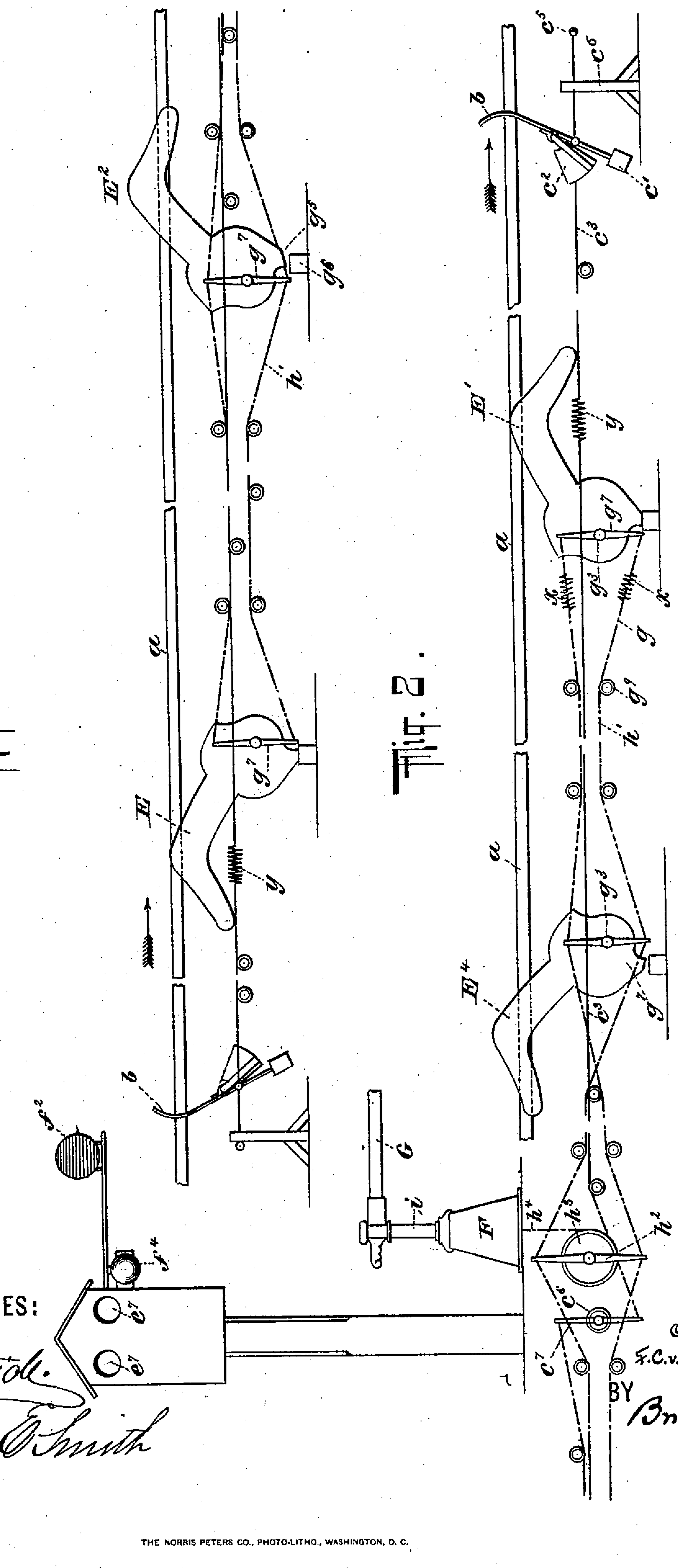
No. 636,220. Patented Oct. 31, 1899.

A. D. TURNER & F. C. von HEYDEBRAND u. d. LASA.

GATE FOR RAILWAY CROSSINGS.

(Application filed Feb. 10, 1898.)

(No Model.) 5 Sheets—Sheet 1.



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(No Model.) 5 Sheets—Sheet 2.

Fig. 3.

