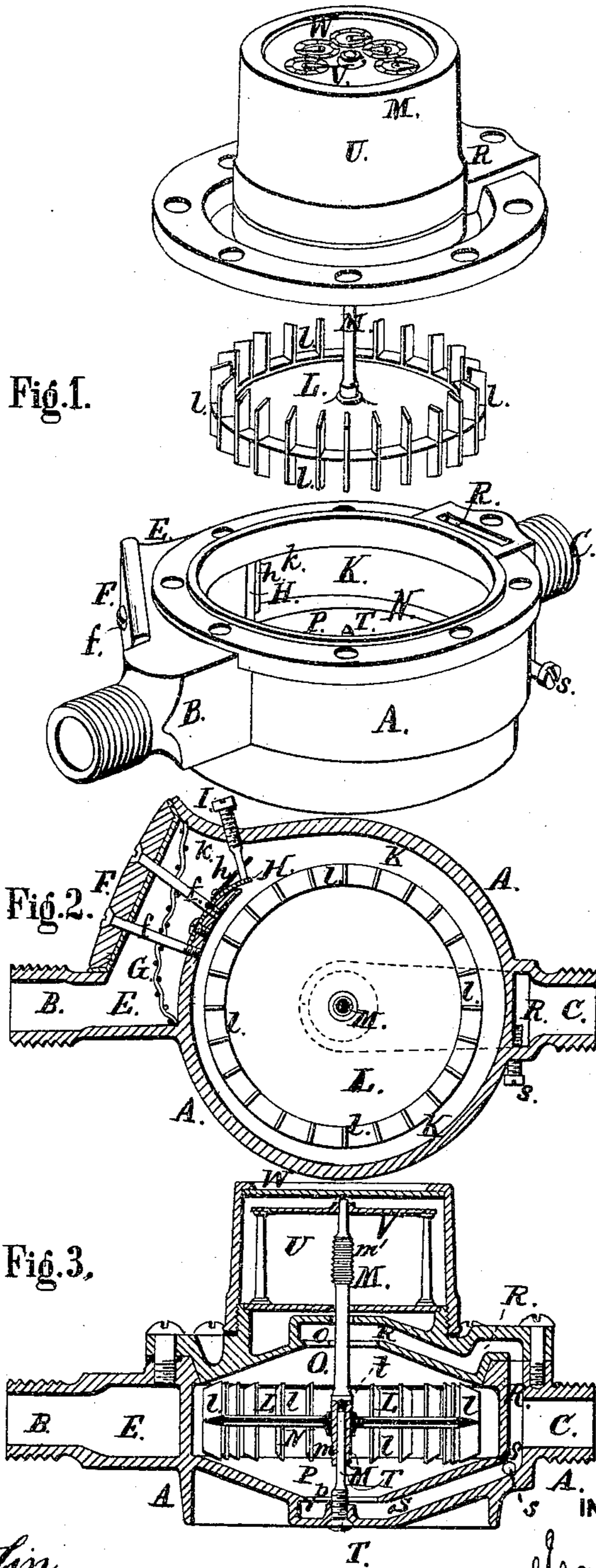


I. COOK.
Rotary Meters.

No. 141,325.

Patented July 29, 1873.



ATTEST:

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UNITED STATES PATENT OFFICE.

ISAAC COOK, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN ROTARY METERS.

Specification forming part of Letters Patent No. **141,325**, dated July 29, 1873; application filed June 24, 1873.

To all whom it may concern:

Be it known that I, ISAAC COOK, of St. Louis, St. Louis county, Missouri, have invented an Improvement in Liquid-Meters, of which the following is a specification:

The first part of my invention relates to the construction of the bucket-wheel and shaft. These are made entirely of hard rubber, which has several special advantages for this use, among which may be stated light and unvarying weight and indestructibility. The wheel has a flat horizontal disk with angular edge to part the water, and radial vertical buckets extending upward and downward from near the edge of the disk. The second part of my improvement consists in the two axially-perforated diaphragms, one above and the other below the wheel, the water being received at the periphery of the wheel and flowing out upward and downward through the axial openings of the diaphragms. The third part of my improvement relates to the construction of the diaphragms. These are made of conical form, as shown, to increase the water-space vertically toward the center, so that as the water flows inward to the central discharges, and consequently into a space of more contracted area, it may be allowed to spread vertically, that its flow may not be checked, so as to interfere with the proper action of the wheel. The fourth part of my improvement consists in the provision of two outflow-passages in communication, respectively, with the upper and lower axial discharges, one or both passages being provided with a means of adjustment as to size, so as to regulate the quantity of water (relatively) passing through the two passages, the object being to balance the wheel vertically by adjusting the relative water-pressure above and beneath it. The fifth part of my improvement consists in the combination with a vertically-balanced bucket-wheel of the glass face of the register, when the shaft of such wheel has bearing against such face in its upmost position, the object of this being to enable the proper balancing of the wheel in the water. The sixth part of my improvement consists in the combination of the adjustable spring-regulator plate, screw, and automatic spring-regulator, as hereafter described.

