

No. 615,751.

Patented Dec. 13, 1898.

E. P. SANDS.
CHECK AND BACK PRESSURE VALVE.

(Application filed Feb. 20, 1897.)

(No Model.)

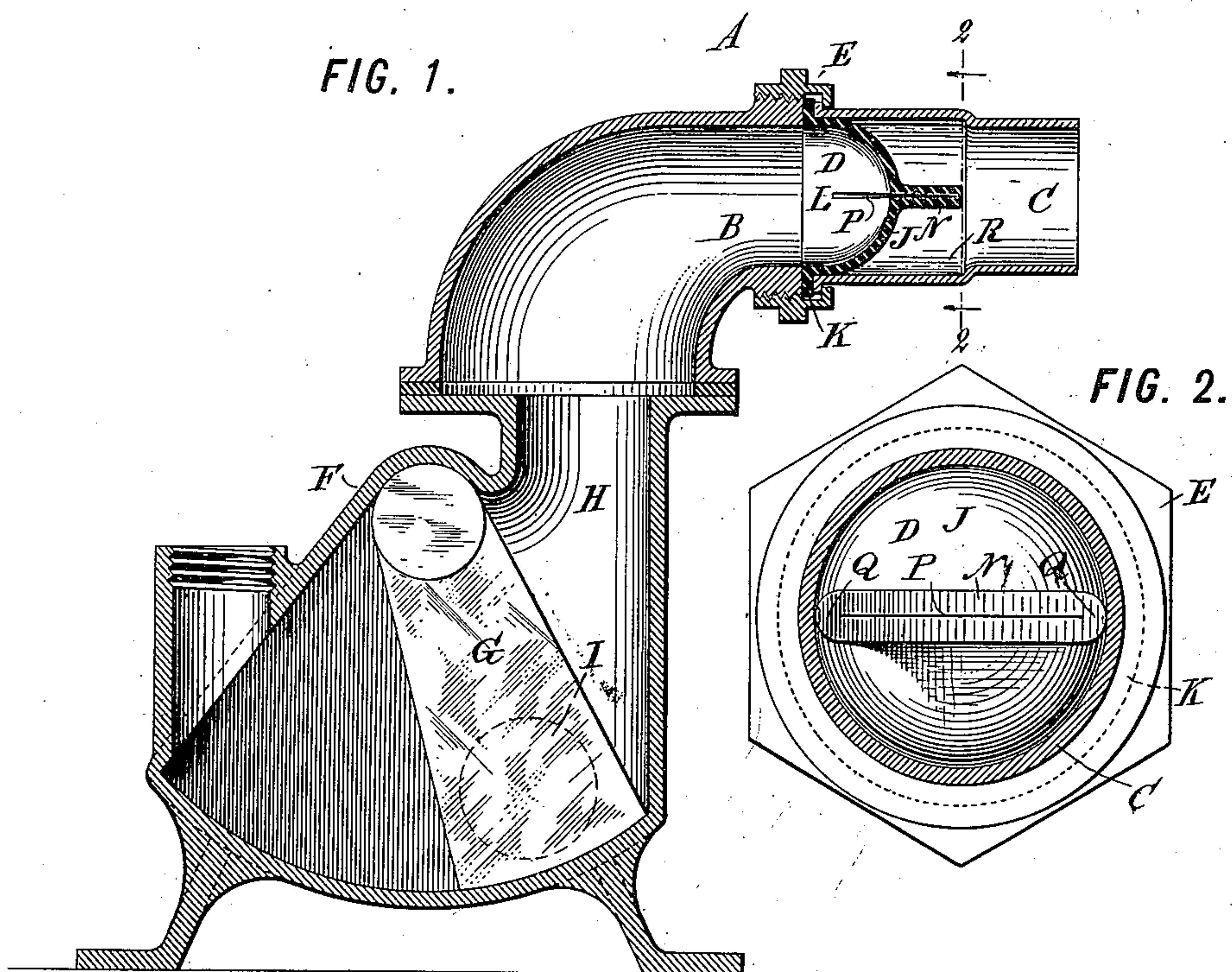


FIG. 4.

