(No Model.) 3 Sheets—Sheet 1.

E. A. CHAPEL.

AUTOMATIC RAILWAY GATE.

No. 458,267. Patented Aug. 25, 1891.

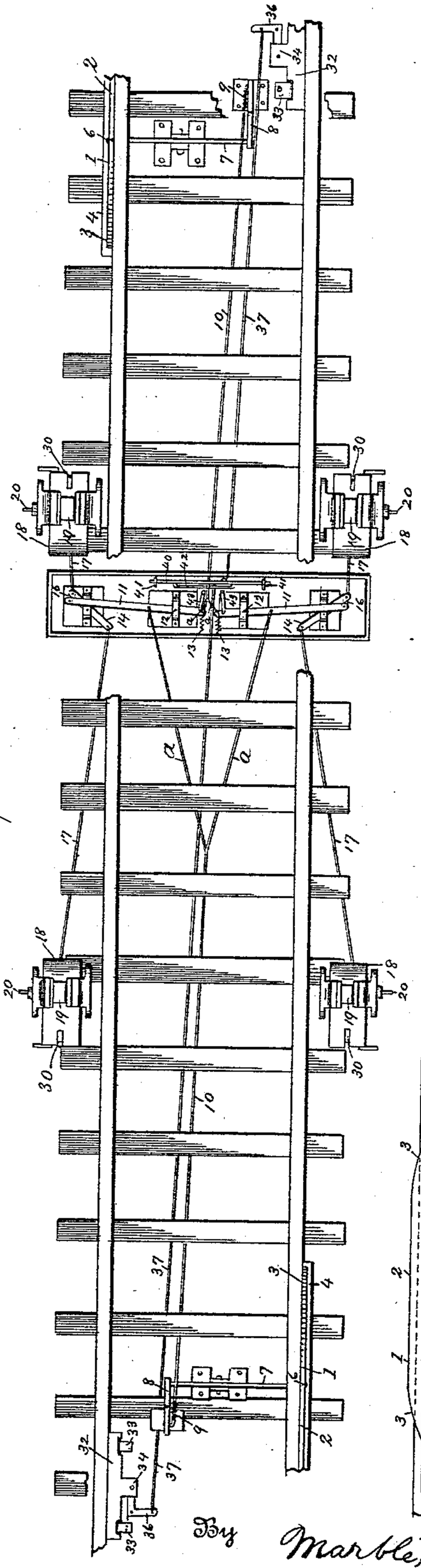

Fig. 1.

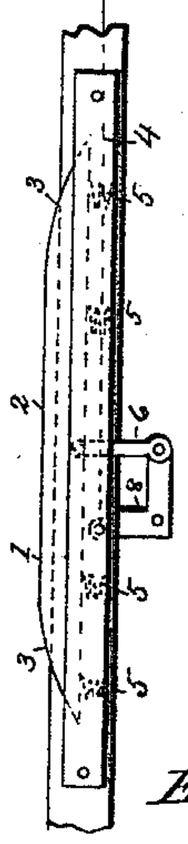

Fig. 2.

Witnesses:
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Inventor:
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By Marble, Mason & Canfield,
Attorneys.

(No Model.)

