

No. 713,920.

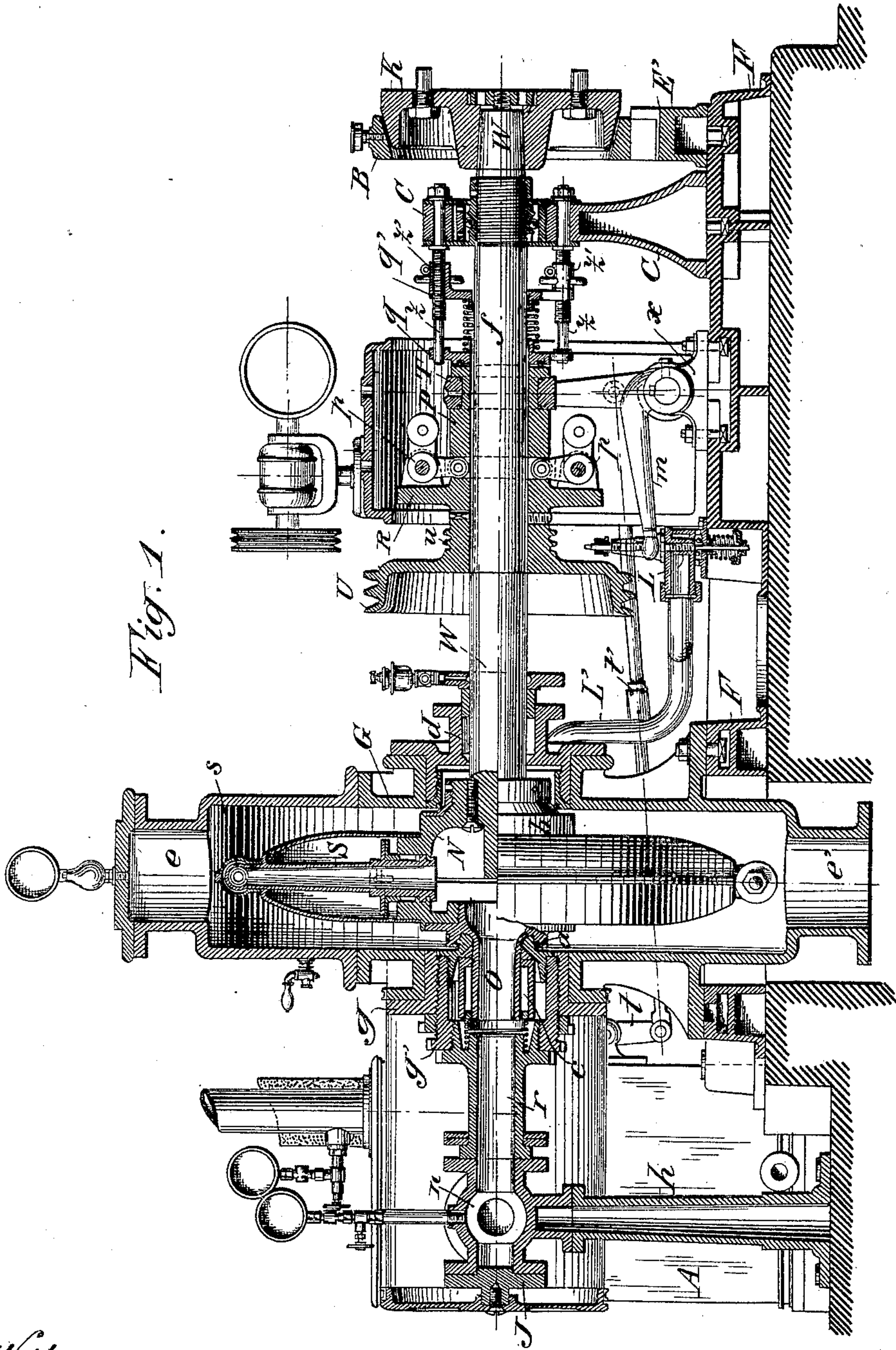
Patented Nov. 18, 1902.

