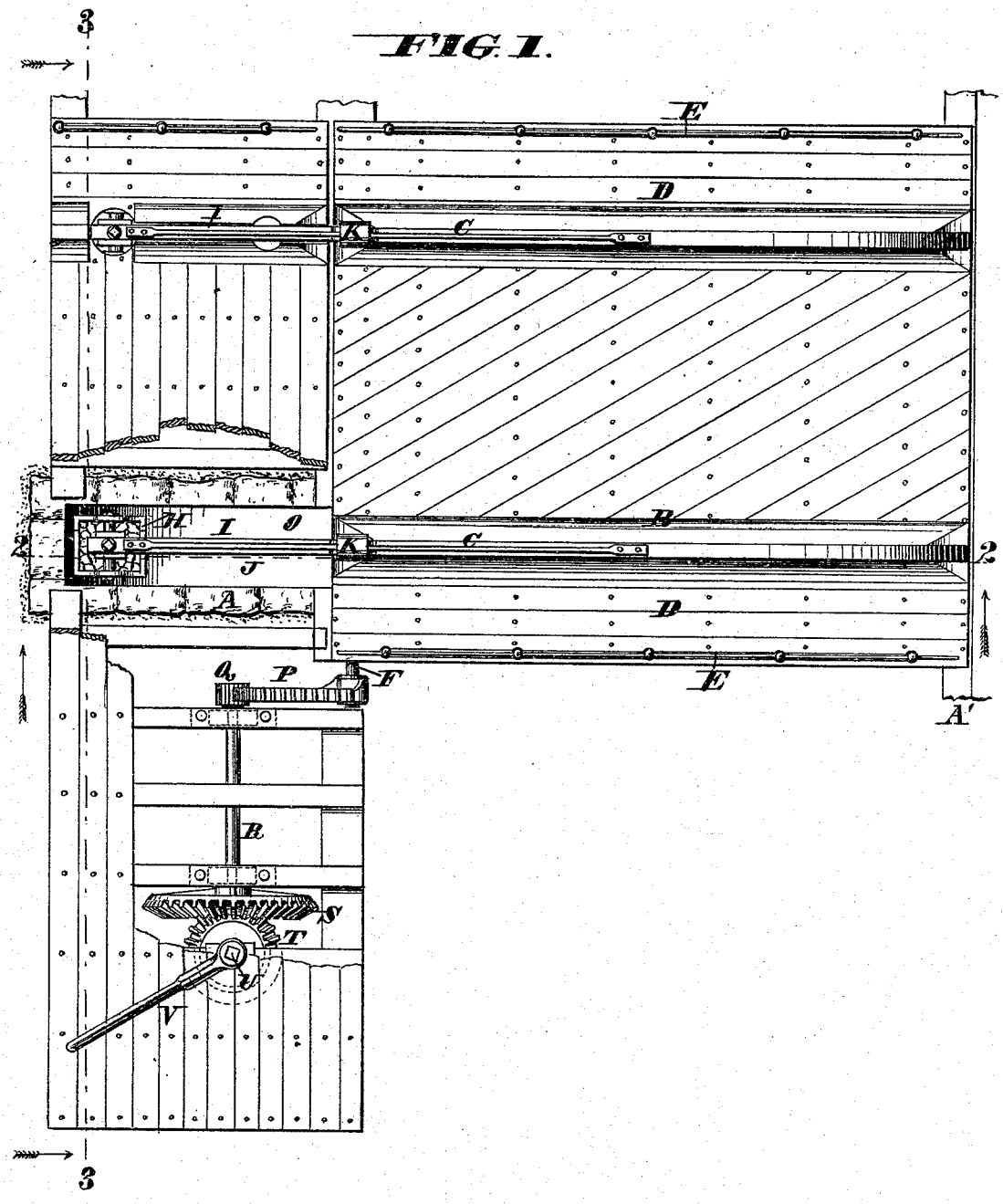
3 Sheets—Sheet 1.

S. SWARTZ.

LIFT-BRIDGE.

No. 172,204. Patented Jan. 11, 1876.

FIG. 1.



WITNESSES

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3 Sheets—Sheet 2.

