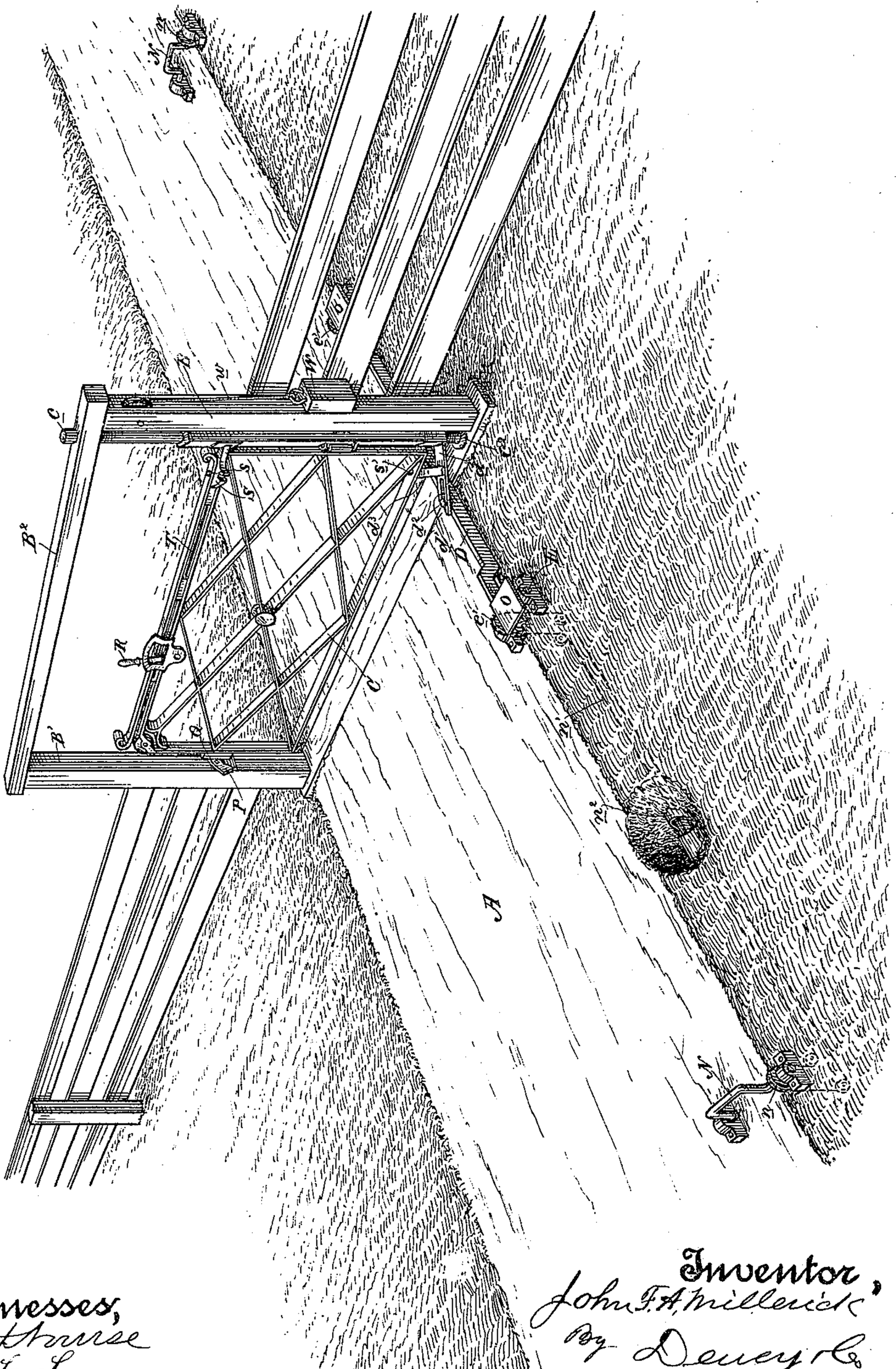
(No Model.) 3 Sheets—Sheet 1.

J. F. A. MILLERICK.

GATE.

No. 447,013. Patented Feb. 24, 1891.

Fig. 1.



Witnesses,
L. Strause
H. C. Lee.

Inventor,
John F. A. Millerick,
By Dewey & Co.
Attys

(No Model.) 3 Sheets—Sheet 2.

