

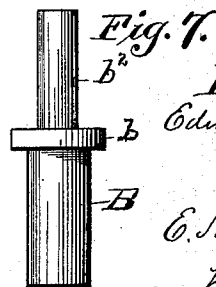
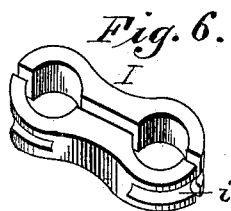
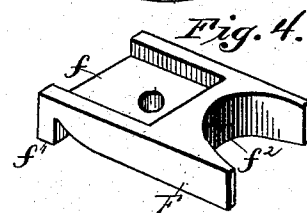
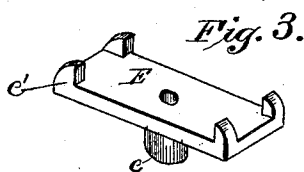
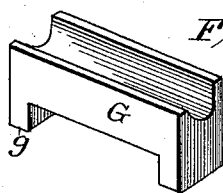
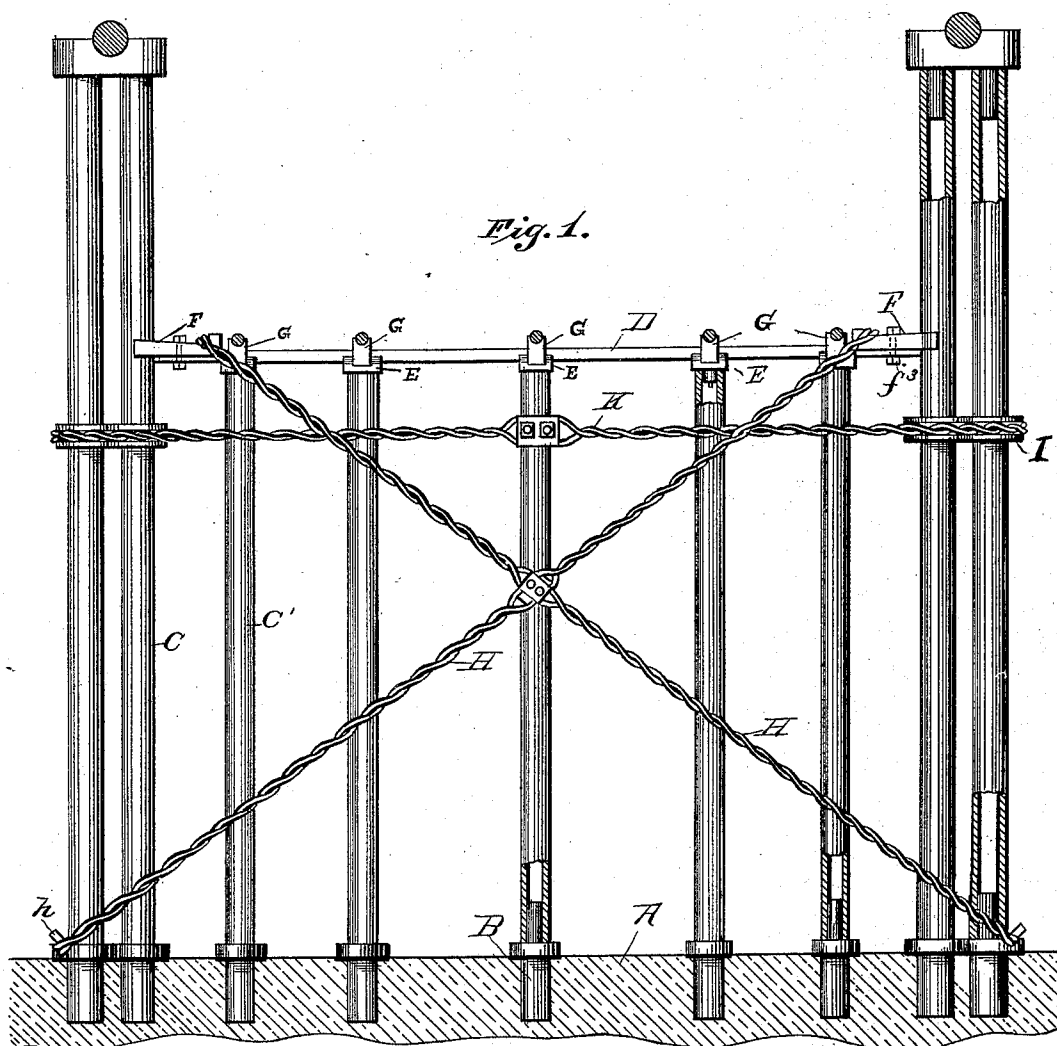
(No Model.)

