(No Model.) 2 Sheets—Sheet 1.

A. KIRK.

COFFER DAM.

No. 385,358. Patented July 3, 1888.

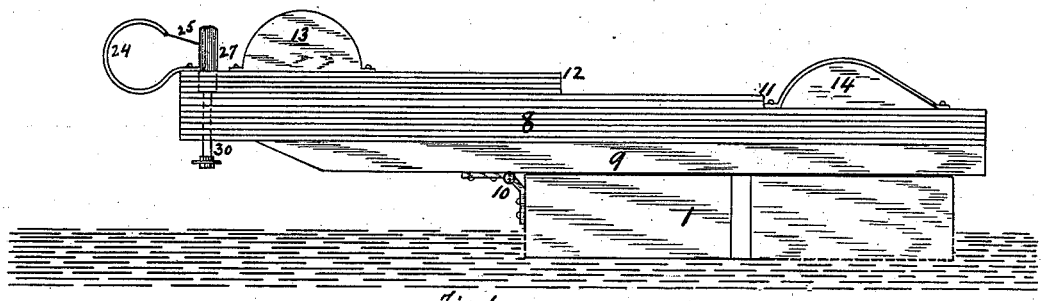

Fig. 1.

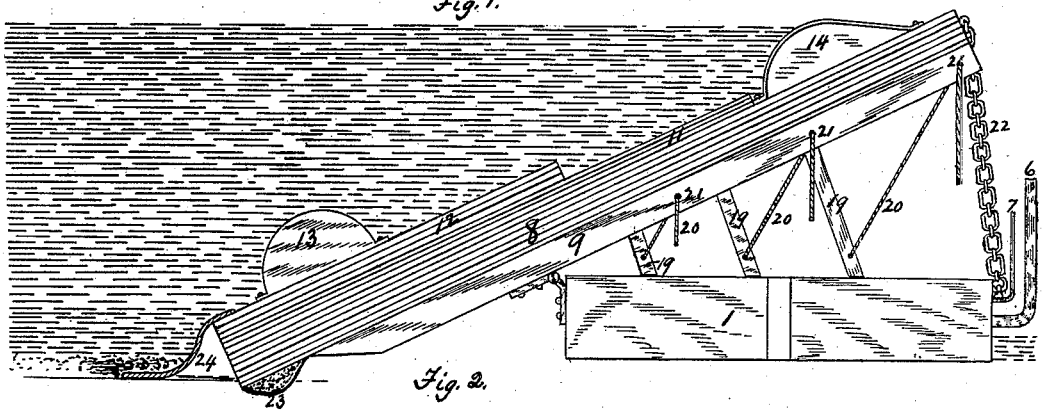

Fig. 2.

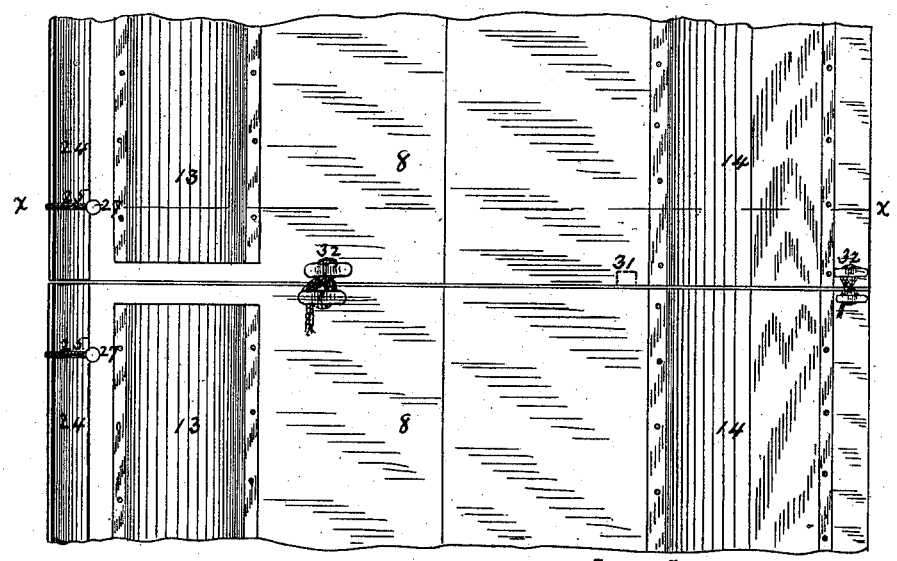

Fig. 3.

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Bakewell & Kerr

(No Model.) 2 Sheets—Sheet 2.

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COFFER DAM.

