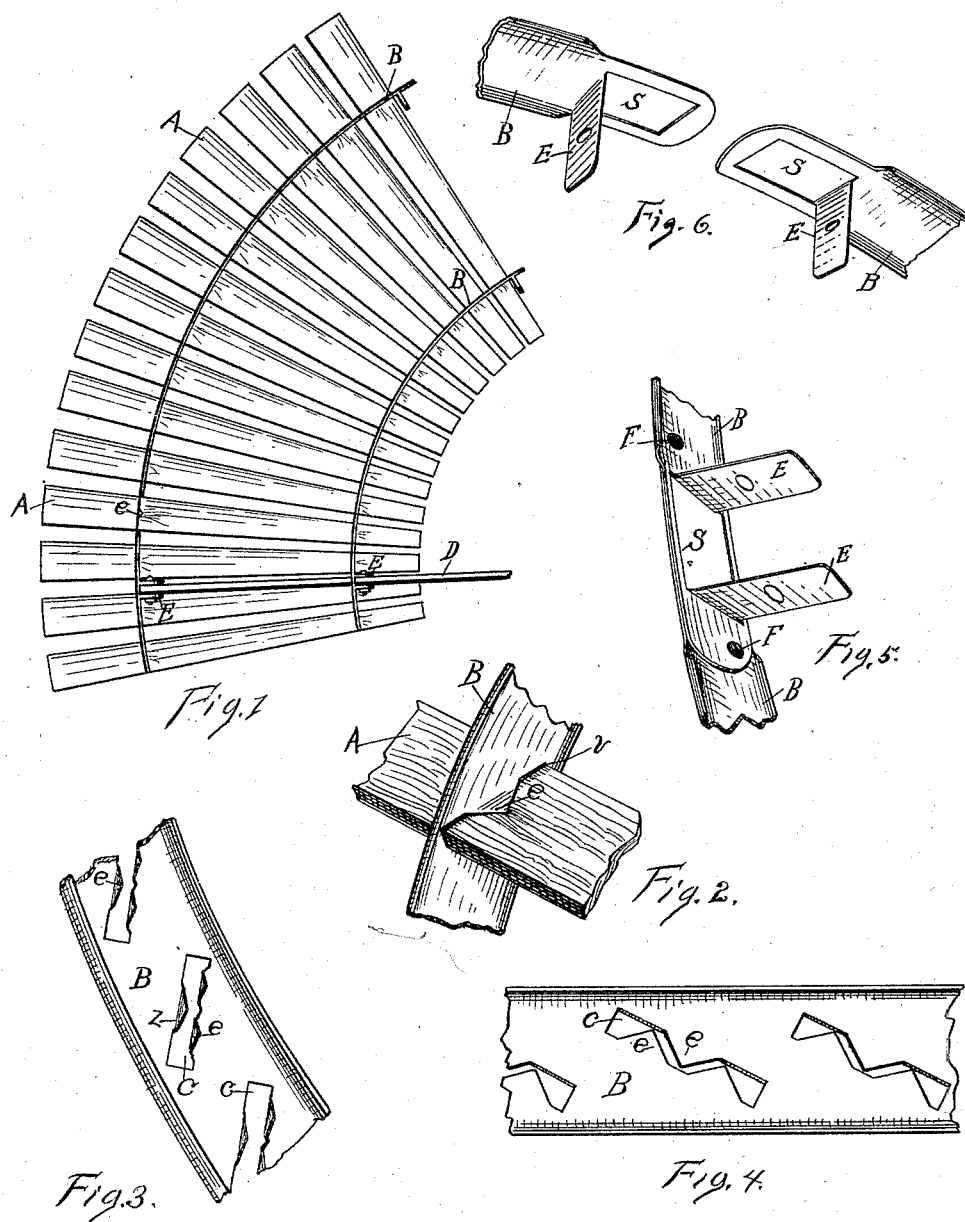


(No Model.)

M. B. WILLIAMS.  
WIND WHEEL.

No. 489,885.

Patented Jan. 10, 1893.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

MALCOLM B. WILLIAMS, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO THE  
WILLIAMS MANUFACTURING COMPANY, OF SAME PLACE.

## WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 489,885, dated January 10, 1893.

Application filed July 8, 1892. Serial No. 439,328. (No model.)

*To all whom it may concern:*

Be it known that I, MALCOLM B. WILLIAMS, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Wind-Wheel, of which the following is a specification.

