W. C. & W. H. BIGGINS.

AUTOMATICALLY OPERATED RAILROAD GATE.

APPLICATION FILED APR. 15, 1916

1,246,384.

Patented Nov. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

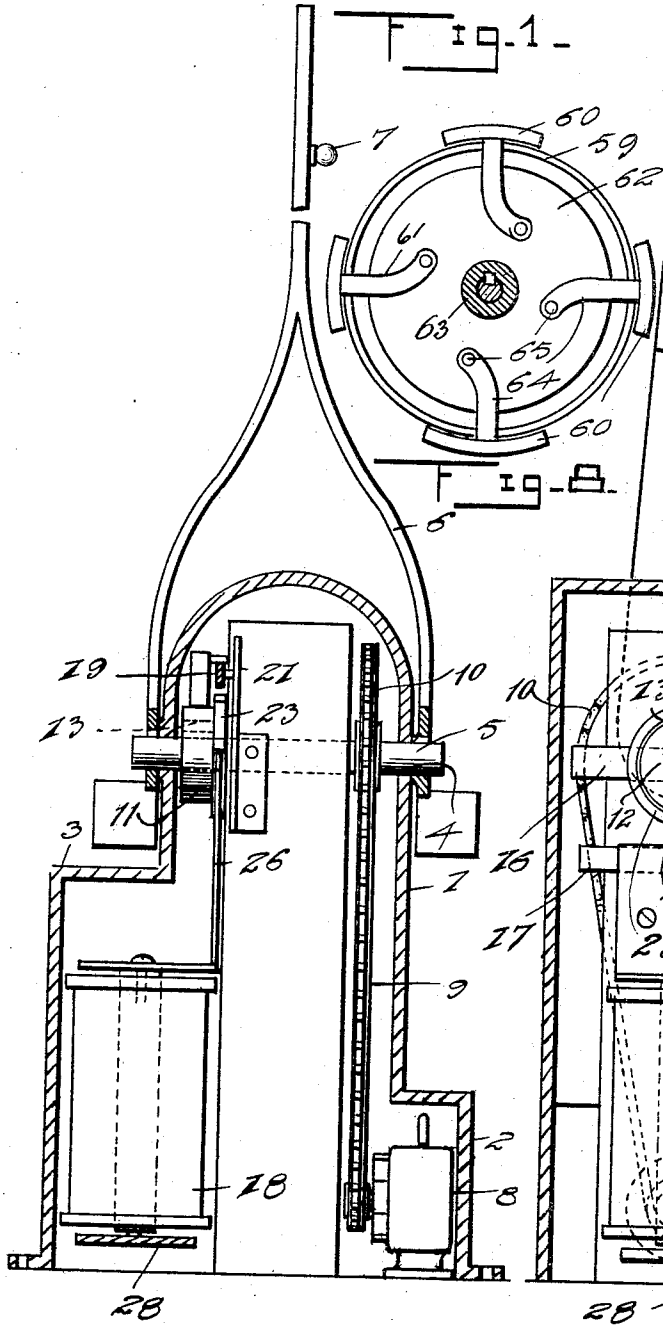


Fig. 8.

Fig. 2.

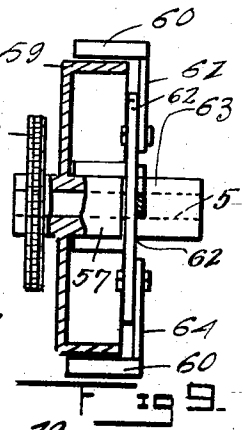
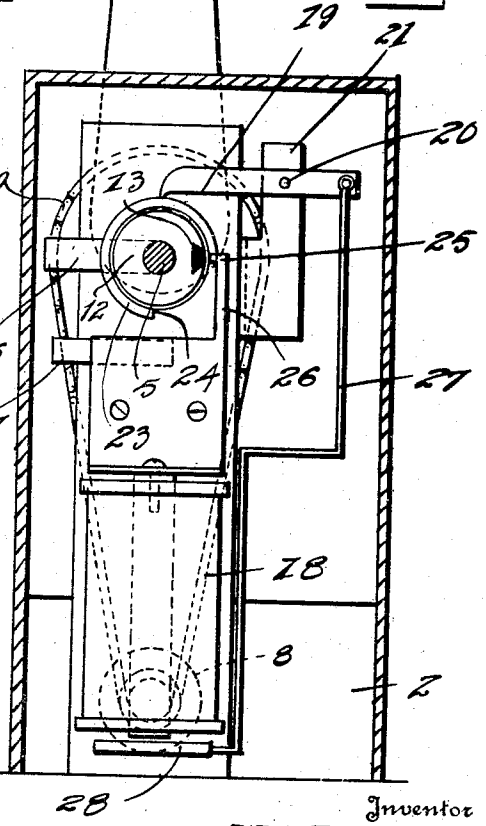


Fig. 9.



