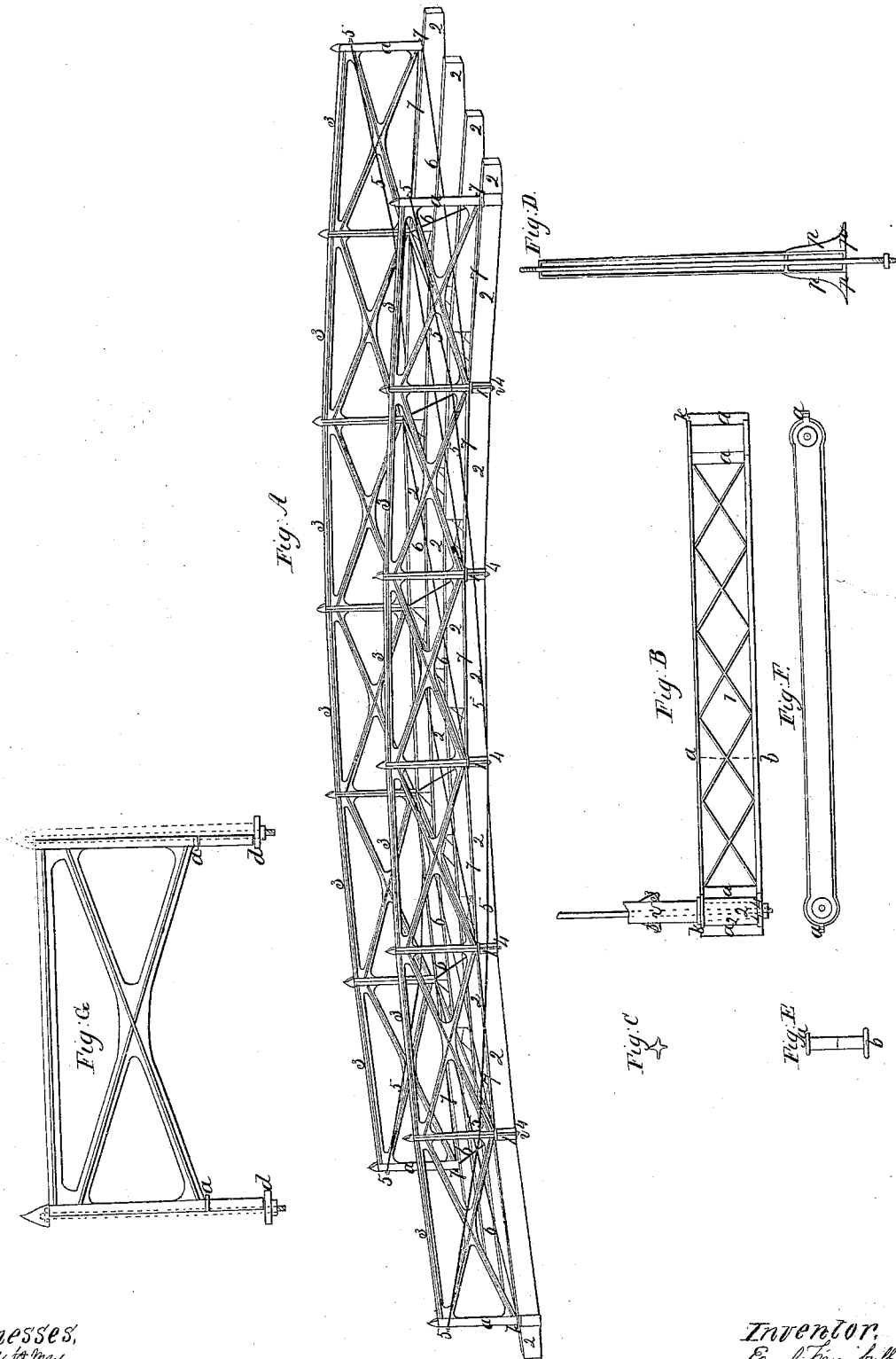


E. Trumbull.
Truss Bridge.

Nov. 2, 1841.

Patented Jul. 10, 1841.



Witnesses,
Edward H. May
Aaron Allen

Inventor,
E. Trumbull.

