(No Model.)

3 Sheets—Sheet 1.

G. N. LANTZ.

WIRE CABLE BRIDGE.

No. 436,606. Patented Sept. 16, 1890.

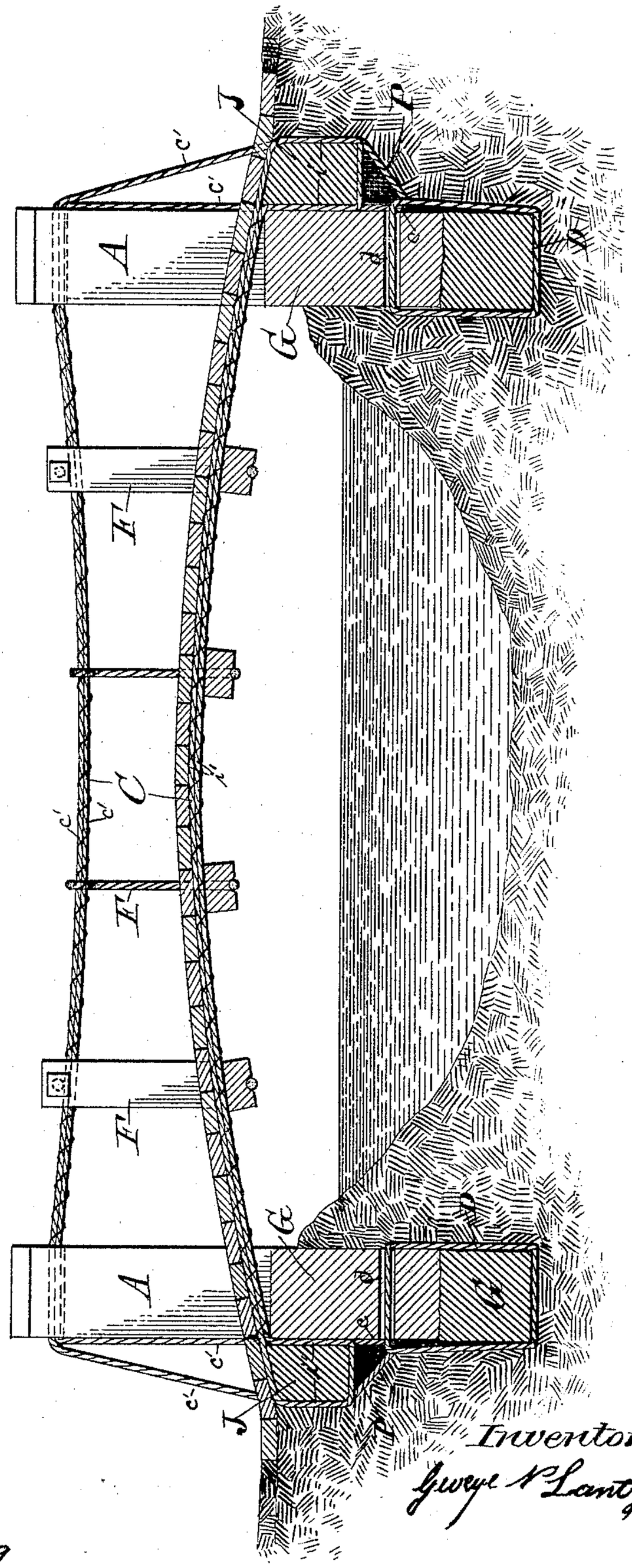


Fig. 1.

