(No Model.) 2 Sheets—Sheet 1.

J. BAADE.

AUTOMATIC RAILWAY GATE.

No. 524,662. Patented Aug. 14, 1894.

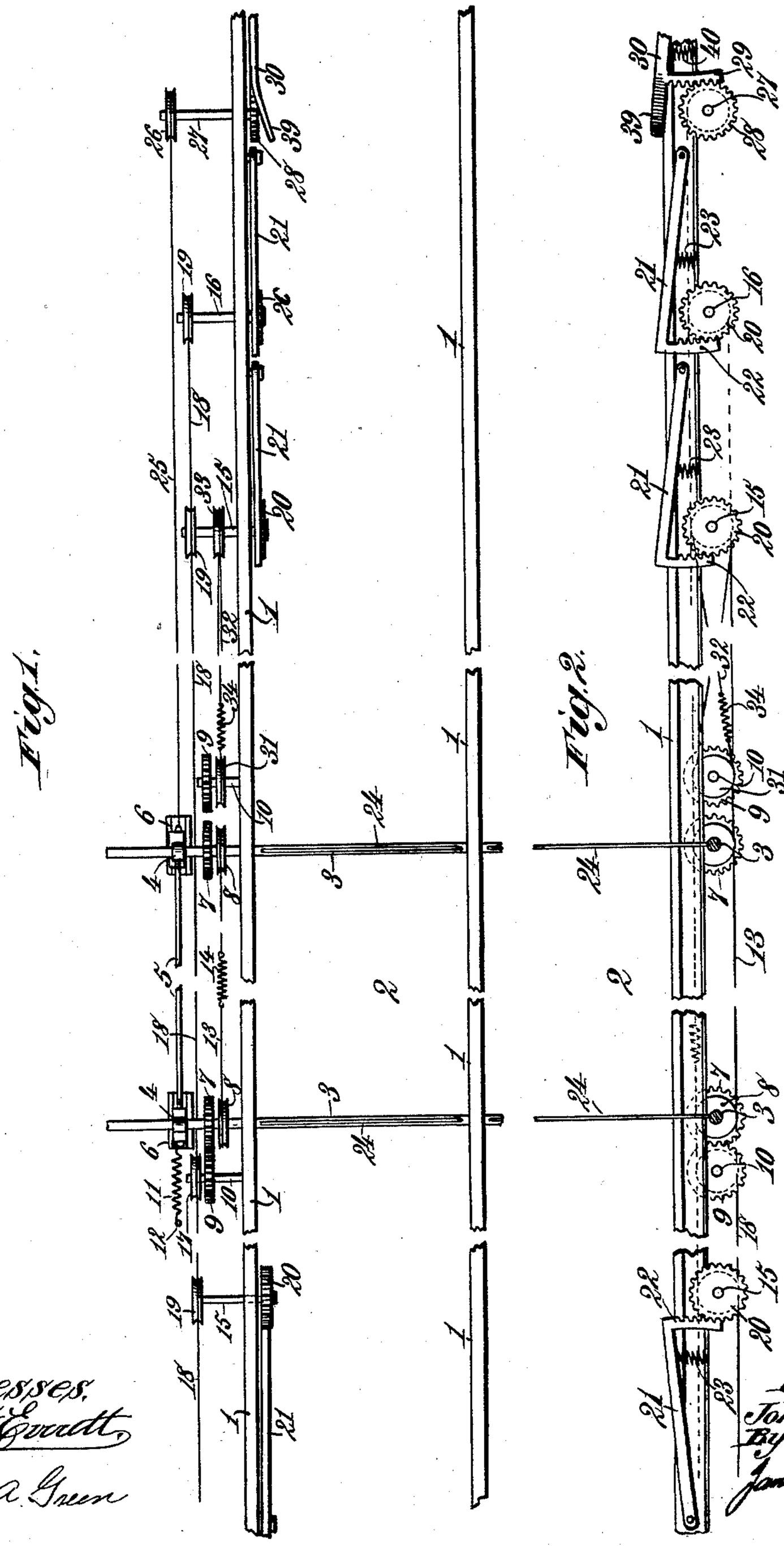

Fig. 1.

