

No. 726,568.

PATENTED APR. 28, 1903.

F. R. PLEASONTON.

ROTARY VALVE.

APPLICATION FILED SEPT. 29, 1902.

NO MODEL.

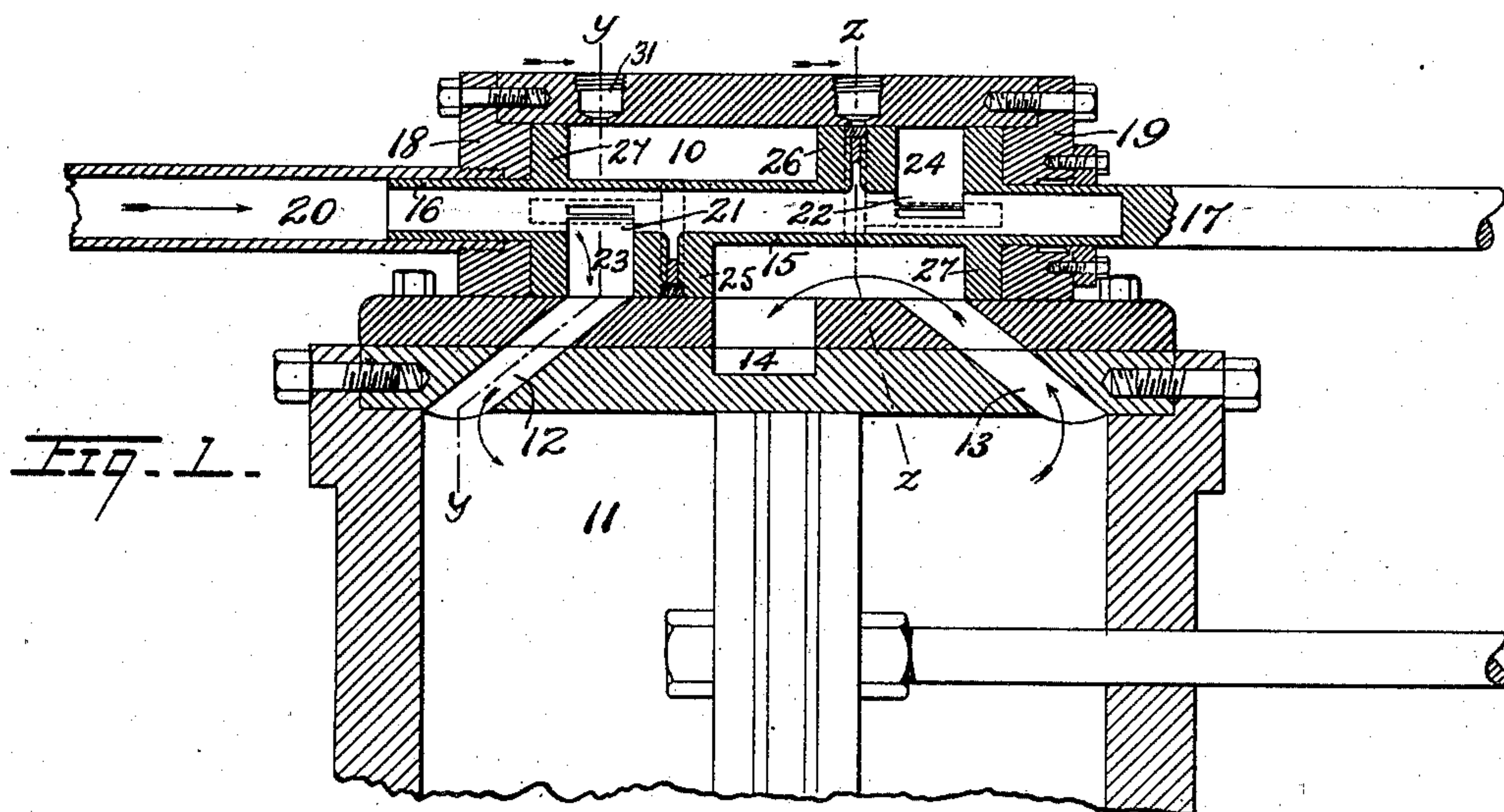


Fig. 1.

