

(No Model.)

J. EASTMAN.

FLOOR ARCH FOR FIRE PROOF BUILDINGS.

No. 457,985.

Patented Aug. 18, 1891.

Fig. 1.

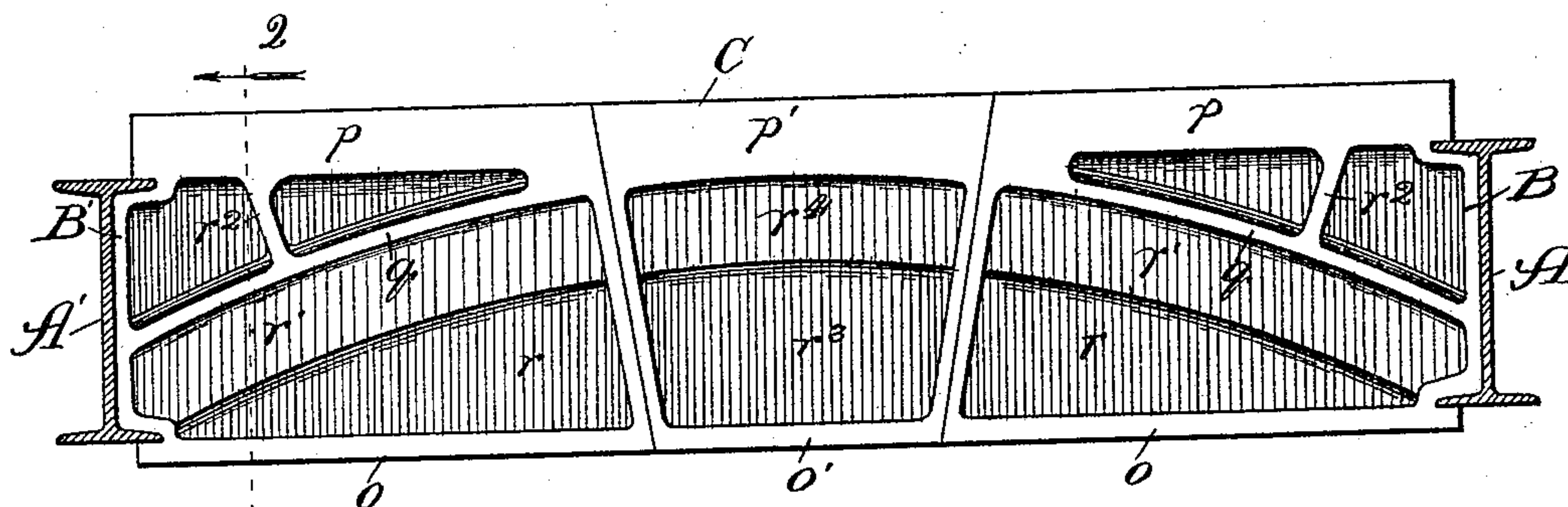
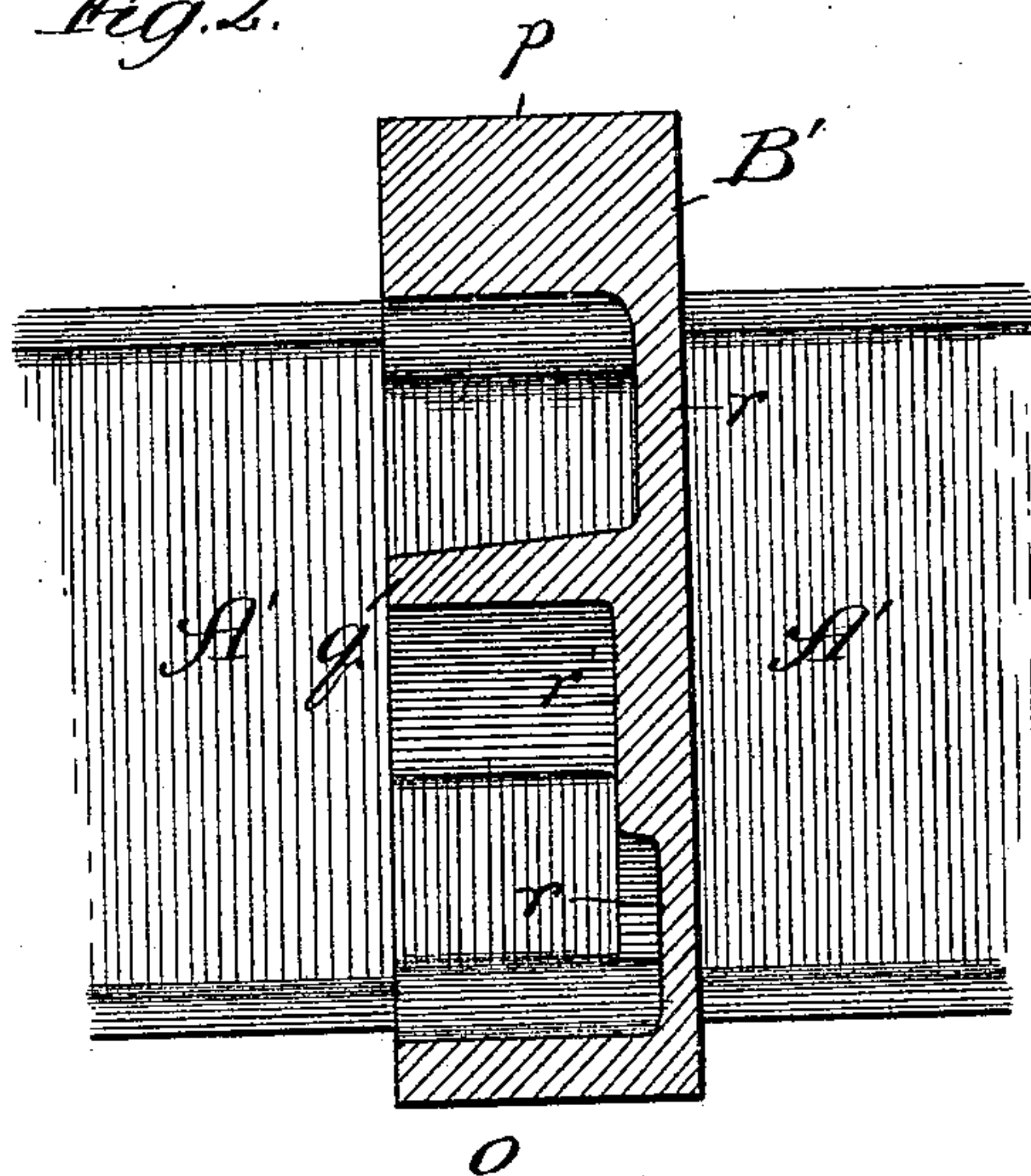


