Nov. 20, 1928. 1,692,127

J. J. KEON

EMERGENCY CLOSURE FOR HYDRAULIC INTAKES

Original Filed Feb. 4, 1927

Fig. 1.

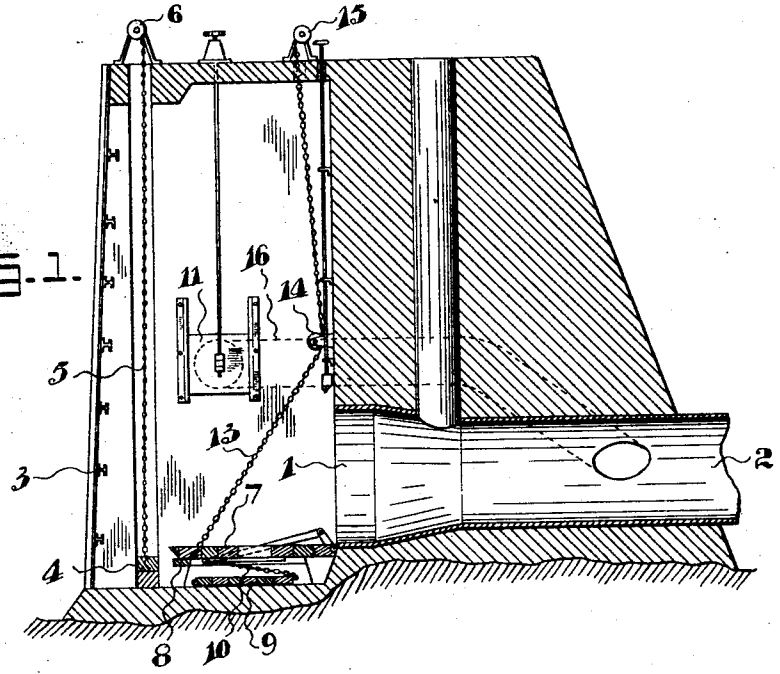
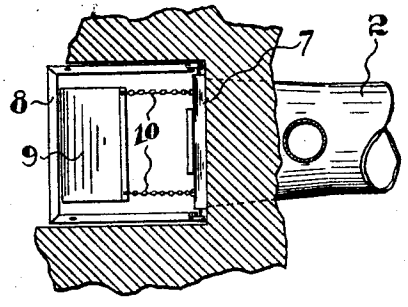


Fig. 3.



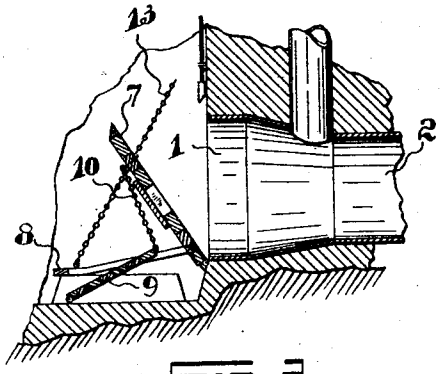


Fig. 2.

INVENTOR.

J. J. Keon.

BY J. Edward Maybee.

ATTY.

Patented Nov. 20, 1928. 1,692,127

UNITED STATES PATENT OFFICE.

JAMES JOSEPH KEON, OF OWEN SOUND, ONTARIO, CANADA, ASSIGNOR TO THE WILLIAM KENNEDY & SONS, LIMITED, OF OWEN SOUND, CANADA.

EMERGENCY CLOSURE FOR HYDRAULIC INTAKES.

Application filed February 4, 1927, Serial No. 165,905. Renewed July 28, 1928.

This invention relates to emergency closures for hydraulic intakes for power plants and the like, which closures are for the purpose of cutting off the flow of water through the intake in the case of an abnormal rush of water such as is likely to take place in the event of trouble in the power plant. In such cases, owing to the abnormal rush of water, there is considerable danger of the closure itself or its seat being damaged owing to the rapidity with which it is closed.

My object therefore is to devise an arrangement whereby the seating of the closure will be controlled to such an extent that its movement is very slow by the time it reaches the seat, thus avoiding the danger of damage due to slamming of the closure against the seat.

I attain my object by providing in conjunction with the closure member a check gate which is arranged in such a manner that, as the closure member moves towards its seat, the pressure on the check gate is gradually increased, thus counteracting the effect of the water on the closure member sufficiently to check the momentum of the latter.

The construction is hereinafter more specifically described and illustrated in the accompanying drawings in which

Fig. 1 is a sectional view of the mouth of the intake showing my improved emergency closure in open position;

Fig. 2 is a detail illustrating the emergency closure in partly closed position; and

Fig. 3 is a plan view showing the emergency closure in closed position.

In the drawings like numerals of reference indicate corresponding parts in the different figures.

1 represents an intake of ordinary type such as is used with the tubes 2 leading to the turbines of an hydraulic power plant. Down stream of the racks 3 and upstream of the intake is located the usual vertically sliding stop logs 4, which are actuated in any ordinary manner, such, for example as by the chains 5 adapted to be wound on a drum 6 above the intake.

Hingedly mounted at the lower side of the intake is the emergency closure gate 7. When in its open position, this gate, as will be seen from Fig. 1, is supported above the bottom on the lifting cradle 8. The gate 7 is bevelled so that water impinging on end will cause an upward component and raise the gate. When thrown up in the ordinary manner by means of a sudden rush of water, the water would tend to violently seat the gate, with the consequent danger of damage to either the gate or the seat.

