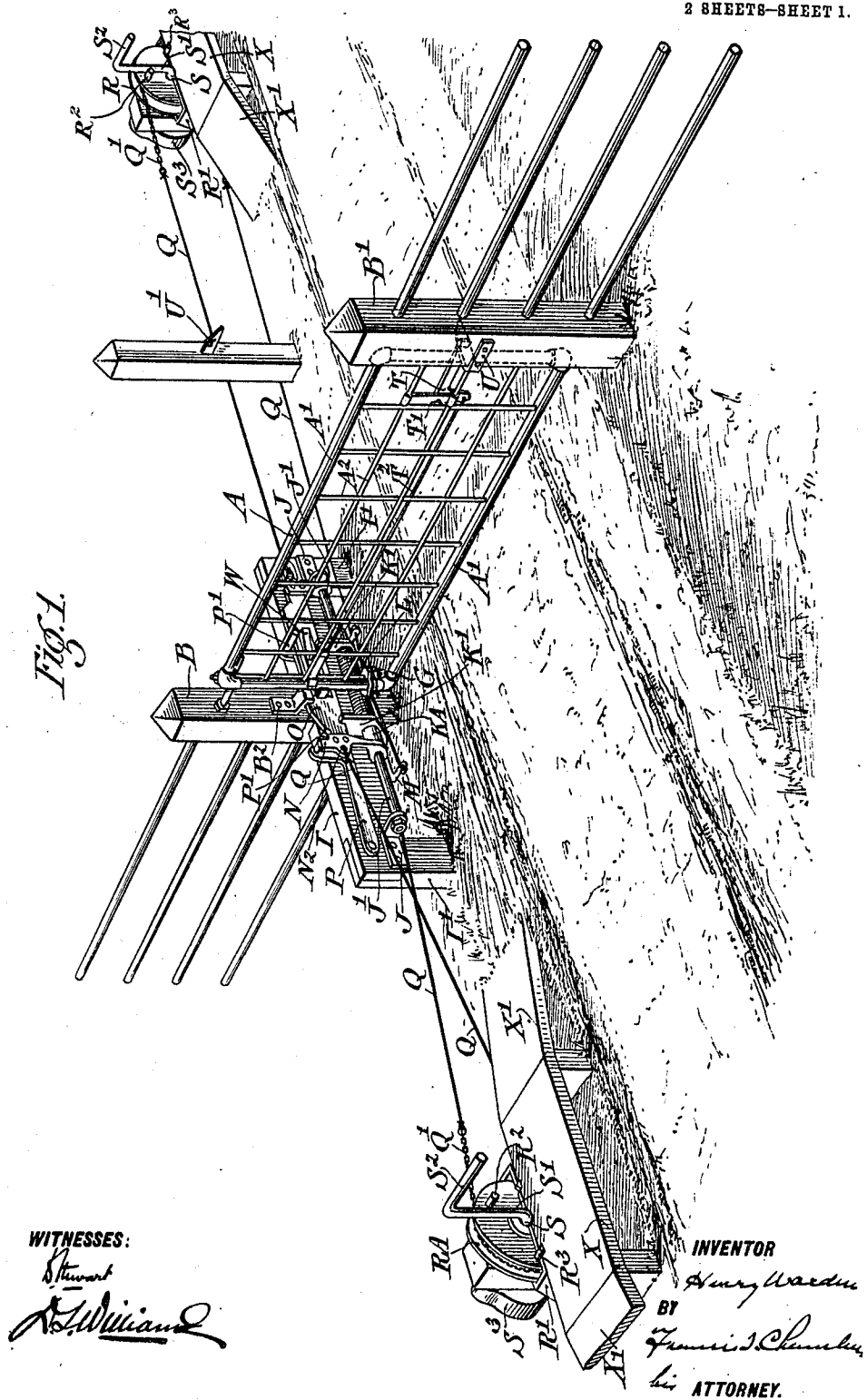
