

No. 894,181.

PATENTED JULY 28, 1908.

A. A. BORKENHAGEN.
SAFETY GUARD FOR STREET CARS.

APPLICATION FILED DEC. 27, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

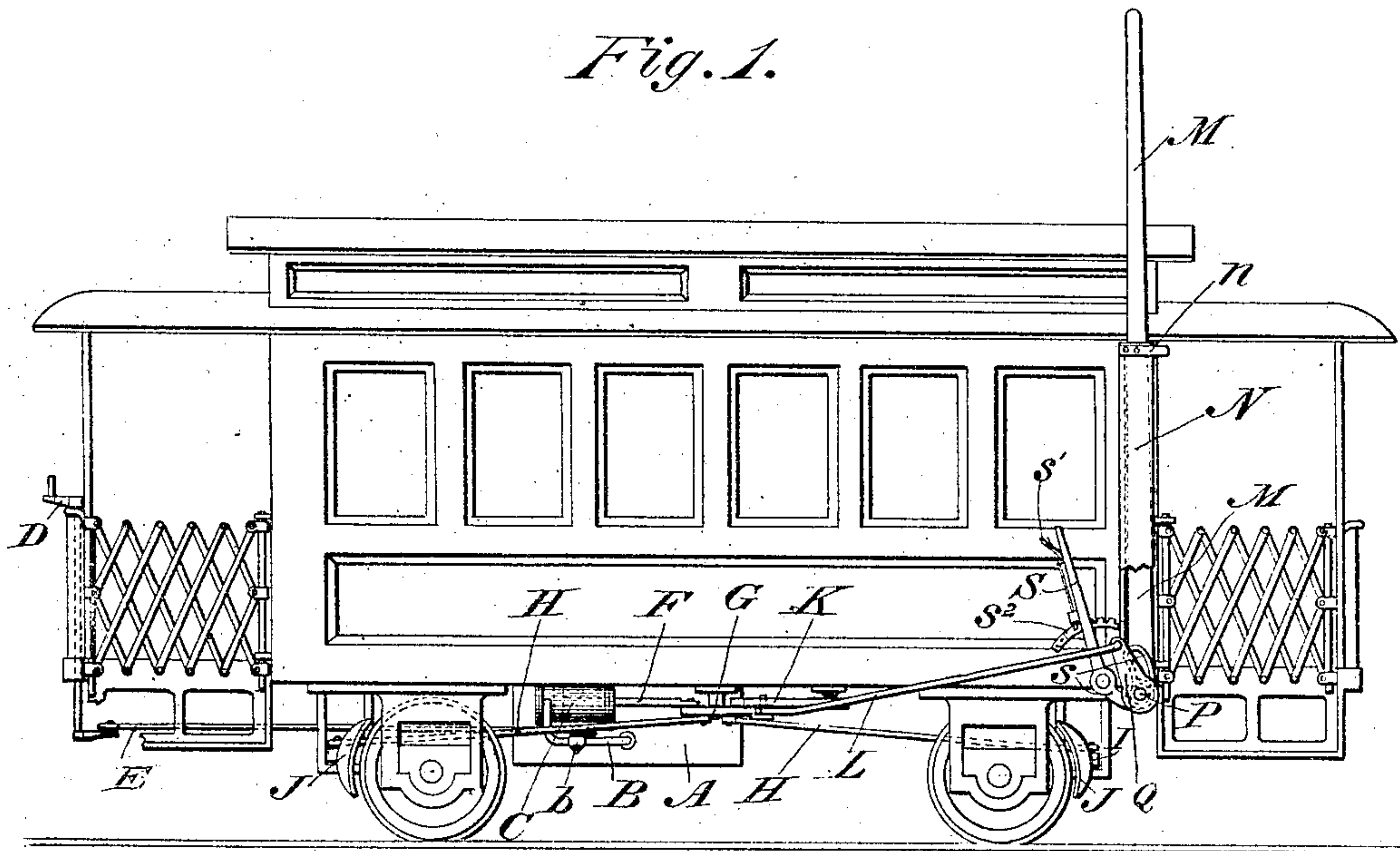


Fig. 2.

