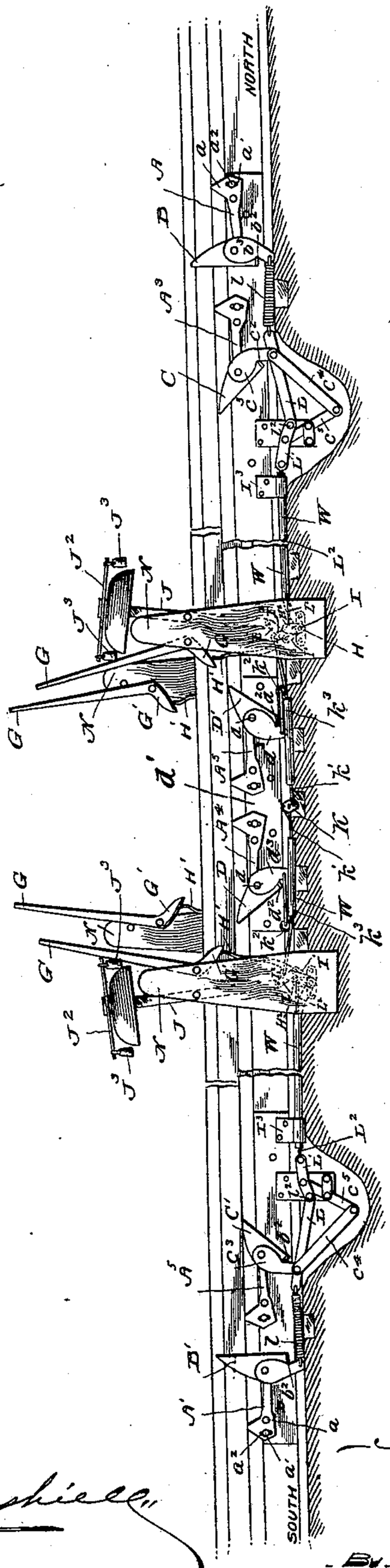
(No Model.) 2 Sheets—Sheet 1.

M. W. TAYLOR.

RAILROAD CROSSING GATE AND SIGNAL.

No. 564,234. Patented July 21, 1896.

Fig. 1.



Witnesses:
Wm. C. Dashiell
G. N. Rothwell

Minor W. Taylor
Inventor
By A. H. Evans & Co
Attys.

(No Model.) 2 Sheets—Sheet 2.

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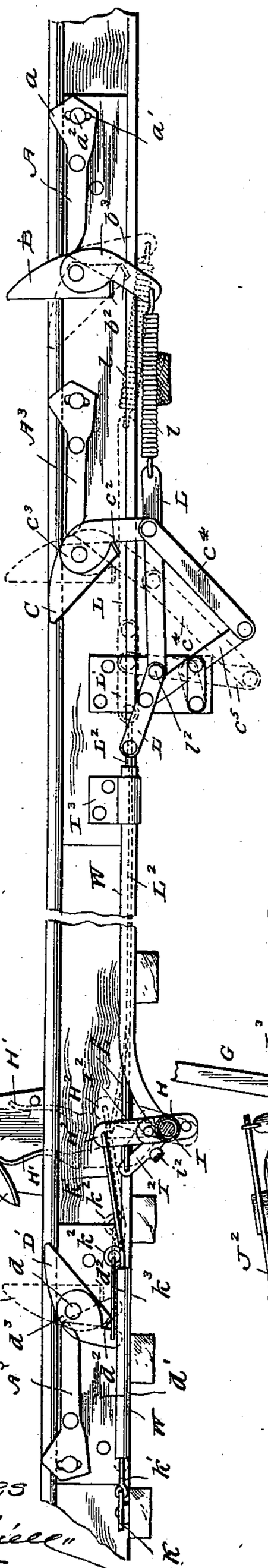

Fig. 2.

