

(No Model.)

F. M. SMITH.
BRIDGE GATE.

No. 572,318.

Patented Dec. 1, 1896.

Fig. 1.

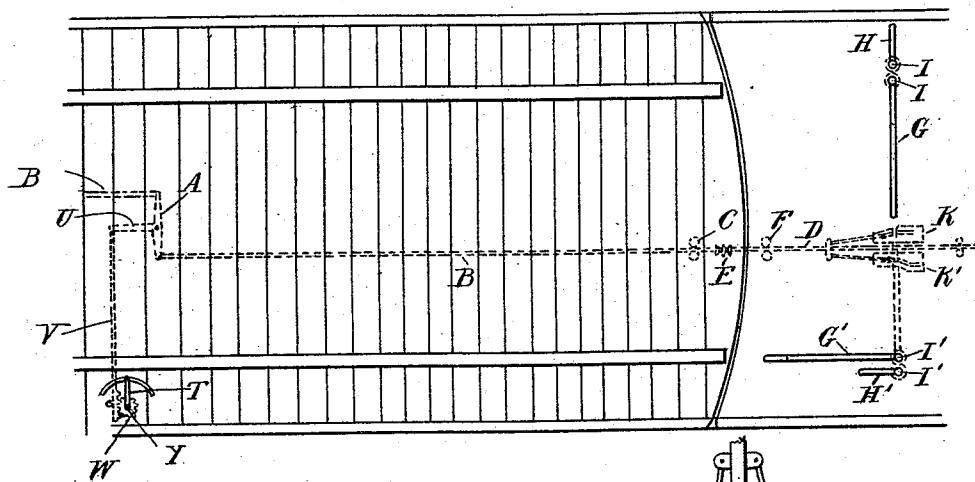


Fig. 2.

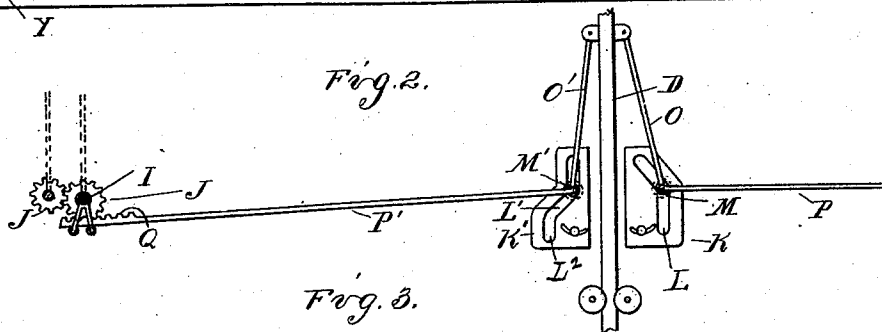


Fig. 3.

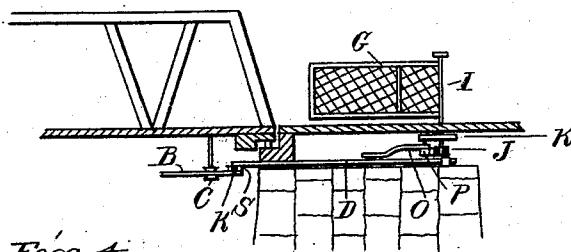
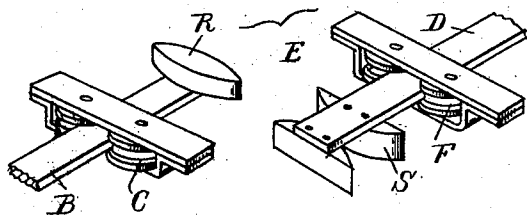


Fig. 4.



Witnesses
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By *W. Sprague* Attys.

UNITED STATES PATENT OFFICE.

FREDERICK M. SMITH, OF BAY CITY, MICHIGAN, ASSIGNOR OF ONE-HALF
TO THOMAS E. WEBSTER, OF SAME PLACE.

BRIDGE-GATE.

SPECIFICATION forming part of Letters Patent No. 572,318, dated December 1, 1896.

Application filed October 8, 1895. Serial No. 565,013. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK M. SMITH, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Bridge-Gates, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention refers more particularly to operating mechanism for that type of bridge-gate in which the gates swing upon vertical pivots; and my invention has for its object to provide mechanism whereby the bridge-tender from his usual position in the tower on the bridge controls at will the opening and closing of the gates.

