

No. 848,157.

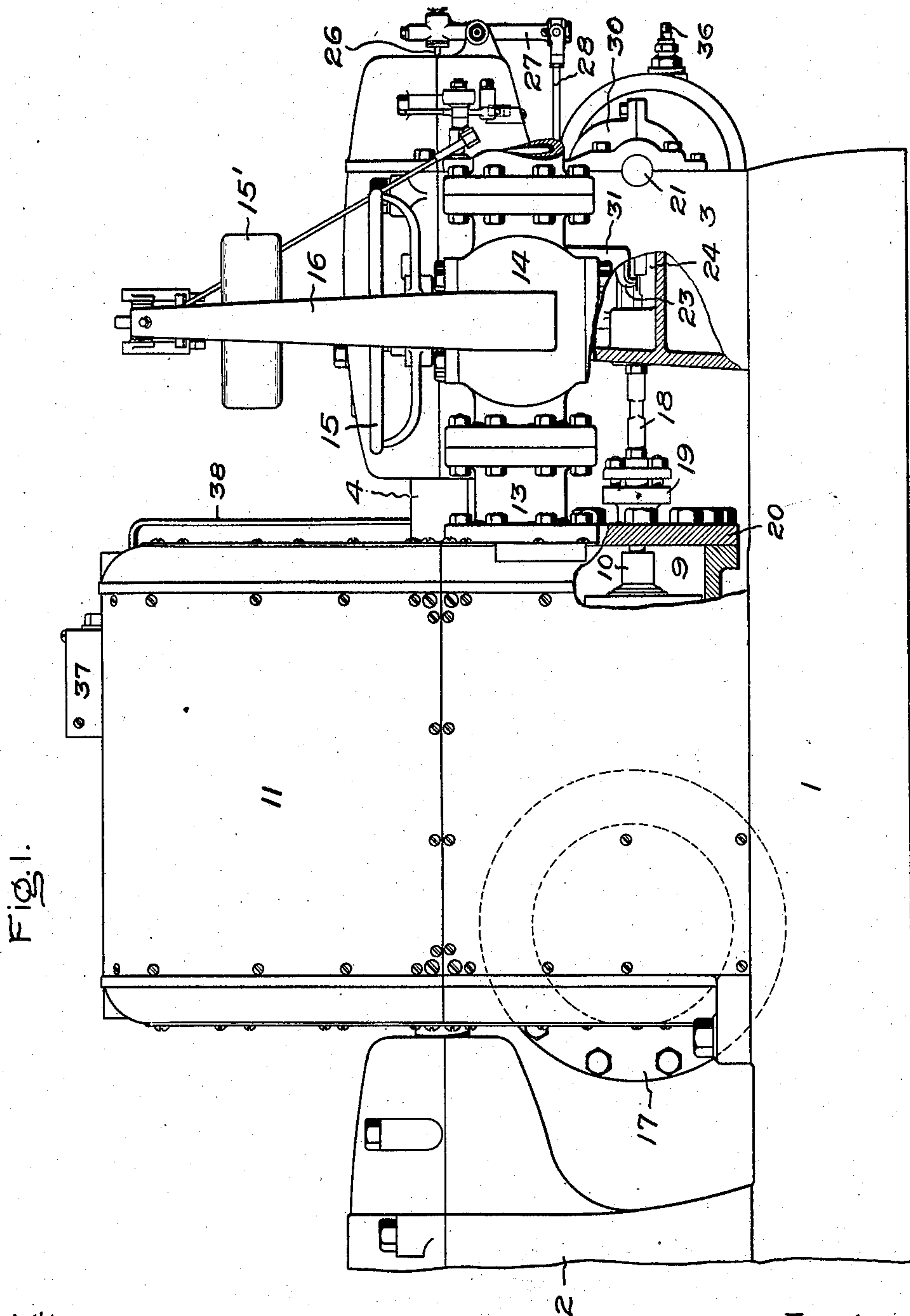
PATENTED MAR. 26, 1907.

J. G. CALLAN & H. J. HANZLIK.

ELASTIC FLUID TURBINE.

APPLICATION FILED AUG. 20, 1906.