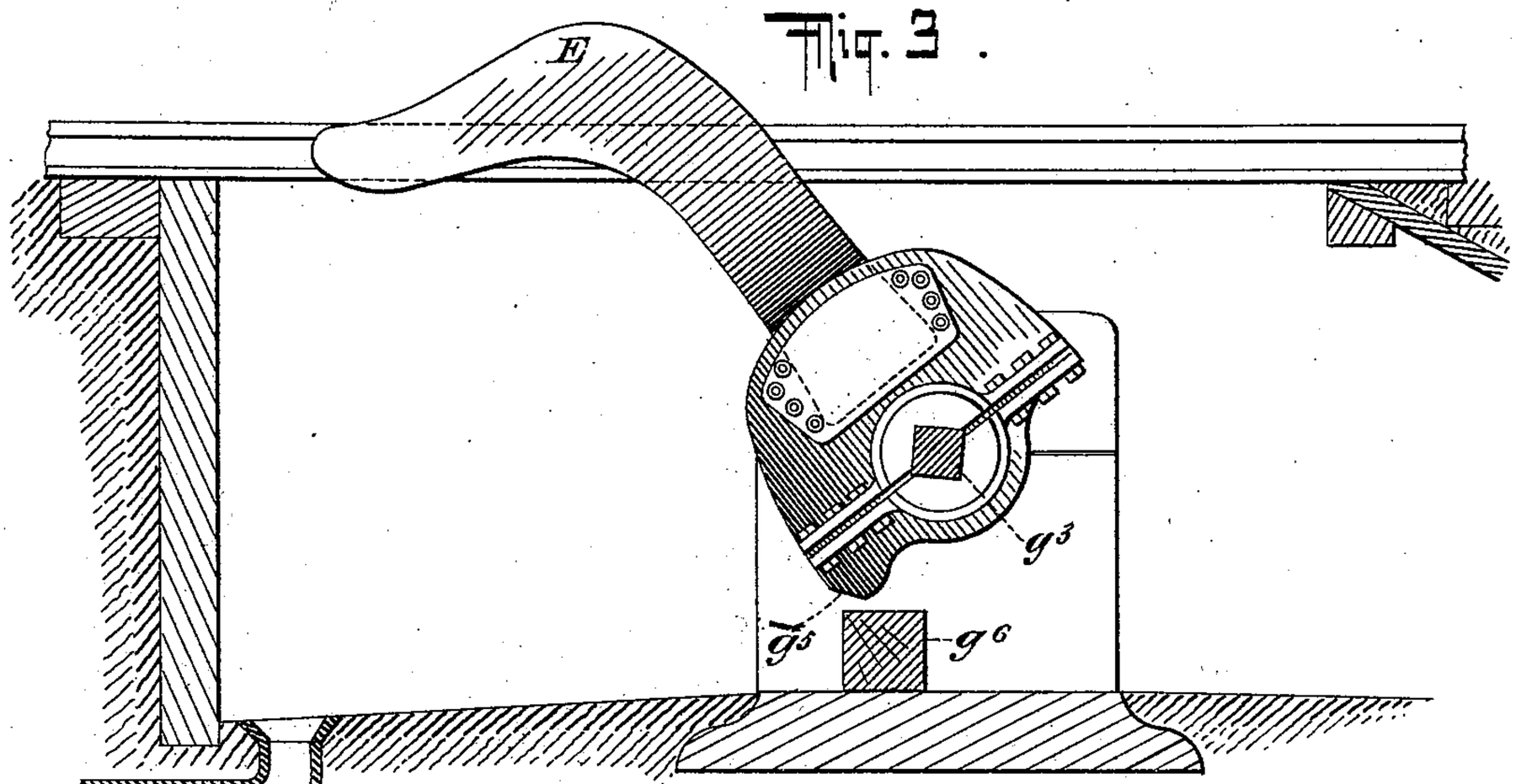


Fig. 4.

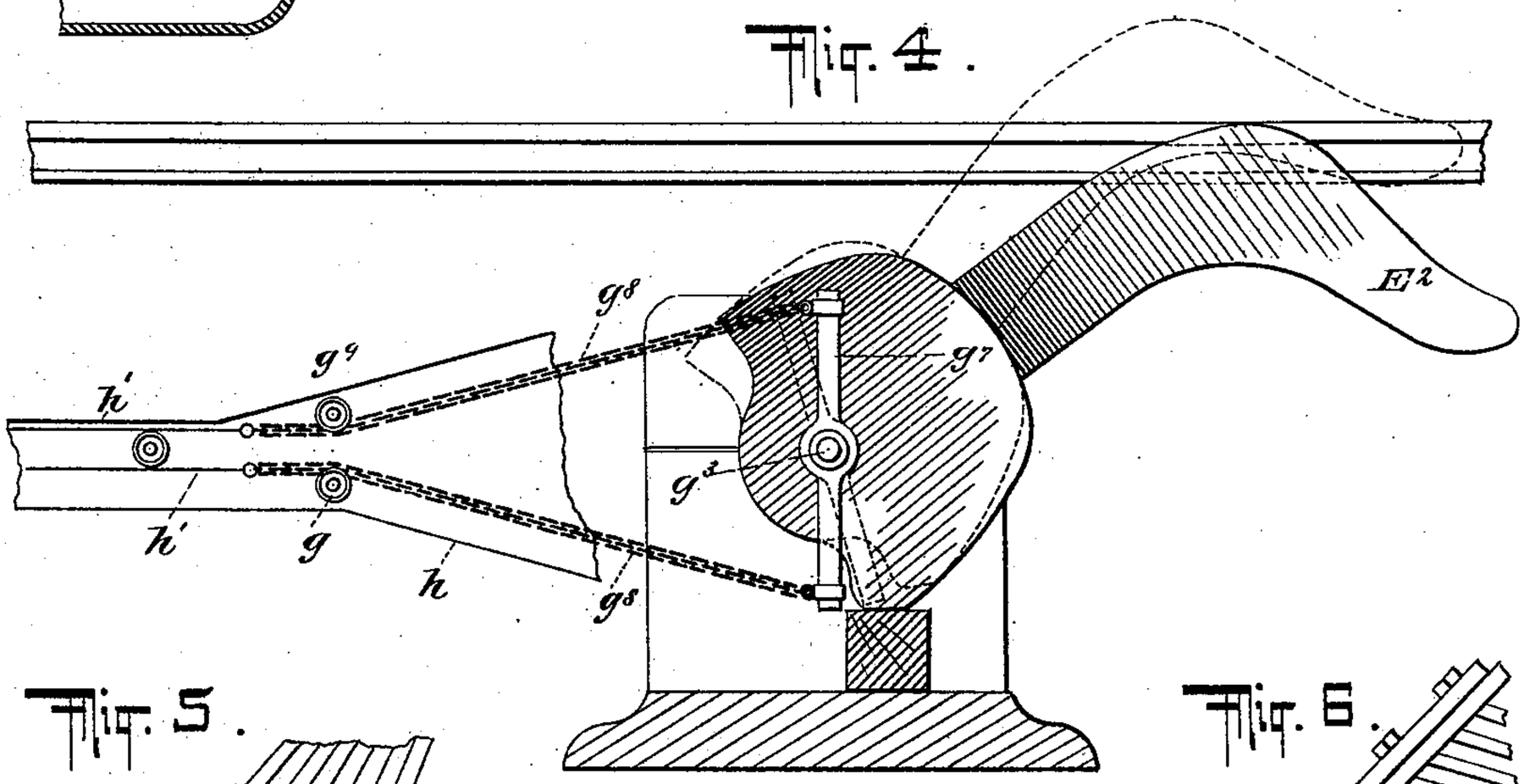


Fig. 5.