To this end my invention consists, first, in the novel application of a push and pull rod extending from near the position of the bridge-tender on the tower to the gates on the approaches, all in such manner that the movement of a lever by the bridge-tender operates the gates on both approaches, while at the same time the bridge is free to swing at all times.

Further, my invention consists in the peculiar provision made for operating the admission-gates in advance of the exit-gates, whereby the traffic over such bridges, in which the rule is to keep to the right, is properly regulated, and, further, the invention consists in the peculiar construction, arrangement, and operation of the mechanical devices employed for obtaining these objects in a simple and efficient manner, all as more fully hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a plan view of one half of a pivot-swing-bridge with the approach thereto, showing the actuating mechanism of the gates in dotted lines as being located below the surface of the roadway. Fig. 2 is an enlarged plan view of a part of the operating mechanism. Fig. 3 is a vertical central section through the adjacent ends of the bridge and the approach. Fig. 4 are detail perspective views of the coupling members of the push and pull rod.

A is a walking-beam lever pivotally secured at or near the pivotal center of the bridge beneath the roadway.

B B are push and pull rods extending to opposite ends of the bridge at or near the center thereof and continuing beyond the same on the approach.

C are antifriction guide-rollers, through which the push and pull rods pass.

D are extensions of the push and pull rods located upon the approaches in line with the push and pull rods B.

E is an automatic coupling device between the adjacent ends of the push and pull rods B and D.

F are antifriction guide-rollers for the push and pull rods D.

G G' are respectively the admission and exit gates for the vehicles, and H H' for the foot-passengers on one of the approaches of the bridge. These gates turn on pivotal gate-posts I I', which are arranged in pairs adjacent to each other and are provided at their lower ends with intermeshing pinions J J' for simultaneous operation centrally between the two pairs of gates, and on opposite sides of the push and pull rod D are located two

bed-plates K K', provided with the cam-grooves L L', adapted to receive suitable guide-rollers M M', respectively. These guide-rollers are pivotally connected by means of links O O', respectively, with the push and pull rod D, and also carry the free ends of the transverse push and pull rods P and P'. These push and pull rods P and P' extend to the opposite pairs of gates, and each is provided with a rack Q, engaging the pinion of one of the pair of gate-posts, as shown.

As will be seen from Fig. 2, each of the cam-grooves L L' has one portion which is parallel to the push-rod D and a connecting portion which is inclined thereto, but the sequence of these inclined and parallel portions is reversed in the two cam-grooves.

The coupling device E may be of any suitable description which permits the automatic coupling and uncoupling of the push and pull rods B and D in opening and closing the bridge. I preferably employ the construction shown in Fig. 4, in which the end of one of the push and pull rods, such as B, is provided with an upwardly-projecting lug R, while the other one is provided with corre-

sponding downwardly-projecting lugs S S, which are a suitable distance apart to permit of the entering of the lug R between the two. The meeting faces of these lugs on both sides of the push and pull rods are beveled, as shown, so that when the bridge is opened or closed the lug R may readily couple or uncouple with the lugs S S, even if the parts are slightly displaced.

The walking-beam lever A is connected with an operating-lever T in the bridge-tower (not shown) in any manner which permits of its being moved into the different positions required to open and close the gates. In the drawings I show an arm U, connected to the walking-beam lever, and to the free end of this is pivotally connected the push and pull rod V, the free end of which is provided with a rack engaging with a pinion W on the end of a vertical shaft Y, extending up into the tower, and to which the operating-lever T is secured, which, as in the usual construction of such devices, may be a so-called "quadrant-lever."

The parts being thus arranged, as shown and described, they are intended to operate as follows: When the bridge is closed, the operator through the lever T in his tower has full control over the opening and closing of the gates. If all the gates are open and the push and pull bars B D are coupled, the position of the parts is such that the cam-rollers M M' are in the inner end of the cam-grooves. As soon as the operator gives a proper movement of the lever to close the gates the push and pull bar B and D is pushed lengthwise and the roller M' is thereby carried along in the parallel portion of the slot L', while the cam-roller M has passed through the inclined portion of the slot L. Thus, while no movement is communicated to the gates at the exit side during such movement, the gates on the other side are rotated upon the pivots and closed, this side being the one which gives admission. At the proper moment, when the bridge is cleared of its traffic, the operator then gives a further movement to the lever T, and by this further movement the cam-roller M' will begin to act by traveling in the inclined portion of the slot L' and actuate the gates which guard the exit, while the roller M, traveling in the parallel portion of the slot L, holds the admission-gates in their closed position.

