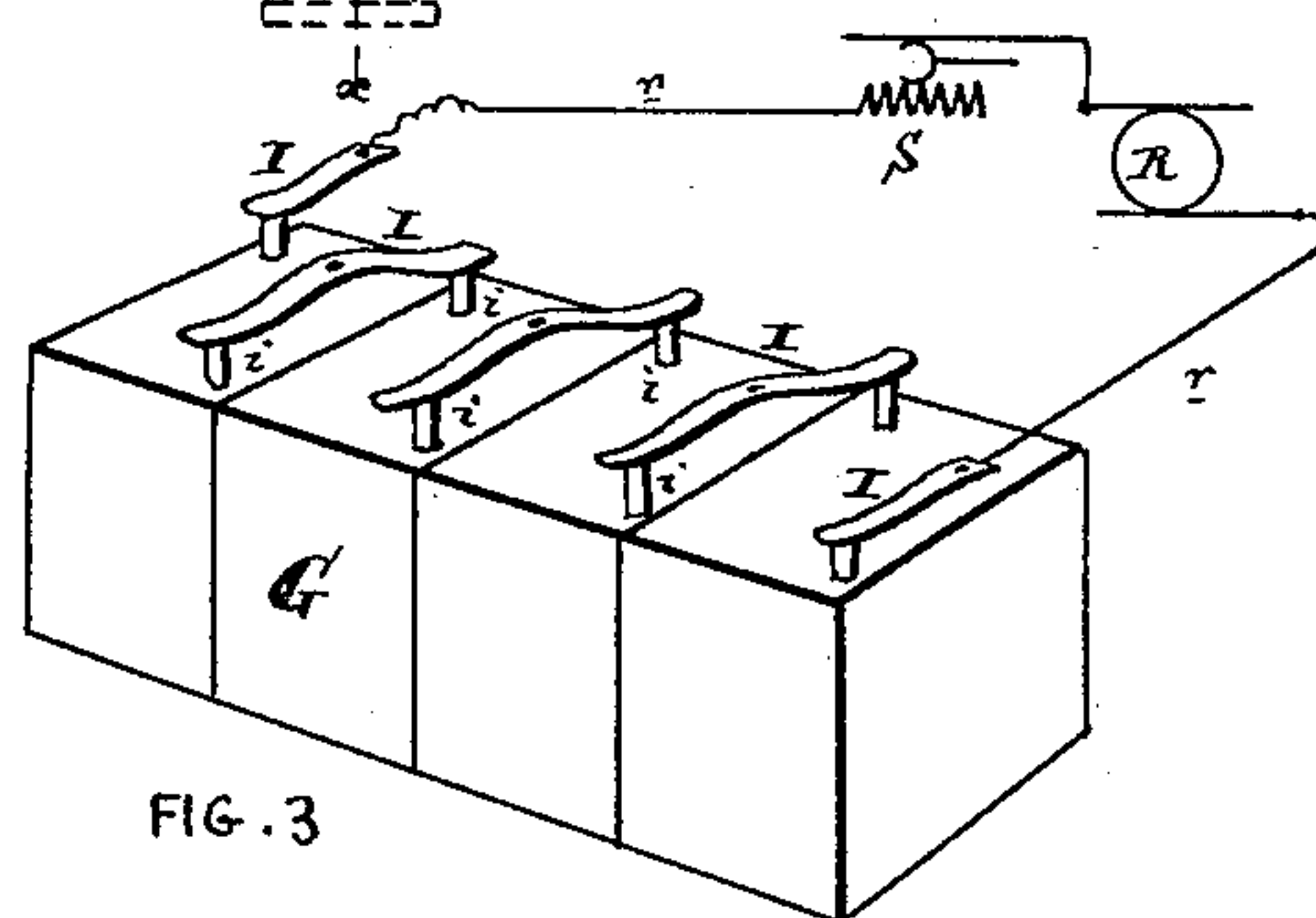
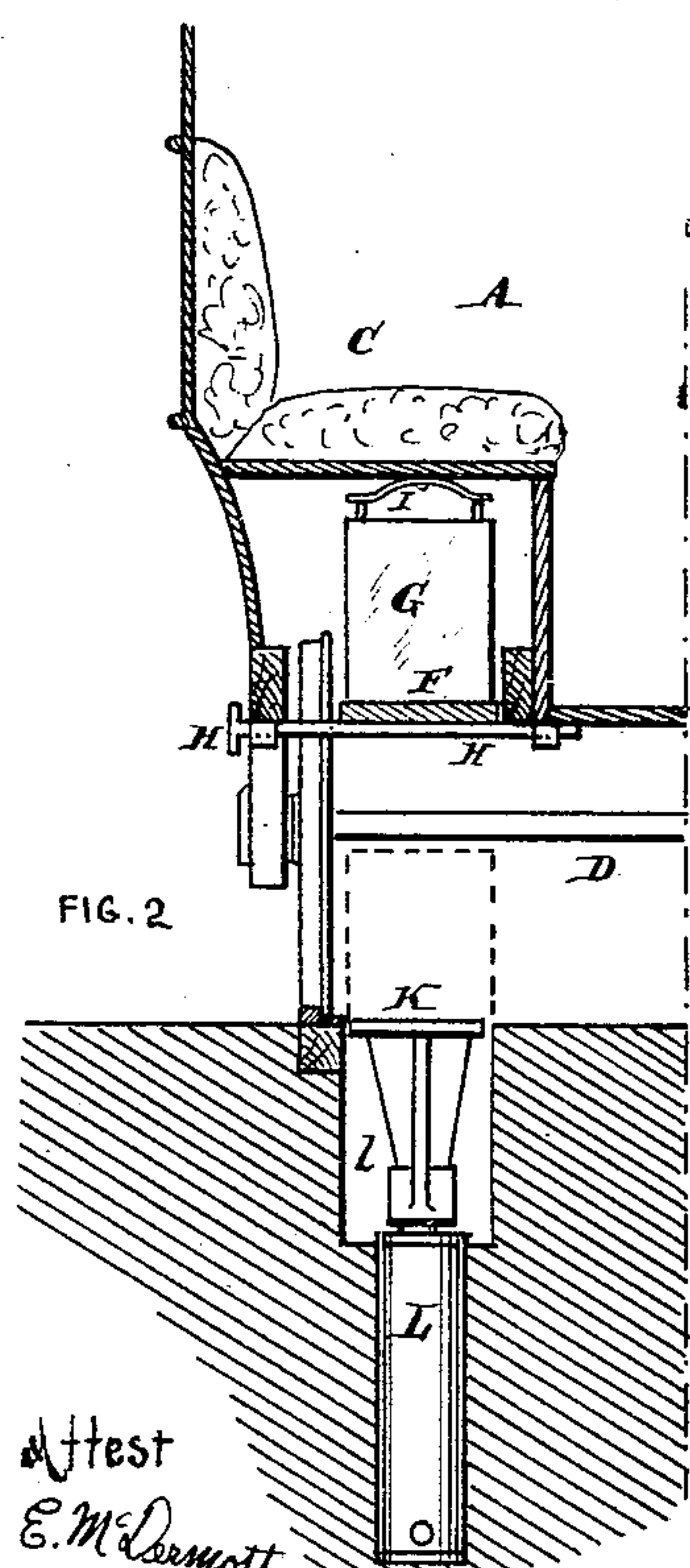
