(No Model.)

2 Sheets—Sheet 1.

J. C. WALKER.

WIND WHEEL.

No. 505,736. Patented Sept. 26, 1893.

Fig. 1.

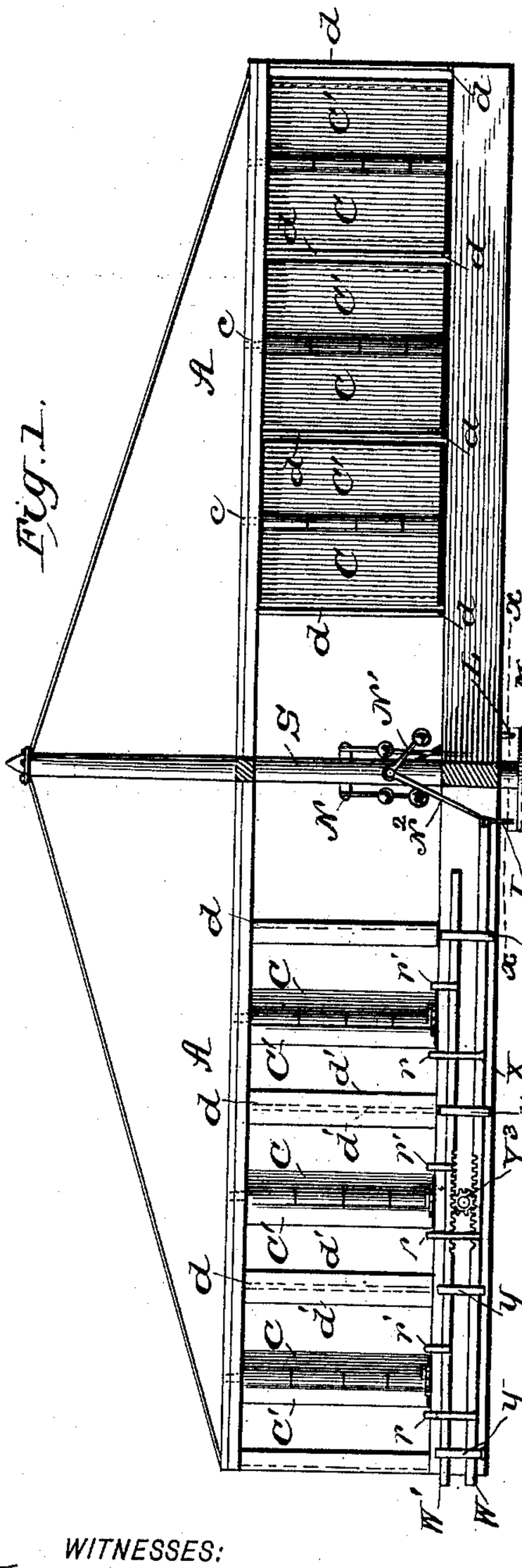
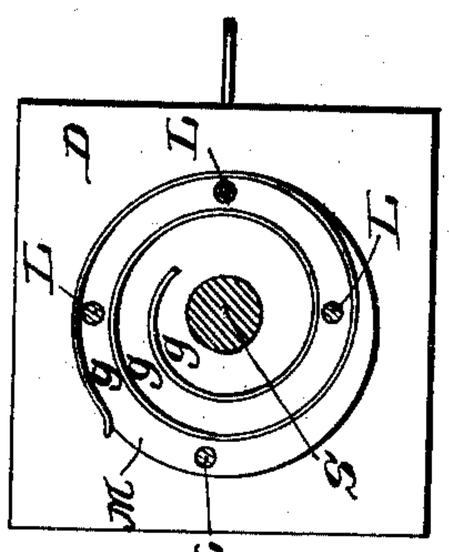
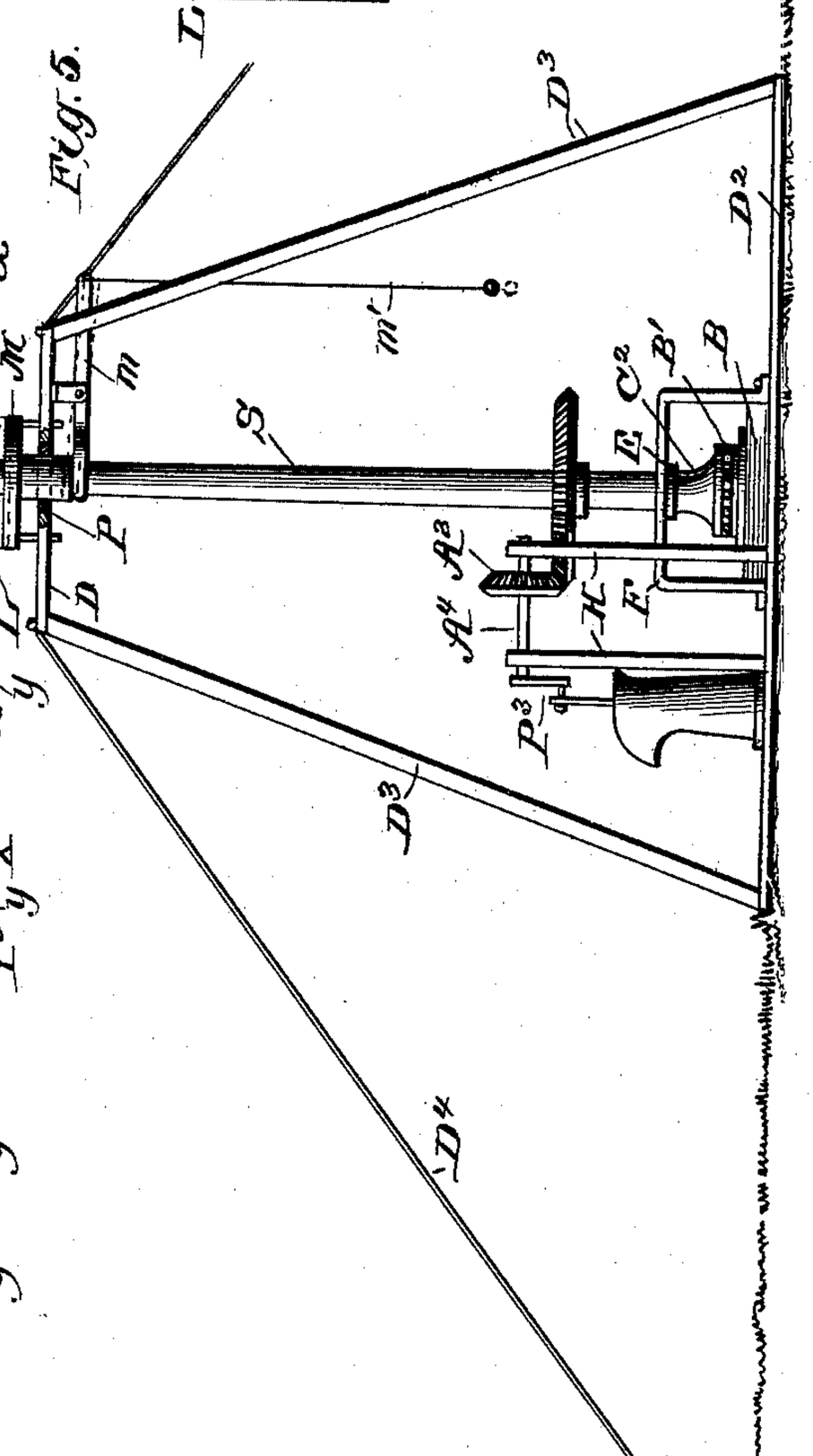