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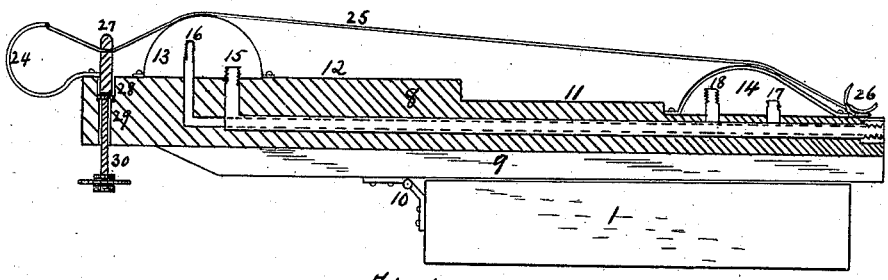

Fig. 4.

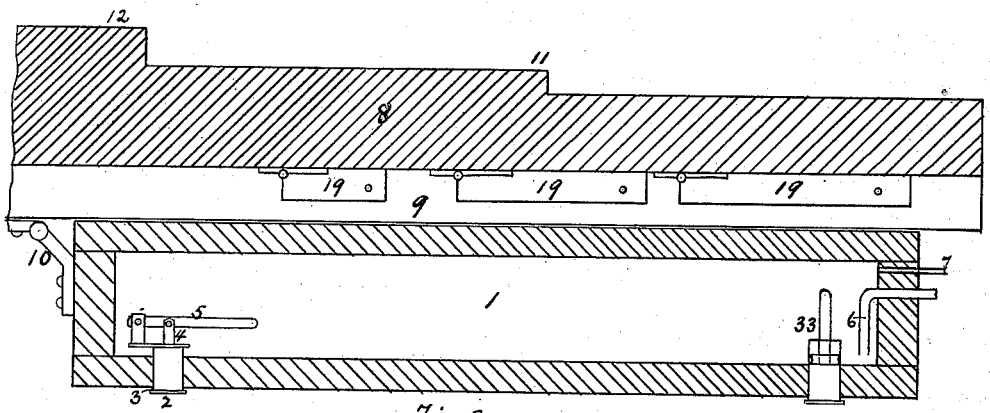

Fig. 5.

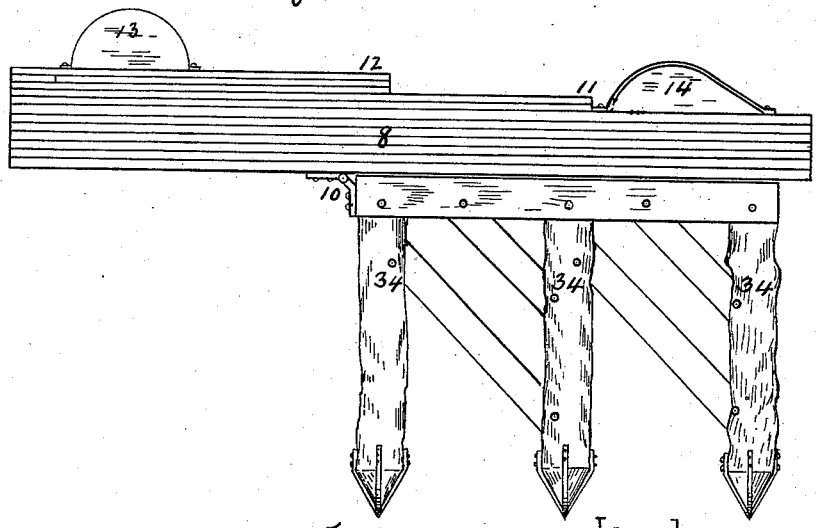

Fig. 6.

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UNITED STATES PATENT OFFICE.

ARTHUR KIRK, OF SHARPSBURG, PENNSYLVANIA.

COFFER-DAM.

SPECIFICATION forming part of Letters Patent No. 385,358, dated July 3, 1888.

Application filed July 2, 1883. Serial No. 99,739. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR KIRK, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Sectional Dams; and I do hereby declare the following to be a full, clear, and exact description thereof.

As heretofore constructed coffer-dams have been made by driving rows of timbers into the bottom of the stream and securing them in place by long bolts at the top and bottom, and then nailing planking to the timbers and filling the space between the rows with earth, which frequently has to be conveyed from a great distance. With such dams the breaking of a bolt often causes the whole structure to give way and is productive of great damage. This method of construction is slow and expensive, and the dams thus made are not only not reliable, but are expensive to remove, and in cases where the removal has not been successfully accomplished may constitute a dangerous obstacle to the navigation of the stream.

It is the purpose of my invention to obviate these objections by constructing a movable and easily managed and controlled coffer-dam, the use of which is not limited to a single instance, but may be repeated a number of times, as the structure is not exposed to greater damage than results from ordinary wear and tear by reason of its transfer from place to place.

