No. 787,525. PATENTED APR. 18, 1905.

W. J. MEYERS.

DAM.

APPLICATION FILED DEC. 29, 1904.

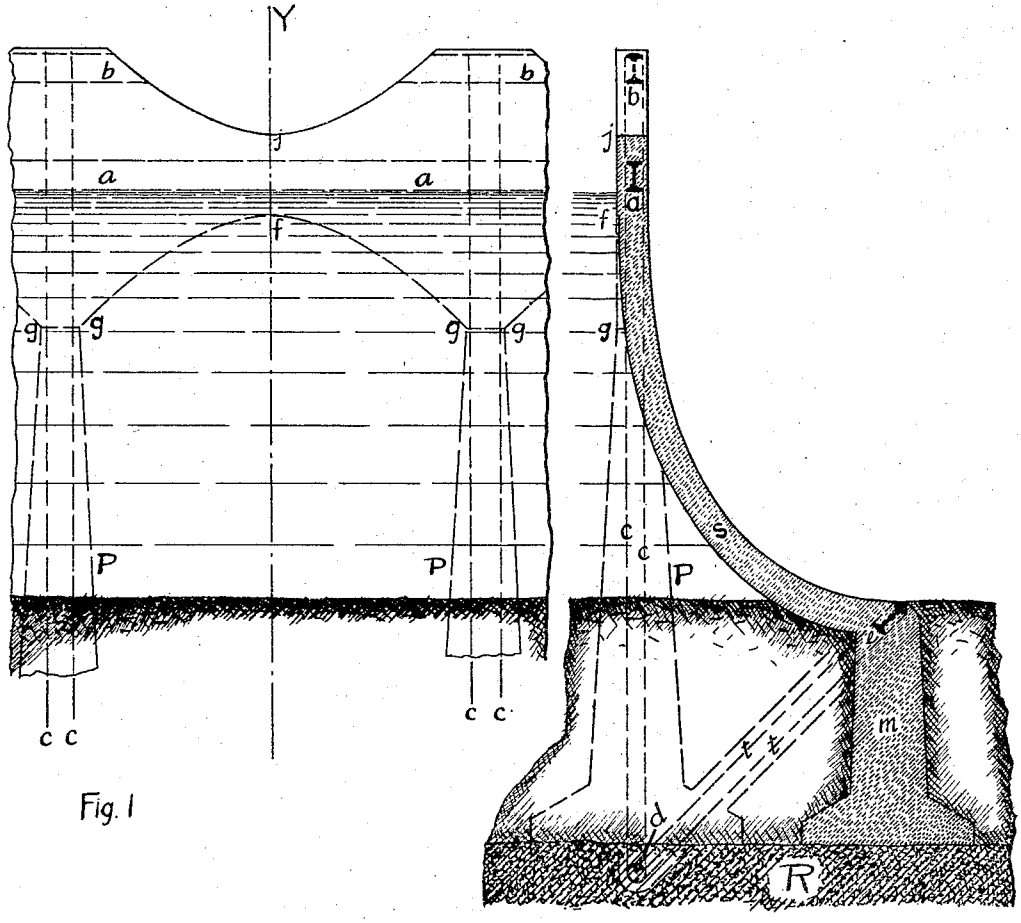


Fig. 1

Fig. 2

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No. 787,525. Patented April 18, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM J. MEYERS, OF FORT COLLINS, COLORADO.

DAM.

SPECIFICATION forming part of Letters Patent No. 787,525, dated April 18, 1905.

Application filed December 29, 1904. Serial No. 238,700.

To all whom it may concern:

Be it known that I, WILLIAM J. MEYERS, a citizen of the United States, residing at Fort Collins, in the county of Larimer and State of Colorado, have invented an Improvement in Dams, of which the following is a description.

In this specification I use the term "sheet" or the phrase "sheet of the dam" to denote that portion of the dam which is composed of substantially impervious material and against which the water above and upstream from the dam directly presses. I use the term "cut-off wall" to denote that portion of the substructure whose purpose it is to prevent or impede the underground escape of the waters of the reservoir or basin.

