

C. GILSON.
METHOD OF SHROUDING BLADES.
APPLICATION FILED DEC. 30, 1914.

1,286,283.

Patented Dec. 3, 1918.

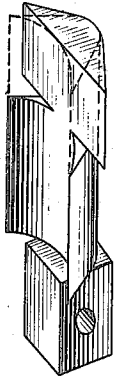


Fig. 1.

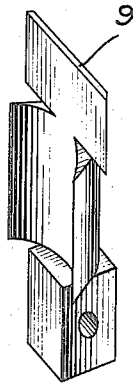


Fig. 2.

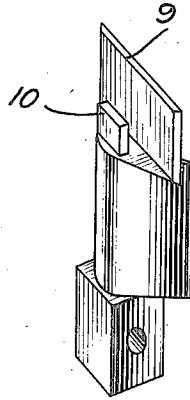


Fig. 3.

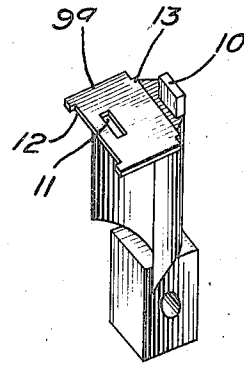


Fig. 4.

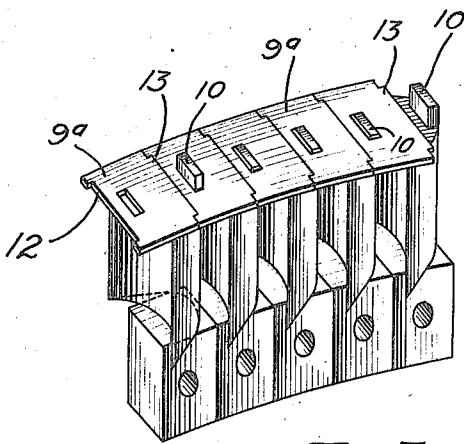


Fig. 5.

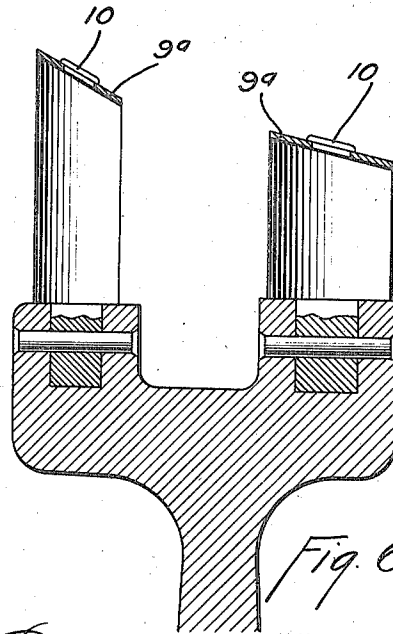


Fig. 6.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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METHOD OF SHROUDING BLADES.

1,286,283.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHRISTIAN GILSON, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Methods of Shrouding Blades, of which the following is a specification.

An object of this invention is to produce a new and improved method of shrouding blades, or is the production of blades having improved shrouding members formed thereon.

This and other objects, which will be made apparent throughout the further description of my invention, are attained by means of the method herein described and illustrated and by means of the blade constructed in accordance with that method.

In the drawings forming a part hereof, Figure 1 shows in full lines a perspective view of a blade after it has been subjected to the first step in the operation of forming shrouding members, in accordance with my invention, the dotted line construction showing the incut blank.

Figs. 2 and 3 are perspective views of opposite sides of a blade and illustrate a blade which has been subjected to the second step of the method herein described as an embodiment of my invention.

Fig. 4 is a perspective view of a completed blade embodying my invention and constructed in accordance with the method herein described.

Fig. 5 is a perspective view of several completed blades assembled in a row.

Fig. 6 is a fragmental sectional view of the rotor element of a turbine or similar apparatus equipped with blades embodying my invention.

The method herein described as an embodiment of my invention consists in forming a shroud member and a shroud engaging tip on the outer end of a forged, drawn or cast blade, and then bending the shrouding member so formed to an operative position, or at right angles to the longitudinal axis of the blade.

In carrying out this method I first shear the wings of the blade at a point intermediate the ends of the blade and at a distance from the free end equal to the desired length of the shroud member. I then press the partially severed portion of the blade so

that the wing portions thereof are flattened out, as is shown in full lines in Fig. 1. It will be understood by those skilled in the art that the shearing and pressing of the wings may be done simultaneously, or in one operation. After the partially severed portion of the blade has been pressed so that its flattened face defines a plane tangent to the concave face of the blade and normal to the longitudinally extending axial plane which bisects the blade, the severed portion is milled to form a flat longitudinally extending wing 9 and a longitudinally extending tip 10. The milling operation is preferably so performed that the flat face of the partially severed portion of the blade, shown in Fig. 1, remains intact and forms one face of the completed wing.

