(No Model.) 2 Sheets—Sheet 1.

F. H. BAINBRIDGE.

DAM.

No. 525,834. Patented Sept. 11, 1894.

Fig. 1.

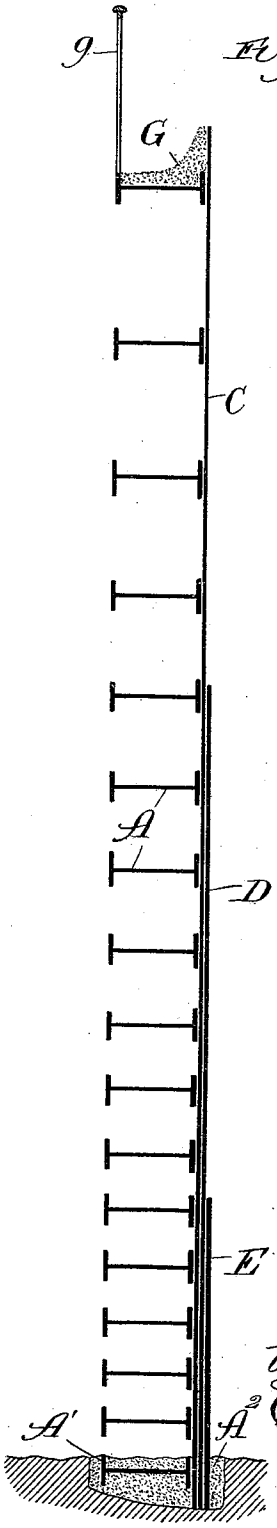


Fig. 2.

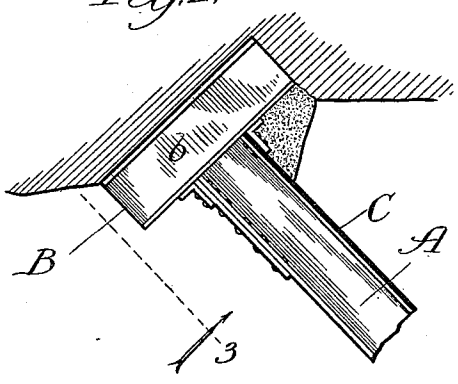
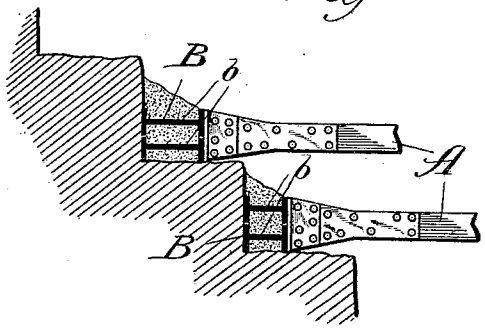


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

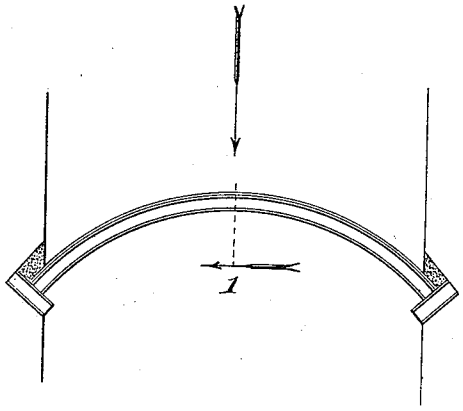


Fig. 5.

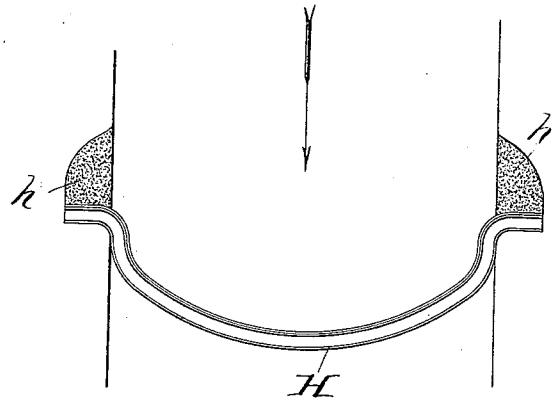


Fig. 6.

