

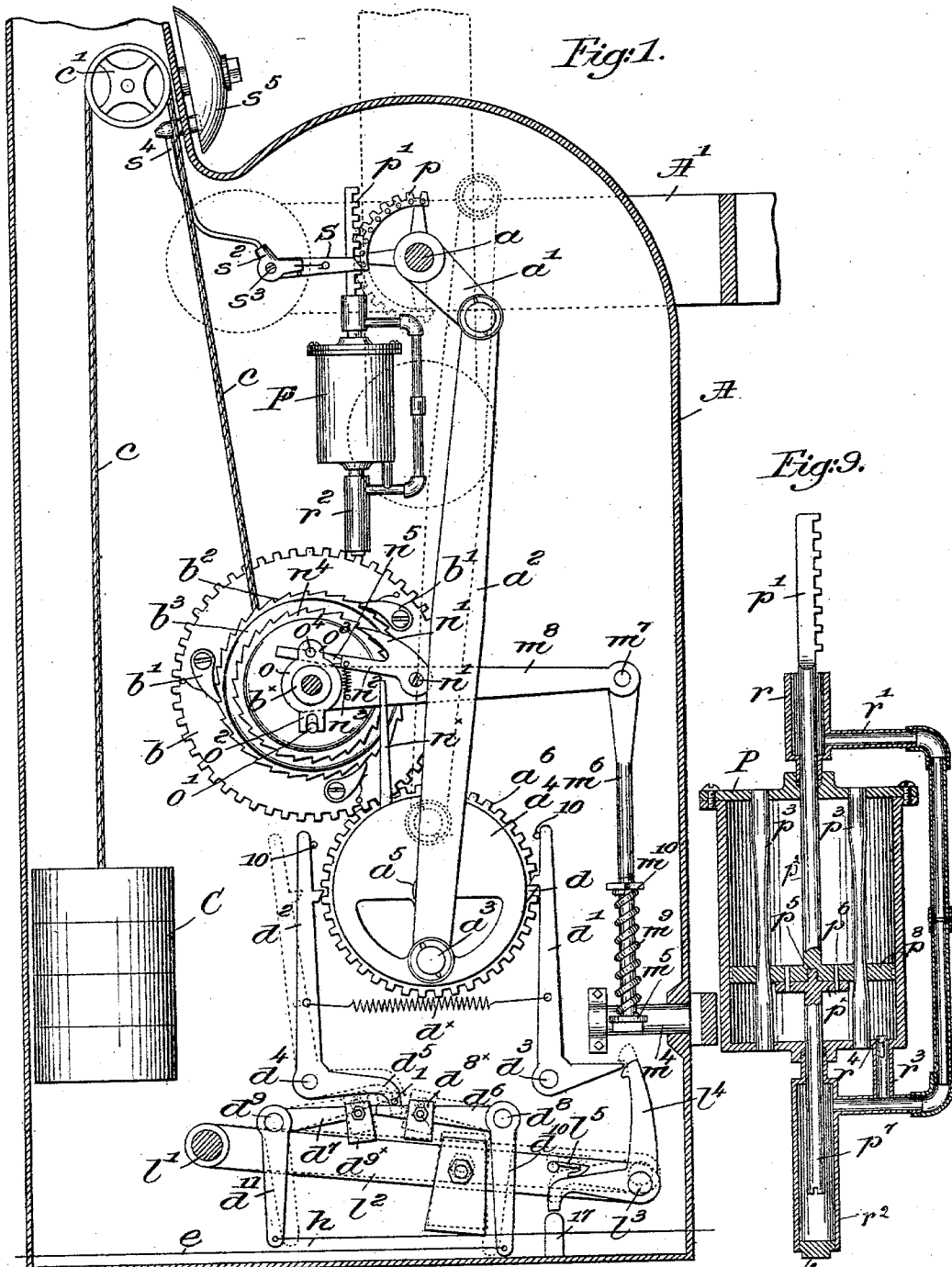
(No Model.)

3 Sheets—Sheet 1.

H. W. BURLEIGH.
GATE FOR RAILWAY CROSSINGS.

No. 586,592.

Patented July 20, 1897.



Witnesses.
Fred L. Gunkel.
Thomas J. Hammond.

