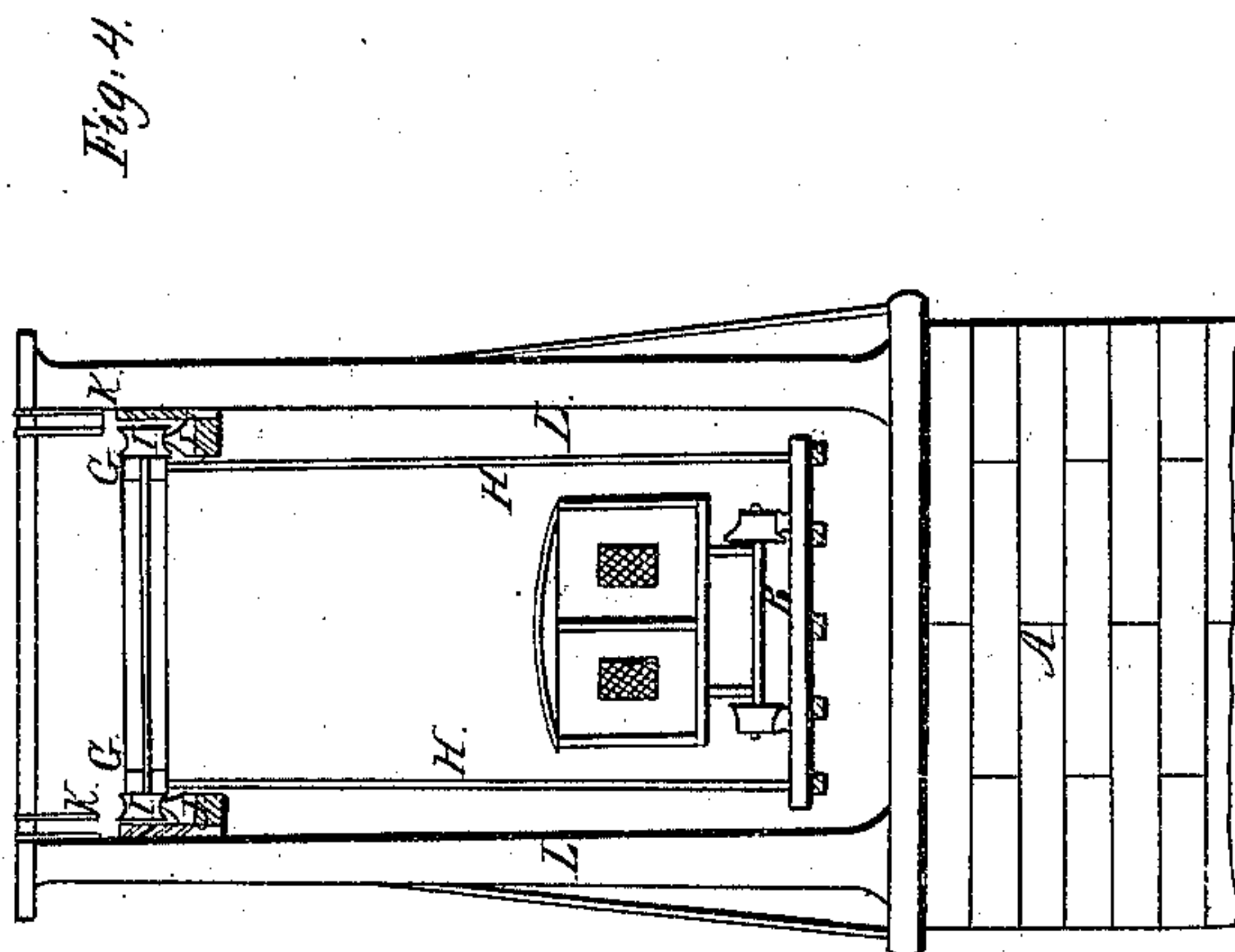
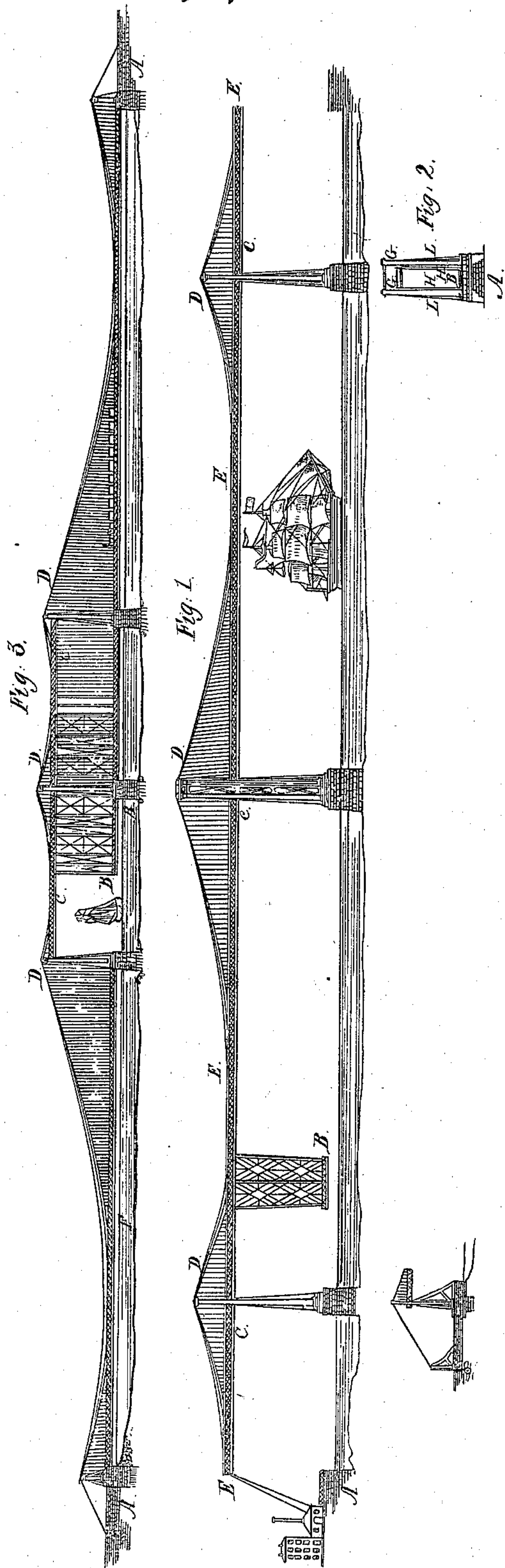


