

No. 875,650.

PATENTED DEC. 31, 1907.

N. C. BASSETT.
BLADE FASTENING.

APPLICATION FILED OCT. 29, 1906. RENEWED AUG. 23, 1907.

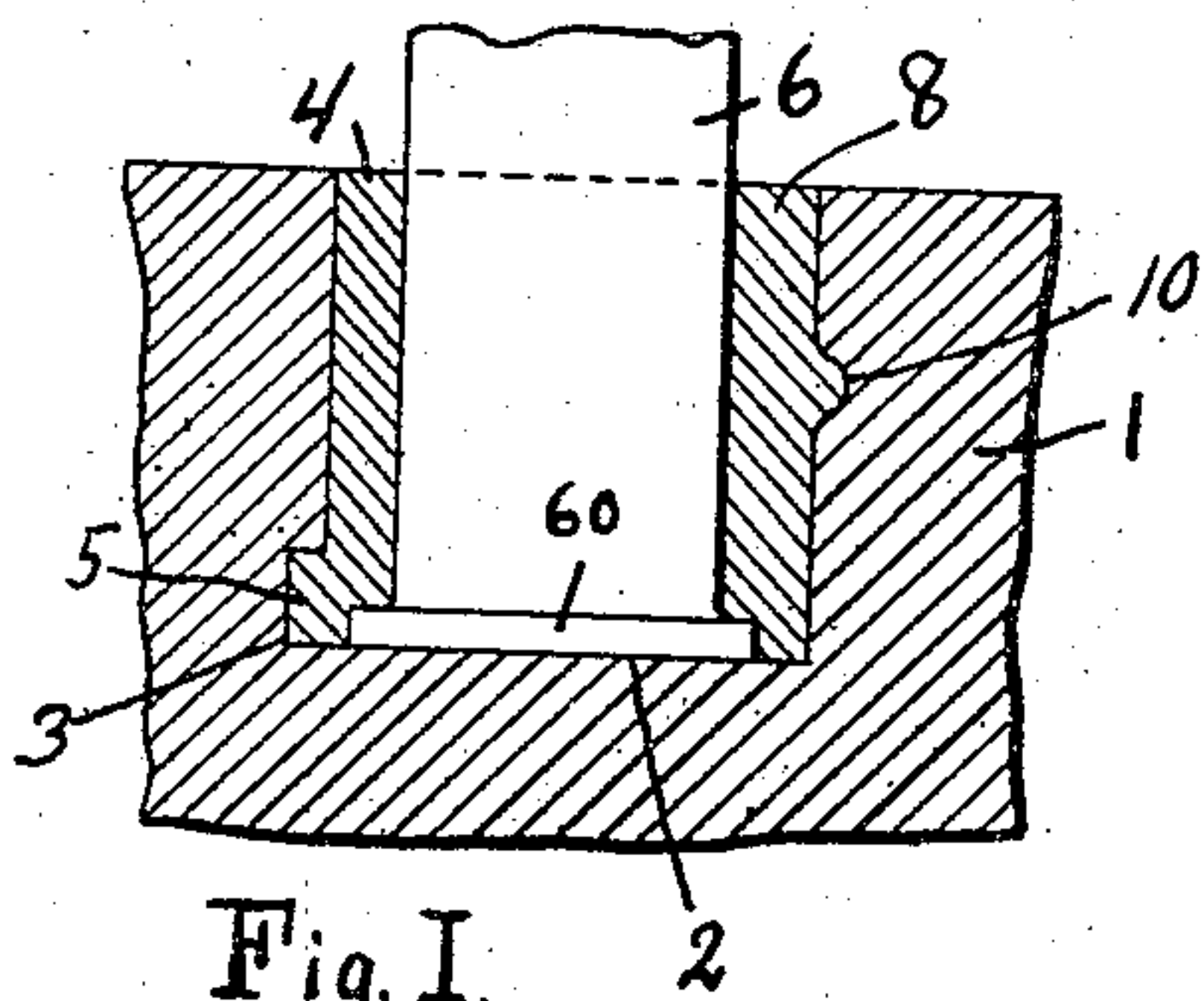


Fig. I.

