May 19, 1931. G. POLAK 1,806,497

AUTOMATIC CROSSING GATE

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Fig. 1.

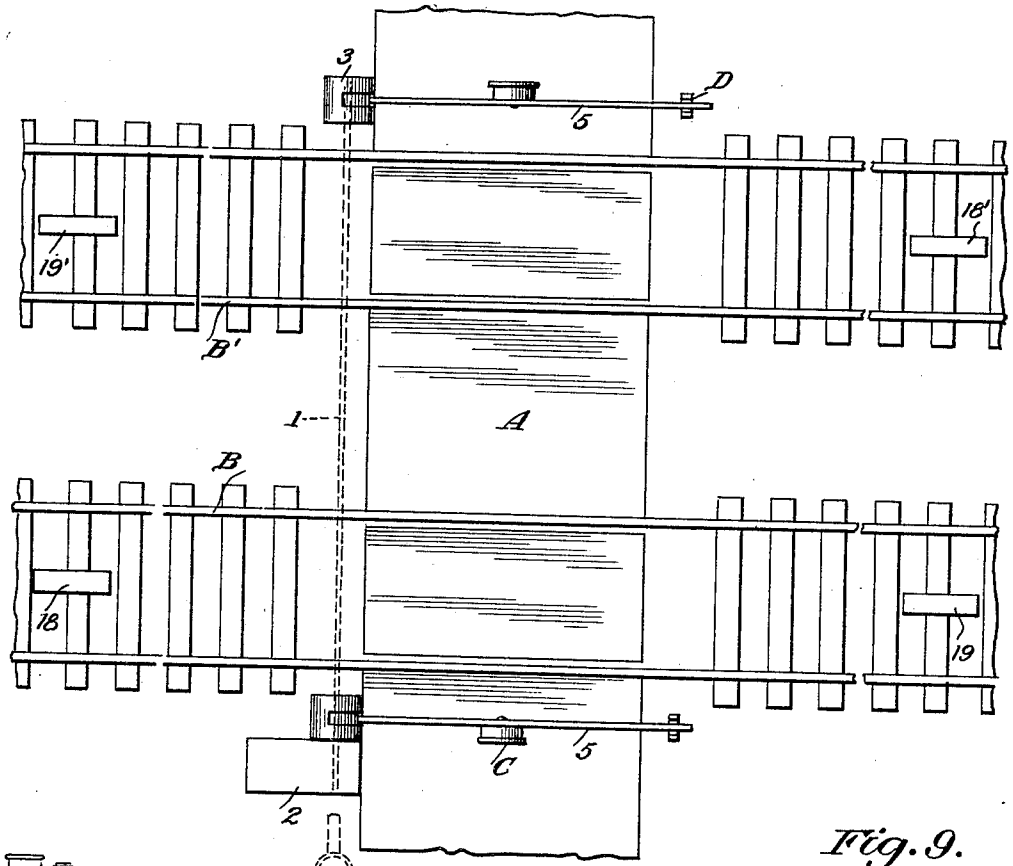


Fig. 9.

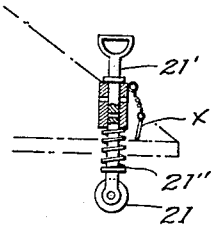


Fig. 2.

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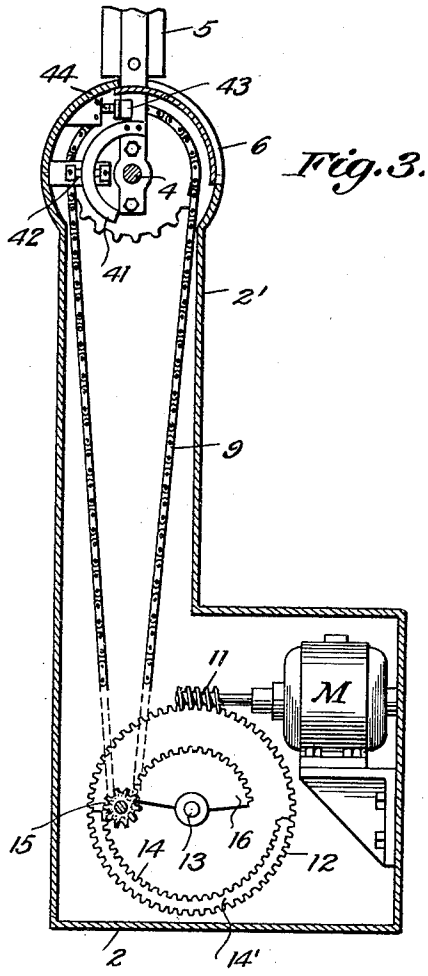


Fig.3.