Witnesses

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2 SHEETS—SHEET 2.

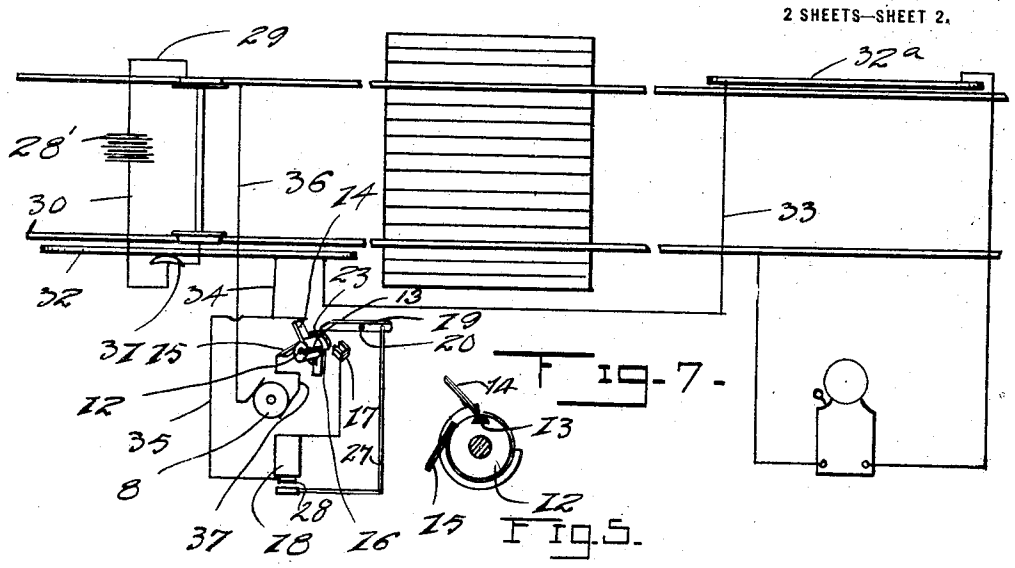


Fig. 7.

Fig. 5.

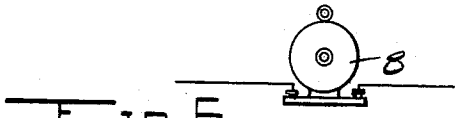


Fig. 6.

Fig. 3.

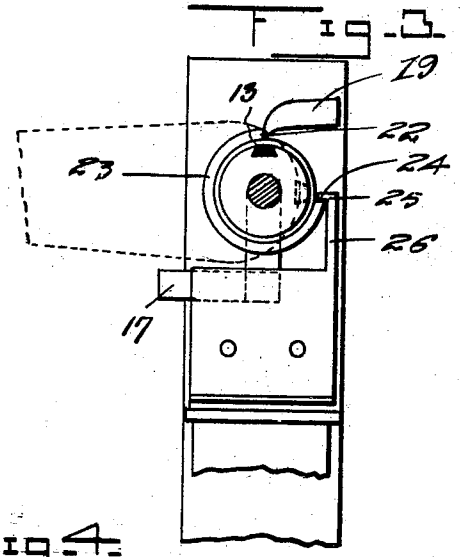
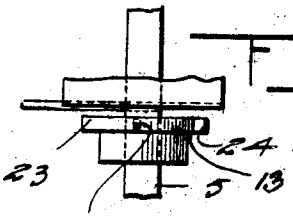


Fig. 4.



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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-OPERATED RAILROAD-GATE.

1,246,384. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed April 15, 1916. Serial No. 91,402.

To all whom it may concern:

Be it known that we, (1) WILLIAM C. BIGGINS and (2) WILLIAM H. BIGGINS, (1) a subject of the King of Great Britain, (2) a citizen of the United States, residing at Diamond, in the county of Parke and State of Indiana, have invented certain new and useful Improvements in Automatically-Operated Railroad-Gates; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in automatically operated railroad gates and the principal object of the invention is to provide a device which is automatically operated upon the approach of a train toward a crossing.