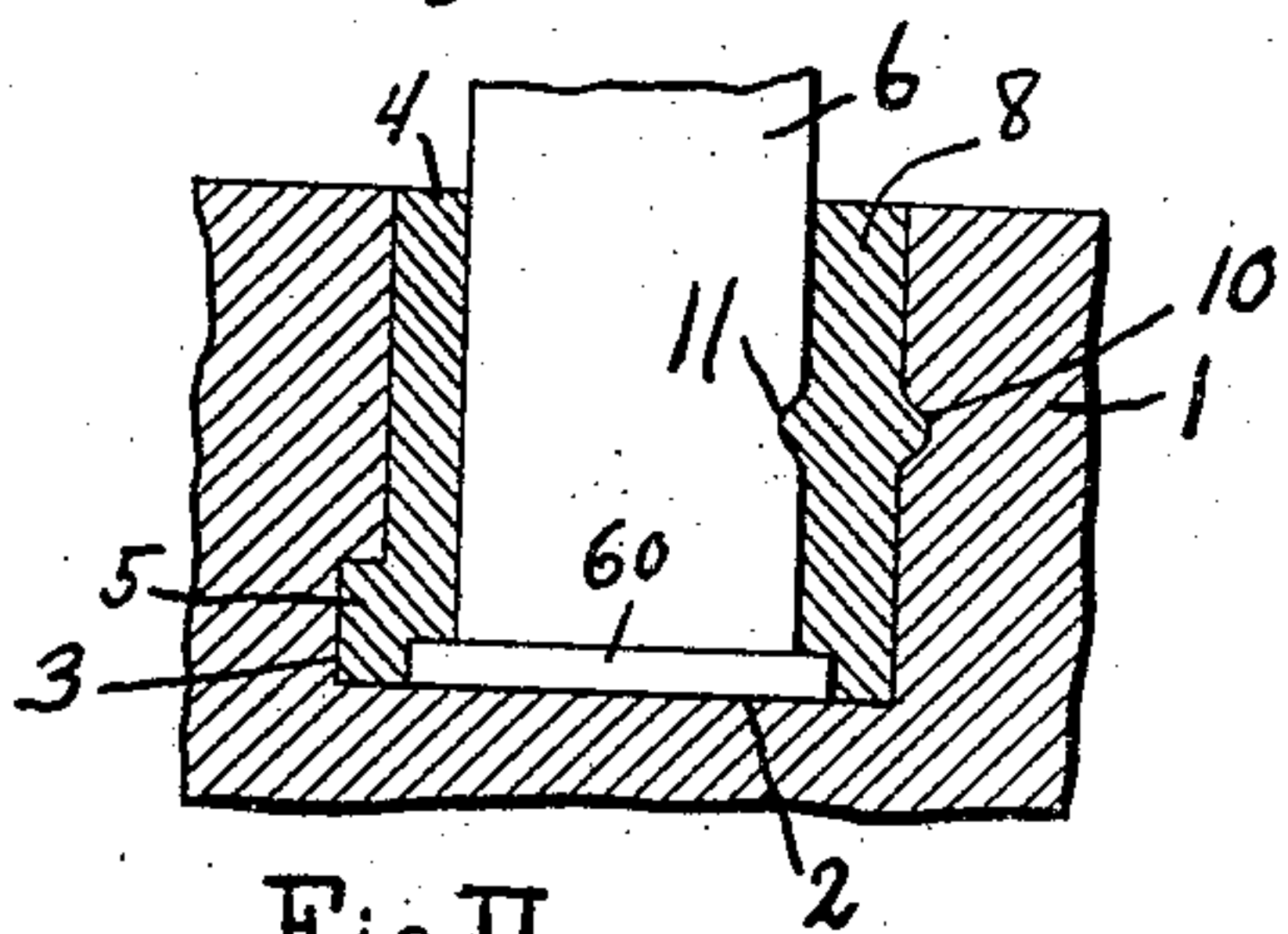


Fig. II.

