Aug. 23, 1927. 1,639,866

V. SZUCH ET AL

GATE FOR RAILROAD CROSSINGS

Filed Dec. 15, 1926 5 Sheets-Sheet 1

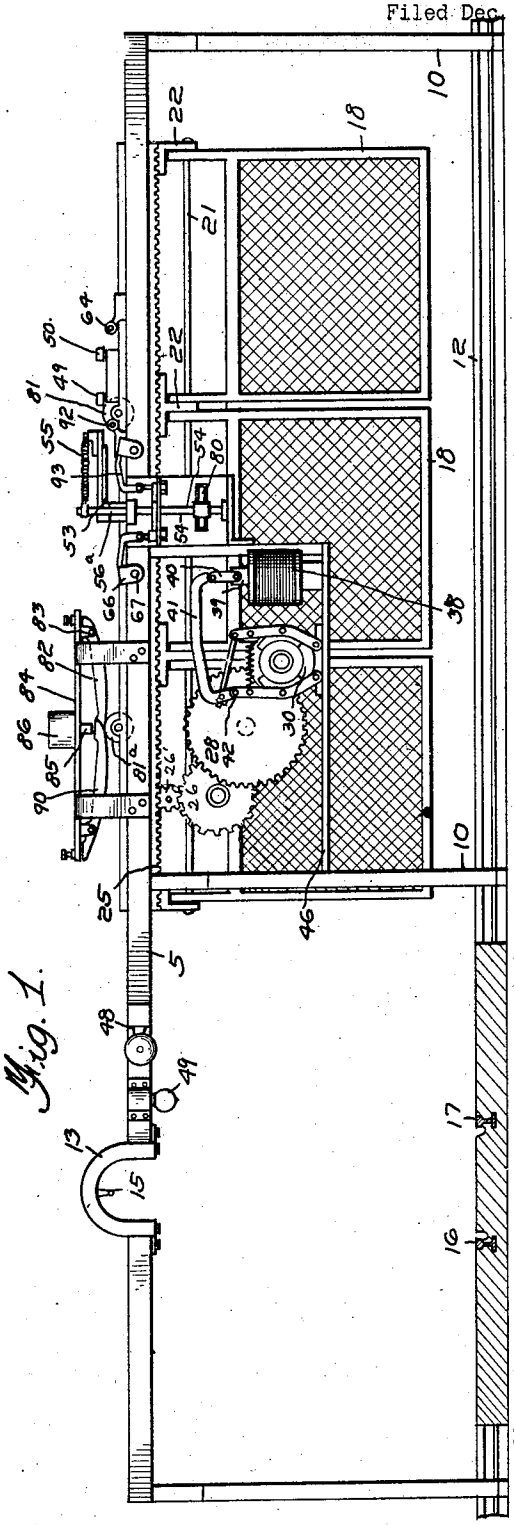


Fig. 1.

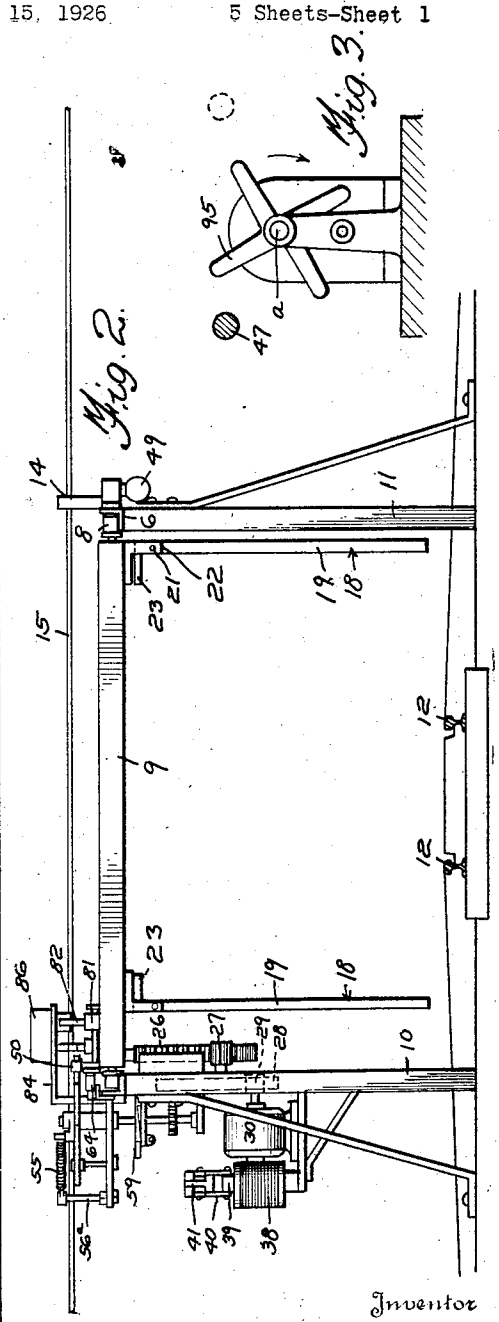


Fig. 2.

