

No. 724,497.

PATENTED APR. 7, 1903.

G. B. PETSCHÉ.

PUMP VALVE AND VALVE ACTUATING MECHANISM.

APPLICATION FILED JULY 31, 1897.

NO MODEL.

FIG. 1.

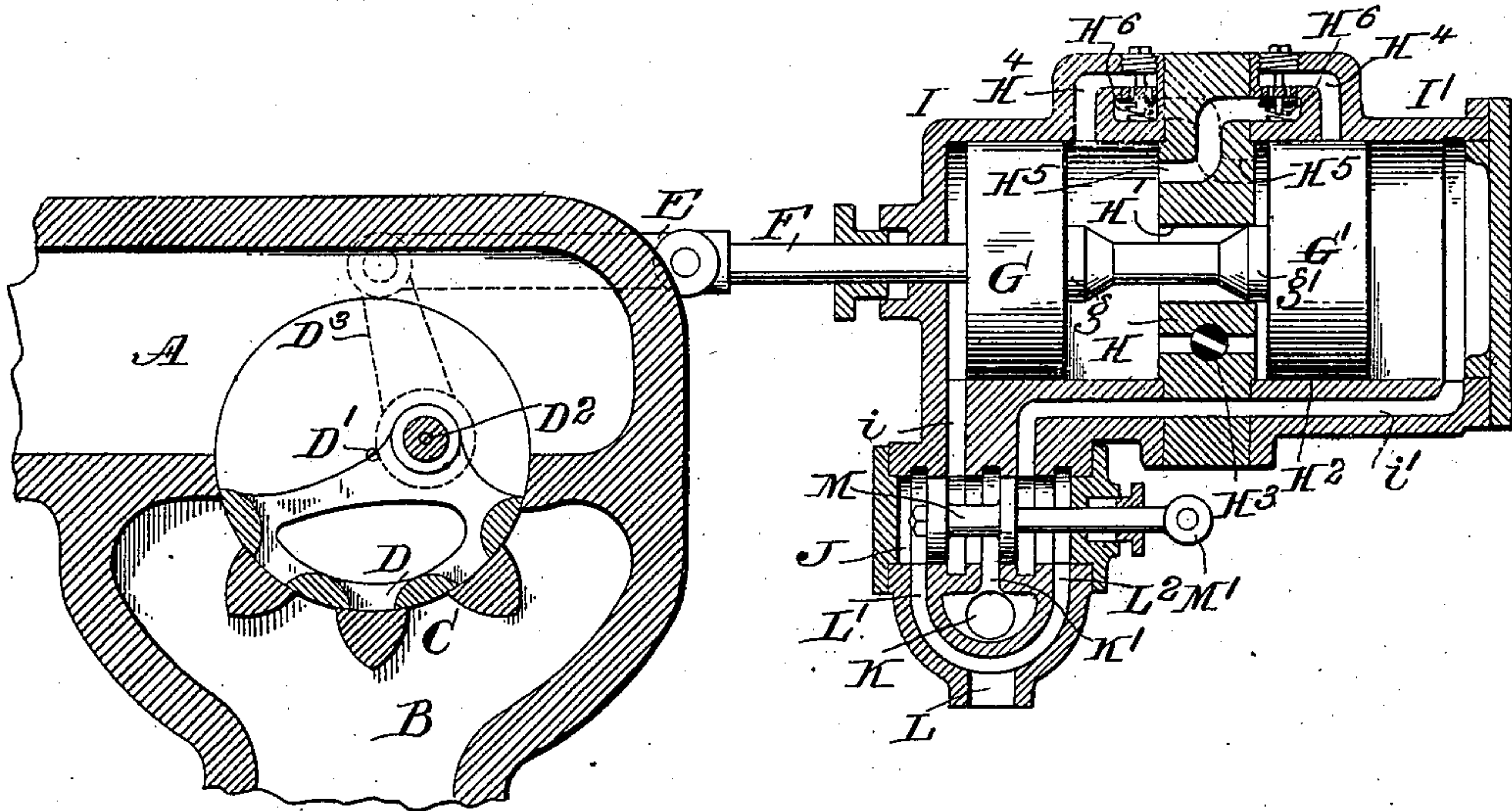


FIG. 2.