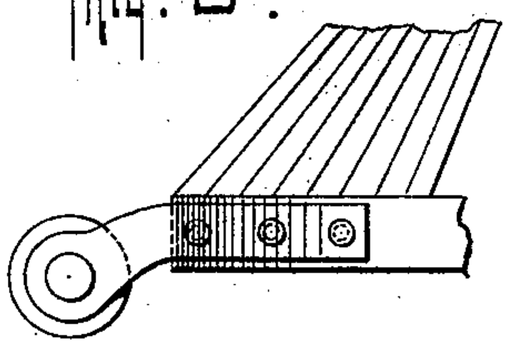
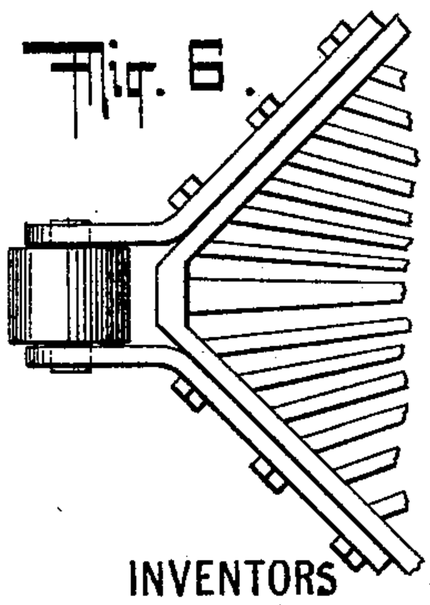


Fig. 6.



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(No Model.) 5 Sheets—Sheet 3.

Fig. 7.

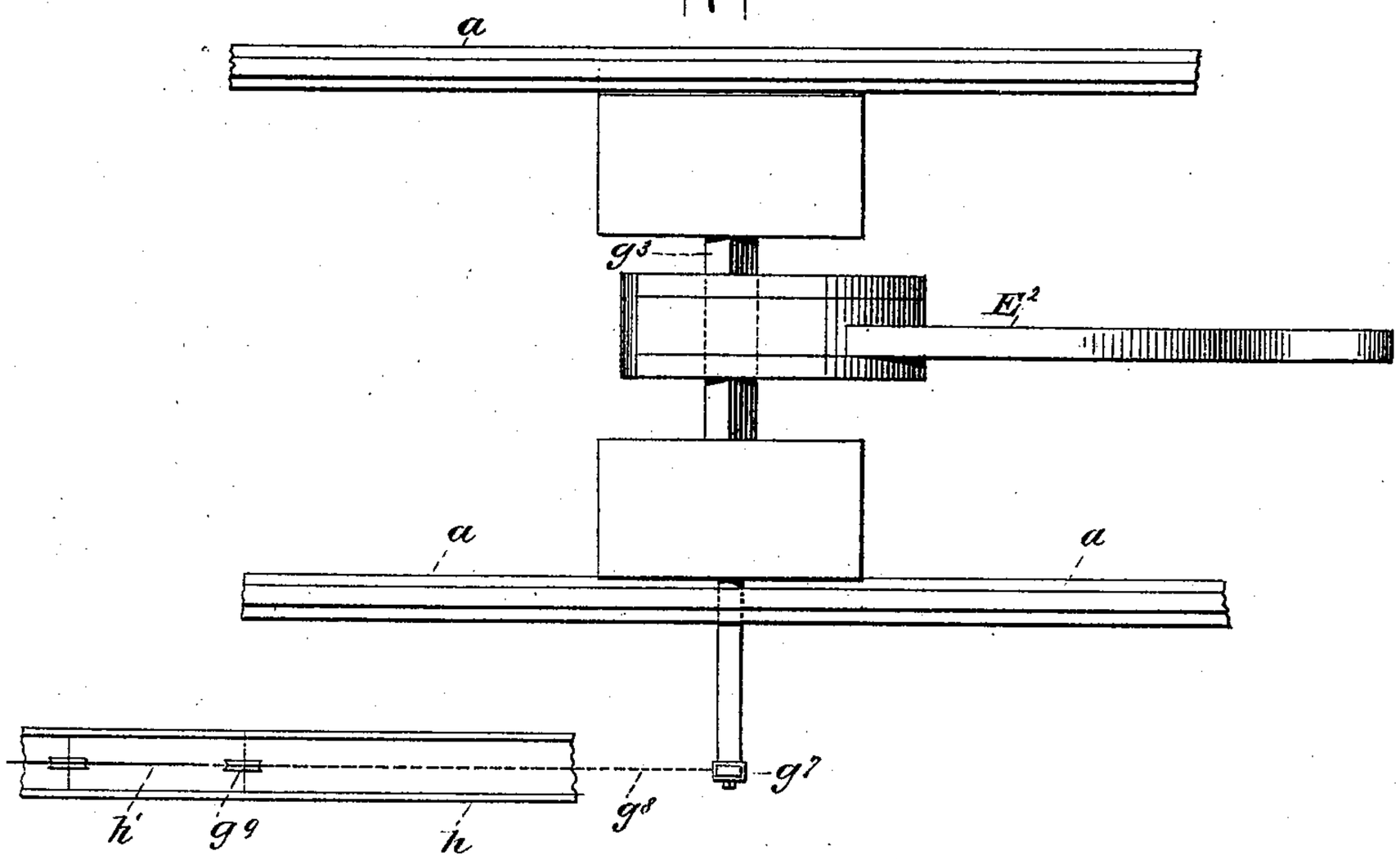


Fig. 8.