Fig. 3.

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Aug. 23, 1927. 1,639,866

V. SZUCH ET AL

GATE FOR RAILROAD CROSSINGS

Filed Dec. 15, 1926 5 Sheets-Sheet 2

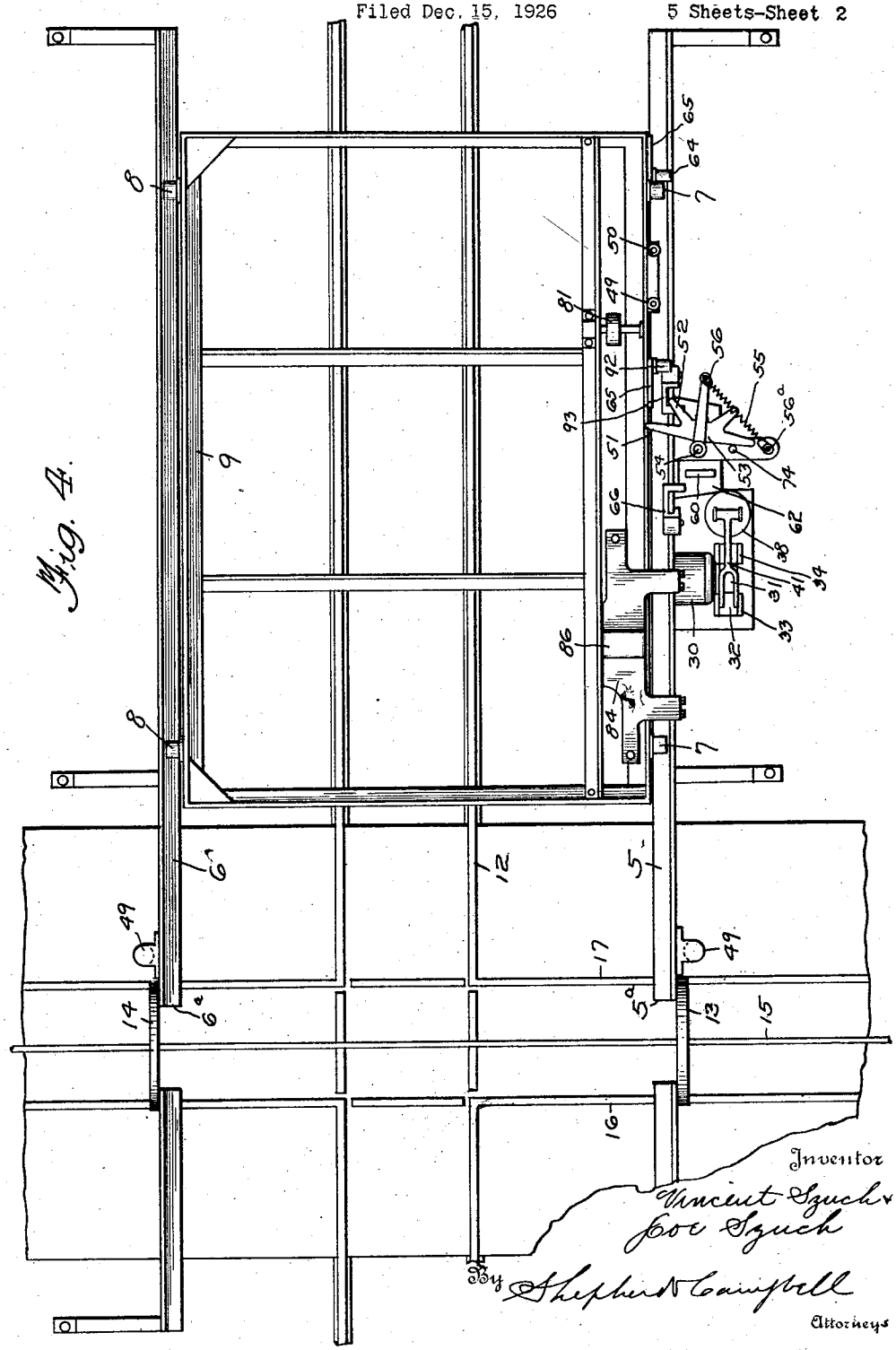


Fig. 4.

