No. 731,570. PATENTED JUNE 23, 1903.

G. J. HENRY, JR.

WATER NOZZLE FOR IMPACT WATER WHEELS.

APPLICATION FILED APR. 8, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

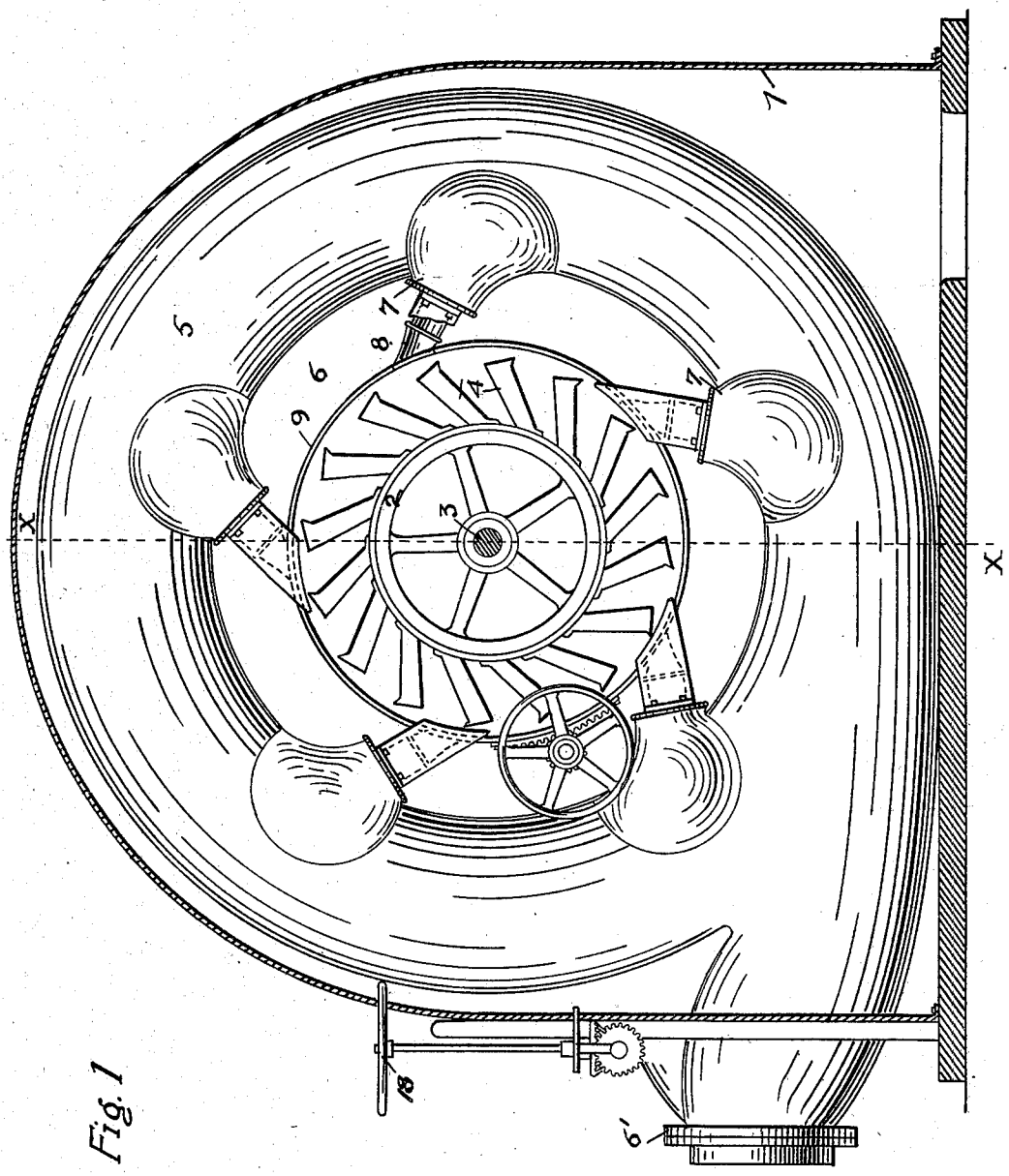

Fig. 1

WITNESSES:

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INVENTOR:

George J. Henry, Jr.