In the drawings, Figure 1 is a perspective

view of the parts detached. Fig. 2 is a horizontal section. Fig. 3 is a vertical axial section.

A is the bucket-wheel case. B is the inflow-pipe, and C the outflow-pipe. E is a chamber, closed by a removable cap, F, secured by screws *f*. This chamber contains a strainer, G. H is an adjustable screw-plate, secured to the case in such a manner that by it the size of the water-passage may be regulated. The plate H is so formed and secured to the case that it tends to spring outward and so partially close the water-way. I is a temper-screw, by which the free end of the plate H is forced inward, so as to enlarge the water-way at that point. *h* is a thin tongue of metal springing outward. By the use of this tongue the water-way is automatically adjusted in width to correspond with the amount of the water-flow, so that when the flow is large the tongue will be pressed back to increase the size of the passage; but if the flow is small the tongue will spring outward and partly close the passage, so as to force the water to flow in a current of some speed at the periphery of the water-way, thus causing its force to be more thoroughly availed to turn the wheel than if the small current were diffused in a large passage-way and should slowly meander through the wheel-case. The water-way K inside the case is of convolute form, or gradually narrowing from the inflow at the adjusting-plate H, so that, as the water runs around, it is gradually forced inward between the buckets *l* of the wheel. The buckets may be vertical and radial, extending upward and downward from the flat horizontal disk L of the wheel, which is about level with the mid-height of the water-way. The edge of the disk L is sharp, so as to deflect the water upward and downward. The top and bottom of the water-chamber N consist of similar conical disks or diaphragms O P, having central water-openings *o p*, through which the water flows into passages R and S in communication with the outflow-pipe C. The arrangement is such that the flow of water through the lower passage S shall have the preponderance over that through the passage R; but the relative flow through the two passages is regulated by a screw, *s*, which screws into the passage S to partly close the same. By means of this screw the relative water-flow in the passages R S is

regulated for the purpose of balancing the wheel vertically, so that the wheel-shaft may have little or no vertical pressure on its bearings. For instance, should the wheel-shaft bear too hard on its lower bearing or step the screw *s* is turned inward, which somewhat checks the outflow at this passage *S* and causes an increased pressure beneath the wheel, and the wheel is raised by means of this pressure. Should the wheel run so high that the pressure is constant against the top bearing the screw *s* is turned outward and the pressure lessened beneath the wheel.

The wheel *L l* and its shaft *M* are both made of hard rubber, which has special advantages over the substances heretofore used. Among these advantages may be mentioned its anti-corrosive quality, which has value, first, because no change will take place from corrosion in the form or bearings of the wheel; second, because the surface is not subject to become roughened from rust, which would affect its running and cause inaccuracy in the register; third, indestructibility; and, fourth, the water is not rendered unwholesome. The hard-rubber wheel has nearly the same specific gravity as water, so that it is nearly balanced in the case, and, with a slight adjustment of the temper-screw *s*, an exact balance is had. Another advantage of prime importance is the impermeability of the wheel, which secures an unvarying weight.

In the lower end of the wheel-shaft *M* is an axial socket, *m*, which receives a step-center, *T*, that screws into the bottom of the case *A*. *t* is a little center block of hard steel dropped into the socket *m* to take the friction of the upper end of the step-screw.

The shaft *M* carries a worm, *m'*, similar to my Patent No. 127,575, dated June 4, 1872. This worm drives the register-gear, which is

not shown here, as I make no claim on the same in this case. The register-case *U* is also similar to that described in said patent, except that in my present improvement the face-plate *V* is perforated to allow the passage of the shaft *M*, and forms the upper lateral journal-bearing of the shaft, the upper end of said shaft having end bearing when in its upper position against the bottom of the glass *W*. This arrangement admits of the inspection of the shaft when running, and enables the proper vertical adjustment to be made, by means of the screw *s*, as before described, while the wheel is in motion.

I claim as my invention—

1. Bucket-wheel consisting of a disk, *L*, and buckets *l* and shaft *M*, all constructed of hard rubber, as and for the purpose set forth.
2. The combination of the peripheral water-inlet *B*, horizontal wheel *L l* at or near the mid-height of the water-inlet, and upper and lower axial discharges *o p*, substantially as set forth.
3. The combination of the water-inlet *B*, wheel *L l*, and conical diaphragms *O P*, as set forth.
4. The combination of wheel *L* located at the mid-height of the water-inlet *B*, the outflow-passages *o p S R*, and adjusting screw or pin *s*, substantially as set forth.
5. The combination of the meter-shaft *M* and glass top bearing *W*, substantially as and for the purpose set forth.
6. The combination of water-passage *B*, adjustable plate *H*, temper-screw *I*, and automatic tongue *h*, substantially as set forth.

ISAAC COOK.

Witnesses:

SAML. KNIGHT,
ROBERT BURNS.