J. F. A. MILLERICK.

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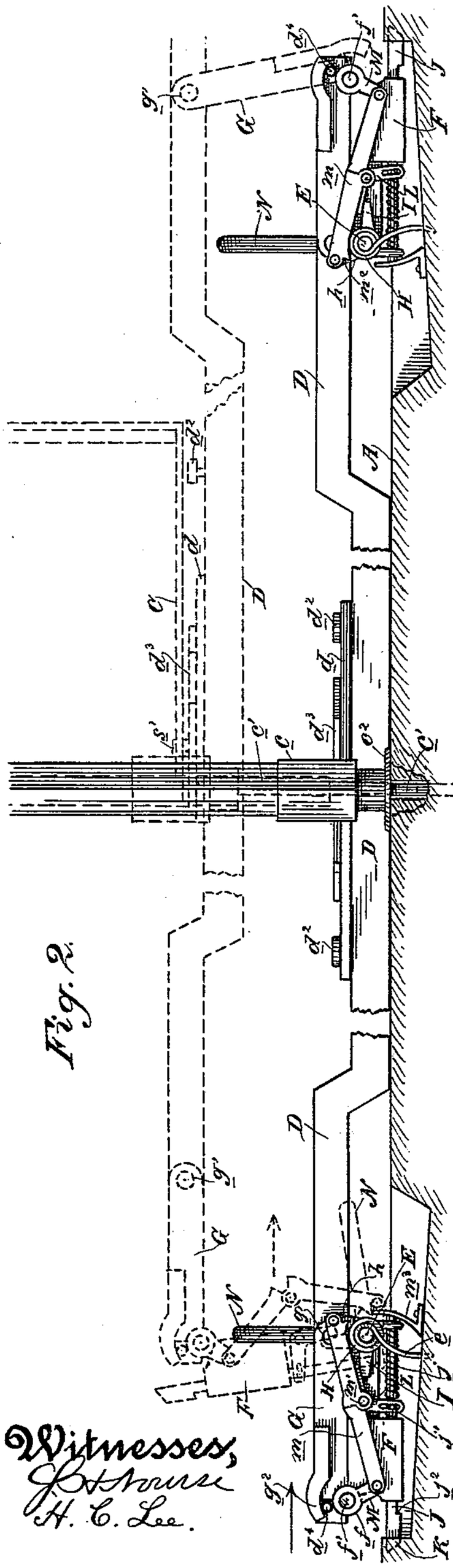

Fig. 2.

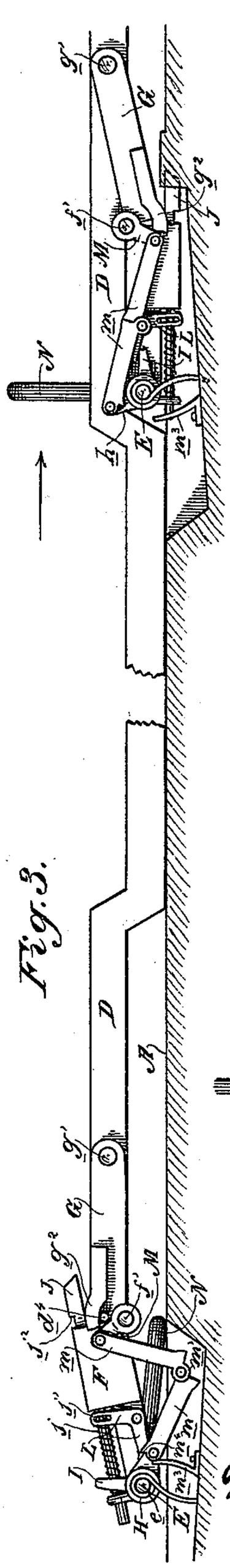

Fig. 3.