Inventor.
Harry W. Burleigh.
by Crosby & Gregory
attys

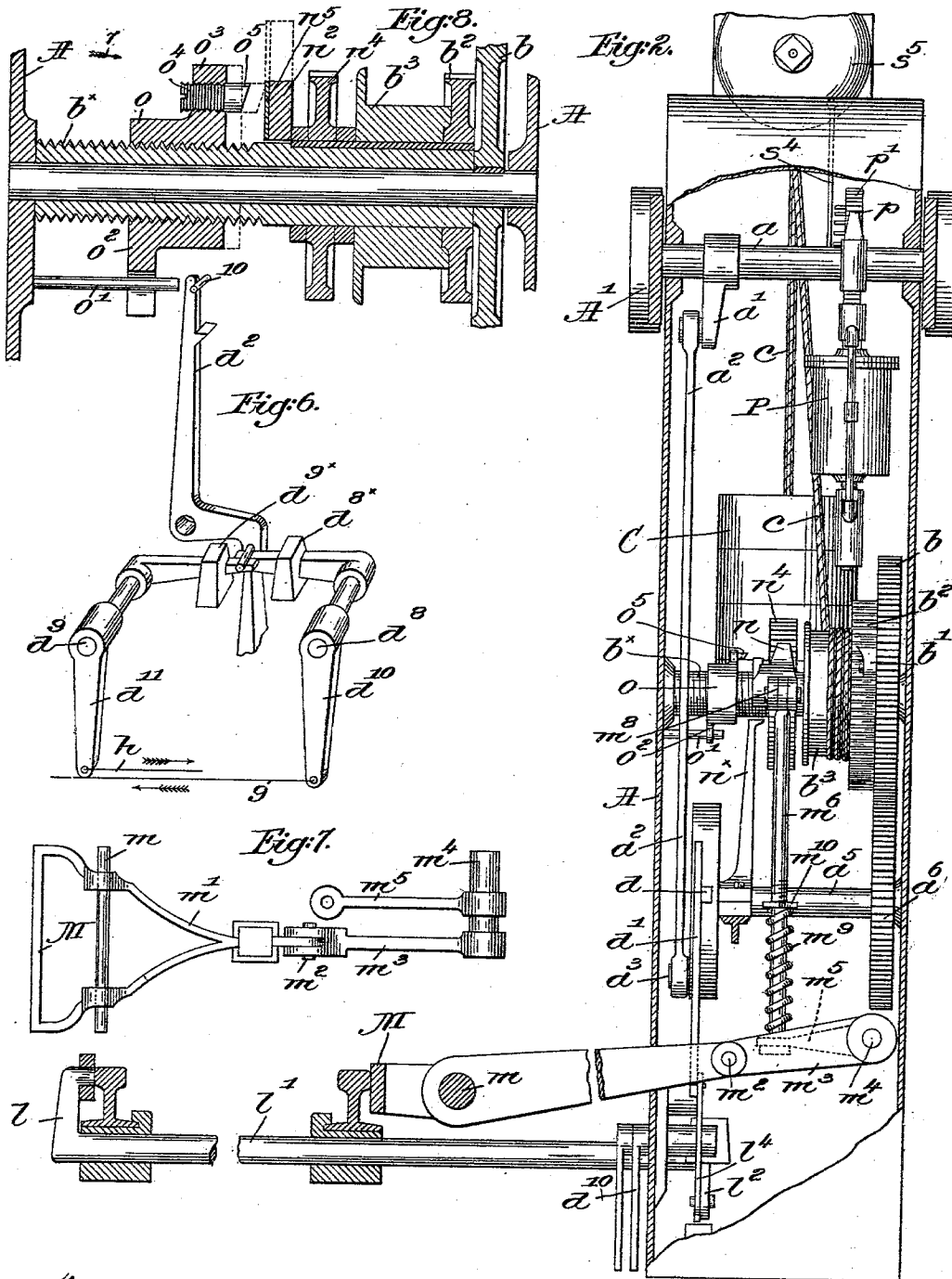
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3 Sheets—Sheet 2.

H. W. BURLEIGH.
GATE FOR RAILWAY CROSSINGS.

No. 586,592.

Patented July 20, 1897.



Witnesses.
Fred S. Grunkof.
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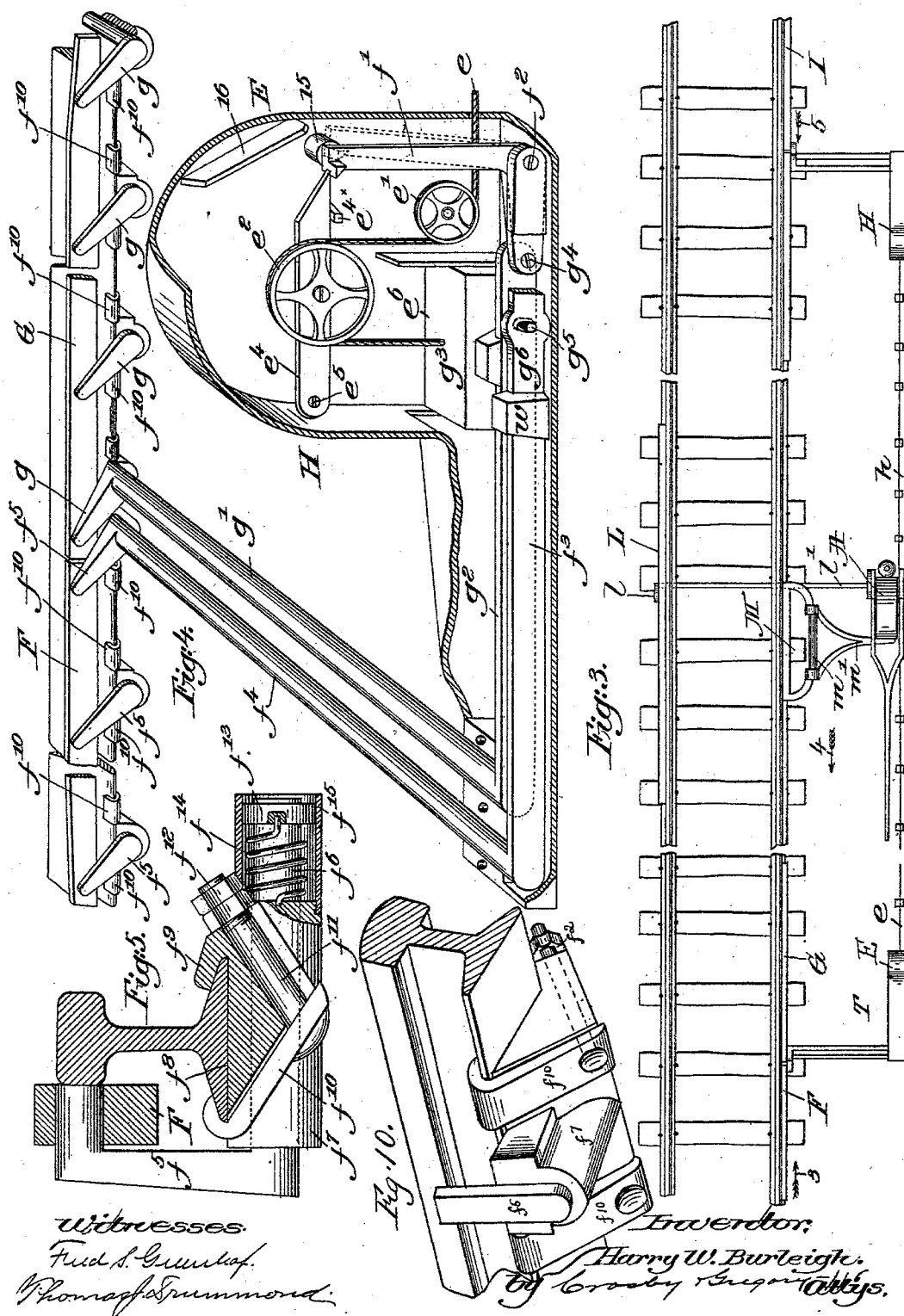
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3 Sheets—Sheet 3.

