

(No Model.)

G. F. & H. N. GRAY.
CONCRETE ARCH AND FIREPROOF CONSTRUCTION.

No. 585,911.

Patented July 6, 1897.

Fig. 1.

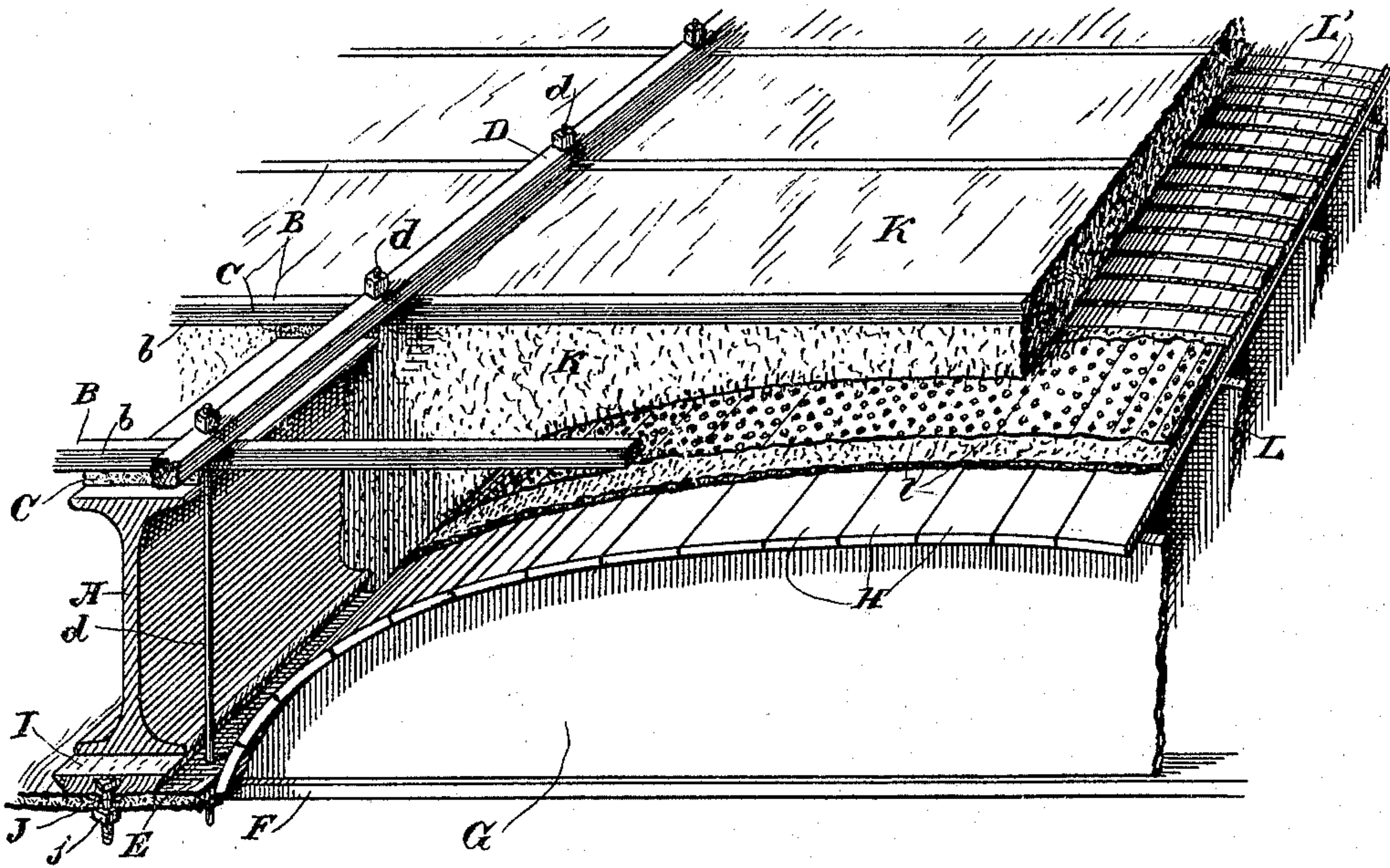


Fig. 2.

