(No Model.) 2 Sheets—Sheet 1.

J. W. WERT.

SAFETY GATE FOR BRIDGES.

No. 305,255. Patented Sept. 16, 1884.

Fig. 1.

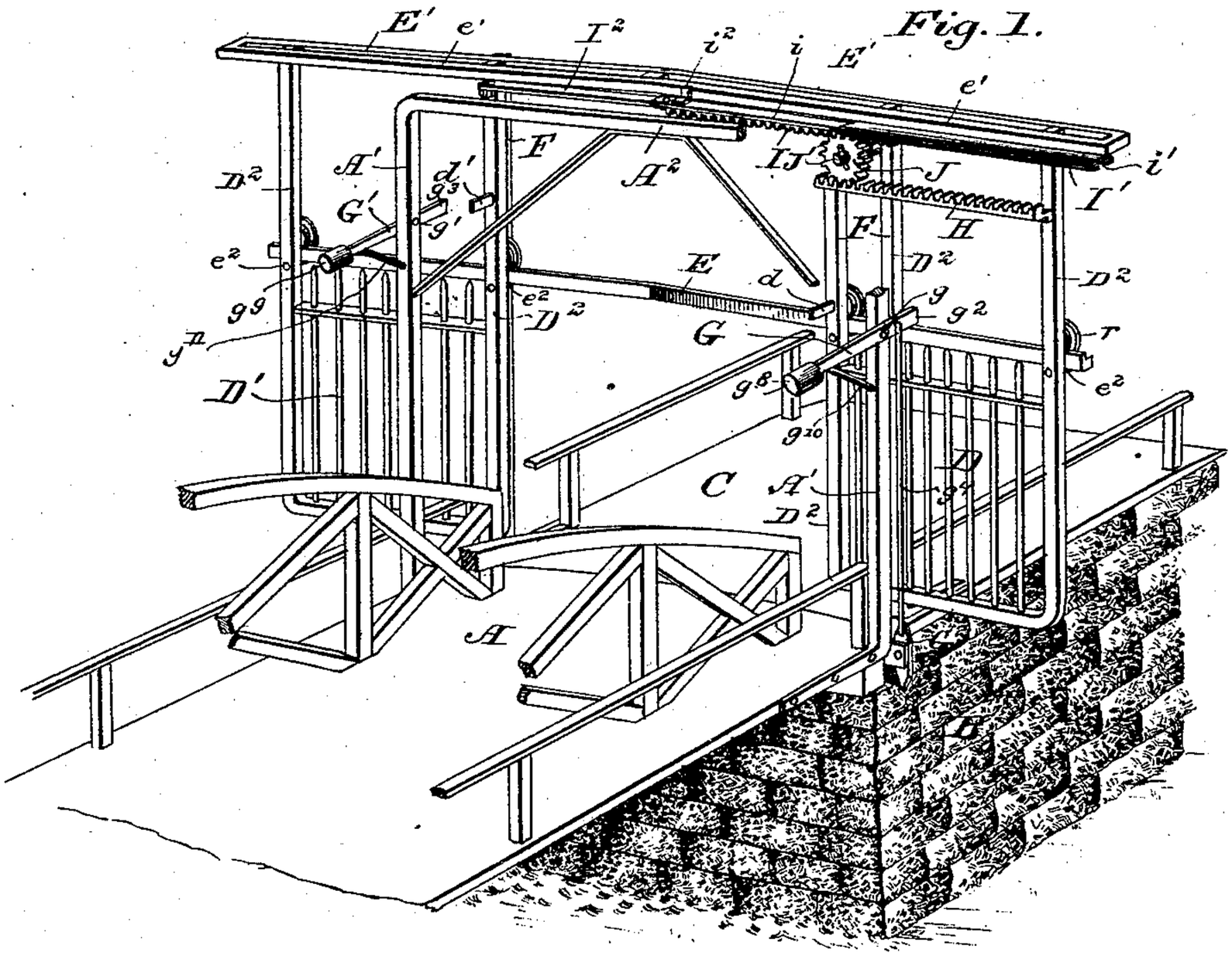
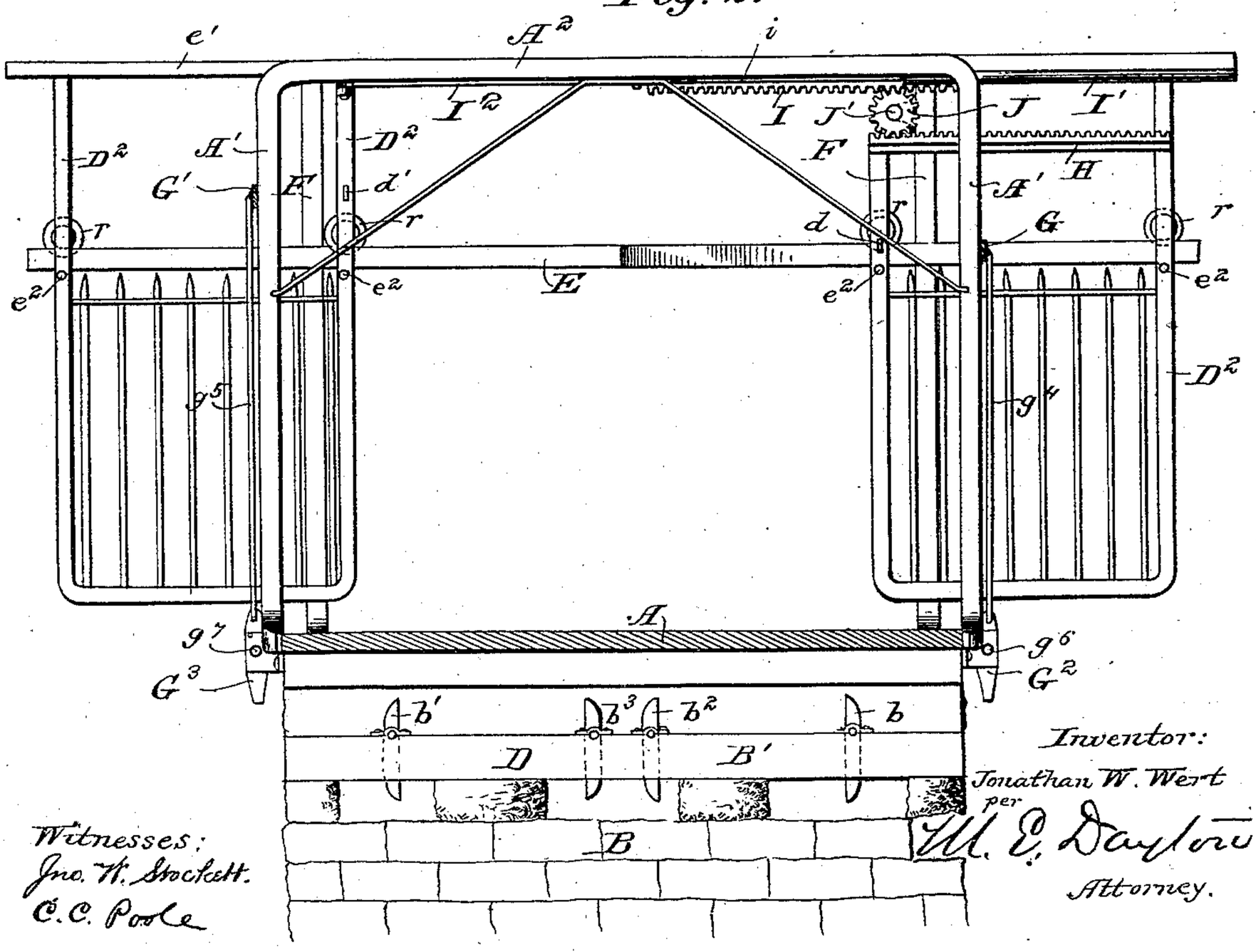