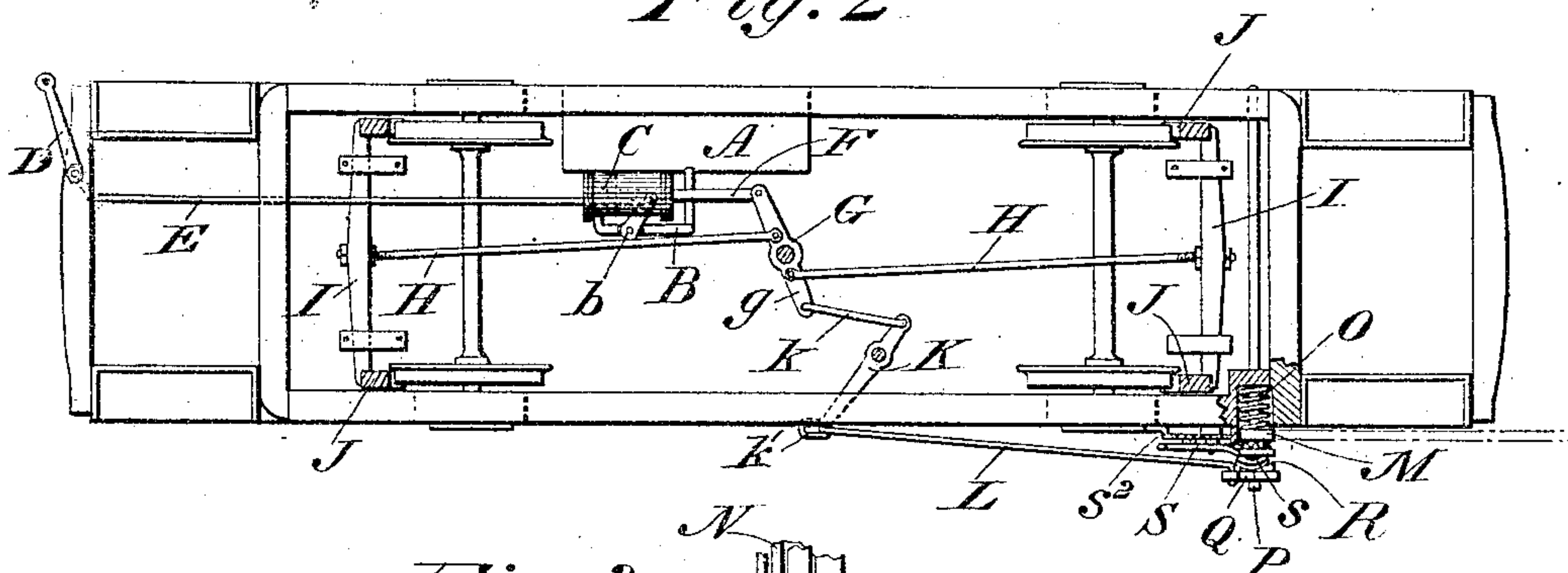


Fig. 3.

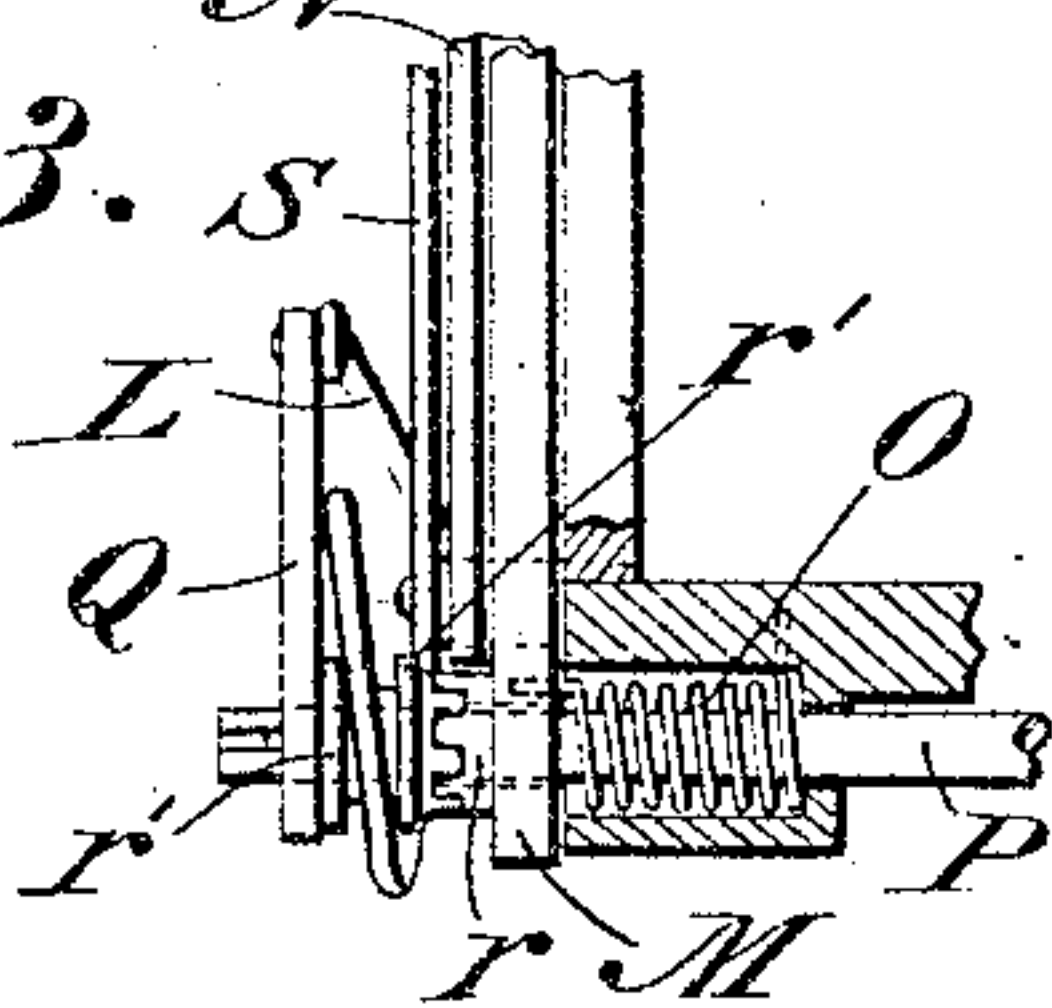
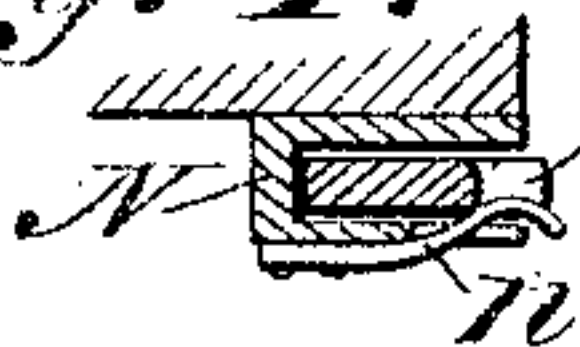


Fig. 4.



