(No Model.)

3 Sheets—Sheet 1.

# M. TOULMIN.

## RAILROAD GATE.

No. 352,590. Patented Nov. 16, 1886.

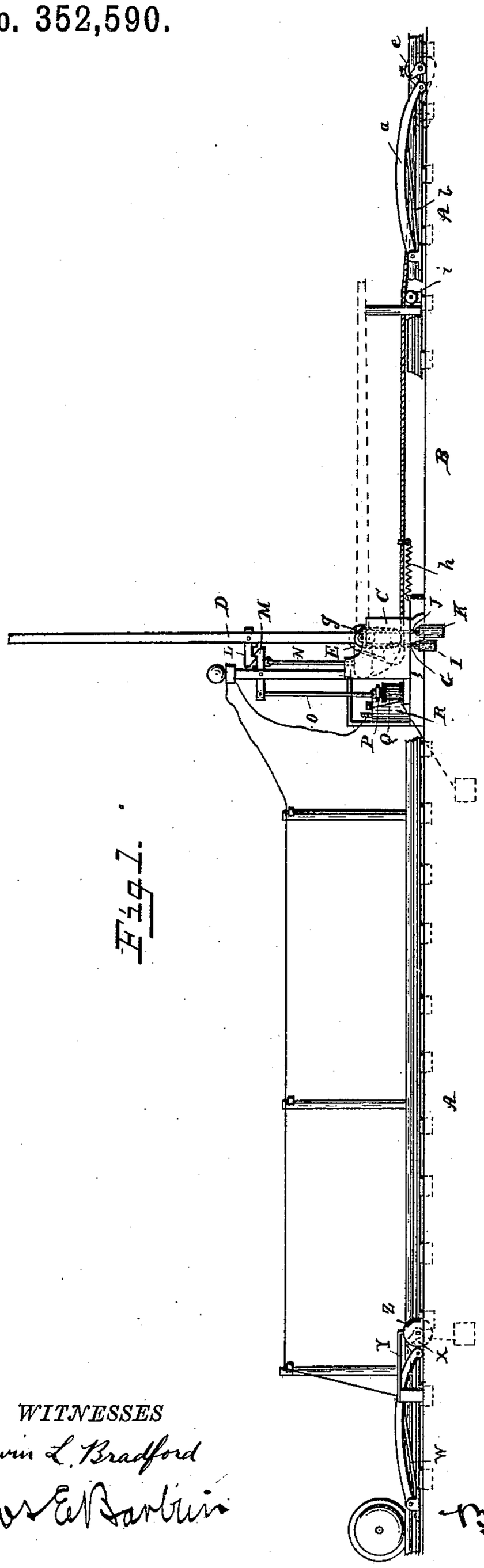

Fig. 1.

