No. 692,386. Patented Feb. 4, 1902.

H. W. TEN BROEKE.

BRIDGE GUARD.

(Application filed Apr. 29, 1901.)

(No Model.)

Fig. 1.

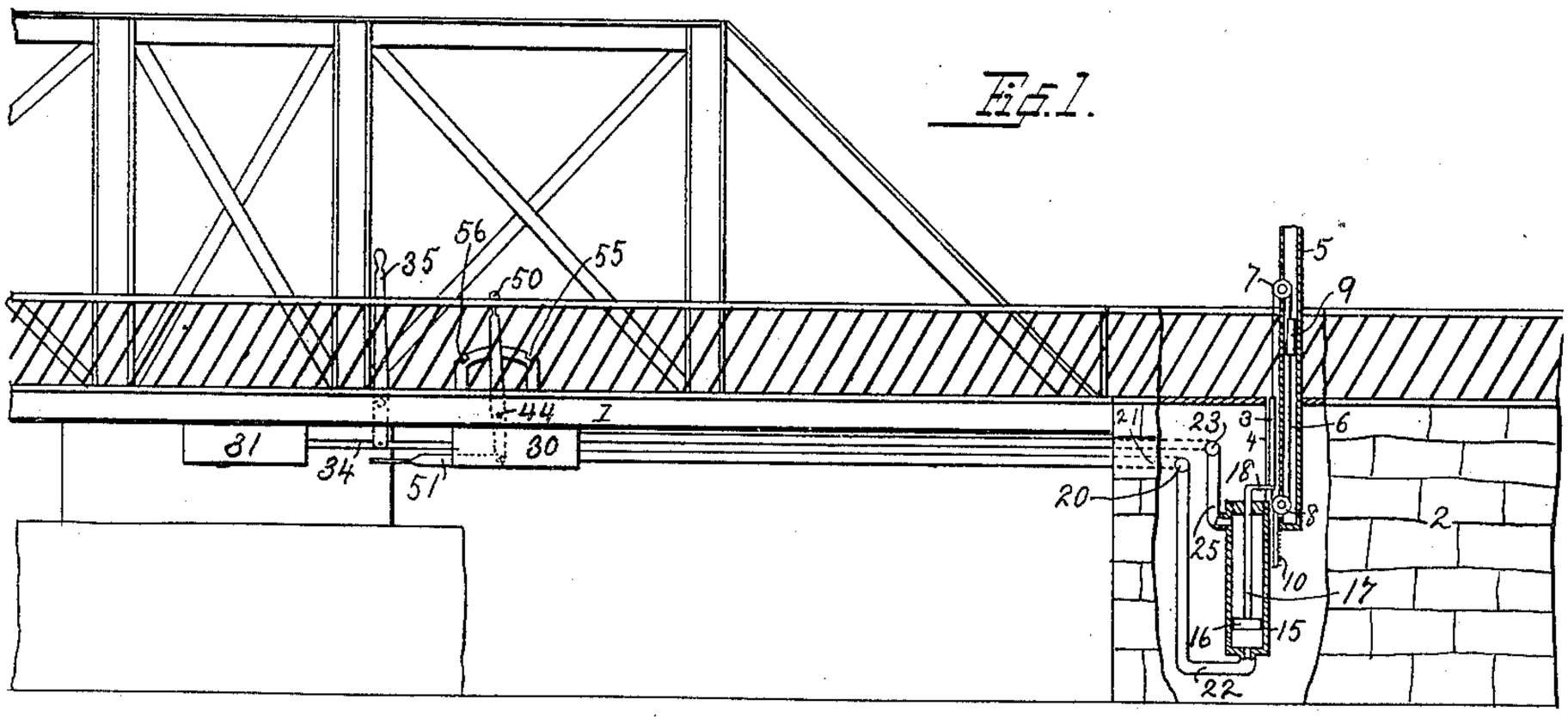


Fig. 2.

