No. 807,603. PATENTED DEC. 19, 1905.

C. G. CURTIS.

ELASTIC FLUID TURBINE.

APPLICATION FILED JUNE 3, 1903.

Fig. 1

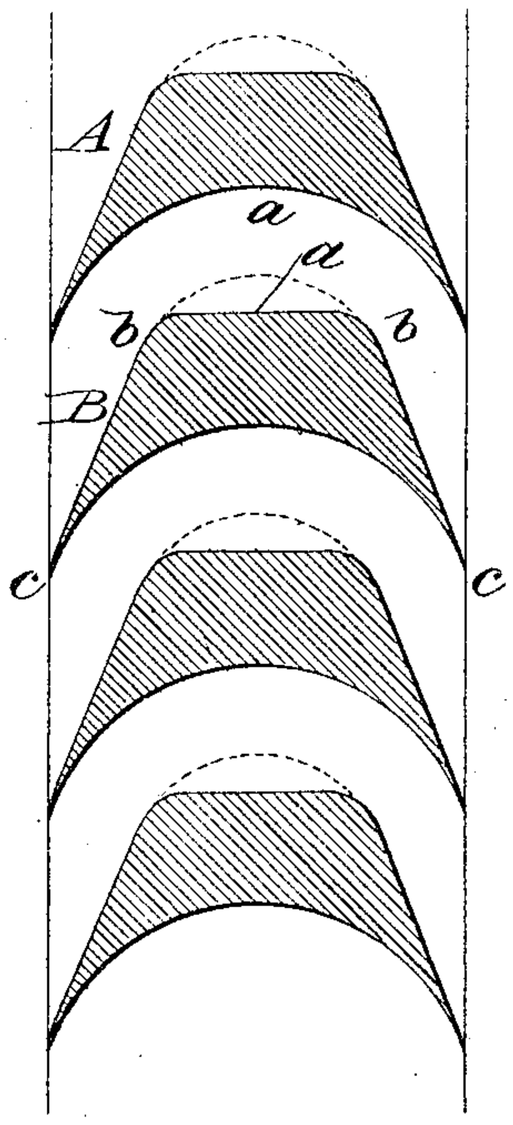


Fig. 2

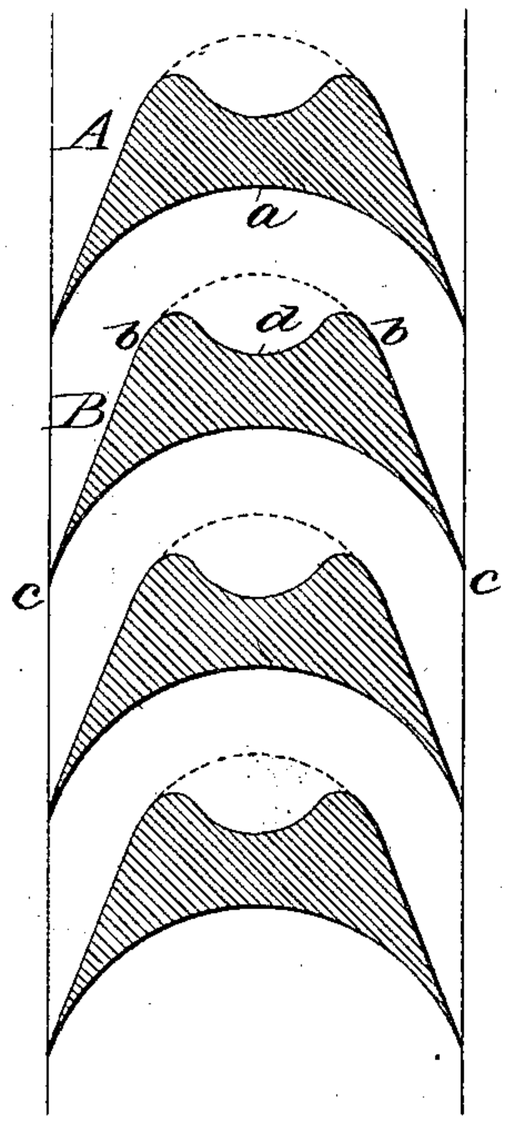


Fig. 3

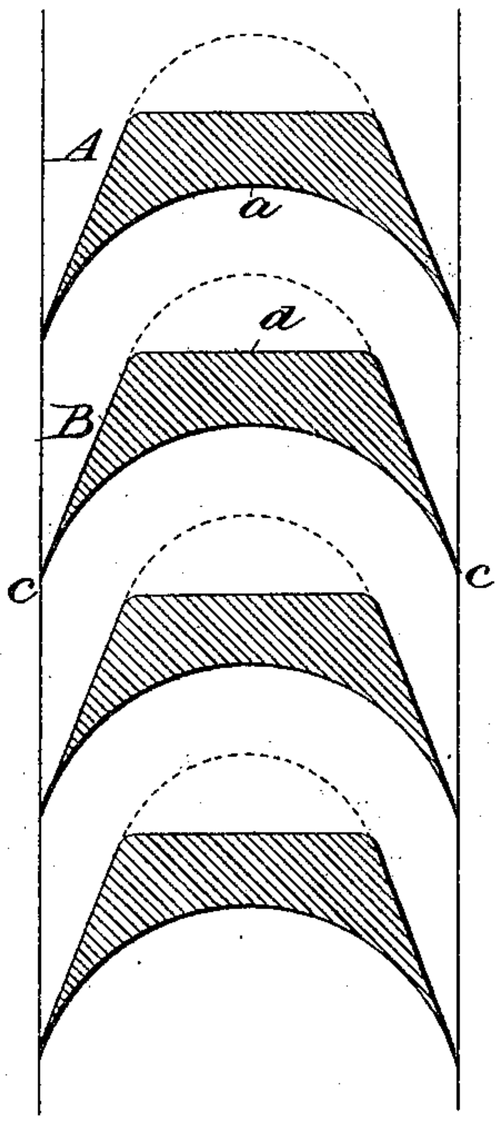


Fig. 4

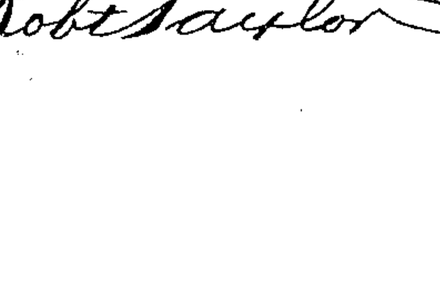
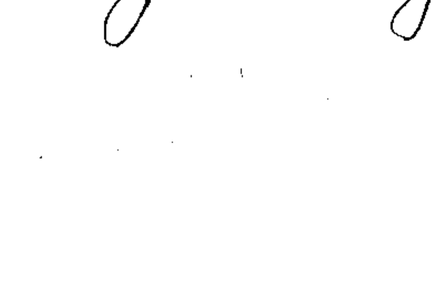


Fig. 5



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UNITED STATES PATENT OFFICE.

CHARLES G. CURTIS, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELASTIC-FLUID TURBINE.

No. 807,603. Specification of Letters Patent. Patented Dec. 19, 1905.

Application filed June 3, 1903. Serial No. 159,887.

To all whom it may concern:

Be it known that I, CHARLES G. CURTIS, a citizen of the United States, residing in the borough of Manhattan, city of New York, State of New York, have invented a certain new and useful Improvement in Elastic-Fluid Turbines, of which the following is a description.

The object of my invention is to increase the efficiency of the movable vanes of elastic-fluid turbines. These vanes are usually made with parallel opposing side walls, forming between them vane-spaces in the form of a curve concave toward the direction of rotation and of the same width throughout in the plane of movement. The jet of elastic fluid in passing through the vane-space undergoes centrifugal compression upon the curved concave forward wall as the direction of the flow of the particles is changed, producing a stress or pressure upon such wall which gives the rotative stress or driving effect. This compression of the jet upon the concave forward wall of the vane-space reduces the pressure somewhat upon the convex rearward wall of the vane-space. I have found that an increase in efficiency can be secured by cutting away the rearward wall of the vane-space at its center and throughout a portion or the whole of its length opposing the forward wall, so as to still further reduce the pressure upon the rearward wall.

In the accompanying drawings, forming a part hereof, Figures 1, 2, and 3 are horizontal sections illustrating in each case two vane-spaces embodying my present invention, and Figs. 4 and 5 are vertical sections illustrating different radial forms of the vane-spaces.

A B are the vanes, which are closed by top and bottom walls C D, the shape of the faces of the vanes and of the inner surfaces of the top and bottom walls determining the character of the vane-spaces. In Fig. 1 the movable vane-space has a curved forward wall *a*, which is preferably an arc of a circle struck from the same center as the opposing ends *b* of the rearward wall. Beyond the opposing ends *b* the rearward wall is extended outwardly to