A. W. KNEE.

RAILWAY CROSSING GATE.

APPLICATION FILED SEPT. 7, 1920.

1,408,008.

Patented Feb. 28, 1922.

2 SHEETS—SHEET 1.

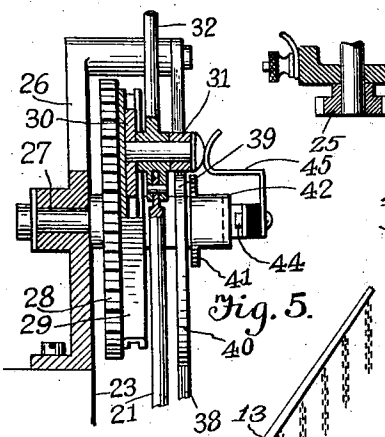


Fig. 5.

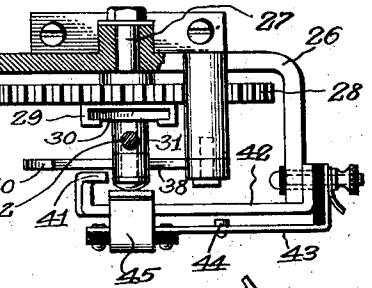


Fig. 3.

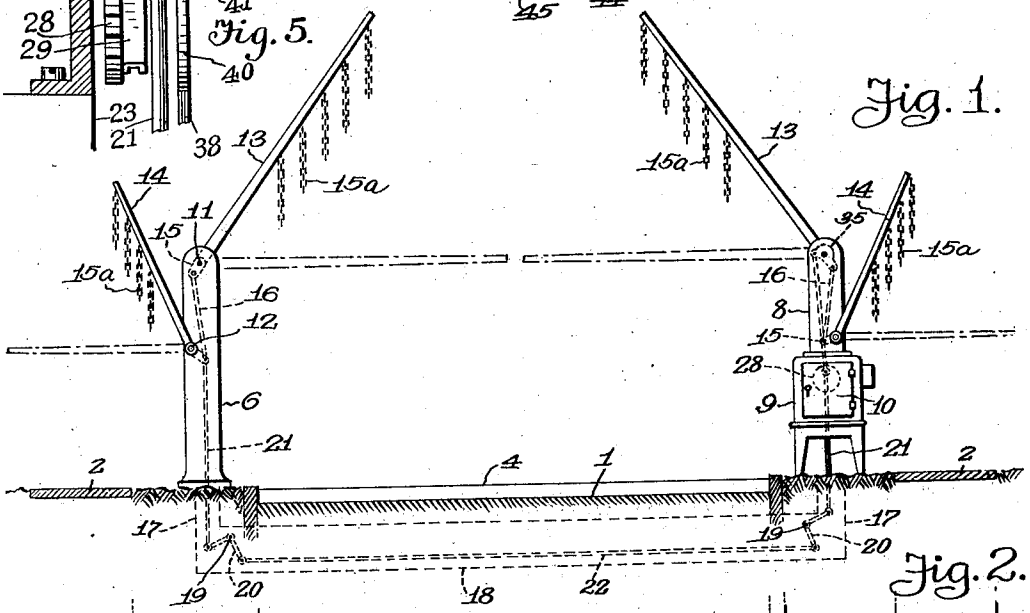
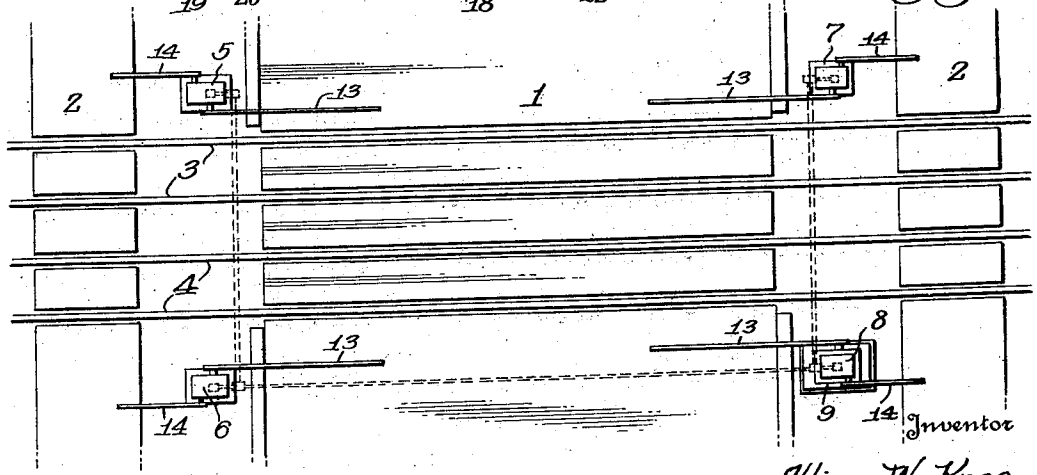


