

No. 639,093.

Patented Dec. 12, 1899.

F. H. RICE.

AUTOMATIC RAILWAY GATE.

(Application filed Jan. 29, 1898. Renewed July 29, 1899.)

(No Model.)

7 Sheets—Sheet 2.

Fig. 2.

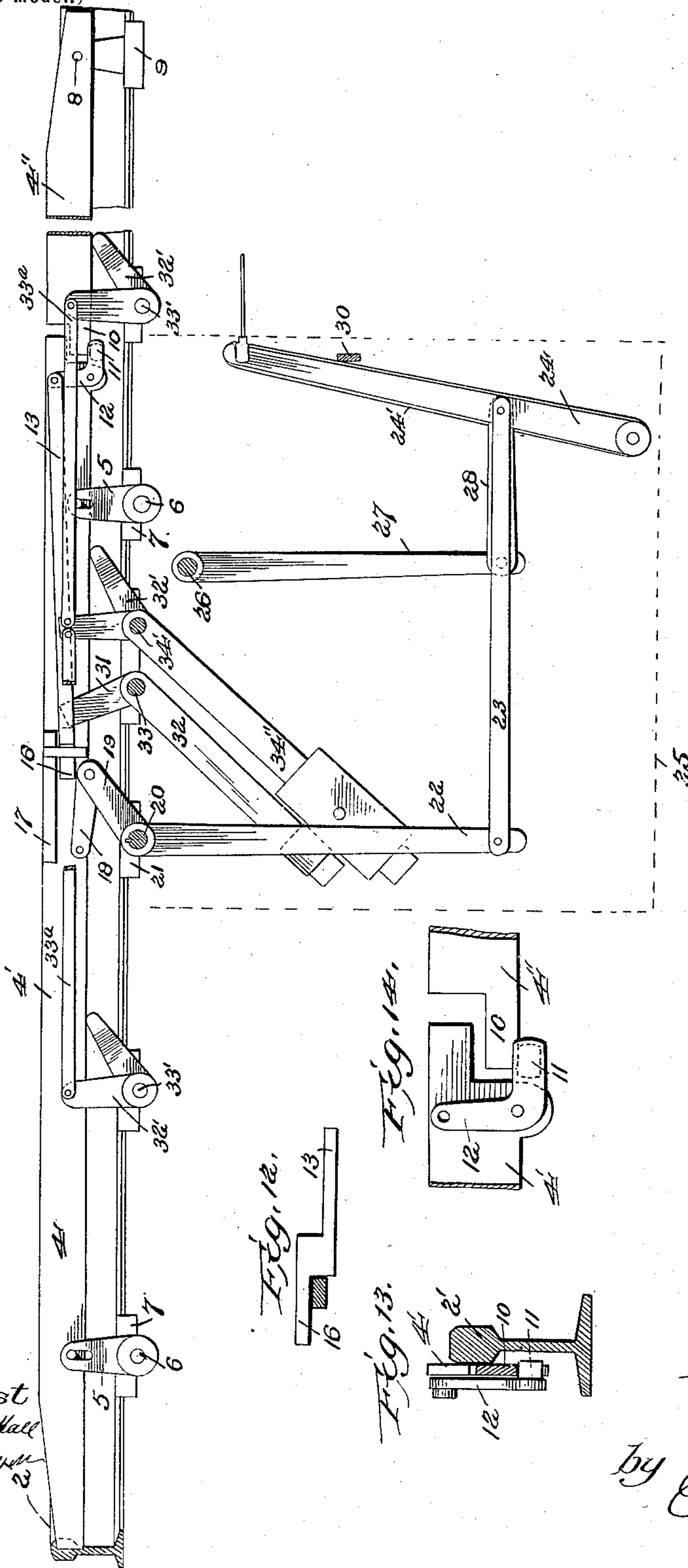


Fig. 12.



Fig. 14.

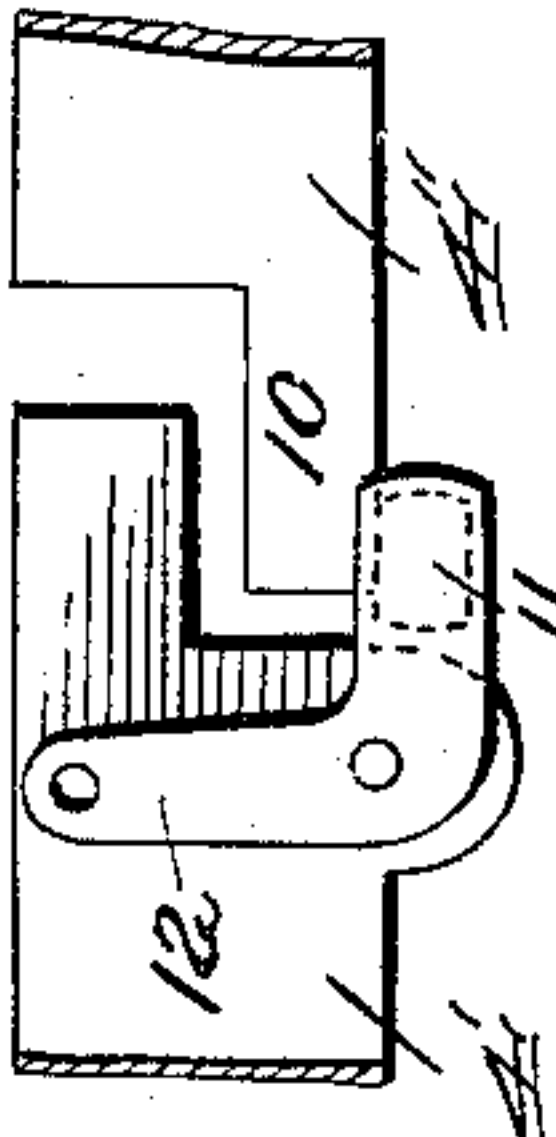
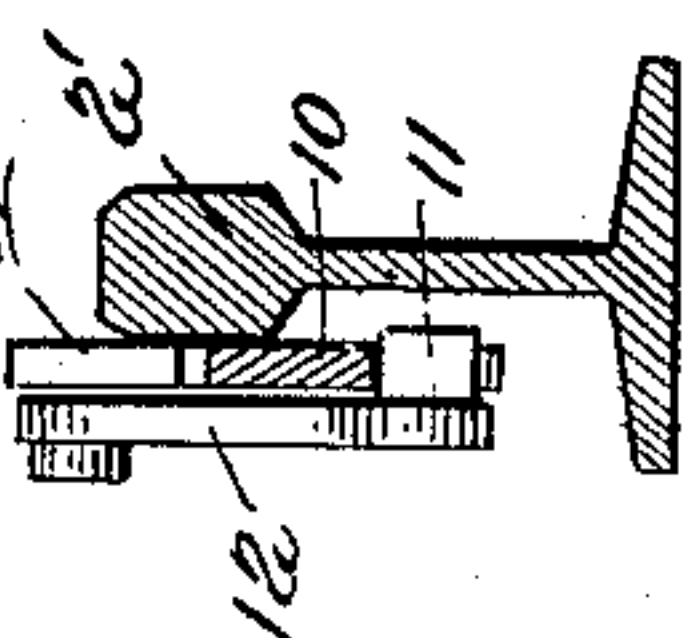


Fig. 13.



Attest
Am. F. Hall
W. D. Dwyer

Inventor
F. H. Rice
by Ellis Spear
Atty.