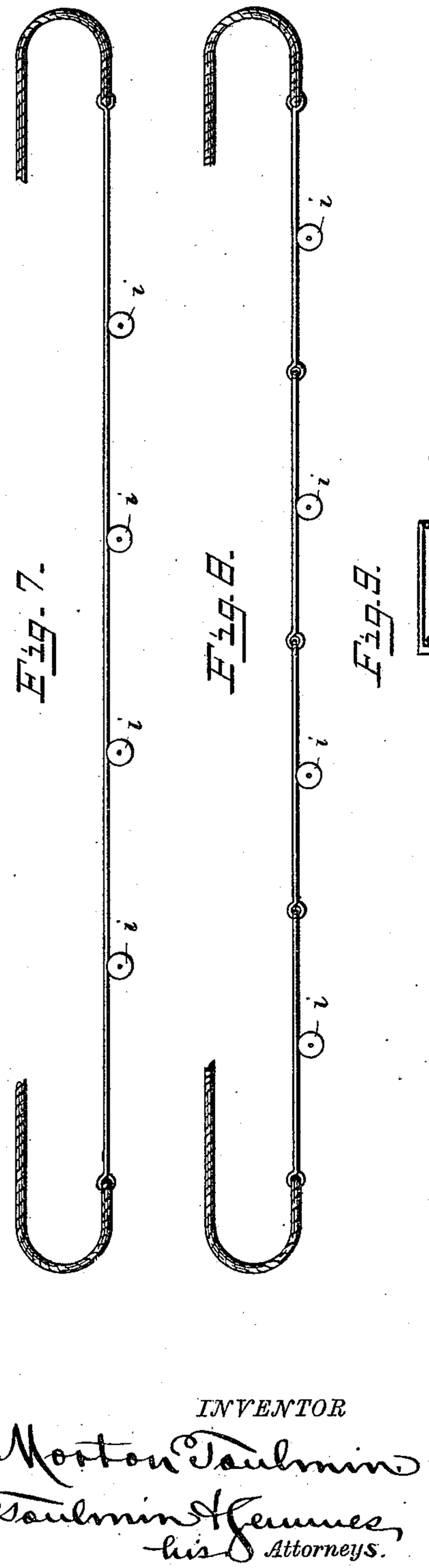

Fig. 2.

Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.

WITNESSES

Edwin L. Bradford

Chas. E. Barbour

INVENTOR

Morton Toulmin

By Toulmin & Semmes

his Attorneys.

(No Model.) 3 Sheets—Sheet 2.

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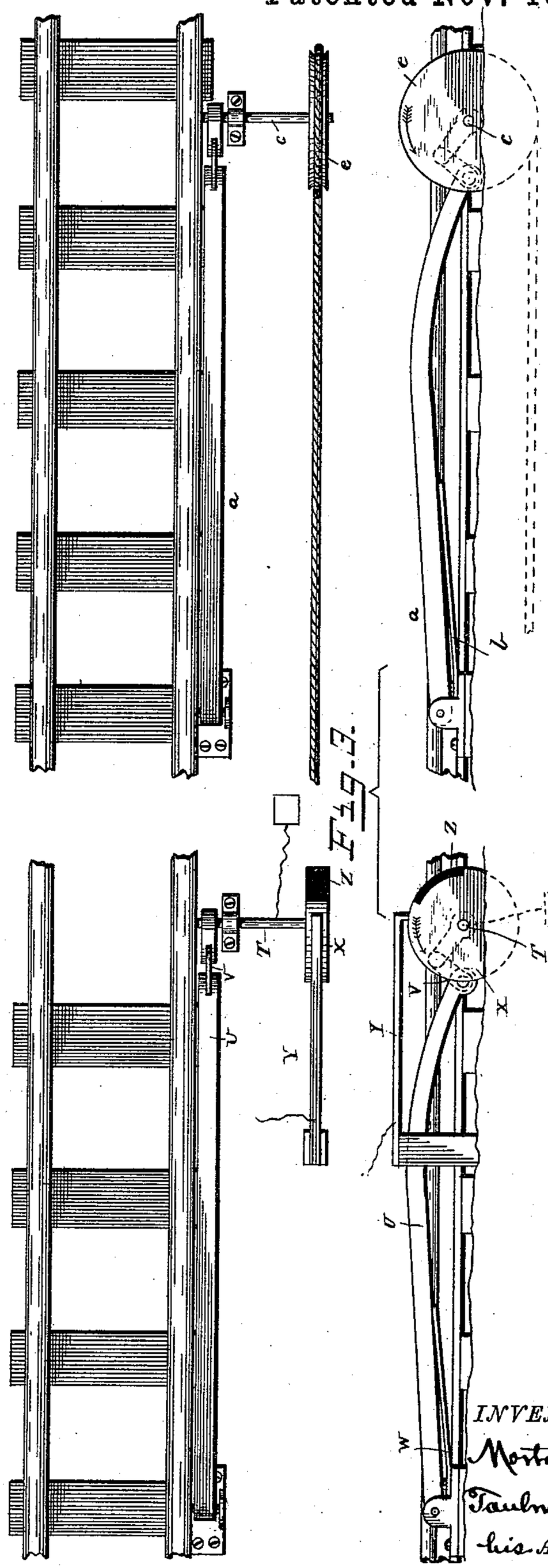


WITNESSES

Edwin L. Bradford

Chas. E. Baker

INVENTOR

Morton Toulmin,

Toulmin & Semmes

his Attorneys.