3 SHEETS—SHEET 1.



Witnesses:

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By *Albert L. Davis*
Att'y.

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3 SHEETS—SHEET 2.

Fig. 2.

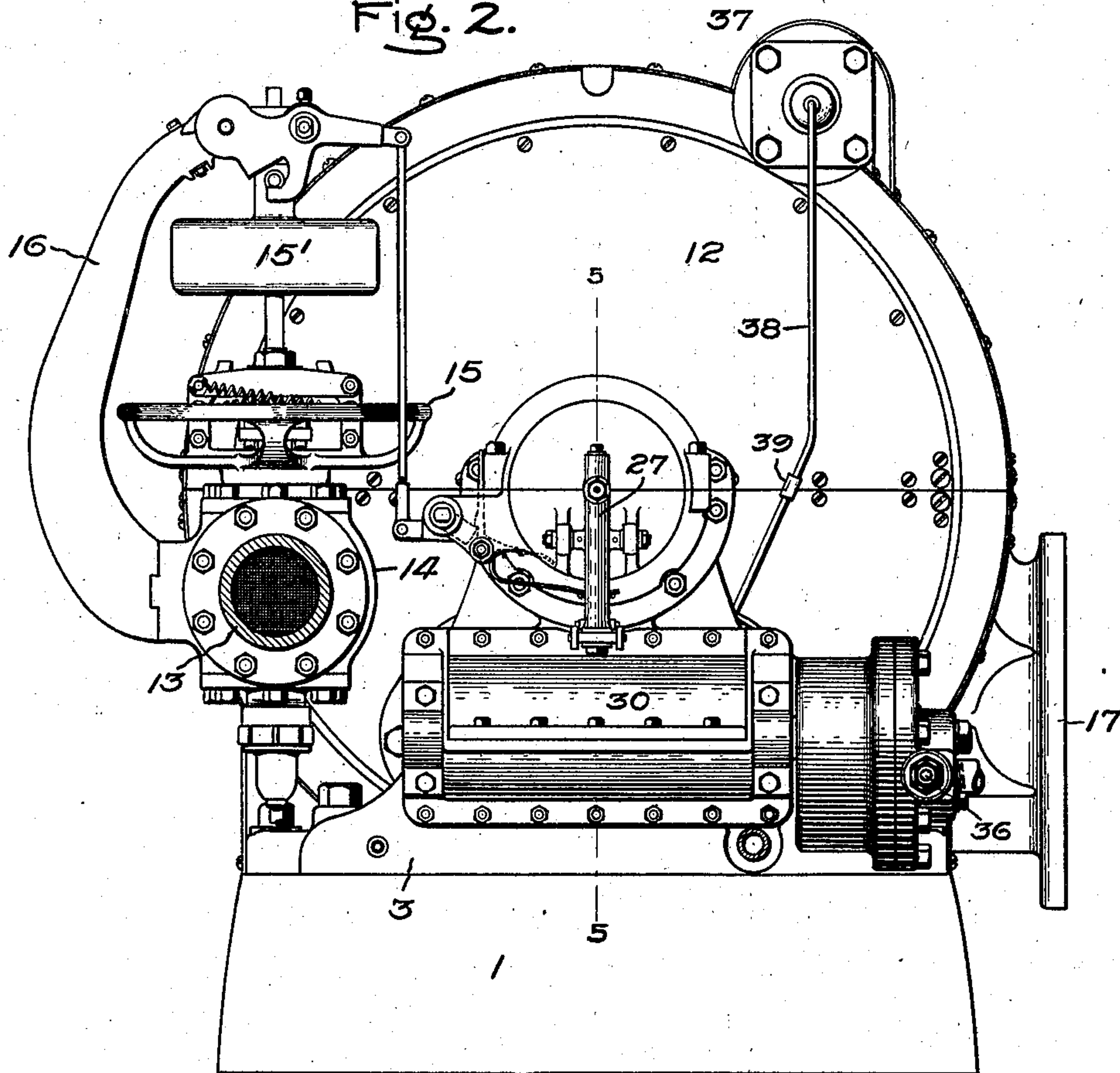


Fig. 3.

