

H. F., J. M. & W. B. RICE.

## Floating Draw-Bridge.

No. 162,768.

Patented May 4, 1875.

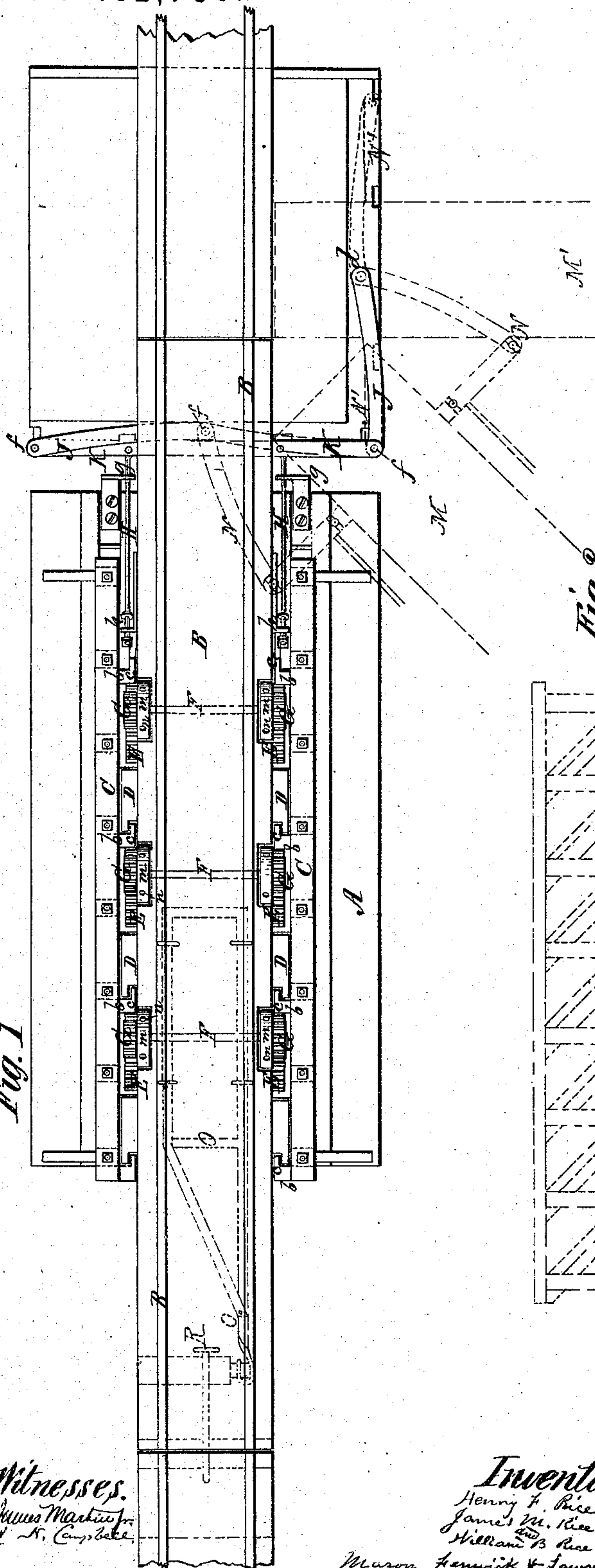


Fig. 1

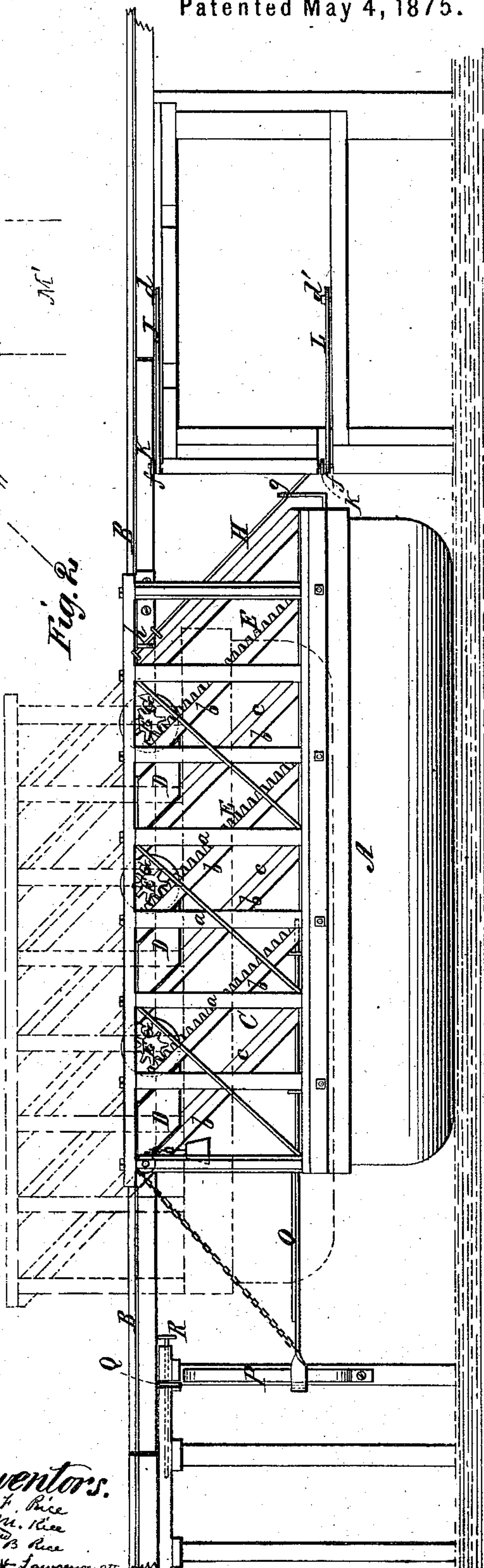


Fig. 2.

*Witnesses.*

James Martin Jr.  
N. Campbell

*Inventors.*

Henry F. Rice  
James M. Rice  
William B. Rice  
Mason Fenwick & Lawrence atty.



# UNITED STATES PATENT OFFICE

HENRY F. RICE, JAMES M. RICE, AND WILLIAM B. RICE, OF DUBUQUE, IOWA.

## IMPROVEMENT IN FLOATING DRAW-BRIDGES.

Specification forming part of Letters Patent No. 162,768, dated May 4, 1875; application filed March 30, 1875.

*To all whom it may concern :*

Be it known that we, HENRY F. RICE, JAMES M. RICE, and WILLIAM B. RICE, of Dubuque, county of Dubuque and State of Iowa, have invented certain new and Improved Floating Supports for Roadways Constructed above Water; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a plan or top view of a bridge upon which to cross a river, having our invention applied to the draw thereof. Fig. 2 is a side elevation of the same.

The full black lines show the ponton on low-water mark, and the dotted lines show it on high-water line.

The nature of our invention consists, first, in the combination of a floating truss-support, which rises and falls with the water, upon which it rests, and a track, roadway-platform, slip, dock, or other marine structure, which is constructed to maintain its original position at all times, except as it is deflected therefrom by the weight of the load passing over or resting upon it. Our invention consists, second, in the combination of a peculiar hinge with the floating support of the draw of a bridge, which has its track or roadway-platform constructed to maintain its original position at all times during the closed condition of the draw, except as it is deflected therefrom by the weight of the load passing over it. This combination permits the draw to be swung open through