(No Model.) 3 Sheets—Sheet 3.

# M. TOULMIN.

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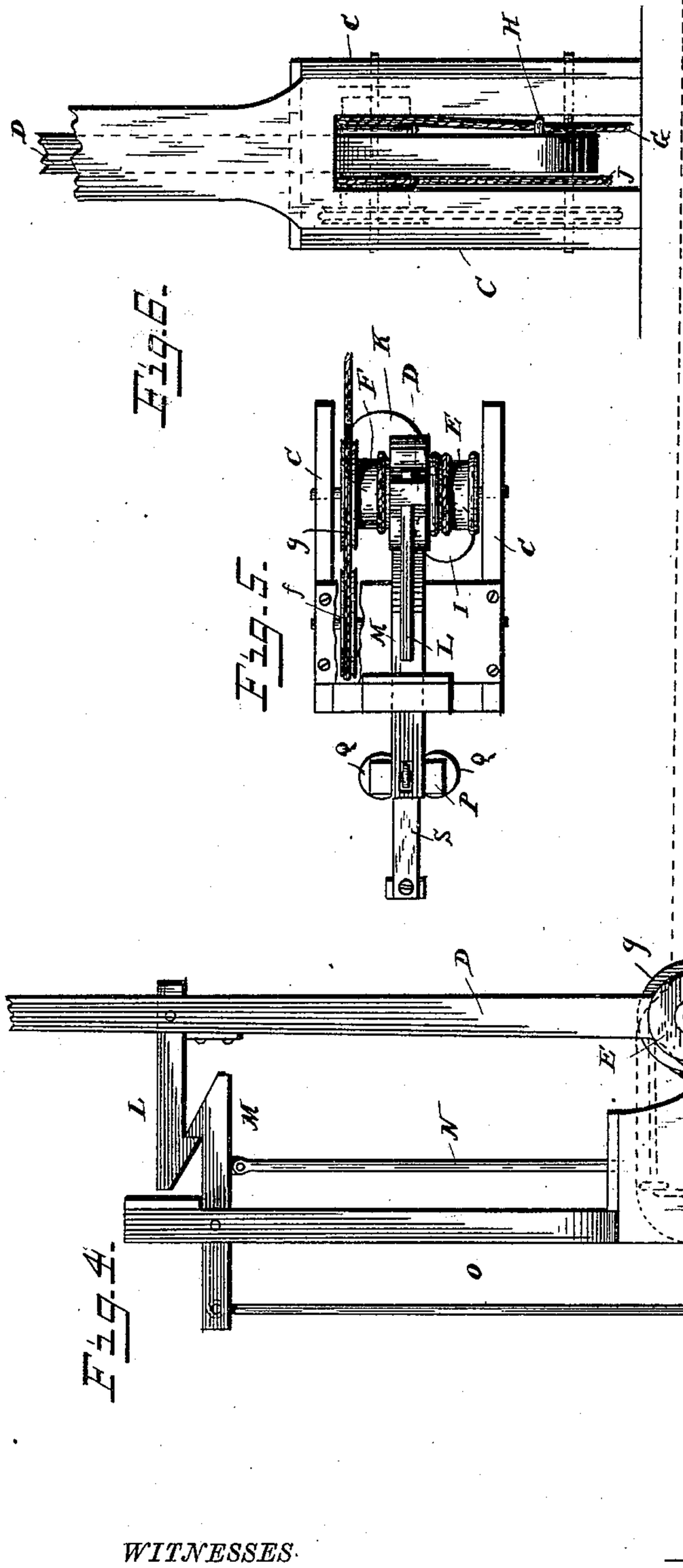


Fig. 3.