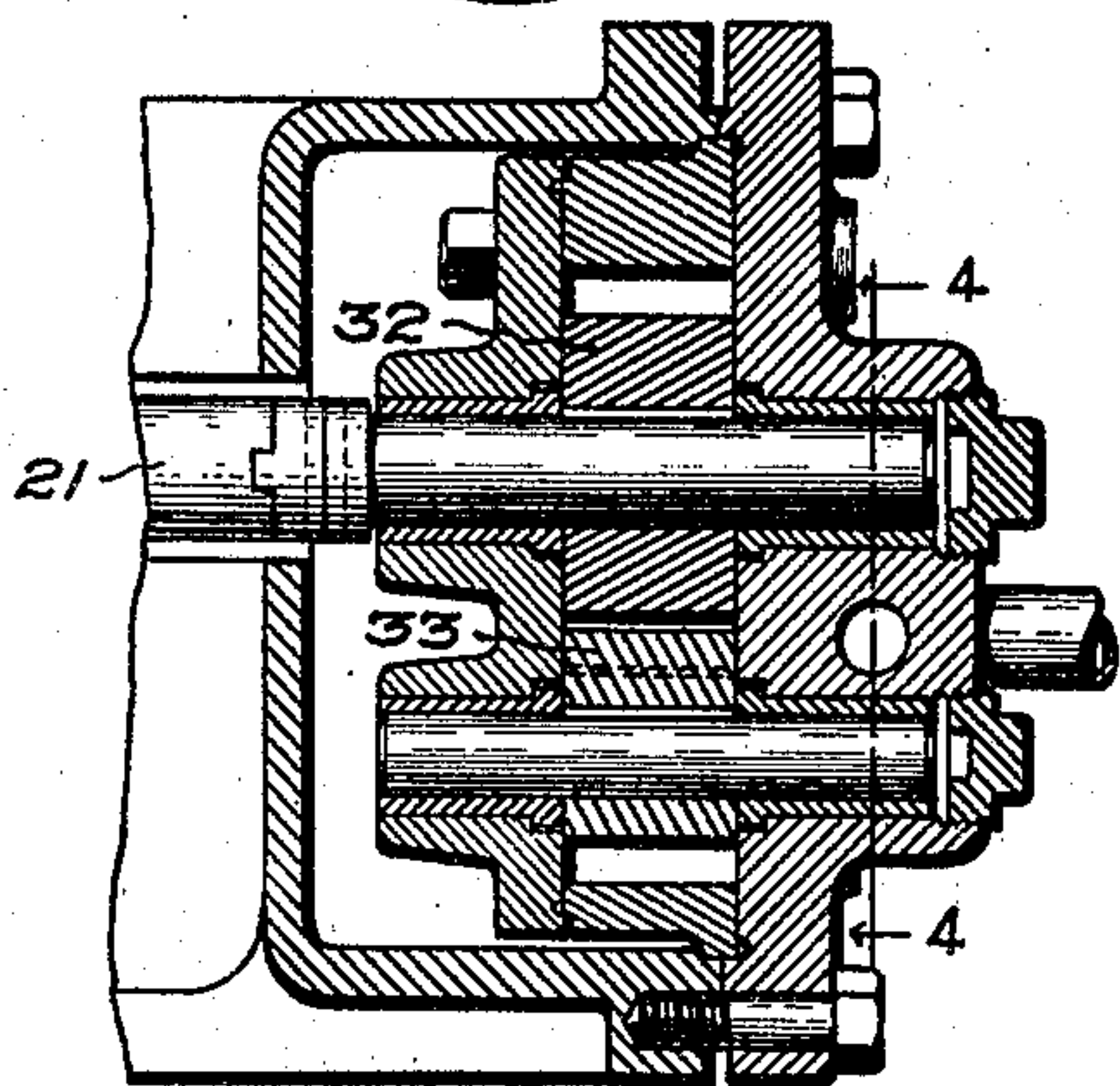
