Oct. 5, 1926. 1,601,783

J. W. WALLIN

ELECTRICALLY OPERATED CROSSING GATE

Filed April 1, 1924 2 Sheets-Sheet 1

Fig: 3.

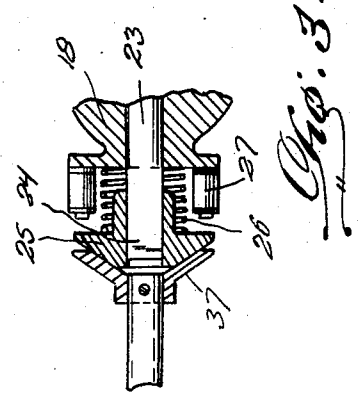


Fig: 1.

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Fig. 4.

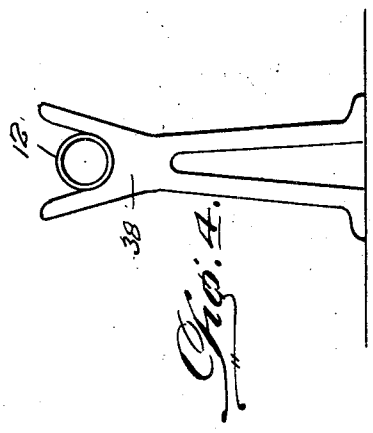


Fig. 5.

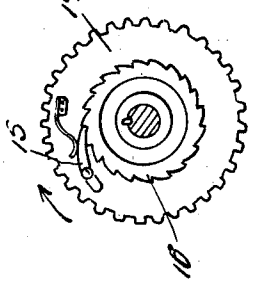


Fig. 6.

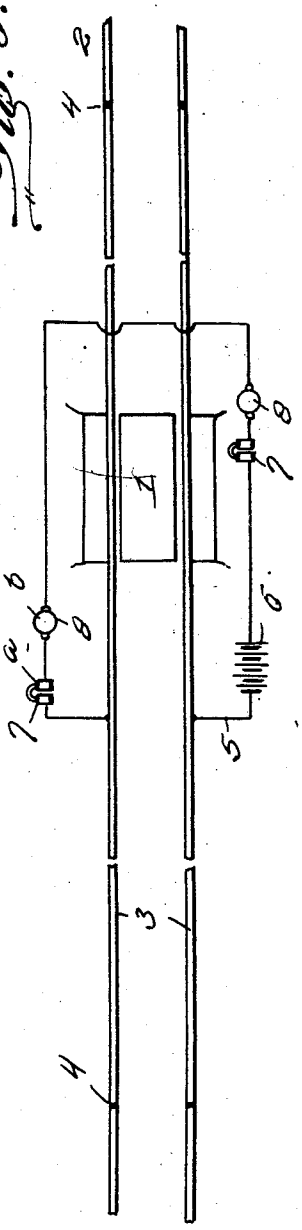
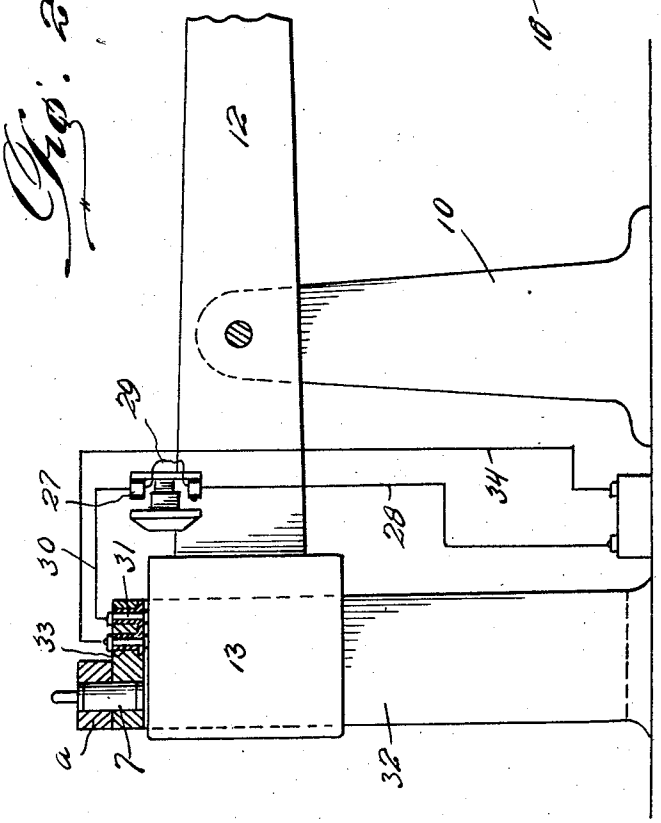


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-OPERATED CROSSING GATE.

