(No Model.)

C. H. PLATT.

BRIDGE CONSTRUCTION.

No. 541,213. Patented June 18, 1895.

Fig: 1.

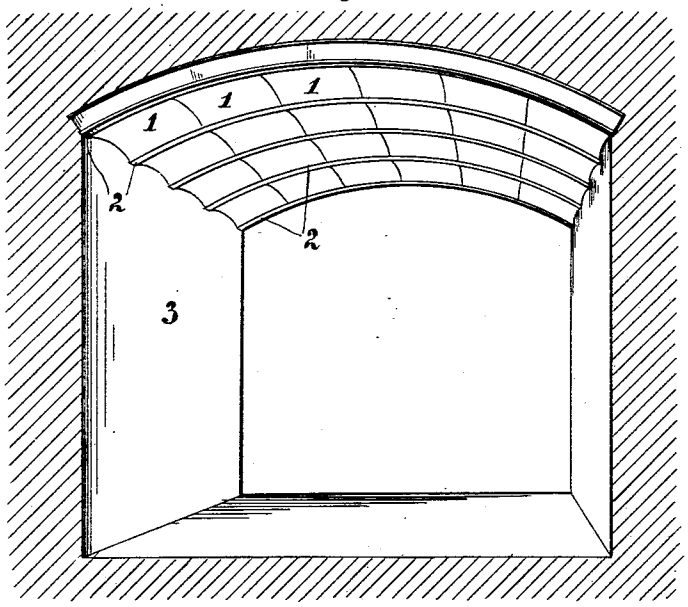


Fig: 2.

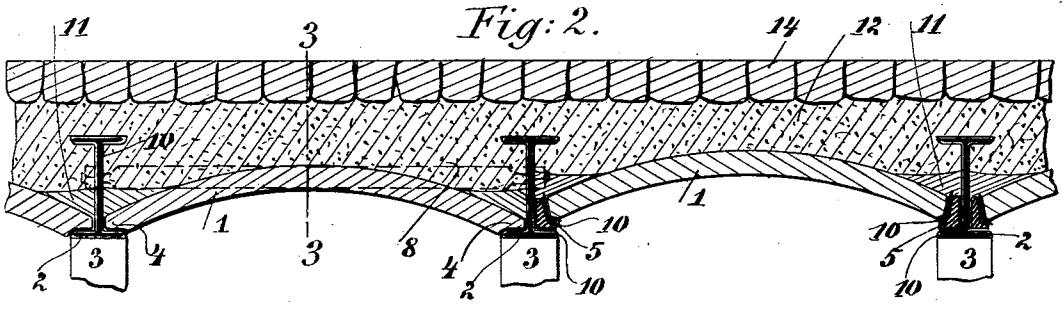
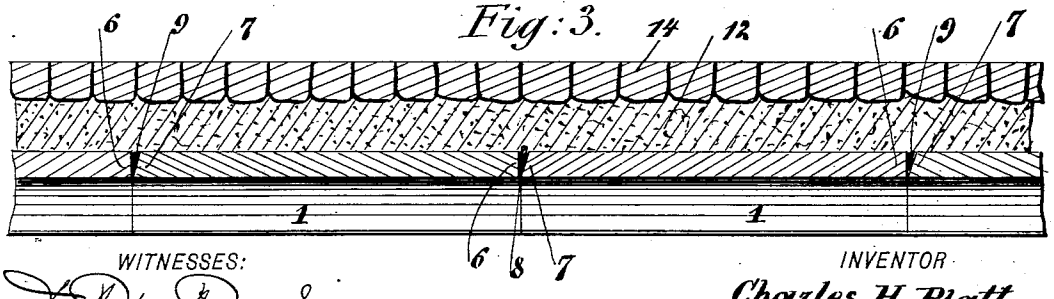


Fig: 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES H. PLATT, OF LONG ISLAND CITY, NEW YORK.

BRIDGE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 541,213, dated June 18, 1895.

Application filed March 15, 1895. Serial No. 541,885. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. PLATT, a citizen of the United States, and a resident of Long Island City, in the county of Queens and State of New York, have invented certain new and useful Improvements in Bridge Construction, of which the following is a specification.

My invention relates to the construction of bridges and arches, and more particularly to that form of bridge construction wherein it is desired to secure a continuous water-tight roof or ceiling for the interior of the arch. This has been accomplished in several ways, but more frequently by the use of cement or concrete, which on hardening presents a uniform and continuous surface. Thus in the United States Letters Patent to J. Melan, No. 505,054, dated September 12, 1893, a method of arch construction is set forth which contemplates the employment of curved ribs, designed to bear the weight of the structure and the load, the intervening spaces between said ribs being filled in by rammed concrete. To effect this filling in between the ribs it is necessary to employ a temporary structure or centering, which is used while the concrete is being laid and until it has hardened, the centering being then removed.

To avoid the employment of such temporary structure or centering, and at the same time to secure an arch with a continuous and water-tight ceiling, and one which combines ease and cheapness of construction with great strength and lightness, I propose to employ a continuous series of curved artificial stone plates in connection with curved **I**-beams, as more fully set forth hereinaffer in the specification and pointed out in the claims.

To this end then my invention consists in the combination of curved **I**-beams and curved artificial stone plates, in the peculiar construction of the curved stone plates, and in certain other features of construction designed to secure strength and rigidity and to permit of necessary yielding and contraction and expansion.

