

(No Model.)

S. H. GODMAN.

BRIDGE.

No. 336,104.

Patented Feb. 16, 1886.

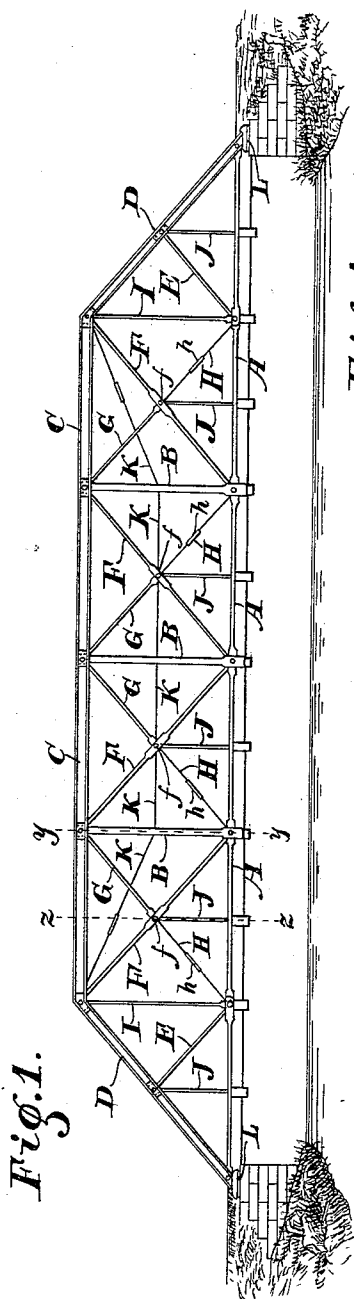


Fig. 4.

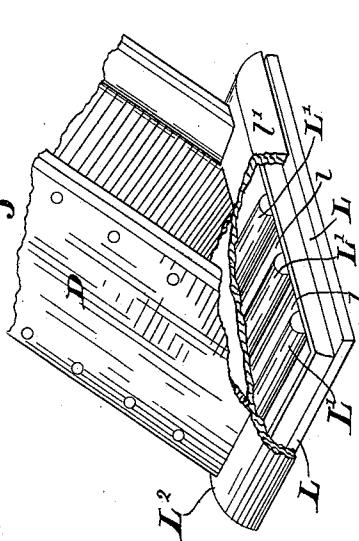


Fig. 5.

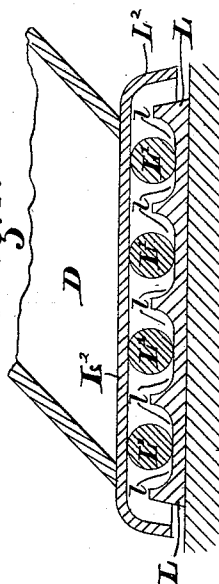


Fig. 3.

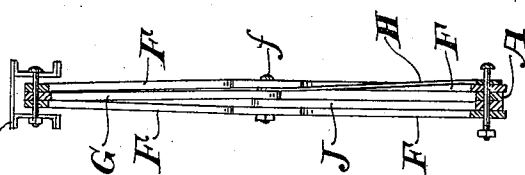
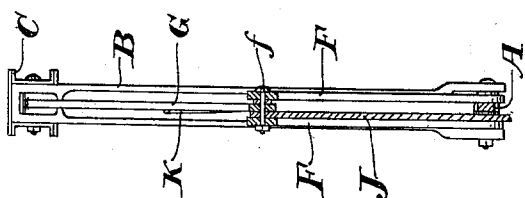


Fig. 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

SOLOMON H. GODMAN, OF INDIANAPOLIS, INDIANA, ASSIGNOR OF ONE-HALF TO WILLIAM C. WHITEHEAD, OF SAME PLACE.

BRIDGE.

SPECIFICATION forming part of Letters Patent No. 336,104, dated February 16, 1886.

Application filed June 12, 1885. Serial No. 168,437. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON H. GODMAN, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Bridges, of which the following is a specification.

My present invention principally consists in an improved construction and arrangement of the truss-work of bridges, whereby a large number of the pieces ordinarily used in their construction are dispensed with, thus effecting a great saving of expense, while all the corresponding parts of said truss-work are formed of equal length, thereby insuring that the contraction and expansion effected by the extremes of temperature shall affect all parts of the bridge equally.

