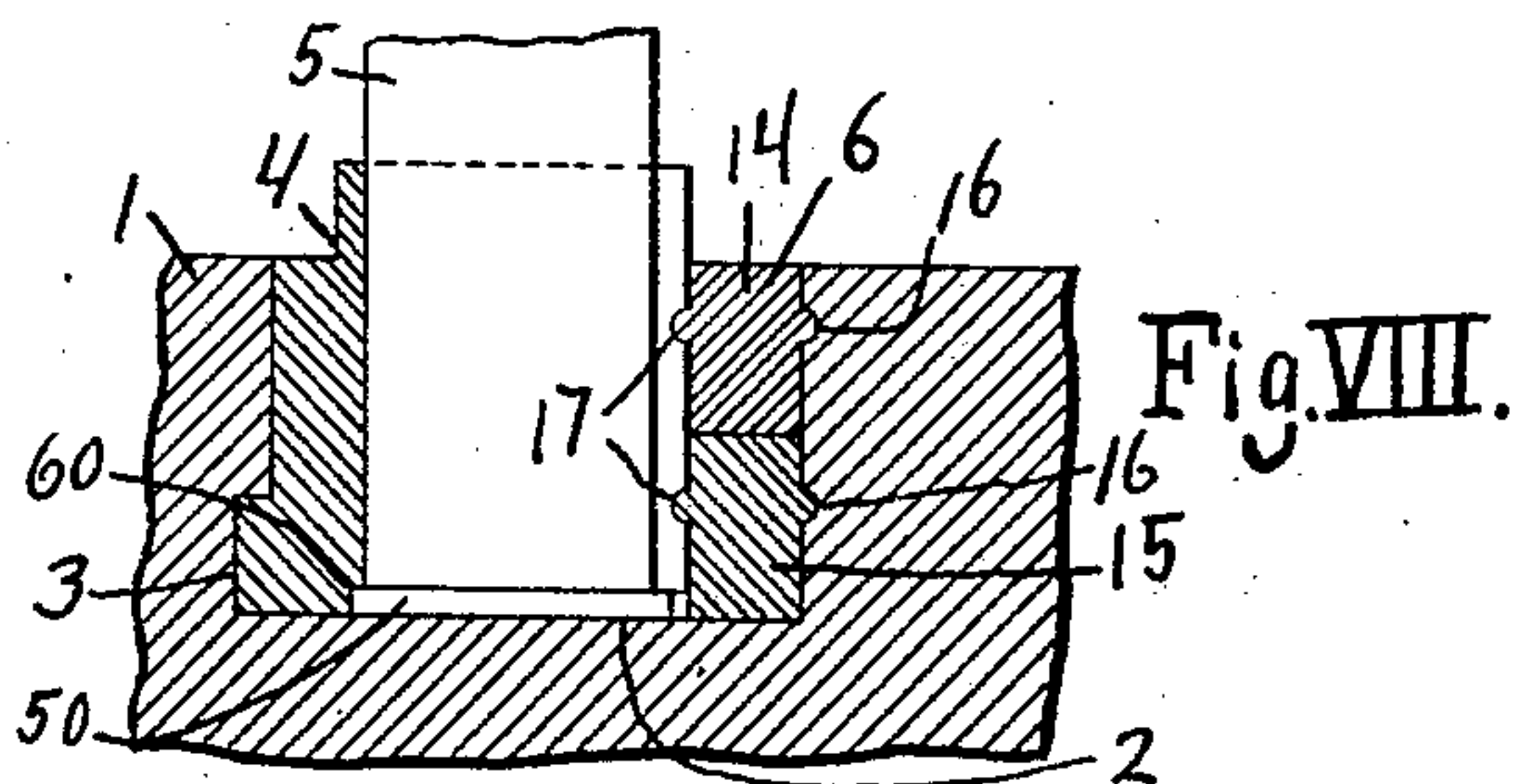