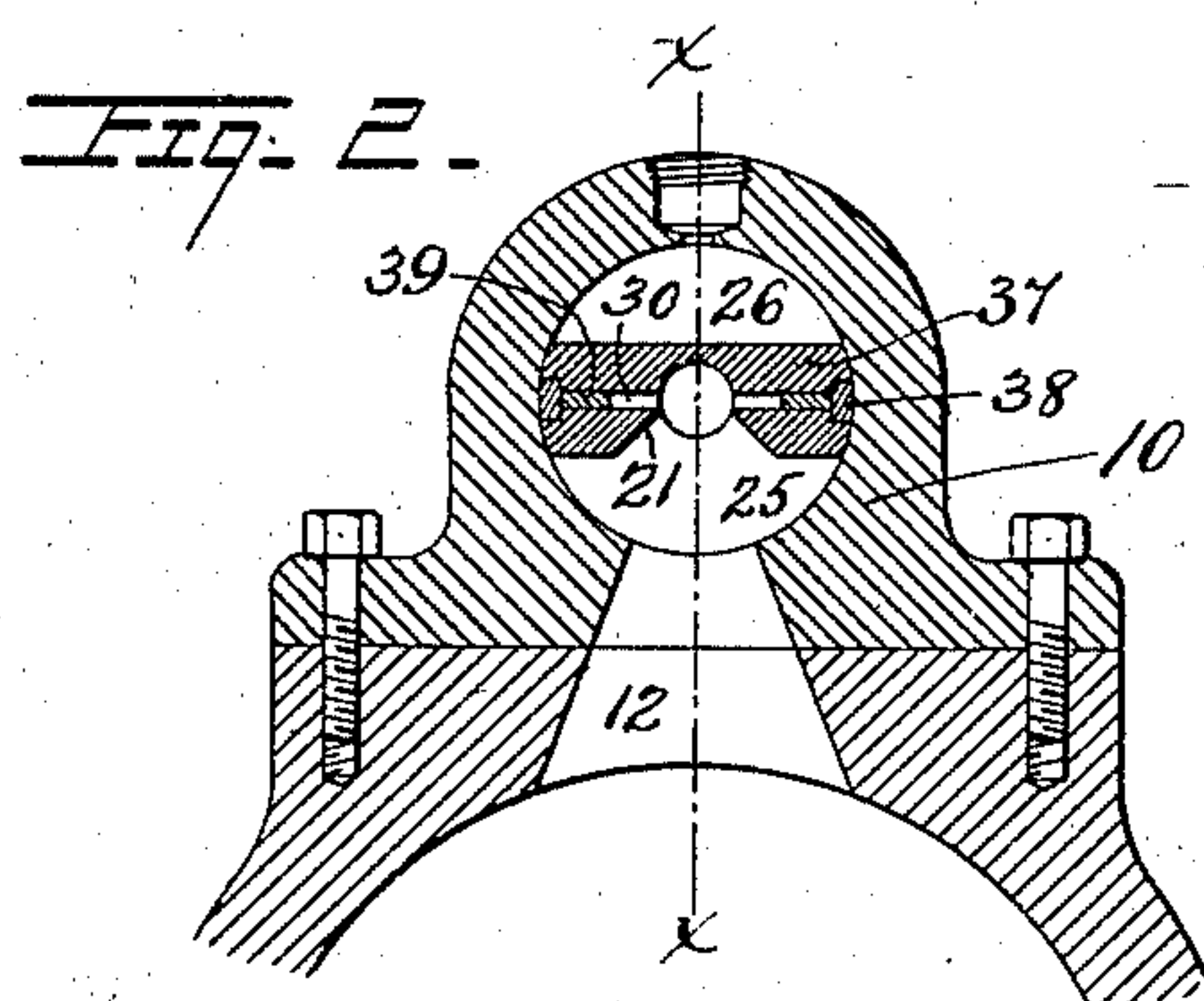


Fig. 2.