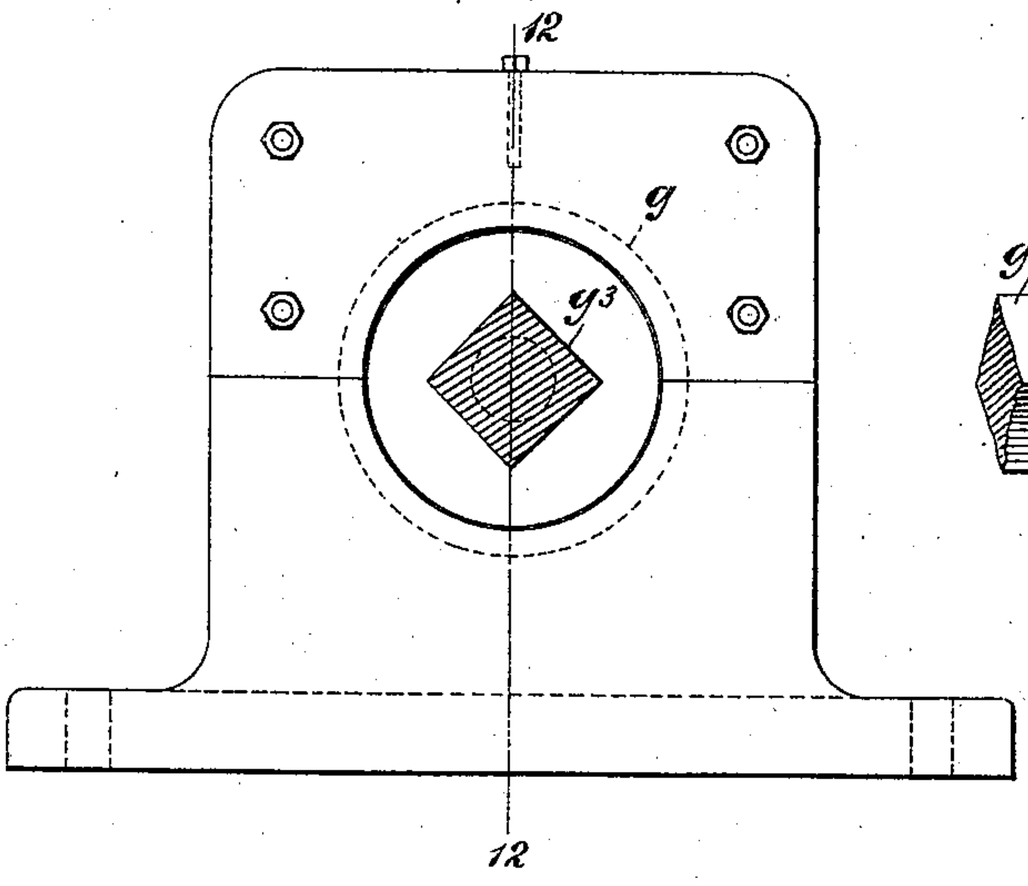
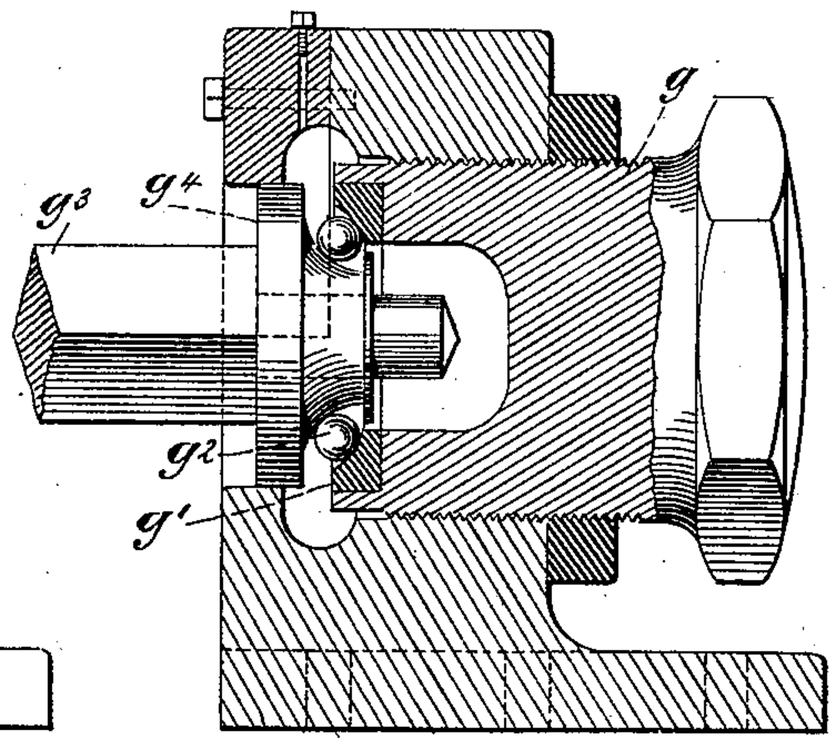


Fig. 9.



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GATE FOR RAILWAY CROSSINGS.

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(No Model.) 5 Sheets—Sheet 4.

Fig. 10.