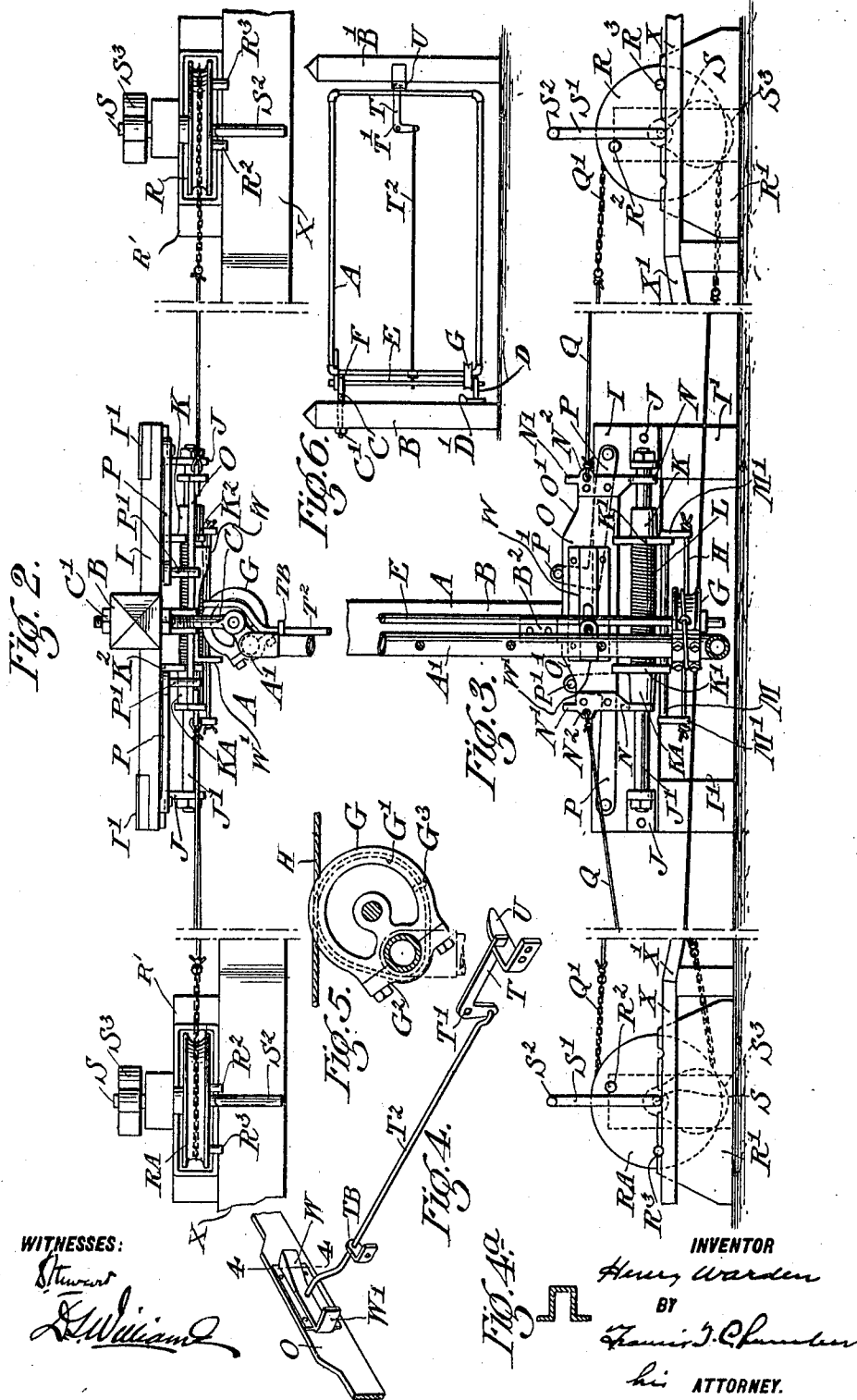