Fig. 2.



Witnesses:

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FLOOR-ARCH FOR FIRE-PROOF BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 457,985, dated August 18, 1891.

Application filed December 15, 1890. Serial No. 374,773. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH EASTMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Floor-Arches for Fire-Proof Buildings, of which the following is a specification.

In buildings wherein the floors and ceilings of the skeleton work of the structures are defined by means of metal **I**-beams supported in parallel relation to each other, a common manner of filling the spaces between the **I**-beams is by means of arches formed of hollow tiles. The tiles are laid in the usual manner of forming stone-arches, with a keystone tile in the center. These arches are laid in abutting series throughout the space between each pair of the **I**-beams, and are filled in with a deadening material, usually concrete, to form the flooring, wooden strips being laid at intervals and embedded in the concrete to expose their upper sides, which are flush with the concrete surface, for the purpose of affording a wooden foundation to admit the nails for securing the subsequently laid wooden flooring. At their under sides the arches are flat, to afford a level ceiling to which the plaster is applied. One of the objections incidental to the aforesaid construction of the floor-arches is that it does not present as great strength as it is possible to attain with the amount of material used in producing it. A further objection is the costliness of the structure, due to the material it requires, and to the employment of "centers" in building it.

My object is to enable a construction of floor-arch to be provided without the use of centers, which shall overcome the enumerated objections by affording greater strength with much less weight and at less cost than the construction thereof referred to.

To these ends my invention consists in the general construction of my improved floor-arch and of details thereof; and it also consists in the more specific construction of the same.

Referring to the accompanying drawings, Figure 1 is a cross-sectional view taken through two parallel adjacent floor **I**-beams at an end of one of my improved floor-arches, which is thus presented in elevation. Fig. 2 is a section taken on the line 2 of Fig. 1,

viewed in the direction of the arrow, and enlarged and showing the detailed construction of my improved floor-arch slab.

A and A' represent two metal **I**-beams supposed to be supported to form part of the floor-beam structure in a building.

B and B' denote two similar hollow slabs formed in accordance with my improvement and involving the following-described construction: One side, which may be designated the "rear" of the slab, is closed and comprises a straight wall or back r , the thickness of which may be about one-half an inch. The opposite or "front" side of the slab is open, the slab being otherwise closed on all sides. About its center, for a distance, say, of about two inches at each side thereof, (the height of the slab being nearly or about thirteen inches,) the wall r is thickened to about one inch, forming a species of arched web r' on the wall r at a right angle, from the upper edge of which extends the arched web q , the thickness of which may be about one inch as the average, being thickest at the base. From one edge of the wall r extends, at right angles thereto, the straight floor portion p of the slab, which may be about two inches thick, and from the opposite edge thereof extends, parallel with the said floor portion, the straight ceiling portion o . The structure may be further strengthened by a web r^2 , extending between the floor portion p and the arched web q .

It should be stated that the foregoing dimensions are given merely to aid in the description, and are not in any way intended as limitations, and they may be varied without thereby departing from my invention.

While I do not limit my improvement to any particular material out of which to form the slab, in order that it may afford all the advantages intended for it, the floor portion p should take the place of the concrete, in which wooden strips, as hereinbefore referred to, are commonly embedded; and to that end the slab should be formed of a composition which when hardened will admit of nails being driven into it and will hold nails so driven. Accordingly I form the slab of such a composition, that used by me comprising the following-named ingredients, compounded substantially in the proportions specified: Plaster-of-paris and cinders or ashes or

sawdust mixed in about equal proportions with water, with enough vegetable fiber added to produce adequate binding of the mixture and enough glue to keep it from setting too quickly.

Ordinarily the two slabs B and B' of my improved construction suffice, with the center or "keystone" slab C, hereinafter described, to form a floor-arch, and they may be provided of the same dimensions for different widths of space between floor-beams A A', the degree of variation being comparatively slight and readily compensated for by proper variation in the width of the keystone slab.

The center slab C is of the general keystone form illustrated and fits between the beveled closed ends of the slabs B and B'. It is hollow, as are the said slabs, and closed, like the latter, at its rear side by a wall forming a "back" r^3 similar to the wall r . It is furthermore provided with an arched thickening of its back, forming a web r^4 , preferably somewhat thicker than, and to coincide at its outer ends with, the adjacent ends of the lower portions of the web r' in the slabs B and B', while the thickness of its floor portion p' is greater, as shown, than that of the other slabs, with the ceiling portions o of which, however, the ceiling portion o' of the slab C may correspond in thickness.

At their outer ends the slabs B and B' are shaped to conform to and fit, as shown, the recesses afforded by the adjacent sides of the I-beams, the respective edges of the flange portions of the beams being preferably let into the slabs between the body portions thereof and the floor and ceiling portions, as illustrated, whereby the last-named portions extend for some distance (but short of the vertical webs of the beams) over the flanges. As will be seen, when the slabs B, B', and C are laid in the manner represented in Fig. 1 they afford a strong form of arched filling between the floor-beams, the arched webs affording to the slabs and the structure produced with them great strength. The filling between the floor-beams is made continuous by adding successively to the structure presented in Fig. 1 similar structures applied in the same manner with their open sides abutting against the walls r and r^3 , presented at the advance side of the laid slabs B B' C, the edges of the open sides being "battered" with a suitable cement (as plaster-of-paris) to cement the structures together. It will furthermore be seen that the series of the said structures between each pair of I-beams form a practically continuous and even floor and ceiling, the continuity being broken along the top and bottom of each I-beam by the floor and ceiling portions p and o of the slabs B and B', applied to opposite sides of the beam, reaching short of the longitudinal centers of the flanges, the spaces thus left affording recesses to receive gas and water pipes and the like, and which may, when the

