

F. R. C. BOYD.
SHROUDING FOR TURBINE BUCKETS.
APPLICATION FILED AUG. 13, 1907.

903,167.

Patented Nov. 10, 1908.

Fig. 1.

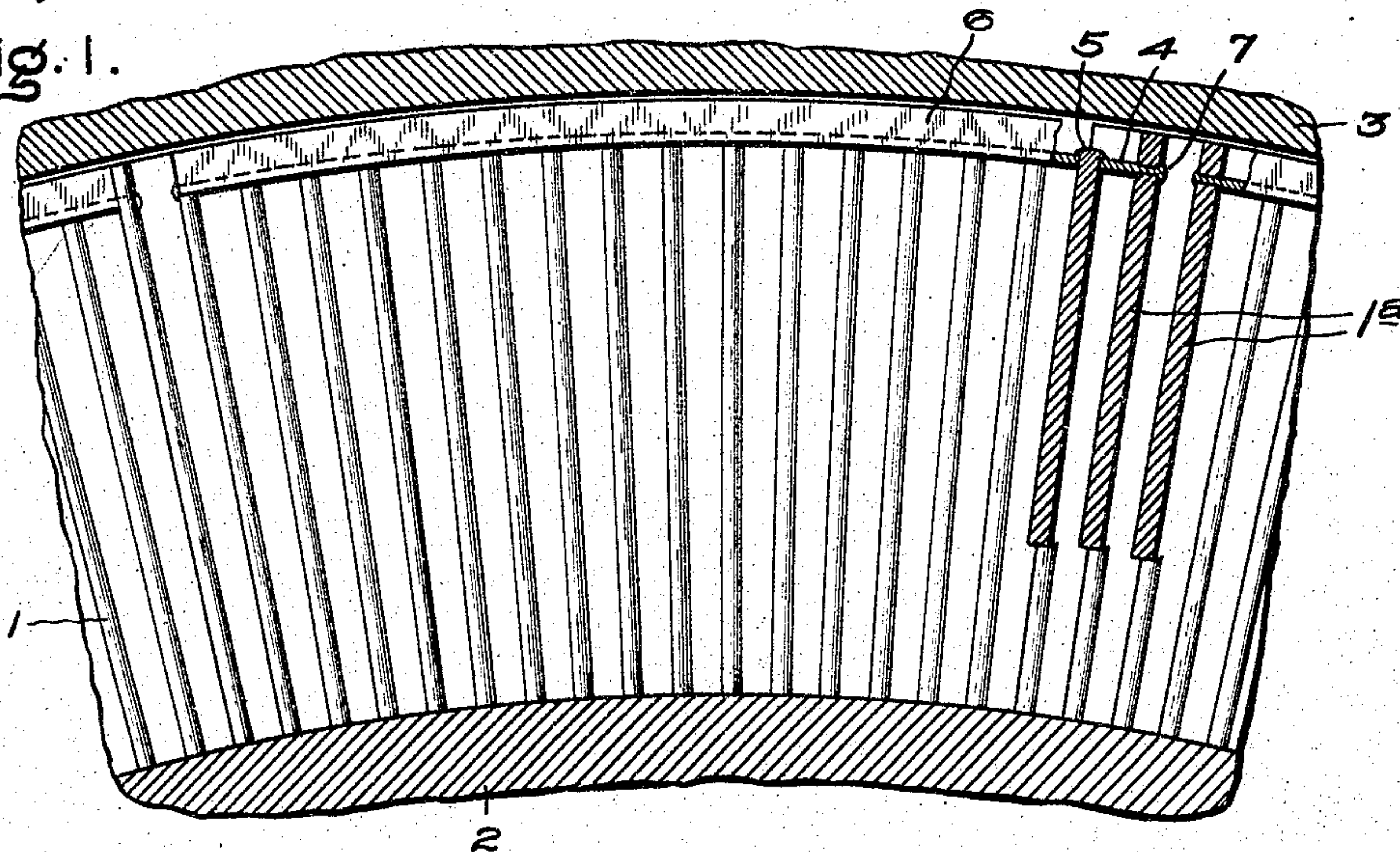


Fig. 2.

