A. W. BUSH.
Water-Motor.

No. 207,247. Patented Aug. 20, 1878.

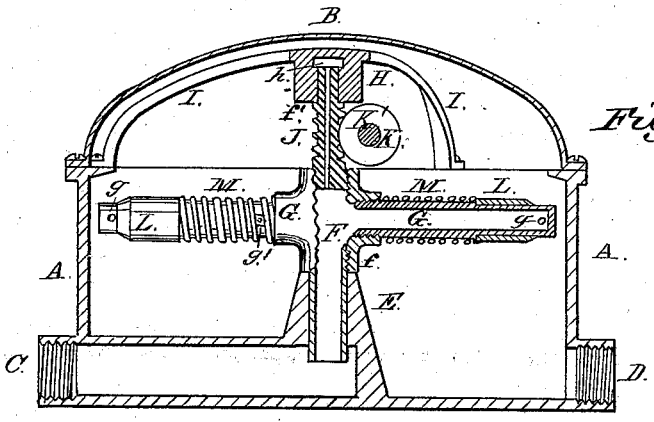

Fig. 1.

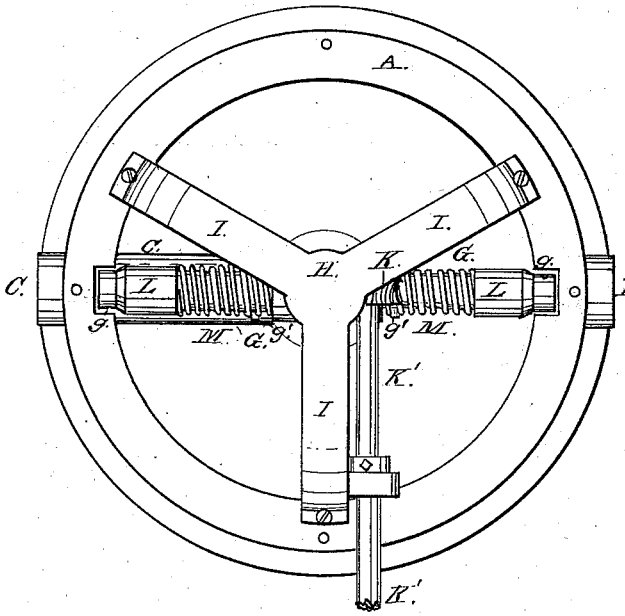

Fig. 2.

Witnesses:
Geo. H. Knight.
Chas J. Gooch

Inventor:
Arthur W. Bush
By Knight Bros. Attys.

UNITED STATES PATENT OFFICE.

ARTHUR W. BUSH, OF BOULDER, COLORADO.

IMPROVEMENT IN WATER-MOTORS.

Specification forming part of Letters Patent No. **207,247**, dated August 20, 1878; application filed January 8, 1878.

To all whom it may concern:

Be it known that I, ARTHUR W. BUSH, of Boulder, Boulder county, in the State of Colorado, have invented a certain new and useful Improvement in Water-Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

My improvement consists in an upright pipe, turning in bearing at top and bottom, said pipe being in communication at the lower end with a water-supply. It has a cross-pipe, closed at the ends, and having near each end an orifice, through which the water escapes to cause the rotation of the pipe. Upon each end of the cross-pipe is a sliding sleeve, that is connected at the inner end to the cross-pipe by a spring, and which is capable of sliding out, so as to close, or partly close, the water-discharge orifice. These sleeves are moved outward by centrifugal force, and form governors, because, upon an increase of speed, they partly close the orifices, and so limit the speed by decrease of the discharge of water. The part of the upright pipe above the cross-pipe carries water to a water-chamber above it, so as to give a downward pressure, to partially counterbalance the upward pressure of the water, and so to balance the upright pipe or tubular shaft in its bearing. The working parts are inclosed in a case.

In the drawings, Figure 1 is an axial section through the case, showing a portion of the working parts in section. Fig. 2 is a top view with the cover of the case removed.

A is the case, and B the cover of the same. C is the induction-water pipe, and D is the waste-pipe, through which the water escapes from the case after passing through the motor. At the center of the case is the step-bearing E of the tubular shaft F.

The induction-pipe is in communication with the bore of the shaft F, so as to cause an upward flow of the water therein to feed the radial pipe or tubular arms G, closed at the ends, and extending horizontally from the tubular shaft F to near the sides of the case. *g* are orifices in the sides of the arms G, near the ends, for the escape of jets of water, the jets from one arm being thrown in an opposite direction to that from the other, so as to cause the revolution of the pipe and give rotation to the shaft F. The shaft F has a small bore, extending to its upper end, and communicating with a water-chamber, *h*, in the upper shaft-bearing H, so as to give a water-pressure upon the top of the shaft to partly counterbalance the upward pressure, and thus balance the shaft F in its bearings. The shaft is held in proper vertical position by shoulders *f f'*, bearing upon the lower and upper bearings E and H, respectively. The bearing H is at the center of a spider, I, secured to the top of the case A, and covered by the dome-shaped lid B. Between the cross pipe or arms G and the upper bearing, H, the shaft F is provided with a gear-screw, J, engaging with a screw-gear wheel, K, upon a shaft, K', through which motion is communicated to any machinery.

I do not confine myself to a screw-gear as the means for transmission of power, as the power may be communicated from the motor to any machinery by a cog-gear or belt, or other well known or suitable means; but as the shaft F may rotate at a very high speed the screw-gear forms a good means for the transmission of power to machinery not requiring so high a speed.

L L are sleeves, fitting neatly the ends of the tubular arm G, and sliding easily thereon, so as to close, partially or wholly, the jet-holes *g*. M M are springs, surrounding the arms G, and connected at the outer ends to the sleeves L. The inner ends of the springs are attached to the arms G, so as to hold the outer end of the sleeves from overlapping the holes *g* when the motor is at rest or moving at a proper speed; but when the desired speed is exceeded, the sleeves are moved outward by the increase of centrifugal force, and overlap more or less the holes *g*, so as to act as a speed-governor by diminishing the escape of water. The inner ends of the spring are secured to the tubular arms by pins *g'*, which project through the coils; and it will be seen that by turning the spring so as to move the coil upon the pin the governor-sleeve may be adjusted

inward or outward on the arm G, so as to give an increase or decrease of the mean speed.

I claim as my invention—

1. The combination, with the tubes F and G and the screw-gear J K, of the water-pressure chamber *h*, in communication with the water-supply, for the purpose set forth.

2. The combination, with radial revolving pipe or tubular arm G, of the spring-governor, consisting of cut-off sleeve L and a retracting-spring, M, for the purpose set forth.

3. The combination, with the arm G, sleeve L, and spiral spring M, of the pin *g'*, for the described adjustment of the governor.

ARTHUR W. BUSH.

In presence of—

SAML. KNIGHT,

GEORGE H. KNIGHT.