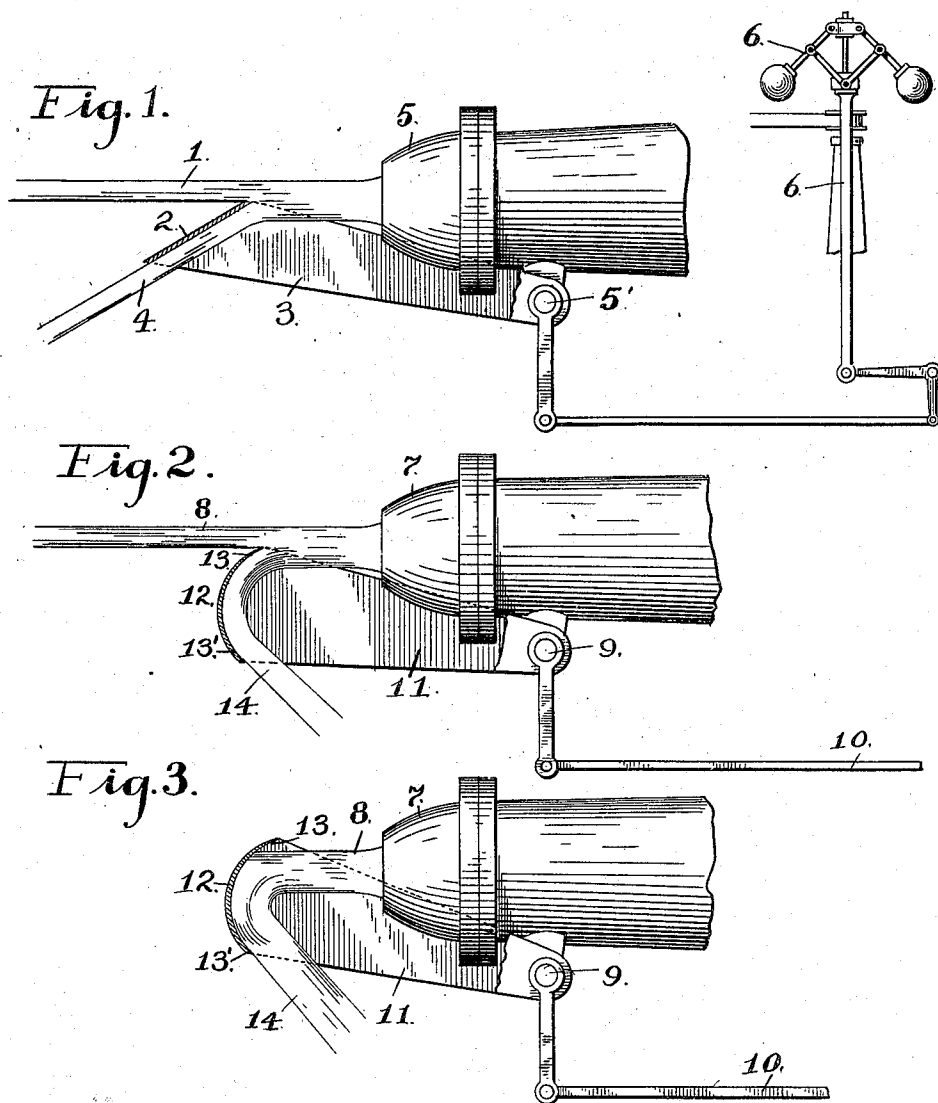


No. 853,787.

PATENTED MAY 14, 1907.

G. J. HENRY, JR.
STREAM DEFLECTOR.
APPLICATION FILED AUG. 29, 1905.



Witnesses.
Arthur J. Lee.
J. Compton.

Inventor
Geo. J. Henry, Jr.
by M. A. Allen
his atty.

UNITED STATES PATENT OFFICE

GEORGE J. HENRY, JR., OF SAN FRANCISCO, CALIFORNIA.

STREAM-DEFLECTOR

No. 853,787.

Specification of Letters Patent.

Patented May 14, 1907.

Application filed August 29, 1905. Serial No. 276,256.

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 Stream-Deflectors; and I do hereby declare the following to be a full, clear, and exact description of the same:

In connection with nozzles for directing an impact stream onto the buckets of a tangential water wheel or hydraulic motors it is customary to employ what is termed a "deflector" for the purpose of deflecting a portion of the impact stream off of the motor, such deflection being in accordance with load variations of the motor, that is to say, where the motor's load is reduced, the deflector cut into the issuing impact stream and deflect such a quantity of the said stream as to leave only such a portion thereof to bear onto the motor as will suffice for the required working load. With the deflectors of the common type, a very heavy effort is required to keep the deflector, when it starts to cut into the stream, from jumping entirely in, due to the unbalanced force tending to pull the same therein. It follows, that by the use of such a deflector for regulating the speed or power output of a hydraulic motor, as for instance a water wheel, that means must be provided which will hold the deflector in every and any position, hence a heavy and constant load being thus placed onto the holding means, usually the governor for the motor, when the motor is in operation, in some instances this load reaching many thousands of pounds, requiring the introduction of very expensive controlling mechanism, making it difficult to handle such a deflector by hand power, if for any reason the controlling mechanism is out of commission.