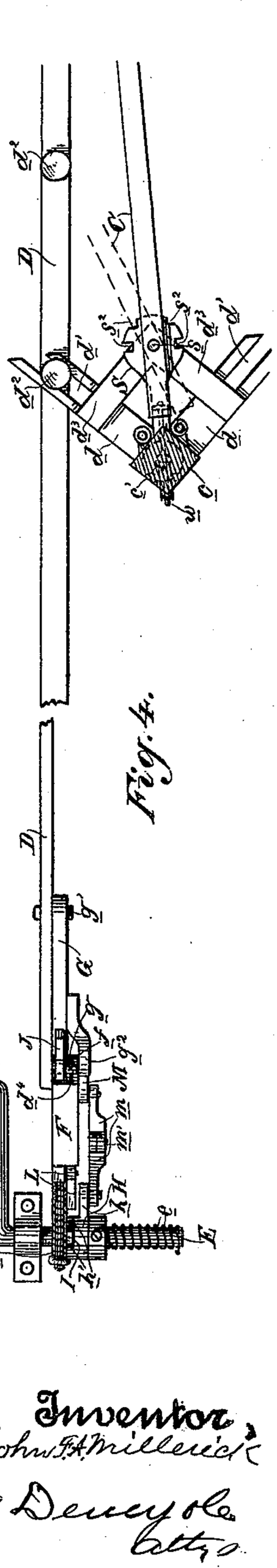

Fig. 4.

Witnesses,
H. C. Lee.

Inventor,
John F. A. Millerick
By Dewey & Co.
Attys.

(No Model.) 3 Sheets—Sheet 3.

J. F. A. MILLERICK.

GATE.

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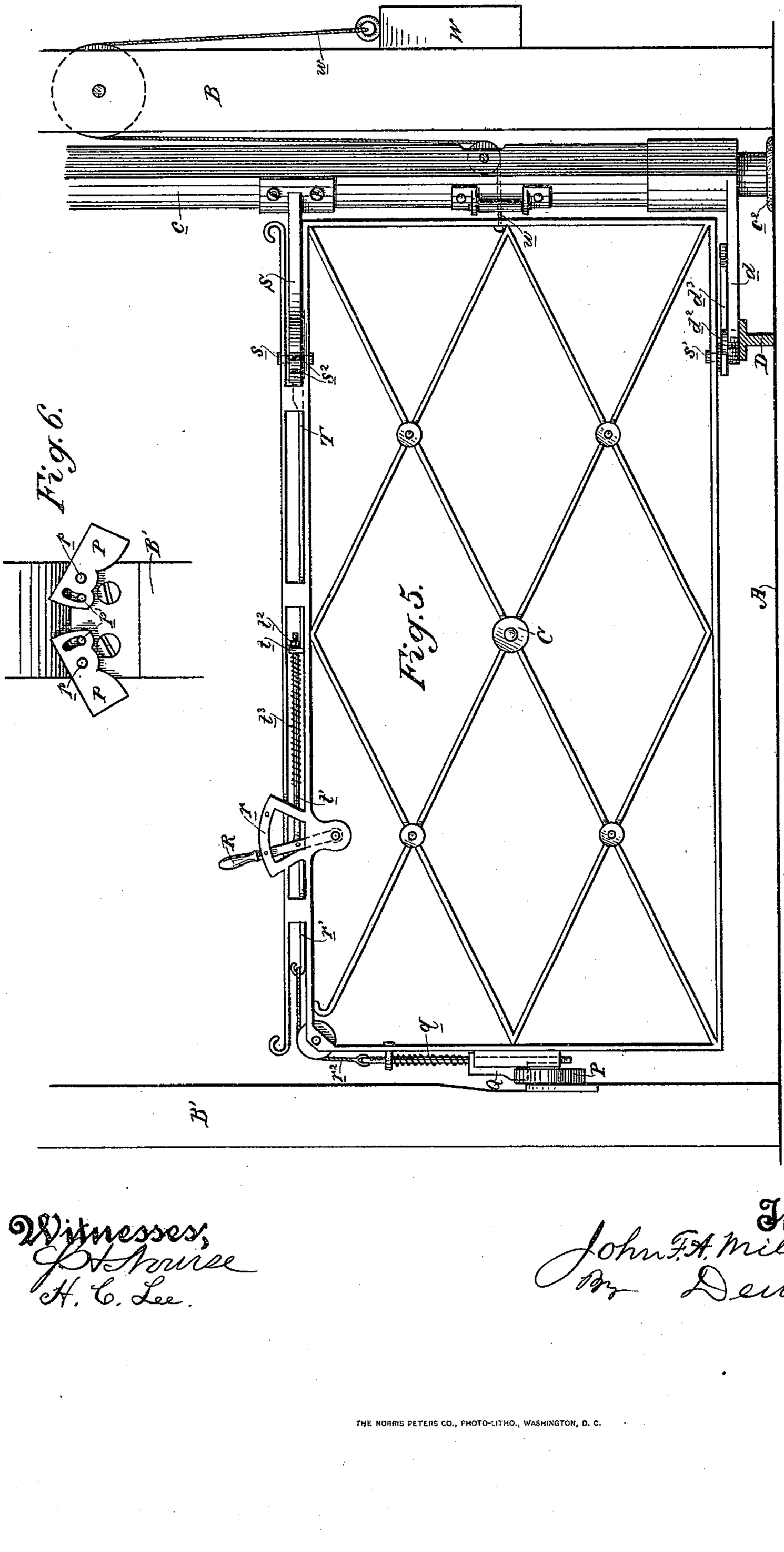