Fig. 2.



Witnesses:
Jno. H. Stockett.
C. C. Poole

Inventor:
Jonathan W. Wert
per
W. E. Daylon
Attorney.

(No Model.) 2 Sheets—Sheet 2.

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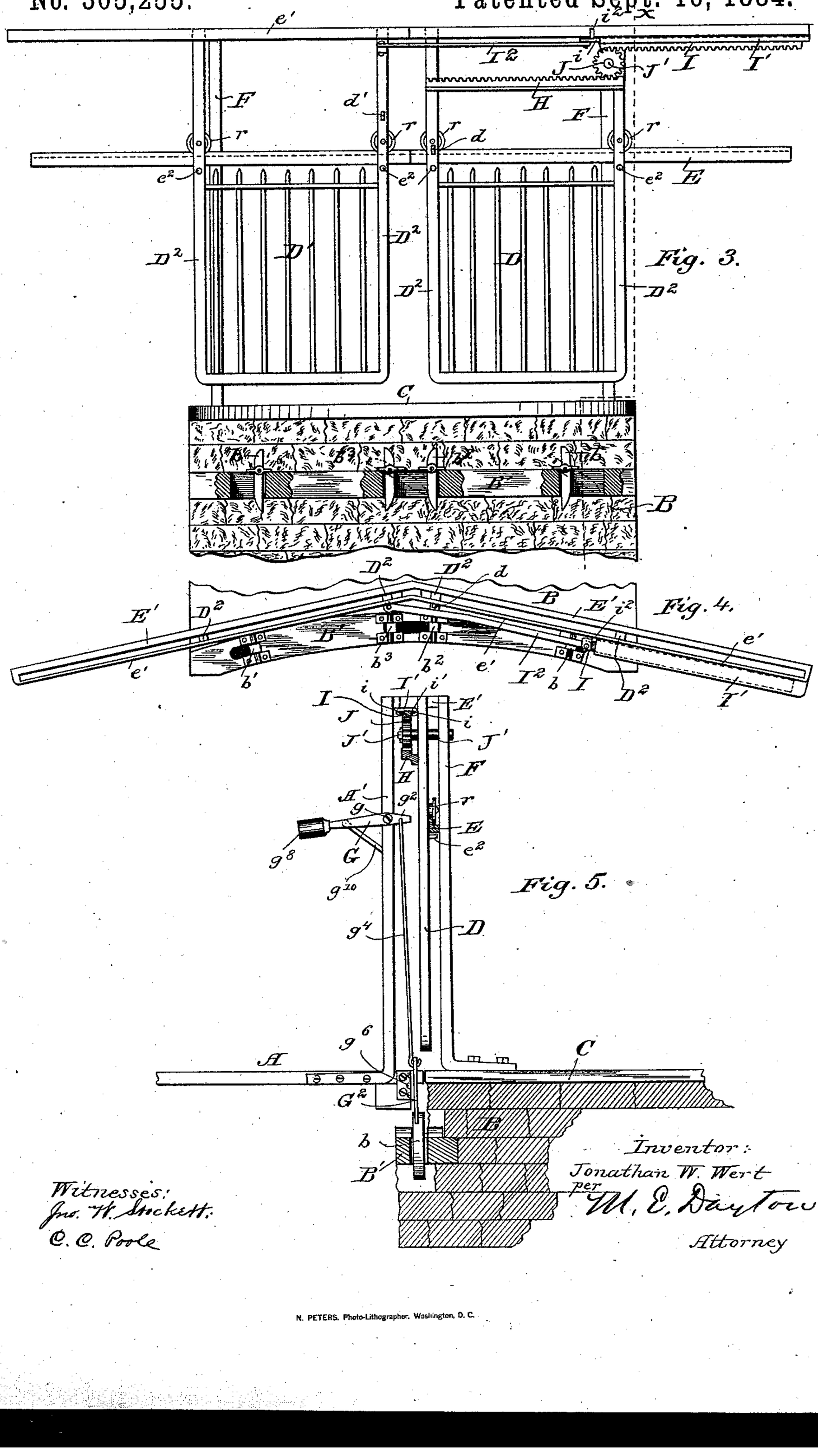

Witnesses:
Jno. H. Stockett.
C. C. Poole

Inventor:
Jonathan W. Wert
per
W. E. Dayton
Attorney

UNITED STATES PATENT OFFICE.

JONATHAN W. WERT, OF NAPERVILLE, ILLINOIS.

SAFETY-GATE FOR BRIDGES.

SPECIFICATION forming part of Letters Patent No. 305,255, dated September 16, 1884.

Application filed September 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN W. WERT, of Naperville, in the county of Du Page and State of Illinois, have invented certain new and useful Improvements in Safety-Gates for Bridges; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to safety-gates located at the approaches to the ends of a swinging bridge and operated automatically by the movements thereof. Its object is to generally improve the construction of such devices; and it consists in the matters hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of the end of a swinging bridge and one of its approaches, having a safety-gate embodying my invention placed thereon. Fig. 2 is a vertical cross-section of a bridge, taken near the end thereof, and showing the safety-gate and its operating mechanism in elevation. Fig. 3 is an elevation of the gate closed. Fig. 4 is a top or plan view of the gates and the supporting-frame thereof. Fig. 5 is a detail vertical section of the gates and end of the bridge, taken on the line *x x* of Fig. 3.