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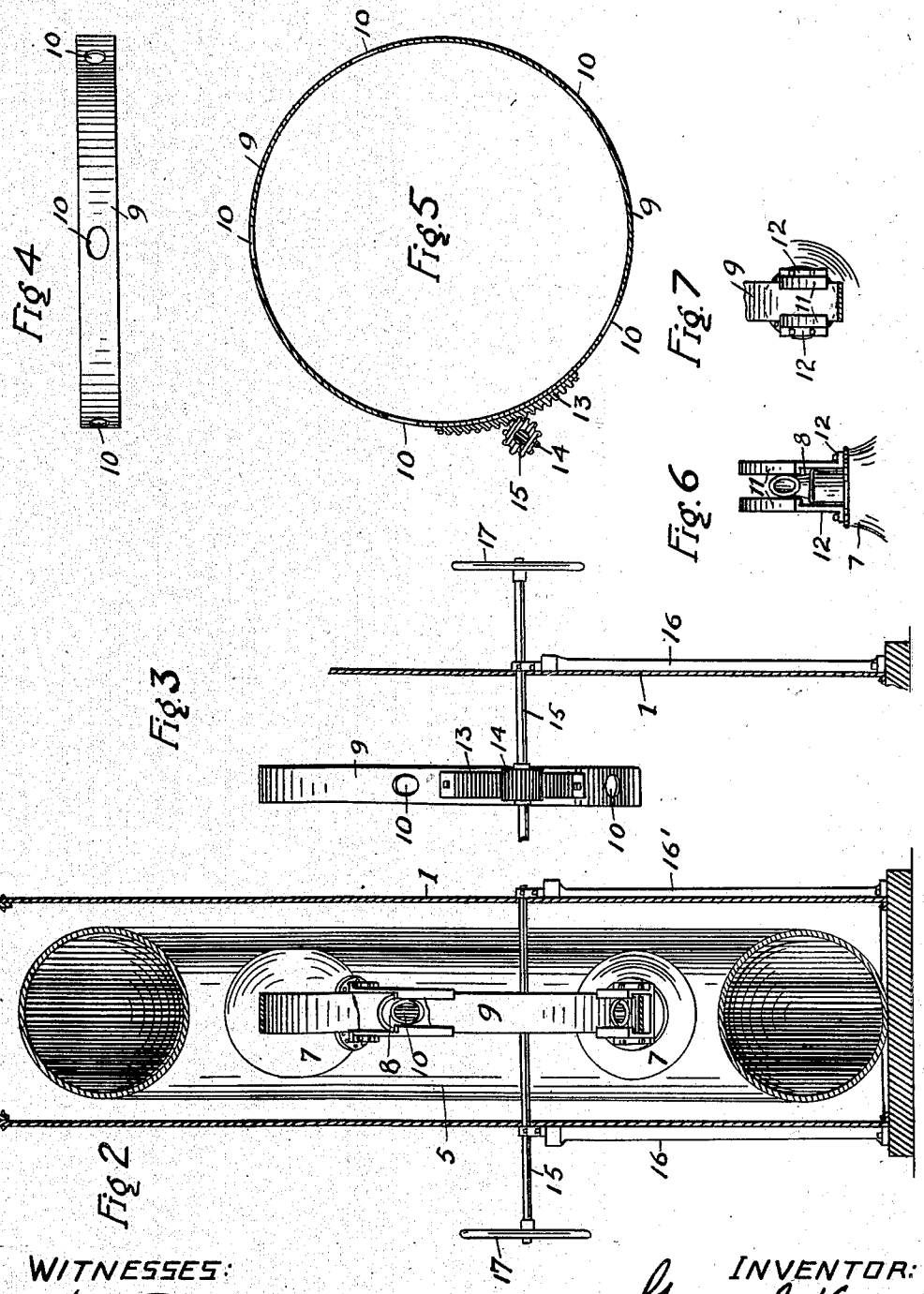

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UNITED STATES PATENT OFFICE.

GEORGE J. HENRY, JR., OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO PELTON WATER WHEEL COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

WATER-NOZZLE FOR IMPACT WATER-WHEELS.

SPECIFICATION forming part of Letters Patent No. 731,570, dated June 23, 1903.