J. PROCNER.
TURBINE.

(Application filed Dec. 30, 1901.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses:
Jules b. Delauney
E. Kaniusch

Inventor:
Jan Procter
per *Wing*
Attorney

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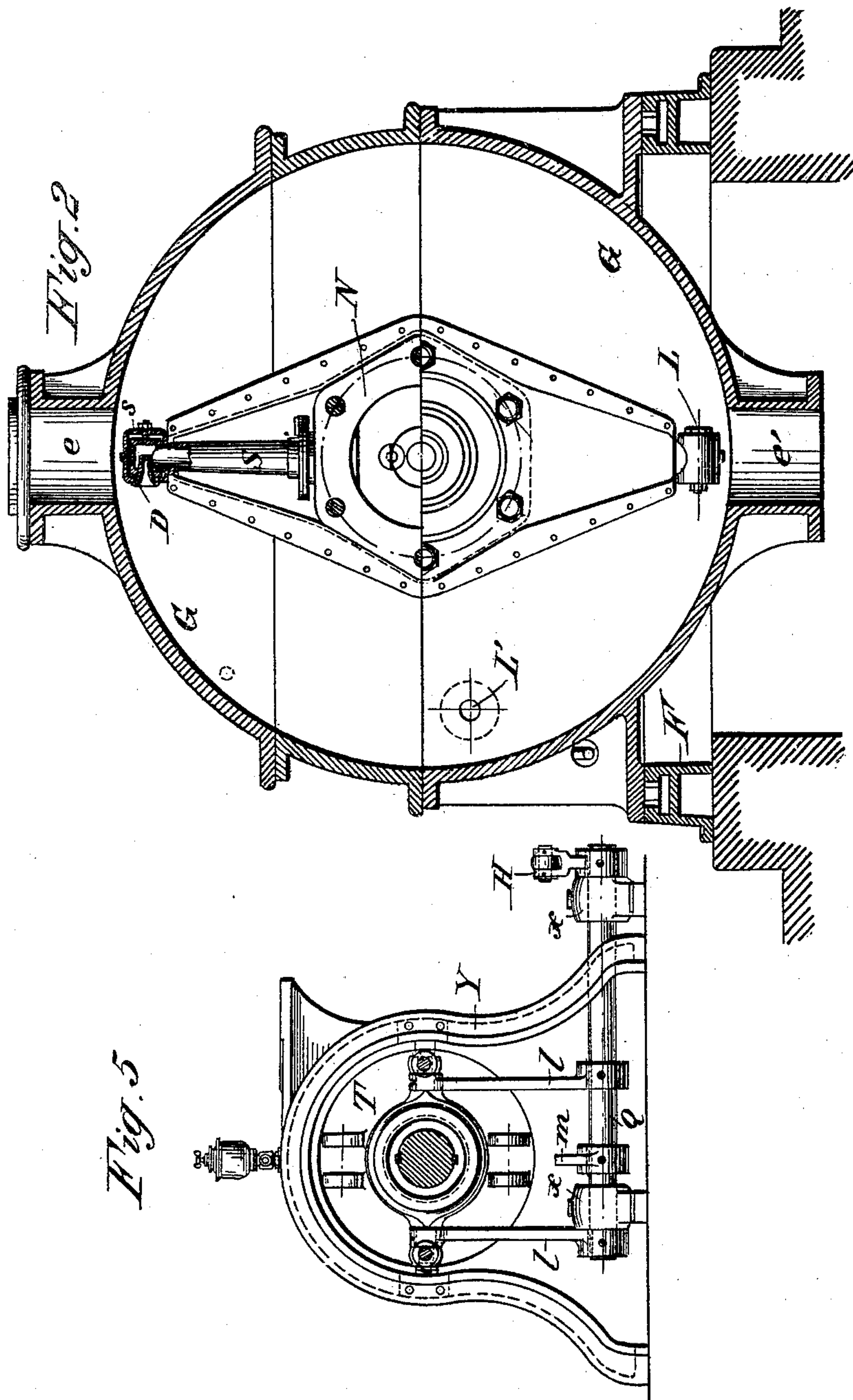
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Witnesses:
Jules b. Delaney
O. Kanusch.