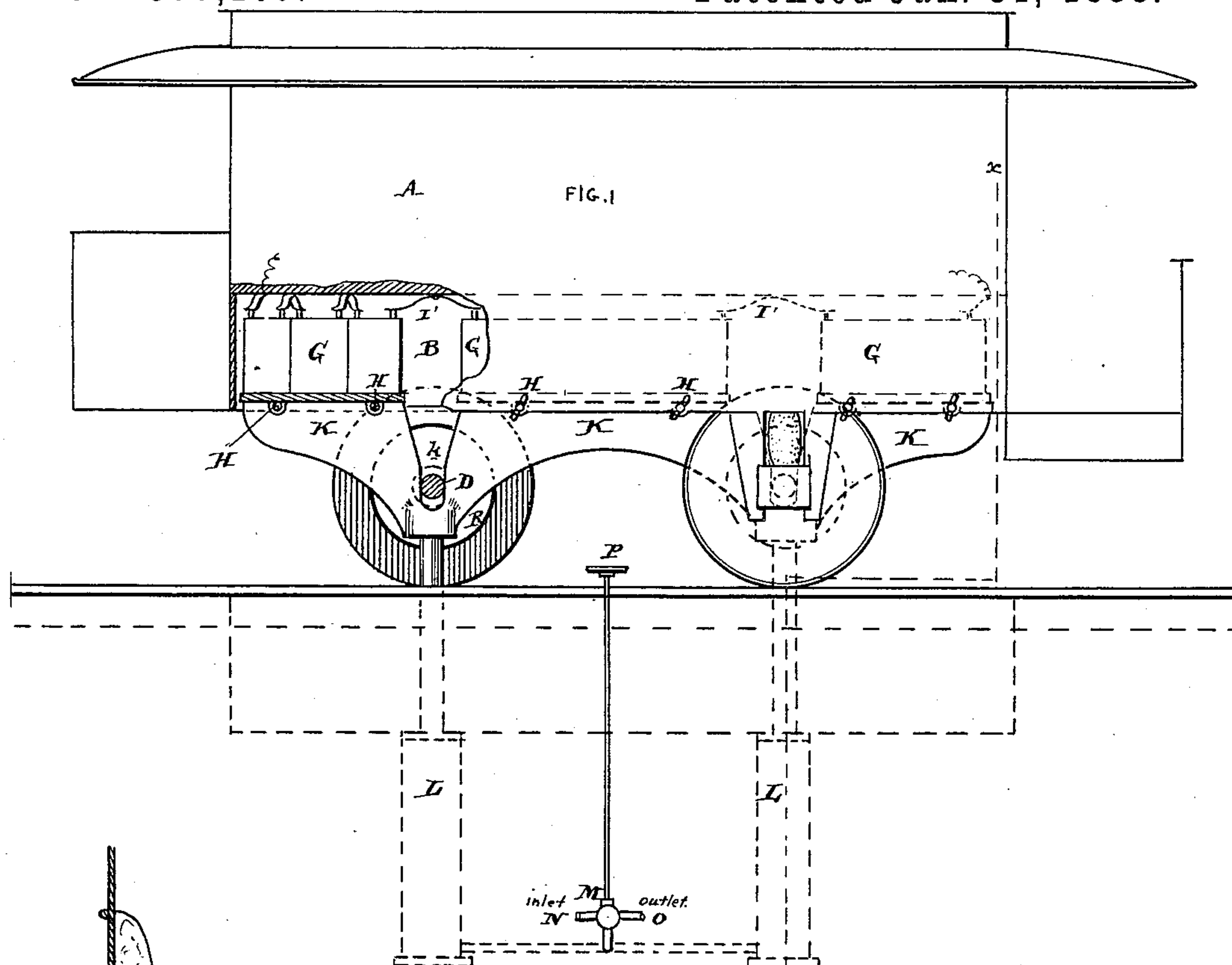


