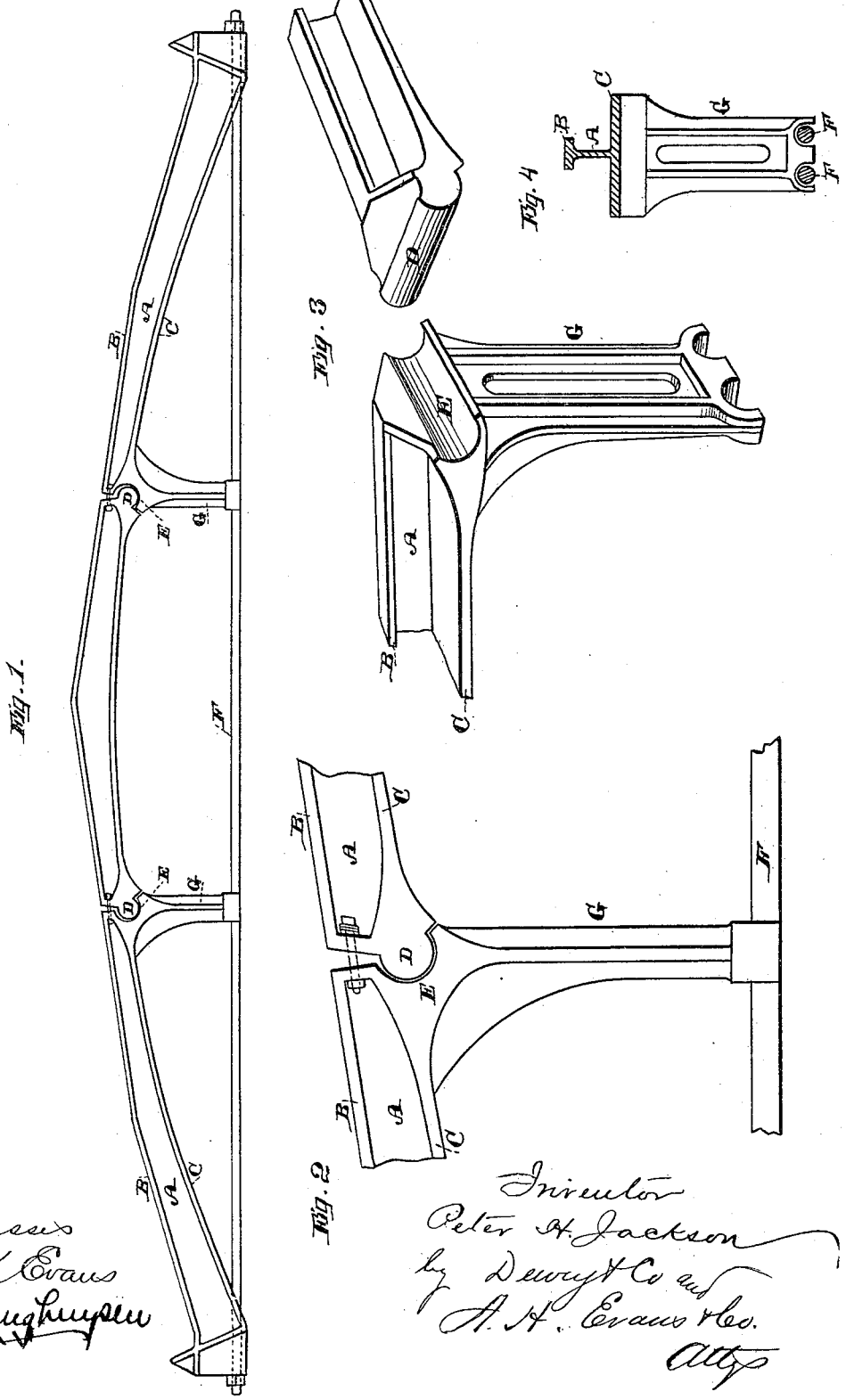
(No Model.) 2 Sheets—Sheet 1.

P. H. JACKSON.

ARCHED GIRDER.

No. 265,321. Patented Oct. 3, 1882.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5

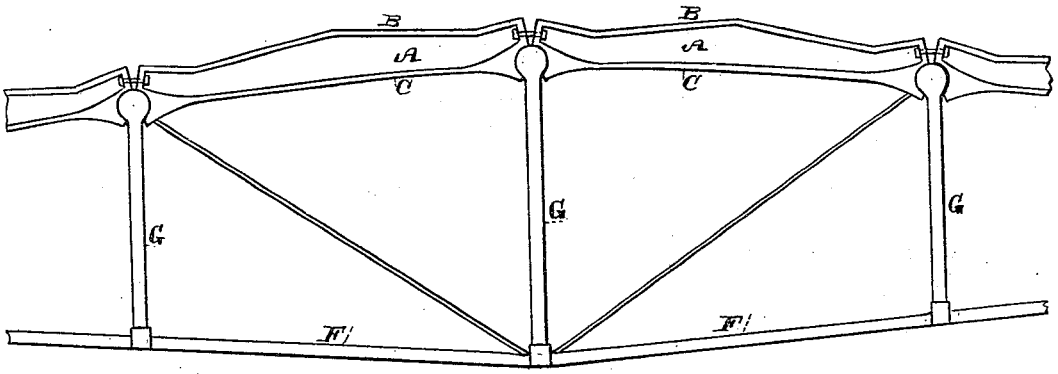
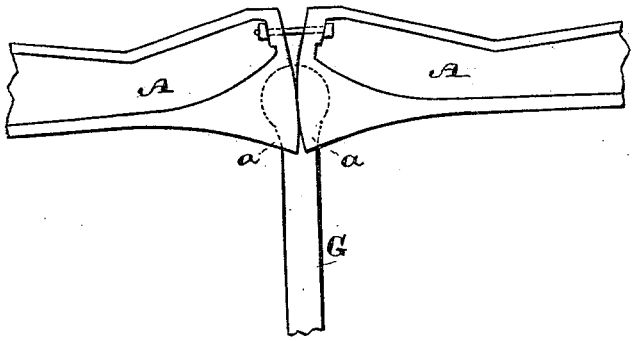


Fig. 6.



