

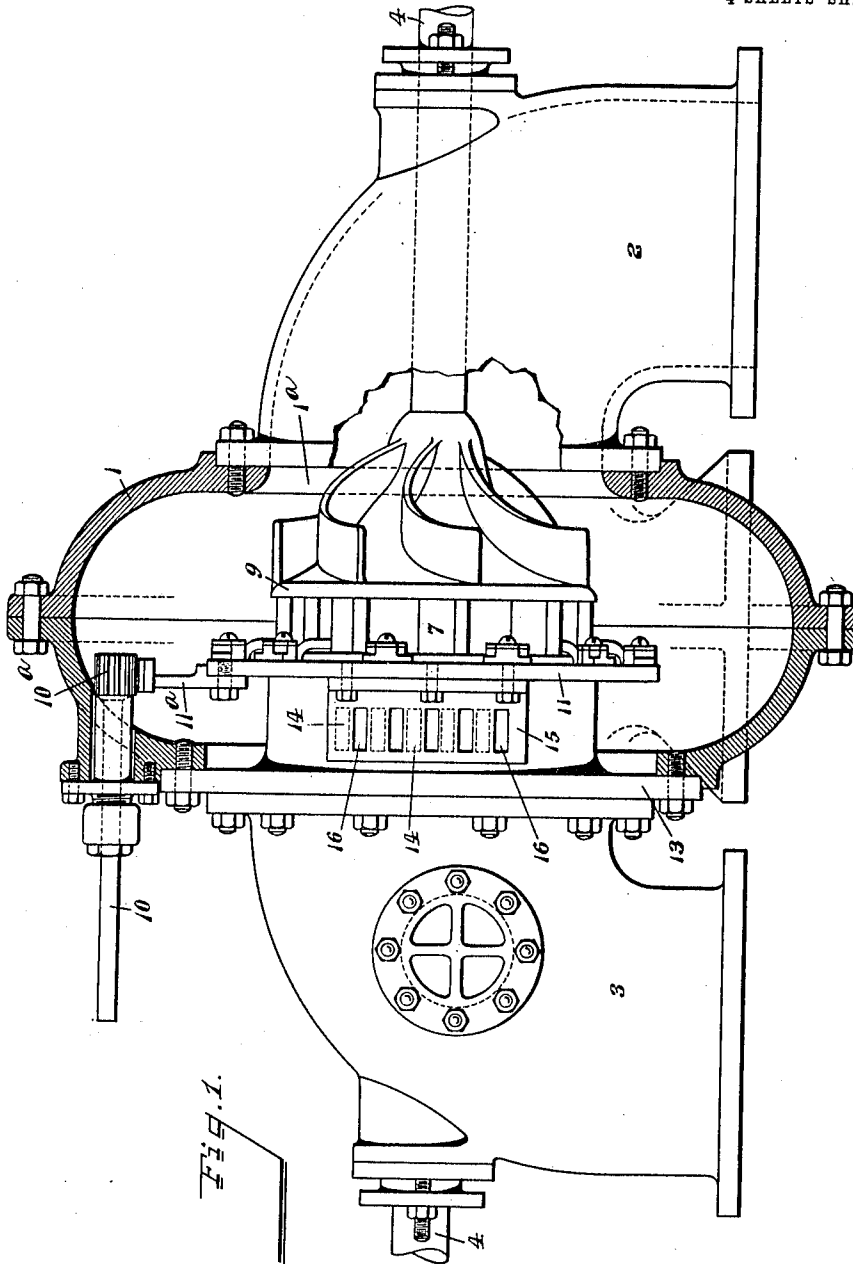
F. TRUMP.
WATER WHEEL.

APPLICATION FILED APR. 28, 1911.

1,035,275.

Patented Aug. 13, 1912.