Fig. 5.




Fig. 4.

WITNESSES.

Edwin L. Bradford

Chas. E. Barbar

INVENTOR

Morton Toulmin

By Toulmin & Semmes.

his Attorneys.

# UNITED STATES PATENT OFFICE.

MORTON TOULMIN, OF WASHINGTON, DISTRICT OF COLUMBIA.

## RAILROAD-GATE.

SPECIFICATION forming part of Letters Patent No. 352,590, dated November 16, 1886.

Application filed February 18, 1886. Serial No. 192,467. (No model.)

*To all whom it may concern:*

Be it known that I, MORTON TOULMIN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Automatic Railroad-Gates, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to automatic crossing-gates for railways, the peculiarities of which will hereinafter more fully appear.

In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 represents a side elevation of a section of a railway, showing my improved gate and its operating mechanism, also in elevation; Fig. 2, a plan view of a like section of a railway, showing the circuit-breaker and the gate-opening mechanism; Fig. 3, a side elevation thereof; Fig. 4, an enlarged detail side elevation of the gate and its devices; Fig. 5, a plan view thereof; Fig. 6, an end view of the pedestal upon which the gate is mounted, showing the lower edge of the gate; Figs. 7 and 8, views of an operating-wire and a long-link chain, respectively; and Fig. 9, a view of turn-buckle for adjusting the length of the operating wire or chain or rope, as the case may be.

The letter A designates a section of a railway-track, across which a street or roadway passes at B, and at either side of the latter, and in convenient proximity to the track, is a suitable pedestal, C. On this pedestal is pivotally mounted a gate-bar, D, of any approved construction, the shaft of which carries drums E and F, over each of which is wound a chain or rope, or a strap, whether metallic or otherwise, the one G being passed through an eye, H, secured to the shorter arm of the gate to one side of the axis of its shaft. To this rope is attached a weight, I, the function of which is to assist in elevating the gate, and it will be seen that when the gate is in a horizontal or closed position the weight will be suspended from the shorter arm thereof. This gives the weight additional leverage over the gate, and forms a more perfect counter-balance; yet as the gate rises and assumes a perpendicular position the leverage of the weight is gradually decreased, until finally it exercises only that leverage due to the diameter of the drum. On the other hand, when the gate is released and the inertia is being overcome, this weight offers but little resistance to the descent of the gate; but as the gate increases in the speed of its descent the smaller weight correspondingly increases in its power of resistance as it becomes suspended more and more directly from its connecting-point with the shorter arm of the gate, and thereby acts to gradually check the speed of the descent of the gate. The other rope, J, hangs over its drum and carries a heavier weight, K, the function of which is to assist in causing the gate to descend or close. The difference between the heft of the two weights is overcome by the engine through the mechanism to be presently described, in order to lift or open the gate. To the latter at a suitable point is pivoted a locking-hook, L, while to a post extending from the pedestal is pivoted a reversely-placed hook, M, and from this latter is suspended a rod, N, and a pitman, O, the function of the former being that of returning the hook M to normal position by being elevated by the shorter arm of the gate as the latter assumes a closed position. The function of the latter is to connect the hook M with an armature, P, of a magnet, Q.

The description which will follow will be upon the presumption that the circuit employed is a normally-closed circuit, though an open circuit may be used by a slight change of construction.

One pole of the magnet-wire is connected with one pole of the battery R, consisting of as many cells as may be necessary for the purpose which is in view, while the other pole of the magnet-wire is grounded. The armature is normally held down by the magnet, and the hook M held in the position shown in Figs. 1 and 4; but when the circuit is broken a spring, S, to which the armature is secured, elevates the latter, and through the pitman O tilts the hook M and disengages it from the hook L, when the gate D will descend or close under the influence of the weight K, and of the superior weight of the longer arm thereof, should the latter be somewhat heavier than the shorter arm. When the gate descends, the shorter arm engages the rod N and returns

the hook M to normal position, bringing the armature P within the magnetic field of the magnet.