As illustrated in the drawings, A is the end of a swinging draw-bridge, which is supported upon a central pier, and is constructed to rotate thereon in either direction in a well-known manner.

B is one of the walls or abutments which support the approaches to the bridge, and with which the ends of the bridge come in contact when it is closed, and C indicates the surface of the roadway or approach to the bridge.

Over the approach C, near the end of the bridge, are located two sliding gates, D D′, which are supported by a stationary frame placed transversely over said approach, and which are constructed to meet at the center of the roadway, so as to close the approach to the bridge when it is open, and to be moved an equal distance laterally, so as to leave the approach clear when the bridge is open. The supporting-frame for the gates D and D′, above mentioned, preferably consists of two uprights, F, fixed at their lower ends to the abutment-wall B at either side of the roadway, a horizontal guide-piece, E′, secured to the top of said uprights, and a horizontal bar, E, constituting a track or way upon which suitable rollers upon the gates travel, as hereinafter described. The gates D and D′ preferably consist of bars D^2, which are bent so as to form a bottom rail and vertical side pieces to the gates. Upon the said bars D^2 are journaled grooved rollers, *r* which are constructed to run upon the track or way E, and by which the gate is upheld. The bars D^2 are extended above the rollers *r*, and engage at their upper ends slots formed by the cross-piece E′, and a parallel bar, *e′*, secured at its ends thereto, the said cross-piece and bar *e′* being located considerably above the track E, so that the gates are held firmly in a vertical position without additional support at their lower portions.

Upon the upper portion of the gate D, and secured at its ends to the vertical frame-pieces D^2 thereof, is a horizontal toothed or rack bar, H, having its serrated surface placed upwardly. A second and similar rack-bar, I, is located upon the horizontal bar E′ of the gate-supporting frame, and above and parallel with the rack-bar H, and in an inverted position. The rack-bar I is held and constructed to slide in a T-groove, *i′*, in a guide-piece, I′, secured to said bar E′, the said rack-bar I being provided with longitudinal flanges *i*, which enter the said groove *i′*, as shown. Journaled upon a bearing-pin, J′, secured to the upright F, is a pinion, J, which is located between and constructed to engage the rack-bars H and I, so that when one of the said bars is moved longitudinally the other will be moved an equal distance in the opposite direction by the action of said pinion, as clearly shown in the drawings. The rack I, which is arranged to slide in the stationary guide I′, as above mentioned, is connected at its end toward the center of the bridge with the gate D′ by means of a pitman, I^2, and the racks H and I and pinion J, operating as before described. When either one of the gates D or D′ is moved laterally, the other will receive a corresponding motion, and the act of opening or closing one gate will cause the other to move in a similar manner.

Upon the inner or meeting vertical frame-

pieces, D^2, of the gates D and D′ are placed projections or pins *d* and *d′*, one of said pins, *d′*, being placed higher than the other, as shown clearly in Figs. 1 and 2, and upon the end of the bridge structure, at either side thereof, and adjacent to the gates mentioned, are placed pivoted levers G and G′, having projecting ends g^2 and g^3, constructed to respectively engage the pins or projections *d* and *d′* when the bridge is swung. As a preferable means of supporting the levers G and G′, uprights A′ are placed at the ends of the bridge, at either side thereof, which are secured at their lower ends to the flooring of the bridge and joined at their top by a transverse bar, A^2, as shown, the levers G and G′ being pivoted to the said uprights A′ by means of pivot-pins *g* and *g′*, and the shorter ends g^2 g^3 of said levers being arranged to project from said uprights toward the gates, so as to engage the pins *d* and *d′*, as before described. The gates are opened and closed by contact of the projecting levers G and G′ with the stops *d* and *d′*, the engagement of one of the levers with one of said stops when the bridge is turned moving one of the gates, and the other gate being moved in the opposite direction by the operation of the racks H and I and the stationary pinion J, as above described.

