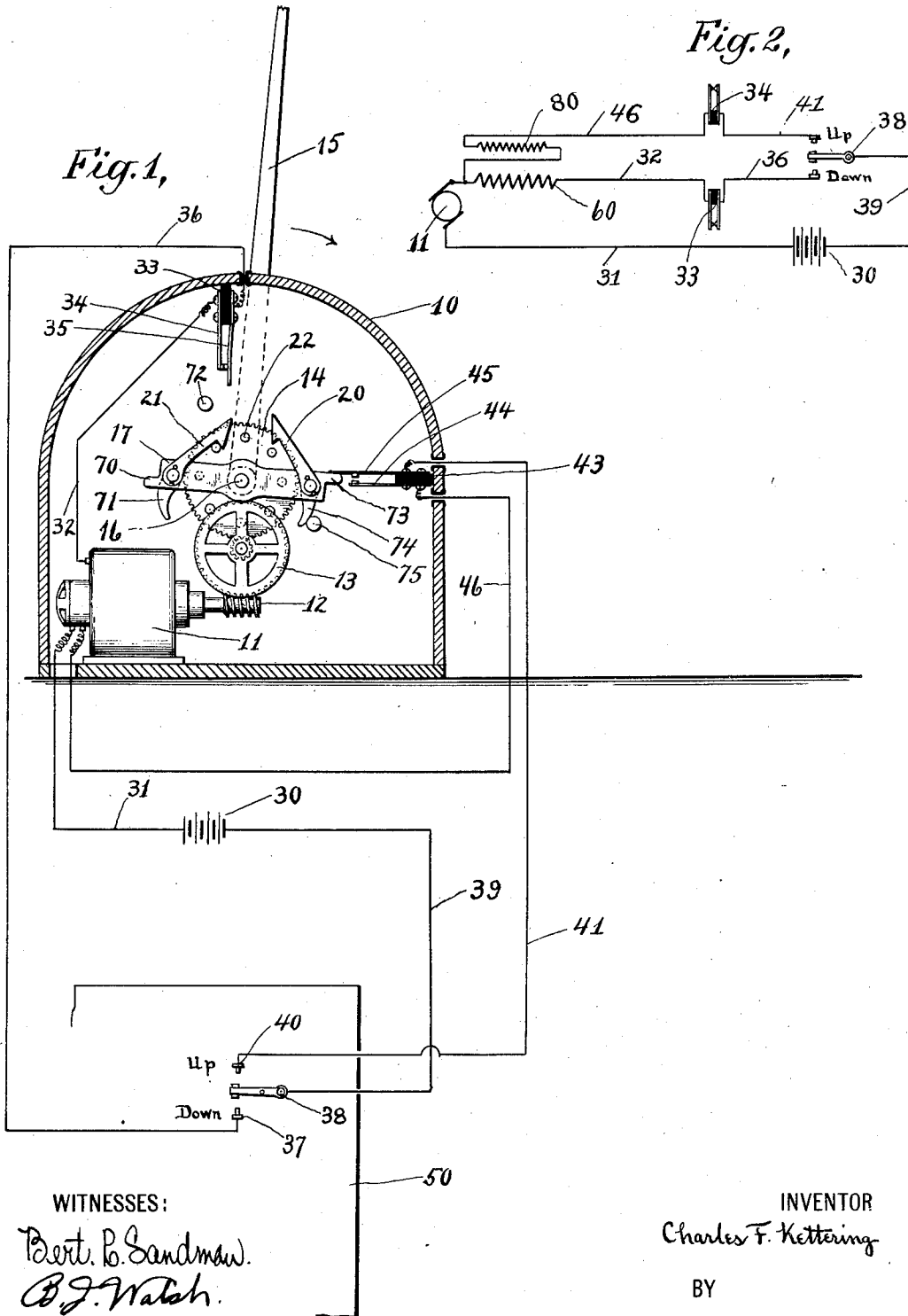


C. F. KETTERING.
ELECTRIC RAILWAY GATE.
APPLICATION FILED JAN. 15, 1910.

1,046,605.

Patented Dec. 10, 1912.



UNITED STATES PATENT OFFICE.

CHARLES F. KETTERING, OF DAYTON, OHIO, ASSIGNOR TO CHARLES E. MENDENHALL
AND LOUIS P. EARNSHAW, BOTH OF DAYTON, OHIO.

ELECTRIC RAILWAY-GATE.

1,046,605.

Specification of Letters Patent.

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Application filed January 15, 1910. Serial No. 538,192.

To all whom it may concern:

Be it known that I, CHARLES F. KETTERING, a citizen of the United States, residing at Dayton, county of Montgomery, State of Ohio, have invented certain new and useful Improvements in Electric Railway-Gates, of which the following is a full, clear, and exact description.

