

973,639.

Patented Oct. 25, 1910.

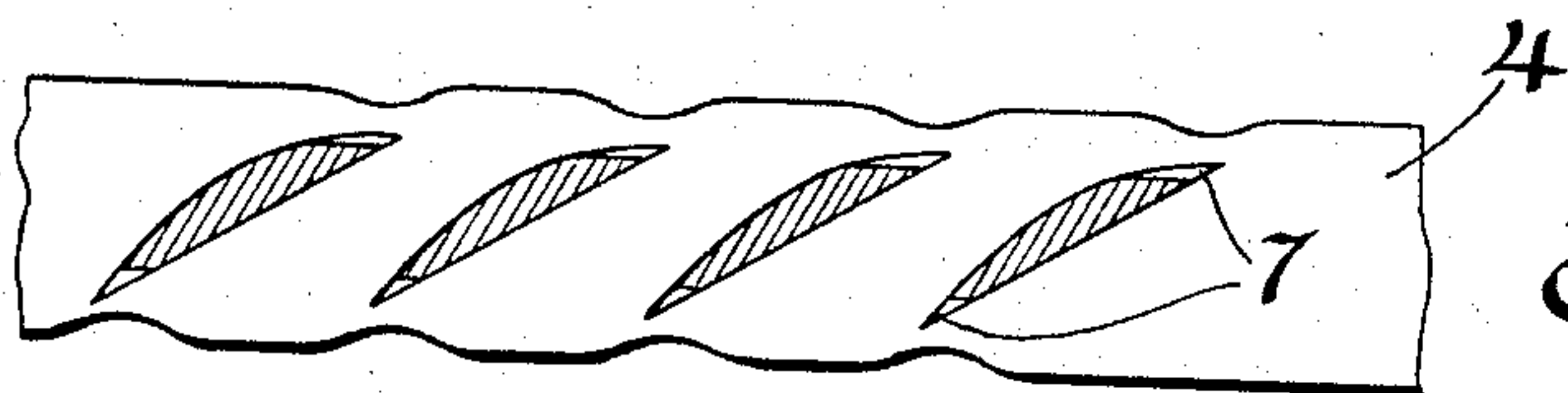


Fig. 6.

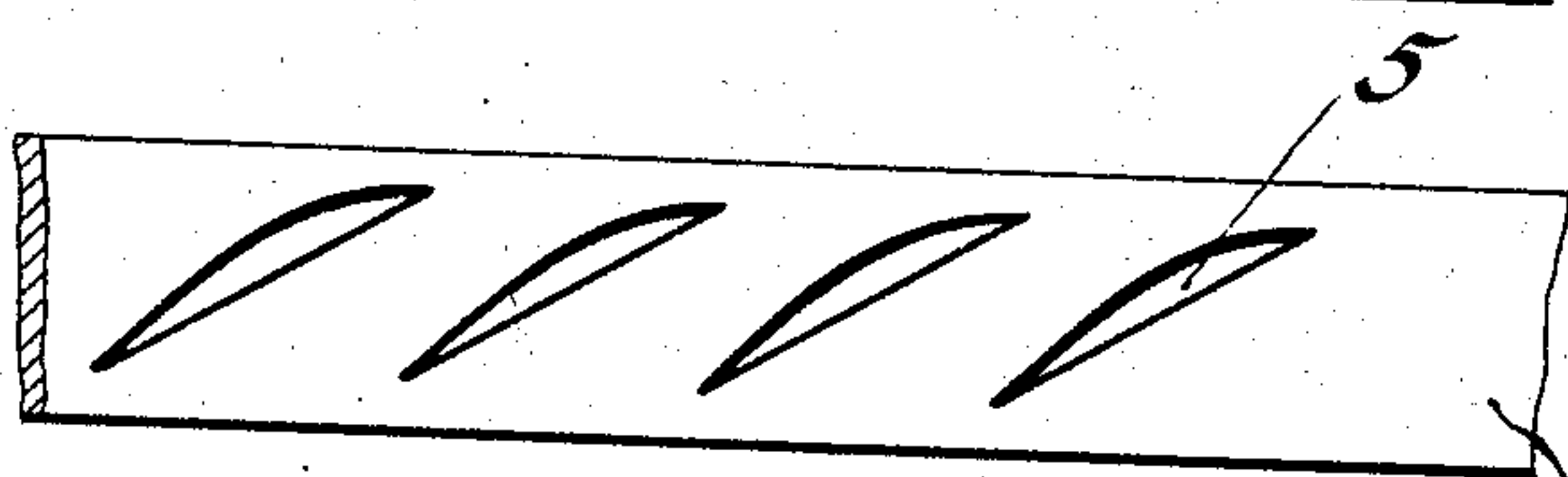


Fig. 5.

