No. 875,646. PATENTED DEC. 31, 1907.

N. C. BASSETT.

BLADE FASTENING.

APPLICATION FILED OCT. 29, 1906. RENEWED MAY 27, 1907.

Fig. II.

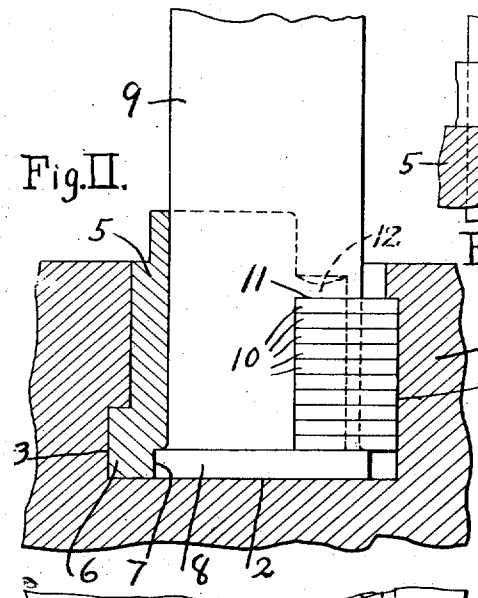



Fig. III.

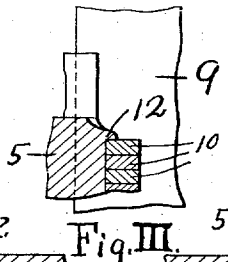
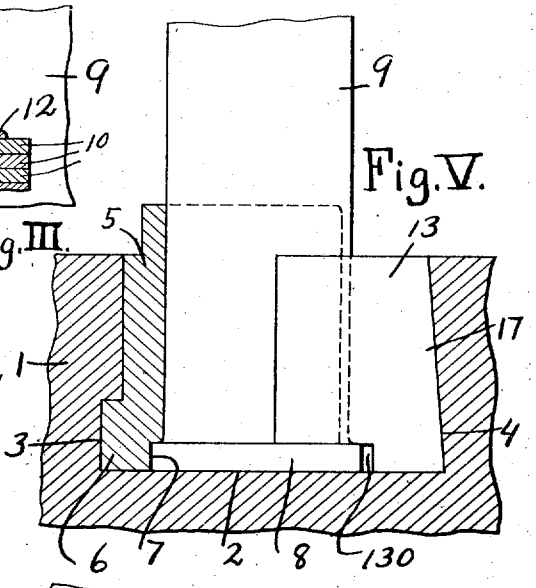



Fig. V.



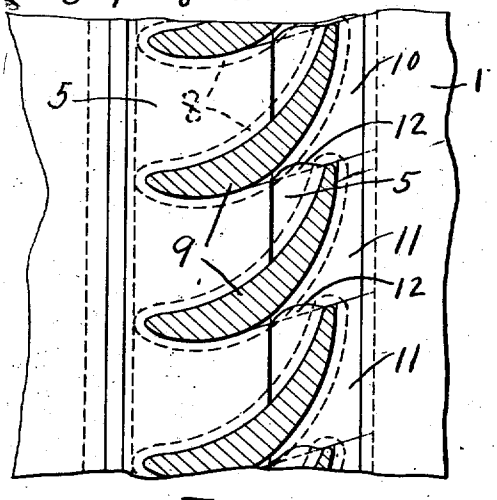




Fig. I.

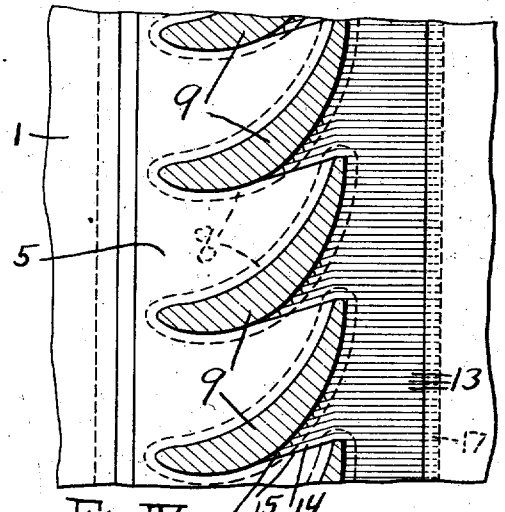



Fig. IV.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

NORMAN C. BASSETT, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW JERSEY.

## BLADE-FASTENING.

No. 875,646. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed October 29, 1906, Serial No. 341,076. Renewed May 27, 1907. Serial No. 375,955.

*To all whom it may concern:*

Be it known that I, NORMAN C. BASSETT, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Blade-Fastenings, of which the following is a specification.

This invention relates to fastening devices suitable for fastening the blades of fluid propelled engines, or the blades of fans or pumps for propelling fluid, and generally it relates to a fastening means which is capable of being used in any relation where it is desirable to firmly secure to a member a plurality of similarly associated elements.

