(No Model.) 3 Sheets—Sheet 1

F. G. CORNING.

APPARATUS FOR TRANSFERRING ELECTRIC CAR BATTERIES.

No. 434,863 Patented Aug. 19, 1890.

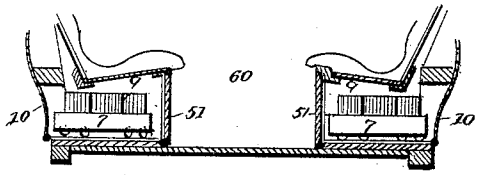


Fig. 2.

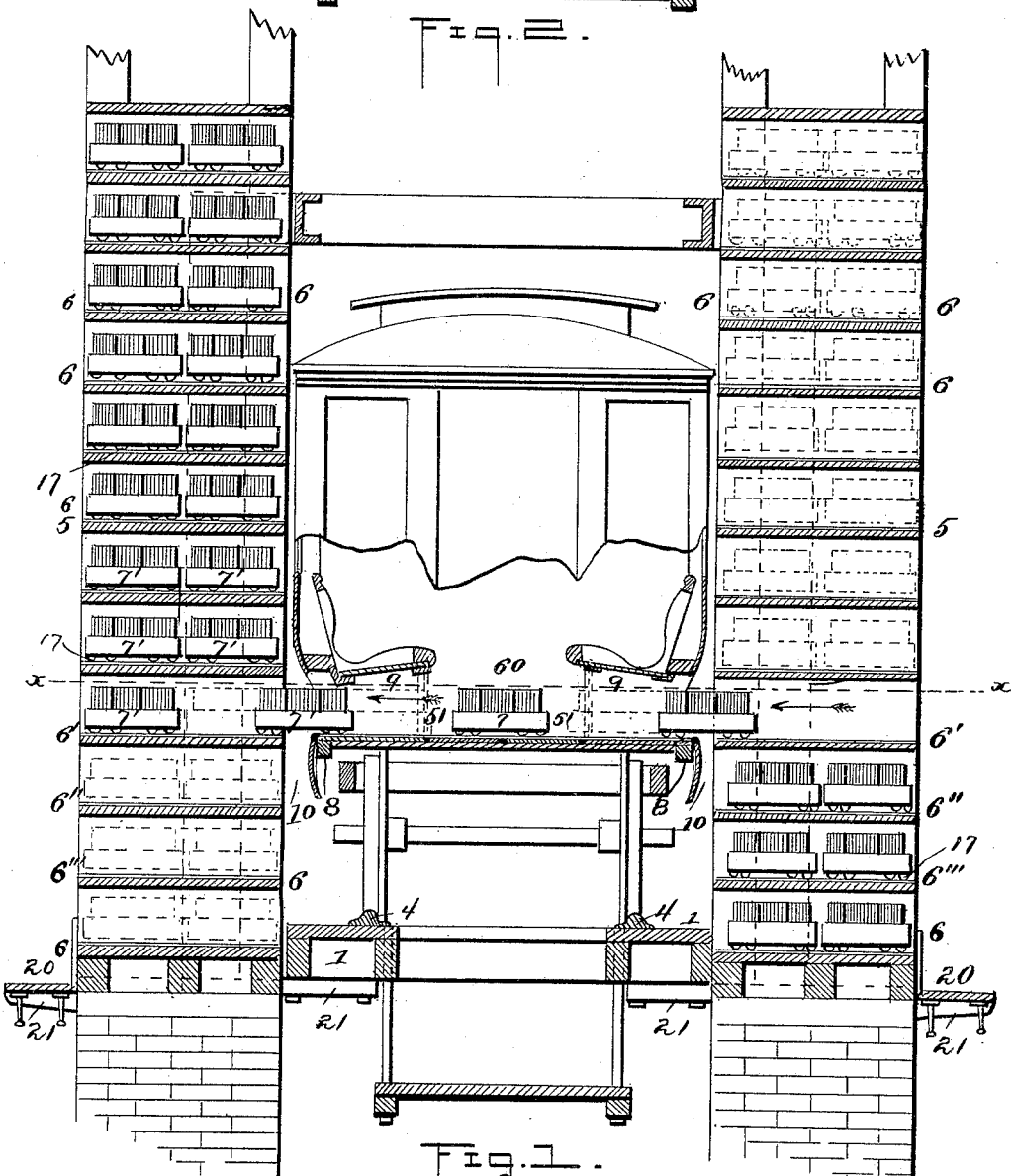


Fig. 1.