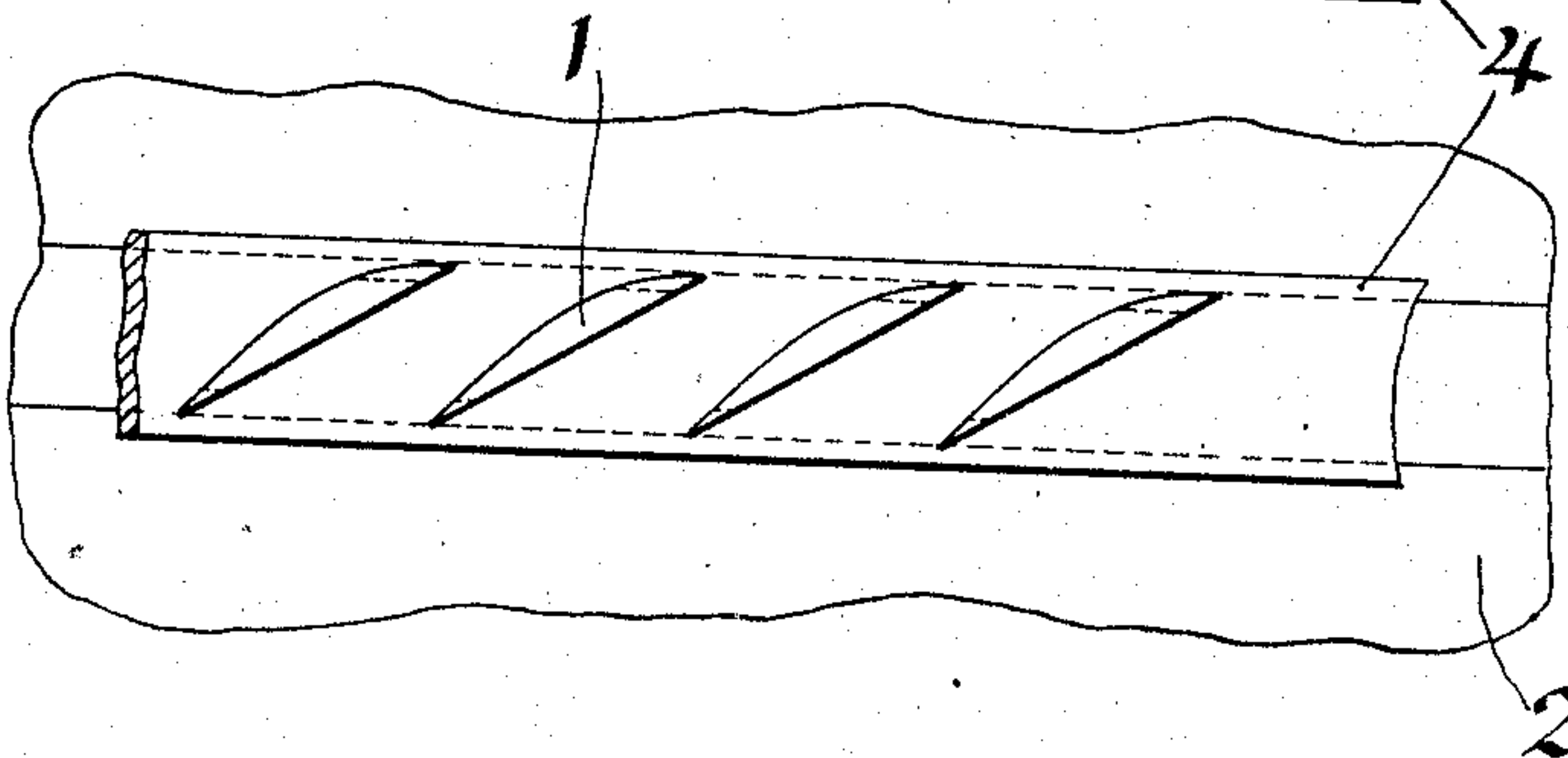


Fig. 2.



