No. 875,374. PATENTED DEC. 31, 1907.

J. F. M. PATITZ.

TURBINE VANE.

APPLICATION FILED OCT. 19, 1903.

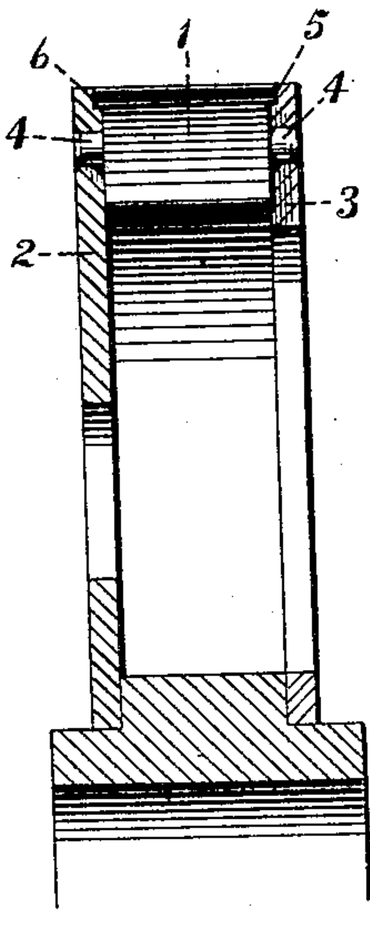

Fig 1.

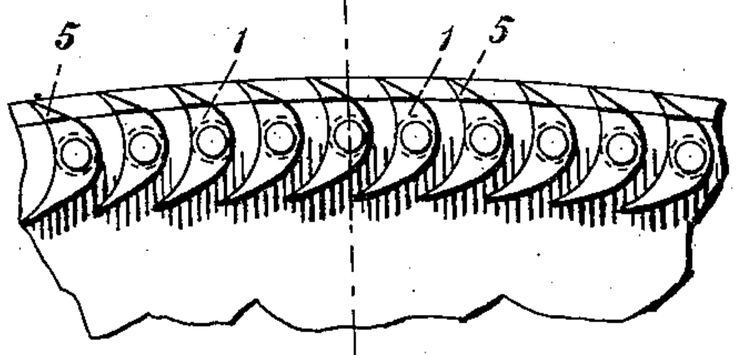

Fig 2.