Application filed April 1, 1924. Serial No. 703,452.

This invention relates to electrically operated crossing gates and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide a gate structure adapted to be positioned at a crossing and which includes a gate bar pivotally mounted upon the post and counter-balanced or so poised as to normally maintain itself in an open position. When the gate is closed the bar is swung transversely across the road which intersects a railway track. The rails of the track are separated into a block at the crossing and electric means for swinging the gate bar from an open to a closed position across the road are connected in open circuits with the rails at the said block. When a train approaches the road and moves upon the said block of the track the electric circuit is closed through the axles and wheels of the rolling stock, the gate operating means is energized and the gate bar is swung from an open to a closed position. When the train has negotiated or passed the crossing and moved beyond the block the electric circuit is broken or opened, thus deenergizing the gate operating means and the gate bar, under the influence of gravity, swings from a closed to an open or normal position.

In the accompanying drawings:—

Figure 1 is a fragmentary side elevation of the crossing gate and actuating means showing the gate bar at an open position,

Figure 2 is a similar view with parts removed and parts shown in section and illustrating the gate bar at a lowered position,

Figure 3 is a detailed sectional view of an electrically operated friction clutch mechanism used in the structure,

Figure 4 is a side elevation of a support for the free end portion of the gate bar when the same is in a lowered position,

Figure 5 is a detailed side elevation of a pawl and ratchet wheel mechanism used in the structure,

Figure 6 is a diagrammatic view indicating the electric circuit, the block in the railway track and their relative arrangement with respect to the crossing.

As illustrated in the accompanying drawing a road or highway is shown at 1 and a railway track at 2. The said road and track intersect each other at grades, in a usual manner. The rail sections 3 are disposed transversely across the road 1 and are insulated from the rails of the track 2 and at opposite sides of the road 1 as at 4. The insulated rail sections 3 are referred to hereinafter as blocks.

As shown in Figure 6 of the drawing an electric conductor 5 is connected at its end with the opposite rails 3 of the block and a battery or generator 6 is connected with the said conductor. Magnets 7 and motors 8 are also connected with the conductor 5. There are two of the motors 8 provided at the crossing, one located at each side of the road 1 and at each side of the track 2, therefore the said motors are diagonally positioned with relation to the crossing and each motor is designed to move a gate bar, as hereinafter described, located at the opposite side of the road. There is one magnet 7 located adjacent each of the motors 8. As the gate structures are both alike a description of one will suffice.

Each gate structure comprises a post 10 having a shaft 11 journaled thereon. A bar 12 is mounted at a point between its ends upon the shaft 11, the bar 12 carries at its shorter end portion a weight 13 which is of metal and which is consequently an electric conductor. A gear wheel 14 is journaled upon the shaft 11 and carries at its side a pivoted pawl 15, the free end of which engages the teeth of a ratchet wheel 16 which is fixed to the shaft 11. The post 10 is provided with a bracket 17 upon which is mounted a frame 18. A shaft 19 is journaled in the frame 18 and carries a gear wheel 20 which meshes with the teeth of the gear wheel 14. The shaft 19 also carries a spiral pinion 21 which meshes with a spiral 22 which is mounted upon a shaft 23 also journaled in the frame 18. The pitch of the spiral 22 is sufficient to allow said spiral pinion 21 to rotate the spiral 22. The shaft 23 is provided with a squared end portion 24, best shown in Figure 3 of the drawings. A friction clutch member 25 is slidably mounted upon the squared portion 24 of the shaft 23, a spring 26 is interposed between the clutch member 25 and the frame 18 and is under tension with a tendency to normally hold the clutch member 25 spaced from the said frame. Magnets 27 are mounted upon the frame 18 and have their poles disposed toward the inner sides of the clutch member 25. A wire 28 connects one of the magnets 27 with the battery 6. The magnets 27 are electrically connected together by a wire

29. A wire 30 connects the other magnet 27 with a terminal 31 mounted upon a guide or stand 32. A terminal 33 is also mounted upon the stand 32 and is spaced from the terminal 31. A wire 34 connects the terminal 33 with the battery 6 as best shown in Figure 2 of the drawings.