Fig. 4.

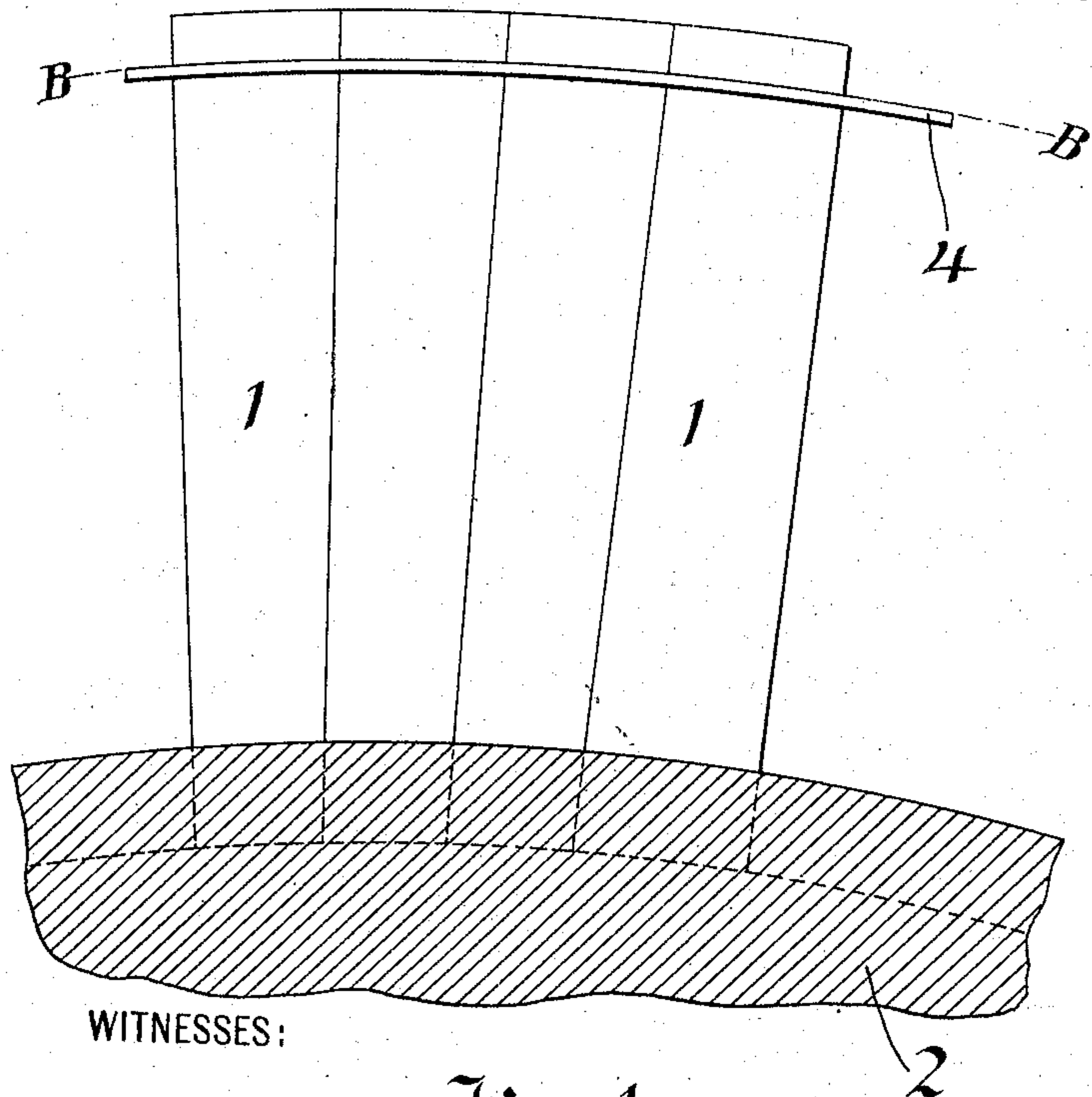


Fig. 1.