Fig. 2.

Witnesses.
Robert Everett.
Thos. A. Green

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Fig. 1.

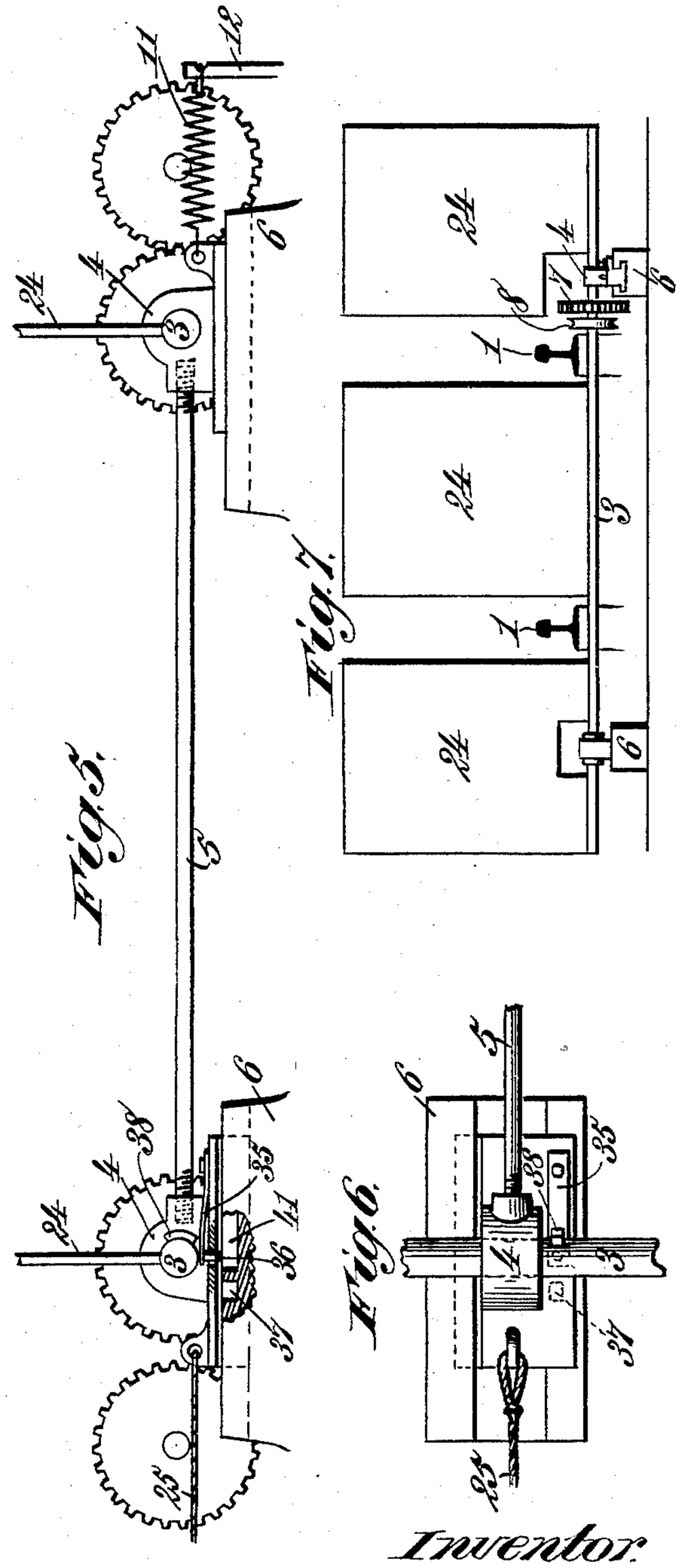

Fig. 2.

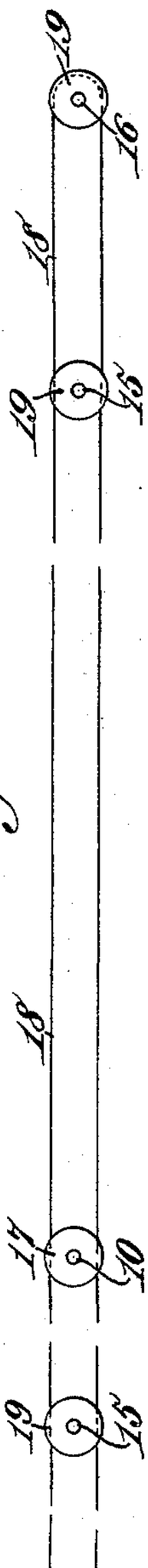

Fig. 3.

