

No. 666,977.

Patented Jan. 29, 1901.

A. RICHTER.
VALVE MOTION FOR PUMPS.

(Application filed Nov. 13, 1900.)

(No Model.)

2 Sheets—Sheet 1.

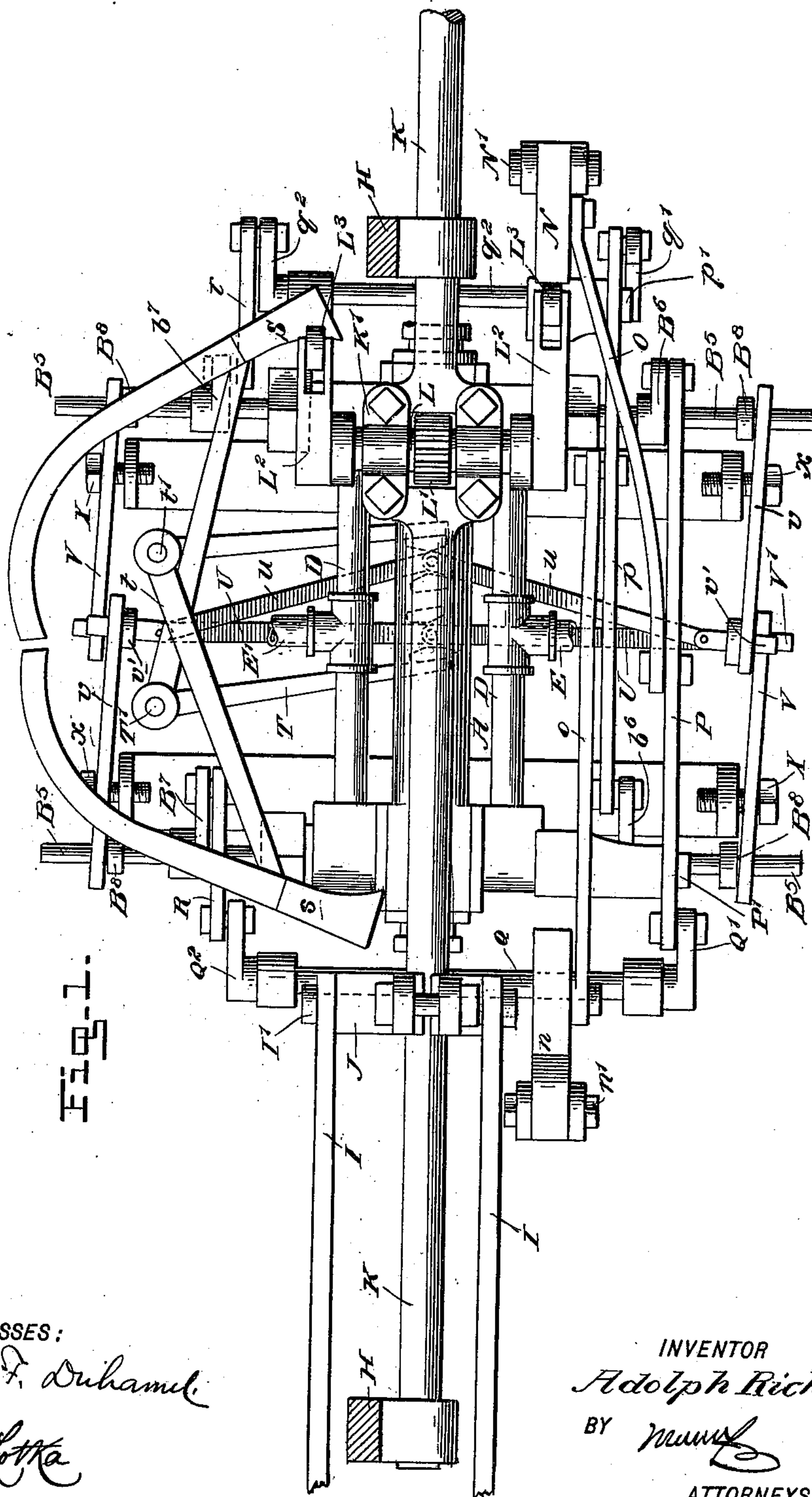


Fig. 1.