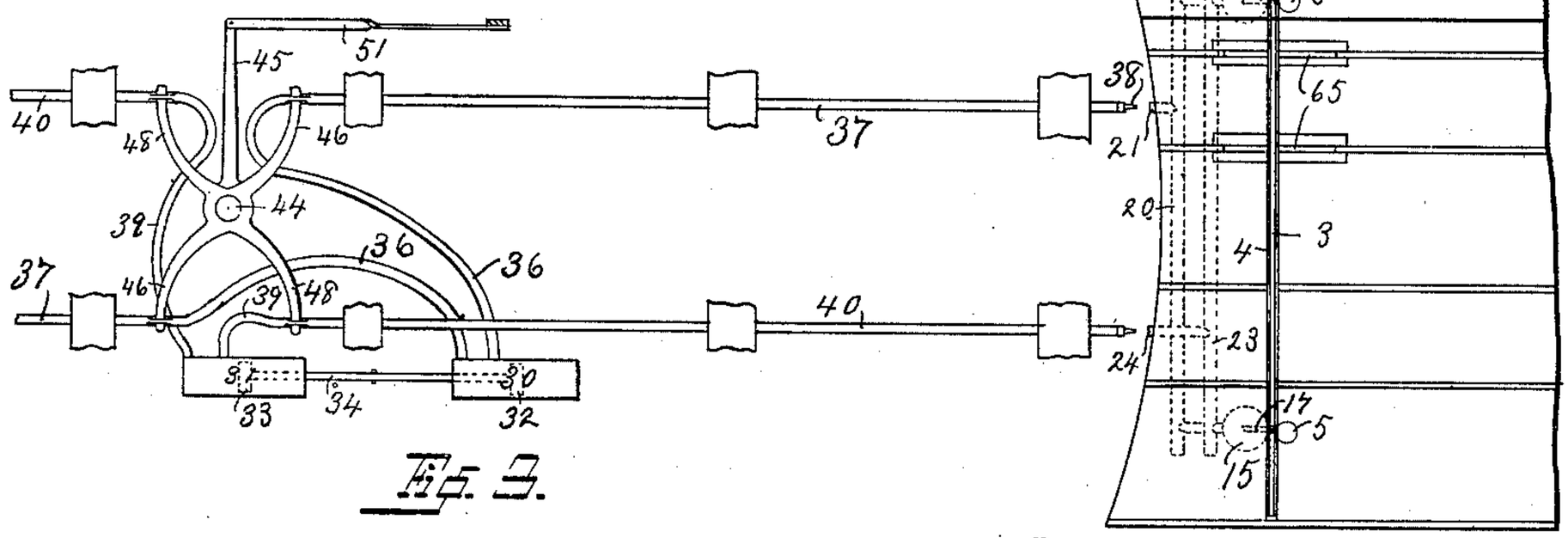


Fig. 3.