Witnesses:
Jacob C. Lantz
Christopher C. Young

Inventor:
George N. Lantz

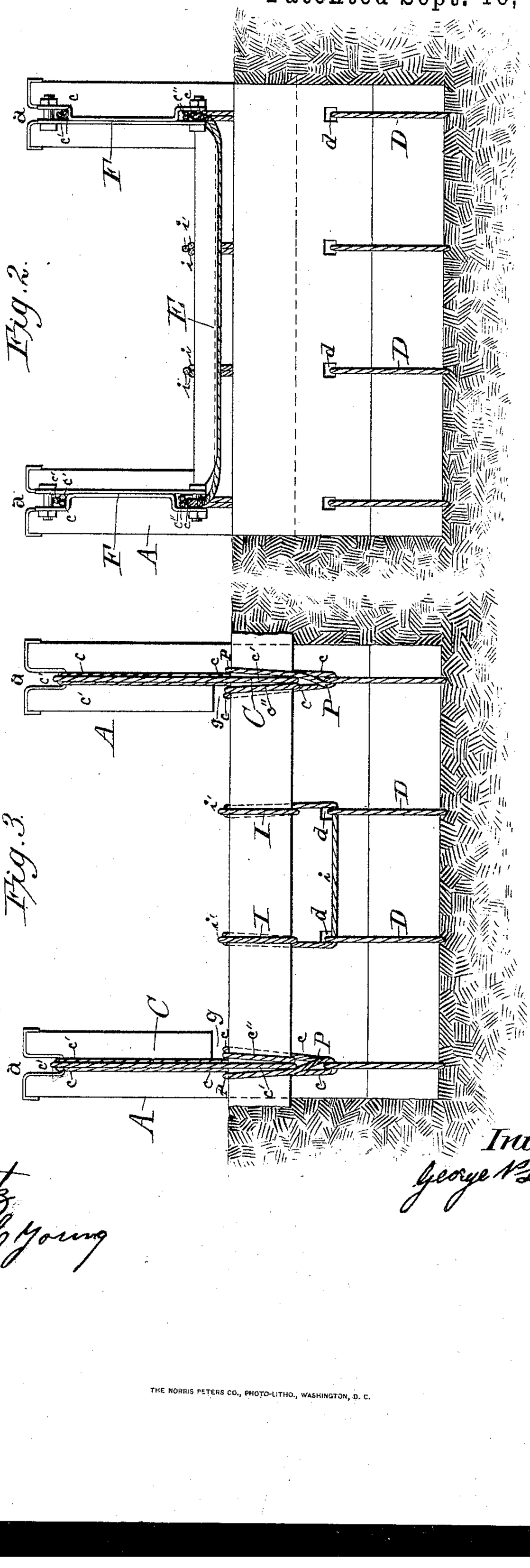
(No Model.)

3 Sheets—Sheet 2.

G. N. LANTZ.

WIRE CABLE BRIDGE.

No. 436,606. Patented Sept. 16, 1890.



Witnesses:
Jas. C. Lantz
Christopher C. Young

Inventor:
George N. Lantz

(No Model.) 3 Sheets—Sheet 3.

G. N. LANTZ.

WIRE CABLE BRIDGE.

No. 436,606. Patented Sept. 16, 1890.

