No. 846,514. PATENTED MAR. 12, 1907.

T. W. SMALL.

CIRCUIT CLOSING MECHANISM FOR RAILWAY INDICATORS.

APPLICATION FILED AUG. 14, 1906.

2 SHEETS—SHEET 1.

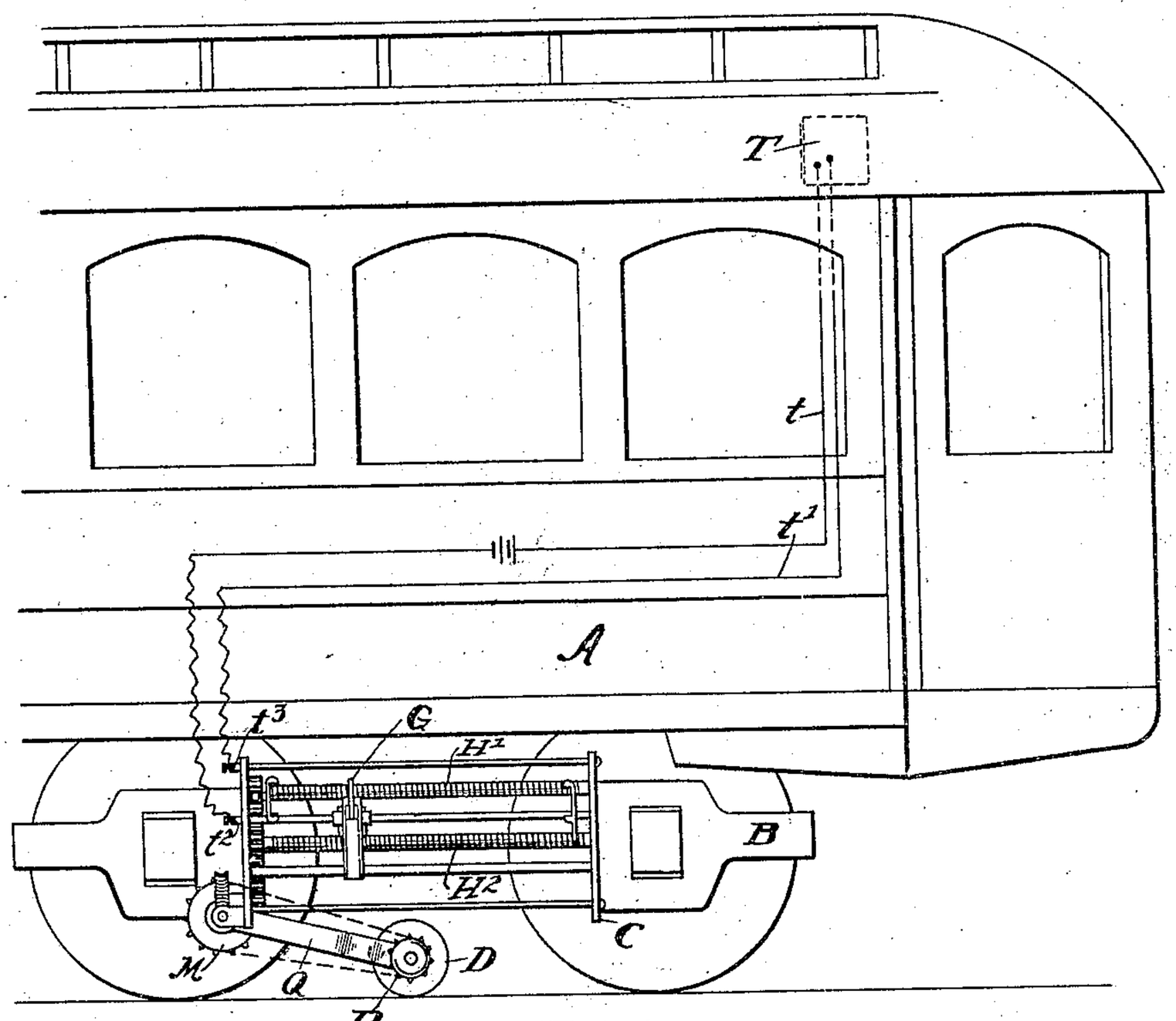

Fig. 1.

