

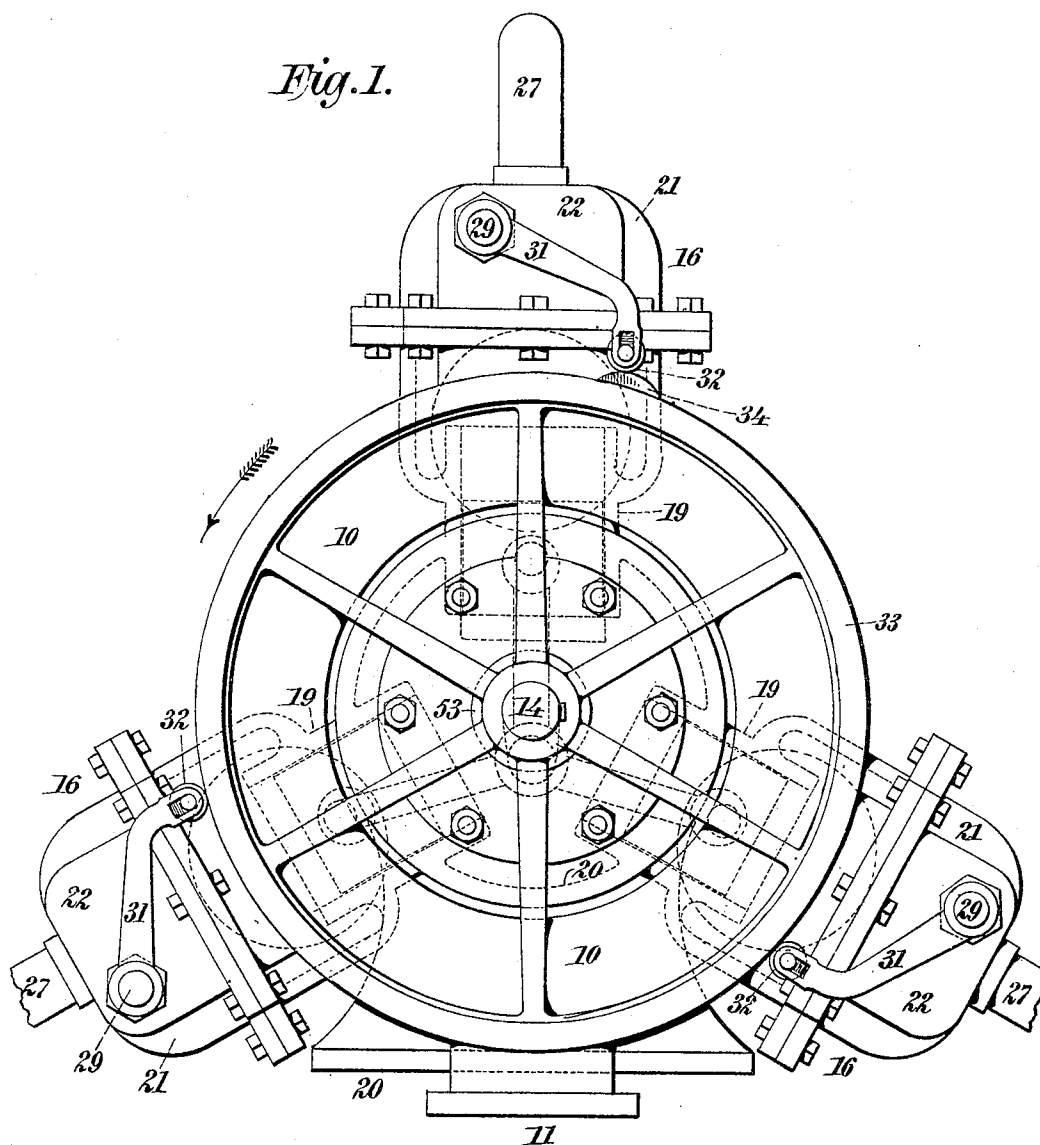
No. 800,738.

PATENTED OCT. 3, 1905.

J. A. GROSHON.
PUMP.

APPLICATION FILED FEB. 15, 1904.

