L. Eikenberry.
Truss Bridge.

No. 22,715. Patented Jan. 25, 1859.

Fig: 1

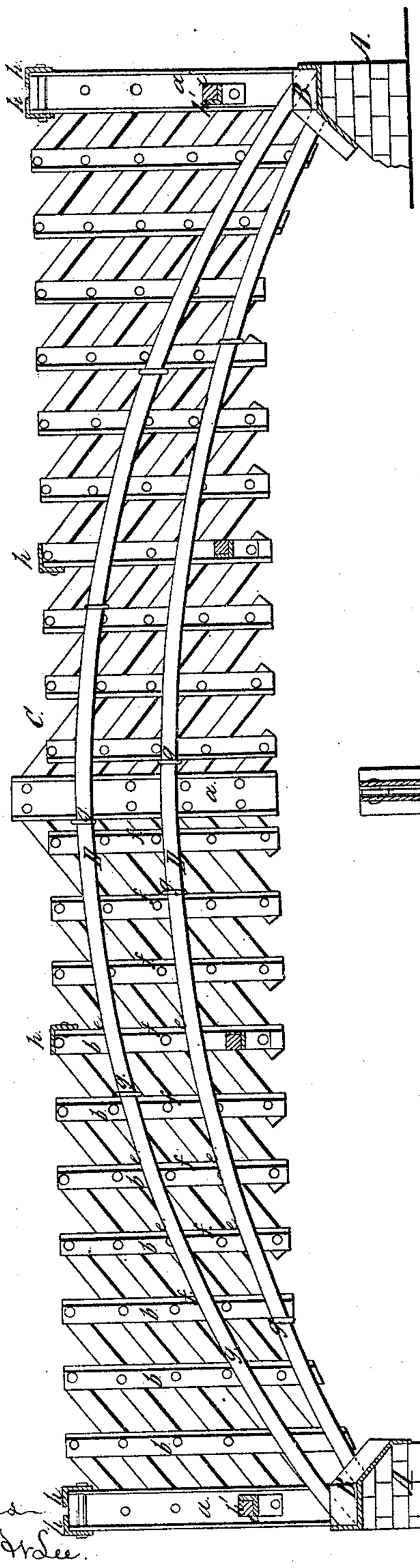


Fig: 2

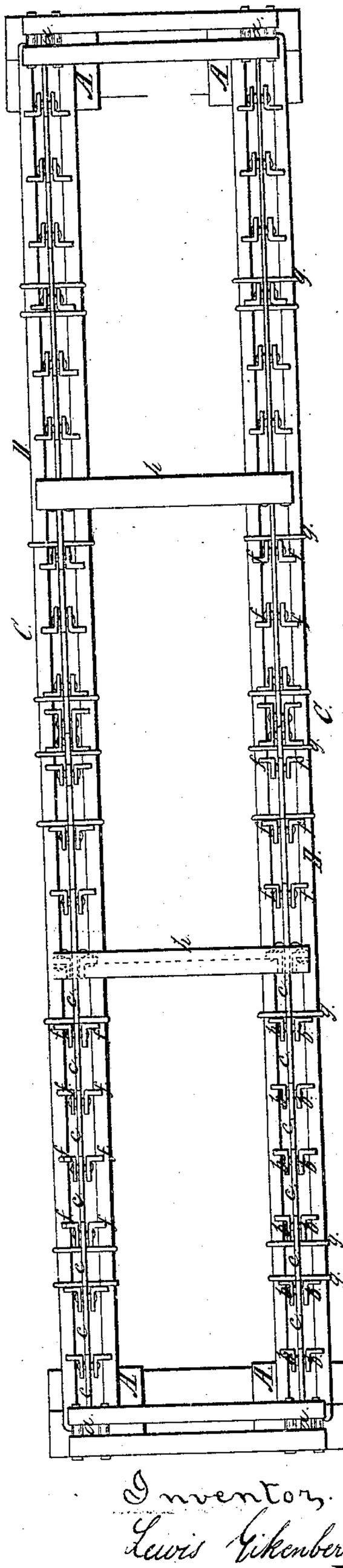
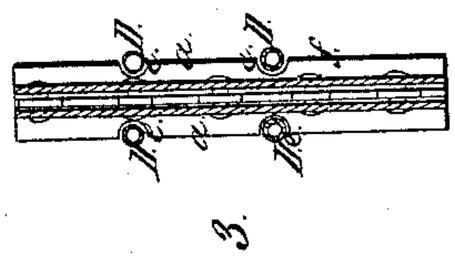


Fig: 3.



Witnesses
C. G. Parke Ap Lee.
H. H. Young

Inventor.
Lewis Eikenberry

UNITED STATES PATENT OFFICE.

LEWIS EIKENBERRY, OF EASTON, PENNSYLVANIA.

IRON BRIDGE.

Specification of Letters Patent No. 22,715, dated January 25, 1859.

To all whom it may concern:

Be it known that I, LEWIS EIKENBERRY, of Easton, in the county of Northampton and State of Pennsylvania, have invented a new and useful Compensating Iron Bridge; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side view of a combined lattice and arch bridge constructed after my invention. Fig. 2 is a top view of the same, and Fig. 3, a transverse section.