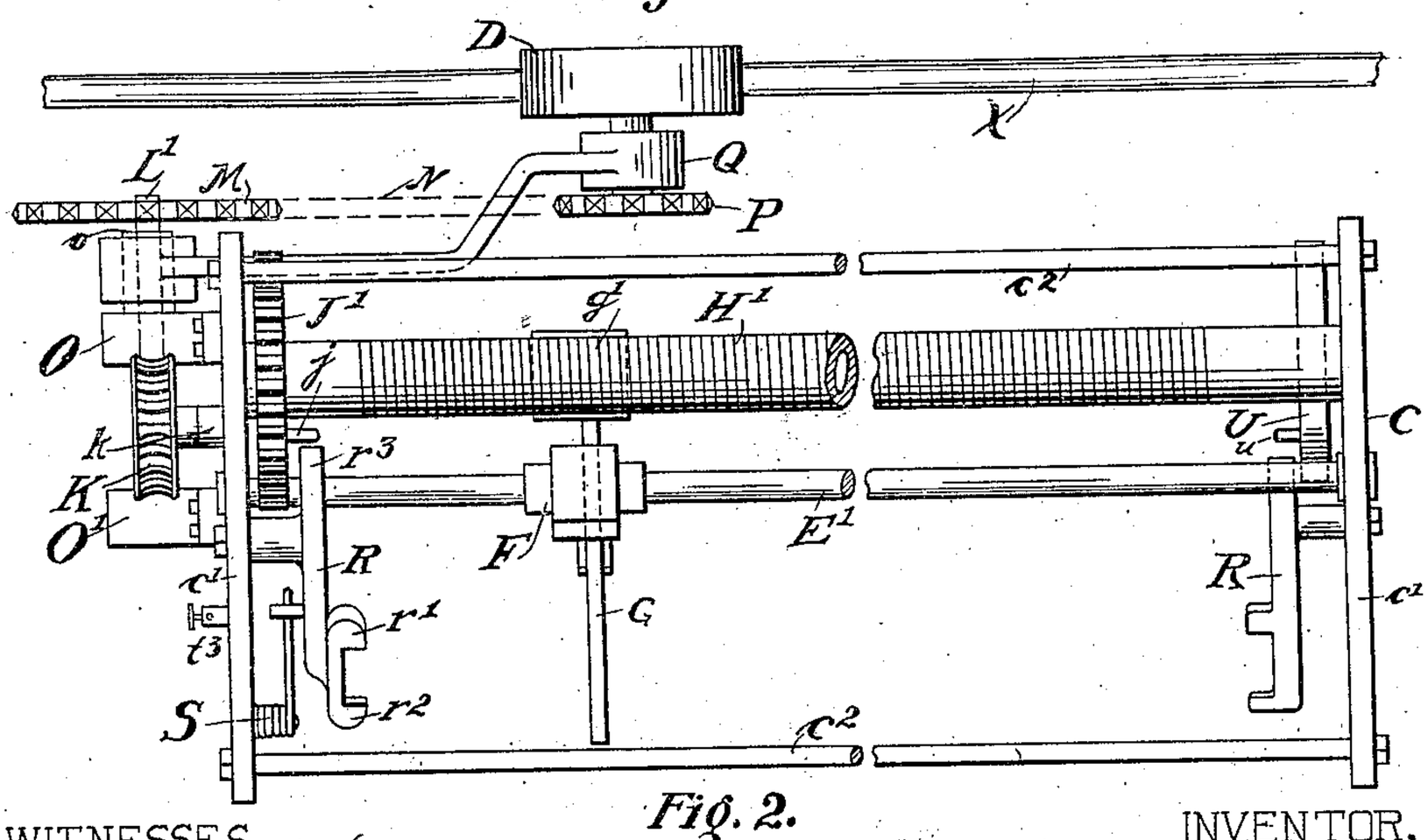

Fig. 2.

