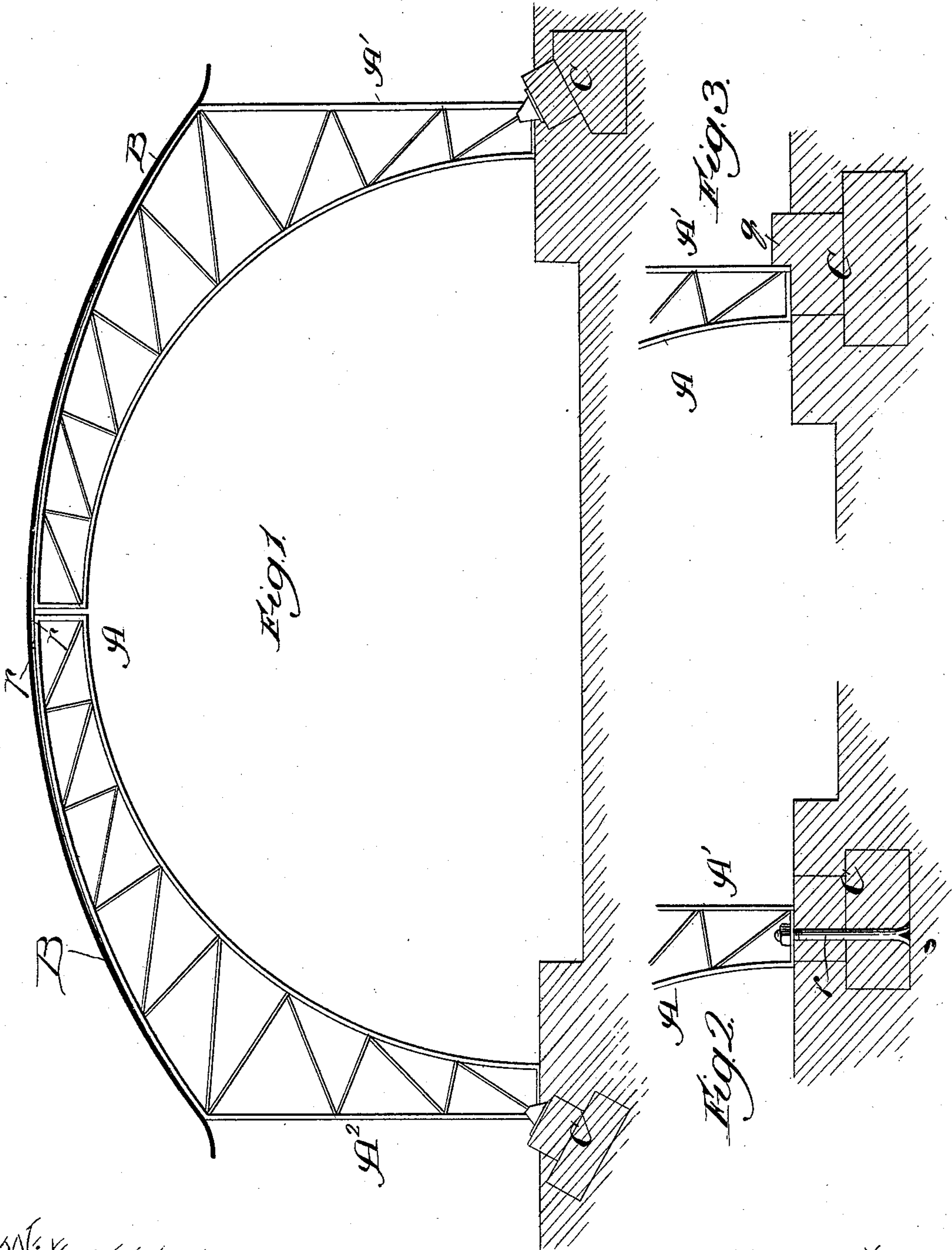


(No Model.)

C. F. T. KANDELER.
ROOFED ARCH STRUCTURE.

No. 495,222.

Patented Apr. 11, 1893.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES F. T. KANDELER, OF CHICAGO, ILLINOIS.