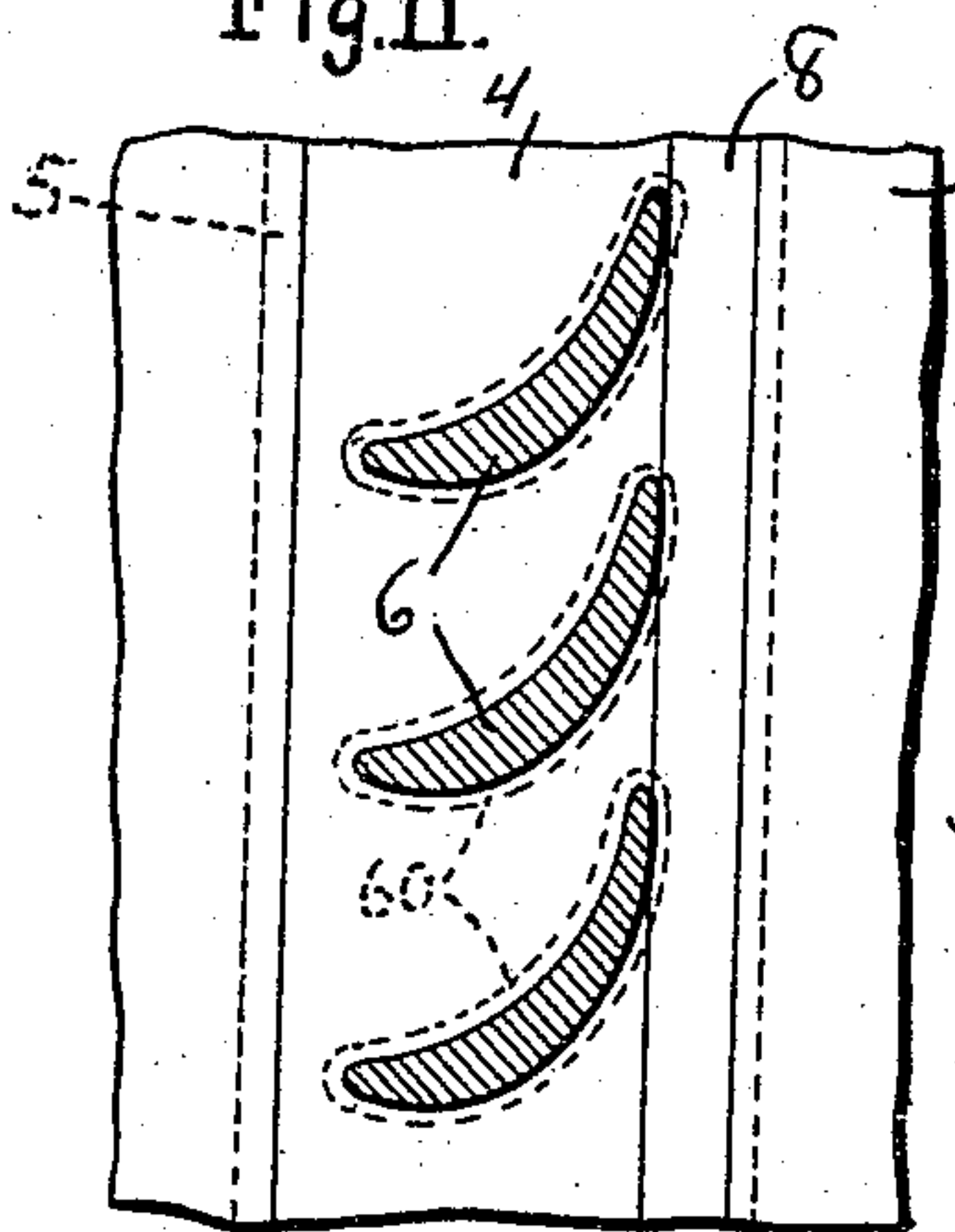


Fig. III.

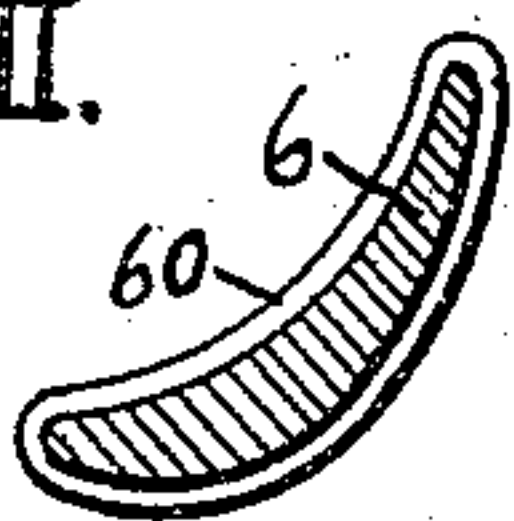


Fig. IV.

