

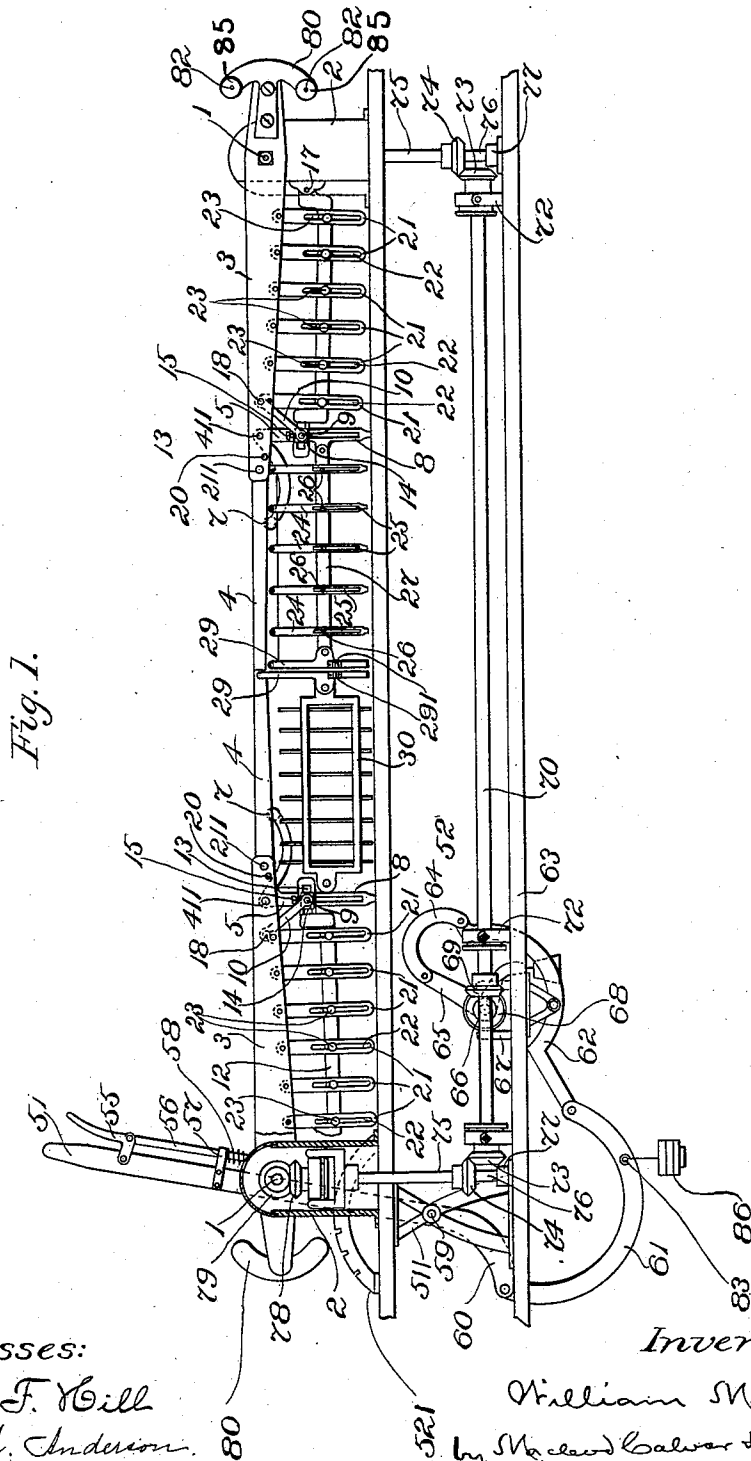
(No Model.)

3 Sheets—Sheet 1.

W. MARTIN.
RAILWAY CROSSING GATE.

No. 592,013.

Patented Oct. 19, 1897.



Witnesses:

Oscar F. Hill
Edith J. Anderson.

Inventor.

William Martin

by Maxwell Calver & Randall
Attorneys.

