

No. 760,106.

PATENTED MAY 17, 1904.

C. G. CURTIS.
ELASTIC FLUID TURBINE.
APPLICATION FILED AUG. 1, 1902.

NO MODEL.

Fig. 1

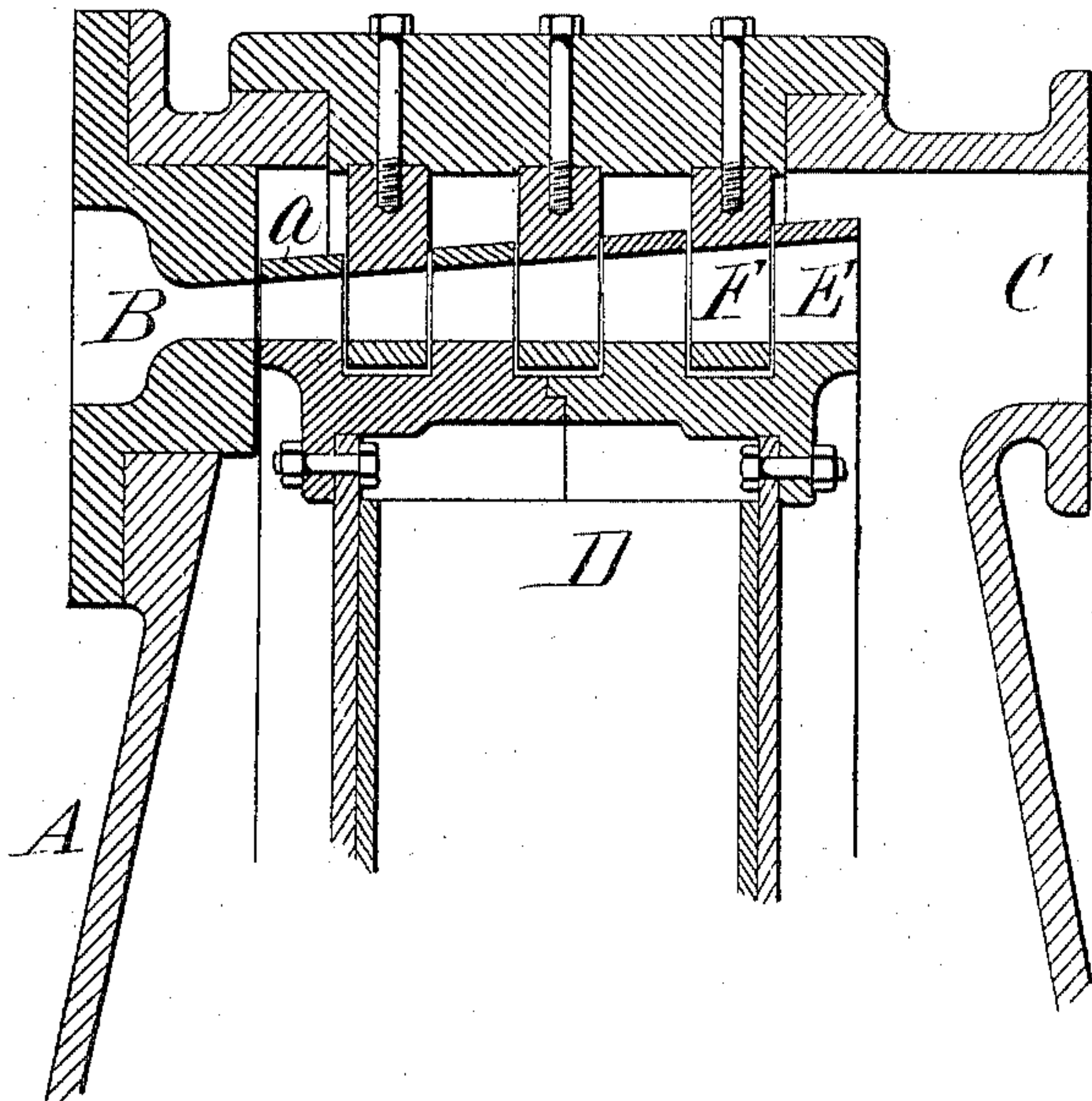


