D. B. LUTEN.

SKEW ARCH.

APPLICATION FILED MAY 13, 1911.

1,004,051.

Patented Sept. 26, 1911.

2 SHEETS—SHEET 1.

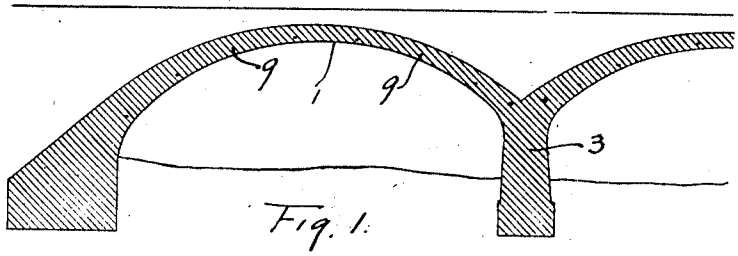

Fig. 1.

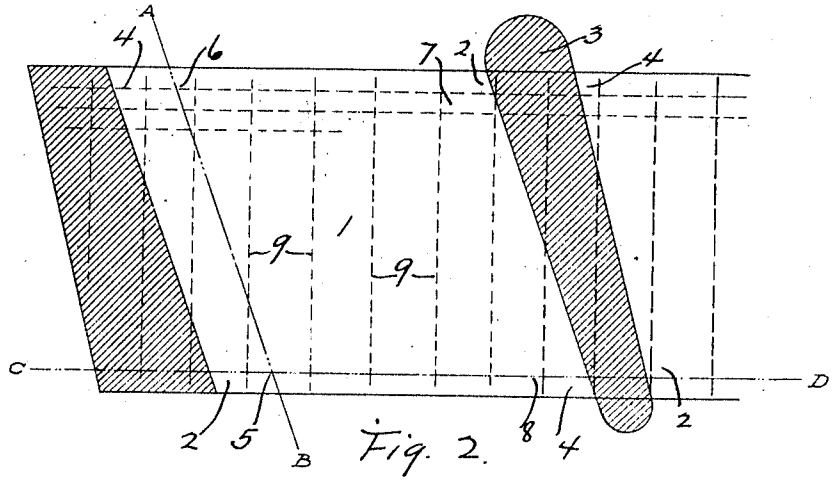

Fig. 2.

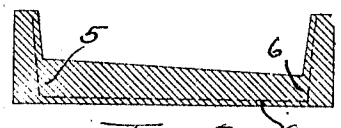

Fig. 3.

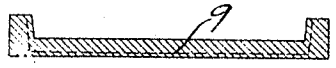

Fig. 4.

Witnesses

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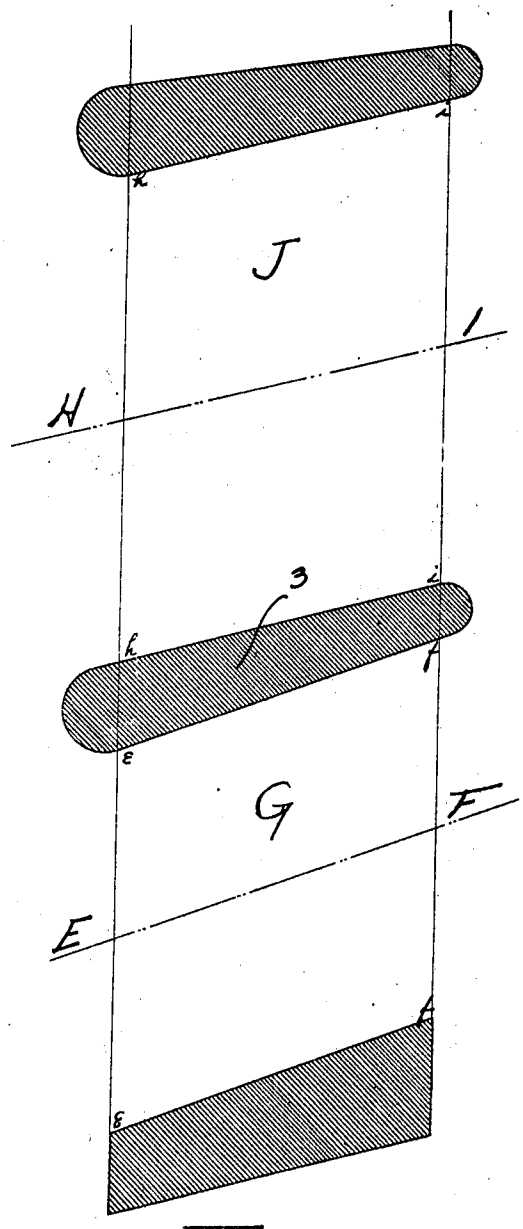