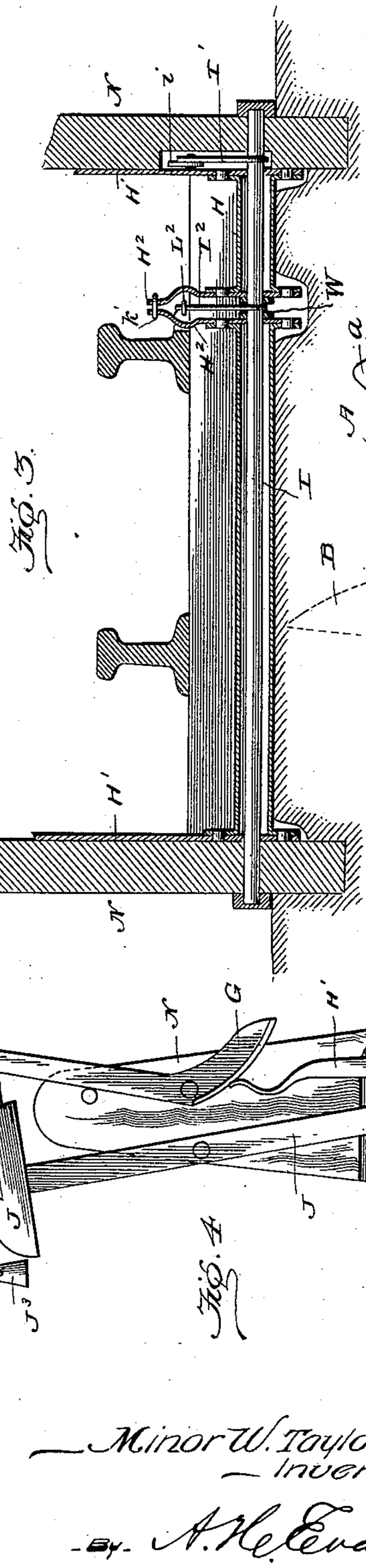

Fig. 3.