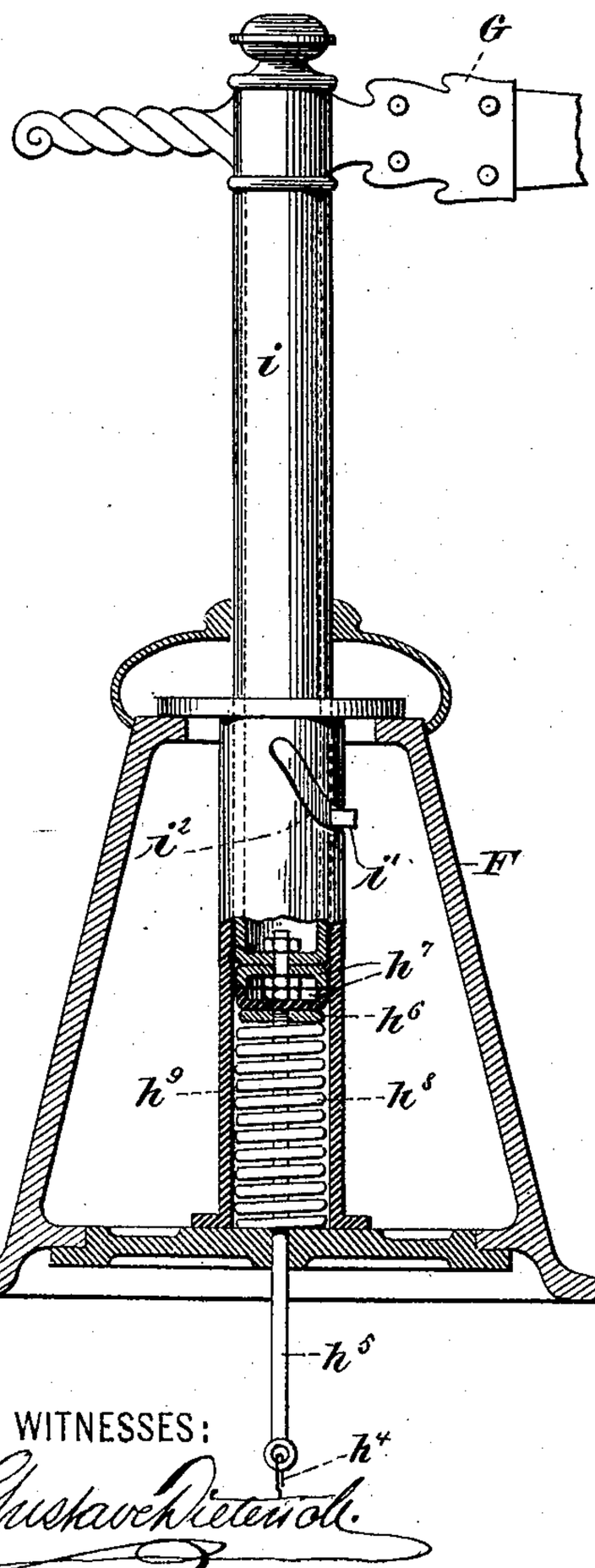
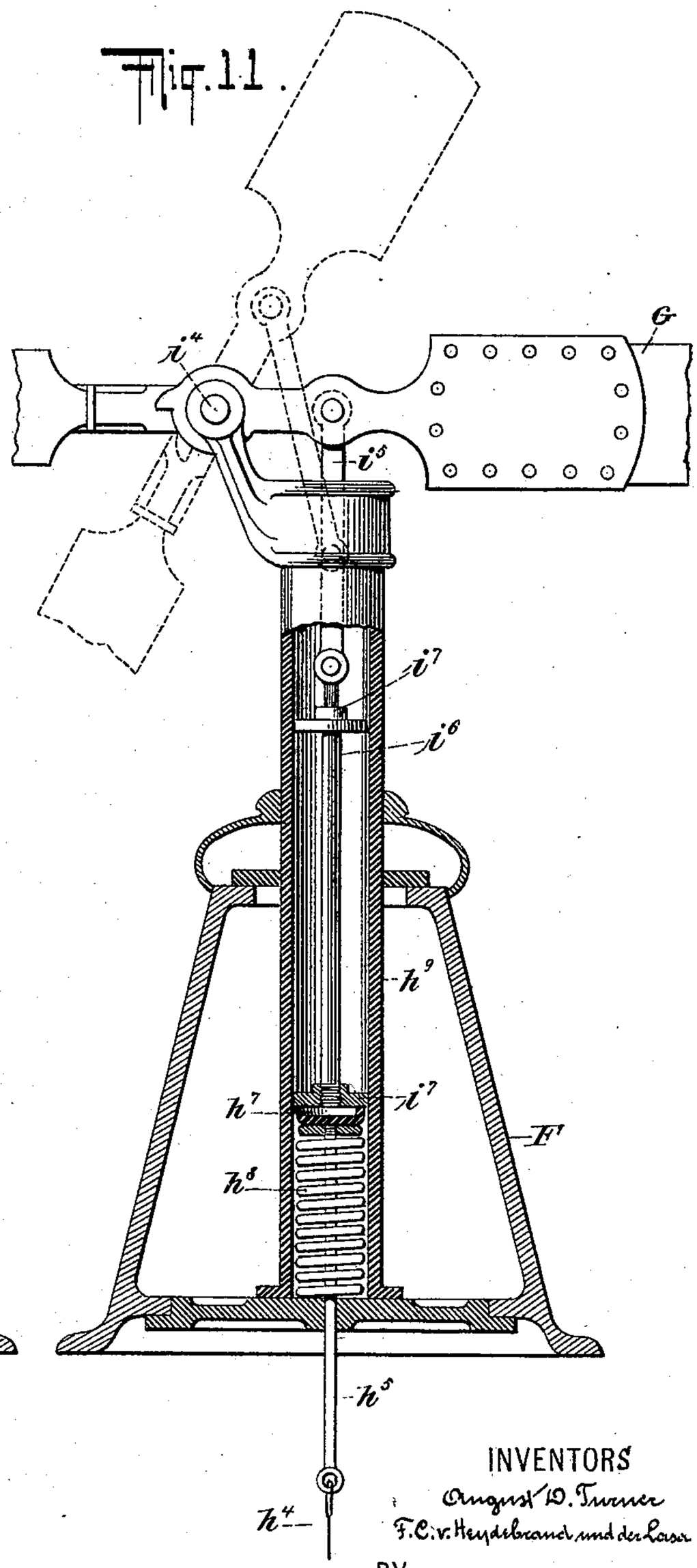


Fig. 11.



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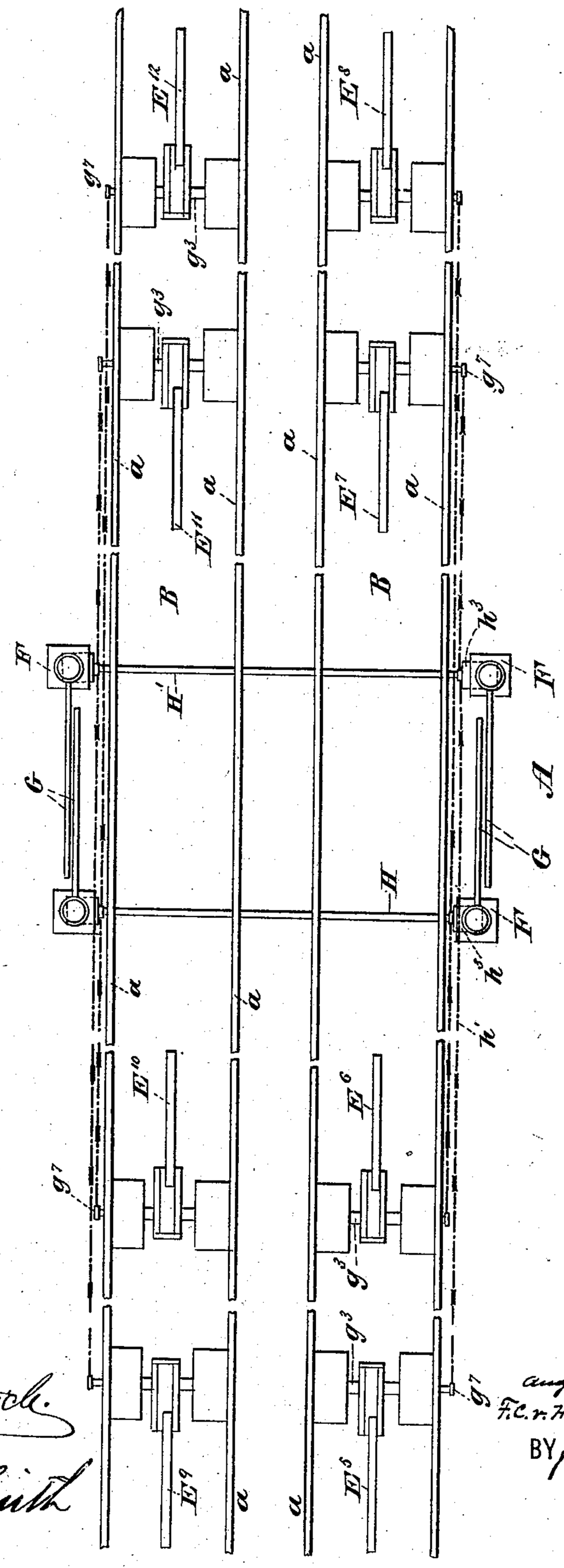
(Application filed Feb. 10, 1898.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 12.