4 SHEETS-SHEET 1.



Inventor

Fuller Trump
By Staley W. Borman

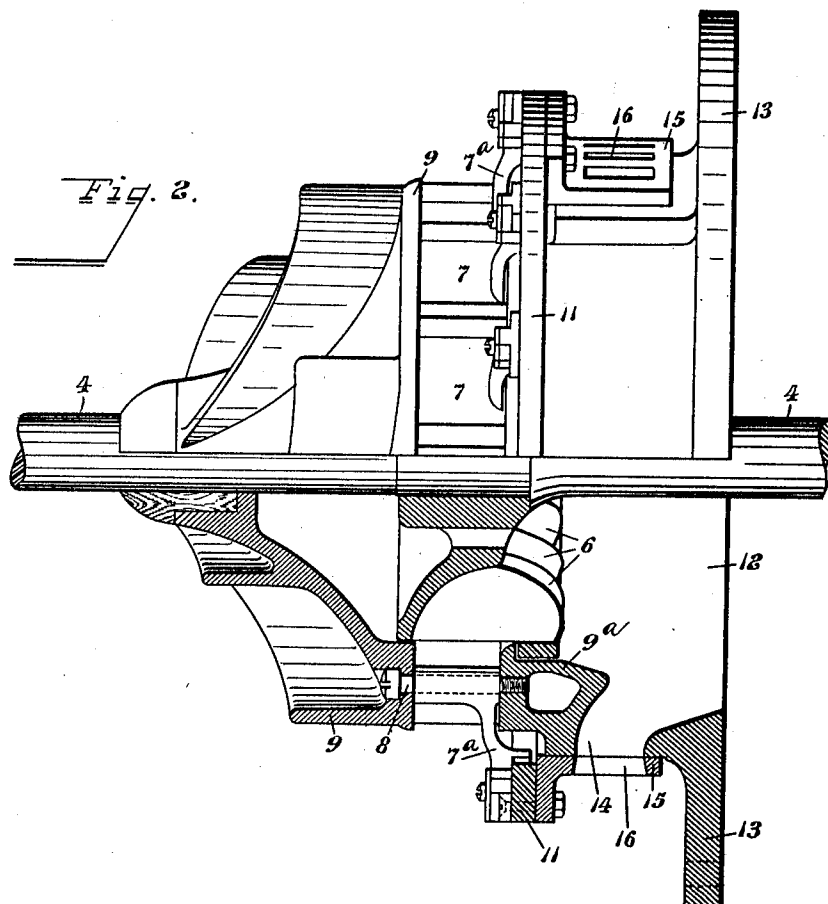
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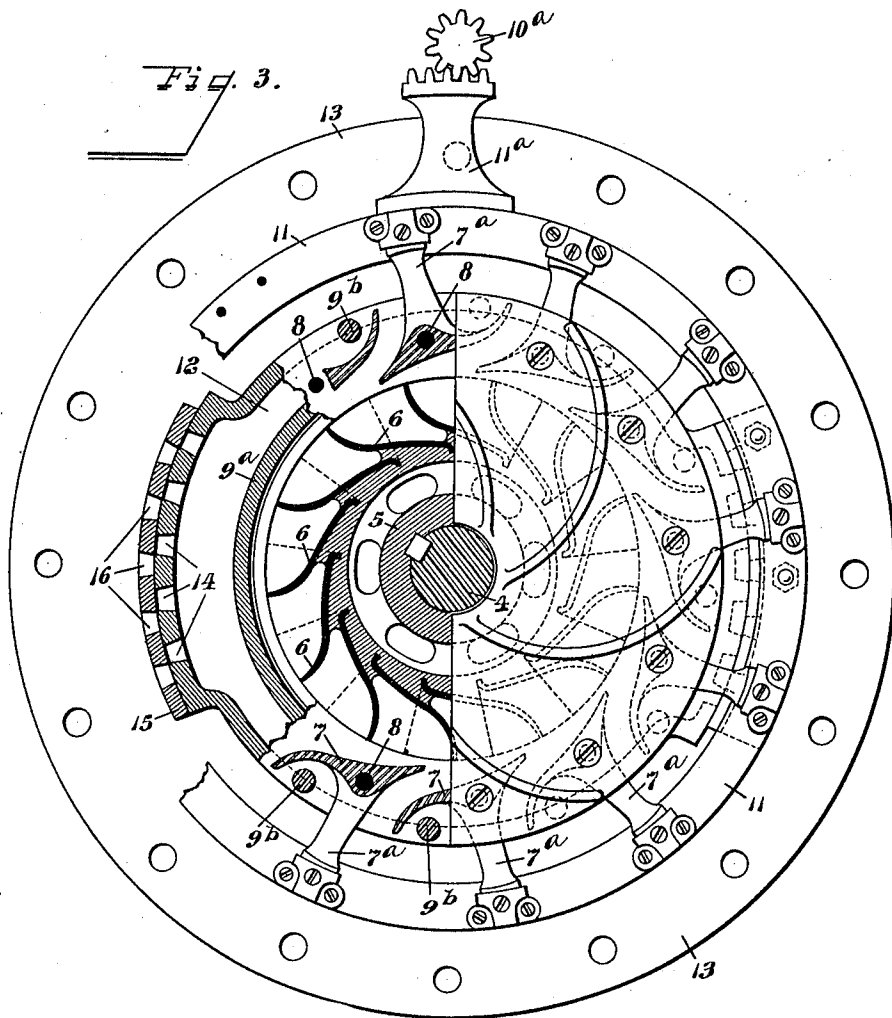