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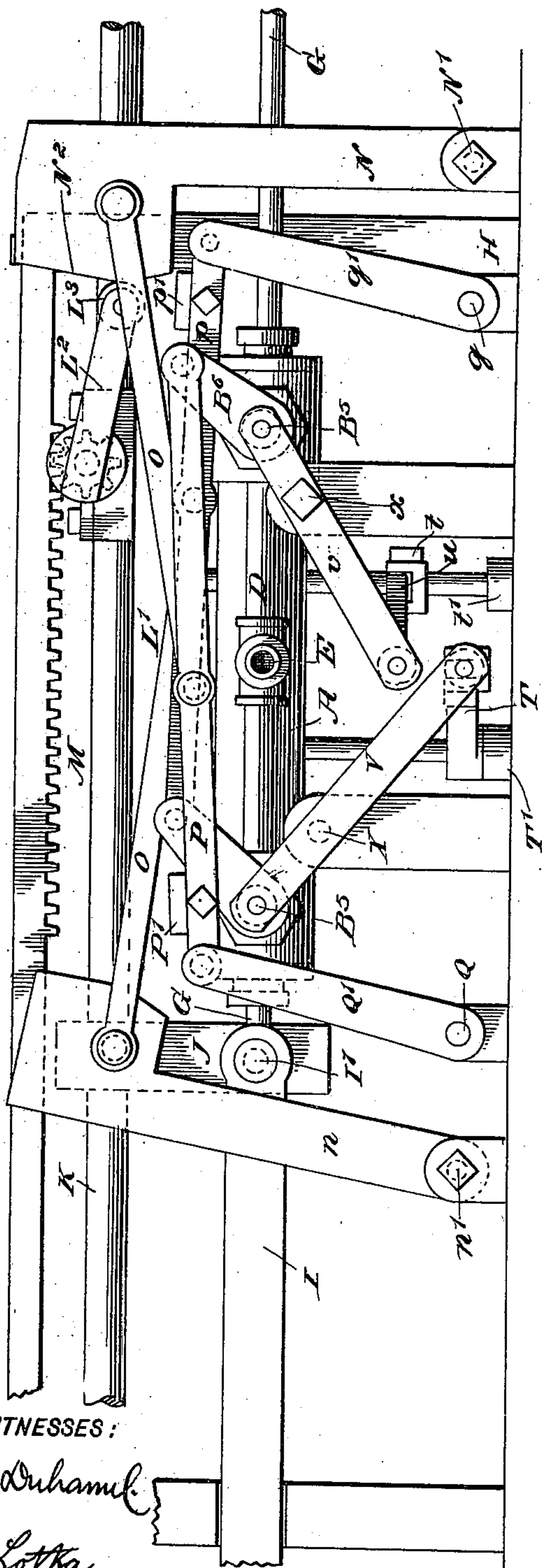
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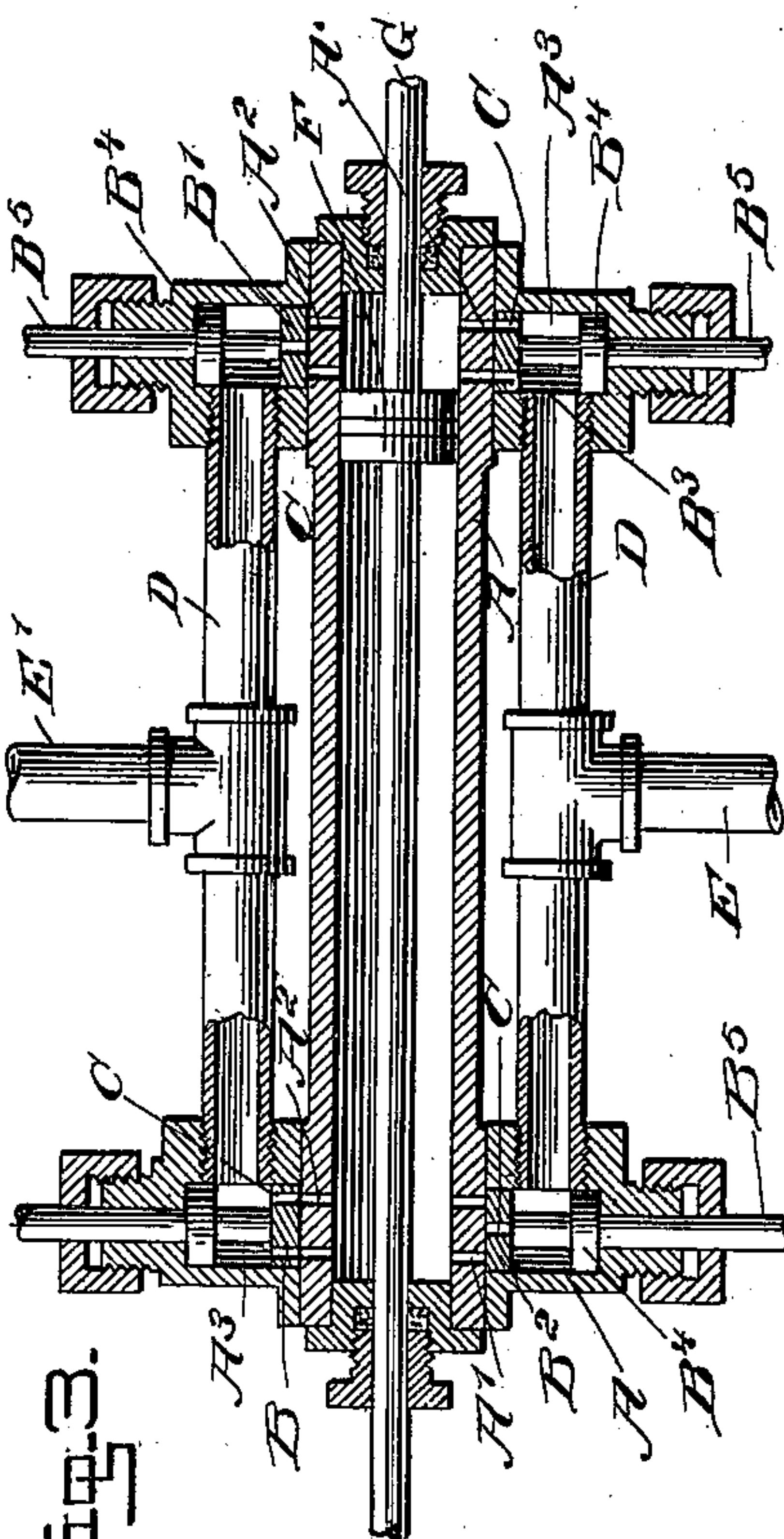
Fig. 2.