I therefore provide the check gate 9, which is hingedly mounted at the bottom of the pocket and normally lies below the closure gate 7 with its free edge directed downstream, that is, in a direction opposite to which the free side of the closure gate is pointing. The free side of this check gate is connected by means of chains 10 with the free side of the gate 7.

It will thus be seen that as the gate 7 is raised by the water, the chains 10 are tightened, and the gate 9 will also be lifted. It will be apparent therefore that as the angle of the gate 9 to the direction of flow of water is increased, the greater will be the checking effect imparted to the gate 7, so that by the time the check gate reaches its highest point, which is at approximately an angle of forty-five degrees to the vertical, the rate of closing of the gate 7 will be sufficiently retarded so that there will be little danger of any damage ensuing.

A bye-pass valve 11 which may be opened as desired may be placed in any convenient position in the wall.

In order that the gate 7 may be manually closed if desired, it is, as hereinbefore stated, supported when in open position by the lifting cradle 8, but is free to move without the cradle. The upstream side of the cradle has chains 13 secured thereto, which chains are adapted to be wound on winches 15. These chains preferably pass around sheaves 14.

By winding up the chains 13, the cradle may be raised to move the gate 7 to closed position. As the gate is free of the cradle, the latter may return to its lowered position, without the gate, as the pressure of the water will hold the gate seated.

When the pipe line is filled by the admission of water through the opening of the bye-pass valve 11, the weight of the gate itself will cause the gate 7 to leave its seat and return to its position resting on the cradle. The bye-pass may, however, be formed as a gate controlled passage 16, as indicated in dotted lines, and the bye-pass valve in the gate omitted.

From the above description it will be seen that I have devised an emergency closure de-

vice which will satisfactorily attain the object of my invention as set out in the preamble of this specification.

What I claim is:

1. In an emergency closure for hydraulic intakes, the combination of a movable closure member for said intake adapted to be moved to closed position by an abnormal rush of water through the intake; and a check member connected with said closure member and positioned to be initially unaffected by the water flow and adapted to be drawn into the path of the water as the closure member moves to closed position.

2. In an emergency closure for hydraulic intakes, the combination of a gate hingedly mounted at one side of the intake normally open and adapted to be moved to closed position by an abnormal rush of water through the intake; and a second gate hinged in front of the first mentioned gate and positioned to be initially unaffected by the water flow, said gates being connected whereby as the first mentioned gate is closed the second gate will be drawn into the path of the water.

3. In an emergency closure for hydraulic intakes, the combination of a closure gate hingedly mounted at the bottom of the intake and directed forwardly when in open position; a check gate hinged in front of the closure gate and directed rearwardly when in open position, the closure gate normally at least partially overlying the check gate; and means connecting the free sides of said gates.

4. In an emergency closure for hydraulic intakes, the combination of a closure gate hingedly mounted at the bottom of the intake and directed forwardly when in open position; a check gate hinged in front of the closure gate and directed rearwardly when in open position, the closure gate normally at least partially overlying the check gate; and means connecting the free sides of said gates, said gates when in open position being spaced from one another whereby an abnormal flow of water may act on the closure gate to move it to closed position.

5. In an emergency closure for hydraulic intakes, the combination of a closure gate hingedly mounted at the bottom of the intake and directed forwardly when in open position, a pocket being formed below said gate into which water may flow; a check gate hinged at the bottom of the pocket and directed rearwardly when in open position, the closure gate normally at least partially overlying the check gate; and means connecting the free sides of said gates.

6. In an emergency closure for hydraulic intakes, the combination of a movable closure member for said intake and adapted to be moved to closed position by an abnormal rush of water through the intake; a check member; and a flexible connection between said closure member and check member whereby the latter is drawn into the path of the water as the closure member moves to closed position.

7. In an emergency closure for hydraulic intakes, the combination of a closure gate hingedly mounted at the bottom of the intake and directed forwardly when in open position, the forward edge of said closure gate being bevelled; a check gate hinged in front of the closure gate and directed rearwardly when in open position, the closure gate normally at least partially overlying the check gate; and means connecting the free sides of said gates.

8. In an emergency closure for hydraulic intakes, the combination of a movable closure member for said intake adapted to be moved to closed position by an abnormal rush of water through the intake; a check member connected with said closure member and adapted to be drawn into the path of the water as the closure member moves to closed position; and means independent of the water for moving said closure member to closed position.

9. In an emergency closure for hydraulic intakes, the combination of a movable closure member for said intake adapted to be moved to closed position by an abnormal rush of water through the intake; a check member connected with said closure member and adapted to be drawn into the path of the water as the closure member moves to closed position; a cradle on which the closure member rests when in open position; and means for actuating said cradle to close the gate.

10. In an emergency closure for hydraulic intakes, the combination of a movable closure member for said intake adapted to be moved to closed position by an abnormal rush of water through the intake; a check member connected with said closure member and adapted to be drawn into the path of the water as the closure member moves to closed position; a cradle on which the closure member rests when in open position; and means for actuating said cradle to close the gate, said cradle being free to move away from the closure member when the latter is in closed position.

11. In an emergency closure for hydraulic intakes, the combination of a movable closure member for said intake adapted to be moved to closed position by an abnormal rush of water through the intake; and a check member connected with said closure member and positioned to be initially unaffected by the water flow and adapted to be drawn into the path of the water as the closure member moves to closed position, said closure member having a valve controlled opening therethrough.

Signed at Owen Sound, this 10th day of January, 1927.

JAMES JOSEPH KEON.