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3 SHEETS—SHEET 2.

Fig. 5.

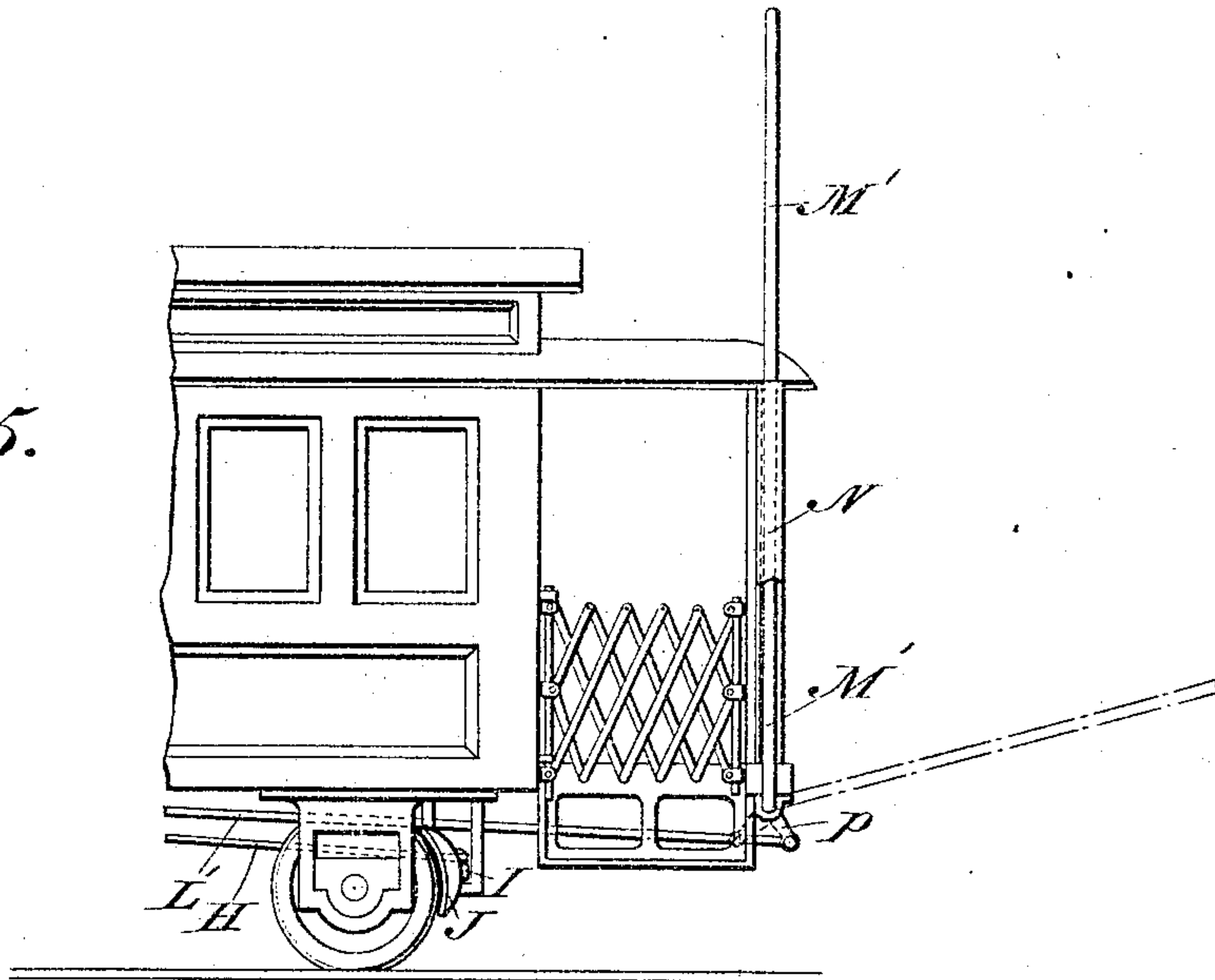
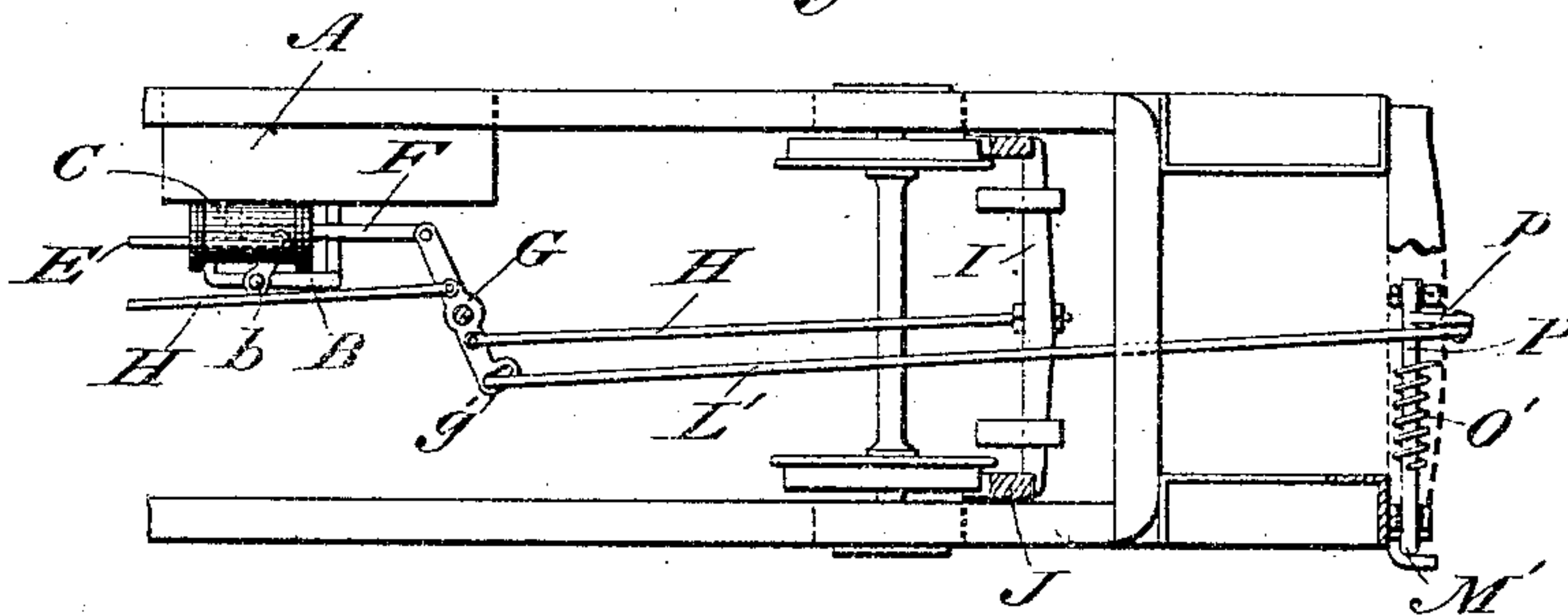