Fig. 4.

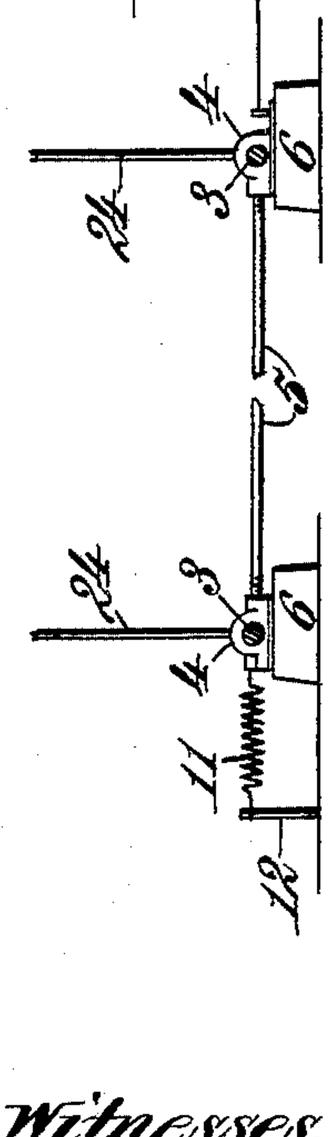

Fig. 5.

Fig. 6.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN BAADE, OF WACO, TEXAS.

AUTOMATIC RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 524,662, dated August 14, 1894.

Application filed January 27, 1894. Serial No. 498,227. (No model.)

To all whom it may concern:

Be it known that I, JOHN BAADE, a citizen of the United States, residing at Waco, in the county of McLennan and State of Texas, have invented new and useful Improvements in Automatic Railway-Gates, of which the following is a specification.

This invention relates to automatically actuated mechanism for operating railway gates or cattle-guards at various points along a line of railroad, whether at crossings, the entrances to tunnels, bridges or trestles, or at other places where it is desirable to guard the tracks.

The object of my invention is to provide a simple and thoroughly effective arrangement of automatically operated devices for closing railway-gates or cattle-guards, and to operate the said gates or guards from a distance, and either upon a single or a double track, by means of mechanism actuated and controlled by the wheels of passing trains, moving in either direction.

My invention consists in the features of construction and novel combinations of devices comprised in an automatically actuated mechanism for operating from a distance the gates or cattle guards located along a railway, as hereinafter more fully set forth.

To enable others skilled in the art to which my invention pertains to understand and to make, construct and use the same, I will now describe the said invention in detail, reference being had, for this purpose, to the accompanying drawings, in which—

Figure 1 is a plan of a portion of a railway track showing my improved automatically actuated gate operating mechanism arranged in connection with a cattle-guard extended across the track. Fig. 2 is a partly sectional elevation of the same, in the longitudinal line of the track, between the rails. Fig. 3 is a detail view of a series of drums or pulleys connected by an endless chain, cable, or wire rope for transmitting the motion of certain parts of the mechanism on one side of a crossing, or pair of gates, to corresponding mechanism or devices on the other side. Fig. 4 is a detail sectional elevation illustrating means for automatically shifting or adjusting the gate shafts and their immediate operating mechanism for bringing the same into position to be automatically actuated by a train passing in the opposite direction from that for which the gates are normally set. Fig. 5 is an enlarged partly sectional view of the same, from the opposite side, illustrating, also, a locking mechanism for the gates. Fig. 6 is a detail plan also showing the said locking mechanism. Fig. 7 is an elevation of a cattle-guard, with the railway track in vertical transverse section.

In the drawings, the reference numeral 1, designates the rails of a line of railway, and 2 indicates a crossing or passage way over the railway track, which it may be desirable to protect, either by means of vertically swinging gate-arms or beams arranged to be swung transversely to the crossing road during the passage of a train, or by means of cattle-guards or gates normally extended across the railway track when the road crossing is open.