3 Sheets—Sheet 2.

E. A. CHAPEL.

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Fig. 3

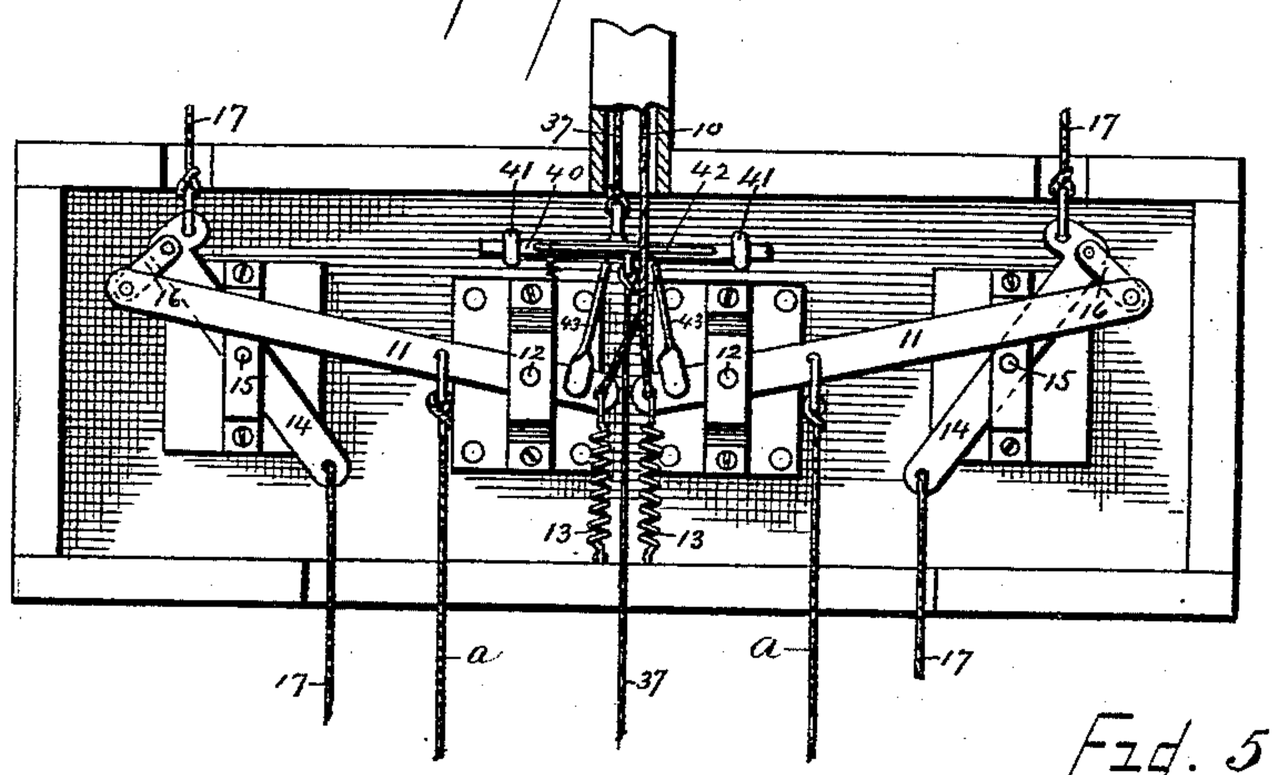


Fig. 4.

