W. E. GEDDES.

RAILWAY GATE.

APPLICATION FILED FEB. 17, 1910.

977,001.

Patented Nov. 29, 1910.

3 SHEETS—SHEET 1.

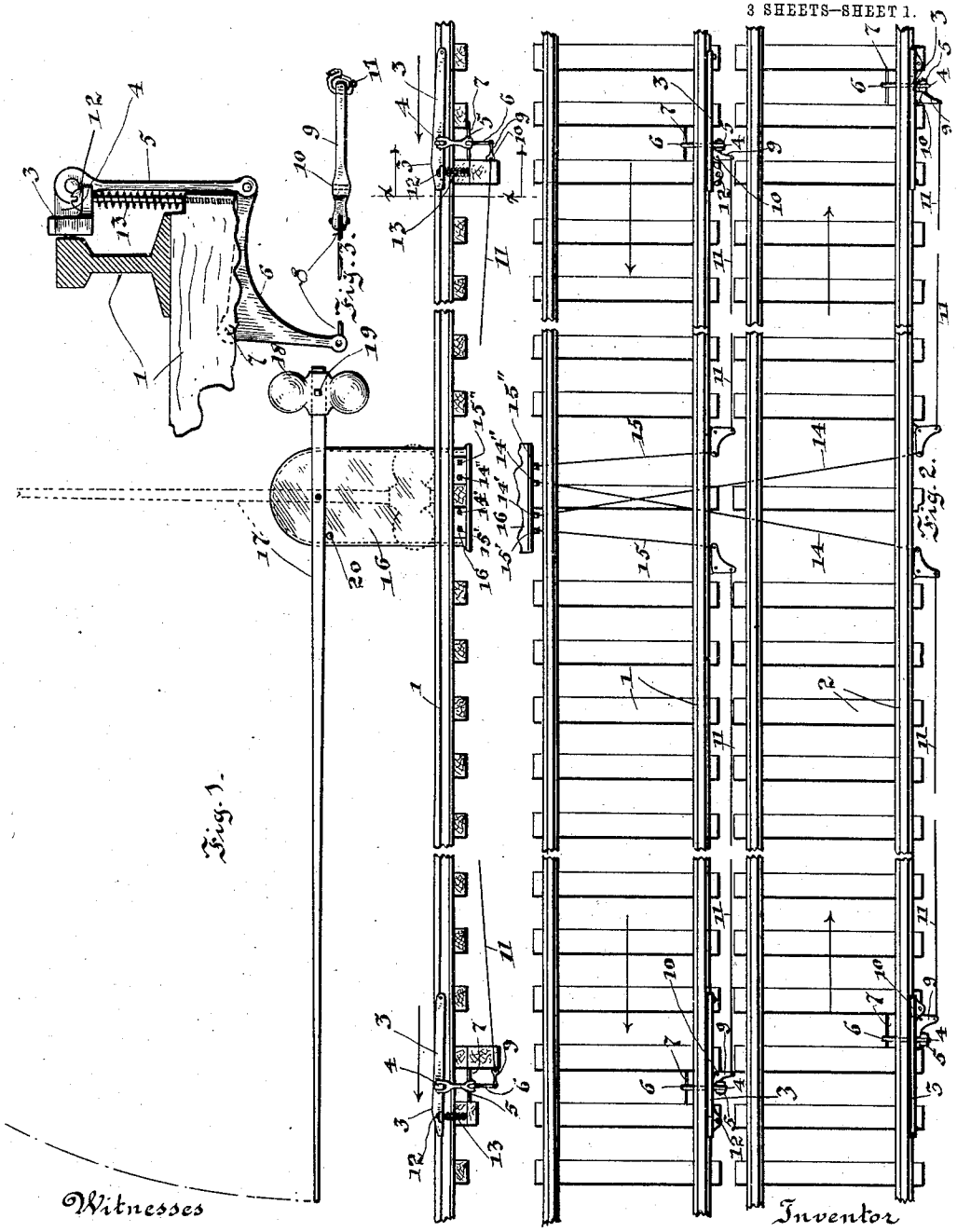

Fig. 1.