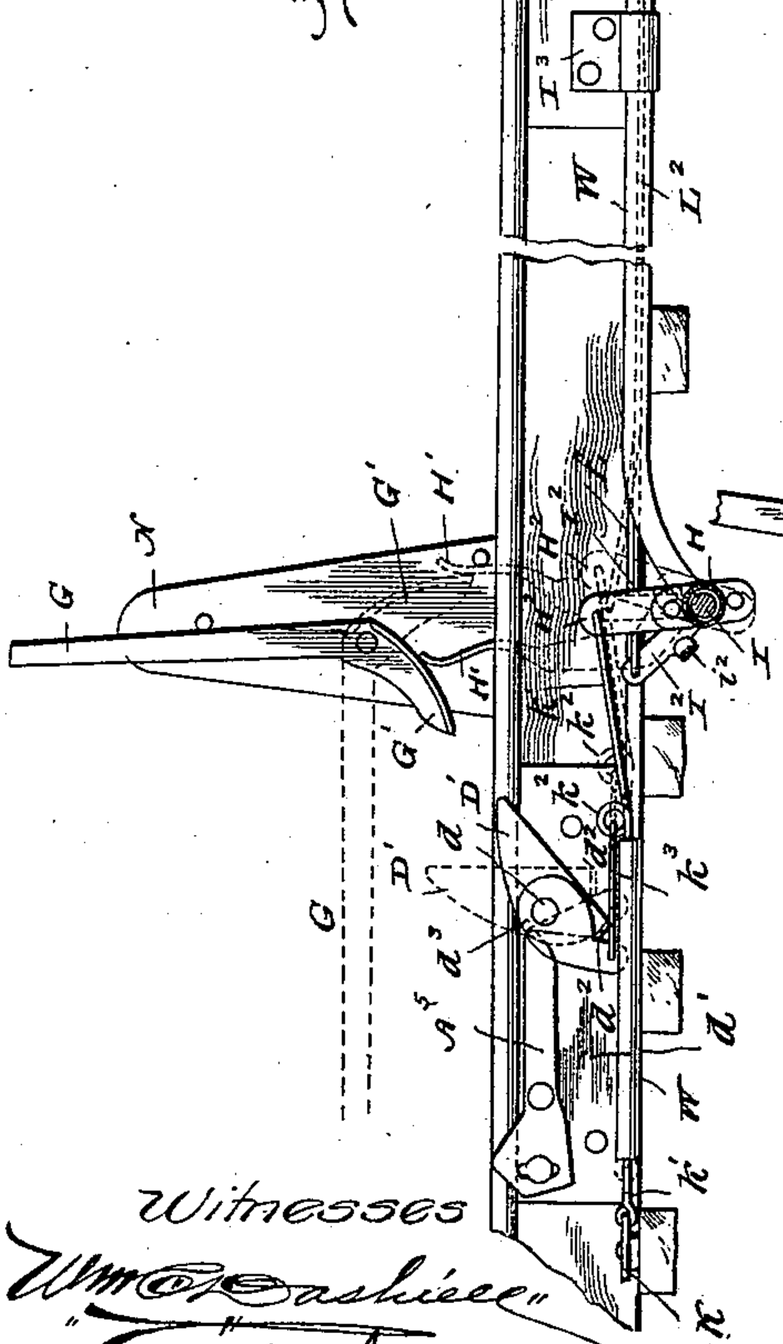

Fig. 4.

Fig. 5.

Witnesses
Wm. A. Cashiee
F. H. Rothenhead.

Minor W. Taylor
Inventor
By A. H. Evans & Co
Atty's.

UNITED STATES PATENT OFFICE.

MINOR W. TAYLOR, OF WATERLOO, IOWA.

RAILROAD-CROSSING GATE AND SIGNAL.

SPECIFICATION forming part of Letters Patent No. 564,234, dated July 21, 1896.

Application filed March 12, 1896. Serial No. 582,838. (No model.)

To all whom it may concern:

Be it known that I, MINOR W. TAYLOR, a citizen of the United States, residing at Waterloo, Black Hawk county, Iowa, have invented certain new and useful Improvements in a Combined Railroad-Crossing Gate and Signal, of which the following specification contains a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective of the improved gate and signal mechanism with the gates raised. Fig. 2 is a side elevation of one half or set of said mechanism with the parts enlarged and in both full and dotted lines to show the operation. Fig. 3 is a transverse section through the track with the tubular gate-operating shaft in section better to show the signal-operating shaft which passes therethrough. Fig. 4 is a detail view showing the connections between said two shafts, the signal-lever, and the gate-bar. Fig. 5 is a detail to show the operation of a setting-lever with respect to one of the train-operated levers.

My invention relates to a combined railroad-crossing gate and signal mechanism, which will be automatically operated by the approach of trains from either direction.

The object of the invention is to provide a crossing gate and signal mechanism, which will be automatically operated to lower the gate and operate a signal or alarm by the approach of the train some distance in advance of the crossing, and in which the gates will be automatically raised when the train passes over the crossing, and in which the mechanism at the opposite side of the crossing will be set by the train after leaving the crossing, so that a train coming from the opposite direction toward the crossing will also cause the closing of the gates and operation of the signal, the raising of the gates and the setting of the other gate-lowering and alarm-operating mechanism.

A further object is to so construct the various parts that the operation may be perfectly relied upon and the mechanism not liable to get out of order, but which may be readily repaired in that event.

The invention will first be described, and specifically pointed out in the claims.

N N represent the four posts or supports set at opposite sides of the crossing and at opposite sides of the track, which is shown as a single track, and for the sake of convenience in describing the invention the track at one side of the crossing is marked "North" and at the other side "South."

The gates consist of the four bars G G G G, one pivoted to every post, so as to swing down over the crossing by gravity. The inner ends of the gate-bars G are provided with rounded or inclined extensions G′, the outer edges of which are engaged by crank-arms H′, projecting upwardly from the two tubular crank-shafts H, which rock upon the inner crank-shafts I I, crossing the road-bed and journaled at their ends in bearings at the lower ends of the posts N N. One end of each shaft I is provided with a crank-arm I′, connected by a link *i* with the lower end of a signal-lever J, pivoted between its ends to the post N and provided above the post with a gong J′ and a cross-bar J^2, having depending swinging clappers J^3, which strike the gong as the lever J is vibrated from the shaft I through mechanism which will be presently described.