A stand 35 is mounted adjacent the post 10 and the motor 8 is mounted upon the upper end of the said stand 35. The shaft 36 of the motor 8 carries a clutch member 37 which is disposed opposite the clutch member 25. The clutch members 25 and 37 constitute a friction clutch and the said clutch is cone shaped in form. A prop 38, see Figure 4, is positioned adjacent the road 1 but at the opposite side thereof from the post 10 and is adapted to receive the free end portion of the bar 12 when the said bar is lowered across the road 1. The wheel 14 is normally loose with relation to the bar 12 and upon the shaft 11.

When a train moves upon the rails 3 of the block, the electric circuit through the wheels and axles is closed from the battery or generator 6 to the motors 8 and the magnet 7. Thus the motor 8 is energized and its shaft 36 is rotated and the clutch member 37 rotates with the said shaft. At this time the clutch member 25 is in frictional engagement with the clutch member 37 and held in such engagement under the tension of the spring 26. Therefore the shaft 23 is rotated and the spiral 22 is correspondingly rotated. In that the spiral meshes with the spiral pinion 21, the said pinion and shaft 19 are rotated. The gear wheel 20 rotates with the shaft 19 and in that the said gear wheel meshes with the gear wheel 14, the said gear wheel 14 is rotated. In that the pawl 15 which is carried by the gear wheel 14 engages the teeth of the ratchet wheel 16, the said ratchet wheel 16 is rotated and the shaft 11 is rotated. Thus the longer end of the bar 12 is lowered and the weight 13 carried at the shorter end of the bar is elevated. When the weight 13 swings to the position shown in Figure 2 of the drawings, it comes in contact with the magnet 7 which is energized at this time. Thus the bar 12 is held at the lowered position across the road 1. At the time that the weight 13 comes in contact with the magnet 7 it also engages the terminals 31 and 33 and completes the electric circuit from the battery 6 to the magnet 27. Thus the said magnets are energized and may draw the clutch member 25 out of engagement with the clutch member 37. Thus the shaft 36 continues to rotate but the shaft 23 comes to a state of rest.

When the train moves over the crossing at the intersection of the road 1 and the track 2 and leaves the rails 3 of the block, the circuit from the battery or generator 6 to the motors 8 and the magnet 7 is broken or opened and when the magnets 7 are deenergized, the weights 13 are released and they descend by gravity and the bars 12 are swung from the horizontal position as shown in Figure 2 to the vertical position as shown in Figure 1. Thus the cycle of operation is completed.

It will be noted that the within described invention provides a safety crossing gate which is capable of extensive use, and is at the same time inexpensive, simple in construction, economic to operate and easy to regulate. The device is capable of a wide variety of uses at grade crossings. Changes may be resorted to in the construction and arrangement and apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings should be interpreted as illustrative and not in a limiting sense. It will be noted that the gate may be closed manually by any suitable means at which time the ratchet 16 will be rotated and the teeth thereof will slip by the pawl 15 so as to not rotate the gear 14 so that only the necessary energy will be required, as will lift the weight 13.

It is also to be understood that the language used in the following claim is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having thus described the invention, what I claim is:—

A crossing gate structure including, in combination, a post, a bar pivoted intermediate its ends to the post, a weight carried at the shorter end of the bar and serving to normally hold the bar in an open position upon the post, a shaft journaled upon the post, means operatively connecting the shaft with the bar to swing the same from an open to a closed position, a spring pressed clutch member carried by the shaft, magnets disposed opposite said spring pressed member, a motor journaled adjacent the shaft and having a clutch member adapted to be engaged by the first mentioned clutch member, a magnet located in the path of movement of the weight, and terminals located in the path of movement of the weight and being electrically connected wtih the magnet adjacent the clutch member.

In testimony whereof I affix my signature.

JOSEPH W. WALLIN.