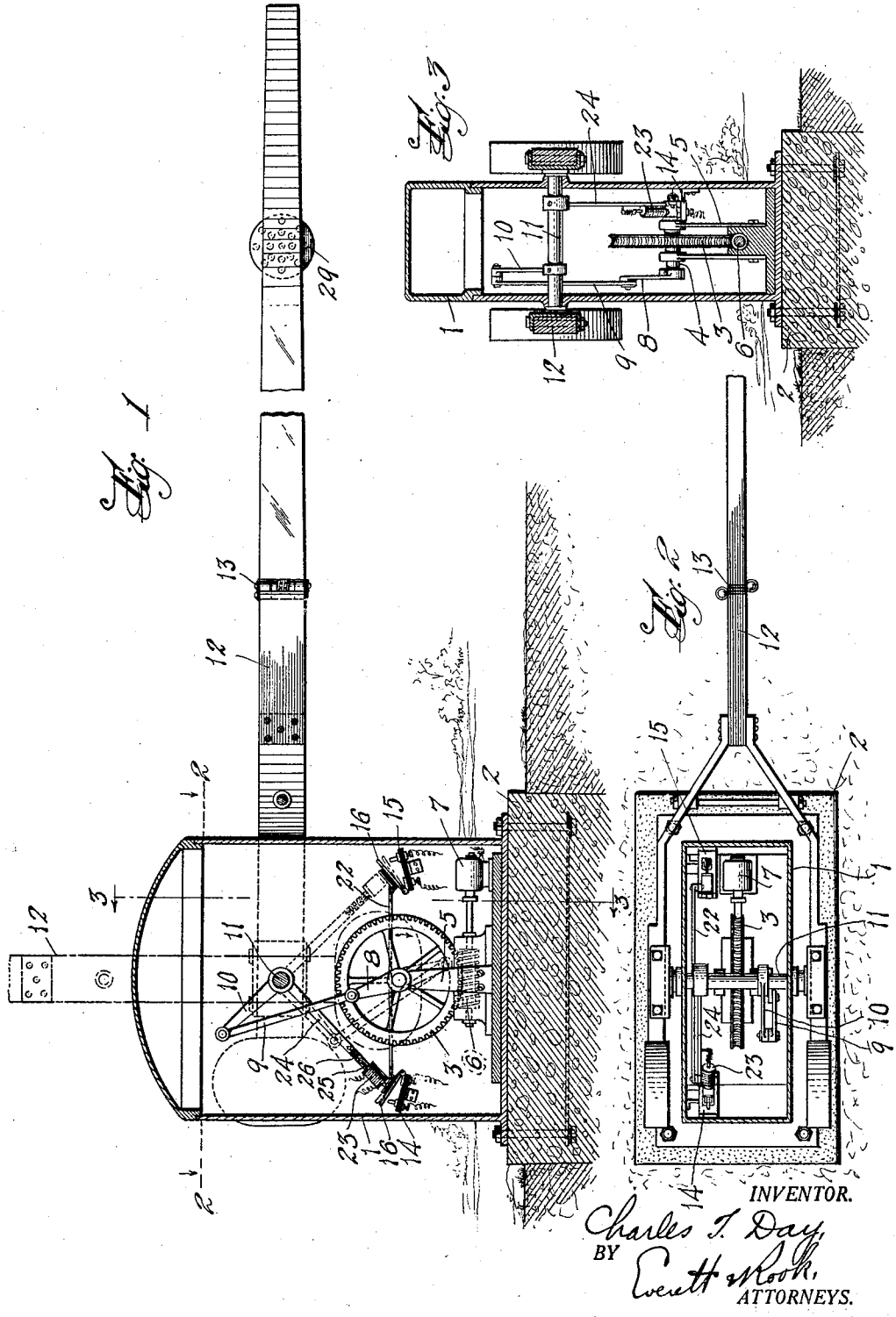
Feb. 28, 1933. C. T. DAY 1,899,496

AUTOMATIC RAILWAY CROSSING GATE

Filed Jan. 15, 1932 2 Sheets-Sheet 1



INVENTOR.
Charles T. Day,
BY
Everett & Mook,
ATTORNEYS.

