

(No Model.)

3 Sheets—Sheet 1.

J. E. SECORD.  
RAILROAD GATE.

No. 375,653.

Patented Dec. 27, 1887.

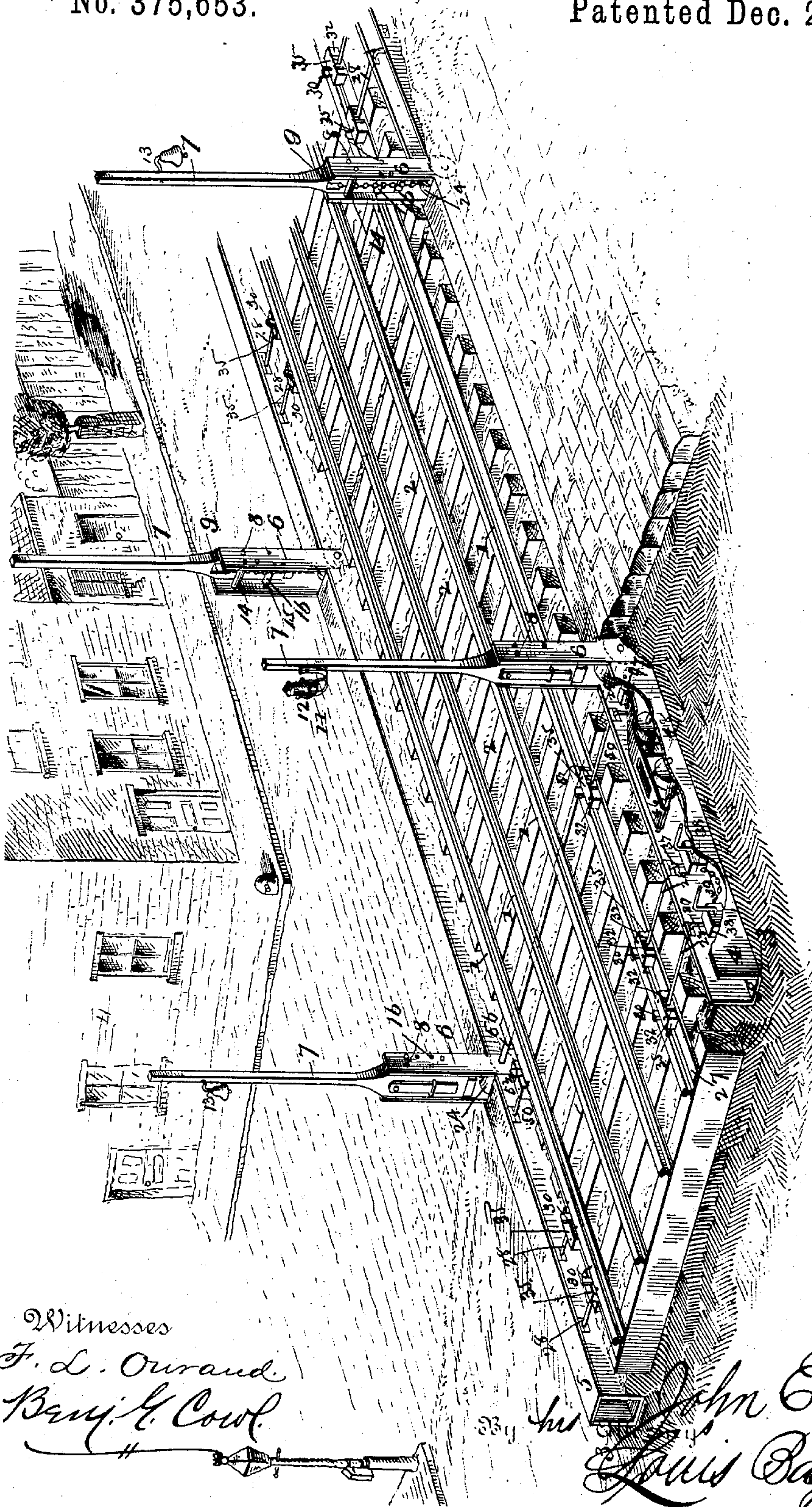


Fig. 1.