UNITED STATES PATENT OFFICE.

EARL TRUMBULL, OF LITTLE FALLS, NEW YORK.

BRIDGE.

Specification of Letters Patent No. 2,164, dated July 10, 1841.

To all whom it may concern:

Be it known that I, EARL TRUMBULL, of Little Falls, in the county of Herkimer and State of New York, have invented a new and Improved Mode of Constructing Bridges and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in the form and manner in which I construct bridges, which is described in the specification hereto annexed and represented by the draft herewith presented.

Figure A is a drawing in isometrical perspective of my bridge showing two trusses each composed of six sections supported and connected by wrought iron tie rods and suspension rods extending from end to end, needle beams or roadway sills (hereafter referred to as sills) extending from a post in one truss to the opposite post in the other truss. Cross braces of wrought iron to strengthen the roadway, and prevent any lateral motion of the bridge. String pieces to support the roadway, plank, &c., all hereafter to be separately, definitely and circumstantially explained.

Fig. B is a side view of the sill before mentioned composed of two plates of iron, one on the upper and the other on the under side connected by cross braces and having at both ends cylinders to receive the lower ends of the posts composed by the junction of two sections. These cylinders have projections cast on the outside of both ends of the sill to receive a tie-rod and in some cases the suspension rods. The projections are designated in the drawing by the small letters *a, a*. The sill exhibited in Fig. B, is that also designated in Fig. A, by the small letters *b, b*, and the Figs. 4, 4, the end and top and a part of one side being there shown. In one end of the sill exhibited in the draft (Fig. B) the lower part of one of the posts is shown also the lower part of a rod connecting the sill with the truss, and running through it as hereafter to be explained. The small letters *a, b*, connected by a dotted line denote the place at which the transverse section Fig. E, is taken. The whole of the sill described above is cast together, the two plates, upper and lower connected by what

I call cross bracing, the cylinders at the ends and the projections beyond the cylinders both on the inside and outside.

Fig. E, is a transverse section of the sill taken at *a b* on Fig. B, as before explained. In this view the plate at the top and bottom and parts of two connecting braces are represented.

Fig. F, is the plan of the sill before referred to, showing the upper plate and the edges of the lower plate projecting beyond the edges of the upper plate on either side being of greater breadth than the upper plate, in order to give a secure foundation for the string pieces to rest upon. This view also shows the top of the cylinder to receive the posts before alluded to, the size of the inside of the cylinder being distinguished by a shading of black lines radiating from the center and terminating at the circumference of the inside of the cylinder. This cylinder receives the bottoms of the cast iron posts (before alluded to and hereafter to be explained) from the flanges or projections cast on the posts and marked *a, a*, in Fig. G, and extends from the upper side of the upper plate of the sill to the upper side of the lower plate of the sill. There is a small orifice perforated through the lower plate of the sill in the center of the cylinder (shown in the draft by the first circle surrounding the center of the cylinder on Fig. F, and by dotted lines marked 4, 4, on Fig. B,) this is to admit the passage of the connecting rod before alluded to as running through the posts, a part of which is shown in Fig. B, partly by whole and partly by dotted lines marked with the Figs. 2, 2, and the whole of which is shown in Fig. G, although by dotted lines.

Fig. G, is a side view of what I call a section of the truss of my bridge, this is cast whole, in the shape shown in the draft. A transverse section of the top and diagonal braces is shown in Fig. C. Each end of this section terminates in what I call one-half a post. These end posts are cast hollow to receive the connecting rods which run through from top to bottom as shown in the draft, being secured at top and bottom by a screw and nut. At the outside ends of the

section placed on the abutments or commencement of a bridge, whole posts are cast to the sections, no connecting rod passing through them, as they are intended to rest on the springing points of the bridge (be they abutments or piers) and therefore have no sill attached. There is also shown in Fig. G, by dotted lines on one end and whole on the other, the shape of a cap which I place on the top of each post (composed of the ends of two sections) to couple the sections together and form an ornamented finish to the tops of the posts, receiving and hiding the tops of the connecting rods before alluded to.