I shall now proceed to describe the circuit-breaker, and which is laid any proper distance in advance of the gate—say two hundred or three hundred yards. It consists of a shaft, T, mounted in suitable bearings near the track, and provided at one end with a crank, to which is connected one end of a pivoted lever, U, by a link, V. This lever runs alongside of either rail, and is pivoted at its other end somewhat below the plane of the rails, and its general position from its pivotal point to within some distance of its other end is at a gradual incline, and a spring, W, placed, in the present instance, beneath it, and having a bearing upon one of the cross-ties, serves to maintain the lever normally in this inclined position. When the wheels of the engine—especially the driving-wheels, as they are of broader tread than the wheels generally of the train—reach the lever and ride upon it, it is depressed and a partial rotation of the shaft T effected. The contact-disk X, mounted upon the shaft T, is of conductive material, or is in electrical connection with the shaft T, and the latter is in electrical connection with one pole of the magnet-wire, as by being grounded, as seen in the figures. A contact-strip, Y, is in connection with the other pole of the magnet through the battery, and is normally in contact with the disk X, thus establishing the circuit. When, however, the lever U is actuated in the manner above described, the consequent partial rotation of the disk X presents an insulated portion, Z, thereof in contact with the strip Y, and thereby breaks the circuit. This destroys the influence of the magnet upon its armature, and the hook M is tilted in the manner also above stated and the gate unhooked and allowed to close or descend, as already described. After this has occurred any subsequent action of the remaining wheels of the train upon the lever U will have no effect upon the gate.

Whether there will be any subsequent action by the remaining wheels upon the lever U will depend upon the width of the tread of said wheels and the proximity of the lever to the rail, and inasmuch as the tread of the driving-wheels of the engine is very much broader than that of the wheels generally of the train, and as the lever will be placed to the rail with respect to the overhang of the driving-wheels, it is not likely that any subsequent action will occur. The spring W, it will be understood, will return the lever to normal position, and thus re-establish the circuit.

When the train shall have passed or partly passed the roadway, the wheels, especially the driving-wheels, will act upon the mechanism for elevating or opening the gate. This mechanism is placed some distance beyond the roadway, according to the conditions of the location, and consists of a lever, *a*, and a spring, *b*, like the lever and spring already described, as also of the several connections and the shaft *c*, carrying, instead of the contact-disk, a drum or pulley, *e*. Over this pulley is wound a wire rope or other suitable belt or chain, and is thence extended over a pulley, *f*, mounted on the pedestal C, and to a pulley, *g*, mounted on the gate-shaft. When the wheels, particularly the driving-wheels of the engine, act upon the lever *a*, as described in reference to the lever U, the pulley *e* is partially rotated and the wire rope wound thereon and drawn along its entire length, causing the gate to open or rise and the hook L to engage with the hook M. Should any of the wheels of the train, after the driving-wheels of the engine, ride upon the lever *a*, no effect will be transmitted to the gate, and the remarks made with reference to this subsequent action of the wheels upon the lever, in speaking of the lever U, are equally applicable to the lever *a*. The lever *a*, under the influence of the spring *b*, will unwind the rope from the pulley *e* to the extent that it wound the same on that pulley, and thus leave the rope slack between the pulley and the gate. To take up the slack and draw the rope toward the gate, so as to allow the gate to come down unaffected by the rope, a suitable spring—a spiral in this instance—*h*, is secured at some convenient point to a fixture, and to the rope comparatively near the gate, the contraction of which takes up the slack. A weight might be used to take up the slack of the rope. The rope is supported at suitable intervals upon one or more pulleys, *i*, and may be replaced by a wire or a succession of long links supplied with ropes or chains at either end where the pulleys occur. The preferred construction is seen in Fig. 7. The rope or wire may be provided with suitable means—such as a turn-table—to make the proper adjustment as to its length.