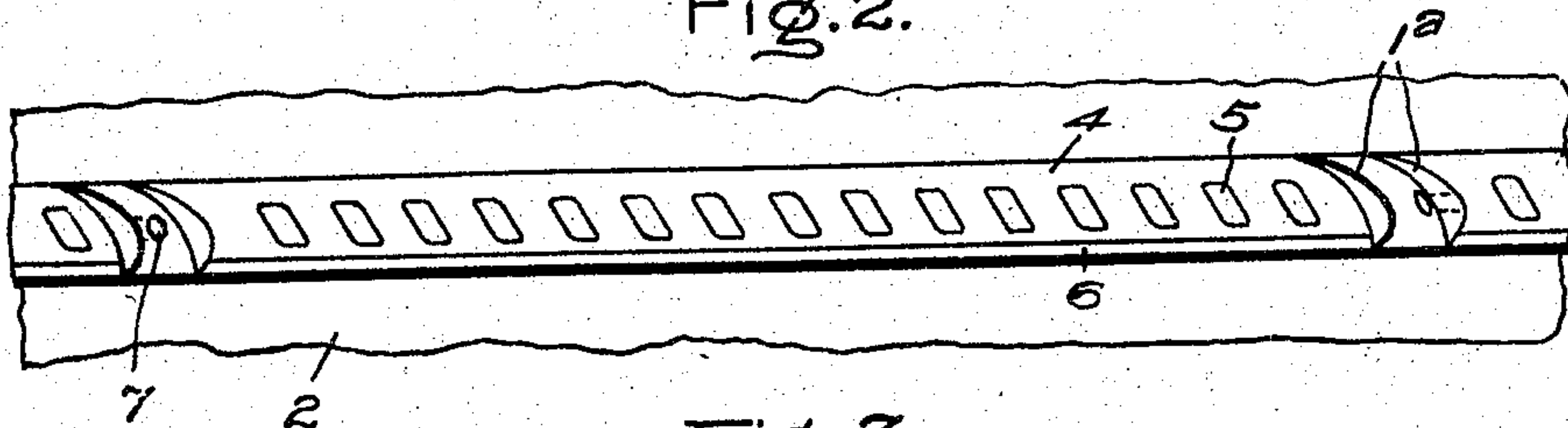


Fig. 3.