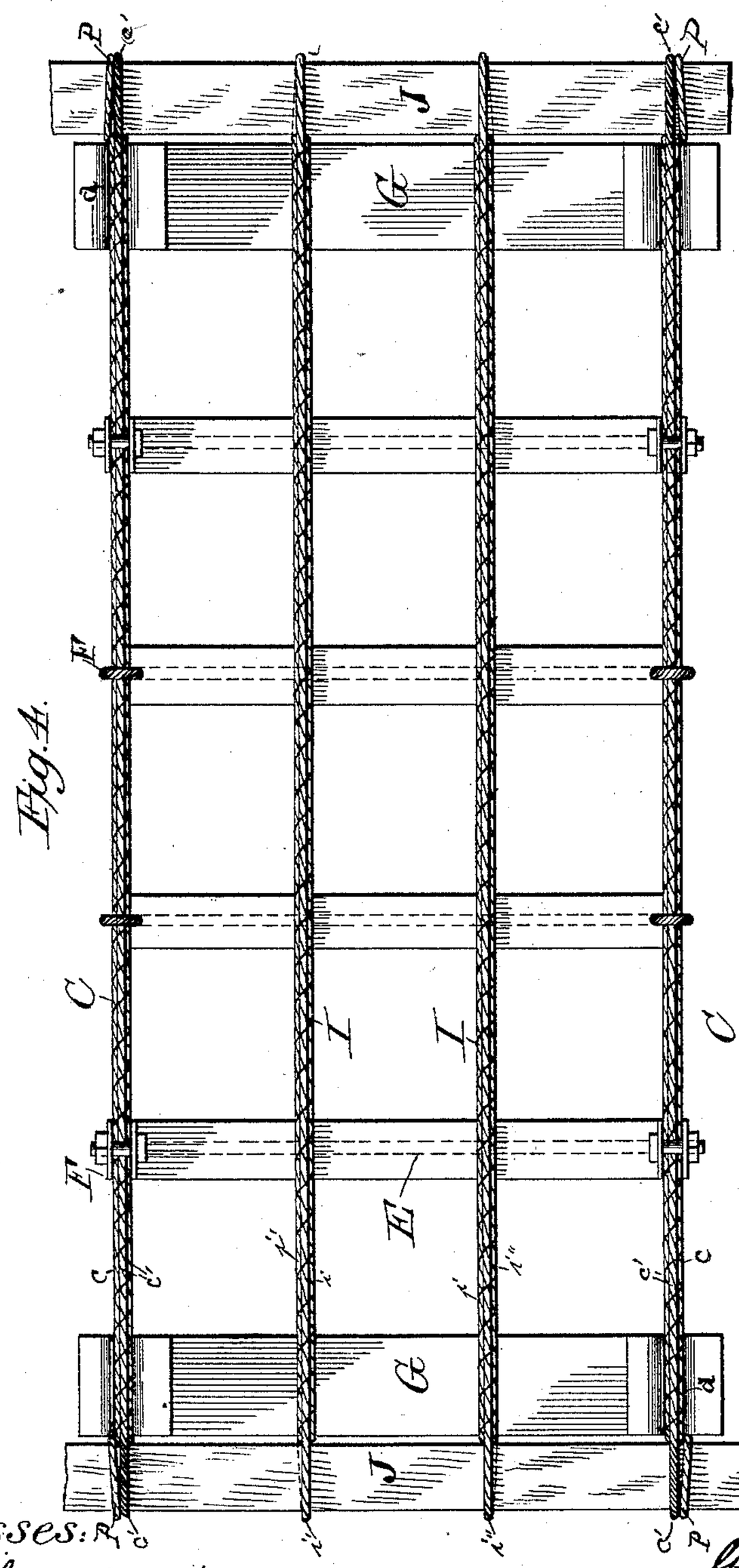


Fig. 4.

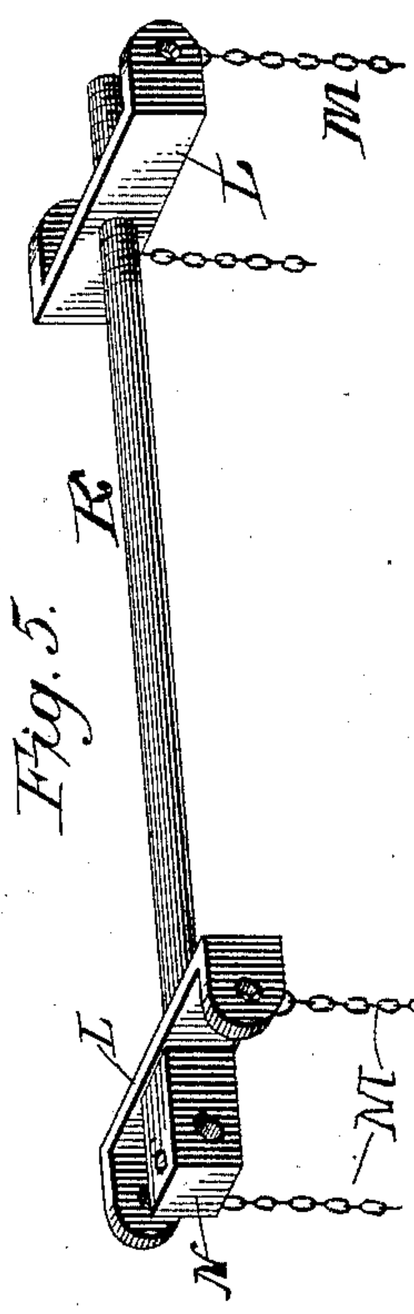


Fig. 5.

