

J. F. DE NAVARRO & H. C. SERGEANT.

Liquid Meter.

No. 125,794.

Patented April 16, 1872.

Fig. 1.

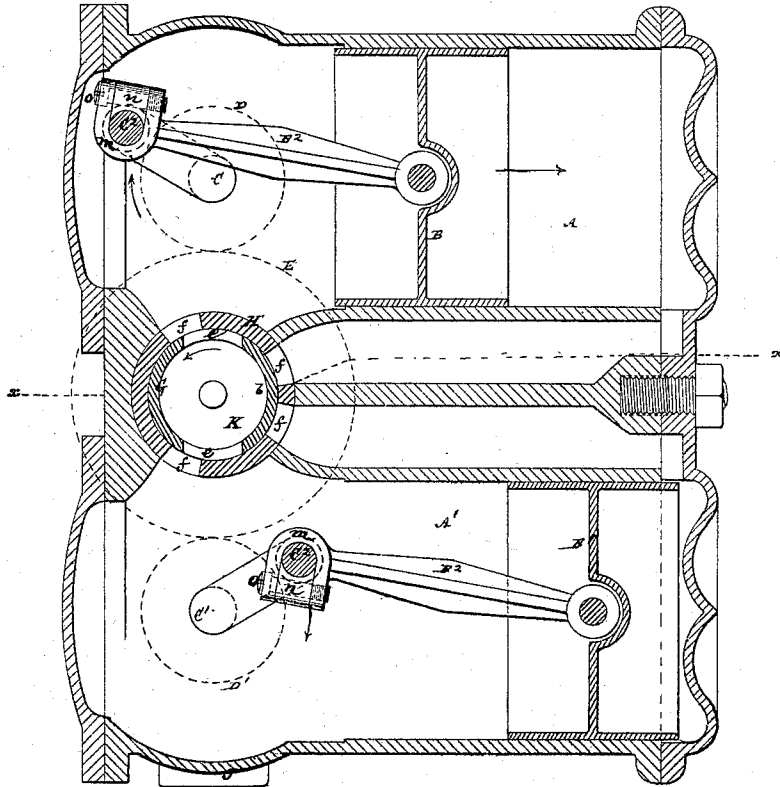
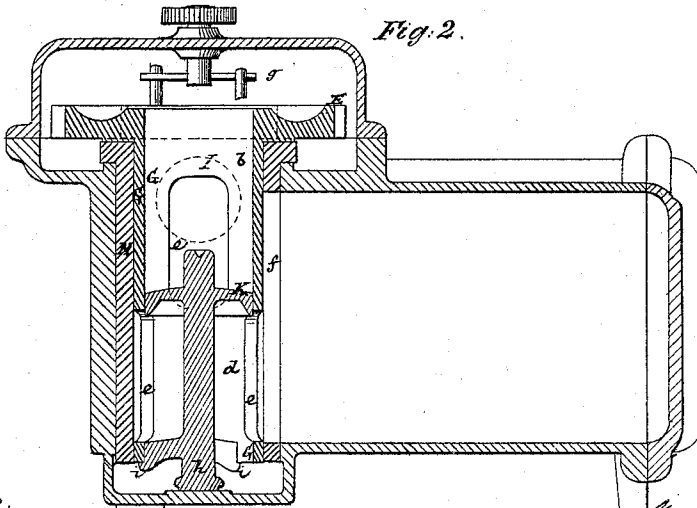


Fig. 2.



Witnesses.