Fig. 2.

Witnesses

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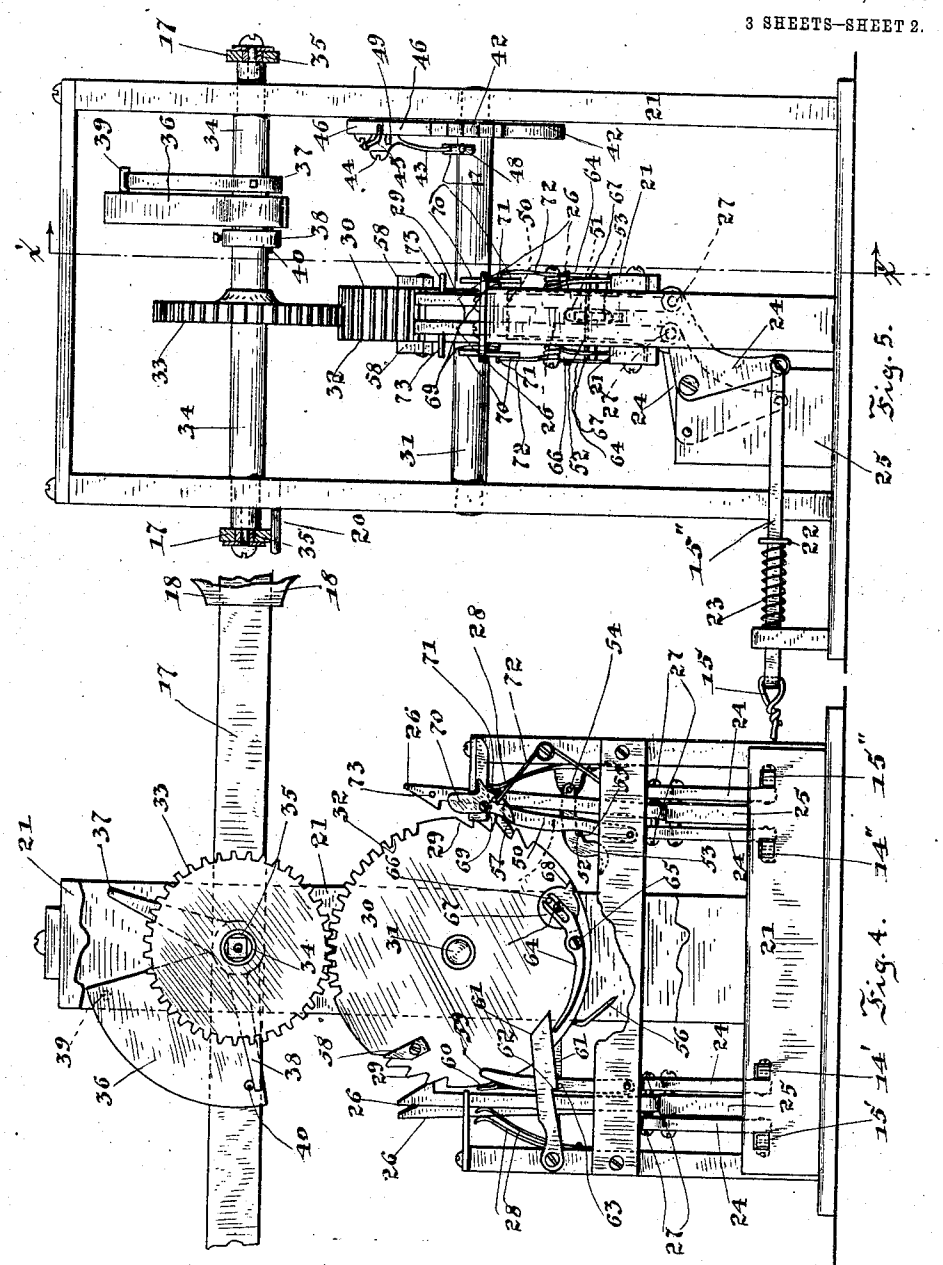

Fig. 5.

Fig. 4.