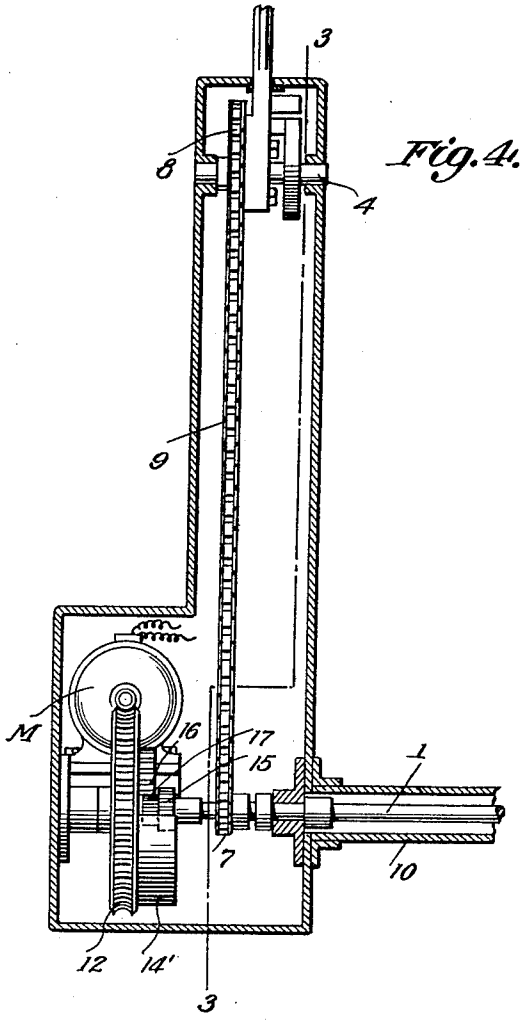
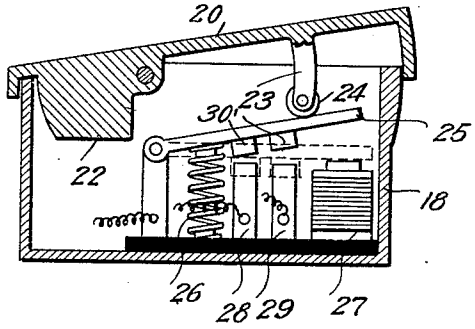


Fig.4.

Fig.5.



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Fig. 8.