At each side of the road crossing, and below the level of the rails 1, are transversely arranged shafts 3 that extend across the track and, preferably, beyond its opposite sides. These shafts 3 are journaled in suitable bearings which, on one side of the track, are arranged in or upon slide blocks 4 having a slight automatic horizontal adjustment in the manner and for the purpose hereinafter explained. The slide blocks 4, on opposite sides of the road crossing, are rigidly connected by means of a rod 5 arranged parallel with and below the level of the railway track. Suitably firm supports 6 are provided for the journal bearings of the shafts 3, and for the slide blocks 4 through which said shafts are made adjustable.

The shafts 3 are each provided with a spur-gear 7 and with a drum or pulley 8, both of which are fast on their respective shafts. The gears 7 and drums 8 are located on one side of the track and outside the adjacent rail 1, as shown. By a slight lateral adjustment of the shafts 3, through the connected slide blocks 4, either spur-gear 7 may be made to mesh with a spur gear 9 which is fast on a short transversely arranged shaft 10 that may be supported in any suitable manner adjacent to the track. A spur-gear 9 and its shaft 10 are arranged on the outer side of each shaft 3, or outside the road crossing 2, as shown.

To the outer end of one of the slide blocks 4 is fastened one end of a spring 11, the other end of which is secured to a fixed support, as a stake or pin 12 driven into the road bed on one side of the crossing. The purpose of this spring is to hold the gears 7 and 9 of that side in normal engagement for the automatic operation of the gates by a train approaching from the left, say, of Fig. 1 and leave the corresponding gears on the right out of mesh until the gates are to be operated by a train approaching from the right. The drum or peripherally grooved pulley 8 on each shaft 3 is connected with the corresponding drum or pulley of the other shaft by a wire rope or a chain 13 so arranged that the rocking motion of either shaft will be transmitted in the same direction to the other shaft and cause both shafts 3 to turn together. At a suitable point in this connecting chain or wire rope 13 is interposed a spring, or elastic portion 14, that will permit the rope to yield sufficiently to avoid breakage, in the event of any obstruction to the easy and complete movement of either shaft 3 and its attached gate.

A series of short horizontal or transversely arranged shafts, as 15 and 16, are placed along one side of the railway track at substantially regular intervals, receding from the gates at the crossing or place to be protected. In Figs. 1 and 2 are shown only two of these shafts at the right of the crossing and only one at the left, but it will be understood that any required number may be employed in order to provide for a gradual opening and closing of the gates or guards at the crossing and that the series will be extended to such distance as will afford ample time for the automatic operation of the gates before the train arrives at the crossing.

By referring to Figs. 1 and 3 it will be seen that a pulley or drum 17, fast on the shaft 10 at the left of the crossing, is connected by a chain or wire rope 18 with each of a series of drums or pulleys 19 which are fast on the series of shafts 15, 16, on both sides of the crossing. Each shaft 15 and 16 has secured thereto a spur gear 20 located adjacent to either the inner side or outer side of one of the track rails. On the same side of said track rail is arranged a series of lever arms 21 each of which is pivoted at one end to the side of the rail, or other support, and at its other end is provided with a toothed segment 22 meshing with one of the gears 20, before mentioned. The points of pivotal attachment of the several lever arms 21 are in substantially the same plane but the lever arms themselves are so arranged that when in normal position their upper edges rise, by a gradual inclination, to and above the tread of the rail. The arrangement of the series of said lever arms is such, also that each one in succession, as the gate is approached, rises slightly higher above the tread of the rail than its predecessor. The toothed segment 22 on each lever arm is carried by the higher end of said arm, or that end which is toward the gate or cattle-guard. Each lever arm 21 rests on a spring 23, or other yielding support, through which it will be restored to its normally elevated position after the gates have been operated.

