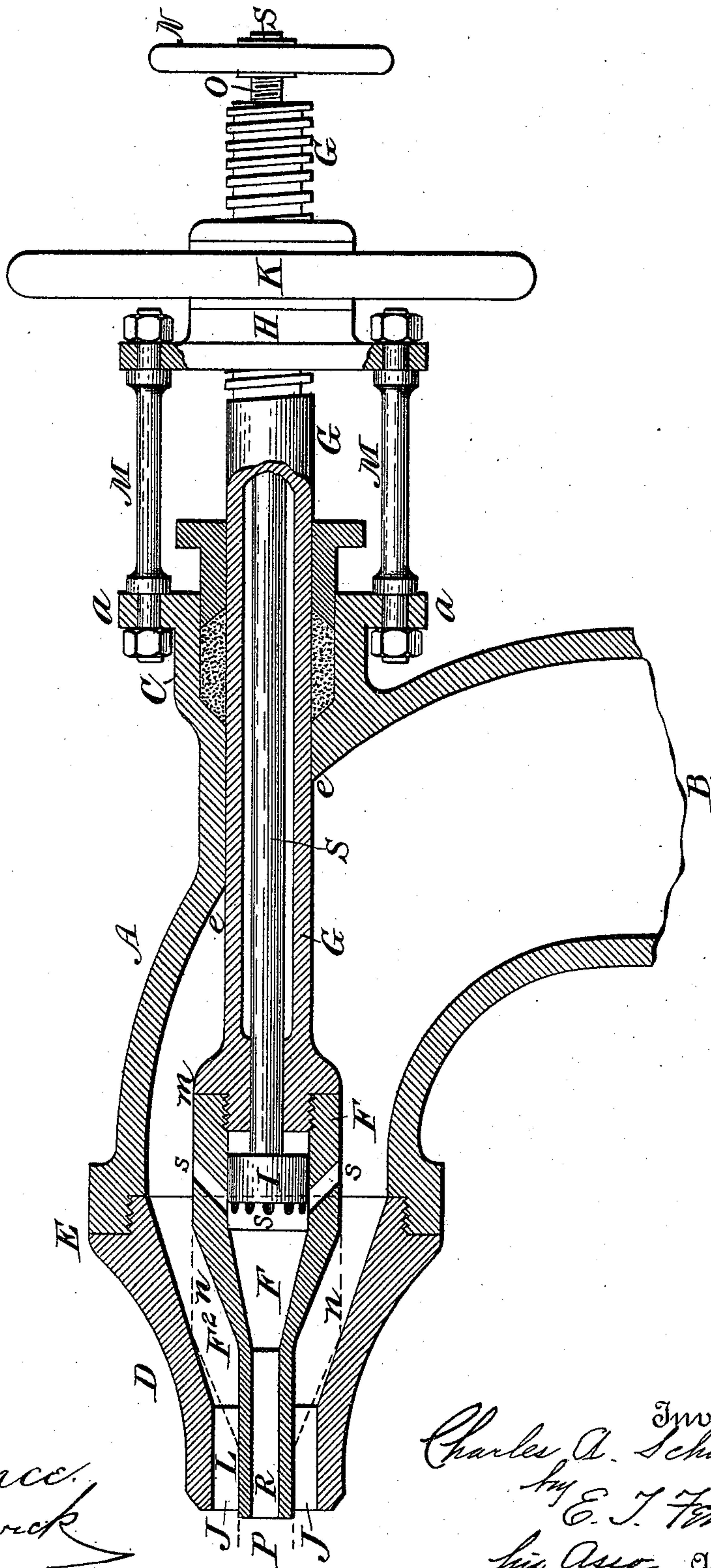


(No Model.)

C. A. SCHARFF.
WATER WHEEL NOZZLE.

No. 485,663.

Patented Nov. 8, 1892.



Witnesses

Everance.
John H. Henwick

Inventor
Charles A. Scharff.
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his Atty. Attorney

UNITED STATES PATENT OFFICE.

CHARLES A. SCHARFF, OF SAN FRANCISCO, CALIFORNIA.

WATER-WHEEL NOZZLE.

SPECIFICATION forming part of Letters Patent No. 485,663, dated November 8, 1892.

Application filed July 8, 1891. Serial No. 398,869. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. SCHARFF, 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 Adjustable Nozzles for Tangential Water-Wheels; and I hereby declare the following description and drawing to be a full and exact description of my invention.