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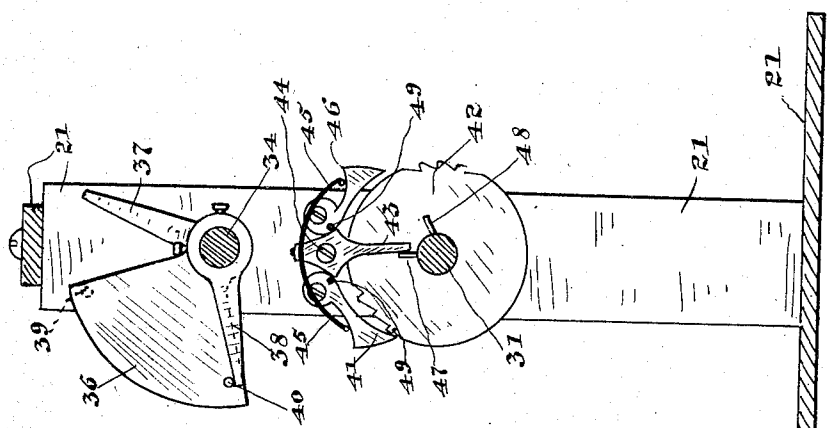

Fig. 7.

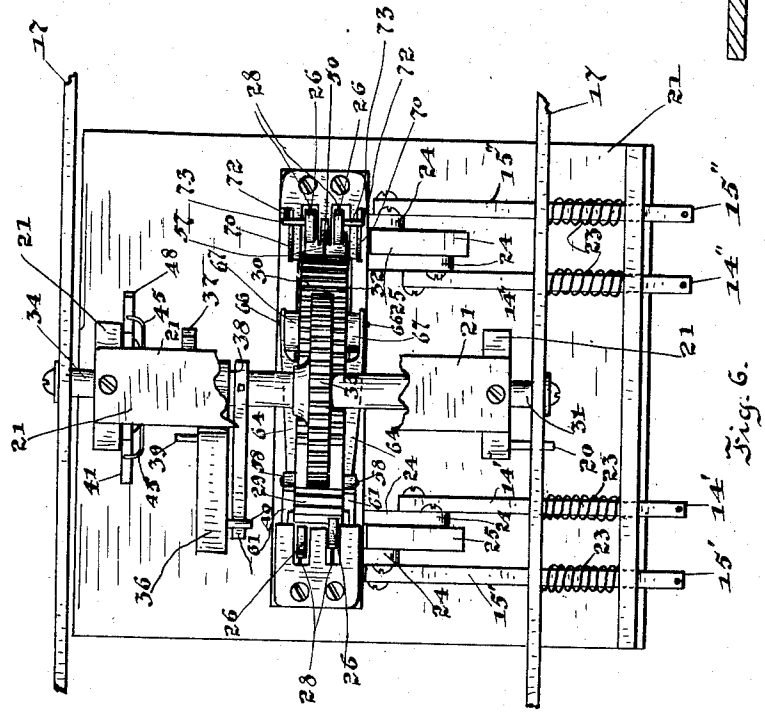

Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

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RAILWAY-GATE.

977,001. Specification of Letters Patent. **Patented Nov. 29, 1910.**

Application filed February 17, 1910. Serial No. 544,349.

To all whom it may concern:

Be it known that I, WILLIAM E. GEDDES, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Railway-Gates, of which the following is a specification.

My invention relates to improvements in railway gates and has for its object the production of a gate of this character which shall be closed and opened automatically by a moving train before and after a crossing respectively.

A further object of my invention is to provide a railway gate which shall be inexpensive of manufacture and efficient in its operation.

Other objects will appear hereinafter.

With these objects in view my invention consists in the novel construction and arrangement of parts which shall be hereinafter fully described and particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a side elevation of a railway and my improved railway gate in its preferred form, Fig. 2 is a top plan view of a double track railway showing the car-wheel-operated devices which control the operation of the gate mechanism, Fig. 3 is a detail view showing one of said devices taken on line x—x of Fig. 1, Fig. 4 is a side elevation showing the gate mechanism, Fig. 5 is an end elevation, Fig. 6 is a top plan view, and Fig. 7 is a vertical section taken on line x'—x' of Fig. 5.