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UNITED STATES PATENT OFFICE.

AUGUST D. TURNER AND FERDINAND CHRISTOPH VON HEYDEBRAND UND DER LASA, OF NEW YORK, N. Y., ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AUTOMATIC TRIP RAILROAD GATE COMPANY, OF ELIZABETH, NEW JERSEY.

GATE FOR RAILWAY-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 636,220, dated October 31, 1899.

Application filed February 10, 1898. Serial No. 669,805. (No model.)

To all whom it may concern:

Be it known that we, AUGUST D. TURNER and FERDINAND CHRISTOPH VON HEYDEBRAND UND DER LASA, of the city, county, and State of New York, have invented certain new and useful Improvements in Automatically-Operated Gates for Railroad-Crossings, of which the following is a specification.

Our invention relates to automatically-operated gates for railroad-crossings. Heretofore various kinds of apparatus have been devised for this purpose; but in all such apparatus, so far as we are aware, disadvantages were present which rendered their use impracticable.

The object of our invention is to overcome the disadvantages heretofore found in automatically-operated gates and to provide at comparatively small cost a simple and efficient mechanical device for automatically opening and closing gates at both sides of a crossing by a train moving in either direction without the aid of motive power other than that supplied by the passing engine or train, the invention being adapted for a double or a plurality of tracks, as well as a single track, and for use in connection with suitable alarm and signal mechanism, which, however, forms no part of the present invention.

To these ends our invention consists in the novel arrangement and combination of parts hereinafter described and claimed.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a diagrammatic view, in side elevation, of one section of one form of apparatus embodying our invention. Fig. 2 is a like view of the remaining section or portion of such apparatus. Fig. 3 is an enlarged detail side view of one of the gate-operating trips. Fig. 4 is a like view of another of said trips and its connections. Fig. 5 is an enlarged detail side view of the pilot of an engine provided with one form of device which is adapted to coöperate with the trips in the road-bed. Fig. 6 is a plan view of the same. Fig. 7 is an enlarged detail plan view of one of the gate-trips and its connections. Fig. 8 is an enlarged inside face view of one of the bearings of a gate-trip. Fig. 9 is a vertical sectional view of the same on the line 12 12 of Fig. 8. Fig. 10 is an enlarged detail side view, partly in section, of one form of gate and its coöperating mechanism, the spring being shown contracted. Fig. 11 is a like view of a modified form of gate and its coöperating mechanism, the spring being shown contracted; and Fig. 12 is a diagrammatic plan view of a modified form of gate-operating mechanism embodying our invention.

In the accompanying drawings, A represents a cross-road, Fig. 12, which crosses one or more railroad-tracks B. For the purposes of clearness we have represented but one track and mechanism for use in connection therewith in Figs. 1 to 11, inclusive, whereas two tracks are represented in Fig. 12.

a represents the rails, which may be of any suitable character.

We will first describe one form of signal which may be used in connection with the gate-operating mechanism forming the subject-matter of our invention.

A signal-trip *b* may be pivoted beneath the road-bed to operate a suitable signal mechanism. This trip is provided with a counterbalance-weight c', which maintains it in the normal position. The trip is adapted to operate the signal or alarm wire or rod c^3 if it is moved in one direction, whereas the trip may be moved in the opposite direction without imparting motion to the signal-rod c^3. One of these signal-trips may be provided at each side of the crossing, and two of such signal-trips are provided for each track, each at a distance of, say, eight blocks from the crossing A. Each of the signal-rods c^3 is connected with an arm c^7, which is carried by a drum c^8. This drum is connected with a rod or wire *d*, which is adapted to communicate motion within a suitable signal mechanism which may be contained within a suitable signal-tower.

It will be understood that when a train approaching the crossing reaches a bell-trip *b* the trip will be shifted to operate the signal-rod c^3 and the drum c^8, when motion will be

communicated to the signal mechanism in the tower, thus warning any one on the cross-road of the approach of a train. When the train has passed the road, contact with the next signal-trip is had in a direction opposite, since the alarm-trips are oppositely disposed, and a movement of the trip in the direction of the arrow in Fig. 2 will not communicate motion to the signal-rod c^3, and consequently no movement will be communicated to the mechanism in the signal-box. Should, however, a train be passing in an opposite direction, a movement of this last-named trip will be effected to operate the mechanism in the signal-box, and the first-named trip will not effect a movement of the signal.