My invention relates to that class of water-wheels wherein water under pressure is forcibly ejected against the bucket or vanes of unsubmerged water-wheels, commonly called "tangential wheels," and to means for changing the section or volume of the jet of water impinging on such wheels without destroying its solidity and maintaining the dynamic effect in proportion to the volume of water consumed or passing through the nozzles; and it consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter described and claimed.

The drawing herewith shows one of my improved nozzles, the main operating parts being in section.

The main member A is connected with the water-supply by an extension at B. On the exterior of this member A is formed a packing-box C, having lugs *a a* and struts or pillars M M for supporting the nozzle-adjusting mechanism to be hereinafter described. To the end of this main member A is attached the main or exterior nozzle D by either a screwed or flanged joint at E. Concentric within this nozzle D is a second nozzle or core-piece F, consisting of a parallel or nearly parallel section L and a conical section F², supported on a stiff stem G, which takes its bearing in the main casting at *e* and also in the adjustable screw-bearing H. This adjustable nozzle F is made hollow with inlets *s s* and an adjustable valve I, so a central jet of water can be discharged through this nozzle at R independent of or in conjunction with the main annular jet passing out at J J. The extension L of the nozzle F can be made parallel or slightly tapered in this part along a portion of its length without changing its functions and the water permitted to maintain its initial velocity from the beginning to the end of the parallel extensions.

The central nozzle or core-piece F is moved forward or back by turning the hand-wheel K, which operates a nut on the screwed portion of the stem G. In this way the nozzle F can be advanced until it takes the position indicated by the dotted lines *n*, closing entirely the annular jet at J, or in various positions modifying this main jet to correspond with the power required or the resistance offered to the water-wheel on which the water is discharged.

The central or regulating nozzle F is attached to the stem G by a screwed joint *m*, and in its enlarged or conical part contains a sliding piston-valve I, which opens and closes the inlets *s s* as the stem S is adjusted forward or back by means of the hand-wheel N and screw extension O of the stem S, which latter has its bearing in the main stem G. In this manner the adjustment or position of the valve I is not affected by the regulating movement of the main stem G and core-nozzle F.

The influence of the parallel or nearly parallel portion L of the core-nozzle F on the annular jet issuing at J J is such as to cause the water to converge toward the center after passing the end at P, and thus prevent diffusion, which diminishes the dynamic effect of the jet; also, the central or core jet R when employed will move at less velocity than the enveloping jet issuing at J, this being due to the fact that the aggregate area of the openings *s* is smaller in proportion to the outlet R than the area of the passage surrounding openings *s* is to the outlet J when the latter passages are most open, thus tending by such retardation to condense and draw toward the center the outward or enveloping section of the main jet at J J, thus producing what is called a "solid stream," capable of variation in volume and to suit the resistance or power required. The effect produced by the section L of the internal nozzle, which is preferably made even with or projecting beyond the main nozzle D, is wholly different from the result produced by means of a pointed cone sometimes employed to regulate the discharge of water-wheel nozzles, and this difference in effect is the obtaining of a determined initial velocity to the outgoing stream, the result being obtained by having the termini cylindrical instead of conical.

It will be understood that although I have shown in the drawing hand apparatus for the adjustment of the nozzle F such adjustment can be performed by power and by means of 5 centrifugal governors, the action of which will depend on the speed of the water-wheel driven. It will also be understood that in cases where the friction and resistance of the stem G is more than can be controlled by a 10 centrifugal governor directly attached hydraulic pistons or other supplemental power can be applied to move the stem G in the usual manner.

Having thus explained the nature and objects of my invention and illustrated the manner of constructing and applying the same, what I claim, and desire to secure by Letters Patent, is—

1. In a water-wheel nozzle, the adjustable 20 internal core-piece or nozzle F, with a parallel or nearly-parallel section L and a conical section F², made hollow, to discharge a central

jet and provided with inlets s s and a valve I, so arranged as to discharge a central stream and at the same time by adjustment of this 25 nozzle control the amount of water passing at the orifice J J of the main nozzle, substantially in the manner and for the purposes described.

2. In a water-wheel nozzle, as herein described, the main nozzle D, the internal regulating-nozzle F, hollow screw-stem G, valve I, and control screw-stem S, so arranged as to discharge and control an annular jet from the 35 main nozzle D and a central or core jet from the inner nozzle F, substantially in the manner and for the purposes described.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

CHARLES A. SCHARFF.

Witnesses:

ALFRED A. ENQUIST,
WILSON D. BENT, Jr.