Fig. 5.

WITNESSES:

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SKEW-ARCH.

1,004,051. Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed May 13, 1911. Serial No. 627,040.

To all whom it may concern:

Be it known that I, DANIEL B. LUTEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Skew-Arches, of which the following is a specification.

My invention relates to improvements in skew arches and has for its purpose to provide increased strength and waterway of such structures without added materials or increased cost.

The invention is illustrated in the accompanying drawings in which the same reference characters describe like parts throughout the several views.

Figure 1 is a longitudinal section of a skew arch taken on the line C D of Fig. 2. Fig. 2 is a plan of a skew arch embodying my improvement, Fig. 3 is a vertical section on the line A B of Fig. 2, Fig. 4 is a vertical section at the crown parallel to the axis of the arch and to the section of Fig. 3, and Fig. 5 is a plan showing the axes of the arches.

A skew arch of properly bonded materials exerts greater thrust upon its abutments and piers 3 at its obtuse angle 2 than at the acute angle 4. Hence it is desirable to provide greater strength in those portions of the arch where this greater thrust is exerted. I therefore thicken the arch ring in the obtuse angle and reduce its thickness correspondingly in the acute angle. Thus the section of Fig. 3 taken on the line A B shows a thicker arch ring at 5 than at 6. At the other end of the span as at 7 and 8 the reverse conditions would apply, 7 having the same thickness as 5, and 8 corresponding to 4.

It is frequently desirable in such a bridge to build multiple spans with different degrees of skew, the axis of each succeeding arch inclining more and more with respect to the roadway. This is accomplished by thickening the pier at one end. Thus in Fig. 5 the axis E F of arch G is inclined to the roadway and to the longitudinal axis of the bridge more than the axis H I of the arch J. The axes are each parallel respectively to the faces *e f* and *h i* of the intermediate pier 3.

It has been customary in building reinforced skew arches to skew the transverse reinforcement, placing it parallel to the axis of the arch. In my improvement, these transverse members are placed substantially at right angles with the roadway, regardless of the degree of skew of the arch. Because of the thickness of the haunches at the obtuse angles these transverse members are readily embedded although the intrados of the arch may be much lower at one end of the member than at the other. The result is a structure well balanced and reinforced to resist the eccentric stresses that occur in a skew arch.

I claim;—

1. A plurality of arches in straight alinement but with their axes inclined with respect to one another, and supported on a plurality of piers, each pier having its faces parallel respectively to the axes of the adjacent arches.

2. A plurality of skew arches supported on a plurality of piers, each pier having its sides inclined with respect to each other.

3. A skew arch and supports therefor with obtuse and acute angles between the faces of the arch and the supports, said arch being of increased thickness at the obtuse angle and of decreased thickness at the acute angle.

4. A skew arch of thickness increasing longitudinally of one abutment and decreasing correspondingly along the opposite abutment, and reinforced substantially at right angles to the longitudinal axis of the arch by embedded tension members inclined to both abutments.

5. An arch with parallel faces inclined to its axis and reinforced substantially normal to its faces by embedded tension members inclined to its axis.

6. An arch with a face inclined to its axis and reinforced with embedded tension members substantially normal to its face.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this eleventh day of May, A. D. one thousand nine hundred and eleven.

DANIEL B. LUTEN. [L. S.]

Witnesses:
ARTHUR M. HOOD,
FRANK A. FAHLE.