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BLADE FOR FLUID PRESSURE TURBINES.

APPLICATION FILED MAR. 19, 1919.

1,347,003. Patented July 20, 1920.

Fig. 1

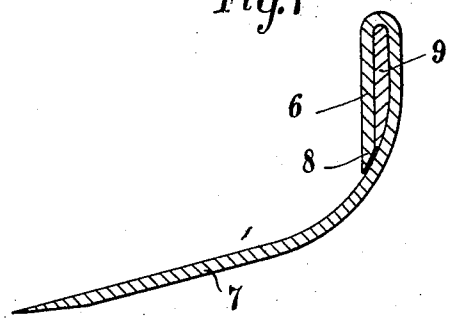


Fig. 2

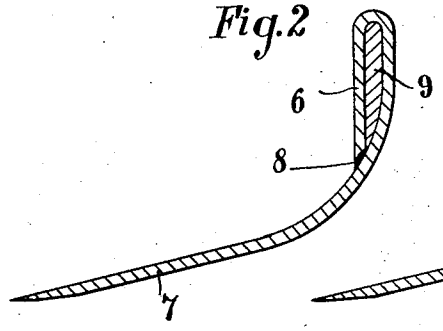


Fig. 3

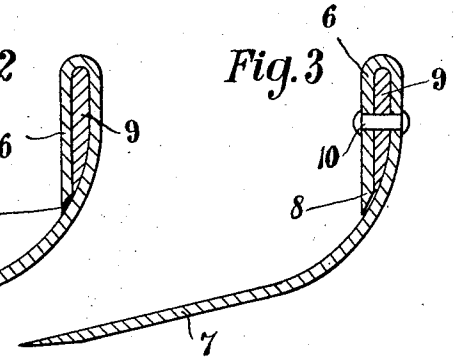


Fig. 4

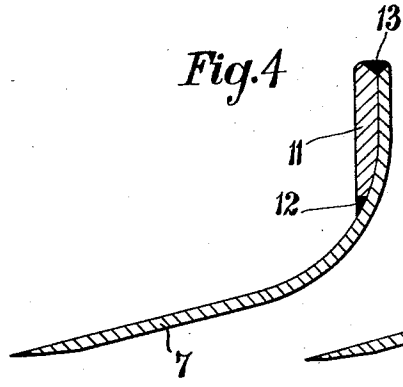
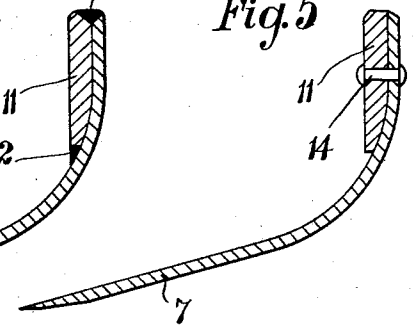


Fig. 5



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UNITED STATES PATENT OFFICE

KARL BAUMANN, OF URMSTON, AND HENRY LEWIS GUY AND JOHN FREDERICK FRANKLAND WINNING, OF MANCHESTER, ENGLAND, ASSIGNORS TO THE BRITISH WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, LIMITED, A CORPORATION OF GREAT BRITAIN.

BLADE FOR FLUID-PRESSURE TURBINES.

1,347,003. Specification of Letters Patent. Patented July 20, 1920.

Application filed March 19, 1919. Serial No. 283,641.

To all whom it may concern:

Be it known that we, KARL BAUMANN, a citizen of the Confederation of Switzerland, and a resident of Urmston, in the county of Lancaster, England; HENRY LEWIS GUY, a subject of the King of Great Britain, and a resident of Victoria Park, Manchester, in the county of Lancaster, England, and JOHN FREDERICK FRANKLAND WINNING, a subject of the King of Great Britain, and a resident of Stretford, Manchester, in the county of Lancaster, England, have invented a new and useful Improvement in Blades for Fluid-Pressure Turbines, of which the following is a specification.

This invention relates to stationary guide blades employed in the diaphragms of axial flow fluid pressure turbines of the impulse type.

The stationary guide blades of such turbines when mounted in the diaphragms are subjected to considerable bending stresses due to the pressure of the motive fluid on the diaphragm. In order to obtain sufficient strength to resist such bending stresses without unduly obstructing the flow of motive fluid between the blades the latter are made of greater cross-section near their inlet edges than near their outlet edges.

In order to reduce the cost of blades of this character the blades are, according to this invention, made of a single thickness of sheet metal, sheet steel for example, the increase in thickness at their inlet edges necessary to enable them to withstand the bending stresses being secured by turning or bending over the sheet metal at these edges, or alternatively by welding or otherwise securing a strip of metal to said edges.

Various forms of blades constructed in accordance with the invention are illustrated in the several figures of the accompanying drawing, in which Figures 1 to 5, inclusive, are cross-sections.

In carrying out the invention in the manner illustrated in Figs. 1 to 3 the bent-over portion 6 at the inlet edge of the blade 7 is preferably not pressed flat against the rest of the blade as this may tend to damage the metal but is so turned over as to leave a space between the adjacent surfaces, enabling an easier bend to be employed. The free edge 8 of the bent portion 6 is pressed into close contact with the surface of the blade and is preferably chamfered or reduced in thickness so that the inner surface of the finished blade will present a substantially continuous curve. If desired the free edge 8 may be welded to the main portion of the blade as shown in Fig. 2. The bent-over portion 6 of the blade is either closed at the ends of the blades by welding, or the space within the bent-over portion is filled either completely or at the ends only of the blade with a strip or strips of metal 9. This is desirable as otherwise when the blades are secured to the diaphragm by casting, the hollow spaces left within the turned-over portions of the blade might be partly filled with cast metal, particles of which might become detached and cause serious damage to the turbine. It has also been found that blow holes are liable to be formed near the embedded ends of the blades when the diaphragm is cast around them unless the ends of the blades are either closed by welding or filled up as described. In the construction illustrated in Fig. 3 the free edge 8 of the bent-over portion of the blade as well as the filling piece 9 is held in position by means of rivets 10.

Figs. 4 and 5 show constructions in which the desired increase in the thickness of the blades 7 at their inlet edges is obtained by securing a strip of metal 11 thereto. As shown in Fig. 4 the strip 11 is attached to the blade by welding at the parts 12, 13 and in Fig. 5 by means of rivets 14.

We claim as our invention:—

1. A turbine blade having its major portion formed of a single thickness of sheet metal and its inlet edge formed of two thicknesses of metal.

2. A turbine blade having its major por-

tion formed of a single thickness of sheet metal and being doubled at its inlet edge to form two thicknesses of metal.

3. A turbine blade having its major portion formed of a single thickness of sheet metal and at its inlet edge being doubled over a metal filler to form a thickened inlet edge.

In testimony whereof we have hereunto subscribed our names this third day of January, 1919.

KARL BAUMANN.
HENRY LEWIS GUY.

In testimony whereof I have hereunto subscribed my name this eleventh day of January, 1919.

JOHN FREDERICK FRANKLAND WINNIN