the arc of a quadrant, and when closed or entirely open it is brought properly up to and held against the structure upon which it is hinged, and the draw, when swung open, passes entirely beyond the space which is to form the passage-way for boats, and in this opened condition the hinge and the permanent portion of the roadway is sustained by the floating support in just the same manner as when the draw is closed.

To enable others skilled in the art to make and use our invention, we will proceed to describe it.

A is the floating support or ponton, constructed similar to a barge; and of a size capable of buoying up the roadway or track B,

which is erected about it. C are trusses constructed upon the ponton, one each side thereof, outside the margin of the roadway B. These trusses are formed of strong uprights *a*, and diagonal braces *b*, and tie-rods, and otherwise properly stayed and strengthened. The diagonal braces are at intervals rabbeted on their upper sides, as at *c*, and these rabbeted sides are fitted to slide in corresponding grooved timbers or strong blocks D, fastened securely on the sides of the roadway B. On the other side of those diagonal braces which are not rabbeted strong rack-bars E are bolted. F F are strong revolving shafts passed from one side of the roadway to the other, and firmly supported by the same. On the shafts cog-pinions G G are fastened, so as to work in gear with the rack-bars E.

It will be seen that the ponton and its trusses cannot move sidewise unless a portion of the roadway is moved with it.

It will also be seen that if the ponton rises with the water, in which it rests, the racks will gear with the pinions and cause the pinions to revolve, and thus its ascent will be facilitated in the event that the diagonals should bind or stick too snugly upon their inclined guides. The same will be the case when the ponton descends with the water in which it rests.