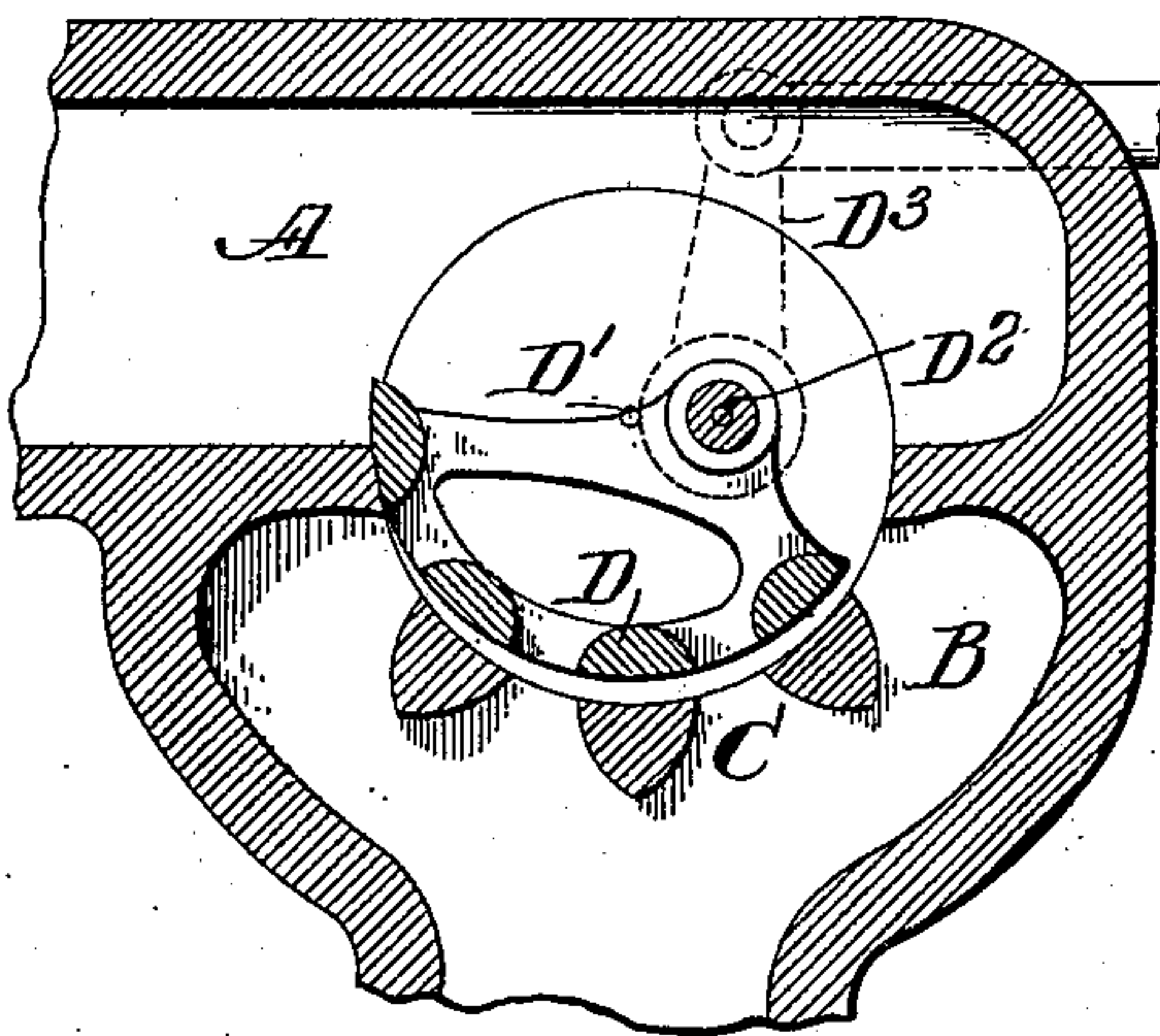
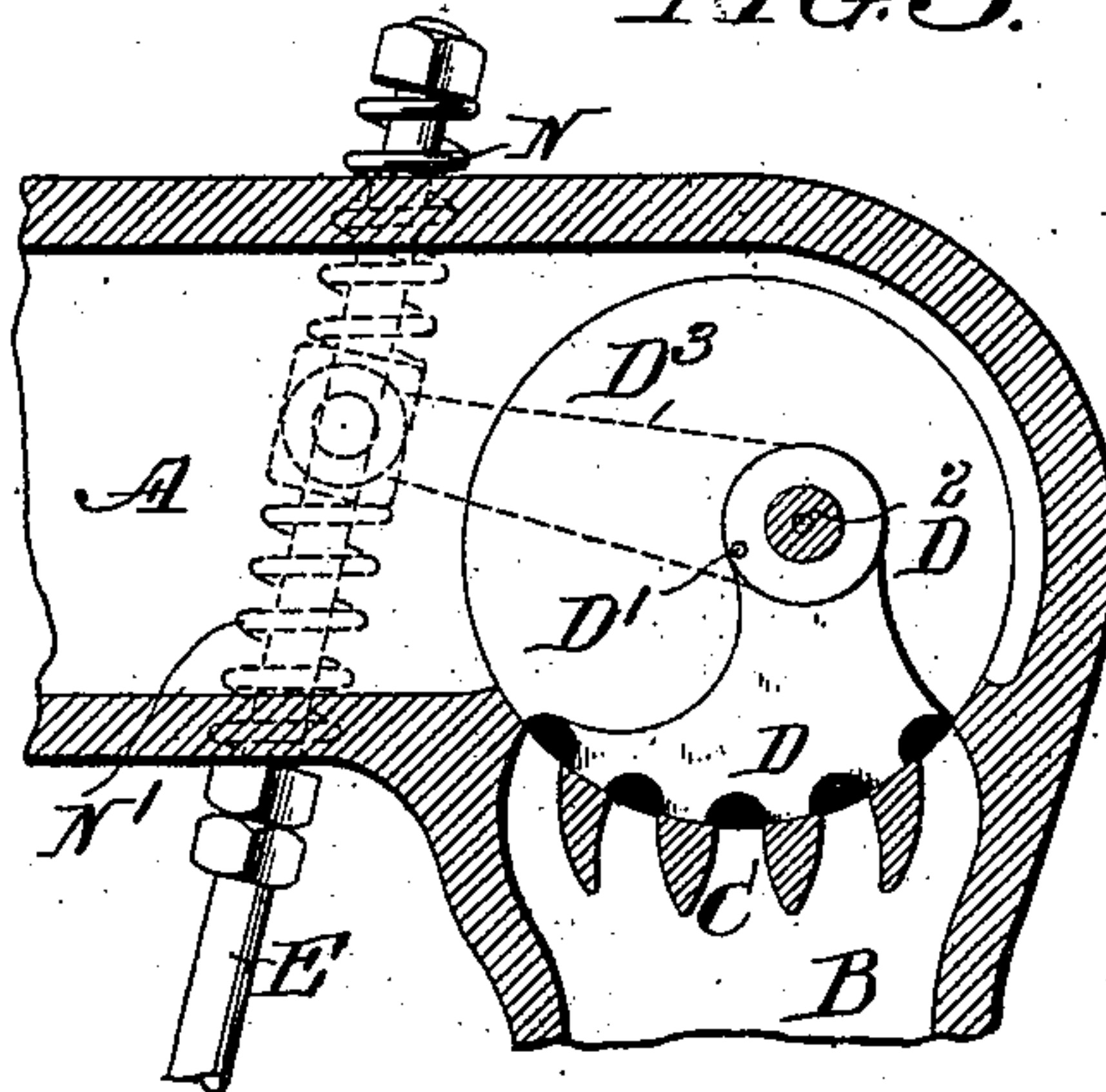