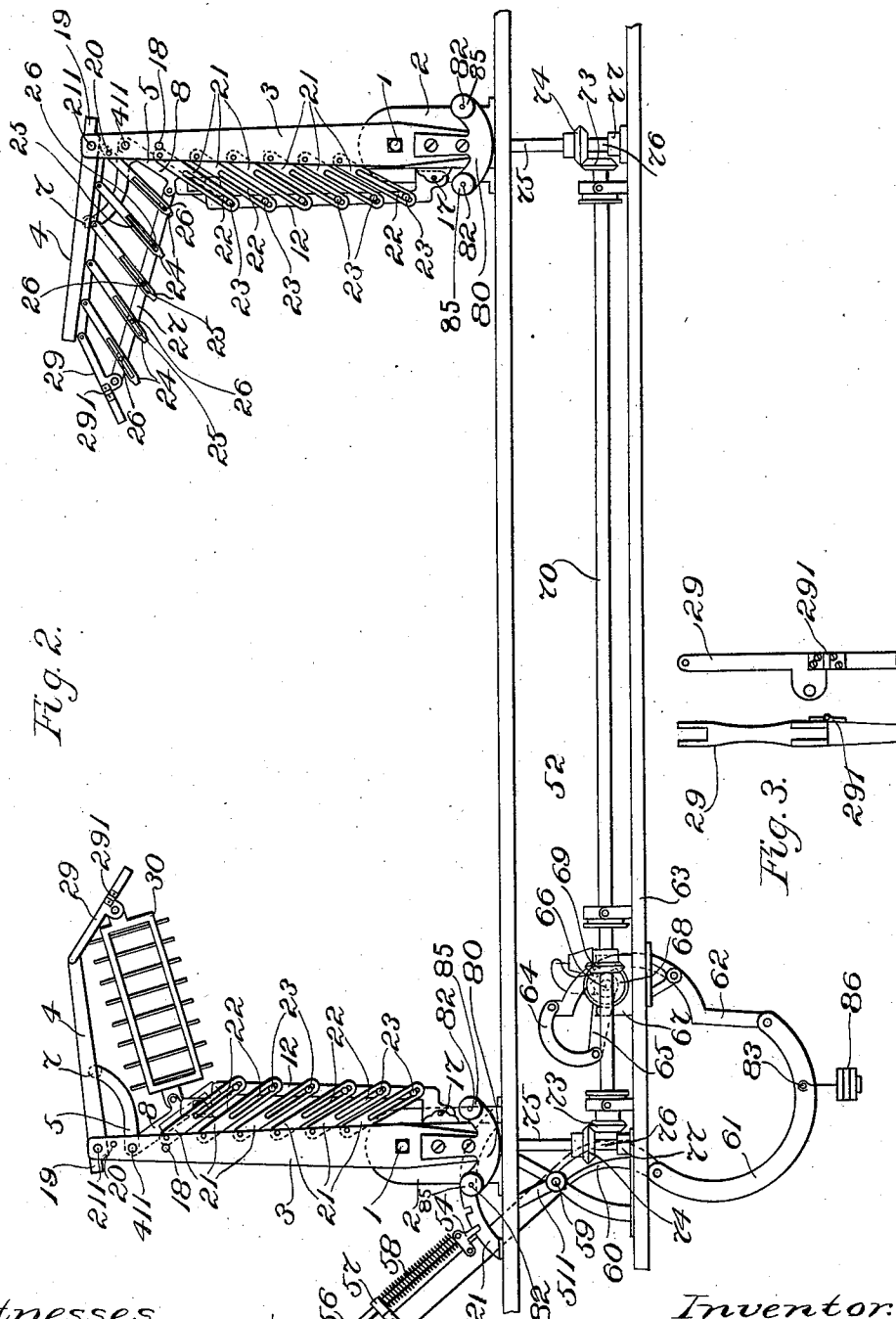
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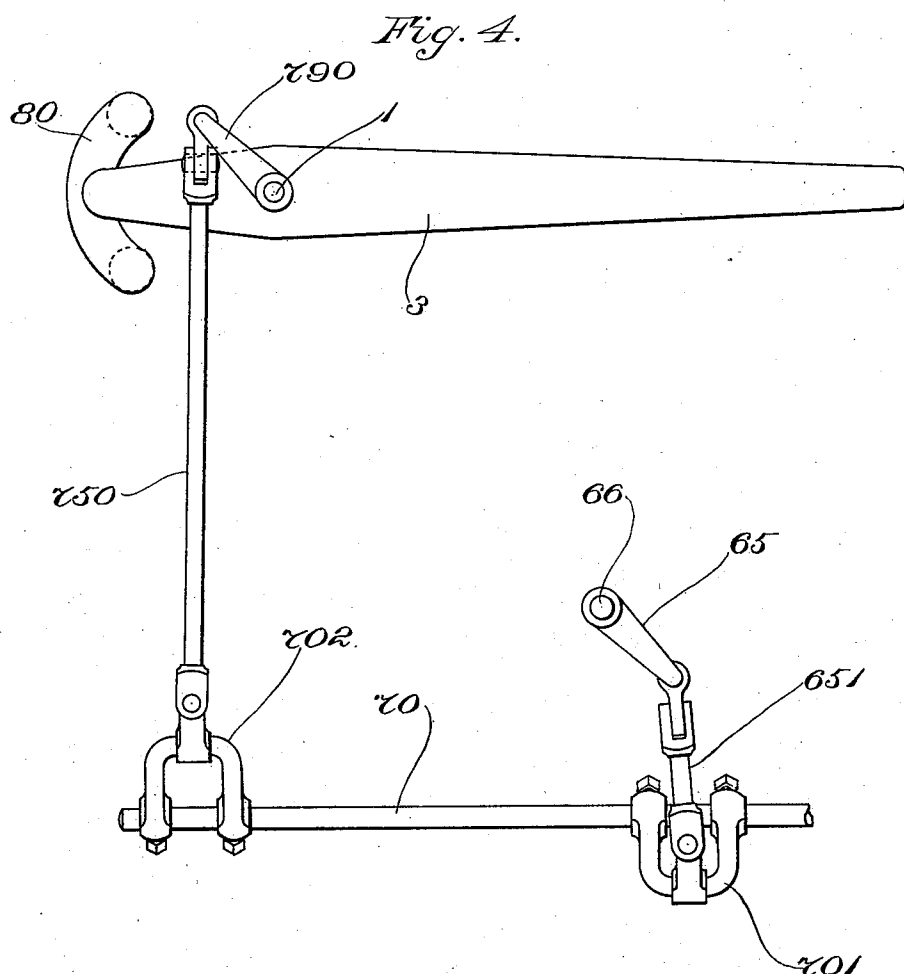
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UNITED STATES PATENT OFFICE.