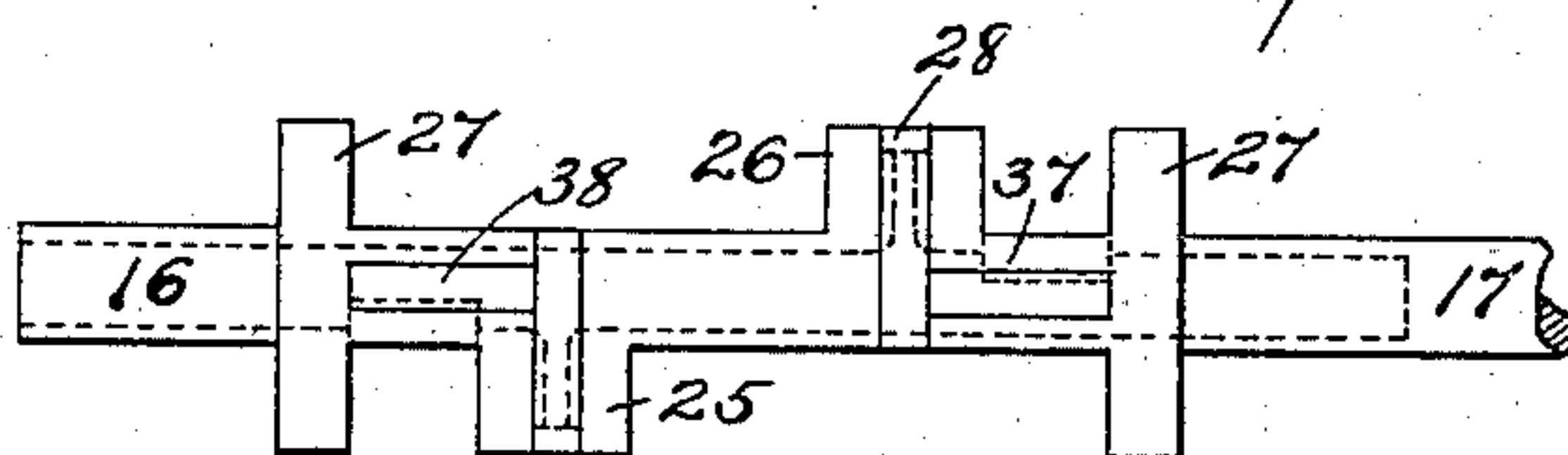


Fig. 3.