While I am aware that in the construction of buildings, slabs and plates have been employed to span the spaces between the beams, such construction could not be availed of for bridges, as the beams, slabs and cement filling unite in one solid and rigid mass, without the elasticity and capacity for yielding necessary for the great loads and sudden impact to which bridge structures are subjected, and to permit the expansion and contraction of metal due to the greater extremes of temperature. Such construction, if employed in bridges, would be in constant danger of fracture or cracking, either in the arch itself, in the slabs, or in the concrete filling. To secure a light, rigid, firm structure, and at the same time to permit of the necessary yielding and elasticity is the object of my present invention.

In the accompanying drawings, which form a part of this specification, Figure 1 is a view of the intrados of an arch constructed according to my invention. Fig. 2 is a sectional view of the crown of the arch, taken transversely to the **I**-beams; and Fig. 3 is a sectional view taken parallel to the **I**-beams on the line 3 3 in Fig. 2.

In the drawings, the curved **I**-beams 2 are supported on the abutments or other suitable supports 3, and on these curved **I**-beams 2 and between them are placed in continuous series and edge to edge the curved artificial stone plates 1. It will be seen that the curve of the stone plates 1 is transverse to that of the **I**-beams 2, and that this double arch construction combines great strength with lightness. Further, the placing of the plates edge to edge gives a continuous and unbroken ceiling, possessing all the advantages and appearance of the solid concrete, and avoiding the expense and delay of the other construction and entirely dispensing with temporary centering.

The curved stone plates or slabs 1 are constructed of concrete, alone or in combination with other suitable materials, and when molded into the desired form, are artificially hardened in any proper manner. Although the exact dimensions and radius of curvature of the slabs or plates are not essential to the practice of my invention and may be varied at will, I prefer to construct them of a length sufficient to span the distance between the **I**-beams, about two feet in breadth, and of a thickness of not less than two inches. These plates or slabs when carefully constructed of the proper curv-

ature and thickness, and artificially hardened, I have found to combine the maximum of strength with the minimum of weight and to be both sound and durable. The ends of the plates may be molded either to fit directly on the flange of the I-beams as shown at 4 at the left of Fig. 2, or to fit into the supplementary skewback 5, as shown at the right of Fig 2. As before stated the plates 1 are placed in series, edge to edge, to secure a practically water-tight and continuous structure, but to further insure this, I prefer to construct the plates 1 having one edge 6 square or rectangular (see Fig. 3), and the other edge with an acute angle or bevel 7. These plates when laid present from beneath a continuous and unbroken surface, but on top between each pair of plates is left an angular space or recess. This recess is designed to receive the edge of the correspondingly bevel shaped tie-rod 8 (see Figs. 2 and 3), without breaking the continuity of the arch ceiling, or may be filled with an elastic or damp course 9 of woven jute, hemp, asbestos or other fiber, or rubber fabric, saturated with some bituminous mastic, or I may employ a course consisting only of the bituminous mastic. In practice I employ the tie-rods 8 at each third or fourth plate, and use the elastic or damp course 9 in the other recesses, in either case filling in with the bituminous mastic. It will be seen that this construction and arrangement secures not only a perfectly water and air-tight joint, but because of the yielding character of the filling permits sufficient play and elasticity of the structure to obviate largely any liability to fracture or cracking of the plates due to jar or heavy loads.

To still further permit of play in the structure and to provide elasticity, for contraction and expansion due to change of temperature, I either partly or entirely surround the I-beams 2, (and skewbacks 5 when employed) with an elastic or damp course 10, (see Fig. 2) similar to that already described always thoroughly saturating the joint with the bituminous mastic. It will be apparent that without affecting the rigidity of the structure, this arrangement gives a series of thoroughly air and water-tight joints, and affords a certain amount of play and elasticity.

Other features shown in the drawings but which are not essential to the practice of my invention are the cement sealing 11, which may or may not be employed, and the filling 12 and paving 14, which may be of any suitable character.

I have described my invention broadly and indicated a mode in which it may be specifically applied. Obviously, many changes in the details may be made without departing from the spirit of my invention.

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

1. In bridge construction, the combination of suitable abutments or supports, curved I-beams supported thereby, with a series of artificial stone plates, curved transversely to the curve of the I-beams, and supported thereby, and elastic or damp courses between the contiguous edges of said plates substantially as described.

2. The combination of suitable abutments or supports, I-beams supported thereby, and curved artificial stone plates carried on said I-beams, with elastic or damp courses partly or entirely surrounding said I-beams, substantially as described.

3. The combination of suitable abutments or supports, I-beams supported thereby, skewbacks on said I-beams, and curved artificial stone plates on said skewbacks, with elastic or damp courses partly or entirely surrounding said I-beams, and skewbacks, substantially as described.

4. In combination, suitable abutments or supports, I-beams supported thereby, a series of plates supported on said I-beams, said plates being formed to leave an angular joint between contiguous plates, and elastic or damp courses laid in said angular joints, substantially as described.

5. In combination, suitable abutments or supports, I-beams, carried thereby, a series of artificial stone plates having one edge square and one edge beveled, and elastic or damp courses laid between these edges, substantially as described.

6. In combination, suitable abutments or supports, I-beams carried thereby, a series of artificial stone plates, having one edge square and one edge beveled, and tie-rods having a beveled edge to fit between the contiguous edges of the stone plates, substantially as described.

7. In combination, suitable abutments or supports, I-beams carried thereby, a series of plates supported on said I-beams, said plates being formed to leave an angular joint between contiguous plates, and tie-rods having a beveled or angular edge to fit said angular joints, substantially as described.

Signed at New York, in the county of New York and State of New York, this 13th day of March, A. D. 1895.

CHARLES H. PLATT.

Witnesses:
ROBERT F. ROGERS,
JOHN A. WESTBROOK.