WILLIAM MARTIN, OF SALEM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO THOMAS F. LITTLE, OF SAME PLACE.

RAILWAY-CROSSING GATE.

SPECIFICATION forming part of Letters Patent No. 592,013, dated October 19, 1897.

Application filed February 25, 1897. Serial No. 625,006. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MARTIN, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Railway-Crossing Gates, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to railway-crossing gates of the familiar form in which a swinging arm is mounted upon a pillar adjacent to the track or tracks at one side of a street, road, or the like crossing the said track or tracks, and is provided with actuating means whereby the said arm may be swung down by the gate-tender into a position parallel with the tracks of the railway and extending over the street, road, or the like crossing the said tracks, and afterward raised into the normal retracted position. A gate of this type is presented in my former Letters Patent, No. 547,795, granted October 15, 1895. In the said patent I have shown, described, and claimed a railway-crossing gate in which the pivoted or swinging arm comprises two parts—to wit, a main part which is mounted pivotally upon the supporting-pillar at one side of the street or road, and a smaller part or tip which is mounted pivotally upon the upper or outer extremity of the said main part of the arm, there being combined with the two-part arm just referred to a rod or bar which is connected pivotally at one end with the pillar aforesaid and has the opposite extremity thereof in engagement with a radius-bar or link, which is applied to the outer or free extremity of the main part of the arm, the said main part and rod or bar swinging on different centers. With the main part, the tip, and the rod or bar, which have been referred to, is combined a bell-crank that is mounted pivotally upon the said main part of the arm, and has an outwardly-projecting arm in sliding engagement with the tip portion of the swinging arm. The said bell-crank has operative connection with the said rod or bar, the latter being connected with the depending arm of the bell-crank, the said arm being extended sufficiently to enable it to constitute a prop or support for the gate