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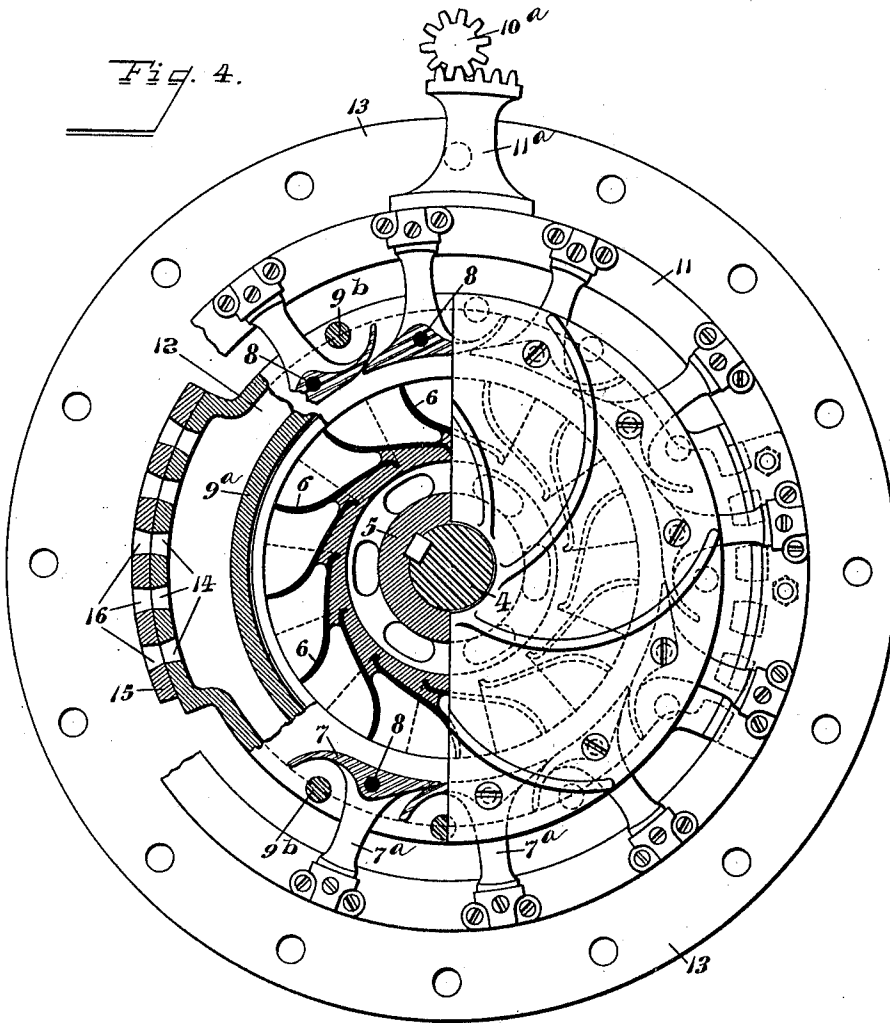
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UNITED STATES PATENT OFFICE.