4 SHEETS—SHEET 1.



WITNESSES:

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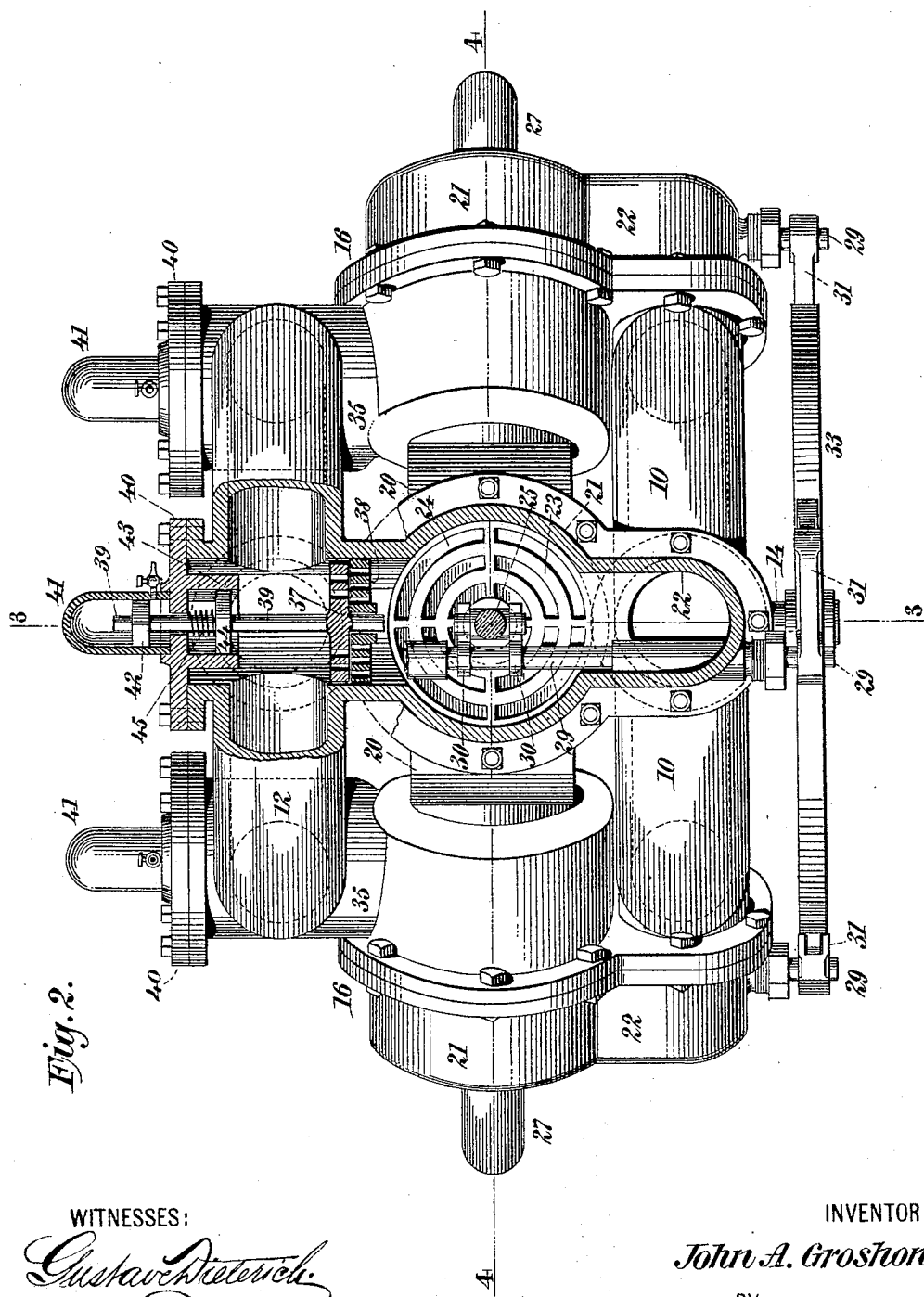
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4 SHEETS—SHEET 2.