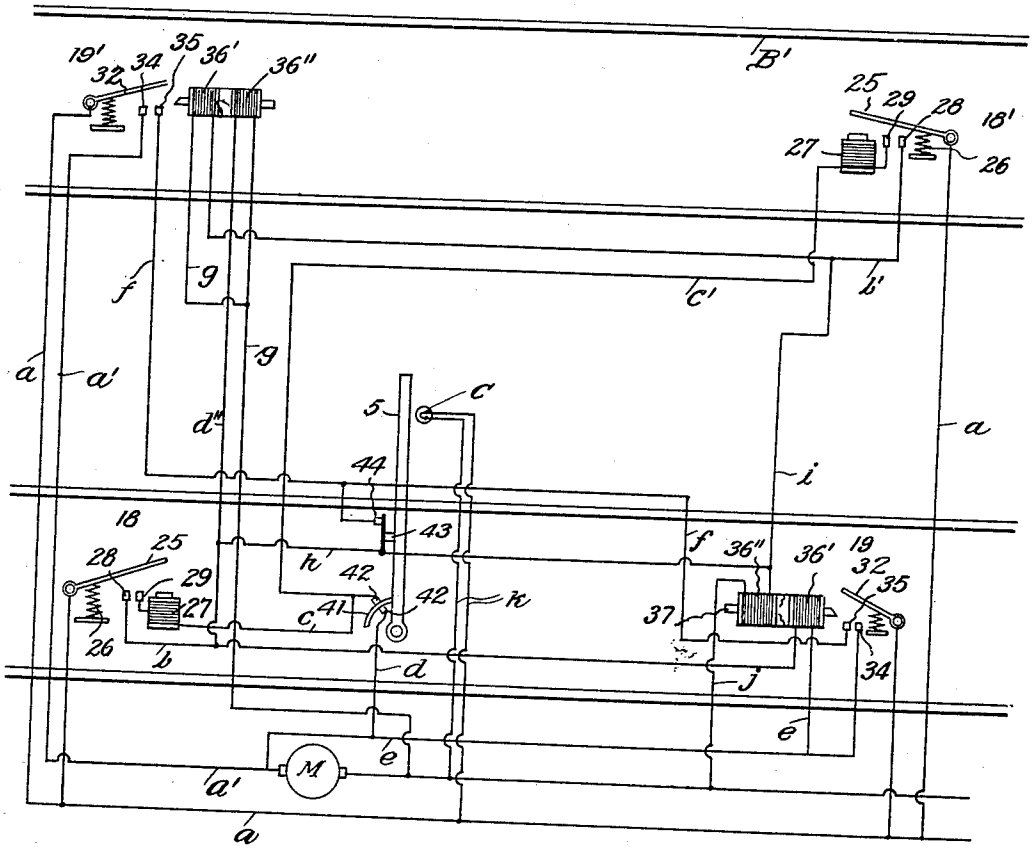


Fig. 7.

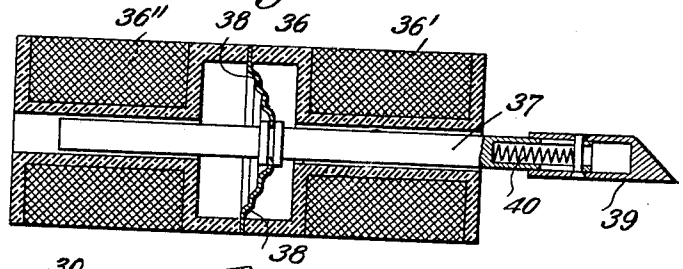
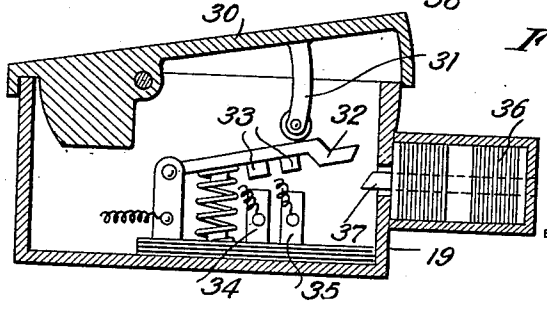


Fig. 6.



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Patented May 19, 1931 1,806,497

UNITED STATES PATENT OFFICE

GABRIEL POLAK, OF FOREST CITY, PENNSYLVANIA; HELEN POLAK, ADMINISTRATRIX OF SAID GABRIEL POLAK, DECEASED, ASSIGNOR OF THIRTY-FIVE ONE-HUNDREDTHS TO JOHN FARKAS

AUTOMATIC CROSSING GATE

Application filed September 17, 1930. Serial No. 482,620.

This invention relates to automatic crossing gates, the general object of the invention being to provide a motor for raising and lowering the gates, with means whereby a train approaching the crossing will close the circuit of the motor to cause the motor to lower the gates after which the circuit is broken so that the gates will remain in lowered position, and means beyond the crossing and operated by the train, after passing the crossing, for closing the circuit of the motor and causing the same to raise the gates.

Another object of the invention is to provide means whereby a train approaching the crossing on a second track will cause the gates to remain in lowered position after they have been lowered by a train on the first track so that the train on said first track will not raise the gates.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings, and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings, wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a plan view of a railroad crossing equipped with the invention.

Figure 2 is a transverse sectional view through the crossing.

Figure 3 is a sectional view through the housing containing the motor and the means operated thereby, the section being on the line 3—3 of Figure 4.

Figure 4 is a sectional view taken at right angles to Figure 3.

Figure 5 is a vertical sectional view through the housing which supports the train operated mechanism.

Figure 6 is a sectional view through the train operated mechanism at the far side of the crossing.

Figure 7 is a sectional view through the magnet operated latch links.

Figure 8 is a diagrammatic view of the circuits.

Figure 9 is a view showing an adjustable contact member on a train.