The outer end of the cam-groove L' is provided with a slight extension L² in a line parallel to the push and pull bar D. By this means the push and pull bars P P' are always locked against longitudinal movement in any direction and cannot be displaced by any force pushing upon the gate. Thus whether the gates are open or closed this mechanical device for operating the same acts at the same time as a locking device to prevent the accidental displacement of the gates. In operating the gates thus successively one after the

other the work of the operator is divided, while the gates are under absolute control.

What I claim as my invention is—

1. In a bridge-gate, the combination with the approach and the gates carried by rotatable gate-posts, arranged in pairs on opposite sides, of a transverse push and pull rod extending from each pair toward the center of the approach and adapted to rotate the gate-posts, a guide-roller on the inner end of each push and pull rod, a cam-groove for each guide-roller, a longitudinal push and pull rod extending from the bridge to the approach and having actuating connection with the transverse push and pull rods, and a lever upon the bridge having actuating connection with said longitudinal push and pull rod, substantially as described.

2. In a bridge-gate, the combination with the approach and the gates therefor, having rotatable gate-posts arranged in pairs on opposite sides, of a transverse push and pull rod extending from each pair toward the center of the approach and adapted to operate the gates, cam-grooves in which the inner ends of said push and pull rods are guided, a longitudinal push and pull rod under the control of the bridge-tender from the bridge and extending therefrom to the approach, links connecting the same with the transverse push and pull rods, and an automatic coupling and uncoupling device in said longitudinal push and pull rods, substantially as described.

3. In a bridge-gate, the combination with the approach and the gates thereupon, having rotatable gate-posts arranged in pairs on opposite sides, of a longitudinal push and pull rod extending from near the pivotal center of the bridge to the approach and provided with means under control of the bridge-tender to operate the same, of transverse push and pull rods upon the approaches on opposite sides of the longitudinal push and pull rod and extending to the gate-posts to operate the same, links connecting the longitudinal push and pull rod with the transverse push and pull rods, and cam-grooves into which the inner ends of said transverse push and pull rods engage, said cam-grooves having their inclined and parallel portions reversely arranged substantially as described.

4. In a bridge-gate, the combination with the approach and the two sets of swinging gates thereupon, controlling the admission and exit to and from the bridge of the transverse push and pull rods P P', one for each set of gates the bed-plates K K' having cam-grooves guiding the inner ends of said transverse push and pull rods and having inclined and parallel portions reversely arranged in the two bed-plates, the longitudinal push-rod extending from the bridge to the approach and consisting of the separate parts B D, the automatic coupling and uncoupling devices E, the links O O' connecting the push and

pull bars, and a lever on the bridge having actuating connection with the longitudinal push and pull bar, substantially as described.

5 In a bridge-gate, the combination with the approaches and the two sets of swinging gates on each approach, of the walking-beam lever A centrally of the bridge, the lever T and its actuating connection with the walking-beam lever A, two longitudinal push and pull rods extending from the opposite ends 10 of the lever A to the approaches, and having the separate parts B and D secured respectively in guides upon the bridge and the approaches thereto, automatic coupling and uncoupling devices between the parts B and D 15 and connections between the parts D and the gates whereby the two sets of gates on each approach are differently operated, substantially as described.

20 6. In a bridge-gate, the combination with the draw and approaches provided with swinging gates on opposite sides, of the bed-plates K K' located between the gates, the cam-grooves L L', having parallel and inclined 25 portions, reversely arranged in the two plates, the parallel extension L² of the cam-slot, the guide-rollers M M' engaging into said cam-grooves, the transverse push and pull rods P P' carried by the guide-rollers and adapted 30 to operate the gates successively on opposite sides, and devices operated from the draw to reciprocate the guide-rollers in the cam-slots, substantially as described.

7. The combination with a draw and an approach thereto, of a gate on the entrance and 35 on the exit side of the approach, and a single means on the draw for operating both said gates one in advance of the other.

8. The combination with a plurality of swinging gates, of push and pull rods operatively connected with said gates extending 40 from the gates toward each other, cams with which the contiguous ends of said rods engage, a push and pull rod, actuating connections between said last rod and said first-mentioned rods, and means for operating said 45 last-mentioned rod for operating said gates.

9. The combination with a plurality of gates, of a single operating device for said gates, and connections between said gates 50 and device whereby the gates are differently operated.

10. The combination with a plurality of gates, rods operatively connected with said gates, a single operating means for said gates, 55 and cams interposed between said rods and operating means whereby the gates are differentially operated and locked in their opened and closed positions, substantially as described. 60

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK M. SMITH.

Witnesses:

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