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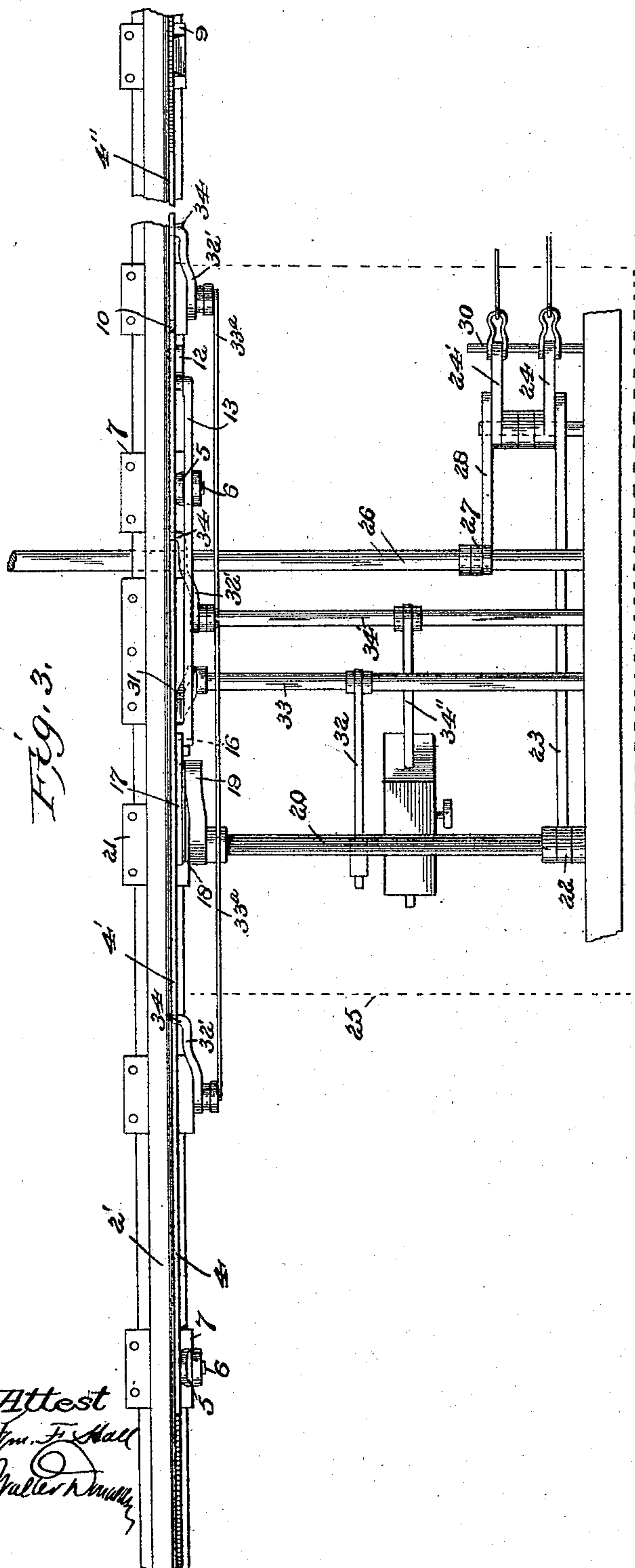
F. H. RICE.

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7 Sheets—Sheet 3.



Attest
Wm. F. Hall
Mallen & Mullen

Inventor
F. H. Rice
by Ellis Spear
Atty.

No. 639,093.

Patented Dec. 12, 1899.

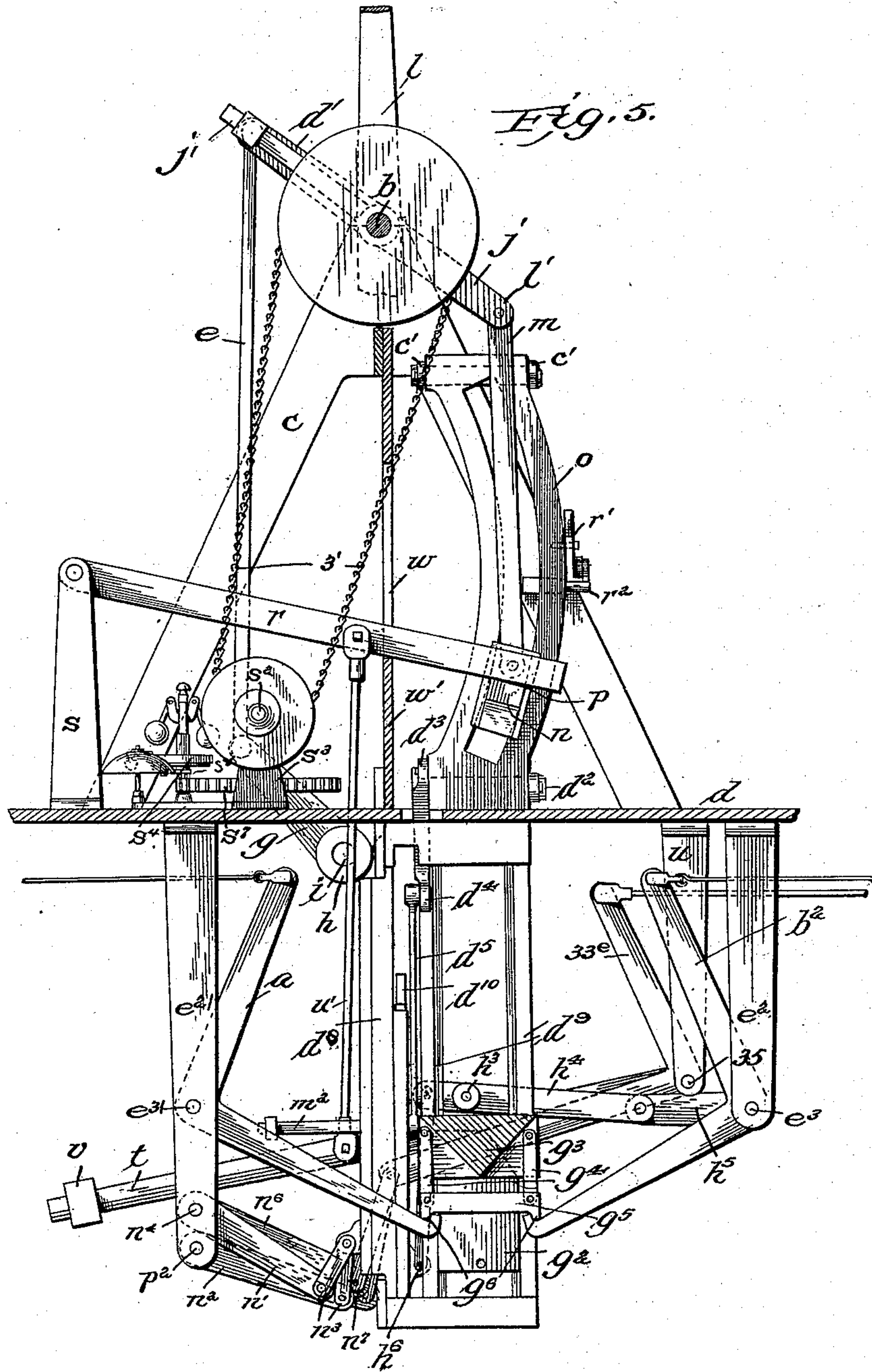
F. H. RICE.

AUTOMATIC RAILWAY GATE.

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(No Model.)

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Attest
Wm. F. Hall
Miller & Muldrow

Inventor
F. H. Rice
by Ellis Spear
Atty.

No. 639,093.

Patented Dec. 12, 1899.