when the latter is in its depressed position. In consequence of the fact that the main part of the arm or gate and the rod or bar aforesaid swing upon two centers as the gate is raised and lowered, it follows that in the rise and fall of the outer extremity of the said main part of the arm the bell-crank is swung upon its pivotal mounting on the said main part, so as to cause the tip of the arm to turn on its pivot relatively to the main part of the arm. In this manner, as the gate is raised from its depressed position, the tip part of the same is allowed to remain in a substantially horizontal position projected across the street or road, thereby obviating any contact with overhead wires or other obstructions, such as the trolley-wires of electric street-railways. In the descent of the gate or arm, the construction and connections described cause the tip of the arm to remain in a substantially horizontal position, approaching gradually a line which is in continuation of the length of the main part of the arm or gate, until the prop or support constituted by the downwardly-depending arm of the bell-crank comes to rest upon the ground, the gate then being stretched to its full length across the crossing.

My present invention is in the nature of an improvement upon the gate of my patent aforesaid, and comprises various novel and improved features, including provisions for affording a more complete barrier to the passage of persons and animals while the gate is in its depressed position; also means whereby to actuate a swinging railway-gate of the type to which reference has been made, and also means whereby to facilitate the escape of a person who may be caught on the tracks by the closing of the gates.

The invention will be described first with reference to the accompanying drawings, in which latter I have represented the best embodiment thereof which I have yet contrived, and afterward the distinguishing or characteristic features thereof will be particularly pointed out and distinctively defined in the claims at the close of this specification.

In the said drawings, Figure 1 is a view, chiefly in side elevation, of a pair of railway-crossing gates having my present invention

applied thereto, certain small parts being shown in section or broken away in order the better to illustrate other parts which otherwise would be concealed. In this figure the gates are shown in their depressed position. Fig. 2 is a view in side elevation showing the parts of Fig. 1 in their raised position. Fig. 3 shows the post with outwardly-swinging portion, hereinafter described. Fig. 4 shows a modification.

As is well known, on narrow streets or roads a single gate of sufficient length to stretch entirely across is frequently employed. On wider streets or roads it is common to use two gates, one of which is mounted at each side of the street or road, their tip ends meeting at the middle of the street or road when the gates are in their depressed positions. Certain portions of the invention admit of being utilized when a gate or gates is mounted on a single side of the street or road and stretches entirely across the latter, while certain other features of the invention are applicable in cases where gates are mounted at both sides of the street or road, as shown in the drawings.

In the case of each of the gates shown in the drawings the rock-shaft on which the two-part arm is mounted is designated 1, and the hollow pillar on which the said rock-shaft is mounted is designated 2. The inner or main part of the arm is designated 3, and the tip or supplementary part is designated 4, the point of pivotal connection being marked 211.

In order to double up the supplementary arm 4 upon the main arm 3 when the main arm is raised, or, in other words, retain the former in a horizontal position, I provide the following mechanism: On a rock-shaft 411 on the main arm, a little distance in from the pivot of the supplementary arm, I attach the bell-crank 5, one member of which is formed of bow shape in order to clear the pivot 211 of the supplementary arm. The end of the curved or bow-shape member is provided with a friction-roller 7 and bears against and runs in a groove in the under face of the supplementary arm. The other and straight member 8 of the bell-crank is slotted, and through the slot runs the pin 9 of a radius-bar or link 10, the upper end of which is pivoted to the main arm of the gate somewhat back of the rock-shaft 411, on which the bell-crank is mounted. The lower end 11 of the slotted member 8 of the bell-crank is of sufficient length to enable it to serve as a foot to rest upon the ground when the gate is down, as indicated clearly in Fig. 1. Pivoted to the pillar 2 below the bearings of the rock-shaft 1 of the main arm 3 is a rod or bar 12, which extends out parallel or substantially parallel to the main arm and has at its outer end a slot 13, which embraces a block 14, that is connected to the pin 9 of the radius-bar or link 10. This block is adjusted at any required point in the slot of the said rod or bar 12 by a set-screw 15, applied to the bar. This