FIG. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

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PUMP-VALVE AND VALVE-ACTUATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 724,497, dated April 7, 1903.

Application filed July 31, 1897. Serial No. 646,633. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV BERNHARD PETSCHÉ, a subject of the Emperor of Germany, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Pump-Valves and Valve-Actuating Mechanism, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction and operation of valves especially devised and arranged for use as a suction or delivery valve of a liquid-pump, but adapted for use as well in air-pumps or similar mechanism.

The object of my invention is to provide a pump-valve which will embody to a large extent the good qualities of the rotary and slide valve types; and, generally speaking, my invention may be said to consist in combining with the port of a pump an eccentrically-pivoted rotary valve arranged to face the flow of fluid through its port and in combining with such a valve means for applying a yielding pressure to open and preferably, also, to close the valve.

Reference is now had to the drawings in which my invention is illustrated, and in which—

Figure 1 is a sectional side elevation of a portion of a pump provided with my improved valve and valve-actuating mechanism. Fig. 2 shows the same valve in the open position, and Fig. 3 is a sectional view illustrating a modification in the valve-actuating mechanism.

As shown in Figs. 1 and 2, the valve is arranged to serve the purpose of a suction-valve, A indicating the pump-chamber, and B the suction-chamber, of the pump.

C is the seat of the valve, which of course is curved to conform to the segmental section of the valve-face.