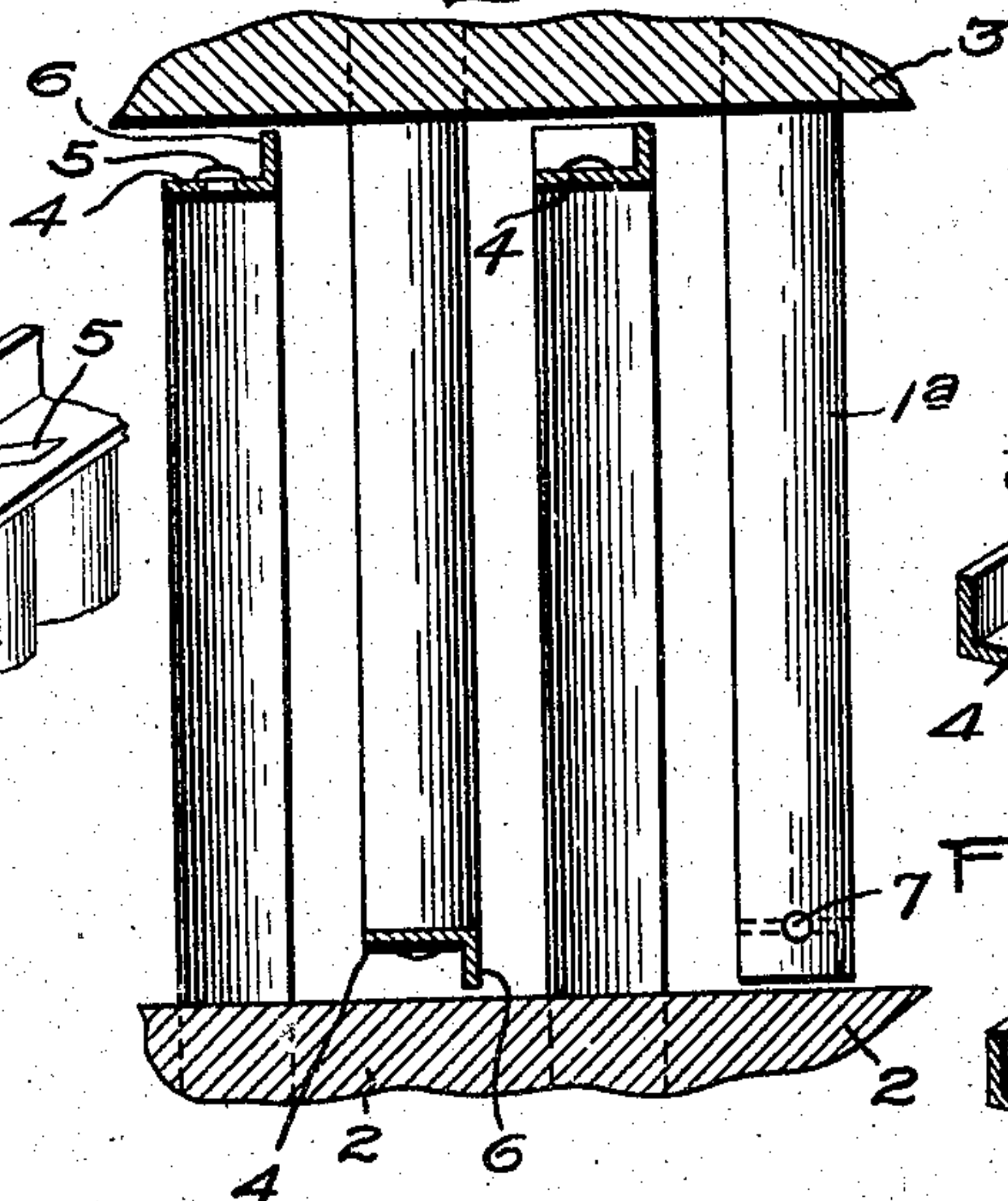


Fig. 4.