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

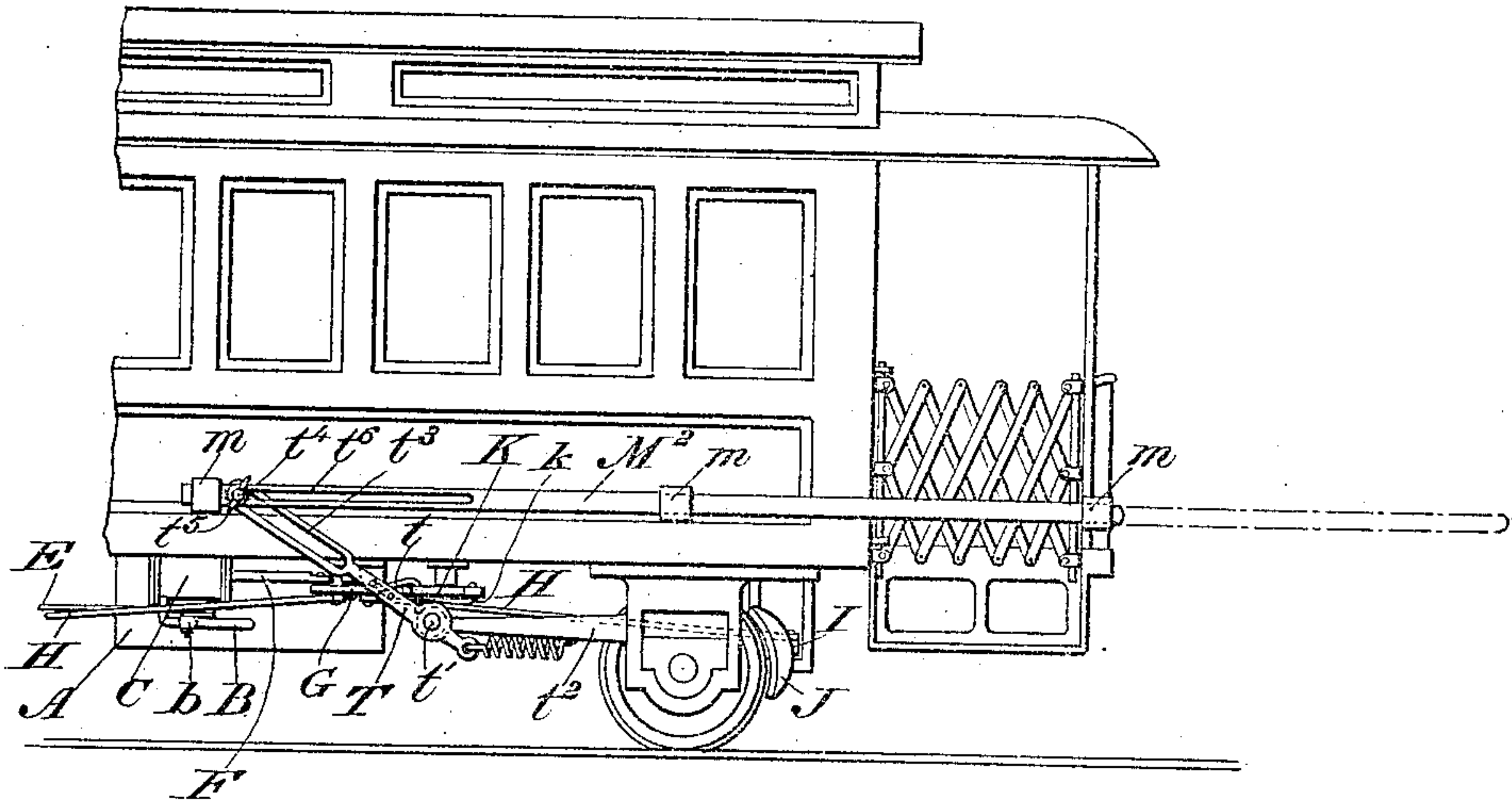


Fig. 8.

