No. 649,643. Patented May 15, 1900.

D. B. LUTEN.

ARCH BRIDGE.

(Application filed Aug. 2, 1899.)

(No Model.)

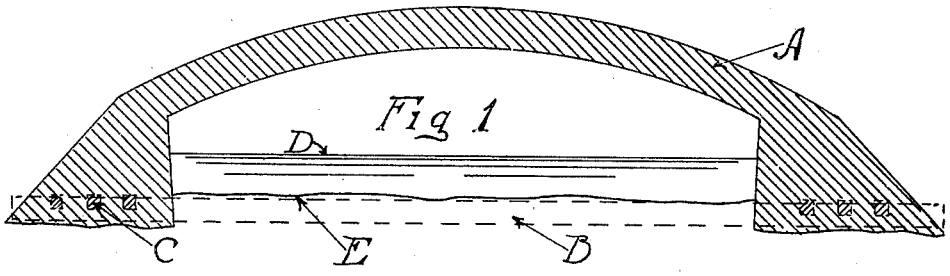

Fig 1

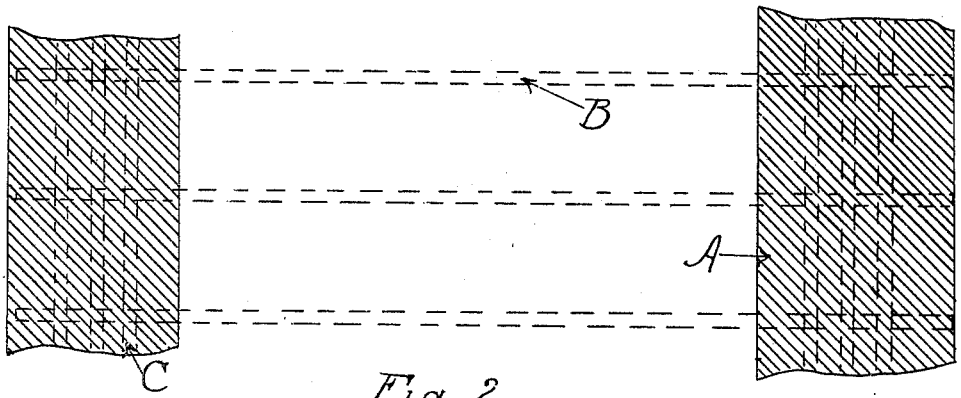

Fig 2

Witnesses.
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UNITED STATES PATENT OFFICE.

DANIEL B. LUTEN, OF LAFAYETTE, INDIANA.

ARCH-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 649,643, dated May 15, 1900.

Application filed August 2, 1899. Serial No. 725,851. (No model.)

To all whom it may concern:

Be it known that I, DANIEL B. LUTEN, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe, State of Indiana, have invented an Improvement in Arch-Bridges, of which the following is a specification.

My invention relates to bridges; and it consists in providing means to relieve the abutments thereof of a part of the horizontal thrust of the arch, thus permitting of lighter construction and reducing the cost of building and maintenance, as well as increasing their periods of usefulness.

It consists more particularly in uniting the abutments of an arch-bridge by means of a tie or ties placed beneath the water-line of the structure, which thus relieves the abutments of some horizontal strain and provides a foundation for the bridge, and at the same time the ties are concealed from view, are out of the way of shipping, floating ice, logs, or other objects, are effective in preventing scouring of the bed of the stream, and in case wood or timber is used in their construction they are practically permanent.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical cross-section of an arch-bridge provided with timber ties, and Fig. 2 is a foundation-plan of abutments and ties.

Similar letters refer to similar parts in both views.

The arch structure A, of concrete, stone, brick, iron, steel, or other suitable materials, is supported by abutments or piers, of concrete, stone, brick, or other materials, extending below the water-line D of the structure. Extending from abutment to abutment and below the water-line are the ties B, which may be made of any suitable material—as wood, iron, or steel—but in this case are shown as being made of wood or timber, as this is the best material now known to me for the purpose, it being practically everlasting when used under water.

A satisfactory joint between the material of the abutments and the ties is secured by notching the ties and embedding them in the material of the abutments, or by the use of interlocking cross-pieces, as shown at *c*, or by any other usual method of making such connections.

It is an essential part of my invention that all ties shall be placed below the water-line of the structure to insure a good foundation, protection to the bed of the stream, elegance of appearance of the arch, and that the stream is left clear, so that a free passage-way is provided for shipping, floating logs, ice, or debris of any character, and when wood or timber is used there is the further advantage that it is preserved by the water.

I am aware that various forms of tie-rods have long been in use in connection with arched structures. I do not therefore claim such an invention broadly.

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

1. An arch-bridge of concrete, stone, iron, or steel, having a tie or ties of timber, from abutment to abutment, below the water-line of the structure, substantially as set forth.

2. An arch-bridge of concrete stone, iron, steel, or brick, having a tie or ties from one abutment or pier to the other abutment or pier, below the water-line of the structure, substantially as described.

3. In a bridge, the combination of an arch or vault, with the abutments or piers, and a tie or ties extending from one abutment or pier to the other abutment or pier, beneath the water-line, to relieve the same from strain, substantially as set forth.

4. The combination of an arch or vault with abutments or piers for supporting the same, and a tie or ties of wood or timber extending from one abutment or pier to the other abutment or pier, beneath the water-line, to relieve the same from strain, substantially as described.

DANIEL B. LUTEN.

Witnesses:
A. BERTELL LUTEN,
ALONZO W. JOHNSTON.