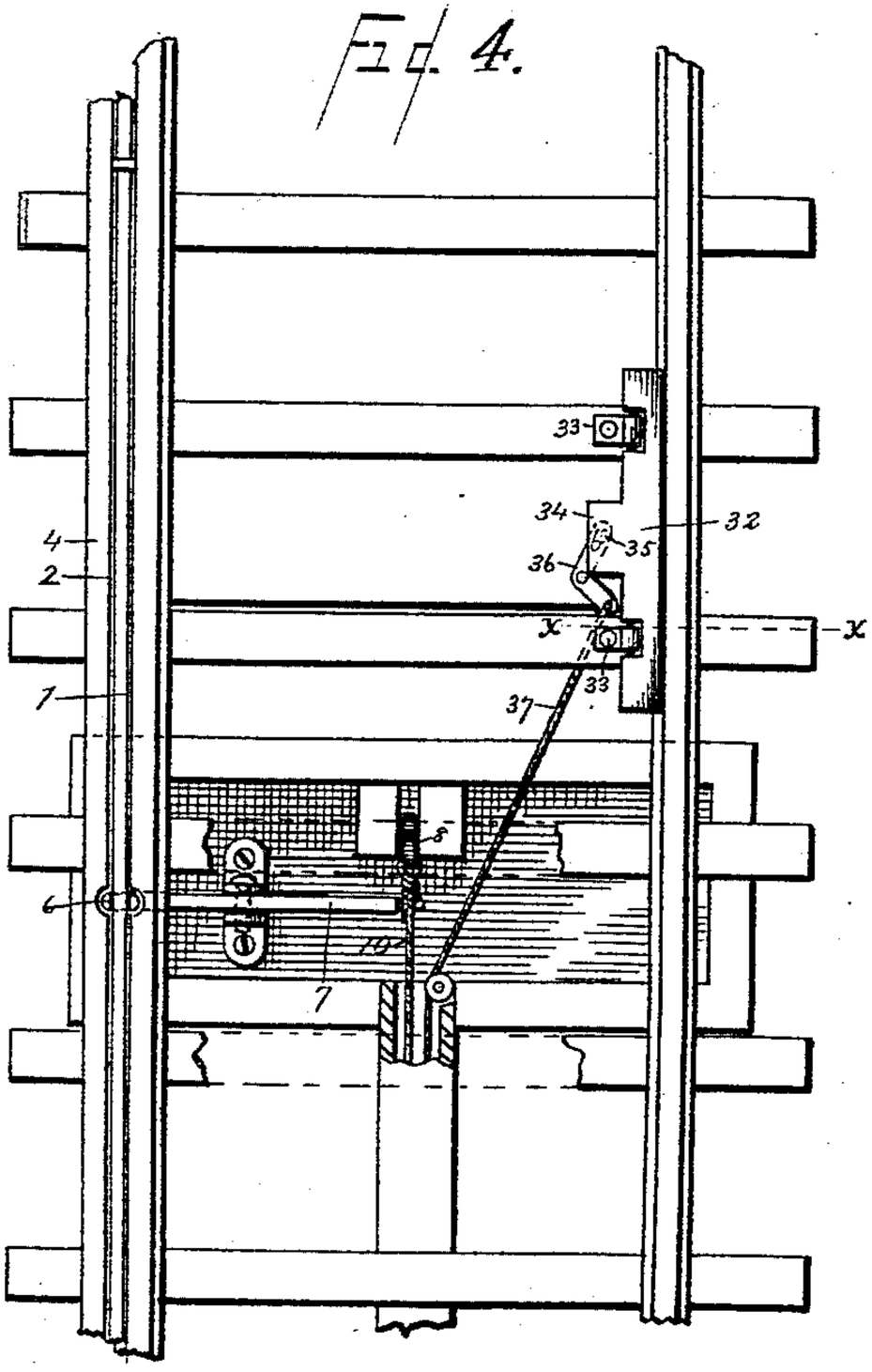


Fig. 5

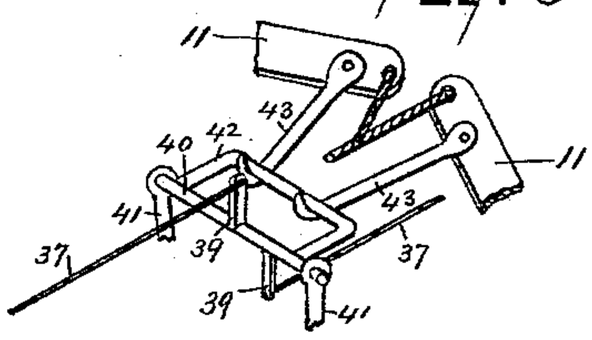


Fig. 6.

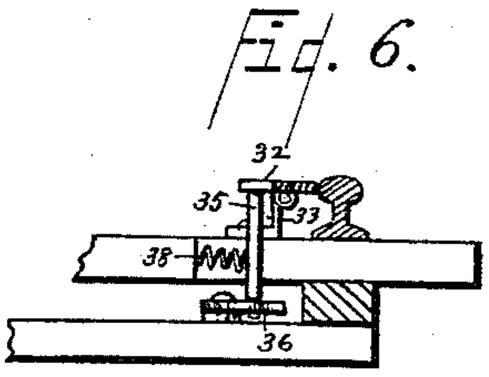
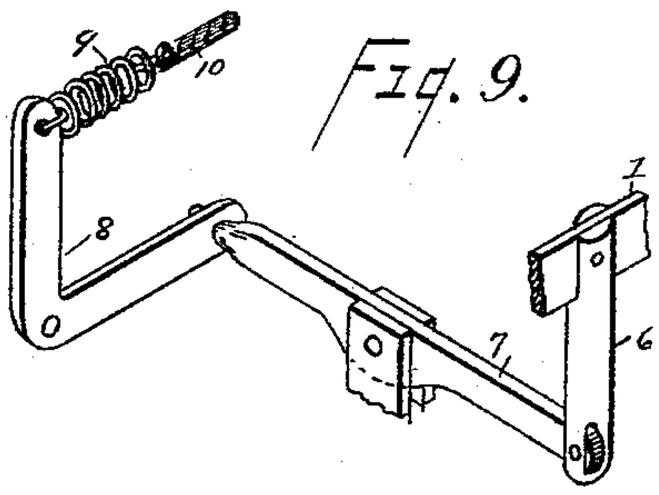


Fig. 9.



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(No Model.)

3 Sheets—Sheet 3.

E. A. CHAPEL.

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Fig. 7.