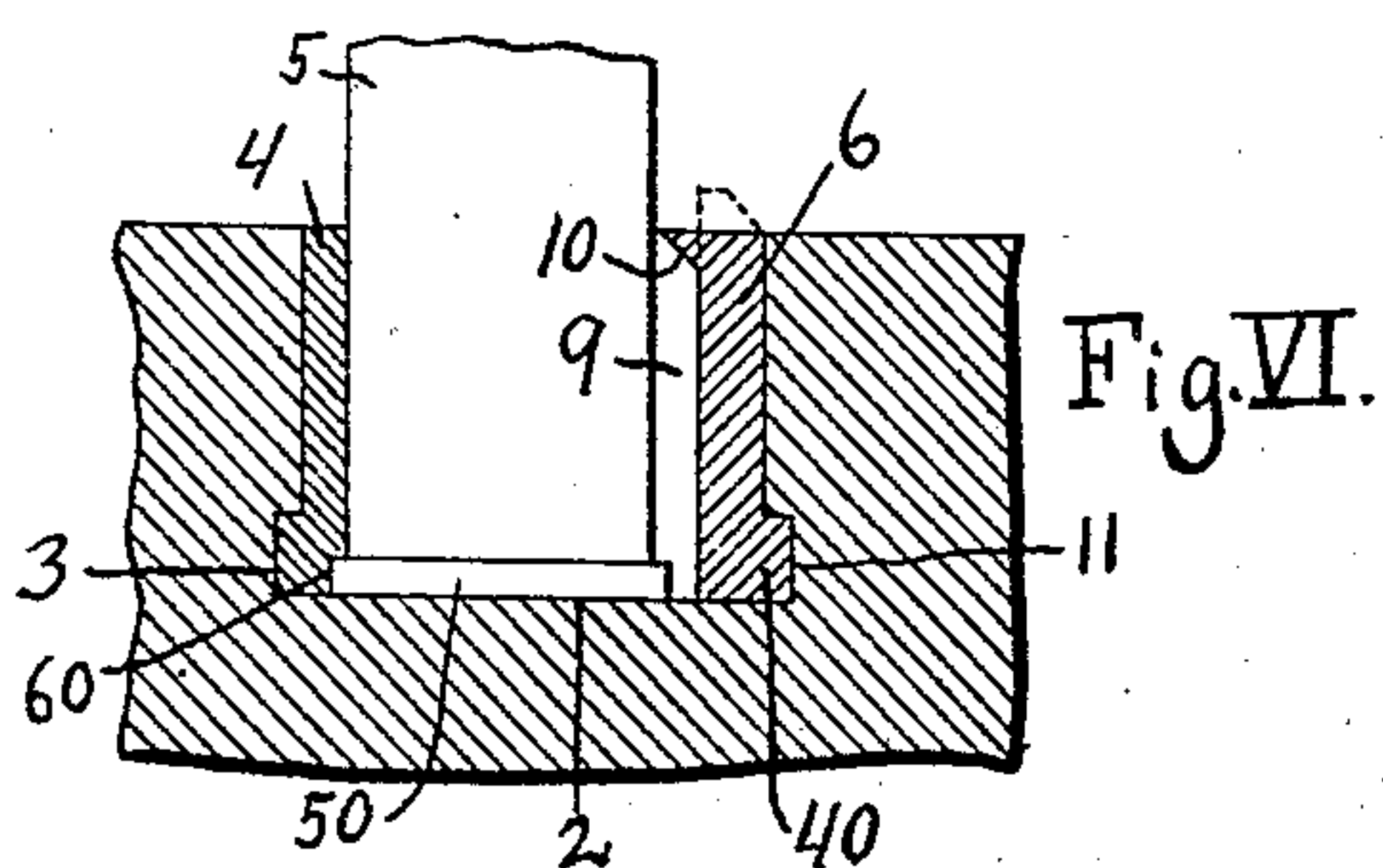
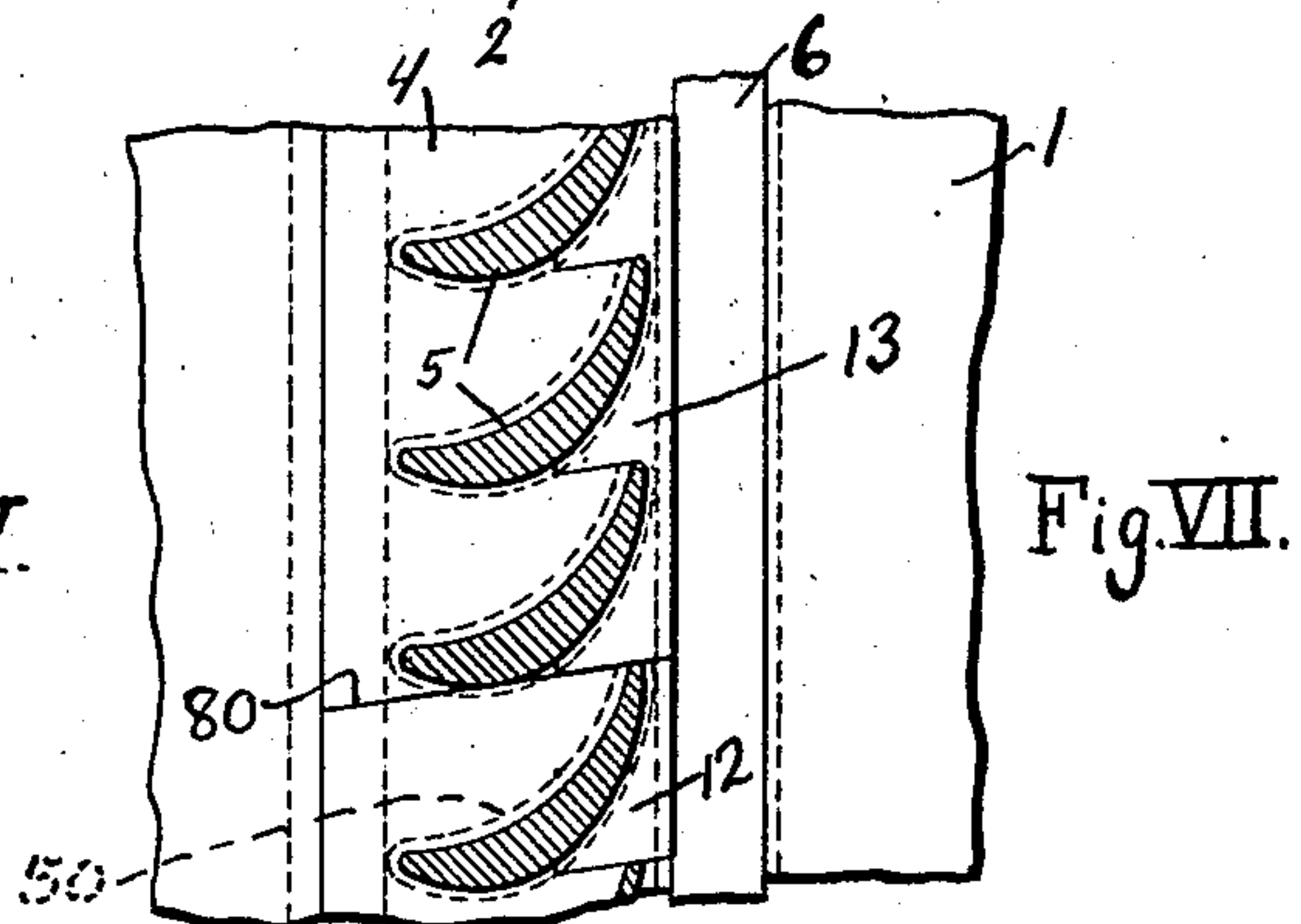