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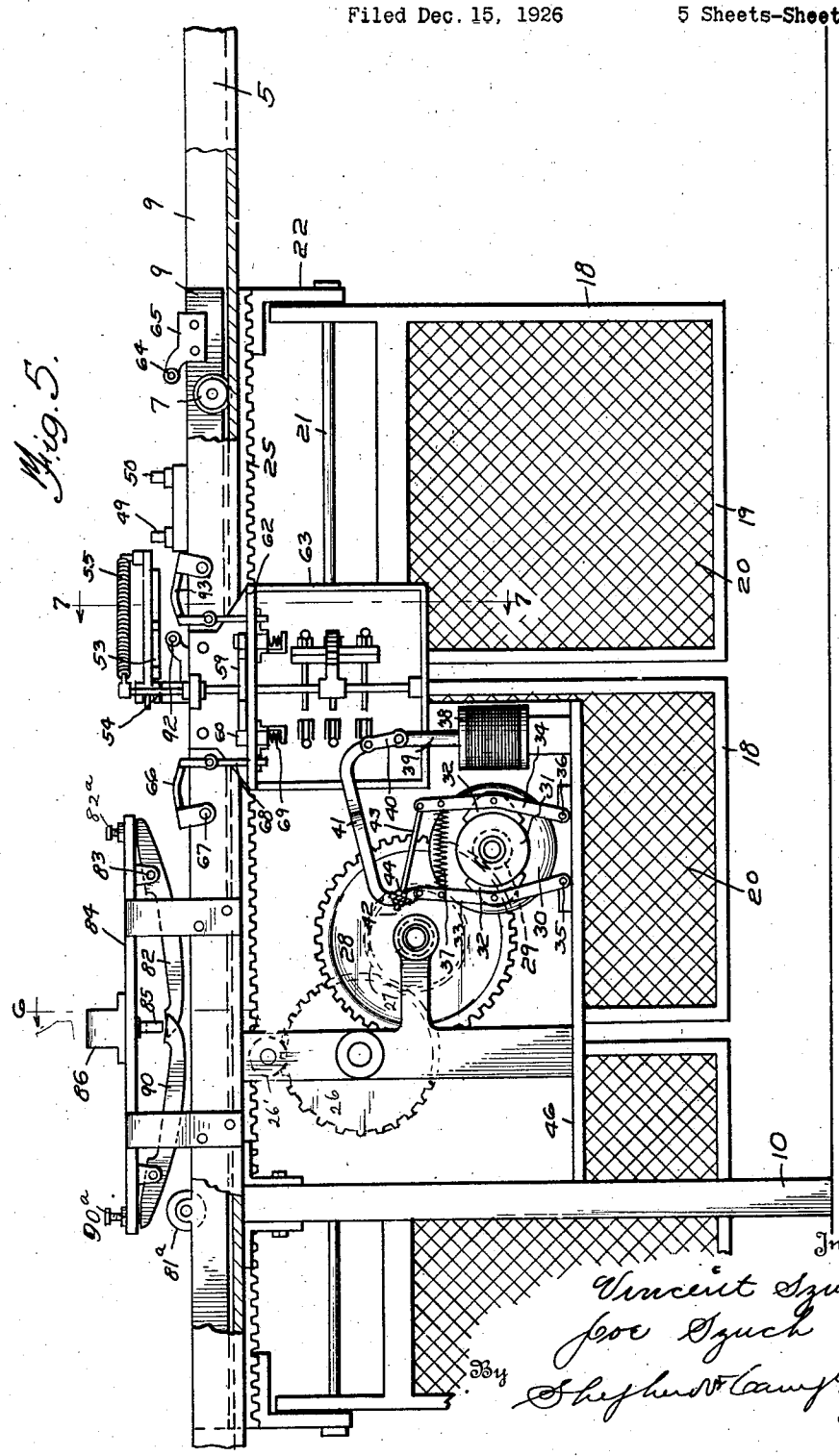
Aug. 23, 1927. 1,639,866

V. SZUCH ET AL

GATE FOR RAILROAD CROSSINGS

Filed Dec. 15, 1926 5 Sheets-Sheet 3

Fig. 5.



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Aug. 23, 1927. 1,639,866

V. SZUCH ET AL

GATE FOR RAILROAD CROSSINGS

Filed Dec. 15, 1926 5 Sheets-Sheet 4

Fig. 6.