It further consists of improvements in the construction of the supports, which are placed under the bottoms of the end posts to allow the longitudinal contraction and expansion of the bridge, whereby all dirt, ice, snow, &c., which ordinarily get into said supports and lessen their efficiency, are excluded, and the satisfactory operation of said supports thereby insured at all times, all of which will be hereinafter more particularly set forth.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of a bridge embodying my said invention; Fig. 2, a transverse section through one side of said bridge, looking to the right from the dotted line *z z*; Fig. 3, a similar section looking to the right from the dotted line *y y*, the strut being omitted; Fig. 4, a detail perspective view showing the lower end of one of the end posts and my improved device on which it rests, one corner of the top of which is broken away to show the inside; and Fig. 5, a central longitudinal section through said device.

In said drawings, the portions marked A represent the lower chord of the bridge; B, the upright posts or struts thereof; C, the top chord; D, the end posts; E, the diagonal struts; F, the long diagonal truss-rods; G, the short diagonal truss-rods; H, counter-rods; I, long suspension-rods; J, short suspension-rods; K, a line of tie or stiffening rods; and L, my im-

proved supports, upon which the ends of the bridge rest.

The lower chords, A, are not of a peculiar construction; but may be of any form desired which is suitable for this form of bridge. The upright struts B are also of a common construction, and are secured to the chords by any suitable or desired means. They are placed about twice the usual distance apart, the improved construction of the truss-work permitting about one-half the usual number to be dispensed with, as will be presently more fully described.

The top chords, C, are in main of an ordinary construction, and are provided at the proper intervals with appropriate means for securing the struts and truss-rods thereto. They are formed considerably shorter and proportionately larger with my improved construction than ordinarily, the end posts being formed longer, as will be presently described.

The end posts, D, are secured at their top ends and lower ends to the top and lower chords by pins, or in any desired manner. They are formed somewhat longer than in the usual constructions, and at their centers are provided with means for connecting the diagonal struts E thereto.

The diagonal struts E are formed about one-half the length of the end posts, and preferably of about the same length as the short diagonal truss-rods. They are secured at one end to the end posts, in the center thereof, and at their other ends are secured to the lower chord directly under the joint formed by the connection of the end post and top chord, the same bolt which secures the lower ends of the suspension-rods J to the lower chord preferably passing through an eye in this end of said strut and securing it to said chord also. By reason of these short diagonal struts the end posts are permitted to be made considerably longer than ordinarily, and considerable saving of material is thus effected in the top chord by reason of its decreased length, as before described.

The long diagonal truss-rods F are preferably double, and are provided with an enlarged central portion, in which a hole is provided for the insertion of a pin, *f*, by which other

parts are secured in place, as will be presently described. One of these double truss-
 rods extends from each of the corners formed
 by the connection of the end posts and top
 5 chord toward the middle of the span to the
 bottom of the nearest strut, or first vertical
 strut from the end of the span, and from the
 top of said strut to the foot of the next strut
 toward the middle. In the bridge shown there
 10 are but three vertical struts in the span, and
 thus two of these truss-rods on each end of
 the span would bring the bottom ends of the
 two nearest together at the foot of the middle
 strut; but in longer spans, having more struts,
 15 a correspondingly greater number of these
 diagonal truss-rods would be necessary, as will
 be readily understood. They are secured at
 their ends to the upper and lower chords by
 bolts or pins in the usual and well-known
 20 manner.

The short diagonal truss-rods G are of a
 length equal to one-half the length of the rods
 F, and are secured at the top of each of the up-
 right struts at one end, and extend toward the
 25 end of the span, and are secured between the
 parts of the double truss-rod F at the center
 by the pins *f*, which extend through said parts,
 and an eye formed in the end of said short
 truss-rod. One extends each way from the
 30 top of the middle strut and connects with the
 middle long rod on its side of said strut, as
 shown.

The counter-rods H are secured between the
 double truss-rods F on the same pin *f* with the
 35 short diagonal truss-rods G, and extend there-
 from in line with said rods G to the foot of the
 next strut, where the other end is secured. An
 ordinary turn-buckle, *h*, is provided midway
 in each of said counter-rods, by which they
 40 can be drawn to the required tension. These
 counter-rods serve to prevent the long truss-
 rods from springing upwardly, and prevent
 the central point of connection of the several
 rods from getting out of the proper location
 45 from any cause.

The long suspension-rods I are secured at
 the corners formed by the end posts and top
 chord at their top ends, and to the lower chord
 directly underneath said corner, thus serving
 50 to support the ends of the sections of said
 lower chord and the floor-beams there located.

