F. G. Johnson,

Rotary Meter.

No. 31,055. Patented Jan. 1, 1861.

Fig. 4.

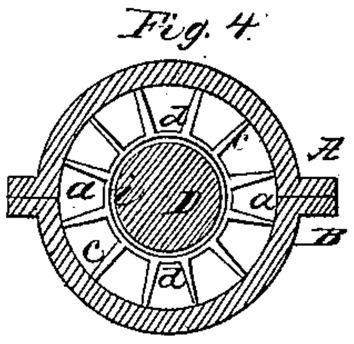


Fig. 5.

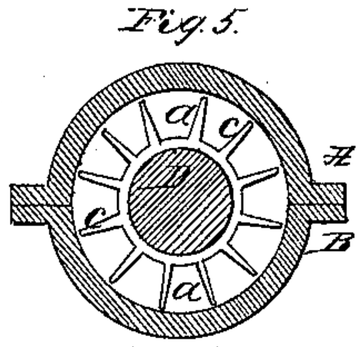


Fig. 1.

Fig. 2.

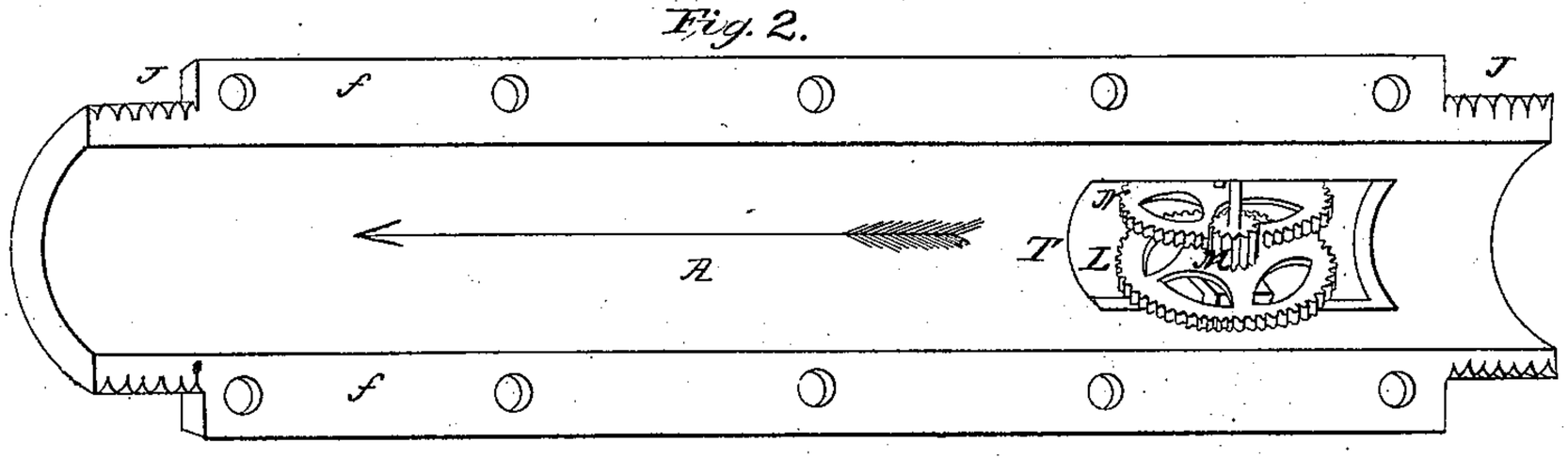


Fig. 3.

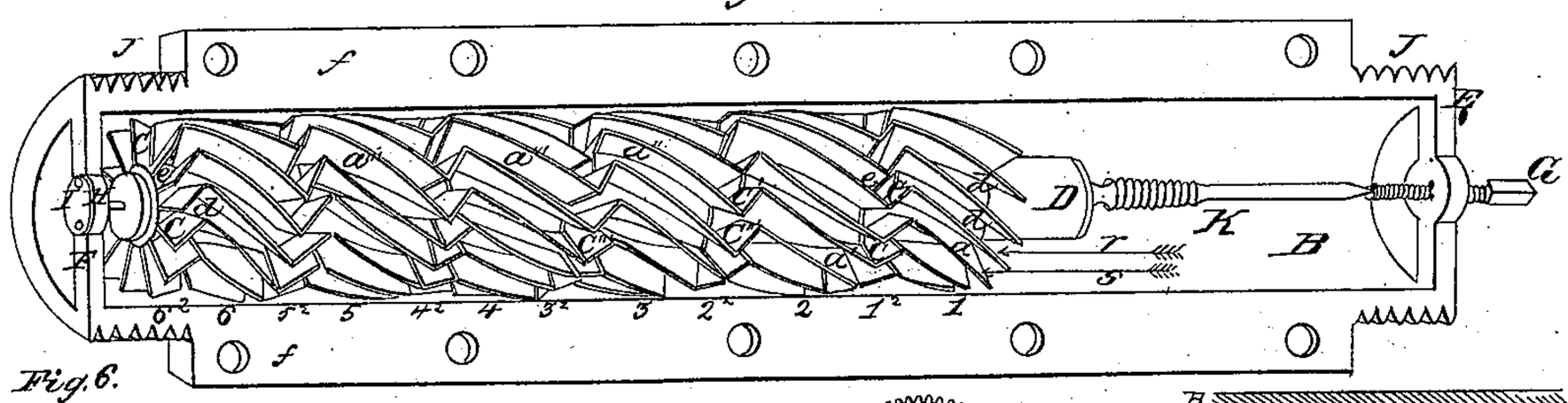


Fig. 6.

