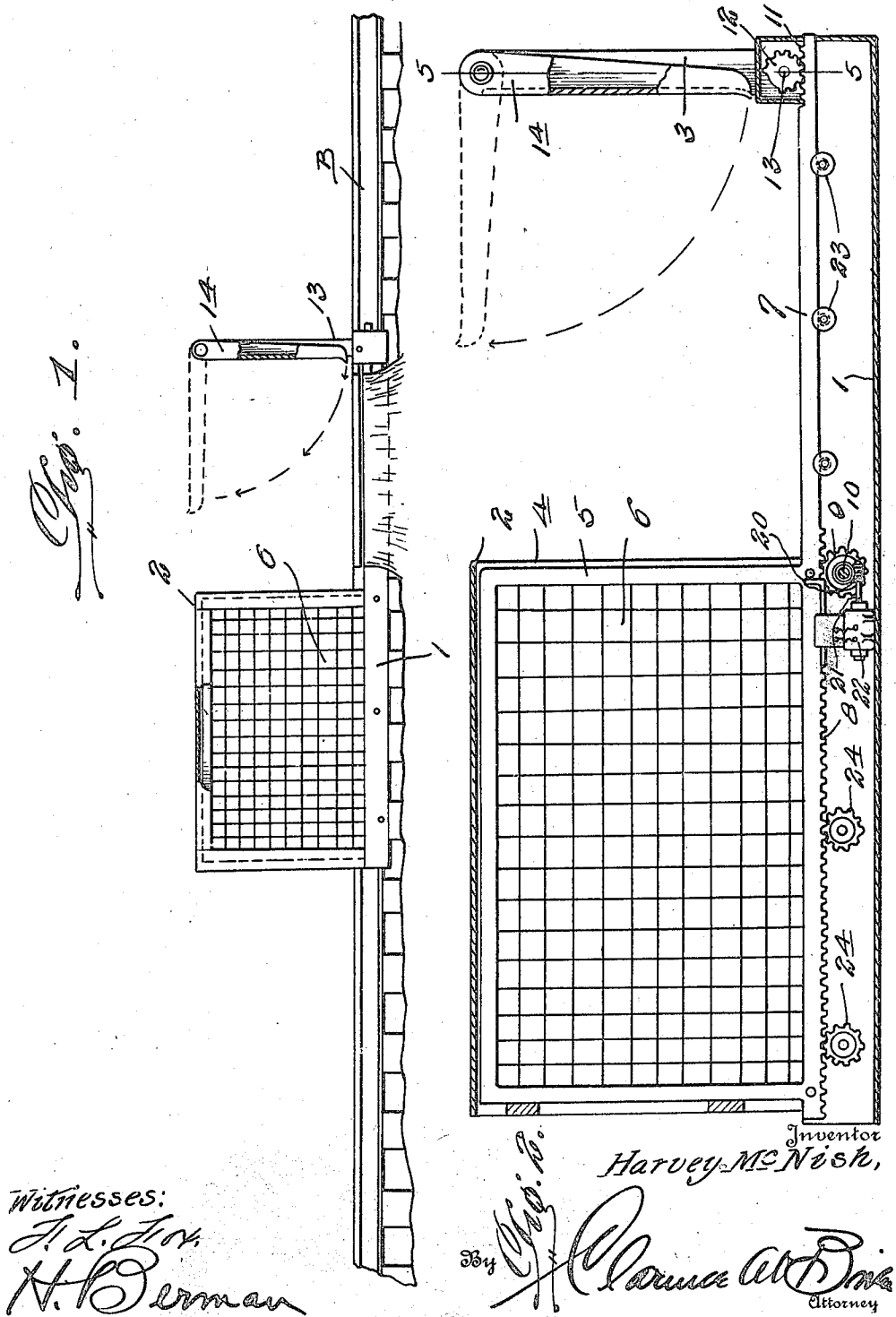
Dec. 25, 1923. 1,478,446

H. McNISH

RAILROAD CROSSING GATE

Filed Sept. 16. 1922 2 Sheets-Sheet 1



Witnesses:
H. L. Lyon
H. Berman

Inventor
Harvey McNish,
By Clarence A. Dike
Attorney

