

T. H. SKINNER.

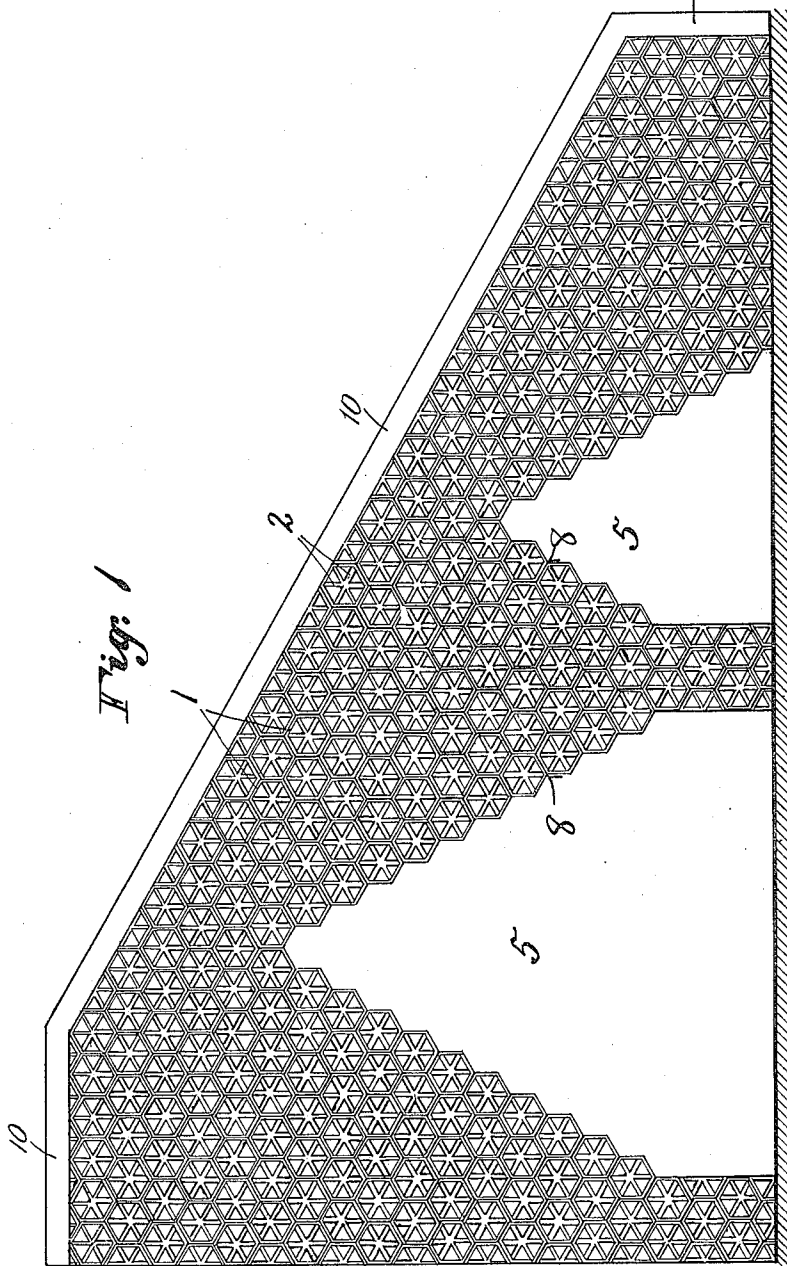
DAM.

APPLICATION FILED MAR. 8, 1910.

Patented Oct. 7, 1913.

1,075,128.

3 SHEETS—SHEET 1.



Witnesses

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1,075,128.

Fig. 5.

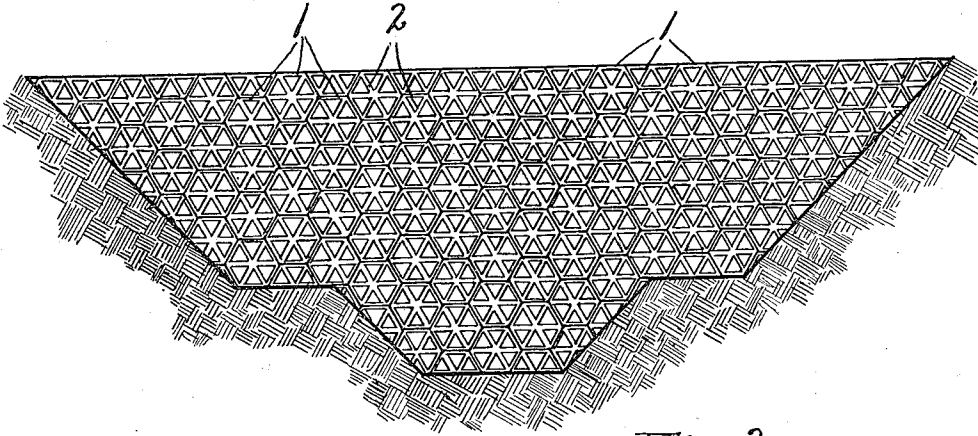


Fig. 2.