UNITED STATES PATENT OFFICE.

HENRY WARDEN, OF FREDERICKSBURG, VIRGINIA.

GATE-OPENING DEVICE.

978,245.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY WARDEN, a resident of the city of Fredericksburg and county of Spottsylvania, Virginia, have invented a certain new and useful Improvement in Gate-Opening Devices, of which the following is an exact and true description, reference being had to the accompanying drawings, which form a part thereof.

The present invention relates to mechanism employed for opening and closing gates.

One main object of the present invention is the provision of a gate opening and closing mechanism adapted to be actuated by the wheels of a vehicle passing through the gate, which will be durable and reliable in operation, simple in construction, and relatively inexpensive to manufacture and install.

A further object of the invention is the provision, with the gate opening and closing mechanism, of simple and effective mechanism actuated thereby for positively latching the gate in its closed and open positions.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and the advantages possessed by it, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described one of the forms in which the invention may be embodied.

Of the drawings, Figure 1 is a perspective view illustrating the application of the invention to an ordinary swinging gate. Fig. 2 is a plan view of the gate mechanism of Fig. 1. Fig. 3 is a side elevation of the gate and operating mechanism, the gate proper being broken away. Fig. 4 is a perspective view of the latch mechanism. Fig. 4^A is a section on the line 4—4 of Fig. 4. Fig. 5 is a partial plan illustrating a detail of the gate operating mechanism, and Fig. 6 is a diagrammatic side elevation of the gate.

In the drawings, A represents the swinging gate, B the post to which it is hinge connected, and B' the post at the opposite side of the gateway. The gate A proper may be of any usual and suitable form, though I prefer the metallic gate construction shown in which the frame of the gate is formed by

work A² of rods or wires. The gate may be hinge connected to the post B in any usual manner, though I prefer the construction illustrated, in which C and D represent hinge members in the form of eyebolts. The upper eyebolt C, on which the gate exerts a pull under normal conditions, preferably passes through the post and is threaded at its rear end and provided with a nut C', by means of which the bolt C may be adjusted to give the proper hang to the gate. The lower eyebolt D, on which the gate normally exerts a thrust need not pass through the post, but is provided with a collar D' engaging the front side of the gate post. Brackets F are secured to the gate at its rear edge, and are formed with eyes adapted to register with the eyes in the bolts C and D, and the pintle of the hinge connection is formed by a rod E which passes through the eyes in the bolts C and D and in the brackets F, as shown best in Fig. 6.

There is secured to the gate at its rear edge a member G which may advantageously be in the form of a segment of a pulley concentric with the shaft E. As shown best in Fig. 5, the pulley G may advantageously be formed in two sections G' and G² which are detachably clamped in place on the vertical portion of the frame tubing A' at the rear edge of the gate by suitable clamping bolts. A flexible member H, which may be a cable or other member of suitable strength and durability, is looped around the segment G and is preferably secured to the latter at some point as at G³ (see Fig. 5).

A horizontal frame member I, which may be in the form of a wooden plank, extends transversely to the gateway and may be secured to the gate post. Preferably, also, the member I is secured at its ends to short posts I' at opposite sides of the gate B. At the ends of the member I are secured brackets J which support the opposite ends of a horizontal rod or guide member J'. On the member J' are mounted sleeve like members K and KA which are provided at their inner ends with transverse flanges K'. Surrounding the rod J', between the members K and KA, is a coiled compression spring L. The flanges K', of the members K and KA, are provided with apertures through which passes the rod like body of a bow shaped member M, to the ends M' of which the ends of the flexible member H are secured. Between each sleeve like member K

and the adjacent bracket J, an arm N is sleeved on the rod J'. The arms N are secured to the ends of a reciprocating gate operating device in the form of a sliding plate or bar O which is slidably guided by a bracket B² carried by the post B. The lower edge of the plate O is received in notches in the flanges K' of sleeves K and KA.

A pair of locking dogs in the form of bent arms P are pivoted to the plank I, one adjacent each end of the plank. Each arm P is provided with a pin P' which rides along the upper edge of the member O when the latter is reciprocated. The upper edge of the member O is cut away at the ends of the member to form depressions in the upper edge as indicated at O'. When the pin P' of one of the arms P enters the corresponding depression O', as shown at the left of Fig. 3, the arm P is free to drop down back of the corresponding flange K' and holds the corresponding sleeve K or KA against movement toward the adjacent bracket J. When the member O is moved a slight distance away from either end position, the pin P', which, at the beginning of the motion, rests in the depression O', rides up on the elevated portion of the upper edge of the slide O, and this carries the body of the arm P above the flange K' of the corresponding member K or KA. The slide O is reciprocated by means of a belt or band like member formed preferably in part by wires or rods Q and in part by chains or cables Q', and having its ends secured to the slide O. The chain or cable portion Q' of the band passes over pulley wheels R and RA located at opposite sides of and at appropriate distances from the gate.