It will be understood that the gates are carried by the shafts 3 and that they may be of any suitable or well known construction. In Figs. 1 and 7 they are shown in the form of cattle-guards 24 adapted and arranged to occupy a normally erect or vertical position across the railway track or tracks; but it is obvious that instead of three cattle-guards, or in addition thereto, the ends of the shafts 3 may be made to carry the ordinary gate arms or beams that are employed for blocking a crossing during the passage of a railway train. The cattle-guards 24 are preferably made in several sections as shown in Fig. 7, and the outermost sections should be extended far enough outside the rails effectually to prevent cattle from passing and gaining the track.

Now if a train is supposed to be approaching the crossing from the left of Fig. 1, it will be seen that the flanges of the locomotive wheels will successively depress the lever arms 21 on that side of the crossing. The respective toothed segments 22 will thus be made to impart rotary movement to the gears 20 and the shafts on which they are mounted; and the rotation of the shafts farthest from the crossing will be transmitted through the drums or pulleys 19 and chain or rope 18 to the succeeding shafts nearest the crossing and also to the shafts 15 and 16 on the opposite side of the crossing. Through the chain or wire rope 18 the motion derived from the successive depression of the lever arms 21 at the left of Fig. 1 will be gradually transmitted to the drum or pulley 17 on the shaft 10 at the left of the crossing and thence through the intermeshing gears 7 and 9 to the adjacent gate shaft 3 in such manner as to cause the gate carried by that shaft to be gradually swung downward in front of the approaching train and in the same direction that the train is moving. At the same time the farther gate or cattle-guard is swung down in like manner and direction through motion transmitted thereto by the chain or wire rope 13 connecting the drums 8 on the gate shafts. By the provision for transmitting motion, through the wire rope 18 and the several pulleys 19, to the series of shafts, as 15 and 16, on the farther side of the crossing the gears 20, shown at the right of Fig. 1, will be caused to act on the toothed segments 22 in such direction as to draw down the series of lever arms 21 below the level of the tread of the rail so that they will offer no obstruction to the passage of the train nor be exposed to any risk of breakage or injury. As soon as the train has passed by all the lever arms 21, the gates will be raised, or restored to their normal positions by the action of the compressed springs 23 lying beneath said le-

ver arms, or any other suitable means for accomplishing the same result may be employed.

It may now be supposed that the gates are to be operated by a train approaching from the right end of Fig. 1, and it will be seen that in order to do this with the mechanism illustrated it will be necessary to bring into mesh the gears 7 and 9 at the right of the crossing and at the same time disengage the corresponding gears that are on the left. As before explained the slide blocks 4 of the gate shafts 3 are connected by a rod or bar 5 so that both shafts may be adjusted together. To the slide block 4 on the right, say, of the crossing is secured one end of a chain or wire rope 25, Figs. 1 and 4, the other end of which is fastened to a drum or pulley 26 on a transversely arranged shaft 27 supported outside the track and at a point beyond the series of lever arms 21 on the right of the crossing. This shaft 27 has secured thereto a spur-gear 28 meshing with a toothed segment 29 on a lever arm 30 that is pivotally supported adjacent to the track rail in the same manner as the lever arms 21 hereinbefore described. A train approaching from the right will first depress the pivoted lever arm 30 and thereby cause its toothed segment 29 to impart to the gear 28, shaft 27 and pulley 26 a rotary movement in such direction as will partly wind the chain or wire rope 25 onto the pulley 26 and thus cause it to draw the connected slide blocks 4 a sufficient distance to the right to bring into mesh the gears 7 and 9 on that side of the crossing, the corresponding gears on the other side being, of course, disengaged by the same movement.

The short shaft 10 at the right of the crossing is provided with a rigidly secured drum or pulley 31, Figs. 1 and 2, that is connected by a crossed driving chain or wire rope 32 with a drum or pulley 33 fast on the nearest shaft 15 in the series of lever-operated shafts at the right of the crossing. In this chain or wire rope 32 may be interposed a spring or elastic portion 34 that will yield sufficiently to prevent breakage or disarrangement of any part of the mechanism in case of any obstruction to the free movement of either gate. It will now be seen that after a train has approached from the right, depressed the lever arm 30 and thereby brought into mesh the gears 7 and 9 at the right of the crossing, the further progress of the locomotive wheels will successively depress the series of lever arms 21 on that side and through the crossed driving chain or rope 32 will actuate the shaft 10 and gears 7 and 9 in such direction as will cause the connected cattle guards or gates to be swung downward, away from the approaching train and in the same direction that the train is moving.