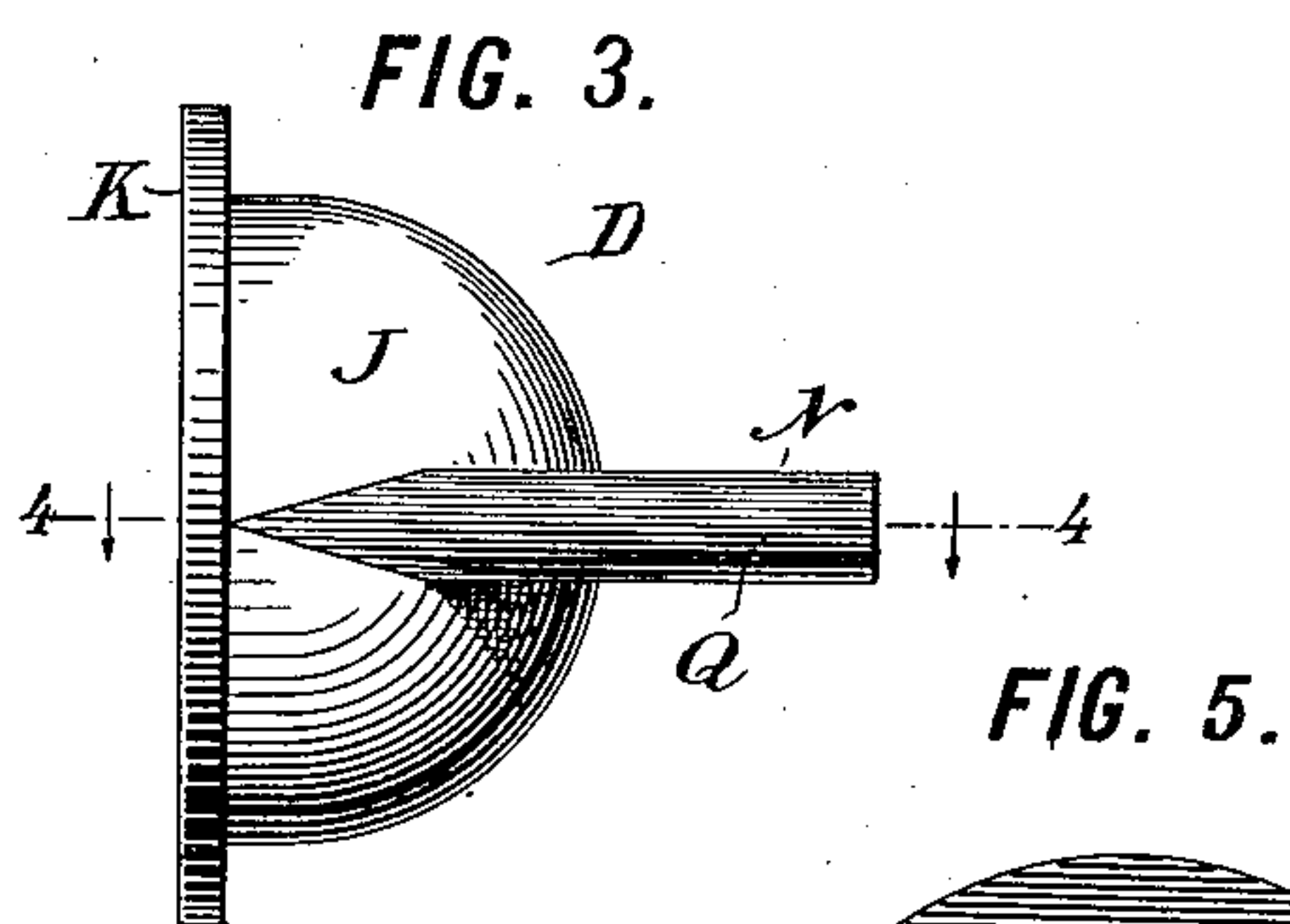


FIG. 5.