Inventor.
Jan Procter
per V. L. Singer
Attorney.

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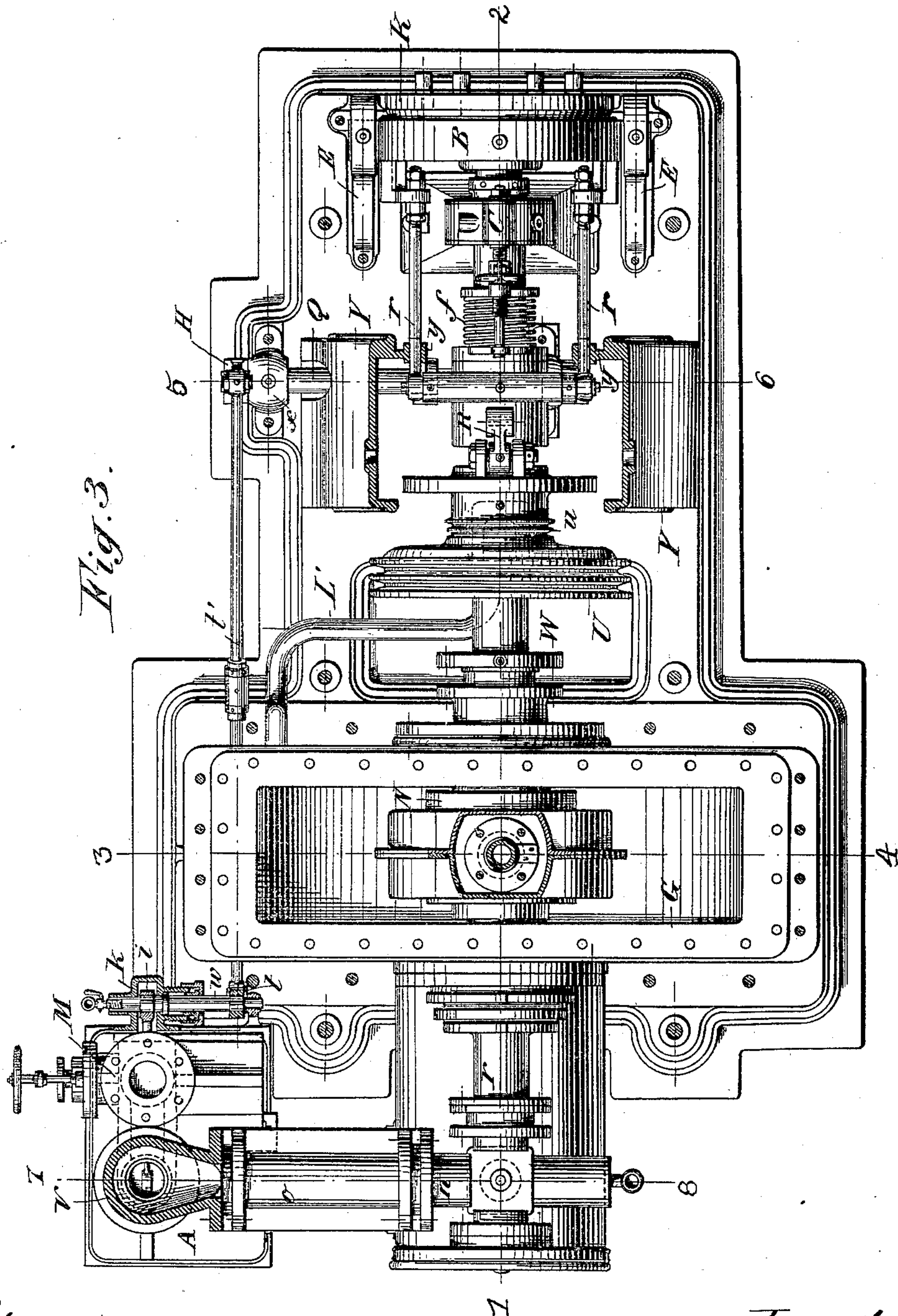
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Witnesses:
Jules b. Delainey
E. Kamsch.