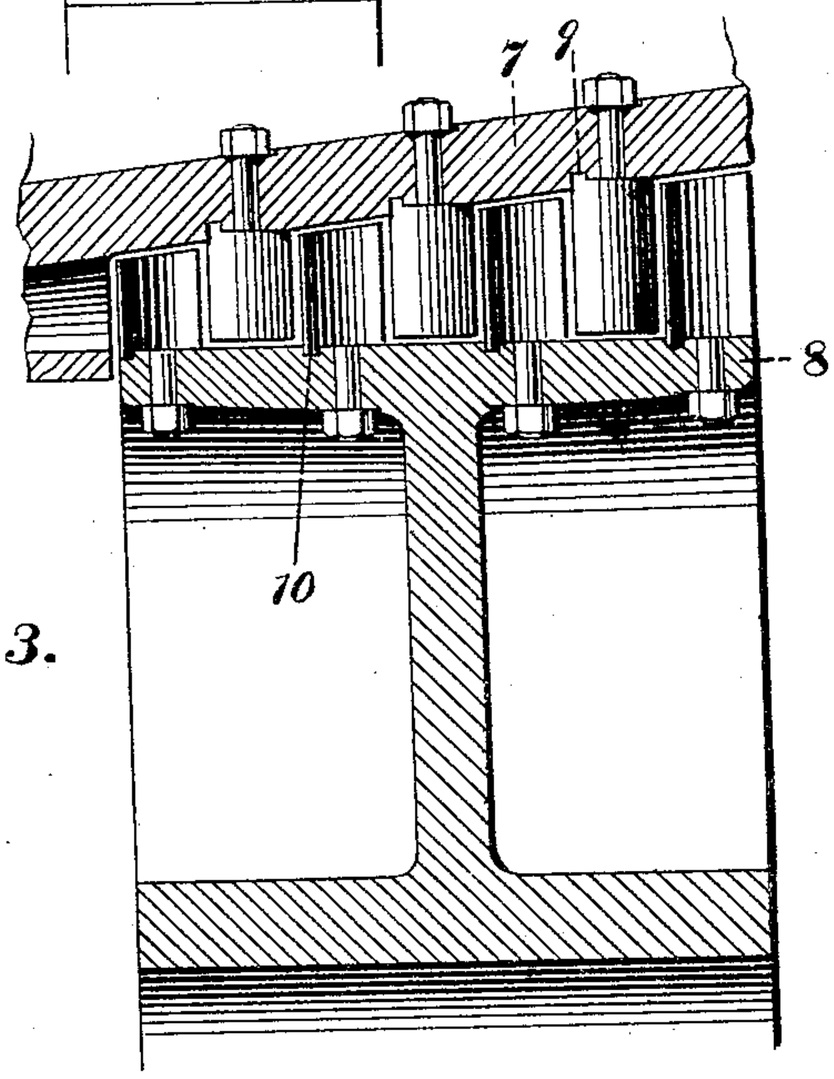

Fig 3.

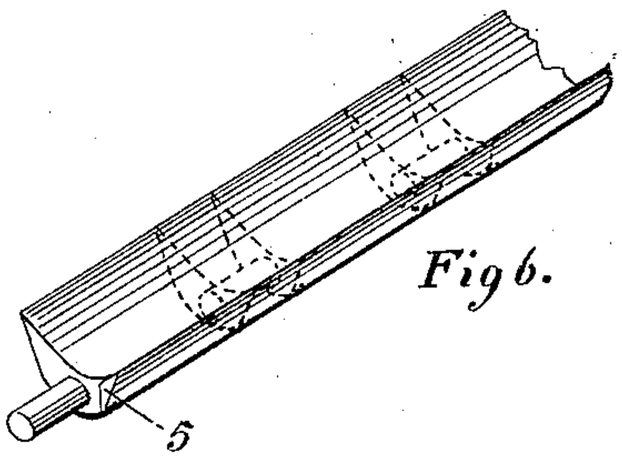

Fig 6.

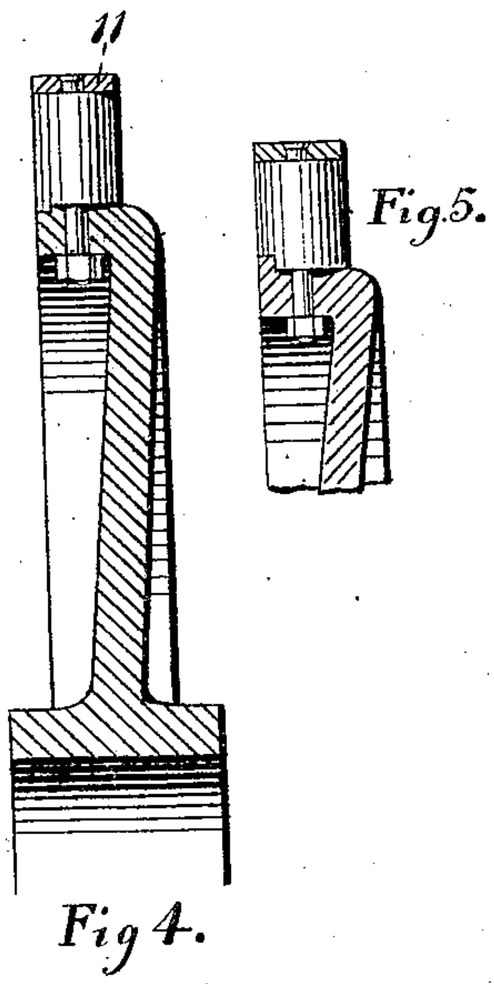

Fig 5.