The pulley wheels R and RA and cooperating parts are identical, and I will only describe the wheel R and cooperating parts. R' represents a pedestal or base in which is journaled the horizontal portion S of a bent rod. The rod portion S passes through a sleeve which forms an axle for the pulley R. The bent rod comprises a crank arm portion S' at right angles to the portion S and adapted to engage pins or stops R² and R³ projecting from the side of the pulley and spaced about ninety degrees apart. At the free end of the portion S' is a horizontal portion S² which projects at right angles to the front side of the pulley R. The portion S' of the bent rod is normally held in the vertical position by means of a counterweight S³ secured to the inner end of the rod. The horizontal portion S² of the bent rod is adapted to be engaged by the wheels of a vehicle passing through the gate and moved in one direction or the other from its normal position according to the direction of movement of the vehicle. Preferably, a runway formed of a horizontal plank X and

inclined planks X' is arranged adjacent each of the devices R and RA over which the adjacent wheels of a vehicle, passing through the gate, run, and the downward movement of the horizontal portion S² of the bent rod in each case when engaged by a vehicle wheel is checked by its engagement with the corresponding plank X.

In operation, assuming the gate to be closed, a vehicle moving toward the gateway from either side engages the horizontal arm S² of the corresponding device R or RA, and moves it toward the gate and downward until it engages the plank X. The bent rod, thus moved, engages the pin R² of the corresponding pulley wheel R and rotates the wheel. This, through the band formed by the sections Q and Q', rotates the other of the pair of pulleys R and RA and slides the member O to the left, as the parts appear in Figs. 1, 2 and 3. The movement of the slide O to the left causes a corresponding movement of the sleeve K, and at the conclusion of the movement of the slide O the corresponding arm P drops behind the flange K' of the sleeve K. At the beginning of the movement of the slide, the pin P' of the arm at the left of the slide rides up on the inclined bottom of the corresponding depression O' and after a slight initial movement of the slide O the sleeve KA is disengaged. When the sleeve K moves to the left, the spring L tends to move the sleeve KA in the same direction. The movement of the sleeve KA to the left causes the gate to be opened by the engagement of the sleeve KA with the left hand end portion M' of the member M. When either bent arm S is swung inwardly and downwardly, from the position shown in Fig. 3, for instance, the pin R² directly engaged is moved down and the pin R² of the other wheel is also moved inwardly and downwardly so that when thereafter the bent rod S which has been actuated is allowed to return to its normal position it, as well as the arm S of the other device, will engage the pin R³. When thereafter either bent rod is engaged by the wheels of a vehicle moving away from the gate, the slide O will be moved in the reverse direction and the gate closed. Projecting portions N' at the upper ends of arms N serve as stops engaging the corresponding pins P' to prevent accidental movements of the slide O beyond the proper limits.

While the slide O may be moved quickly and positively from one limit of its movement to the other with a corresponding quick and positive movement of the sleeve K or KA, directly and positively engaged by the slide O on such movement, the movement of the gate itself is brought about through the spring L and the gate consequently is not forced too rapidly or violently

from either position into the other position, energy being stored in the spring to complete the movement. The provision of the locking arms P results in holding each of the sleeves K or KA in the position into which it has been positively moved by the slide O until after the slight initial movement of the slide in the reverse direction necessary to lift or cam the corresponding arm P out of the locking position.

To latch the gate in its open or closed position, a latch member T, preferably in the form of a bell crank lever, as shown, is pivotally connected at T' to the gate adjacent its front end. This latch is adapted to engage with the catch member U carried by the post B', or with a similar catch member U' carried by a post at the side of the roadway in a position to be engaged by the latch T when the gate is open. One arm of the bell crank lever T projects downward from the pivot point T' and has connected to it a rod T² which extends lengthwise of the gate, passes through a guide TB at the rear edge of the gate, and terminates in position to be engaged by the inclined cam W carried by the slide O when the latter is moved to the left to open the gate and to be engaged by the stop or shoulder W' when the gate is open and the slide is moved to the right. In either case the movement of the slide O causes the cam W or stop W' to engage the rod T² in such manner as to swing up the bell crank lever T and unlatch the gate.

With the gate opening and closing mechanism and latching mechanism described, it will be apparent that a pedestrian, for instance, may readily unlatch the gate when latched in the closed position, and open it to permit his passage through the gateway, and when the gate is thus unlatched and opened the spring L serves the function of an ordinary spring closing device for causing the gate to be returned to the closed position when permitted to do so.