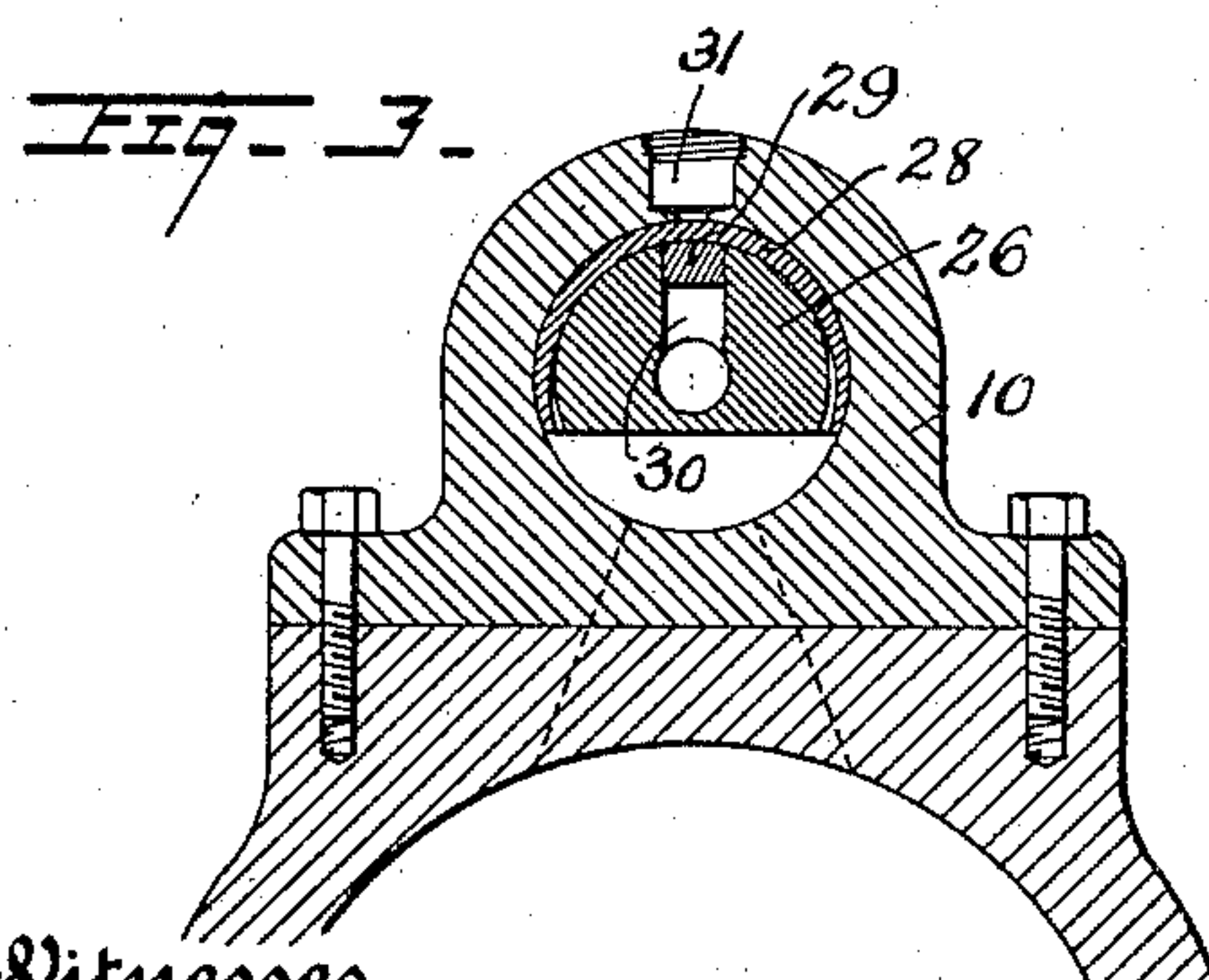


Fig. 4.