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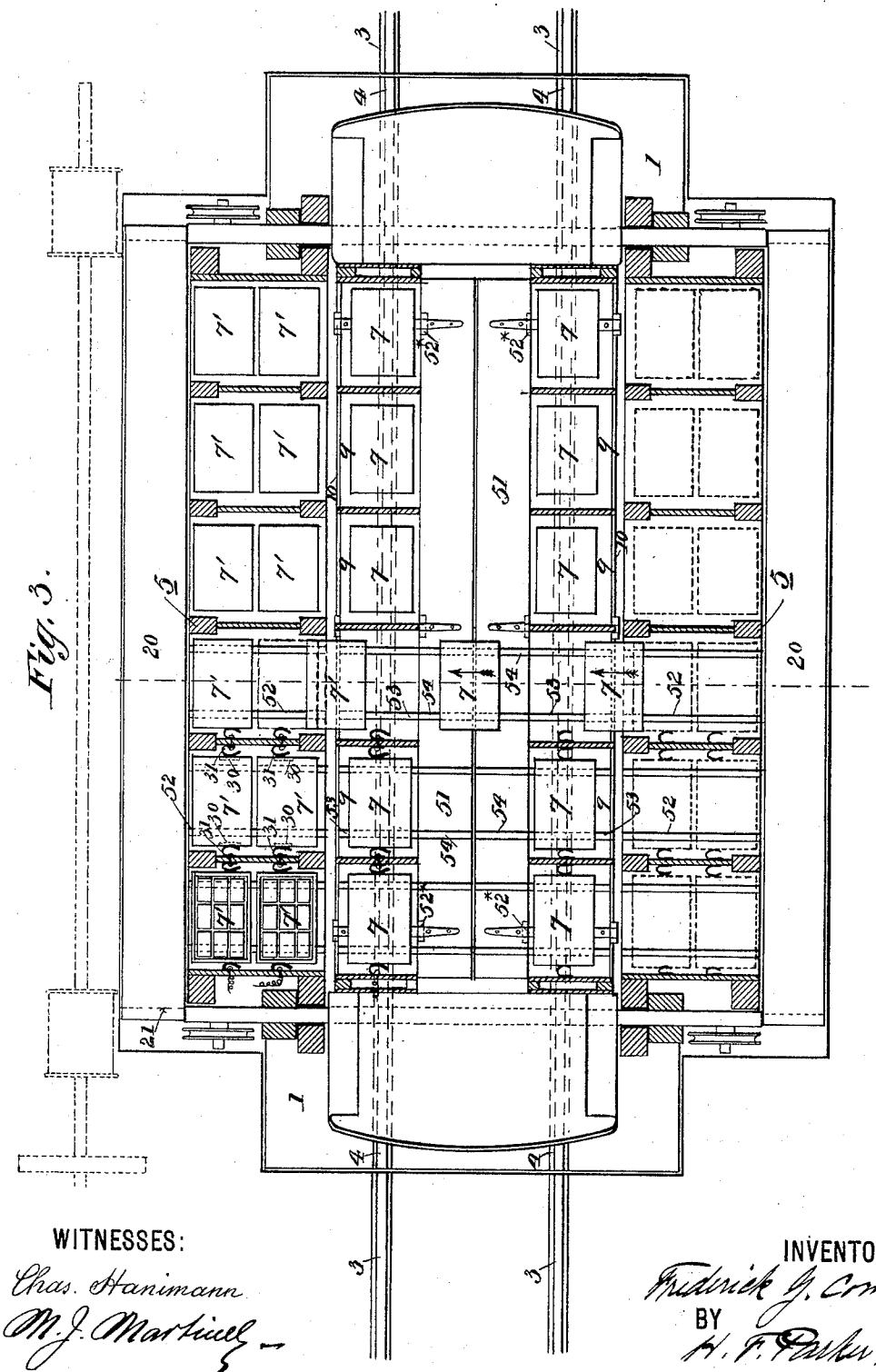
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Fig. 3.



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Fig. 4.