FULLER TRUMP, OF SPRINGFIELD, OHIO, ASSIGNOR TO PAUL A. STALEY AND J. F. TRUMP, BOTH OF SPRINGFIELD, OHIO, RECEIVERS OF TRUMP MANUFACTURING COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION.

WATER-WHEEL.

1,035,275.

Specification of Letters Patent.

Patented Aug. 13, 1912.

Application filed April 28, 1911. Serial No. 623,880.

To all whom it may concern:

Be it known that I, FULLER TRUMP, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Water-Wheels, of which the following is a specification.

My invention relates to improvements in water wheels, and more particularly to water wheels of the turbine type.

An object of my invention is to provide for relieving the pressure on the wheel casing and the pen-stock at such times as the wheel is inactive or running at part gate, this relieving and equalizing of the pressure being accomplished automatically by the gate controlling mechanism.

A further object of my invention is to provide means for securing a constant discharge at all times of the water from the penstock or water wheel inclosing chamber; that is, either when the wheel is in use or when the same is at rest.

I accomplish these objects by an arrangement of parts adapted to be operated in connection with the wheel gate rigging so that a discharge passage in the nature of a by-pass is provided and controlled in connection with the wheel controlling mechanism, so that a part or all of the water may be directed through the by-pass or through the wheel accordingly as the demands upon the wheel shall be determined.

The invention consists in the construction and combinations of parts hereinafter described and set forth in the claims.

In the accompanying drawings: Figure 1 is a side elevation partly in section of a water wheel, its penstock and other parts necessary to its installation, together with the auxiliary discharge or by-pass constituting my invention. Fig. 2 is a side view in detail and partly in section of the wheel and the auxiliary discharge or by-pass. Fig. 3 is an end view of the wheel and by-pass, showing the gates of the wheel in open position. Fig. 4 is a similar view showing the water wheel gates in closed position.

Like parts are represented by similar characters of reference in the several views.

In the use of turbine water wheels as generally installed, the water discharged from

the penstock or inclosing casing is dependent upon the amount of water used by the wheel; that is, whether running at full or part gate—the discharge being completely cut off when the wheel is at rest. It is desirable in some installations, such as in irrigating plants and similar uses, that a constant discharge of the water should be maintained because of other uses to which it may be put, and by my present construction the parts are so arranged that when the water wheel is at rest, or running at part gate, an auxiliary discharge is provided in the nature of a by-pass which will permit the excess water over that which is passing through the wheel to escape into the discharge pipe and thus maintain a constant flow of water therein.

In the drawings; 1 represents the usual pen-stock which incloses the wheel and its casing; 2 the inlet pipe or elbow secured to the penstock so as to communicate with the inlet opening 1^a therein; and 3 the discharge pipe or elbow.

4 is the wheel shaft journaled in suitable bearings in the usual way in the pipes 2 and 3.

The hub 5 of the wheel proper or runner is splined to the shaft and has the usual radially arranged curved buckets 6, adapted to receive the water which enters through the gates 7. These gates are of the well known butter-fly type and are arranged around the outer periphery of the wheel casing, this wheel casing being in two parts 9, 9^a connected together in the usual way by columns 9^b.

The gates are located between the respective parts of the casing, being hinged on the pivot screws 8, and are arranged to be opened and closed by gate rigging of any well known kind, the preferable type, as shown in the drawing, consisting of an operating ring 11, having a driving connection with the arms 7^a of the said gates, and being provided with a segment arm 11^a engaged by a pinion 10^a on the usual shaft 10 which extends into the penstock from any suitable point. As thus far described the construction is the usual and well known one and is to be regarded as typical only. The discharge end of the wheel casing is