WITNESSES.
Ludo A. Keller.
Forman Bedell.

INVENTOR.
Thomas W. Small,
By Dale, Foulds & Hull,
ATTYS.

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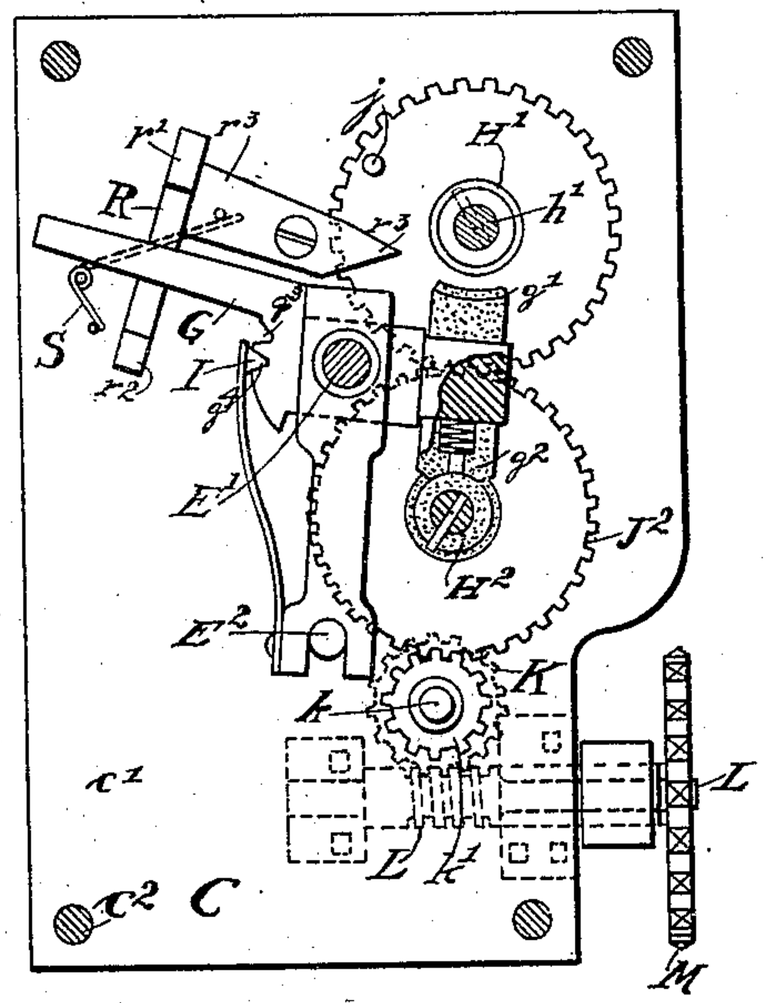

Fig. 4.

