

F. HODGKINSON.
BLADE LASHING.
APPLICATION FILED JULY 30, 1910.

1,016,942.

Patented Feb. 13, 1912.

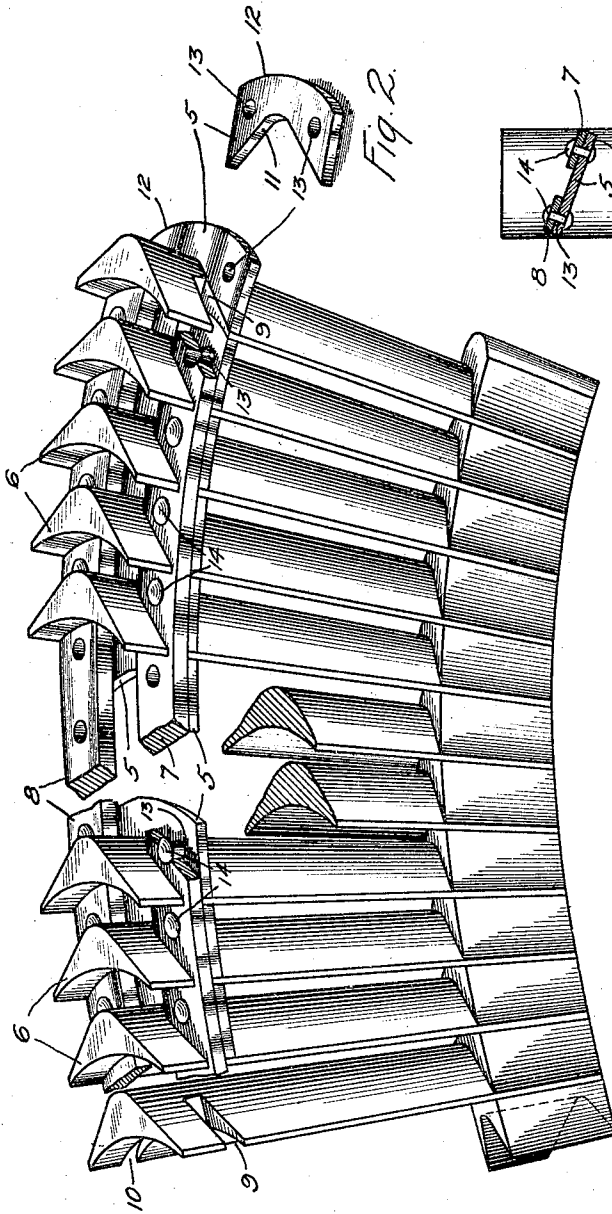


Fig. 1.

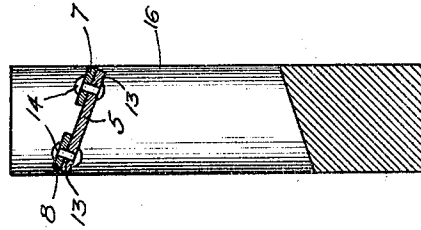


Fig. 3.

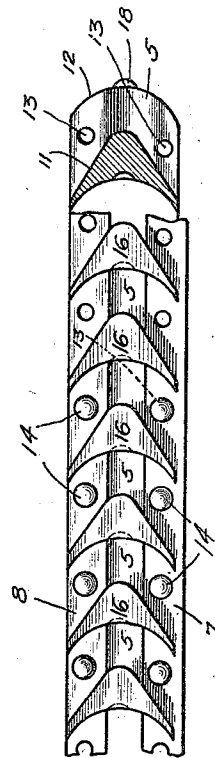


Fig. 4.

WITNESSES:

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BLADE-LASHING.

1,016,942.

Specification of Letters Patent.

Patented Feb. 13, 1912.

Application filed July 30, 1910. Serial No. 574,648.

To all whom it may concern:

Be it known that I, FRANCIS HODGKINSON, a subject of the King of Great Britain and Ireland, and a resident of Edgewood Park, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Blade-Lashing, of which the following is a specification.

This invention relates to turbines and particularly to blading for turbines.

An object of this invention is to produce a shroud or binding member for the outer or free ends of the blades, which rigidly holds the blades in their proper relative positions and is also capable of directing and, to some extent, confining the flow of fluid to the working passages between the blades. This and other objects I attain by means of a binding member embodying the features herein described, and illustrated in the drawings accompanying this application and forming a part thereof.