R. M. HUNTER.
ELECTRIC RAILWAY.

Patented Jan. 31, 1888.



Attest
E. McDermott
C. W. Breckinridge

Inventor

R. M. Shanks

UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 377,107, dated January 31, 1888.

Application filed June 30, 1887. Serial No. 242,930. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Electric Railways, of which the following is a specification.

My invention has reference to electric railways; and it consists in certain improvements, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide a convenient and quick method of supporting and changing storage-batteries on street-cars or other vehicles.

In carrying out my invention I provide compartments under the seats or other convenient parts of the car, and at the charging-station I provide a lift in the track which can be quickly raised and lowered for the purpose of removing or inserting one or more storage-batteries from or into the said compartments on the car. When raised, the removable battery-supporting buttons or floors are locked in place by suitable means.

I do not confine myself to any particular means for accomplishing the lift or for securing the batteries to the car, as they may be made in a large number of ways and yet be within the spirit of my invention.

The motor may be supported on the car in any suitable manner and coupled with the secondary batteries in series or otherwise, as desired. By supporting the different cells of a battery on a single removable board or bottom they can all be removed or inserted at once in a convenient and speedy manner and with but little labor. The automatic coupling-contacts may be provided, with the result of quickly coupling the cells as an incident to their being placed in position on the car.