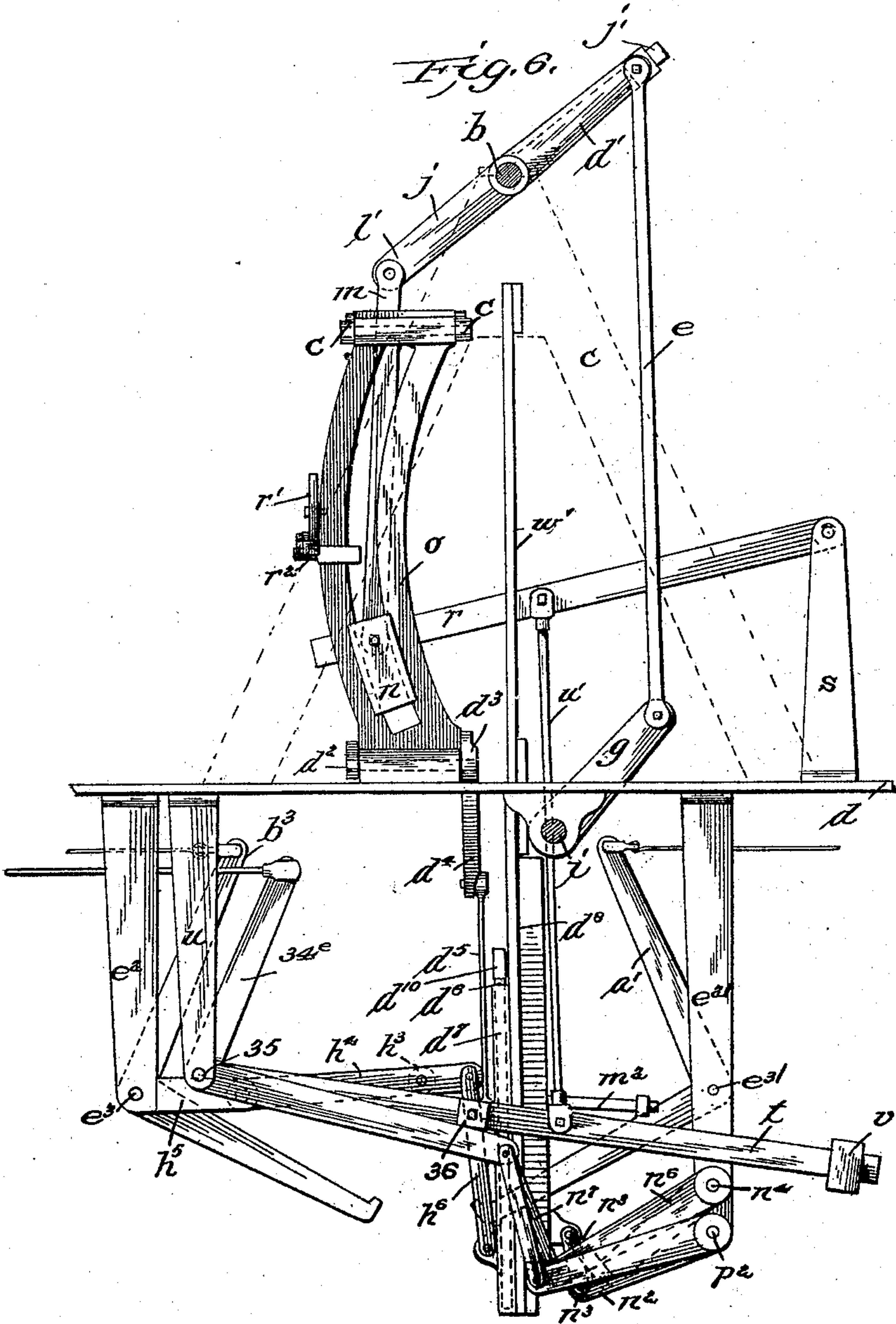
F. H. RICE.

AUTOMATIC RAILWAY GATE.

(Application filed Jan. 29, 1898. Renewed July 29, 1899.)

(No Model.)

7 Sheets—Sheet 5.



Attest
Malvern Donaldson
C. S. Middleton

Inventor
F. H. Rice
by *Ellis Spear*
Atty.

No. 639,093.

Patented Dec. 12, 1899.

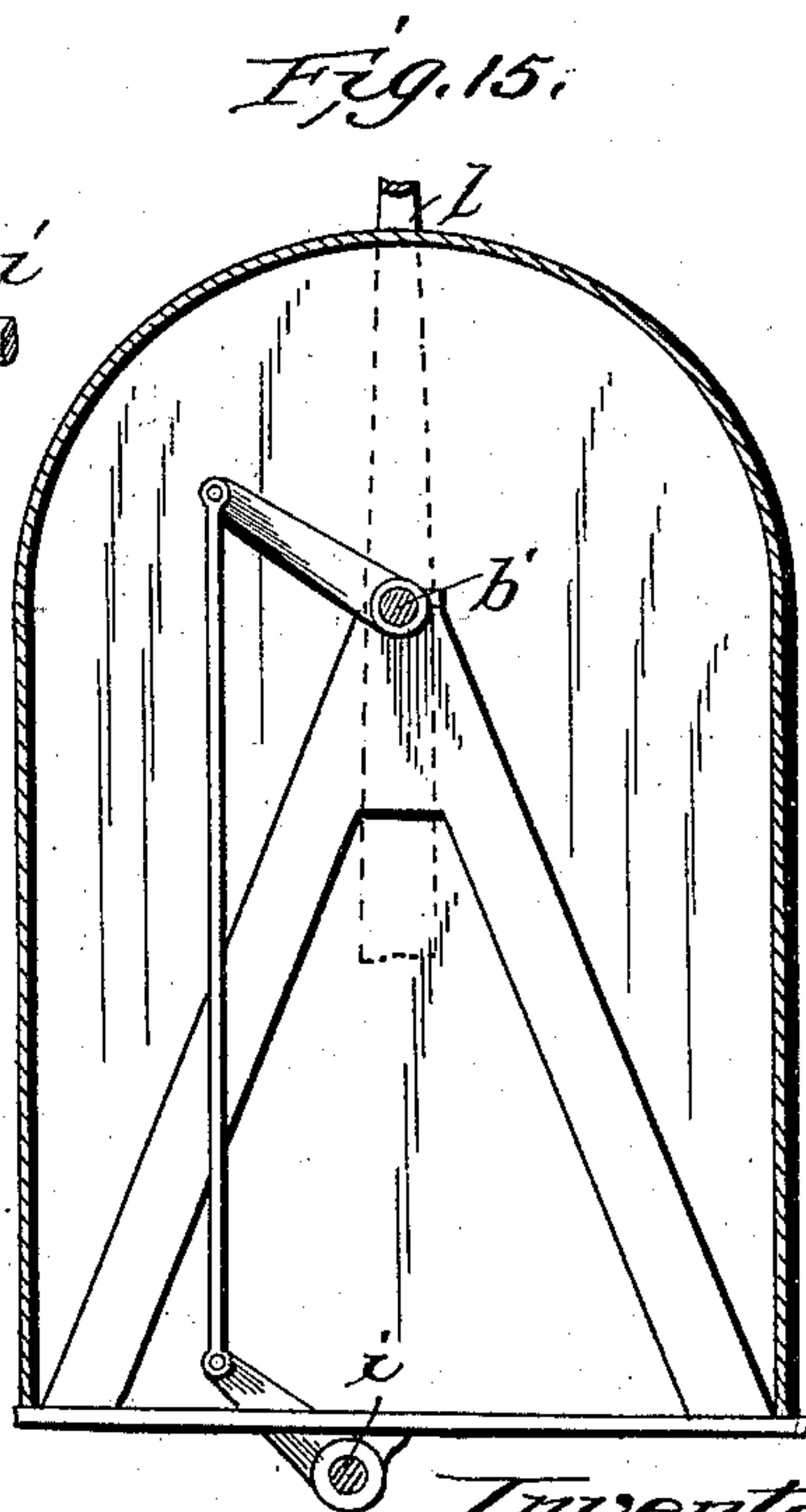
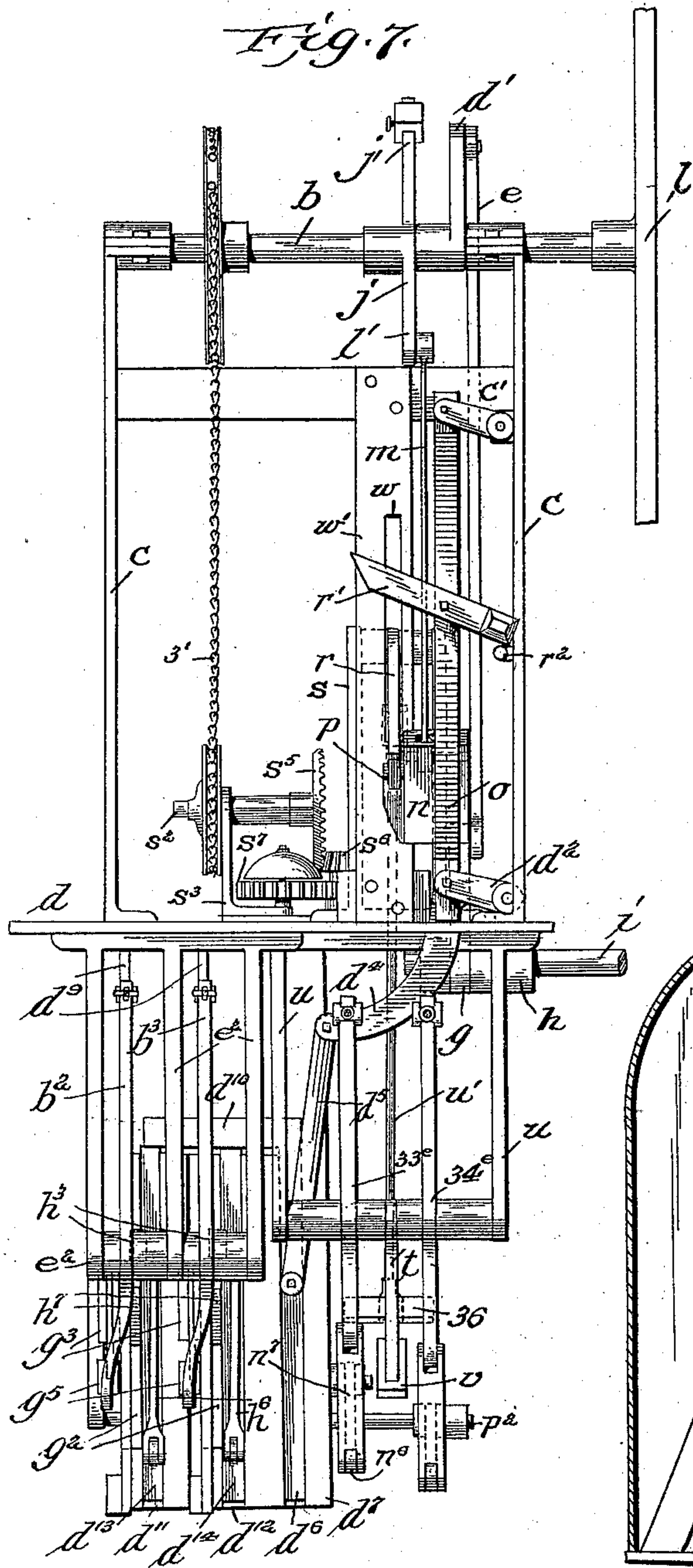
F. H. RICE.