Witnesses,
H. C. Lee.

Inventor
John F. A. Millerick
By Dewey & Co.
Attys.

UNITED STATES PATENT OFFICE.

JOHN F. A. MILLERICK, OF SAN FRANCISCO, CALIFORNIA.

GATE.

SPECIFICATION forming part of Letters Patent No. 447,013, dated February 24, 1891.

Application filed July 10, 1890. Serial No. 358,342. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. A. MILLERICK, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Gates; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of gates adapted to be opened and closed by the wheels of an approaching and receding vehicle running down cranks in the roadway; and it consists in the novel constructions and combinations hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide an effective and readily-operating gate of this class.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a view of my gate. Fig. 2 shows the operating parts when the gate is closed, the dotted lines showing the position when a vehicle is advancing from the left. Fig. 3 shows the movement completed and the gate swung open. Fig. 4 is a plan view of the left side of Fig. 3. Fig. 5 is a front view of the gate. Fig. 6 is a face view of the gate-catch.

A is the roadway, on one side of which is the gate-post B, to which the gate is hinged, and on the other side is the gate-post B′, which carries the catch of the gate. A top bar B^2 extends between and is supported by the two posts.

C is the gate, having at one end a standard *c*, the upper end of which is pivotally mounted and vertically movable in the top bar B^2, and the lower end is hollow or tubular and fits freely over a fixed standard *c′*, rising from the roadway or a suitable beam therein, and having at its base a cushion or buffer c^2, upon which the lower end of the gate-standard normally rests. This manner of hanging the gate provides for its vertical movement bodily, its end standard *c* passing up through the top bar B^2, and the lower end of said standard moving up and down on the fixed standard *c′*, the fall of the gate being broken by the cushion or buffer c^2. This vertical movement of the gate frees its latch, hereinafter described, from the catch on the post B′, so that the gate may swing open.

Extending longitudinally in the side of the roadway past the gate is the gate-operating bar D.

Secured to the lower end of the gate-standard *c* are arms *d*, two in number, and extending at right angles to each other. The outer ends of these arms are slotted at *d′* and are adapted to fit freely over and play past studs or pins d^2 on the bar D. Suitable braces d^3 are connected with the arms and with the bottom rail of the gate. Now it will be seen that if the bar D be raised the gate itself will be raised bodily; but the bar D is adapted not only to be lifted but to be moved while lifting longitudinally as well; or, in other words, the whole bar is made to describe a half-circle in a vertical plane. The effect of this is first to raise the gate sufficiently to free its latch from the catch, and then by the engagement of one of the studs or pins with one of the arms *d* to turn said gate to an open or closed position, according to the direction in which the bar is moved, the other of said arms *d* meanwhile playing free from the other stud or pin of the bar.

The mechanism for operating the bar D is as follows: One device is located on one side of the gate and the other on the other side, and each is the counterpart of the other. Mounted in suitable bearings is a rock-shaft E in a plane transverse to the roadway, but at one side thereof. Upon the outer end of this shaft is a spring *e*, the tendency of which is to rock the shaft back again in a direction toward the gate. Connecting the bar D and the rock-shaft E is what may be termed a "toggle-lever." It consists of two bars or members. The lower member F is freely journaled at its inner end on shaft E, and has a slotted ear *f* at its outer end, between the parts of which is fitted the ear *g* of the upper member G, which is pivoted at its other end at *g′* to the bar D. The ears *g* and *f* of the members G and F are pivoted together by a pin *f′*. Extending from the side of the end of bar D is a contact-pin d^4, which projects outwardly and lies directly over the ears of the members F and G. This construction results in the following movement: If the lower mem-

