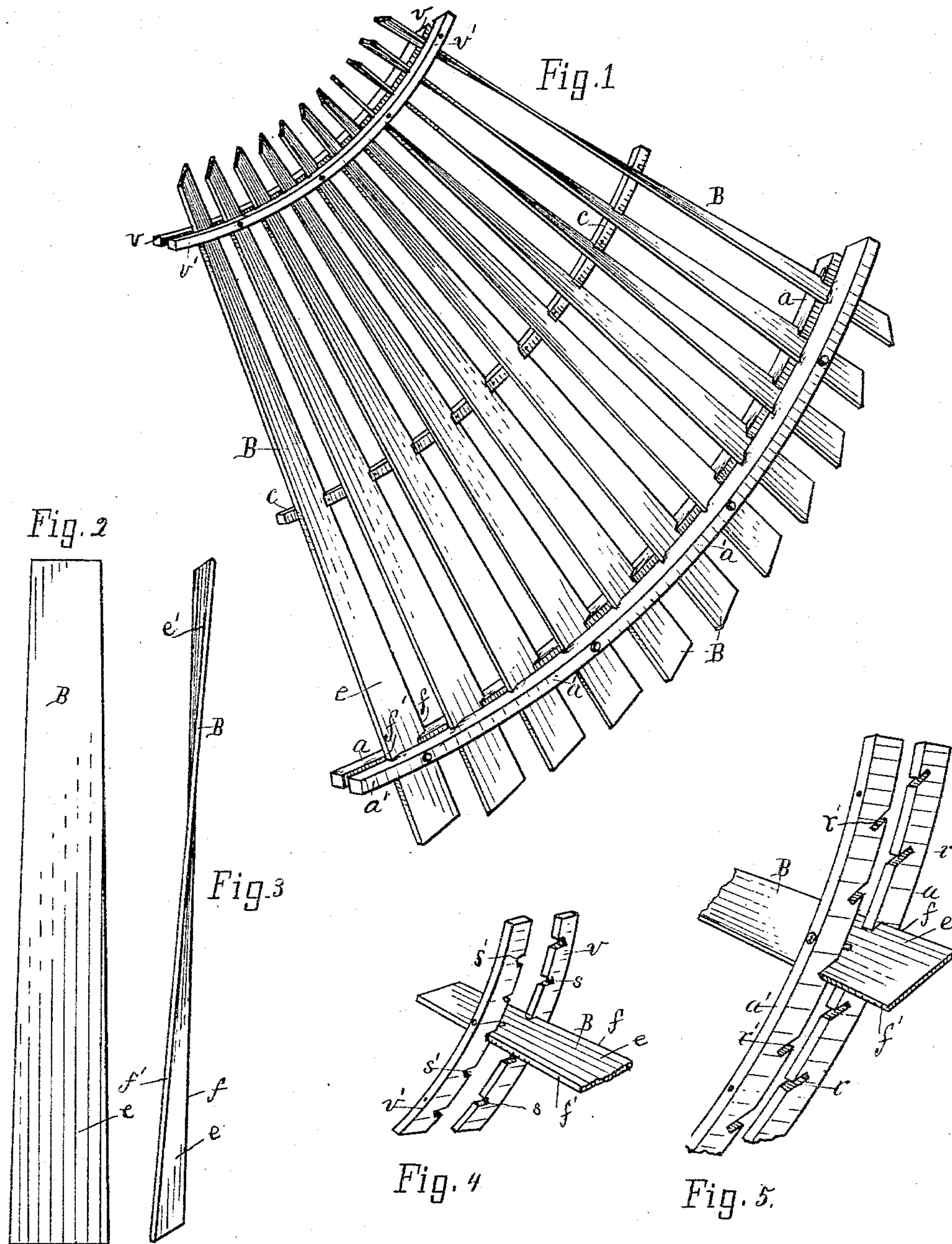


(No Model.)

J. Q. ADAMS.
WINDMILL.

No. 323,485.

Patented Aug. 4, 1885.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN Q. ADAMS, OF ALAMO, MICHIGAN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 323,485, dated August 4, 1885.

Application filed April 29, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN Q. ADAMS, of Alamo, 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 windmills of the class having wheels made with wooden slats, fans, or sails; and it consists in improvements which will be fully hereinafter set forth.

Figure 1 shows in perspective a portion of my improved wheel sufficient to illustrate the manner of embodying my invention. Fig. 2 is a face view of one of the slats or sails before it is put in place in the wheel. Fig. 3 illustrates the shape assumed by one of the slats after it has been put in place. Fig. 4 shows in perspective a portion of the inner rings or rims which hold the inner ends of the fans or sails. Fig. 5 is a similar view of the rings or rims for the outer ends of the sails.