### *Suspension Bridge.*

*Patented Mar. 4, 1842.*

N<sup>o</sup> 2,478.





# UNITED STATES PATENT OFFICE.

HARVEY LEACH, OF PHILADELPHIA, PENNSYLVANIA.

MANNER OF CROSSING RIVERS, SWAMPS, RAVINES, &c., BY MEANS OF A MOVING PLATFORM SUSPENDED TO A BRIDGE OR VIADUCT.

Specification of Letters Patent No. 2,478, dated March 4, 1842.

*To all whom it may concern:*

Be it known that I, HARVEY LEACH, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and useful improvement in the manner of constructing suspension-bridges or viaducts for crossing rivers or other waters without obstructing the navigation and which may be used also in passing over swamps or ravines; and I do hereby declare that the following is a full and exact description thereof.

My suspension bridge, or viaduct, may be said to consist in the combining of the principle of the chain, or wire, bridge, and of the suspension railway; and it may be applied with great facility and economy in many situations where bridges could not be conveniently erected, or would involve an outlay that would forbid the undertaking.

On each side of a river, or other water, or in any other situation where it is desired to construct a suspension bridge, or viaduct, upon my plan, I usually erect a double abutment, of suitable height, either of stone, wood, or iron; and where the distance to be crossed is too great for a single span, I erect, or place, piers, or columns, of any suitable material, at fixed and regular distances from each other, using piles, or any other foundation which may be necessary to give stability to the superstructure; such piers, or columns, like the abutments, being double, as they are to support a double track, or railway, upon which wheels are to run, said wheels being attached to a truck, or carriage, from which a platform is to be suspended, in the manner, and for the purpose, to be presently described. The wheels on the two sides of such truck, or carriage, rest and move upon the two rails, or ways, above named. The pairs of abutments, piers, or columns, are to be at such distance apart as to allow the platform to pass between them, and they may be united together at their upper ends, above the truck, or carriage, by means of cross beams, or ties, so as to be braced together and tend to preserve each other in their proper relative positions.

The rail, or way, on each side, is to be sustained by wire ropes, or chains, passing over the tops of the abutments, piers, or columns, or over the crossties by which they are connected, in the same way in which such chains, or ropes, are ordinarily employed in suspension bridges. To each of the rails,

or ways, I attach a system of continuous braces, or trussing, consisting, in general, of lattice work, either of wood, or of iron, which is to be secured at the joints, or crossings, by pins, rivets, or bolts, as may be preferred; braces, or trusses, of other kinds may, however, be employed.