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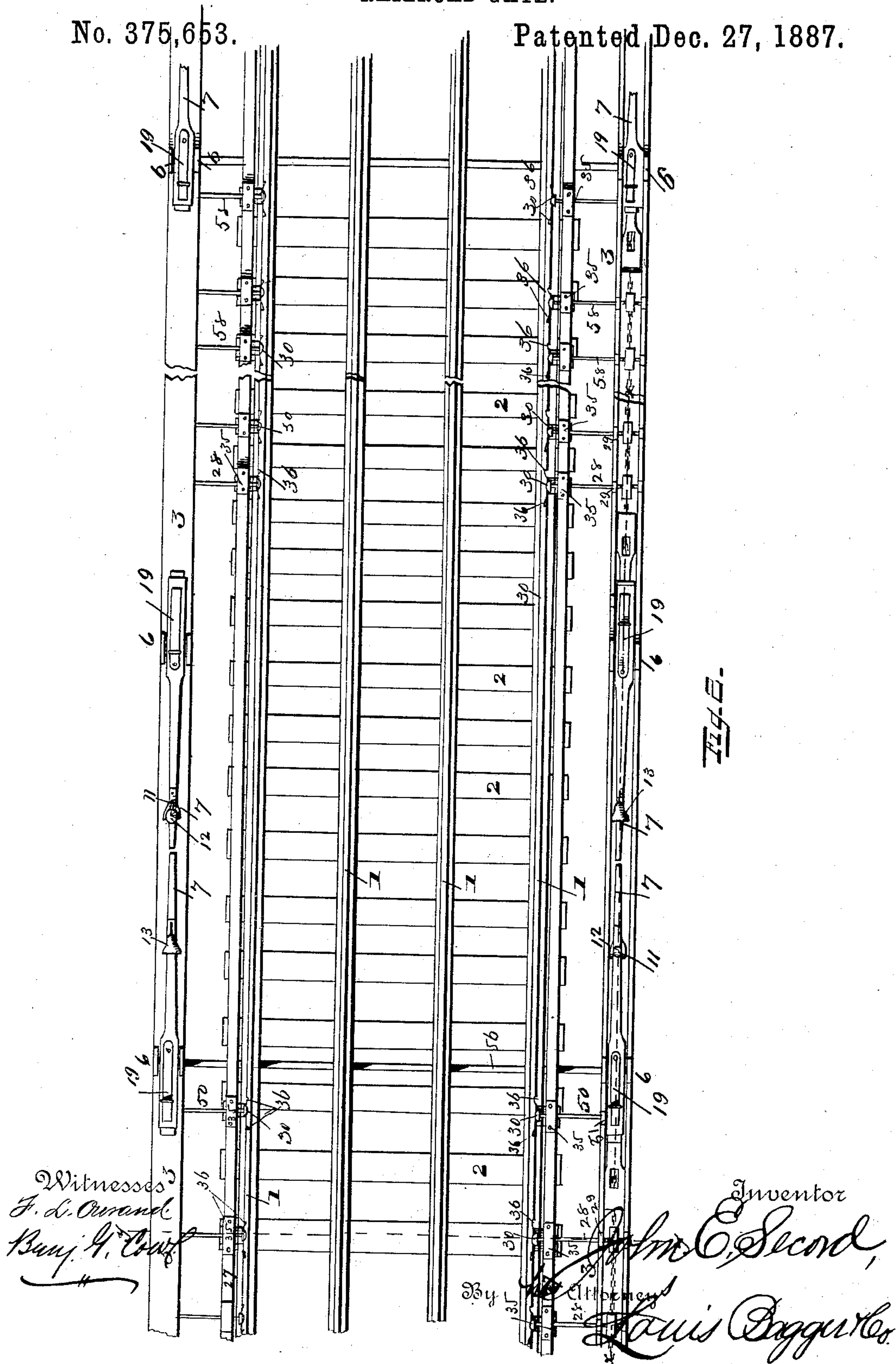
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