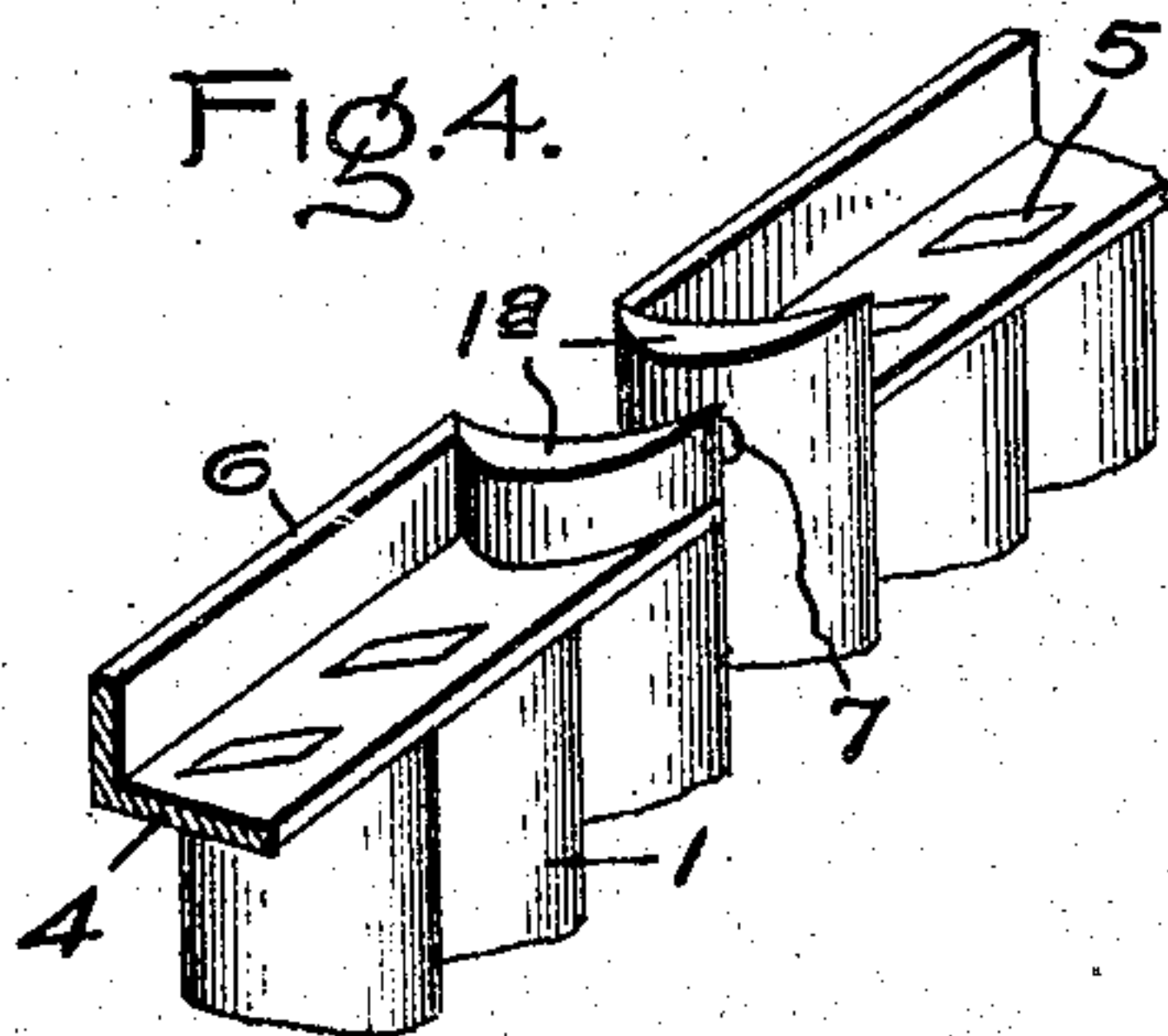


Fig. 5.