The wing 9 is then bent about its point of union with the blade proper, and may be simultaneously sheared to the desired shape and punched as at 11 to receive a shroud engaging tip 10 of the adjacent blade. The wing so bent and sheared forms a shrouding member 9^a for the outer end of the blades, since it engages the severed ends of the blade wings and overhangs the concave face of the blade. In assembling the blades, the shroud member of one blade is engaged by the shroud engaging-tip of the next adjacent blade and also coöperates with the shrouding member of the next adjacent blade to form a continuous shroud. With this arrangement blades mounted in an annular row will be provided with a substantially continuous annular shroud.

The shrouding members of the blades illustrated are provided with a recess 12 at one edge and a tongue or projection 13 at the other edge, which is adapted to engage the recess 12 of the next adjacent shrouding member when the blades are assembled. With this arrangement the shrouding members coöperate, independently of the shroud engaging tips 10, to hold the ends of the blades against lateral as well as circumferential vibrations. After the blades are assembled, the shroud member of each blade is positively locked to the next adjacent blade by riveting over, crimping or distorting the shrouding member engaging tips 10.

In Fig. 6, I have illustrated blades having inclined shroud members for the purpose of providing fluid passages through the blades of gradually increasing area. This is ac-

complished by severing the blade wings at an angle instead of at right angles as shown in Fig. 1, and then proceeding as already described.

5 While I have illustrated one embodiment of the method forming a part of my present invention, it will be apparent that the method may be varied materially without departing from the spirit and scope of the
10 invention and that the blades made in accordance with my improved method may also be varied in details of construction without departing from the spirit and scope of the invention as set forth by the appended
15 claims.

What I claim is:

1. A method of forming a shrouded blade, which consists in forming a shroud member on the end of a blade, and then bending the
20 member so formed at an angle to the axis of the blade.

2. A method of forming a shrouded blade, which consists in milling a longitudinally extending shroud member on a blade, then
25 bending the member so formed at an angle to the longitudinal axis of the blade.

3. A method of constructing a shrouded blade, which consists in partially severing the outer end of a blade, flattening one face
30 of the severed portion, then milling a shroud member from the flattened portion, and then bending the member so formed to an operative position with relation to the blade.

4. A method of constructing a shrouded
35 blade, which consists in partially severing the outer end of a blade, pressing the wings of the severed portion into substantially the same plane, then milling the partially severed portion to form a longitudinally extending shrouding member and bending the
40 member at an angle to the longitudinal axis of the blade.

5. A method of constructing a shrouded
45 blade, which consists in partially severing the outer end of a blade, pressing the wings of the severed portion into substantially the same plane, then milling the partially severed portion to form a longitudinally ex-

tending shrouding member, and a shroud
engaging tip on the blade, and bending the
50 member at an angle to the longitudinal axis of the blade.

6. A method of constructing a shrouded blade, which consists in partially severing the outer end of a blade, pressing the wings
55 of the severed portion into substantially the same plane, then milling the partially severed portion to form a longitudinally extending shrouding member, and a shroud engaging tip on the blade, bending the mem-
60 ber at an angle to the longitudinal axis of the blade, and punching said member to form a tip-receiving aperture therein.

7. A method of constructing a shrouded blade, which consists in partially severing
65 the outer end of a blade, pressing the wings of the severed portion into substantially the same plane, forming a shroud member from the partially severed portion, and then pressing the member so formed into engagement
70 with the severed ends of the undistorted wings of the blade.

8. The method of constructing a blade which consists in flattening one face of the outer end of the blade, milling a shroud
75 member from the flattened portion and bending the shroud member to an operative position.

9. The method of constructing a blade which consists in flattening one face of the
80 outer end of the blade and then forming a shroud member from the flattened portion.

10. The method of forming a shrouding for the end of a blade, which consists in partially severing a portion at the outer end
85 of the blade, flattening one face of the partially severed portion, and then bending the partially severed portion at an angle to the axis of the blade.

In testimony whereof, I have hereunto
90 subscribed my name this 28th day of December, 1914.

CHRISTIAN GILSON.

Witnesses:

C. W. MCGHEE,

E. W. MCCALLISTER.