Fig. 2

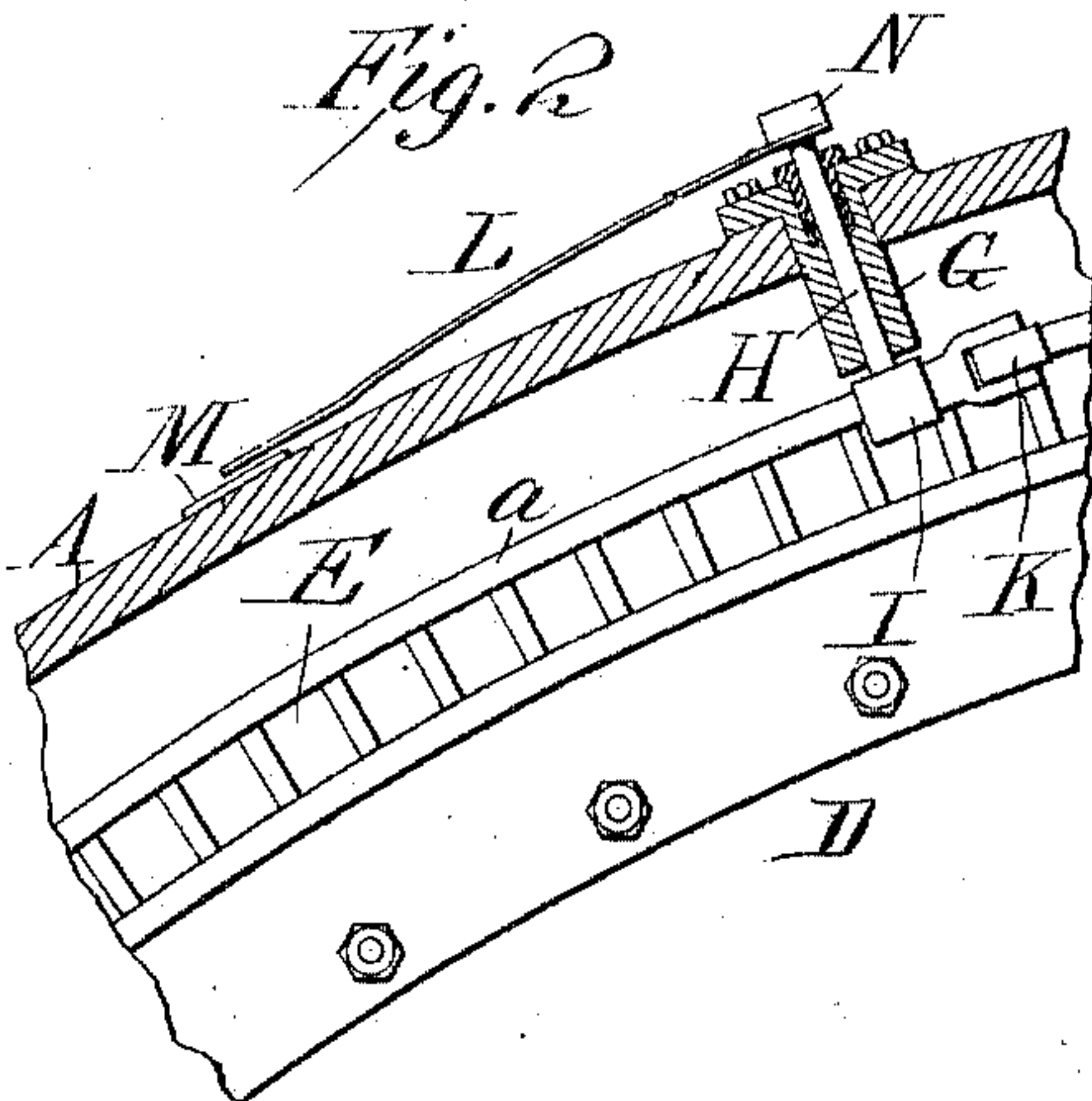


Fig. 3

