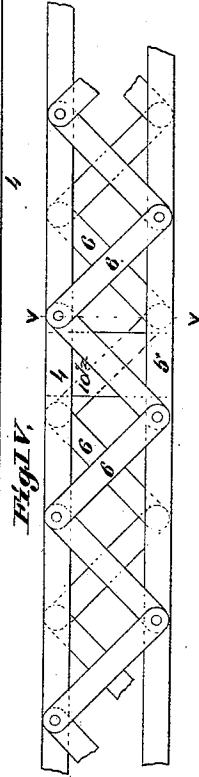
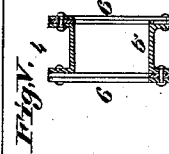
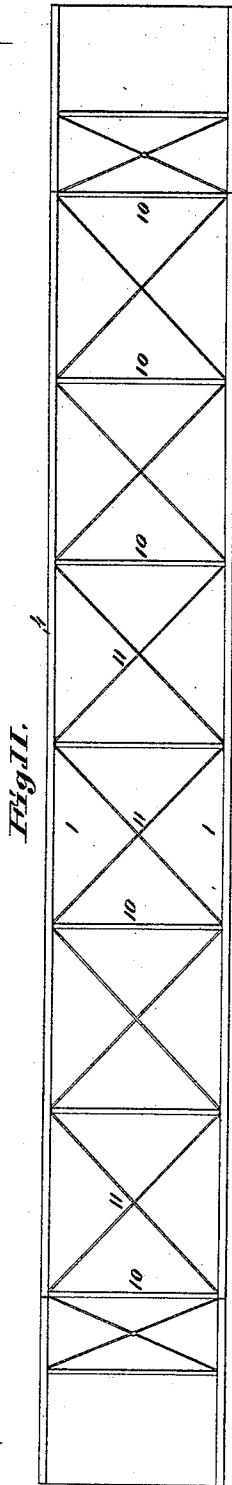
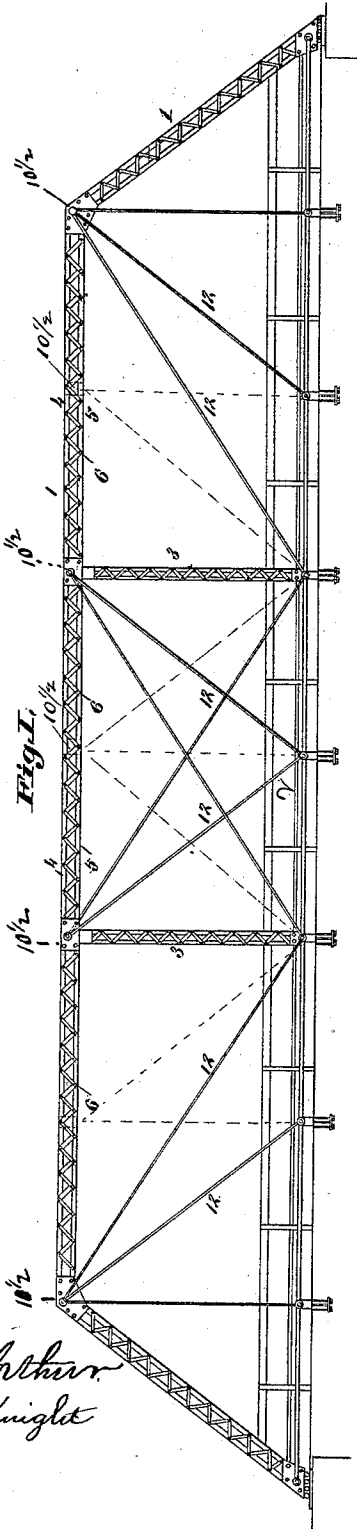
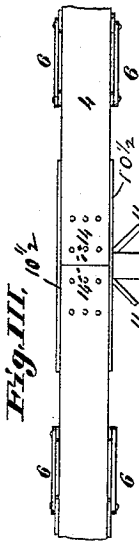


(No Model.)

W. E. STEARNS.  
BRIDGE.

No. 419,897.

Patented Jan. 21, 1890.



Attest:  
Emma Arthur  
Edward Knight

Inventor:  
William E. Stearns  
By Knight & Bond  
attys

# UNITED STATES PATENT OFFICE.

WILLIAM E. STEARNS, OF LEAVENWORTH, KANSAS.