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Fig. 3.



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UNITED STATES PATENT OFFICE.

ADOLPH RICHTER, OF NEW YORK, N. Y.

VALVE-MOTION FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 666,977, dated January 29, 1901.

Application filed November 13, 1900. Serial No. 36,354. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH RICHTER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, county and State of New York, have invented a new and Improved Valve-Motion for Pumps, of which the following is a full, clear, and exact description.

My invention relates to pumps, and has for its object to enable a high pressure to be exerted with a pump having a relatively small cylinder.

To this end I provide means for periodically pressing the valves against their seats tightly and relieving the pressure temporarily to allow the position of the valves to be changed, as will be fully described hereinafter, and particularly pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan of a pump provided with my improvement. Fig. 2 is a front elevation thereof, and Fig. 3 is a sectional plan showing only the cylinder with its valves and suction and delivery connections.

The cylinder A has inlet-ports A' and outlet-ports A². These are adapted to be alternately opened and closed by valves B B' B² B³, mounted to turn or to oscillate, said valves having eccentric ports C, which in one position (see valves B B³) register with the respective ports A' A², while in the other position, as shown for valves B' B², the ports A' A² are closed. The valves are located in chambers A³, communicating by pipes D with the inlet or suction pipe E and the outlet or delivery pipe E'. The valves are capable of a very slight endwise play in the chambers A³, their outward movement being limited by collars B⁴ on rods B⁵, to which the valves are secured, and the play is just sufficient to allow the valves to turn readily when they are not pressed inward against their seats. Within the cylinder A moves the piston F, secured to the reciprocating piston-rod G, which is guided in the frame-posts H and is connected by a pin I' with connecting-rods I, receiving motion from an engine in any suitable manner. The pin I' also connects the piston-rod