The object of the present invention is to provide a stream deflector for water wheels or hydraulic motors of large power, which may be controlled by less complicated and cheaper means than at present required to operate and hold the same against the pressure exerted thereon, or which may be controlled by hand power, if for any reason the operating mechanism be thrown out of commission, the deflector for attaining such object being so shaped as to utilize the reactionary pressure of the water on the surface thereof to counterbalance the water pressure which tends to force the same into the stream.

To comprehend the invention reference

should be had to the accompanying sheet of drawings, wherein

Figure 1 is a side view in elevation, disclosing a deflector partly in section of the common type, arranged in connection with a nozzle for directing an impact stream onto a water wheel, the deflector being illustrated partly in the stream for deflecting a portion thereof off of the wheel; Fig. 2 is a similar view disclosing the improved deflector for working in advance of the nozzle, as being moved partly into the stream, said view illustrating the direction of the water discharge from the surface of the deflector; Fig. 3 is a view illustrating the deflector positioned to deflect the entire impact stream from off of a water wheel.

With the form of deflector set forth in Fig. 1 of the drawings, the moment the impact stream 1 is cut into by the deflecting surface or plate 2 of the deflector 3, the pressure of the water tends to draw or force the deflector upwardly or into the stream. This tendency exists the entire time the deflector is held into the stream, inasmuch as the deflected portion of the stream is discharged away from the discharge nozzle 5, or in a forward direction, an upward pulling strain thus acting on the deflecting surface or plate of the deflector during the entire deflection of the stream which increases as the deflector is moved into the impact stream to deflect a greater quantity of water. This upward strain has to be resisted by the rock shaft 5', which swings the deflector into and out of the impact stream, requiring that the operating mechanism 6 for actuating the rock shaft be of sufficient strength to hold the said shaft locked against movement.

Referring to Figs. 2, and 3 of the drawings, the numerals 7, 8, 9 and 10 are employed to designate respectively the nozzle, the impact stream, the rock shaft and the controlling means for actuating the rock shaft to swing the deflector into or out of the impact stream. On the said rock-shaft 9 is mounted the deflector 11, the deflecting plate 12 of which, in Figs. 2 and 3, has its inner surfaces 13 and 13' directed in opposite directions. The upper portion 13 constitutes the receiving surface of the deflector, and 13' the discharge surface for the deflected portion 14 of the impact stream. As the deflector is moved to cut into the impact stream 8, the water is at once directed by the slope of the receiving surface 13 onto the surface 13', and

is discharged therefrom rearwardly or in a direction toward the nozzle 7, the reactionary pressure of the water on the surface 13' counterbalancing any strain on the surface 5 13' tending to force the deflector upwardly into the stream, the reaction pressure being thus utilized in the same manner as in the buckets of a tangential water wheel.

Various modifications and combinations 10 of the curves for the deflector plate may be utilized, the only requirement being that the water to be deflected be received at an angle to its line of flow, so as to cause the deflected stream to react as it flows over the discharge 15 surface of the deflector plate, in order that a reaction pressure may be obtained to counterbalance the water pressure strains which tend to force the deflector into the stream.

Having thus described the invention, what 20 is claimed as new and desired to be protected by Letters Patent is—

1. As a new article of manufacture, a stream deflector for hydraulic nozzles, the same having a discharge surface for the water 25 shaped to neutralize the pressure of the discharged water.

2. The combination with a hydraulic nozzle, of a stream deflector mounted to swing in 30 advance of the nozzle, of mechanism for actuating the deflector, and said deflector having a discharge surface shaped to counterbalance the forces that exist to force the deflector in the direction of its movement into the nozzle stream.

35 3. In combination with a hydraulic nozzle,

of a stream deflector mounted to swing in advance of said nozzle, the same having a receiving and discharge portion arranged substantially in opposition to one another.

4. The combination with a hydraulic nozzle, of a stream deflector mounted to swing in 40 advance of the nozzle, the same having a receiving and discharge surface both of which surfaces extend rearwardly relative to said nozzle.

5. A deflector attachment for hydraulic nozzles having a receiving portion, and a discharge portion, the discharge portion being arranged in opposition to the receiving portion. 45

6. The combination with a hydraulic nozzle of a cut-off or deflector connected to the nozzle and arranged to deflect a portion of the stream issuing from the nozzle, and a counteracting discharge portion on said deflector. 50

7. The combination with a nozzle of a plate for deflecting a portion of the stream issuing therefrom, said plate having a receiving surface and a balancing surface constructed and 60 arranged so that the pressure of the water on the latter tends to neutralize the pressure on the former.

In testimony whereof I have hereunto affixed my signature in the presence of witnesses. 65

GEORGE J. HENRY, JR.

Witnesses:

N. A. ACKER,

D. B. RICHARDS.