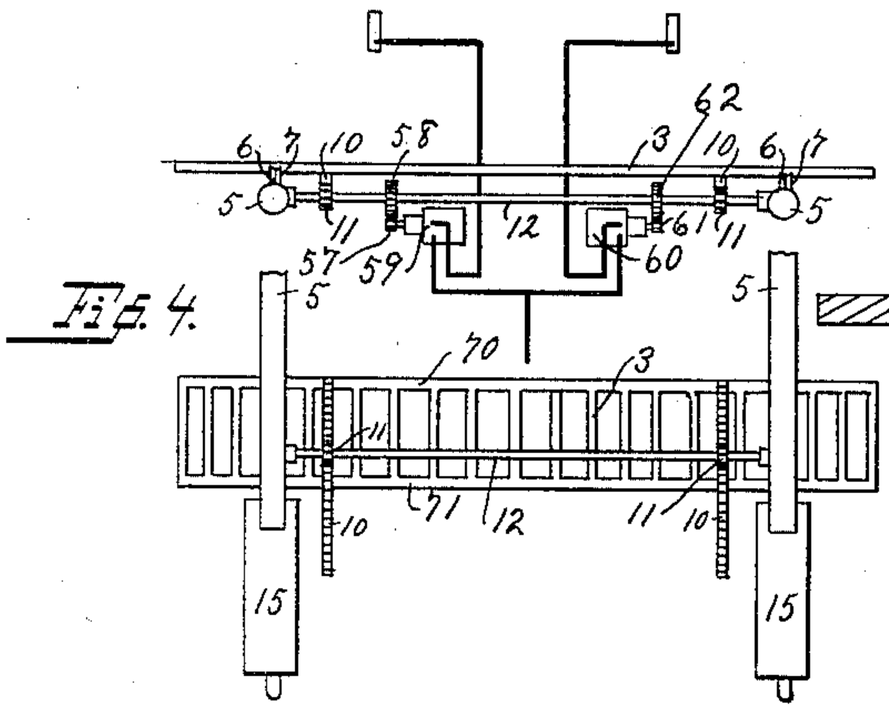
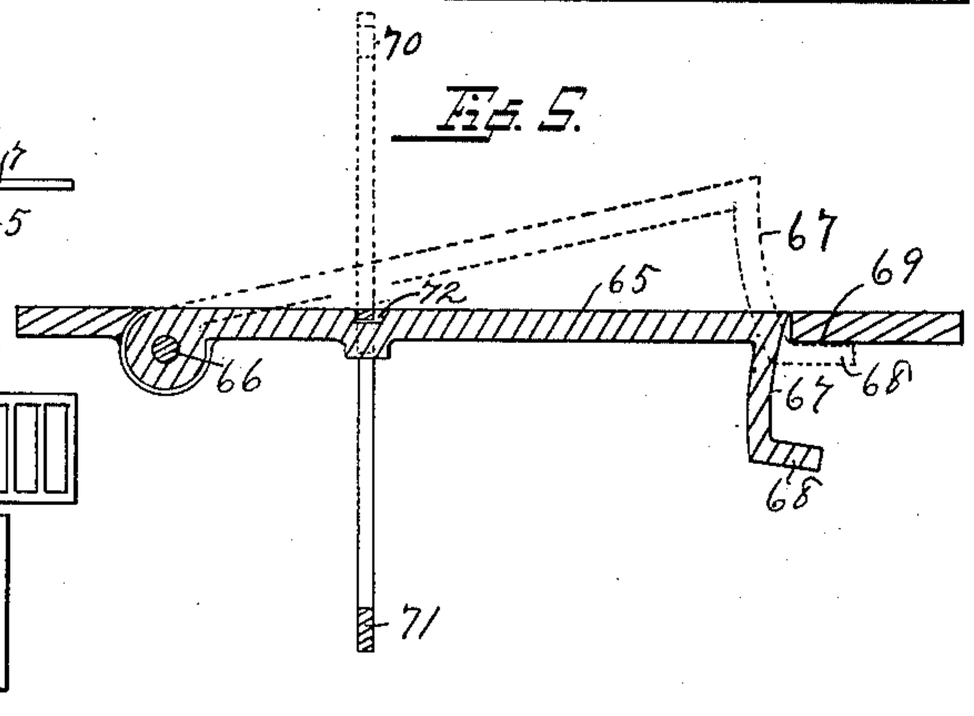


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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BRIDGE-GUARD.

SPECIFICATION forming part of Letters Patent No. 692,386, dated February 4, 1902.

Application filed April 29, 1901. Serial No. 57,946. (No model.)

To all whom it may concern:

Be it known that I, HERMAN W. TEN BROEKE, a citizen of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Bridge-Guards, of which the following is a specification.

My invention relates to improvements in bridge-guards.

The object of my invention is to provide manually-controlled mechanism whereby both a bridge-gate and a car stop or buffer may be operated and manually controlled from the center of the bridge preparatory to opening or closing the same.

My invention contemplates the use of either compressed air or electrical power for operating the gate and buffer.

In the following description reference is had to the accompanying drawings, in which—

Figure 1 is a side view, partly in section, of a portion of a bridge and its abutment equipped with my invention. Fig. 2 is a plan view of the same, the platform of the bridge being removed to show the guard-operating mechanism, with dotted lines indicating the position of the operating devices. Fig. 3 is a detail plan view of electrically-controlled mechanism for operating the guards. Fig. 4 is a front elevation of the gate and its power-transmitting connection. Fig. 5 is a detail sectional view of the gate and buffer drawn on the line of one of the railway-track rails.