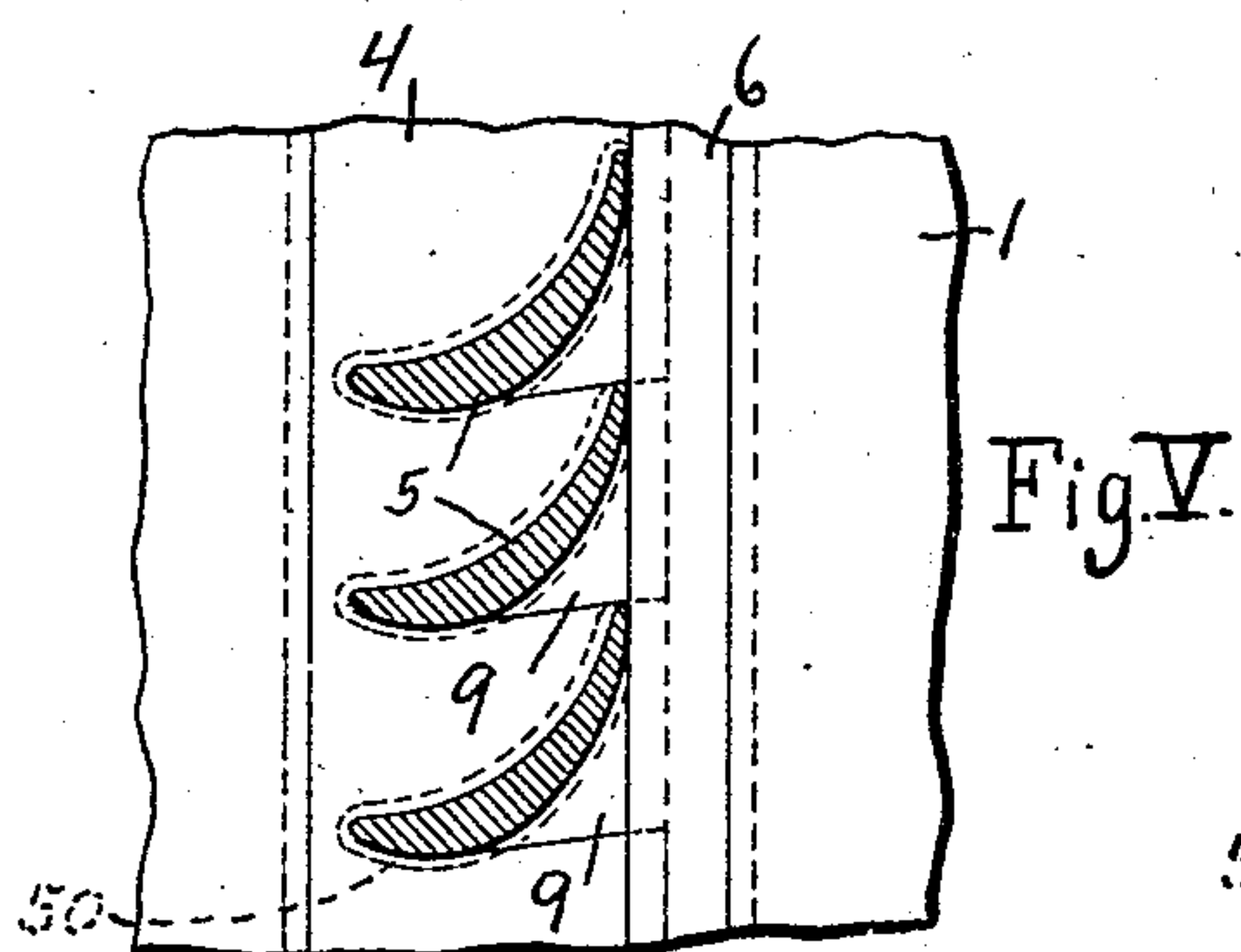
