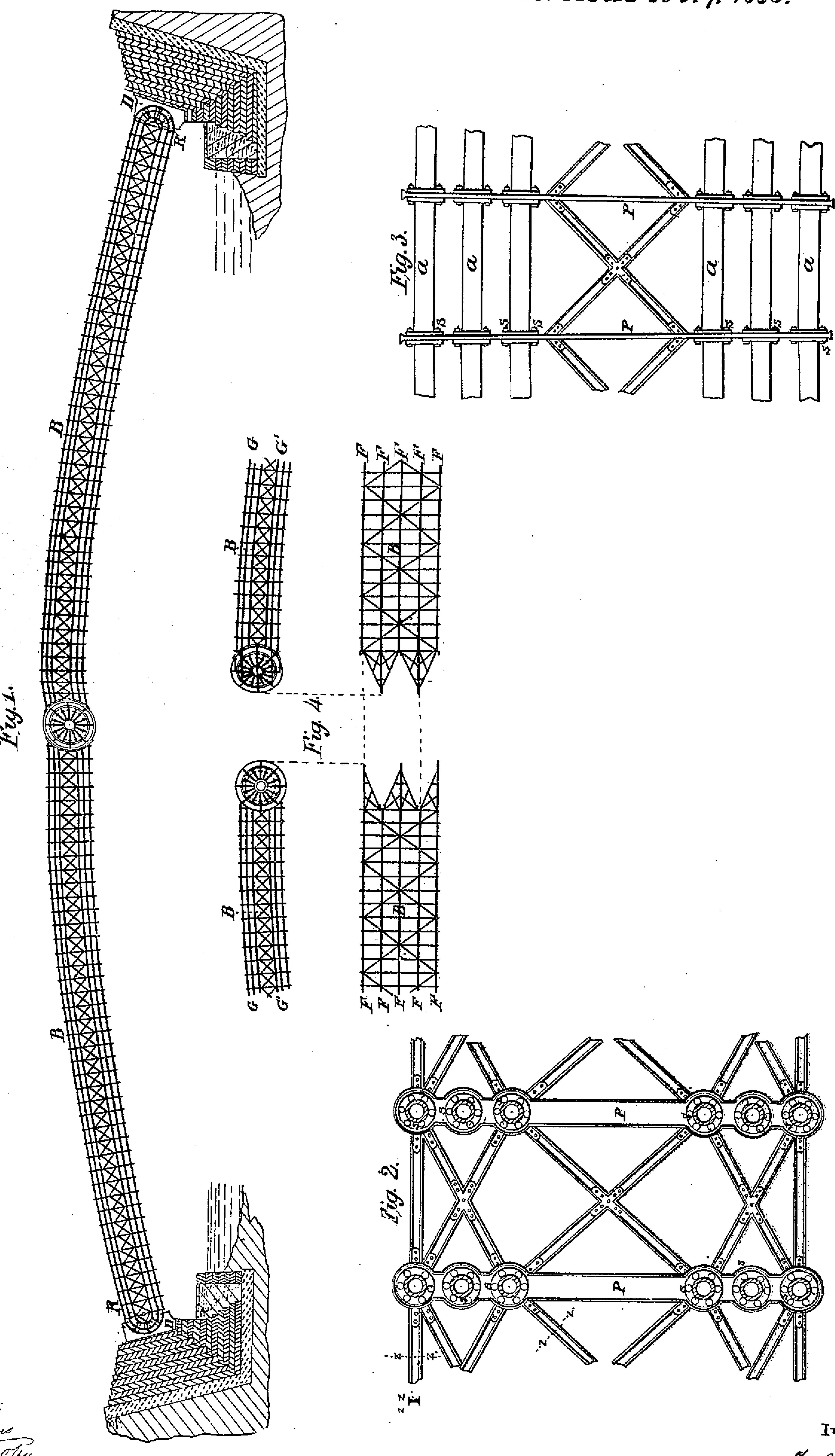
2 Sheets. Sheet 1.

J. E. Kauser,
Truss Bridge.

No. 50,827. Patented Nov. 7. 1865.



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UNITED STATES PATENT OFFICE.

JOSEPH E. KAUSER, OF NEW YORK, N. Y.

IMPROVEMENT IN BRIDGES.

Specification forming part of Letters Patent No. **50,827,** dated November 7, 1865.