2 Sheets—Sheet 1.

E. E. RUNYON.
BENT FOR SUSPENSION BRIDGES.

No. 410,201.

Patented Sept. 3. 1889.



Witnesses
M. B. Harris
Wm. Kelton

Inventor
Edwin E. Runyon
by
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his Attorney

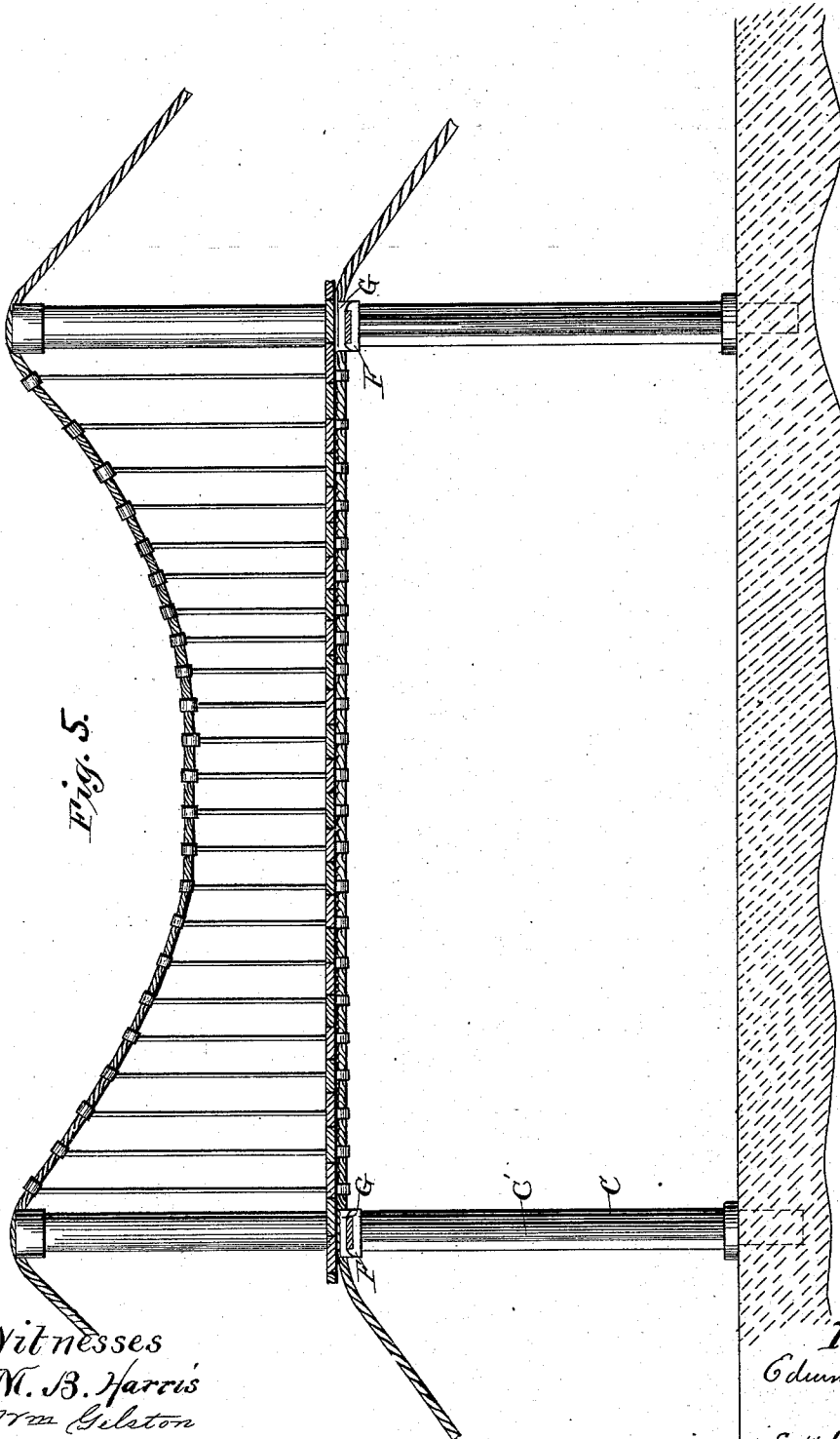
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E. E. RUNYON.
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M. B. Harris
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his Attorney

UNITED STATES PATENT OFFICE.