means of adjusting the block along the slot of the bar 12 enables the gate to be adapted to the grade of the street or road across which it extends—that is to say, to the transverse inclination of the surface thereof—and enables any accumulation of compacted and frozen snow to be compensated for. Thus when it is found that the descent of the main part of the gate is arrested by contact with the surface of the roadway or with any obstruction or accumulation on the said surface, which would result in the supplementary arm drooping out of line with the main arm, a slight adjustment of the block in the slot aforesaid is all that is required in order to enable the supplementary arm in the lowest position of the gate to be maintained in proper line with the main arm. The relative positions of the pivotal axis of the main arm, the pivot 17 of the rod or bar 12, the pivot 9 between the said rod or bar and the radius-bar or link, and the pivot 18 of the radius-bar or link upon the main arm are such that these four members are articulated into a form similar to that of a parallel-ruler, so that the said rod or bar will remain parallel or substantially parallel to the said main arm as the gate rises, and so, also, that the said radius-bar or link will be always parallel or approximately parallel to the line joining the two pivots on the pillar. As the gate rises, therefore, the radius-bar or link will be swung inward toward the pillar, and will draw with it the slotted member 8 of the bell-crank, thereby retracting the curved member of the said bell-crank and allowing the supplementary arm 4 to turn downward, so that when the gate reaches the highest point the supplementary arm will still stand horizontal and more or less approximately at right angles to the main arm. The curve which the outer end of the supplementary arm traces in its rise, therefore, enables the gate easily to clear a trolley-wire or other obstruction within the arc of a circle struck from the axis of the rock-shaft 1 as a center. The inner end 19 of the supplementary arm 4 projects somewhat beyond its pivot, and when the gate is down it comes against a stop 20 on the main arm, which prevents the said supplementary arm from being lifted so long as the main arm remains horizontal. This prevents people on the outside of the gate from lifting the gate in spite of the gate-keeper and passing through.

Further, in order effectually to prevent the passage of persons or animals when the gate is down, I apply to the main arm, and also to the supplementary arm, obstructions in the form of depending wings or guards. One section, constituting a depending wing or guard, is combined with the main arm of the gate, and the other section with the supplementary arm. When the gate is in its depressed position, the said wings or guards extend to or nearly to the ground or pavement, and preferably constitute a species of fence which

closes entirely the street or road from one side thereof to the other. These wings or guards, preferably, are of open-work, such as wire or slats, and, preferably, in order to simplify the construction, as well as for certain other reasons, the slats composing the same are connected at their upper ends to the main arm and supplementary arm, and at lower points in their lengths the slats depending from the main arm are connected to the rod or bar 12, and those depending from the supplementary arm are connected to the rod or bar 27, the said rod or bar 27 being connected pivotally at one end thereof with the depending arm of the bell-crank 5 and at the other end thereof with an arm or post 29, the upper end of which last is joined pivotally to the outer extremity of the supplementary arm or tip of the gate. In consequence of the main arm and the rod or bar 12 being on different centers and of the change in relative positions of the parts, which takes place as the gate is raised and lowered, the slats 21, composing the wing or guard which is applied to the main arm, are swung upon the pivots which join them to the said main arm, so that as the gate is raised the said wing or guard becomes contracted or reduced somewhat in width, and is increased to its full width again as the gate is lowered. This reduction of the width of the wing or guard, which is effected as the gate is raised, thus diminishes the extent to which the said wing or guard projects from the main arm, and diminishes also the danger of injury thereto by passing vehicles. With the object in view of shielding the free extremities of the slats, which are pivoted to the main arm, when the gate is raised, so that the said extremities shall be unlikely either to receive or occasion injury from or to passing persons, animals, or objects, and yet allow the said extremities to project below the rod or bar 12 when the gate is down, I depress the said rod or bar 12 between its opposite ends so that its intermediate portion shall be at a greater distance from the main arm than the distance between the pivots of the main arm and the said rod or bar, and also than the length of the radius-bar or link, and I form the slats with longitudinal slots 22, through which slots pass pins or the like which are indicated at 23 and which are applied to the said intermediate portion of the rod or bar 12. The slats 21 and the depressed intermediate portion of the rod or bar 12 being thus in sliding connection or engagement, it follows that when the gate is raised the extreme ends of the slats occupy positions in which they are protected by the rod or bar 12. The series of slats 24 which are pivoted to the supplementary arm or tip are formed with slots 25 which receive the pins or the like 26 that project from the rod 27 aforesaid. The movement which is imparted to the bell-crank as the gate is raised, in lowering the supple-

mentary arm or tip so as to allow the latter to remain in a horizontal or substantially horizontal position, causes the slats 24 and arm or post 29 to be projected upwardly and outwardly from their position at right angles to the said supplementary arm or tip into inclined positions, thereby diminishing the vertical width of the wing or guard which is applied to the supplementary arm or tip, and raising the lower extremities of the slats which pertain to the same.