AUTOMATIC RAILWAY GATE.

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(No Model.)

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Attest
Malen Maldsen
C. S. Middleton

Inventor
F. H. Rice
by Ellis Spear
Jelly

No. 639,093.

Patented Dec. 12, 1899.

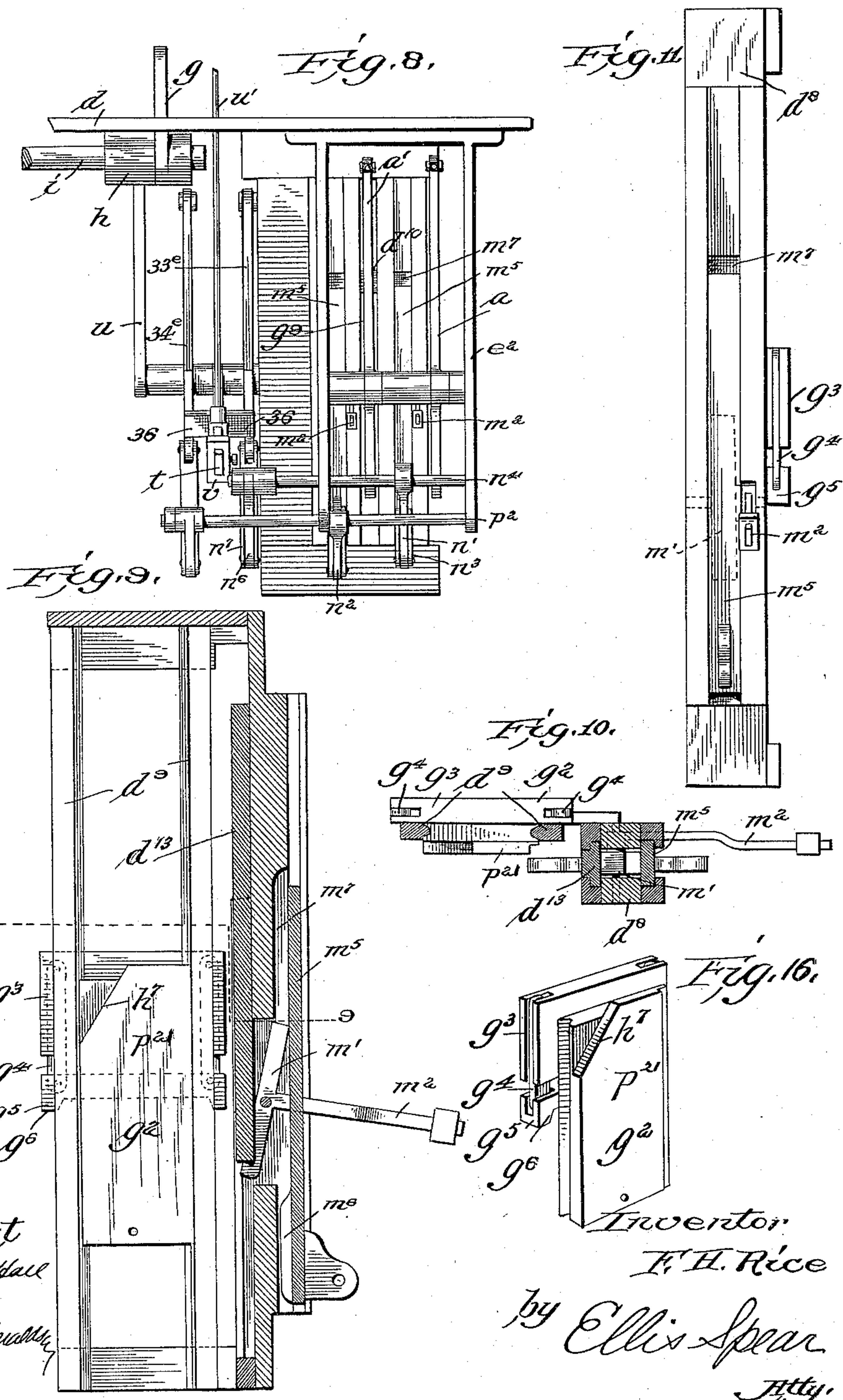
F. H. RICE.

AUTOMATIC RAILWAY GATE.

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(No Model.)

7 Sheets—Sheet 7.



Attest
Wm. F. Hall
M. D. D. D. D. D.

Inventor
F. H. Rice
by Ellis Spear
Atty.

UNITED STATES PATENT OFFICE.