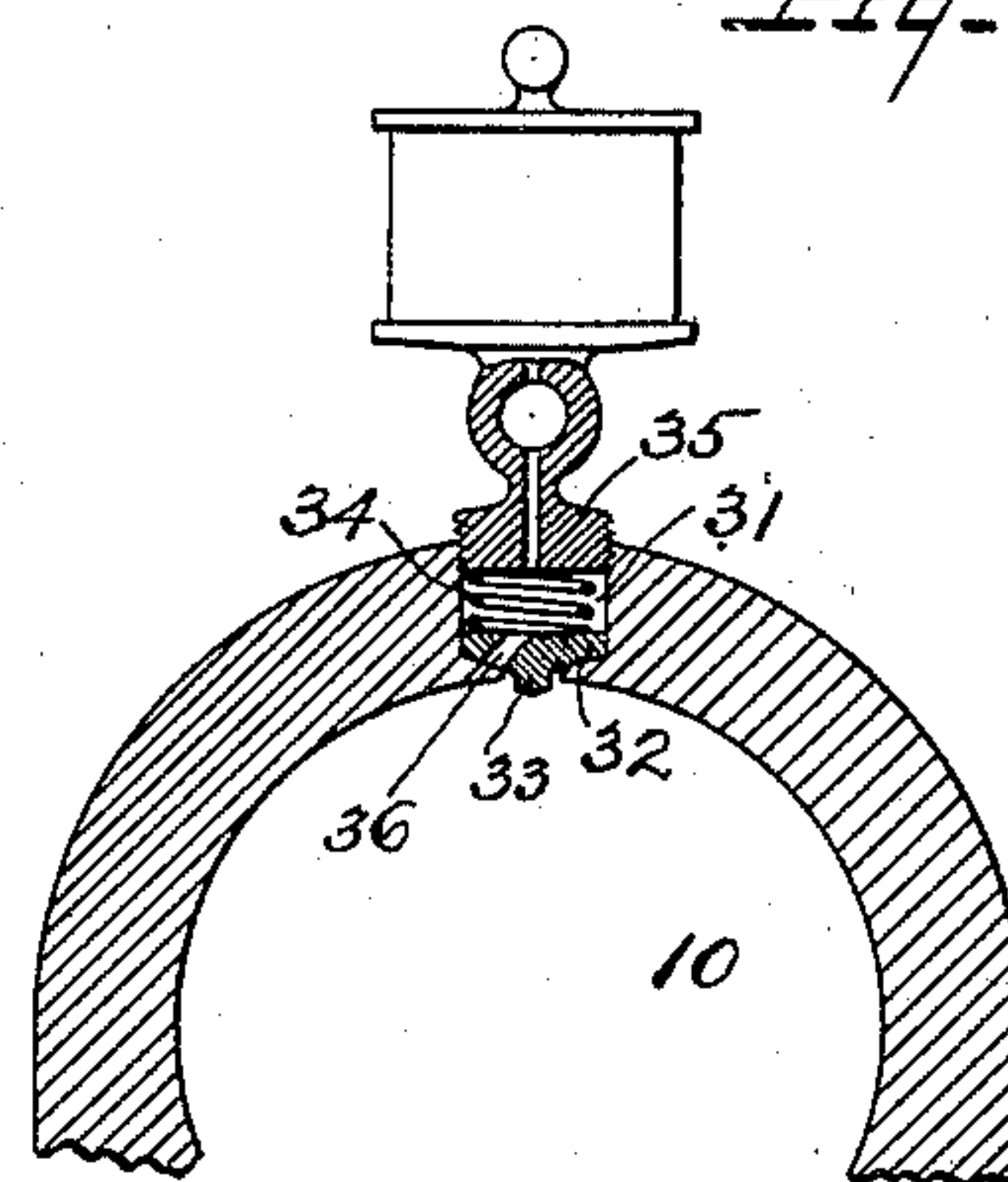


Fig. 5.

Witnesses  
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# UNITED STATES PATENT OFFICE.

FRANK RODNEY PLEASANTON, OF PHILADELPHIA, PENNSYLVANIA.

## ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 726,568, dated April 28, 1903.

Application filed September 29, 1902. Serial No. 125,250. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK RODNEY PLEASANTON, a citizen of the United States of America, and a resident of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Valves, of which the following is a specification.

My invention relates particularly to rotary engine-valves; and it consists in certain improvements therein designed to provide for more simply and satisfactorily controlling the admission and exhaust of the steam or an equivalent actuating medium to and from the cylinder and for such efficient packing and lubrication as will insure the satisfactory practical operation of the same.

The invention is fully described in connection with the accompanying drawings, and the novel features are specifically pointed out in the claims.

Figure 1 is a longitudinal sectional view taken on the line  $xx$  of Fig. 2, showing a portion of a steam-engine cylinder with my improved rotary valve applied thereto. Fig. 2 is a cross-sectional elevation taken on the line  $yy$  of Fig. 1. Fig. 3 is a cross-sectional elevation taken on the line  $zz$  of Fig. 1. Fig. 4 is an enlarged view of the automatic lubricating device. Fig. 5 is a separate view of the rotary valve.

The valve-casing, or "steam-chest," as it may be termed, (indicated by the reference-numeral 10,) is of cylindrical form to receive the rotary valve and is preferably bolted, as shown, to a separately-formed cylinder 11, having the usual end ports 12 and 13 and an intermediate exhaust-port 14, all of which ports communicate with the cylindrical chamber of the casing 10 through corresponding openings in the wall of the latter. Within the cylindrical casing is located my improved rotary valve, which is constructed, as shown, with an axial stem or shaft 15, the opposite ends 16 and 17 of which project through the front and rear heads 18 and 19, respectively, of the casing and which is hollow throughout the portion within the casing and the projecting forward end 16, as shown, to communicate with a fixed steam-supply pipe 20. Exit-ports 21 and 22 from this hollow stem open laterally in opposite directions within

the casing in the planes of the cylinder-ports 12 and 13, respectively. These exit-ports from the hollow stem of the valve constantly admit steam from the latter into end chambers 23 and 24, respectively, forming part of the cylindrical space of the casing. These chambers are bounded by the wall of the casing and by enlargements 25 26 of the valve-stem located adjacent to said exits and rotatably fitted to the cylindrical casing, as shown. These enlargements of the valve-stem to form the chambers 23 and 24 each comprise a semicylindrical portion 25 or 26 and a united partition portion 37, extending axially at right angles thereto, the head of the casing, or, preferably, a circular collar 27 on the valve-stem, also rotatably fitting the wall of the casing, forming the end closure of each chamber. The central portion of the valve-stem intermediate of these enlargements 25 26 is of considerably smaller diameter than the bore of the casing, so as to permit communication between the exhausting cylinder-port and the exhaust-port, as indicated in Fig. 1.

The operation of the valve as described is as follows: In the position indicated in Fig. 1 the steam admitted to the hollow valve-stem discharges therefrom through both the exit-ports 21 and 22 into the chambers 23 and 24. The chamber 23, as shown, is thrown into communication with the cylinder-port 12, thus admitting steam to that end of the cylinder, while the opposite end exhausts through ports 13 and 14. The other chamber 24 in the position shown is cut off from all outlet for the steam therein until the valve is turned, by rotation of the stem 17 through any convenient operating mechanism, to a position corresponding with that of the chamber 23, already referred to, when the admission to and exhaust from the cylinder are reversed. The degree of cut-off for the expansion is determined by the amount of lap provided over the cylinder-ports by the partition enlargement 37 of the valve.