Fig. 5.





WITNESSES:

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Edw. T. W. Byrn.

INVENTOR

James C. Walker

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

J. C. WALKER.

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No. 505,736. Patented Sept. 26, 1893.

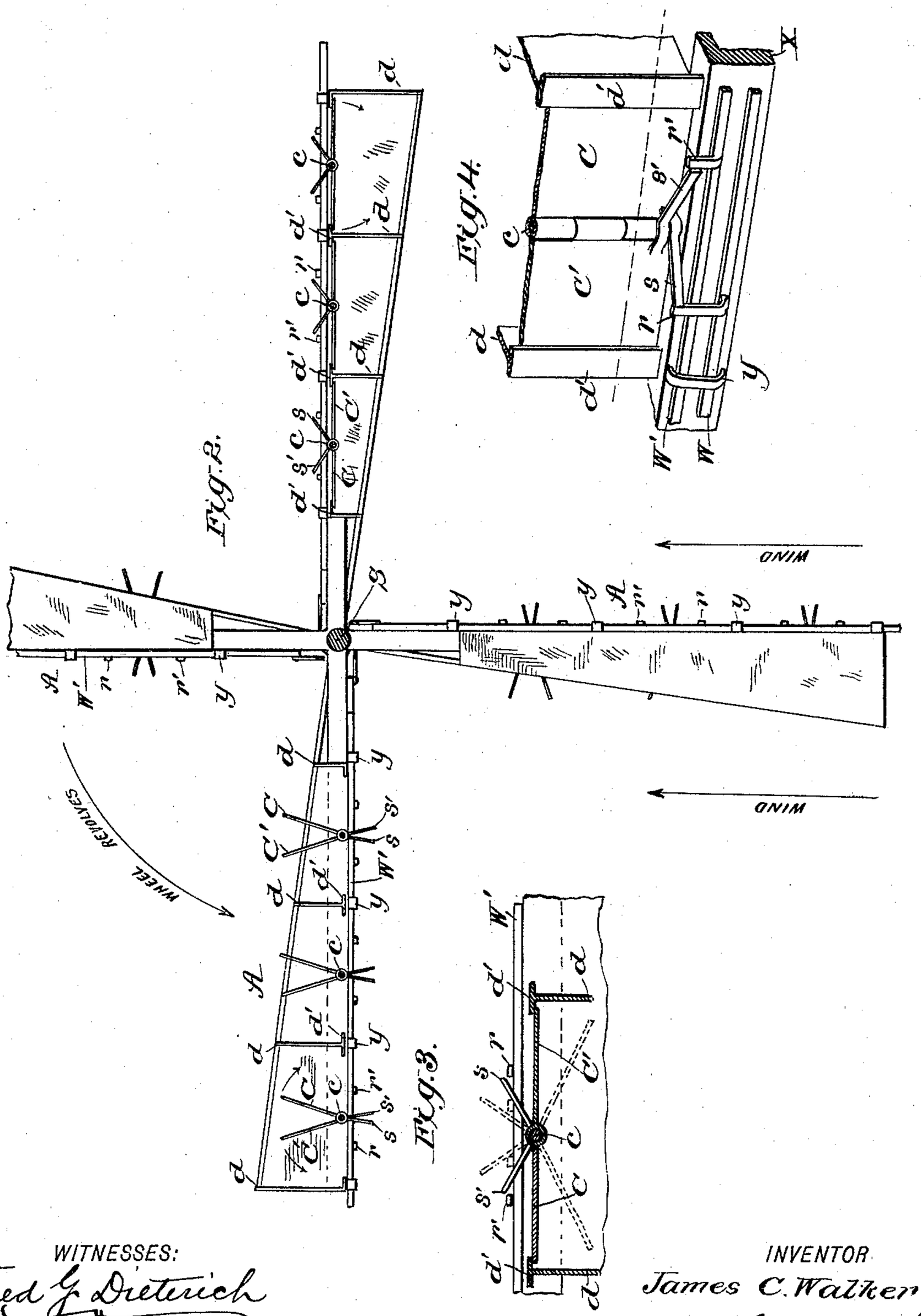

Fig. 2.

Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES C. WALKER, OF WACO, TEXAS.

WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 505,736, dated September 26, 1893.

Application filed March 14, 1893. Serial No. 465,963. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. WALKER, of Waco, in the county of McLennan and State of Texas, have invented a new and useful Improvement in Wind-Wheels, of which the following is a specification.

The object of my invention is to provide a wind wheel which needs no guiding vane or tail, but shall turn in the same direction at all times regardless of the direction of the wind. It is an improvement in horizontal wind wheels, or wheels that rotate about a vertical axis, and it consists in the peculiar construction and arrangement of the wings or blades which automatically open on one side and close on the opposite side, and in the peculiar construction and arrangement of means for adjusting the blades to render the wheel partially or wholly inoperative as will be hereinafter fully described.

Figure 1 is a side elevation of the wheel with the middle arm cut away. Fig. 2 is a plan view of the wheel with the canvas removed from the tops of two of the diametrically arranged arms. Fig. 3 is a horizontal section, and Fig. 4 a perspective view showing stop lugs for controlling the positions of the wings and Fig. 5 is a sectional plan view through line x—x of Fig. 1.

The wheel is mounted upon a vertical shaft S held in a derrick consisting of an upper platform D, a lower platform D^2, four corner posts D^3, and wire stays D^4 Fig. 1.

The wheel consists of four horizontally projecting radial frames A which are fixed rigidly to the main shaft S and rotate together. Each of these frames is made of two diverging timbers at the top, and two at the bottom covered at the top and bottom with canvas or cloth stretched to form an inclosed casing which is divided into cells or compartments by vertical partitions d d which may also be made of canvas or light wood. These partitions have at one edge or upon one side of the frame right angularly projecting flanges d' for the purpose hereinafter described.

C C′ are pairs of hinged wings or blades. Each of these pairs of wings is hinged about a vertical rod c arranged in the middle of each of the cells, the rod c being held at top and bottom in the frame timbers at one side of the frame. The wings C C′ fold toward each other so as to open the cells to permit the wind to pass through one side of the shaft S as shown, on the left of Figs. 1 and 2 and on the other side the wings open away from each other and shut up one side of the cells so that the cells catch the full force of the air instead of allowing it to pass through them as on the other side. This it will be seen causes the wheel to continually offer a greater resistance to the wind upon one side than it does on the other, which causes it to rotate with a large available force for motive power. When the wings close one side of the cells the outer edges of said wings strike against the flanges d' of the partition d which flanges thus act as stops to determine the movement of the wings. When the wings pass around to the opposite side in the revolution of the wheel they do not close up to a position flat against each other, but remain a slight distance apart, so that the wind can find a space between them to press them apart when their resisting faces are again presented to the wind as the wheel revolves. It will thus be seen that the force of the wind operates directly upon the wings to both open and close them.

The shaft S is preferably made as an iron tube held in perpendicular position by the collar P on platform D, and is stepped upon or journaled in the circular base B resting on and screwed firmly to platform D^2. In the base plate B are anti-friction rollers B′ upon which rests and revolves plate C^2 which is fixed to shaft S. On these two plates the whole weight of the shaft and wheel rests and revolves. Just above the plate C^2 is the collar E which is fast on the shaft. This collar is held to the platform by an iron frame F which embraces the shaft above the collar the object of which is to keep the shaft S in proper working position with reference to its bearings.

To utilize the power of the wind wheel a crown gear or bevel wheel is fixed upon the shaft and is made to rotate a pinion A^3 on a horizontal shaft A^4 which is journaled in standards H. This shaft A^4 is provided at its outer end with a crank P^3 which is arranged to operate the plunger of a pump or any other desired mechanism.

I will now describe the means for adjust-

ing the wings or blades of the wheel to adapt them to the force of the wind, or stop the wheel altogether. The wings are made of a quadrangular steel frame covered with strong canvas or other light material. The bottom sections of these frames are extended horizontally at *s s'* beyond the hinge rod and oscillate with the wings. Through these extensions *s s'* the wings are adjusted as follows.