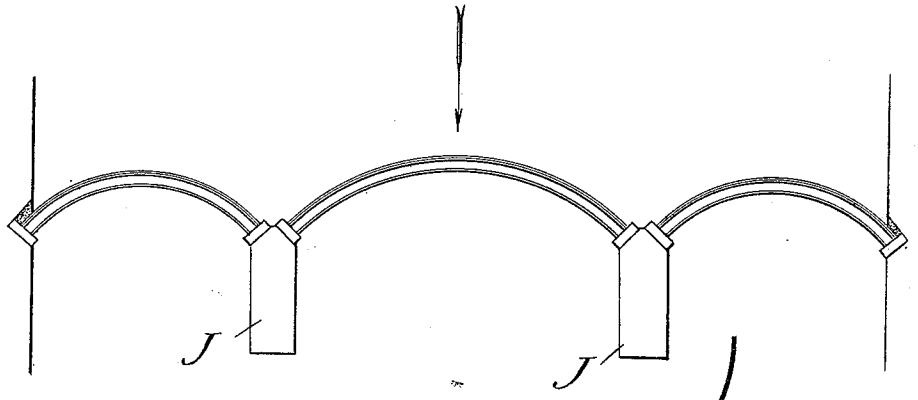


Fig. 7.

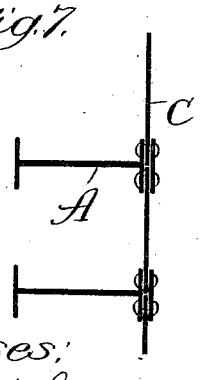
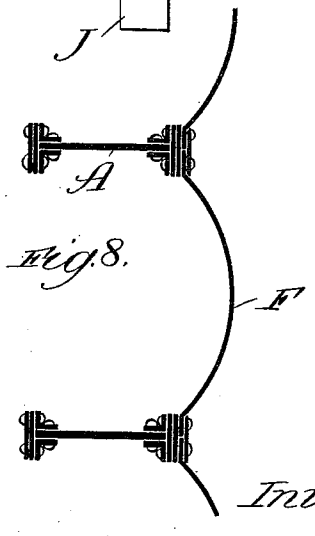


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANCIS H. BAINBRIDGE, OF CHICAGO, ILLINOIS.

DAM.

SPECIFICATION forming part of Letters Patent No. 525,834, dated September 11, 1894.

Application filed March 27, 1894. Serial No. 505,259. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. BAINBRIDGE, of Chicago, Illinois, have invented a new and useful Improvement in the Construction of Dams, &c., of which the following is a specification.

The object of my invention is to construct a dam of wrought iron or steel for closing a valley or cañon for the purpose of impounding water. As is well known, in various sections of the United States rain falls during but a short season of the year, and in such localities water is retained in large reservoirs and utilized during the remaining portion of the year for irrigating and other purposes. Such reservoirs may be formed by closing up a valley or cañon by the construction of dams, which are generally of great height and involve great expense.

It is the object of my invention to form a dam cheap and simple in construction, and of sufficient strength to resist the pressure of the water impounded. Furthermore, my construction is such that it can be completed in much shorter time than a dam of any other known construction; and my invention consists in the features and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an enlarged vertical sectional view of my construction, taken on line 1 of Fig. 4; Fig. 2, a plan view of the girder bearings; Fig. 3, a detail view of the steps supporting the ends of the girders; Fig. 4, a plan of the valley or cañon with the girders arched toward the impounded water; Fig. 5, a modified form of construction showing the girders curved from the impounded water; Fig. 6, a modified form of construction, and Figs. 7 and 8, detailed views of the girders and plates forming the water face.