Inventor:
Jan Procner
per *B. Singer*
Attorney

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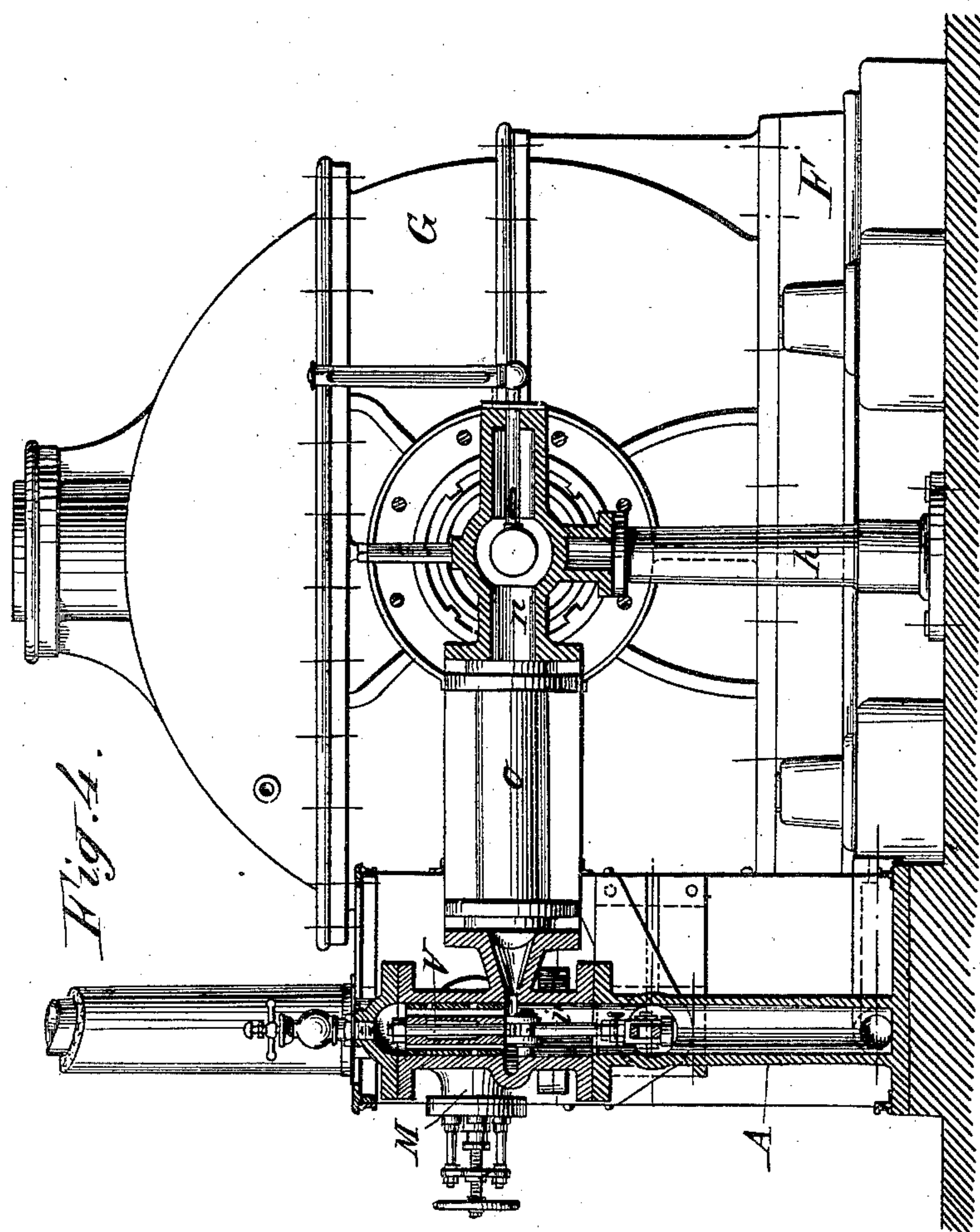
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5 Sheets—Sheet 4.



Witnesses:
Jules C. Delaney
E. Hanusch.