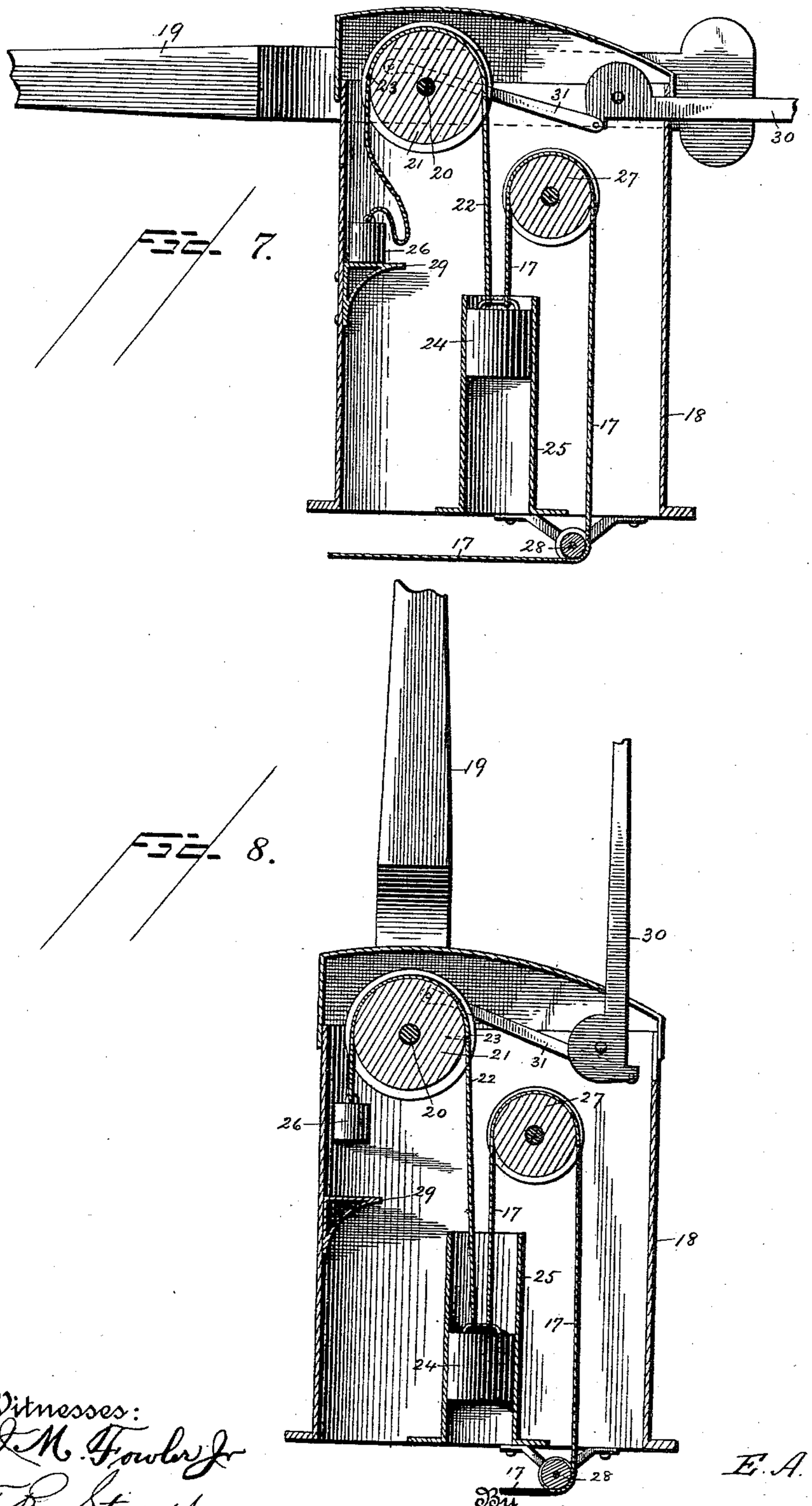

Fig. 8.

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UNITED STATES PATENT OFFICE.

EDWARD A. CHAPEL, OF MARENGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO ADELBERT B. COON AND MERRICK J. GOCHEY, OF SAME PLACE.

AUTOMATIC RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 458,267, dated August 25, 1891.

Application filed September 2, 1890. Serial No. 363,755. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. CHAPEL, a citizen of the United States, residing at Marengo, in the county of McHenry and State of Illinois, have invented certain new and useful Improvements in Automatic Railway-Gates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates, generally, to railway-gates, and particularly to improvements in that class thereof which are known as "automatic railway-gates," which are composed of one or more beams or masts located on each side of a thoroughfare or crossing and which are constructed and arranged to be simultaneously lowered and raised, these movements of the masts being automatically accomplished by a passing train; and it consists in the improved construction and arrangement or combination of parts hereinafter fully disclosed in the description, drawings, and claims, whereby the beams or masts, whether one, two, or four be employed, will be automatically and simultaneously lowered by an approaching train and raised to their normal positions after said train has passed the crossing.