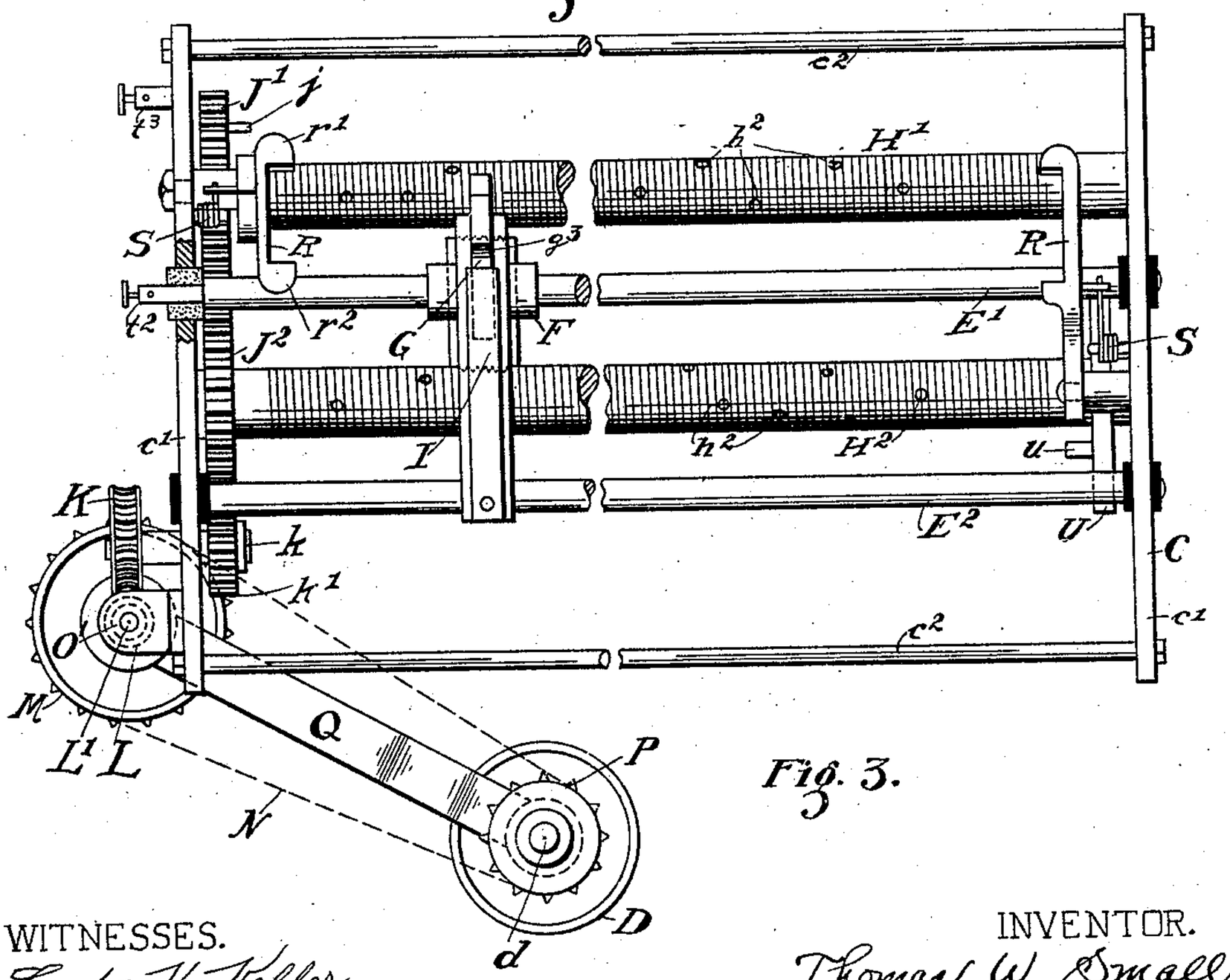

Fig. 3.

WITNESSES.
Ludo H. Keller.
Brennan Bullock.

INVENTOR.
Thomas W. Small,
By Bates, Jones & Hull.
ATTYS.

UNITED STATES PATENT OFFICE.

THOMAS W. SMALL, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ACME AUTOMATIC STREET INDICATING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

CIRCUIT-CLOSING MECHANISM FOR RAILWAY-INDICATORS.

No. 846,514. Specification of Letters Patent. Patented March 12, 1907.

Application filed August 14, 1906. Serial No. 330,563.

To all whom it may concern:

Be it known that I, THOMAS W. SMALL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Circuit-Closing Mechanism for Railway-Indicators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide a simple and efficient mechanism adapted to be attached to a car and automatically make electric contacts periodically as the car travels certain predetermined distances.

The invention is well adapted for actuating street-indicators in street-cars, the mechanism being arranged for the particular route over which the car travels.

The present invention is concerned with the means for driving the circuit-closing device according to the movement of the car, the circuit-closing mechanism itself being the subject of my copending application Serial No. 298,086, filed January 26, 1906.

The invention is more fully hereinafter described and its essential characteristics set out in the claims.

In the drawings, Figure 1 is a side elevation of a portion of a railway-car with my invention attached. Fig. 2 is a plan of my mechanism, partly broken away. Fig. 3 is a side elevation of the same. Fig. 4 is a vertical cross-section through the same, partly broken out to more clearly show the thread and nut.