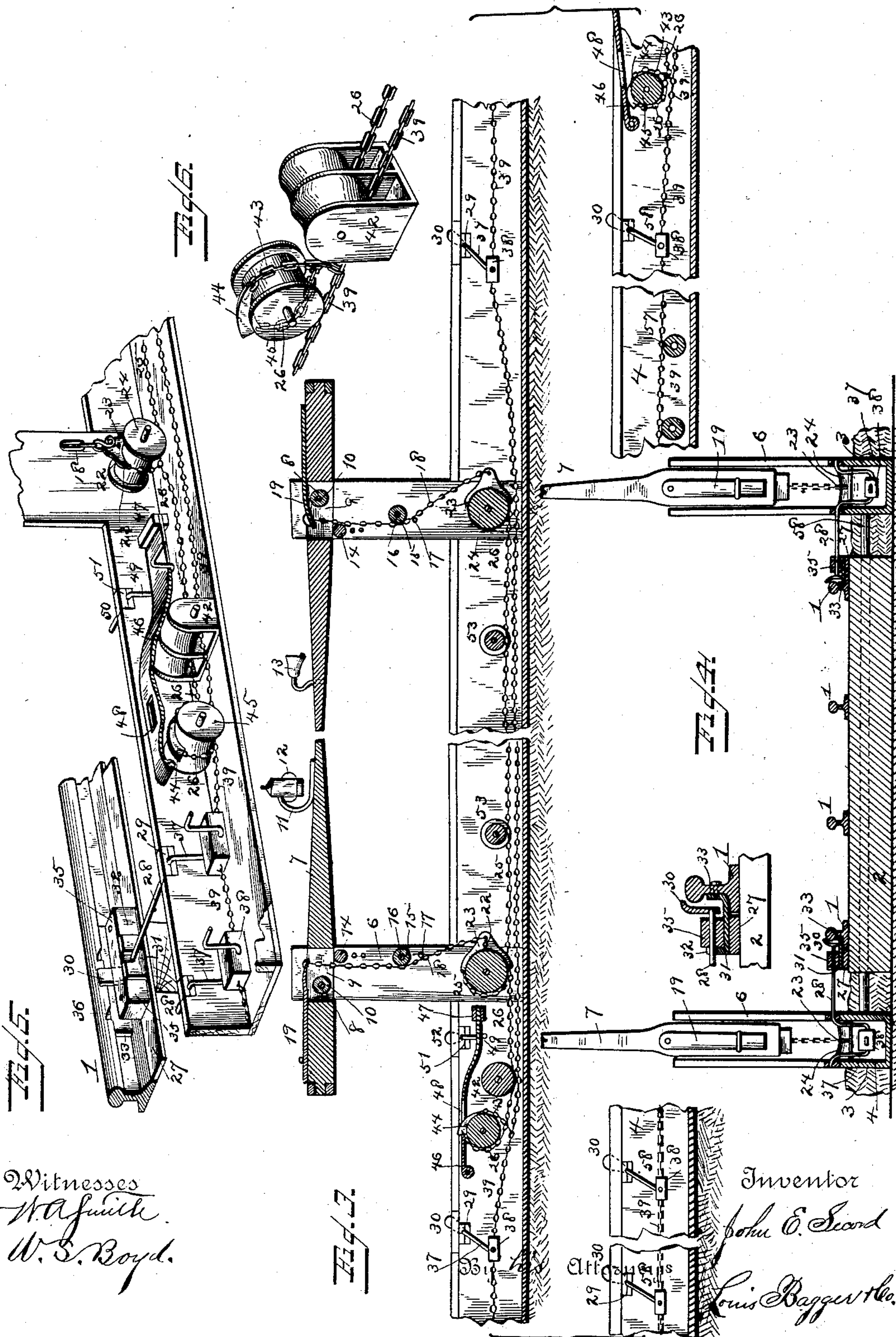
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# UNITED STATES PATENT OFFICE.

