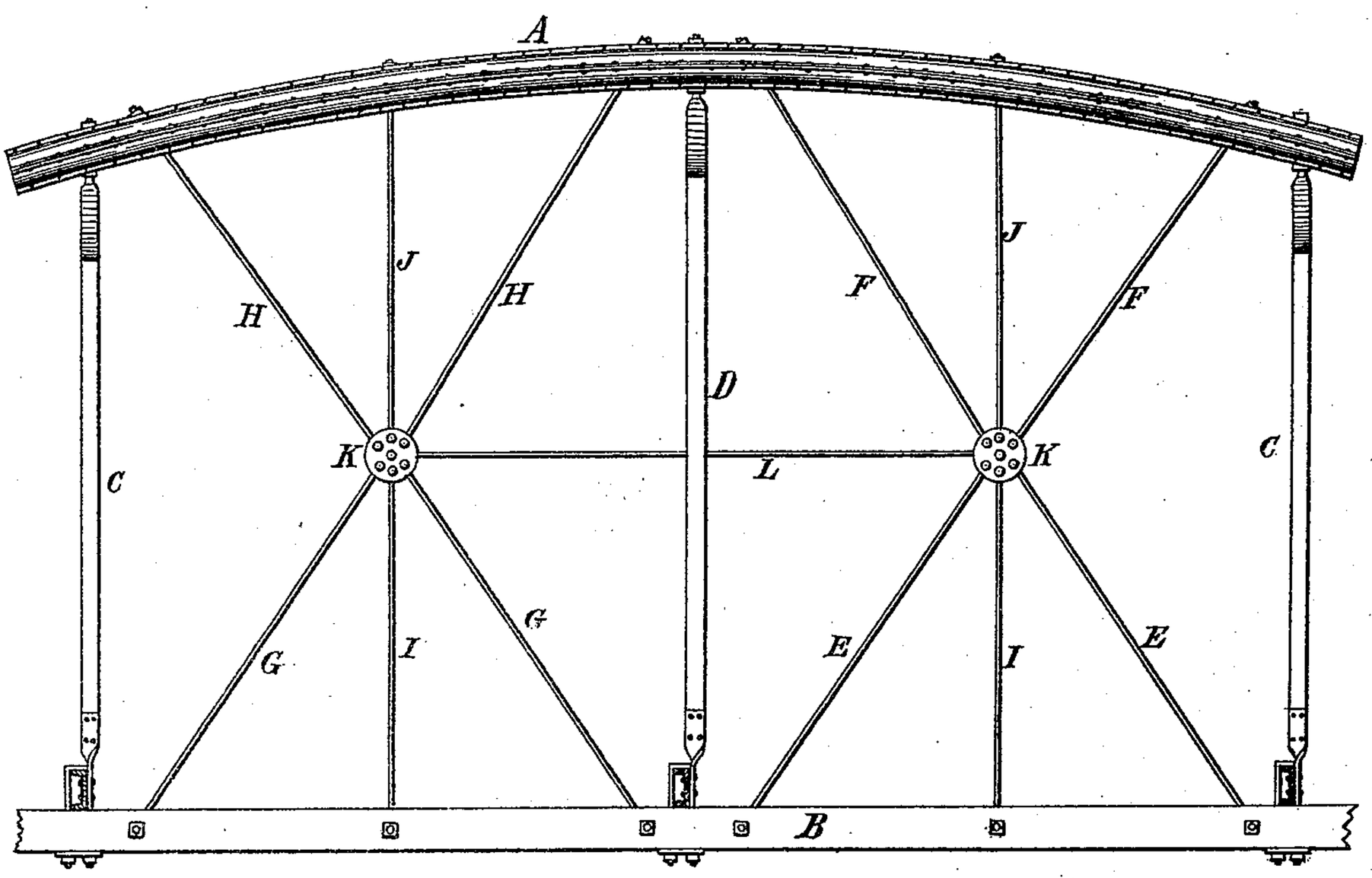
J. ABBOTT.