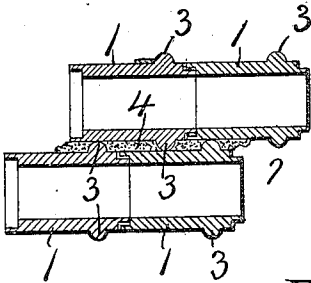


Fig. 3.

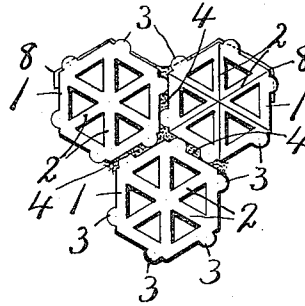
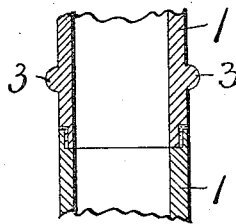


Fig. 4.



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UNITED STATES PATENT OFFICE.

THEODORE H. SKINNER, OF ONEIDA, NEW YORK.

DAM.

1,075,128.

Specification of Letters Patent.

Patented Oct. 7, 1913.

Application filed March 8, 1910. Serial No. 548,059.

To all whom it may concern:

Be it known that I, THEODORE H. SKINNER, of Oneida, in the county of Madison, in the State of New York, have invented
5 new and useful Improvements in Dams, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in dams in which a void or voids may be necessary or desirable, and involves a systematic assemblage of similarly formed and interchangeable tile or hollow monoliths of terra-cotta, cement, concrete or like
15 material cementitiously bound together during progressive building to constitute a multi-cellular monolithic structure of the desired form capable of resisting the strains or stresses to which that particular structure may be subjected.

One of the objects is to enable such structures to be built up with one or more voids, arches or similar openings therein and to render the same self-sustaining during progressive building without the use of forms or other false structures or supports and at the same time to permit the stresses due to the weight of the structure to be evenly distributed or balanced during such progressive building, so that when the structure is completed this stress will be directed in predetermined directions and concentrated or distributed upon predetermined points or areas, as may be desired to resist and balance the superposed structure or load.

Another object is to dispose cellular monoliths in such manner as to allow an even distribution of surface or ground water therethrough for the purpose of relieving the entire structure from hydrostatic pressures tending to overturn or reduce the stability of the same.

Other objects and uses will be brought out in the following description.

In the drawings: Figure 1 is an end elevation of a dam. Fig. 2 is an enlarged sectional view of portions of two adjacent tiers or layers of hollow monoliths shown in Fig. 1. Fig. 3 is an enlarged transverse end view of adjacent monoliths showing particularly the cementitious bond between them. Fig. 4 is an enlarged sectional view of adjacent monoliths as used in an upright position. Fig. 5 is a face view of a dam, showing the tile arranged with their openings toward the water.

This dam is composed of a series of similarly formed tiles or hollow monoliths —1— of terra-cotta, cement, concrete or like material of suitable dimensions, the normal section of each being that of a system of equilateral triangles assembled or grouped integrally or cementitiously to form a regular polygon preferably hexagonal so that when assembled the sides of the triangles will form reinforcing webs —2— extending from corner to corner of the hexagon to more effectively resist compression strains. It is to be understood, however, that in some instances these reinforcing ribs may be omitted and that in other instances where certain tiles are subjected to excessive strains they may be filled with concrete and suitable reinforcements embedded therein. In the construction of a dam these monoliths are arranged systematically side to side and held a slight distance apart by spacing members —3— forming intervening spaces at the joints for the reception of a suitable bond —4— of cementitious material by which the units are bound together to render the structure self-sustaining during progressive building.