Referring now to the drawings 1 designates track No. 1 and 2 track No. 2, and trains run thereover as indicated. Each car-wheel-operated device comprises a shoe 3 pivoted to the side of a rail as shown in detail in Fig. 3. A perforated lug 4 projects from the side of the shoe 3 and to which a link 5 is pivoted at its upper extremity. The bell-crank lever 6 pivoted as at 7 to a tie of the track 1 is pivoted to the link 5 and to the horizontally extending link 8, the latter being pivoted to the bell-crank lever 9 which is adapted to swing in a horizontal plane and pivoted as at 10. The wire 11 is tied to the bell-crank lever 9, as shown in Fig. 3. To limit the upward movement of the shoe 3 a screw head 12 and a spring 13 is provided, the latter surrounding the screw. The wires 11 have bell-crank connection to the wires 14 and 15 which lead to the gate-operating mechanism, the wires 14 connecting with the rods 14′ and 14″ and the wires 15 with the rods 15′ and 15″. The gate-operating mechanism is provided with a housing 16, and to said mechanism is connected the gate arm 17, shown in Fig. 1, the dotted lines therein indicating the vertical or open position. An adjustable weight 18 is mounted on the gate 17 and is held in any desired position thereon by means of a set-screw 19, a stop 20 being provided to limit the movement of said gate.

21 designates the main frame of the gate-operating mechanism and 22 collars secured to the rods 14′, 15′, 14″ and 15″ and serve to react on the compression springs 23 surrounding said rods. To the inner end of said rods are pivoted bell-cranks 24 which in turn are pivoted to the supports 25 provided in the main frame 21.

One arm of the bell-cranks 24 is pivoted to vertically disposed pawls 26 by means of the screws 27, springs 28 secured to the main frame 21 being provided to maintain said pawls in normal engagement with the ratchet teeth 29 provided in the periphery of the oscillatory member 30. The oscillatory member 30 is secured to the shaft 31 which is journaled in the main frame. Teeth 32 are provided in the oscillatory member 30 and with which the spur gear 33 meshes, the latter being secured to the shaft 34 journaled in the main frame 21 in a manner similar to the shaft 31. Squared portions 35 are provided at each end of the shaft 34 in order that the gate members 17 may be rigidly secured thereto. Loosely mounted on the shaft 34 is a sector-shaped weight 36 the movement of which is limited by radial arms 37 and 38 which are secured to the shaft 34, the object of said weight being to hold the gate member 17 more positively in either the closed or open position. Pins 39 and 40 projecting laterally from the oscillatory member 36 engage respectively the arms 37 and 38 for obvious reasons.

The gate arm 17 in Fig. 4 is shown in closed position and the pawl 26 connected with a rod 14′ leading from track No. 2 is

in a position ready to open said gate arm when a train running on track No. 2 actuates one of the car-wheel-operated devices provided thereon. This pawl will be pulled downwardly as each wheel passes shoe 3 and will rotate the oscillatory member 30 the distance of a single tooth for each downward movement when the stop pawl 41 will engage a tooth of the ratchet wheel 42 to prevent retrograde movement. During the closing of the gate arm 17 the short arm 43 was moved to the position as shown in Fig. 7, hence the pawl 41 will be in the proper position to perform its function. The arm 43 is frictionally pivoted on the screw 44 in such a manner that it will remain in any position after being moved. The spring 45 is secured rigidly to one end of the arm 43 and is adapted to press the pawls adapted to engage the ratchet wheel 42 into engagement therewith. When the gate is being closed the ratchet wheel 42 will rotate in the reverse direction and during this time the stop pawl 46 will engage the teeth of said ratchet wheel since the pin 47 will cease to act on the arm 43 and the pin 48 will act on the same to cause the necessary rotation. The arm 43 moves the pawls 41 and 46 by means of pins 49 projecting laterally therefrom. The oscillatory member 30 will continue to rotate for opening the gate arm 17 until pawls 26 engaging the lever 50 which is provided with the slot 51 stops such movement. To said lever a transverse wire 52 is soldered which wire engages the arm 53. The arm 53 is pivoted to the main frame as at 54 and is provided with a notch 55 adapted to engage the wire 52. Secured in the periphery of the oscillatory member 30 is an obliquely disposed pin 56 the point of which is adapted to engage the point of the arm 53 after the gate has been fully opened. This causes the arm 53 to rise which causes the notch 55 to disengage the wire 52, thus allowing the springs 28 to force the pawls 26 to their engaging position for closing the gate. The peripheral projection 57 provided in the oscillatory member 30 is adapted to contact with the lever 50 for forcing the pawls 26 into their inoperative position after the gate is closed, and the projections 58 secured to the side of said member are adapted to engage the levers 59 and to press the same outwardly, said levers being provided with a stop shoe 60 adapted to engage the periphery of the oscillatory member 30. Levers 61 are pivoted to the main frame 21 and are provided with notches 62 in the lower edges thereof, which notches are adapted to engage pins 63 provided in the levers 59 for holding the same in their outermost positions. It is apparent that when the notches 62 engage the pins 63 that the pawls 26 adjacent thereto are in the inoperative position.