Feb. 28, 1933. C. T. DAY 1,899,496

AUTOMATIC RAILWAY CROSSING GATE

Filed Jan. 15, 1932 2 Sheets-Sheet 2

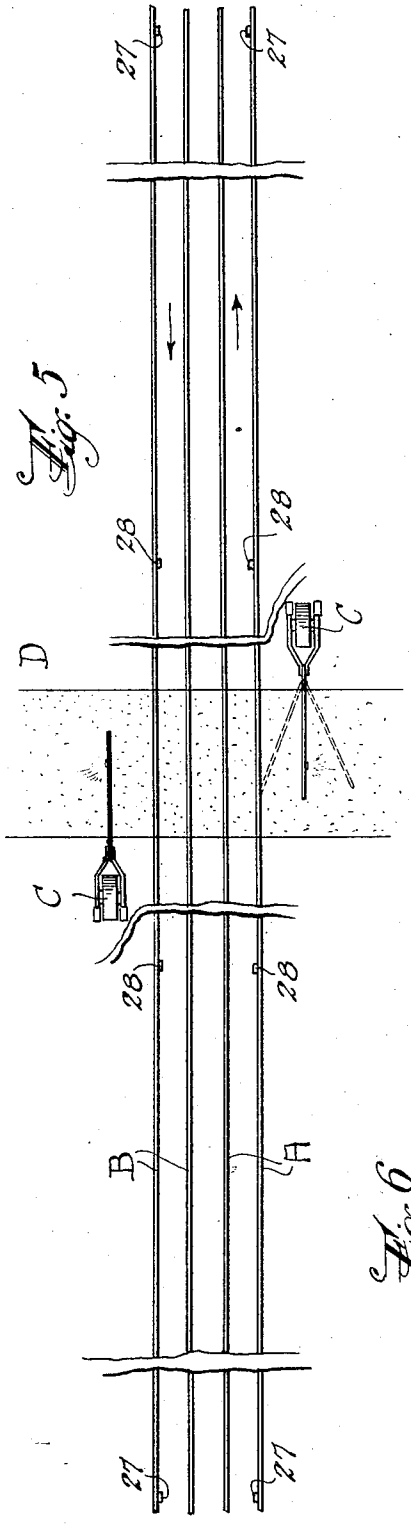


Fig. 5

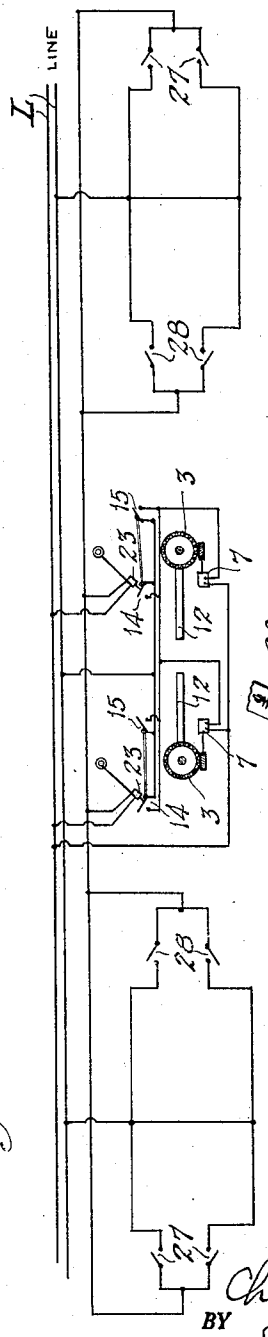


Fig. 6

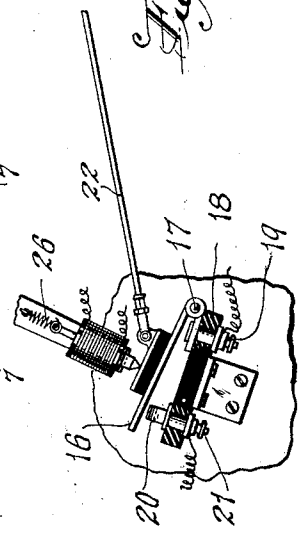


Fig. 4

INVENTOR.
Charles T. Day,
BY
Everett & Cook,
ATTORNEYS.

Patented Feb. 28, 1933

1,899,496

UNITED STATES PATENT OFFICE

CHARLES T. DAY, OF BRADLEY BEACH, NEW JERSEY

AUTOMATIC RAILWAY CROSSING GATE

Application filed January 15, 1932. Serial No. 586,863.

This invention relates in general to a railway crossing gate of the type in which the gate is automatically closed upon the approach of a train to the crossing, and is automatically opened after the train has passed the crossing.

One object of the invention is to provide a novel and improved crossing gate of this character which shall embody a minimum number of simple parts so that the gate shall be positive, reliable and durable in operation, and shall require a minimum of attention and repair.

Another object is to provide in an automatic railway crossing gate a driving mechanism for raising and lowering the gate which shall always rotate in the same direction in both opening and closing the gate, whereby it shall be possible to use a single direction electric motor, in combination with a novel and improved construction and arrangement of a plurality of electric switch mechanisms controlled by a train as it approaches the crossing and after it has passed the crossing for automatically starting the drive mechanism into operation to close the gate as the train approaches the crossing, stopping the operation of the drive mechanism while the gate is closed, and again starting the drive mechanism to open the gate after the train has passed the crossing.