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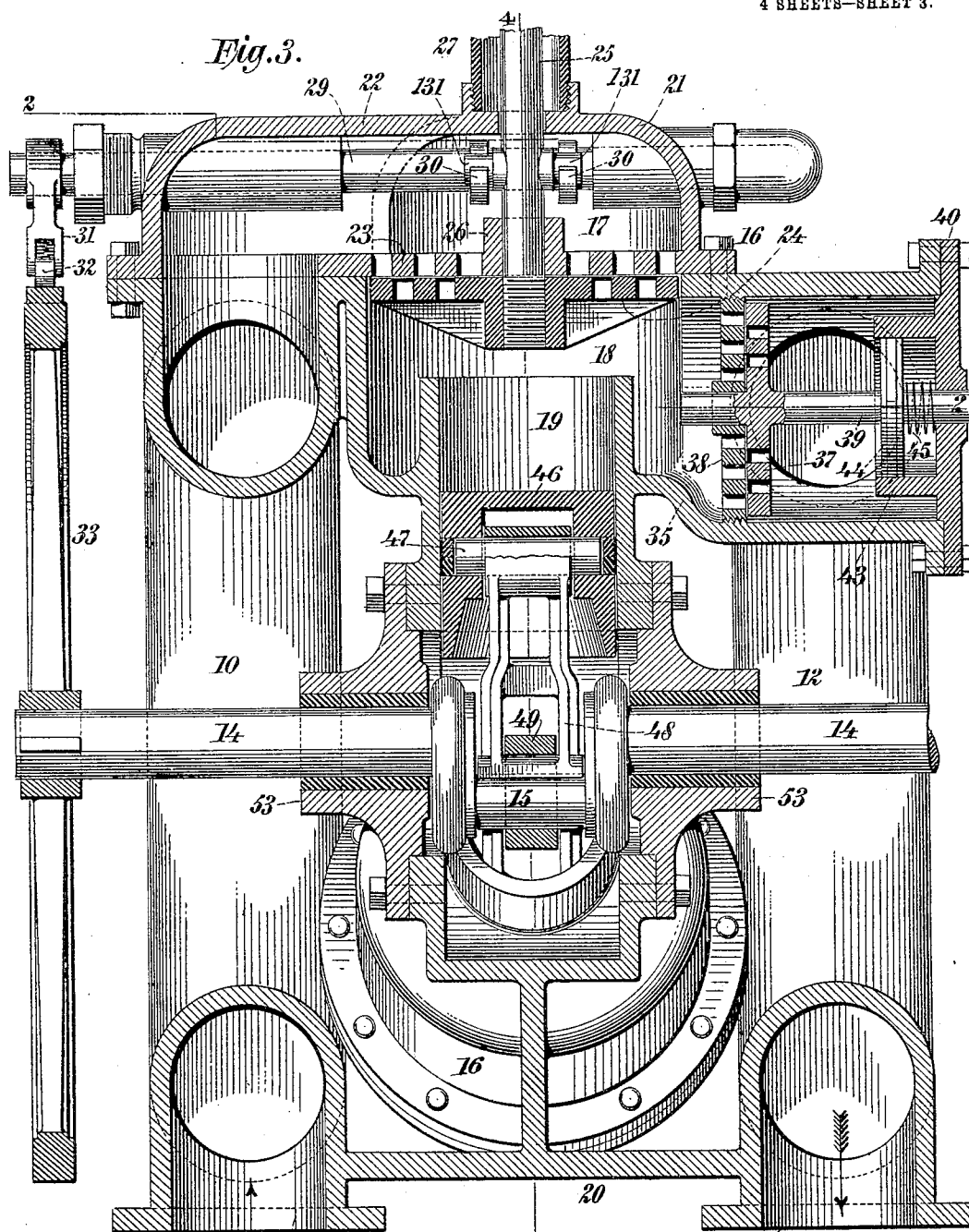
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4 SHEETS—SHEET 3.