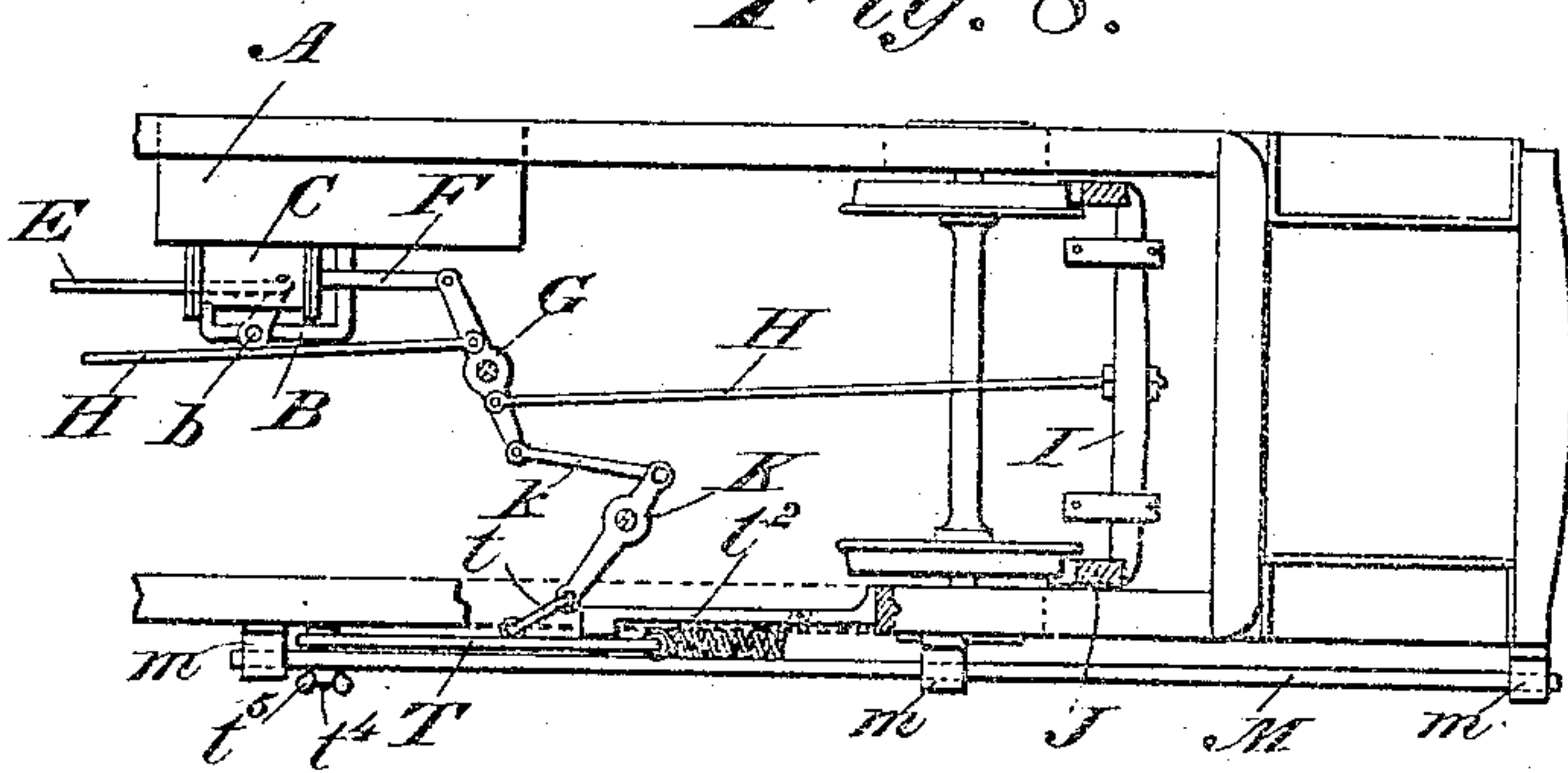
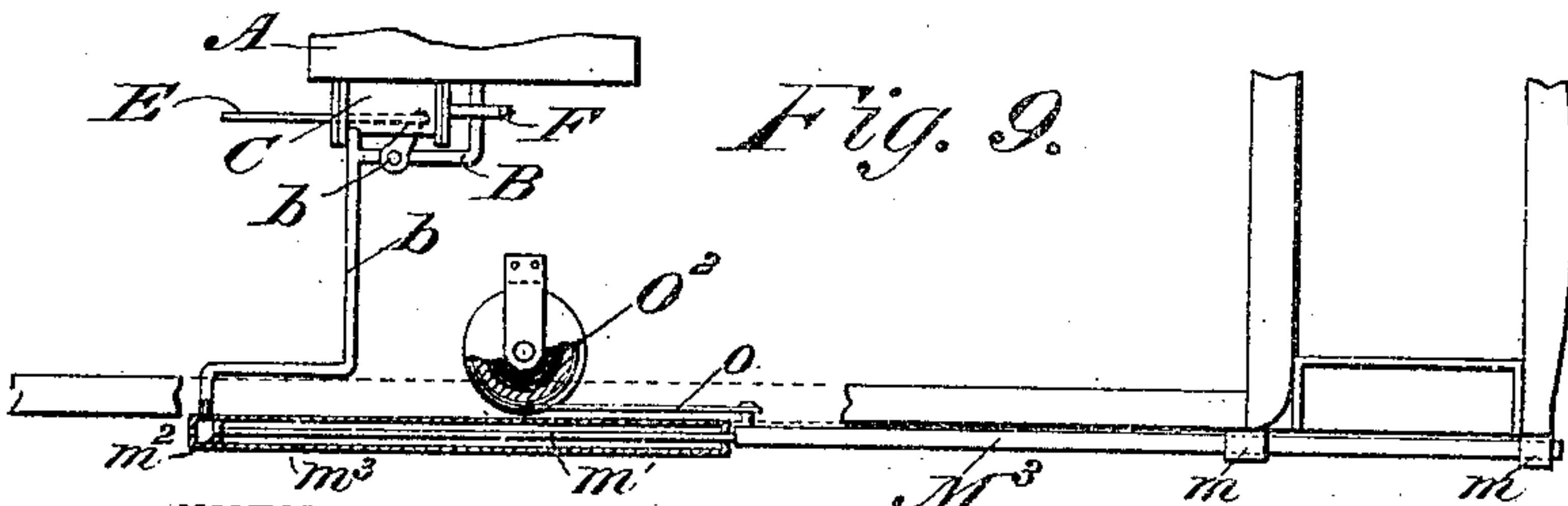