FRANKLIN HENRY RICE, OF PALMER, NORTHAMPTON COUNTY, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO M. H. JONES, OF EASTON, PENNSYLVANIA.

AUTOMATIC RAILWAY-GATE.

SPECIFICATION forming part of Letters Patent No. 639,093, dated December 12, 1899.

Application filed January 29, 1898. Renewed July 29, 1899. Serial No. 725,478. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN HENRY RICE, a citizen of the United States, residing in Palmer township, county of Northampton, and State of Pennsylvania, have invented certain new and useful Improvements in Automatically-Operated Railway-Gates, of which the following is a specification.

My invention relates to automatically-operated railway-gates of the class known as "mast-gates;" and its object is to provide mechanism applicable to either a single track or a plurality of tracks for positively lowering the gates on the approach of a train from either direction and for positively raising the gates after the last car of the train has passed without resorting to the use of springs, compressed air, electricity, or like outside source of power.

A further object is to provide a locking device for holding the gates in their lowered position after the passing of a train in the event of the approach of a second train from an opposite direction until the second train has passed.

To this end the invention includes a tread-plate on each side of the crossing adapted to be operated by passing trains to lower the gates and a single releasing rail or tread-plate for each track adapted to operate means for raising the gates.

It includes also a locking device for controlling the operation of the releasing mechanism.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view showing the relative position of the gates and tread-plates. Fig. 2 is a side elevation of one operating tread-plate and the contiguous mechanism. Fig. 3 is a plan view of the same. Fig. 4 is a side elevation of the releasing tread-plate and contiguous mechanism. Fig. 5 is a view of the mechanism arranged in the gate-pit and above the same for directly operating the gate, looking at the gate on the side farthest from the tracks. Fig. 6 is a similar view taken from the opposite side, parts being omitted. Fig. 7 is a view taken at right angles to Fig. 5, looking from the right-hand side of

said figure. Fig. 8 is a similar view looking from the left-hand side, the mechanism above the gate-pit being omitted. Fig. 9 is a detail view of the operating-slide and catch. Fig. 10 is a sectional view thereof, taken on line 9-9 of Fig. 9. Fig. 11 is a detail elevation of the slide and guide looking from the right of Fig. 9. Figs. 12, 13, 14, 15, and 16 are detail views.

The invention is shown as adapted to a double-track system; but this involves nothing more than a duplication of some of the parts used with a single track, and a further addition of similar parts will adapt it for a plurality of tracks.

The gates *l* are arranged at one side of the crossing parallel with the tracks *x* and *y*. Secured to the flange of one rail 2' of each track, at a distance from the position of the gate, is a plate 4. This plate is guided near each end by slotted arms 5, fixed on studs 6, journaled in brackets 7, clamped to the flanges of the rails, the upper edges of said plates projecting above the rails. These plates lie snugly against the sides of the rails and at their ends are beveled to present an inclined surface flush with or a little below the level of the rails. Each plate 4 is made in two sections, the larger section 4' being wholly guided by the arms 5, while the shorter section 4'' is pivotally supported at one end on a stud 8, fixed in a bracket 9. The opposite end of the section 4'' has a forwardly-projecting tongue 10, extending beneath a projection on the section 4' and resting upon a stud 11, projecting from the side of the horizontal member of a bell-crank lever 12, pivoted to the section 4'. To the opposite end of the bell-crank an arm 13 is pivoted, having at its opposite end a tongue 16, normally extending inwardly beneath a fixed extension 17 from the side of the section 4'. An arm 18 is pivoted to the section 4' at one end and at its opposite end is pivotally connected to the end of an arm 19, keyed to a shaft 20, journaled near the rail in a bracket 21 and at its opposite end in a framework fitted in a suitable trench or pit 25. (Represented by dotted lines in Figs. 1, 2, and 3.)

A depending arm 22, keyed to the shaft 20,

is connected by a link 23 with a vertical arm 24, pivoted to a suitable support at its lower end. The upper end of this arm 24 is connected by a wire to a lever *a* in the gate-pit, as will be described hereinafter. In the use of a double track or a plurality of tracks a pit 25' similar to the pit 25 is sunken alongside each of the lowering-plates of the additional tracks. A shaft 26 extends beneath the double tracks and is journaled in the outer walls or frames of the pits. From this shaft an arm 27, keyed thereto, depends in each pit 25 25', and in the pit 25' the link 23 is connected to said arm 27 to rock the shaft 26. Connections similar to those between the link 23 and the plate 4' in the pit 25 are interposed between the link 23 in the pit 25' and the tread-plate 4' above the same. The rocking of the shaft 26 will tilt the arm 27 in the pit 25, and through the link 28, which couples the end of the arm 27 to the arm 24', the latter arm will be operated and from thence the gate through the wire connecting the same to a lever *a'* in the gate-pit. The arm 24' is pivoted at its lower end on a stud located in the bottom of the pit 25, and it will be understood that for each additional track an arm similar to the arm 24' is placed in each pit 25 with like connections.

The arms 24 and 24' are limited in their movement toward the gate by a stop 30, projecting from the wall of the frame in the pits 25.

The tongue 16 is normally held in place by an arm 31, attached to a shaft 33, having a weighted arm 32 extending therefrom, the end of the arm 31 bearing against a shoulder formed by giving the arm 13 an angular bend, as in Fig. 12. This arm is held against the shoulder by the weighted arm 32.

The plate 4 is normally held in raised position by bell-cranks 32', having vertically and obliquely extending members. These levers are fixed on studs 33', journaled in brackets similar to the brackets 7. The vertical members of the bell-cranks are connected together by a link 33^a. The oblique members have each an angular projection 34, Fig. 3, extending beneath the bottom of the plate 4 and supporting the same. To hold these supports in normal position, a shaft 34' is provided, which extends across the pit 25 and has a weighted arm 34'' keyed thereto. This weight tends to press upwardly the end 34 of the bell-crank connected to the shaft 34', and through the links 33^a communicates the upward pressure to the other arms of the series, and thus holds the plate 4' raised.

In operation, supposing the train to be approaching the crossing on the track *x*, the section 4' will be depressed, and as the tongue 16 is in between the fixed extension 17 and the arm 18 the shaft 20 will be rocked through the arm 19 and the arm 24 will be drawn upon through the connections 22 and 23, and through the wire connecting the arm 24 with the lever *a* in the gate-pit the said lever will

be operated. Should the train approach from the opposite direction, the section 4'' will be first depressed, which will depress the lower end of the lever 12 through the tongue 10 and projection 11, and this will withdraw the tongue 16 from between the arm 18 and the extension 17. Now as the train depresses the section 4' it will lower it without affecting the said arm 18, and thus the lowering of the gates will not follow. If the train be approaching the crossing on the track *y* in the direction of the arrow, the plate on that track will be depressed, and through the connections described the shaft 26 will be rocked and the arm 24' drawn backwardly from the gate, so as to operate the lever *a'* correspondingly to the lever *a*, as will be hereinafter described. Thus, also, for an additional track the common shaft 26 will be turned and a lever similar to 24' provided for the other track will be operated and will operate through its connection a lever similar to *a* and *a'*.