Other objects are to provide in a railway crossing gate of this character, a pair of electric switches, each to control starting and stopping of the electric drive mechanism, said switches being actuated into closed position by a solenoid the circuit through which is controlled by switches on the railway track, and opened by mechanical actuation through the medium of an oscillating arm upon which the solenoid is mounted and which swings in synchronism with the opening and closing of the gate; and to obtain other advantages and results as will be brought out by the following description.

Referring to the accompanying drawings, in which corresponding and like parts are designated throughout the several views by the same reference characters,

Figure 1 is a side elevation, partially in section, of an automatic railway gate embodying my invention;

Figure 2 is a horizontal sectional view, on the line 2—2 of Figure 1;

Figure 3 is a transverse vertical sectional view, on the line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary sectional elevation of one of the switches for controlling operation of the drive mechanism;

Figure 5 is a schematic plan view of the gate, showing its relation to the railway crossing, and

Figure 6 is a wiring diagram of the apparatus.

Specifically describing the illustrated embodiment of the invention, I have shown it in connection with a two-track railway including the two tracks A and B, and at each side of the railway is arranged an automatic gate C embodying my invention; preferably one gate is arranged at each side of the roadway D. These gates are identical in construction, and only one thereof will be specifically described; but both gates are connected in an electric circuit so as to be simultaneously operated.

The gate mechanism includes a casing 1 of the usual construction mounted on a suitable foundation 2 at one side of the railway crossing. Within the casing 1 is journaled a worm gear 3 on a horizontal shaft 4 in bearings 5, and said worm gear is driven by a worm 6 connected to an electric motor 7 which rotates in one direction. Rigidly connected to the shaft 4 is a crank arm 8 which is connected by a link 9 to a crank arm 10 on a horizontal shaft 11 journaled in the casing 1 with its ends projecting from opposite sides of the casing. On the ends of the shaft 11 is mounted a gate arm 12 which is preferably formed in two sections hingedly connected at 13 so that the end section overlies the roadway D and may hingedly yield in both directions, as shown in Figure 5 of the drawings, should it be struck by a vehicle. In Figure 1 of the drawings the gate arm 12 is shown in its horizontal or road-closing position, and the crank arm 8, link 9 and crank arm 10 are of such relative sizes and so related to the gate

arm 12 that upon rotation of the worm gear 3 in the direction of the arrow in Figure 1, the gate arm will be swung upwardly; a half revolution of the crank arm 8 serves to swing the gate from its horizontal position to its vertical or open position shown in dot and dash lines in Figure 1, and upon the next half revolution of the crank arm in the same direction, the gate arm will be lowered to its horizontal position.

For controlling operation of the motor 7 and gate-opening and closing mechanism, I may utilize two electric switches 14 and 15. These switches may be of the knife type as shown, each including a blade 16 pivotally mounted at 17 on an insulating base 18 and connected in circuit through a binding post 19, said blade cooperating with a bifurcated spring contact 20 of the usual construction which is also mounted on the base 18 and connected in circuit by a binding post 21. The blades 16 of the two switches 14 and 15 are connected by a tie rod 22, and so related to each other that when one switch is closed the other switch is open, and both switches may be open at the same time, as clearly shown in Figure 1 of the drawings. For opening and closing the switches 14 and 15, I may utilize a solenoid 23 mounted on an arm 24 rigidly connected to the gate arm shaft 11 so as to swing synchronously therewith. The solenoid 23 has a reciprocable core 25 which is projected from the outer end of the solenoid when the solenoid is energized, and is retracted by a spring 26.

Assuming that the gate arm 12 is in its horizontal or closed position, as shown in Figure 1, both switches 14 and 15 are open, and the solenoid is arranged in juxtaposition to one of the blades. When the solenoid is energized, the core 25 is projected abuttingly against the blade 16 so as to close the switch, i. e., force the blade into engagement with the spring contact 20. The switch is connected in circuit with the motor 7, as hereinafter described, so that when the switch is closed the motor is started. The worm gear 3 is then rotated so as to swing the gate 12 to its vertical or open position, and when the gate reaches its vertical position, the solenoid 23 has been swung by the arm 24 into juxtaposition to the other switch 15, as shown by dot and dash lines in Figure 1. As the solenoid approaches the switch 15, it engages the blade of said switch so as to force it toward its closed position, and thereby, through the tie rod 22, the blade of the switch 14 is opened, as shown by solid lines in Figures 1 and 4. Upon the next energization of the solenoid 23, the core 25 is projected against the blade of the switch 15 so as to close said switch and again start the motor in operation. The gate arm 12 is thus swung to its horizontal or closed position, and the solenoid is at the same time swung into juxtaposition to the blade of the switch 14 so as to partially close said switch and open the switch 15 to stop the motor. It will thus be seen that the motor is started in operation alternately by the switches 14 and 15 to alternately open and close the gate arm 12, the motor always rotating in the same direction.