Fig. 9.



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UNITED STATES PATENT OFFICE.

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SAFETY-GUARD FOR STREET-CARS.

No. 894,181.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed December 27, 1905. Serial No. 293,542.

To all whom it may concern:

Be it known that I, ALBERT A. BORKENHAGEN, a citizen of the United States, residing at St. Louis city and State of Missouri, have invented a certain new and useful Safety-Guard for Street-Cars; 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.

The object of this invention is to prevent passengers leaving one street car from immediately passing behind the same and thereby endangering their lives by crossing in front of a car coming in the opposite direction on the other track, and to warn the passengers to look out for the approaching car; in order that the ever-increasing number of accidents due to this cause may be greatly reduced or eliminated. For this purpose, the invention provides an automatic apparatus incorporated with the brake-mechanism of the car, for extending a safety-guard in the nature of a bar or other obstruction from the rear end of the car when it stops at crossings or elsewhere, said safety-guard preventing the passengers alighting from the car from immediately passing behind and crossing the other track, and also serving as a movable signal to warn the passengers or pedestrians to watch out for the car coming in the opposite direction.

With the above stated object in view, together with other minor objects incidental to the main purpose, the invention will hereinafter be fully described with reference to the accompanying drawings, which form a part of this specification, and then will be more particularly pointed out and defined in the annexed claims.

In said drawings, Figure 1 is a side view of a street car equipped with one form of apparatus embodying my invention, the same being incorporated with the brake-mechanism of the car, and having a swinging guard-rail at the rear end of the car which lets down behind the same when the brakes are applied to stop the car. Fig. 2 is a top plan view of the bottom frame or car-truck, and running-gear, brake-mechanism, and mechanism of the safety appliance incorporated therewith. Fig. 3 is an enlarged fragmentary view, principally in rear elevation but with parts in section, of the lower end of the guard-rail and

parts contiguous thereto. Fig. 4 is a horizontal cross-section through the guard-rail and its inclosing casing, showing a retaining-spring for preventing the rail from coming out of its case. Fig. 5 is a side view of the rear end of a car equipped with another form of apparatus embodying my invention, this apparatus also having a swinging guard-rail or bar which automatically lets down behind the car when the car is stopped. Fig. 6 is a plan view of the same, taken just above the car-truck or bottom frame of the car. Fig. 7 is a side view of the rear half of a street car, equipped with still another form of apparatus embodying my invention, this apparatus having a longitudinally movable push bar which automatically projects or moves back behind the rear end of the car when the car is stopped. Fig. 8 is a plan view of the same taken just above the car-truck or bottom frame, similarly to Figs. 2 and 6. Fig. 9 is a detail view of still another form of apparatus embodying my invention.

Referring to Sheet 1 of the drawings, Figs. 1 and 2 represent a street car equipped with an ordinary air-brake apparatus. It will be understood that the invention is adapted for incorporation or organization with any suitable car-brake mechanism, operated either by hand or by power, the present representation of an air-brake mechanism being adopted as a preferred means of illustration.

A denotes an air-tank attached to the bottom of the car, and containing a supply of compressed air. B is a pipe leading therefrom to the brake-cylinder C, for supplying compressed air to said cylinder for applying the brakes. The air-valve or cock *b* in the pipe B is controlled by the motorman or operator by means of the controller D at the front of the car, through the medium of the connecting-rod E.

F denotes the piston-rod, which is forced downward by admission of the compressed air behind the piston in the brake-cylinder.

G is an intermediately fulcrumed or pivoted brake-lever, connected to and operated by the piston-rod F, and connected by the rods H to the opposite brake-beams I, for applying the wheel-brakes J when the brake-lever G is moved by the piston-rod. The pull rods H which connect the brake-lever G with the opposite brake-beams I are shown pivotally-attached to said brake-lever at opposite sides of its fulcrum and relatively close there-

to, so that the wheel-brakes at both ends of the car are applied by the same movement of the brake-lever.