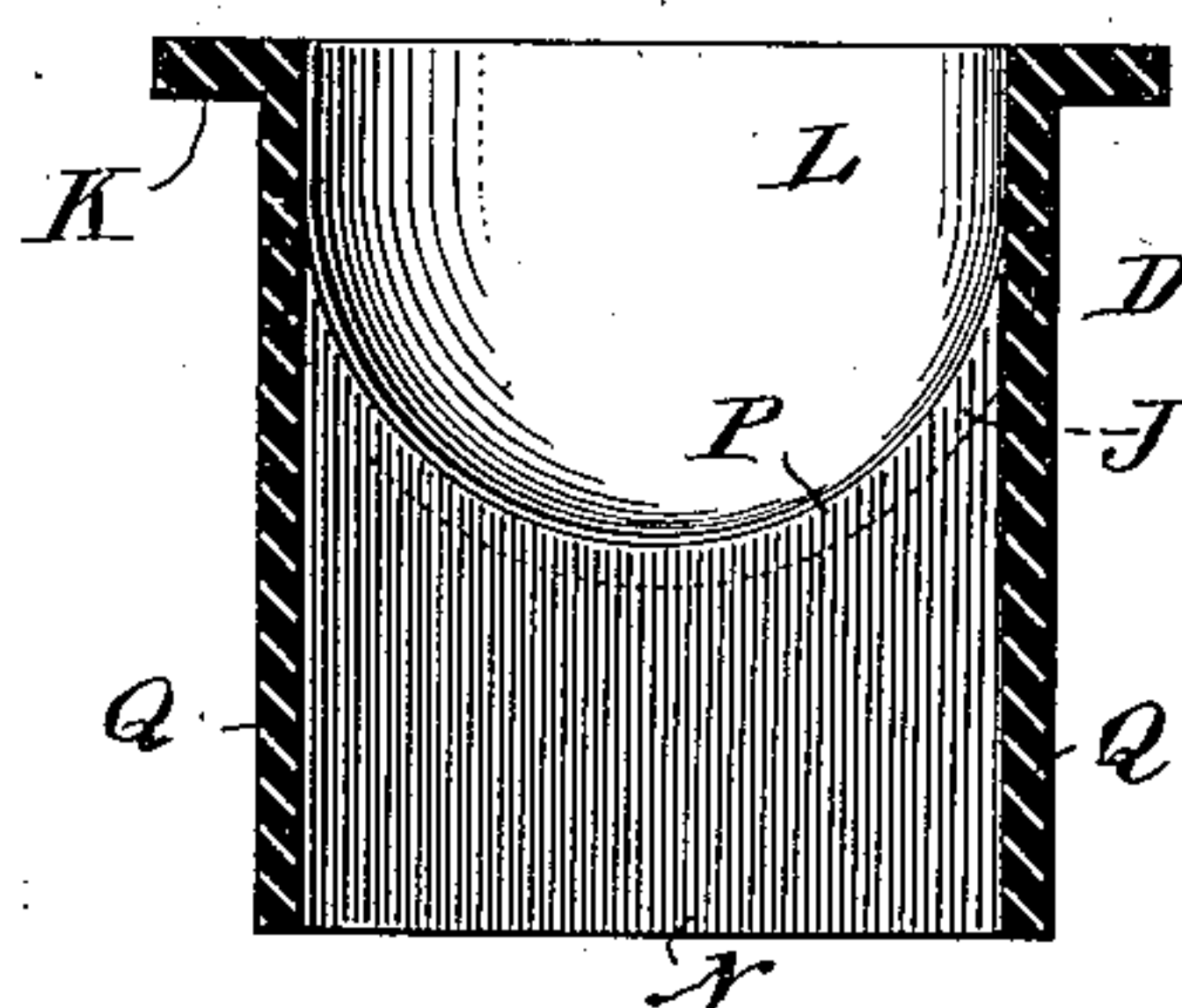
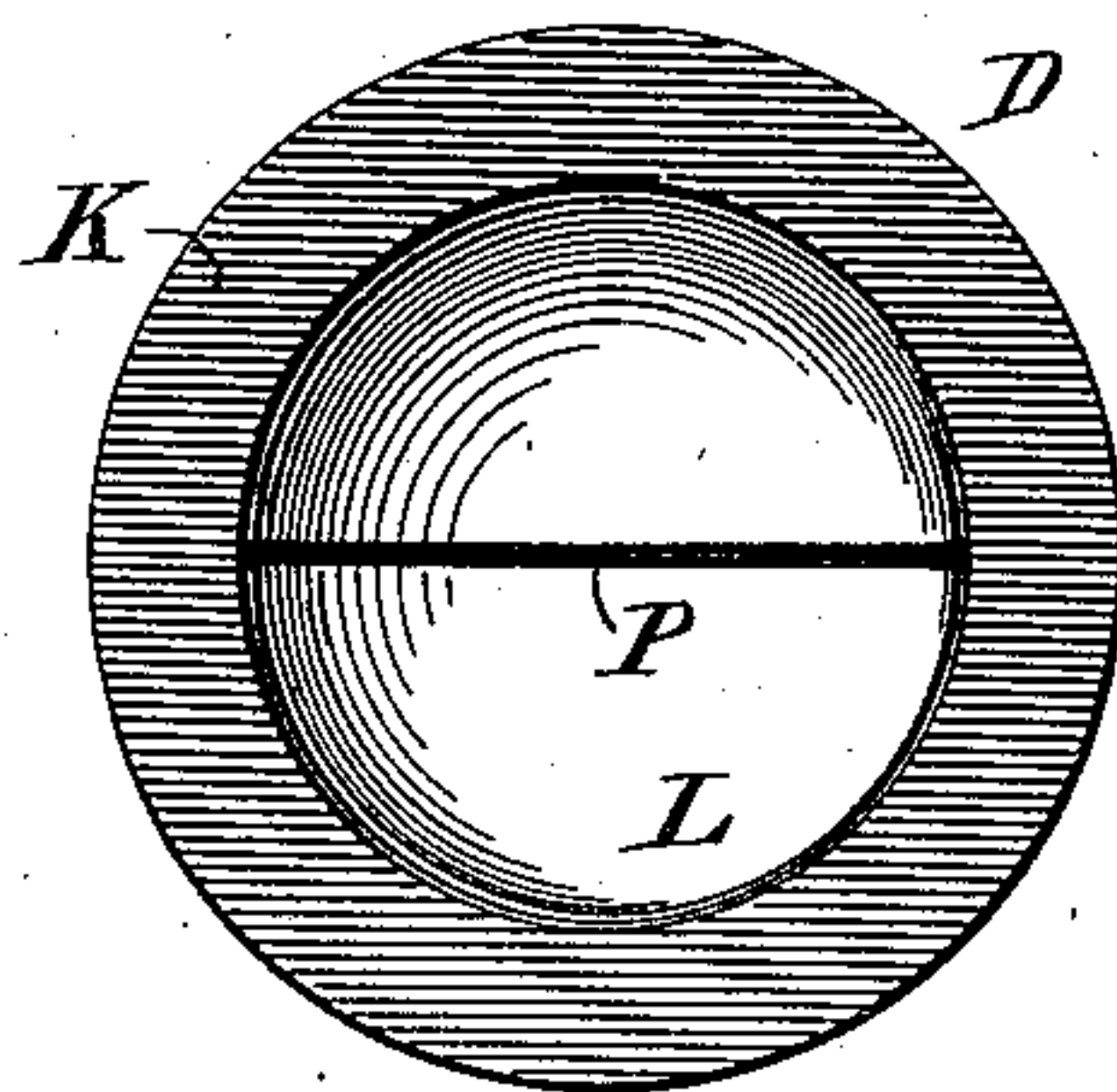