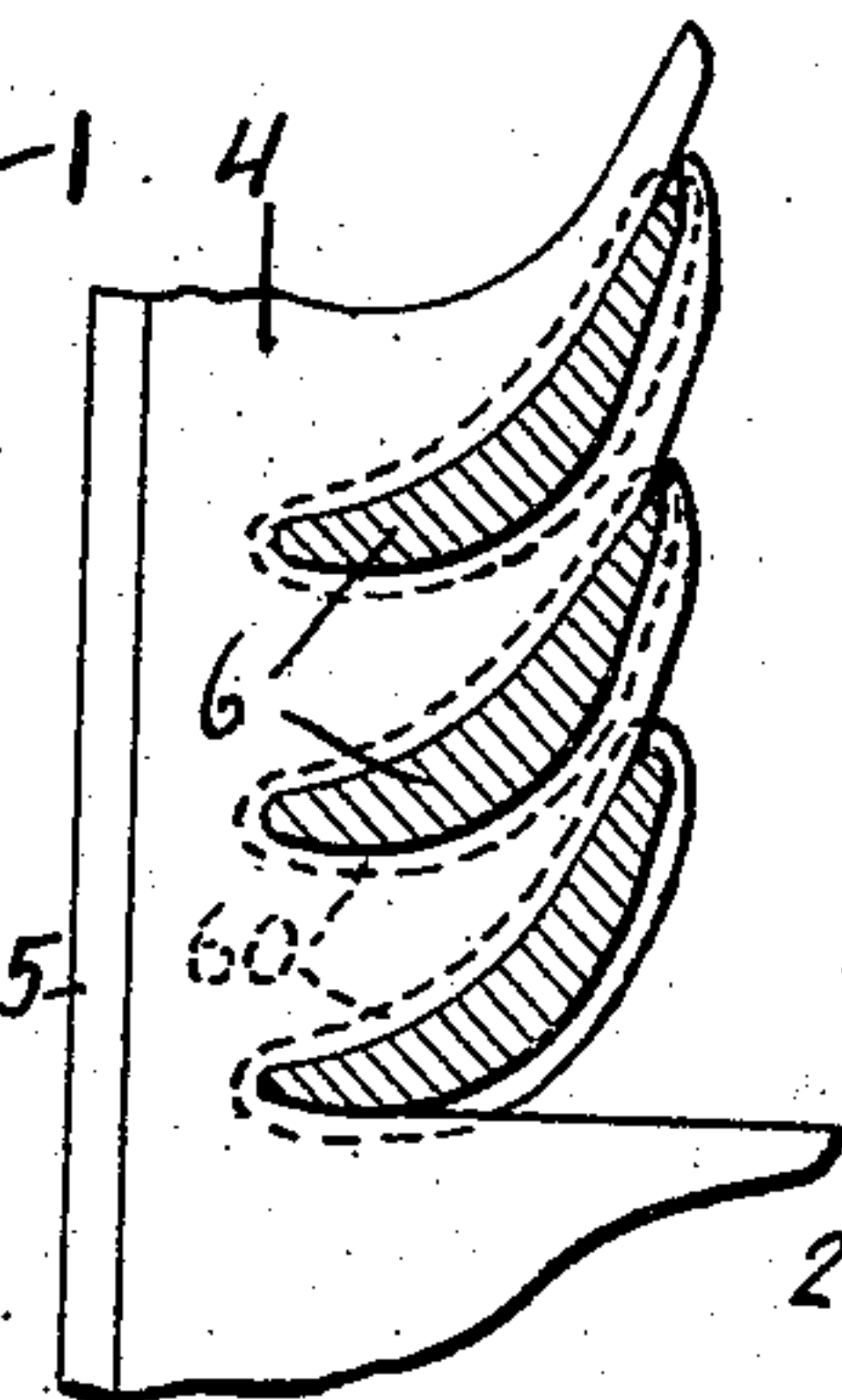


Fig. VI.

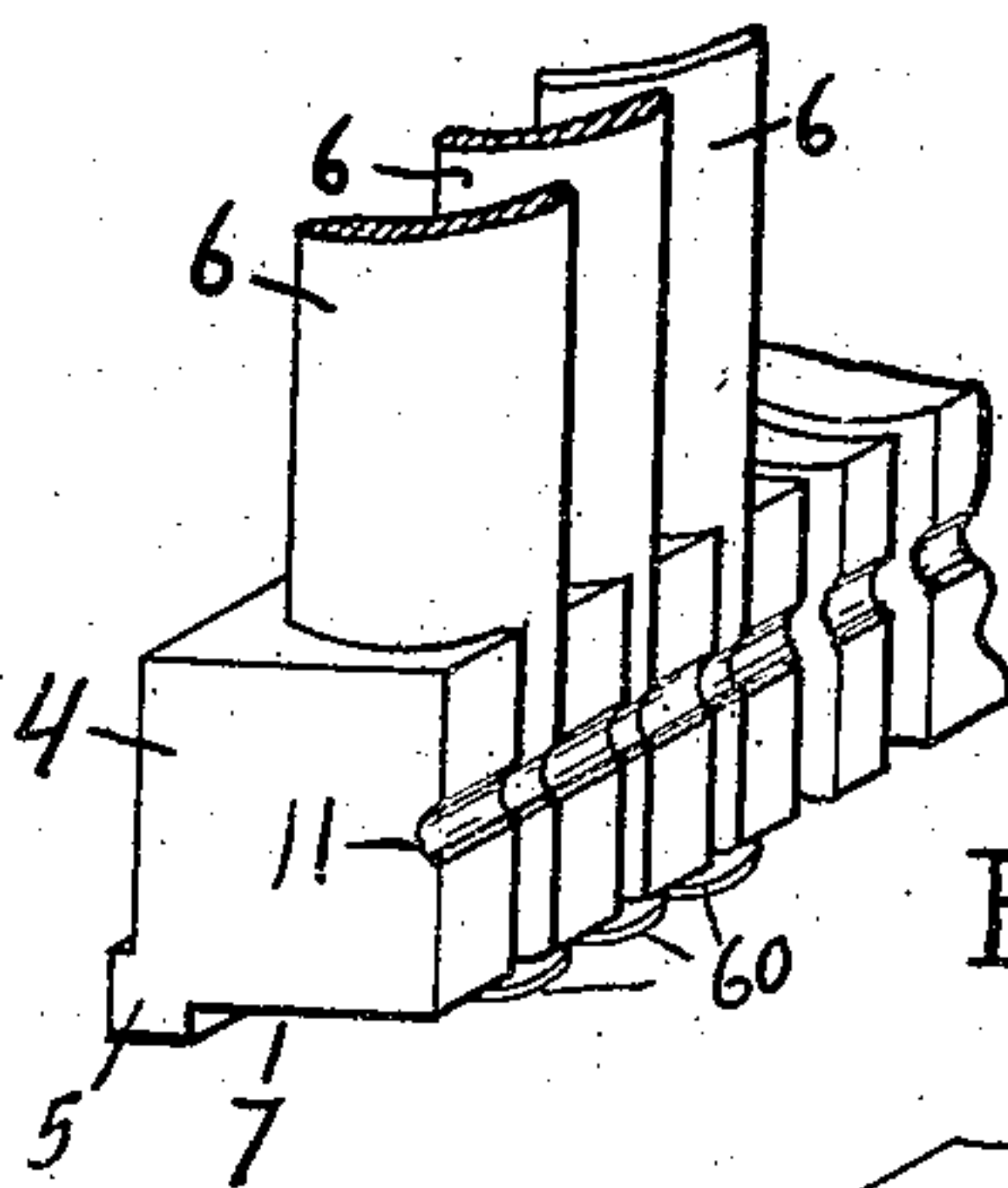


Fig. V.