The tubular shafts H are divided between their ends and are there provided with two connected operating-cranks H^3, and the inner rock-shafts I are each provided with an operating-crank I^2, which projects between the operating-cranks H^2 and works freely back and forth between them. The operating-cranks I^2 are provided with lateral lugs or hooks i^2, which project across the inner edges of the crank-arms H^3 or the edges next to the crossing, so that when the cranks I^2 are moved outwardly or away from the crossing they will pull the cranks H^2 with them, but when moved toward the crossing will move away from cranks H^2 and not operate them. So also when cranks H^2 are moved toward the crossing they will pull the cranks I^2, but will not so operate them when rocked in an opposite direction or away from the crossing.

K is a lever pivoted between its ends to a cross-tie at the middle of the crossing, and *k′* *k′* are rods extending oppositely from the ends of said lever through tubes W to the crank-arms H^2, and these rods *k′* are provided with eyes k^2 between their ends.

D D′ are oppositely-operating gate-opening

levers pivoted between their ends, as at d, to base-plates d' d', which are bolted to the web of the rail at opposite sides of the middle of the crossing and provided at their lower ends with outwardly-projecting lugs d^2, which engage the opposite outer edges of the respective depending links or arms d^3, pivoted at their upper ends on the pivots d and at their lower ends connected by short links or rods k^3 to the eyes k^2 of the respective rods k'. The gate-lowering levers B B′ are constructed just like the levers D D′, but are mounted several hundred feet to the north and south of the crossing, respectively, and engage the inner edges of the links b^3 with their lugs b^2. The lower ends of the pivoted arms or links b^3 are connected to longitudinally-extending links L L′ by means of cushioning-springs l, the links L L′ being pivoted together, as at l^2, and the inner ends of the links L′ are connected to the cranks I^2, respectively, by means of the rods L^2, which extend through tubing W, mounted in clamps or brackets I^3, bolted to the rails, the inner ends of these tubes W being bifurcated and apertured and forming bearings for the inner shafts I at opposite sides of the cranks I^2.

C C′ are oppositely-arranged bell-operating levers, one at each side of the crossing, and constructed just like the levers B B′ D D′ and engaging with their lugs C^2 the inner edges of the depending links c^3, the lower ends of which are pivotally connected by bars c^4 to the lower ends of vertically-rocking centrally-pivoted levers c^5, the upper ends of which levers are pivoted to the links L′, before described.

A A′ represent setting-levers pivoted between their ends beyond the gate-closing levers B B′ and engaging the outer edges of levers B B′ with their inner ends. The outer ends of the setting-levers are provided with heads a, which are projected above the tread of the rail when their inner ends are depressed, and said ends are slotted, as at a', and through these slots extend pins a^2 to limit the movement of the said levers. The levers C C′ D D′ are all provided with similar setting-levers A^2 A^3 A^4 A^5, respectively. The object of these levers is to raise the levers B B′ C C′ D D′ into their operative position in the event of said levers being swung over with their straight edges flush with the tread of the rail, as shown in Fig. 5. If one of the levers B B′ C C′ D D′ should be so swung over its curved side will of course depress the adjacent end of its setting-lever, which will raise its opposite end or head a above the tread of the rail, so that a train approaching any lever B B′ C C′ D D′ in a direction to operate it will first strike head a of the setting-lever and depress it, and this will cause the inner end of said lever to press upwardly on the curved side of the operating-lever B or B′, &c., and raise it into its operative position.