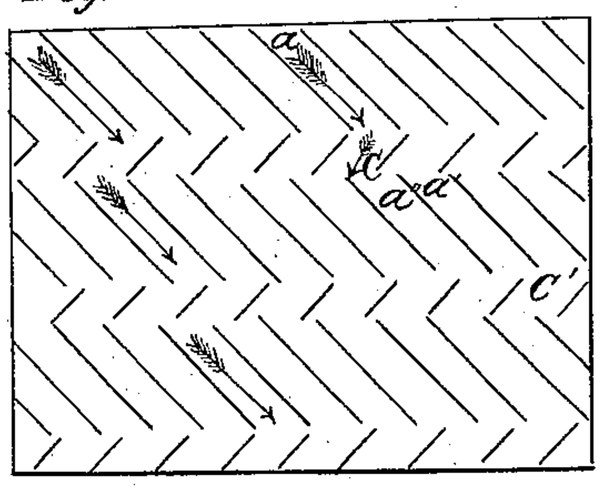


Fig. 7.

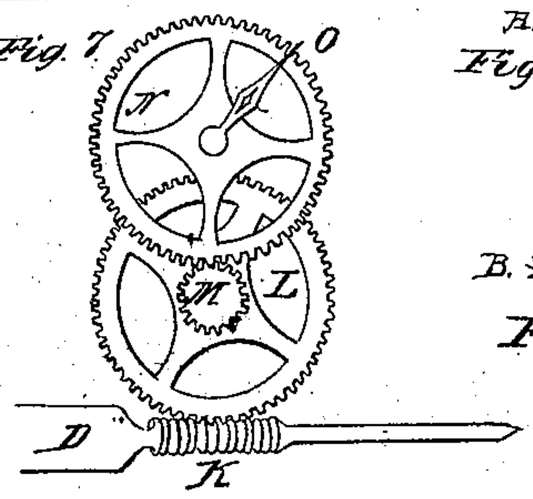


Fig. 9.

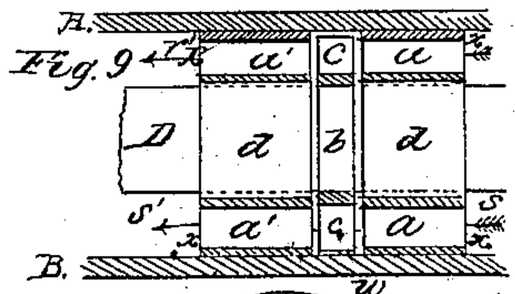
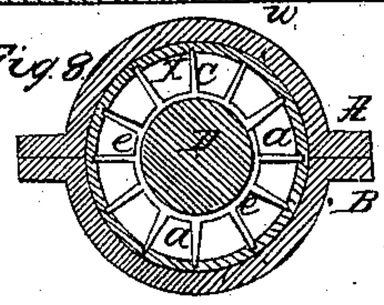


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANK G. JOHNSON, OF BROOKLYN, ASSIGNOR TO HIMSELF, W. T. B. MILLIKEN, AND E. JONES, OF NEW YORK, N. Y.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **31,055**, dated January 1, 1861.

To all whom it may concern:

Be it known that I, FRANK G. JOHNSON, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Mode of Constructing Water-Meters; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is a perspective view; Figs. 2 and 3, longitudinal sections; Figs. 4 and 5, transverse sections; Fig. 6, a view of the interior or motor part of the meter laid out on a plain; Fig. 7, a view of the index-wheels and their connection with the motor of the meter.

The nature of my invention consists in arranging within a pipe or small cylinder a simple shaft adjusted on two points or bearings, and placing on this shaft at suitable distances from each other several wheels or bands having on their outer edges several blades standing at angles of forty-five degrees to the line of said shaft, and then placing in said pipe or cylinder and between the said wheels sections of a hollow screw surrounding the shaft clear of contact but in contact with and held by the inner surface of the pipe or cylinder, leaving the shaft free to be turned by the water passing through spaces between the threads of the screw and coming in contact with the blades on the shaft in perpendicular lines to the surfaces of said blades, by which means the water as it passes through the pipe or cylinder is made to act and react on the inner surfaces of the threads of the screw and the blades on the shaft several times before it leaves the meter, first, by being thrown out of straight lines of motion and thus brought to act and react on the blades of the wheels in the direction of perpendicular lines to their surfaces, by which, from a given pipe of water greater power to move the meter is obtained than could be had with only one set of blades, while at the same time there is no material increase of friction on the shaft.