ROOFED ARCH STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 495,222, dated April 11, 1893.

Application filed July 19, 1892. Serial No. 440,448. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. T. KANDELER, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Roofed Arch Structures, of which the following is a specification.

My invention relates to improvements in the class of structures, such as railway-sheds, exposition-buildings, dance-halls, and the like, in which the roof is supported on metal (steel) arches, provided at suitable intervals and imposed on foundations. In this class of structure it is common to provide vertically-disposed foundations on which to support the ends of the arches, at which they are connected by tie-rods of the same material as the arches; and in order that the expansion and contraction of the tie-rods under the influence of temperature may be accompanied by the expansion and contraction of the arches it is usual to fasten or anchor only one end of each of the latter on its foundation, and provide rollers at the other end on its foundation to render it free to yield toward that end to the expansion and contraction and thus permit the tie-rods always to remain straight.

There are several objections to the use of the afore-mentioned tie-rods, among which may be mentioned, as a principal one, their expense, which is estimated at about one-fifth of the entire cost of the arch-structure. Another objection is that there is not adequate provision for taking the horizontal thrust and particularly not for horizontal wind-pressure, which is resisted only by the one anchored or fastened end of each arch.

The objects of my improvement are to enable the tie-rods to be entirely dispensed with, thereby greatly decreasing the cost of construction, and at the same time to provide a form of construction which shall render the structure the stronger against horizontal thrust, and which shall distribute the wind-pressure in the plane of the arch to both of its foundations; and also to improve the roof-structure as to certain details.

In the accompanying drawings, Figure 1 is a cross-sectional view of a roofed arch-structure involving my improvements, the roof-proper being shown in section, and the arch

and its inclined foundations in elevation. Figs. 2 and 3 are views in broken elevation of an end of an arch and its foundation, showing, respectively, variations from the inclined-foundation means illustrated in Fig. 1, for taking the horizontal thrust, as also the vertical load, of the arch.

A is a metal arch of the kind and form suitable for or usually employed in structures of the class to which my invention relates, and which may be of the latticed construction represented; and B is the roof thereon and supported by foundations C C at the ends of the arch. As illustrated in Fig. 1 the foundations are inclined upwardly in an inward direction, or toward each other, being thereby adapted to support the vertical load of the roofed arch as well as to take the horizontal thrust of the arch and to distribute the wind-pressure in the plane of the arch to both of its foundations. The foundation feature of my improvement is preferable in the inclined form thereof described, though the object to be attained, namely of both supporting the vertical load and taking the horizontal thrust of the arch, will also be subserved by employing foundations disposed vertically under the ends of the arches, as represented in Figs. 2 and 3, and either anchoring the ends by means of fastening-bolts *r*, as shown in Fig. 2, or stopping them against outward horizontal displacement by means of abutments *q* extended on the tops of the foundations against which to permit the outer sides of arches toward their lower ends to bear.

Another feature of my improvement relates to providing the arch in two sections A' and A² connected by a flexible joint, which may be a hinged joint, though I prefer to form it with a metal plate *p* fastened to the sections to extend over their line of junction, the plate being adequately thin to afford the desired flexibility in the joint to permit expansion and contraction of the metal of the arch.

Structures are known, in which straight sections, lying in a line with each other, are connected by a yielding joint. Such yielding joint would not, however, answer my purpose in a sectional arch-structure, since it cannot transmit any horizontal thrust at all. My flexible joint must transmit all horizontal

thrusts and permit vertical expansion and contraction.

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

- 5 1. In combination a roofed arch-structure A formed in sections A' and A² connected by a flexible joint, and resting on horizontal-thrust taking and vertical-load supporting foundations C, substantially as described.
- 10 2. In combination a roofed arch-structure A

formed in sections A' and A² connected by a flexible metal plate *p* fastened to the sections to extend across the line of their junction, the arches resting on horizontal-thrust taking and vertical-load supporting foundations C, substantially as described. 15

CHARLES F. T. KANDELER.

In presence of—

M. J. FROST,

M. E. WINN.