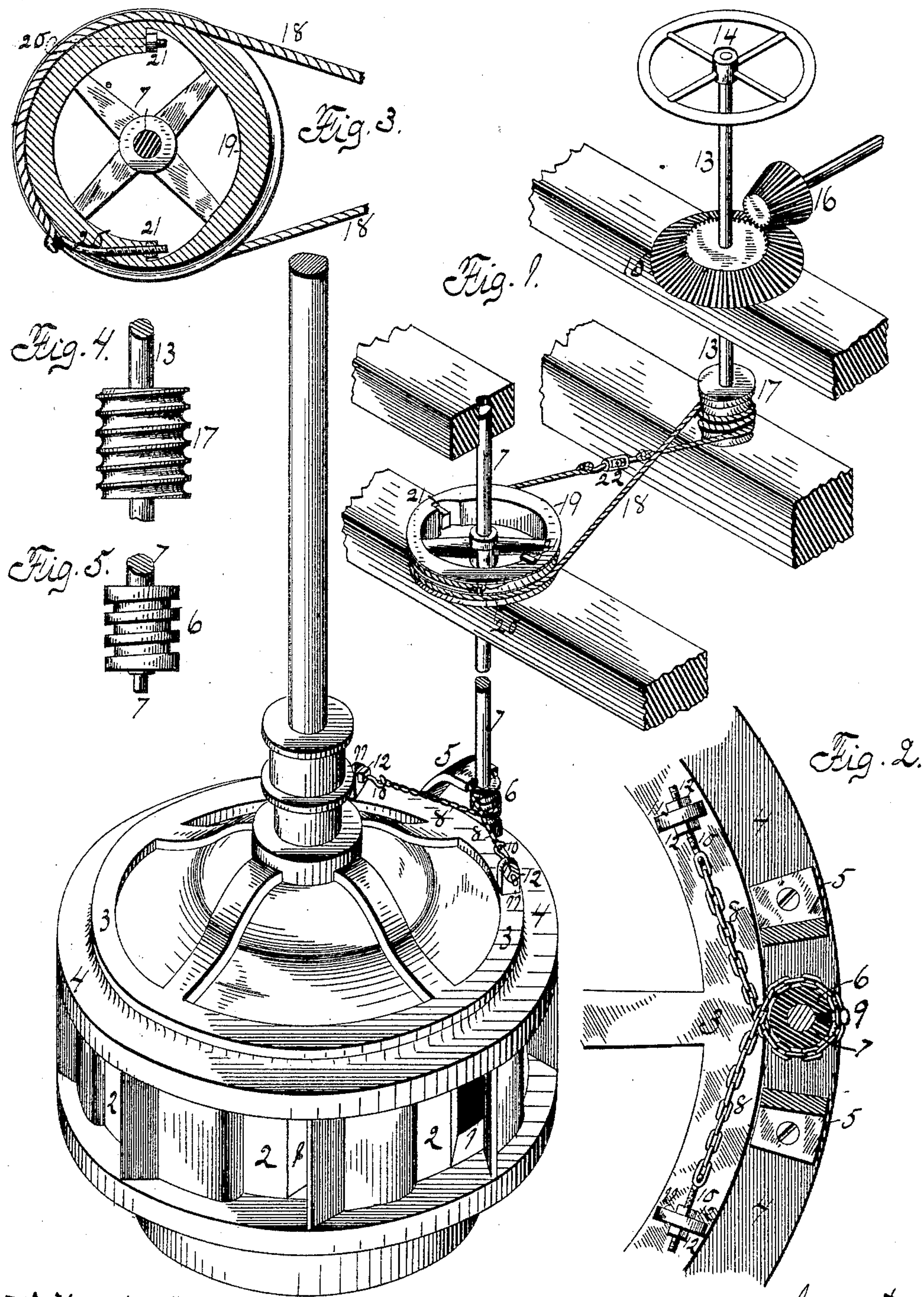


(No Model.)

H. B. UTTER.
WATER WHEEL CONTROLLING DEVICE.

No. 437,825.

Patented Oct. 7, 1890.



Witnesses:
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UNITED STATES PATENT OFFICE.

HORACE B. UTTER, OF ROCKFORD, ILLINOIS.

WATER-WHEEL-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 437,825, dated October 7, 1890.

Application filed May 21, 1889. Serial No. 311,606. (No model.)

To all whom it may concern:

Be it known that I, HORACE B. UTTER, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in a Water-Wheel-Controlling Device, of which the following is a specification.