It is desirable that when a train on either track closes the gate arms 17 that the same train causes the gate to open and that the proper means shall be provided to prevent a train on the other track from interfering with such action. To this end levers 64 are pivoted on each side of the oscillatory member 30, as at 65, the forks provided in one end of said levers being adapted to engage pins 66 projecting laterally from oscillatory members 67 which members are provided with peripheral teeth 68. When the teeth 68 engage the main frame 21 at the points 69 the small ends of levers 64 will be raised, and in order to depress one of said ends a tooth 68 must be moved to its former position by one of the levers 70. Each lever 70 is provided with a projecting pin 71 which engages a spring 72 for normally holding said lever in position as shown in Fig. 4.

In order that a lever 70 shall move to engage a tooth 68 the pin 73 projecting laterally from a pawl 26 must engage the left-hand side of the upper end thereof, and in order that this may be effected the lever 53 must be raised to allow the pawls 26 to move to the left.

As aforesaid the lever 53 is raised after the gate is fully opened so as to allow the pawls 26 at the right to engage the member 30 and to be in a position ready to close the gate. Supposing now that the gate is closed by the action of one of the pawls at the right, then it must also be opened by the pawl diametrically opposite or, in other words, by the same train. The reason for this is evident since during each operative down stroke of the pawl the pin 73 in its side engages and oscillates the lever 70. During the first stroke the lever 70 engages the tooth 68 and oscillates the member 67 which oscillation causes the lever 64 to assume the position shown in Fig. 4 which causes the corresponding pawl 26 to assume its operative position. The small end of the member 64 on the other side of the member 30 will simply pass over the corresponding member 61. Thus the desired selective action is produced with no interference of trains on tracks 1 and 2.

In order to explain the operation of the device, the cycle of operations which takes place as a train passes the gate on track 2 will now be traced. As the train approaches the gate in the direction of the arrows on Fig. 2 the corresponding track shoe is operated by the wheels of said train to cause vertical reciprocations of pawl 26. Under these conditions said pawl 26 is free to engage the teeth 29 on the oscillatory member 30 to cause partial rotation thereof and consequent rotation of shaft 34 to elevate the weight 36 and lower gate 17, until the center of gravity of weight 36 passes

