SAFETY DEVICE FOR WATER WHEELS

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This invention relates to improvements in safety devices for water wheels.

The principal object of this invention is to provide means whereby the water nozzle may be diverted when the water wheel against which the same impinges revolves at a rate greater than that for which it is designed under normal load.

Another object of this invention is to provide means whereby the nozzle automatically causes its propulsive force to be diverted so as to decrease the speed of the wheel.

An additional object of this invention is to produce a device of this character which is simple in construction and, therefore, one which will be efficient in operation.

A still further object of this invention is to provide a device of this character which may be incorporated in the ordinary water wheel construction without altering the construction of the same or its associated parts.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a water wheel having my device applied thereto,

Figure 2 is a view similar to Figure 1, showing my device in operation and diverting the flow of water away from the wheel,

Figure 3 is a modified form of my device attached to a water wheel,

Figure 4 is a view similar to Figure 3, of the modified form showing the water being diverted from contact with the wheel, and

Figure 5 is a fragmmentary detail view showing a hydraulic means for accomplishing the same purpose.

In an impact water wheel a jet of water contacts a wheel having a plurality of blades, paddles or cups attached to the wheel, with the result that the wheel rotates and is capable of delivering power. When a load is placed upon the wheel, the jet will strike the cups and after giving up its force will splash downwardly and flow away. When the load is suddenly removed, as often happens in the shutting down of a generator, or breaking of a power line or shafting, or for any other similar cause, the result is that the water wheel will accelerate in speed, which speed, in a few moments, becomes dangerous.

When a water wheel rotates beyond a predetermined speed, the water no longer splashes downwardly but extends past the wheel and would strike the back wall of the wheel housing. It is this principle that I employ to cut off the flow from the water wheel.

In the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a water wheel having a plurality of cups 6, while a nozzle is shown at 7 adapted to discharge a stream 8 against the cups 6. Normally while the wheel is loaded, it will strike the cup and be deflected downwardly as shown in full lines at 9. At 11 I have shown a portion of the back wall of the wheel housing upon which is mounted a bumper 12. A lever 13 is connected to the nozzle 7 and extends to a point outside of the wheel housing, the purpose of which is to move the nozzle 7 when desired. As before mentioned, when the speed of rotation of the wheel 5 becomes excessive, the stream 8 will pass the cups 6 as shown in dotted lines at 14 and will contact a movable member 16, which movable member is pivoted as at 17 to a suitable support 18.

A deflector 19 is pivoted at as 21' to a support 22 and has a link 23 connected thereto as shown at 24, while its opposite end is pivoted as at 26 to the movable member 16, the result being that as the stream strikes the movable member 16 it is forced over and against the bumper 12 thus lifting the deflector 19 through the medium of the link 23. This immediately deflects the water of the stream 8 downwardly as shown in full lines at 27.

When the deflector is in this position the stream cannot contact the buckets of the water wheel, with the result that it will immediately slow down and stop. It is then necessary for the operator to shut off the flow of water, reset the deflector to the position shown in Figure 1 and again open the flow of fluid to the nozzle.

In the modified form shown in Figure 3 it will be noted that the action is similar, with the exception that the nozzle is made to move downwardly toward the deflector. As
many of the parts are the same in the modified form, the same numerals have been applied thereto.

It will be noted that the nozzle in all of the forms is pivoted as at 29 so as to be movable by the lever 13. In the modified form a link 31 is connected to the nozzle 7 and has its free end secured to a bell-crank lever 32, pivoted as at 33 and having its opposite end provided with a pin 34 movable within a slot 36 formed in one end of a link 38, the opposite end of which link is pivoted as at 39 to the member 16, the result of this construction being that, when the wheel 5 rotates at a speed in excess of the predetermined speed, the stream will impinge upon the member 16 as before mentioned, moving the member about its pivotal member, moving the deflector upwardly in a manner similar to that previously described and at the same time through the medium of the link 33, bell-crank lever 32 and pin 34.

The nozzle 7 is moved downwardly so as to contact the underside of the deflector 19 thus holding the same in this position until reset by the operator, which is accomplished by shutting off the flow of fluid to the nozzle, resetting the parts and again turning on the flow.

In the form shown in Figure 5, the movable member is designated at 41 as having a plunger 42 adapted to enter one end of a tube 43. This tube may extend to any convenient point and serve to conduct hydraulic pressure for the purpose of cutting off the flow of fluid or operating the deflecting mechanism.

It will thus be seen that I have provided a very simple and efficient means for utilizing the effect of an increase in speed of a water wheel for the purpose of deflecting the fluid to prevent further increase in speed of the motor.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. In a device of the character described, the combination with a water wheel, a nozzle positioned adjacent said water wheel, a movable member in alignment therewith, said movable member being pivoted to a suitable support, a deflector pivoted at a point below said water wheel, a link connecting said deflector and said movable member for the purpose of moving said deflector to a point between said nozzle and said water wheel when the fluid issuing from said nozzle strikes said movable member.

2. In a device of the character described, the combination with a water wheel, a nozzle positioned adjacent said water wheel, a movable member in alignment therewith, said movable member being pivoted to a suitable support, a deflector pivoted at a point below said water wheel, a link connecting said deflector and said movable member for the purpose of moving said deflector to a point between said nozzle and said water wheel when the fluid issuing from said nozzle strikes said movable member, and means associated with said movable member for moving said nozzle, as specified.

In testimony whereof I affix my signature.

STEVEN A. SCANAVINO.