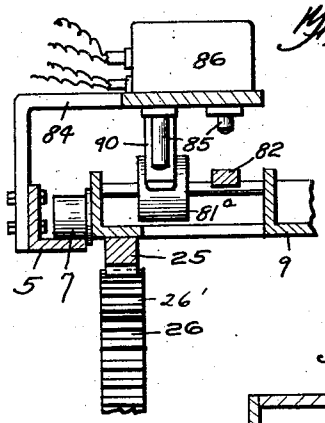


Fig. 7.

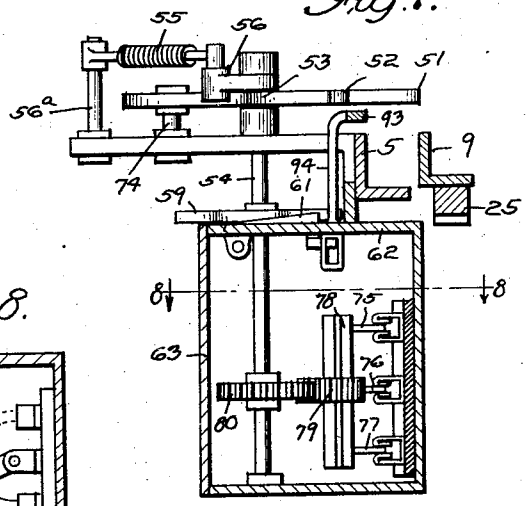
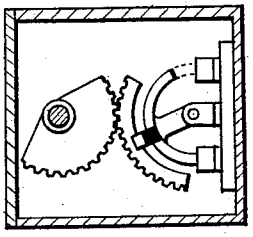


Fig. 8.



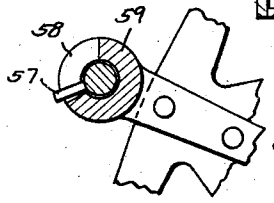
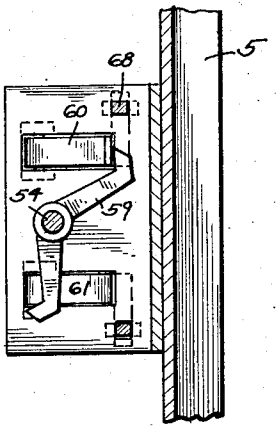


Fig. 9.

Fig. 10.



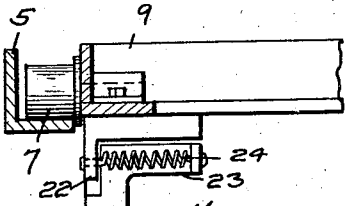


Fig. 11.

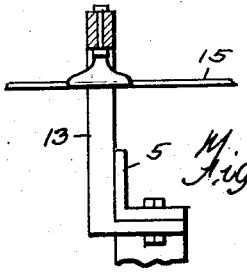


Fig. 12.

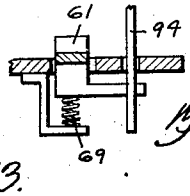


Fig. 14.

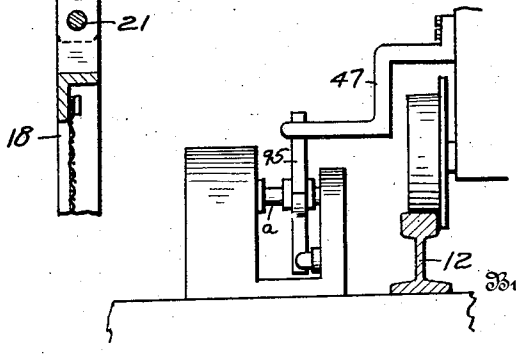


Fig. 13.

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Aug. 23, 1927. V. SZUCH ET AL 1,639,866

GATE FOR RAILROAD CROSSINGS

Filed Dec. 15, 1926 5 Sheets-Sheet 5

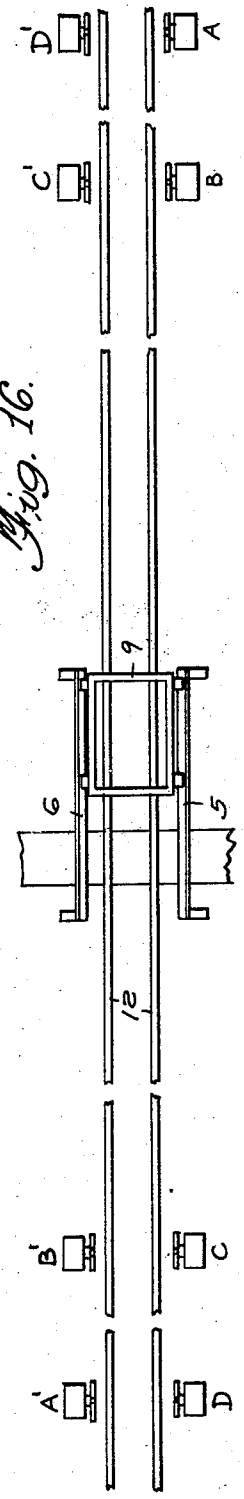


Fig. 16.