The foregoing parts being a common construction of air-brake mechanism, require no further explanation.

The brake-lever G has an arm *g* extending beyond its pivotal connections to the pull rods H, and said arm is pivotally-connected, as by means of the link *k* to the short arm of the intermediately-fulcrumed lever K, in such manner as to throw back the long arm of said lever K when the brake-lever G is operated to apply the brakes. The long arm of said lever K is connected by the rod L to the guard-rail or safety-bar M, which is pivotally-mounted on the rear end of the car. Said safety-bar stands normally upright or approximately vertical, as shown in Fig. 1, when the brake-mechanism is in normal inoperative position. The safety-bar is shown set within an open-sided case N therefor, being retained therein by a spring *n*, which prevents the bar from falling out. When the brakes are applied, the safety-bar M swings directly backward and downward, so as to project from the rear end of the car, this movement being effected through the agency of lever K and connecting-rod L. Thus it will be seen that the operation of the safety-bar is automatic, occurring simultaneously with the setting of the brakes, so that the motorman or car-driver does not have to manipulate any extra lever or device besides the controller or lever for applying the brakes.

It may be desirable to have the brakes act or begin to act before the safety-bar is let down, for which reason means for a slight lost motion or play in the connections may be provided, for example, the long arm of the lever K is shown having a slot *k'* at its outer end, to which the connecting rod L is attached, so that the lever K moves back the distance of the slot before beginning to operate the safety-bar. When the brakes are released, the safety-bar is raised and returned to its place by any appropriate instrumentality, such as a retracting or recoiling spring O. The safety-bar M is shown mounted rigidly upon an axle or shaft P, journaled in suitable bearings therefor at the bottom of the car, and the spring O is shown arranged in a boxing therefor and coiled around such shaft or axle and having its opposite ends attached respectively to the car-body and to the safety-bar.

The connecting-rod L may be attached directly to the safety-bar M, or to a part rigid therewith, where it is desired to operate said safety-bar at all times, or rather whenever the car is stopped. But where the car is used on a single-track railway, or for example on a single-track extension of the railway line, it may be desirable to maintain

the bar upright and inoperative at all times, so as to avoid letting down the bar when the car stops at crossings or elsewhere on such single line. For this purpose, the connecting-rod L is shown in Figs. 1, 2 and 3 connected to a crank Q, having rigid therewith a clutch-member R adapted to coact with a clutch-member *r* rigid with the safety-bar. the said clutch-members being keyed on the axle or shaft P. When the clutch-members are engaged, as in Fig. 3, the safety-bar swings down simultaneously with the application of the brakes, or immediately after the application of the brakes. But when the clutch-members are disengaged the safety-bar remains inoperative in its upright position. In this connection, the aforesaid retaining-spring *n* is especially desirable for holding the safety-bar in its case N and preventing it from falling out, when the clutch-members are disengaged. For operating the clutch, a lever S is shown fulcrumed at the side of the car near the rear end thereof, said lever having a short arm carrying a slotted segment *s*, which segment fits over the clutch collar R, so as to permit movement of the lever within the limits allowed by the length of the slot. The said slotted segment *s* is inclined, as shown in Fig. 3, and is arranged between the opposite flanges or collars *r'* of the clutch-member R, so that when the lever S is moved backward its inclined slotted segment *s* will exert a cam action on the clutch-member R, throwing the same outward and disengaging it from the clutch-member *r*, while the opposite or forward movement of the lever S will exert a similar cam action to move the clutch-member R inward and engage it with the clutch-member *r*. Lever S is shown having a supplemental locking-lever *s'*, whose lock-bolt engages the usual segmental rack *s''*. By this means, the safety-bar may be operatively-connected with the brake-mechanism or disconnected at will so as to operate therewith or remain inoperative as desired.

Referring to Figs. 5 and 6, which illustrate another form or embodiment of the invention, M' designates the safety-bar or guard-rail, which in this instance is shown pivotally-mounted at the rear end of the car platform. As in the construction first described, the safety-bar M' maintains an upright position normally, but when the car stops and the brakes are applied said safety-bar swings down behind the car, as indicated by dotted lines in Fig. 5. In this case, the safety-bar M' is shown mounted rigidly on a crank-shaft or axle P', which is journaled in suitable bearings therefor beneath the platform of the car, and has associated therewith a retracting or recoiling spring O' for elevating the safety-bar when the brakes are released. The brake-mechanism is the same as shown in Figs. 1 and 2, and the corresponding parts

are designated by the same reference symbols as before. The brake-lever G is connected by a rod L' with a crank-arm p on the crank-shaft or axle P', for operating the safety-bar when the car brakes are set. In this instance, a slot g' is shown at the end of lever G to which the connecting-rod L' is attached, to permit a certain lost motion or allow an initial movement of the brake-mechanism before the safety-mechanism begins to operate.