The levers G and G′ operate, respectively, upon opposite sides of the stops *d* and *d′* in opening and closing the gates, suitable automatic devices being used for moving the said levers, so as to cause them to release and pass the said stops in leaving the gates after said gates have reached the limit of their movement in being opened, and to similarly cause the lever to release the stops, so as to permit the bridge to proceed in its rotation until it has reached its normal position after the gates are closed. For this purpose the projecting ends g^2 g^3 of said levers are, as shown, connected by rods g^4 and g^5 with trip-levers G^2 and G^3, respectively, said trip-levers being pivoted at points g^6 and g^7 to the lower portion of the bridge structure, at the ends thereof, as clearly shown in Fig. 2. The trip-levers G^2 and G^3 are operated so as to depress the projecting ends of the levers G and G′, and thereby permit them to pass under the stops *d* and *d′* at the times above stated by means of a series of trip-dogs, *b*, *b′*, b^2, and b^3, which are pivoted in a horizontal beam, B^2, secured upon the abutment wall B′, beneath the swinging end of the bridge. In the device shown two of the trip-dogs, *b* and *b′*, are located near the ends of the beam B′, and are constructed to engage the trip-levers and release the pins *d* and *d′* when the gates have been opened and the bridge is closing. The trip-dogs b^2 and b^3 are located near the center of the said beam, and are arranged to engage the trip-levers and release the pins *d* and *d′* from the levers G and G′ at the moment the gates meet when they are closed and the bridge is opening. Two only of the trip-dogs mentioned—one upon the end (as *b′*) and another near the center (as b^3)—come into play when the bridge is turned in one direction; and in order that the other shall not operate when the trip-levers pass them, the several dogs are provided with stops to limit their movement in one direction, so that they will yield when the said trip-levers pass over them in one direction, and will remain stationary upon the contact of the trip-levers therewith when the latter are moving in the opposite direction.

As shown in the drawings, the lever G′ only upon the left-hand side of the bridge operates when the end of the bridge is swung to the right, the said lever operating the gates by striking the stop *d′*, and the trip-lever G^3 at such time passing over the dog *b′* and encountering the dog b^3 at the moment the gate is closed, so as to release said lever G′ from the pin *d′* and allow the bridge to continue in its rotation until opened. In closing the bridge when opened, as last described, the lever G′ passes over the pin *d* and encounters the pin *d′* upon its side opposite to that against which it rested in closing the gates, so as to throw them open, the trip-lever G^3 in such operation passing freely over the trip-dog b^3 and encountering the trip-dog *b′*, by which said lever is operated, and the lever G′ thereby released from the stop *d′*. During the movement of the bridge as last described, the trip-bar G^3 will obviously encounter the dogs *b* and b^2, located at the right-hand side of the center of the timber B′, as shown in Fig. 3. The lever G′ at the time of striking such dogs will have passed from contact with the stop *d′*, and although said lever will be moved by contact of the lever with the dogs, such movement will have no effect. In order, however, to prevent the contact of the trip-dog which operates when the bridge is swung in one direction with the trip-dogs which are not necessary for its operation at such time, one of the trip-levers, G^2 and G^3, may be constructed to rotate in the path somewhat distant from the path of the other lever, and the trip-dogs may be correspondingly located, so that in the passage of the said trip-levers over the said dogs it encounters only those necessary to operate it. The operation of the bridge in swinging in the opposite direction from that described, or to the left hand in the several figures, is the same, the lever G in the latter case being moved so as to pass the stop *d* by means of the contact of the trip-lever G^2 with the trip-dogs *b* and b^2 at the right hand in said figures.

As illustrated in the drawings, and as preferably constructed, the bridge is arranged to swing in both directions, and the two levers G and G′, which operate upon the opposite gates, are required for this purpose. In case it is desired to swing the bridge in one direction only, therefore but one lever, as G, is necessary, which will operate upon the stop, as *d*, of one of the gates, and will actuate both gates through the medium of the connection between them, as before described. In such case, also,

only the two trip-dogs, as b and b^2, which operate said lever G^2, are necessary, and the others may be dispensed with.

