(No Model.) 2 Sheets—Sheet 1.

H. HARDING.

AUTOMATIC DAM.

No. 332,895. Patented Dec. 22, 1885.

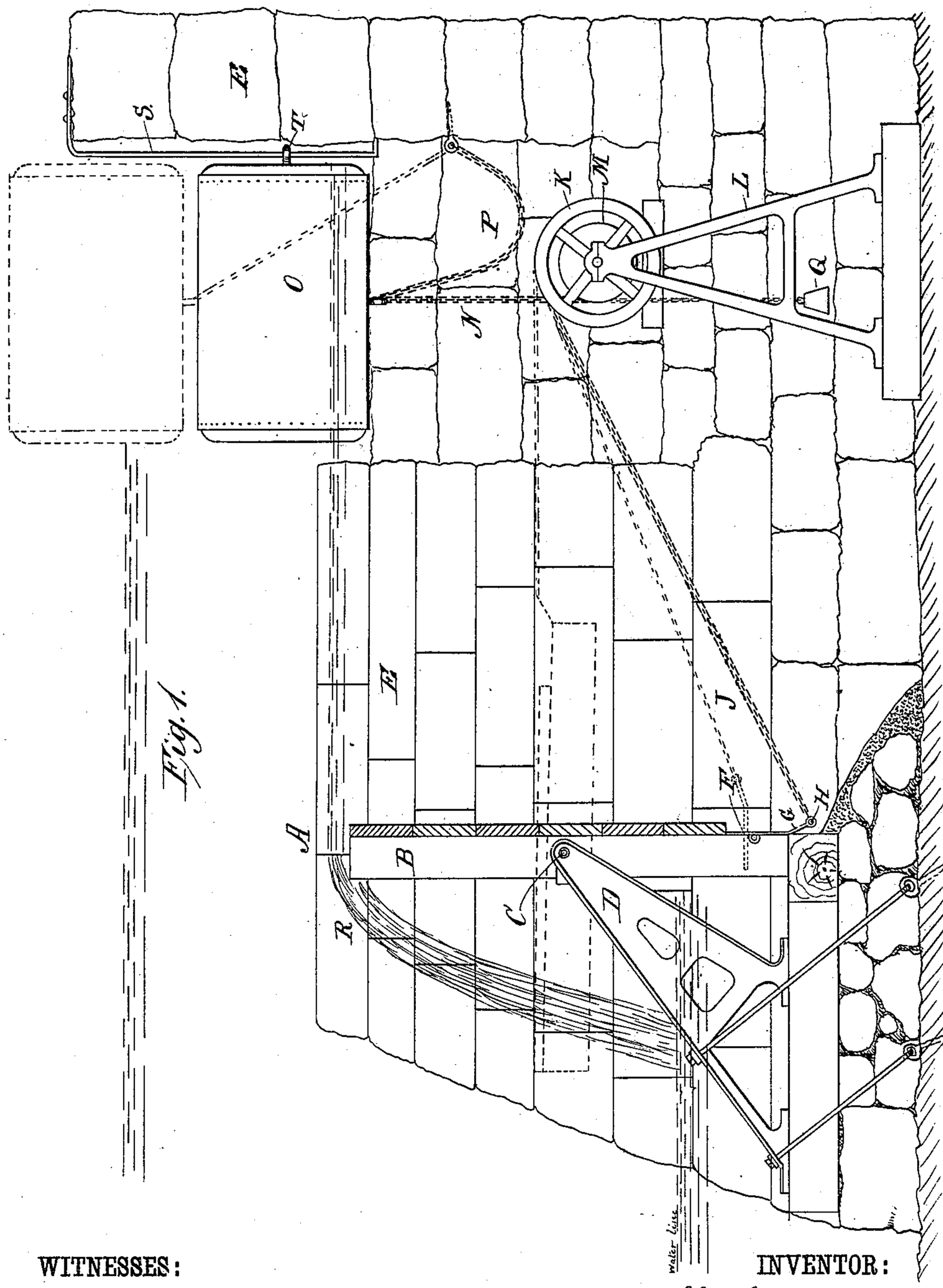

Fig. 1.

WITNESSES:

W. W. Hollingsworth

Solon C. Kemon

INVENTOR:

H. Harding

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

H. HARDING.

AUTOMATIC DAM.

No. 332,895. Patented Dec. 22, 1885.