This invention relates to that class of wind wheels consisting of sections composed of radial sails attached together by rims running transversely to said sails.

The main objects of the invention consist in the manner of fastening the sails to the rims and in the attachment of the arms to the sections, all of which is below described and is designed to make a simple, strong wheel and to especially facilitate the construction, by the mode of fastening the parts.

In the drawings forming a part of this specification, Figure 1 is an elevation of a portion of the wheel, showing one section and part of another; Fig. 2 broken details from Fig. 1, in enlarged perspective; Fig. 3 a broken portion of the rim in Fig. 1, in perspective, enlarged; Fig. 4 a plan of a broken portion of the rim, enlarged, showing the mode of construction; Fig. 5 shows an enlarged view of the rims in Fig. 1, in perspective, at the ends where they are attached; and Fig. 6 shows these parts in Fig. 1, detached.

Referring to the lettered parts of the drawing, A are the radial sails of the wheel, made in the ordinary manner. The rims which hold the sails together are shown at B, said rims being preferably made of metal which is channeled, or turned at the edges, as shown in the drawing, for the purpose of stiffening it and being enabled to use lighter material. The sails are passed through slots, *c*, in the rims, B, which slots are formed by cutting through the metal at the proper places, in a manner to leave portions of the metal to be turned up out of said slots, said portions being shown at *e*. In Fig. 1 the rim is shown with the slots as I prefer to cut them, leaving the points *e* (which in said Fig. 4 have not yet been turned up, but are shown turned upward in Fig. 3) ready to receive the sails through the slots.

It will be observed that the main portion of the slots, *c*, is made wider than the space for

the sails between the points *e*, after the latter have been turned up. By this means I secure longer points *e*, to bear against the surface of the sails, A, than would be the case if the slots were cut only as wide as the thickness of the sails, and at the same time leave a space between the side boundaries of the main slot and the sail as shown at *v*, in Fig. 2. To accomplish this, the lower bend in the points is a little inside of the boundary line of the main slot, *c*, which will be seen at *z*, in Fig. 3. As many of these bearing points may be provided as deemed necessary, two being here shown on one side of the slot and one on the other.

After the sails, A, are inserted through the slots in the rims, B, the bearing points, *e*, are upset against the sides of the sails, as in Figs. 1 and 2, which thoroughly attaches the parts together. A portion of the edge of the outer rim, B, in Fig. 1, is broken away, so as to show the point at *e*.

While the slots, *c*, are cut so as to show the points *e*, they may be cut so that the turned up portion of the metal which is upset against the sails A, may be otherwise shaped, although the points are deemed preferable.

So far as forming the metal rims with the turned edges to stiffen them is concerned, the slots for receiving the sails may be otherwise formed, or said sails may be attached to them in any other desirable manner.

The ends of the rims, B, where the sections come together, are lapped one on the other, as shown in Fig. 5. These lapping ends are gashed so as to form slots, S, from which slots the metal is turned up, forming tongues, E, integral with the ends of the rims, as in Fig. 6. When the ends of these rims, B, are lapped together, one of the tongues E, is passed through the slot S, as shown in Fig. 5. The arms, D, are placed between these projecting tongues of the outer rims of the sections and passed through the slots, S, and between the projecting tongues of the inner rims of the sections; and bolts are passed through said tongues and arm. At F the lapping ends of the rims are riveted together. This provides a very satisfactory attachment of the rims and arms, it being simple, strong and easily made.

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

- 5 1. In a wind wheel, the combination of metal rims provided with slots having portions of metal turned outward therefrom, the sails passed through said slots, said outwardly turned metal portions pressed against the surface of said sails; substantially as set forth.
- 10 2. In a wind wheel, the combination of a metal rim having slots which are wider than the thickness of the sails, and the bearing points outwardly turned, leaving a space for the sails, and the sails inserted in said slots;
- 15 substantially as set forth.

3. In a wind wheel, sections having metal rims with lapping ends where the sections are attached together, said lapping ends being provided with the slots and outwardly turned tongues, the tongue of one end turning out- 20 wardly through the slot of the other end, in combination with arms bolted between said tongues; substantially as set forth.

In testimony to the foregoing I have here- unto subscribed my name in the presence of 25 two witnesses.

MALCOLM B. WILLIAMS.

Witnesses:

F. P. JOHNSTON,  
HOMER MANUEL.