In the drawings, Figure 1 is a side elevation of an electrically-propelled vehicle and my improved battery-changing apparatus. Fig. 2 is a cross-section on line *x x*, showing one-half of the car and battery-changing apparatus. Fig. 3 is a perspective view showing method of coupling up the battery-cells in the car.

A is the car, having the seats C and compartments B under the seats, made open on the bottom and adapted to be closed by removable

bottoms F, locked in place by bolts H, or other equivalent device.

K are the lifting-platforms, and are raised and lowered by suitable lifts, L, shown in this case as hydraulic lifts, receiving water-supply by pipe N and controlled by a valve, M, operated by a handle, P.

O is the discharge-pipe, and the valve M is of the usual pattern of a three-way valve, allowing the water to enter the cylinder or discharge therefrom.

The table or platform K is provided with guides *k*, preferably made flaring, so as to receive the axles D of the car and move it exactly in position to receive the batteries standing upon the platform K as it rises up on each side of the axles. Any other form of adjusting device may be used in place of the guides shown. The platform K, when lowered, descends into the compartment *l*, arranged close to the track-rail E, so as to work as closely to the wheels as possible, and when lowered receive the floors and batteries, so that the car may pass above them into position to receive them when they are raised.

In operating, the car is brought over one lift, such as described, and the lift raised until the pressure is taken off the locks H. The locks are then withdrawn and the batteries lowered. The car is then moved over another lift having fresh batteries, and these are raised in position and locked in the compartment B. The lift is then lowered and the car moves on. If desired, the entire operation may be done with one lift only for each side of the car.

The batteries are made up of a number of cells, each of which has its terminals *i*, which, when the batteries are raised into operative position in the compartment B, press against the circuit-closing springs I, as shown in Figs. 2 and 3, and the several batteries are similarly coupled up by springs I', Fig. 1.

R is the electric motor, and *r* the motor-circuit connecting with the batteries, and may be provided with a resistance-changer, S.

It is evident that the various details may be modified by one skilled in the art without in the least departing from the merits of the invention.

Any matters herein set out but not claimed

are not dedicated to the public, but form subject-matter of other applications.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a car having compartments under the seats, a removable bottom for said compartments, and secondary batteries supported upon said removable bottom.
2. The combination of a car having compartments under the seats, a removable bottom for said compartments, secondary batteries supported upon said removable bottom, and detachable locks to detachably secure said removable bottoms in place.
3. The combination of a car having compartments under the seats, a removable bottom for said compartments, and secondary batteries supported upon said removable bottom, and stationary contacts for automatically connecting the cells of the battery in circuit upon placing said battery in working position in the car.
4. The combination of a car having compartments under the seats with two or more removable bottoms under each seat-compartment and a secondary battery upon each bottom.
5. The combination of a car having compartments under the seats with two or more removable bottoms under each seat-compartment, a secondary battery upon each bottom, and connecting-circuits for electrically connecting the several batteries under the same seat-compartment.
6. The combination of the railway, lifts lo-

cated below the railway, an electrically-propelled car having compartments under its seats and above the lifts, and storage-batteries adapted to be supported upon the lift and raised into the compartments under the seats.

7. The combination of the railway, a hydraulic lift located below the railway and close to each rail, valves to control the movements of said lifts, an electrically-propelled car having compartments under its seats and above the lifts, and storage-batteries adapted to be supported upon the lift and raised into the compartments under the seats.

8. The combination of the railway, a lift located below the railway and having guides acting on the axles to automatically adjust the car into position to receive the batteries, an electrically-propelled car having compartments under its seats and above the lifts, and storage-batteries adapted to be supported upon the lift and raised into the compartments under the seats.

9. The combination of the railway, a car adapted to receive storage-batteries from below, a lift or elevating device having a platform or frame for receiving and lifting the storage-batteries into position, and guides to hold the car in position above the lifts.

In testimony of which invention I hereunto set my hand.

R. M. HUNTER.

Witnesses:

E. M. BRECKINREED,
RICH'D. S. CHILD, Jr.