A. J. ROSS.
Bridges.

No. 212,748. Patented Feb. 25, 1879.

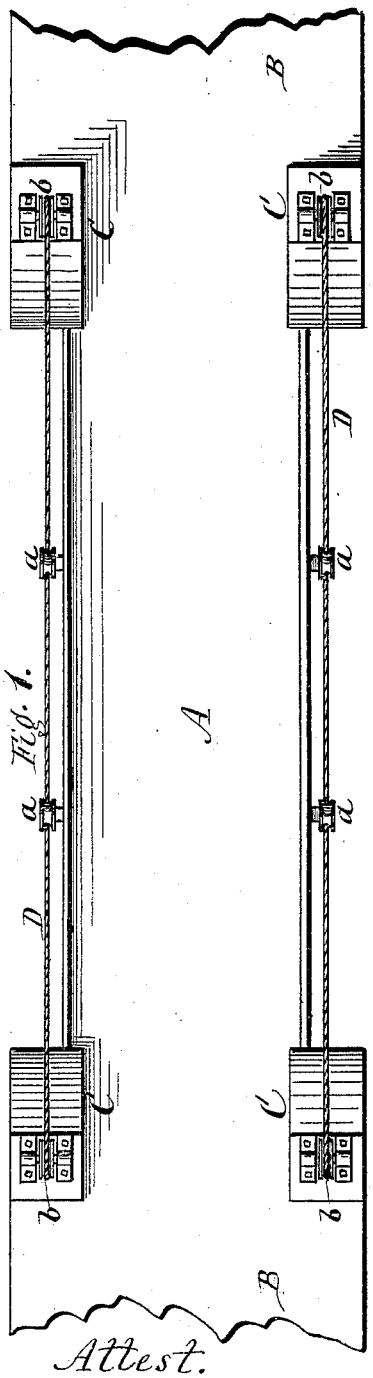

Fig. 1.

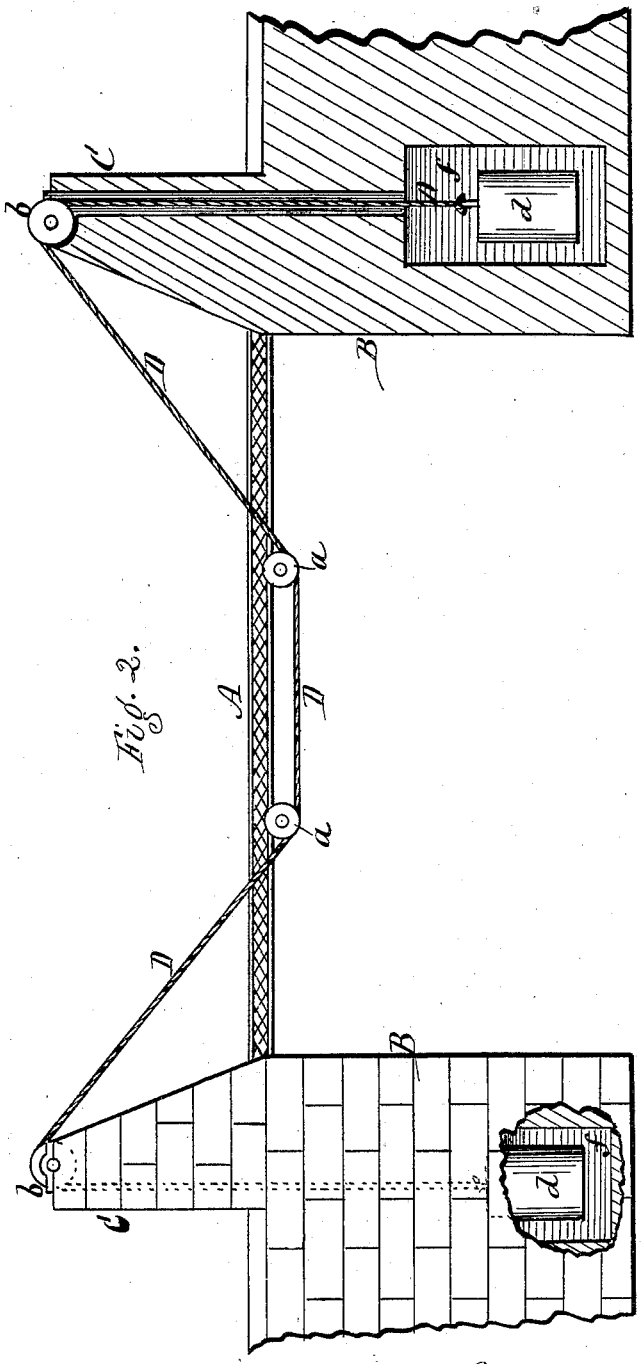

Fig. 2.