Inventor
Jan Procter
per B. H. H. H.
Attorney

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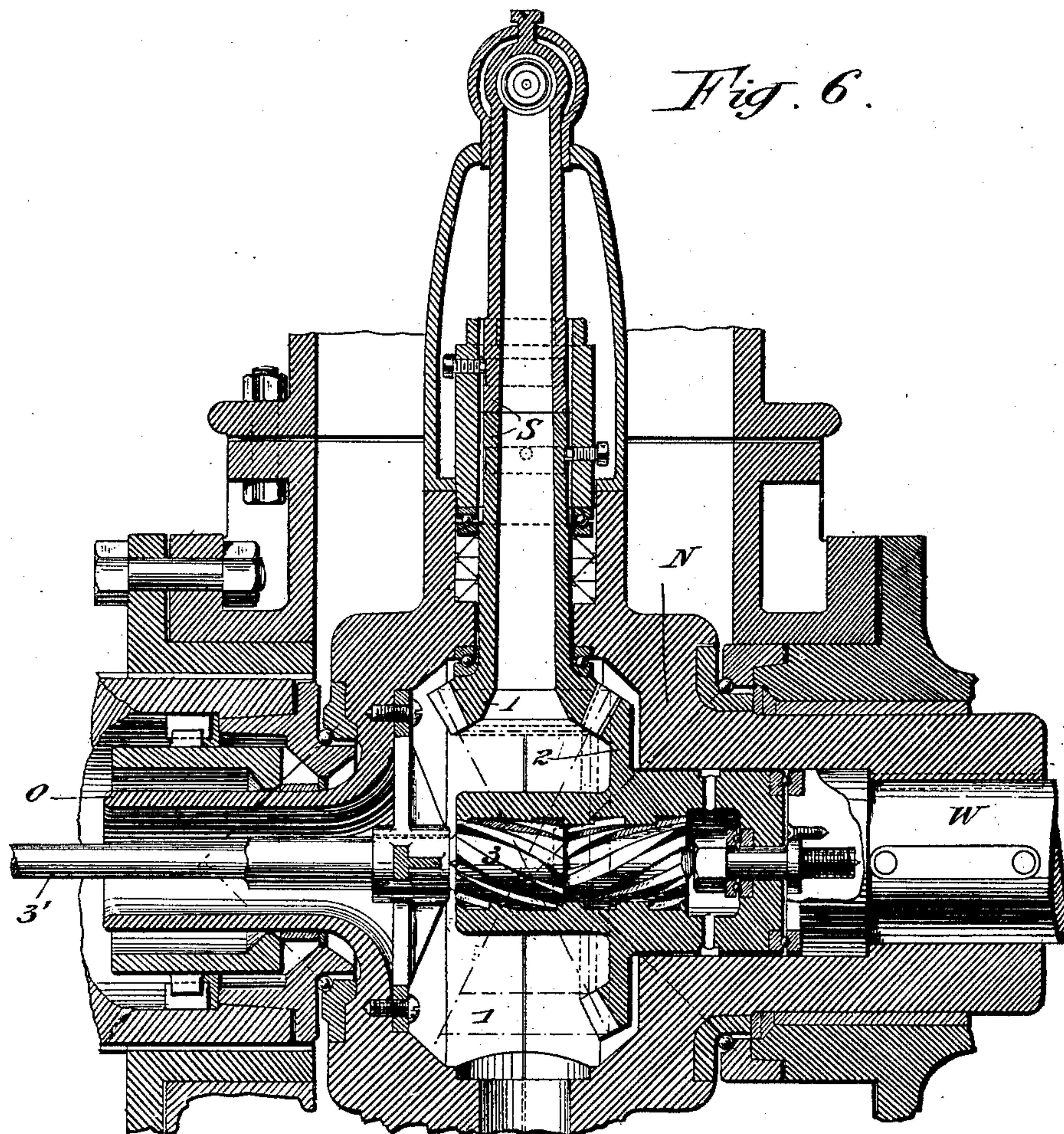
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(Application filed Dec. 30, 1901.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses:
Jules b. Delaney
E. Kanusich

Inventor:
Jan Procner
per [Signature]
Attorney

UNITED STATES PATENT OFFICE.