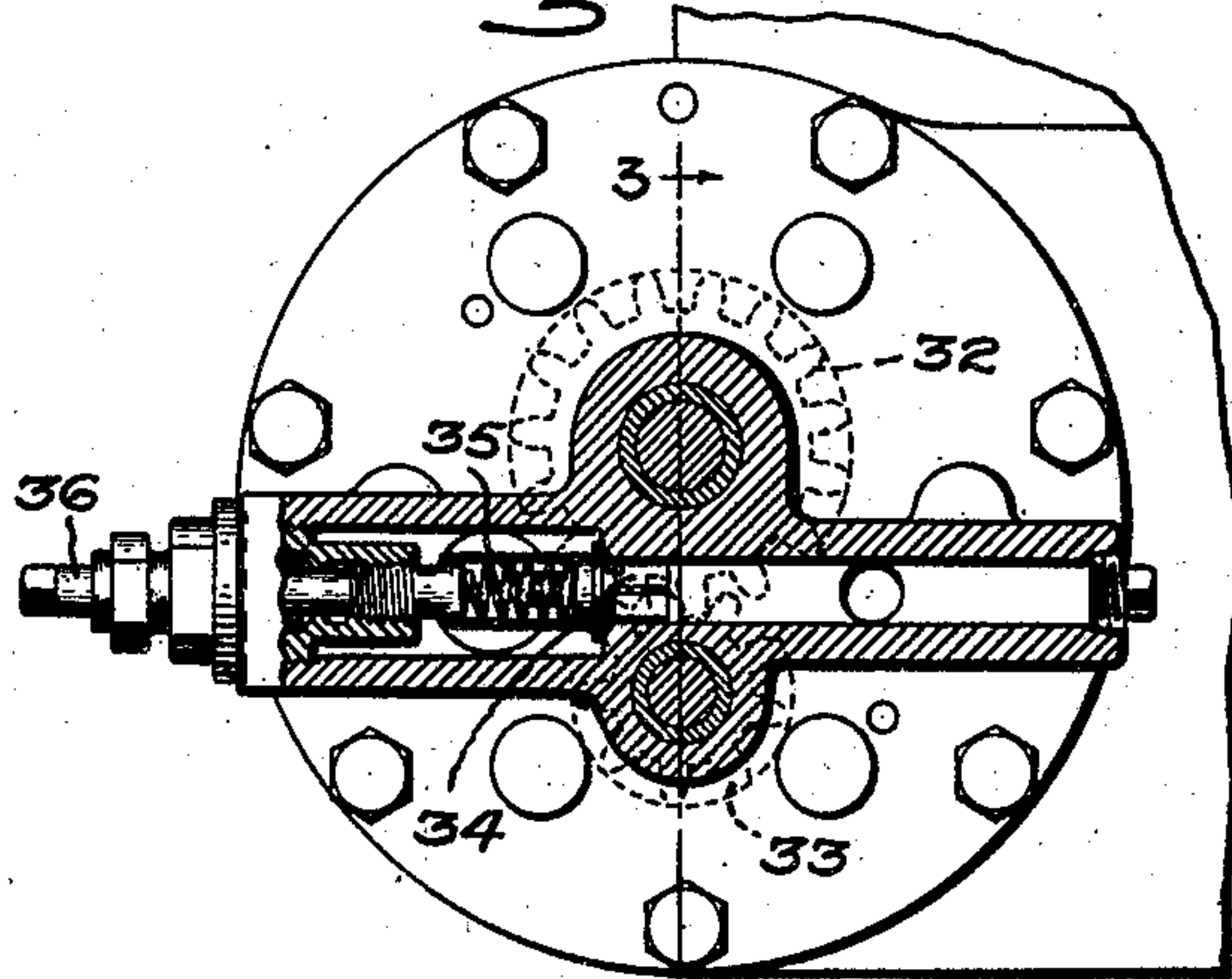