G and the connecting-rods I with a cross-head J, the upper portion of which is secured to a reciprocating rod K, guided in the frame and carrying bearings K', in which is journaled a shaft L. The central portion of this shaft carries a pinion L', arranged in engagement with a stationary rack M. The ends of the shaft carry arms L², provided with rollers L³ at their ends. It will be understood that as this rod K reciprocates the arms L² will be swung first in one direction and then in the other. The arm L² on one side of the pump (the suction side, as shown) is adapted to operate the mechanism for turning the valves to change their position. This mechanism comprises a lever N, fulcrumed at N' and having a surface N², adapted to be engaged by a roller L³, as shown in Fig. 2. By a link O this arm is connected with a rod P, one end of which operates a crank-arm B⁶ on the rod B⁵ of the suction-valve B³ to turn said valve. The other end of the rod P is secured to a crank-arm Q' on a cross-shaft Q, extending to the other or delivery side of the pump and there carrying another crank-arm Q², connected by a rod R with a crank-arm B⁷ on the rod B⁵ of the delivery-valve B. The valves B B³ are therefore turned by the arm L² when it reaches its extreme position toward the right. When it moves toward the left, said arm is adapted to engage an arm n, fulcrumed at n', connected with the suction-valve B² and the delivery-valve B', having crank-arms b⁶ and b⁷, respectively, in the same manner as described with reference to the other valves, as will be obvious from the similar reference-letters indicating corresponding parts.

Each of the rods P and p carries adjacent to the levers or arms Q' and q', respectively, a block P' or p', against which the roller L³ is adapted to abut after engaging the adjacent lever n or N, respectively, to change the position first of the valves operated by the lever n or N and immediately thereafter that of the valves connected with the lever or arm Q' or q'.

The mechanism for pressing the valves tightly against their seats and for relieving the pressure is operated by the arm L² on the delivery side of the pump and is constructed as follows: Into the path of the arm L², at the right-hand side, extends an operating-bar S, se-

cured rigidly to an elbow-lever T, fulcrumed at T'. The other arm of the elbow-lever engages toggle-links U, pivotally connected therewith and connected at their free ends with studs V', secured to spring-arms V, which are supported adjustably by screws X and engage collars B⁸ upon the rods B⁵ of the valves B' and B². On the left-hand side the same mechanism is duplicated, its parts being designated by similar letters. The valves B and B³ are operatively connected with the arms v. The ends of the operating bars S are adapted to engage each other. The spring-arms V v when forced outward by the toggle-links U u press the valves tightly against their seats. When the links U u are moved to form an angle, they allow the arms V v to relax, so as to relieve the valves of pressure.

It will be seen by reference to Fig. 1 that the arms L² on the same shaft are not parallel, but form an angle with each other.

In operation the parts are so timed that the pressure on the valves is relieved before they are turned, and after they have been turned they are pressed against their seats tightly, thus allowing high pressures to be obtained without danger of leakage. The arms V v by their engagement cause the valves B B³ to be tightened at about the same time the valves B' B² are freed, and vice versa. The screws X afford a means of varying the tension of the spring-arms V v.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a pump, the combination with the pump casing or barrel, and the movable fluid-propelling member, of valves mounted to turn and controlling the inlet and the outlet of the pump-casing respectively, means for turning said valves about their axes, a holding device for pressing the valves axially against their seats when the valves are stationary, and means for throwing said holding device momentarily out of action when the valves are to be turned.

2. In a pump, the combination, with the

pump casing or barrel, and the movable fluid-propelling member, of valves controlling the inlet and the outlet of the pump-casing respectively, means for moving said valves, and a locking or holding device for pressing the valves tightly against their seats when the valves are stationary, said device consisting of spring-arms arranged to press the valves axially, toggle-levers connected with said arms, and means for operating the toggle-levers.

3. In a pump, the combination, with the pump casing or barrel, and the movable fluid-propelling member, of valves controlling the inlet and the outlet of the pump-casing respectively, means for moving said valves, a slide held to move in unison with the fluid-propelling member, a shaft journaled in said slide, and provided with a projection, means for turning the shaft by the reciprocating movement of the slide, and a device for pressing the valves tightly against their seats, said device being adapted for operation by the projection on the said shaft.

4. In a pump, the combination, with the pump casing or barrel, and the movable fluid-propelling member, of valves controlling the inlet and the outlet of the pump-casing respectively, means for moving said valves, a slide held to move in unison with the fluid-propelling member, a shaft journaled in said slide, and provided with a projection, means for turning the shaft by the reciprocating movement of the slide, levers adapted to engage one another and extending into the path of said projection to be operated thereby, toggle-levers connected with said levers, and a pressure device connected with the toggle-levers for pressing the valves against their seats.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ADOLPH RICHTER.

Witnesses:

JOHN LOTKA,

EVERARD BOLTON MARSHALL.