Fig. 1.

Fig. 2.



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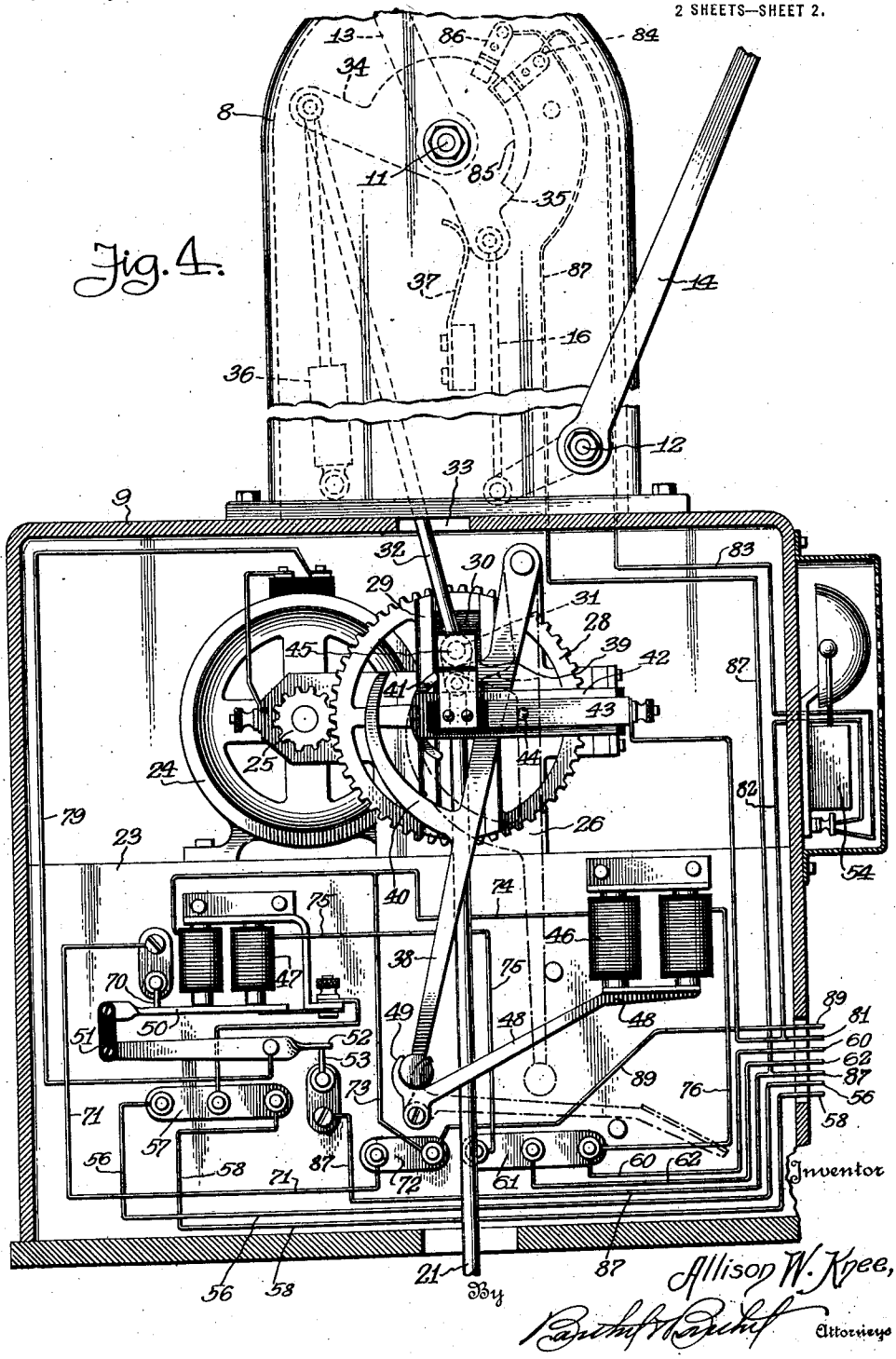
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2 SHEETS—SHEET 2.