The foregoing description of the wing or guard which is applied to the supplementary arm or tip of the gate applies only to the form of gate which is shown at the right-hand side in the figures of the drawings.

In the gate which is shown at the left-hand side of the figures of the drawings, a modified construction of wing or guard is shown applied to the supplementary arm or tip. In this case, a square frame 30 is connected pivotally to the bell-crank 5 and post or arm 29, the said frame being provided with fixed rods or slats that are passed through or secured to the upper and lower side bars thereof. It sometimes happens that on the closing of the gates at a railway-crossing, a person is caught between them, owing to his own carelessness or inattention or that of the gate-tender. With the object in view of guarding against accidents and fatalities rising because of this, I hinge the lower portion of each post 29 so as to be capable of being turned outwardly, the hinge or joint being indicated at 291. (See more particularly Figs. 1 and 3.)

The gates are operated by the following mechanism: An operating-lever 51 is pivoted on a bracket 511 below the level of the street. The street is represented as excavated for several feet down underneath the area below the gates, leaving a chamber 52, in which the shafting and gearing is placed. The operating-lever 51 moves between two racks 521, shaped in the arc of a circle struck from the pivot of the lever as a center. To the lever, near these racks, is pivoted a latch 54, arranged to enter the notches of the racks when depressed and lock the lever at any desired point. The latch is operated from the handle end of the lever by an L-shaped arm 55, whose elbow is connected with the latch by a rod 56, passing through a guide 57 at about the center of the lever. Between the guide and the latch is confined a spiral spring 58, which holds the latch normally in the rack. The part of the operating-lever above its pivot 59 is straight, but below the pivot it is shaped in about a quarter-circle, at 60. Its lower end is connected by a curved link 61 to the end of a second lever 62, pivoted under the floor 63 of the main chamber 52. To accommodate the movement of this link, a narrow secondary pit is sunk below the chamber. The upper end of this second lever is again connected by a curved link 64 to an arm 65 on a shaft 66, run-

ning lengthwise of the street and crosswise of the plane in which the levers and links lie. This shaft 66 is carried in suitable bearings 67 upon the floor 63 of the chamber 52, and in Figs. 1 and 2 it has at each end a beveled gear or segment 68. These gears mesh with bevel-gears 69 on two shafts 70, which run crosswise of the street, each shaft lying in the common disposition of gates under the gates which it operates. These latter shafts 70 are carried in suitable bearings 72, and each is provided at each end with a bevel-gear or segment 73, which meshes with a bevel-gear or segment 74 near the lower end of a perpendicular shaft 75. There are four of these perpendicular shafts, each running up into one of the gate-pillars and being journaled therein. At their lower ends 76 these perpendicular shafts are stepped in bearings 77, secured to the floor of the chamber. There is a bevel-gear or segment 78 at the upper end of each of the perpendicular shafts inside the hollow pillar and it meshes with a bevel-gear or segment 79 on the rock-shaft 1 on which each gate is hung. Following now the operation of this train of mechanism, beginning at the operating-lever and ending with the rock-shaft of the gate, we see that when the operating-lever 51 is unlocked by the operator actuating the L-shaped arm 55, and thereby retracting the latch 54 from the racks 521 521, the operating-lever may be swung to the left from the position shown in Fig. 1 to the position shown in Fig. 2. Its lower end will be swung down and toward the right; thereby, through the medium of the curved link 61, causing the lower end of the second lever 62 to move in approximately the same direction. Thereby the upper end of the second lever 62 will be swung up and toward the left, operating through the second curved link 64 to swing the rocker-arm 65 to the left and rotating the shaft 66 in that direction. Through the intermeshing gears the four perpendicular shafts 75 will be rotated; and the bevel-gear 79 in each of the pillars attached to the gate-shaft being correctly placed to produce an upward movement of the corresponding gate, the gates will simultaneously swing up into the position shown in Fig. 2. To facilitate this operation and permit it to be accomplished with a slight expenditure of force, I provide weights at two points in the system.