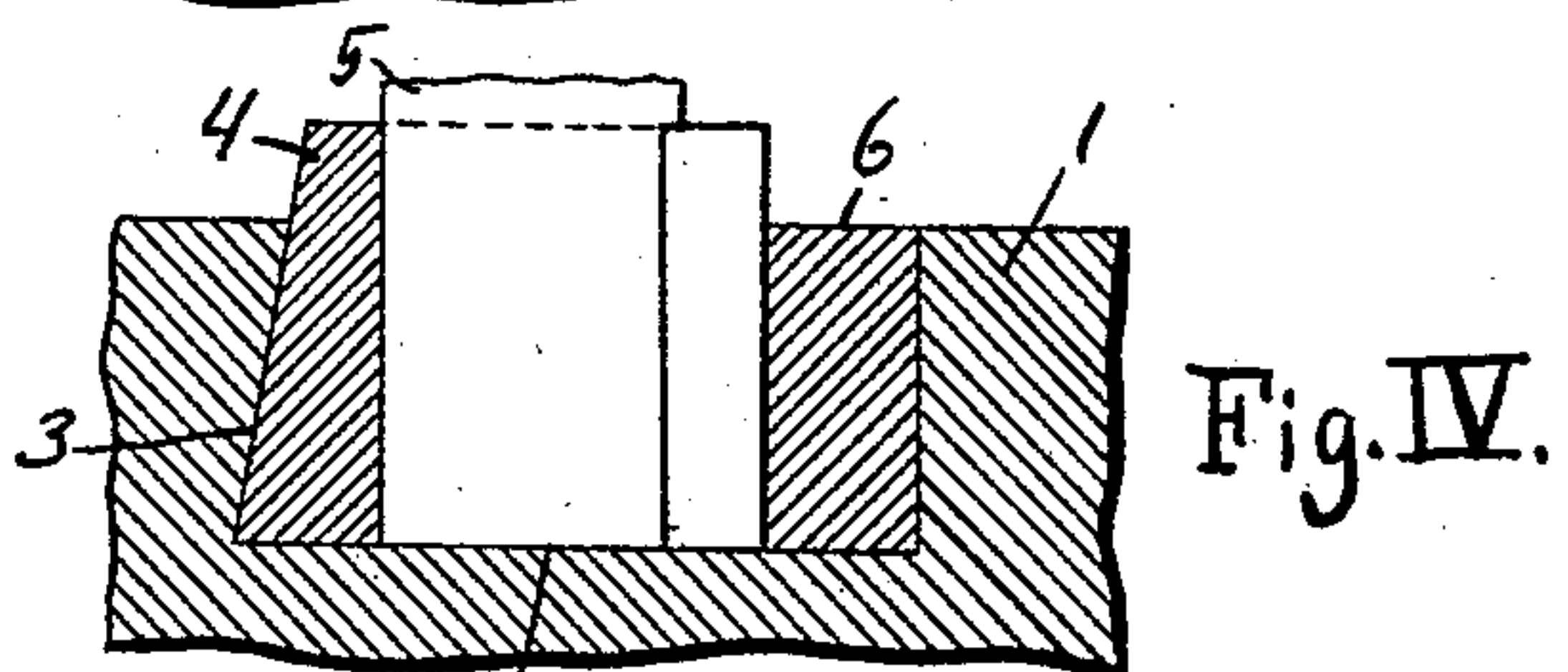