ber F be turned about its pivotal inner end with the shaft E for an axis, so that its outer end is swung upwardly, the ear of said outer end, bearing up under the contact-pin d^4, will raise the bar D, and the upper member G, being connected with said bar, will carry the bar over through the arc of its movement, remaining parallel with the side of said bar. When the member F reaches a vertical position, it is at right angles to the bar and to the member G, and further movement past the vertical carries the two members into substantial alignment. Now, on the backward movement the two members pass from alignment through a position at right angles to each other and down to their first position, where they lie parallel and on top of each other.

Securely fastened to the shaft E is a collar H, from which projects a crank-arm h. In one side of this collar is made a groove, leaving terminal shoulders h'.

Pivoted upon the shaft E is a catch-arm I, which is adapted to have a free movement between the terminal shoulders h' of the collar H, and to be controlled by them.

Mounted in the lower portion of the lower member F and adapted to slide longitudinally therein is a locking-bar J, the outer end of which is adapted to be projected into and to engage a socket K in the roadway. The rear or stem end of this locking-bar has a surrounding spring j, the tendency of which is to keep said bar normally projected to its engagement with the socket K.

Pivoted on one side of the member F is a bell-crank lever L, one arm of which is slotted over a pin j' of the locking-bar, and the other arm is in the path of the projecting catch-arm I. The head of the locking-bar J is shouldered at j^2, whereby its backward movement is limited by coming in contact with the body of the member F, in which it is seated. Now upon rocking shaft E in a direction toward the gate the shoulder h' of collar H on said shaft picks up the catch-arm I, and the end of this arm, coming in contact with the bell-crank lever L, swings said lever so that its other arm withdraws the lock-bar J from its engagement with the socket K. This retraction of the locking-bar is only sufficient to relieve it from its socket, and then its shoulder j^2 coming in contact with the body of member F said lock-bar is limited, and further movement of the shaft E through the contact of the catch-arm I and bell-crank lever L results in connecting the member F with the shaft E, so that the movement of the shaft imparts movement to the member F, and consequently the bar D is raised and swung over through its half-circle, as heretofore described. Now upon the return movement the members F and G, bending at their hinged ends, move freely without affecting the shaft E until the end of bell-crank lever L, coming in contact with the catch-arm I, has moved said arm until it strikes the terminal shoulder h' of collar H, whereupon the shaft E is rocked back through the latter half of the movement of bar D and the lock-bar J slips to its engagement with the socket K. In the movement of the bar D it will be seen that the rocking of shaft E is only through a quarter-revolution, which is sufficient to raise the member F to a vertical or a little past a vertical position, and after the perpendicular is passed the bar D drops by gravity the rest of the way.

Pivoted upon the pivot-pin f' of the members F and G is a contact-arm M, with which one end of a jointed lever m is connected, the other end of said lever being connected with the crank-arm h of the collar H. This lever is jointed at its middle by a shouldered hinge m', which allows for the bending of the lever in one direction, but limits it in another. Upon the side of the member G is a contact lug or piece g^2. These parts apply to the closing of the gate by rocking shaft E in an opposite direction, as will be more fully described. By the opening movement of the bar the contact-lug g^2 is thrown around into contact with the arm M on the pin f'. At this time the jointed lever m is straight and rigid.

Now upon turning the shaft E away from the gate its effect will be, through the rigid lever m and the contact-arm M, to bear against the contact-lug g^2, whereby the member G is swung around on its hinge to and a little past the vertical, thereby raising the bar D, and when past the perpendicular the bar drops down to its normal position with the two members G and F parallel and upon one another. The reason for the joint in lever m is to allow it to bend on the other movement of the shaft when its operation is not called for, and this bending is insured by the engagement of a small shoulder m^2 on the lower end of the lever, which is adapted to come in contact with a piece m^3, fixed below.