The object of my invention is to provide improved means for effectually closing and opening a roadway or crossing on each side of the track as a train approaches and departs and while it is at a considerable distance from said crossing and to keep the latter closed until the train has passed, so that vehicles will be excluded and also pedestrians warned of the proximity of the train and protected. To this end I employ, primarily, the well-known or ordinary plan of lowering from the sides of crossings and tracks nearly counterbalanced masts, which are pivoted about three feet above the surface of said crossings and lowered in vertical planes until they are horizontally held across said crossings at the proper height therefrom and at suitable distances from and parallel with the tracks. For a narrow crossing—for instance, a country road—a single mast or a pair of masts would be sufficient, while a wide crossing or thoroughfare should be more safely guarded or closed by two pairs of masts, one pair at each side of the track and so arranged that their extremities, when lowered, will meet at the center of the roadway or crossing. This object is accomplished by the mechanism illustrated in the accompanying drawings, forming part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 represents a partly-broken plan view of my entire invention, including the mechanisms for raising and lowering the masts at each side of the crossing; Fig. 2, a side elevation of one of the pressure-plates and its attachments; Fig. 3, a plan view of the central lever mechanism and its connections; Fig. 4, a plan view of one of the pressure-plates and one of the releasing-plates and their connections; Fig. 5, a broken detail perspective view of the locking devices and their connections; Fig. 6, a cross-section of the releasing-plate and its attachments on the line *x x* of Fig. 4; Fig. 7, a detail vertical section of one of the hollow gate posts or housings, showing the positions of the large and small weights when the mast is lowered or in horizontal position; Fig. 8, a similar view with said weights in the positions they assume when the mast is raised or in vertical position, and Fig. 9 a detail perspective view of the levers for receiving motion and power from the pressure-plate and transmitting the same for lowering the masts.

My invention is shown in the drawings as applied to a single-track railway, in connection with which, at suitable points or at any desired or necessary distance from a railway-crossing, are employed the pressure-plates 1, which are arranged edgewise against the outer sides of the track-rails and secured thereto in such positions that they can yield in vertical planes to the pressure of car-wheels passing thereover. Each of these pressure-plates is gradually inclined or tapered along its ends down to or slightly below the surface of the adjacent rail, its central portion being horizontal and elevated slightly about two and one-half inches above the surface of said rail, and it is to be made of such length that it

will extend from truck to truck of the longest cars, so as to remain continually depressed during the passage of a train over a crossing. I have found that a plate of this kind should be about sixty feet in length and made with a central, level, or horizontal plane 2, about thirty feet long, and with inclined or tapered end portions 3, about fifteen feet long, so that it will comply with the requirements of cars of varying lengths; also, each of these pressure-plates is loosely supported against the outer side of the track-rail by the long guide-plate 4, which is bolted at its ends to said rail at points beyond the ends of said pressure-plate, as shown in Fig. 2. Beneath the lower edge of each pressure-plate is arranged a suitable number of strong spiral springs 5, which serve to hold its upper edge normally elevated above the level of the rail, but which will yield to permit its depression under the weight of a passing car or train. This result may also be accomplished by mounting and holding said springs and pressure-plate in suitable castings secured to the cross-ties at the outer side of the rail.

At or about the middle of each pressure-plate 1 and to its lower edge is secured a short downwardly-projecting arm 6, which is pivotally connected at its lower end to the outer end of the horizontal lever 7, which is jointed at its inner end to the lower or horizontal arm of a vertically-arranged bell-crank lever 8, as shown in detail in Fig. 9. To the upper or vertical arm of this bell-crank lever is attached the outer end of a spiral spring 9, to the inner or opposite end of which is secured the outer end of one of the cables 10, which, at their inner ends, are bifurcated, as at *a a* in Fig. 1, and connected to a pair of horizontally-arranged levers 11, which are fulcrumed upon the vertical pivots 12 and attached at their inner ends to the spiral springs 13, and which are adapted to be moved in the arc of a circle in a horizontal plane when either of the pressure-plates 1 is depressed and the cable 10 is drawn outwardly, the pull upon the spiral springs serving to restore said levers to their normal positions as soon as the depression of the pressure-plate ceases. A second pair of horizontally-arranged levers 14 are centrally fulcrumed upon the pivots 15 and connected at their outer ends by the links 16 to the outer ends of the levers 11. To the ends of the levers 14 are connected the cables 17, which lead to and operate the mast lowering and raising mechanism.