This invention relates to electrically operated railway gates, or signals, it being among the objects to provide means whereby the railway gate or other signal or protective device may be operated electrically from a distance, and to have the device so arranged so that the gate may be under control in any of its positions for stopping or reversing its direction of movement; and further to control the electric circuits so as automatically to make and break the circuits in the positions of the gate at the limits of its downward and upward movements.

Described in general terms, my invention provides an electric motor, to the rotary element of which is connected the railway gate arm such that the rotation of the motor operates to produce the up and down movement of the gate. The motor is wound to provide for running in either direction and the switch is arranged in the electric circuits in such manner that when thrown in one position the motor operates to carry the gate down, and when thrown into the other position the motor carries the gate up. The operation of the gate automatically breaks the electric circuit when the gate has reached the extremity of its down or upward position. Moreover the mechanism is so constructed that the motor becomes disconnected from the gate at the extreme down and up positions of the gate. With this general description, I will now proceed to describe in detail the specific form of mechanism adapted for accomplishing the objects sought; it being understood that the preferred form shown in the drawings and described herein may be varied in numerous respects without departing from the spirit of the invention.

In the drawings accompanying this specification, Figure 1 represents a side elevation of the operating motor and connections with the gate, the electric circuits and switch be-

ing shown in a diagrammatic manner. Fig. 2 represents a diagram of the circuits alone.

In Fig. 1 the inclosing case 10 contains the electric motor 11 to the armature of which is connected the worm 12 operating the gear wheel 13 which in turn operates the main driving gear 14. The gate 15 is pivoted upon the shaft 16 and is connected to the rock-frame 17 which also swings about the shaft 16 as the pivotal point. On the opposite ends of the frame 17 are operating pawls 20 and 21. These pawls are hook shaped and arranged to be engaged by the operating pins 22 projecting from the side of the main operating gear 14. When the gear 14 revolves in either direction, one or the other of the pawls 20 or 21 will be engaged by the pins 22 whereby to rock the frame 17 and thus moves the gate 15 up or down. The electric motor 11 is of the type arranged to run in opposite directions, and controlled by two circuits, one to cause the motor to run in one direction to lower the gate, and the other circuit to cause the motor to run in the reverse direction to raise the gate. The source of energy for operating the motor may be from a battery or generator 30 or other suitable device, connected to the motor by the lead wire 31. The return wires from the motor are indicated by the numerals 41 and 46, these wires 41 and 46 being connected to the contact strips 45 and 44 respectively, on the circuit breaking device 43. The wire 32 leads from the motor to the contact device 33, comprising the contact strips 34 and 35. The strip 34 is connected to wire 32, and strip 35 is connected to wire 36 which leads outside of the casing and is connected to the contact point 37 for the switch lever 38. This switch lever 38 is connected by wire 39 to the battery 30. On the opposite side of the switch lever 38 is the other contact point 40 connected by wire 41 to the other contact device 43. This contact device is composed of two strips 44 and 45, 45 being connected to the wire 41, and 44 being connected to the lead wire 46 which goes back to the windings of the electric motor.

It will be understood that the switch lever 38 is located at a distance from the railway gate and its operating motor, such for example as being located in the gateman's

tower represented on the drawings by the inclosure 50. The gateman can then operate the gate from the tower or from the small house usually situated at railroad crossings.

The manner of operation of this device will now be described.

The position of the gate being up and the other parts being as shown in Fig. 1, the gateman wishing to throw the gates down at the approach of a train, throws the switch lever 38 to the down position making contact with the terminal 37. This establishes the circuit through the contact device 33 and through the field winding 60 (see Fig. 2) and the armature of the electric motor so as to cause the motor to run in such direction as to rotate the main operating wheel 14 in clockwise direction on Fig. 1. The result is that one of the pins 22 engages the hooked pawl 21 and thereby pulls the rock frame 17 around with the gear wheel 14. This of course lowers the gate 15 to its horizontal position. As soon as the gate has reached its horizontal or down position, the electric circuit is broken and the motor disconnected from the gate by the following construction:—Projection 70 formed on the frame 17, contacts with the lower end of the contact strip 35 and forces the strip slightly away from the strip 34 and thus opens the circuit. (The position of the parts as illustrated in Fig. 1 shows the breaking of the other contact device 43 as presently described.) Furthermore the pawl 21 is formed with the tail 71 which strikes the stationary pin 72 when the frame 17 has been rocked into its upper position and the gate is down. This unclutches or unhooks the pawl 21 and frame 17 from the operating gear 14 when the gate reaches its down position and allows the motor to run on independently under its own momentum until it stops naturally, the circuit having been broken as just explained. It will be seen on Fig. 1 that the gate is in its up position, and projection 73 of the frame 17 engages the contact strip 45 of the contact device 43 so as to break the gate raising circuit at that point. Similarly the pawl 20 is shown with the tail 74 which engages the stationary stop pin 75 when the gate is up so as to unhook the pawl 20 from the operating gear 14 at this point. As soon as the gate is started downward, the projection 73 retreats from the contact strip 45 allowing the latter to strike the strip 44 and close the circuit at that point. Therefore when the gate has reached its down position, the gateman may now raise the gate by throwing the switch lever 38 to up position making contact with the terminal 40. This closes the circuit through the other field winding 80 (see Fig. 2) and armature of the electric motor, thus causing the motor to run reversely and raise the gate by a similar operation.