To enable others skilled in the art to make and use my invention, I will now describe it by reference to the accompanying drawings, in which—

Figure 1 is a side view of my improvement when not in use. Fig. 2 is a similar view illustrating its position when in use. Fig. 3 is a plan view of two sections of my improved dam. Fig. 4 is an edge view, partly in section, on the line *x x* of Fig. 3. Fig. 5 is a sectional view of a portion of my improvement. Fig. 6 is a side view of a modification. Fig. 7 is a view of a device for stretching a web of canvas out from the edge of the dam.

Like figures of reference indicate like parts.

Referring now to Figs. 1 to 5, I construct a water-tight ponton or flat buoyant vessel, 1, which is provided with a valve, 2, in its bottom, closing an opening, 3, by means of which water may be given access to the water-tight interior. The valve 2 is operated by a stem, 4, and lever 5, through the medium of a rod connected thereto and extending to the deck of the ponton or vessel. Extending from the bottom of the interior of the vessel 1 is a pipe, 6, which reaches to any desired height, and is for the purpose of pumping water out of the interior of the vessel. An air-pipe, 7, extends from the top of the interior, and is for the purpose of admitting the air into the vessel, to take the place of the water when the latter is pumped out through the pipe 6. Hinged to one side of the vessel 1 is a platform, 8, composed of boards built upon each other and bolted together in any suitable or desired way and supported upon timbers or beams 9. The hinges 10, which connect the part 8 to part 1, are bolted to the timbers 9. The outer end of the platform 8 is made thicker than the inner end by adding to the top thereof additional courses or shorter boards, as shown at 11 and 12. On top of the platform 8, near the outer end, is a sheet-iron trough or tank, 13, and near the other end is a second trough or tank, 14. A pipe, 15, Fig. 4, extends from the inner edge or side of the platform 8 through the boards that compose the same, and opens into the tank 13, near the bottom, and a second pipe, 16, extends through the same course and opens into the tank 13, near the top. The tank 14 is provided with similar pipes, 17 and 18. The pipes 15 and 17 are water-pipes, for the purpose of admitting water to the tanks 13 and 14, and the pipes 16 and 18 are for the purpose of admitting air thereto. Hinged to the lower side of platform 8 are braces or supports 19, Fig. 2, one or more in number, and connected to them are ropes 20, which pass up through holes 21 in the beams 9, and thence extend to the inner edge or side of the platform 8. The inner edge or side of the platform 8 is connected to the adjacent side of the ponton 1 by means of a chain, 22, so as to limit its movement upon the hinges 10. The lower outer edge of the platform 8 is provided with a fibrous or textile cushion or mat, 23, which is designed to act as a packing when that portion of the platform comes against or is embedded in the bottom of the stream, as indicated in Fig. 2. Fastened along the projecting outer side of the platform 8 is a skirt, 24, composed of a suitable web

of gum-cloth or canvas, to the outer edge of which cords 25, extending across the top of the platform 8 to cleats 26, Fig. 4, at its other side, are secured. Fastened to the cords 25 are pins 27, which are designed to be placed in the sockets 28 on the upper side of the platform 8, Fig. 4, near its outer edge. Extending from the bottom of the sockets 28 to the under side of the platform are holes 29, in which vertically-sliding bolts 30 are secured. When the platform is going down into the position shown in Fig. 2, the heads of the bolts strike upon the bottom of the stream and the bolts are projected upward and force the pins 27 out of their sockets. Then, if the platform 8 is pointing up the stream, the hydrostatic pressure and the force of the current will cause the skirt to be held tightly down against the bottom and to make a tight joint along the submerged edge of the platform, which joint will be further sealed by the collection of gravel and other shifting material which may be swept down against it upon the lower edge of the skirt. This joint at the submerged end of the platform 8 is rendered more tight and the percolation of water through it more effectually guarded against by the presence of the mats 23 of fibrous material. A number of sections similar in construction to those just described, and illustrated in Figs. 1 and 2, may be secured together, end to end, if desired, by ropes 32, or otherwise, as shown in Fig. 3, for the purpose of constituting a coffer-dam of any desired length greater than that of one of the sections, and for the purpose of centering these separate sections properly together and of sealing the joint between them more tightly I provide the adjoining edges with tenons and sockets 31, or other interlocking devices.