JAN PROCNER, OF PABIANICE, NEAR LODZ, RUSSIA.

TURBINE.

SPECIFICATION forming part of Letters Patent No. 713,920, dated November 18, 1902.

Application filed December 30, 1901. Serial No. 87,800. (No model.)

To all whom it may concern:

Be it known that I, JAN PROCNER, a subject of the Emperor of Russia, and a resident of Pabianice, near Lodz, Russia, have invented certain new and useful Improvements in Turbines, of which the following is a specification.

The present invention relates to a turbine which may be actuated by steam, gases under pressure, or compressed air, the working of which is based upon the reaction. The motive power (steam, gas, or air) exerts its power in the machine by its vis viva and by expansion when passing from the state of tension to the state of ambient tension.

The object of the invention is to cause the energy of the motive agent to act without shocks and without loss of pressure by the simple effect of reaction upon the rotation of a shaft and then to utilize the power obtained by means of the said shaft for working purposes.

In the accompanying drawings, Figure 1 is a section on 1 2 of Fig. 3. Fig. 2 is a section on 3 4 of Fig. 3. Fig. 3 is a plan view of the motor. Fig. 4 is a section on 7 8 of Fig. 3. Fig. 5 is a section on 5 6 of Fig. 3. Fig. 6 is an enlarged fragmentary view of a modified form of my improved turbine and the casing therefor.

The figures show a horizontal turbine in which steam is intended to be used for only one rotative direction with a fixed number of revolutions.

The shaft W is furnished at one end with a hollow boss N and at the other end with a coupling K. The boss N enters a casing G, being supported therein on both sides by suitable ball-bearings *a* and *b*, the shaft W also rotating in a ball-bearing C, close to the coupling K at its other end. The casing G and the bearing C are fixed on a common bed-plate F.

The boss N is provided at the side with a central opening terminating in a tubular collar O. On the periphery of the boss N several tubular projections S are arranged. These tubular projections are at least two in number, placed radially and not capable of rotating around their own axes. These tubular projections 3 are in communication with the hollow of the boss N, the free end of each being in the shape of a pipe-nozzle *s*. To the

