G. F. DE WEIN.

WATER WHEEL NOZZLE.

APPLICATION FILED SEPT. 18, 1905.

915,277. Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

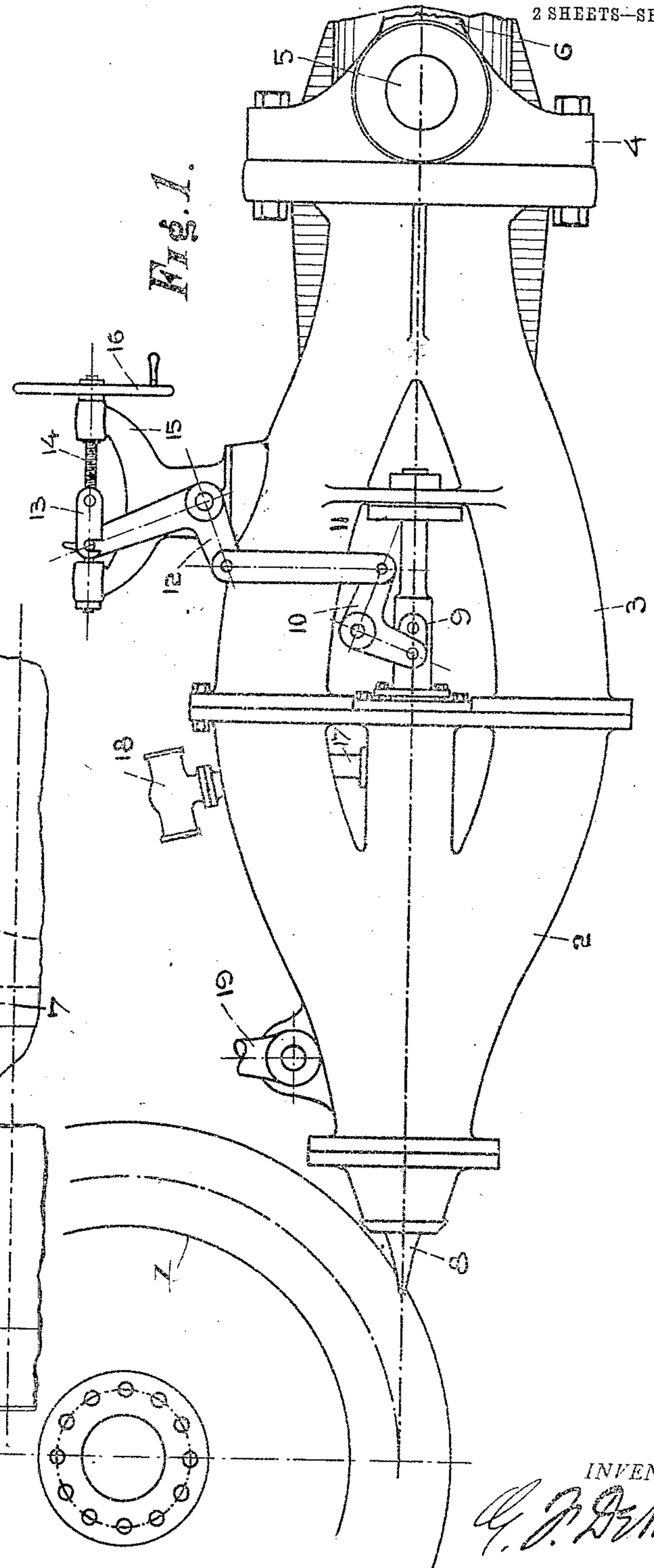
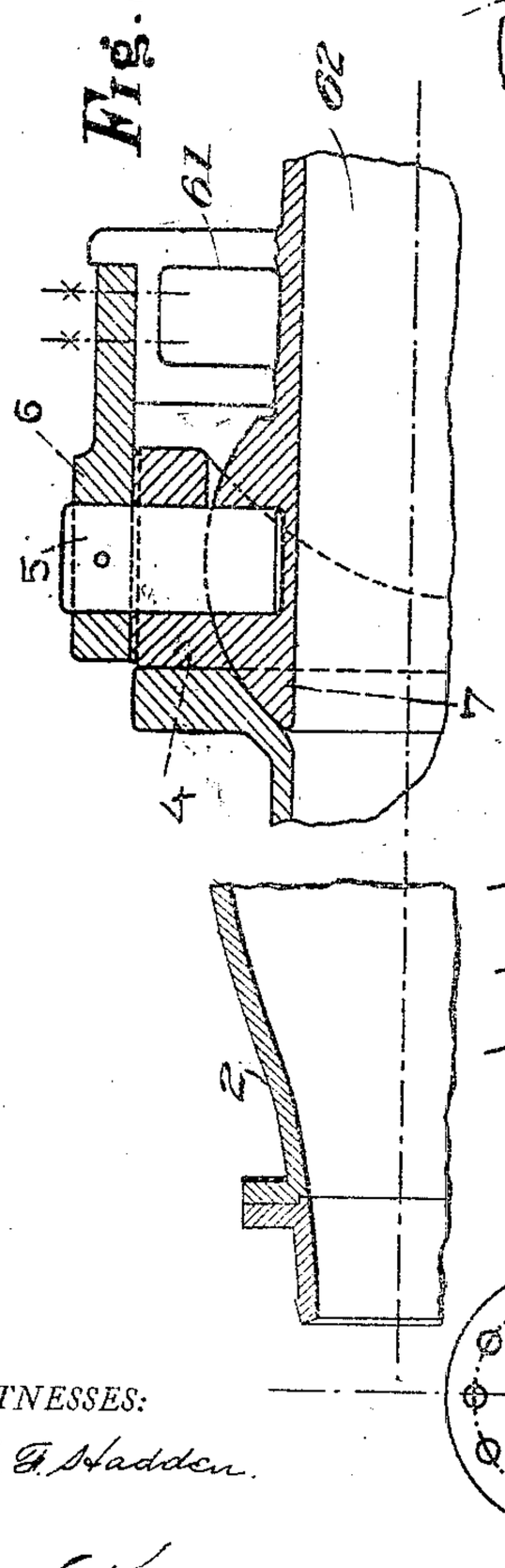