The object of this invention is to control the revolutions of a water-wheel by connecting the gate of the wheel with a governor in such a manner that the action of the governor will be transmitted to the gate without any practical lost motion, thereby enabling the wheel to revolve with more uniform speed.

This invention consists of a gate of a water-wheel and a governor having a flexible connection with the gate; also of the various adjustments of the flexible connections, and the construction and combination of the parts hereinafter described.

In the accompanying drawings, Figure 1 is an isometrical representation of a water-wheel and its connection with a governor. Fig. 2 is a plan view, partly in section, of an upper portion of a water-wheel, showing the connection of the gate with the gate-shaft. Fig. 3 is a horizontal section of the large driven grooved face-pulley, showing the device for tightening the cable. Fig. 4 is a face view of the spirally-grooved face-pulley employed to transmit motion to the gate-shaft. Fig. 5 is a face view of the spirally-grooved faced pulley connected with the gate-shaft, and also connected to the gate by a flexible connection.

In the drawings the water-wheel shown is of the ordinary construction, and I deem it necessary to refer only to the parts with which my improvements have a close connection.

The water-wheel has the usual water-inlets 1, and a gate 2, supported by an annular ring 3, resting upon the top frame 4 of the wheel. The movements of the gate will open or close the water-inlets for the purpose of starting or stopping the wheel.

Upon the upper face of the top frame 4 is secured an arch 5. Under the arch is placed a spirally-grooved wheel 6, and a gate-shaft 7 passes through the arch and wheel and enters a seat in the top frame. The wheel is secured to the shaft so as to move therewith.

A chain 8 is passed around the wheel 6 and is secured thereto by a pin 9 or other suitable means. The links of the chain that lie in a horizontal position are made to partly enter the grooves of the wheel, and the links that stand in a vertical direction come in contact with the pulley of the wheel, thus winding and unwinding the chain upon the wheel in an even manner without jerking, as is common in ungrooved wheels. The grooves of this wheel are spiral, so as to permit the crossing of the chain, as shown in Figs. 1 and 2.

Each end of the chain 8 has a connection with the gate of the wheel by a screw-hook 10 passed through supports 11 and screw-nuts 12 placed on each side of the support. By means of these screw-nuts the slack of the chain may be taken up, so that any movement imparted to the gate-shaft in either direction will be transferred to the gate without loss of motion.

A vertical shaft 13 has a hand-wheel 14 at its upper end and a bevel gear-wheel 15 some distance below the hand-wheel. A bevel-pinion 16, connected to the governor, meshes with the bevel gear-wheel.

A screw-wheel 17 is secured to the shaft 13 below the beveled gear-wheel and has a connection with the gate-shaft by a cable 18. This cable is passed around the screw-wheel 17 a sufficient number of times and has its center portion secured thereto. The free ends of the cable pass partly around the grooved wheel 19, which is secured to the gate-shaft.

The manner of securing the ends of the cable to the wheel is shown at Fig. 3, which consists of a hook 20 having a screw-threaded end. The cable engages the end of the hook, and the hook is passed through an opening in the rim of the wheel from the outside to the inside, where a screw-nut 21 is placed on its screw-threaded end, and by means of which the cable may be tightened. Both ends of the cable are secured in the same manner, each end in a groove of its own provided in the periphery of the wheel.

A turn-buckle 22 is placed in one section of the cable for the purpose of adjusting the cable as to length, also to let out any twist that may manifest itself.

As the governor turns the shaft 13, it will

in turn oscillate the gate-shaft, and by reason of its chain-connection with the gate the gate will be opened or closed to admit more or less water to the wheel, thereby increasing or
5 decreasing the revolutions of the wheel, as occasion requires, without loss of motion.

This arrangement is especially adapted for electric-light plants run by water-power, and in which great difficulty is experienced in
10 controlling the movement of the wheel to produce a steady power.

This arrangement is to take the place of the ordinary gearing and shafting now in use, and in which the serious trouble is the play
15 or lost motion in the gearing.

In this invention I have employed a cable to connect the governor with the gate-shaft.

It is evident that a chain may be used under certain circumstances without departing from my invention.

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I claim as my invention—

In a water-wheel-controlling device having an adjustable gate, a gate-shaft, and a governor, the provision of a flexible connection between said gate and gate-shaft, with means
25 for taking up the slack, and a flexible connection or gear between the gate-shaft and governor, with means for taking up the slack, substantially as set forth.

HORACE B. UTTER.

Witnesses:

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