Connecting rods.—What I call the connecting rods are rods of wrought iron for the purpose of connecting the sills with the truss and of assisting to maintain the necessary erect position of the truss. They run completely through the section from the top, (where they are covered by the cap) to the bottom of the lower plate of the sill. One of these rods is shown in Fig. D, with both ends terminating in the form of a screw to receive a nut for the purpose of securing them in the requisite position. The manner of securing them and of supporting the ends of the sill will be seen by attention to Fig. G, where a rod is shown at both ends of the sections with a plate of iron represented on the lower end and marked *d, d*, the better to support the ends of the sill marked *a, a*. A part of one of these rods is also shown in Fig. B, as has been before explained. The nut and screw at the bottom of these rods is also shown at the points marked 4 on Fig. A.

Suspension rods.—What I call suspension rods are rods of wrought iron commencing and terminating at the points marked 5, 5, 5, 5, near the top of the end posts of the end sections on Fig. A. It will be observed by attention to Fig. A that these rods form a catenarian curve commencing at nearly the top of the end posts of the end sections and are there secured and tightened by a nut and screw. After passing through a plate of wrought iron perforated and placed for the purpose near the top of the end posts, they pass at the apex under the center sill, supporting the truss at other points either by passing under projections cast for the purpose to the posts formed by the junction of two sections as will be seen by attention to Fig. B, where two projections are shown at the points marked 3, 3, or by passing through holes perforated for the purpose in the projections spoken of as appertaining to the ends of the sills. The suspension rods are composed of several pieces of such length as may be deemed advisable, varying with the span or weight of the bridge. I usually place the suspension rod on each side of each

truss. In Fig. A one suspension rod is shown to each truss, the other being placed in the same relative position on the other side of the truss not represented in the draft.

Tie rods.—The tie rods commence at either end of the bridge a little above the tops of the flanges represented on the draft as being on the lower ends of the posts and designated in Fig. G by the small letters *a, a*, passing through holes perforated for the purpose in the end posts of the end sections of the bridge, being there secured by nut and screw in the same manner as the suspension rods. The nuts and screws spoken of are designated on Fig. A by 7, 7, 7, 7, placed at the extremities of the tie rods. This rod extends the whole length of the bridge, passing over the projections at the ends of the sills, being confined to their places at these points by small notches cast to receive them in the top of the projection shown by small letters *k, k*, on Fig. B. The tie rods are intended to strengthen the bridge and assist in maintaining the sections in their position. I usually place one on the outside of each truss. One of these rods is shown in each truss on Fig. A of the draft by the figures 7, 7, 7, 7.

Diagonal braces.—The diagonal braces are rods or plates of wrought iron for the purpose of preventing any lateral motion in the bridge. They commence at each post of each truss and extend to the next opposite but one on the other truss, crossing each other in the longitudinal center of the bridge. They are designated in Fig. A by the small figures 6, 6, 6, &c.

String pieces.—The string pieces are sills placed lengthwise of the bridge to support the roadway, being supported themselves at their ends either on the abutments, piers, or sills. When on the sills, by resting on the lower plate of the sills, which is made broader than the upper plate for this purpose, as shown by Fig. E and Fig. F. These stringers are represented in Fig. 4 by the small figures 2, 2, 2.

Fig. D is the transverse vertical section of a part or end view of a section particularly adapted to the use of wooden sills by the casting of projections or feet to each side of the post to preserve the section from lateral motion by resting on the upper surface of the wooden sill. The feet or projections are shown at *p, p*, on the figure. This post is the same as that used with iron sills excepting that instead of having the lower end continued to fit a cylinder reaching nearly to the bottom of the sill it terminates at the upper side of the sill and has feet or projections to afford a broad base for the purpose before described. A connecting rod is shown in the figure, extending below the

bottom of the post and of sufficient length to be secured at the bottom of the sill by a nut and screw as usual.

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

1. The combination of the suspension rods with the truss frames, made in sections for the purpose and in the manner specified, and in combination with these, thus combined, I also claim the tie rods as specified.

2. I also claim the particular construction of the cast iron beams or sills by uniting together in casting the two plates, upper and lower as exhibited by Fig. E, with the diagonal bracing shown in Fig. B, as described.

EARL TRUMBULL.

Witnesses:

GEORGE PETRIUS,
J. DYGERT.