Fig. 2.



WITNESSES:

Sal. F. Hadden.

Geo E Kirk

INVENTOR.

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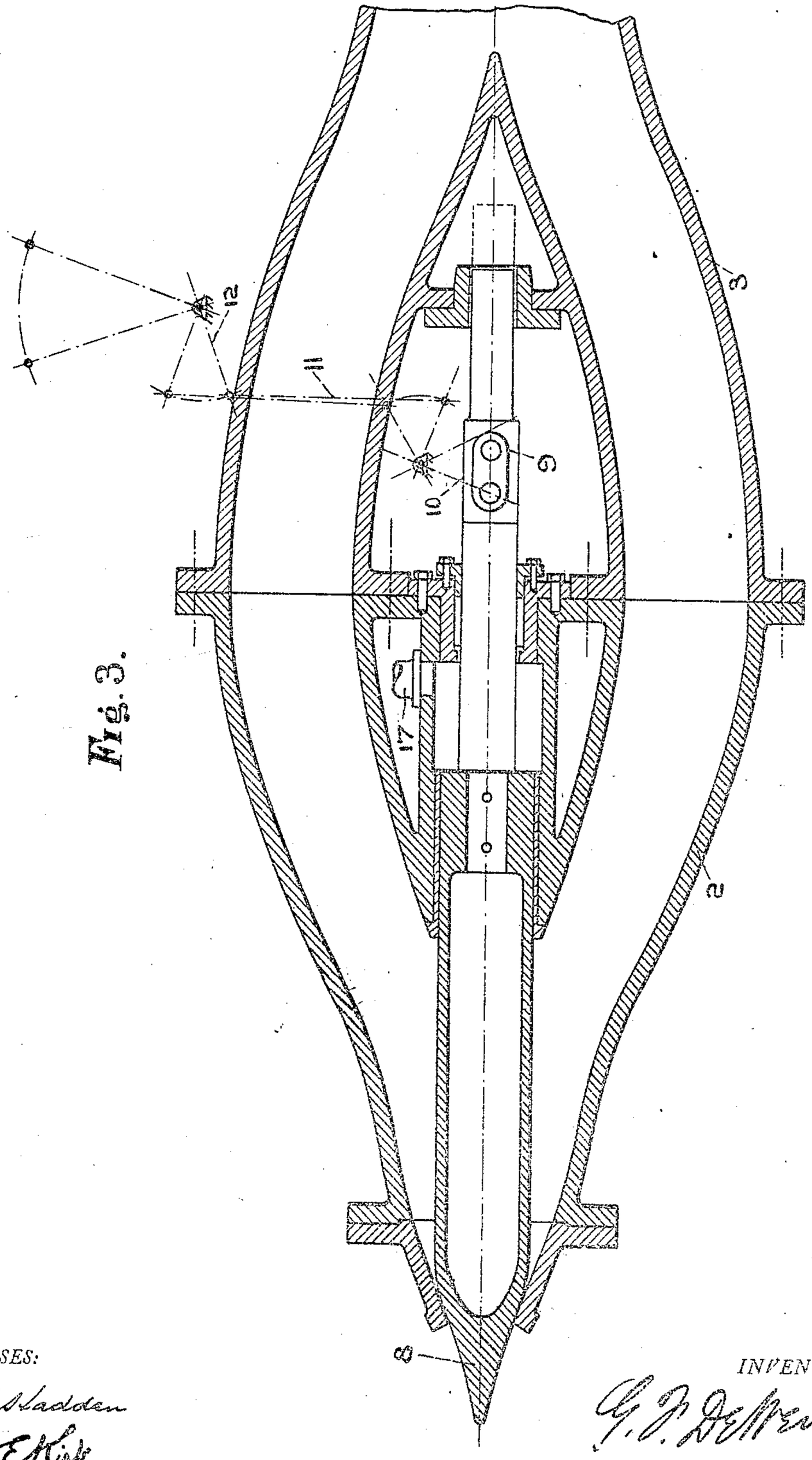

Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE F. DE WEIN, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW JERSEY.

WATER-WHEEL NOZZLE.

No. 915,277. Specification of Letters Patent. Patented March 16, 1909.

Application filed September 18, 1905. Serial No. 278,851.

To all whom it may concern:

Be it known that I, GEORGE F. DE WEIN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Water-Wheel Nozzles, of which the following is a specification.

This invention relates to certain improvements in nozzles, and more particularly to a nozzle which is pressure-balanced; that is, where there is no reactive force tending to swing the nozzle. The nozzle is also mounted so that the reactions on the two pivot pins carrying the nozzle are equal.

This nozzle has great value when used with water wheels driven by great heads, thus resulting in very high pressures. When so used it is desirable to control the outlet, as by a concentric core, and also to govern by swinging the nozzle about its pivot mounting to direct the fluid against or away from the buckets. This latter control may be a hydraulic relay governor, and when so connected up the swinging is automatic. The disclosure is applied in this relation, and in the drawings,—Figure 1 is an elevation of the nozzle showing the water wheel diagrammatically. Fig. 2 is a detail in horizontal section showing the pivot pin mounting. Fig. 3 is a vertical section of the nozzle.