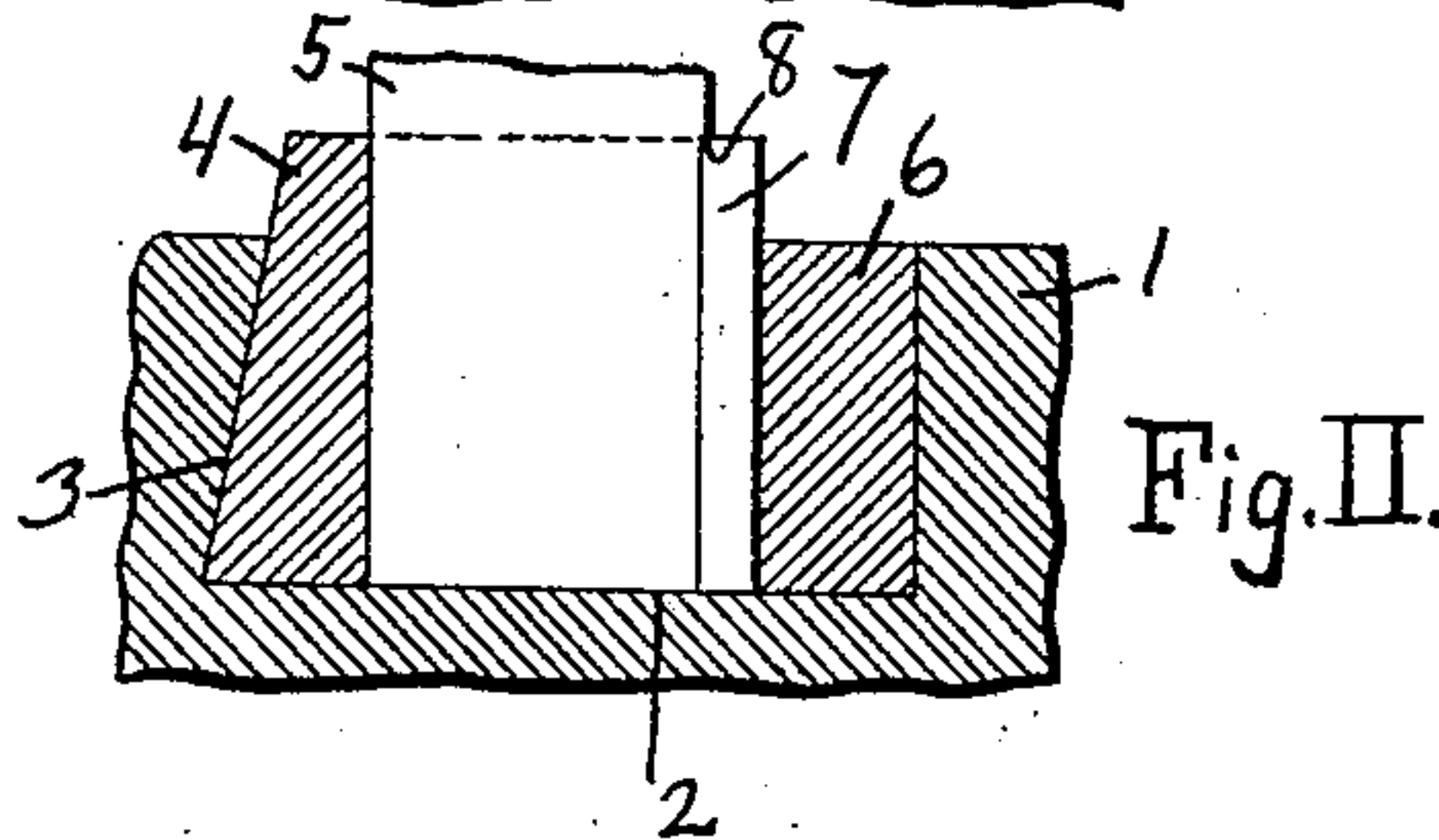
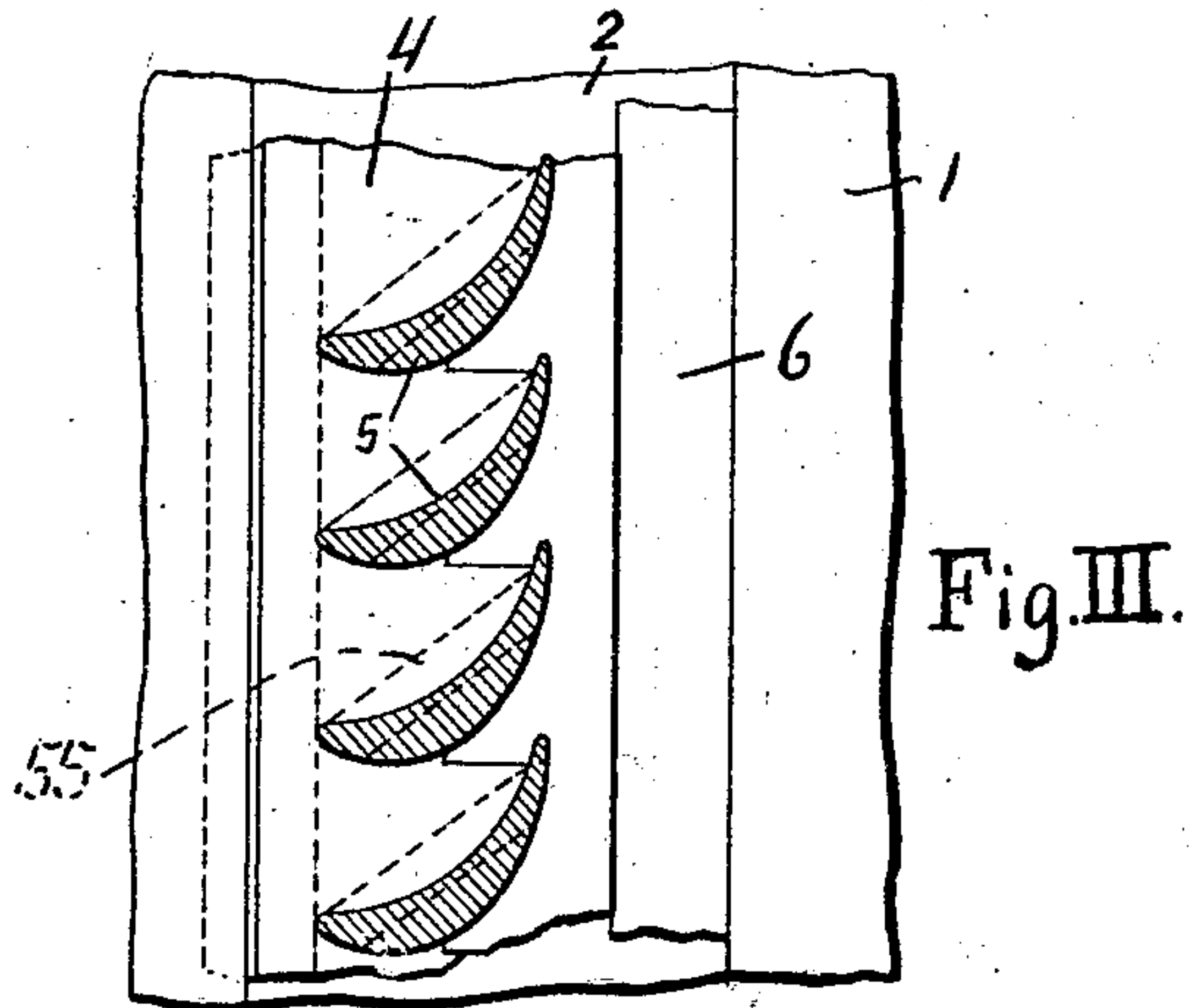