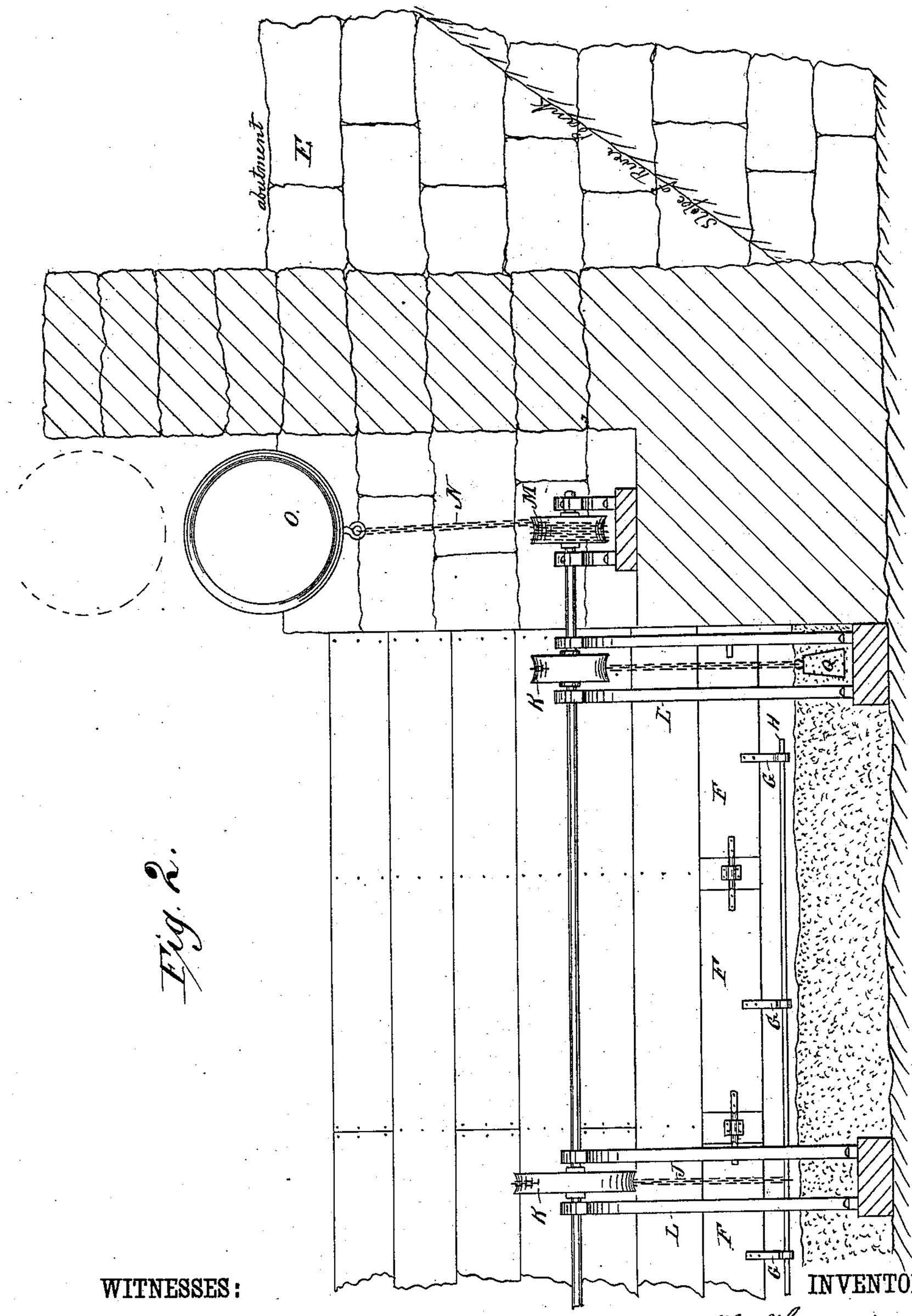

Fig. 2.

WITNESSES:

W. W. Hollingsworth

Solon C. Kemon

INVENTOR:

H. Harding

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

HORACE HARDING, OF TUSCALOOSA, ALABAMA.

AUTOMATIC DAM.

SPECIFICATION forming part of Letters Patent No. 332,895, dated December 22, 1885.

Application filed September 5, 1885. Serial No. 176,278. (No model.)

To all whom it may concern:

Be it known that I, HORACE HARDING, a citizen of the United States, residing at Tuscaloosa, in the county of Tuscaloosa and State of Alabama, have invented a new and useful Improvement in Automatic Dams, of which the following is a description.

This invention relates to that class of dams which are used for the purpose of maintaining slack-water levels upon which navigation may be continued on rivers which run low; and the object of the invention is to automatically set a dam to stop the water when a river runs low, and to automatically remove the said dam to permit free passage of boats when it runs high, in order that dependence need not be placed on a watchman to maneuver the dam.

To this end my invention consists in the construction and combination of parts forming an automatic dam hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a transverse vertical section of my dam, showing some of the working parts and one of the abutments in side elevation, as seen in looking shoreward from the center of the river. Fig. 2 is an elevation of a portion of the dam, looking downstream thereat, and a section of a portion of one abutment.

A represents the dam, consisting of a series of planks nailed to posts B, and pivoted at C to brackets D, which are rigidly anchored to the bottom of the river.

The posts B represent the height of the dam, and swing as an integral part thereof on the pivots C. These pivots are a little above the center of the area of the dam, and the latter is hung thereon to swing its lower edge upstream in opening; therefore the greater area of the dam being below the pivots, the current of the river tends to maintain the dam in a vertical position.