As before stated, the signal-trips are first set into operation by the approaching train and are located at a distance of, say, eight blocks from the cross-road. At a distance of, say, four and two blocks on each side of the cross-road are located trips E E′ and E^2 E^4, respectively, which are adapted to operate the gates. Each of these trips is preferably mounted in a housing beneath the road-bed, as indicated in Fig. 3, and is adapted to project through a slot or opening in the road-bed between the rails *a*. These trips are likewise preferably mounted in ball-bearings, which are shown in Fig. 9 to consist of an adjustable head g with a supporting-face g' for the balls g^2. A square shaft g^3 is provided with a flange g^4, which is adapted to constitute an operating bearing-face for the balls g^2. The gate-trip proper is preferably bolted to the square shaft g^3 in the manner illustrated in Fig. 3, and each of these gate-trips is provided with a nose or abutment g^5, which is adapted to bear upon a bolster g^6, as represented in Fig. 4, and limit the downward movement of the gate-trip. Carried by the shaft g^3 and movable therewith is an arm g^7, which is secured centrally to the shaft. To the outer ends of this arm g^7 are connected chains g^8, which pass over suitable pulleys g^9, supported within a conduit or channel h on one side of the track, Fig. 7. One end of each of these chains is connected to a gate rod, wire, or chain h', and these connecting-rods h' unite the various trips in a manner clearly indicated in Figs. 1 and 2 and likewise connect with a centrally-pivoted arm h^2, which in turn is united to a drum h^3, which connects with a gate-operating chain h^4. It will thus be seen that endless connections are formed between the various trips and that any movement imparted to one trip will be imparted to a corresponding extent to the other trips. This gate-operating chain is connected with a rod h^5, which is provided at its upper end with a plunger-head h^6, which is provided with a flexible cup h^7, of rubber or other suitable material. The rod h^5 is normally maintained in the elevated position by a coil-spring h^8, which is shown contracted in the drawings, and the cup h^7, connected therewith, is adapted to operate in a cylinder h^9, which may constitute part of the standard F of the gate. In the cylinder h^9 an upright post i is adapted to move. The post i is provided with a pin i', which is adapted to work in an inclined or helical slot i^2 in the cylinder h^9. The post i is provided at its lower end with a flexible cup h^7, which is intended to retard the downward movement of the post. A cross-bar or a gate G of any suitable pattern is secured to the post i and is adapted to extend entirely across the cross-road A. It will be observed that by this construction the spring h^8 normally tends to maintain the post i in the raised position, in which the gate-bar G does not extend across the road, and that when the rod h^5 is pulled down against the tension of the spring h^8, as illustrated in Fig. 10, the post i is without support and is free to lower itself by its own weight. In the downward movement of the post it will make a quarter-turn by reason of the engagement of the pin in the inclined slot in the cylinder h^9. This quarter-revolution of the post i is sufficient to cause the gate-bar G to be projected across the path of the cross-road. When the rod h^5 is released, the plunger or head h^6 will be slowly restored to the normal position by the spring h^8, the cup-valve h^7 preventing the rapid movement of the parts. The upward movement of the head h^6 will raise the post and cause the gate to be slowly opened. It will be observed that by this construction no matter how suddenly the rod h^5 is drawn down the gate will be closed at a given rate of speed, because of the fact that there is no connection between the gate-post and the head h^6 or the rod h^5, which operates it.

In Fig. 11 a modified form of construction is illustrated, which is adapted for a drop-gate instead of a swinging gate. In this construction the gate-bar G is pivoted, as indicated at i^4, and is connected by a link i^5 to a rod i^6, which carries piston-heads i^7, which work sufficiently tight in the cylinder h^9 to prevent a too-rapid movement of the parts. In this device the gate is normally maintained in the elevated position by the spring h^8, which spring is depressed by a rod h^5. A flexible cup h^7 is connected to the rod h^5 for the same purpose as that described in connection with the device illustrated in Fig. 10. When the rod h^5 is depressed to contract the spring in this device, the gate-bar, which is normally maintained in the position illustrated in dotted lines, will gradually fall to the position illustrated in full lines by reason of the fact that the piston-heads working in the cylinder will prevent a rapid movement of said gate-bar.

Having described the construction of the various elements which are embodied in our invention, we will now describe the operation thereof.

Supposing a train to be coming in the di-

rection of the arrow in Fig. 1, the antifriction-roller or other coöperating device carried by the pilot of the engine or by any of the cars of the train will first strike the signal-trip *b*, (illustrated in Fig. 1,) when the signal will be operated in the manner hereinbefore described. The engine will next approach the gate-trip E; but it will be observed that this trip is below the rail and is maintained out of the path of the roller on the pilot of the engine and is therefore not affected by the passage of the train. When, however, the engine reaches the gate-trip E^2, it is depressed until the nose g^5 thereof is brought into contact with its coöperating bolster g^6. This movement of the trip E^2 causes the trip E to be raised into operative position and at the same time causes the gate to be closed in the manner which has hereinbefore been explained. The shifting of the gate-trip E^2 not only causes an elevation of the trip E, but it likewise causes a depression of the trip E^4 and an elevation of the trip E′, so that after the train has passed the gates the gate-trip E′ will have been raised into operative position, where the antifriction-roller on the pilot is brought into engagement therewith and the position of the trips is again reversed and the gate is opened. The train passing to a farther point contacts with the signal-trip *b* in Fig. 2, but does not effect an operation of the signal, because of the fact that the trip is operative when turned in but one direction, and that the direction from which a train approaches the gates or cross-road. It should be understood that these various trips are located at a considerable distance apart, and should a second train closely follow the first train it will be observed that the trips have been left by the first train in the position they were in before the first train arrived at the first trip, so that the second train in passing will merely cause a repetion of the movement before described to take place. Should, however, a train approach from the opposite direction, the signal-trip *b* in Fig. 2 will be operated and the trip E′ will be passed without engagement. The trip E^4, however, will be operated to close the gates and to shift the gate-trips E and E′ into operative position and to cause the trip E^2 to be forced out of the operative position, so that the train will not strike the trip E^2, but will depress the trip E when it arrives at that point, and thus restore the parts to their normal position. Thus it will be seen that the signal and the gates are operated under all conditions, whether trains be following one another or whether they approach from one direction or the other, and that after a train has passed the parts are automatically restored to their normal position and are ready to be operated by the next train.