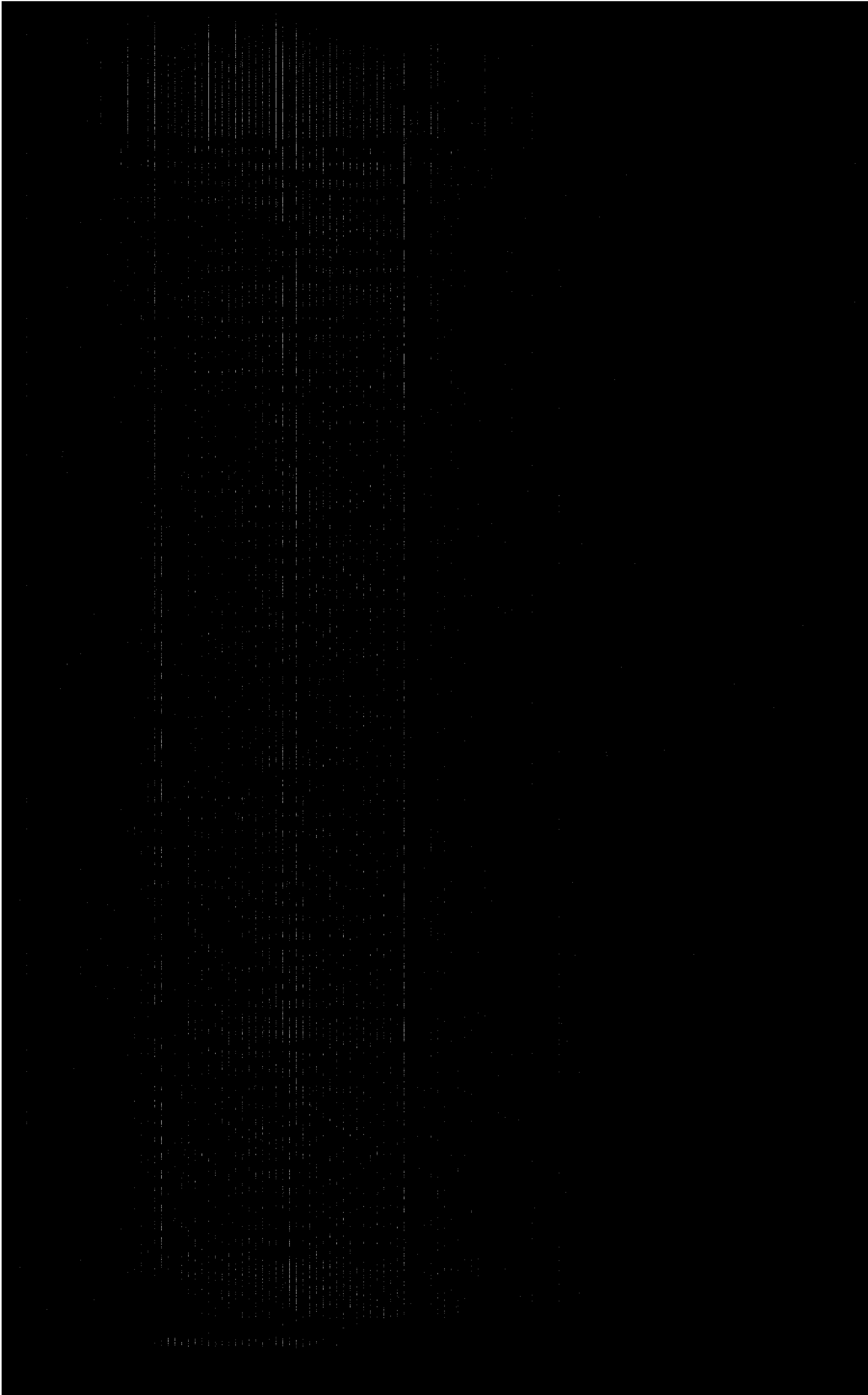
side of this nozzle a pipe D is fixed at right angles to the tube S. The tube D is provided with a parabolical perforation, the narrow part of which is inside the pipe-head, while the wider part is turned to the outside. The various nozzles are turned so as only to have one rotative direction.

The casing G is provided at the top with an exhaust-pipe *e* and underneath with a union *e'* for connection eventually with the condenser. The shaft W passes through a stuffing-box *d*, provided with a gland *d'*, so as to prevent air from entering the casing G, and at the middle thereof a gland *g* is arranged, into which is screwed a small box *g'*, serving to firmly maintain the boss N in the ball-bearings *a* and *b*. In the box *g'* is placed a movable stuffing-box *c* in order to assure a tight joint at the collar O. To the box *g'* is connected a straight tubular part *r*, and to the latter is connected a T-piece *n*, maintained by a small pedestal *h*.

Near the casing G is arranged a water-separator A, consisting of two perpendicular tubes mounted on a common bed-plate and communicating between themselves by an upper and a lower cross-pipe. The latter is provided with a lateral union in order to set up the communication with the tube for the discharge of condensing water. One of the vertical pipes is provided with a stop-valve M for the steam and the other with a regulating-valve V, communicating with the separator A. The regulating-valve V is connected with tube *n* by means of a flexible tube *o*.

To the main shaft W, between the casing G and the bearing C, is fixed an automatic and centrifugal governor R, the boss of which forms two grooved pulleys U and *u*, the former being the larger one.