Fig. 4.



UNITED STATES PATENT OFFICE.

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RAILWAY-CROSSING GATE.

1,408,008. Specification of Letters Patent. Patented Feb. 28, 1922.

Application filed September 7, 1920. Serial No. 408,593.

To all whom it may concern:

Be it known that I, ALLISON W. KNEE, a citizen of the United States of America, residing at Greenville, in the county of Montcalm and State of Michigan, 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.

This invention relates to railway crossing gates and my invention aims to furnish railway crossings with apparatus for automatically opening or lifting gates which control vehicular and pedestrian traffic at the crossing, the gates being locked in an open position and automatically released, to descend or close by gravity, when a train approaches the crossing.

My invention aims to provide novel means by which a plurality of gates may be simultaneously actuated from a single controlling apparatus, although each gate may be provided with a controlling apparatus.

My invention will be hereinafter described and then claimed, and reference will now be had to the drawings, wherein—

Figure 1 is a front elevation of crossing gates in accordance with my invention;

Fig. 2 is a plan of the same;

Fig. 3 is a horizontal sectional view of a portion of the electrical controlling apparatus for the gates;

Fig. 4 is an enlarged vertical sectional view of the gate controlling apparatus, partly broken away; and

Fig. 5 is a vertical sectional view of a portion of the apparatus.

Reference will first be had to Figs. 1 and 2 showing somewhat diagrammatically a gate installation for a double track railway system, and the reference numeral 1 denotes a street or road having pavements or paths 2 intersected by tracks 3 and 4. Traffic across these tracks on the street 1 and the pavements 2 is controlled by a plurality of gates, which have been illustrated in full lines as raised or opened and by dot and dash lines as lowered or closed.

Between the street 1 and the pavements 2, at the outer sides of the tracks 3 and 4, are mounted hollow pedestals 5, 6, 7, and 8, which are identical in construction, with the exception of the pedestal 8, said pedestal being of less height so that it may be supported upon a housing 9 having a hinged normally closed and locked door 10. All of the pedestals are provided with rock shafts 11 and 12, the former supporting street gates 13 and the latter pavement gates 14. The gates 13 and 14 are preferably provided with suspended members 15ª, as chains, which may interfere with vehicular or pedestrian traffic under the gates. The gates 13 and 14 of each pedestal have crank portions 15 connected by links 16 so that the gates may be operated in synchronism, and in order that all of the gates may be operated and controlled from the housing 9 suitable conduits 17 and 18 are placed below the street for connections between the pedestals 5 to 8 inclusive. The conduits 17 which connect the pedestals 5 and 6 and the pedestals 7 and 8 have rock shafts 19 journaled therein and provided with bell cranks 20. The bell cranks 20 are located below the pedestals and have rods 21 connected to the cranks 15 of the gates 14. The conduit 18 connects the conduits 17 and in said conduit is a connecting rod 22 which articulates the bell cranks 20 below the pedestals 6 and 8, so that the gates at one side of the street may be operated in unison with the gates at the opposite side of the street.