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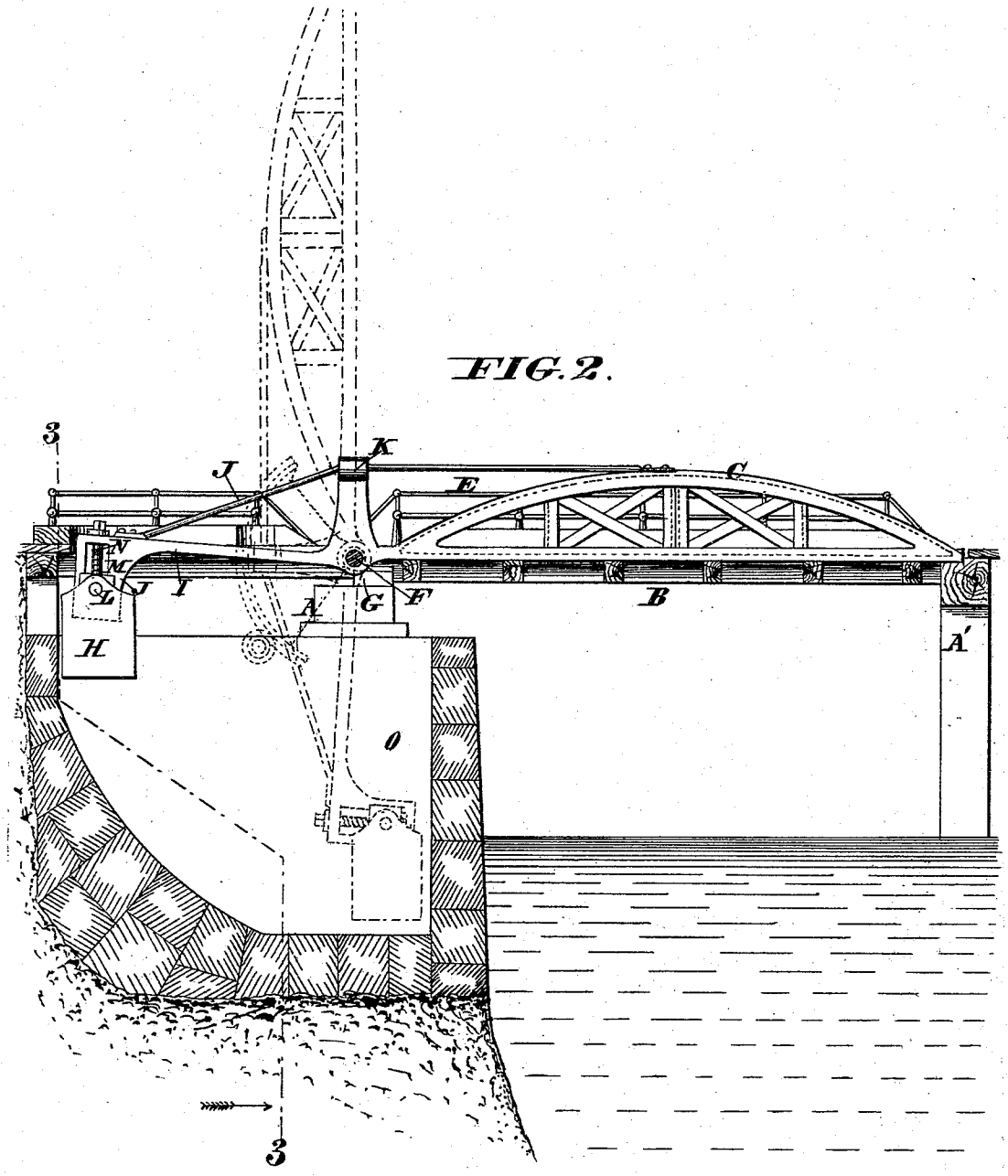
LIFT-BRIDGE.

No. 172,204. Patented Jan. 11, 1876.

FIG. 2.



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S. SWARTZ.

LIFT-BRIDGE.

No. 172,204. Patented Jan. 11, 1876.

FIG. 3.