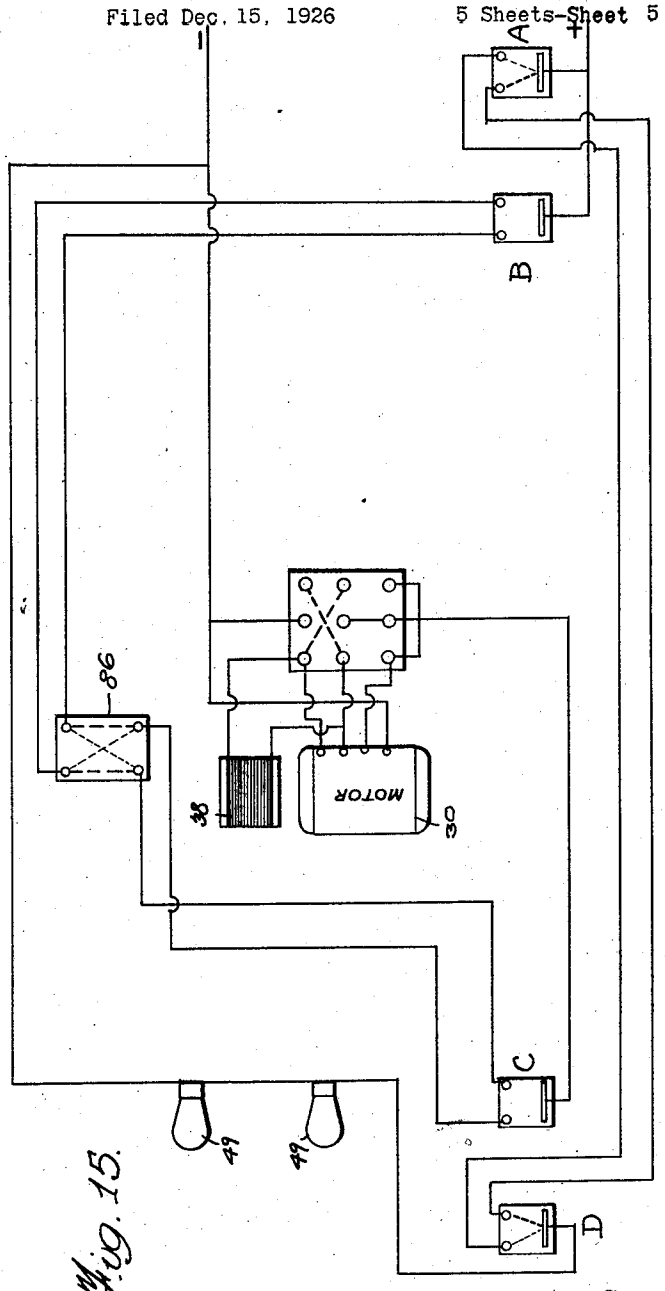


Fig. 15.

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UNITED STATES PATENT OFFICE.

VINCENT SZUCH AND JOE SZUCH, OF RAVENNA, OHIO.

GATE FOR RAILROAD CROSSINGS.

Application filed December 15, 1926. Serial No. 154,941.

This invention relates to a protecting gate for railway crossings and it has for its object to provide an improved device of this nature, constructed to be automatically operated by passing trains.

In the particular embodiment of the invention which we have chosen for purposes of illustration, elevated trackways disposed upon opposite sides of the railroad track, serve to support for longitudinal travel, a horizontal frame, which carries a plurality of depending vertically disposed gates. The longitudinal movement of the frame along its elevated track carries the gates to and from protecting position with respect to a point of crossing of the railroad track. The gates are so mounted with respect to the horizontal travelling frame that while they will yield outwardly, they will not yield inwardly. Thus, if any person or vehicle be trapped between the gates and upon the railroad track, they can get out by merely pushing upon the gate, but no one outside can get into the space between the gates, upon the railroad track. The horizontal gate carrying frame is actuated through a suitable train of reducing gearing by an electric motor. Suitable limit switch and pole changing mechanism hereinafter described, bring about a limited movement of the frame upon its trackway in each direction under the control of switches actuated by passing trains. Means are provided for creating either a visible or an audible signal at the crossing, or both, as may be desired. A control brake in series with the motor is arranged to be spring actuated to brake setting position but to be electrically held out of brake setting position, so that as long as the motor is deenergized a brake is applied to the actuating mechanism to prevent accidental movement of the gate and associated parts. The brake is automatically released when the motor is energized for action.