H. W. BURLEIGH.
GATE FOR RAILWAY CROSSINGS.

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Patented July 20, 1897.



UNITED STATES PATENT OFFICE.

HARRY W. BURLEIGH, OF FRANKLIN, NEW HAMPSHIRE.

GATE FOR RAILWAY-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 586,592, dated July 20, 1897.

Application filed October 5, 1895. Serial No. 564,805. (No model.)

To all whom it may concern:

Be it known that I, HARRY W. BURLEIGH, of Franklin, county of Merrimack, State of New Hampshire, have invented an Improvement in Gates for Railway-Crossings, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention relates to automatic gates for railway-crossings of the class shown and described in United States Patent No. 427,395, dated May 6, 1890, the object of the invention being to simplify and improve the construction and operation of the mechanism for automatically raising and lowering the gate or gates upon the approach and departure of trains.

20 The particular features of my invention will be hereinafter set forth, and specified in the claim.

Figure 1 represents in vertical longitudinal section a single standard, with its gate broken away, constructed in accordance with this invention. Fig. 2 is a right-hand elevation and partial sectional view of the mechanism shown in Fig. 1. Fig. 3 shows a section of single track equipped with an automatic gate in accordance with this invention. Fig. 4 is a detail of the mechanism for lowering the gate. Fig. 5 is a sectional detail of the trip mechanism and rail-clamp. Fig. 6 is a perspective detail showing the starting devices which control the operation of the gate. Fig. 7 is a detail showing the trip for winding the weight. Fig. 8 is a sectional detail showing the mechanism to automatically stop the winding of the weight, and Fig. 9 is a section of the controlling device of the gate to be described. Fig. 10 is a perspective view of the rail-clamp.

Referring to the drawings, A represents a standard and housing of suitable shape and construction to sustain and inclose the mechanism for actuating the gate.

30 The gate A', of usual construction, is mounted fast upon a shaft a , journaled in the standard A and provided with a crank a' , connected by a pitman a^2 with a crank-pin a^3 on the disk-crank a^4 , fast on the shaft a^5 , journaled in the standard. A toothed wheel a^6 , fast on the shaft a^5 , is in mesh with and driven by

a toothed wheel b on the shaft b^1 , journaled in the standard, said toothed wheel b having one or more spring-controlled pawls b' , which engage the ratchet-teeth on the periphery of a wheel b^2 , fast on the hollow shaft b^x , sleeved on said shaft b^1 , said wheel b^2 being provided at one side with a drum b^3 , Fig. 2, about which is wound one end of a cord or cable c , shown as passed upwardly and about a sheave c' in the upper part of the standard and sustaining at its end a weight C sufficient to raise and lower the gate or gates A'.

The weight C is prevented from rotating the drum b^3 and the wheels b and a^6 to move the gate or gates by a tooth or detent d on the periphery of the disk-crank a^4 , which is engaged and held by one or the other of the pawls d^1 d^2 , pivoted, respectively, at d^3 d^4 to the standard and normally held against the stop-pins 10 in position to engage said detent by means of a spring d^x , as shown in Fig. 1. The pawl d^2 has a laterally-extended and depending arm d^5 , provided at its outer end with a pin 1, against which lie the ends of the horizontal arms of the oppositely-facing bell-crank levers d^6 d^7 , pivoted, respectively, at d^8 d^9 . (See Fig. 1.) These levers carry weights d^{8x} d^{9x} to maintain them normally in their depressed positions, Fig. 1.

The end of the pivotal shaft d^8 of the bell-crank lever d^6 is extended through the standard A, as shown in Fig. 2, so that the depending arm d^{10} of said lever is outside the standard, said depending arm having attached to it one end of a cable or rope e , (see Fig. 1,) which extends along the track, as shown in Fig. 3, to the auxiliary standard E, Fig. 4, into which it enters and passes under and about a sheave e' , journaled in the standard and upwardly and about a swinging sheave e^2 , journaled on a stud e^3 on the lever e^4 , pivoted at e^5 , and normally resting upon a support e^{4x} , said cable at its end being attached to a weight e^6 , which normally rests upon the bottom of the standard or upon any other suitable support, the cable being held taut when the weight is at rest. The bell-crank lever d^6 at the standard A is thus connected by the cable e with the pivoted lever e^4 in the auxiliary standard E.

The weight remains stationary at all times unless the lever e^4 is moved more than usual

or the wire has contracted and thereby shortened, in either of which cases the weight merely lifts, so as to compensate therefor after the lever has pulled the wire and bell-crank lever at the main standard as far as possible and hangs suspended until the lever e^4 resumes its normal position, when the weight again drops to its position at rest.

The length of movement of the lever e^4 is sufficient to exert a pull upon the cable when the latter is expanded or at its greatest length. Hence the lever has more slack to take up at such time. When, however, the cable is shortened by contraction, the lever, which must move the same, merely raises the weight after it has pulled the cable as far as possible, to thus prevent breakage or straining of the cable or other parts.