The short suspension-rods J support the
 floor-beams at an intermediate point between
 each pair of struts between the end struts and
 55 the suspension-rods I, and between said sus-
 pension-rods and the ends of said lower chords,
 respectively, said points being those where
 floor-beams are usually located. They are se-
 cured at their lower ends at these points in
 60 any suitable manner, and are secured at their
 top ends to the center of the long double truss-
 rods between their parts on the pins *f*, an eye
 being formed in said top ends for this purpose.

The line of tie or stiffening rods K pass
 65 from the top corners down through the center
 of the struts longitudinally of the span, and
 serve to give it additional strength and rig-

idity. They form no part of my present in-
 vention, however, being fully described and
 illustrated in my Letters Patent No. 263,333, 70
 dated August 29, 1882.

The construction of the lower part of the
 bridge, including the floor-beams, the sup-
 ports for the same, and all the "under work"
 of the bridge, is or may be of any approved 75
 construction, and needs no description in this
 application.

The supports L consist of rectangular bed-
 plates, of appropriate size, having low side
 flanges and transverse troughs or grooves *l* 80
 therein, loose rollers *L'* being mounted in these
 grooves, and a top or cap piece, *L''*, placed on
 top, resting on said rollers. The sides of the
 plates are of sufficient size to prevent the roll-
 ers from working out of their places in the 85
 grooves longitudinally, but not high enough
 to prevent the top *L''* from being supported on
 the rollers. Said top piece is of a width suffi-
 cient to extend out over the sides of the bed-
 plate, and is provided with side flanges, *l'*, 90
 which extend down far enough to overlap the
 side flanges of the bed-plate. It is formed
 somewhat longer than the part of the bed-plate
 having the rollers therein, in order to permit
 its longitudinal movement on said rollers. Its 95
 ends are curved down to completely inclose
 said rollers and effectively prevent any dirt,
 snow, ice, or such substance from getting there-
 in and impeding the operation of the device.
 The ends of the bridge being placed on these 100
 supports, they are permitted to easily move
 the short distance required during the con-
 traction and expansion of the bridge without
 disarranging any of the parts or injuring the
 construction of the bridge. As a whole, this 105
 construction of the truss-work contains about
 one-half the number of pieces commonly used
 in the construction of bridges, and, by reason
 of the increased size of these parts subjected
 directly to the strain, the bridge is equally 110
 strong and durable, while much cheaper to con-
 struct. The corresponding parts of the bridge
 all being of corresponding lengths, they are
 equally affected by the extremes of tempera-
 115 ture, and the regular arrangement of the parts
 is thus maintained during all temperatures,
 thereby insuring that the regular and equal
 distribution of the strain shall also be main-
 tained at all times.

I am aware that bridges have before been 120
 constructed with rods suspending the floor-
 beams extending from the intersections of the
 bracing and counter-bracing rods, and also
 with a strut and suspending-rod arranged be-
 tween the inclined end posts and the first 125
 panel-point of the lower chord; but I am not
 aware that the particular construction herein
 shown and claimed was ever known prior to
 my invention thereof.

Having thus fully described my said inven- 130
 tion, what I claim as new, and desire to se-
 cure by Letters Patent, is—

1. In a bridge, the combination, with the
 upper and lower chords and end posts thereof,

of diagonal struts extending from said end posts to the lower chord, the upright struts, long truss-rods extending from the corners formed by the connection of the end posts and top chord, or from the top of the vertical struts to the foot of the next vertical strut, the short truss-rods connecting the central portions of said long truss-rods to the top chord or top end of the vertical strut nearest it, and suspension-rods supporting the floor-beams, substantially as set forth.

2. In a bridge, the combination, with the lower chord, A, upright struts B, top chord, C, and end posts, D, of the diagonal struts E, long truss-rods F, short truss-rods G, counter-rods H, long suspension-rods I, and short suspension-rods J, all arranged and operating substantially as described, and for the purposes specified.

3. The combination, with the upper and lower chords, upright struts, and end posts of a bridge, of the long double truss-rods F, hav-

ing pin-holes provided in the center thereof, the short truss-rods G, secured at one end to said central portion and at its other end to the top chord at the top of the next strut, and the counter-rod H, connected at one end to the central portion of said long truss-rods, and at its other to the lower chord at the foot of the next strut, all substantially as set forth.

4. The combination, with a bridge, of the supports L, for carrying the ends of said bridge, consisting of the bed-plate provided with transverse grooves, the rollers L', mounted loosely in said grooves, and the top piece, L², mounted on top and bearing on said rollers, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 27th day of January, A. D. 1885.

SOLOMON H. GODMAN. [L. s.]

In presence of—

E. W. BRADFORD,
CHAS. L. THURBER.