(No Model.)

D. H. ANDREWS.

TELESCOPIC DRAW BRIDGE.

No. 452,630. Patented May 19, 1891.

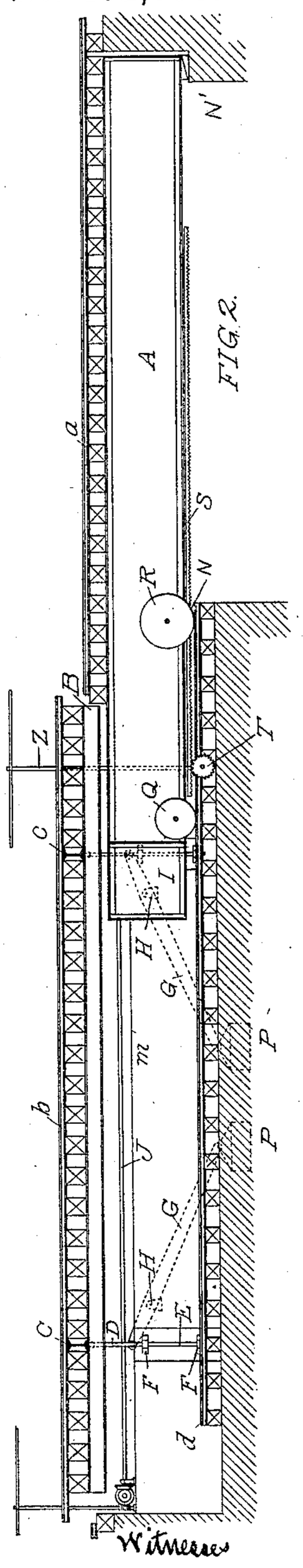

FIG. 2.

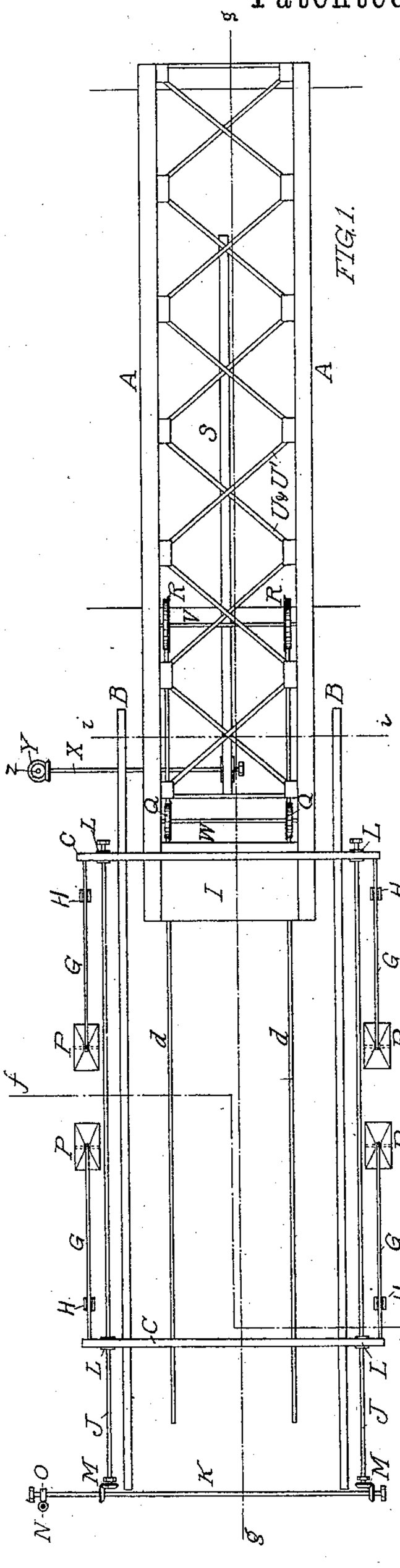

FIG. 1.