That is, the main gear wheel 14 rotates in anticlockwise direction and one of its pins 22 engages the hooked pawl 20 (the frame 17 then being in vertical position) and rotates the frame 17 back to horizontal position, with the gate in its up position. At the extreme upper limit of the gate, projection 73 strikes the contact strip 45 and breaks the motor circuit at that point. At the same time the tail 74 of pawl 20 strikes the pin 75 and disengages the frame 17 from the operating gear 14 so that the motor may run on freely until it stops. In thus running on, the pins 22 strike the beveled nose of the pawl 21 and click idly by.

It will be seen from this construction that all that the gateman has to do to lower the gate is to throw the switch lever 38 to its down position, and then the gate takes care of itself. That is, the gate is moved to its down position and at that point the motor circuit which operates the gate, is broken, and the gate unclutched from the driving motor. Then when the gateman desires to raise the gate he throws the switch lever 38 to up position, and the gate again takes care of itself, moving to its up position, with similar breaking of the motor circuit and unclutching from the driving gear. This construction moreover enables the gateman to have complete control over the gate in any of its intermediate positions. If the gate had been moved part way upward and it is desired to check it upon the possible intervention of some obstruction, then the gateman need only throw the switch lever 38 to its intermediate or neutral position between the terminals 37 and 40. The motor circuit is completely broken in such position and therefore the motor stops, with the gate resting in this intermediate position. To continue the gate downward the gateman again simply throws the lever 38 to its down position with the result above described, the pawl 21 having still remained connected with the driving pin 22 of the gear 14. If however the gateman has started the gate downward and then checks it part way as just described by throwing the lever 38 to neutral and he then desires to restore the gate back to its up position, he simply throws the lever 38 to up position, which thereby establishes the circuit through contact device 43. This causes the motor to run reversely, and one of the pins 22 now engages pawl 20 which has dropped into engaging position and thus raises the gate again to its up position. This arrangement gives the gateman complete control of the gate at all points, and at the same time makes the gate automatically control itself after the switch is thrown, in case the full limit of movement in one direction or the other is to be permitted.

It will be understood that the usual de-

vices are employed for checking the gate in
 its complete down and up positions. Also
 that mechanical design and the arrangement
 of parts may be varied in numerous respects,
 such as changes in the form of motor driv-
 ing device, clutch mechanism, contact de-
 vices, and the controlling switch, such
 changes coming within the scope of the
 claims which follow. It is desired also to
 call attention to another feature of the in-
 termediate connections between the gate and
 the electric motor device, in that these in-
 termediate connections are so constructed
 that the gate is locked throughout the ex-
 tent of its intermediate positions between
 down and up. After the gate has started
 downward from the position shown in Fig.
 1, the pawl 20 is allowed to drop downward
 when its tail 74 retreats from the pin 75.
 This pawl 20 is then in the path of the op-
 erating pins 22. Thus the gate cannot now
 be turned backward or forward independ-
 ently of the motor, by reason of the fact
 that any attempted movement of the gate
 will cause the pawl 20 or the pawl 21 to pull
 in one direction or the other upon the main
 operating gear wheel 14. But this gear
 wheel can only be operated through the me-
 dium of the rotation of the worm 12, and
 can not be turned backward against the
 worm. Therefore, the gate is positively
 locked in all its intermediate positions, that
 is, locked against any movement except the
 proper movement under control of the mo-
 tor itself.

What is claimed is as follows:—

1. In an electrically operated gate, the
 combination with the gate, an electric motor
 device, and intermediate connections be-
 tween the gate and motor for operating the
 former by the latter; of an electric circuit
 and switch therein for controlling the op-
 eration of the motor and constructed to stop
 the motor at any point upon the opening of
 said switch; and means automatically con-
 trolled by the motor and connections, for
 breaking the motor circuit and disconnect-
 ing the motor from the gate at the extremi-
 ties of movement of the gate.