As shown in the drawings, A represents the body of the street-car, and B one of the longitudinal members of a truck thereof. Secured to this member B is the contact mechanism carried by a frame C and including a pair of contact-screws H′ H² and a traveling head G, arranged to coöperate therewith, as hereinafter explained. The contacts are made by the rotation of the screws, and this rotation is caused by a measuring-wheel D, which runs along the track as the car moves. The connection between the measuring-wheel and the screws will now be described.

The measuring-wheel D is rigid on a shaft *d*, which is mounted on the lower end of a floating frame or arm Q, which is pivoted on a cylindrical boss *o*, formed on a bracket O, secured to the end plate *c′* of the frame. Journaled within this bracket and another bracket O′, secured to the plate *c′*, is the worm L, the shaft of which projects through the boss *o* and has on its end a sprocket-wheel M, which is connected by a sprocket-chain N with a sprocket-wheel P on the other end of the shaft *d*, on which the measuring-wheel D is mounted. The arm Q is offset laterally, as shown in Fig. 2, to bring the measuring-wheel directly over the rail X. The sprocket-wheel P is thus on the inner side of the arm Q, while the sprocket-wheel M is on the outer side and the sprocket-chain crosses the bend in the arm.

The worm L meshes with the worm-wheel K, which is on a shaft *k*, journaled in the end plate *c′*. On the inner end of the shaft, on the inner side of the frame-plate, is the pinion *k′*, which meshes with the gear J² on the screw H². This gear in turn meshes with the gear J′ on the screw H′. By this means the screws are rotated in opposite drections continuously as the wheel D travels over the rail.

The worm connection and the gearing cause the screws to rotate very much slower than the travel of the wheel, whereby the length of the screws may be made to correspond with the length of the route over which the car travels, and contacts may be formed on the screws corresponding to the stations at which the car may stop. This will be understood from the description of the circuit-closer itself, which will now be given, it being understood that the circuit-closer proper, apart form its driving mechanism, is the subject of my companion application referred to.

The frame of the circuit-closer is composed of the plates *c* and *c′*, heretofore referred to, at the opposite ends of the distance-rods *c²*. Extending between these plates are a pair of rods E and E², insulated from them. Slidable on these rods is a cross-head F, on which is the pivoted bar G, which carries the nuts and contacts coöperating with one or the other of the screws H′ H², as hereinbefore referred to.

The nuts are indicated by *g′* and *g²*. They are partial nuts, each formed with an integral thread on its free edge, as shown, and are held on the rear end of the bar G between the screws in such position that but one of them can engage a screw at a time. In the bar G are formed a pair of detent-notches *g³* *g⁴*, with which coöperates a detent-spring I, operating to hold either nut in engagement with its screw, while allowing a properly-ap-

plied force to shift the bar to release such engagement and bring the other nut into engagement with the other screw.

From the construction just described it follows that as the car travels along the track the wheel D rotates, measuring the distance and driving the screws at a much reduced speed, causing the cross-head to travel just in proportion to the travel of the car, the cross-head starting adjacent to one frame-plate when the car starts from one end of the route and reaching the other end of its travel when the car reaches the other end of the route. The cross-head is thus, in effect, a miniature car traveling along a miniature route corresponding to the route the car travels. It follows, therefore, that whenever the car is at a certain street the nut will be at a corresponding definite point on the screw. The nuts are made of fiber, and in each of them is a metallic pin g^5 in electric connection with the bar itself, the pin being pressed outward by a spring g^6, bearing against the bar G. The screws are made of fiber sleeves h around steel shafts h', and set radially in these sleeves and in engagement with the shafts are metallic pins h^2, which are positioned according to the streets, so that when the car is about to reach a street the pin g^5 in the fiber nut will engage the pin in the sleeve and cause a contact. One of the circuit-wires is connected to the guide-bar E′ and the other to the frame of the machine. The circuit when closed may operate suitable electric street-indicating mechanism, as illustrated conventionally in Fig. 1, the indicator being designated T and the circuit-wires t t'. The wire t connects with a binding-post t^2 on the rod E′, while the wire t' connects with a binding-post t^3 on the frame C. The screws turn in opposite directions, so that the cross-head travels in one direction or the other according to which nut is in engagement. To cause the change of engagement from one screw to the other automatically when the car reaches the end of its route, I provide the following mechanism.

