 8, 1886. Serial No. 198,205. (No model.)

To all whom it may concern:

Be it known that I, DAVID B. WOOD, of Sibley, in the county of Osceola and State of Iowa, have invented a new and Improved Windmill, of which the following is a full, clear, and exact description.

My invention relates to the construction of a cheap, efficient, and durable form of windmill, wherein the floats are arranged in sets and carried by a hollow vertical shaft that is supported in a properly-constructed tower.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a central vertical sectional view of my improved form of windmill. Fig. 2 is a plan view of the mill. Fig. 3 is a sectional plan view taken on line *x x* of Fig. 1, and Figs. 4 and 5 illustrate a modified construction wherein two floats are carried by each arm.

In constructing such a mill as is illustrated in the drawings above referred to I provide a main tower, A, which consists of an open frame-work within which the floats of all wheels except the upper wheel revolve. In the center of this frame A there is arranged a hollow shaft, B, to which the arms C C are rigidly secured, two of such arms being employed in connection with each float D, the floats being provided with trunnions *a a*, which are mounted in bearings formed in the extending ends of the float-supporting arms. Each of the floats is provided with two strips, *b*, which project somewhat beyond the inner faces of the floats and engage with the stops *c c*, that are carried by vertical rods E E, said rods being fixed to an upper ring, F, and arranged to ride in apertures *d d*, formed in the arms C, as clearly indicated in Figs. 1 and 3. The position of the rods E is regulated by means of a governor, G, the weighted arms of which are carried by a clamp, *e*, that is fixed to the shaft B, while the movable sleeve *f*, which is raised when the centrifugal force is sufficient to throw out the weighted arms of the governor, is keyed to a central shaft, H, that is arranged within the shaft B, elongated slots *g* being formed in the shaft B to permit of a proper connection with the shaft H, and at the same time to permit of the sliding of the collar *f*. Connection between the collar *f* and the lower set of rods E is obtained by means of connecting-links *h h*, that are pivotally connected to the collar *f* and to the lower ends of the rods E, while connection between the governor and the upper set of rods E is established by means of a collar, *k*, keyed to the shaft H and connected to the rods E by links *i i*, a slot, *g*, being formed in the cylindrical shaft B, in order that the collar *k* may move upon said shaft.

From the construction described it will be seen that when the mill is revolving at too high a rate of speed and the governor-arms are thrown out the raising of the collar *f* will elevate the rods E, so that their stops *c* will be raised out of the paths of the projecting ends of the strips *b*, and the same effect is produced upon the upper set of rods E through the raising of the central shaft, H, and its collar *k*, so that the floats will be free to swing upon their pivotal connection with their supporting-arms C, it being understood that when the wind is blowing in the direction indicated by the arrow in Fig. 3 the floats upon the right side of the mill will be thrown against the stops *c*, and that as they revolve to the position shown at *t* in said figure the wind will strike upon their rear face, and they will be swung free of the stop, taking the direction of the arrow, to be again returned to their position against their stops when the wind strikes upon their face. The upper section of the mill is formed of a series of stationary floats, I, that are carried by arms J, that are rigidly secured to the shaft B. The floats I are partially surrounded by a curved shield, K, that is carried upon a frame, L, formed with two projecting arms, N N′, upon which arms I mount vanes M M′, said vanes being carried by shafts *m m′*, that are arranged in bearings *o o o*, carried by the arms. The inner ends of each of the shafts *m m′* are provided with pinions *p*, that are engaged by a cylindrical rack, *q*, formed upon the upper end of the central shaft, H. Upon the lower end of the shaft H there is a grooved collar, *r*, which is engaged by the projecting end of a

lever, P, the position of which is controlled by a weight, *u*, or by a pin inserted in one of the apertures, *s*, formed in the frame-work of the tower A. The relative position of the vanes M M′ is such that when the vane M (which is the main vane of the mill) is in a vertical position the vane M′ will be in a horizontal position, and vice versa. Now, when the vane M is in a vertical position, the shield K will be held in a position relative to the direction of the wind—such as that indicated in Fig. 2—so that the floats upon one side will be shielded from the action of the wind, while the floats upon the other side are fully exposed to such action. Now, as the speed of the mill increases and the arms of the governor are thrown out, the shaft H and its cylindrical rack *q* will be raised and each of the vanes partially rotated, so that the vane M′ will be turned to a position to be effected by the wind, and the vane M will be partially thrown out of the wind, which movement of the vane will cause the shield K to move in the direction of the arrow, (shown in connection therewith,) thus cutting off the wind from the exposed side of the wheel. The shaft B carries a gear, R, and through the medium of this gear R the motion of the shaft is transmitted to the machinery it is designed to actuate.

In case it is at any time desired to stop the mill, the central shaft, H, may be thrown up through the medium of the lever P, which movement of the shaft will cause the shield K to be thrown in front of the floats I, and will raise the stops *c*, so that the floats D will be free to swing upon their pivotal connection with the arms C.

In the construction illustrated in Figs. 4 and 5 each of the arms C carries two floats, D and D′, instead of a single float, D, the inner floats, D, in this case being provided with sliding bars 2, formed with beveled faces 3, said arms being normally forced by springs 5 to a position so that their beveled ends will be in line with the inner ends of the arms *b;* but as the wheel revolves the beveled ends 3 will strike against the stops *c*, carried by the rods E, and the bars 2 will be forced back to the position shown in Fig. 4, in which position their outer ends will act as stops for the floats D′, which floats D′ are, as best shown in Fig. 5, mounted slightly to the rear of the floats D, so that the ends of the bars 2 will be thrown outward in time to catch the floats.

Although I have described my double-float attachment as applicable only to the particular form of mill shown and described herein, it will of course be understood that this arrangement of fans could be applied with but slight modification to any of the ordinary forms of windmill.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a windmill, the combination, with the shaft carrying a cylindrical rack and arranged within the hollow main shaft of the machine, of two vanes mounted on rotating shafts which carry pinions that are engaged by said cylindrical rack, a shield, K, the shield and the vanes being carried by a frame that is free to revolve about the hollow shaft, and a governor connected to the central shaft carrying a cylindrical rack, substantially as described.

2. The combination, with a central shaft carrying a cylindrical rack, of a hollow shaft carrying fixed floats, a governor arranged in connection with said central shaft, a frame carrying a shield, and two vanes mounted on shafts which carry pinions that are engaged by the cylindrical rack, substantially as described.

3. The combination, with a central shaft, of a hollow shaft surrounding said central shaft, floats pivotally connected to arms that are rigidly fixed to the hollow shaft, strips *b*, carried by the floats, a vertically-sliding frame carrying stops, and a governing mechanism, substantially as described.

4. The combination, with a central shaft, of a cylindrical shaft surrounding the same, two sets of floats carried by the cylindrical shaft, one set being fixed and the other pivotally connected to arms extending from said shaft, strips *b*, carried by the movable floats, a sliding frame carrying stops, a cylindrical rack, a revolving frame carrying a shield, K, and two vanes mounted on shafts which carry pinions that are engaged by said cylindrical rack, and a governing mechanism, substantially as described.

5. The combination, with a shaft carrying a cylindrical rack, of a cylindrical shaft carrying floats, a revolving frame carrying a shield, and two vanes that are mounted on shafts which carry pinions that are engaged by said cylindrical rack, and a regulating mechanism consisting of a collar, *r*, and lever P, substantially as described.

DAVID B. WOOD.

Witnesses:
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J. B. LEUT.