Fig. 4.



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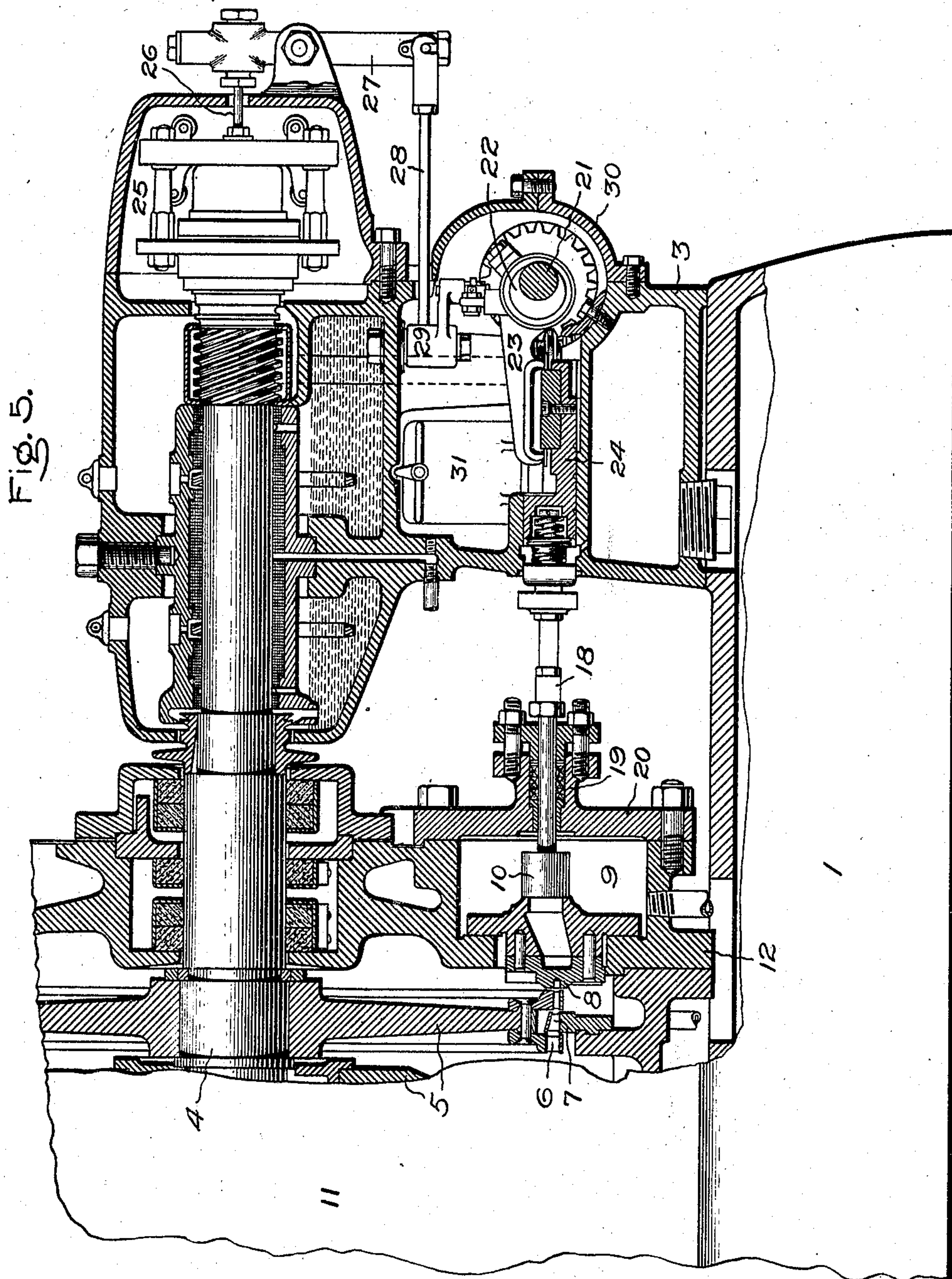
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOHN G. CALLAN AND HENRY J. HANZLIK, OF LYNN, MASSACHUSETTS, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELASTIC-FLUID TURBINE.

No. 848,157.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed August 20, 1906. Serial No. 331,273.

To all whom it may concern:

Be it known that we, JOHN G. CALLAN and HENRY J. HANZLIK, citizens of the United States, residing, respectively, at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Elastic-Fluid Turbines, of which the following is a specification.

This invention relates to engines driven by an elastic fluid, such as steam, and has especial reference to steam-turbines of the horizontal type.