The base of the auxiliary standard E has suitable bearings for a rotatable shaft f^4 , provided at one end with a long arm f^3 , to the outer end of which is pivoted at f^2 a bell-crank-actuating lever f' , on the upper end of which is a detent f , which normally stands in a position beneath the outer end of the lever e^4 .

The opposite end of the shaft f^4 is provided with a crank-arm f^5 , pivoted at its free end to a long trip-bar F, lying close to the outer side of one rail of a track, as best shown in Fig. 3, said crank-arm f^5 being one of several similar arms, the other arms, however, being mounted upon short shafts f^6 , (see Figs. 4 and 5,) journaled in blocks f^7 , adapted to be clamped to the under side of the rail, each block having at one side a flange f^9 to lap over the flange of the rail and at its ends triangular ears or body portions f^8 . (See Fig. 5)

The blocks f^7 are clamped to the rail by means of hooked plates f^{10} , which are hooked to the opposite side of the flange of the rail, bolts f^{11} being passed through the lower ends of the plates f^{10} and fitted with nuts f^{12} , which, when drawn against the ears, as in Fig. 5, clamp the block tightly to the rail, the wedge shape of the ears causing the block to be pressed tightly against the under side of the rail and the plate f^{10} .

The shafts f^6 are preferably extended beyond the ends of the blocks f^7 and are fitted at their inner ends with collars f^{13} , between which and the blocks are inserted spiral springs f^{14} , which permit the shafts to have slight longitudinal movements in their bearings, if necessary, and also act to return the crank-arms to their normal upright positions after being depressed by the passage of a train over the track-bar, a protecting-sleeve f^{15} inclosing the collar f^{13} and spring, as shown.

A weight w on the long arm f^3 , Fig. 4, assists the springs in maintaining the said arms normally in their lowermost position and the crank-arms f^3 in their uppermost position.

A second inner trip-bar G is arranged between the trip-bar F and the main standard A, said inner trip-bar being mounted upon

crank-arms g , similar in arrangement and construction to the crank-arms f^3 , upon which the outer bar F is mounted, one of the arms g being fast on one end of a shaft g' , journaled in suitable bearings and provided at its end with a long arm g^2 , having a weight g^3 to assist in keeping it normally depressed with the trip-bar G elevated, said long arm g^2 at its free end being jointed at g^4 to the horizontal arm f^x of the actuating-lever f' within the auxiliary standard, (see Fig. 4,) a pin g^5 on the arm g^2 projecting laterally into a slot g^6 in the long arm f^3 , as shown.

When both trip-bars are elevated with the long arms f^3 g^2 depressed in their normal position at rest, the pin g^5 lies at the bottom of the slot g^6 , as shown.

When a train approaching in the direction of arrow 3, Fig. 3, reaches the trip-bar F, said bar will be depressed by the wheels, thereby causing the outer end of the arm f^3 to be raised and to raise with it the actuating-lever f' . The pin g^5 on the arm g^2 , lying at the bottom of the slot g^6 , causes the arm g^2 to be raised with the arm f^3 and thereby pull the trip-bar G also into its depressed position, with its upper surface on a level with the upper surface of the trip-bar F to present a continuous or substantially unbroken surface for the wheels of the train, and as the said trip-bars are of sufficient length to reach from one pair of wheels to another on the train it will be seen that only one movement takes place upon passage of any train, the first pair of wheels which strike the lever F depressing the same and through the pin g^5 also depressing the lever G, both levers remaining thereafter depressed until the train has passed. When the actuating-lever f' is raised in this manner by the depression of the trip-levers F and G, the detent f on the upper end of the lever strikes the pivoted lever e^4 and lifts the same to thereby exert a pull upon the cable e to move the bell-crank lever d^6 , Fig. 1, to the left and thereby turn the pawl d^2 back away from the disk a^4 to permit the same to be rotated to actuate the gates, as will be hereinafter described. When, however, a train is proceeding in the direction of arrow 4, Fig. 3, it will strike and depress the inner trip-lever G first and will cause the long arm g^2 to be raised independently of the long arm f^3 until the pin g^5 reaches the upper end of the slot g^6 in the lever f^3 , after which the lever f^3 will be moved with and by the lever g^2 and will cause the trip-bar F to be depressed.

The movement of the lever g^2 with relation to the lever f^3 before the pin g^5 reaches the end of the slot is sufficient to turn the actuating-lever f' , jointed to the lever g^2 , back into its dotted position, Fig. 4, so that when the pin reaches the end of its slot and causes the lever f^3 to be also raised and thereby raise the actuating-lever f' the detent f on the said actuating-lever will have been swung back from beneath the lever e^4 , so as to pass by the end of the lever e^4 without lifting the

same, so that no pull will be exerted upon the cable e by such depression of the track-lever G .