Dec. 25, 1923. 1,478,446

H. McNISH

RAILROAD CROSSING GATE

Filed Sept. 16, 1922 2 Sheets-Sheet 2

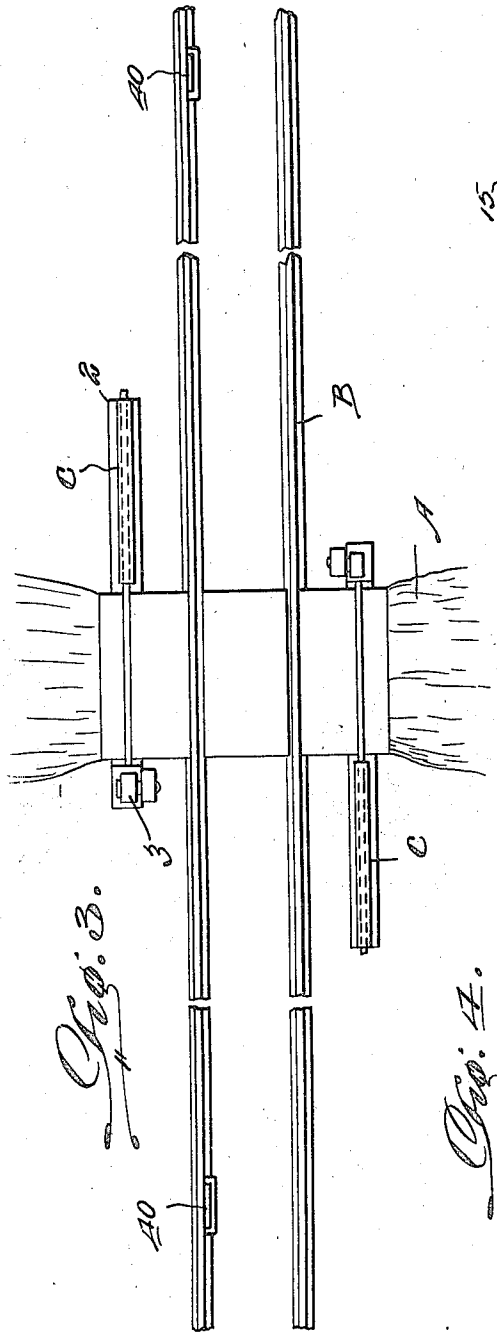


Fig. 3.

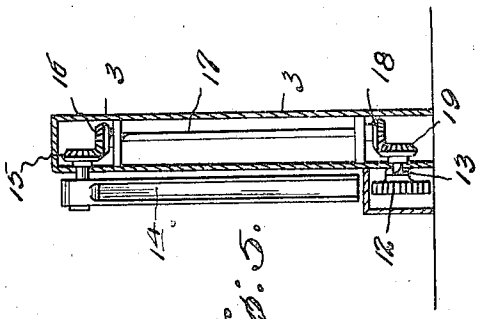


Fig. 5.

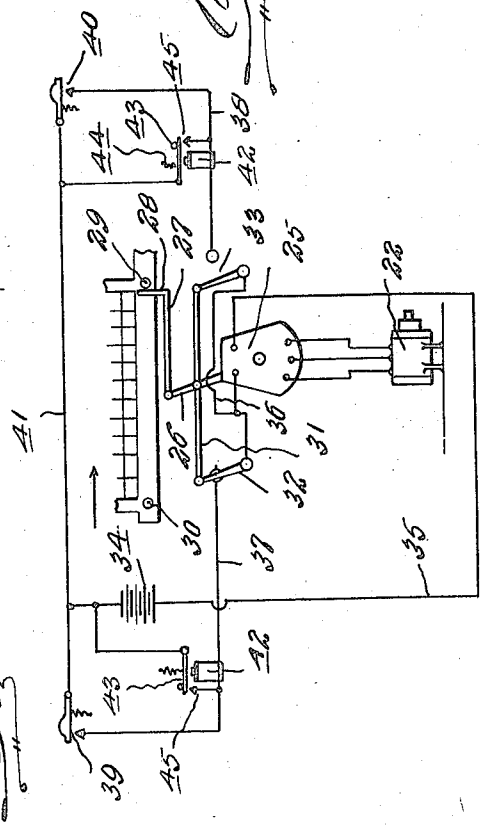


Fig. 4.