The gate *l* is suitably counterbalanced and is fixed on the end of a shaft *b*, journaled in standards *c*. The standards and mechanism above the platform *d*, which forms a base for said standards, are inclosed by a suitable casing. (Not shown.) Extending from the shaft *b* is an arm *d'*, connected by a vertical link *e* to a corresponding arm *g*, keyed to a common cross-shaft *i*, that extends between the gates beneath the tracks. This shaft *i* is journaled in brackets *h*, depending from the platform *d*. The shaft *b'* on the opposite side of the track corresponding to the shaft *b* and the gate carried thereby is controlled wholly by the shaft *b* through the arms *d* *g*, link *e*, and shaft *i* and corresponding connections to the opposite gate-shaft. To the shaft *b* a second arm *j* is fixed, having a weighted end *j'*, which when the gates are up is above the horizontal axis of the shaft *b*, and the weight is sufficient to turn said shaft when it is not locked against rotation and lower the gate. The opposite end *l'* is pivotally connected to the upper end of a link *m*, the lower end of which is pivoted to a block *n*, guided in a segmental way *o*, said block being provided with a shoulder *p*, upon which the free end of an arm *r* rests when the gate is up or being raised. The opposite end of said arm *r* is pivoted between short standards *s*, bolted to the platform *d*. This arm *r* is connected intermediately of its ends by a link *u'* to the central part of an arm *t*, pivoted at one end on a shaft 35, supported in hangers *u*, depending from the under side of the platform *d* into a pit beneath said platform. The opposite end of the arm *t* carries a weight *v* sufficient to overcome the weight carried by the arm *j*. The arm *r* is drawn downwardly by the weighted arm *t* until it is arrested by the bottom of a slot *w* in a vertical plate *w'*, which also serves to guide said arm. As the end of this arm normally engages the shoulder *p*, it will hold the block *n* in its lowest position, and thereby the weighted end *j'* of the arm *j* in its highest position and

the gates up. The curved way o is pivotally supported at its upper end by links c' , pivoted to one of the standards c . At its lower end the way is pivotally connected by similar links $d^2 d^3$. The link d^3 has an extension d^4 , connected by a link d^5 to a sliding bar d^6 , guided in vertical ways d^7 , secured to one side of a vertical casting d^8 , that extends from beneath the central part of the platform to the bottom of the pit beneath the same. On the upward movement of said slide the extension d^4 is swung upwardly, which will swing the way o away from the arm r , carrying the block n therewith and the shoulder p from beneath the free end of said arm r . The block n being thus freed, the weight on the end j' of the arm j will fall and turn the shaft b , and thus lower the gate. The sliding bar d^6 carries a cross-arm d^{10} , extending across the upper end of the way d^7 and across similar ways $d^{11} d^{12}$, also bolted to the casting d^8 . Independent bars $d^{13} d^{14}$ slide in these ways, which in their upward movement strike said cross-bar d^{10} and raise the sliding bar d^6 . From the platform d on one side of the casting d^8 a hanger e^2 depends and supports an axle e^3 , and upon the opposite side of the casting a hanger e^{21} depends and supports an axle e^{31} . Upon the axle e^{31} the bell-crank levers $a a'$, before mentioned, are pivoted. The upper ends of these levers $a a'$ are connected, respectively, to wires running from the arms $24 24'$, Figs. 2 and 3. On the same side of the casting as the bar d^6 similar bell-crank levers $b^2 b^3$ are pivoted on the axle e^3 . These latter levers are similarly connected to arms on this side of the casting corresponding to the arms $24 24'$, which are operated from the lowering tread-plate on this side of the gate. Depending from the platform on the same side of the casting as the bar d^6 and supported by brackets bolted to the upper end of the casting d^8 are two sets of vertical guiding-ways d^9 , (one set for each track,) that extend down almost to the bottom of the gate-pit. Upon each of these ways a weighted rectangular casting g^2 is guided, (one casting for each track.) On one side of it each casting has a rectangular part g^3 , having recesses cut therein from each end, in which two links g^4 are freely pivoted. These links depend from the part g^3 and are pivoted in recesses in opposite ends of a block g^5 , provided on its under side with end hooks g^6 . One member of each of the bell-cranks is pivoted on the axles $e^3 e^{31}$, as before described, is connected by a wire to its respective mechanism operated by the gate-lowering tread-plates, and the other member of each of said bell-cranks is provided with a hooked end engaging one of the hooks g^6 as said levers are tilted. On the tilting of one of said levers by the depression of one of the tread-plates 4 the hooked end of said lever will engage one of said hooks g^6 , and in the upward course of said member the casting g^2 is lifted, the block g^5 freely swinging to compensate for the change in the distance between the pivot e^3

of the raising-lever and the casting being lifted thereby. From the opposite side of each casting to the part g^3 a block p^{21} projects, that as the casting moves upwardly strikes against a roller h^3 , located above the same, each of said rollers being carried by an arm h^4 , pivoted to an extension h^5 from the lower end of the hangers e^2 . These arms h^4 are each connected by a link h^6 to one of the sliding bars $d^{13} d^{14}$. The raising of one of the castings g^2 by its respective lever thus raises its sliding bar, which in turn lifts the cross-bar d^{10} and the slide-bar d^6 , and there-through moves the way o and frees the block n from the arm r . To permit the hooked member of the lever a' to engage its casting g^2 , the casting d^8 is slotted at g^9 , and through this slot said member passes, the hook member of the lever a passing between the edge of the casting d^8 and the wall of the pit. Each block p^{21} has an inclined surface h^7 to permit the roller h^3 to run gradually off the same as the casting g^2 is raised.

To release the gate or lift the same after the train has passed or is passing the crossing, a plate 30^e is placed alongside one rail of each track. One plate is provided for each track, and they are supported in a similar manner to the plates 4. Arms $31^e 32^e$ are also provided, which are operated in a similar manner to the levers $24 24'$ on the depression of the plates 30^e . These arms $31^e 32^e$ are connected, respectively, to the vertical members of bell-crank levers $33^e 34^e$, pivotally supported between hangers u . The weighted arm t , before mentioned, has a projection extending from each side thereof, which rests upon the upper edges of the adjacent horizontal members of the levers $33^e 34^e$, so that when either of said levers $33^e 34^e$ is tilted on the depression of its release-plate said lever t will be lifted, and therethrough the arm r , until it reaches a point above the shoulder p , when the block n is in its highest position. The way o swings back to its normal position again as soon as the slide-bar d^6 drops, and on the passage of the last car of the train over the release-plate the arm t again falls, drawing down with it the arm r and the latter the block n , and thus through the arm j the gates are raised.

To prevent the gates from rising directly after the passage of the crossing by one train should a second train coming from the opposite direction be between the lowering and release plates on another track, a catch m' is pivoted in recesses in the casting d^8 back of each sliding rod $d^{13} d^{14}$. Each of these catches is centrally pivoted and provided with a weighted arm m^2 , extending laterally from the intermediate portion of the same, so that the lower end of each catch, which is provided with a hook m^3 , will be forced against the rear face of its respective slide when said slide is in its lowered position. As soon as the lower end of the slide is raised above the hooked end of the catch the weighted arm m^2

throws said hook beneath the end of the slide and prevents its again falling until the catch is released. The release is effected by providing sliding bars m^5 on the face of the casting opposite to the sliding bars d^{13} d^{14} and corresponding in position thereto. A projection m^6 is carried on the back of each bar m^5 , near the lower end thereof, which moves in a groove m^7 . When the catch is tilted, so that its hooked end engages its respective bar d^{13} d^{14} , its upper end projects into this groove m^7 . The catch is released from its engagement with its sliding bar by raising the bar m^5 directly opposite thereto, this bringing the projection m^6 against the upper end of the catch and forcing it inwardly, and as said catch is pivoted centrally its lower end is also forced back and released from its slide d^{13} or d^{14} . The slide may now drop, and this will permit the way o to swing back to bring the shoulder p of the block m beneath the arm r . Each of the slide-bars m^5 is connected to one of the arms n' n^2 , respectively, by pivoted links n^3 . The arm n' is keyed to a shaft n^4 , which is journaled in the hangers e^{21} , depending from the platform d . On the end of said shaft n^4 a second arm n^6 is keyed, the free end of which is pivotally connected to the free end of the horizontal member of the bell-crank 33^c by a link n^7 . The arm n^2 is keyed to a second shaft p^2 , also journaled in the hangers e^2 below the shaft n^4 . This shaft p^2 is similarly connected by an arm and link to the end of the bell-crank 34^c . It will be apparent from the foregoing that a train on the track x , operating either of the tread-plates 4, will lift the slide d^{13} , and said slide will be held up by its catch until it is released by the bell-crank being tilted by the train passing over the release tread-plate on that track. However, if before the first train passes over the release tread-plate on its track a second train on the track y depresses the lowering tread-plate on that track the slide d^{14} will be raised and retained by its hook until the release tread-plate on the track y is depressed. Thus although the bar d^{13} may fall the sliding bar d^6 is retained in its upward position by the slide d^{14} , supporting the cross-bar d^{10} , and the way o is thereby held away from the arm r' and the shoulder p from beneath the same. The bar t when the first train passes the release tread-plate thus draws down the bar r without affecting the gate.