JOHN E. SECORD, OF GRINDSTONE CITY, MICHIGAN.

## RAILROAD-GATE.

SPECIFICATION forming part of Letters Patent No. 375,653, dated December 27, 1887.

Application filed May 24, 1887. Serial No. 239,194. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. SECORD, a citizen of the Dominion of Canada, and a resident of Grindstone City, in the county of Huron and State of Michigan, have invented certain new and useful Improvements in Railroad-Gates; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of a railway-crossing provided with my improved gates. Fig. 2 is a top plan view of two adjoining crossings, the portion of the track between the crossings being broken away. Fig. 3 is a longitudinal vertical sectional view on the line *x x* of Fig. 2, showing a section of track intermediate of the signaling-stations and means for supporting and operating the chain or rod between such stations, continuations of such track being shown below each end of the main track and connected thereto by means of brackets. Fig. 4 is a transverse sectional view on line *y y*, Fig. 2. Fig. 5 is a detail view, on an enlarged scale, of the operating mechanism; and Fig. 6 is a detail view of one of the operating-pulleys and its chain attachments.

My invention relates to that class of railroad-gates in which the gates are automatically closed and opened by the train; and it consists in the improved construction and combinations of parts, as will be hereinafter more fully described, and pointed out in the claims.

In the accompanying drawings, in which the same numerals of reference indicate corresponding parts in all of the figures, 1 indicates the rails of a railroad-track, which are secured to the ties 2 in the usual manner. At one side of the track a trench, 3, is formed, which is provided with a lining, 4, and cover 5, the trench extending under the roadway or crossing. Upon one side of the crossing, and in a line with the trench, or rather directly above it, is an upright, 6, to the upper end of which a gate, 7, is pivotally secured upon the bolt 8. The lower end of this gate is provided with a suitable weight to keep it in a

vertical position when not being operated by the train, and its upper end is provided with a bell, 12, or lantern, 13, to signal the approach of a train. These signals may be secured to the gate by means of a spring, 11, which will cause them to move with a very slight movement of the gate.

The mechanism for operating this gate automatically consists of a crank-shaft, 28, and a series of chains, which connect the two, so that when the wheels of the train strike an arm on the end of the crank-shaft the gate is drawn down by means of the crank at the other end of the shaft. This crank-shaft is placed at such a distance from the crossing that the gate will be drawn down in time to stop all travel before the train reaches the crossing. The end of this shaft which is next the track is provided with an arm, 30, the upper end of which is made broad and slightly curved, and projects about two inches above the top of the rail, so that it will be struck by the tire of the front wheel of the train and forced over in the direction in which the train is moving. If desired, the side of the rail can be provided with notches 36, to permit the top of the arm to be as close to the rail as possible, and also allow it to be turned down, the curved portion of the arm passing through the notches. To prevent the wheels of the train from crowding the arm away from the side of the rail, and thus making it inoperative, that end of the shaft is secured or journaled in a bearing-block, 35, which is secured at a certain distance from the rail by means of a plate or seat, 31. This plate rests upon a flat bar, 27, which is secured upon the ties at the side of the rail, the plate being about the thickness of the base of the rail, so that the plate which extends from the bar to the rail will be level, or nearly so. The edge of the plate next the rail is bent up, as shown at 33, and perforated, by means of which it is secured to the web of the rail. The other edge of this plate is also bent up, as shown at 32, having a portion cut away to permit of the passage and operation of the shaft 28. As the block 35 is thus secured between the outer bent edge, 32, of the plate and the rail, it will be impossible for it to be forced away from the rail without breaking the plate. The opposite end of this shaft is journaled in bearings 29 in



the sides of the lining 4 of the trench, and is provided with a double crank, 37, which swings within the trench.

