(No Model.) 2 Sheets—Sheet 1.

S. N. STEWART.

PONTON BRIDGE.

No. 423,455. Patented Mar. 18, 1890.

Fig. 2.

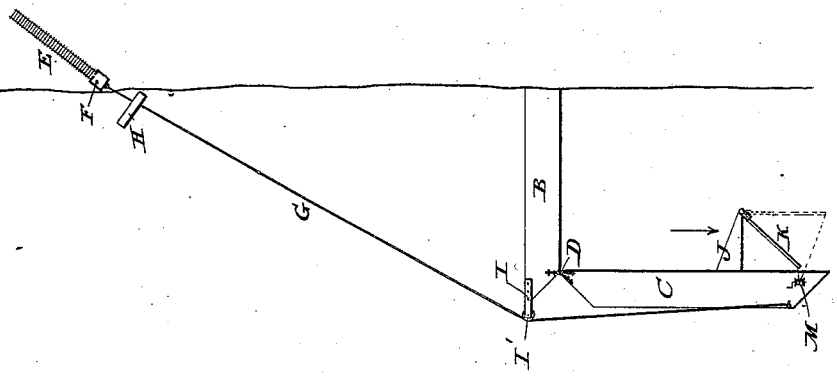
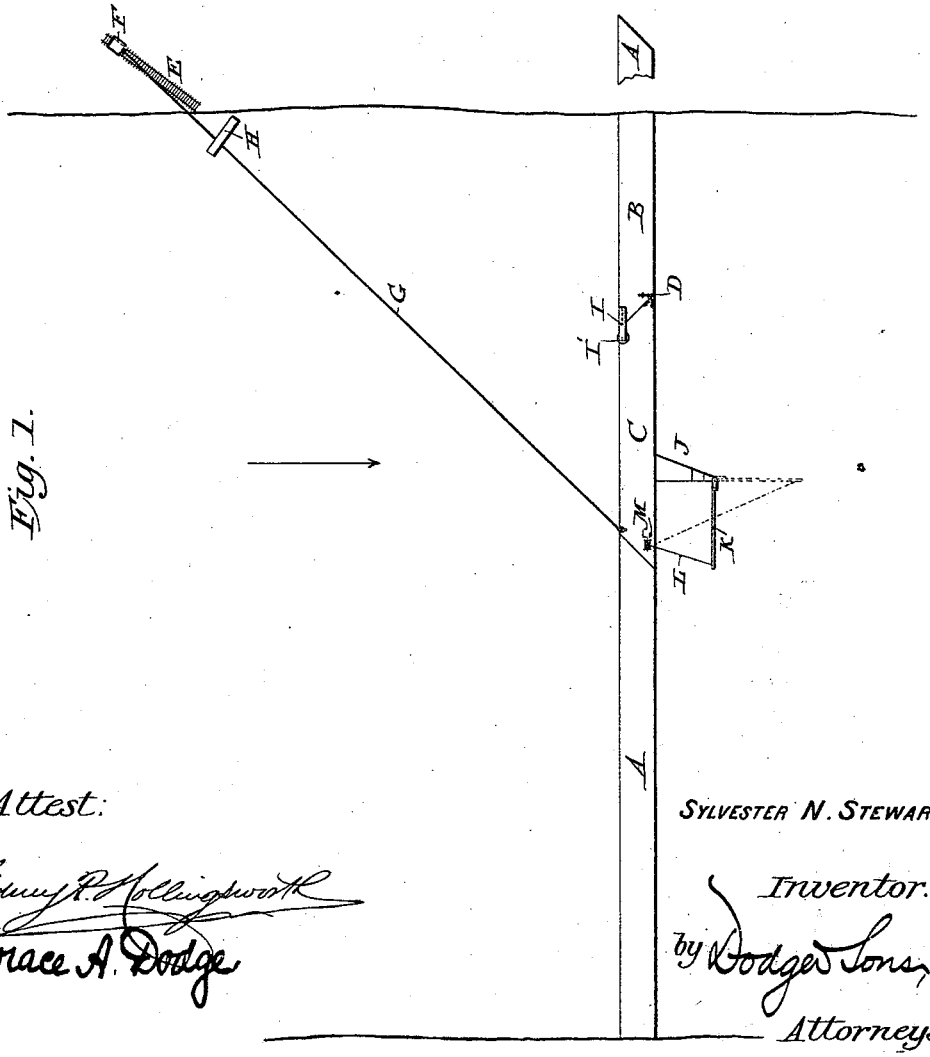


Fig. 1.