Should the catches fail to work for any reason on the raising of the bar d^{13} d^{14} , and thus permit the said bar to fall immediately after a train passes off of the lowering tread-plate, the way o would swing back to its normal position before the depression of the release tread-plate. This would bring the block n above and in the same vertical plane as the arm r , and said arm would thus strike the under side of the block when raised by the depression of the release tread-plate, and the operation of this part of the device would be defeated. To avoid this, a plate r' is pivoted

intermediately of its ends to the side of the way o . This plate has its forward end beveled and its rear end weighted and supported on a stop-pin r^2 , projecting from one of the standards c . The beveled end extends out from the face of the way beyond the shoulder p . With this arrangement on the raising of the arm r , if the block n is in its raised position and the way o has swung back by the failure of one of the catches to work, the forward end of the plate r' would be struck, and as its rear end cannot be depressed the way o will be forced backward and the arm r will pass from beneath the shoulder to its proper place above the same. On the downward movement of the arm r from above the plate r' said plate will be tilted on its pivot and permit said arm to pass without interference.

To regulate the speed with which the gates are raised and lowered irrespective of the weights for effecting the same, a disk is keyed to the gate-shaft, which has the ends of a chain or belt $3'$ fixed to the periphery thereof, the bail of the chain passing around a pulley keyed to a shaft s^2 , journaled in a bracket s^3 , bolted to the platform d . The rotation of this shaft is regulated or timed by a braking mechanism forming the subject-matter of a companion application of even date herewith through beveled gears s^5 and s^6 and a large gear s^7 , keyed in the same spindle as the gear s^6 .

I claim—

1. In combination, the gates, the independent shafts carrying each gate connected to operate in unison, a radial arm fixed to one of said shafts and extending normally in an oblique direction, the upper end of said arm being weighted, a sliding block, a vertical guideway therefor, a connection between the lower end of the oblique arm and said block, and means for holding the gate up and the block in its lowered position against the force of said weight, substantially as described.

2. In combination, the gate, the shaft carrying the same, an obliquely-extending radial arm fixed to said shaft, a weight carried on the one end of said arm, a block, a guideway therefor, a connection between the opposite end of said arm and said block, and means for engaging said block for holding the same in its lowered position, said means being connected to a second weight adapted to compensate for the weight on said radial arm, substantially as described.

3. In combination, the gate, the shaft carrying the same, the radial arm fixed to the shaft carrying a weight at one end, a sliding block, a guideway therefor, a connection between the opposite end of the radial arm and the block, a pivoted arm having its free end adapted to engage the block, a weighted arm connected to said pivoted arm adapted to hold the same in its depressed position and thereby by the block when said pivoted arm engages therewith, substantially as described.

4. In combination, the gate, the shaft carrying the same, the radial arm fixed to the

shaft carrying a weight at one end thereof, a sliding block, a movable way therefor, a connection between said block and the opposite end of said radial arm, a pivoted arm engaging said block, a weighted arm connected to the pivoted arm, and means for shifting said way to shift said block out of engagement with said pivoted arm, substantially as described.

5. In combination, the gate, the shaft carrying the same, the radial arm fixed to the shaft, a weight carried on one end thereof, a block connected to the opposite end of the same, a movable guide for said block, a pivoted arm engaging the same, a weighted arm connected to said pivoted arm, and a movable slide with means for operating the same having a connection to said guideway to shift the same and move the block carried thereby out of engagement with said pivoted arm, substantially as described.

6. In combination, the gate, the shaft carrying the same, the radial arm fixed to said shaft, the weight on one end thereof, a block connected to the opposite end of the same, a guideway for the block, pivoted links for supporting said way, an extension from one of said links, a pivoted arm engaging the block, a slide-bar with means for actuating the same and a connection between said bar and the end of the link extension whereby on the release of said bar said way will be swung upwardly and backwardly to release said block from said pivoted arm, substantially as described.

7. In combination, the gate, the shaft carrying the same, the radial arm fixed to said shaft, the weight on one end thereof, a block connected to the opposite end of the same, a pivotally-supported guideway for said block, a movable casting for each track, vertical guideways therefor, a guiding-bar for each casting, means for raising one of the castings when operated from its respective track, means operated by said casting as it rises to raise its respective slide-bar, a common slide-bar, means for raising the common slide-bar on the raising of either of the independent slide-bars and a connection between said common slide-bar and the movable way for tilting the same to release said block from said pivoted lever, substantially as described.

8. In combination, the gate, the shaft carrying the same, the radial arm fixed to said shaft, the weight on one end thereof, a block connected to the opposite end of the same, a movable way for said block, the gate-pit, the platform, the central casting depending centrally therefrom into the pit, the guiding-ways fixed thereto, an independent sliding bar for each track guided in its way, a sliding bar common to all of said independent sliding bars also guided in a way secured to said central casting, a cross-bar extending from the common bar above the upper ends of all of the independent bars whereby on the rising of one of said independent bars the com-

mon bar will be raised, a connection between the common bar and the movable way to shift the latter to release the block on the lifting of said bar and the means for lifting each independent bar operated from its respective track, substantially as described.

9. In combination, the gate, the shaft carrying the same, the radial arm fixed to said shaft, the weight on one end thereof, a block connected to the opposite end of the same, a movable way for said block, the gate-pit, the platform, the central casting depending centrally therefrom into the pit, the guiding-ways fixed thereto, an independent sliding bar for each track guided in its way, a sliding bar common to all of said independent sliding bars also guided in a way secured to said central casting, a cross-bar extending from the common bar above the upper ends of all of the independent bars whereby on the rising of one of said independent bars the common bar will be raised, a connection between the common bar and the movable way to shift the latter to release the block on the lifting of said bar, the vertical ways one for each independent bar depending from the platform a distance from the central casting, the sliding castings movable on said ways, means for raising said castings, a pivoted arm for each casting adapted to be lifted thereby as the casting is raised and a connection between each of said arms and its respective independent sliding bar, substantially as described.

10. In combination, the gate, the shaft carrying the same, the radial arm fixed to said shaft, the weight on one end thereof, a block connected to the opposite end of the same, a movable way for said block, the gate-pit, the platform, the central casting depending centrally therefrom into the pit, the guiding-ways fixed thereto, an independent sliding bar for each track guided in its way, a sliding bar common to all of said independent sliding bars also guided in a way secured to said central casting, a cross-bar extending from the common bar above the upper ends of all of the independent bars whereby on the rising of one of said independent bars the common bar will be raised, a connection between the common bar and the movable way to shift the latter to release the block on the lifting of said bar, the vertical ways one for each independent bar depending from the platform, the castings guided thereon, the projections from each casting, the pivoted arms one for each casting, rollers carried thereby adapted to be struck by said castings in rising to lift said arms, a link between the end of each arm and its respective independent bar and means for raising the castings, substantially as described.