Like parts are identified by the same reference-figures throughout the several views.

1 is a bridge.

2 is an abutment.

3 is a gate normally located in a channel 4 in the abutment and supported near each end by posts 5, to which the gate is connected by means of endless chains 6, which are passed over suitable pulleys 7 and 8, mounted on the posts 5, as best shown in Fig. 1. The posts 5 are preferably tubular in form, as shown, and arranged with the chains 6 extending downwardly in the interior of the posts and provided with a weight 9, which counterbalances the weight of the gate. The gate is provided with depending rack-bars 10, which are arranged to mesh with suitable pinions 11, mounted on a transverse shaft 12 below the surface of the abutment. These rack-bars cooperate with the gate-supporting chain 6 in holding the gate in a vertical position.

The gate may be actuated either by air-power or by electricity. When operated by air, I provide vertical cylinders 15 near each end of the gate, having pistons 16 and piston-rods 17, the latter being provided with an arm 18, connected with the lower edge of the gate. An air-pipe 20, arranged transversely of the roadway near the face of the abutment, is provided with an open branch 21, leading to and projecting from the face of the abutment, and other branches 22, leading to the lower ends of the cylinders 15. Another air-pipe 23, having a similar location to that of the pipe 20, is provided with an open branch 24, projecting from the face of the abutment, and branch 25, leading to the upper ends of the cylinders 15, the arrangement being such that air under pressure from the pipe 20 will enter the lower ends of the cylinders 15 underneath the pistons 16 to elevate the latter and lift the gate through the medium of the piston-rods 17 and connecting-arms 18, while if the air under pressure is admitted to the cylinders from the pipe 23 it will enter the cylinders above the pistons 16 and cause the depression of the gate.

The air-supply to operate the gates at the respective ends of the bridge is derived from the pump-cylinders 30 and 31, located underneath the bridge. These cylinders are provided with pistons 32 and 33, respectively, by means of which air under pressure may be supplied to the gate-operating cylinders and pistons, as hereinafter explained. The pistons 32 and 33 are connected by a piston-rod 34 and are operated by means of a hand-lever 35, which is fulcrumed on the bridge and loosely connected with the piston-rod. The pump-cylinder 30 is provided with flexible tubular connections 36, communicating between said cylinder and longitudinally-movable tubular rods 37, mounted in suitable bearings underneath the bridge platform or floor and alined with the branch tubes 21 at the respective ends of the bridge. The outer ends of the rods 37 are provided with a tapering portion 38, adapted to enter the open ends of the tubes 21 when the rods 37 are moved outwardly. Similar connections are formed between the pump-cylinder 31 and the branch

tubes 24 through the medium of the flexible tubular connections 39 and longitudinally-movable rods 40, these rods being also provided with tapered end portions 38, adapted to register with and enter the open ends of the tubes 24.

At or near the center of the bridge I have provided an operating-lever for the rods 37 and 40, respectively, this lever being fulcrumed at 44 and provided with an actuating-arm 45, oppositely-extending connecting-arms 46, having loose-jointed connection with the rods 37, and oppositely-extending arms 48, having loose-jointed connection with the rods 40, whereby when the actuating-arm 45 is moved in one direction both rods 37 will be moved outwardly, while the arms 40 will be retracted, while if the actuating-arm 45 be moved in the opposite direction the rods 37 will be retracted and the rods 40 extended or moved outwardly. Motion is communicated to the arm 45 of the lever from the vertically-disposed hand-lever 50 through the medium of the connecting-link 51, the arrangement being such that when the lever 50 is in the vertical position the rods 37 and 40 will all be withdrawn from the corresponding tubes or coupling-heads 21 and 24 with which they register. If the lever 50 is moved to the point 55, Fig. 1, the rods 37 will be actuated through the medium of intervening connections into contact with the pipes 21. If the lever 50, however, be adjusted to the point 56, Fig. 1, the rods 37 will be retracted and the rods 40 will be moved outwardly into engagement with the tubes 24. Assuming that it is desired to raise the gate, the lever 50 is first moved to the point 55 to establish the communication between the rods 37 and tubes 21, thus connecting the bridge-tubes with those on the abutment which lead to the lower end of the cylinders 15. The lever 35 is then reciprocated until sufficient air-pressure is exerted underneath the pistons 16 to lift the latter with the gate, whereupon the lever 50 is moved to the vertical position to adjust the tubular rods 37 and 40 in the position in which they are shown in Fig. 2, when the bridge may be opened. When the bridge is again closed, the lever 50 is moved to the point 56, thus causing the tubular rods 40 to engage in the tubes 24, when the lever 35 is again actuated to force air from the cylinder 31 through the pipes 40 and the intervening tubes to the upper ends of the cylinders 15 until sufficient pressure is exerted to retract the gate to the level of the street.