The operation is as follows: The parts being in the positions shown in full lines, Fig. 1, and the train approaching the crossing from the north, the lever B will be struck first and thrown down toward the crossing and force the arm or link b^3 away from the crossing and cause it to pull on the link L, which in turn will pull on rod L^2 and the upper end of lever c^5. The rod L^2 will pull on the crank I^2, causing it to rock the bell-lever J in one direction and also causing the hooks on said crank I^2 to engage crank H^2 and raise it into the dotted position shown in Fig. 2. This will cause the arms H′ at that side of the gate to be swung up past the vertical position (see dotted lines, Fig. 2) and allow the bars G to swing down, and the cranks H^2 in their movement will pull on the adjacent rod k', which will rock the lever K and cause it to push on the other rod k' and cause it to throw the crank H^2 at the other side of the crossing outwardly, which will rock that shaft H and swing its arms H′ away from that pair of gate-bars G, which will swing down also. In pulling on the upper end of the lever c^5 its lower end will have been thrown toward the crossing, as shown in dotted lines, Fig. 2, and this will have caused connecting-bar c^4 to pull on the depending arm or link c^3 and cause it to raise the lever C through the medium of its lug c^2. As the different cars pass over these two levers B C they will be alternately raised and depressed, which will cause a pushing and pulling action on rod L^2, which in turn will rock the crank-arm I^2 back and forth and cause the continual sounding of the signal. The initial pull on the rod k' and consequent rocking of lever K will also have caused the short links or rods k^3 to pull the lower ends of the depending arms or links d^3 outwardly in opposite directions, and as these arms or links engage the lugs d^2 d^2 both levers D D′ will have been raised into vertical positions, where they will remain until the train reaches the crossing, as the rocking of the crank-arms I^2 will not affect the crank-arms H^2 during this interval. When, however, the train reaches the crossing, it will strike and depress the lever D′ and swing its lug d^2 upwardly and away from the depending link d^3, but when the train strikes lever D the lug d^2 thereon will throw the lower end of the adjacent link or arm d^3 inwardly and its rod or link k^3 will pull on the south crank H^2, and as this crank is connected with the north or right-hand crank H^2 both crank-shafts H will be rocked and their arms H′ pressed against the curved ends G′ of gate-bars G, which will cause all of the gate-bars to be simultaneously raised, as in full lines, Figs. 1 and 2. The train will then pass over the south or left lever C′ without operating it as it is lying down. Then the train will strike lever B′ and throw it forwardly and as the last wheel passes over setting-lever A′ said lever will raise lever B′ into its operative position for the next train from the south; but if either lever B B′ should be jarred or otherwise knocked over, its lever A or A′ will

raise it into operative position when struck by a train.

The operation just described with relation to levers B C D and the parts to which they are connected will be repeated by the levers B′ C′ D′ on the approach of a train from the south or left.

It will of course be understood that while I have described the trains as having passed alternately southward and northward, the mechanism will operate equally well should two or more trains pass consecutively in the same direction, as the inside lever C or C′ is always depressed after lever B or B′ when a train is approaching a crossing, (see Fig. 2,) and consequently lever B or B′ will be raised, through links c^4, c^5, and L, into operative position.

The various lever mechanisms will in practice be inclosed in suitable casings. It will be understood that the above-described mechanism may be readily applied to a double-track system without the exercise of more than mechanical skill.

If no signal or alarm is desired, the lever mechanism C C′, levers J, and signals carried thereby may be omitted, and if the signals alone are to be used, the arms H′, the gate-bars, and the lever mechanisms D D′ will be removed.

The outward movement of the arms H′ will be limited by stops *h* on the posts N and the gate-bars G will be limited in their upward movement by similar stops *g*, so that they will always fall when the arms H′ are moved away from them.

Having thus described the invention, what is claimed is—

1. The combination with the gates and signals for the crossing, the tubular crank-shafts for operating the gates, and the signal-operating crank-shafts extending through said tubular shafts and operatively connected with the signals, of separately-acting gate-closing and signal-operating levers, one pair at each side of the crossing and connected with the said outer and inner shafts to close the gates and operate the signals at the approach of a train from either direction, and the oppositely-operating gate-opening levers at the crossing for opening the gates when the train reaches the crossing, substantially as set forth.

2. A railroad-crossing gate mechanism, comprising the gates for closing the crossing, transverse rock-shafts, each having gate-operating arms and operating-cranks, oppositely-arranged, one-way gate-lowering levers at opposite sides of the crossing and separably engaging below their pivotal points depending links to throw said links away from the crossing when said levers are pressed toward the crossing, operating rods or connections extending from said links to the operating-cranks of the respective gate-operating rock-shafts and having a loose or separable one-way connection therewith, oppositely-arranged one-way-operating gate-opening levers at the crossing constructed like the gate-closing levers and having similar depending links, or arms, and rods positively connected at their outer ends to the operating-cranks of the respective gate-operating crank-shafts, connected at their inner ends to a centrally-pivoted lever, and linked between their ends to the lower ends of the depending gate-opening links or arms, substantially as set forth.