In these drawings the numeral 1 indicates a shaft arranged at one side of the crossing A of the tracks B and B′, the shaft having its ends extending into the housings 2 and 3 arranged adjacent the crossing beyond the tracks and having their lower portions embedded in the ground. Each housing is provided with an upright part 2′ in the upper end of which is journalled a shaft 4 to which a gate 5 is connected, the gate extending through a curved slot 6 in the top part of the upright portion of the housing. Sprockets 7 are placed on the shaft 1 and sprockets 8 on the shafts 4, and chains 9 pass over the sprockets so that the rotary motion of the shaft 1 is communicated to the shafts 4 and thus the gates will be raised and lowered by the movement of the shaft 1. The shaft 1 passes through a conduit 10 which is embedded in the ground under the tracks. A motor M is arranged in the lower part of the housing 2 and has a worm 11 on its shaft which engages a worm gear 12 fastened to a stud shaft 13 journalled in the housing 2. This worm gear is formed with the semi-circular internal gear 14 meshing with a pinion 15 on the shaft 1, and a second semi-circular gear 16 is connected with the worm gear 12 for meshing with a second pinion 17 on the shaft 1. The gears 14 and 16 are oppositely arranged with the gear 14 having its teeth formed on a flange 14′ of the gear 12. Thus the gear 14 during the rotation of the gear 12 will turn the shaft 1 a half turn in one direction and then the gear 16 will turn the shaft 1 a half turn in the opposite direction.

A housing 18 is sunk in the track B a suitable distance from the crossing so that the mechanism in this housing will be operated by a train approaching the crossing and a similar housing 18′ is arranged in the track B′ in front of the crossing so that it will be operated by a train approaching the crossing from this track B′. Housings 19 and 19′ are sunk in the tracks B and B′ at the far sides

of the crossing so that the mechanism in these housings will be operated by trains leaving the crossings. Each of the housings 18 and 18′ is provided with a pivoted treadle member 20 which forms a top for the housing and is adapted to be depressed by a wheel carrying projection 21 on the cowcatcher or other part of a train approaching the crossing. The treadle is normally held in raised position by a weight 22 and the treadle has a depending arm 23 thereon which carries a roller 24. A switch arm 25 is pivoted in each of the housings 18 and 18′ and is normally held in raised position by a spring 26 and when in raised position, this arm will engage the roller 24. A magnet 27 is located in each housing and is adapted to hold the switch arm in lowered position when the magnet is energized. A pair of terminals 28 and 29 is arranged in each of the housings 18 and 18′ and these terminals will be engaged by the contacts 30′ on the switch arm when the arm is lowered.

Each of the housings 19 and 19′ is provided with a treadle part 30 carrying the roller bearing arm 31, and a spring actuated arm 32 is arranged in each of these housings. Each arm carries the contacts 33 engaging the terminals 34 and 35 so that the housings 19 and 19′ and their interior parts are the same as the housings 18 and 18′, except that the housings 19 and 19′ do not have the magnets 27 therein. Each housing 19 and 19′ is provided with a magnetic latch for holding the arm 32 in lowered position, this latch consisting of a magnet 36 and a core 37 which is held in either projected or contracted position by the spring diaphragm member 38. A sliding latch member 39 is arranged at the outer end of the core and is normally held projected by springs 40. Thus as the arm 32 is lowered by the depression of the treadle 30 by a train, it will cause the latch member 38 to move inwardly as the beveled end of the arm 32 engages the beveled part of the latch member and then the spring 40 will project the latch member over the end of the arm 32 and hold the arm in lowered position with its contacts 33 engaging the terminals 34 and 35.

A curved switch arm 41 is attached to the gate shaft 4 which is associated with the housing which contains the motor and this arm bridges the contacts 42 arranged in the top part of the extension 2′ of the housing 2 while the gate is in raised position, but when the gate reaches lowered position, the arm will disengage the contacts. A contact 43 on the gate also engages the contact 44 in the extension 2′ when the gate is in raised position.

A supply line a is connected with each of the switch arms in the four housings. A conductor b connects the terminal 28 in the casing 18 with the part 36′ of the magnet 36 and a conductor b' connects the contact 28 of the housing 18′ with the part 36′ of the magnet 36 in the housing 19′.

The terminal 29 in each of the housings 18 and 18′ is electrically connected with the magnet 27 in each housing and these magnets are connected by the conductors c and c' with a contact 42, the other contact 42 being connected by a conductor d with a conductor e which in turn is connected with the negative line a' and with the part 36′ of the magnet 36 in the housing 19 and with the terminal 34 in said housing 19. The conductor a' is also connected with the terminal 34 in the housing 19′. A conductor f connects the terminal 35 in the housing 19′ with the contact 44 in the extension 2′ of the housing 2 and with the terminal 35 in housing 19. A conductor d'' connects the conductor b with the part 36″ of the magnet 36 in housing 19′, and the parts 36′ and 36″ of the magnet 36 in housing 19′ are connected by the conductors g with the negative line a'. A conductor h connects the conductor d'' with the switch composed of the parts 43 and 44 and with the part 36″ of the magnet 36 in the housing 19. A conductor i connects this part 36″ with the conductor b' and a conductor j connects the part 36″ in housing 19 with the negative line a'.