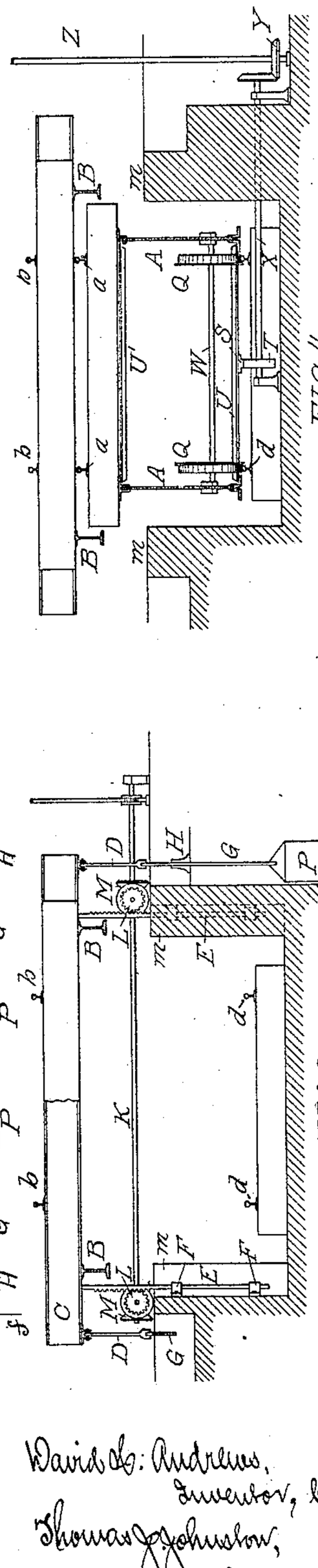

FIG. 4.

FIG. 3.

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UNITED STATES PATENT OFFICE.

DAVID H. ANDREWS, OF BOSTON, MASSACHUSETTS.

TELESCOPIC DRAW-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 452,630, dated May 19, 1891.

Application filed March 10, 1891. Serial No. 384,416. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. ANDREWS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Telescopic Draw-Bridges, of which the following is a specification.

My invention relates to draw-bridges, and more particularly to that class of such bridges which are drawn back to open the channel-way.

Where railways or highways cross navigable water in approaching seaport cities, or where the line runs through tide-water country, it is necessary to have but little head-room under a bridge in order to afford easy grades to the road, and where there are many tracks in a railway or where space is limited for any other reason the use of large swing-bridges is very objectionable. In such cases (particularly in New England) the so-called "jack-knife draw," described in the patent to Ross, No. 5,997, January 2, 1849, has been employed on account of the small space necessary for its operation. Objections have been found to draws constructed in this way, however, the principal being the want of lateral bracing between the two girders carrying the rail, thereby rendering the draw unsafe for trains at speed, (the rails being apt to spread under the vibration, the girders being separately movable,) and the fact that it is unsuitable for more than one track, because of the additional length needed for one bridge constructed by the side of another to enable the first one to clear the channel. Lift-bridges in which a span is tilted up around a horizontal axis are also objectionable, particularly in winter. The counterpoises usually employed dip in the water as the bridge rises. When ice is formed, they rest on it and act only during part of the lift, and when they dip into the stream they lose part of their value. In both cases the bridge binds before it gets up, and has to be raised by main force, which is destructive to the gearing. My invention obviates all these objections. I so mount a section of track or approach as to raise it bodily by suitable means. Into the pit or pocket thus formed I retract the draw-span. By suitable counterweights I so balance the movable section of track as to lessen the strain on the gearing and the amount of power necessary to operate the draw. I also have improved on the details of construction of such a bridge as I have here described, the improvements being described in the specification hereto annexed, and the elements of novelty being particularly designated in the claims.

It will be understood that my device is entirely applicable to highway-bridges, and wherever the word "track" is used in this specification the word "roadway" is also to be understood.

In the drawings which are annexed to and made part of this specification, and which show one form in which I embody my invention, Figure 1 is a plan, the track being removed. Fig. 2 is a longitudinal vertical section taken on the line *g g* of Fig. 1. Fig. 3 is a transverse vertical section, taken on the line *f f* of Fig. 1, looking toward the left. Fig. 4 is a transverse vertical section on the line *i i* of Fig. 1, looking toward the left.

Similar letters refer to like parts in all the drawings.

The bridge is shown with the movable portion of the track raised ready for the retraction of the draw-span.

Referring by letter, A A, Figs. 1 and 2, represent the girders of the channel-span, which are braced laterally by the diagonals U U′, and on the top of which are placed ties, over which run the rails *a a*, only one of which is shown. To the bottom of the bracing is secured the rack S, with which meshes the gear T on the shaft X, which is driven by means of bevel-gears from the shaft Z, using any desired power, as best seen in Fig. 4. The whole structure is supported on a truck having wheels Q R, and is balanced about the axis of the wheel R. To effect this counterbalancing a box I is constructed on the shore end of the draw, in which weights may be placed at the discretion of the engineer. It being objectionable to throw any part of the live load on the axle W of the truck, I provide for the draw-span solid wedge-bearings N N′, (only one of which is shown,) Fig. 2, so arranged as to relieve the truck when the draw spans the

channel, while affording but slight resistance to the operation of the bridge.