By reference to Figs. 5 and 6 it will be observed that to one of the slide blocks 4 is secured one end of a flat spring 35 which carries on the underside of its other end a downward projecting locking pin 36 that is brought over a socket 37 in the base or support 6 when the gate shafts have been shifted or adjusted to the right, or laterally, as above described. The spring 35 is extended partly under the adjacent gate shaft 3 on which is a cam or segmental projection 38 so arranged that when the gates are swung downward to a horizontal position, by an approaching train, the said cam projection will bear on the spring 35 and force the locking pin 36 into the socket or locking recess 37, thereby holding the connected slide blocks 4 in a locked position, toward the right, after the wheels of the train have passed off from the lever arm 30, and preventing the spring 11 from restoring the said slide blocks to their normal position at the left until the gates have resumed an erect position after the train has passed over all the lever arms on both sides of the crossing.

A train approaching from the right of Fig. 1 and successively depressing the several lever arms 21 on that side will also cause a downward movement, through the endless chain or wire rope 18 and connected drums 19, of all the lever arms in advance of the train, precisely as the same movements take place when a train is approaching from the left, as already described. This simultaneous movement of all the gate operating lever arms on both sides of the crossing, as effected through the endless chain or rope 18 and connected drums 19, provides for a gradual opening and closing of the cattle-guards or gates, without shock or jar, and at the same time, whether a train is approaching from the right or the left, the gate operating lever arms on the farther side of the crossing will be moved downward in season to escape contact with the wheels.

On the slide block operating lever arm 30 is a laterally curved horn or projection 39, Figs. 1 and 2, extended in such direction that when engaged by a wheel flange of a train approaching from the left the said lever arm will be forced laterally without receiving any downward movement and without being subjected to any risk of breakage or other injury. The lever arm 30 may be provided with a spring 40, Fig. 2, to assist in restoring it to an elevated position after the passage of a train from the right and when the spring 11 moves the connected slide blocks 4 back to the left, on the upward movement of the gates.

The spring 11 is of sufficient strength to normally hold the slide blocks 4 to the left with the gears 7 and 9 on that side of the crossing in meshing engagement to permit the automatic operation of the gates by a train approaching from that side. At that time the pin 36, carried by the spring 35, is in position to be pressed by the rocking of the shaft 3 into a cutaway portion or recess 41, Fig. 5, of the bed or base 6 on which the slide block is supported. The pin 36 does not need to have any locking engagement in this recess 41, as

the spring 11 is sufficient to hold in mesh the gears 7 and 9 on the left of the crossing. It is obvious that a suitable arrangement of counterbalance weights may be substituted for this spring, if desired. When the gate shafts and slide blocks have been automatically adjusted to the right by a train approaching from that direction the downward movement of the gates, by forcing the locking pin 36 into the locking recess 37, will hold in mesh the gears 7 and 9 at the right until after the train has entirely cleared the gate operating mechanism.

It will be understood that the terms "right" and "left" are merely relative and have been employed only for convenience of description, as the position of parts of the gate operating mechanism may obviously be varied within certain limits without affecting the principle of my invention.

Although I have shown the several lever arms arranged on the inner side of one of the track-rails it is obvious that they may be arranged on the outer side. Instead of drums or pulleys placed on the several shafts and connected by chains, wire ropes or cables, any other suitable gearing may be employed that is adapted to accomplish the desired results. The gate operating mechanism may be duplicated on opposite sides of a railway track, and the same mechanism or separate mechanisms may be employed for operating gates on adjacent tracks. The described mechanism through which an automatic movement is simultaneously transmitted in the same direction to both parallel shafts 3 and thence to the attached cattle-guards or gates may be usefully applied in various situations along a railway, whether at crossings, the entrances to bridges, trestles or tunnels, or elsewhere, as may be found desirable. By so arranging the several parts of the automatic gate actuating mechanism that both gates will be caused to move together in the same direction, and so that they will both swing downward in the direction that the train is moving it will be obvious that should either gate, for any reason, not descend fully or completely it will not project in such a way as to form an obstacle to the passage of the train, but will descend farther as the train passes over it and without being exposed to injury. Should it be desired to arrange the gates so that they will open or close in opposite directions it will be only necessary to cross the chain or wire rope 13 through which the gate shafts are connected.