To all whom it may concern:

Be it known that I, JOSEPH E. KAUSER, of the city, county, and State of New York, at present residing in Hungary, Europe, have invented a new and useful Improvement in Bridges; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a geometrical elevation of bridge, with section of abutments. Fig. 2 is a section of two trusses, showing their connection. Fig. 3 is an elevation of an arch-piece, showing its connection with adjacent arch-pieces. Fig. 4 is an elevation and plan of the central part of the bridge, showing the device at the center of the bridge for neutralizing the effect of the contraction and expansion of the materials composing the bridge. Fig. 5 is a geometrical elevation of bridge. Fig. 6 is a top view of the base of bridge, showing the circular concavities for the reception of the lower ends of the arches.

My invention consists, first, in applying in the construction of bridges, viaducts, &c., iron or cast-iron hollow cylinders or tubes, whether round or polygonal in form, in such a way that the strain shall be in the direction of their longitudinal axis without relying upon their lateral or cohesive strength; and, second, in the device, hereinafter more fully described, for neutralizing the effect of the contraction and expansion of the materials.

My improved bridge is constructed in the form of an arch, all material which merely augments its weight without increasing strength being carefully eliminated.

The bridge consists of a system of parallel arches, F, securely trussed together by horizontal and oblique braces *f*. The exterior and interior lines of each arch—*i. e.*, the extrados and intrados—consist of one, of two, or of a greater number of series of hollow cylinders, *a*, the number of lines or series depending upon the length of the span and the exigencies of each particular case. In the accompanying drawings, the exterior (G) and interior (G′) lines are represented as each consisting of three series of tubes, *a*. The length of each of the tubes *a* should not exceed twelve times its own diameter. Pare iron plates extending from the outermost exterior line or series of tubes to the innermost interior line or series of tubes, to which are attached the adjacent ends of the tubes, or by means of screw-bolts *s*, in the manner represented in Figs. 2 and 3. The plates P are braced together in the space between the exterior lines or series of tubes, G, and the interior line or series of tubes, G′, as represented. From this construction it is evident that the stress produced, as well by inherent as extraneous weight, will act in the direction of the longitudinal axis of the tubes *a*, and consequently in the direction of their greatest power of resistance; but in order to make this construction available and practical there must be combined with it some device for neutralizing the expansion and contraction of the materials of which the bridge is constructed, and thus protect the interior parts, as well as the abutments, from the effects of such contraction and expansion. To accomplish this the bridge is constructed in two perfectly distinct and separate parts or semi-arches. The semi-arches forming each half of the bridge terminate at their highest point alternately in concave and convex ends, so as to fit exactly into each other in the manner of a pair of hinges, but without the connecting-bolt, two or more or all of these arches at the point of meeting being provided with side pieces to prevent lateral displacement. The lower ends of the arches are also rounded off, and fit exactly into the concave cast-iron supports D, fastened to the abutments. There will thus be two fixed rotation-points, R, one at each end of the bridge, and one movable rotation-point, C, at the center. The effect of expansion will thus be to lift up the whole structure, the central rotation-point, C, rising, and the semi-arches tending to revolve about it and at the same time tending to revolve around the fixed rotation-points R. Then, as the materials contract, the arches sink back into their original position without having injured or displaced any part of the bridge.

I do not claim any system of connecting, bracing, and otherwise fastening the different parts of the trusses, either separate or among each other, or any of them with the railing or

parapet, the flooring, or any other part of the bridge; but

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

1. Combining, in the construction of bridges, viaducts, &c., iron or cast-iron round or polygonal cylinders or tubes, the length of which shall not exceed twelve times their diameter, in the manner herein described—that is to say, in such a way that the pressure of the inherent or extraneous weight shall act in the direction of the longitudinal axis of said cylinders or tubes, substantially as herein described, and for the purpose set forth.

2. Combining the semi-arches which form the bridge with each other at the center of the bridge and with the abutments at its ends in the manner described—that is to say, making the central ends of the parallel semi-arches alternately convex and concave, so as to fit into each other, and lower ends of said semi-arches convex, so as to fit into concave supports on the abutments, substantially as described, and for the purpose stated.

J. E. KAUSER. [L. S.]

In presence of—

ISIDOR MÁTTYUSE,

BOTZ KÁROLY.