From the foregoing it will be seen that a train approaching the crossing on track B will engage and depress the treadle of the housing 18 so that the arm 25 of said housing is forced downwardly against the magnet 27, and the terminals 28 and 29. This will close the circuit from the supply line a through the arm 25, terminal 29, magnet 27, conductor c, the switch composed of the parts 41 and 42, conductors d and e through the motor to the negative a'. Thus the motor will start up and the gear 14, meshing with the gear 15, will cause the shaft 1 to lower the gates. As soon as the arm 41 rides off the contacts 42, which happens when the gate reaches lowered position, the circuit will be broken so that the motor comes to rest and as the magnet is de-energized, the spring will return the arm 25 to open position. When said arm is lowered, its engagement with the terminal 28 will close the circuit to the part 36′ of magnet 36 in housing 19 so that the core 37 in said magnet will be moved outwardly. The train then proceeds across the crossing with the gates lowered and after passing the crossing, the train will engage the treadle of the housing 19, thus lowering the same and causing the arm 32 of this treadle to engage the terminals 34 and 45 and as the arm passes under the latch 39, said latch will be first retracted and then projected by its spring to hold the arm in lowered position. The lowering of this arm closes the circuit of the motor through the conductor e and the terminal 34 so that

the motor will begin to operate and thus cause the gear 16 to engage the pinion 15 on the shaft 1, which will rotate the shaft in an opposite direction and cause the raising of the gates.

When the gates are raised, one of them will cause the closing of the switch composed of the parts 43 and 44 and as the arm 32 is resting on the terminal 35 in the housing 19, the circuit through the conductor *f* and said switch will be closed so that the current will pass through the conductor *h*, through the part 36″ of the magnet 36 in the housing 19 and through the conductor *j* to the negative *a′*. Thus said part 36″ is energized so that the core 37 will be retracted and the arm 32 in the housing 19 released and thus the circuit of the motor will be broken.

A train approaching the crossing on track B′ will depress the treadle of the housing 18′, which closes the gates as before described, and sets the latch means in the housing 19′, and then when this train passes across, it will depress the treadle in the housing 19′ to cause the motor to open the gates, after which the circuit will be broken, as before described. If a train on track B, for instance, closes the gates and passes the crossing, and another train is approaching the crossing on track B′, the gates will remain lowered as the depression of the treadle of the housing 18′ by the second train will move the latch means in the housing 19 to releasing position so that the motor will not start to move the gates to open position when the train on track B passes over the housing 19. The circuit of the motor will not be closed until the train on track B′ passes over the housing 19′.

A lamp C is placed on each gate and these lamps are electrically connected with the supply lines *a* and *a′* by the conductors *k*. A post D having a forked upper end is provided for supporting each gate when in lowered position.

In some cases, it is advisable to provide means whereby the operating member on the train can be moved to inoperative position when desired, and this can be done through any suitable means from the cab, but Figure 9 shows the member 21′ which carries the roller 21 as slidably supported from a part of the train and having a handle at its upper end whereby the member can be raised against the action of the spring 21″ so that a pin X can be passed through holes in the parts to hold the member 21′ in raised position and thus prevent the wheel 21 from engaging the treadles.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. The combination with a double track and its crossing, gates for controlling the crossing, a shaft for operating both gates, a motor, means for connecting the motor with the shaft to cause the shaft to lower the gates at one operation of the motor and to raise the gates in another operation of the motor, a circuit for the motor, means operated by a train approaching the crossing on either track for closing the circuit of the motor, means for breaking the circuit when the gates are lowered, train operated means on each track beyond the crossing for closing the circuit to the motor to raise the gates, means for breaking the circuit when the gates are raised and means for preventing the gates being raised by a train on one track when a train on the other track is approaching the crossing.

2. An automatic crossing gate comprising a pivoted gate, a motor for operating the same, a treadle on the track in front of the crossing a treadle on the track beyond the crossing, said treadles being operated by a train on the track, a circuit for the motor including switches closed by the depression of each treadle and a switch on the gate opened when the gate is in lowered position, whereby a train approaching the crossing will depress the first treadle and close the circuit to the motor to cause the motor to lower the gate after which the switch on the gate will break the circuit, magnetic latch means for holding the second treadle in lowered position when depressed by a train leaving the crossing, the lowering of said second treadle closing the circuit to the motor to cause the same to raise the gate and a circuit connected with the latch means and closed by the raising of the gate to move the latch means to releasing position.

In testimony whereof I affix my signature.

GABRIEL POLAK.