At the bottom of the upright 6, and within the trench, a pulley, 24, is journaled, having a flange, 23, extending around about one-third of its periphery. Between this pulley and the crank-shaft, but nearer the pulley than the shaft, is journaled a pulley, 45, which I will call a "lock-pulley." A chain, 39, is secured at one end to the crank 37 and at the other end to this pulley 45. A second chain, 26, is also secured at one end to this pulley and at the other end to the pulley 24 at the bottom of the upright 6. A third chain, 18, is secured at one end to the flange 23 on the pulley 24 and at the other end to the gate 7, or rather to the end of a spring, 19, which is secured to the gate, thus completing the connection between the crank-shaft and the gate.

The bolt 8, upon which the gate is pivoted to the top of the upright, is provided with a sheave or pulley, 10, against which the chain bears when the gate is in its vertical position, the gate being provided with a slot, 9, at this point. Between this bolt and the pulley 24 is another pulley or roller, 15, which is journaled upon a bolt, 16. The upright at this point is provided with a series of holes, 17, by means of which the bolt and roller can be placed nearer to or farther from the pulley 24. The nearer the roller is to the pulley the greater the purchase for shutting the gate, and the farther it is removed from the pulley the less will be the purchase. The purchase of the chain upon the gate can also be regulated by securing the lower end of the chain in the different holes 22 in the flange 23. At the top of the upright is placed a bar, 14, against which the gate strikes when drawn down into a horizontal position. If desired, this bar may be secured at different heights by means of a series of holes or perforations in the upright.

After the gate has been drawn down by the front wheels of the train, it is very desirable that it be prevented from moving until the entire train has passed, as the continued jerking or drawing of the crank-shaft upon the chain as the different wheels of the train struck the arm 30 would soon break the chain or otherwise damage the whole device. To avoid this I have provided the pulley 45 with a wedge-shaped flange, 44, which, when the pulley has been rotated sufficiently to close the gate, passes through and engages with a slot, 48, in a plate or arm, 46. This arm is pivoted at one end between the upper edges of the trench, and is provided at its other end with a weight, 47. To release this locking mechanism by the train a crank-shaft, 50, which I call the "key-crank," is journaled in bearings 51 at the side of the track and in the trenches, similar to the bearings for the shaft 28. One end of this key-crank is provided with an arm, 52, which projects upwardly at the side of the rail, and the other end is provided with

a crank or key, 49, which swings in the trench under the weighted end of the arm 46. As the front wheels of the train strike the arm 52 and force it over in the direction in which the train is moving, the crank 49 is caused to swing in the opposite direction, which raises the end of the arm 46 until the flange 44 is released from the slot 48. As soon as the flange is thus released, the pulley 45 is drawn back into its normal position by the movement of the gate in assuming its vertical position, which is caused by the weighted lower end, and which it could not do as long as the flange was engaged by the arm. To assist in the moving of the pulleys and chains, and also to cause the crank to hang vertically in the trench, and thus keep the arm at the other end in a vertical or operative position at the side of the track, a weight, 38, is hung upon the crank and the chain secured to it.

As above described, the gate can only be operated by a train passing in one direction; but as on most roads it is necessary to run trains in both directions it is necessary to have some means for operating the gate when a train approaches the crossing from either direction. To accomplish this I place a crank-shaft similar to the shaft 28 upon the other side of the crossing and at a suitable distance from it, and connect its crank with the crank 37 by extending the chain 39 from the one to the other; but as the two cranks are caused to turn in opposite directions by trains traveling in the opposite direction it is necessary to connect the chain to the pulley 45 for operating the gate, so as that it will always be rotated in the same direction, whichever way the train moves. This is accomplished by connecting the periphery of the pulley with the chain by means of a short piece of chain, 43, and also by securing a double pulley, 42, in the trench between the pulleys 45 and 24. This double pulley is placed so close to the pulley 45 that when the chain 39 is drawn toward the double pulley the short piece of chain is drawn down under one of the two pulleys, and the pulley 45 is rotated in the same direction as when the chain 39 is drawn in the opposite direction. By placing the double pulley lower than the pulley 24 the chain 39 passes under the pulley 24 without touching it or interfering with its free movement in operating the gates, and at the same time the action of the chain 26 is not changed in the least, even though it passes under the double pulley. It is obvious that where the two crank-shafts are used, as above described, the train in passing over one of them only causes its crank to swing toward the operating mechanism, which only makes the chain looser instead of drawing upon it, as is done with the other one, and as soon as it is released or the train has passed its weight 38 causes it to swing back into its vertical position.