The governor-weights *p p* bear while the machine is working against a boss P, sliding on the motor-shaft and pushed in one direction toward the front. In the opposite direction this boss is pressed by a spring *f* between the sliding disks *q q'*. The sliding disk *q* is suspended and slides on two studs *z z*, fixed to the bearing C, and is pushed against the boss P by the spring *f*. The pressure on the bearing-face of the boss P is transmitted from the disk *q* by means of a ball-bearing in order to prevent the rotation of



both directions is not great. For a reversing-engine the governor-disk with weights $p p$ is not used. The spring f , the guides $q q'$, and the studs $z z$, with the nuts $z' z'$, are also
 5 dispensed with. The distributing-shaft Q is rotated from the driver's platform by means of a hand-wheel and a screw actuating a lever placed on the shaft Q in such a way that the valve is opened and closed, not automati-
 10 cally, but by hand. The rotation speed of the shaft W is regulated by hand while observing the tachometer. The reversing of the turbine-shaft W is caused by the nozzles D being made to turn to one hundred and eighty
 15 degrees on their axial line and can be so turned by hand with the help of a suitable implement. For this purpose each nozzle-tube S is fitted with a small conical wheel 1, placed inside the hollow boss V . The toothed
 20 wheels 1 1 gear with a large conical wheel 2, which is rotative inside the boss N . The toothed wheel 2 is provided with a boss extending toward the rear and its orifice is provided with a multithreaded screw. A small
 25 piston 3 is provided with similar screw-threads and is introduced into the boss of the toothed wheel 2. The piston 3 moves with a reciprocating motion (in the axial direction of the turbine) in the boss of the toothed
 30 wheel 2 by means of a rod 3', passing centrally toward the exterior through $O r n$, as well as the cover J , furnished with the stuffing-box. The rod 3' of the piston 3 is partially in square section to prevent the piston 3 from turning
 35 and in order to cause the rod to rotate with the nozzles and with the shaft W . With a sufficient axial displacement of the piston 3 the toothed wheels 2 and 1 1 rotate sufficiently to allow the nozzle-tube S to be rotated at the
 40 same time to one hundred and eighty degrees and to give the jets of steam from the nozzles D the required direction. In this way the turbine-shaft W is rotated in the opposite direction. The end of this rod forming a projection
 45 toward the outside therefore rotates with the shaft W and is furnished with a reversing head placed in such a way that the rod may turn freely therein without being withdrawn therefrom. This head can only take a motion
 50 sliding along the shaft and is actuated by hand by means of a lever furnished with a pawl engaging a cam.

The driver should control the reversing-lever with one hand and with the other regulate the admission of steam by means of the
 55 hand-wheel.

For certain purposes the reversible turbine

may be constructed without condensation and without the air-valve L .

When the brake B is replaced by another 60 device, the distributing-shaft q is also dispensed with, and the regulating-valve V is controlled directly by means of a screwed rod passing through its upper part and fitted with a hand-wheel. 65

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a turbine, the combination with a shaft, carrying at one end a hollow boss and 70 at the other a coupling-organ, of a fixed casing in which rotates the said boss, of a central opening in the boss ending in a tubular collar, tubular parts on the periphery of the boss, the end of which forms a pipe-nozzle, 75 of a right-angled nozzle secured on each of the before-named pipes, the outer end of the opening of the said nozzle being enlarged and all these openings being directed so as to produce a single rotative direction, an exhaust- 80 pipe and a pipe connected to the before-mentioned tubular collar and to a connecting-pipe, substantially as described and as shown.

2. In a turbine, the combination with a shaft carrying at one end a hollow boss and 85 at the other a coupling-organ, of a fixed casing in which rotates the said boss, of a central opening in the boss ending in a tubular collar, tubular parts on the periphery of the boss, the end of which forms a pipe-nozzle, 90 of a right-angled nozzle screwed on each of the before-named pipes, the opening of the said nozzle being enlarged outwardly and all these openings being directed so as to produce a single rotative direction, of an exhaust- 95 pipe, of a pipe connected to the before-mentioned tubular collar and to a connecting-pipe, of a water-separator comprising two vertical pipes connected, at the top and at the bottom, to transverse pipes, of a lateral union 100 on the upper cross-pipe for the discharge of condensation-water, of a stop-valve arranged on one of the two vertical pipes, and of a regulating-valve arranged on the other vertical pipe, the latter being connected to the 105 branched pipe by means of a flexible tube substantially as described and as shown.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

JAN PROCNER. [L. S.]

Witnesses:

WLADYSLAW ZANIOWSKI,
 CHS. STAREWSKY.