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UNITED STATES PATENT OFFICE.

PETER H. JACKSON, OF SAN FRANCISCO, CALIFORNIA.

ARCHED GIRDER.

SPECIFICATION forming part of Letters Patent No. 265,321, dated October 3, 1882.

Application filed April 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, PETER H. JACKSON, of the city and county of San Francisco, State of California, have invented an Improvement in Arched Girders; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in the construction of sectional cast-iron arched girders by which the tensile strain upon the tie-rods and the compressive force upon the cast-iron arch are better distributed and equalized.

It consists in such a construction that the abutting parts of the sectional arch always meet on a line with the intrados of the arch, whatever may be the deflection under loads, and also in connecting the joints or meeting ends of the sections with the tie-rods by intervening vertical connecting-struts, which serve to transmit the strain from arch to tie-rods, so that any deflection of the arch is resisted by the tie-rods, and all vertical strains are resisted by both the arch and the rods.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of an arch of my construction. Fig. 2 is an enlarged portion of the same. Fig. 3 is a view of the meeting ends. Fig. 4 is a transverse section. Figs. 5 and 6 are modifications of the same.

My present invention is an improvement upon one which was patented to me November 28, 1871. This previous patent contemplated such a construction of the sections of an arch that the pressure should be distributed uniformly over the abutting surfaces under any load; but I have found that when subjected to great strain the tie-rods become extended, so that the arch sinks proportionately, and instead of the pressure being distributed evenly over the whole of the meeting ends it was transferred entirely to the top or extrados of the arch, which thus sustained all the compressive force due to the tensile strain upon the tie-rods. If, on the contrary, the arch is made in a single casting, the wrought-iron tie-rods will, when subjected to strains, become elongated, a certain small proportion of their length depending upon the load, and this will allow the arch to become depressed, so that a considerable tensile strain will be thrown upon the intrados of the arch, which cast-iron is comparatively feeble to resist.

In my present invention, A A are the sections of the cast-iron arch. These sections, of which there may be any suitable or desired number, are made of sufficient width and depth, and have flanges B and C at the top and bottom. Upon one of the meeting ends is formed a semi-cylindrical projection, D, which extends across the full width of the abutting face, as shown. The opposite abutting face has a corresponding recess or socket, E, into which the projection D fits, resting against the bottom of the depression, and as the arc of the depression is shorter than that of the cylinder it will be seen that the opposite faces or ends of the sections above this joint will not come together under any deflection, and thus allow of considerable movement about the joint. This joint is formed so that its center is in the line of the lower rib, C, or intrados of the arch, and thus the whole compressive force is exerted in this line. As the upper portion of the sections do not come together, it will be seen that the arch may be subjected to considerable deflections without changing the line of compression, which will always be through the center of the joint and in the line of the intrados. In some cases this joint is formed by making a concavity or depression in each of the abutting ends in a line with the intrados of the arch, and forming a cylindrical head upon the top of the strut G, which is inclosed by these concavities, as shown in Figs. 5 and 6. This cylindrical head is made shorter than the full width of the arch-sections, and the sections A are cast with projections *a*, which extend across the concavities, thus forming a closed end, which retains the head D in its place. The lower edges of the meeting ends of the sections in both cases will meet and prevent the rising of the joint from a load at some other point of the arch.

The tie-rods F, formed of wrought-iron, extend from one end to the other of the arch, forming a chord to it. They may be as many in number as are found necessary, lying side by side and parallel with each other.

From each joint or point of meeting of the sections A a strut, G, extends vertically down-

ward, and has grooves or arches made in the lower side to fit upon the tie-rods, so that when the load is brought upon any portion of the arch, so as to deflect it, it is partially transferred to the rods, and, by increasing their tension, resist further compression.

By this mode of construction the tensile strain at the intrados of each of the cast sections, due to the load upon that section, may be neutralized by the compressive resistance in that particular section caused by the tensile strain upon the tie rod in the whole system.

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

1. In an arch composed of cast-iron sections A, the joints formed of the transverse cylindrical projections D upon one section, and the corresponding depression, E, in the face of the opposing section, said joints being in a line with the intrados of the arch, substantially as and for the purpose herein described.

2. In an arch or girder, and in combination with the sections A, having the joints D E, formed in a line with the intrados of the arch, the tie-rods F, extending from end to end of the arch and forming chords thereto, substantially as herein described.

3. In an arch or girder consisting of the sections A, with their joints D E, formed in line with the intrados of the arch, and the tie rods or chords F, the struts G, extending from the joints vertically down to and resting upon the tie-rods, substantially as and for the purpose herein described.

4. The combination, in an arch or girder, of the sections A, the tie-rods F, the struts G, and the joints D E, formed in line with the intrados of the arch, all constructed and operating substantially as and for the purpose herein described.

In witness whereof I hereto set my hand.

PETER H. JACKSON.

Witnesses:
G. W. EMERSON,
S. H. NOURSE.