The energization of the solenoid 23 is controlled by switches on the railway tracks A and B; these switches may be of any suitable construction. As shown, each track has a self-opening switch 27 at each side of the road crossing a distance sufficient to permit closing of the gate arms before the train reaches the crossing, said switches to be closed by the train only when the train is approaching the crossing; and each track has a similar self-opening switch 28 at each side of the road crossing to be closed only after the train has passed the crossing. These switches 27 and 28 are connected in parallel circuit on an electric power line L and to the solenoid 23 of each gate mechanism C, as shown in Figure 5, so that as any track switch 27 or 28 is actuated by a train, both solenoids 23 are energized to close one of the switches 14 or 15. The switches 14 and 15 are connected in parallel with the line L and both motors 7, so that when either switch 14 or 15 is closed, the motors are operated to open or close the gate arms. The switches 14 and 15 are mechanically opened as the solenoids 23 are swung by the arms 24 when the gates reach the limits of their movements in either direction, the closed switch 14 or 15 being pulled open through the tie rod 22 as the solenoid engages the previously open switch 14 or 15, and both switches being open while the gate arms are either open or closed.

Preferably, each gate arm has a danger indicator, for example a red light or a red reflector 29 for automobile headlights, to indicate to an approaching driver that the gates are closed, and, of course, if desired, a warning audible signal might be connected in the electric circuit to sound when the gates are closed.

While I have shown and described the invention as embodied in certain details of construction, it should be understood that the drawings illustrate the apparatus schematically, and that any suitable parts may be utilized in the apparatus without departing from the spirit or scope of the invention.

Having thus described the invention, what I claim is:

1. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter, a pair of normally open switches for controlling said motor, a common electromagnetic means for closing said switches and normally in operative relation to one thereof, means for controlling energization of said electromagnetic

means, means actuated simultaneously with said gate for bodily moving said electromagnetic means into operative relation to said switches alternately, and means including the last-named means for opening the closed switch as said electromagnetic means is moved into operative relation to the other switch.

2. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter, a pair of normally open switches for controlling said motor, a common electromagnetic means for closing said switches normally in operative relation to one thereof, means for controlling energization of said electromagnetic means to close said switches, and means for bodily moving said electromagnetic means into operative relation to said switches alternately.

3. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter alternately with the motor rotating in the same direction, a pair of normally open switches for controlling said motor, a member movable alternately in opposite directions as said gate opens and closes, an electromagnetic means common to both switches for closing the same mounted on said member and moved into operative relation to said switches alternately, and means for controlling energization of said electromagnetic means to close said switches.

4. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter, a pair of normally open switches for controlling said motor, means connecting said switches whereby the closed switch is opened by a partial closing of the other, a member movable alternately in opposite directions simultaneously with said gate, an electromagnetic means common to both said switches for closing them mounted on said member and moved thereby into operative relation to said switches alternately, said member engaging and partially closing the open switch and opening the closed switch at each limit of its movement.

5. An automatic railway crossing gate, comprising an oscillatory shaft, a gate arm mounted thereon, an electric motor, a worm connected thereto, a worm gear driven by said worm, a crank and link connection between said worm gear and said oscillatory shaft to alternately raise and lower said gate arm as said motor rotates in one direction, a pair of switches for controlling said motor, each having a movable contact member connected to the movable contact member of the other so that both switches may be open at the same time and one switch may be opened as the other is partially closed, an arm on said oscillatory shaft to swing therewith, an electromagnetic means common to both switches to engage said contact members and close the switches, said electromagnetic means being mounted on said arm and moved thereby into operative relation to said switches alternately, whereby the closed switch is opened by engagement of said electromagnetic means with the open switch as said electromagnetic means is actuated into operative relation to said open switch, and means for controlling energization of said electromagnetic means to close both said switches.

6. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter, a pair of normally open switches for controlling said motor, a common means for closing said switches and normally in operative relation to one thereof, means for controlling actuation of said common means, means actuated simultaneously with said gate for bodily moving said common means into operative relation to said switches alternately, and means including the last-named means for opening the closed switch as said common means is moved into operative relation to the other switch.

7. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter, a pair of normally open switches for controlling said motor, a common means for closing said switches normally in operative relation to one thereof, means for controlling actuation of said common means to close said switches, and means for bodily moving said common means into operative relation to said switches alternately.

8. An automatic railway crossing gate, comprising a gate arm, an electric motor, an operative connection between said motor and said gate to open and close the latter, a pair of normally open switches for controlling said motor, means connecting said switches whereby the closed switch is opened by a partial closing of the other, means common to both said switches for closing them and bodily movable alternately in opposite directions simultaneously with said gate into operative relation to said switches alternately, said common means engaging and partially closing the open switch and opening the closed switch at each limit of its movement, and means for controlling actuation of said common means to completely close said switches.

CHAS. T. DAY.