over the center of shaft 34, whereupon said weight will fall to continue the movement of gate 17. At the first downward movement of said pawl 26 pin 73 passes to the left of member 70 holding said member in such a position that the beveled side of projection 68 will contact with the lower end of member 70 to cause rotation of member 67 and the setting of lever 64 in position to contact with trigger member 61 near the end of the oscillatory movement of member 30. This elevates trigger 61 to release lever 59 and thus release the corresponding pawl 26 for engagement with oscillatory member 30. When the train passes the gate, its wheels contacting with the corresponding track shoe 3 causes vertical reciprocations of said released pawl 26. During these reciprocations said released pawl 26 engaging with the corresponding teeth 29 on the oscillatory member 30 causes rotation of said oscillatory member to cause the elevation or opening of gate 17, the fall of the weight 36 serving to complete said movement of said gate as before. Near the end of this oscillation of member 30, member 58 contacting with the upper end of lever 59 throws said lever outwardly to throw the corresponding pawl 26 out of operative relation with teeth 29 and said pawl is held in inoperative relation by the engagement of notch 62 on trigger lever 61 with pin 63. At the first movement of member 30 to effect the raising or opening of the gate projection 57 will have actuated lever 50 to throw both of the pawls 26 on the corresponding side of member 30 out of operative relation where they will be held by trigger arm 53 engaging wire 52 so as to permit of the opening or raising movement of member 30. Near the end of the opening movement of member 30, pin 56 contacting with trigger arm 53 to release corresponding pawls 26 and to render them operative, and at substantially the same time member 68 engaging shoulder 69 operates lever 54 to place the latter in inoperative position. This places the operating parts in normal or initial position ready for another operation through the same cycle upon a passage of a train over track 2 in the direction indicated. The other side of oscillatory member 30 is provided with duplicates of the parts already described which serve to coöperate with the corresponding pawls 26 to perform the same cycle of operations during the passage of a train over track No. 1 in the opposite direction to the passage of that over track No. 2. Thus it will be observed that the passage of a train over either track in the directions indicated will automatically close and open the gate to prevent accidents.

It will be noted that the foregoing described device is simple and effective and that the movements are effected by a minimum number of parts.

While I have shown what I deem to be the preferable form of my improved railway gate I do not wish to be limited thereto as there might be various changes made in the details of construction and arrangement of parts described without departing from the spirit of the invention, and hence I desire to avail myself of such changes and modifications as fairly fall within the spirit and scope of the appended claims.

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

1. In a device of the class described, an oscillating shaft, a gate fixed thereto, a weight loosely mounted on said shaft, means on said shaft for limiting the movement of said weight thereon, means actuated from points remote from said gate for imparting initial movement to the gate and to shift said weight to complete the movement of the gate.

2. In a device of the class described, an oscillating shaft and a gate fixed thereto, in combination with a weight loosely mounted on said shaft, a pair of spaced arms fixed to said shaft and adapted to limit the movement of the weight thereon, means for imparting initial movement to said gate and shaft to shift said weight whereby said weight shall complete the movement of the gate.

3. In a device of the class described, an oscillating shaft, a gate fixed thereto, a weight loosely mounted on said shaft, a pair of spaced arms fixed to said shaft, stops projecting from said weight and adapted to engage said arms to limit the movement of the weight, and means actuated from points remote from said gate for imparting initial movement to said gate and for shifting said weight.

4. In a device of the class described, an oscillating shaft, a gate operatively connected thereto, means for imparting a step by step rotation to said shaft in one direction from a point remote from said gate and for imparting a like rotation in the opposite direction from another point remote from said gate, a double ratchet member fixed to said shaft, a pair of pawls arranged adjacent said ratchet, means for simultaneously throwing either of said pawls into engagement with its respective ratchet and for disengaging the opposite pawl, and means on said shaft for shifting the pawl throwing means, substantially as described.

5. In a device of the class described, an oscillating shaft, a gate operatively connected thereto, means for imparting a step by step rotation to said shaft in one direction from a point remote from said gate and for imparting a like rotation in the opposite direction from another point remote from said gate, a double ratchet member fixed to said

shaft, a pair of pawls arranged adjacent said ratchet, a member pivotally mounted adjacent said pawls and adapted in one position to throw one of said pawls into engagement with its respective ratchet and to disengage the opposite pawl, and in another position to reverse said pawls, and a pair of spaced members on said shaft adapted to engage and operate the pawl shifting member, substantially as described.

6. In a device of the class described, a pivotally mounted gate, an oscillating member operatively connected thereto, oppositely disposed sets of ratchet teeth formed on said member upon opposite sides thereof, a reciprocating pawl arranged adjacent each set of ratchet teeth, means for actuating said pawls from points remote from said gate and means for disengaging one of said pawls from its respective ratchets as the other pawl is thrown into engagement with its ratchet, substantially as described.