D indicates the valve, which, as shown, is of a gridiron type, having four bars to cover the four port-openings in the valve-seat, D' indicating the center of pressure—that is to say, the point at which the lines of pressure extending through each of the bars of the valve meet—while D² indicates the pivotal center

of the valve, which, as shown, is eccentric. Obviously, therefore, pressure acting on the face of the valve when it is closed will tend to open the valve, acting with a leverage equal to the distance between the centers D' and D². In the same way pressure acting upon the back of the valve will tend to close it, turning the valve backward in the direction to seat it. The opening of the valve is accomplished by a slight movement of the valve-stem, practically such as would be necessary to open an ordinary rotary valve of the same type, and the effect of opening the valve is indicated in Fig. 2, where the valve is shown as moved laterally, so as to leave a free passage through the ports, which it closes and at the same time moves slightly away from its seat.

I actuate the valve by some means by which a yielding pressure is transmitted to it at proper intervals, so that in case the pressure to open the valve is applied before the pressure upon its face and back is equalized the pressure upon its back will tend to hold it to its seat until the pressure upon its face substantially or nearly counterbalances the back pressure, which point is, of course, the proper time for a pump-valve to open. The means shown in Fig. 1 for actuating the valve in this way consist of a divisional cylinder, two parts of which are indicated at I and I' and are separated by an inwardly-extending flange or perforated plate H, the opening H' in which is of considerably greater area than the valve-stem connecting the two pistons working in the cylinder-sections. An opening H² is formed through the plate H and regulated by means of a plug or cock H³, and preferably by-passes H⁴ H⁵ connect the two cylinder-sections, leading in each case from a point on the side of one cylinder-section which will be closed by the piston to a point in the other cylinder-section which will not be affected by the piston, and in each of these by-passes I place a non-return valve H⁶. G and G' indicate connected pistons, one working in each of the cylinder-sections, and upon the inner face of each piston I secure a short plunger, as g or g', adapted to fit neatly in the perforation of the plate H and close it, so that water will no

longer pass through it when the plunger is in
coaction with it. i and i' are the ports lead-
ing to the cylinder-sections I and I' and to a
valve-chamber J, into which chamber also
5 leads a port K' from a source of fluid under
pressure (indicated at K) and exhaust-ports
L' and L², connecting with an exhaust-open-
ing L. M is a piston-valve working in the
valve-chamber J and regulating the admis-
10 sion and exhaust of the pressure fluid to the
ends of the cylinder. It will be seen at once
that the motions of the pilot-valve M will con-
trol the motions of the pistons G and G', and
through them the motions of the valve D, and
15 that the pressure applied to open or close the
valve will be a yielding pressure determined
by the pressure under which the motive fluid
is supplied, also that the special construction
of cylinder which I have described provides
20 a device in the nature of a dash-pot, by which
the momentum of the valve in opening and
closing is overcome and rendered innoxious,
while the by-passes H⁴ H⁵ prevent the plun-
gers g and g' from retarding the beginning of
25 motion in the valve, permitting the fluid to
flow from in front of an inwardly-moving
piston to the face of the outwardly-moving
piston without having to pass through the
opening H².
30 In Fig. 3 I have shown the valve-actuating
rod E as connected with the lever-arm D³
through the medium of springs N and N', so
that a positive motion given to the rod E will
impart an elastic or yielding impulse to the
35 valve-actuating lever, enabling it to operate
in much the same way, generally speaking,
as where the actuating-cylinder is used, as
shown in Fig. 1.

The valve-actuating cylinder, with its dash-
pot feature and also the arrangement of 40
springs shown in Fig. 3, are not specifically
claimed in this application except in combi-
nation with the eccentrically-pivoted rotary
valve, as in other applications filed by me I
have shown and described the same mechan- 45
ism for acting upon pump-valves with a yield-
ing pressure and have claimed the same so
far as I believe it to be new, said applications
being those on which Patents No. 632,744, of
September 12, 1899, and No. 647,153, of April 50
10, 1900, have issued and the pending appli-
cation, Serial No. 646,629, filed July 31, 1897.

Having now described my invention, what
I claim as new, and desire to secure by Letters
Patent, is— 55

1. In combination with a pump an eccen-
trically-pivoted rotary valve seated to face
the flow of liquid through its port and means
for acting on said valve to open it with a
yielding pressure. 60

2. In combination with a pump having a
port or ports provided with a concavely-
curved grid-valve seat facing in the direction
in which the fluid flows through the port, an
eccentrically-pivoted rotary valve having 65
grid-bars adapted to close the valve-seated port
aforesaid and its pivot arranged, as described,
so that it opens the port by a simultaneous
lateral and lifting action and means for act-
ing on said valve to open it with a yielding 70
pressure.

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Witnesses:

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