In the housing 9 below the pedestral 8 is an electrical apparatus including an instrument board 23 and suitable supports for an electric motor 24 having its armature shaft provided with a small gear wheel 25. The armature shaft motor is supported, in part, by a bracket 26 and journaled in said bracket is a shaft 27 provided with a large gear wheel 28 meshing with the small gear wheel 25. On the face of the large gear wheel 28 is a channel guide 29 for a slide head 30, and said slide head has a stud 31 to which is pivotally connected a rod 32. The rod 32 extends through an opening 33 in the top of the housing 9 and upwardly into the pedestal 8 where it is pivotally connected to an arm 34 of a sector member 35 mounted on the rock shaft 11 within said pedestal. The arm 34 is connected to a conventional form of dash pot device 36 which is adapted to retard and cushion a closing or lowering movement of the gates. An opening or raising movement of the gates is cushioned by a spring or other device 37 with which the sector member 35 con-

tacts, as best shown in Fig. 4. It is in this figure of the drawings that the normal condition of the electrical controlling apparatus has been shown, and when the slide head 30 is released, as will hereinafter appear, said slide head may descend in the channel guide 29 and allow the gates to close or lower by gravity. When the motor 24 is started and the large gear wheel 28 makes a half rotation the slide head is again restored to a raised position relative to the large gear wheel and it is during the raising of the slide head that the gates are opened or raised.

To hold the gates opened or raised a detent or lever 38 is employed and pivotally connected to an extension of the bracket 26 so that it may swing by gravity in one direction, similar to a pendulum. The detent 38 has a side lug 39 adapted to engage under the stud 31 and support said stud, and below the lug 39 is a curved guide arm 40 adapted to cooperate with a curved guide 41 in guiding the stud 31 of the slide head 30 when being restored to normal position by the large gear wheel 28.

The curved guide 41 is supported by an extension 42 of the bracket 26 and on the bracket extension 42 and suitably insulated therefrom is a resilient motor switch arm 43 having a contact member 44 adapted to engage the extension 42. The outer end of the switch arm 43 has an insulated cam member 45 with which the stud 31 contacts and actuates the switch arm 43 to break a motor circuit including said arm and the bracket extension 42, as will hereinafter appear.

Mounted on the instrument board 23 is a set of detent electromagnets 46 and a set of motor switch electromagnets 47 which are constantly energized when the apparatus is in normal condition with the gates open. Adjacent the detent magnets 46 is a pivoted armature 48 having its pivoted end provided with a keeper 49 for the lower enlarged end of the detent 38, said enlarged end assisting the detent to swing by gravity. The position of the pivoted armature 48 is such that when it is actuated by the stud 31 that it elevates the armature 48 until it comes under the influence of the magnets 46, when it will be attracted thereby and held by the magnets being energized. This is the condition shown in Fig. 4 and it is apparent that when the magnets 46 are deenergized that the armature 48 will drop by gravity and permit the detent 38 to swing by gravity, thereby causing the lug 39 to release the stud 31 and permit of the slide head 30 descending by gravity due to the weight of the gates.

Mounted on the instrument board 23 adjacent the motor switch electromagnets 47 is an armature 50 loosely connected by an insulator 51 to a motor switch arm 52 which is pivoted on the instrument board 23 and adapted to engage a contact member 53 when the armature 50 is held by the energized magnets 47.

Assuming that the controlling apparatus is in normal condition with the electromagnets 46 and 47 constantly energized, a train is adapted to cause a short circuit and deenergizing of the electromagnets. Release of the armature 48 releases the detent 38 which swings out of engagement with the stud 31 and permits the gates to close by gravity. By reference to Fig. 4, it will be noted that when the detent 38 assumes a vertical position that the curved guide arm 40 thereof is still under the stud 31, so that when the stud is shifted by the motor driven gear wheel 28 the detent 38 will be actuated.