Witnesses:
Jacob C. Lantz
Christopher C. Young

Inventor:
George N. Lantz.

UNITED STATES PATENT OFFICE.

GEORGE N. LANTZ, OF NEAR SEDAN, KANSAS.

WIRE-CABLE BRIDGE.

SPECIFICATION forming part of Letters Patent No. 436,606, dated September 16, 1890.

Application filed April 15, 1889. Serial No. 307,355. (No model.)

To all whom it may concern:

Be it known that I, GEORGE N. LANTZ, a citizen of the United States, residing near Sedan, in the county of Chautauqua and State of Kansas, have invented certain new and useful Improvements in Wire-Cable Bridges, of which the following is a description.

In building suspension or wire-cable bridges one great requisite is that the ends of the cables be well secured or anchored; otherwise the structure will soon become so loose and unstable by the giving or slipping of the cables at the ends that the bridge becomes insecure and dangerous. I have overcome this objection by utilizing the enormous weight of the towers and abutments, together with the weight of the structure itself, to anchor the ends of the cables and hold them taut at all times. To do this I arrange the cables and secure them as will be hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view of a bridge embodying my invention. Fig. 2 is a transverse sectional view. Fig. 3 is an end view. Fig. 4 is a top plan view. Fig. 5 is a perspective view of a vise or clamp for drawing certain parts of the bridge together.

In constructing my improved bridge I first build the abutments G G and towers A A of masonry in the usual manner, and make them of such shape and size as are necessary or desirable. The lower part of each abutment is built within four endless wire-cable rings or links D, which will necessitate leaving holes or openings *d d* for the passage of the upper portion of the rings, although the rings could be embedded solidly within the walls at these points. Other holes or recesses *g g* are formed in the sides of the abutments or towers at the top of the ground or beginning of the floor of the bridge. After the abutments and towers have been completed and the tops of the towers prepared for the reception of the cables by means of recesses *a* or otherwise the main cable-links C C are first put in place. These links are preferably formed of three strands, each of which is formed by passing the wire of which the strand is composed around and around until the strand is of the desired size. One of these strands *c* passes over the tops of the towers down through the links D D at the bottoms of the abutments directly under the towers, back up to the recesses *g g* in the sides of the towers, and across over the stream under the upper portion of the strand. The other two strands *c' c'* of the upper portion of the link pass across the tops of the towers and around the struts or projections J J, which extend outward at the ends of the bridge, the tops of the struts being on a level with the floor of the bridge, and thus form the approaches to the bridge to a certain extent. These struts may be made of timber or iron, or they may be built up of masonry and form a portion of the abutment itself. The other two strands *c c* of the lower portions of each of the main cable-links C are passed through the recesses *g g* in the sides of the towers and around the struts or projections J J.

The different strands of the cables C C are bound together by means of the ordinary wrapping-wire, which thus binds them together in a compact mass or body and gives very great strength to the completed structure.

The struts J J are kept from being drawn upward by the links of the cables which pass over the tops of the towers by means of endless links P P, which pass over the ends of the struts and down through the links D D.

In addition to the above-described cables for supporting the bridge two or more additional cables I I are placed between the two outside cables and assist in supporting the floor of the bridge. These cables each consist of three strands, each strand consisting of an endless wire-cable link similar to those composing the cables C C. One of the strands *i* composing the cables I I passes over the tops of the abutments of the bridge and then down through two of the links D D, as shown in Fig. 3, and the other strands *i' i'* pass over the tops of the abutments and then around the central portion of the struts J J. In this manner the strand which passes through the links D D will form a portion of each of the cables I, while the other two strands will be formed in each cable by a separate link, the ends of which pass over or around the struts at the ends of the bridge.