In order to prevent leakage from the chambers 23 and 24, I provide each of the valve-stem enlargements 25 37, forming the movable walls of said chambers, with packing-strips 28 and 38, fitting corresponding peripheral grooves therein and arranged to be pref-



erably pressed outward against the wall of the valve-casing during the operation of the engine by the pressure of the steam in the hollow stem of the valve. These packing-strips 28 and 38, lying in planes at right angles to each other, are respectively semicircular and approximately flat, as shown, but are each provided with similar plunger-bosses 29 39, fitting a radial opening 30, extending into the bore of the hollow valve-stem. The area of this opening or openings is adapted to provide sufficient pressure upon the plunger-bosses, varying automatically with the pressure of the steam employed, to insure proper contact of the packing-strip with the wall of the casing, thereby securing at all times the desired steam-tight fit without incurring the expense and uncertainty involved in the use of springs.

To provide for the efficient and economical lubrication of the rotating valve, I employ an intermediate feed device located in an opening 31 through the wall of the casing and adapted to be operated automatically by the passage of the rotating valve-stem enlargement 25 37. A lift-valve 33, Fig. 4, is loosely fitted in the opening 31 with a conical seat therein and a central projection 33 normally extending slightly through said opening 31 into the valve-casing, and said valve is normally pressed to its seat by a spring 34, which is backed by a perforated plug 35, screw-threaded into said opening and carrying a suitable oil-cup, by means of which the lubricant is properly supplied to the space above the lift-valve 32. As the rotary valve rotates within the casing the enlargement 25 37 comes in contact with the projection 33 and raises the valve 32, permitting the lubricant to fall through a perforation or perforations 36 therein, as shown, upon the periphery of the rotating valve until the enlarged portion thereof has passed the projection, when the valve 32 is automatically closed by the spring 34, thus intermittently lubricating the wearing-surface of the valve without allowing any wastage of the lubricant.

My improved valve combines with the simplicity of operation incident to the continuous rotary motion and the capacity for satisfactorily controlling the admission and exhaust of steam or other operating medium, as desired, great simplicity and economy of construction and provision for maintaining steam-tight fit and efficient lubrication requisite to its satisfactory operation in practical service.

The preferred construction specifically described may evidently be modified in matters of detail without departing from the spirit of my invention.

What I claim is—

1. The combination with a cylinder having ports at each end and a cylindrical valve-casing having communicating ports and an intermediate exhaust-port, of a rotary valve in said casing provided with a hollow stem having a steam-inlet thereto and opposite outlets therefrom into said casing adjacent to the respective ends of the latter, said stem having opposite semicylindrical enlargements with right-angular extensions thereof adjacent to said outlets and forming separated steam-chambers within the casing adapted to be alternately moved into communication with the adjacent cylinder-port substantially as set forth.

2. The combination with a cylindrical casing of a rotary valve therein having a hollow steam-inlet stem and an enlargement thereof to fit the wall of the casing, said enlarged portion being provided with a packing-strip mounted in a corresponding peripheral groove therein and said strip having a plunger-boss engaging a radial opening in said enlarged portion extending into communication with the bore of the stem substantially as set forth.

3. The combination with a cylindrical casing of a rotary valve therein having a stem portion formed with an enlargement thereof to fit the wall of the casing, and an automatic lubricating device comprising a spring-seated lift-valve located in a lubricating-opening through the wall of said casing and having a projection extending into the latter in the path of said enlarged portion of the rotary valve whereby the latter intermittently opens said lift-valve in passing the same substantially as set forth.

4. The combination with a cylinder having ports at each end and a cylindrical valve-casing having communicating ports and an intermediate exhaust-port, of a rotary valve in said casing provided with a hollow stem having a steam-inlet thereto and opposite outlets therefrom into said casing adjacent to the respective end of the latter, said stem having enlargements adjacent to said outlets forming separated steam-chambers within the casing adapted to be alternately moved into communication with the adjacent cylinder-port, and an automatic lubricating device comprising a spring-seated lift-valve located in a lubricating-opening and having a projection extending into said casing in the path of the enlarged portion of the rotary valve.

Signed at Philadelphia this 18th day of September, 1902.

FRANK RODNEY PLEASANTON.

Witnesses:

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