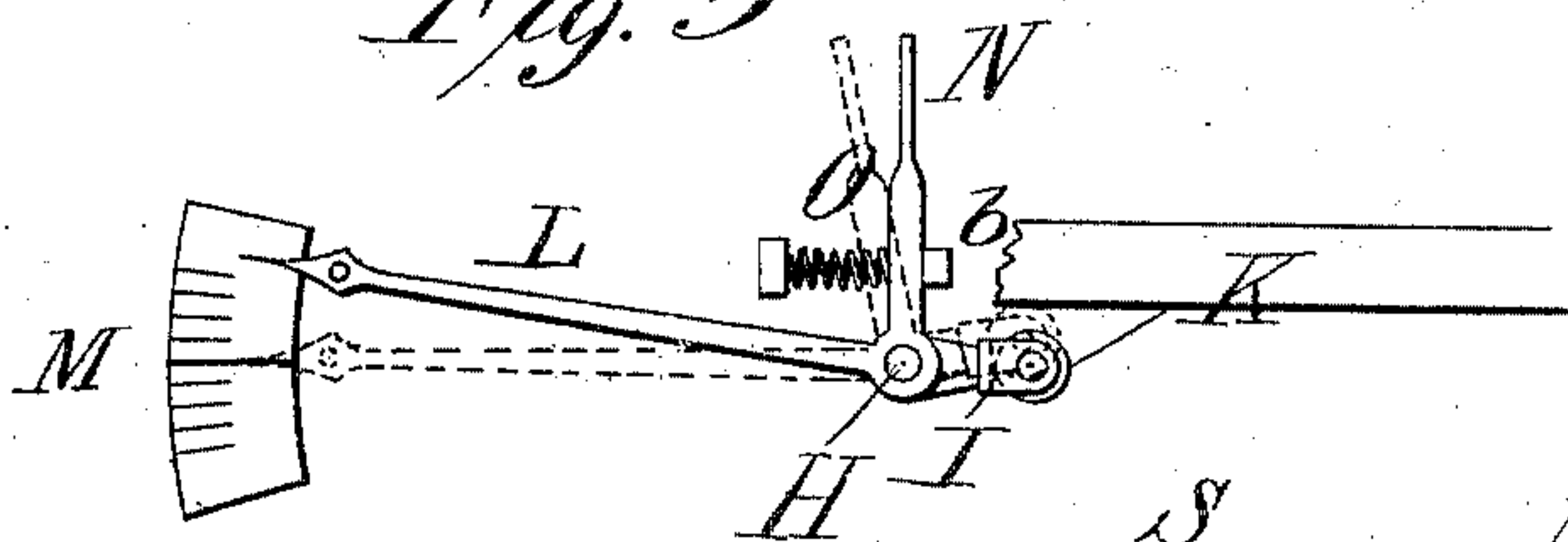
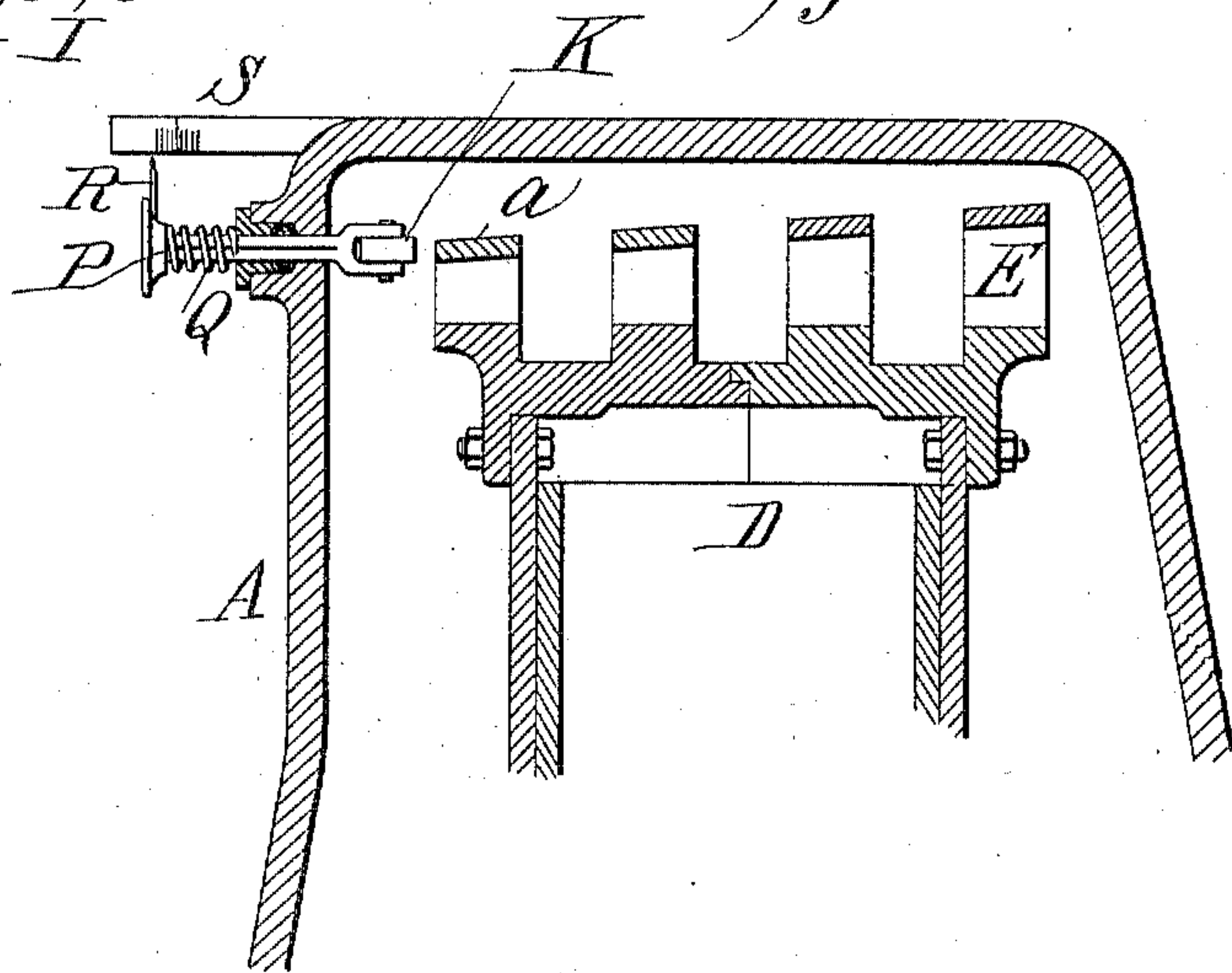