At the sides of the railway-crossing are mounted the hollow gate-posts or housings 18, as shown in detail in Figs. 7 and 8, within which the masts 19 are rigidly secured to the transverse rock-shafts 20, which are journaled in the walls of said housings and arranged at the proper height above the crossing to cause said masts, when lowered into horizontal position, to effectually bar or close the same to passage. Within each housing 18 and rigidly secured to the rock-shaft 20 is the pulley 21, which is peripherally grooved for guiding the cable 22, which is fixed thereto by a bolt or staple 23. A heavy weight 24 is attached to one end of the cable 22, which, when it is taut and the mast 19 is in a raised or vertical position, suspends said weight at or near the bottom of the vertical tube 25, within which it is guided in its vertical movements. To the other end of the cable 22, on the opposite side of the pulley 21, is attached a lighter weight 26, which exerts a constant pull in opposition to the heavier weight 24 when the latter is raised, and thus, in connection with the weighted lower end of the mast, operates to hold the latter in almost counterbalanced vertical position. To the heavy weight is also attached the cable 17, which passes over the grooved pulley 27 and under a guide-pulley 28 at the base of the housing. A bracket or shelf 29 is attached to the inside of each housing for the light weight to rest upon when the mast is lowered and the heavy weight is raised; also, within each housing is pivoted the lower end of a short supplemental beam or mast 30, which is operated from the pulley 21 by the connecting-rod 31, which is pivoted to the side thereof and which consequently is automatically lowered and raised simultaneously with the long mast 19. This short mast is employed for extending across and closing sidewalks, and thus protecting pedestrians while a train is passing; also, it could be used, if desired, for actuating the mast by hand.

This automatic lowering mechanism for the masts is operated as follows: When either pressure-plate 1 is depressed by the wheels of an approaching train, its arm 6 forces down the outer end of the horizontal lever 7 and raises its inner end. This rocks the bell-crank lever 8 and causes its vertical arm to pull or draw the bifurcated cable 10 outward, which, being attached to a pair of horizontally-arranged levers 11, moves their ends in the arcs of circles, operates the links 16 and the second pair of levers 14, and causes the cables 17, which are attached to the ends of the latter levers and pass over the pulleys 28 and 27, to lift or raise the heavy weights 24, which, when in this position, permit the masts 19 to be swung from their vertical positions by the light weights 26. After the masts have been started and partly lowered by these light weights they are not permitted to continue their descent, as they would bring the masts down with too great jar or violence, and therefore the housings 18 are provided with the shelves 29, which arrest the descent of said weights soon after the masts have been started from their vertical positions. Under these conditions the masts can never be thrown down so suddenly as to be dangerous or so as to break them or their connections as they descend after a slight start by the action of gravity. At points opposite the outer inclined or tapered portions 3 of the pressure-plates 1 are arranged the releasing-plates 32, which are placed against the inner

sides of the opposite track-rails and pivoted at their inner edges to the brackets 33, which normally support their upper surfaces about on a level with said track-rails and in position to have their outer edges depressed by the flanges of car-wheels when passing thereover. On the inner edge of each of these releasing-plates is formed an extension 34, from which a stem 35 projects downwardly and engages the outer arm of a horizontally-arranged bell-crank lever 36, to the end of the inner arm of which is secured the outer end of the cable 37. As each of these releasing-plates is pivoted at its inner edge, as shown in Fig. 6, the effect is that when its outer edge is depressed by the flanges of car-wheels the stem 35 is moved inwardly at its lower end, which results in causing the bell-crank lever 36 to draw the cable 37 outwardly. After pressure is removed from the outer edge of said releasing-plate it is returned to its normally-horizontal position by the spring 38 pressing against the lower portion of the stem 35. The inner ends of the two cables 37 are secured to the two oppositely-projecting arms 39 on the rock-shaft 40, which is journaled in the vertical supports 41, as shown in detail in Fig. 5, which is arranged near the inner portions of the levers 11 and which is provided with the bent rod or loop 42, which is adapted to be engaged with and disengaged from the catches 43 on the inner ends or arms of said levers 11, whereby the latter may be held in locked and unlocked condition when the pressure-plates 1 and the releasing-plates 32 and their connections are respectively operated by the car-wheels for lowering and holding the masts in horizontal positions and for releasing and permitting them to rise to their vertical positions.