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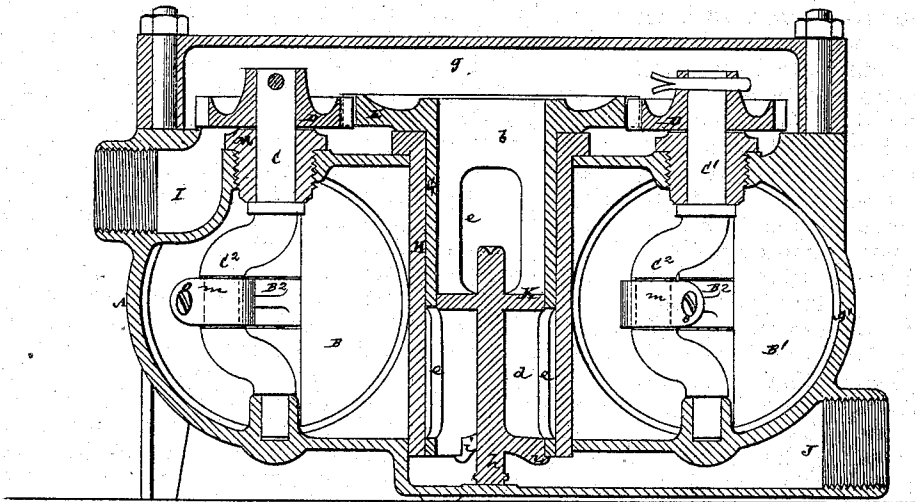
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Fig. 3.



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IMPROVEMENT IN LIQUID-METERS.

Specification forming part of Letters Patent No. 125,794, dated April 16, 1872.

DIVISION B.

Specification describing certain new and useful Improvements in Liquid-Meters, invented by JOSÉ F. DE NAVARRO and HENRY C. SERGEANT, both of the city, county, and State of New York.

The one part of this invention relates to a certain description of valve used, among other purposes or uses, to particular advantage in liquid-meters, said valve being of a hollow cylindrical construction, open at its ends, but divided transversely to form an inlet and outlet chamber, and provided with ports or passages in its sides in communication with said chambers, and operating as said valve is revolved or reciprocated about its axis, in concert with fixed ports or passages in the valve-seat. Heretofore, in valves of this description, the partition dividing the inlet from the outlet chamber has been fast to or formed in one piece with the body of the valve. This induces end or longitudinal thrust on and friction of the valve, by reason of the excess in pressure of the fluid the valve serves to control, on the one side of the partition dividing the inlet from the outlet chamber, over the pressure of said fluid on the opposite side of the partition. The first part of our invention obviates this, and consists in the employment of a piston-like partition supported by a step, or otherwise, independently of the valve, to divide the latter into inlet and outlet spaces, and forming an independent transverse surface or piece within the valve, to receive the end thrust or pressure that otherwise would be thrown upon the valve by the fluid. The invention also consists in certain combinations of parts, and peculiarities of construction, applicable to reciprocating piston-meters using a crank or cranks, whereby we are enabled to work an entire crank or cranks, and support the same at both ends, thereby steadying and easing the general action of the meter, and whereby increased facility is afforded for getting at or removing the piston or pistons without disturbing the crank or cranks, and devices set in motion by it or them.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a horizontal section of a duplex cylinder wa-

ter-meter, having a revolving valve constructed in accordance with our invention, and about the general action of which, as regards its control of the pistons, and about the gearing of the valve and pistons together, nothing here is claimed as new, the same being found in a previously-patented meter or meters invented by Henry C. Sergeant, one of the applicants. Said view also shows the mode of connecting the pistons with their cranks. Fig. 2 is a longitudinal vertical section of the meter at the irregular line *x x*, in Fig. 1, and Fig. 3 a transverse vertical section of the same, taken mainly through the center of the valve.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawing.

A A' are the cylinders of the meter, and B B' its reciprocating pistons, which latter serve, by means of connecting-rods B² B² to revolve vertical crank-shafts C C¹ that are geared together by spur-wheels D D' and E, the intermediate wheel E making one revolution for every two revolutions of each of the other wheels D D', and serving to revolve the cylindrical valve G, by which the movements of the pistons are controlled. The cranks C² C² of the shafts C C¹ are made double or entire, and their shafts supported both top and bottom, or with bearings on both sides of the connecting-rods B² B², whereby a much smoother and easier running action is obtained for the working parts than when half cranks are used. To enter said cranked shafts within the meter, and to provide for their extension above to connect with the gear-wheels or pinions D D', presents a difficulty which we have met by entering them from above through holes that are afterward closed by screw-bushes or nuts M, said bushes also serving to form the upper bearings of the crank-shafts. The connecting-rods B² B², are fitted to the cranks C² C², by making said rods of a hook or strap form at their ends *m*, so as to form half-eyes for the cranks, and further serving to receive blocks *n* within them. These blocks close the eyes of the rods on the cranks, and are secured to the rods by screws *o*, fitted to pass through the hooked ends *m* of the rods, and the blocks