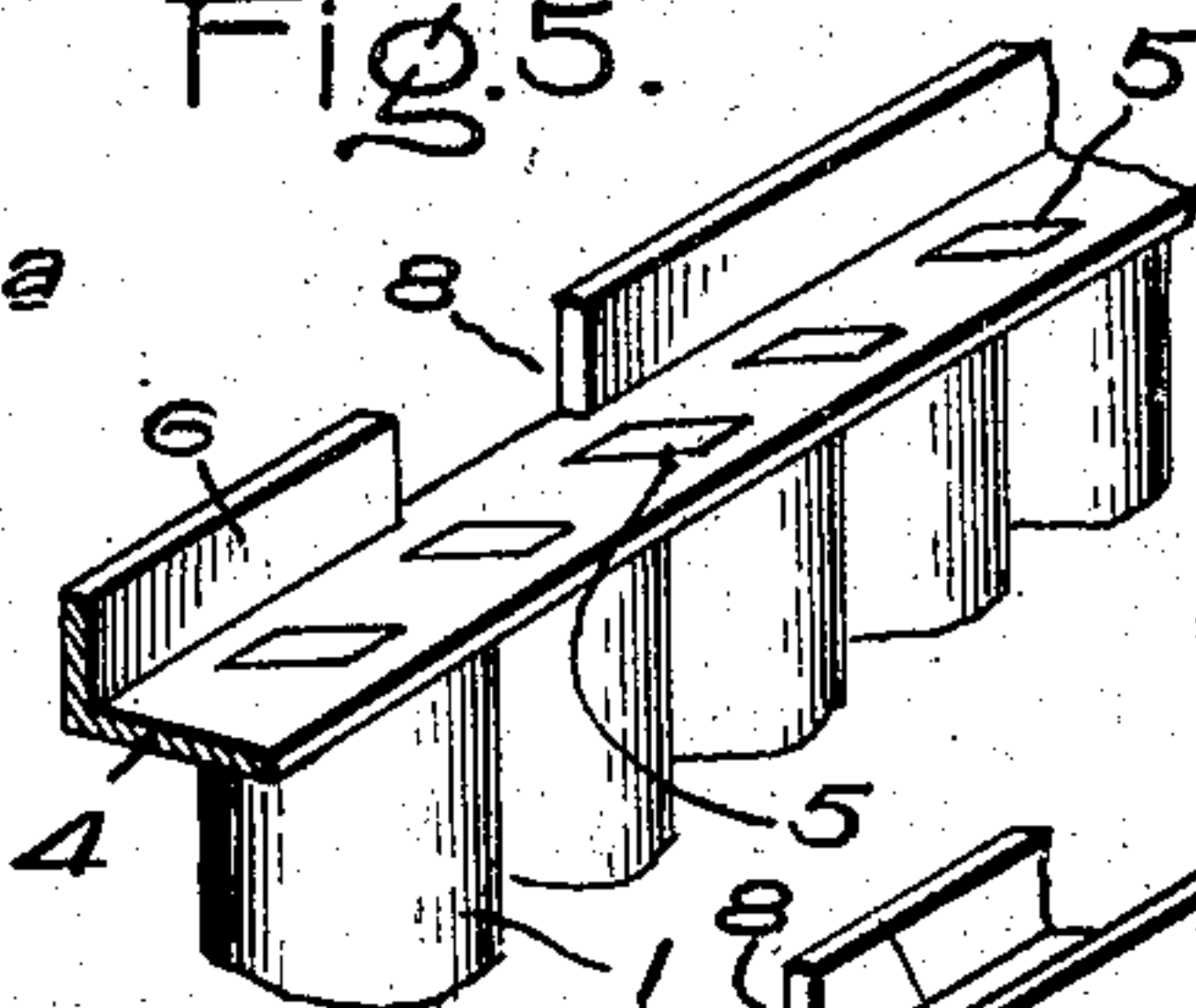
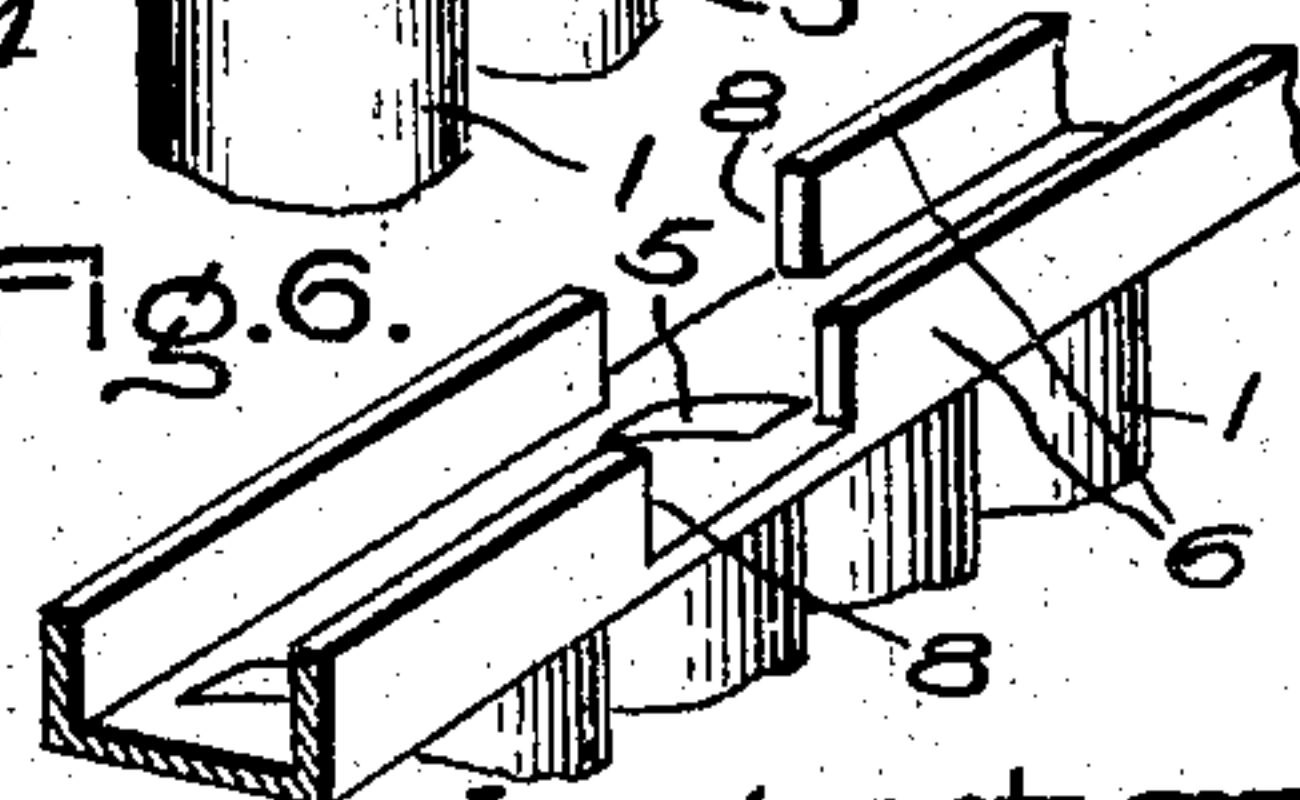


Fig. 6.



Witnesses:
Marcus L. Byng.
J. Ellis Allen.

Inventor,
Frédéric R. C. Boyd,
By *Wm. H. Davis*
Att'y

UNITED STATES PATENT OFFICE.

FREDERIC R. C. BOYD, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SHROUDING FOR TURBINE-BUCKETS.

No. 903,167.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed August 13, 1907. Serial No. 388,350.

To all whom it may concern:

Be it known that I, FREDERIC R. C. BOYD, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Shrouding for Turbine-Buckets, of which the following is a specification.