In Fig. 3 I have illustrated a plan for operating the gates by means of electricity, in which the branch tubes or coupling-heads 21 and 24 are constituted electrodes, the rods 37 and 40 serving as switches, by means of which an electrical circuit is closed through the corresponding electrodes when brought in contact therewith. 59 is an electric motor included in a circuit which is closed by contact of the rods 37 with the electrodes 21, the motor thereupon causing the elevation of the gate through the medium of the gear-wheels 57 and 58, shaft 12, pinions 11, and rack-bars 10. When it is desired to lower the gate, the circuit is closed through the motor 60 through the medium of the rods 40 and electrodes 24, when motion will be communicated from the motor through the gear-wheels 61 and 62, shaft 12, pinions 11, and rack-bars 10, the motor 60 being arranged to revolve in an opposite direction from that of the motor 59. It will be understood that any suitable current-supply may be provided, with suitable conductors leading to the rods 37 and 40, respectively, and from the motors to any suitable return-circuit connections. As the requirements for making such electrical connections are well understood, I have not illustrated the conductors, it being deemed sufficient to show the motors and the switches and electrodes for closing the circuit through them.

Where the bridge is crossed by a railway-track or tramway, I provide the right-hand track with a section 65, which is pivotally secured at 66 on the side of the gate nearest the abutment and extends through the gate, with a segmental depending arm 67 at its outer end, provided with a hook 68, adapted to engage a fixed projection 69 when the track-section is raised, as shown by dotted lines in Fig. 5. The track-section 65 is provided with a notch 72, in which the upper rail 70 of the gate enters when the gate is lowered. When the gate is raised, however, the track-section 65 remains in position until it is engaged by a bar 71 in the lower portion of the gate, whereupon the continued upward movement of the gate lifts the track-section to the position shown in dotted lines in Fig. 5. When in this position, the track-section will serve as a buffer against which the wheels of a car upon a track will impinge, thereby preventing the further progress of the car. As the pressure of the car-wheel will be exerted longitudinally of the track-section 65 when the latter is raised, it is obvious that the track-section will offer great resistance and will be effective in preventing the car from accidentally passing over the edge of the draw.

It will be observed that with the above-described construction the rack-bars 10, pinions 11, and shaft 12 perform the double function of preserving the alinement of the gate at each end when the latter is raised by air-pressure and also of facilitating the connection of the electric motors, whereby the gate may be operated by electric power.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a bridge and one of its abutments; of a gate arranged transversely of the approach to the bridge; actuating mechanism for raising and lowering the gate; coupling-heads on the face of the abutment, one having operative connection with

the gate-lifting mechanism, and another with the gate-lowering mechanism; a source of power-supply; longitudinally-movable power-transmitting connections located on the bridge, and arranged to separately connect the coupling-heads with the source of power-supply; and manually-controlled mechanism for alternately coupling and uncoupling said connections from their respective coupling-heads, said connections being normally disconnected from the heads.

2. In a device of the described class, the combination with a gate and actuating mechanism therefor; of separate coupling-heads on the face of the bridge-abutment, having separate operative connection with the gate setting and reversing mechanism; manually-controlled devices on the bridge, adapted to be separately engaged with the corresponding coupling-heads; and power-supply connections with said devices.