The following detailed description of the operation of these parts will at this point be of advantage. For the time being let it be supposed that a crank is connected with each of the shafts E, said crank being located in the roadway in the path of one of the wheels of the vehicle and held normally in a vertical position by means of the springs e, this position being limited by the normal contact of the catch-arm I with the bell-crank lever L. In this position the parts on one side occupy the same relation to each other as the parts on the other side—that is to say, the gate is closed, the bar D is down, the upper member G of the toggle-lever lies parallel with and alongside of the end of the bar, the lower member F of said lever extends parallel with and directly under the upper member, the jointed lever m is straight, the lock-bar J is projected to its engagement with the socket K, the catch-arm I is in contact with the bell-crank lever L, and the contact-pin d^4 of bar D rests upon the jointed ears of the members of the toggle-lever. Now let us suppose a vehicle to approach the

gate from the left-hand side and its wheel to run down the crank on said side. As the crank turns, the shaft E is turned toward the gate. The shouldered collar H of shaft E now picks up catch-arm I, and said arm, coming in contact with bell-crank lever L, causes said lever to withdraw the locking-bar J from socket K. Thus the parts which had heretofore been locked by the bar J (and the gate therefore prevented from being moved by any other means) are released. The shouldered head of the lock-bar J, now coming in contact with the body of the lower member F of the toggle-lever, forms the connection, as heretofore described, of said member with shaft E, and continued movement of said shaft therefore operates to swing the lower member F upwardly through a vertical arc of a circle. This movement through the contact of the joint of said lever with pin d^4 of bar D, raises and causes said bar to accompany the lower member of the toggle-lever, the upper member of the toggle-lever remaining in its position parallel with and alongside of the bar D, as all the raising of said bar at this end is done by the lower member. This movement continues until the crank has been depressed to the ground, at which time the shaft E has performed a quarter-revolution and the lower member F of the toggle-lever has reached a position a little beyond the perpendicular. Now turning to the mechanism to the right, or on the other side of the gate, we find that the following movement has taken place. As the bar D rises the end on the right simply turns about the joint of the toggle-lever, carrying the upper member G with it, so that said upper member turns through an arc in a vertical plane, coming to a perpendicular position as the lower member F on the first or left-hand side reaches the perpendicular. On the right-hand side the lower member F remains in its normal position, and also all the parts connected with it. Now the bar D, being in its highest position and having moved through half of its course, has lifted and partially turned the gate open, away from the approaching vehicle. This movement carries the member F on one side and the member G on the other, a little past the vertical, so that as the wheel of the vehicle leaves the depressed crank, which it has run over, the bar by its own weight accomplishes the other half of its movement, falling by gravity down to its lower position, whereby the gate is fully opened. Now turning to the parts on the left we have them in this position: The upper member G of the toggle-lever is still parallel and alongside of the end of the bar D. The lower member F, having passed through approximately a semicircle, lies extended from and substantially in the line of the upper member. The jointed lever m is bent at its joint, as is necessary, on account of the now-contracted distance between its ends, this bending having been insured by the contact of its end with the fixed piece m^3. The bell-crank lever L has left the catch-arm I, which arm occupies a substantially vertical position, and the crank which the wheel ran over lies upon the ground. Now turning to the right-hand side we find this position of the parts: The lower member F and all its adjacent and connected parts, including the shaft E, remain in the first position, having been unaffected by the movement of the bar D, which takes place with the assistance of the upper member G only, and the crank which we have supposed to be attached to shaft E remains in an upright position. The upper member G is extended from and lies substantially in line with the lower member F, and the contact-lug g^2, attached to said upper member, has by its movement been carried around into the path of and lies directly against the contact-arm M. Now the vehicle passes through the gate, and its wheel runs down the crank on the right-hand side. This turns the shaft E through a quarter-turn in a direction away from the gate, and its effect is as follows: The jointed lever m, now rigid, is forced outwardly by its connection with the crank-arm h of the collar H on the shaft, and thereby forces the contact-arm M against the lug or piece g^2 on the upper member G. This forces said upper member upwardly and backwardly until the crank having reached a recumbent position in the roadway the upper member is raised to a position a little past the vertical, and as soon as the wheel leaves the crank the spring e returns the shaft and connected parts back again to the normal position, so that the crank immediately rises. Now at the other side of the gate—namely, on the left—the upward movement of the bar takes place about the joint of the toggle-lever and about the journal of the inner end of the lower member on the shaft E, so that said lower member is raised to and a little bit past the vertical, and about this time the bell-crank lever, coming back to its contact with the catch-arm I and said catch-arm coming to its engagement with the shoulder of the collar H, is ready to return the shaft and raise the crank in the roadway. This rising and backward movement of the bar D has returned the gate partially toward a closed position. Now the bar drops the rest of the way by gravity, as before described, so that all the parts return to the position first described and are locked by the bars J engaging the sockets K, the gate being now closed and both cranks raised in the roadway. Now if a vehicle should approach in an opposite direction the reverse of this operation takes place. A weight W is suspended by a cord w, which, after passing over suitable pulleys, is connected with the gate and serves to assist in raising it. In this operation I have supposed that the cranks which the wheels are to run down are connected directly with the shafts E, and while this arrangement may be had I prefer the following arrangement: Shafts E