Attest:

Sidney P. Hollingsworth

Horace A. Dodge

Sylvester N. Stewart

Inventor.

by Dodge & Sons,

Attorneys.

(No Model.) 2 Sheets—Sheet 2.

S. N. STEWART
PONTON BRIDGE.

No. 423,455. Patented Mar. 18, 1890.

Fig. 3.

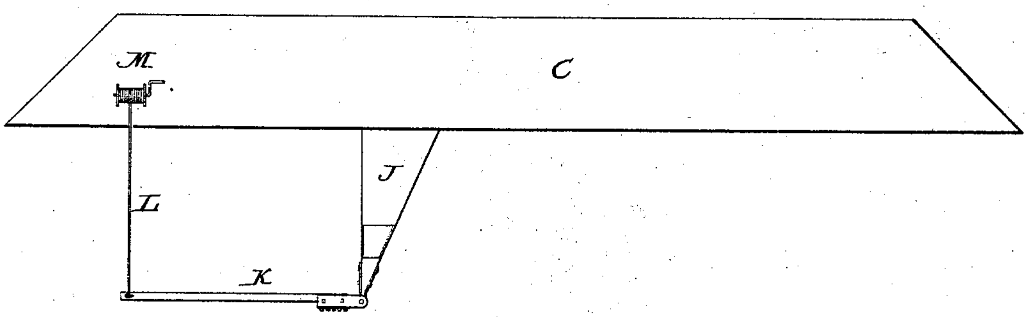


Fig. 4.

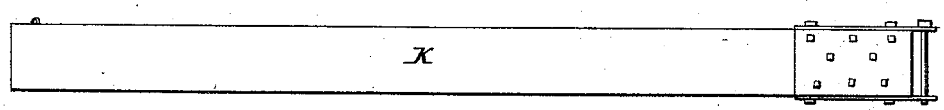


Fig. 5.

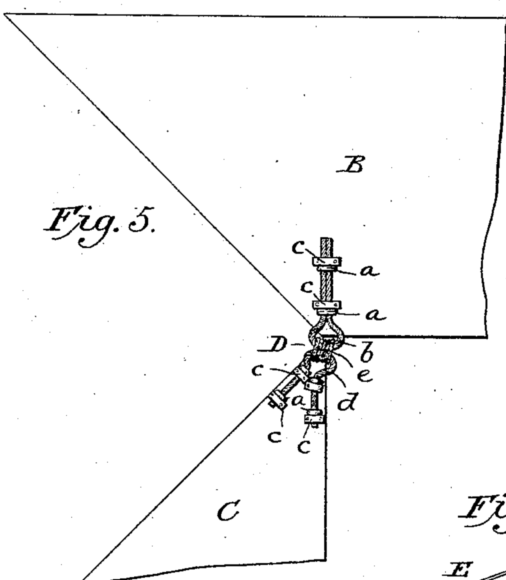


Fig. 6.