My invention, briefly described, consists in so shaping the sheet of the dam that every section of the upstream face of said sheet normal to the crest of the dam shall throughout the extent of said section be convex to the water of the reservoir, thus subjecting the said sheet along the said section to compressive stresses dependent on the degree of curvature of the water or upstream face of the said section and the depth of the particular point below the free surface of the water in the reservoir, which compressive stresses are resisted by suitably-disposed material of great compressive strength. Such material is at the base of the sheet suitably abutted against beams suitably attached to the cut-off wall, and at the upper part of the sheet the said material is suitably abutted against beams substantially parallel to the crest of the dam, which beams, either alone or with the aid of arches lying in the plane of the load, concentrate the load at certain places which are securely tied or anchored to the foundation of the structure. Where the base of the sheet and the plane of the cut-off wall are not tangent, as they ordinarily will not be, the resultant stress is carried to the foundation by suitably-disposed braces.

To make the foregoing specification clearer, reference may be made to the drawings accompanying this specification, said drawings consisting of two figures marked, respectively, "Fig. 1" and "Fig. 2" and placed on a single sheet.

Figure 1 of the said drawings shows an elevation of the upstream face of the dam; and Fig. 2 shows a cross-section of the dam described herein, the said section being that cut by the plane whose trace is the line Y in Fig. 1, which cutting plane is normal to the crest of the dam.

In Fig. 2, *s* denotes the sheet of the dam, which is shown as being horizontal at its lower edge or portion and vertical at its uppermost, as will ordinarily be the case, although the invention is not limited to this arrangement, and under some circumstances it will be expedient to give these parts of the sheet other inclinations. At the base of the sheet it abuts against the beam *e* and at the upper part against the beam *a*. The beam *e* is also abutted against by the cut-off wall *m*, and the resultant load on *e* is carried to the foundation by the braces (marked *t*) here in tension. The braces are not, however, limited to this position, and under some circumstances it will be expedient to place them on the downstream side of the cut-off wall, in which case they will be in compression and the cut-off wall will be in tension.

The load upon the beam *a* is concentrated, by means of the beam alone or with the aid of inverted arches, to certain places, whence it is tied or anchored to the foundation. *j* in Figs. 1 and 2 shows the soffit or vertex of one of these inverted arches, and *b*, Figs. 1 and 2, shows the short beam, against which the load is concentrated. The beam *b* is tied to the foundation by the cables (marked *c* in Figs. 1 and 2.)

When the reservoir is empty, or nearly so, the buoyant effect of the water being largely or entirely absent, the sheet will need to be supported in position. For this purpose stiffening beams or trusses lying in planes normal to the crest of the dam and suitably attached to the beams *a* and *e* will be inserted in the sheet in its construction, and the beam *a* will be provided with posts P, Figs. 1 and 2, for its support, these posts receiving their load either directly from the beam *a* or indirectly through arches having their soffits at *f*, Figs. 1 and 2, and their springing-points at *g*, Figs. 1 and 2.

The curve of the water-face or upstream face of the sheet *s* in Fig. 2 is one the radius of curvature at any point of which is inversely proportional to the depth of that point below the free surface of the water in the reservoir, thus making the compressive stress uniform at all points of the curve; but the invention is not limited to the use of such curve.

For the material in compression I shall in most cases use concrete and for that in tension high steel; but I do not limit myself to any particular material or materials.

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

An improvement in dams for resisting fluid-pressure, which said improvement consists of a substantially or sufficiently impervious sheet whose section in a plane normal to the crest of the dam is substantially everywhere convex to the impounded fluid, the said sheet being supported by compressively-stressed material the planes of compression in which are substantially normal to the crest of the dam, the load caused by the said compressive stresses being transmitted through the medium of beams or of arches or of beams and arches combined to ties and braces, through which ties and braces the said load is transmitted to the foundation of the structure, substantially as described in the foregoing specification, but without restriction of the class of curve to the circle, the hydrostatic arch or any other particular curve save that the curve be substantially everywhere convex to the impounded fluid.

In witness whereof I have subscribed my name to this specification in the presence of two subscribing witnesses.

WM. J. MEYERS.

Witnesses:
BALTHASAR HENRY MEYER,
EDWIN W. KERR, Jr.