Fig 4.

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TURBINE-VANE.

No. 875,374. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed October 19, 1903. Serial No. 177,661.

To all whom it may concern:

Be it known that I, JOHANN FRIEDRICH MAX PATITZ, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Turbine-Vane, of which the following is a specification.

My invention relates to steam turbine vanes and fastening and locking means therefor.

The object of my invention is to provide simple and efficient means for fastening the vanes to either the stationary or rotating part of the steam turbine, and to lock them positively against movement in any direction.

The invention is more particularly described in the following specification and shown in the accompanying drawings, in which:—

Figure 1 is a section of a radial flow turbine wheel. Fig. 2 is a face view of Fig. 1, one side plate being removed. Fig. 3 is a part section through an axial flow turbine having a stationary, vane-bearing casing and a drum with several rows of vanes. Fig. 4 is a part section through a wheel similar to the one shown in Fig. 3, with the addition of a surrounding ring for supporting the outer ends of the vanes. Fig. 5 shows a modification of the locking means. Fig. 6 is a perspective view of the roll section from which the vanes may be cut.

In the wheel shown in Fig. 1, the vanes 1 are inserted and held between side plates 2 and 3, by means of end rivets 4, formed thereon. If the riveting alone is depended upon to hold the vanes in place, unequal expansion, or careless riveting, or other causes may so loosen the fastening that the vanes will turn when subjected to their working strain, thus causing loss of efficiency and possible damage. In order to avoid this, projections 5, are provided at each end of the vane, these projections fitting into shoulders 6, in the plates, which shoulders are formed by cutting away a part of the side plates, as shown. The projections 5, fit over the ledge thus formed, and firmly hold the vanes in place. It is evident that this same construction could be used with any other form of wheel fastening, for instance, a screw fastening.

Figs. 3, 4 and 5, show the vanes arranged vertically and likewise provided with locking means. In Fig. 3 there are two sets of vanes, one set being stationary in the casing 7, and the other movable with the drum 8. The projections 9 and 10, respectively, fit into grooves cut in the casing wall and the drum, as shown. The vanes carry only one stem for fastening, which may be either riveted or provided with a nut, as shown. Fig. 4 shows an exactly similar construction applied to a wheel whose vanes are united at their extreme ends by means of a ring 11, to which the vanes are riveted.

In Fig. 5 is shown a reversal of the relative locking means. A cut out portion of the vane fits over a corresponding projecting rib on the wheel. The vanes shown may be cut out of a solid rolled bar of the form shown in Fig. 6. Dotted lines show how the bar may be divided for this purpose.

Having thus described my invention, what I claim is:—

1. In a turbine, the combination of a support comprising two walls, a series of vanes, and means for fastening the vanes between the walls, one of the walls having a continuous formation coacting with the vanes to prevent their twisting.

2. In a turbine, a wheel or casing, a set of vanes, and fastening means for the vanes, the wheel or casing having a common continuous locking formation separate from the fastening means, and the vanes being formed for coaction with the locking formation of the wheel or casing.

3. In a turbine, a wheel or casing, a set of vanes, and fastening means for the vanes, the wheel or casing having a common groove separate from the fastening means, and each vane having a projection thereon fitting the groove and locking the vanes against twisting.

4. In a turbine, a wheel, a set of vanes, and fastening means for the vanes, the wheel having a common groove separate from the fastening means and each vane having a projection thereon fitting the groove so as to bring a surface of the set of vanes flush with a wheel surface.

5. As an article of manufacture, a vane, and a fastening means at the end of the vane, the vane being formed at an end for locking and the formation being separate from the fastening means.

6. In a turbine, the combination of a support comprising two walls, a series of vanes, and means for fastening the vanes between the walls, one of the walls being formed with a groove coacting with the vanes to prevent their twisting.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHANN FRIEDRICH MAX PATITZ.

Witnesses:
G. SCHULSE PILLOS,
C. G. SPRADO.