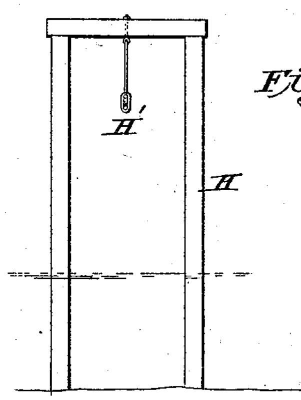
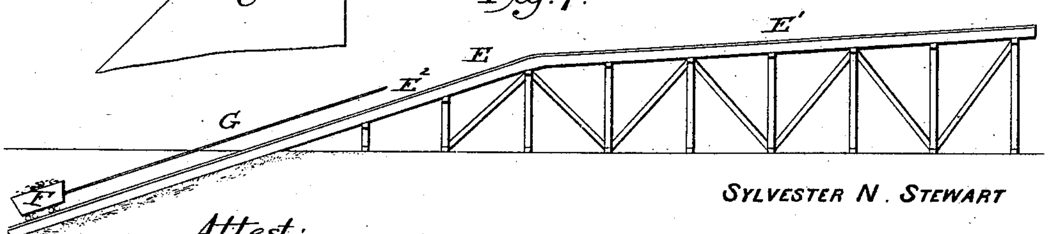


Fig. 7.



SYLVESTER N. STEWART

Attest:
Sidney P. Hollingsworth
James F. DuHamel

Inventor.

by Dodge & Sons,
Attorneys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

SYLVESTER N. STEWART, OF PHILADELPHIA, PENNSYLVANIA.

PONTON-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 423,455, dated March 18, 1890.

Application filed December 17, 1889. Serial No. 334,035. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER N. STEWART, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ponton-Bridges, of which the following is a specification.

My invention relates to ponton-bridges, and has reference more particularly to a novel construction and arrangement of the draw or movable section and the means for operating the same.

In the drawings, Figure 1 is a plan view illustrating the application of the draw to the bridge, the draw being shown in its closed position; Fig. 2, a similar view with the draw opened; Figs. 3, 4, and 5, views illustrating certain details in the construction of the draw-section; and Figs. 6 and 7, views illustrating the construction and arrangement of the cable-guide and the inclined way for the counter-balance.

A and B indicate the two parts of the causeway projecting from the opposite banks, and C indicates the draw or the movable section, the ends of the draw and the causeway sections being beveled, as shown, so that the narrower face of the draw shall be on the upper side of the bridge. At one corner, on the rear or lower side of the bridge, the draw is hinged to the causeway-section B by means of a hinge or connection D, of the form shown in Fig. 5. Secured to the upper face of the section B are eyebolts *a*, through which passes a loop *b*, formed, preferably, of wire rope, clamping-plates *c* of any suitable construction being used in connection with the eyebolts in order to secure the ends of the rope forming the loop in position. Secured to the upper face of the draw is a similar loop *d*, which is securely held in position by eyebolts and clamps in a manner similar to the loop *b* on the causeway; but instead of extending the ends of the rope in the same general direction as on the causeway the ends in the present arrangement are separated and separately secured in position. This arrangement of the ends of the loop in different directions is rendered desirable because of the fact that the strain upon the hinge when the draw is opened is in a different line from the strain upon the draw when the latter is closed.

Connecting the loops *b* and *d* is a link *e*, which I prefer to make of a hempen rope, so that in an emergency the link may be readily cut and the draw allowed to give way.

E, Figs. 1, 2, and 7, represents an inclined way which is located on the shore from which the causeway-section B projects, the said inclined way comprising two sections E′ and E^2, varying somewhat in their inclination.

Mounted upon the way E is a car F, which is connected with the draw C by means of a cable G, these parts being so arranged that when the draw is closed the car will be at the lower end of the inclined way; but when the draw is opened the car shall be at the upper end. It will be observed that in swinging from the open to the closed portion the resistance increases, and it is for this reason that the two parts of the way E are of different inclinations. The inclination of the section E′ is about five degrees, (a rise of about one in twelve,) while the inclination of the section E^2 is about eighteen degrees, (a rise of about one in three.) Of course as the draw begins to close the car will descend upon the slightly-inclined section E′, but as the draw gets nearer its closed position the resistance offered by the current increases gradually; but this resistance is overcome by reason of the increased inclination given to the section E^2 of the way E, onto which the car passes from the section E′. In some cases it may be found desirable to divide the inclined way E into more than two sections of varying inclinations; but this would add to the expense and would not be accompanied by corresponding advantages.