2. In an electrically operated gate, the
 combination with a pivoted gate, an electric
 motor device and electric connections there-
 for, means comprising pawls between the
 gate and the motor adapted to raise and
 lower said gate, means associated with the
 aforesaid means adapted to disengage one
 of said pawls at the extreme movement of
 said gate whereby the motor may slowly
 come to rest.

3. In an electrically operated gate, the
 combination with the gate, an electric motor
 device, and intermediate connections be-
 tween the gate and motor for operating the
 former by the latter; of electric circuits for
 operating said motor forwardly or reversely;

a switch for controlling said forward and
 reverse circuits, said circuits and switch be-
 ing constructed to stop the motor at any
 point upon the opening of the switch; and
 means automatically controlled by the mo-
 tor and connections, for breaking either the
 forward or the reverse circuit at the extremi-
 ty of the respective upward or downward
 movements of the gate; and means also au-
 tomatically controlled by the motor and
 connections, for disconnecting the motor
 from the gate at either extremity of move-
 ment, concomitantly with the breaking of
 the motor circuit.

4. In an electrically operated gate, the
 combination with the gate, an electric motor
 device, and a clutch mechanism between the
 gate and the motor for driving the gate by
 the motor in forward and reverse directions;
 electric circuits for operating said motor
 forwardly or reversely; contact devices in
 said forward and in said reverse circuits;
 a switch for controlling said forward and
 reverse circuits, said circuits and switch be-
 ing constructed to stop the motor at any
 point upon the opening of the switch; means
 cooperating with the motor and connections,
 for automatically opening the forward con-
 tact device at the extremity of the forward
 movement and automatically opening the
 reverse contact device upon the extremity
 of the reverse movement; and means also
 automatically controlled by the motor for
 disconnecting the clutch to free the motor
 from the gate at either extremity of its
 movement concomitantly with the breaking
 of the motor circuit.

5. In an electrically operated gate, the
 combination with the gate, an electric motor
 device, and intermediate connections be-
 tween the gate and motor for operating the
 former by the latter; of an electric circuit
 and switch therein for controlling the op-
 eration of the motor and constructed to stop
 the motor at any point upon the opening
 of said switch; and means automatically
 controlled by the motor and connections, for
 breaking the motor circuit at the extremity
 of movement of the gate independently of
 said switch; said intermediate gate and
 motor connections being constructed with
 provisions operating to lock the gate from
 movement in either direction during its
 intermediate positions, except under control
 of the motor device itself.

6. In an electrically operated gate, the
 combination with a pivoted gate, an electric
 motor device and electric connections there-
 for, means for operatively connecting the
 motor and the gate, adapted to raise and
 lower the same, means automatically con-
 trolled by said connecting means adapted to
 break the electric circuit to said motor at
 the extremities of movement of said gate.
 and automatic means for disconnecting said

motor and gate at the extremities of movement of said gate, whereby the motor can come slowly to rest.

7. In an electrically operated gate, the
5 combination of a pivoted gate, an electric motor device and electric connections therefor, means between the gate and motor for raising and lowering the former by the latter comprising a gear wheel rotatably
10 mounted on said gate pivot and having projections thereon, a frame having pawls on the ends thereof and mounted on the gate, means for rotating the gear in opposite directions, and means for causing the pawls to
15 engage the projections on the disk whereby the gate is raised and lowered.

8. In an electrically operated gate, the combination of a pivoted gate, power means for operating said gate, means between the
20 gate and the power means for raising and lowering the former by the latter comprising a disk rotatably mounted upon the pivot of the gate, projections on said disk, a frame mounted upon the gate adjacent to said disk,
25 pawls on the opposite ends of the frame adapted to engage the projections on the disk, and means between the power means and disk operated in both directions to rotate the disk in either direction to raise and
30 lower the gate.

9. In an electrically operated gate, the

combination of a pivoted gate, power means for operating said gate, means between the gate and the power means for raising and lowering the former by the power from
35 the latter comprising a disk rotatably mounted upon the pivot of the gate having projections thereon, a frame mounted upon the gate adjacent to said disk having pawls at the opposite ends thereof, and means for
40 causing the pawls to engage and disengage the projections.

10. In an electrically operated gate, the combination of a pivoted gate, power means for operating said gate, a disk rotatably
45 mounted on the pivot of the gate, a frame mounted on said gate adjacent to said disk having pawls on the opposite ends thereof, means for causing one pawl to engage a projection on the disk to lower the gate
50 when the power means is operated in one direction, and means for causing the other pawl to engage a projection on the disk to raise the gate when the power means is operated in the other direction.
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In testimony whereof I affix my signature in the presence of two subscribing witnesses.

CHARLES F. KETTERING.

Witnesses:

EARLE WELBORN,
J. B. HAYWARD.