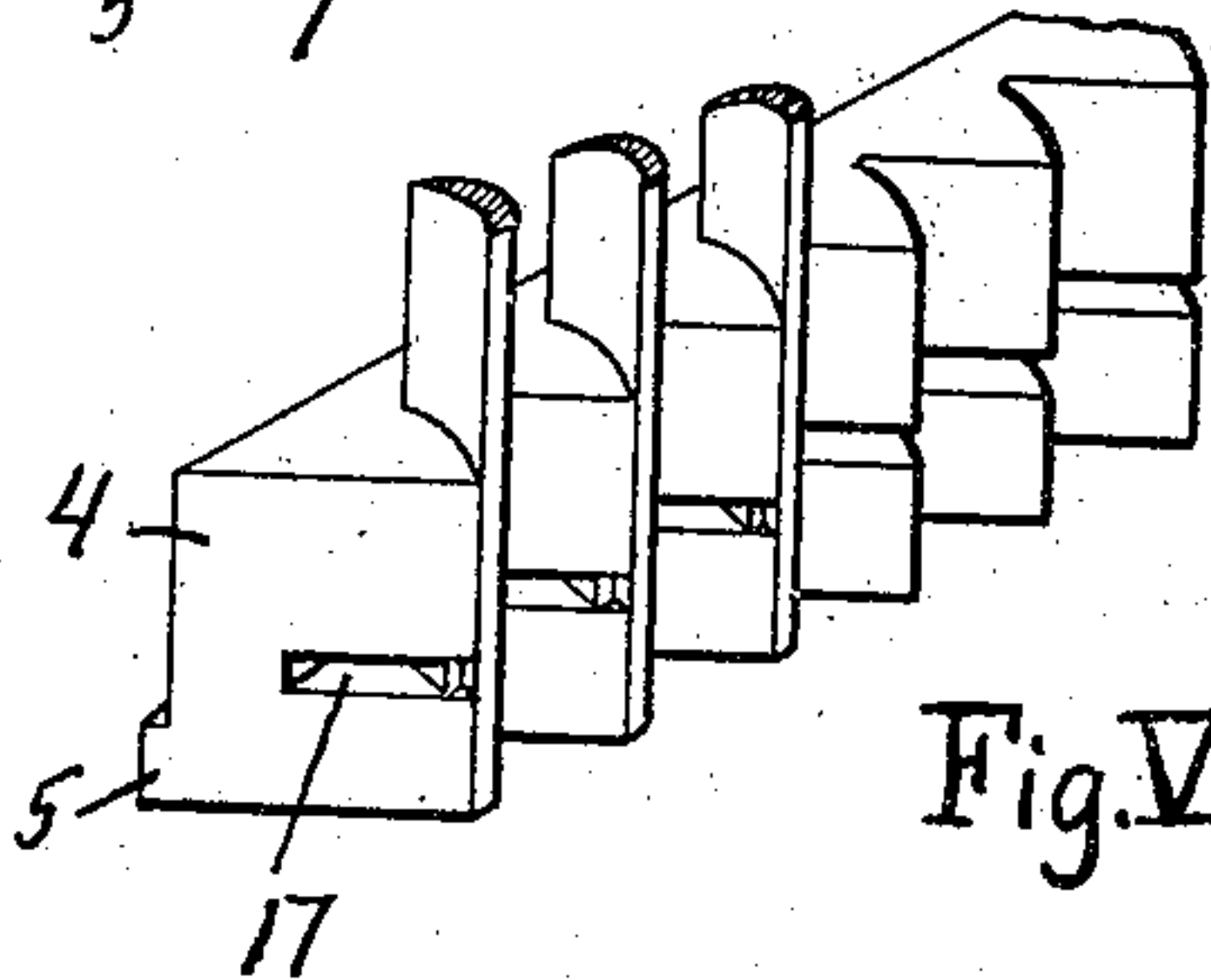


Fig. VII.