As preferably constructed, the levers G are provided upon their ends, which are opposite the ends g^2 and g^3 thereof which encounter the stops, with weights g^6 and g^7, which tend to keep the said projecting ends at the upward limit of their movement, suitable stops, g^{10} and g^{11}, being provided, as shown, to retain said ends g^2 and g^3 of the levers normally in position for engagement with said stops. By the construction in the trip-levers G^2 and G^3 shown, the result last mentioned is, however, equally well obtained, as said levers, when in a vertical position, in connection with the rods g^4 and G^5, serve to retain said levers G and G′ from rising from their normal position by the action of the said weights. The projecting ends of the levers G and G′ may obviously be held in the path of the stops d and d' by means of suitably-arranged springs instead of by the weights shown.

The gates D and D′ are preferably placed in an inclined position with reference to each other, as shown more clearly in Fig. 4, so as to be more readily operated upon by the levers G and G′ in the rotation of the bridge, the construction above described, by which a flexible connection is provided between the rack-bar I and the gate D′ by means of the pitman I^2, being for the purpose of permitting said gates to be moved one by the other when in such inclined position. Said rack-bar I is preferably provided upon its end which projects from the guide I′ with a stop, i^2, which rests against the face of the bar e', and serves to retain the said bar when moved in alignment with the guide-groove i'.

In order to prevent possibility of the gates being lifted, so as to allow the rollers r to leave the track E, pins e^2 are preferably fixed in the said vertical frame-pieces D^2 of the gates, beneath the track, with their ends projecting horizontally a short distance below the same, in position to encounter said track in case the gate is accidentally raised from its place.

The trip-dogs b, b', b^2, and b^3, instead of being located upon the bridge-abutment below the end of the bridge, may be placed upon the stationary frame above the roadway, so that their operation will not be affected by the presence of mud and dirt, which are liable to fall upon them from the surface of the roadway when they are placed in the position shown.

As a preferable construction in the trip-dogs and the parts operating in connection therewith when located above the roadway, the said trip-dogs are pivoted upon the horizontal bar e' of said frame, and the trip-levers G^2 and G^3 are mounted upon the upper ends of the standards A′, in the same relative position with reference to the trip-dogs as shown and before described, and with their lower or depending ends connected by means of suitable rods with the ends g^2 and g^3 of the levers G and G′, so as to operate the said levers when the said depending ends of the trip-levers are lifted by contact with the trip-dogs in the manner before described in connection with the form of the device shown in the drawings.

An important advantage gained by the construction in the gate-operating devices as shown and described is that the several operative parts of the gate are located above the roadway, whereby they are not liable to injury and are readily accessible for repairs. The said operative parts may obviously be protected from the weather by a suitable covering or roof supported by the stationary uprights F.

I claim as my invention—

1. The combination, with a swinging bridge, the oppositely-sliding gates D and D′, and means connecting said gates over the roadway, constructed to cause them to open and close by force applied to one of them, of pins d and d', arranged on the respective gates at different elevations, projections G and G′ upon the bridge, constructed to respectively engage the several pins d and d', and pivoted trip-dogs upon the bridge-abutment, constructed to move one of said projections G and G′ so as to release it from contact with the pin with which it is engaged when the bridge is moving in one direction, and to yield so as to permit the same projection to pass freely over them in the movement of the bridge in the opposite direction, substantially as described.

2. The combination, with a swing-bridge and oppositely sliding gates, of a lever, as G, pivoted to the bridge, and constructed to engage a projection on one of the gates, a trip-lever, as G^2, upon the bridge, connected with the lever G, and pivoted trip-dogs, as b' and b^3, constructed to engage said trip-levers, substantially as and for the purpose set forth.

3. The combination, with a swinging bridge and the oppositely sliding gates D and D′, of levers G and G′, pivoted to the bridge and constructed to engage projections upon the gates, trip-levers G^2 and G^3, pivoted to the bridge and connected with the levers G and G′, and two oppositely-yielding pairs of trip-dogs, b, b', b^2, and b^3, constructed to actuate the said trip-levers so as to release the said levers G and and G′ from the said projections when the bridge is turned in either direction, substantially as described.

4. The combination, with the sliding gates D and D′, located at an angle to each other, and a supporting-frame for said gates, of a rack-bar, H, fixed to one of said gates, a rack-bar, I, constructed to slide upon the said frame, a pinion, J, mounted upon the said frame and constructed to engage the rack-bars H and I, and a pitman, I^2, connecting said rack-bar I with the other gate, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JONATHAN W. WERT.

Witnesses:
SIMON SPILMAN,
A. J. SHAW.