(No Model.)

W. L. CALDWELL.

FIREPROOF CONSTRUCTION.

No. 522,193. Patented July 3, 1894.

Fig. 2

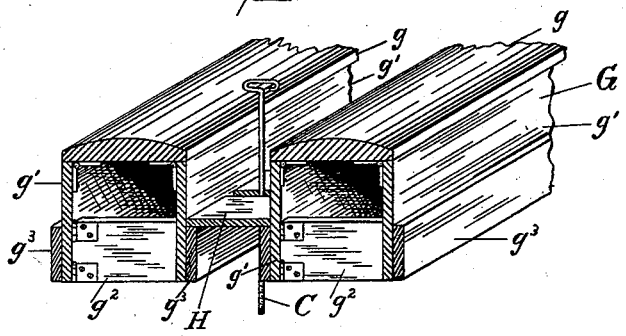
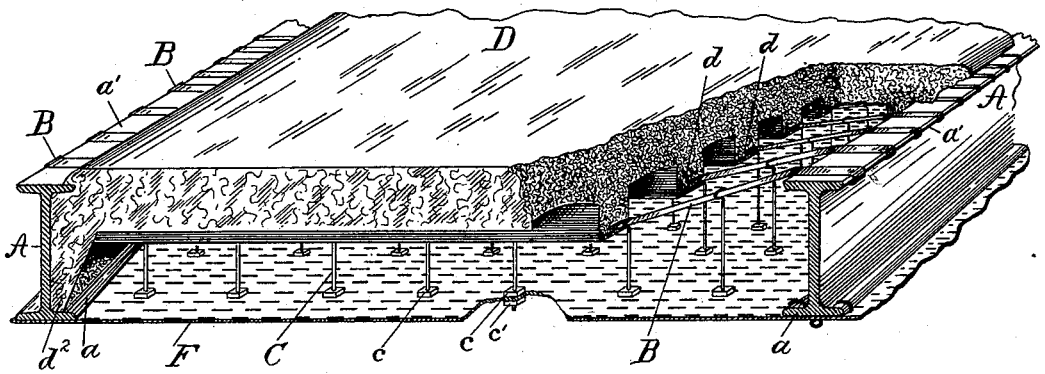


Fig. 1



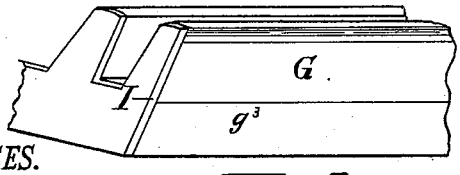


Fig. 3

WITNESSES.

B. L. Griswold

Nellie M. Wood

INVENTOR.

William L. Caldwell

By Wing & Thurston

his attys.

UNITED STATES PATENT OFFICE.

WILLIAM L. CALDWELL, OF CLEVELAND, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE CLEVELAND FIRE PROOFING COMPANY, OF ILLINOIS.

FIREPROOF CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 522,193, dated July 3, 1894.

Application filed September 20, 1893. Serial No. 486,007. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. CALDWELL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fireproof Construction; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the construction of fire proof horizontal partitions,—floors and ceilings.

The object is to provide a structure which shall combine in the highest degree the various characteristics which make such structures practically successful; that is to say, a structure which will be economical, both with respect to the cost of materials and the cost of construction; which will be light and strong, and indestructible by fire.

In the drawings, Figure 1 is a perspective view of one arch of my improved floor and ceiling. Fig. 2 is a perspective view partly in section of parts of two of the knock-down cores used in constructing the arch. Fig. 3 is a side view of an end of one of the knock-down cores used in laying the floor.

Referring to the parts by letters, A A represent the flanged metallic floor beams by which the fire proof arch is to be supported.

D represents the cement concrete body of the arch. It is provided with longitudinal horizontal ribs *d d* and intermediate grooves, both of which extend from one end of the arch to the other,—that is to say, from one beam A to the other. The lower edges of the ribs *d* are preferably some little distance above the lower flanges *a* of the beams A, thus making the arch lighter than it would be, and providing for an air space between the said arch and the ceiling, which will generally be supported below, but in contact with the lower edges of said beams. The ends d^2 of the arch, however, extend down onto the said flanges *a*, whereby the concrete, when hardened, serves in no small degree to support itself. It is intended, however, that the said arch shall be supported for most part by a series of metallic straps B B, the ends of which are connected to the beams A A, by passing over the tops thereof and being bent around under one of the upper flanges *a'*. These straps are embedded in the concrete and lie in the ribs *d*, being bent downward between their ends so that their lowest points are near the lower edges of the said ribs.