The object of the invention is to facilitate the removal of the upper half of the casing without disturbing the piping in order to give ready access to the packing and other internal parts.

Furthermore, it aims to locate the valve-gear in a position where it will not be exposed to dirt or injury and yet will be entirely accessible.

Incidentally it strives to produce a design which gives a neat and attractive appearance.

To this end the invention consists in a construction wherein the valve-gear is located in the lower part of a pillow-block, and the nozzles and nozzle-valves are arranged in the lower half of the turbine, the casing being divided in two on a horizontal line and the piping being connected with the lower half.

In the accompanying drawing, Figure 1 is a side elevation of a horizontal steam-turbine equipped with our improvements. Fig. 2 is an end elevation. Fig. 3 is a section of the oil-pump on a larger scale. Fig. 4 is an end view of said pump, partly in section; and Fig. 5 is a longitudinal vertical section on the line 5 5, Fig. 2.

The bed-plate 1 is preferably a hollow casting, and to it are fastened the pillow-blocks 2 3, in which is journaled the horizontal shaft 4. The bucket-wheels 5 are secured to said shaft and carry two or more rows of buckets 6, cooperating with one or more rows of intermediates 7. Steam is supplied to said buckets through nozzles 8, opening from a steam-chest 9, each valve being controlled by its valve 10. The bucket-wheels

are inclosed in a casing 11, which is composed of two parts meeting on a preferably horizontal diametrical plane. The casing is preferably cylindrical, or substantially so, and has suitable heads 12. Suitable packing surrounds the shaft at the point where it passes through said heads. The steam-chest 9 is preferably integral with one head, being located in the lower half thereof below the shaft. The steam-main 13 connects with the upper part of said steam-chest and is controlled by a throttle-valve 14, which can be opened and closed either by a hand-wheel 15 or automatically, as by release and fall of weight 15'. The low position of the steam-main brings this hand-wheel within easy reach of the engineer. The valve is preferably provided with an emergency mechanism of some approved type for closing it automatically—as, for example, by releasing the aforesaid weight 15' in case the engine attains an excessive speed. This mechanism may conveniently be mounted on a standard 16, rising from the casing of the throttle-valve. The connection 17 for the exhaust-steam is cast in the lower half of the casing 11.

The stems 18 of the nozzle-valves 10 open through stuffing-boxes 19 in the cover 20 of the steam-chest and extend across the space between said chest and the pillow-block 3, into the lower part of which they enter. Suitable mechanism for operating the valve-stems is housed in the hollow pillow-block below the shaft-bearing. In the drawings we have indicated mechanism similar to that shown in the pending application of John G. Callan, Serial No. 276,665, comprising a transverse shaft 21, carrying eccentrics 22, each of which operates a hook-bar or dog 23, adapted to engage with a slide 24, connected with a valve-stem. By means of this mechanism, (which is not fully shown, as its details form no part of the present invention,) the nozzle-valves are opened and closed intermittently, admitting the steam to the buckets or cutting it off from them, the number of valves in operation at any given time being determined by a speed-responsive device 25, mounted on the end of the shaft and

connected with the valve-controlling mechanism by a rod 26, lever 27, link 28, and crank 29. There is ample room inside the pillow-block for a valve-gear of the type here
 5 used, and at the same time the arrangement utilizes for the gear space already necessarily used by the pillow-block. The gear is entirely unobtrusive and is securely protected from dust and dirt and mechanical injury. It is
 10 easy of access for oiling and in operation and repair through openings in the front and sides of the pillow-block closed by the cover 30 and doors 31.

Lubricant is supplied to the bearings of the
 15 machine by an oil-pump mounted on the pillow-block and comprising two geared rotary elements 32 33, driven by the shaft 21 and delivering oil or other lubricant through a conduit, which is provided with a relief or by-
 20 pass valve 34, loaded with a spring 35, which can be adjusted from outside the casing by a stem 36.