Similar letters of reference in each of the several figures indicate corresponding parts.

In the use of iron for bridges experience has taught that to render its adoption useful and safe the parts of the bridge must be so shaped as to combine lightness and great strength and be capable of adjusting themselves so as to compensate for the contraction and expansion due to them by reason of the change in temperature of the weather.

My invention consists, 1st, in having the uprights and diagonals of the side framings of the bridge united together in the manner hereinafter specified so that they shall be capable of turning on their points of connection, and thus whenever expansion or contraction in the metal occurs, they may be able to compensate therefor without ceasing to brace the bridge at top and bottom, and thus avoid the necessity of allowing the ends of the whole structure to slip or change position on the piers, or prevent breaking or straining of the parts when no such provision is made for the slipping of the ends of the bridge on the piers or abutments.

My invention consists, 2nd, in the combination of lattice side frames of bridges formed of diagonal bars and angle iron uprights which are united together so as to turn on their points of connection as above stated, with tubular, semi-tubular or angle iron arches, said arches being fitted within recesses formed in the angle iron uprights, all as hereinafter specified, so that all of the parts forming the combination, shall receive the strain of the bridge, and in case of expansion or contraction in any part of the combination, or of the whole thereof, the same will be compensated for as hereinafter described and the arches perfectly supported, the bridge made very stiff and yet very light, and all undue strain on any one part or upon the whole combination will be avoided without the necessity of having the ends of the bridge slip or change position on the piers or abutments.

To enable others, skilled in the art, to make and use my invention, I will proceed to describe its construction and operation.

A, A, represent the piers of the bridge. B, B, iron shoes fitted to the abutments so as to prevent the bridge from slipping at either end.

C, C, represent the side frames of the bridge, they rest on the shoes as shown. The pillars or main uprights *a*, *a*, *a*, of these frames are, in their transverse section, similar in shape to a semi-equate tube, so as to give great strength and yet be very light. The auxiliary uprights *b*, *b*, are formed of angle iron with the same object in view. The diagonal bars or braces *c*, *c*, may be flat as shown. The auxiliary uprights *b*, *b*, are pivoted or bolted to the diagonal bars or braces at *d*, *d*, in such a manner that freedom of motion at the points of connection shall be allowed.

D, D, are arches of different radius for supporting the frames C, C. On each side of these frames, one or more of these arches are arranged, said arches being fitted to recesses *e*, *e*, formed in the lateral flanges *f*, *f*, of the angle-iron uprights, and their ends passing into the metal shoes B, B, of the piers as shown. The arches on opposite sides of the frame after being thus arranged are united and held together so as not to have any lateral movement by means of suitable straps or links *g*, *g*, as represented. The two side frames are united together by transverse angle iron beams *h*, *h'*; the beams of the upper tracks are placed and fastened securely upon the ends of the uprights and those of the lower track bolted or securely fastened to the inner faces of said uprights. The angle iron beams of the lower track may be placed the reverse of those of the upper and filled in with wood as shown at *i*, in the drawing so that holdfasts for nails shall be provided and thus the lower tracks, if desirable, made of timber. The upper track generally has two wooden stringers placed upon and bolted to the beams; said stringers supporting a railroad track. As a modification of my invention, in order to make a suspension bridge, I propose to employ inverted arches formed of wire cords in combination with loosely pivoted diagonals and angle iron

uprights. In this case the inverted arches or wire cords will be arranged and secured in a similar manner as the wire cords in ordinary suspension bridges, excepting that they are fitted in recesses formed in the lateral angles of the uprights. With this arrangement, the thrust of the arches or cords, uprights and diagonals, in case of expansion will be downward instead of upward, the effect and results of said thrust, however, will be just the same as in the arrangement before described and exhibited in the drawings.

Operation: From the foregoing it will be evident that if any change in the length of the arches, uprights and diagonals occurs by reason of expansion, the arches uprights and diagonals will cause an upward thrust, which, owing to the point of conection being loose will be equal throughout the bridge and consequently an upward pull upon all the points of connexion will take place in a manner to make them rise slightly, and owing to their rising, the diagonals will be caused to approximate or move closer together and stand at a greater inclination to a perpendicular, and consequently while the arches rise intermediate between their ends instead of slipping on the piers, the diagonals and uprights also rise with them, and every compensation will be made for this change in these parts and the strain and disastrous effects usually experienced when the points of connections allow no freedom of motion in the parts, are completely avoided. Also all necessity of having the ends of the bridge slip on the piers dispensed with.

What I claim as my invention and desire to secure by Letters Patent, is

1. Having the uprights and diagonals of the side framings of the bridge so united together that they shall be capable of turning on their points of connection and thus whenever expansion or contraction in the metal occurs, they may be able to compensate therefor without ceasing to brace the bridge at top and bottom, substantially as and for the purposes set forth.

2. The combination of lattice side frames of bridges formed of diagonal braces and angle iron uprights which are united together so as to turn on their points of connection as above stated, with tubular, semi-tubular or angle iron arches, substantially as and for the purposes set forth.

LEWIS EIKENBERRY.

Witnesses:
G. YORKE AT LEE,
H. H. YOUNG.