From each side of the truck, or carriage, which is to run upon the rails, a suitable frame work is to descend, which may be formed either of wood, or of iron, or in part of each, and these lateral frames are, at their lower ends, to support a platform, or floor, of such width and length as may be necessary for the receiving of a car, or cars, carriage, or carriages, or any other article or articles, which it is intended to transport from one side of the bridge, viaduct, or structure, to the other; the platform being placed in such situation as to cause it to coincide with the road at either end of the structure.

In many situations, it will be found most convenient and economical to carry the road over a considerable portion of the water, or other place to be crossed, upon a bridge resting upon piles, or other foundation, in the ordinary manner, and to elevate double piers on each side of the main channel only. The elevated portion of the structure constituting the suspension bridge, need not, in this case, be of any greater length than is required for the convenient passage of vessels between such piers; and the platform may then be considered as constituting a draw, the length of which may be equal to one half the distance between the termination of the ordinary bridge, more or less. The suspended platform may be moved from one side of the river, or open space, to the other, by means of stationary power on each side, or by motive power which may be situated upon the platform itself; in the manner of effecting this, however, I do not propose anything new, or peculiar, but intend to resort to any of the modes of carrying the platform which may be deemed most convenient, and which are well known to engineers.

In the accompanying drawing, Figure 1 is a side view of a suspension bridge with my suspended platform appended thereto. In this figure, the bridge is represented as extending from side to side of a river; A, A, being the wharves, or abutments, on the op-



posite shores, where a railroad may be supposed to terminate. B, is the suspended platforms, the side frames of which are, at their upper ends, attached to a truck, or carriage which runs upon rails at C, C; which rails are supported by chains, or wire ropes D, D, in the same manner in which suspension bridges are ordinarily sustained. In this figure, the double abutments are not represented as erected upon the wharves, or foundations A, A. The rail at C, C, on each side, is braced by lattice work E, E, to render it, as nearly as may be, inflexible.

Fig. 2 represents a pier, or abutment, shown transversely, with its double columns, having the platform B, suspended between them. This arrangement is also shown on a larger scale in Fig. 4, to be presently referred to. Fig. 3 is a representation of a suspension bridge, in which the elevated rails extend no farther than across the main channel, where vessels are to pass. The platform B, B, in this case fulfils the intention of an ordinary draw-bridge. The portions F, F, of the bridge make parts of the ordinary road-way, and may rest upon piers, or piles, or be sustained in any of the known modes. The platform B, B, may, in this case, be made of greater length, and sustain a heavier load than when the spans of the bridge are longer. It may be equal to half the length of the whole opening, more or less dependent upon circumstances, sufficient space being left for the passage of vessels. The platform may be allowed to pass over onto the flooring of the bridge, or may coincide at each end with its termination, the proper and obvious means of adapting it to the passing of carriages onto and from it being adopted.

Fig. 4 is an enlarged representation of

the parts shown in Fig. 3. B, is the platform suspended from the sides G, G, of the truck, or carriage, by the side framing H, H. The truck wheels, of which there may be any desired number, are shown at I, I, resting upon rails J, J. The rails are made fast to the lattice work, or other bracing, K, K, which is sustained by the suspension chains, or wire ropes, passing over the tops of the columns, or other elevated part of the structure, L, L, resting upon a pier, or abutment.

Having thus fully described the nature of my improvement, and shown the manner of carrying the same into operation, I do hereby declare that I do not claim to be the inventor of suspension bridges, or of latticed, or trussed, framing to give strength and stability to chain, or other bridges, or similar structures; nor do I claim to be the inventor of either of the parts of the above described apparatus, or structure, taken separately or alone; but

What I do claim as constituting my invention, and desire to secure by Letters Patent, is—

The combining of a suspended platform with a suspension bridge, which suspended platform shall descend to the level, and make a component part, of a railroad, or other road, so that cars, carriages, or other articles may be transferred directly from the stationary road to said platform and moved from one side of the suspended bridge, or structure, to the other, by, any adequate power applied thereto, the whole being combined, arranged, and operating substantially as herein set forth.

HARVEY LEACH.

Witnesses:

B. K. MORSELL,  
WM. WALLIS.