are set close to the gate on each side, so that the bar D need not be a very long one. The cranks, which are designated by N, are journaled in the roadway at any proper distance to allow for their operation before reaching the gate. The crank-shafts have chain-pulleys n, from which extend endless chains n' to pulleys e' on shafts E, whereby the movement of the cranks is transmitted to the shafts. I prefer to run these endless chains through channels or tubes n^2, placed under ground, said chains being properly directed into the channels or tubes by means of suitable guide-pulleys.

In order to house the parts connected with the shaft E and the ends of the lifting-bar, I have an angular plate or casing O, carried by the ends of the bar and adapted when the bar is down to fit over the several levers and connected parts.

On the gate-post B′ is secured the catch. It consists of opposing plates P, each pivoted at p to the gate-post, and each slotted over a fixed pin p' at its inner end. The outer end of the plates is heavier within the inner end, so that they drop by gravity to a position in which their tops are outwardly and oppositely inclined, being held in this position by the pins p'.

Between the adjacent ends of the two plates a space is left to receive the gate-latch. The gate-latch Q consists of a vertically-movable bar mounted in guides on the end of the gate and held down by a spring q. When this latch meets the outer depressed end of one of the catch-plates, it rises thereon until having passed the pivotal center of said plate the latter rocks, and the latch passes over it to its inner end, where it drops between the two plates, the plate over which it passed returning by gravity to its normal position, and thus the latch is confined between the two plates.

Now to operate the gate by hand I have the following mechanism: Pivoted in the top rail of the gate is a lever R, the upper end of which is adapted to engage and to be fixed by a rack r. This lever is connected by a link r' with the end of a cord r^2, which passes over a guide-pulley in the end of the gate, and is connected at its lower end with the movable gate-latch Q. Now by operating this lever the gate-latch can be raised from the catch, thus freeing the gate; but in order to allow the gate to turn without affecting the mechanism in the roadway, heretofore described, I have a second hinge for said gate. Extending outwardly from the gate-standard c is an arm S, to the end of which the gate is pivoted at s. The bottom rail of the gate is pivoted at s' to the braces d^3 of the arms d, so that the gate is thus provided with a second hinge-center, and can turn about this second hinge without affecting the standard c.

Now to hold the gate in an open position when turned upon this second hinge I have the following mechanism: The end of arm S is formed with notches s^2. Mounted in the top of the gate is a sliding pawl-bar T, the outer end of which is adapted to engage the notches. The inner end of the pawl-bar has a perforated lug t, through which passes the end of a link-rod t', the other end of which is connected with the lever R. The end of the link-rod which passes through the perforated lug t is provided with the nut t^2, so as to limit the play of the link-rod in said lug, and a spring t^3 encircles the link-rod between the lug and a shoulder on the link-rod so as to affect the pawl-bar and keep it to its engagement. Now, when the lever R is moved to raise the latch its movement is not interfered with, for link-rod t' simply plays freely through the lug t. Then the gate is swung open, and the pawl-bar, influenced by the spring t^3, seeks engagement with the notches s^2 in arm S, thereby holding the gate open. To release it, the lever R is turned in the other direction, whereby the link-rod t' is moved, and its nut t^2, coming in contact with lug t, withdraws the pawl-bar T, and the gate can be closed. In order to make the weight W assist in closing the gate when operated by hand, I run the inner end of cord w through standard c, and, guiding it by small pulleys on the inner side of the standard, connect it with the gate-end proper. As the gate swings open on its second hinge this end moves away from the standard, and thus raises the weight.