The gates remain closed while the train is on the crossing and the last car truck is adapted to make a circuit for the switch electromagnets 47, which are energized, thereby closing the circuit of the motor 24. The circuit includes a suitable source of electrical energy, rail sections, wires 58 and 56 to the connector 57 and wire 89 to the connector 72. From the connector 72 by wires 73 and 74 to the electromagnets 47, and then by wires 75, connector 61 and wire 60 to the source of electrical energy. The electromagnets 47 are therefore energized and the armature 50 shifted to close the motor switch arm 52 relative to the contact 53. The closing of this motor switch establishes a circuit through the motor, which is as follows:—wire 87 to contact 53, switch arm 52 and wire 79 to motor 24. From the motor 24 by a wire to the bracket 26, bracket extension 42 and contact 44 to the switch arm 43, and then by wire 81 to the source of energy. This circuit is established by reason of the stud 31 having been lowered relative to the cam member 45 which permitted the switch arm 43 to close.

With the motor 24 in operation and the stud 31 at the lower side of the large motor driven gear wheel 28, the stud engages the curved guide arm 40 of the detent 38 causing said detent to be shifted from its vertical position towards the keeper 49, which it eventually engages and causes the armature 48 to come under the influence of the previously energized electromagnets 46.

As the stud 31 rides upwardly against the guide arm 40 and the curved guide 41 the gear wheel 28 is completing a half revolution, raising the gates, and again carrying the stud 31 into engagement with the cam member 45, causing the switch arm 43 to be shifted to break the circuit of the motor 24 so that there will be a cessation in the operation of the motor when the gates have reached an extreme open or raised position. Since the electromagnets 46 and 47 have

been previously energized, the magnets remain so until another train approaches the crossing.

What I claim is:—

1. The combination with a gate adapted to close by gravity and be opened by power, of a controlling apparatus for the gate, comprising a motor adapted to raise the gate, a constantly energized magnet adapted to be de-energized and then re-energized, an armature held by said magnet, a detent held by said armature to retain the gate raised and adapted to release the gate to descend by gravity when the magnet is de-energized, and a motor circuit adapted to be established by the re-energizing of the magnet to place said motor in operation to raise the gate.

2. The combination set forth in claim 1, wherein the operative connection between the gate and the motor includes a driven gear wheel, and a slide head carried thereby adapted to restore said detent to normal position.

3. The combination set forth in claim 1, wherein a slide head is articulated with the gate and actuated by the motor and controls the motor circuit.

4. The combination set forth in claim 1, wherein a slide head is articulated with the gate and actuated by the motor, with the detent in position to hold the slide head elevated and constructively arranged to be actuated by the slide head so that the apparatus may be restored to normal condition.

5. The combination with a gate adapted to close by gravity and be opened by power, of a controlling apparatus for the gate comprising an electric motor adapted to raise the gate, gravity means maintaining the gate raised, electro-magnetic means in circuit with a source of electrical energy and constantly energized to maintain said gravity means in normal position with the gate raised and adapted to be de-energized to release said gravity means and permit of said electromagnetic means being successively re-energized and start said motor.

6. The combination set forth in claim 5, wherein additional means actuated by the raising of the gate causes a cessation in the operation of said motor.

7. The combination with a gate adapted to be raised by power and lowered by gravity, of an electric motor, a slide head articulated with the gate and actuated by the motor to raise the gate, gravity means adapted to hold the slide head with the gate raised, and electrical means to maintain said gravity means in a slide head engaging position and adapted to release said gravity means to permit the slide head and gate to lower.

8. The combination set forth in claim 7, wherein said gravity means includes a detent actuated by said motor actuated slide head to assume a slide head engaging position.

9. The combination set forth in claim 7, wherein said electrical means includes an electromagnet and armature, the latter being brought under the influence of the electromagnet by said gravity means being restored to normal position.

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

ALLISON W. KNEE.

Witnesses:
FAITH TERRY,
JOHN M. CRAWFORD.