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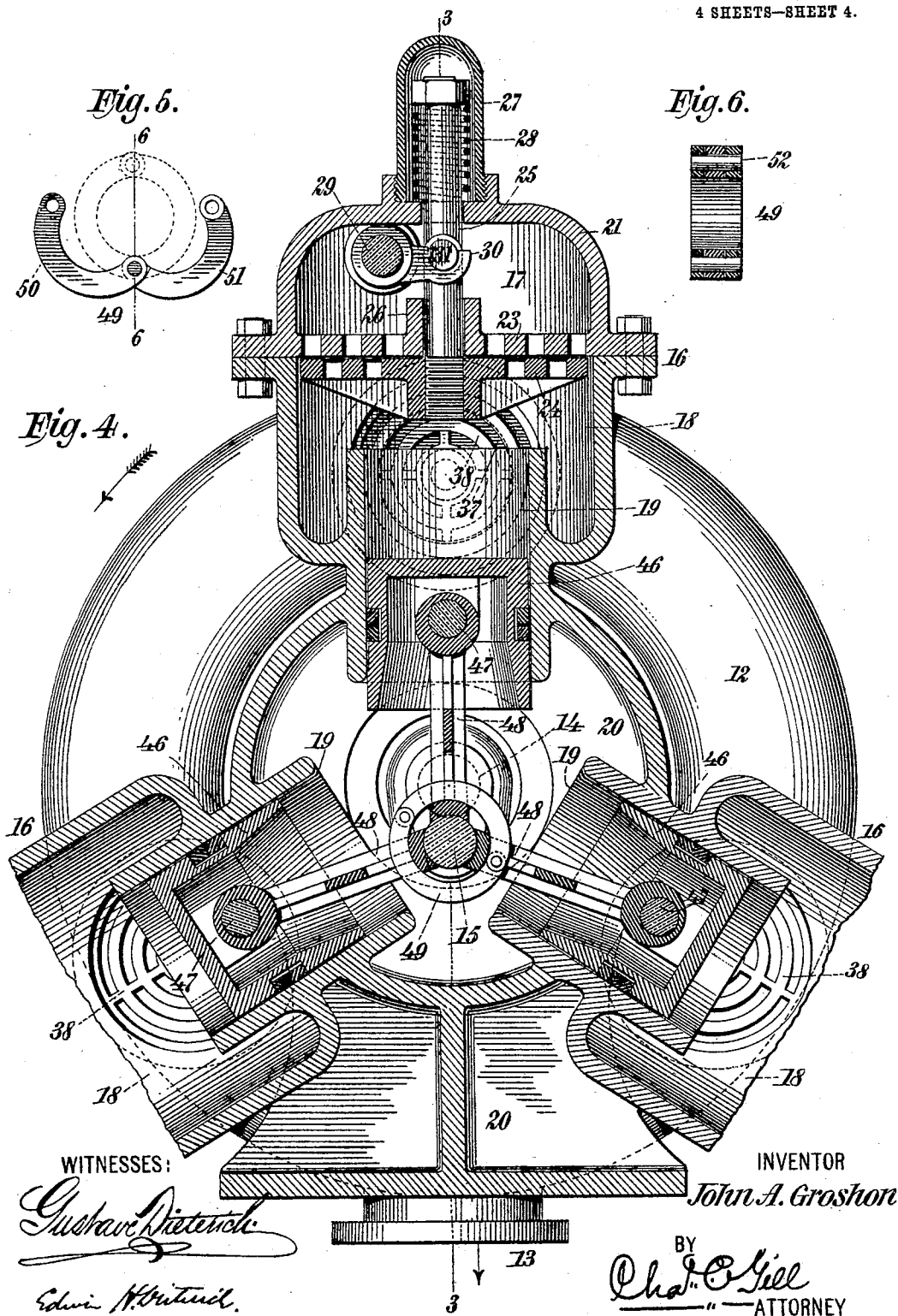
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4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

JOHN A. GROSHON, OF NEW YORK, N. Y.

PUMP.

No. 800,738.

Specification of Letters Patent.

Patented Oct. 3, 1905.

Application filed February 15, 1904. Serial No. 193,539.