F represents a series of gates in the dam, to permit the water to escape or to retain it according as the river is high or low. Each of these gates is pivoted above the center of its area to the dam, so that the current has the same tendency to close it as it does to hold the dam set vertically. Each gate has a downward-projecting arm, G, and these arms are connected by a bar, H, extending the whole length of the dam, so that the movement of the bar H controls all the gates. Chains J are attached to the arms G or to the cross-bar H, and also to a series of wheels, K, which are journaled in standards L.

M is another wheel mounted on the same journals or shaft as the wheels K, and connected with a float, O, which rests on the river-water, by a chain, N.

Q represents a weight and chain to be wound up by the wheel M in the act of letting off or unwinding the chain N.

The operation is as follows: When the river is low, the dam, setting in its normal vertical position, holds the water back until enough is accumulated to fill the level above the dam, as at R, Fig. 1. Now, if enough water comes along to fill the level below the dam and begins to rise higher, the float O is thereby raised, turning the wheels K and M, drawing the chains J, and opening the gates F, as shown in dotted lines, Fig. 1. If, after the gates are opened, allowing a portion of the flow of the river to pass through them, the river still continues to rise, the continued rise of the float will, by pulling on the gates, raise the lower end of the dam, thereby permitting still more water to flow freely both above and below the dam, for when the bottom of the dam rises the top falls. If the water still continues to rise, the float will be lifted until it turns the dam to a horizontal position, as shown in dotted lines, Fig. 1.

P is a stay-chain, attached at one end to the abutment or some other anchor and attached at the other end to the float, whereby the rise of the float is limited, so that it can no longer strain on the chains J after the dam is level. In this position the dam's edge is turned to the stream, thereby offering the least possible resistance thereto.

An important feature of the construction of the dam is that the pivots C are located above the center of the area of the dam when the gates F are closed, and form a part of that area; but when these gates are open the area of that portion of the dam above the pivots is greater than that remaining below. By this means when the gates are open there will be less resistance to the current below the pivots

of the dam than above, whereby the current pushing strongest on the upper portion will assist in leveling the dam.

This dam is not in any respect a gate for canal-locking purposes. The lock used with this dam may be of any form, that being a matter wholly independent of the characteristics of the dam.

S represents a guide-rod secured to the abutment, and T is a staple or eye secured to the float and looped around the rod to slide vertically thereon as the float rises or falls, whereby the float is retained in its proper location. The chain and weight Q serve merely to revolve the wheel K with sufficient force to unwind the chain J, thereby enabling the gates to close when the float descends. When the water in the river falls, the float descends, permitting the dam and the gates to close by gravity. Thus this dam is automatic in its operation. By shifting the balance of superficial area from below the pivots to above, as described, the current is utilized to assist in opening the dam, enabling small floats to do the work. While the floats would be wholly unable to open the entire dam at the proper time, they are fully able to open the nearly-balanced gates, thereby reducing the area of the dam below the axis, and the current now having an excess of pressure above, the dam swings. When the dam is open, navigation may proceed uninterruptedly over it, and when the dam is closed boats may travel on the slack water above, but must pass it by means of locks, as usual.

Some advantage would be gained by the use of gates placed below the pivots thereof, even if the area of the said gates were not equal to or greater than the difference between the areas of the gate above and below the pivots thereof.

The gates may be pivoted centrally relatively to their area if the weight of their operating-arms, cross-bar, &c., overbalances the upper half, so as to normally hold the gates closed.

The ratio between the sizes of the wheels K and M may be arbitrarily fixed to open the dam by a certain amount of rise of the float; or the float may be connected directly with the gates by a chain.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with abutments and fixed bearings, substantially such as described, of a dam pivoted above the center of its area in said bearings, and gates in the lower portion of the dam covering an area thereof greater than the difference between the areas above and below its pivots, substantially as shown and described.

2. The combination of a dam pivoted above the center of its area and gates in the dam below the said pivots, substantially as shown and described.

3. The combination of a dam horizontally pivoted above the center of its area, gates pivoted in the dam below the pivots of the dam, a float adapted to rest on the water, and connections between the float and the said gates, substantially as shown and described, whereby a rise of the river raises the float, thereby first opening the said gates, and then by the same continued motion opening the dam, as set forth.

4. The combination of the anchored standards D, the dam A, pivoted above the center of its area therein, the gates F, pivoted in the dam, the wheels K and M, mounted on the same shaft, the float O, the chain N, connecting the float with the wheel M, and the chain J, connecting the wheel K with the said gates, substantially as shown and described.

5. The combination of the float O and means connecting it with water-gates, and the chain P, secured at one end to the float and anchored at the other end, substantially as shown and described, whereby the amount of rise of the float and its strain upon the said connections is limited, as set forth.

HORACE HARDING.

Witnesses:
W. F. FITTS,
W. P. G. HARDING.