B B represent the girders forming the foundation of the vertically-movable section of track.

C C designate cross-beams securing these girders together, an additional security being given by the ties, on which rest the rails *b b*. When the girders B B are in their lowest position they rest directly on the masonry or side walls M M of the pit, and thus relieve the gear from the strain of any load which may come on the bridge.

Depending from the girders B B at as many points as the engineer may deem necessary are hangers or links D D, Figs. 2 and 3, furnishing an attachment for one end of the levers G G, which bear on the fulcra H H, and are provided at their other ends with weights P P of sufficient mass to counterbalance the entire weight of the vertically-movable section of track, or so much thereof as may be deemed advisable. To effect the synchronous raising of all parts of this section, I employ the rods E E, working in bearings F F, and having racks on their upper portions. These racks are driven by the pinions L L, fast on the shaft J, deriving motion from the shaft K, by means of the bevel-gears M M.

The operation of this bridge is as follows: The movable section of track being run up by means of the gear shown, connected to the shaft N, the gear connected to the shaft Z is operated and the draw-span run back into the pit, where it rests on the rails *d d*, which furnish the bearing for the wheels of its truck. The operation is then reversed, the draw run out, and the track lowered, where it locks in position the draw-span, thus preventing accidents by its displacement during the passage of a train.

It is manifest that many changes might be made in the arrangement here shown—as, for example, the gearing may be so connected as to work from one shaft, an automatic signal may be attached to the draw, and the whole may be driven by power, &c.; but these changes do not affect the mode of operation of my invention.

Having now described my invention, what I claim, and wish to protect by Letters Patent of the United States, is—

1. In a draw-bridge, a movable section, a pit or pocket thereunder, and a draw-span retractible into the pit or pocket, substantially as described.

2. In a draw-bridge, a counterbalanced movable section, a pit or pocket thereunder, and a draw-span retractible into the pit or pocket, substantially as described.

3. In a draw-bridge, a movable section, a pit or pocket thereunder, and a counterbalanced draw-span retractible into the pit or pocket, substantially as described.

4. In a draw-bridge, a counterbalanced movable section, a pit or pocket thereunder, and a counterbalanced draw-span retractible into the pit or pocket, substantially as described.

5. In a draw-bridge, a vertically-movable section, means for synchronously moving all parts thereof, a pit or pocket, and a draw-span retractible into the pit or pocket, substantially as described.

6. In a draw-bridge, in combination, a vertically-movable section abutting against the draw-span when the bridge is closed, a pit or pocket thereunder, and a draw-span retractible into the pit or pocket, substantially as described.

7. In a draw-bridge, in combination, a vertically-movable section, a pit or pocket thereunder provided with a track, and a retractible draw-span provided with a truck adapted to run upon the track in the pit, substantially as described.

8. In a draw-bridge, in combination, a counterbalanced vertically-movable section, means for synchronously moving all parts thereof, a pit or pocket thereunder provided with a track, a draw-span provided with a truck adapted to run on the track, and means for moving the draw-span, substantially as described.

9. In a draw-bridge, a draw-span having lateral bracing and retractible into a pit or pocket, in combination with a vertically-movable section over the pit or pocket, substantially as described.

10. In a draw-bridge, a suitably-counterpoised vertically-movable section composed of the girders B B, secured together by the cross-beams C C, the girders B B being adapted to rest throughout their length on the walls of a pit or pocket when in their lowest position.

11. In a draw-bridge, a draw-span composed of girders, as A A, stayed or braced by diagonals, as U U′, balanced upon a truck running on rails in a pit or pocket formed under a vertically-moving section, whereby the draw-span may be withdrawn into the pit or pocket, substantially as described.

12. In a draw-bridge, in combination, a suitably-counterpoised vertically-movable section composed of the girders B B, adapted to rest in their lowest position on the walls of a pit or pocket and secured together by cross-beams C C, means for raising and lowering such section, and a draw-span composed of girders A A, braced by diagonals U U′ and balanced upon a truck running upon rails in the pit or pocket, with suitable means for retracting and projecting the draw-span into and out of the pit or pocket, substantially as described.

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

DAVID H. ANDREWS.

Witnesses:
HENRY E. COOPER,
MARGARET V. COOPER.