It will further be seen that the weight of the roadway will be borne by the trusses of the ponton, whether the water be at a high or low water mark, as the ponton has perfect freedom to descend and rise independently of the fixed roadway; and notwithstanding this the bearing of the roadway upon the diagonals of the trusses is maintained at a greater or less altitude with respect to the top of the ponton, accordingly as the ponton is elevated by the rise of the water from low-water mark to high mark, and in this condition the stationary roadway is supported by the diagonal braces, while the water sustains the ponton to which these braces are connected.

In order to make a draw for a bridge on the plan of our invention, we construct that portion of the roadway which is to form the draw separate from the main portions, and extend the ends of the draw portion over the abutments or piers, so as to adjoin snugly to the main portions, as shown. This draw portion



is constructed upon the trusses of a ponton in the same manner as above described, and shown in the drawings, and is hinged by one end to one abutment or pier, and latched by its other end to the other pier, as follows: By a hinge composed of two pairs of arms, J L, and connected by one of their ends to vertical pivots  $d d'$ , attached to the roadway, and by their other ends to vertical pivots  $f f'$  of a strong bracket, K, attached to one end of the draw. The bracket of the hinge is sustained at its bottom by diagonal rods H H, which are fastened firmly to vertical uprights of the bracket K, and through eye-pieces  $g$  on the ponton, and to and through eye-brackets or guides  $h$ , attached to the stationary roadway. These rods slip loosely in the brackets  $g$  and  $h$ , and have nuts on their upper ends, so that they shall not slip out of the brackets, and also shall prevent, as far as practicable, any descent of the draw when opened. With this mode of hinging the draw, it will be seen that when the draw is partly opened and takes the position shown at M in dotted lines, Fig. 1, the arms of the hinge take the position shown by dotted lines N, and when completely opened the draw and arms take the position shown at M' N'. O is a sliding latch attached to the loose end of the draw, and sustained at its outer end by a chain, and P is a vertical catch on the stationary portion of the bridge. The hook of the latch takes hold of the catch, as illustrated in the drawings. Q is a perforated fastening-plate attached to the draw, and R a pin passed through part of the stationary bridge and through the plate Q. By these fastenings the draw is firmly closed. The draw is unfastened by the attendant and opened and closed in any well-known manner.

We have described the hinge as double for the reason that it, as shown, holds both the ponton and roadway of the draw. We shall make the hinge in some of its uses single, and it will then consist of but one pair of arms and a connecting-bar. The pivots of the double hinge may be strong bolts passed down through both pairs of arms.

We contemplate using friction-rollers upon the diagonals of the trusses or their guides in the event there is enough friction between the trusses of the draw and their guides to retard the ascent and descent of the ponton with the rise and fall of the water.

The shafts of the cog-wheels may have circular hubs  $m m$  applied to them, and these hubs will be perforated, as at  $n n$ , around their periphery. By this contrivance, and removable hand-bars inserted into the perforations of the hubs, the cog-wheels can be locked into the racks, and the draw prevented from sagging when opened. This contrivance, as a matter of convenience, may also be used as an auxiliary when the draw is closed, notwithstanding the buoyancy of the water alone is sufficient for supporting the ponton and roadway, as its use will render the roadway more permanent under very heavy weights, and at the same time save the attendant the trouble of going upon the draw and inserting them when the draw is opened. If these bars are used at all times, they must be withdrawn and reinserted with the rise and fall of the tide.

What we claim as new is—

1. A permanent roadway or marine structure erected above water, in combination with a floating truss-ponton, the trusses of the ponton being connected to the roadway by inclined guides and diagonal braces, substantially as and for the purposes described.
2. The combination of the shafts, pinions, and rack-bars with the truss ponton and the permanent roadway, substantially as described.
3. The perforated hubs, in combination with the shafts, pinions, rack-bars, ponton-truss, and permanent roadway, substantially as described.
4. The combination of the hinge, composed of the bracket K, pivots  $d d'$ , and two pairs of arms, J L, with the truss pontoon-draw for a bridge, substantially as described.

Witness our hands in the matter of our application for a patent on an improved ponton-bridge.

HENRY F. RICE.  
JAMES MERRIT RICE.  
WILLIAM B. RICE.

Witnesses:

J. C. LONGUEVILLE,  
MAURICE FLYNN.

Witnesses for WILLIAM B. RICE:

J. N. CAMPBELL,  
JAMES MARTIN, Jr.