I make use of my improvement in the following way, to wit: The float composed of the ponton 1 and platform 8, keeping the relative position shown in Fig. 1, is brought to the desired point where the dam is to be constructed. Then water is introduced into the interior of the ponton 1 by opening the valve 2, and the whole structure is thereby caused to sink to the bottom of the stream. Then water is admitted into the tank 13 by means of the pipe 15, and the platform 8 is caused to assume an inclined position by reason of the excess of weight at its outer end. The standards or braces 19 (which, when the structure is in the position shown in Fig. 1, lie horizontally between the timbers 9) drop into an inclined position, their lower ends resting upon the top of the ponton 1. When the parts come to rest, the platform 8 is sustained firmly in an inclined position by the braces 19. As the outer edge of the platform 8 strikes the bottom, the bolts 30 are forced up and dislodge the pins 27 from their sockets, so as to release the skirt 24, and the cords 25 having been loosened (before the ponton was sunk) from the cleats 26, the skirt settles upon the bottom in the position shown in Fig. 2 and makes a tight joint between the bottom of the stream and the dam. Other sections of the dam are brought into position with relation to the first section and sunk in a similar manner until the entire structure is completed. The joint 32, Fig. 3, between the different sections may be sealed tightly by covering it with a strip of gum-cloth or canvas laid on top of the platform and secured in any desired manner. The greater the pressure of water upon such strip the tighter the joint between the sections will be sealed.

A coffer-dam thus constructed is not only much more secure and impervious to water than the old form mentioned, but it has the further advantages of being capable of transportation in complete form from place to place, of being quickly put into position, and of being taken out and used again. The outer part of the platform 8 is made thicker, because it is exposed to greater pressure of the water and to more severe usage.

When it is desired to raise the sections of the dam, it is done in the following manner: First, a sufficient quantity of water is pumped out of the ponton 1 through the pipe 6 to give it sufficient buoyancy to cause it to rise from the bottom. This causes the dam to rise at its rear side, while the outer side of the platform 8, being still heavily weighted, clings to the bottom. Then the valve 2 is opened and the water is permitted to rush suddenly into the interior of the ponton, which causes it to sink again slowly for the purpose of relieving the braces 19 and permitting them to be drawn up by the ropes 20. Then I pump the water out of the tank 13 by means of the pipe 15, replacing it with air by means of the pipe 16. Then I fill the tank 14 with water, so that the inner side of the platform shall be made heavy and the outer side buoyant. This causes it to assume a horizontal position. Then I pump out the ponton 1 through the pipe 6, air flowing in through the pipe 7 to replace the water and to give the requisite buoyancy to the structure. This causes it to rise to the surface of the water, when it may be floated away to any desired position.

Instead of using the valve apparatus shown at 2, I can use that shown at 33, Fig. 5, where a cylinder provided with a piston operated by compressed air or other similar means is used for moving the valve.

I do not limit myself to any particular construction or arrangement of the scuttle-valves, but propose to use any form of valve which is suitable for the purpose.

In Fig. 6 I show the use of the platform 8, with its parts, in connection with piles 34, where for any reason the use of the ponton may conveniently be avoided, or where the use of the dam is likely to be of considerable duration. In this case the platform 8 is hinged to cross-timbers secured to the upper ends of the piles, and it is tipped into posi-

tion and raised out of the water in the manner before described with reference to Figs. 1 to 5.

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

1. The combination of an air-tight ponton or float provided with a suitable scuttle-valve and with pipes for exhausting the water therefrom and admitting it thereto, with the platform placed on top and hinged to one side of the same, substantially as and for the purposes described.

2. The combination of an air-tight float having means for admitting and exhausting water therefrom, with a platform placed upon and hinged thereto, and movable braces for sustaining the platform in an inclined position on the ponton, substantially as and for the purposes described.

3. The combination of an air-tight float having means for admitting and exhausting water therefrom, with a platform placed upon and hinged thereto, pivoted braces for sustaining the platform in an inclined position, and means for withdrawing the said braces from their supporting position to permit the return of the platform to its normal position, substantially as and for the purposes described.

4. A tipping dam having a mat or cushion of fibrous material at its lower outer corner or edge, and a skirt of gum-cloth or similar material secured along its outer edge, substantially as and for the purposes described.

5. A tipping-dam platform provided with a skirt attached by one edge to its outer side, in combination with movable pins placed in sockets in the upper side of the platform, bolts projecting below the lower side for dislodging the pins, and cords fastened to the outer edge of the skirt, secured to the pins and extending to the inner side of the platform, substantially as and for the purposes described.

6. A tipping-dam platform pivoted at or near the middle to a suitable ponton or base, so that one edge shall project beyond the same over the water, in combination with a tank extending along said projecting edge, and means for admitting and removing water from the tank, substantially as and for the purposes described.

7. A tipping-dam platform provided with tanks extending along its inner and outer edges, and with pipes for admitting and withdrawing water from the tanks, substantially as and for the purposes described.

8. A tipping-dam platform pivoted at or near its middle to one edge of its support, with one edge projecting beyond the side of the support, so as to be capable of being tipped downward to constitute a dam, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 23d day of June, A. D. 1883.

ARTHUR KIRK.

Witnesses:
W. B. CORWIN,
T. B. KERR.