As the actuating-lever f' passes by the end of the lever e^4 without lifting the same a roll 15 on the upper end of the actuating-lever strikes the inwardly-inclined cam-plate 16, which throws the said actuating-lever to the left into its normal position with relation to the lever f^3 to thereby lift the lever f^3 with relation to the lever g^2 , the pivot g^4 acting as a fulcrum until the pin g^5 lies in its normal position in the bottom of the slot g^6 , when the two levers will be parallel with each other and the trip-bars F and G will be depressed equally to present a substantially continuous surface to the wheels. From this it will be understood that a train moving in the direction of arrow 3, Fig. 3, acts upon and depresses the outer trip-bar F , which raises the long arm f^3 , and through the pin g^5 also raises the arm g^2 and causes an equal depression of the trip-bar G , both trip-bars falling at the same time, while the upward movement of both the long arms f^2 and g^3 together causes the actuating-lever to act upon and raise the lever e^4 and exert a pull upon the cable, the roll 15 in contact with the cam-plate 16 maintaining the actuating-lever in engagement with the lever e^4 and maintaining the two arms f^3 and g^2 in their normal position with relation to each other. When, however, a train moving in the direction of arrow 4, Fig. 3, depresses the inner trip-bar G first, the arm g^2 will be raised slightly for a distance equal to the length of the slot g^6 before causing the arm f^3 to be moved with it, this lost motion between the two arms being sufficient to throw the actuating-lever f' outwardly or into position to clear the lever e^4 , so that the latter will fail to be lifted and no pull upon the cable will result. The arms g^2 having been moved somewhat before moving the arm f^3 , the trip-bar F when depressed by the final movement of the arm f^3 would still be somewhat above the trip-bar G , but it is thrown down to a level with the trip-bar G by the action of the roll 15 upon the cam-plate 16, which lifts the arm f^3 through such additional distance as is necessary to cause the trip-bar F to assume a position on a level with the trip-bar G . The depending arm d^{11} of the bell-crank lever d' , also on the exterior of the standard, as shown in Fig. 6, is connected by a cable h with mechanism contained within an auxiliary standard H , which mechanism is similar in construction and operation to that just described within the auxiliary standard E , the mechanism in said auxiliary standard H being connected with and operated in similar manner by the inner and outer trip-bars I and J , so that a train moving in the direction of arrow 3, Fig. 3, will cause a pull to be exerted upon the cable h , while a train moving in the direction of arrow 6, Fig. 3, will fail to exert a pull on the said cable.

L , Fig. 3, represents a trip-bar mounted in the same manner as the other trip-bars, but preferably at the opposite side of the track, 70 and having one of its arms l fast on one end of a shaft l' , which passes beneath the rails and enters the standard A , Fig. 1, said shaft within the standard having fast upon it an arm l^2 , to the end of which is pivoted at l^3 a 75 hook l^4 , acted upon by a spring l^5 , which tends to move the hook to the left. A train approaching in the direction of arrow 3, Fig. 3, acts upon the outer track-bar F , depressing the same, and through the mechanism de- 80 scribed exerts a pull on the cable e , which thereby moves the bell-crank lever d^6 to cause the same to act upon the pin 1 and throw the pawl d^2 back into its dotted position to disengage it from the detent d on the disk-crank 85 a^4 . As soon as the pawl is disengaged from the projection d the weight C , acting through the drum b^8 and the toothed wheels b and a^6 , rotates the shaft a^5 and its disk-crank a^4 , the latter, through its pitman a^3 , crank-arm a' , 90 and shaft a , rotating the shaft to lower the gate or gates into their full-line position, Fig. 1, the shaft a being checked in its rotative movement, after having lowered the gates, 95 by the detent d on the disk-crank a^4 striking and being stopped by the pawl d' , as shown in full lines, Fig. 1, which now holds the shaft a from rotation by the weight C . The trip-bars F G and also the trip-bars J and I are placed at quite a distance on opposite sides 100 of the gate, two hundred yards, more or less, so that the gates are lowered before the train reaches the crossing protected.

When the train reaches the trip-bar L , located at or near the crossing, it will depress 105 said trip-bar and thereby cause rotation of the shaft l' to raise its arm l^2 , causing the hook l^4 on the outer end of the arm to rise above the pawl d' , and as the trip-bar L is of such length as to reach from one pair of 110 wheels to another on the train it remains depressed until the final passage of the train. Therefore its arm l^2 and hook l^4 remain in their elevated abnormal position until the train has passed, after which the trip-bar will 115 resume its normal elevated position and the arm l^2 will drop to its normal position, causing the hook l^4 to catch the pawl d' , which also constitutes a starting device, and throw the pawl back to disengage it from the detent 120 d and permit the weight C to further rotate the shaft a^5 in the same direction as before, while the shaft a , by reason of the longer radius of the crank-arm a' , is rotated back in an opposite direction from that in which it 125 was rotated before to cause the gates A' to be returned to their normal or vertical position.

When the arm l^2 nearly reaches the end of its downward movement, having through its hook l^4 pulled the pawl d' back from engage- 130 ment with the detent to permit raising of the gates, a stop 17 on the standard strikes the hook l^4 and throws its upper end out to disengage it from the pawl d' and permit the lat-

ter to resume its normal position in readiness to engage the detent d when the gates are next lowered, the spring l^5 maintaining the hook normally in position to engage the pawl when the arm l^2 is raised and lowered. Thus when the train leaves the crossing the gates are raised, the shaft a^5 being again checked in its rotative movement by the detent d striking the pawl d^2 .

As the train proceeds beyond the crossing in the direction of arrow 3 it strikes and depresses in succession the track-bars J and I, but the track-bar J being depressed first no pull is exerted on the cable h and no operation of the parts is effected.

A train approaching in the direction of arrow 5, Fig. 3, being a direction opposite to that just described, will depress the outer trip-bar I in advance of the inner trip-bar J, and thereby cause a pull to be exerted on the cable h , which when pulled will turn the bell-crank lever d^7 , Fig. 1, to act through the pins 1 to throw the pawl d^2 back into its dotted position to permit the weight C to lower the gates in the same manner as when the pawl d^2 was thrown back by movement of lever d^6 and cable e , previously described.

The gates are stopped when lowered by engagement of the detent d with the pawl d^7 , which pawl is thrown back by depression of the trip-bar L when the train leaves the crossing precisely as before when the train was moving in the opposite direction. Thus on a single track the gates are lowered before the train reaches the crossing and are raised when the train leaves the crossing.