To all whom it may concern:

Be it known that I, JOHN A. GROSHON, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The invention relates to improvements in pumps; and it consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

The object of the invention is to produce a simple pump of great efficiency and having several cylinders and pistons or plungers intermediate the supply and discharge pipes, said pistons or plungers being operated from one crank.

The pump of my invention comprises in the preferred construction a circular supply-pipe, a circular delivery-pipe arranged parallel with said supply-pipe, a series of three radially-disposed casings forming water-chambers, and cylinders intermediate said circular supply and delivery pipes and independently connected with both thereof, so as to take the water from said supply-pipe and force it into said delivery-pipe, pistons within said radial cylinders, a shaft having a single crank for driving said pistons and connected therewith by means of rods pivotally secured to said crank and pistons, and mechanically-operated valves controlling the water-passages.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a pump constructed in accordance with and embodying my invention. Fig. 2 is a top view, partly broken away and partly in section, on the dotted line 2 2 of Fig. 3 of same. Fig. 3 is a central vertical longitudinal section of same on the dotted line 3 3 of Figs. 2 and 4. Fig. 4 is a central vertical transverse section of same on the dotted line 4 4 of Fig. 3. Fig. 5 is a side elevation of a locking-band employed for fastening the outer ends of the piston-rods to the driving-crank, the dotted lines showing said band in its closed position; and Fig. 6 is a sectional view of the locking-band when the latter is in closed position.

In the drawings, 10 designates the circularly-arranged water-supply pipe, having the inlet 11; 12, the circularly-disposed delivery-pipe, having the outlet 13; 14, the driving or

pump shaft, having a crank 15 intermediate said pipes 10 12, and 16 the casings intermediate said pipes 10 and 12 and radially disposed with respect to said shaft and each comprising an outer water-chamber 17, an inner water-chamber 18, and a cylinder 19, those portions of the casings 16 forming the chambers 18 and cylinders 19 being preferably in one integral casting with the main body of the pipes 10 and 12 and a central and lower framework 20. The chambers 17 are formed by caps 21 at the outer ends of the casings 16, and these caps 21 are integral with or have lateral extensions 22, which form branch pipes connected with the supply-pipe 10 and establishing a permanent communication between said pipe 10 and the outer water-chambers 17.

At the inner ends of the outer water-chambers 17 are gratings 23 for coöperation with valves 24, carried within the outer ends of the inner water-chambers 18, the valves 24 having slots to register with the solid bars of the gratings 23, so as to close off communication between the chambers 17 18 when said valves are against said gratings. The slots in the gratings 23 and valves 24 are provided to freely admit water from the chambers 17 to the chambers 18 when said valves are away from said gratings. The valves 24 are carried on the inner ends of valve-rods 25, which pass outwardly freely through guiding-sleeves 26 at the center of the gratings 23 and thence through the caps 21 and into domes 27, wherein cushioning-springs 28, Fig. 4, encompass said rods 25, intermediate heads on the outer ends of the latter, and the outer ends of said caps. The valves 24 have a direct reciprocating movement toward and from the gratings 23, said valves leaving said gratings automatically at the proper time to permit the flow of water from the chambers 17 to the chambers 18 and cylinders 19 and being positively returned to said gratings by mechanical means when in the manner hereinafter described the water is to be discharged or forced from the chambers 18 and cylinders 19 into the discharge-pipe 12. The means presented for closing the valves 24 comprise for each valve a rock-shaft 29, extending through the branch pipe 22 and cap 21 and carrying within the chamber 17 a pair of recessed arms 30, forming a saddle for lateral pins 131, connected with the rod 25, said rock-shaft at its outer end being provided with a crank-arm 31, carrying at its outer end a spring-pressed roller

32 normally in close relation to the periphery of a wheel 33, carried by the shaft 14, as shown in Fig. 1. The wheel 33 has a plain periphery, except at one point, where it is provided with the cam projection 34, which during the rotation of said wheel will ride against the rollers 32 of the crank-arms 31 and in doing so operate through said arms to turn the rock-shafts 29 one after another in a direction to effect, through the arms 30 and pins 131, the closing of the valves 24 against the gratings 23, this occurring with respect to each valve 24 at the time the water is to be discharged from the chamber 18 and cylinder 19 into the pipe 12. After the cam projection 34 leaves any one of the crank-arms 31 such arm will, due to the opening of its valve 24 and the consequent reverse movement of its rock-shaft 29, return to its normal position with respect to the periphery of the wheel 33. The engagement of the arms 31 with the periphery of the wheels 33 limits the movement of the valves 24 from the gratings 23 and steadily maintains the valves 24 in their open position until such time as they should, one after another, be closed, their closing movement being, as above explained, effected by the passage of the cam projection 34 against said arms 31 or a part connected with them.