3. The combination with a bridge and its abutments; of a gate located in a suitable channel in each abutment or approach; depending rack-bars connected with the gate near each end; pinions arranged in mesh with said racks and mounted on a common supporting-shaft; air-cylinders provided with pistons having operative connection with the gate; independent tubular connections for the opposing ends of said cylinders, having open-ended projections on the face of the abutment; a source of air-supply located on the bridge; and mechanism for alternately connecting the air-supply with the tubular connections leading to the upper and lower ends of the gate-actuating cylinders, respectively.

4. The combination with a bridge and its abutments; of a gate located in a suitable channel in each abutment or approach; depending rack-bars connected with the gate near each end; pinions arranged in mesh with said rack-bars and mounted on a common supporting-shaft; air-cylinders provided with pistons having operative connection with the gate; independent tubular connections for the opposing ends of said cylinders, having open-ended projections on the face of the abutment; a source of air-supply located on the bridge; and mechanism for alternately connecting the air-supply with the tubular connections leading to the upper and lower ends of the gate-actuating cylinders, respectively; together with means for counterbalancing the weight of the gate.

5. The combination with a bridge and its abutments; of a gate located in a suitable channel in each abutment or approach; depending rack-bars connected with the gate near each end; pinions arranged in mesh with said racks and mounted on a common supporting-shaft; air-cylinders provided with pistons having operative connection with the gate; independent tubular connections for the opposing ends of said cylinders, having open-ended projections on the face of the abutment; a source of air-supply located on the bridge; mechanism for alternately connecting the air-supply with the tubular connections leading to the upper and lower ends of the gate-actuating cylinders, respectively; together with a movable track-section extended through the gate and pivoted at one side thereof; and a lifting-bar located on the gate and adapted to engage and lift the track-section during the final movement of the gate.

6. The combination with a bridge and its abutments; of a gate arranged transversely of the approach to the bridge; depending rack-bars connected with the gate near each end; pinions in mesh with said racks; a common supporting-shaft for said pinions; a source of power-supply; bridge raising and lowering mechanism; power-transmitting connections for operating said mechanism to raise the bridge; independent connections for operating the actuating mechanism to lower the bridge; coupling-heads for each of such connections projecting from the face of the draw; and manually-controlled power-transmitting connections for each coupling-head, located on the bridge and adapted to actuate in opposite directions to engage and disengage the same from said heads, and connect the same with the source of power-supply, said connections being normally out of engagement with the coupling-heads.

7. In a device of the described class, the combination with a bridge-gate and its operating connections; of a rail or tram way section of a track, pivotally secured to a fixed support at one end; and a connection between the gate and the track-section adapted to communicate motion from the former to the latter when said gate is completing its movement in either direction.

8. In a device of the described class, the combination with a bridge-gate and its operating connections; of a rail or tram way section of a track, pivotally secured to a fixed support at one end; and a connection between the gate and the track-section, adapted to communicate motion from the former to the latter when said gate is completing its movement in either direction; together with means for limiting the upward movement of the end of the track-section opposite to its pivotal connection.

9. In a device of the described class, the combination with a bridge-gate and its operating connections; of a rail or tram way section of a track, pivotally secured to a fixed support at one end; and a connection between the gate and the track-section, adapted to communicate motion from the former to the latter when said gate is completing its movement in either direction; said track-section being provided with a depending hooked arm, adapted to engage a fixed support, and limit its upward movement.

10. In a device of the described class, the combination with a bridge-gate and its actu-

ating connections; of a rail or tram way track section, pivotally secured at one end to a fixed support, and extending through the gate, said track-section being provided with a notch adapted to receive the upper gate-bar; and said gate being provided with a vertical guide-way through which the track-section passes, adapted to permit a limited vertical movement of the gate, without actuating the track-section; and track-engaging bars adapted to actuate said section during the final movement of the gate.

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

HERMAN W. TEN BROEKE.

Witnesses:

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