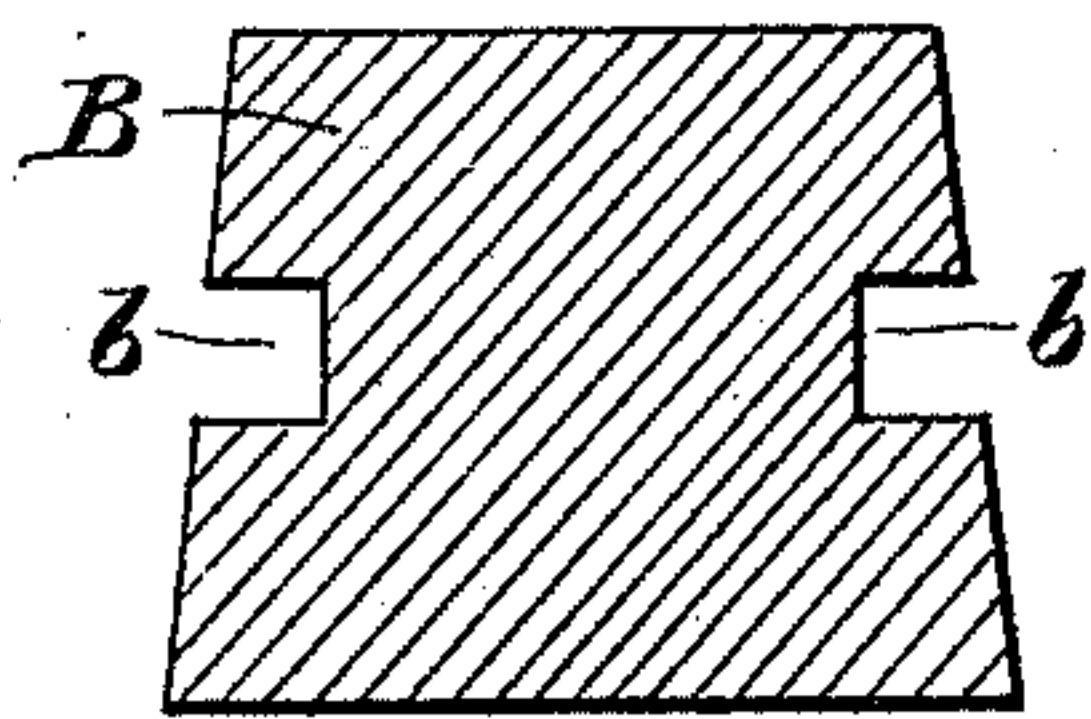
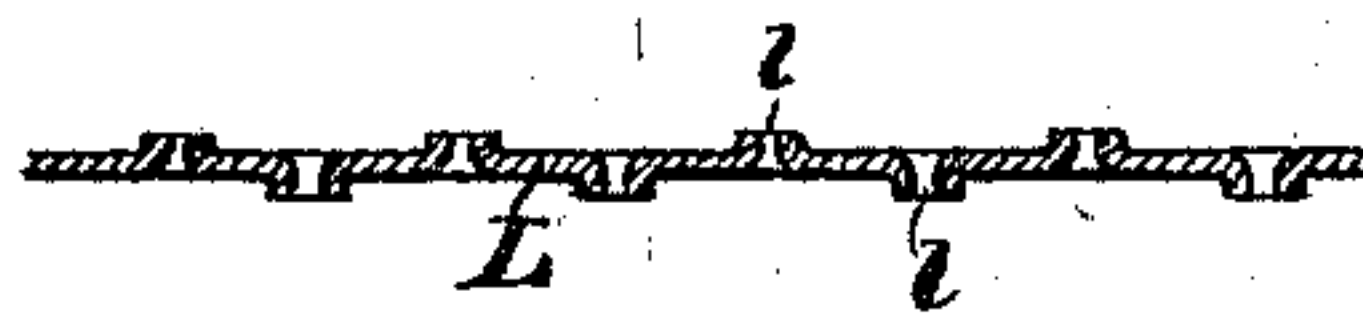


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE F. GRAY AND HARRY N. GRAY, OF SAN FRANCISCO, CALIFORNIA.

CONCRETE ARCH AND FIREPROOF CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 585,911, dated July 6, 1897.

Application filed October 23, 1896. Serial No. 609,804. (No model.)

To all whom it may concern:

Be it known that we, GEORGE F. GRAY and HARRY N. GRAY, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Concrete Arches and Fireproof Constructions; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to that fireproof or arch construction in buildings in which the arch or flooring is made of concrete laid upon temporary false work and permanently supported by metallic beams.

Our invention consists in the parts and the constructions and combinations of parts which we shall hereinafter describe and claim.

The main object of our invention is to provide a structure which by reason of the intimate and practically integral construction of the arch and the furring-strips will avoid the usual practice of first making the concrete arch up to the level of the supporting-beams and then subsequently placing a separate layer or flat sheet of concrete upon this arch in which to hold the furring-strips. This usual practice results in adding a dead-weight to the arch in the shape of the subsequently-placed layer of concrete, which does not add to but detracts from the strength of the arch, besides making the structure unduly thick; but by our construction of making the concrete arch and the furring-strips one single and practically integral structure we are enabled to make the arch of less thickness and at the same time give to it an element of self-sustaining strength, both said results being the more attainable when the metallic strengthener in the lower portion of the concrete is employed.

Referring to the accompanying drawings, Figure 1 is a general view of our construction, parts being broken away and the strengthener being shown, one portion as a burred plate L and in another portion as separated strips L'. Fig. 2 is a cross-section of one of the furring-strips B. Fig. 3 is a view showing the burred strengthening-plate L as laid on top of the "mortar concrete."