3. A railroad-crossing gate mechanism, comprising the gates for closing the crossing, transverse rock-shafts each having gate-operating arms, and operating-cranks, crank-arms alongside the said operating-cranks having lateral projections or hooks engaging the inner edges thereof, oppositely-arranged, one-way gate-lowering levers at opposite sides of the crossing and separably engaging below their pivotal points the adjacent edges of two depending links or arms to throw said links or arms away from the crossing, operating rods or connections extending from the lower ends of said links or arms to the said hooked crank-arms, a centrally-pivoted lever at the crossing connected at its opposite ends by rods to the operating-cranks of the said gate-operating crank-shaft, and the oppositely-arranged one-way-operating gate-opening levers at the crossing, constructed like the gate-closing levers and having similar depending links connected to the respective rods which connect said centrally-pivoted lever to the operating-cranks of said gate-operating crank-shafts when said outer end is depressed, substantially as set forth.

4. In a gate-operating mechanism of the character described, the following subcombination of elements viz: the train-operated operating-lever pivoted between its ends alongside of the rail and having an outwardly-projecting lug at its lower end; the upper end of the lever projecting above the tread of the rail into the path of the train-wheels and having a rounded edge to be struck thereby, and the depending operating link or arm engaged at one edge below its pivot by said lug, substantially as set forth.

5. In a gate-operating mechanism of the character described, the following subcombination of parts viz: the train-operated operating-lever pivoted between its ends and having a laterally-projecting lug below its pivot, a link or arm depending from said pivot and engaged at one edge by said lug, and a train-operated setting-lever having a head or upwardly-projecting outer end for depression by the train and engaging with its opposite end the adjacent edge of the said operating-lever, to raise said lever into its operative position, substantially as set forth.

6. In a gate-operating mechanism of the character described, the following subcombination of parts, viz: the train-operated lever (as B) pivoted between its ends, having a laterally-projecting lug at its lower end, a straight rear edge and a rounding or inclined

front edge, a link depending from the lever-pivot and engaged by said lug for movement in one direction thereby, and a setting-lever pivoted between its ends longitudinally of the rail to permit its outer end to be projected above the tread and its inner end engaging the rounded edge of said train-operated lever to raise the lever into its operative position when said outer end is depressed, substantially as set forth.

7. The combination, with the pivoted gravity-lowering gate-bars, having their inner ends extended beyond their pivot and rounded or inclined, of the transverse crank-shafts provided with upwardly-projecting arms engaging the outer edge of said curved or inclined extensions and an operating mechanism connected to said crank-shafts, substantially as set forth.

8. The combination, with the pivoted gravity-lowering gate-bars having rounded or inclined extensions at their inner ends, transverse crank-shafts having upwardly-extending arms bearing against the outer edges of said inclined or curved extensions, gate-lowering mechanisms beyond and at opposite sides of the crossing for rocking the shafts and permitting the gates to fall at the approach of a train from either direction, and gate-opening mechanisms at the crossing for operation by a train from either direction and operatively connected with said gate-operating crank-shafts, substantially as set forth.

9. A railroad-crossing gate mechanism, comprising the gate-bars to close the crossing, the transverse crank-shafts at opposite sides of the crossing operatively connected to the respective gate-bars, oppositely-arranged one-way-operating gate-operating levers beyond and at opposite sides of the crossing and operatively connected to said crank-shafts, oppositely-arranged one-way-operating gate-opening levers at the crossing and having connecting devices connecting them to the said two gate-operating crank-shafts, and a train-operated setting-lever for every one of said gate-operating levers all arranged and combined substantially as herein shown and described.