Fig. 4



Witnesses:

Jas. F. Coleman
Wm. Robt. Taylor

Inventor

Charles G. Curtis
By Syer Edmunds & Syer

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES G. CURTIS, OF NEW YORK, N. Y.

ELASTIC-FLUID TURBINE.

SPECIFICATION forming part of Letters Patent No. 760,106, dated May 17, 1904.

Application filed August 1, 1902. Serial No. 117,960. (No model.)

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.

In the practical operation of my elastic-fluid turbine especially when the same is used for the driving of a boat's propeller or the like where there is considerable end thrust on the turbine-shaft, I have found that it is desirable to provide means by which the relative position of the stationary and moving parts of the turbine can be quickly and accurately ascertained while the turbine is in operation, so that any wear at the thrust-box can be compensated for by adjustment before the moving and stationary parts of the turbine are permitted to make contact with each other—a condition which might result in serious injury to the turbine.

In carrying out my invention I provide the turbine with a feeler, preferably in the form of a small wheel or roller, which is carried within the turbine in proximity to the rim of one of the sets of movable buckets. This feeler is suitably supported so as to be movable toward the wheel-rim and is preferably held normally away from the wheel-rim by means of a spring. A connection through the casing of the turbine to its outside is provided for moving the feeler against the tension of the spring into contact with the wheel-rim, and a suitable indicating-finger and scale are provided on the outside of the turbine for indicating the position of the feeler when in contact with the wheel-rim. The means for mounting and moving the feeler may be of any suitable character, such as a turning spindle or a sliding shaft extending through the casing.

In the accompanying drawings, Figure 1 is a radial section taken on the line of the passage-way for the elastic fluid through the nozzle and the revolving and stationary vanes of my turbine. Fig. 2 is an elevation of the nozzle end of the turbine with the casing broken away and partly in section and showing the

feeler in position. Fig. 3 is a top view illustrating the parts of the indicating device, and Fig. 4 is a vertical section illustrating a modified form of the indicating device.

A is the shell of the turbine. B is the nozzle, and C is the exhaust-opening. Within the shell is the turbine-wheel D, carrying on its rim several sets of movable vanes E, four of such sets being illustrated. The shell supports a suitable number of sets of intermediate stationary vanes F, as will be understood by those familiar with my elastic-fluid turbine. Projecting through the casing, preferably near one end of the nozzle, is a bearing G, carrying a spindle H, capable of turning therein, a stuffing-box being provided at the outer end of the bearing. The inner end of the spindle H carries a short arm I, provided with a roller K at its outer end. The position of this roller is such that by turning the spindle H the roller can be brought into contact with the edge of the band *a*, which encircles the set of movable vanes E adjoining the nozzle. Outside of the turbine-casing the spindle H is provided with an indicating-finger L, traveling over a scale M. The spindle H is also provided outside of the casing with a thumb-piece N, projecting laterally therefrom, by means of which the spindle can be turned. A spring O forces the thumb-piece N against a stationary stop *b*, so that normally the roller K is out of contact with the band *a* and the pointer L is at one end of the scale.

When it is desired to ascertain the position of the turbine-wheel, the thumb-piece N is pushed against the spring O until the movement is arrested by contact of the roller K with the band *a*, when the indicator L will show the position of the turbine-wheel on the scale M. The scale and indicator may be so arranged relatively that the central point on the scale will indicate the normal position of the turbine-wheel, and the graduations on either side of the center will show the departure either way from the normal. The dotted lines in Fig. 3 show the position of the parts when the feeler is operated and the turbine-wheel is found to be in its normal position. When the indication has been secured, the

thumb-piece N will be released and the spring O will force the thumb-piece against the stop b, moving the roller K out of contact with the band a and carrying the indicating-finger L to one end of the scale M.

Instead of having the roller K mounted on a turning spindle extending through the casing this roller may be mounted upon a sliding stem P, Fig. 4, which passes through a stuffing-box in the shell of the turbine and is provided with a spring Q for retracting the roller. An indicating-finger R and scale S will show the position of the turbine-wheel when the stem P is pushed inwardly to bring the roller K in contact with the band a.

What I claim is—

1. In an elastic-fluid turbine, the combination with the casing or shell and the movable and stationary elements of the turbine inclosed by said casing or shell, of means for indicating the relative position of the movable and stationary elements while the turbine is running, substantially as set forth.

2. In an elastic-fluid turbine, the combina-

tion with the shell and the turbine-wheel, of a feeler within the shell, means outside the shell for moving the feeler into contact with the wheel-rim, a steam-tight stuffing-box or joint through which the connections with the feeler pass and an indicator outside the shell for indicating the position of the feeler when in contact, substantially as set forth.

3. In an elastic-fluid turbine, the combination with the shell and turbine-wheel, of a feeler within the shell movable into and out of contact with the rim of the wheel, means outside the shell for moving the feeler into contact with the wheel-rim, a spring for moving the feeler out of contact with the wheel-rim, and an indicator for indicating the position of the feeler when in contact with the wheel-rim, substantially as set forth.

This specification signed and witnessed this 25th day of July, 1902.

CHARLES G. CURTIS.

Witnesses:

JNO. ROBT. TAYLOR,
JOHN LOUIS LOTSCH.