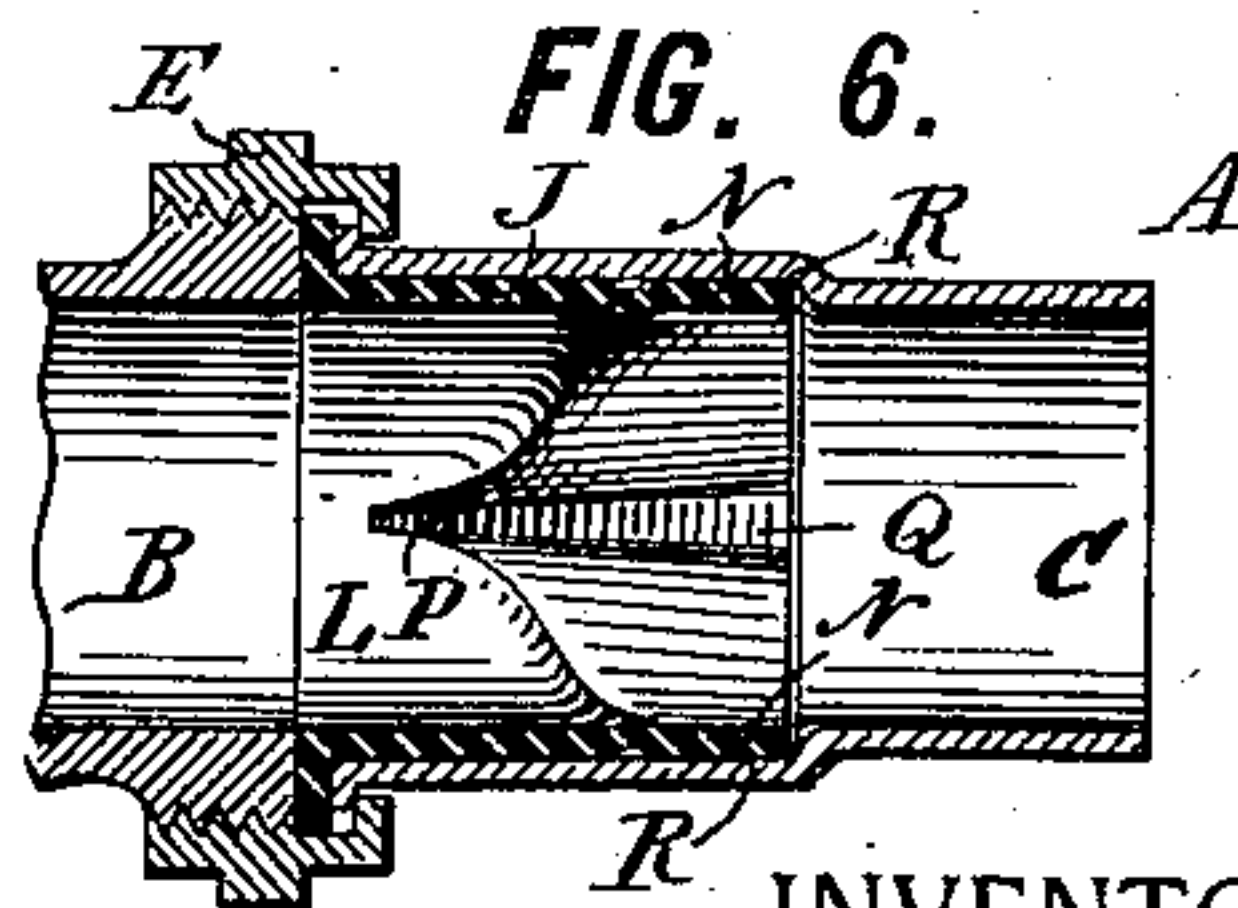