Another object of the invention is to provide a gate in which the operating mechanism is particularly simple in construction thereby reducing the cost of production and upkeep to a minimum.

Still another object of the invention is to provide an electrically controlled gate using a third rail circuit in which the voltage is so low as to remove all possible danger.

With these and other objects in view, the invention consists in the novel combination and arrangement of parts which will be fully set forth in the following specification and accompanying drawings, in which:—

Figure 1 is a vertical sectional view of a gate constructed in accordance with this invention.

Fig. 2 is a view similar to Fig. 1 taken at right angles thereto.

Fig. 3 is a fragmentary side view of the operating mechanism showing the casing removed.

Fig. 4 is an enlarged detail fragmentary view of the device illustrating the commutator.

Fig. 5 is a detail side elevation of the commutator showing the brushes.

Fig. 6 is a detail side view of the motor.

Fig. 7 is a fragmentary plan view of a track illustrating the wiring diagram.

Fig. 8 is a side view of the clutch used in connection with the device, and

Fig. 9 is a sectional view through Fig. 8.

Referring to the drawings 1 designates as an entirety the casing of the device formed with an offset portion 2 on one side and a relatively large offset portion on the opposite side. This casing is provided near its upper terminal with the opening 4 arranged in alinement for the reception of the pivot shaft 5 on which the gate 6 is mounted. The gate may be of any suitable construction as illustrated in the drawing and carries near its outer end a lamp 7 which is automatically lighted when the gate is being lowered and during the time that it remains in its closed position.

The operating mechanism of the gate consists of a suitable motor 8 connected by a suitable chain 9 to a large sprocket 10 which is keyed or otherwise secured to the shaft 5. The gate 6 is attached to the shaft so as to rotate therewith and it will thus be seen that when the motor is set in operation the gate will be lowered. Suitable counter-balancing weights are connected to the gate so as to return the same to its raised position as soon as the motor is out of operation.

In order to control the flow of current through the motor, a suitable commutator 11 is provided which consists of a suitable core 12 of a conducting material having inserted in its periphery a strip of insulation 13 which extends in parallel relation with the axis and insulates a small portion of the surface of the commutator as clearly illustrated in Fig. 5. Mounted to bear on the commutator is a brush 14 and a similar brush 15 which are in electrical connection with the terminals of the motor so that when the circuit is completed through the device it will pass through the brushes 14 and 15 by way of the core 12 of the commutator, except at such times as when the insulating element 13 rests beneath one of the brushes. It will be understood that the gate moves only through a ninety degree arc therefore when the gate is in its raised position the insulator 13 will be in the position shown in Fig. 2 and when in its lowered position the insulator will be in the position shown in Fig. 5 thereby discontinuing the motor circuit. In order to hold the gate in its lowered position after the circuit is discontinued through the motor a suitable working contact arm 16 is provided which is adapted to engage a suitable contact 17 which in turn is connected to one terminal of the electromagnet 18, the opposite terminal of which is connected to a power source. The contact 16 is secured to the shaft 5 so as to turn therewith and it will be seen that when the gate is in its raised

position the contact 16 will disengage the contact 17 thereby discontinuing the flow of current through the electromagnet 18. A suitable pawl 19 is pivoted as at 20 to a bracket 21 and is arranged to engage a shoulder 22 formed at one end of the commutator by a flange 23 which extends around the commutator, a distance equal to substantially three-fourths of its periphery. It will thus be seen that the shoulder 22 and a similar shoulder 24 are provided and the shoulder 24 is adapted to engage a stop finger 25 formed on the arm 26 to prevent the gate to move downwardly beyond a predetermined point. A suitable link 27 is connected to the outer end of the pawl 19 and extends downwardly and is pivotally connected to the armature 28 which is pivoted beneath the electromagnet. It will thus be seen that when the armature 28 moves downwardly after the discontinuance of the circuit through the electromagnet 18 the pawl will be raised so as to disengage the shoulder 22 and permit the gate to move upwardly under the influence of the counterweights until the shoulder 22 engages the finger 25 thereby holding the gate in its raised position.