## BRIDGE.

SPECIFICATION forming part of Letters Patent No. 419,897, dated January 21, 1890.

Application filed December 3, 1888. Serial No. 292,508. (No model.)

### *To all whom it may concern:*

Be it known that I, WILLIAM E. STEARNS, of Leavenworth, in the county of Leavenworth and State of Kansas, have invented a certain new and useful Improvement in Bridges, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure I is a side elevation of my improved bridge. Fig. II is a top view showing the lateral bracing and ties. Fig. III is an enlarged detail top view of one of the top chords. Fig. IV is a detail side view of same. Fig. V is a transverse section taken on line V V, Fig. IV.

My invention relates to an improved manner of constructing bridges; and my invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Referring to the drawings, 1 represents the top chords of the bridge, 2 the bottom chord of the bridge, and 3 the posts or uprights. Each chord 1 is composed of an upper channel-bar 4 and a lower channel-bar 5, the channel-bars being placed so that their flanges stand vertically, as shown in the section, Fig. V. The channel-bars of each chord are connected by lacing consisting of links or bars 6, riveted or bolted at their upper ends to the flanges of the bar 4 and at their lower ends to the flanges of the bar 5. By arranging the upper and lower channel-bars at a considerable distance apart and connecting them by lacing in this manner a chord of great rigidity is formed, and I am thus enabled to extend the struts a much greater distance without intermediate vertical supports than has heretofore been possible with a chord constructed in the ordinary manner—that is to say, I am enabled to do away with at least one vertical support or upright to each section of the chord which has heretofore been employed with each section at the points indicated by dotted lines in Fig. I, and at the same time I produce a structure equal in strength to those which employ vertical supports at these intermediate points in addition to those at each end of the chord-section.

10 and 11 (see Fig. II) represent a system of lateral bracing extending from chord to

chord and connected to the chords by means of plates 10½. These plates 10½ are arranged at suitable intervals along the chords, and are secured in any convenient and suitable manner to the inner sides of the channel-irons behind the outer link of the lacing 6, as plainly shown in Fig. IV, and afford surfaces to which these lateral braces may be secured. These plates are also located at the head of each post, as well as at the bend where the top chord turns down to meet the lower chord. At these points, however, the lacing is discontinued, and there is a plate on both sides of the chord, as shown in Fig. III, which plates strengthen the joint 14, Fig. III, between the ends of the chord-sections where the latter rest upon the ends of the posts 3, while the inner one of these plates also serves as an attaching-surface for the lateral braces.

12 represents a series of supporting or tie rods extending from the respective chords to the bottom of the bridge, and to show that a portion of such rods that are commonly used may be omitted with my improved construction I have illustrated the parts thus omitted by dotted lines in Fig. I.

I do not confine myself to the system of supporting - rods shown, as other systems might be used with like effect.

By the method of construction which I have described I am enabled to place the vertical supports or uprights at a much greater distance apart than is now customary in bridge construction without any depreciation in strength as compared with the strength of prior constructions, as before said, and at the same time save a large amount of material in the chord and web members of the main vertical truss, as well as considerable labor in the erection of the bridge.

I claim as my invention—

1. In a bridge, a top chord constructed, as described, of two channel-irons suitably laced together, substantially as set forth.

2. In a bridge, the top chords constructed, as described, each of two channel-irons having their flanges placed vertically, and lacing consisting of connecting-links secured to the flanges of the channel-bars, substantially as set forth.

3. In a bridge, the combination of the top

chords constructed of channel-irons, as described, and a system of top lateral bracing, substantially as and for the purpose set forth.

4. In a bridge, the combination of the chords 5 1, chord 2, lateral bracing 10 and 11, vertical posts 3, and bracing 12, substantially as described, and for the purpose set forth.

5. In a bridge, the combination, with the 10 bottom chord 2 and the posts or uprights 3, of the top chord resting upon said posts and consisting of two channel-irons suitably laced together, and the tie-rods 12, secured to said top and bottom chords, substantially as set forth.

6. In a bridge, the combination, with the bottom chords 2 and the posts or uprights 3, 15 of the top chords resting upon said posts, and each consisting of two channel-irons arranged one above the other and laced together, the tie-rods 12, connecting the top and bottom chords, and lateral lacing connecting said top 20 chords together, substantially as set forth.

WILLIAM E. STEARNS.

In presence of—

JAS. E. KNIGHT,  
JAMES M. ANDERSON.