First, I attach brackets 80 to the prolonged rear ends of the main arms, and provide the brackets with pins 82, on which may be hung weights 85 sufficient to partially counterbalance the gates. This facilitates the turning of the gates on their pivotal supports and relieves the operating mechanism from the strain and liability to breakage, which would exist if the gates themselves were not counterbalanced.

Second, I fasten a pin 83 in a transverse hole in the curved link 61 and to that I attach a weight 86 sufficient to complete the

counterbalancing of the movable parts of the mechanism from the operating-lever to and including the gates.

Fig. 4 shows a modified arrangement of means of transmitting motion from cross-shaft 66 to the gates. Thus the arm 65 on each end of said cross-shaft is connected by a link 651 with a crank-arm 701, extending outwardly from the shaft 70. On each end of each of the shafts 70 is provided a crank-arm 702, which last is joined by a rod 750 with a crank-arm 790, extending from the rock-shaft 1, on which is mounted the main arm 3 of the corresponding gate. This arrangement enables the use of gears to be dispensed with.

What I claim is—

1. In a railway-crossing gate, the combination of a pillar, a gate-arm, means to operate said arm, a bar having a depressed intermediate portion, the said gate-arm and bar being pivoted to the pillar on different centers, a link connecting the free ends of said arm and bar, and slats pivoted to said arm and having slots embracing pins on the depressed portions of the bar, substantially as described.

2. In a railway-crossing gate, in combination, a supporting-pillar, a gate-arm, a rod or bar, the said gate-arm and rod or bar being mounted pivotally on the said pillar on different centers, a link or radius-bar connecting the free end of the said rod or bar to the said gate-arm near the free extremity of the latter, slats pivotally connected to the said gate-arm and engaged with the said rod or bar, a tip or supplementary arm pivotally mounted upon the said main arm, a bell-crank pivotally mounted upon the said main arm and having one arm thereof in sliding engagement with the said tip or supplementary arm and the other arm thereof actuated from the said rod or bar, and a wing or guard depending from the said tip or supplementary arm and connected with the depending arm of the bell-crank, substantially as described.

3. In a railway-crossing gate, the combination with the arm thereof, of a depending wing or guard to obstruct the space between the said arm and the roadway, the said wing or guard having a portion thereof near the ground made capable of outward movement to facilitate the escape of a person caught on the tracks by the closing of the gates, substantially as described.

4. In a railway-crossing gate, the combination with the pillar, the main arm, the supplementary arm or gate mounted pivotally on the said arm, the rod or bar 12, the said main arm and the rod or bar 12 being pivoted on the pillar on different centers, the radius-bar or link connecting the free end of the said rod or bar with the main arm, the wing or guard applied to the main arm, the bell-crank, and the wing or guard applied to the supplementary arm or tip and connected with the said bell-crank, the said wing or guard

having a post with the lower extremity thereof capable of being swung outwardly to facilitate the escape of a person caught on the tracks by the closing of the gate, substantially as described.

5 5. In a railway-crossing gate, the combination of a pivoted gate-arm, a bevel-gear on its pivot, a bevel-gear meshing with the said gear and fixed to a vertical shaft, an actuating-shaft, connections whereby said vertical shaft is operated from said actuating-shaft, an arm on said actuating-shaft, an operating-lever and means whereby said lever is operatively connected with the said arm upon
10 the said actuating-shaft, substantially as described.
15

6. In a system of railway-crossing gates, the combination of a series of gates, an oper-

ating-lever, a horizontal shaft provided with bevel-gears, means to actuate said shaft from
20 said lever, horizontal shafts running toward the pillar of each gate and provided with bevel-gears meshing with the gears on the shaft first mentioned, vertical shafts in the
25 said pillars and having bevel-gears meshing with bevel-gears on the said horizontal shafts, and gates pivoted to the pillars and having bevel-gears on their pivots meshing with the
30 said vertical shafts, substantially as described.

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

WILLIAM MARTIN.

Witnesses:

WM. A. MACLEOD,
CHAS. F. RANDALL.