FIG. 8.



WITNESSES:

Frederick White

Thomas F. Wallace

INVENTOR:

Ernest P. Sands,

By his Attorneys,

Arthur C. Fraser & Co.

UNITED STATES PATENT OFFICE.

ERNEST P. SANDS, OF NEW YORK, N. Y.

CHECK AND BACK-PRESSURE VALVE.

SPECIFICATION forming part of Letters Patent No. 615,751, dated December 13, 1898.

Application filed February 20, 1897. Serial No. 624,496. (No model.)

To all whom it may concern:

Be it known that I, ERNEST P. SANDS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Check and Back-Pressure Valves, of which the following is a specification.

This invention relates to valves, and especially to check and back-pressure valves; and the invention provides an improved valve especially applicable to the pumps of ships' closets.

My invention provides an improved form or construction of flexible valve adapted to open under egress pressure to the full area of the discharge and to close by the elastic contraction of the valve to prevent return flow. To this end my improved valve proper is formed with a hollow hemispherical body portion adapted to resist external pressure and having an outlet-slit adapted to open under internal or egress pressure, and this outlet-slit is prolonged by means of flexible lips extending to a considerable distance beyond the body portion, which lips, under egress pressure, are adapted to open out to substantially the full size of the body and subsequently to close together under elastic contraction and make a tight seal for resisting pressure from the egress side. Such flexible valve proper is combined with a casing or tube the through-passage of which has a diameter approximately equal to the internal diameter of the valve proper when expanded, this casing being enlarged around the valve proper to an extent equal to the thickness of the latter, so that under egress pressure the valve is expanded against this enlarged portion, which supports the valve against undue distention, and the casing and valve afford together a discharge-passage of substantially uniform diameter.

In the accompanying drawings, which illustrate the preferred form of my present improvements, Figure 1 is a longitudinal axial section of the improved valve and the discharge-pipe of the pump of a ship's closet, to which it is applied, the closet being shown in section and its plunger in elevation. Fig. 2 is an enlarged front elevation of the valve and discharge-pipe, showing the latter in sec-

tion on the line 2 2 in Fig. 1. Fig. 3 is a side elevation of the valve proper alone. Fig. 4 is a horizontal section thereof, cut on the line 4 4 in Fig. 3. Fig. 5 is a rear view thereof; and Fig. 6 is a fragmentary view corresponding to Fig. 1, but showing the valve proper in the extreme open position.