When there is only one gate required, as where the fences of a field come close to a railroad track, such gate may be operated in the same manner as the two gates described, by means of the mechanism actuated by a train moving in either direction.

What I claim as my invention is—

1. The combination with a railway gate or guard, of a series of lever arms arranged at substantially regular intervals along one side of a track rail at a distance from the gate and in position to be successively depressed by the wheels of a train approaching the gate, each of said lever arms being pivotally supported at one end and provided at its other end with a toothed segment, a series of horizontal shafts arranged transversely to the railway track and each provided with a spur-gear in mesh with the toothed segment of one of said lever arms, gearing for connecting the gate with the several shafts in said series gradually to operate the gate on the approach of a train, and means for automatically elevating the said lever arms and restoring the gate or guard to its former position after the passage of the train, substantially as described.

2. The combination with a railway gate or guard, of a series of pivoted lever arms arranged at substantially regular intervals along one side of a track rail and in position to be successively depressed by the wheels of a train approaching the gate, a series of horizontal shafts arranged transversely to the railway track, toothed segments and gear wheels connecting the said lever arms with the said transverse shafts, gearing connecting the gate with the several shafts in said series gradually to operate the gate on the approach of a train, and means for automatically elevating the said lever arms and sustaining them at successively increased heights above the tread of the rail when the gate is restored to its former position, after the passage of a train, substantially as described.

3. The combination with parallel gate shafts arranged transversely to a railway track at a crossing or other point to be protected, and gearing connecting said gate shafts, of a series of lever arms arranged at substantially regular intervals along one side of a track rail at a distance from the gate and receding therefrom on each side of the crossing, said lever arms being each pivotally supported at one end and provided at its other end with a toothed segment and said lever arms being yieldingly sustained at successively increased heights above the tread of the rail in going toward the gate and in position to be successively depressed by the wheels of a train approaching the gate, a series of horizontal shafts arranged transversely to the track, on each side of the crossing, and each provided with a gear in mesh with the toothed segment of one of said lever arms, gearing for connecting the several shafts in said series of shafts on opposite sides of the crossing, a spur gear fast on each of the gate shafts, a short shaft located on each outer side of the crossing, parallel with the adjacent gate shaft and carrying a spur gear adapted to mesh with the gear on said gate shaft, gearing connecting each short gear-carrying shaft with the nearest shaft on that side in the series of shafts geared with the lever arms, and means for automatically shifting or adjusting the gate shafts to the

right or left to change the meshing of the gears and adapt the gates for operation by a train moving in either direction, substantially as described.

4. The combination with parallel gate shafts arranged transversely to a railway track, and connecting gearing for operating said shafts together, of connected slide blocks in which said shafts are mounted to be capable of simultaneous lateral adjustment to the right or left, a spring connected to one of said slide blocks, a horizontal shaft mounted transversely to one of the track rails and provided at one end with a drum or pulley and at its other end with a spur-gear, a cable, chain, or wire rope connecting said drum with the other one of the slide blocks, a lever arm pivoted at one end alongside the track rail and provided at its other end with a toothed segment meshed with the said spur-gear, and automatically actuated mechanism for imparting a rocking movement to the gate-shafts from the wheels of a train passing in either direction, substantially as described.

5. The combination of parallel gate shafts mounted transversely to a railway track on opposite sides of a crossing and in connected slide blocks that are adapted to be automatically adjusted parallel with the track to shift the said gate shafts laterally to the right or left, means for automatically adjusting said slide blocks, a spring or its equivalent for restoring the slide blocks when released, an automatic lock for securing the slide blocks in one of the adjusted positions of the gate shafts, and automatically actuated devices connected in series along the track at a distance from the gate and on each side of the crossing for automatically operating the gate from the wheels of a train moving in either direction, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

JOHN BAADE. [L. S.]

Witnesses:
E. W. EWING,
R. G. GAINES.