The term "blade" as used in this specification and in the claims is used in the generic sense to include any equivalent elements which it might be desirable to secure to a member in a similar manner and is not intended to restrict this invention to any specific art or machine, the term "blade" being used for convenience as this invention is particularly well suited for use in the construction of steam turbines.

The purpose of this invention is to provide a simple, safe and convenient means for the purpose described, the parts composing the structure of which are easily manufactured and such that the blades may be readily assembled and secured in the blade-carrying member with the greatest possible despatch.

On the drawings which accompany this specification and form a part thereof and on which the same reference characters are used to designate the same elements wherever they appear in each of the several views, and which illustrate embodiments of this invention,—

Figure 1 represents a plan view of a fragment of a blade-carrying member with the blades secured therein, the blades being shown in section. Fig. 2 is a sectional elevation of the parts as shown in Fig. 1. Fig. 3 is a sectional elevation of a detail taken parallel to the general direction of the blade-holding member. Fig. 4 is a plan of a fragment of a blade-carrying member with the blades secured thereto, the blades being shown in section, showing an alternative construction. Fig. 5 is a sectional elevation of the parts as shown by Fig. 4.

On the drawings the numeral 1 indicates a blade-carrying member provided with a recess 2, the sides of said recess being undercut thereby providing recesses as shown at 3 and 4.

The numeral 5 represents a blade-holding member provided with a projection 6 which is adapted to seat in the recess 3 of the blade-carrying member 1 and said blade-holding member is notched on the side opposite to said projection 6, the notches being approximately triangular shaped, as seen in the plan views, and said blade-holding member is further provided with recesses 7 adapted to be engaged by projections 8 on the blades 9 to lock said blades to said blade-holding member.

In order to securely fasten the blade-holding member 5 and the blades assembled therewith in the recess of the blade-carrying member 1, a plurality of relatively thin strips are provided which are adapted to be seated in said recess, entering the recessed portion 4 thereof and bearing at their opposite edges preferably against the blades alone, as shown by the drawings. These strips when assembled form what may properly be called laminated filling blocks and may take in actual construction several forms, two of which are illustrated by the drawings.

In Figs. 1 and 2 are shown laminated filling blocks composed of series of superposed plates and in this construction, which is the preferred construction, each of these plates is a duplicate of each of the others.

The plates, which are designated by the numeral 10, may be readily cut or stamped from material of the proper thickness, being cut so as to conform to the shape of the space they are required to occupy, and when the blades 9 are assembled with the blade-holding member 5 within the recess 2 of the blade carrying member 1, they are inserted in position, one at a time, and preferably forced into place, being of such a size preferably as to fill the space they occupy tightly instead of loosely. After the requisite number of plates have been inserted to form a filling block 11, which fills the recess 4 as shown, the adjacent corner of the blade-holding member 5 may be punched over, as indicated at 12, to positively lock said plates within said recess.

In Fig. 4 is shown a modification in the shape of the plates and the method of placing them within the recess 2. In this modification the individual plates, which are desig-

nated by the numeral 13, are of different sizes, comparing the number necessary to constitute a filling block for each blade, but the corresponding plates as used with each of the several blades are duplicates each of the other. In this case the first plate of a series, which is designated by the numeral 14, is seated in the recess 2 with one edge in contact with a blade 9, and as in this particular structure shown, the edge 15 of the notch 16 in the blade-holding member is disposed at a slight angle with respect to the cross section of the recess in the blade-carrying member, the plate 14 is then bent forcibly around the free edge of the adjacent blade 9 until it lies at right angles to the general longitudinal direction of the recess 2, in which position its other side 17, which is offset or provided with a projection to register with an undercut side 4 of the recess, closely engages the side of said recess.

The succeeding plates necessary to constitute a group composing a filling block are inserted in the same manner, but it will be noticed that on account of the convexity of the blades the last half of the number of blades are not bent as are the former.

The plates shown by Figs. 1, 2 and 3 are not necessarily limited in size to provide a filling block for each separate blade, but they may be so formed that they serve to form filling blocks for a plurality of blades. The form shown by said figures is, however, the preferred form as each plate is readily assembled with the other parts, and, as each plate is a duplicate of each of the others, no judgment nor selection is required to be exercised by the workmen, and, besides, the filling blocks can be formed readily and economically.

With the form of filling blocks as shown by Figs. 4 and 5, judgment and selection must be exercised by the workmen in assembling the parts in their proper relation, and on account of this and the fact that it is preferred to bend slightly some of the plates as shown, these structures are not as readily assembled as the structures of the preferred form.

As each of these plates in the alternative construction as used with the different blades is a duplicate of the plates used with each of the other blades, the duplicate plates are of course kept together and the workman who assembles the plates may be provided with receptacles each of which contains a separate size of plates, and by starting with the receptacle containing the larger, and continuing with the next smaller until the filling-block is completed, the act of selection becomes mechanical rather than mental, which facilitates the operation of assembling the plates.

In each of the structures illustrated the plates bear upon the projections on the blade thereby holding the blades firmly seated in the recess 2, the plates 13 being cut away or recessed, as shown at 130, so that they bear against the bottom of the recess 2 also.