A represents the supporting metallic beams, here shown in the shape of the ordinary I-beams.

B are the wooden furring-strips, which in the best construction are laid transversely of the arch, though they may be laid in other directions, as far as the general feature of their incorporation in the arch is concerned. These are supported above and away from the beams by means of a layer of mortar C of sufficient thickness to insure the fireproof result.

D are the leveling-stringers on top of the furring-strips, and d are long bolts which pass down through these stringers and through the furring-strips, and they carry upon their lower ends the boards E and scantlings F of the false work, and said scantlings carry the segment or arch boards G of the false work, upon which said segments are laid the temporary boards A, thus forming the centers upon which the concrete to make the arch is subsequently filled in.

The boards E are held at a proper distance from the foot of the I-beams A, by means of wedges I, and through these boards are dropped the short bolts J with nuts j upon their lower ends. When this false work is all ready, the concrete (represented by K) is filled in and it passes down under the foot of the I-beams. It is filled in up to and flush with the tops of the furring-strips B, so that said furring-strips are at once directly included and incorporated in the arch itself and are practically made integral therewith, so that said arch is not unnecessarily thick, and when the furring-strips stretch across it the arch is further strengthened. By incorporating the furring-strips directly in the arch itself the latter has an element of self-sustaining strength, in this respect differing from the common practice, heretofore mentioned, of first laying the arch and then laying a separate sheet of concrete on top of the arch to carry the furring-strips. After the arch is formed the leveling-stringers D are removed and also the long bolts d and also all the false work underneath, consisting of the boards E, the scantlings F, the segmental

boards G, and the temporary boards H, thus leaving the arch with its contained furring-strips intact.

The short bolts J are confined in the concrete, and by removing their nuts *j* the boards E of the false work may be easily removed from said bolts, leaving the bolts in place. The wedges also remain and support the bolts J, which may be used to support gas-fixtures or chandeliers, and being wedge-shaped they are prevented from dropping down from the ceiling. Furthermore, there may be a little space left between the board and the wedge by inserting small chips of wood or wire, so that the concrete will surround the wedge entirely. In same cases the wedges are not continuous, but only at certain specified places.

In order to firmly lock or key the furring-strips B in the concrete, we form grooves *b* in their sides, into which the concrete enters, and thus the furring-strips are firmly held.

In order to further strengthen the arch and give an opportunity thereby to still further lessen its thickness in such cases as may be desirable or required, we put a metallic strengthener in the arch as follows: After the false work is all ready we put in directly upon the boards H, which form what are known as "centers," a thin layer of fine concrete, or, as it is termed, "mortar concrete," which is very plastic. Then upon this, while it is still soft, we put a metallic strengthener, which may be either a plate L, having perforations with burs *l* on each side, or a series of metallic strips L', separated slightly from each other. The soft material presses up through the perforated plate and also engages the burs, or it presses up between the separate strips, in either case fully holding and incorporating them in conjunction with the rest of the concrete, which is then placed on top in the general mass of the arch. The metallic strengthener may be placed transversely of the arch or otherwise, as found best.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A concrete arch and fireproof construction comprising supporting-beams, an intervening arch of concrete supported by said beams, a layer of fireproof material upon the

beams and furring-strips supported above the beams by means of said fireproof material and incorporated directly in and flush with the upper surface of the arch.

2. A concrete arch and fireproof construction, comprising supporting-beams, a layer of fireproof material thereon, an intervening arch of concrete supported by the beams, and furring-strips resting on said layer of fireproof material so as to be supported above the beams, said strips being incorporated directly in and flush with the upper surface of the arch and extending transversely thereof.

3. A concrete arch and fireproof construction, comprising supporting-beams, having a superposed layer of fireproof material, an arch of concrete supported by said beams and furring-strips resting on the layer of fireproof material so as to be supported above the beams, said strips being incorporated directly in and flush with the upper surface of the arch and having side grooves forming keys by which they are held in the concrete.

4. A concrete arch construction, comprising supporting-beams, a layer of fireproof material thereon, an intervening arch of concrete supported by said beams, furring-strips supported above the beams, on said fireproof material, and incorporated directly in and flush with the upper surface of said concrete arch, and a metallic strengthener incorporated in the lower portion of said concrete arch.

5. A concrete arch construction, comprising supporting-beams, a layer of fireproof material thereon, an intervening arch of concrete supported by said beams, furring-strips supported above the beams, on said fireproof material, and incorporated directly in and flush with the upper surface of said concrete arch, and a metallic strengthener incorporated in the lower portion of said concrete arch, said strengthener having interstices through which the concrete passes to fully incorporate it.

In witness whereof we have hereunto set our hands.

GEORGE F. GRAY.
HARRY N. GRAY.

Witnesses:

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