This invention relates to elastic fluid turbines, and its object is to provide an improved shroud ring for the tips of the blades or buckets. A well-known form of shrouding is made in the form of a channel iron whose web receives the tenons on the ends of the buckets, while the flanges of said channel extend toward the opposite member of the turbine; the shrouding being applied to the buckets on the stator as well as on the rotor of the machine. In each case the edges of the flanges lie close to the opposite member, so that they quite effectively baffle the leakage of steam past the ends of the buckets. It is found, however, that the water of condensation, also, is prevented from passing the buckets, and accumulates in the spaces between the flanges of the shroud rings, where it exerts a brake action sufficient to seriously impair the efficiency of the turbine.

My invention aims to obviate this difficulty, and to this end it consists in a shroud ring or baffle containing ports or passages through which the water can pass. Since there will also be a leakage of steam at these points, the adjacent buckets are preferably made longer so that the leaking steam may exert a reactionary effect.

In the accompanying drawing, Figure 1 is an edge view of a number of buckets equipped with my improved shroud ring; Fig. 2 is a plan view of the same; Fig. 3 is a side view of four buckets; Fig. 4 is a perspective view showing the escape port; and Figs. 5 and 6 are perspective views of modifications.

The buckets 1 are of the usual construction, and are secured in alternate rows, in any suitable manner, to the two members of the turbine, the rotor 2 and the stator 3, respectively. The shroud ring or baffle is made preferably in sections. It has a web 4, in which the tenons 5 of the buckets are riveted, and a flange 6 at right angles to the web, whose periphery stands close to the

opposite member of the turbine. In Figs. 1, 2 and 3 the ends of the sections are separated by a space equal to that between two buckets and the buckets 1^a at the ends of each section are longer than the others, extending beyond the web 4 and terminating substantially flush with the periphery of the flange 6. The web 4 abuts against these end buckets, and is provided with a tenon 7 which passes through said buckets and is riveted down thereon, as shown in Fig. 1. It will be seen that the space between two adjacent end buckets 1^a is not obstructed by any web or flange, so that both steam and water can pass through and will not be trapped by the shroud ring. Owing to the extension of the end buckets, the steam passing through will exert its usual reactionary effect on the portion of said buckets beyond the web 4.

Fig. 5 shows a modified structure in which the shroud ring is continuous, or composed of abutting sections; but at intervals the flange 6 is cut away, as at 8, to afford escape ports for the water. Fig. 6 shows a channel iron baffle similarly provided with escape ports 8 in its flanges 6. With both these modifications there is a slight waste of steam leakage through said escape ports.

When a single flange is used on the shroud ring there can be no trapping of water in the shrouding; and whether one or two flanges are used, the escape ports, due to the non-continuity of said flanges, prevent the trapping of water between the buckets. The invention therefore obviates the trouble due to the brake action of entrapped water, and to this extent improves the operation of the turbine.

I have illustrated the invention as applied to bafflers which operate at the ends of the buckets, that is, in the same plane of revolution. But it is evident that the invention is also applicable to bafflers which operate at the side of the row of buckets, and this modification is so obvious that it has not been deemed necessary to do more than merely call attention to it.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the

apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. The combination with a row of buckets of an elastic fluid turbine, of a baffler having means formed therein for permitting water of condensation to escape past said baffler.
2. The combination with a row of buckets of an elastic fluid turbine, of a baffler having a flange which is non-continuous, thereby providing ports for the escape of water of condensation.
3. The combination with a row of buckets of an elastic fluid turbine, of a baffler made in sections which terminate at adjacent buckets, thereby leaving an escape port between said buckets.
4. The combination with a row of buckets of an elastic fluid turbine, of a baffler made in sections whose ends abut against adjacent buckets.
5. The combination with a row of buckets of an elastic fluid turbine, of a baffler made in sections, the buckets at the ends of each section being longer than the others.

6. The combination with a row of buckets of an elastic fluid turbine, of a baffler made in sections terminating at adjacent buckets, said end buckets extending beyond the others to form a passageway for the escape of the water of condensation.

7. The combination with a row of buckets of an elastic fluid turbine, of a baffler consisting of sections, each having a web and a flange, the end buckets being extended so that their ends are substantially flush with the edge of said flange.

8. The combination with a row of buckets of an elastic fluid turbine, of a baffler consisting of sections, each having a web and a flange, the end buckets being extended so that their ends are substantially flush with the edge of said flange, the ends of the web abutting against said end buckets having tenons passing through said buckets.

In witness whereof, I have hereunto set my hand this ninth day of August, 1907.

FREDERIC R. C. BOYD.

Witnesses:

JOHN A. McMANUS, Jr.,
WILLIAM E. HANNUM.