latter have been laid, be filled with my aforesaid compound or with other suitable material.

A floor formed with the floor portions $p p'$, of slabs molded out of some such composition as that hereinbefore specified, requires no additional provision to permit nails being driven into it, since it readily admits nails without injury to the material and holds them like wood.

For convenience in laying, the keystone slab C may be laid to extend about one-half an inch in advance of the slabs B and B' to afford lateral abutments to hold up the succeeding-laid slabs B and B' without a center, with which I entirely dispense in laying my improved slabs.

If desired, that portion of the backs r and r^3 below the arched webs may be entirely omitted, when, however, the abutting ends of the slabs in each arch should be strengthened by thickening.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a hollow slab for a floor-arch, substantially as described, the combination of the back provided with an arch-shaped web q , and a floor portion p , and a ceiling portion o , extending, respectively, from the upper and lower edges of the said back and forming the top and bottom of the slab, substantially as and for the purpose set forth.

2. In a hollow slab for a floor-arch, substantially as described, the combination of the back r , thickened on one side in arch form and provided with an arch-shaped web q and a floor portion p , and a ceiling portion o , extending, respectively, from the upper and lower edges of the said back and forming the top and bottom of the slab, substantially as and for the purpose set forth.

3. In a hollow slab for a floor-arch, substantially as described, the combination of the back r , having on one side an arched web r' , and an arched web q , extending from the upper edge of the web r' , and a floor portion p , and a ceiling portion o , extending, respectively, from the upper and lower edges of the said back and forming the top and bottom of the slab, substantially as and for the purpose set forth.

4. A floor-arch comprising, in combination with beams A and A', slabs B and B', each formed with a back r , provided with an arch-shaped web q and a floor portion p , and a ceiling portion o , extending, respectively, from the upper and lower edges of the said back and forming the top and bottom of the slab, the said slabs fitting at their outer ends into the opposing recessed sides of the beams, and a hollow keystone slab C between the slabs B and B', having a back r^3 , provided with an arched web r^4 and with a floor portion p' and a ceiling portion o' , coinciding with the said parts of the slabs B and B', substantially as described.

5. A floor-arch comprising, in combination

with beams A and A', slabs B and B', each formed with a back r , having on one side an arched web q , extending from an arched web r' , and a floor portion p , and a ceiling portion o , extending, respectively, from the upper and lower ends of the said back and forming the top and bottom of the slab, the said slabs fitting at their outer ends into the opposing recessed sides of the beams and the floor and ceiling portions overlapping the beam-flanges, and a hollow keystone slab C between the slabs B and B', having a back r^3 , provided with an arched web r^4 , and with a floor portion p' , and a ceiling portion o' , coinciding with the said parts of the slabs B and B', substantially as described.

6. A floor-arch comprising, in combination with beams A and A', slabs B and B', each formed with a back r , having on one side an arched web q , extending from an arched web r' , and a floor portion p , and a ceiling portion o , extending, respectively, from the upper and lower ends of the said back and forming the top and bottom of the slab, the said slabs fitting at their outer ends into the opposing recessed sides of the beams and the floor and ceiling portions overlapping the beam-flanges, and a hollow keystone slab C between the slabs B and B', having a back r^3 , provided with an arched web r^4 and with a floor portion p' , and a ceiling portion o' , coinciding with the said parts of the slabs B and B', substantially as described.

JOSEPH EASTMAN.

In presence of—

J. W. DYRENFORTH,
M. J. FROST.