It will be apparent to those skilled in the art that the apparatus disclosed is inexpensive to manufacture and install, and is simple, durable, and reliable in operation. Comparatively little power is required to operate the gate and the energy for opening and closing the gate may be imparted to the gate operating mechanism in a rapid manner and is then stored in the spring L until it is gradually expended in swinging the gate from one position into the other. This avoids the necessity of either operating the gate opening and closing mechanism slowly or of making the connections strong enough to stand the stresses due to the very rapid manipulation of the gate itself. The apparatus as a whole is so arranged as to give little likelihood of interference from snow or ice.

While in accordance with the provisions of the statutes I have herein described and illustrated the best form of my invention now known to me it will be apparent to those skilled in the art that many changes in the form of the apparatus disclosed may be made without departing from the spirit of my invention, and I do not wish the claims hereinafter made to be limited to the particular apparatus disclosed more than is made necessary by the state of the art.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. The combination, with a gate, of an opening and closing mechanism therefor, comprising a guide, a pair of members mounted on and independently movable along said guide, a reciprocating operating device which, when moved, engages one of said members and moves it in one direction or engages the other of said members and moves it in the opposite direction according to the direction of movement of said device, resilient means connecting said members through which each member when moved by said device tends to move the other in the same direction, and connections between said members and the gate whereby one of said members when moved through said resilient means opens the gate and the other of said members when moved through said resilient means closes the gate.

2. The combination, with a gate, of an opening and closing mechanism therefor comprising a guide, a pair of members mounted on and independently movable along said guide, a reciprocating operating device which, when moved, engages one of said members and moves it in one direction and engages the other of said members and moves it in the opposite direction according to the direction of movement of the device, resilient means connecting said members through which each member when moved by said device tends to move the other in the same direction, connections between said members and the gate whereby one of said members when moved through said resilient means opens the gate and the other of said members when moved through said resilient means closes the gate, and devices for locking each member against return movement from the position into which it is positively moved by said operating device, one of said locking devices being moved into, and the other being moved out of, the locking position by said operating device as the latter is moved from one extreme position into the other extreme position.

3. The combination with a gate support, of a gate hinged at one edge to said support, a reciprocating member, flexible connections between said member and the gate whereby when said member is reciprocated

the gate is opened or closed, a guide rod, a pair of sleeves mounted on said guide rod, and movable relatively to said member and adapted, one on a predetermined movement in one direction, and the other on a predetermined movement in the other direction, to engage and move said member, a helical spring surrounding said guide rod and bearing at its ends against the adjacent ends of said sleeves, a slide having arms engaging the guide rod at opposite sides of said sleeves, means for reciprocating said sleeves, and locking dogs one adjacent each end of the guide and adapted to drop behind the corresponding sleeve and hold the latter against return movement when the sleeve has been moved away from that end of the guide by the adjacent slide arm, said slide and said dogs having cooperating provisions whereby when the slide is moved in one direction the locking dog toward which the slide is moving is lifted out of the locking position and the locking dog away from which the slide is moving is allowed to drop into the locking position.

4. The combination, with a gate, of an opening and closing mechanism therefor, comprising a guide, a pair of members mounted on and independently movable along said guide, a reciprocating operating device which, when moved, engages one of said members and moves it in one direction or engages the other of said members and moves it in the opposite direction according to the direction of movement of said device, resilient means connecting said members through which each member when moved by said device tends to move the other in the same direction, a reciprocating member engaged and moved in one direction by one of the first mentioned members and engaged and moved in the opposite direction by the other of the first mentioned members when one or the other of said members is moved by said resilient means, and connections between said reciprocating member and the gate for opening and closing the latter according to the direction of movement of the member.

5. The combination with a gate, of an opening and closing mechanism therefor comprising a guide, a pair of members mounted on and independently movable along said guide, a reciprocating operating device which, when moved, engages one of said members and moves it in one direction or engages the other of said members and moves it in the opposite direction according to the direction of movement of the device, resilient means connecting said members through which each member when moved by said device tends to move the other in the same direction, a bow like member slidably mounted in each of the first mentioned pair of members and having end portions each

of which is engaged and moved by the adjacent one of said members upon a predetermined movement of the latter, and connections between the ends of the bow and the gate for opening and closing the latter.