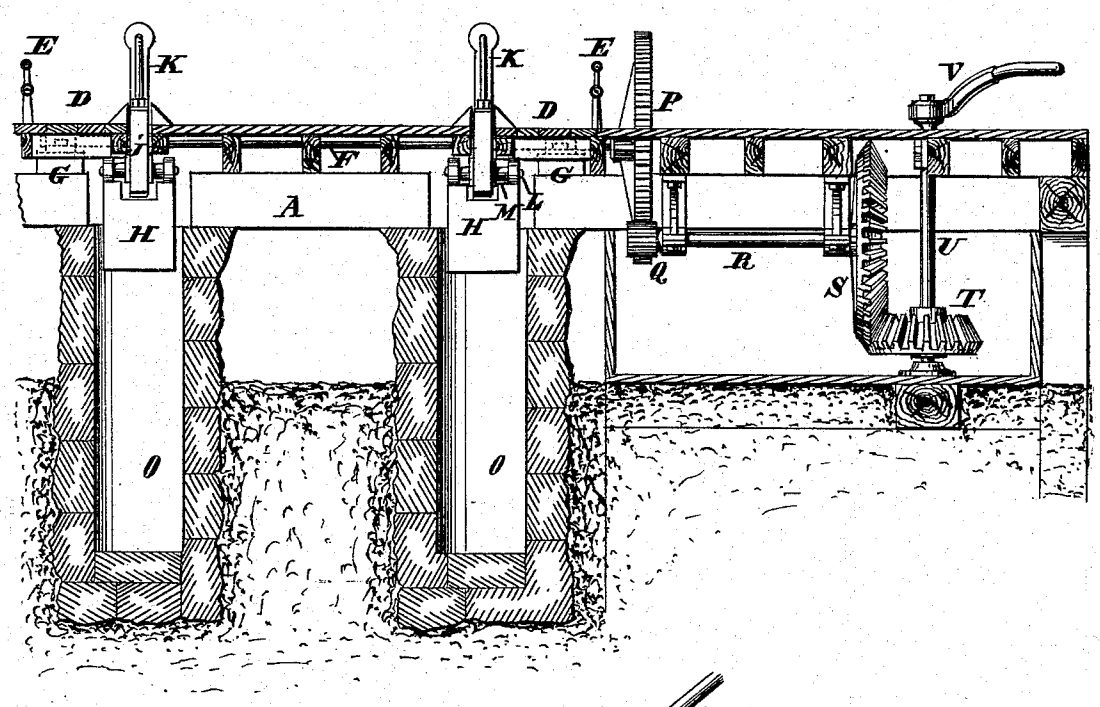
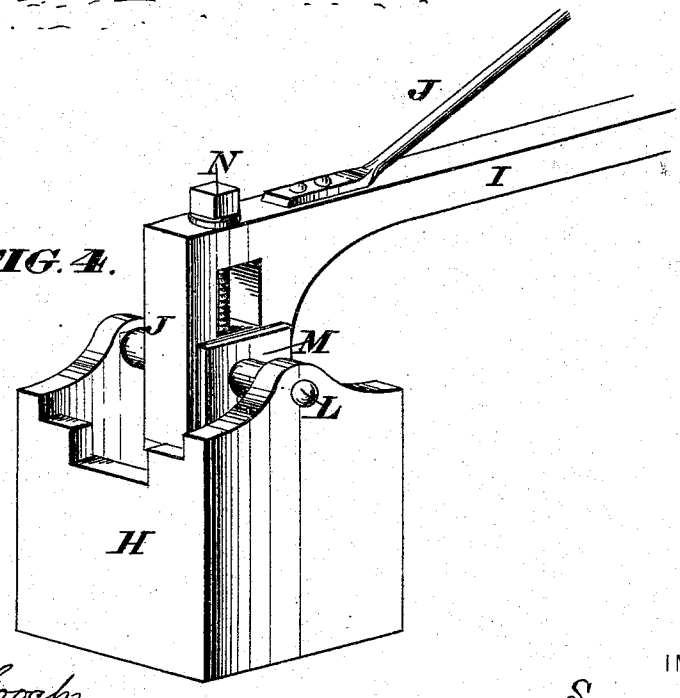


FIG. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

SAMUEL SWARTZ, OF BUFFALO, NEW YORK, ASSIGNOR TO JULIA SWARTZ, OF SAME PLACE.

IMPROVEMENT IN LIFT-BRIDGES.