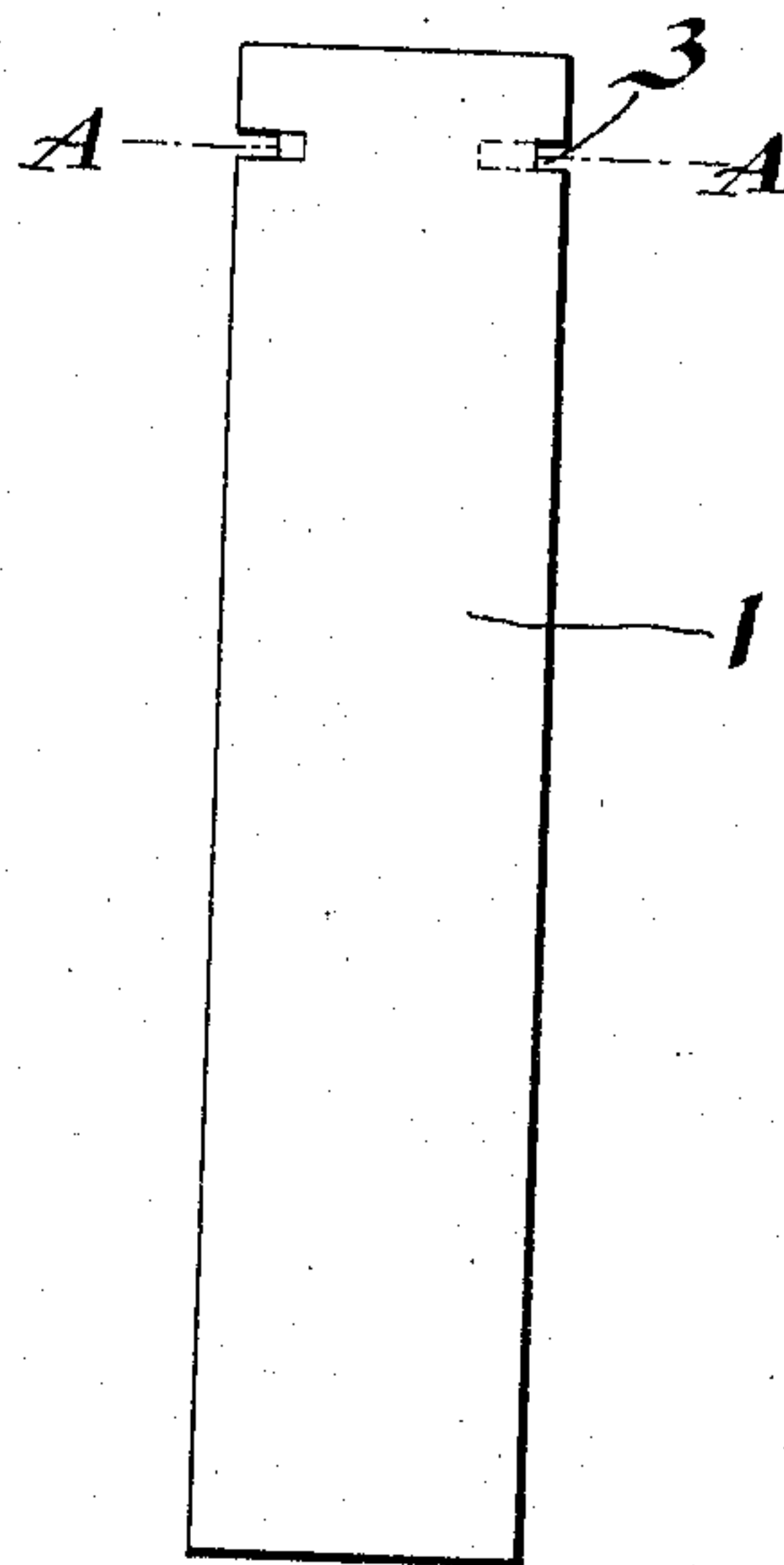


Fig. 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

DELANO H. DUGAR, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE WEST-
INGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

BLADE-TIE.