Application filed April 8, 1902. Serial No. 101,863. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. HENRY, Jr., a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Water-Nozzles for Impact Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to a certain new and useful water-nozzle for use in connection with that class of water-wheels known as "impact-wheels" or those propelled by a jet of water or impact-stream ejected against a series of impelling-buckets attached to the periphery of the wheel.

The invention also consists in certain means whereby the outlets of the nozzle may be controlled to vary the area of the discharged streams or to regulate the outlet-openings of the nozzle.

To comprehend the invention, reference should be had to the accompanying sheets of drawings, wherein—

Figure 1 is a side view in elevation, disclosing the invention as applied to a tangential water-wheel, the casing for the wheel and nozzle being in section. Fig. 2 is a vertical sectional end view taken on line $x\,x$ of Fig. 1 of the drawings. Fig. 3 is a detail end view of the nozzle cut-off and its adjusting mechanism. Fig. 4 is a top plan view of the cut-off band for the nozzle. Fig. 5 is a sectional view of the band or plate. Fig. 6 is a detail view of one of the guides for the cut-off band; and Fig. 7 is a plan view of one of the guides, showing a portion of the cut-off band or plate therein.

In the drawings the numeral 1 is used to indicate a casing or housing of any suitable type for the water-wheel 2, located therein, which wheel is secured to the shaft 3, working through the casing. To the periphery of this wheel is secured a series of water-buckets 4, preference being given to the centrally-divided class of buckets.

Within the housing or casing 1 is arranged the water-nozzle 5, which in the present case completely encircles the water-wheel 2. This is located a distance from the water-wheel, so as to give a clearance-space 6 for free rotation of the wheel within.

The water-wheel nozzle is illustrated as being formed integral with coupling-section 6′, which extends outside of the casing or housing and forms connection with the water-line or supply-pipe. (Not shown.)

The water-nozzle 5 is formed with a series of outlet-openings 7, arranged an equidistance apart, each opening in the present case being provided with a nozzle-tip 8, through which the water escapes. By this arrangement of a water-nozzle with a series of outlet-openings a number of impact-streams or water-jets are simultaneously discharged tangentially against the buckets of the water-wheel.

In front of the outlets of the nozzle is located a slide cut-off 9, which in the present case consists of a circular band. This cut-off 9 is provided with a series of openings 10, which are designed to register with the outlets of the nozzle. The cut-off works within the guideway formed by the flanges 11 of the plates 12 and the face of the nozzle-tips. However, any suitable form of guideway or support for the slide cut-off may be utilized. To one portion of the slide cut-off is secured the rack 13, with which meshes a rack-pinion 14, attached to inner end portion of cross-rod 15. This rod extends through the casing or housing 1 and is supported by uprights 16 16′. To the end of the rod 15, projecting beyond support 16, is attached a band-wheel 17, by means of which the rod is turned to actuate the rack-pinion, so as to operate the slide cut-off to place its openings 10 in or out of registry with the outlets of the nozzle, the nozzle-tips when used being considered a portion of the outlets of the nozzle 5. By means of this cut-off mechanism the outlet-openings of the nozzle are controlled or regulated to increase or decrease the area of the impact-streams discharged therefrom onto the water-wheel buckets.

The water-nozzle may only partially encircle the water-wheel; but I prefer to extend the same therearound. By so encircling the wheel the force of the impact-streams is evenly distributed, thereby approximately balancing the wheel throughout its work.

Section 6′ of the water-nozzle is provided with a controlling-gate (not shown) which is raised or lowered by mechanism 18 in order to admit or cut off the supply of water to said nozzle from the main-line pipe.

Having thus described the invention, what is claimed as new, and desired to be protected by Letters Patent, is—

In combination with an impact-wheel, a water-nozzle provided with a series of outlet-openings, a nozzle-tip for each outlet-opening, plates secured to the nozzle on opposite sides of the nozzle-tips and projecting outwardly to a point beyond the discharge ends of said tips, inwardly-turned flanges at the free ends of the plates, and a cut-off slidable between said plates and between the flanges thereof and the discharge ends of the nozzle-tips; substantially as and for the purpose described.

In witness whereof I have hereunto set my hand.

GEORGE J. HENRY, JR.

Witnesses:
N. A. ACKER,
D. B. RICHARDS.