In the drawings, Figure 1 is a perspective view of a partial row of blades equipped with a binding member embodying my invention. Portions of the binding member and two of the blades are shown broken away for convenience of illustration. Fig. 2 is a perspective view of the spacing pieces which form a detail of my invention. Fig. 3 is a front elevation of an impulse blade equipped with an embodiment of my invention. Fig. 4 is a plan view of a row of blades similar to the blade illustrated in Fig. 3, and provided with an embodiment of my invention.

The embodiment of my invention illustrated in Figs. 1 and 2 consists of spacing pieces 5, which are adapted to be located between blades 6 and are secured in place by means of strips 7 and 8 which are respectively located in notches 9 and 10 located on opposite sides of each of the blades 6. The spacing pieces 5 may be cut or punched from a piece of sheet metal and each piece is formed with curved edges 11 and 12 which respectively correspond in contour to the convex and concave faces of the blades 6. An aperture 13 is provided near each end of each piece 5 and may be formed during the operation of cutting or forming the pieces. The pieces 5 are preferably located in place between the blades 6 after the blades are assembled into segmental blade strips or are mounted on a

blade carrying element. The pieces are secured in place by means of rivets 14, which extend through the apertures 13 and registering apertures located in the strips 7 and 8. Each piece is of such size that the edge 11, contacts with the convex face of an adjacent blade 6 and the edge 12, contacts with the concave face of the next adjacent blade, when the piece is in place between the blades. The strips 7 and 8 are locked into the slots, provided in the blades, by the riveting operation which secures the pieces 5 in place, consequently each blade 6 is located between the two strips 7 and 8 and two spacing pieces 5 which are positively secured together and the blades are, therefore, rigidly held in position by the coöperation of the other blades of the row. A binding member of this construction may be located at any point along the length of the blade, so long as sufficient metal is retained between the mounting slots of the strips 7 and 8 and the ends of the blades to resist centrifugal strains.

In Figs. 3 and 4 I have shown a binding member applied to impulse blades 16 of a turbine and inclined to the axes of the blades. I have also shown each piece 5 provided with a lug 18 formed on the convex edge 12 of the piece and adapted to engage a correspondingly shaped recess formed in the concave face of an adjacent blade. This construction provides additional means for securing the spacing pieces 5, and the assembled binding member in place against centrifugal force. It will be apparent that the spacing pieces 5 will be effective in directing the flow of fluid through the passages between the blades, and of also confining the fluid and preventing it from passing in a radial direction.

A binding member embodying my invention may be employed with the stationary, as well as the moving blades of a turbine, and various modifications may be made without departing from the spirit and scope of my invention.

Having now described my invention, what I claim is:

1. In combination with a row of blades, a binding member comprising spacing pieces located between the blades and secured to strips mounted in slots provided in the blades.

2. In combination with a row of blades, a

binding member for the blades comprising spacing pieces located between the blades, and strips to which said pieces are secured by means of rivets.

5 3. In combination with a row of blades, spacing pieces located between the blades, and circumferentially extending members located in slots provided in the blades and secured to said spacing pieces by means of
10 rivets.

4. In combination with a row of blades, a binding member comprising a spacing piece located between the blades, and strips secured to said piece for holding them in
15 place.

5. In combination with a row of blades, a binding member comprising spacing pieces located between the blades, and strips located in slots provided in the blades and secured to said spacing pieces.
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6. In combination with a row of blades, a binding member comprising spacing pieces, and means riveted to said pieces for securing them in place between the blades.

7. In combination with a row of blades, a binding member comprising separate spacing pieces located between the blades, and means located in slots provided in the blades for securing said spacing pieces in place. 25

8. In combination with a row of blades, a binding member for the blades comprising strips located in slots provided in the blades, and means located between the blades for securing said strips in place. 30

9. In combination with a row of blades, a binding member comprising separate spacing pieces located between the blades and provided with lugs which engage recesses formed in the faces of the blades, and means located in slots provided in the blades for securing said spacing pieces in place. 35 40

In testimony whereof, I have hereunto subscribed my name this 28th day of July 1910.

FRANCIS HODGKINSON.

Witnesses:

C. W. MCGHEE,

B. F. FUNK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."