The water wheel 1 has the stream of water directed against it by the two-part nozzle 2, 3. The nozzle part 3 has bolted to it bearing ring 4 through which pivot pins 5 project. The pivot pins are mounted in the ears 6, which are bolted to projecting lugs 61 cast integral with or bolted to the end of the penstock 62, as clearly shown in Fig. 2. The inner end of the nozzle portion 3 and the interior of the bearing ring 4 are concaved. Fitting in this recess is the convex portion 7 of the water conduit. This structure results in a ball and socket connection at the pivot joint. The pivot pins 5 react equally because the common center line of inlet and discharge passes midway between the pivot pin bearings. The inlet to the nozzle at the pivoted end is in alinement with the discharge at the opposite end of the nozzle. The discharge is controlled by the core 8 which has a point entering the discharge. At its rear end this core passes through an opening in the wall of the nozzle, which opening is between the two curved passages of the nozzle. The movement of the core 8 may be controlled through the link 9, the bell crank lever 10, link 11, and second bell crank lever 12. This second lever 12 may be engaged by the latch 13 mounted upon a nut carried by the threaded shaft 14, which shaft is mounted in the bearings of standard 15, carried by the nozzle member 3. The shaft 14 may be rotated by the hand wheel 16, thereby effecting the control. However, this latch 13 may be released, and through passage 17 and a two-way valve 18, head pressure or back pressure permitted to actuate the core 8. When the latch 13 is not released from bell crank lever 12, the fluid pressure may be used to assist the manual control. The swinging of the nozzle about the pivot pins 5 is controlled through a link 19. This link may be connected to any control device, and in the particular structure herein set forth, a hydraulic relay governor is desirable as it would produce automatic operation.

What is claimed is:

1. A curved passage, pivoted nozzle having the center line of its discharge and the center line of its inlet coincident and said coincident center lines intersecting the axis of the pivot bearing, and means for throttling extending outside of the nozzle and having the outside portion located adjacent the concave side of the curved portion of the nozzle.

2. A common inlet, common discharge and multiple passage pivoted nozzle, and means extending outside of the nozzle and located between the passages for throttling the nozzle.

3. A curved passage pivoted nozzle having its inlet and discharge in alinement, and throttling means extending outside of the nozzle and having the outside portion located adjacent the concave side of the curved passage of the nozzle.

4. A multiple curved passage pivoted nozzle having an inlet and a discharge on a common center line and being symmetric as to a plane passed through the common center line, and a core extending outside of the nozzle and having its outside portion located between the curved passages.

5. The combination of a pivoted nozzle having two curved branches located in a single plane and forming between the concave walls thereof a space freely communicating with the outside space surrounding the nozzle, a common inlet and a common outlet for

the branches, a core extending outside of the nozzle and within the space between the concave walls of the branches, and means for adjusting the core.

6. The combination with a conduit of a nozzle pivoted thereto, the discharge end of said nozzle being in line with its pivoted end so that a center line drawn through the discharge and pivoted ends of said nozzle would intersect its pivotal axis, a part of said nozzle between its discharge and inlet ends being offset from said center line, and a core extended into said nozzle adjacent the discharge end thereof.

7. The combination with a conduit of a nozzle pivoted thereto at two oppositely disposed points, the discharge end of said nozzle being in line with its pivoted end so that a center line drawn through the discharge and pivoted ends of said nozzle would intersect its pivotal axis, a part of said nozzle between its discharge and pivoted ends being offset from said center line, and a core extended into said nozzle adjacent the discharge end thereof.

8. The combination with a conduit and a nozzle pivoted thereto, the discharge end of said nozzle being in line with its pivoted end so that a center line drawn through the discharge and pivoted ends of said nozzle would intersect its pivotal axis, parts of said nozzle being offset and providing a plurality of passageways affording communication between said conduit and the discharge end of said nozzle, and a core extended into said nozzle adjacent the discharge end thereof.

In testimony whereof I affix my signature in presence of two witnesses.

G. F. DE WEIN.

Witnesses:
GEO. E. KIRK,
JOHN DAY, JR.