Upon reference to the wiring diagram it will be noted that the power source is carried by the vehicle traveling on the track and is designated by the numeral 28′ and has one terminal grounded through a wire 29 to the frame of the vehicle. The opposite terminal of said power source is connected by a wire 30 to a sliding shoe 31 for engagement with a third rail section 32 which extends along the track parallel to the rails. In order that the gate may be operated by trains traveling in both directions, a similar sectional rail designated by the numeral 32^a is provided on the opposite side of the track and the rail sections 32 and 32^a are connected by a wire 33. A suitable lead wire 34 is connected to the rail section 32 and is connected to the branch wire 33 one terminal of which leads to the brush 14 while the opposite terminal is connected to one terminal of the electromagnet 18. A similar lead wire 36 is connected to one of the rails of the track and leads directly to the motor 8 while the opposite terminal of the motor is connected by a wire 37 to the brush 15. It will thus be seen that when the vehicle moves into such a position as to bring the shoe 31 into contact with the rail 32, the current will flow from the battery 28′ through the wire 30 and shoe 31 into the rail 32 thence through the wire 34, brush 14, commutator 12 into the wire 37 the motor 8 and thence back through the wire 36 to the track rail and then through the ground wire back to the battery. In this way it will be seen that the motor 8 will be set in operation. After the gate has been moved to the proper position, it will be apparent that the insulator 13 will move into such a position as to be interposed between the brush 14 and the commutator 12 thereby discontinuing the motor circuit. Simultaneously with this movement it will be evident that the working contact 16 will engage the contact 17 thereby completing the circuit through the electromagnet 18 and causing the armature to be moved upwardly so that the free end of the pawl 19 may engage the shoulder 22 and hold the gate in its lowered position against the influence of the weight. As soon as the vehicle moves beyond the end of the sectional rail 32 it will be evident that the circuit will be broken through the magnet 18 thereby permitting the armature to drop and cause the pawl 19 to disengage the shoulder 22, thus permitting the gates to return to their normal open position under the influence of the weights.

In order to prevent the reverse rotation of the motor upon the returning of the gates to their raised position a suitable sleeve 57 is loosely mounted on the motor shaft and this sleeve carries the sprocket 58 over which the chain 9 runs. A drum 59 is carried by the sleeve and the friction surface of said drum is adapted to be engaged by the shoes 60 which are carried at the outer ends of the stems 61 which in turn are mounted on the disk 62 of the sleeve 63 which is keyed to the motor shaft. As shown in Fig. 8 the inner or secured ends of the stems 61 are bent inwardly as at 64 so that the pivots 65 are offset with relation to the axis of its respective stem so that upon rotation of the disk 62 the shoes 60 will be moved into engagement with the drum 59 thereby causing the sprocket 58 to be rotated. In this way it will be seen that the motor will rotate the sprocket but the reverse movement of the sprocket will not rotate the motor.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that such changes may be made in the combination and arrangement of parts as will fall within the spirit and scope of the appended claims.

What is claimed is:—

1. In an automatically operated railway gate, a standard, a shaft journaled in said standard, a gate carried by the shaft, a sprocket keyed to the shaft, a motor having one terminal grounded to one of the track rails, a chain connecting the sprocket with the motor, a train carried power source, a third rail, one terminal of the power source being connected to the third rail and the opposite terminal being connected to the track rail, a commutator mounted on the shaft, a brush bearing on the commutator, said brush being connected to the third rail, a second

brush bearing on the commutator, the second brush being connected to the motor, a housing completely inclosing said standard, shaft and motor and chain connection, and means in the housing coacting with the shaft to limit the downward movement of the gate.

2. In an automatically operated gate, a train carried power source, a third rail, means to conduct the power from the opposite terminals of the power source to the track and to the third rail, a standard, a shaft rotatably mounted in the standard, a gate keyed to the shaft for rotation therewith, a motor for controlling the operation of the shaft, a commutator carried by the shaft, brushes bearing on the commutator, said brushes being respectively and electrically connected with the track and third rail, a housing completely inclosing said motor and operating means for the motor and commutator and also a portion of the shaft, an electromagnet, one terminal of the electromagnet being connected to the third rail, a movable contact carried by the shaft, a stationary contact, a wire connecting the stationary contact with the opposite terminal of the electromagnet, an insulated portion in the commutator, means for holding the insulated portion beneath one of the brushes to discontinue the circuit through the motor after the gate has been lowered, said means being releasable when said electromagnet is deënergized, and means carried by the motor permitting a reverse rotation of the shaft when the gates are being raised.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM C. BIGGINS.
WILLIAM H. BIGGINS.

Witnesses:
BRUCE WHETSEL,
WILLIAM J. IRWIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."