7. In a device of the class described, a pivotally mounted gate, an oscillating member operatively connected thereto, oppositely disposed sets of ratchet teeth formed on said member upon opposite sides thereof, a pair of reciprocating pawls arranged adjacent each set of ratchet teeth, means for actuating each of said pawls independently from different points remote from said gate, the pawls of one pair being adapted to operate singly to close the gate and the pawls of the other pair being adapted to operate singly to open the gate, means for throwing the gate closing pawls into and out of operative position simultaneously, means for maintaining the gate opening pawls out of operative position when the gate closing pawls are in operative position, and selective means for throwing the gate opening pawl corresponding to the previously operated gate closing pawl into operation as the gate closing pawls are thrown out of operation, substantially as described.

8. In a device of the class described, a railway track and car-wheel-operated devices mounted adjacent thereto, a gate arranged adjacent said track, mechanism adapted to operate said gate, and means connecting said devices with said mechanism for controlling the operation of the latter, each of said devices comprising a shoe pivoted to a side of a rail of the track, a vertically disposed link pivoted to said shoe, a bell-crank adapted to move in a vertical plane pivoted to said track and to said link, a link adapted to move in a horizontal plane pivoted to said bell-crank, a second bell-crank adapted to move in a horizontal plane pivoted to said bell-crank, a second bell-crank adapted to move in a horizontal plane pivoted to said last named link, resilient means for normally maintaining said shoe in its highest position, and a stop to limit the upward movement of said shoe consisting of the head of a screw which is secured in a tie of the track, said resilient means consisting of a compression spring surrounding said screw, substantially as described.

9. In a device of the class described, a gate operative mechanism comprising a main frame, horizontally disposed rods slidably mounted in said frame and projecting therefrom, bell-cranks pivoted in said frame and to said rods, substantially vertically disposed pawls pivoted to said bell-cranks, an oscillatory member mounted in said frame having a segment gear and ratchet teeth on the periphery thereof, said teeth being adapted to engage said pawls, resilient means adapted to normally press said pawls into engagement with said teeth, stop pawls adapted to prevent retrograde movement of said oscillatory member after the same is moved by said vertical pawls, a spur gear and shaft therefor mounted in said frame in mesh with said segment gear, and a sector-formed oscillatory weight mounted on said last named shaft, substantially as described.

10. In a device of the class described, a gate operative mechanism comprising a main frame, four horizontally disposed rods slidably mounted in said frame and projecting therefrom, four bell-cranks pivoted in said frame and to said rods, four substantially vertically disposed pawls pivoted to said bell-cranks, an oscillatory member mounted in said frame having a segment gear and ratchet teeth on the periphery thereof, said teeth being adapted to engage said pawls, resilient means adapted to normally press said pawls into engagement with said teeth, a stop pawl mechanism adapted to prevent retrograde movement of said oscillatory member, a spur gear and shaft therefor mounted in said frame in mesh with said segment gear, an oscillatory weight mounted on said last named shaft, two of said vertical pawls being adapted to engage said oscillatory member diametrically opposite the other two, and means for disengaging one of said last named pawls when a diametrically opposite pawl is positioned to engage said oscillatory member, substantially as described.

11. In a device of the class described, a gate opening and closing mechanism comprising a main frame, reciprocatory rods mounted in said frame, an oscillatory member having gear and ratchet teeth formed in the periphery thereof, pawls connected with said rods and adapted to engage said ratchet teeth for oscillating said member, a shaft journaled in said frame carrying said oscillatory member, said ratchet teeth being in two series which are arranged diametrically opposite on the periphery of said oscillatory member, the teeth of one series being disposed opposite to those of the other,

means for releasing the engagement of said pawls engaging one series of ratchet teeth before the pawls adapted to engage the other series of teeth are in engagement, and a gate pivotally mounted in said frame in operative connection with said gear teeth, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. GEDDES.

Witnesses:

HELEN F. LILLIS,

JOSHUA R. H. POTTS.