Further objects and advantages of the invention will be set forth in the detailed description which follows.

In the accompanying drawings:

Fig. 1 is a side elevation of a device constructed in accordance with the present invention; Fig. 2 is an end elevation thereof; Fig. 3 is a detail view of one of the switch actuating spiders; Fig. 4 is a plan view; Fig. 5 is an enlarged side elevation; Fig. 6 is a transverse sectional view on line 6—6 of Fig. 5; Fig. 7 is a sectional view on line 7—7 of Fig. 5; Fig. 8 is a horizontal sectional view on line 8—8 of Fig. 7; Fig. 9 is a detail sectional view of the hub of the spider hereinafter described; Fig. 10 is a plan view of the bolt and detents illustrated in Fig. 7; Fig. 11 is a sectional view showing the mounting of the gate carrying frame and the mounting of one of the gates thereon; Fig. 12 is a sectional view through one of the goosenecks; Fig. 13 is a detail view of the train carried tappet and one of the track switches; Fig. 14 is a detail sectional view through one of the detents hereinafter described; Fig. 15 is a diagrammatic view of the wiring; and Fig. 16 is a further diagrammatic view.

Like numerals designate corresponding parts in all of the figures of the drawings.

Referring to the drawing, the numerals 5 and 6 designate horizontally disposed rails which may be of any suitable formation in cross section, so long as they provide horizontal trackways for the rollers or wheels 7 and 8, of a horizontal rectangular frame 9. The track ways 5 and 6 are held at such an elevation by uprights 10 and 11, as to support the frame 9 high enough above the rails 12 of the railroad track to permit of a train passing under the frame 9. Where an electric trollev line crosses the railroad track at the point of crossing protected by the gates, the rails 5 and 6 may be interrupted as indicated at 5^a and 6^a and these interrupted portions may be spanned and connected by upstanding goose-necks 13 and 14, through which the trolley wire 15 of the trolley line may pass. Thus the presence of the trolley wire does not interfere with the travel of the horizontal gate carrying frame 9. The rails of the trolley line are indicated at 16 and 17.

A plurality of gates 18 depend from each side of the frame 9 in such position as to lie upon opposite sides of the track 12. There may be as many of these gates as is deemed necessary. For purposes of illustration, we have shown three upon a side, although the number may be varied at will. Each gate comprises an outer frame 19 and a covering of wire mesh 20, so that they are in a measure transparent and the vision of approaching drivers or pedestrians is not obstructed when the gates are closed. The vertical members of the frame 19 of the several gates are hinged upon longitudinal rods 21, supported in depending brackets 22 of the frame 9. Each gate carries a lug 23, which

abuts against the corresponding bracket 22 and limits the movement of the gate so that it swings only in one direction. In other words, the gates may swing outwardly or away from track 12 but they cannot swing inwardly upon their hinge support. Thus if a person or vehicle becomes trapped upon the track, the gates will yield outwardly to permit the escape of such trapped person or vehicle, but persons on the outside of the gate cannot enter into the space between the gates and upon the tracks. The gates are held in their normal or vertical positions by springs 24.

The frame 9 carries a longitudinally extending rack bar 25, which meshes with a train of reducing gearing 26, 26', 27, 28 and 29, the element 29 being a small pinion upon the shaft of an electric motor 30. The other end of the motor shaft carries a brake drum 31 which is adapted to be engaged by brake shoes 32, that are carried by swinging members 33 and 34. The lower ends of these members are pivotally mounted at 35 and 36. A spring 37 extends between the upper portions of these members and tends to draw them together to apply the brake shoes to the brake drum. However, during the operation of the motor the brake is held out of action by a solenoid magnet 38. The core or armature 39 of this magnet when drawn downwardly, acts through a link 40 upon an arm 41, that is pivotally connected at 42 to the upper end of the member 32. A rod 43 is pivoted at 44 to arm 41, and at its opposite end to the upper end of the member 34. Thus when the armature 39 is drawn downwardly the members 33 and 34 are thrust apart against the tension of the spring 37, but when the magnet 38 is de-energized, the spring 37 acts to draw the brake shoes into engagement with the brake drum. Thus when the motor is not in action, the brake is applied to prevent accidental movement of the frame 9 and the gates carried thereby. The motor gearings, brake and associated parts are supported by means of frame 46 from the upright 10 and it is clear that if the motor be energized, the frame 9 will be caused to travel in one direction or the other, according to the direction of rotation of the motor.