The weight C is wound up by the following mechanism: A trip-bar M, Figs. 2 and 3, preferably constructed in yoke form, as shown, is pivoted on a shaft m , journaled in suitable bearings, an arm m^1 , extending rearwardly upon said shaft, being pivoted at its outer end at m^2 to the end of the crank-arm m^3 on a shaft m^4 , which extends through the interior of and is journaled in the main standard A, the said shaft m^4 within the standard (see Fig. 1) having an arm m^5 , through which is loosely passed the end of a rod m^6 , jointed at its upper end at m^7 to the end of a winding-lever m^8 , loosely journaled about the hollow shaft b^x .

A spring m^9 is interposed between the arm m^5 and an adjustable collar or nut m^{10} , threaded on the rod m^6 , so that when the trip-bar M is depressed it will cause the arm m^5 to be lifted and through the spring m^9 and collar m^{10} lift the outer or free end of the lever m^8 , the spring permitting a yielding movement to arrest the shock from the locomotive-wheel.

A pawl n , pivoted at n^1 on the lever m^8 , has its arm n^2 acted upon by a spring n^3 , so as to tend to engage with the ratchet-teeth on the periphery of the wheel n^4 , fast on the hollow shaft b^x , to which the cable-drum b^3 is also fast. When the lever m^8 is lifted by depression of the trip-bar M, the pawl n rotates the wheel n^4 and hollow shaft b^x a distance equal

to one or more of the ratchet-teeth to thereby wind up the cable c and raise the weight C.

When the trip-bar M is permitted to rise after the passage of a wheel, the lever m^8 is returned to its lowermost position, and the pawl n strikes the end of an upwardly-extended arm n^x , which move it from engagement with the ratchet-teeth of the wheel n^4 , so that when the pawl is in its normal position the mechanism on the shaft is free to be rotated by the weight C upon the operation of the gate.

A series of depressions of the track-bar M, by the passage thereof of the many wheels under a train, causes the shaft b^x to be rotated sufficiently to raise the weight C to its highest position, so that the weight is automatically raised or wound up by the passage of a train to be in readiness to operate the gates upon the approach of another train.

A collar o , Figs. 1 and 8, is threaded upon the hollow shaft b^x , and is restrained from rotation by a pin o^1 , standing out from the interior of the standard A and extended through a slot in an ear o^2 , depending from the collar o , in order that when the shaft is rotated within the non-rotatable collar o the said collar will be moved longitudinally on the shaft. This collar o has at its upper side an ear o^3 , in which is tapped a threaded finger o^4 , the inner end of which projects beyond the ear, as shown at o^5 , Fig. 8.

When the hollow shaft b^x is rotated to wind up the weight C, the collar o is caused to travel to the right or in the direction of arrow 7, Fig. 8, and the pitch of the threads on the shaft is such that just before the weight C has, by rotation of the shaft, been raised to its most elevated position the beveled projecting end o^5 of the finger o^4 on the collar will strike a flat spring n^5 , secured to the side of the arm n^2 of the pawl n , and will compress the spring or move it inwardly toward the surface of the arm of the pawl, and as the pawl is lifted to disengage it from the ratchet-toothed wheel n^4 by the next succeeding downward movement of the lever m^8 the spring-plate n^5 upon the side of the pawl will be lifted above the finger o^4 and will immediately spring out above the end o^5 of the screw and prevent the pawl dropping again into engagement with the ratchet-toothed wheel n^4 until the shaft b^x has, by further operation of the gates, been rotated in an opposite direction by the unwinding of the weight sufficiently to withdraw the collar and finger o^4 from beneath the pawl, when the latter will again drop into engagement with the ratchet-toothed wheel n^4 , and upon successive depressions of the trip-bar M again wind the weight C to its elevated position, when it will again be disengaged from the ratchet-toothed wheel by the approach of the finger o^4 on the collar o . Thus after each operation of the gates the mechanism is wound up by the passage of the wheels of the train over the trip-bar M, and when the train is a long one and the

number of depressions of the trip-bar M is greater than the number necessary to completely wind the weight C the collar *o*, just before the weight has reached its most elevated position, will throw the winding mechanism out of operation, so that thereafter any number of depressions of the trip-bar will fail to move the weight until the same has been permitted to drop somewhat by operation of the gate.

Referring to Figs. 1 and 9, the gate-shaft *a* within the standard A is provided with a toothed sector *p*, the teeth of which are in engagement with the teeth of a rack *p'* on the end of a piston-rod *p²*, the piston *p³* of which is fitted to move vertically within a closed cylinder P. Within the cylinder P are placed one or more rods *p³*, which extend longitudinally of the cylinder from one to its other head and pass through suitable openings in the piston. These rods *p³* are of less diameter between than at their ends, so that while the said rods nearly fill the openings in the piston when the latter is at or near either end of the cylinder, yet when the piston is moving through the middle portion of the cylinder from one extreme position to the other the reduced portions of the rods do not fill to such an extent the openings in the piston. The object of this will be hereinafter described.

The cylinder P is filled with oil or some other suitable fluid, which, as the piston *p³* in the cylinder is moved from one end of its stroke to the other by the raising or lowering of the gates A', acts as a retarding device to prevent too rapid movement of the gates, the fluid passing readily from one side of the piston to the other through the openings in the piston surrounding the reduced portions of the rods *p³* while the piston is moving from one end of its stroke to the other, but when the piston, actuated by the crank-disk *a⁴*, approaches the end of its movement in either direction the openings in the piston surrounding the rods and through which the retarding fluid must pass are so reduced by the greater diameter of the ends of the rods *p³* as to retard the flow of the fluid through the openings and thereby check or retard the movements of the gates. The movement of the fluid from one to the other side of the piston is further controlled by a suitable valve *p^x*, herein shown as a disk having a threaded nipple *p⁵*, which is tapped into the piston, as shown, or into the end of the piston-rod, said valve being provided with suitable openings *p⁶*, adapted to register with corresponding openings in the piston, which openings are opened more or less by rotative movement of the disk valve by means of its stem *p⁷*. I also use in connection with this retarding device a peculiar packing to prevent escape of the retarding fluid.