As above described my bridge is very strong, and by making the cables of connected links and passing the end ones around

the bottoms of the abutments and around the struts I secure an anchorage for the cables which it will be impossible to move or weaken in any way without destroying the bridge itself, for the greater the load upon the bridge the greater is the weight or downward pressure of the abutments and the more secure the anchorage becomes, and it also avoids the necessity of building separate pieces at each end of the bridge for anchorage, as has heretofore been done. In this manner the struts will give an anchorage for the cables that pass through the center of the bridge, and will also assist in forming the approach to the bridge and will not take up the room at the entrance to the bridge, as is done by the large bulky piers that must be constructed for the ends of the ordinary straight cables.

The floor of the bridge is arched toward the middle in the usual manner by drawing the upper and lower portions of the cables C C toward each other and securing them by means of the stays or braces F F. These stays may be of any desired kind or construction, although I prefer to make them, as shown in the drawings, in which they are each composed of two flat straps of iron or steel bolted or riveted together, and having their ends diverging from each other for the reception of the cables. Bolts or rivets are passed through the ends beyond the cables, by means of which the braces are firmly secured to the cables, and thus support the floor of the bridge.

Joists or beams E E are suspended from the cables C C for the support of the floor of the bridge by means of the cable-links, which pass along in a channel in the under side of each of the beams and suspend them from the cables. The suspending-links may pass from the upper cable C without the flat stay or brace, as shown in Fig. 1; or they may be secured to the bolt or rivet through the lower end of each of the stays, as shown in Fig. 2.

In putting the stays in place on the cables C it is necessary to draw the upper and lower portions of the cables together between the towers, which I accomplish by means of a vise or clamp, as shown in Fig. 5, and which consists of a rod or shaft K, two cross-arms L L, and the chains M M. The rod K is of any convenient size and has a head N on one end, which engages with one of the cross-arms, which fits loosely upon the rod, and the other end is screw-threaded and engages with the other cross-arm, which is screw-threaded. The head N is preferably squared, so that the rod can be turned by means of a wrench, if desired; or it may have one or more holes through it for the reception of a spike or lever. In using it the chains M M are secured upon the upper and lower portions of the cable, and then by turning the rod K the two cross-arms are made to approach each other until finally the cable is drawn taut, and is then secured in position by means of stays or braces F F.

Having thus described my invention, but without limiting myself to the exact construction shown, I claim—

1. In a suspension-bridge, the combination, with the abutments and towers, of links secured to the lower portions of the abutments, and an endless wire-cable link on each side of the bridge engaging with the towers and with the links at the bottoms of the abutments, substantially as described.

2. In a suspension-bridge, the combination, with the abutments having holes formed through them and towers having a recess at the bottom of each tower, of links around the lower portion of each of the abutments and passing through the holes in the same, and an endless wire-cable link on each side of the bridge passing over the tops of the towers and through the recesses at the bottoms of the towers and through the links at the lower portions of the abutments, substantially as described.

3. In a suspension-bridge, the combination, with abutments having outwardly-projecting struts at the entrance to the bridge, of endless wire-cable links secured to the lower portions of the abutments and a main cable-link on each side of the bridge secured thereto, a portion of the main cable-links engaging with the links at the lower portions of the abutments and the remaining portions engaging with the struts, substantially as described.

4. In a suspension-bridge, the combination, with the abutments having outwardly-projecting struts, of a series of links secured to the lower portion of each abutment, main cable-links across the central portion of the bridge, each main cable-link consisting of a series of endless wire strands, one of which engages with the links at the lower portions of the abutments and the others engage with the struts, substantially as described.

5. In a suspension-bridge, the combination, with the cables at the sides of the bridge, of stays secured thereto, each consisting of two flat straps of metal secured together, but having their ends separated and engaging with the cables, and bolts in the ends of the stays beyond the cables for securing them in place, substantially as described.

6. In a suspension-bridge, the combination, with the cables at the sides of the bridge, of stays secured thereto, suspension-links secured to the lower ends of the stays upon opposite sides of the bridge, and a beam between each link and the bottom of the floor, substantially as described.

GEORGE N. LANTZ.

Witnesses:
JACOB C. LANTZ,
C. C. YOUNG,
CHRISTOPHER C. YOUNG.