It is obvious that the contact-disk X might be grounded instead of grounding its shaft, and that a second line might be used instead of grounding the connections.

An electric bell will preferably be used in connection with the gate, and will be placed in the circuit, as seen in Fig. 1, so as to announce the approach of the engine and call attention to the descending gate.

In closing the gate at long distances a relay-magnet will probably be placed in the circuit.

It is obvious that the device will be successful without any particular form of circuit-closer; but that herein described is the preferred form.

I wish to be understood as not confining myself to any particular detail construction, since that shown can be largely varied without departing from the spirit of my invention.

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

1. The combination, with a pivoted gate having a normal tendency to close, and the locking devices, of a normally-closed electric circuit, a circuit-breaker, an electro-magnet

and its armature, the magnet and armature and intermediate devices arranged to control the locking devices, and the gate arranged to return the armature within the magnetic field by its descent, and mechanical mechanism connected with the gate and constructed to open it, said mechanism being adapted to be operated by a passing train, substantially as specified.

2. The combination, with the pivoted gate having a normal tendency to close, of an electro-magnet, the locking-hooks, one of which is controlled by said magnet, the circuit-breaker located in advance of the gate and near the track, and constructed to be operated by the train, the pulley located some distance beyond the gate, the rod or rope connecting said pulley with the gate, and means to actuate the said pulley by the passing of a train, whereby the gate is elevated.

3. The combination, with a pivoted gate having a drum and a pulley on its shaft, of the lighter weight suspended from the drum and connected with the shorter arm of the gate, the heavier weight suspended from the drum, the locking-hooks, the electro-magnet, the electric circuit, the pivoted lever, the contact-disk and strip constituting the circuit-breaker, and the pivoted lever, the pulley actuated thereby, and the rod or rope connecting said pulley with the gate.

4. The combination, with a pivoted gate having a drum on its shaft, of two weights of unequal heft, the heavier of said weights being hung from the drum on the inner side of the gate, and the lighter of said weights being hung from the drum on the outside of the gate, and being also connected with the shorter arm of the gate.

5. The combination, with a pedestal, a pivoted hook having rods suspended therefrom, and an electro-magnet and its armature connected with one of said rods, of a pivoted gate having a hook which engages with the first-named hook when the gate is opened, and having weights of unequal heft suspended from opposite sides of its axis, the shorter arm of said gate being adapted to actuate the other of said rods as the gate descends to return the armature within the magnetic field.

6. The combination, with a pivoted gate and the described mechanism to open it by the action of a train, of a wire or rope connecting the gate with said mechanism, and a spring to overcome the slack of the wire or rope.

7. The combination, with a pivoted gate having a normal tendency to close, and locking-hooks to hold the gate in an open position, of an electro-magnet and its armature, the armature controlling one of the locking-hooks, and a device connected with that hook against which the gate acts in closing to return the armature within the magnetic field, from which field it departs when the locking-hooks are freed.

8. The combination, with a pivoted gate having a tendency to close, of an electrical generator, an electro-magnet, hooks to hold the gate in an open position, one of which is controlled by the armature of said magnet, the normally-closed electric circuit, and a circuit-breaker consisting, essentially, of the rocking disk, and an operating-lever connected thereto and located in proximity to a railway-rail.

9. The combination, with a pivoted gate having a normal tendency to close and a wire or rope connected thereto, so as to elevate it when drawn, of a pivoted inclined lever located near a railway-rail some distance beyond said gate, a rock-shaft with which such lever is pivotally connected, and a pulley mounted upon said shaft, to which said wire or rope is connected.

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

MORTON TOULMIN.

Witnesses:
CHAS. E. BARBUR,
EDWIN L. BRADFORD.