Assuming that a train is approaching from the right in Fig. 1, said train by means of a suitable tappet arm 47, carried by the train, first reaches and actuates an electric switch A (see Fig. 16). It is to be understood that this switch is set a very considerable distance away from the crossing and when this switch is closed, it energizes suitable signal elements, such as bells 48, lights 49, or other suitable visual or audible signals, which serve to give warning to the public that the gates are about to close and that the crossing must be cleared. At a suitable distance further along in the travel of the train, the tappet arm 47 actuates a second electric switch B, the effect of which is to energize the motor and magnet 38. This releases the brake and the motor sets the frame 9 in motion which causes it to travel to protective position, or to the left in Fig. 1.

During this movement of the frame to the left, upstanding anti-friction studs 49 and 50, which are carried by and moved with the frame, successively engage the fingers 51 and 52 of a spider 53, the head or hub of which is mounted upon the upper end of a vertical shaft 54. A spring 55 is connected at one end to a finger 56 of the spider and at its other end to a bracket 56a. There is a lost motion connection between the spider and the vertical shaft 54, consisting of a pin 57, which is carried by the shaft and which projects into a slotted part 58 of the hub 59 of the spider. Thus when the spider starts to swing under the influence of the engagement therewith of the studs 49 and 50, it does not, at first, turn the shaft 54. Upon the contrary the spider moves with respect to the shaft until the body of the spring has moved to the opposite side of the pivot constituted by the vertical shaft. In other words, the spring moves to "past center" position. The action of the spring then tends to continue the movement of the spider and to turn the shaft, because by that time the pin 57 has reached the opposite end of the slot 58. However, the shaft is restrained from turning movement by a bolt 59 which is carried by the shaft and which is engaged by a latch 60. This latch, together with a corresponding latch 61, is pivoted upon the top 62 of the housing 63 of a pole changing mechanism. The shaft 54 is restrained by the latch 60 until a roller 64 that is carried by a bracket 65 of the travelling gate carrying frame, passes over a trip 66, that is pivoted at 67 to the rail 5. When this happens a link 68 thrusts the detent or latch 60, downwardly, against the tension of its spring 69 and out of the path of the bolt 59, whereupon spring 56 acts to pull the spider and the shaft 54 around until the spider engages a suitable stop 74. The turning movement imparted to the vertical shaft 54 is utilized to shift fingers 75, 76 and 77 of a pole changing mechanism, said fingers being carried by a vertical bar 78 and said bar carrying an arcuate toothed segment 79, which meshes with a segmental gear 80, upon the shaft 54. However, this shifting of the pole changer contact fingers does not take place until just after a roller 81, that is carried by and moves with the gate carrying frame, rides under an elongated arm 82 that is pivoted at 83, to a plate 84, that is supported from the rail 5. The lifting of the arm 82 causes its inner or

free end to thrust against and operate one of the push buttons 85 of the double pole, double throw switch 86, the closed side of which, up to this time, had been included in the motor circuit and the opening of which circuit deenergizes the motor and brings the gate carrying frame to rest. When the push button 85 is thrust upwardly or inwardly, its companion push button 89 moves outwardly as is common in switches of this character and the shifting of the switch completes another circuit through said switch. However, said circuit is open at another place, viz, at a track switch C, which is disposed alongside the track at a point beyond the crossing and when the tappet arm upon the train actuates said switch C, the circuit is wholly closed through the path which has been established by the shifting of the switch 86 and the motor and the brake are again energized, but since the pole changing mechanism of the motor has been shifted, it follows that the rotation of the motor will be in a reverse direction and the gate will begin to travel to open position. When the gate has about reached its limit of movement to the open position, a roller 81ª, carried by frame 9, will ride beneath and elevate an elongated arm 90, which acts to thrust the push button 89 of switch 86 upwardly to break the circuit to the motor and bring about a setting of the brake. During this movement of the gate to open position the spider and spring 55 are moved to "past center" position by the action of the studs 49 and 50 upon fingers 51ª and 52ª of the vertical shaft, the vertical shaft 54 of the pole changer, being restrained by detent 61 and bolt 59 until a roller 92, carried by the frame 9, rides over the trip 93, which corresponds to trip 63, and by depressing link 94, moves detent 61 out of the path of the bolt and permits the spring 55, to turn the shaft 54, through the connections previously described to again shift the pole changing mechanism so that the motor, when again energized, will rotate in such direction as to move the gate to closed position. Adjusting screws 82ª and 90ª determine the clearance of the arms 82 and 90 with respect to the push buttons of switch 86.

