

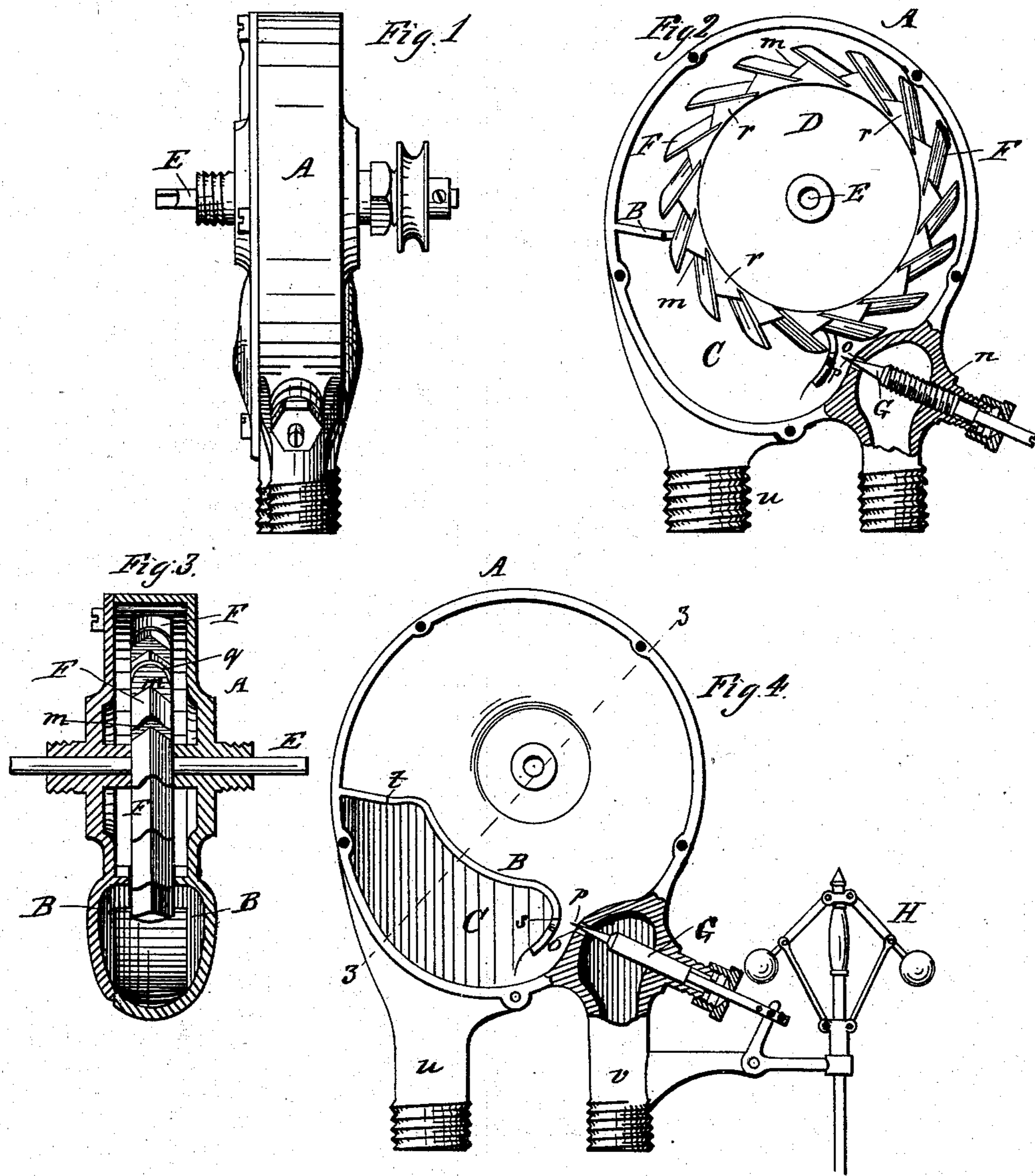
(No Model.)

F. W. TUERK, Jr.

WATER MOTOR.

No. 249,274.

Patented Nov. 8, 1881.



WITNESSES—

F. B. Townsend
Charles Gaylord.

INVENTOR—

Frederick W. Turk, Jr.,
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UNITED STATES PATENT OFFICE.

FREDERICK W. TUERK, JR., OF CHICAGO, ILLINOIS.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 249,274, dated November 8, 1881.

Application filed October 4, 1880. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. TUERK, Jr., a citizen of the Dominion of Canada, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Motors; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, of which—

Figure 1 is an end elevation of my device; Fig. 2, an interior side view, partly in section; Fig. 3, a section taken on the line 3 3, Fig. 4; and Fig. 4, a side view, partly in section, showing the device with the addition of a governor for regulating the valve.