973,639.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed May 21, 1907. Serial No. 374,962.

To all whom it may concern:

Be it known that I, DELANO H. DUGAR, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Blade-Ties, of which the following is a specification.

This invention relates to the blading of elastic fluid turbines, compressors, blowers and similar machines, and more particularly to binding or tie members for securing or tying together the free ends of a number of blades comprised in a row.

An object of this invention is to produce a blade tie or binding member which unites simplicity of manufacture, rigidity of structure and minimum resistance to the passage of fluid. As this member is not designed to come in close proximity with the stationary casing or the revolving spindle of the machine, its only function is to tie together or secure the free ends of a number of blades comprised in one annular row.

In the drawing accompanying and forming a part of this application; Figure 1 is a fragmentary transverse section through a rotor and on which are mounted several blades whose free ends are secured by a blade tie embodying my invention; Fig. 2 is a plan view of Fig. 1, showing a portion of the blade tie in place on the blades; Fig. 3 is an elevation of a blade adapted to assemble with the blade tie; Fig. 4 is a section on the line A—A of Fig. 3; Fig. 5 shows a plan view of a portion of the tie member included in my invention; and Fig. 6 is a section along the line B—B of Fig. 1.

In the following description similar characters designate the same parts.

A number of blades 1 comprised in an annular row are shown assembled in a groove formed in a rotor 2, of a steam turbine, in which they are firmly secured in some appropriate way.

At a certain distance from the outer or free ends of the blades, notches 3 are punched or otherwise formed on each side and are adapted to engage with the tie piece hereinafter described. The width of these notches is equal to the thickness of the tie piece, while the depth is such as to offer a firm seat to the same when assembled with the blades.

The tie piece 4 is preferably made of the same material as the blades, and is long enough to include a desired number of blades. Throughout the length of the blade-tie is punched or otherwise formed a series of holes 5, the number and spacing of which conforms to the number and spacing of the blades it is to secure. The shape of each hole is such as to permit it to fit snugly to and around a blade.

The assembling of the tie piece and the blades is accomplished as follows: The several blades are inserted in their respective holes 5 in the tie piece, which is then forced along the blades until the tie piece is in position to engage with the notches 3. The tie piece is then subjected to a pinching or indenting process at points on its edges adjacent to the edges of the blades. This process forces the metal of the tie piece 4 into the notches 3 and causes the tie piece to engage with the blades by fitting snugly around the reduced section of the blade, as shown at 7, Fig. 6. In this way the tie piece is forced into the notches and around the reduced portions of the blades. The outer ends of the blades resist any radial force which tends to remove the tie piece, while the tie piece resists any force which tends to cause relative motion between the ends of the blades. After the blades have been thus secured a finishing cut is taken on each side of the tie piece to make it uniform in width.

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.

Having thus described my invention, what I claim as new and useful is:

1. In combination with a blade holding element, a plurality of blades provided with notches on each side, and a tie member adapted to engage with said notches.

2. In combination with a blade holding element, a plurality of blades notched on each side and adapted to engage with a tie member provided with a plurality of holes.

3. In combination with a blade mounting element, a plurality of blades notched on

each side, and a tie member provided with a plurality of holes and adapted to be calked into place.

4. In combination with a plurality of blades notched on each side, a tie member adapted to engage with said blades and notches.

5. In combination with a plurality of blades provided with notches on each side, a tie member provided with holes to engage said blades and adapted to be pinched into said notches.

6. In combination with a plurality of blades provided on both sides with notches adapted to receive a tie member, a tie member adapted to be secured to said blades by being forced into engagement with said notches.

7. In combination with a blade-carrying

element, a plurality of blades provided with notched edges, a tie member provided with alined holes extending therethrough and adapted to receive said blades.

8. In combination with a plurality of blades, a tie member provided with holes for receiving blades, the opposite faces of the tie member being in parallel planes, the metal in the parallel faces being spread to contract the holes so as to engage the blades to be secured.

In testimony whereof, I have hereunto subscribed my name this 20th day of May, 1907.

DELANO H. DUGAR.

Witnesses:

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