Pivoted to the inner side of each frame member c is a dog R, having a pair of jaws r' and r^2. A spring S holds this dog in position, so that as the cross-head travels the forward end of the bar G comes between the jaws r' and r^2. A rearward projection r^3 of the dog stands in the path of a pin j, carried by the spur-gear J′ on the shaft H′ at one end or of a pin u, carried by a collar U on the shaft H² at the other end. The result is that the two dogs are oscillated for every rotation of the screws. When the cross-head is in an intermediate position, this movement of the dogs is idle; but when either screw has brought the cross-head substantially to an extreme position the forward end of the bar G stands between the jaws of the dog, so that the succeeding oscillation of the dog swings the bar to cause the engagement of the other screw, wherefore the cross-head travels in the opposite direction.

The result of the described construction is that as the car travels continuously over its route, making the usual loop at the end thereof, the cross-head, automatically moving and reversing, travels backward and forward along its path, making a contact before each street or station is reached. In placing the contact-pins h^2 in the screw-sleeves, I have found it convenient to first run the car with my mechanism attached over the route without these pins, stopping the car at each point where it is desired to have the contact made and making a mark at the point on the screw which the pin g^5 in the fiber nut is then engaging. After the round trip has been made in this way the pins h^2 are inserted in the two screws at the positions marked, and the device is ready of operation. It will be seen that by this method of operating the indicator it is unnecessary to equip the track or road bed with special devices to close the circuit. Each car is equipped for its own route with the proper indicator and contact-maker. If the car be changed to another route, it is a simple matter to change the indicator and contact-maker. The measuring-wheel has very light work to do and will not slip on the track. It will continue to properly record the distance whenever the car moves, whether the car-wheels rotate or slide. By mounting the measuring-wheel on the floating arm Q, as shown, the proper driving-contact is maintained between the wheel and the rail, notwithstanding the track being uneven or curved, and the grip of the wheel on the track is always the same, so that the circuit-closer may be driven regularly and with certainty. If the car should on any occasion return short of its usual run, the indication is easily rectified by the conductor opening the box of the contact-maker and adjusting by hand the position of the cross-head.

Having thus described my invention, I claim—

1. The combination of a pair of screws, a measuring-wheel geared therewith and adapted to rotate such screws, a traveling member adapted to engage either screw and thereby move in either direction, and contacts, one of which is carried by said traveling member.

2. The combination of a measuring-wheel, a member connected therewith caused to travel along its path and automatically back again for continued rotation of the wheel in one direction, and electric contacts brought into engagement by such travel, whereby no manual operation is required when the return trip begins.

3. The combination of a pair of screws, a member adapted to be driven in one direction by one screw, and in the opposite direction by the other, means for automatically

changing the engagement from one screw to the other as the member reaches the end of its travel, contacts controlled by such travel, a measuring-wheel, and driving connections between the same and the screws.

4. The combination of a vehicle adapted to travel along a route and back again with the same end of the vehicle foremost, a measuring-wheel carried by the vehicle and adapted to be rotated by such travel, a member connected with such wheel and caused thereby to move in one direction for the outgoing trip of the vehicle, and move back again in another direction for the return trip, and automatic means for actuating said member at the end of the outgoing trip to cause its direction of movement to be changed, and electric contacts brought into engagement by the movement of such member.

5. The combination of a vehicle, a measuring-wheel carried thereby, a traveling contact member, two sets of electric contacts, mechanism connecting said member with the measuring-wheel and adapted to cause the member to travel along said contacts as the vehicle travels, and mechanism for automatically shifting said member from one set of contacts to the other when the vehicle reaches the end of its outgoing trip.

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

THOMAS W. SMALL.

Witnesses:

ALBERT H. BATES,

W. L. MCGARRELL.