(No Model.)

J. WHITEHEAD.

WATER DAM.

No. 596,644. Patented Jan. 4, 1898.

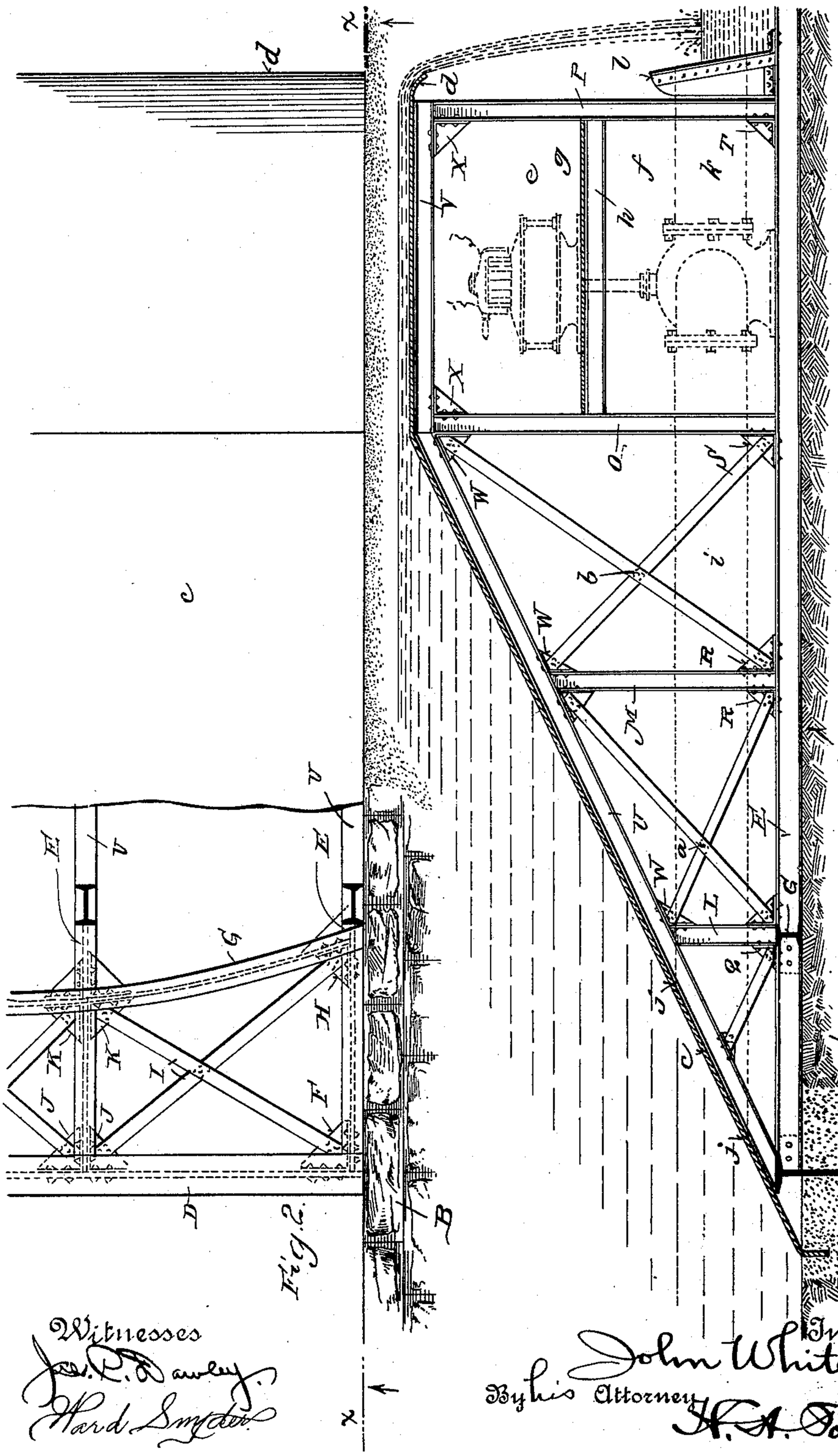

Fig. 1.

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN WHITEHEAD, OF URBANA, OHIO.

WATER-DAM.

SPECIFICATION forming part of Letters Patent No. 596,644, dated January 4, 1898.

Application filed May 3, 1897. Serial No. 634,813. (No model.)

To all whom it may concern:

Be it known that I, JOHN WHITEHEAD, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Ohio, have invented certain new and useful Improvements in Water-Dams, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in water-dams.

The leading objects of my invention are, first, the provision of a dam structure which shall embody a space or room underneath it for utilization as a machinery-apartment or as a submarine passage-way across the stream; second, the provision of anchoring means in connection with the point of the dam at or near the bottom of the stream, and, third, the provision of a dam with such anchor means at its forward point and with an inclined floor-space adapted to sustain a down pressure twice that of the downstream pressure of the water, which is obtained by making the horizontal foot or bed of the dam approximately twice the length of the height of dam from the crown to such base.

My invention embraces also certain features of detail hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, on which like reference-letters indicate corresponding parts, Figure 1 is a side elevation of my improved dam with one bank of the stream removed, such view being taken on the line *x x* of Fig. 2; and Fig. 2, a plan view of the dam with a portion of the inclined floor broken away to show the supporting structure.