At some suitable point on the casing we locate a stage-valve 37. In case the second-
 25 stage nozzles are located in the upper half of the shell this entails placing the stage-valve in this half also, as illustrated in the drawings, though it is evident that if the second-stage nozzles are arranged in the lower half the
 30 stage-valve will be correspondingly shifted. When placed in the upper half, a small pipe 38 will be run to it, and this necessitates making said pipe in two lengths, coupled by a union 39 at about the height of the split in
 35 the shell, so that said pipe may be readily broken when the upper half of the shell is to be removed. It will be noted that this is the only steam connection that has to be disturbed when the shell is to be opened. The
 40 invention therefore provides for the ready inspection of the parts by the easy removal of the upper half of the shell, protects the valve-gear from dirt and injury by housing it in the otherwise useless space inside the pillow-
 45 block, brings said gear and the throttle-valve down within convenient reach of the operator, and enhances the attractive appearance of the machine.

In accordance with the provisions of the
 50 patent statutes we have described the principle of operation of our invention, together with the apparatus which we now consider to represent the best embodiment thereof; but we desire to have it understood that the ap-
 55 paratus shown is only illustrative and that the invention can be carried out by other means.

What we claim as new, and desire to secure by Letters Patent of the United States, is—
 60 1. An elastic-fluid turbine of the horizontal type, having a casing for the bucket-

wheels divided in two on the plane of the shaft, a steam-chest at one end of the lower part of said casing, nozzles leading from said chest into said casing, and valves in said
 65 chest controlling said nozzles.

2. An elastic-fluid turbine of the horizontal type, having a casing for the bucket-wheels divided in two on the plane of the shaft, nozzles and nozzle-valves at one end of
 70 said casing in the lower part thereof, and an exhaust-pipe leading from the same part of said casing near its other end.

3. An elastic-fluid turbine, comprising a bed-plate, pillow-blocks secured thereto, a
 75 shaft journaled in said pillow-blocks, bucket-wheels on said shaft, a casing secured to said bed-plate between said pillow-blocks and surrounding said bucket-wheels, said casing being divided in half on the plane of the
 80 shaft, and one half only having a steam-chest and exhaust-pipe connected therewith.

4. An elastic-fluid turbine, comprising a bed-plate, pillow-blocks secured thereto, a
 85 shaft journaled in said pillow-blocks, bucket-wheels on said shaft, a casing secured to said bed-plate between said pillow-blocks, and surrounding said bucket-wheels, said casing being divided in half on the plane of the shaft, steam admission and exhaust connec-
 90 tions entering one half of said casing, a stage-valve connected to the other half, and a small pipe for supplying steam to said stage-valve having a coupling to enable it to be disconnected to permit the removal of that
 95 half of the casing carrying the stage-valve.

5. An elastic-fluid turbine of the horizontal type, having its valve-operating mechanism housed in one of its pillow-blocks.

6. An elastic-fluid turbine of the horizontal
 100 type, having a casing for the bucket-wheels located between the pillow-blocks, valves having stems extending from said casing to one of said pillow-blocks, and valve-operating mechanism inclosed in said pillow-
 105 block.

7. In an elastic-fluid turbine of the horizontal type, the combination with a hollow pillow-block having openings in its walls, of valve-operating mechanism inclosed in said
 110 pillow-block, and valve-stems entering said pillow-block.

8. In an elastic-fluid turbine of the horizontal type, the combination with a hollow pillow-block, of valve-operating mechanism
 115 housed therein, a shaft journaled in said pillow-block, and a speed-responsive device mounted on said shaft and controlling said mechanism.

9. An elastic-fluid turbine of the horizontal
 120 type, having its steam connections and nozzle-valves below its main shaft, and its valve-

operating mechanism housed in a pillow-block underneath one of the journal-bearings of said shaft.

10. In an elastic-fluid turbine, the combination with a mechanically-operated valve-gear including a driven shaft, of a rotary lubricating-pump actuated by said shaft.

11. In an elastic-fluid turbine of the horizontal type, the combination with a pillow-block, of a mechanical valve-operating gear

housed therein and comprising a transverse shaft, and a rotary oil-pump adjacent to said pillow-block and connected with said shaft.

In witness whereof we have hereunto set our hands this 15th day of August, 1906.

JOHN G. CALLAN.

HENRY J. HANZLIK.

Witnesses:

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