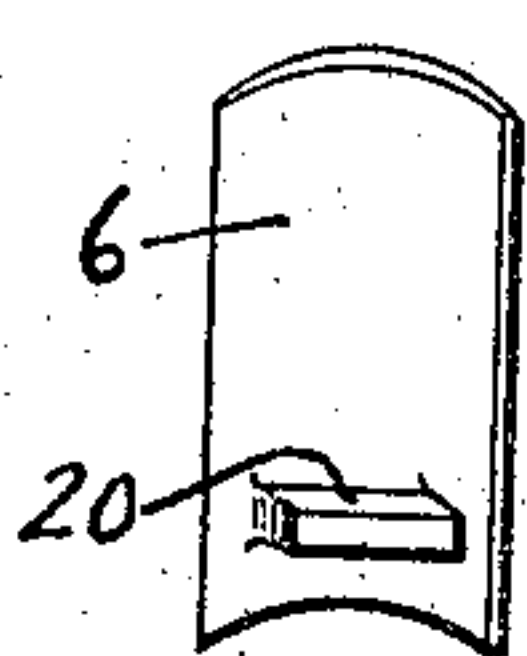


Fig. VIII.

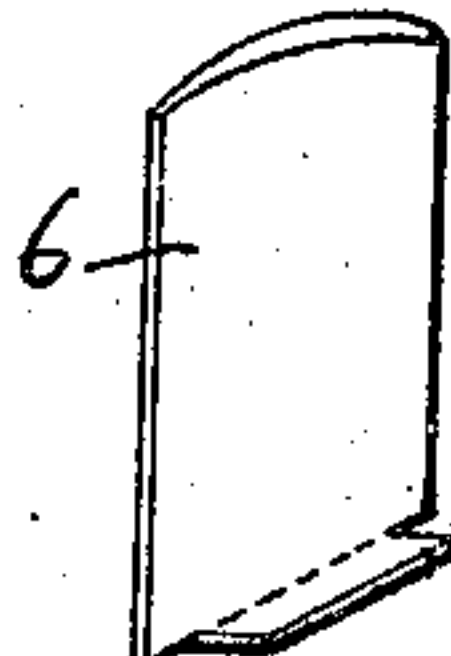


Fig. IX.

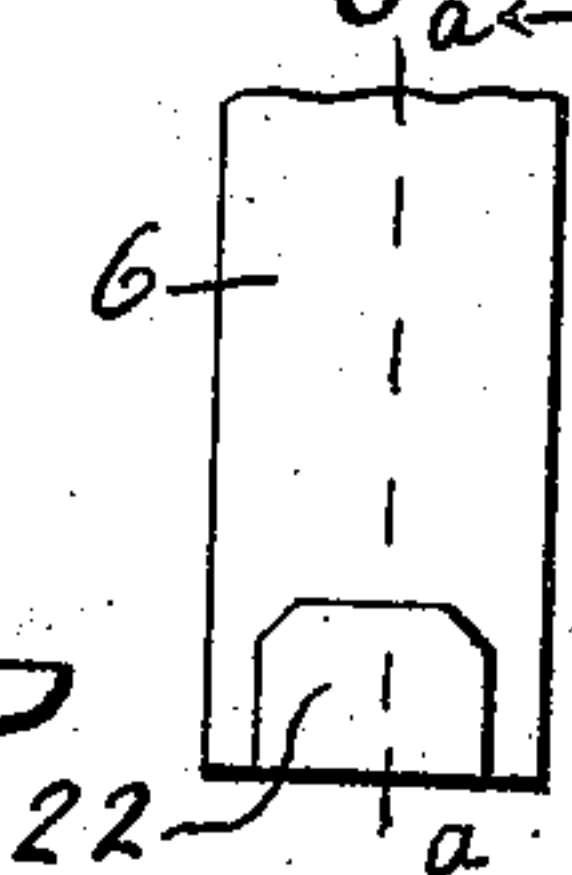


Fig. X.

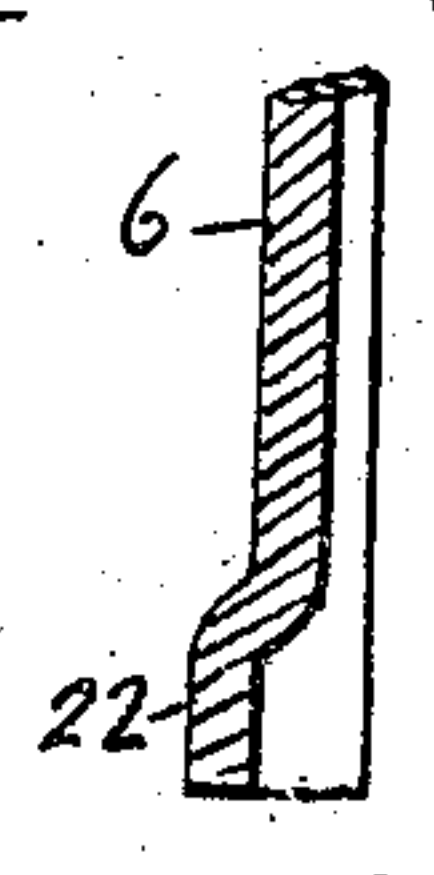


Fig. XI.