The train in its continued travel, reaches and actuates a track switch D, the effect of which is to break the circuit to the signal lights or bells, as the case may be. The detailed internal construction of the several track switches has not been illustrated because they are conventional types of switches of the character known to the trade as three-point switches. Switches of this character operated by the step by step turning of their operating shaft, have acquired a distinct status in the art and may be purchased in the open market. Of course, the switches that we employ must be large enough and strong enough to stand the strains to which they are to be subjected and we mount upon the operating shafts (*a*), (*b*), (*c*), of these switches, wheels or spiders 95, the arms of which are engaged by the tappet arms 47, carried by successive trains to impart step by step movement continuously in the same direction to the operating shaft of said switches.

By referring to the diagrammatic view, Fig. 15, it will be seen that the switches A, B, C and D, are conventional three point switches and that switch 83 is a conventional type of four point switch. The circuits used in connection with these switches are well known to those skilled in the art, being commonly employed to control the upper and lower hall lights in residences. Consequently it is thought that the detailed description of the same is not necessary, since any electrician would immediately understand their operation. Furthermore those skilled in the art will readily understand that to adapt the mechanism to operate under the influence of trains travelling in the opposite direction, it would only be necessary to install track switches upon the opposite side of the track as indicated at A′, B′, C′ and D′, and to connect said switches in parallel with the corresponding switches upon the side of the track opposite to them.

It is to be understood that the invention is not limited to the precise construction set forth but that it includes within its purview whatever changes fairly come within either the terms or the spirit of the appended claims.

Having described our invention what we claim is:

1. A protecting gate for railway crossings comprising a support, a gate movable with respect to said support, means for bodily moving the support and gate to protecting position with respect to a crossing and means for mounting the gate with respect to the support in such manner as to permit it to yield laterally outward but to resist inward movement.

2. A protecting structure for railroad track crossings comprising an elevated trackway, a frame mounted to travel thereon, a gate carried by said frame and movable to protective position with respect to the crossing by the travel of the frame upon the trackway and means for mounting the gate upon said frame in such manner as to permit it to yield laterally outward but to resist inward movement.

3. A protecting structure for railroad track crossings consisting of an elevated trackway, above the railroad track, comprising runs upon opposite sides of said track, a horizontal frame movable longitudinally upon said trackway and a gate

depending from said frame upon each side of the trackway and lying in a vertical position, being mounted to yield laterally outward with respect to the frame but to resist inward movement.

4. A protecting structure for railroad track crossings comprising an elevated trackway, a horizontal frame mounted to move longitudinally on the trackway and spanning the railroad track, a plurality of gates depending from said frame at each side of the track and means for mounting said gates upon the frame in such manner as to permit them to yield laterally outward and to resist inward movement.

5. In a crossing gate structure of the character described, the combination with a longitudinally movable, gate-carrying frame and a motor for moving the same, of a pole changing mechanism for the motor comprising a spring actuated part, lugs upon the frame for engaging said part and moving it partly to pole changing position, a detent for preventing movement of said part completely to pole changing position and a member upon the frame adapted to engage said detent when the frame reaches a predetermined point in its travel to release the detent and permit the pole changing mechanism to move the pole changing position.

6. A structure as recited in claim 5 wherein the spring actuated part comprises a vertical shaft, a set of swinging contact fingers, a rack carried by said fingers, a segmental gear upon the vertical shaft meshing with said rack, a head upon the upper end of the shaft having lost motion engagement therewith, a plurality of divergent fingers extending substantially horizontally from said head and overlying the path of movement of the frame and with which fingers the said lugs engage, a spring engaged with a fixed member and one of said fingers to be pulled to past center position, the detent being carried by the vertical shaft.

7. A protecting device for railroad crossings, comprising an elevated trackway and frame mounted to travel longitudinally thereof in substantial parallelism with the railroad track, depending gates carried by said frame lying upon opposite sides of the railroad track, said gates being so mounted with respect to the frame as to permit them to yield laterally outward but to resist movement inwardly, a motor and connections between the motor and the frame whereby the frame is caused to travel upon the trackway when the motor is energized.

In testimony whereof we affix our signatures.

VINCENT SZUCH.
JOE SZUCH.