The delivery-pipe 12 is connected by branch pipes 35 with the water-chambers 18, and the communication through these pipes 35 is controlled by slotted valves 37 and stationary gratings 38, the solid portions of the valves closing the slots through said gratings when the valves are against the latter. The valves 37 are carried by rods 39, which are guided at their inner ends within sleeves at the center of the gratings 38, and at their outer portions pass through heads 40 and enter casings 41, which form dash-pots, said rods 39, within said casings 41, being provided with pistons 42. The heads 40 at their inner sides are formed with short cylinders 43, which receive and co-operate with balancing-pistons 44 on the valve-rods 39, there preferably being between the pistons 44 and heads 40 suitable cushioning-springs 45, which may also act to assist the valves 37 on their return movement toward the gratings 39.

The cylinders 19 extend inwardly and outwardly from the inner ends of the water-chambers 18, and within these cylinders are suitable pistons or plungers 46, to which are pivotally secured on pins 47 the outer ends of the piston-rods 48, whose inner ends are pivotally secured to the crank 15 by means of a locking-band 49, the inner ends of the rods 48 being concaved to fit against the exterior surface of the crank 15 and being in the form of bars or shoes around which the band 49 is clasped. The band 49 is shown in detail in Figs. 5 and 6 and is composed of two hinged sections 50 51, which may be fastened together at their

free ends by a pin 52, Fig. 6. The rods 48 are all of the same length and are all operated from the one crank 15 during the rotation of the shaft 14, and said rods impart movement to the pistons or plungers 46.

At opposite ends of the crank portion of the shaft 14 the latter is mounted in bearings 53, Fig. 3, bolted to a portion of the casting connected with the cylinders 19, as shown.

In the operation of the pump the shaft 14 will be driven by any suitable power and will, through the crank 15 and rods 48, impart the requisite movements to the pistons or plungers 46, the latter all being simultaneously actuated and operating to first draw the water from the supply-pipe 10 into the chambers 18 and cylinders 19 and then to expel the water from said chambers and cylinders into the delivery-pipe 12, the water being drawn from the pipe 10 during the inward movement of said pistons and forced into said pipe 12 during the outward movement of said pistons. Since all the rods 48 are connected with the one crank 15, the pistons 46 will not all move either outward or inward at one time, but all will be in active operation and at different stages of action, which is a result desired, and this feature will be readily understood upon reference to Fig. 4, which shows the upper piston 46 in its extreme inward position and ready to be moved outwardly, the right-hand piston 46 as moving outwardly, and the left-hand piston as moving inwardly. Upon the inward movement of any piston 46 its coöperating valve 24 leaves its seat or grating 23, and the water from the pipe 10, branch 22, and chamber 17 will enter the chamber 18 and cylinder 19 for said piston, the coöperating exit-valve 37 then being closed, and upon the outward movement of the piston its coöperating valve 24 will be closed by the engagement of the cam projection 34 on the wheel 33 with the crank-arm 31 for said valve, and said piston moving against the confined body of water will drive the same against the said valve 37 and into the pipe 12, said valve 37 opening outwardly under the pressure of the water and automatically closing thereafter and remaining closed during the succeeding inward movement of the piston. The valves 24 are in succession closed mechanically by the wheel 33, arms 31, and connections intermediate said arms and said valves, and in the condition of the parts shown in Fig. 4 the valve 24 for the lower right-hand pump-chamber was closed at the time the piston or plunger for said chamber reached its inner position and the valve 24 for the upper pump-chamber has just been closed, while the valve 24 for the lower left-hand pump-chamber is open, the water then flowing into said chamber and the piston or plunger therefor being on its inward movement.