Witnesses:
F. L. Fox
H. Berman

Inventor
Harvey McNish

By Clarence A. O'Brien

Attorney

Patented Dec. 25, 1923. 1,478,446

UNITED STATES PATENT OFFICE.

HARVEY McNISH, OF ATTICA, KANSAS.

RAILROAD-CROSSING GATE.

Application filed September 16, 1922. Serial No. 588,575.

To all whom it may concern:

Be it known that I, HARVEY McNISH, a citizen of the United States, residing at Attica, in the county of Harper and State of Kansas, have invented new and useful Improvements in Railroad-Crossing Gates, of which the following is a specification.

In carrying out the present invention it is my purpose to provide a railroad crossing gate which may be used at the intersection of a railway with a highway and which will be under the control of the train approaching the crossing, so that as the train approaches the crossing the gate will be closed, while when the train leaves the crossing the gate will be opened, thereby holding up traffic while the train approaches the crossing, but permitting such traffic to pass over the railway track after the train has left the crossing.

It is also my purpose to improve and simplify the general construction of automatic railway gates and to provide an automatic gate and operating mechanism therefor which will embrace the desired features of simplicity, efficiency and durability, which will be positive and reliable in operation and which will embody comparatively few parts, and these so arranged and corelated as to reduce the possibility of derangement to a minimum.

With the above recited objects in view, and others of a similar nature, the invention resides in the construction, combination and arrangement of parts set forth in and falling within the scope of the appended claims.

In the accompanying drawings:

Figure 1 is a view in side elevation showing my improved gate installed at the intersection of a railroad and a highway.

Figure 2 is an enlarged side elevation of the automatic gate, parts being shown in section.

Figure 3 is a top plan view showing the gate installed.

Figure 4 is a diagrammatic view showing the circuit connections.

Figure 5 is a vertical sectional view on the line 5—5 of Figure 2.

Referring now to the drawings in detail, A designates a highway and B a railroad track intersecting the highway A.

Arranged at the sides of the railroad track and adjacent to one edge of the highway are automatic gates C—C normally in open position, unobstructing the highway, so that traffic may move over the highway and adapted to be projected across the highway when a train approaches the crossing, so that traffic upon the highway across the railroad track will be held up until the train has passed.

Each gate comprises a longitudinal casing 1 embedded in the highway and extending across the same. In the present instance the casing 1 is substantially rectangular in cross section and has its upper side open and integral with the casing 1 at one side of the highway and upstanding from such casing is a housing 2, while integral with the casing at the other end thereof and extending upwardly therefrom is a housing 3. The housing 2 is relatively long and narrow and is arranged at right angles to the highway, as clearly shown in Figure 2 of the drawings, while the housing 3 is comparatively small and substantially rectangular in cross section.

Mounted within the housing 2 and capable of longitudinal sliding movement out of and into the casing 2, in order to obstruct and open the highway, is a gate 4 formed, in the present instance, with a substantially rectangular frame 5 and a panel 6 of wire mesh carried by the frame. Integral with the lower member of the frame 5 of the gate and extending across the highway within the casing 1 is a bar 7, the lower edge of which is flush with the lower edge of the bottom bar of the frame 5. The end of the bar 7 remote from the casing 2 extends through the lower end of the casing 3 and the bottom edge of the lower bar of the frame 5 and the contiguous portion of the bar 7 are formed with rack teeth 8 with which meshes a pinion 9 journaled upon a shaft 10 carried by the casing 1, while formed on the upper edge of the bar 7 within the casing 3 are rack teeth 11 that mesh with a mutilated gear 12 journaled upon a shaft 13 carried in the lower end of the casing 3.