The letter A designates the bed of a stream of water in which my dam may be placed. I prefer to wall up the bank of the stream a short distance, as indicated at B in Fig. 2, so as to give a solid abutment-like structure to prevent the lateral spreading of a certain arched bottom to be presently referred to. Near the forward end of this stone structure I excavate the bed of the stream to form a lateral ditch or depression C, in which I place a filling of concrete or grouting, and in the latter I embed the anchor-beam D. This consists of an iron or steel beam of the form shown, specially wide, so as to extend well down into this filling. The filling, being tapped or rammed and becoming hard, anchors the anchor-beam in a solid manner. This beam extends from side to side or wall to wall. To it I secure at each end and in the middle and, if need be, at intermediate points longitudinal sills E, also of iron or steel, in the form of I-beams. Corner-plates F are shown in Fig. 2 to connect these parts by bolts or rivets. To the rear of the anchor-beam I secure an arch-beam G, also of iron or steel and in cross-section in the form like the letter I. Corner-plates H with rivets or bolts are used to secure this arch-beam to the sills E.

A system of braces is employed to firmly brace the anchor-beam to the arch-beam. This system consists of cross-braces I, secured to the corner-plates H and to the other corner-plates J and K, themselves fastened to the anchor-beam D and arch-beam G. A continuation of the inner sill E is also secured through these corner-plates to the anchor-beam D and the arch-beam G, so as to tie the two together in a longitudinal direction to the stream. The downstream pressure or thrust is thus resisted by the arch-beam G through its connections with the anchor-beam. The lateral spreading of the arch is resisted by the side or abutment walls B. At suitable intervals a series of uprights L, M, N, O, and P are also secured to the sills E by means of corner-plates Q, R, S, and T. These uprights are also of iron or steel and in the form of I-beams. Inclined joists or floor-beams U, one over each sill E, are secured to the uprights L, M, and O, while horizontal floor beams or joists V, one over each sill E, are secured upon the uprights O and P. Corner-plates W and X are employed to secure the flanges of these floor beams or joists to the uprights, as shown, rivets or bolts being employed for the purpose, and the joists being of iron or steel in the form of I-beams. A system of braces *a b* extends from the foot of the uprights L and M and M and O to the corner-plates W, where they are secured. This renders the structure of great strength. Upon these joists is secured a flooring *c*, of sheet-metal, preferably of boiler-iron, with its point carried down into the concrete or

grouting C. This flooring is also carried back over and upon the joist B, and thence extends back to form a discharge-plate *d*.

As before intimated, the longitudinal measurement from about the forward end of the incline to the uprights O is twice the vertical measurement from the upper end of the incline to the top of the sills E. The result of this is to give floor space or area which will suffer a vertical pressure twice as great as the downstream pressure it suffers, so that this self-anchoring tendency is utilized in aid of the positive anchor embodied in the anchor-beam and cement or grout. I would generally utilize and combine with my positive anchor this self-anchoring construction, but may vary from it under some conditions; yet this combination is a part of my invention as I would generally use it.

Referring now to the room or apartment which my dam structure affords, it will be seen that I have divided it into, in the illustration, two apartments *e f*, a flooring for the former being sustained by joist *h*, suitably secured to the uprights *o* and *p*, and a vertical electric generator or dynamo being shown therein in dotted lines and receiving motion from a water-wheel (shown in dotted lines) in the lower room, with its flume or feed-pipe *i* extending under the inclined floor of the dam to the flooring *c*, where the water is allowed to enter, as suggested by the dotted lines shown at *j*, indicating an opening. The hydrostatic force is as great at this point as at any higher place along the dam. A discharge-pipe for the water-wheel is shown in dotted lines at *k*. A dam or protecting-wall of some suitable nature is preferably erected, as shown at *l*, to prevent the water below the dam from washing back into the lower room. In some instances I will not utilize this apartment structure, but in most instances will, because it affords a place for machinery of different kinds and avoids the necessity of a long water-race and of buildings such as usually employed. The power can be conducted from this generator in any suitable manner by any of the known conducting means.

Thus it will be seen that I have provided a dam with one or more apartments to be utilized for machinery or other purposes and that I have provided a positive anchor construction and have combined with it a certain self-anchoring arrangement, besides numerous features of detail and besides, also, what may be termed a "submarine passage," being the apartment *f* or apartments *e* and *f*, as travel could thus be provided for under the water flowing over this structure, the banks being suitably cut down for this purpose.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dam, the combination with an anchor-beam and its concrete or grouting body embedded in the stream bottom, of sills secured to said anchor-beam and a dam superstructure erected on such sills with an inclined floor having its lower forward end terminating at or near said anchored beams.

2. In a dam, the combination with a body of concrete or grouting in the stream bottom, a lateral anchor-beam partially embedded therein, longitudinal sills secured to the exposed upper portion, a system of uprights and braces carried by said sills, inclined joists supported by such uprights and a boiler-iron or metallic sheathing forming a flooring upon said joists, the lower end of the same being at or near said anchor-beam.

3. In a dam, the combination with a bed of concrete or grouting and an anchor-beam partially embedded therein, of sills secured to the exposed portion of the beam and a dam structure built upon said sills, the height of which at the high end is approximately twice the length along the sill-line, whereby a floor area is provided which will suffer vertically about twice the downstream pressure, the latter preventing the former from being ineffective by securing it against vibrations which would start it.

4. In a dam, the combination with an inclined floor, of a substantially horizontal floor forming an extension thereof, and suitable supports for said floor and extension, whereby a combined dam and apartment structure is provided the latter constituting space for machinery or a submarine passage.

5. In a dam, the combination with an anchor-beam and horizontal sills secured to it, of uprights and braces carried by the sills, an inclined floor carried by the uprights with its lower point near the anchor-beam and the horizontal floor carried by a part of the uprights and extending rearward from the top of the incline all for the purpose described, and a subdam to protect the apartment under said floor.

6. In a dam, the combination with an anchor-beam and sills secured to it, of side abutment-walls and a horizontal arch secured to said sills and to said anchor-beam.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN WHITEHEAD.

Witnesses:
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