Attest.
Abner Burbank
John C. Bond.

Inventor.
Andrew J. Ross,
per R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE

ANDREW J. ROSS, OF ROCHESTER, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO ALPHONSO COLLINS, OF SAME PLACE, AND PLINY H. PARK, OF PITTSFORD, NEW YORK.

IMPROVEMENT IN BRIDGES.

Specification forming part of Letters Patent No. **212,748**, dated February 25, 1879; application filed January 24, 1879.

To all whom it may concern:

Be it known that I, ANDREW J. ROSS, of the city of Rochester, county of Monroe and State of New York, have invented a certain new and useful Improvement in Bridges; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of my improvement. Fig. 2 is a sectional elevation.

The object of my improvement is to assist in supporting bridges; and the invention consists in combining, with a bridge, cables passing loosely over pulleys on the towers at the ends of the bridge and under pulleys attached to the bridge, said cables having at their ends heavy weights, the whole arranged in such a manner that the bearing of the cables under the bridge will assist in sustaining the same, as hereinafter more fully described.

A represents the bridge, which may be of any ordinary construction. B B are the abutments at the ends of the bridge; and C C C C are four towers erected at the four corners of the abutments for the support of the cables. These towers may be of iron, stone, wood, or of other material, and of any desired form and height, the great object being to secure sufficient strength.

D D are the cables, of which one or more are used on each side of the bridge. These cables are preferably wire, but may be of other strong material. The central portion of each cable passes under pulleys *a a*, attached in any strong and substantial manner to the bridge, and the ends pass over other pulleys, *b b*, on the towers, and thence the ends of the cable pass down through passages in the abutment, and are attached at the bottom to weights *d d*, which hang free in openings *f f* of the abutments.

It will be seen that the cables run free their whole length, and that the weights also hang free; hence there is constant tension on the cables, which produces a lifting-power under the bridge proportionate with the weights. These latter can be adjusted to the weight of the bridge by adding on or taking off from the weights, so that the desired action upon the bridge and the loads which cross the same can be obtained with great exactness. The weights may be of any desired material, such as stone, iron, lead, &c. These weights may hang free, and so high that they will never strike at the bottom under action; or a stop or bed may be used under them for them to strike on under heavy vibration, either elastic or otherwise.

In heavy bridges, or those of long span, it may be necessary to use more than one cable on a side, arranged as above described, which is readily done. Additional cables may also be used, attached at one end to the bridge, between the bearing of the main cables, above described, and the ends of the bridge, said auxiliary cables passing up over separate pulleys on the towers, and thence downward, and being weighted, as before described. By this means the bridge is stayed at intermediate points and made very strong.

The improvement is applicable to all kinds of bridges, even ordinary suspension-bridges, in which case the pulleys may be applied on the ordinary suspension-cables, and the weighted cables above described may pass under the pulleys and help sustain the suspension-cables.

The pulleys *a a*, instead of being attached under the bridge, may be attached above, if desired, and connected with the bridge by suitable attachments. To prevent undue end movement or crawling of the cables, by which one weight would strike and be inoperative, suitable stops may be placed on the cables.

It will be noticed as a particular feature in this case that the cables D D are entirely free and independent from end to end; hence they can adapt themselves exactly to the work under all circumstances, and both weights are made available at all times. For instance, if a heavy load comes on one end of the bridge the strain is equally divided, and both weights assist in sustaining the load at that point, which would not be the case if each weight had an independent cable attached permanently to the bridge. It also prevents undue strain drawing longitudinally of the bridge. It allows easy and natural action under con-

traction and expansion of the bridge in different temperatures. A bridge thus constructed receives central support, thereby insuring greater safety, and in many bridges obviates the necessity of a central pier or support.

The pulleys *a a*, if desired, may be extended along, so as to furnish a support for the cables, a considerable length of the bridge, instead of being confined simply to the center.

In winter, when the bridge is liable to become weighted with snow, the extra weight can be readily balanced by simply adding to the weights, as before described.

What I claim as new is—

The combination, with the bridge A, of the independent cables D D, passing beneath pulleys attached to the bridge and over pulleys at the ends of the bridge, and provided with weights at their ends, the whole so arranged, as described, that the cables have free movement and assist in supporting the bridge, as herein specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

A. J. ROSS.

Witnesses:
R. F. OSGOOD,
A. COLLINS.