A series of rods C C are secured to each strap B, by having their upper ends bent around said strap, or in any other suitable manner. The said rods hang down below the lower flanges of the beams A, and afford means for supporting the metallic ceiling F. The lower ends of these rods are threaded, and a nut *c* screwed onto each one; these nuts are adjusted into the proper position. The ceiling, which I prefer to use, is made of slotted or perforated sheet metal. The ceiling is passed up over the rods against the nuts, and other nuts *c'* are screwed onto the rods against it, thereby holding it against the nuts *c*, and in line with the lower flanges of the beams.

When the partition is completed, there is a large air space between the concrete arch and the ceiling, in which air may be caused to circulate. It is believed that the described arch is stronger than any hollow tile arch, and lighter and less expensive than any concrete arch heretofore used. In addition to these points of advantage, there is another, viz.: the cost of constructing the arch is, it is believed, less than the cost of constructing any other fire proof arch, because in the construction of other arches it is necessary to build false work beneath the arch to support a flooring on which the arch rests until the cement has set, and it has been heretofore impossible to support said false floor on the lower flanges of the beams A.

In the construction of the above described arch, I employ knock-down cores G, the ends of which rest during the process of construction on the edge of the flanges *a a*. These cores are formed from the center board *g*, and two sides *g' g'*, which are hinged to the center board, so that they normally stand at

right angles thereto, but may be swung inward or toward each other. Hinged to one of the boards g' g' is a board or boards g^2, which when swung at right angles to the board g' holds the two boards g' g' parallel with each other. The ends of the side piece g' g' are beveled, as shown in Fig. 3, so that the boards are longest at their lower edges. Preparatory to forming one of the described arches, a number of these cores are placed parallel with each other, a distance apart equal to the desired width of the ribs d. The cores, when so placed, are spread as shown in Fig. 2, and the ends of the boards g' g' rest on the flanges a a. The straps B are then fastened to the beams A as described, their middle parts being curved down between the cores. Small boards H are then laid on the cleats g^3, which are secured to the outer lower edges of the sides g'. The rods C C are then suspended from the strap B and extend downward between said boards H. The ends of the cores are closed by boards I, which are laid loosely over them. The cement concrete is then run onto the false floor thus formed, tamped and allowed to set. The ribs d d are formed in the space between the cores, and the straps B are embedded therein. When the concrete has set, the boards g' g' on one end of each core are sawed off and the boards g^2 are folded back so as to permit the sides g' g' to be swung toward each other. When they are so swung, the cores G and the boards H and I may be easily removed from below, leaving the arch as first described. When it is desired to use the cores again, pieces to replace the pieces which have been sawed off are nailed to the sides g' g'.

Having described my invention, I claim—

1. In a fire proof structure, the combination of the flanged beams, the straps secured at their ends to the top edges thereof and curved downward between said ends to a point intermediate of the upper and lower flanges of the beams, a concrete arch extending from one beam to the other and resting at its ends on the lower flanges of the beams, the said straps being embedded in said concrete, rods secured to said straps and extending downward through the concrete, a metallic ceiling and means for securing the ceiling to said rods, substantially as and for the purpose specified.

2. In a fire proof structure, the combination of the flanged beams and the straps secured at their ends to the upper edges of said beams and curved downward between said ends, with a concrete arch D having on its under side ribs d and intermediate grooves,—the lower edges of said ribs being higher than lower flanges of the beams,—and having at their ends the downward extensions d^2 which rest upon said lower flanges, substantially as and for the purpose specified.

3. In a fire proof structure, the combination of the flanged beams, the metal straps which curve downward from the top edges of said beams, a concrete arch which rests on the lower flanges of said beams and which embed said straps, vertical rods secured at their upper ends to said straps and a metallic ceiling secured to the lower ends of said rods, substantially as and for the purpose specified.

4. In a fire proof structure, the combination of the flanged floor beams, the metal straps which extend between and curve downward from the top edges of said beams, a concrete arch resting on the lower flanges of said beams, and embedding said straps, vertical rods secured at their upper ends to said straps and having threaded lower ends, two nuts on each of said rods, and a metallic ceiling secured to said rods between said nuts, substantially as and for the purpose specified.

5. The herein described method of laying a fire proof arch between two flanged beams, which consists in resting on the lower flanges of the beams the ends of a series of knock-down cores having cleats on their outer lower edges; fastening to the upper edges of said beams the ends of curved metal straps which lie between said cores; placing on cleats secured to sides of said cores a series of small boards; securing to the straps a series of vertical rods which pass between the ends of said small boards; filling the space above said cores and intermediate boards with concrete and allowing the same to harden; and finally sawing off one end of each of said cores collapsing the cores and removing them and the intermediate boards, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM L. CALDWELL.

Witnesses:

W. B. SLUSSER,

E. L. THURSTON.