Referring to Fig. 9, *r* represents an elongated cup surrounding the piston-rod *p²*, said cup being connected by a suitable pipe *r'* with a closed chamber *r²* at the opposite end

of the cylinder and into which the stem *p⁷* of the valve *p⁸* projects and moves. This cup *r*, together with the pipe *r'* and closed chamber *r²*, are filled with oil or other suitable liquid, which forms a liquid seal about the piston-rod *p²* and its extension or stem *p⁷* to absolutely prevent the escape of any retarding fluid from within the cylinder. The pipe *r'* is preferably connected by a short branch *r³* with one end of the cylinder, a check-valve *r⁴* being introduced into this branch to permit fluid from the pipe to flow into the cylinder as the piston is drawn up to thereby keep the same always completely filled.

The sector *p* is shown as provided with several pins or teeth *s*, which as the shaft *a* is rotated to drop the gates cooperate with a pivoted latch *s'* on an arm *s²*, pivoted at *s³* and carrying a hammer *s⁴*, which when the arm is moved is caused to strike a bell or gong *s⁵* to sound an alarm.

When the gates are raised, the pins *s* simply turn the latch *s'* on and with relation to the arm *s²* and do not, therefore, actuate the hammer *s⁴*.

This invention is not restricted to the particular construction or arrangement of the various parts of the mechanism herein shown and described for the sake of illustrating this invention, for the same may be varied in many particulars without departing from the scope or spirit of this invention.

The arm *m'*, actuated by the trip-bar M, might, if so desired, itself enter the standard A and actuate the bar *m⁶*, but such a construction would necessitate a vertical slot of suitable length in the standard, through which the arm should work. Such a slot would permit snow and water to enter the standard and would for that reason be objectionable, and I therefore prefer to connect the arm *m'* with the arm *m³* on the short shaft *m⁴* and permit the shaft to extend through the standard to the interior thereof, for the shaft may be suitably packed to prevent entrance of any snow or water. The bell-crank lever shafts at the main standard A are also carried through the standard to the outside thereof, because a rotating shaft may be more tightly packed to exclude water, &c., than could the wires if themselves passed through the standard to connect with the lever inside the standard.

The inner trip-bars by throwing the actuating-levers *f'* out of their normal positions to prevent their engaging the levers *e⁴* thereby render the connecting devices between the outer trip-bars and the starting devices inoperative, for the said actuating-levers constitute a part of the connecting devices.

I claim—

1. A railway-gate, actuating mechanism therefor, and an outer and an inner trip-bar, said trip-bars being adjacent to, but disjointed from and independent of, each other, combined with a starting device for the actuating mechanism, and intermediate connec-

tions, intermittingly connecting the same and said trip-bars whereby depression of the trip-bars, when the outer trip-bar is acted upon first, causes the said starting device to be operated; but when the inner trip-bar is acted upon first, causes the trip-bars to be disconnected from the starting mechanism, substantially as described.

2. A railway-gate, actuating mechanism therefor, and a starting device for the said mechanism, combined with two outer trip-bars located at opposite sides of the gate, two inner trip-bars independent of the said outer trip-bars located at opposite sides of the gate but between said outer trip-bars, and connecting devices between each of the said trip-bars and said starting device, whereby either outer trip-bar when acted upon in advance of its adjacent inner trip-bar acts to operate said starting device for lowering the said gate, substantially as described.

3. A railway-gate, actuating mechanism therefor, and a starting device to control said mechanism, combined with a trip located at a distance from said gate, and connecting devices between said trip and starting device and including a cable passed over a swinging pulley and held taut by a weight to connect said trip with and to operate said starting device, substantially as described.

4. A trip-bar-supporting block having a flange at one side adapted to hook upon the flange of a rail at one of its sides, and a body extending beneath the rail, combined with a plate adapted to hook over the flange of the rail at its opposite side and to rest along one of the faces of the body, and a bolt to draw the plate and flanged block together to clamp the foot of the rail between them, substantially as described.

5. A trip-supporting block having a flange at one side to hook over the flange of a rail at one side, a body extending beneath the rail, combined with a plate f^{10} adapted to hook over the flange of the rail at the side opposite said block-flange and to rest along the adjacent face of the body, and a bolt passed along the opposite face of the said body through said plate to draw the said plate and block together, substantially as described.

6. The combination with a trip-supporting block adapted to be secured to a rail, of a shaft journaled in said block and provided at one side thereof with a crank-arm f^5 , and a trip-bar mounted on the outer end of said crank-arm, a collar on the end of the shaft opposite the crank-arm, and a spring interposed between the collar and block to permit the shaft to yield longitudinally and return the crank-arm to its normal position, substantially as described.

7. A gate, normally-wound mechanism to actuate the same, and a shaft rotated by said mechanism and carrying a detent, combined with two pawls adapted to alternately engage said detent and restrain said mechanism from

operation, and trip-bars independently connected respectively with and to move said pawls to operate, substantially as described.

8. A gate, and a normally-wound mechanism to actuate the same, combined with two pawls to alternately engage and restrain said mechanism from operation, two trips located at opposite sides of said gate, each connected with and to move one of the said pawls, and a third trip located between the said two trips, and connected with and to move the other of said pawls, to operate, substantially as described.