6. The combination with a gate support, of a gate hinged at one edge to said support, a reciprocating member, and flexible connections between said member and the gate whereby when said member is reciprocated the gate is opened or closed, a guide, a pair of sleeves mounted on said guide and movable relatively to said member and adapted, one on a predetermined movement in one direction, and the other on a predetermined movement on the other direction, to engage and move said member, a helical spring surrounding said guide rod and bearing at its ends against the adjacent ends of said sleeves, an operating slide having arms engaging the guide rod at opposite sides of said sleeves, and means for reciprocating said sleeves.

7. The combination with a gate hinged support, of a gate hinged at one edge to said support, a body secured to the gate in a position to be traversed by the hinge axis of the gate, a fixed member looped about said body, a reciprocating frame to which the ends of said flexible member are connected, and resilient means for reciprocating said frame.

8. The combination with a gate support, of a gate hinged at one edge to said support, a body secured to said gate, a flexible member secured to said body, a reciprocating frame to which the ends of said flexible member are connected, and resilient means for reciprocating said frame, said body having surfaces engaged by said flexible member when the frame is reciprocated which are substantially circular about the hinge axis of the gate as a center whereby when said frame is reciprocated the gate is turned upon its hinge axis and the flexible member is maintained taut.

9. The combination, with a gate support, of a gate hinged at one edge to said support, a body secured to the gate, a reciprocating frame, flexible connections between said body and said frame, and resilient means for reciprocating said frame, said body having a surface substantially concentric about the hinge axis of the gate as a center against which the flexible connections bear as the frame is reciprocated whereby the reciprocation of the frame causes the gate to be turned about its hinge axis while maintaining said connections taut.

10. The combination with a gate, of a resilient gate operating mechanism adapted when acted upon in one direction to have energy stored in it for closing the gate and holding it closed and when acted upon in another direction for opening the gate and

holding it open, a reciprocating operating device adapted to act on said resilient mechanism in said one direction or said other direction according to the direction of movement of the device, a latch mounted on said gate, a catch engaged by said latch when the gate moves to the open position, a second catch engaged by the latch when the gate moves to the closed position, and means actuated by said device for operating said latch to release the gate on an initial movement of the device in either direction.

11. The combination with a gate support, of a gate hinged at one edge to said support, a latch secured to the gate at its opposite edge, a catch with which said latch is adapted to engage when the gate is in the closed position, a second catch adapted to be engaged by the latch when the gate is in the open position, a latch releasing rod extending from the latch to the hinged edge of the gate, a resilient mechanism adapted when acted upon in one direction to have energy stored in it for closing the gate and holding it closed, and when acted upon in the other direction for opening the gate and holding it open, an operating device adapted to reciprocate in a direction transverse to the direction of the gate when closed, and adapted to act on said resilient mechanism in said one direction or in said other direction according to the direction of movement of said operating device, a cam carried by said device for engaging the end of the latch releasing rod when the device is moved to open the gate, and a shoulder carried by said device and adapted to engage the end of said latch releasing rod when the device is moved to close the gate.

12. The combination with a hinged gate, of means for opening and closing it, comprising an operating mechanism and a band like actuating member having its ends connected to the operating mechanism, pulley

wheels pivotally supported to turn about horizontal axes arranged one at each side of the gate and about each of which said band is looped, the portion of the band looped around one of said pulleys being crossed, a pair of spaced apart stops carried by each pulley at one side thereof and spaced substantially ninety degrees apart, a crank arm pivotally supported concentric with each pulley adapted to engage said stops and formed with a horizontal extension adapted to be struck by the wheel of a vehicle passing through the gate, and a counterweight normally holding each crank arm vertical.

13. The combination with a gate support, of a gate hinged at one edge to said support, means for opening and closing the gate comprising an operating mechanism, a band like actuating member having its ends connected to the operating mechanism, a pair of pulley wheels pivotally supported to turn about horizontal axes arranged one at each side of the gate and about each of which said band is looped, the portion of the band looped around one of said pulleys being crossed, a pair of spaced apart stops carried by each pulley at one side and spaced substantially ninety degrees apart, a crank arm pivotally supported concentric with each pulley adapted to engage the stops on said pulley and formed with a horizontal extension adapted to be struck by the wheel of a vehicle passing through the gate, a counterweight normally holding each crank arm vertical, and a runway for a vertical wheel comprising a horizontal portion and inclined end portions, said horizontal portion being adapted to stop the downward movement of the crank arm when the latter is in the horizontal position.

HENRY WARDEN.

Witnesses:

LOVENIA MORRISON,
W. N. UNDERWOOD.