The first of the last-named results—the holding of the levers 11 in locked condition when the masts are lowered and the crossing is barred or closed during the passage of a train in either direction—is effected by the pressure applied by the car-wheels to the raised level surfaces or planes 2 of the pressure-plates 1, which transmit motion through the mechanism described to the inner ends or arms of the levers 11 and cause their catches 43 to engage with and become locked to the bent rod or loop 42 of the rock-shaft 40 for holding said levers in fixed position, while the second of the last-named results—the releasing or unlocking of the levers 11 for permitting the masts to rise to their vertical positions—is effected by the last wheel of a departing train, which, after the opposite wheel has passed the outer end of the level or plane 2 of either pressure-plate 1, enters upon the inner end of the releasing-plate 32 and by its flange forces down the outer edge thereof, the result being that the bell-crank lever 36 and the cable 37 are moved outwardly and that the inner end of the latter, which is attached to one of the arms 39 on the rock-shaft 40, tilts the latter, releases the catches 43 from the loop 42, unlocks the levers 11, and permits the spiral springs 13, which are attached to the inner ends of said levers, to retract and draw their outer ends and connections into proper positions for releasing the tension on the cables 17, for lowering the heavy weights 24 and for permitting the masts 19 to rise to their vertical positions.

It will be obvious from the foregoing that my improved system of levers and cables can be employed for operating one mast or a single pair of masts arranged at one side of a single-track railway, as well as a pair of masts arranged at both sides of the track; that it can be also employed in connection with double-track railways upon which the trains run in opposite directions by the omission of one of the pressure-plates and its connections on one side of the crossing and of one of the releasing-plates and its connections on the opposite side of said crossing, as trains running upon a single track in the same direction will first depress the pressure-plate for lowering and locking the masts before the trains reach the crossing, and will then operate the releasing-plate after they have passed beyond said crossing, for unlocking and raising the masts to their vertical position; that this system of levers and cables can be varied in arrangement to suit particular locations or requirements and boxed or covered for preventing breakage and damage from water and ice; that numbers of other mechanical combinations of equivalent parts could be employed for transmitting the movement of the pressure-plates to these nearly-counterbalanced beams or masts, and that the same is true of the releasing-plates and unlocking mechanism. Hence I do not restrict myself to the specific construction and arrangement of parts herein shown and described, as they can be varied by the use of well-known equivalents without departing from the principles involved in my invention.

Having thus fully described the construction and arrangement or combination of the several parts of my invention, its operation, advantages, and capabilities, what I claim as new is—

1. In an automatic railway-gate, the combination, with two or more pivoted masts, of a spring-supported pressure-plate formed with inclined or tapered end portions and with a central horizontal portion, and lever and cable connections between said masts and pressure-plate, the lever connections comprising pairs of levers, those of a pair crossing each other and being connected together at their outer ends, the shorter levers of the pairs having their ends connected to oppositely-extending cables, substantially as described.

2. In an automatic railway-gate, the combination, with two or more pivoted masts, of a spring-supported pressure-plate formed with inclined or tapered end portions and with a central horizontal portion and pro-

vided on its lower edge with a downwardly-projecting arm, a horizontal lever, a vertical bell-crank lever, and a bifurcated cable receiving motion from said pressure-plate, and lever and cable connections between said bifurcated cable and the masts, the lever connections comprising pairs of levers, the shorter levers having their ends connected to oppositely-extending cables, substantially as described.

3. In an automatic railway-gate, the combination, with two or more pivoted masts, of a pressure-plate, and lever and cable connections between said masts and pressure-plate, said connections including pairs of levers, those of a pair crossing each other and being pivotally connected together at their outer ends, means for uniting these two pairs of levers at their inner ends, and cables and weights operated therefrom for lowering said masts, substantially as described.

4. In an automatic railway-gate, the combination, with two or more pivoted masts, of a spring-supported pressure-plate formed with inclined or tapered end portions and with a central horizontal portion, and lever and cable connections between said masts and pressure-plate, said connections including two pairs of horizontally-arranged levers, spiral springs secured to the inner ends of the longer levers, cables attached to the outer and inner ends of the shorter levers, and weights operated by said cables for lowering said masts, substantially as described.

5. In an automatic railway-gate, the combination, with two or more pivoted masts, of a pressure-plate, and lever and cable connections between said masts and pressure-plate, said connections including two pairs of horizontally-arranged levers, the two levers of each pair crossing each other, links for connecting the outer ends of each pair of levers, oppositely-extending cables attached to the outer and inner ends of the two shorter levers, and weights operated by said cables for lowering the masts, substantially as described.