Pivoted to the upper end of the housing 3 is a channeled keeper 14 normally lying alongside of the housing 3, as in Figure 2 of the drawings, and capable of swinging movement to a horizontal position, as shown by the dotted lines in Figure 2, in order to form a guide for the upper edge of the gate 4 when the latter is projected across the highway.

In order to swing the keeper 14 to horizontal position the shaft by which the keeper is pivoted to the upper end of the casing 3 is equipped with a beveled pinion 15 that meshes with a similar pinion 16 on the upper end of a vertical shaft 17 that is journaled in the casing 3. On the lower end of the shaft 17 is a beveled pinion 18 that meshes with a similar pinion 19 on the shaft 13 that carries the mutilated gear 12. Thus, when the gear 12 is rotated in one direction, motion will be transmitted to the shaft 17 to raise the keeper 14 from the position shown by the full lines in Figure 2 to the position shown in the dotted lines. When the direction of rotation of the gear 12 is reversed, a reverse motion is transmitted to the shaft 17, so as to lower the keeper.

The shaft 19 carries a worm wheel that meshes with a worm 20 on the shaft 21 that is driven by an electric motor 22 and the lower edge of the bar 7 rests upon guide rollers 23 carried by the casing 1, while the rack bar 8 rests upon guide rollers 24 in the shape of pinions also carried by the casing 1.

In practice, when the motor 22 is energized, motion is transmitted to the pinion 9, thereby sliding the bar 7 and the gate 4. In the initial movement of the bar 7 the mutilated gear 12 is rotated by the rack teeth 11, so as to rotate the shaft 13 to an angle of 90° in order to swing the keeper 14 to horizontal position, and when the keeper reaches its horizontal position the mutilated portion of the gear 12 slides upon the smooth edge of the bar 7, thereby holding the keeper in horizontal position. As the pinion 9 continues to turn the gate 4 is projected across the roadway and the upper edge of the frame of the gate engages in the keeper 14, thereby effectively obstructing the highway, so as to prevent traffic from crossing the railroad.

The motor 22 is of the reversible type, and when the direction of rotation of the motor is reversed the gate is moved into the housing 2, so as to open the highway, and as the gate nears the limit of its movement into the housing 2 the rack teeth 11 again engage the pinion 12, so as to reverse the shaft 17 in order to lower the keeper. Thus, the highway is free and unobstructed to traffic.

In order to energize the motor 22 automatically as the train approaches the crossing, so that the gate will be projected across the highway and to reverse the direction of rotation after the train has left the crossing, I employ the following means: Arranged within the casing 1 is a reversible switch 25 that is connected in circuit with the motor 22 and connected to the lever 26 of the reversing switch 25 is one end of a rod 27. The other end of the rod 27 is formed with a lug 28 and arranged in the path of movement are pins 29 and 30 fixed to the bottom bar of the frame 5 of the gate 4. When the gate is in closed position the pin 29 engages the lug 28, so as to move the reversing switch to one position, while when the gate is in closed position the pin 30 engages the lug 28, so as to swing the lever of the reversing switch in the other direction. A bar 31 is connected between its ends to the lever 26 and the ends of this bar are pivotally connected with the blades of knife switches 32 and 33, respectively, so that when the reversing switch is actuated by the pin 29 in the closing movement of the gate, the switch 33 will be opened, and the switch 32 closed, while when the pin 30 actuates the reversing switch in the opening movement of the gate, the switch 33 will be closed and the switch 32 opened. 34 designates a suitable source of electrical energy, such, for instance, as a battery, and one terminal of the battery connects by a wire 35 with one side of the reversing switch 25, while the other side of the reversing switch 25 is connected by means of branch conductors 36 with the blades of the switches 32 and 33, as clearly shown in Figure 4 of the drawings. The contacts of the switches 32 and 33 are connected respectively by means of conductors 37 and 38 with the stationary contacts of circuit closers 39 and 40 located at the approach to the crossing and beyond the crossing. The movable contacts of the circuit closers 39 and 40 are connected by means of a common conductor 41 with the other side of the battery 34. Connected in each conductor 37 and 38 is a holding magnet 42 that controls an armature 43 which is normally held in inactive position by a spring 44 and is adapted to engage the contact 45 when the magnet is energized. The contact 45 is connected in the particular conductor 37 or 38 between the holding magnet 42 and the stationary contact of the circuit closers 39–40, while the armature 43 is connected to the common conductor 41 between the battery 34 and the circuit closers 39–40, as clearly shown in Figure 4 of the drawing.