X represents in front view the bottom frame piece extending across the wind wheel, in which is fixed the journal or step bearing in which the lower end of the hinge rod *c* works. The extensions *s s'* extend over the edges of the bottom piece and engage with lugs *r r'* which work close to the front surface of the bottom frame piece.

W W' are two thin parallel iron bars carrying stop lugs *r r'* and extending across the wheel and sliding on the surface of the bottom frame piece. These bars have gear teeth, see Fig. 1, that engage with the opposite sides of a gear wheel Y^3 journaled on frame X so that these bars move in opposite directions in the guides or holders *y*. The lugs *r* on the lower bar engage the extensions *s* of the wings, and the lugs *r'* on the upper bar engage the extensions *s'* of the wings, so that when the bars are moved by the gear Y^3 the lugs move in opposite directions and acting as stops are engaged by the extensions *s s'* of the wings C and C' to limit the expansion of the latter. Thus in Fig. 3 when lugs *r r'* are at their outermost position wings C C' can expand fully to contact with flanges *d' d'*, but when the lugs are moved inward, as in dotted lines, extensions *s s'* strike against them and the expansion of the wings is limited to the dotted position. This movement is automatically effected whenever the wheel revolves at too high a speed by a ball governor N whose arms N' are fulcrumed to shaft S and connected to the lower sliding bar by rods N^2, so that when the balls fly outwardly from a high speed bar W is drawn toward shaft S and rotating the gear Y^3 the stop lugs *r r'* are adjusted closer together.

To entirely close the wings at will when it is desired to discontinue the operation of the wheel, I provide one of the slide bars W with a downwardly extending arm L, and around the shaft S upon the platform D I arrange a cam plate M which can slide up and down on shaft S without turning by studs extending through the platform. This cam plate, see Fig. 5, has a volute spiral groove *g* on its upper side and is lifted up by a lever *m* and pull cord *m'*. When this cam plate is so lifted its groove receives the lower end of arms L L, and these arms are by the rotation of the wheel and the cam plate drawn to the interior of the cam close to the shaft, drawing the sliding bars W with them and remain there holding the wings shut up or closed. When plate M is dropped below arms L again the wings catch the wind and open again.

I am aware that it is not broadly new to provide a horizontal wind wheel with vertically pivoted flaps or wings and I make no broad claim to this idea.

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

1. A horizontal wind wheel consisting of radial arms constructed in the form of a series of cells and having partitions with stops at one edge, and a pair of oppositely moving hinged wings pivoted in the middle of the cells upon vertical axes and arranged to fold toward each other to open the cells, and to open against the stops of the partitions to close the cells, substantially as shown and described.

2. A horizontal wind wheel having radial arms constructed of diverging frame timbers covered at top and bottom and provided with partitions *d d* with stop flanges *d' d'* at one edge, and the vertically pivoted and oppositely moving wings C C' both having the same center of oscillation located midway the length of the cells substantially as shown and described.

3. The combination of the oppositely moving wings C C' having extension arms *s s'*, the slide bars W W' with lugs *r r'* operating upon the arms *s s'* and having rack teeth, the intermediate pinion Y^3, and a governor mounted upon the wheel frame and operating upon the bars substantially as and for the purpose described.

4. The combination of the wings C C' having extensions *s s'*, and the oppositely moving and longitudinally sliding bars W W' having reversing gears between them, an arm L; of the cam plate M fixed upon the platform D to slide vertically, the said cam plate having a volute spiral groove adapted to draw the arms L to the center when engaged by the cam plate to gradually close all the wings and hold them closed substantially as shown and described.

5. The combination of the wind wheel shaft S having base plate C^2 at its lower end and collar E above it, the rollers B', fixed base plate B, and the yoke frame F embracing the shaft above the collar substantially as and for the purpose described.

JAMES C. WALKER.

Witnesses:
EDW. W. BYRN,
SOLON C. KEMON.