the sides of the wheel at *c* on straight or slightly-curved lines. The center portion *d* of the rearward wall is cut away or formed so that the distance separating this portion of the rearward wall from the forward wall is greater than the distance between the forward wall and the portions *b* of the rearward wall which are parallel therewith. The extent to which the central portion *d* of the rearward wall is enlarged is indicated by the dotted line, which shows the form of this wall when parallel with the forward wall. In Fig. 2 the rearward wall at its central portion *d* is still farther removed from the forward wall by being given a concaved form. In Fig. 3 the reduced center *d* of the rearward wall is carried to the ends of the opposing portions of the walls and includes the parallel portions *b* of Figs. 1 and 2. The top and bottom walls of the vane-space may be parallel, as shown in Fig. 4, or divergent, as shown in Fig. 5. The increased separation between the forward and rearward walls produced by removing the central portion of the rearward wall results in reducing the pressure upon the rearward wall and in securing greater efficiency in the vane action.

What I claim is—

1. An elastic-fluid turbine having a movable vane-space, the said vane-space having a curved forward wall against which the column of elastic fluid undergoes centrifugal compression as it passes through the vane-space, and a rearward wall which is separated from the forward wall by a greater distance at the center than at the ends of the opposing portions of the two walls, substantially as set forth.

2. An elastic-fluid turbine having a movable vane-space, the said vane-space having a curved forward wall against which the column of elastic fluid undergoes contrifugal compression in its passage through the vane-space, and a rearward wall which is separated from the forward wall at its center and for a portion only of its length on either side of the center by a greater distance than the distance between the remaining opposing portions of the two walls, substantially as set forth.

3. An elastic-fluid turbine having a movable vane-space, the said vane-space having a curved forward wall against which the column of elastic fluid undergoes centrifugal

compression as it passes through the vane-space, and a rearward wall which is parallel with the forward wall at the receiving and discharging ends of the opposing portions of the walls and is separated from the forward wall by a greater distance in its central portion, substantially as set forth.

This specification signed and witnessed this 28th day of May, 1903.

CHARLES G. CURTIS.

Witnesses:
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