11. In combination, the gate, the shaft carrying the same, the radial arm, the weight on one end thereof, the block connected to the opposite end thereof, the movable guide for said block, the central casting, the common slide-

bar, the connection between the same and the movable way to shift the latter, the independent bars one for each track for operating the common bar, the vertical ways, the castings one for each independent bar guided thereon, independent means operated by each casting for operating its respective independent slide-bar, an operating tread-plate on each track on each side of said gate a distance therefrom, a pivoted bell-crank lever for each operating tread-plate arranged on the same side of said central casting as its respective operating tread-plate, a pivoted arm for each tread-plate arranged contiguous thereto and adapted to be operated on the effective operation of its tread-plate, a connection from each of said pivoted arms to one member of its respective bell-crank lever, the other member of each of said levers being adapted to raise its respective sliding casting when tilted, substantially as described.

12. In combination, the gate, the shaft carrying the same, the radial arm, the weight on one end thereof, the block connected to the opposite end thereof, the movable guide for said weight, the central casting, the common slide-bar, the connection between the same and the movable way to shift the latter, the independent bars one for each track for operating the common bar, the vertical ways, the castings one for each independent bar guided thereon, independent means operated by each casting for operating its respective independent slide-bar, an operating tread-plate on each track on each side of said gate a distance therefrom, a pivoted bell-crank lever for each operating tread-plate arranged on the same side of said central casting as its respective operating tread-plate, a pivoted arm for each tread-plate arranged contiguous thereto and adapted to be operated on the effective operation of its tread-plate, a connection from each of said pivoted arms to one member of its respective bell-crank lever, a block pivotally swung from each of the movable castings, the outer member of each bell-crank engaging the block swung from its respective casting, substantially as described.

13. In combination, the gate, the shaft carrying the same, the radial arm, the weight on one end thereof, the block connected to the opposite end thereof, the movable guide for said weight, the central casting, the common slide-bar, the connection between the same and the movable way to shift the latter, the independent bars one for each track for operating the common bar, the vertical ways, the castings one for each independent bar guided thereon, independent means operated by each casting for operating its respective independent slide-bar, an operating tread-plate on each track on each side of said gate a distance therefrom, a pivoted bell-crank lever for each operating tread-plate arranged on the same side of said central casting as its respective operating tread-plate, a pivoted arm for each tread-plate arranged contiguous

thereto and adapted to be operated on the effective operation of its tread-plate, a connection from each of said pivoted arms to one member of its respective bell-crank lever, a block pivotally swung from each of said castings, the outer member of each bell-crank engaging the block swung from its respective casting, the end of each block having depending hooks and the ends of the members of the levers engaging the same also being hooked to engage therewith, substantially as described.

14. In combination, the gate, the shaft carrying the same, the radial arm fixed on said shaft, the weight on one end of said arm, the block connected to the opposite end thereof, a movable guideway therefor, a pivoted arm adapted to engage the block, a weighted arm in the gate-pit connected to the pivoted arm for normally holding the same lowered, operating or lowering tread-plates for each track arranged on opposite sides of the gates, mechanism actuated by said tread-plates to shift said way to release said block from said arm whereby the weight on the radial arm will turn the gate-shaft and lower the gate, a release tread-plate on each track contiguous to the gate, and means interposed between the same and the pivoted weighted arm in the gate-pit whereby the latter is raised by the depression of the release tread-plate thereby bringing the pivoted arm above the block and into engagement again therewith, on the rising of the release tread-plate to lower the same as the pivoted weighted arm in the gate-pit lowers and thus raise the gate, substantially as described.

15. In combination, the gate, the gate-shaft, the radial arm, the weight on one end thereof, the movable way, the block guided thereon connected to the radial arm, the pivoted arm adapted to engage said block, the sliding bar with means for operating the same to disengage said arm from said block whereby the block is raised and the gate lowered, the weighted pivoted arm connected to the arm engaging the block, a release tread-plate for each track, a bell-crank lever for each release tread-plate with means for tilting the same on the depression of the release tread-plate, means carried by the weighted pivoted arm engaging one member of each of said bell-cranks whereby said arm is lifted when the bell-cranks are tilted and lifts the pivoted arm above the block, said weighted pivoted bar being adapted to fall on the rising of the release tread-plate and to pull the pivoted bar engaging the block down therewith, substantially as described.

16. In combination, the gate, the gate-shaft, the radial arm, the block connected thereto, the way therefor, the link having an extension for moving said way, the common slide-bar, the connection between said extension and said common slide-bar, the independent slide-bars adapted to operate the common slide-bar, the lowering tread-plates, the means interposed between the tread-plates of one

track and their respective independent slide-bars for operating the latter, and means for locking said independent slide-bars in their raised positions, substantially as described.

5 17. In combination, the gate, the gate-shaft, the radial arm, the block connected thereto, the way therefor, the link having an extension for moving said way, the common slide-bar, the connection between said extension
10 and said common slide-bar, the independent slide-bars adapted to operate the common slide-bar, the lowering tread-plates, the means interposed between the tread-plates of one track and their respective independent slide-
15 bars for operating the latter, means for locking said independent slide-bars in their raised positions, the release tread-plates one for each track and means operated thereby to release said locking means, substantially as
20 described.

18. In combination, the gate, the gate-shaft, the radial arm, the block connected thereto, the way therefor, the link having an extension for moving said way, the common slide-
25 bar, the connection between said extension and said common slide-bar, the independent slide-bars adapted to operate the common slide-bar, the lowering tread-plates, the means interposed between the tread-plates of one
30 track and their respective independent slide-bars for operating the latter and independent catches adapted to engage and lock said slide-bars in their raised position, substantially as described.

35 19. In combination, the gate, gate-shaft, the radial arm, the block connected thereto, the movable way for said block, the platform, the central casting, the pivoted arm adapted to engage the block, the weighted arm con-
40 nected thereto, guideways in each side of said central casting, the common slide-bar, independent sliding bars in one set of guideways adapted to operate said common bar to release said block from said pivoted arm, in-
45 dependent catches adapted to engage and support their respective bars in their raised positions, the operating tread-plates and means actuated thereby for raising said independent sliding bars, release sliding bars
50 movable in the ways of the casting opposite to the independent bars adapted to release said catches, and means for actuating the release-bars, substantially as described.

20. In combination, the gate, gate-shaft, the radial arm, the block connected thereto, 55 the movable way for said block, the platform, the central casting, the pivoted arm adapted to engage the block, the weighted arm connected thereto, guideways in each side of said central casting, the common slide-bar, inde- 60 pendent sliding bars in one set of guideways adapted to operate said common bar to release said block from said pivoted arm, independent catches adapted to engage and sup- 65 port their respective bars in their raised positions, the operating tread-plates and means actuated thereby for raising said independent sliding bars, and release sliding bars mov- 70 able in the ways of the casting opposite to the independent bars adapted to release said catches, the release tread-plates, the bell-crank levers operated thereby, and connec- tions from said levers for actuating said re- lease sliding bars, substantially as described.

21. In combination, the gate, gate-shaft, 75 the radial arm, the block connected thereto, the movable way for said block, the platform, the central casting, the pivoted arm adapted to engage the block, the weighted arm con- 80 nected thereto, guideways in each side of said central casting, the common slide-bar, independent sliding bars in one set of guideways adapted to operate said common bar to re- 85 lease said block from said pivoted arm, independent catches adapted to engage and support their respective bars in their raised po- sitions, the operating tread-plates and means actuated thereby for raising said independ- 90 ent sliding bars, and release sliding bars movable in the ways of the casting opposite to the independent bars adapted to release said catches, the release tread-plates, the bell- 95 crank levers operated thereby, the shafts supported in hangers from the platform, a set of arms fixed to each shaft, one arm of each set being linked to its respective release-bar and the other arm of the set being linked to the end of one member of its respective bell-crank lever, substantially as described.

In testimony whereof I affix my signature 100 in presence of two witnesses.

FRANKLIN HENRY RICE.

Witnesses:

REUBEN KOLB,
ALICE FENICLE.