The nature and operation of my invention are more minutely described, as follows, like letters refer ring to like parts.

A and B represent the pipe or cylinder, which is made in two sections and held together by the screws *m m*, passing through the flanges *f f*; C, a flat surface on the upper section, A, of the pipe or cylinder on which to bolt the register-chamber R; D, the shaft on which the motor or blade-wheels 1^2 2^2 3^2 are fastened; E and F, the cross-braces in which to place bearings for holding the shaft; G, a set-screw into which the upper end of the shaft works, (the meter being set this end up when in use;) H, the lower point or bearing or foot of the shaft which works through F and rests on I, a plate of steel fastened to F. K is a worm-screw to receive and work the register-wheel L. M is a pinion on wheel L to reduce the motion in wheel N; O, the pointer to indicate on the dial-plate P; R, a chamber to contain the register-wheels; Q, a front plate of the chamber containing the glass S, through which the pointers are seen, they working under the plate Q. The frame holding the register-wheels being fastened to the flat surface of the upper section, A, of the pipe or cylinder, the cap or chamber R is merely placed over the whole to prevent the water from passing out through the opening T; J J, screws on each end of the cylinder by which to screw it in connection with the water-pipes. 1 2 3 are sections of the hollow screw, which form spiral water-passages for the water. 1^2 2^2 3^2 are the blade-wheels fastened to the shaft and are made from sections of a hollow screw same as the sections 1 2 3, only having a reversed or left-handed thread; *a a′ a″ a‴*, water-passages formed by the threads of the hollow screw; *c c′ c″ c‴*, the blades, the surfaces of which stand at right angles to the water-passages *e e*, Fig. 8, the band on which are the blades; *d d*, the base of the threads or water-passages. *x x*, Figs. 8 and 9, (not shown in the other figures or model,) represent sections of a thin tube or pipe driven tight onto the several sections of the hollow screw in order that the blades *c c* may project a little beyond the outer edges of the screw, so that no current of water shall pass in the clearage-way between the outer edges of the blades and the inner surface of the cylinder. This method of placing sections of pipes around the sections of the hollow screw is equivalent to making depressions or countersinks in the cylinder to receive the ends of the blades *c c′*, which would bring the

outer lines of the current of water within range of the extremities of the blades, and thus prevent any water from passing through the meter without producing its effects on the blades to move the shaft D. The clearage space between the shaft and inner surface of the hollow screws is shown by *i* in Fig. 4.

The operation of my invention is thus described: The water in passing through the cylinder in the direction indicated by the arrow, Fig. 2, must pass through the water-passages *a a' a'' a'''*, Figs. 3, 4, 5, and 9, and thus be brought to act upon the blades *c c' c'' c'''* in the direction of lines perpendicular to their surfaces, thus causing a rotary motion of the blade-wheels 1^2 2^2 3^2 and the shaft D, on which they are fastened. The several sections of the hollow screw 1 2 3 are clamped and held firmly by the two sections A and B of the cylinder and the hole through them made large enough to admit the shaft D without contact. Suppose the arrows *r* and *s*, Fig. 3, to represent water passing, as it does, in straight lines parallel to the sides of the cylinder, then as it enters between the threads of section 1 it is forced out of its direction and brought in contact with the blades *c c' c'' c'''* at perpendicular instead of oblique angles, thus giving the same stream greater force of action to rotate the blade-wheel 1^2. Now, as soon as the same water has passed the blade-wheel 1^2 it re-enters another set of water-passages, and is thus thrown into an oblique direction again and made to act on the second blade-wheel, 2^2, with as much force to rotate the shaft D as it did on the first, 1^2, and so on with any reasonable number of these sections of water-passages and blade-wheels. Were there an equal number of blade-wheels on the shaft D without the sections of water-passages the water, after passing two or three of them, would get to rotating with the blade-wheels and so lose its force to rotate any of the others as it passes them; but by intercepting these sections of water-passages between the blade-wheels and securing them to the cylinder action and reaction are as powerful to rotate the shaft D on the last and all intervening blade-wheels as on the first. Each blade-wheel is thus made with the same flow of water to contribute equally to overcome one common resistance without increasing that resistance to any perceptible extent.

The shaft D is made large for the purpose of filling up the central part of the cylinder, so as to make the threads or water-passages less deep than would otherwise be needed, and by which means all the water is made to come in contact with the blade-wheels at a greater distance from the center of motion, which gives the same amount of water stronger action and causes the aggregate of the blade-surface to pass through more equal distances and thus avoiding any reaction of the water on the back of the blades. Thus I am able to procure an action or motion of the shaft D sufficiently sensitive for all practical purposes in measuring water by a simple flow of the same through a pipe or cylinder.

The register-wheel L connects with the shaft D at K by means of a worm-screw, and thus motion is given to the pointer O in the ordinary way.

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

The alternate combination of the several (two or more) sections 1 2 3 of the water-passages with the several (two or more) intervening blade-wheels 1^2 2^2 3^2, substantially in the manner and for the purpose set forth.

FRANK G. JOHNSON.

Witnesses:

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H. S. SMITH.