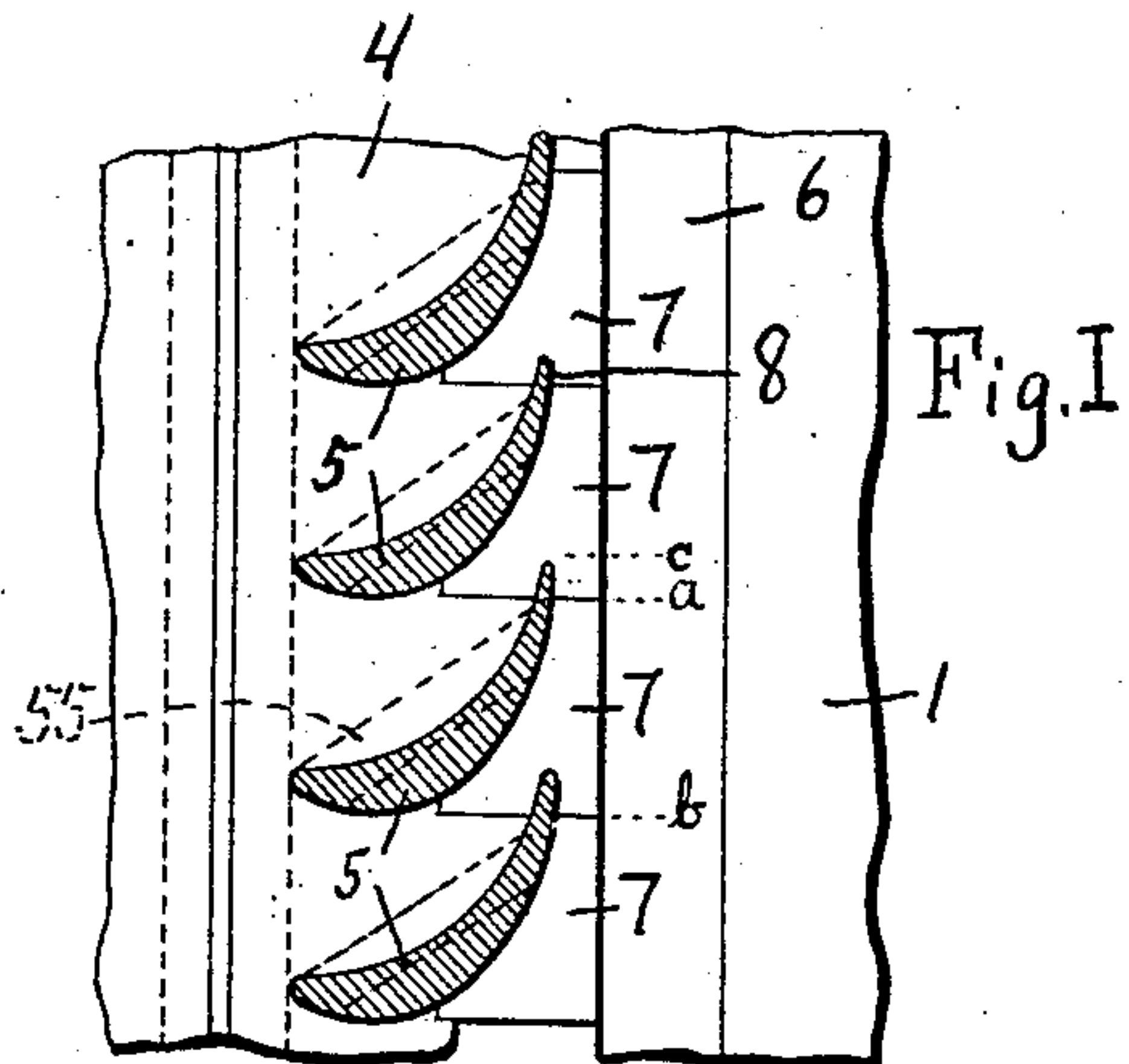