In Fig. 12 we have illustrated a two-track system embodying our invention. The operation of the parts, so far as the gates and the signals are concerned, is in all respects like that hereinbefore described. In this construction, however, two gates G are employed at each side of the crossing, each of which gates extends entirely across the roadway or crossing. Two of these gates, one at each side of the crossing, are united to a shaft H, which extends under the railroad-bed, while the other two gates are connected to a similar shaft H′, and these shafts carry at each end a drum h^3, which connects with the gate-operating mechanism in the manner which has been hereinbefore described. The shaft H and the gates controlled thereby are operated by the gate-trips E^5, E^6, E^7, and E^8, whereas the shaft H′ is operated by the trips E^9, E^{10}, E^{11}, and E^{12}, and the trips E^5, E^6, E^7, and E^8 are operated independently of the trips E^9, E^{10}, E^{11}, and E^{12}; but trips of each set are connected in the manner illustrated in Figs. 1 and 2, and the operation of the parts is the same as hereinbefore described. Thus it will be seen that when a train has passed the trip E^8 on one track and another train has approached the trip E^{11} on the other track the set of gates controlled by the shaft H′ will be closed, while the gates controlled by the shaft H will be opened. Thus by our invention we provide against accidents and against every contingency so far as we are aware. Trains may follow one another in close succession or may pass each other at the crossing, and yet one set of gates will be maintained closed as long as any train has not passed the roadway and reached a point where the opening-trip is operated. It will likewise be observed that there is little liability of the parts of the apparatus becoming injured, no matter what the speed of a passing train may be, since the connections of the various parts are in a sense flexible, inasmuch as all of the parts give at the operation of a trip, and there is no connection whatever between the gate and the mechanism which operates the same. For this latter reason the gates are operated slowly, no matter how great is the speed of a passing train. Furthermore, it will be seen that no power is required to bring about the various operations other than that provided by the contact of the passing train with the trips.

Springs *x* may be variously interposed between the connections which unite the gate-trips. These springs have sufficient tension to overcome the strain exerted by operating the signals and gates. Should, however, the contact-piece of one engine reach the trip E′ while the trip E is being depressed, no injury can result, since the depression of the trip E will merely cause the springs *x* to be expanded, and when either engine has passed a trip E or E′ the parts will assume their normal position. In a like manner springs *y* may be interposed between the connections which unite the signal-trips, so that the connections will not be broken if trains moving in oppo-

site directions should each arrive at a signal-trip at the same time.

The mechanism for operating the signals, which is shown in the accompanying drawings, is not claimed herein, but will form part of an improved signal mechanism which is to be embodied in a separate application.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described, the combination of a gate adapted to drop into the operative position by its own weight, a piston-like plunger connected to and adapted to be moved in one direction by said gate, a cylinder within which said plunger is adapted to work to retard the movement of the gate when it is free of its support and is dropping into the operative position, a spring-support for normally maintaining the plunger and the gate in an elevated position and means for withdrawing the spring-support from said plunger.

2. In an apparatus of the character described, the combination of a gate adapted to drop into the operative position by its own weight, a piston-like plunger connected to and adapted to be moved in one direction by said gate, a cylinder within which said plunger is adapted to work to retard the movement of the gate when it is free of its support and is dropping into the operative position, a spring-support entirely disconnected from said gate for normally maintaining the plunger and the gate in an elevated position, and means for withdrawing the spring-support from said plunger.

3. In an apparatus of the character described, the combination of a gate adapted to drop into the operative position by its own weight, a post to which the gate-bar or gate proper is connected, a cylinder within which said post works, an inclined slot-and-pin connection between said post and cylinder, a spring-support for normally maintaining the post and gate in an elevated position and means for withdrawing the spring-support from said post, whereby, when the spring-support is withdrawn, the gate will be turned and lowered into the operative position.

4. In an apparatus of the character described, the combination of a plurality of gate-trips upon opposite sides of a crossing, said trips being arranged so that certain of them are maintained in an inoperative position while others are in the operative position, connections between said trips whereby a movement of one trip out of the operative position will cause the inoperative trips to be brought into an operative position, double arms connected to each of said trips to which the trip connections are secured, a drum operated by said connections, a gate and intermediate connections between the gate and drum, whereby a movement of any trip by a passing train will communicate motion to the gate.

5. In an apparatus of the character described, the combination of a plurality of gate-trips upon opposite sides of a crossing, said gate-trips being adapted to be operated by a train moving in either of two directions and arranged so that certain of them are maintained in an inoperative position while others are in the operative position, direct connections between said trips said connections being positively secured to said trips whereby a movement of one trip out of the operative position will cause the inoperative trips to be brought into an operative position, a gate adapted to drop into the operative position by its own weight, a spring-support for normally maintaining the gate in an elevated position, and a positive connection between said trips and the spring-pressed support for withdrawing the support from said gate.

6. In an apparatus of the character described, the combination of a plurality of gate-trips upon opposite sides of a crossing, said trips being adapted to be operated by a train moving in either of two directions and arranged so that certain of them are maintained in an inoperative position while others are in the operative position, direct connections between said trips, said connections being positively secured to said trips whereby a movement of one trip out of the operative position will cause the inoperative trips to be brought into an operative position, a gate adapted to drop into the operative position by its own weight, a spring-support entirely disconnected from said gate for normally maintaining the gate in an elevated position, and means connected with the trips for withdrawing the support from said gate.

7. In an apparatus of the character described, the combination of a plurality of gate-trips upon opposite sides of a crossing, said trips being arranged so that certain of them are maintained in an inoperative position while others are in the operative position, positive connections between said trips whereby a movement of one trip out of the operative position will cause the inoperative trips to be brought into an operative position, a gate adapted to drop into the operative position by its own weight, a piston-like plunger connected to said gate, a cylinder within which said plunger is adapted to work, a spring-support for normally maintaining the plunger and the gate in an elevated position, and means connected with the trips for withdrawing the support from said gate.

8. In an apparatus of the character described, the combination of a plurality of gate-trips upon opposite sides of a crossing, said trips being arranged so that certain of them are maintained in an inoperative position while others are in the operative position, connections between said trips whereby

a movement of one trip out of the operative position will cause the inoperative trips to be brought into an operative position, a gate adapted to drop into the operative position by its own weight, a post to which the gate-bar or gate proper is connected, a cylinder within which said post works, an inclined slot-and-pin connection between said post and the cylinder, a spring-support for normally maintaining the post and gate in an elevated position and means connected with the trips for withdrawing the support from said gate.

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