My invention relates to a water-motor for running machinery, principally of the lighter kinds; and it consists in the peculiar construction of the wheel and buckets; also, in the peculiar construction of the interior wall, which, in combination with the case and wheel, forms the impact and waste chamber; also, in the construction and arrangement of the valve which controls the inlet of water to the wheel, and also in combining with such valve an automatic governor, all as hereinafter more fully set forth.

In the drawings, A is the case of the motor, having an inlet-pipe, *v*, and discharge-pipe *u*, as shown. The motor, when set in position, is intended to stand with these pipes downward, as represented.

B is a flange in the lower part of the case, of the form and in the position shown. It is formed partly upon the back and partly upon the lid of the case, and is recessed out in each from the point *t* to the point *s*, to receive the rim of the wheel. Thus when the lid is placed in position the flanges meet and form, with the wheel, the waste-chamber C.

D is the wheel, which is mounted on a central shaft, E, journaled into the case in the usual manner. The wheel is provided on its periphery with stationary buckets, and the peculiarity of this part of my invention lies in the particular construction of the buckets and also of the rim of the wheel, whereby not only the greatest degree of resistance is offered to the water, but, furthermore, the water is prevented

from passing around the case with the wheel and impeding its action, being almost entirely discharged from each bucket in turn before the latter leaves the waste-chamber. This construction is as follows: The rim of the wheel is formed with angular projections *r*, resembling steps, upon its periphery. The buckets F are of the form of angular troughs, inverted over the step-like projections *r*, their rear ends being beveled to conform to the backward slope of the projection at that point. The buckets are of sufficient length to extend beyond the tops of the projections, and their forward ends are recessed back in a curve from base to apex, as shown at *g*.

G is a conical valve, terminating in a point, *p*, and passing through an orifice, *o*, with parallel sides, leading from the inlet-pipe *v* into the interior of the case. I prefer to have this valve regulated by a governor, H, revolved directly or indirectly by the shaft of the motor, in order that uniformity of action may be automatically secured and the volume of water used always be proportioned to the work done. The employment of a governor with a valve such as is here shown overcomes one of the great objections heretofore made to water-motors—viz., that there is an equal loss of water whether the resistance is great or small. Nevertheless, the valve may be regulated otherwise than automatically, if preferred, by providing the stem with a screw, *n*, as shown in Fig. 2, and turning it as occasion demands with a suitable implement.

It will be observed that the opening *o* is cylindrical, while the valve passing through it is tapering. The consequence of this construction is that the water, after entering through the annular space between the valve and the outer edge of the opening, follows the surface of the valve, and not the sides of the opening, and flows from the end in a solid stream, varying in volume according to the size to which the annular space is graduated. The velocity of the stream, moreover, whether the volume is increased or diminished, continues uniform. The sides of the opening, instead of being perfectly parallel, may, if desired, be made slightly flaring in a direction contrary to the taper of

the valve, so that the opening shall be a little wider at its inner than at its outer edge. Such an opening is in all respects the equivalent of the one with parallel sides; but in no case should the taper of the opening correspond in direction with that of the valve, since such construction tends to defeat the objects sought to be produced.

Pointed valves passing entirely through the seat have been used before; but in all cases, so far as I am aware, the seat has been made convergent with the valve. To such construction I make no claim.

The result of the construction above described of the buckets and valve is that the impact of the water is all concentrated into the point *m*, at the rear of the apex of the bucket and against the forward face of the projection *r*. The same construction which tends to concentrate the water, as described, thus producing the greatest effect with a given volume of water, also affords, incidentally, the freest possible discharge, and almost as soon as the bucket passes out of range of the stream its entire contents are emptied into the waste-chamber C.

One of the objects of locating the conical valve below the wheel, as shown, is to take advantage of the lifting tendency which it exerts to relieve the friction of the shafts in the journals.

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

1. In a water-motor, the wheel D, having the angular projections *r* upon its periphery, in combination with the trough-like buckets F, inverted upon and secured to the said projections, substantially as shown and described.

2. In combination with the case A, having the inlet-pipe *v* and discharge-pipe *u*, and the wheel D, having the buckets F, the flange B, formed partly on the back and partly on the lid of the case and recessed to receive the wheel, substantially as described.

3. In combination with the case, wheel, and buckets of a water-motor, the conical valve G, passing through a cylindrical orifice, *o*, in said case, substantially as shown and described, whereby the entering water follows the surface of the valve and leaves the end thereof in a solid stream, as set forth.

4. In combination with the case, wheel, and buckets of a water-motor, the adjustable conical valve G, passing through a cylindrical orifice, *o*, in said case, and the governor H, the whole being constructed and arranged to operate substantially as described.

FREDERICK W. TUERK, JR.

In presence of—

EPHRAIM BANNING,
CHARLES C. LINTHICUM.