10. A railroad-crossing gate mechanism, comprising the gates for closing the crossing, transverse rock-shafts each operatively connected with its respective gate, and provided with operating-cranks, crank-arms alongside said operating-cranks having lateral projections or hooks to engage the inner vertical edges thereof, one-way-operating gate-lowering levers at opposite sides of the crossing separately engaging below their pivotal points the adjacent edges of two depending links or arms to throw said links or arms away from the crossing, operating rods or connections having a spring-cushioned connection with said links or arms and extending therefrom to the said hooked crank-arms, a centrally-pivoted lever at the crossing connected at its opposite ends by rods or links to the operating-cranks of the respective gate-operating crank-shafts, the oppositely-arranged one-way-operating gate-opening levers at the crossing constructed like the gate-closing levers and having similar depending links connected to the respective rods which connect said centrally-pivoted lever to the cranks of the gate-operating crank-shafts, and a setting-lever for every one of the said gate opening and closing levers, substantially as set forth.

11. In a mechanism of the character described, the combination with the signal-operating lever pivoted between its ends to a post at the crossing, a crank-shaft operatively connected with the lower end of said lever to rock it back and forth, and provided with an operating crank-arm, a lever pivoted alongside the rail beyond the crossing and connected by rods and links with the said operating crank-arm to throw it in one direction when struck by an approaching train, and a second lever pivoted nearer to the crossing and linked to one end of a centrally-pivoted lever whose opposite end is linked to the devices connecting the first-named lever to the said crank-shaft; whereby when the first lever is depressed by the train it will rock the shaft in one direction and raise the second lever into operative position and vice versa, substantially as herein set forth and described.

12. The combination with the vertically-rocking signal-lever at the crossing and a crank-shaft operatively connected therewith and having an operating crank-arm, of the lever B having lug b^2 at its lower end, the depending link b^3 engaged at its inner edge by said lug to be thrown away from the crossing when the train presses the upper end of lever B toward the crossing, a link L connected with the lower end of said depending link, a link L′ connected to link L and a connection between link L and the operating-crank of said crank-shaft, a lever C having a lug c^2 at its lower end, a depending link c^3 engaged at its inner edge by said lug, a centrally-pivoted rocking link or lever c^5 pivoted at its one end to link L′ and a connecting-bar c^4 connecting the opposite end of link or lever c^5 with lower end of link c^3, whereby a continuously vibratory movement will be imparted to the signal-operating lever while the train is passing over levers B, C, substantially as set forth.

13. A railroad-crossing gate and signal mechanism, comprising transverse signal-operating crank-shafts at opposite sides of the crossing having operating-cranks provided with laterally-projecting hooks or lugs, vertically-rocking signal-operating arms connected at their lower ends to the respective rock-shafts, tubular rock-shafts mounted on the first-named rock-shafts and each having operating-cranks alongside said hooked cranks, gate-bars operatively connected with said tubular shaft, and train-operated lever mechanisms substantially as described, be-

yond the crossing at both sides thereof for operating said crank-shafts to lower the gates and operate the signals at the approach of a train from either direction, and gate-opening levers at the crossing also connected to the tubular crank-shafts and to each other substantially as set forth.

14. A railroad-crossing gate and signal mechanism, comprising transverse signal-operating crank-shafts at opposite sides of the crossing having hooked crank-arms, vertically-rocking levers connected at their lower ends to the said cranks to be operated thereby and carrying bells at their upper ends, the tubular rock-shafts upon the signal-operating shafts having crank-arms H^2 engaged at their inner vertical edges by said hooked crank-arms I^2, gate-operating arms projecting up from the ends of the tubular shafts, pivoted gate-bars engaged at their inner ends by said operating-arms, a centrally-pivoted lever K at the middle of the crossing, rods k' k' connecting the ends thereof with the respective cranks H^2, oppositely-arranged levers D D′, their transmitting-links d^3 linked to the respective rods k' k' for raising the gates, the remote oppositely-arranged train-operated levers B B′ at opposite sides of the crossing having transmitting-links b^3 connected to the respective hooked crank-arms I^2 and the oppositely-arranged train-operated levers C C′ having transmitting-links c^3 connected to the lower ends of the vertically-rocking levers c^5; the upper ends of the levers c^5 being connected with the connections leading from links c^3 to the cranks I^2 substantially as set forth.

MINOR W. TAYLOR.

Witnesses:
A. I. BRECKENRIDGE,
G. C. KENNEDY.