extended to form a cylinder or chamber 12, having a flange 13 to which is secured the discharge pipe 3. The penstock 2 is also secured to the flange 13 so as to surround the chamber 12 as well as the wheel proper. Located in the wall of the chamber 12 are a series of openings 14; these openings being preferably arranged in two series diametrically opposite each other, although they may be disposed around the chamber in any other suitable manner. Secured to the gate operating ring 11 adjacent each series of openings is a movable valve or shutter 15 provided with a series of openings 16 corresponding to the respective openings 14; this valve or shutter being curved to correspond to the curvature of the chamber 12 and adapted to fit snugly against the periphery of the same. By this construction it will be seen that whenever the gates of the water wheel are operated the valves or shutters 15 will likewise be operated. The relation of the parts is such that when the wheel gates are completely closed the by-pass will be completely opened; that is to say, the openings 15 and 16 will be in registry with each other, as shown in Fig. 4, so that the water entering the penstock will be permitted to enter through these openings and escape out through the discharge pipe 3. In like manner, when the water wheel gates are opened to their full limit these shutters will completely close the openings 14 so that the entire supply of water is directed through the open gates of the water wheel. In like manner, when the water wheel gates are but partially opened the openings 14 will be partially uncovered so that a part of the water will be directed through the water wheel gates and part will find its way through the by-pass openings. The capacity of the entire number of by-pass openings and the capacity of the entire number of water wheel gates will be substantially the same and it will be seen that the shutters will be operated to open and close the by-pass openings in exact relation with the closing and opening of the water wheel gates so that the entire supply of water will always find a free flow through the penstock.

Having thus described my invention, I claim:

1. In a device of the character described, a water wheel, a casing for said wheel, means in said casing for regulating the water to said wheel, a water passage and means for regulating the discharge of water through said passage in proportion to the water admitted to said wheel, substantially as specified.

2. In a device of the character described, a water wheel, a casing for said wheel, said casing having two passages, one to said wheel and the other to a suitable point of discharge, and means for simultaneously and

proportionately opening one of said passages and closing the other, substantially as specified.

3. In a device of the character described, a water wheel, a casing for said wheel, passages in said casing, one to said wheel and one to a suitable point of discharge, and means for opening or closing one of said passages and at the same time closing or opening the other passage to direct the water now through either one or the other of said passages or partially through both and for maintaining the proportionate opened or closed relation of said passages, substantially as specified.

4. In a device of the character described, a water wheel, a casing for said wheel, a series of gates in said casing forming a communication to said wheel together with means for simultaneously opening and closing all of said gates, and an auxiliary outlet in said casing together with means for opening and closing said outlet simultaneously with the operation of said gates, substantially as specified.

5. In a device of the character described, a water wheel, a casing, a series of gates forming a communication to said wheel, an auxiliary water passage, and means for simultaneously opening and closing all of said gates and at the same time proportionately closing or opening said auxiliary water passage, substantially as specified.

6. In a device of the character described, a water wheel, a casing for said wheel, a series of gates forming a communication to said wheel, a series of outlet openings on said casing, a shutter having a series of openings associated with said outlet openings, and means for simultaneously operating all of said gates and also said shutter to direct all of the water either to said wheel or through said outlet openings or partially through both, substantially as specified.

7. In a device of the character described, a water wheel, a casing for said wheel, gates carried by said casing together with means for opening and closing said gates, a discharge chamber on the discharge side of said wheel, and a water outlet to said chamber together with means for opening and closing said outlet, by the gates operating means, substantially as specified.

8. In a device of the character described, a water wheel, a casing for said wheel, gates carried by said casing, gate rigging for opening and closing said gates, a discharge chamber on the discharge side of said wheel, a series of outlet openings to said chamber, a shutter also having a series of openings associated with said outlet openings, and means connected with said gate rigging for operating said shutter to open or close said outlet openings, substantially as specified.

9. In a device of the character described,

a water wheel, a casing for said wheel, a series of gates carried by said casing, a chamber on the discharge side of said wheel a series of openings to said chamber forming a water passage around said wheel, a shutter having a series of openings associated with said chamber openings, and means for simultaneously operating said gates and

said shutter, substantially as and for the purpose specified.

In testimony whereof, I have hereunto set my hand this 25th day of April 1911.

FULLER TRUMP.

Witnesses:

CHAS. I. WELCH,

ELSA K. SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."