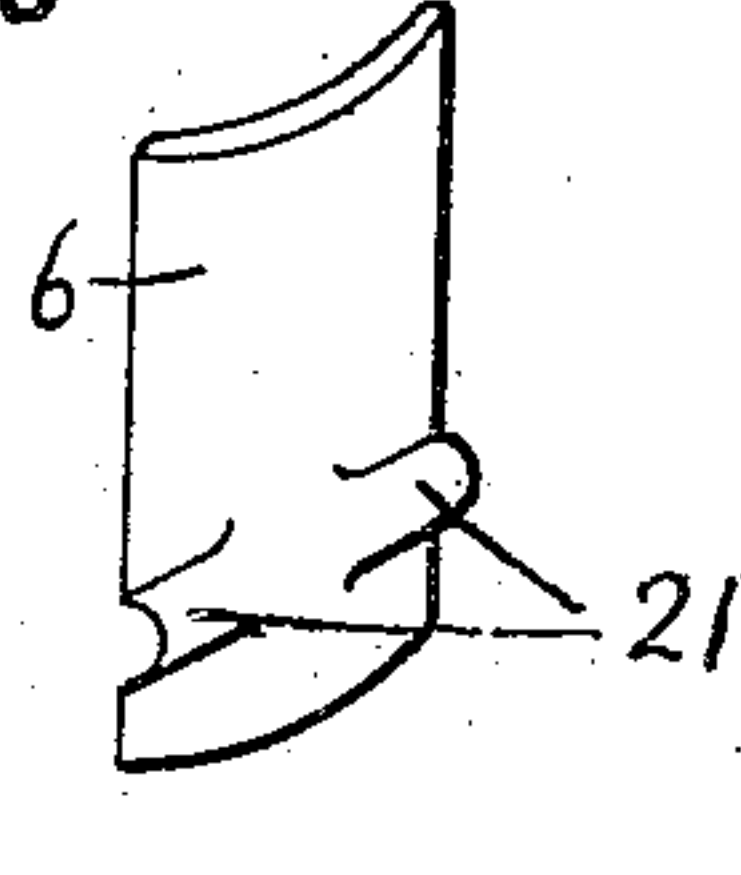


Fig. XII.

WITNESSES:

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BLADE-FASTENING.

No. 875,650.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed October 29, 1906, Serial No. 341,073. Renewed August 23, 1907. Serial No. 389,873.

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-Fastening, 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 a plurality of similarly associated elements to a member.

This invention relates specifically to that class of devices, as steam turbines, for example, where a plurality of blades or similar elements are assembled in a holding member and are then securely fastened within a recess provided by the blade-carrying member. It is common in steam turbines, for example, to provide an elongated holding member for a plurality of blades which is seated in an elongated groove or recess provided by the blade-carrying member, and the holding member, and blades, are then firmly secured in said recess by a separate calking member, piece or strip, which is forced into said recess.

The purpose of this invention is to provide a holding member for the blades which is easily and cheaply constructed and with which the blades can be readily assembled, and the holding strip and assembled blades can then be securely fastened by a calking strip or strips within a recess provided by the blade-carrying member.

In the drawings which accompany this specification and form a part thereof and on which the same reference characters are applied to the same elements wherever they appear in each of the several views, and which illustrate embodiments of this invention,—Figures 1 and 2 represent in section a blade-carrying member, a holding member and calking strip in vertical section, a fragment of a blade being shown in elevation. Fig. 3 represents in plan a fragment of the assembled parts in the relation as shown by Fig. 1. Fig. 4 represents in plan one of the blades as shown by Figs. 1, 2 and 3. Fig. 5 represents in perspective a fragment of a holding strip and blades assembled therewith corresponding to the parts as shown by

Fig. 2. Fig. 6 represents a plan view of a holding strip which is a modification of the specific form of holding strip shown by Fig. 5. Fig. 7 is a perspective view of a modified form of holding member with blades assembled therewith. Figs. 8, 9, 10, 11 and 12 represent forms of blades which are capable of being used in carrying out this invention.

The desirable features which should be embodied in devices similar to those disclosed by the drawings are that the blades may be readily assembled with the holding strips, that the holding strips and blades may be easily and cheaply formed, and that the assembled blades and holding strip can be securely fastened in the recess of the blade-carrying member with the several parts so interlocked that there will be no danger of the parts becoming disassembled.

While for convenience in the specification and claims certain elements will be referred to as "blades", it is to be understood that the term "blades" so used is used in a generic sense and is intended to apply to all elements which are capable of being assembled in a similar relation regardless of their particular structure or intended use, the term "blades" being used as this specific structure is especially applicable in the construction of steam turbines.

On the drawings the reference character 1 represents a blade-carrying member which is provided with an elongated groove or recess 2, and preferably one side of said groove is undercut as at 3.

The blade-holding member is designated by the reference character 4 and is preferably provided with a projection 5 adapted to be seated in the undercut side 3 of the groove or recess.