EDWIN ELIJAH RUNYON, OF MOUNTAIN SPRING, TEXAS.

BENT FOR SUSPENSION-BRIDGES.

SPECIFICATION forming part of Letters Patent No. 410,201, dated September 3, 1889.

Application filed April 1, 1889. Serial No. 305,589. (No model.)

To all whom it may concern:

Be it known that I, EDWIN ELIJAH RUNYON, a citizen of the United States, residing at Mountain Spring, in the county of Cooke and State of Texas, have invented certain new and useful Improvements in Bents for Suspension-Bridges; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in bents for suspension-bridges, especially that class of bridge shown in my patent, No. 394,940; and it consists in the construction and arrangement of parts more fully hereinafter described, and definitely pointed out in the claims.

The object of my invention is to provide a strong, durable, cheaply-manufactured, and easily-erected bent for suspension-bridges. I attain this object by the construction illustrated in the accompanying drawings, wherein like letters of reference indicate corresponding parts in the several views, and in which—

Figure 1 is an elevation of my improved bent, portions of which are shown as being broken away. Fig. 2 is a detail view of a saddle. Fig. 3 is a detail of a bar and saddle-holder. Fig. 4 is a detail of one of the yokes. Fig. 5 is a longitudinal section of a bridge. Fig. 6 is a detail of a clamp, and Fig. 7 is a detail of an anchor-pin.

In the drawings, A represents the masonry foundation, in which are embedded the anchor-pins B, provided with collars *b* and projecting ends *b'*, which fit in the hollow ends of the columns C and C', the former being arranged in pairs at the ends of the bent and supporting the main cables on their upper ends.

To brace and rigidly hold the columns C' in place, I extend an iron bar, as D, across their tops, which rests in a casting E, having a cylindrical projection *e* on its under side, which fits in the top of the columns, and upwardly-extending lugs *e'* on its respective corners, between which the bar is placed, thus

preventing its lateral movement. To firmly brace the bar D against the outer columns, I secure on its ends yokes, as F, having a rectangular groove *f* on their under surfaces, a notch *f'* in their upper faces, and a curved recess *f''* in their ends, which fit partly around the column, the end of the bar fitting in the groove *f* and being bolted to the yoke by a bolt *f''*. To still more effectively hold the bar D in place, pins may be inserted through the same into holes in the castings E.

G represents the saddle, which has a grooved upper face in which the cable rests, and downwardly-projecting flanges, as *g*, on its ends, which pass by the sides of the bar D and rest on the casting E between the lugs *e'*. By this arrangement all side-play and longitudinal movement are prevented.

To give rigidity to the entire structure and more securely unite the several parts, I extend wire cables H and I from the yokes F down obliquely on both sides of the bent, around pins *h*, secured in the collars of the anchor-pins. The upper ends of these cables rest in the grooves *f'* of the yokes. To prevent the outer columns from spreading, clasps I, formed of two pieces, with semicircular grooves on their inner faces near their ends and edge grooves *i* on their outer ends, are placed around the columns and secured together by a suitable bolt passing through their centers between the columns, and a wire cable K is stretched around the bent and rests in the grooves *i* of the clasps. These brace-cables H and K are formed of separate strands of wire placed separately in position and then twisted to give them the right tension. After they have been sufficiently twisted they are prevented from untwisting by having suitable tie-bolts inserted between the strands and made fast to the bent.

I am aware that many minor changes in the construction and arrangement of the parts of my invention can be made and substituted for those shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bridge-bent, the combination, with vertically-arranged columns, of a cross-bar

uniting the inner columns, and obliquely-arranged cable-braces for giving rigidity to the bent, substantially as described.

2. The combination, with the outer columns, 5 of the inner columns, the castings E on the latter, the cross-bar D on the castings, the saddles G, resting on the castings and bar, the yokes F on the ends of the bar, the clasps I on the outer columns, and the twisted-wire 10 brace-cables H and K, substantially as described.

3. The combination, with the columns, of the castings E, having extension *e* and lugs *e'*, the bar D, resting on the castings, the sad-

dles G, having flanges *g* on their under sides, 15 which fit over the bar and between the lugs on the casting, and the yokes F, substantially as described.

4. The bridge-bent composed of a series of hollow columns united by wire braces and a 20 cross-bar on the top of the central columns, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN ELIJAH RUNYON.

Witnesses:

W. H. RAYZOS,

W. R. MADDOX.