Referring to the construction shown in Figs. 7 and 8, in this case the safety-member comprises a longitudinally movable bar M², arranged at the side of the car and working in guides m. therefor, and normally maintained in retracted position, as shown in the figures, but adapted to be projected backward so as to extend behind the rear end of the car, as indicated by dotted lines in Fig. 7. The said safety-bar M² is operated, through the agency of the instrumentalities now to be described, by the car-brake mechanism which is represented as of like construction to that shown in the previous figures, and is designated by the same reference symbols. The brake-lever G is connected by the link k to the short arm of an intermediately-fulcrumed lever K, similar to the construction shown in Fig. 2. See Fig. 8. The long arm of said lever K is connected by a link t to a lever T, which is fulcrumed at t' on a bracket t² extending from the car-truck; said lever T being adapted to move in a vertical plane beside the car. Said lever T has a long arm which is slotted, and its said slot t³ engages a pin t⁴ attached to the safety-bar M². By this means, when the brake-mechanism is operated to apply the brakes, the lever T is swung rearwardly thereby pushing back the safety-bar M², the slot t³ allowing the pin t⁴ to ride therein. The link t, which connects the levers K and T, is preferably adapted for disconnection from one of these parts, being shown in Fig. 7 having a hooked end which engages the lever K. By this means, the said link t can be disengaged so that the brake-mechanism will not affect the safety-bar, in case it is not desired to have the same operate, as when the car is traveling on a single track. Moreover, the pin t⁴ is shown inserted through a slot t⁶ in the bar M², and is rigidly clamped to the bar by a thumb-nut t⁵. By loosening the nut t⁵, the bar M² may be moved forward, its slotted part t⁶ riding past the pin t⁴, so that the rear end of said bar M² can be moved in front of the rear platform of the car, thereby permitting the steps at both sides of the platform to be used.

Referring to Fig. 9, the safety-member comprises a longitudinally movable bar M³, adapted to project back behind the rear end of the car. This bar M³ has a piston-rod m' projected from its forward end and provided

with a piston m² which works in a cylinder m³. The pipe B, leading from the air-tank A of the brake-mechanism to the brake-cylinder C, has a branch pipe b' leading to the cylinder m³, so as to supply compressed air behind the piston m² when the compressed air is supplied to set the brakes. By this means, the safety-bar M³ is pushed rearward. The bar is retracted by a spring drum O² connected by a strap or flexible connection c with the said bar M³.

Each of the several forms or embodiments of the invention illustrated may be duplicated at the opposite or front end of the car, at the reverse side of the car, so as to provide the same safety means at the other end of the car when the car is traveling in the opposite direction. Where the car is equipped with such mechanisms at both ends, the mechanism at the front end of the car will of course be disconnected from the brake-mechanism, so as to remain inoperative, while the mechanism at the rear end of the car will work simultaneously with the application of the brakes, to extend the safety-bar behind the car, as previously described.

It will be understood that the invention is not limited to any particular form or embodiment shown, and is also susceptible of embodiment in other constructions, and susceptible of various modifications in details of structure and arrangement of parts, without departing from the scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A safety appliance for street cars, comprising a guard-member carried by the car, and means connected with the car brakes and controlled by the operator of the car for extending said member back from the rear end of the car when setting the brakes, thereby presenting an obstruction to prevent passengers or others from passing immediately behind the car.

2. A safety appliance for street cars, comprising a guard-member carried by the car and normally held in a retracted position, and automatic mechanism for extending said guard-member back from the rear end of the car when the car stops.

3. A safety appliance for street cars, comprising a guard-member carried by the car and normally held in a retracted position, and automatic mechanism for extending said guard-member back from the rear end of the car when the car stops, and automatic means for retracting said guard-member.

4. In a street car, the combination with the car brake-mechanism or the guard-member carried by the car and normally held in a retracted position, and operative connections between said brake-mechanism and guard-member whereby the application of

the car-brakes causes said guard-member to extend back from the rear end of the car.

5. In a street car, the combination with the car brake-mechanism of the guard-member carried by the car and normally held in a retracted position, and operative connections between said brake-mechanism and guard member whereby the application of the car-brakes causes said guard-member to extend back from the rear end of the car, and automatic means for retracting the guard-member when the car-brakes are released.

6. In a street car, the combination with the car-brakes, of a brake-lever, means for operating the same, connections between said brake-lever and car-brakes for applying the brakes, a guard-member carried by the car and maintained normally in a retracted position, and connections between said guard-member and brake-lever whereby when the latter is operated for applying the brakes the guard-member is extended back from the rear end of the car.

7. In a street car, the combination with the car-brakes, and brake-actuating mechanism, of a guard-member carried by the car and normally maintained in a retracted position, an actuating lever connected with said guard-member and adapted to extend the same behind the rear end of the car, the said lever being operated by the brake-actuating mechanism.

8. In a street car, the combination with

the car-brakes, and brake-actuating mechanism, of a guard-member carried by the car and normally maintained in a retracted position, the said guard-member adapted to be extended back from the rear end of the car, connections between the guard-member and brake-mechanism for extending said guard-member when the brakes are applied, and means allowing an initial movement of the brake-mechanism before the guard-member begins to move.

9. In a street car, the combination with the car-brakes, of brake-actuating mechanism, a guard-member carried by the car and adapted to be extended behind the car, actuating-mechanism therefor operated by the brake-mechanism, and means for operatively connecting and disconnecting the guard-member from its actuating-mechanism.

10. In a street car, the combination of an upright bar pivotally mounted at the rear of the car and adapted to swing rearwardly and downwardly to a position behind the car, brake-actuating mechanism, and connections between the same and said bar whereby the bar is moved to a down position when the brakes are set.

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

ALBERT A. BORKENHAGEN.

Witnesses:

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A. R. O'BRIEN.