The gist of this invention consists in providing an elongated blade-holding member 4 with a substantially continuous recess, in actual practice the recess would be formed as a continuous recess, and providing the blades with projections adapted to be seated in said continuous recess, whereby the blade-holding member 4 is readily and cheaply made and the blades may be assembled therewith very expeditiously, a blade-holding member and blades assembled therewith being then ready for insertion in a groove or recess of the blade-carrying member and the calking of the calking strip.

The blades 6 in each of the Figs. 1 to 6

inclusive, are provided with a headed lower end 60, as clearly shown by said figures, and with blades of this construction the holding member 4 is recessed at its bottom, as clearly shown at 7 in Fig. 5. With the holding member 4 provided with a recessed bottom, as shown particularly by Fig. 5, but also by Figs. 1, 2, 3, 4 and 6, the blades are assembled with the blade-holding member 4 by being inserted into grooves which may be cut in a side or sides of said member with the projections or feet of the blades located in the recess 7 of the holding member 4.

With the form of blade shown by the figures just referred to, or with other forms of blades, some of which are illustrated by the drawings, the same general structure could be realized by simply providing the member 4 with suitable shaped apertures extending therethrough from a recessed portion to the top, through which the blades could be passed from the recessed portion, being prevented by the projecting head or its equivalent from being driven through said aperture when in the assembled relation, as shown by Fig. 1, for example.

The reference character 8 represents an ordinary form of calking member or strip which is adapted to be driven into the recess 2 between the assembled blades and blade-carrying member and the adjacent wall of the recess, and in some cases it is preferred that the feet or projections on the blades 6 shall extend outwardly from the member 4, as clearly shown by Figs. 1 to 6 inclusive of the drawings, in order that said feet may be positively engaged by said calking strip 8. One wall of the recess may be provided with a bead or depression, as shown at 10, and the holding member 4 and edges of the blades even may be similarly recessed, as shown at 11, to receive a part of the material of the calking strip 8, in order to positively and securely lock the several parts in position.

Instead of forming slots in the side of the blade-carrying member 4, which slots are of the same shape as the cross sections of the blades, the slots may be formed to such a shape, as shown by Fig. 6, that a blade may be placed in position against one side of the slot and the tooth or metal forming the other side of the slot may then be forced against said blade. There is an advantage in using this specific method of holding the blades in the blade-holding member, as the blade-holding member, after the blades are secured therein, can be readily supplied with a depression similar to the depression 11, shown by Fig. 5.

In Fig. 7 is shown another form which may be given to the blade-holding member under this invention. In this case the blade-holding member 4 is provided with the continuous recess 17 in its side and the notches provided in the side of said blade-holding mem-

ber do not correspond in shape to the cross section of a blade; one side of each notch, however, conforms to the shape of a blade. With a construction like that illustrated in Fig. 7 where the continuous recess is provided in a side of the blade-holding member, the projections on the blades are preferably located at such a height on the blades that when the foot of the blade is in the plane of the bottom of the blade-holding member, the projections will enter said continuous recess.

Figs. 7, 8 and 12 show blades which fulfil this condition. In Fig. 8 is shown a blade provided with a projection 20 on one face thereof, which is preferably formed by forcing a die against the opposite side of said blade. Fig. 12 shows a blade which is provided with substantially two projections 21, being preferably formed by forcing a die against the concave side of the blade and forcing the metal back until it is in line with the metal of the convex side of the blade. Fig. 9 shows a blade in which a foot is provided by bending over at right angles a part of the blade itself, portions at the side of the blade being first cut away to facilitate the operation of bending. Fig. 10 shows a blade on which a somewhat deep depression 22 is formed, being preferably stamped by a die pressed against the opposite side of said blade. Fig. 11 is a section on the line *a-a* of Fig. 10.

It will be apparent from the whole and complete description just given that by providing the blade-holding member 4 with a substantially continuous recess, the blades may be very readily and quickly assembled therewith; and that it is immaterial whether the bottom of said blade-holding member be recessed, or a side, either one or both, or whether the bottom and a side be recessed.

What I claim is,—

1. The combination with a blade-carrying member, provided with an elongated groove or recess, of an elongated blade-holding member, provided with a continuous recess extending substantially the length thereof, secured within said elongated recess and blades with projections thereon, said projections being engaged in the recess of said blade-holding member.

2. The combination with a blade-carrying member, provided with an elongated groove or recess, of an elongated blade-holding member, provided with a continuous recess extending substantially the length thereof, seated within said elongated recess, blades with projections thereon, said projections being engaged in the recess of said blade-holding member and means for securing the blades and blade-holding member in the recess of said blade-carrying member.

3. The combination with a blade-carrying member, provided with an elongated recess,

a side of which is undercut, of an elongated blade-holding member, provided with a continuous recess extending substantially the length thereof, seated in said recess, blades
5 with projections thereon, said projections being engaged in the recess of said blade-holding member, said blade-holding member being provided with a projection engaged with the undercut portion of said side and a calk-

ing member to secure the blades and blade- 10 holding member in the recess of said blade-carrying member.

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

NORMAN C. BASSETT.

Witnesses:

FRANK E. DENNETT,
JOHN OLSEN.