9. A gate, normally-wound actuating mechanism therefor, and two pawls to alternately engage and restrain said mechanism from rotation, combined with two oppositely-facing bell-crank levers connected with and to move one of said pawls, and trips located at opposite sides of said gate and connected respectively with and to move said bell-crank levers, substantially as described.

10. A gate, actuating mechanism therefor including a shaft b' , a wheel b thereon; a drum loosely journaled about said shaft and connected with said wheel by a pawl-and-ratchet connection, a cable wound about said drum and sustaining a weight, combined with a lever pivoted on the shaft b' , a trip to vibrate said lever, a spring-controlled pawl on the lever adapted to engage on one vibrating movement of the lever the ratchet-toothed wheel fast on said drum, and a device to come in contact with said pawl and thereby disengage it from said ratchet-toothed wheel upon the return or opposite movement of the vibrating lever, substantially as described.

11. A gate, actuating mechanism therefor including a shaft b' , a wheel b fast thereon; and a weight-sustaining drum loosely journaled about said shaft b' and connected with said wheel by a pawl-and-ratchet connection, combined with a vibrating lever pivoted on said shaft and connected with and to rotate by its vibrations the said drum to wind up the weight, a trip, and a yielding connection intermediate the same and said pawl and lever, to operate the latter, substantially as described.

12. A gate, actuating mechanism therefor including a shaft b' , a wheel b , a weight-sustaining drum on said shaft and connected with said wheel by a pawl-and-ratchet connection, a vibrating lever carrying a pawl to engage a ratchet-toothed wheel on said drum, and a trip, connections between said trip and lever to vibrate said lever and pawl to rotate the drum and wind the weight, and a sliding extension member, normally held yieldingly extended, forming part of said connections, whereby the shock from said trip is not transmitted to the winding mechanism, substantially as described.

13. A gate, actuating mechanism therefor including a wheel b mounted on a shaft b' , a weight-sustaining drum loosely journaled

about said shaft and connected with said wheel by a pawl-and-ratchet connection, a vibrating lever carrying a pawl to engage a ratchet-toothed wheel on said drum, and a trip connected with and to vibrate said lever and pawl to rotate the drum and wind the weight, combined with a collar threaded to move longitudinally on said shaft, and to engage said pawl, to operate, substantially as described.

14. A retarding device for railway-gates, consisting of a cylinder, a piston therein, connected with and reciprocated by the gate, their actuating mechanism, an opening in said piston, a longitudinal bar extended through said opening and reduced in diameter at its middle to increase the area of the surrounding opening in the piston as the latter moves through the middle portion of its track, a second opening through the piston, a valve rotatable across the face of the piston to close said second opening, and a stem on said valve, said stem extending through and beyond the adjacent end of the cylinder, whereby the valve may be externally operated, substantially as described.

15. A gate, mechanism to automatically move the same from one to another position, a cylinder containing a piston connected with and reciprocated by said mechanism, a cup surrounding the piston and adapted to be filled with liquid to form a liquid seal, and a connection between said cup and cylinder whereby the latter is maintained at all times full of fluid, substantially as described.

16. A gate, mechanism to automatically move the same from one to another position, a cylinder, a piston therein having its piston-rod connected with and reciprocated by the said mechanism, a valve on said piston having its stem extending through the opposite cylinder-head, a cup surrounding the piston-rod, and a chamber inclosing the valve-stem, a pipe connecting said cup and chamber, and a branch connecting said pipe with the interior of the cylinder, the cup, pipe, chamber and cylinder being filled with fluid, to operate, substantially as described.

17. The winding mechanism, comprising a rotating shaft spirally grooved at one end, a drum fixed thereon at the other end, a ratchet-wheel secured to the inner end of the drum, a reciprocating pawl arranged to engage the ratchet-wheel thereby to rotate said drum, and a non-rotatable collar arranged to travel longitudinally of said shaft by means of the spiral groove thereof and carrying a finger to engage said pawl and lift the same out of

engagement with the ratchet, substantially as described.

18. The winding mechanism, comprising a rotating shaft spirally grooved at one end, a drum fixed thereon at the other end, a ratchet-wheel secured to the inner end of the drum, a reciprocating pawl arranged to engage the ratchet-wheel thereby to rotate said drum, a flat spring on the inner side of said pawl, and a non-rotatable collar arranged to travel longitudinally of said shaft by means of the spiral groove thereof and carrying a finger to engage said pawl by means of said spring and lift the same out of engagement with the ratchet, substantially as described.

19. In a railway-gate, the lever-arm L^2 , fixed on shaft L^1 , and carrying pivoted to its free end the bell-crank pawl L^4 hooked at its upper end and spring-pressed at its lower end, combined with the post 17 and spring-retracted detent d' , substantially as described.

20. The compensator and cable-moving mechanism, comprising a lever pivoted at one end, and the cable-pulley pivoted on the free end of said lever, combined with a rest for said free end, a cable passed over said pulley and provided with a weight thereon suspended beneath said pulley, a lever normally engaging said free end, and means to throw said lever out of said engagement, substantially as described.

21. The compensator and cable-moving mechanism, comprising a lever pivoted at one end, and the cable-pulley pivoted on the free end of said lever, combined with a rest for said free end, a cable passed over said pulley and provided with a weight thereon suspended beneath said pulley, a lever pivoted at one end carrying a bell-crank pivoted thereto at its other end, said bell-crank being normally in engagement at its outer end with the free end of said pulley-lever, and a second lever adjacent to said other lever and normally moving in unison therewith, and pivoted at its free end to the inner end of said bell-crank, whereby movement of the said second lever relatively to its companion lever engages and disengages said companion lever through its bell-crank with the pulley-lever, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HARRY W. BURLEIGH.

Witnesses:

EDWARD B. FERGUSON,
JAMES E. BARNARD.