When used in the construction of a dam, in which it is desired or necessary to form one or more voids, as —5—, the hollow monoliths are arranged in a horizontal position with their upper and lower sides disposed in similar transversely inclined planes of, in this instance 30°, from a horizontal so that each unit in the body of the structure rests upon the adjacent sides of two sub-units and forms a direct support for two adjacent superposed units.

By employing the form of tile or hollow monoliths described, they may be assembled in such manner as to form the voids, arches or openings —5— of any cross sectional area or areas and are rendered self-sustaining during progressive building without the use of forms or other false supports, and at the same time the superposed load and stresses may be distributed to predetermined points as may be determined by the use to which the structure may be adapted. Another important advantage of this cellular structure is that it affords interior channels for the free entry and passage therethrough of surface and ground water, thereby relieving the entire structure or any part thereof from excessive hydrostatic pressures. This provision for the relief of hydrostatic pres-

sures makes it possible to construct a dam from comparatively light tile or hollow monoliths capable of effectively resisting any loads, strains or stresses to which dams of this character may be subjected and at the same time materially reduce the cost of material, labor and time in the construction of such work.

In the construction of dams any one of three conditions may be met. First—where it is desired to store a small quantity of flowing water in solid ground or rock in which the deflection and control of the flow would not make the construction of the dam difficult. In such a case the cellular units would be placed with the closed sides normal to the surface of the dam, thereby making the structure water resistant in one operation. Second—where the ground is soft or full of water tending to produce upward hydrostatic pressure upon the completed structure, in which case the cellular tile units would be placed vertically on end and in vertical alinement thereby providing vertical ways or channels through which the water may rise to a level from which it may be safely withdrawn to the outside of the structure. Third—where a large volume of water or water flowing at high velocity makes it impossible to deflect or hold back the flow by coffer-dams, and it must therefore be allowed to flow during construction. In this last case the cellular tile units would be placed upon their sides longitudinally in alinement and parallel to the flow of the water, thereby forming channels for such flow and not materially reducing the normal area of the bed of the stream, yet providing a foundation and a method for building the entire superstructure before attempting to stop the flow of water, as shown in Fig. 5.

In some instances it may be necessary to tie the outer tile in place during progressive building of the dam and this is particularly desirable where the dam is built up in courses of gradually increasing lengths from a main supporting pier so as to produce a cantaliver support for the superstructure and for these purposes one or more tie pieces —8— are incorporated between and transversely of one or more courses of tile with their ends lapped upon or hooked into the outer faces of the outer tile of the adjacent course, thereby holding the outer tile in place and forming a cantaliver, the bond spanning such course from side to side to more effectually support and distribute the superposed load.

When the cellular units are properly assembled to form the dam and voids or arches therein, the slope or water side of the dam and top may be covered with a layer or fac-

ing —10— of cement or equivalent material which not only affords a wearing surface to protect the tile units but also affords a reinforcing bond tying the entire upper series of tiles together.

What I claim is:

1. A dam composed of similar cell units of regular polygonal cross-section bound together side to side, one upon another without extra supports or forms during progressive building.

2. A dam composed of similar equilateral cell units bound together side to side, one upon another.

3. A dam having an arch or vault composed of similar, regular, polygonal cell units bound together side by side one upon another without forms or preconstructed centers.

4. A dam having an arch composed of regular polygonal cell units of the same size and form, cementitiously joined side to side one upon another in courses, with the cells of each course alined.

5. A dam having piers and arches composed of regular, polygonal cell units, cementitiously joined side to side during progressive building.

6. A dam composed of a multiplicity of cell units of regular polygonal cross-section joined side to side one upon another in courses, the contiguous sides of each unit and its superposed unit being disposed at an angle to a horizontal plane.

7. A dam composed of similar cell units of regular polygonal cross-section joined together side to side one upon another in courses during progressive building, with the cells of each course alined and open from end to end, each unit having partitions divided in its interior into a plurality of cells.

8. A vaulted dam composed of similar units of regular polygonal cross-section cementitiously secured, side to side, one upon the other to form a vault, without forms or preconstructed centers.

9. A dam having an arch composed of cell units of regular polygonal cross-section arranged side to side one upon another, so that one of the upper sides of each unit which forms the arch will be substantially normal to the spring line of such wall.

10. A dam composed of cellular units cementitiously secured side to side, one upon another to form an inclined water front, and a concrete facing covering said front.

In witness whereof I have hereunto set my hand on this 17th day of February, 1910.

THEODORE H. SKINNER.

Witnesses:

H. E. CHASE,

HOWARD P. DENISON.