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

1. In combination with the gate having the axially and vertically movable standard c, the swinging bar D in the roadway, and arms fixed to the standard connecting said bar with the standard of the gate, whereby the standard is raised and turned axially to free the gate and swing it, substantially as herein described.

2. In combination with the gate having the axially and vertically movable standard with a hollow lower end and the fixed standard c', over which the lower end of the gate-standard is fitted and moves, the swinging bar D and arms secured to the gate-standard and connecting the same with the bar, substantially as herein described.

3. In combination with the gate having the vertically and axially movable standard, the swinging bar D, having the fixed pins or studs d^2, and the arms d, connected with the gate-standard and freely slotted over the pins or studs of the bar, substantially as herein described.

4. In combination with the gate having the vertically and axially movable standard, the swinging bar D, and connections between the bar and the standard, the means for operating the bar D, consisting of the rock-shafts E and the toggle-levers, one member of which is connected with the rock-shaft and the other with the bar, substantially as herein described.

5. In combination with the gate having the vertically and axially movable standard, the swinging bar D, and connections between the bar and standard, the means for operating the bar D, consisting of the rock-shafts, the toggle-levers, one member of which is pivoted upon the shafts and the other to the bar, the contact-pins d^4 of the bar under which the joints of the toggle-levers work, and a connection between the shafts and the lower members of the toggle-levers, whereby the latter are operated by the turning of the former, substantially as herein described.

6. In combination with the gate having the vertically and axially movable standard, the swinging bar D, and connections between the bar and the standard, the means for operating the bar D, consisting of the rock-shafts E, the members F and G of the toggle-levers, pivoted to the shafts and to the swinging bar, respectively, the contact-pins of the bar operated by the toggle-levers, the spring-controlled locking-bars J, engaging fixed sockets and having shouldered heads for limiting their retraction, the bell-crank levers connected with the locking-bars, and the catch-arms I on the shafts, adapted to engage the bell-crank levers, substantially as herein described.

7. In combination with the gate having the vertically and axially movable standard, the swinging bar D, and connections between the bar and standard, the means for operating the bar D, consisting of the rock-shafts E, the pivoted toggle-levers connecting the shafts with the bar, the contact-lugs g^2 on the upper members of the toggle-levers, the contact-arms M, adapted to come in contact with said lugs, and the jointed levers m, connecting the contact-arms with the rock-shafts, substantially as herein described.

8. In combination with the gate having the vertically and axially movable standard, the swinging bar D, and connections between the bar and standard, the means for operating the bar D, consisting of the spring-controlled rock-shafts E, the toggle-levers, the lower members of which are pivoted on the rock-shafts, and the upper members are pivoted to the ends of the bar, the contact-pins d^4 on the bar operated by the joint of the toggle-levers, the spring-controlled sliding lock-bars J, carried by the lower members of the toggle-levers and adapted to engage fixed sockets, said lock-bars having shouldered heads for limiting their retraction, the bell-crank levers for operating the lock-bars, the catch-arms I on the shafts for operating the bell-crank levers, the contact-lugs g^2 on the upper members of the toggle-levers, the contact-arms M, operating against the lugs, and the jointed levers m, connecting the contact-arms with the rock-shaft, substantially as herein described.

9. In a gate, and in combination with the swinging bar D for operating it, the rock-shafts E, and connections therefrom to the bar, whereby the latter is operated, the swinging cranks in the roadway, and the endless chains and pulleys by which the movement of the cranks is transmitted to the rock-shafts, substantially as herein described.

10. The swinging gate, in combination with the arm S, having a notched end, the spring-controlled pawl-bar carried by the gate and adapted to engage the notched end of the arm for holding the gate open, and the lever and connections for releasing the pawl-bar, substantially as herein described.

11. In combination with the swinging gate, the spring-controlled latch, and the lever and connections for operating the latch, the fixed arm S, with a notched head, the spring-controlled pawl-bar carried by the gate for engaging said head, and the link connecting the lever with the pawl-bar, substantially as herein described.

12. The combination of the gate having a vertically and axially movable standard at one end, with which it rises and turns, the swinging bar D for raising and turning the standard, the arm S, projecting from the standard to which the gate is hinged, and a pivot for said gate below, whereby said gate can turn independently of the standard, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN F. A. MILLERICK.

Witnesses:

S. H. NOURSE,

H. C. LEE.