n. In this way, or by these means, the pistons may readily be disconnected from the cranks by removing the cylinder-end lids or covers in front of the cranks, and taking out the screws *o*, so that by removing the opposite end cover or covers, the pistons may be drawn out for repair, or otherwise, without disturbing the cranks, and such attachment of the rods to the cranks allows of the wheels *D D'* and *E*, being permanently set in proper relation with each other to secure a perfect action of the valve relatively with the pistons or their cranks, and so that the wheels *D D'*, when thus set may be pinned to their shafts, and the relation in no wise be disturbed by the disconnection or removal of the pistons. The revolving cylindrical valve *G* that controls the movement of the pistons is made open top and bottom, and divided intermediately of its length, as hereinafter described, to constitute an inlet-chamber, *b*, and outlet-chamber *d*, each of which is provided with oppositely arranged side ports *e*, the ports of the inlet-chamber being arranged at right angles to those of the outlet-chamber. This valve revolves within a cylindrical valve-seat, *H*, provided with ports *f*, that communicates by chambers or passages with the opposite ends of the cylinders, to effect the movement of the pistons, as required. *I* is the supply opening by which the water is admitted to the inlet-chamber *b* of the valve, through an upper bonnet, *g*, and *J* is the exhaust opening in communication below with the outlet chamber *d* of the valve. *K* is an independent transverse partition or piston within the valve, and serving to divide the inlet-chamber *b* from the outlet-chamber *d*. This independent partition may either be a stationary fixture, or it may be supported in a free manner within the valve, as by a stem, *h*, and step below, so as to turn or revolve in common with the valve, as for instance—by the friction of the sides of the valve on the periphery or edges of the independent partition—which latter or traveling arrangement is preferred. The stem *h* may be provided with stops or arms *i*, arranged to hook under the valve to prevent the independent partition *K* being forced upward and out of position in case of a sudden or casual excess of pressure upon it from below, and which is apt to occur by back action from the exhaust on the supply being shut off.

During the operation of the meter, the excess of pressure is usually in the inlet-chamber *b* of the valve. This excess of pressure,

so far as regards tendency to end or longitudinal thrust on the valve, is received and borne by the independent partition *K*, and the valve consequently relieved of much friction.

It may here be observed, in conclusion, that by suitably forming the ports in the valve and in its seat, said valve may either be wholly revolved or simply have a reciprocating action about its axis, no restriction here being placed upon the disposition or number of the ports. It may also be remarked that the pistons of the meter may be made either of metal, hard wood, vulcanized rubber, or any other suitable material, and be fitted, if desired, to turn around or about their axes as well as to travel in direction of the length thereof. This may be done by a ball-and-socket attachment of the pistons with the connecting-rods they serve to give motion to, or it may be done in any other way.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The independently-supported transverse partition *K* within the tubular body of the valve *G*, when the latter is constructed with open ends and side ports in communication, respectively, with the interior of the body on opposite sides of said partition, for operation in concert with fixed ports or passages in the valve-seat, substantially as specified.

2. The free or loose and independent partition *K*, arranged in relation with the tubular body of the valve *G*, and provided with a step or stem support *h*, whereby said partition, although independent of the valve-body is free to rotate in common with it, essentially as described.

3. The combination of the stops or arms *i*, with the free and independent partition *K*, and tubular body of the valve *G*, substantially as and for the purpose herein set forth.

4. The combination of the screw-bushes *M*, with the meter cylinders or case, and the entire cranks *C'*, operated by the pistons of the meter, essentially as described.

5. The connecting-rods *B'*, constructed with hook-shaped ends *m*, in combination with the blocks *n*, screws *o*, and entire cranks *C'*, operated by the piston of the meter, substantially as specified.

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