By means of this construction it will be seen that as a train approaches the crossing the circuit closer 39 will be energized, thereby causing the current to flow from the battery 34 through the wire 35, reversing switch 25, motor 22, one branch wire 36, the switch 32, conductor 37, magnet 42 in such conductor 37 and back to the other side of the battery 34 through the circuit closer 39. As the current flows through this established circuit the magnet 42 is energized, thereby engaging the armature 43 with a contact 45, so as to close the circuit around the circuit breaker 39, thereby maintaining the motor energized to close the gate, irrespective of

the constant opening and closing of the circuit closer 39 incident to the passage of the wheels of the train thereover. When the gate reaches its closed position the pin 30 engages the leg 28 and swings the reversing switch 25 to its other position and breaks the established circuit through the switch 32 and in the opening of the switch 32 the switch 33 is closed, so that as the wheels of the train leaving the crossing engage the circuit closer 40, the circuit will be closed through the motor to operate the latter in the reverse direction to open the gate. When this circuit is closed the magnet 42 is energized, so as to maintain the circuit around the circuit closer 40, in order that the gate may be restored to open position, and when the gate reaches open position the pin 29 restores the reversing switch and the switches 32 and 33 to normal position.

I have entered into a detailed description of the construction and relative arrangement of parts embraced in the present and preferred embodiment of my invention with a view to imparting a full, clear and exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the said specific construction and relative arrangement of parts, inasmuch as in the future practice of my invention such changes or modifications may be made as fairly fall within the scope of my invention as defined by my appended claims.

Having thus described the invention, what is claimed as new, is:—

1. In a railway crossing gate, a casing extending across the highway and embedded in the latter parallel with the railway tracks, a housing on one end of said casing, a gate within said housing movable across the highway, a vertical housing on the other end of said casing at the other side of the highway, a keeper pivoted to the upper end of said second named housing, and means for moving said keeper from vertical position to horizontal position and for sliding said gate across the highway into engagement with said keeper.

2. In a railway crossing gate, a casing extending across the highway and embedded in the latter parallel with the railway tracks, a housing on one end of said casing, a gate within said housing movable across the highway, a vertical housing on the other end of said casing at the other side of the highway, a keeper pivoted to the upper end of said second named housing, means for moving said keeper from vertical position to horizontal position and for sliding said gate across the highway into engagement with said keeper, said means comprising a vertical shaft journaled in said second named housing, connections between the upper end of said shaft and said keeper, a mutilated gear journaled in the lower end of said second named housing, a connection between the lower end of said vertical shaft and said mutilated gear, a rack bar for operating said mutilated gear to raise and lower said keeper, said rack bar being connected to said gate, a motor and driving connections between said motor and gate for sliding the latter to closed and open positions.

3. In a railway crossing gate, a casing extending across the highway and embedded in the latter parallel with the railway tracks, a housing on one end of said casing, a gate within said housing movable across the highway, a vertical housing on the other end of said casing at the other side of the highway, a keeper pivoted to the upper end of said second named position, and means for moving said keeper from vertical position to horizontal position and for sliding said gate across the highway into engagement with said keeper, and mechanical connections between said gate and said reversing switch whereby said reversing switch may be operated to the proper position upon the closing of the corresponding circuit closer.

In testimony whereof I affix my signature.

HARVEY McNISH.