METALLIC ARCH BRIDGES.

No. 184,490. Patented Nov. 21, 1876.



Witnesses
Ruth K. Abbott
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UNITED STATES PATENT OFFICE.

JOB ABBOTT, OF CANTON, OHIO, ASSIGNOR TO WROUGHT IRON BRIDGE COMPANY, OF SAME PLACE.

IMPROVEMENT IN METALLIC ARCH-BRIDGES.

Specification forming part of Letters Patent No. **184,490**, dated November 21, 1876; application filed August 19, 1876.

To all whom it may concern:

Be it known that I, JOB ABBOTT, of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Arch-Bridges: and that the following is a full, clear and exact specification thereof, which will enable others skilled in the art to make and use the said invention.

My invention is designed to obviate the difficulty experienced in constructing long-span arch-bridges, of getting the diagonal ties to lie at or near the proper angle, to secure stiffness and economy without making the panels of too great length, as well as to effect a saving of material by reducing the number of posts required; and to this end it consists in connecting the diagonal ties in each panel of an arch-bridge at or near the center of the panel and uniting this point of support with the upper and lower chords of the girder; also in securing the center of the intermediate post of an arch-bridge by means of rods from said central diagonal-tie connections, thus reducing the effective length and increasing the stiffness of said post, as is hereinafter more fully shown.

The accompanying drawing is a view of the central panels of an arch-bridge embodying my invention.

A is an arch of any desired form of section. B is the lower chord, and C D C are the girder-posts, which are usually made widest laterally, to aid in holding the arch against lateral deflection. K is the center diagonal connection, which is here shown as being made of two plates of circular form, between which the eyes on the diagonal rods are secured by bolts run through the plates and eyes, although a pin-and-eye connection may be used instead, if preferred, especially when double ties are used. The diagonal ties E F G H are made in two lengths, the lower parts E G being secured by eyes to the lower chords B and center plates K, and the upper parts F H being secured by eyes in said center plates, and having their upper ends run through the arch A with washer and nut above for tightening up the rods. The suspension-rods I are secured to the center-plate K and lower chords B, and thus serve as supports for the chords midway between the posts, and the rods J run from the center plate K to the arch A and serve to hold the arch against buckling upward, as well as to transfer a portion of the load on the chords to the arch. The rod L has its ends secured between the plates K, and is run through and secured in the web of post D by jam-nuts, thus holding said post from bending longitudinally at the center.

The advantages resulting from this construction will be more readily seen on applying it to a long span of two hundred feet or more, although it can be economically used in spans of one hundred feet and over.

A two-hundred-foot span is ordinarily made with fourteen panels, of about fourteen feet length, and is usually twenty-five feet deep, so that the center ties have a vertical height of about twenty-five feet in fourteen feet, instead of running at the economical angle of forty-five degrees, and each girder requires thirteen posts.

If the eight central panels be made into four double panels, as would be done in applying this plan of construction, it is seen that four of the posts will be replaced by light suspension-rods I J, thus reducing the number of posts to nine, that the three longest remaining posts will be held at the center by rods L, thus halving their length and reducing their cross-section, and that the central diagonal ties will be laid down at an angle of much nearer the economical angle, besides being much reduced in total length, thus materially lessening the cost of the girder, and at the same time increasing its stiffness.

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

1. The connection of the diagonal ties in a panel of a bow-string arch-bridge with each other, and with the arch and chord of said bridge at their intersection, substantially as and for the purpose specified.

2. The attachment of the center of an arch-post with the connection of the diagonal ties at their intersection, substantially as and for the purpose specified.

As evidence of the foregoing, witness my hand this 5th day of August A. D. 1876.

JOB ABBOTT.

Witnesses:
ELVIRA SNYDER.
RUTH K. ABBOTT.