6. In an automatic railway-gate, the combination, with two or more pivoted masts and mechanism for lowering them to horizontal position, of a releasing-plate which is pivotally supported at one edge and adapted to yield at its other edge under pressure of the flanges of car-wheels, a horizontally-arranged bell-crank lever having one arm connected to said plate, and means connected to its other arm for releasing or unlocking said lowering mechanism and for permitting said masts to be raised to their vertical position, said means comprising the rock-shaft having oppositely-projecting arms, the bent rod or loop, and the cable-actuating levers having arms provided with catches engaging said bent rod or loop, substantially as described.

7. In an automatic railway-gate, the combination, with two or more pivoted masts, of a spring-supported pressure-plate formed with inclined or tapered end portions and with a central horizontal portion and mechanism connected therewith for lowering them to horizontal position, a releasing-plate which is pivotally supported at one edge and adapted to yield at its other edge under pressure of the flanges of car-wheels, a horizontally-arranged bell-crank lever having one arm connected to said plate, and means connected to its other arm for releasing or unlocking said lowering mechanism and for permitting said masts to be raised to their vertical position, said means comprising the rock-shaft having oppositely-projecting arms, the bent rod or loop, and the cable-actuating levers having arms provided with catches engaging said bent rod or loop, substantially as described.

8. In an automatic railway-gate, the combination, with two or more pivoted masts, mechanism for lowering them, and means for locking them in their lowered position, of a laterally-pivoted releasing-plate and means connected thereto for unlocking said mechanism and permitting the masts to be raised to their vertical position, said means comprising the rock-shaft having oppositely-projecting arms, the bent rod or loop, and the cable-actuating levers having arms provided with catches engaging said rod or loop, substantially as described.

9. In an automatic railway-gate, the combination, with two or more pivoted masts, a cable connected to the shaft of each mast, a heavy weight attached to one end of said cable, and a light weight attached to its other end, of a laterally-pivoted releasing-plate, and means connected thereto for releasing said weights and permitting the masts to be raised to their vertical position, said locking and unlocking means comprising the rock-shaft 40, provided with the loop 42 and the oppositely-projecting arms 39, and the catches 43 on the inner ends of the levers 11, substantially as described.

10. In an automatic railway-gate, the combination, with a pivoted mast and means for lowering and raising the same, of a pivoted short supplemental mast and means for operating the same simultaneously with the mast first named, said means consisting of the rock-shaft 20, the pulley 21, and the connecting-rod 31, pivoted to the side of said pulley and the lower end of said supplemental mast, substantially as and for the purposes described.

11. In an automatic railway-gate, the combination, with a mast which tends to close when moved from a true vertical position, a rock-shaft for supporting the same, a pulley secured to said shaft, a cable rigidly fixed at a point in its length to the periphery of said pulley, a heavy weight attached to one end of said cable, and a light weight attached to its other end, of means for raising said heavy weight, a vertical tube for guiding said heavy weight, and a bracket or shelf for supporting said light weight, substantially as described.

12. In an automatic railway-gate, the combination, with a mast, a rock-shaft for sup-

porting the same, a pulley secured to said shaft, a cable rigidly fixed at a point in its length to the periphery of said pulley, a heavy weight attached to one end of said cable, and a light weight attached to its other end, of means for locking the mechanism which supports said heavy weight and means for unlocking the same and permitting the mast to be raised to its vertical position, substantially as described.

13. In an automatic railway-gate, the combination, with a mast, a rock-shaft for supporting the same, a pulley secured to said shaft, a cable rigidly fixed at a point in its length to the periphery of said pulley, a heavy weight attached to one end of said cable, and a light weight attached to its other end, of means for locking the mechanism which supports said heavy weight, and means for unlocking and permitting the mast to be raised to its vertical position, said locking and unlocking means consisting of the rock-shaft 40, provided with the loop 42 and the oppositely-projecting arms 30, and the catches 43 on the inner ends of the levers 11, substantially as described.

14. In an automatic gate, the combination, with two or more pivoted masts which tend to close by gravity, of means for holding said masts in a vertical position, mechanism, including levers 11, for releasing them, and mechanism consisting of the rock-shaft 40, provided with the loop 42 and the oppositely-projecting arms 39, and the catches 43 on the levers 11 for locking and unlocking the releasing mechanism, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD A. CHAPEL.

Witnesses:

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ART A. CRISSEY.