What I claim is,—

1. The combination with a blade-carrying member, provided with a recess, of a blade-holding member, provided with notches, seated in said recess, blades seated in the notches of said blade-holding member, and a laminated filling block to secure a blade and said blade-holding member within the recess of said blade-carrying member.

2. The combination with a blade-carrying member, provided with a recess, of a blade-holding member, provided with notches, seated in said recess, blades seated in the notches of said blade-holding member, and a plurality of laminated filling blocks to secure the blades and said blade-holding member within the recess of said blade-carrying member.

3. The combination with a blade-carrying member, provided with a recess a side of which is undercut, of a blade-holding member provided with notches seated in said recess, said blade-holding member being also provided with a projection adapted to engage with said side of the recess within the undercut portion thereof, blades seated in the notches of said blade-holding member, and laminated filling blocks to secure said blades and blade-holding member within the recess of said blade-carrying member.

4. The combination with a blade-carrying member, provided with a recess a side of which is undercut, of a blade-holding member, provided with notches, seated in said recess, said blade-holding member being also provided with a projection adapted to engage with said side of the recess within the undercut portion thereof, said blade-holding member being recessed adjacent to said notches, blades, provided with projections, seated in said notches with their projections engaged with the blade-holding member in the recessed portions thereof, and laminated filling blocks to secure said blades and blade-holding member within the recess of said blade-carrying member.

5. The combination with a blade-carrying member, provided with a recess the sides of which are undercut, of a blade-holding member provided with notches, seated in said recess, said blade-holding member being also provided with a projection adapted to engage with a side of the recess within the undercut portion thereof, said blade-holding member being recessed adjacent to said notches, blades, provided with projections, seated in said notches with their projections engaged with the blade-holding member in the recessed portions thereof, and filling blocks, each of which is composed of a plurality of plates, engaged both with the blades and projections thereon and with a side of the recess in said blade-carrying member

within the undercut portion thereof to secure said blades and blade-holding member within the recess of said blade-carrying member.

6. The combination with a blade-carrying member, provided with a recess the sides of which are undercut, of a blade-holding member provided with notches, seated in said recess, said blade-holding member being also provided with a projection adapted to engage with a side of the recess within the undercut portion thereof, said blade-holding member being recessed adjacent to said notches, blades, provided with projections, seated in said notches with their projections engaged with the blade-holding member in the recessed portions thereof, and filling blocks, each of which is composed of a plurality of plates, one of which plates is engaged both with the projection on a blade and with a side of the recess in said blade-carrying member with the undercut portion thereof while the other plates composing a filling block engage with the blade and with the said side of the recess, to secure said blades and blade-holding member within the recess of said blade-carrying member.

7. The combination with a blade-carrying member, provided with a recess the sides of which are undercut, of a blade-holding member provided with notches, seated in said recess, said blade-holding member being also provided with a projection adapted to engage with a side of the recess within the undercut portion thereof, said blade-holding member being recessed adjacent to said notches, blades, provided with projections, seated in said notches with their projections engaged with the blade-holding member in the recessed portions thereof, and filling blocks, each of which is composed of a plurality of plates, one of which plates is engaged both with the projection on a blade and with a side of the recess in said blade-carrying member within the undercut portion thereof while the other plates composing the filling block engage with the blade and with the said side of the recess, a portion of the blade-holding member being projected over the outermost plate of the series composing a filling block.

8. The combination with a blade-carrying member, provided with a recess, of a blade seated in said recess, and a laminated filling block to secure said blade therein.

In testimony whereof, I affix my signature in the presence of two witnesses.

NORMAN C. BASSETT.

Witnesses:
FRANK E. DENNETT,
JOHN OLSEN.

Correction in Letters Patent No. 875,646.

It is hereby certified that in Letters Patent No. 875,646, granted December 31, 1907, upon the application of Norman C. Bassett, of Milwaukee, Wisconsin, for an improvement in "Blade-Fastenings," an error appears in the printed specification requiring correction, as follows: In line 21, page 3, the word "with" should read *within;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of January, A. D., 1908.

[SEAL.]

C. C. BILLINGS,
*Acting Commissioner of Patents.*

within the undercut portion thereof to secure said blades and blade-holding member within the recess of said blade-carrying member.

6. The combination with a blade-carrying member, provided with a recess the sides of which are undercut, of a blade-holding member provided with notches, seated in said recess, said blade-holding member being also provided with a projection adapted to engage with a side of the recess within the undercut portion thereof, said blade-holding member being recessed adjacent to said notches, blades, provided with projections, seated in said notches with their projections engaged with the blade-holding member in the recessed portions thereof, and filling blocks, each of which is composed of a plurality of plates, one of which plates is engaged both with the projection on a blade and with a side of the recess in said blade-carrying member with the undercut portion thereof while the other plates composing a filling block engage with the blade and with the said side of the recess, to secure said blades and blade-holding member within the recess of said blade-carrying member.

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