Specification forming part of Letters Patent No. **172,204**, dated January 11, 1876; application filed July 8, 1875.

To all whom it may concern:

Be it known that I, SAMUEL SWARTZ, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Lift-Bridges, of which the following is a specification:

This invention is more especially designed for highway and railroad bridges, with or without sidewalks, over canals and like narrow water-ways.

The improvements comprise, first, a device for counterbalancing the bridge and regulating the force and delicacy of the counter-balance; second, a combination and arrangement of devices for operating the bridge.

In the accompanying drawing, Figure 1 is a plan view of a bridge illustrating the invention. Fig. 2 is a longitudinal section on the line 2, Fig. 1. Fig. 3 is a transverse section on the line 3, Figs. 1 and 2. Fig. 4 is a perspective view of a counterbalance-weight.

The foundation A A′ of the bridge can be made of piles and timber, or of masonry, as preferred. B represents the roadway of the bridge proper, sustained by a truss, C, of any usual and suitable construction, and flanked by sidewalks D D, if preferred. E E represent guard-rails. The bridge proper turns vertically on a horizontal pivot-shaft, F, securely fastened on its journal-bearings in pillar-blocks G. The heel end of the bridge B C is secured to the pivot-shaft F, the truss being made to extend beyond the said shaft to the distance of about one-third the length of the span of the bridge, for the purpose of attaching the balance-boxes H, by which the bridge is counterbalanced. I I represent the extension-arms, and J the brace or stay rods, firmly connected at their respective ends to the said extension-arms and to the crown of the arch, and passing over struts K, so as to support the heel-extension, and constitute it a part of the truss. The balance-boxes H are hung on pivot-studs L, projecting from slides M, which, by means of screws N, are adjusted up or down in the solid ends I′ of the arms I, to adapt the weights to properly counterbalance the bridge when in a vertical position.

The vertical adjustment of the counterbalance-weights may be effected by racks and pinions, if preferred, or by graduating-holes for the slides or boxes M, to which the weights are pivoted, or by hinging the lower cords or arms I near the pivot-shaft F, and lengthening or shortening the upper cords or stay-rods J, so as to lower or raise the weights.

The counterbalance apparatus works within a water-tight curb, O, constructed of masonry or wood, or of sheet metal, below the water-line, so that the roadway of the bridge may be placed as low as desirable.

It is preferred to construct the water-tight curbs of boiler-iron of sufficient strength to resist the pressure of water from the outside.

For the purpose of raising the bridge, the pivot-shaft F is extended to the outside, and has keyed to its extremity a segment spur-wheel, P, with which gears a pinion, Q, on a counter-shaft, R, on the other end of which is a bevel-wheel, S, driven by a bevel-pinion, T, on the vertical shaft U, passing just above the floor, and receiving a lever-arm, V, which is operated in the usual manner.

The multiplying gearing here shown will enable the operator to raise the bridge in about one-half a minute, walking at a moderate pace.

The manner of raising and lowering the bridge will be clearly understood from the foregoing description of the construction of the parts.

To regulate the counterbalancing of the bridge the counterbalance-weights are adjusted up or down. The leverage and friction in the hoisting machinery will ordinarily hold the bridge "set" while it is exactly counterbalanced.

If more steadiness be desired, weight should be removed from the counterbalance-boxes H, and added to the toe or extremity of the bridge, so as to seat the bridge more firmly when closed. The boxes are then raised by the screws N or other means, as set forth, so that when the bridge is elevated to the vertical position shown in dotted lines in Fig. 2, the counterbalance-boxes will be more nearly underneath the pivot-shaft F. This causes the bridge to be set more firmly when open.

The following is claimed as new:

1. A lift-bridge constructed with a counter-

balance weight or weights, adjustable vertically in the horizontal position of the bridge, to regulate the effect of said weight or weights on the bridge when in its vertical position, substantially as set forth.

2. The combination of the horizontal pivot-shaft F, counter-shaft R, vertical shaft U, lever V, and gearing P Q S T with the lift-bridge B C, extension-truss I J, and counter-balance-weights H, substantially as and for the purpose set forth.

SAMUEL SWARTZ.

Witnesses:
GEORGE W. TOWNSEND,
ARTHUR W. HICKMAN.