No. 875,649.

PATENTED DEC. 31, 1907.

N. C. BASSETT.
BLADE FASTENING.

APPLICATION FILED OCT. 29, 1906. RENEWED JUNE 14, 1907.



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BLADE-FASTENING.

No. 875,649.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed October 29, 1906, Serial No. 341,074. Renewed June 14, 1907. Serial No. 378,925.

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 for the blades of fluid propelled engines, or for 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 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 a blade-carrying member. It is common in steam turbines, for example, to provide a holding member for a plurality of blades which is seated in a 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 to provide for securing the blades to said holding member and within the recess of the blade-carrying member.

In the drawings which accompany this specification and form a part thereof and on which the same reference characters designate the same elements in each of the several views and which illustrate embodiments of this invention,—Figure 1 is a plan of a fragment of a blade-carrying member with blade secured thereto, the blades being shown in section. Fig. 2 is a vertical section of the blade-carrying member and associated parts, as shown by Fig. 1. Fig. 3 is a plan of a fragment of a blade-carrying member with blade secured thereto, the blades being shown in section, showing a modification in the structure of the filling blocks. Fig. 4 is a vertical section of the blade-carrying member and the associated parts as shown by Fig. 3. Fig. 5 is a plan of a fragment of a blade-carrying member with blades secured thereto, the blades being shown in section, showing an

alternative construction. Fig. 6 is a vertical section of the blade-carrying member and associated parts as shown by Fig. 5. Fig. 7 is a plan of a fragment of a blade-carrying member and blades secured thereto, the blades being shown in section, showing a further modification in the form of the filling blocks. Fig. 8 is a vertical section of the blade-carrying member and associated parts as shown by Fig. 7.

It is the purpose of this invention to combine a blade-carrying member provided with a recess, with a holding member, ring or strip for blades, said strip being provided with notches so formed and arranged that the blades may be readily and quickly assembled therewith, the blades and holding strip being adapted to be seated within the recess provided in the carrying member and provision being made by means of filling blocks for evening up irregularities of surface of the holding member, which filling blocks acting in conjunction with a calking strip are adapted to fasten the blades and holding member securely within the recess of said carrying member.

The term "blades" as used in this specification and in the claims is used in the generic sense of being applied to any elements which may be assembled in a similar manner and is not intended to restrict the structure referred to to "blades" *per se*; the word "blades" being used in this specification as a matter of convenience as the specific fastening means disclosed herein is especially applicable to steam turbines.

Referring to the drawings, 1 represents a blade-carrying member provided with a recess 2, which recess is provided with a side undercut at 3 either of the ordinary dove-tailed form, as in Figs. 2 and 4, or simply of the recessed form, as shown in Figs. 6 and 7.

The reference character 4 in each of the several figures of the drawings represents a holding strip which is appropriately fashioned to coact with the undercut side of the recess 2 on one side, while on the other side it is provided with a plurality of notches of approximately triangular shape in plan, within which notches the blades 5 are adapted to be seated, said blades being either provided with enlarged heads, as shown at 50 by Figs. 5, 6, 7 and 8, or with a bent over portion at the bottom, as shown at 55 by Figs. 1, 2, 3 and 4, or being provided with

projections formed in any suitable or preferred manner, the projections in either case being adapted to engage with corresponding recesses 60 formed in the blade-holding member 4, whereby said blades are prevented from being withdrawn endwise from said blade-holding member 4.

The blade-holding member 4 need not necessarily be provided with the recesses 60 with which the projections on the blades are adapted to coact, but it may be made of less depth than the recess in the blade-carrying member so as to provide a space between the bottom of the recess and the adjacent part of the blade-holding member equal to the thickness of the projections at the bottoms of the blades. This construction, however, is not considered to be as desirable as the construction stated above.