Referring to the drawings, let A indicate the discharge-pipe or other valve casing or shell; B, the ingress or pump tube thereof; C, the egress-tube thereof; D, the valve proper between these tubes; E, a union uniting the tubes; F, the shell of a pump; G, an oscillating plunger therein; H, the discharge-port of the pump, and I the soil-pipe leading to the pump.

The pipe A may be any suitable casing or shell in which the valve proper is to be employed for permitting outflow and preventing backflow. The pipe shown is divided for convenience into egress and ingress portions C and B, which are united by the coupling E. The valve proper may be applied in any desired manner at any suitable point in the pipe or shell, that shown being for convenience clamped between the ends of the parts B and C. The pump F is shown as a flushing and soil pump with an oscillating plunger, the shell being connected to the discharge-pipe by forming the pipe-section B as an elbow; but any other character of pump or any suitable connection between it and the discharge-pipe may be employed without affecting my present invention.

According to the preferred form of my invention I construct the valve proper, D, of rubber or other suitable yielding, flexible, or elastic material, with a hemispherical body J, having an annular projecting flange K surrounding its one end, a hollow interior or ingress chamber L, projecting lips N, and passage-way P. The body J is externally cylindrical adjacent to the flange and hemispherical from thence outwardly. Its convex side is its egress side. Its interior or chamber L is open at the ingress side of the valve, being of full diameter and preferably cylindrical at its ingress side. The maximum diameter of the chamber L is approximately equal to the minimum diameter of the adjacent portion B of the discharge-pipe, while the outer diame-

ter of the body J exceeds this diameter by the thickness of its wall. The flange K is of like thickness to the wall of the body and serves as a means for fastening the valve proper through the casing, this being accomplished in the construction shown by setting up the ends of its pipes B and C against the flat faces, by means of the union E, with sufficient force to make a firm and leak-tight connection.

10 The lips N are preferably of the same thickness and material as the body and project a considerable distance at the egress side thereof, being formed integral therewith, and extend from the cylindrical outer portion at one side thereof to the like portion at the diametrically opposite side thereof, so that they entirely cross its bulbous convex wall. The lips are flat, parallel, and flexible and are united at their side edges by curved portions

20 Q, of like thickness, being separated between these portions by the slit P, which is of equal length with the diameter of the socket L, and extends diametrically across the latter through the wall of the body, being slightly open at its ingress side, and tapering thence outwardly toward the end of the lips, where it is normally closed by the tendency of the latter to lie against each other at their outer ends. This slit constitutes the passage-way through the valve from the socket to the outer side of the lips, and is opened by the distortion of the lips under egress pressure and closed by the return of the lips to the normal position or by the forcing of them together under back pressure.

35 The body and lips are preferably so yielding and elastic that they will stretch open to the full diameter of the inferior and assume a tubular form under proper discharge-pressure, as shown in Fig. 6. They are sufficiently elastic to assume the normal or closed form upon the cessation of pressure, as shown in Fig. 3. The bulbous shape of the body and the width and length of the lips suffice to enable the valve proper to resist undue distortion against heavy back pressure. The flexibility of the lips enables them under back

45 pressure to close around any foreign matter

lodging between them, and thus make a tight joint preventing backflow.

According to my invention I also construct the casing at the egress side of the valve proper with an enlargement or chamber R opposite the valve proper and of suitable size and shape to receive the walls thereof when expanded, so that these walls may stretch out beyond the adjacent diameter of the pipe C and a passage-way through the valve equal to the maximum diameter of its chamber L can be obtained. The wall of the chamber R serves to prevent undue distortion of the valve proper. The enlargement of the pipe at R also enables the use of a valve proper the external diameter of which is greater than that of the adjacent interior of the pipe B.

The improved valve proper constitutes of itself a new article of manufacture which can be applied with facility to any suitable casing or pipe where a valve of this kind is required. It can be made in standard sizes to fit standard diameters of piping.

The valve proper is preferably formed of molded and vulcanized rubber; but any suitable or equivalent material may be used.

What I claim is—

A flexible valve proper having a body J with a base-flange K, outlet-slit P and lips N projecting from the body and surrounding said outlet, combined with a casing surrounding said valve proper formed with a through-passage of a diameter approximately equal to the internal diameter of the valve proper when expanded, and with a chamber R of sufficiently larger diameter to receive the thickness of the walls of the valve proper, whereby it supports the latter against undue distention, and affords a discharge-passage of substantially uniform diameter as described.

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

ERNEST P. SANDS.

Witnesses:

J. H. CURTISS, Jr.,

LOUIS SANDS.