H, Figs. 1, 2, and 6, indicates a frame or support secured in position in the bed of the river in line with the inclined way, said frame being provided with a suspended pulley block or sheave H′, over or through which the car-cable G passes in order that the latter may be prevented from falling into the water when the draw is opened.

Bolted or otherwise rigidly secured to the causeway-section B, on the corner opposite the hinge, is an outwardly-projecting spar I, having at its outer end a grooved wheel I′, which, when the draw is opened, supports the

cable, as shown in Fig. 2; but when the draw begins to close and the point of attachment of the cable to the draw comes into line with the inclined way the cable will leave the wheel or pulley I′.

J indicates what I term the "fin-boat," comprising, preferably, a triangular body or frame projecting from the rear face of the draw, to which it is lashed, as shown in Figs. 1, 2, and 3.

Hinged or pivoted to the outer end of the boat J is a fin K, which would under the present arrangement be about thirty feet long and two feet wide. To the free end of the fin is secured a cable L, which is adapted to be wound upon and unwound from a windlass M, of any suitable construction, secured upon the draw, as shown in Figs. 1, 2, and 3, the fin being thereby adapted to assume a position at right angles or at a less angle to the draw.

The operation is as follows: The pressure or force of the current acting upon the fin, which is at right angles to the current, aided by the action of the current upon the draw, will open the draw and raise the car to the top of the inclined way. As the draw opens, the fin is gradually drawn toward the draw by the bridge-tender into the position shown by full lines in Fig. 2, so that when the draw is entirely open the fin will still be set against the current, the latter moving along the inclined face of the fin and tending to keep the draw open. To permit the draw to close rapidly, the fin is released so that it may trail with the current, as indicated by dotted lines in Figs. 1 and 2; but when it is desired that the draw shall close slowly the fin is kept at an angle to the current. When a gale is blowing upstream, the fin will be set transversely or at right angles to the current, so that the effect of the wind on the structure may be counteracted by the effect of the current acting upon the fin, thus dispensing with downstream anchors.

The construction of the inclined way and the car may be varied considerably without in any manner departing from my invention.

No claim is made herein to features shown in my patents, numbered 407,700 and 407,421, dated July 23, 1889.

Having thus described my invention, what I claim is—

1. A hinged or swinging ponton-draw provided with a hinged or pivoted fin.

2. A hinged or swinging ponton-draw provided with a hinged or pivoted fin, in combination with means for varying the position of the fin.

3. A hinged or swinging ponton-draw provided with a hinged or pivoted fin and with means for varying the position of the fin, in combination with a counter-balance acting to close the draw.

4. A hinged or swinging ponton-draw provided with a hinged or pivoted fin, in combination with a counter-balance for the draw.

5. In combination with a hinged ponton-draw, an inclined way and a car mounted on the way and connected with the draw.

6. In combination with a hinged draw, an inclined way having sections of different inclinations, a car, and a cable connecting the car and draw.

7. In combination with a draw, a fin boat or frame projecting therefrom, a fin pivoted to the boat or frame, a windlass mounted upon the draw, and a connection from the fin to the windlass.

8. In combination with causeway-sections A B, draw C, hinged thereto, spar I, secured to section B and provided with a wheel I′, an inclined way E, a car F, and a cable G, connecting the car and draw.

9. In combination with causeway-sections A B, having their ends beveled, as shown, draw C, having its ends beveled.

10. In combination with a draw, an inclined way and a car moving on the way and connected with the draw, and a frame H, provided with a suspended pulley-block H′ to receive the cable.

11. In combination with a section B and draw C, loop *b*, secured to section B and having its ends extended in the same general direction, and loop *d*, secured to the draw and having its ends extending in different directions.

12. In combination with the section B and draw C, each having eyebolts *a* and clamping-plates *c*, loops *b* and *d*, secured, respectively, to the sections B and C, and a link *e*, connecting the loops.

In witness whereof I hereunto set my hand in the presence of two witnesses.

SYLVESTER N. STEWART.

Witnesses:
J. L. HUTCHINSON,
ALLEN J. SANDT.