It often happens that, as in street-crossings, the single gate is not long enough to reach



across it without being so long as to be unwieldy. In such cases I place an upright at each side of the crossing and place a gate in the top of each upright, the ends of the gates meeting at the middle of the crossing, and provide the extra gate with means for operating it similar to that described for the single gate, except that instead of connecting it directly with the cranks its pulley 24 at the bottom of the upright is connected with the first pulley 24 by means of a chain, 25, which extends under the roadway in the trench. As the ends of this chain are partly wrapped around the pulleys, the rotation of one pulley 24 is communicated to the other one, and both gates are drawn simultaneously. If it is desirable to cause the flanges on both of these pulleys to rotate toward the crossing, one of them being shown rotated in the opposite direction in the drawings, it is only necessary to have the chain 25 passed from the bottom of pulley 24 to the top of the other pulley in the same manner as belts are crossed in the ordinary method of causing two pulleys to rotate in opposite directions. If desired, pulleys 53 can be journaled in the trench under the roadway, against which the chains can bear as they are drawn back and forth.

To adapt the device to double-track roads, as shown in the drawings, all that is necessary is to pass a shaft, 56, under the tracks, having the pulley 24 secured to it at one end and a similar pulley secured to the other end. One or two gates can then be arranged in the same manner as the gates for the single track, and be operated by this additional pulley and an operating mechanism the same as has been described for the single gate. In the drawings all these additional parts are indicated by the same reference-numerals as are used for the corresponding parts in the description of the single gate. Thus there are four uprights, 6, four gates, 7, but only two arms, 46, and two key-cranks, 50, and so on with all the others. In all cases in which the ends of the chains are described as being secured to the pulleys I prefer to secure them to the flanges upon the pulleys by means of clevises or stirrups, although they may be secured in any other ordinary manner.

With single tracks it may be desirable to have gates upon both sides of the track, as described for the double track, in which case it is only necessary to have them arranged in connection with the shaft under the tracks; but it will not be necessary to provide the extra set of gates with separate mechanism for operating and closing them, as described for the two tracks, all four of the gates being operated and controlled by the mechanism described for operating the gates upon one side. When there are more than two tracks, it is only necessary to have the shaft 56 extend under all of them and to provide it with a pulley similar to the pulley 24 for each track, and to provide means for operating and locking each pul-

ley separately and independently of all the others, so that a train in passing on any of the tracks would operate the gates the same as though it were the only track at that point. As this would only require a mere duplication of the parts already described and shown, such construction has not been shown in any of the drawings.