What I claim as my invention, and desire to secure by Letters Patent, is—

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1. The pump comprising the supply-pipe, the delivery-pipe, the series of radially-disposed casings forming the outer and inner water chambers and cylinders, and pistons or plungers for said cylinders, said chambers being respectively connected with said pipes and said cylinders being extended at their outer portions into said inner chambers, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, valves intermediate said chambers and in line with said cylinders for separating said chambers when desired, and the valves intermediate the sides of said inner chambers and the adjacent water-pipe; substantially as set forth.

2. The pump comprising the supply-pipe, the delivery-pipe, the series of radially-disposed casings forming the outer and inner water chambers and cylinders, and pistons or plungers for said cylinders, said chambers being respectively connected with said pipes, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, valves intermediate said chambers and in line with said cylinders for separating said chambers when desired, means for mechanically closing said valves, and the valves intermediate the sides of said inner chambers and the adjacent water-pipe; substantially as set forth.

3. The pump comprising the supply-pipe, the delivery-pipe, the series of radially-disposed casings forming the outer and inner water chambers and cylinders, and pistons or plungers for said cylinders, said chambers being respectively connected with said pipes, combined with the gratings 23 at the inner ends of the outer water-chambers, the valves 24 within the outer ends of the inner water-chambers for coöperation with said gratings, means for mechanically closing said valves, valves intermediate the sides of said inner chambers and the adjacent water-pipe, the driving-shaft having the crank, and the rods pivotally connected with said crank and said pistons or plungers; substantially as set forth.

4. The pump comprising the supply-pipe, the delivery-pipe, a series of radially-disposed pump-chambers connected with said pipes, and pistons or plungers therefor, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, inlet-valves for said pump-chambers, rock-shafts connected therewith, crank-arms on said rock-shafts, a cam-wheel on said driving-shaft and engaging all of said crank-arms to control the movement of said valves, and valves intermediate said chambers and said delivery-pipe to be closed during the inflow of water to said chambers; substantially as set forth.

5. The pump comprising the supply-pipe, the delivery-pipe, the series of radially-dis-

posed casings forming the outer and inner water chambers and cylinders, and pistons or plungers for said cylinders, said outer chambers being connected with said supply-pipe and said inner chambers being connected with said delivery-pipe, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, inlet-valves intermediate said outer and inner chambers, rock-shafts connected therewith, crank-arms on said rock-shafts, a cam-wheel on said driving-shaft and engaging all of said crank-arms to control the movement of said valves, and valves intermediate said inner chambers and said delivery-pipe; substantially as set forth.

6. The pump comprising the supply-pipe, the delivery-pipe, the series of radially-disposed casings forming the outer and inner water chambers and cylinders, and pistons or plungers for said cylinders, said outer chambers being connected with said supply-pipe and said inner chambers being connected with said delivery-pipe, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, suitable valves intermediate said outer and inner chambers, valves 37 intermediate said inner chambers and said delivery-pipe having rods 39, the pistons 44 on said rods 39, and cylinders 43 for said pistons 44; substantially as set forth.

7. The pump comprising the circularly-arranged supply and delivery pipes, a series of radially-disposed pump-chambers intermediate of and independently connected to both of said pipes, and pistons or plungers for said chambers, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, and suitable valves for controlling the flow of the water; substantially as set forth.

8. The pump comprising the circularly-arranged supply and delivery pipes, the series of radially-disposed casings intermediate of said pipes and forming the outer and inner water chambers and cylinders, and pistons or plungers for said cylinders, said outer chambers being connected with said supply-pipe and said inner chambers being connected with said delivery-pipe, combined with the driving-shaft having the crank, the rods pivotally connected with said crank and said pistons or plungers, and suitable valves intermediate said outer and inner chambers and intermediate said inner chambers and said delivery-pipe; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 11th day of February, A. D. 1904.

JOHN A. GROSHON.

Witnesses:

CHARLES C. GILL,
ARTHUR MARION.