By providing the blade-holding member 4 with the substantially triangular shaped notches, it becomes comparatively easy to assemble the blades with said member, and the disassembling of said blades is facilitated. With this construction, however, it may be desirable that the parts of the notches which are not occupied by the blades be filled up by filling pieces or blocks which may assume various forms to meet the particular ends desired. These blocks when placed in position make and form a compact mass against which the pressure of the calking strip 6 is exerted when said calking strip is forced home to hold the blades and blade-holding strip 4 in place in the recess of the blade-carrying member.

In Figs. 1 and 2 a plurality of holding blocks 7 are shown which fill the spaces in the blade retaining member 4, and, as clearly shown by Fig. 1 of the drawings, extend somewhat beyond the outer edge of the blades. The length of each of these blocks from *a* to *b*, as shown by Fig. 1, is somewhat less than the breadth of a blade, viz., from *c* to *b*, and the blades are recessed at 8, as clearly shown by Fig. 2, so that with this construction the blade is not only locked to the blade-holding member 4, but a blade also locks a block 7 within the recess 2, whereby when the calking strip 6 is driven home, the several parts are securely held and locked within the recess 2.

In Figs. 5 and 6 is illustrated a slightly modified construction. In the structure as shown by these figures, the general features of construction already described are retained but the filling blocks 9 are slightly beveled at their upper edge, as shown at 10, while the recess 2 in the blade-carrying member 1 has its second side undercut, as at 11, and the calking strip 6 is adapted to be placed in position with its projection 40 within the recess offered by the undercut at 11 before the filling blocks are placed and after they are inserted in place to be calked down

against the beveled portion 10 of the filling blocks 9, thereby locking the several parts firmly in place. In this construction the blades are not recessed as in the construction shown by Fig. 1, the edges of the notches being continued to such an extent that they terminate approximately at the ends of the teeth.

In Figs. 3 and 4 is illustrated another modification of the filling blocks. In this modification the filling blocks are in all substantial particulars the same as those shown by Fig. 1 of the drawings, the only exception being that instead of their existing as separate blocks, they are formed as a continuous notched strip adapted to serve with a plurality of blades, which is in some respects a counterpart of the blade-holding member 4.

In Figs. 7 and 8 is illustrated a further modification in which the filling blocks are substantially duplicates of the filling blocks 9 shown by Fig. 5, but both multiple and single filling blocks are used, a single filling block being designated by the numeral 12, and a multiple filling block by the numeral 13, the numeral 80 designating the joint between two sections of the blade-holding member.

In Fig. 8 the calking strip 6 is shown as a multiple deck calking member or one made up of two parts, viz., the layers 14 and 15, for convenience in calking, while the side of the recess 2 and the filling blocks are shown as provided with recesses 16 and 17 respectively, into which the material of the calking strips is forced, thereby securely locking the several parts within said recess.

While the construction illustrated and described affords a very convenient means for assembling a plurality of blades in a blade-holding member, it is of especial advantage whenever it is desirable to disassemble the parts, especially where only a single blade is to be removed, in which case by cutting out the proper filling piece or part thereof the damaged blade may be readily removed and a new blade inserted in its place, when a new filling piece may be introduced or any piece of suitable material may be driven or calked into the aperture to retain the blade securely in its position.

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 and filling blocks seated in said notches, and means for securing said blade-holding member, blades and filling blocks in 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, said blade-holding member being recessed adjacent said notches,

blades provided with projections, said blades being seated in said notches with the projections thereon engaged with said blade-holding member in the recessed portions thereof, filling blocks, and means for securing said blade-holding member, blades and filling blocks in 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 a projection adapted to engage said side within the undercut portion thereof, said blade-holding member being provided with notches and seated within said recess and also being recessed adjacent said notches, blades provided with projections, said blades being seated in said notches with the projections thereon engaged with said blade-holding member in the recessed portions thereof, filling blocks, and means for securing said blade-holding member, blades and filling blocks in 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 a projection adapted to engage said side within the undercut portion thereof, said blade-holding member being provided with notches and seated within said

recess and also being recessed adjacent said notches, blades provided with projections, said blades being seated in said notches with the projections thereon engaged with said blade-holding member in the recessed portions thereof, filling blocks, and means for securing said blade-holding member, blades and filling blocks in the recess of said blade-carrying member, the blades being recessed to receive the filling blocks whereby the several parts are locked together.

5. The combination with a blade-carrying member, provided with a recess, of a blade-holding member and blades seated in said recess and a multiple-deck calking member also seated in said recess to secure the blade holding member and blades therein.

6. The combination with a blade-carrying member, provided with a recess, of a blade-holding member, provided with a notch, a blade and a filling block, said blade-holding member, blade and filling block all being seated in said recess with the blade in the notch of the blade-holding member, and means for securing them therein.

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

NORMAN C. BASSETT.

Witnesses:

FRANK E. DENNETT,
JOHN OLSEN.