It will be understood that, so far as the main frame of the wheel, the devices for mounting it, &c., are concerned, use may be made of any of the well-known devices, as my improvements may be applied to any of the various styles of wheels, so far as these parts are concerned.

Upon the frame-work I secure supports for the blades or sails, preferably of the form of rings or annular rims, concentric with each other and at suitable distances from the center. These may be carried by radial arms or other suitable supports, and to them the fan-blades or sails are secured. In the construction shown there are two rings or rims, vv' , at the inner ends of the blades, and two, aa' , at the outer ends one lying at each edge of the blade or sail and at each end thereof. The inner or opposing edges of the rings or rims vv' and aa' are provided with grooves or slots, those in the inner rings being represented by ss' and those in the outer by rr' . These, it will be seen, are inclined to the plane of the axis of the wheel, those in the outer rings or rims, aa' , having a greater inclination than those in the inner, vv' .

B B represent, generally, the fan-blades or sails, they being preferably made of wood sufficiently thin and flexible to permit them

to be more or less bent or twisted to the desired shape. Initially they are of the form shown in Fig. 2—that is to say, flat and narrowing somewhat from the outer toward the inner ends. They are put in place by inserting the smaller ends through the slots rr' in the outer rims or rings, aa' , and then through the slots ss' in the inner rims or rings, vv' . As these slots lie at different inclinations relatively to the plane of the axis of the wheel, as has been stated, each slat will have its ends twisted away from the said plane, the outer ends being twisted more than the inner, as will be understood by examining Fig. 3. The parts should be so constructed and related that the slats shall be twisted in such way that the variations in inclination of each from the plane of the axis shall at the different points radially correspond with the differences in velocity of the wheel at the same points—that is to say, the slats when in place are so arranged that the inner ends lie more nearly in the plane of the axis of the wheel, while at the outer ends they lie more nearly transverse. As a result the wind will not at the center tend to retard the wheel.

I am aware of the fact that use has been made of twisted blades in windmills and for other purposes; but in the devices heretofore employed the blades have not been secured to or held by means of the character of mine. Serrated bands have been secured to the rings or rims, and to these bands the blades have been riveted or otherwise fastened. The blades have had support upon one side only, and have depended upon the rivets or similar devices passing directly through them for holding them in place. After the blades or slats have been twisted there is a tendency with them to return to their normal shape, and when they are supported in the manner which I have devised it is practically impossible for them under ordinary circumstances to be damaged or impaired. It is much easier to fasten them in place by having slotted rims which engage with both edges, and after they are once put in place they are more strongly and firmly held.

I prefer to employ a supplemental ring or rim, c , also provided with slots more or less inclined, this being situated intermediately

between the inner ring or rim and the outer ring or rim, and engaging with the slats at or about their central parts longitudinally or at the lines of twisting.

5 I am also aware of the fact that windmills have been constructed with two concentric rings or rims provided with slots or recesses to receive straight or untwisted fan-blades or sails; but in the construction heretofore used
10 each slot of the inner ring or rim and the corresponding slot of the outer lay in the same plane relatively to the axis of the wheel, whereas in my construction the slots are formed on lines differently inclined, and there-
15 fore the slots themselves can be utilized to assist in twisting and in retaining the slats properly after they are twisted; and, so far as this part of my invention is concerned it will be seen that the rings *a* and *v* alone can
20 be utilized to attain some of the advantages which I achieve, as the slots in them respectively are at such inclination that they will hold the blades without the necessity of the serrated bands heretofore used, the slots or
25 recesses in my case engaging with both of the broad faces *e e'* of each of the slats, and therefore positively gripping it, whereas in those constructions heretofore used, having the serrated bands, each slat had but one of its broad

faces resting upon a supporting face. I pre- 30
fer, however, to have both of the thin or narrow edges *f f'* of each slat inclosed, and therefore I surround not only the edges *f*, but also provide slotted or grooved supports or holders for the opposite narrow edges *f'*, 35
these supports in the construction shown being separate rings or rims *a'* and *v'*; but I do not wish to be limited to all of the details concerning this part of the wheel, as modifi- 40
cations will suggest themselves to those skilled in the construction of such devices.

What I claim is—

In a windmill, the combination of the tapering twisted slats, the ring or rim *a*, having grooves or recesses in its edges on lines in- 45
clined to the axis of the wheel, the inner slat-support, *v*, having the slots or recesses in its edges formed at an inclination differing from the inclination of the slots or recesses in the ring *a*, the ring or rim *a'*, opposite to the ring 50
a, having slots in its edges corresponding to those in the ring or rim *a*, and the ring or rim *v'*, opposite the ring or rim *v* and similarly slotted, substantially as set forth.

JOHN Q. ADAMS.

Witnesses:

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