For the sake of brevity and clearness in description, I will proceed to describe my invention as constructed in a valley or cañon having rock sides. I first take a number of girders or I-beams, A, of the proper curvature and length, the lower one, A′, of which is embedded in a trench in the bottom of the valley in any suitable manner—for instance, embedded in the concrete, A^2. These girders are preferably placed horizontally one above the other at suitable distances apart, the lower ones being arranged closer together on account of the greater pressure exerted there. As shown particularly in Figs. 2 and 3, the ends of the girders are supported in steps, B, B, cut out of the solid rock. The ends of each girder are preferably provided with enlarged bearings, as, for instance, the ends of the girders are secured to I-beams, *b*, *b*, resting upon the step, as shown in Fig. 3, although any other form of construction may be used for the enlarged bearings.

Arranged upon the face of the girders are plates, C, of iron or steel, and made preferably in sections of the proper dimensions. These plates are riveted or otherwise secured to the girders. As shown in Fig. 7, these plates are joined together preferably at the I-beams in order to secure a water-tight joint. A single series of plates is arranged from top to bottom of the dam, but any desired series may be added in order to reinforce the first series, as, for instance, in Fig. 1. I have shown series D and E, the plates being tripled near the bottom of the dam on account of the increased pressure of water there. In Fig. 7 I have shown straight plates forming the water face, and in Fig. 8 is shown a modified form of construction, wherein curved or arched plates, F, presenting their convex surface to the impounded water are used. This is sometimes a desirable construction, for the reason that it permits the girders to be arranged at a greater distance apart—say two or more times than when the straight plates are used. It is obvious, however, that the concave form of plates may be used instead of the convex in this form of construction. The girders used in any case may either be rolled, as shown in Fig. 7, or built up, as shown in Fig. 8. The curvature of the arch may be of any character or degree, and I therefore do not wish to be understood as limiting myself to the precise forms shown in the drawings. The radii of the curve to which the several girders may be bent may be constant, making the water face a portion of the surface of a cylinder, or the radii may decrease in length toward the lower part of the

construction, making a surface which approximates to the surface of a portion of a cone. Upon the upper girder is formed a suitable walkway, G, with a suitable hand rail, *g*, arranged adjacent thereto, whereby facilities for making examination or repairs are provided.

In Fig. 5 I have shown a modified form of construction, wherein the concave surface of the dam is presented to the impounded water. In such forms, the ends of the iron construction, H, or inverted arch, are anchored into the sides of the cañon or valley, as at *h*, *h*.

In Fig. 6 I have shown a form of construction which may be desirable in case the span between the sides of the cañon or valley is too long for a single arch. In such case I prefer to build a suitable number of masonry piers, J, J, and arrange between them any of the forms of iron construction heretofore described. As shown in the drawings, the convex form of construction is employed, but it will be obvious that the concave form shown in Fig. 5 may be used.

By the use of my invention, I am enabled to construct an efficient, substantial and comparatively cheap dam, and one which can be completed in a much shorter time than any other, which is an important consideration in the construction of dams.

Although I have described more or less precise forms and details of construction, I do not intend to limit myself thereto, as I contemplate changes in form, porportions of parts, and the substitution of equivalents, as circumstances may suggest or render expedient.

I claim—

1. In a dam, the combination of girders or I-beams arranged substantially one above another, and secured at their ends, and metallic plates upon the girders and forming the water face, substantially as described.

2. In a dam, the combination of girders or I-beams arranged horizontally substantially one above another, and metallic plates secured upon the girders and forming the water face, substantially as described.

3. In a dam arranged in a valley or cañon, the combination of girders or I-beams arranged horizontally one above another and resting in steps in the sides of the valley or cañon, and metallic plates secured upon the girders and forming the water face, substantially as described.

4. In a dam located in a valley or cañon, the combination of girders or I-beams arranged substantially one above another at suitable distances apart, steps in the sides of the valley or cañon to receive the ends of the girders, of which girders those nearer the bottom being arranged closer together than those near the top, and metallic plates secured to the girders and forming the water face, substantially as described.

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