In cities where the crossings are numerous and close together I make use of an additional crank-shaft, 58, exactly similar to and located beyond each of the crank-shafts 28. These additional shafts, which are indicated by the same numeral, 58, are connected with the other shafts by extending the chain 39; but as the chain is made slack between the two shafts these additional shafts will rotate considerably before their motion is communicated to the operating-shafts. In this manner, when the train passes over the end of either of these shafts, it will only move the gate sufficiently to ring the bell or swing the lantern enough to notify persons crossing the track of the approach of the train; but as soon as the train reaches the next or operating shaft, however, the gates will be drawn down, as formerly described. Instead of having the additional shafts only for the purpose of giving a signal, they can be made to operate a gate at one crossing while giving the signal at the following. To do this it is only necessary to provide it with the operating mechanism by which the gate will be drawn down and secured, and owing to the slack in the chain between it and the next crossing that gate will only be slightly moved, as above described. By extending the chain the entire distance along which the gates are placed, and by regulating the slack in the chain between the different crossings, one gate can be closed by a passing train, while the next one will be drawn half-way down, the one following a quarter of the way, and the next one will only be moved sufficiently to give the signal. To prevent the chain between the two stations from dragging upon the bottom of the trenches I provide pulleys 57 at suitable distances, over which the chains pass. In this manner I provide a means by which a road can be automatically operated without the cost of attendants at every crossing, as must be done with the usual method of hand-signaling.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a railway-gate, the combination of a tilting boom, a transverse shaft having an arm projecting upward at the side of the rail sufficiently close to be tilted by the passing wheels, and having a downwardly-bent double crank in a trench parallel to the track, a guide-pulley, a pulley journaled above the guide-pulley and having a wedge-shaped catch-flange upon its periphery, a weighted arm having a slot engaging the catch-flange, a main chain having a link pivoted upon the double crank and passing under the pulley having the catch, and



having its end secured to the tapering end of the catch-flange, and a chain secured to the wide end of the catch-flange and passing under the pulley and under the guide-pulley, 5 having its end secured to a pulley operating the tilting boom, as and for the purpose shown and set forth.

2. In a railway-gate, the combination of shafts journaled transversely to the track, and 10 having upwardly-projecting arms at the side of the rail of the track and having double cranks formed at their other ends, the shafts being journaled at both sides of the roadway at a distance from the same, a main chain secured to the double cranks and passing in a 15 trench parallel to the track, booms pivoted to tilt in pairs on uprights at the sides of the roadway, pulleys having each a chain secured to it passing to an arm of one of the booms, a 20 chain secured to both pulleys and passing under them and under the roadway, a pair of guide-pulleys journaled below one of these pulleys and at a little distance in advance of it, a catch-pulley journaled above the guide- 25 pulleys and having a wedge-shaped catch-flange, a weighted and pivoted arm having a longitudinal slot engaging the catch-wedge, a crank-shaft having its double crank under the weighted end of the arm, and having an up- 30 wardly-projecting arm at the side of the rail near the crossing, a piece of chain secured to the main chain and to the narrow end of the catch-wedge passing under one guide-pulley, and a piece of chain secured to the wide end 35 of the catch-wedge passing under the catch-pulley and under the other guide-pulley and secured to the operating-pulley of the nearest boom, as and for the purpose shown and set forth.

40 3. In a railway-gate, the combination of a pair of uprights, a boom pivoted between the

upper portions of the same, and having a longitudinal slot traversed by the pivotal bolt and having a pulley within it upon the said bolt, a pulley between the lower ends of the uprights, 45 having a segmental flange in its periphery widening toward the middle and provided with a radial series of perforations, operating-chains secured to said pulley, a pulley journaled upon a bolt inserted through two of two 50 series of vertically-arranged perforations at the inner edges of the uprights, and a chain secured to a spring upon the back of the boom and passing over the pulley in the slot of the same, and secured with a stirrup and bolt in 55 one of the perforations of the widening flange upon the lower pulley, as and for the purpose shown and set forth.

4. In a railway-gate, the combination of a plate secured with an upwardly-projecting 60 flange at one edge to the web of the rail, having a recess or bearing in the said flange, and having upwardly-projecting lips at the other edge having their intermediate space registering with the recess in the flange, a bearing or 65 box secured between the lips and the flange upon the plate and having its bore registering with the space between the lips, and a gate-operating shaft having its end journaled in the recess of the flange and journaled in the 70 bearing, and having an upwardly-projecting widening flat arm secured near the end projecting at the side of the rail, as and for the purpose shown and set forth.

In testimony that I claim the foregoing as 75 my own I have hereunto affixed my signature in presence of two witnesses.

JOHN E. SECORD.

Witnesses:

WILLIAM H. COOPER,  
WILLIAM CREIVY.