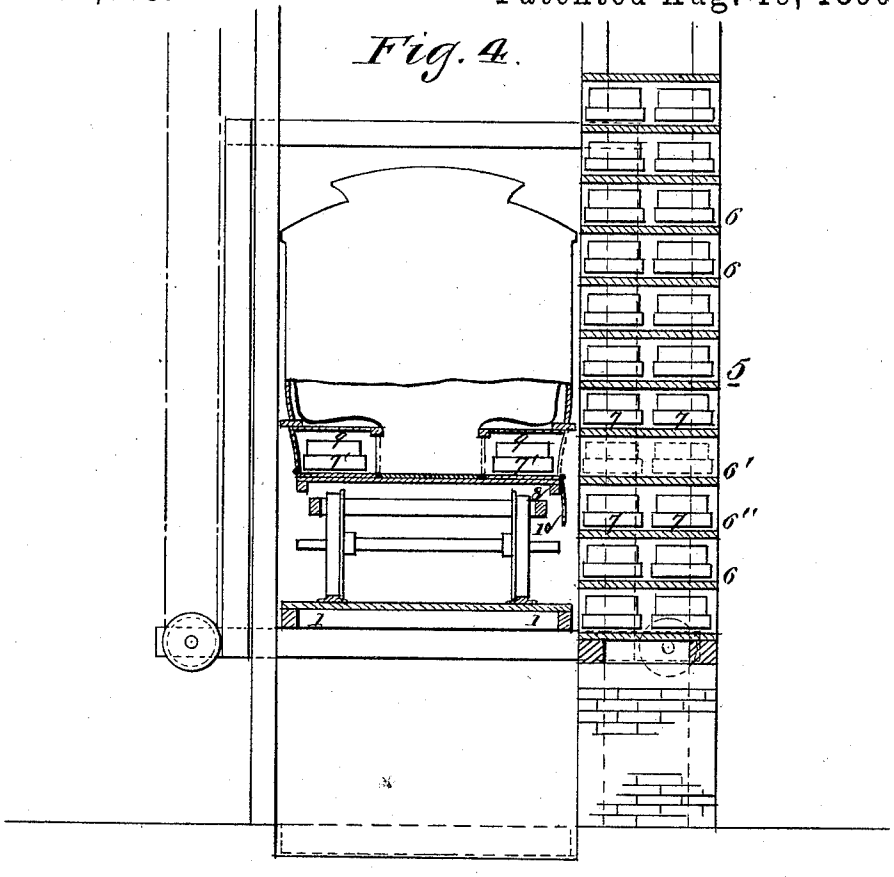
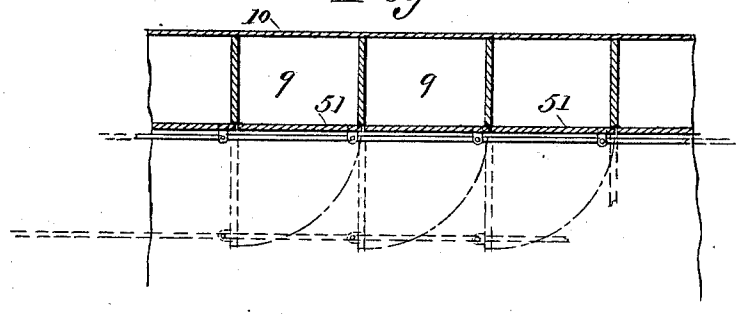


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TRANSFERRING ELECTRIC-CAR BATTERIES.

SPECIFICATION forming part of Letters Patent No. 434,863, dated August 19, 1890.

Application filed May 26, 1890. Serial No. 353,272. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. CORNING, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Transferring Electric-Car Batteries, of which the following is a specification, reference being had to the accompanying drawings, in which similar numerals of reference indicate corresponding parts throughout, and in which—

Figure 1 is a transverse sectional elevation; Fig. 2, a detail view of a portion of Fig. 1, showing the parts in a different position; and Fig. 3, a horizontal sectional view of Fig. 1, taken on the line *x x* and shown on a reduced scale. Fig. 4 is a transverse sectional view illustrating, on a reduced scale, a certain modification of my invention, to be hereinafter described; and Fig. 5, a detail view of another modification.

The improvements herein have relation to my invention described in a separate patent application filed May 21, 1890, Serial No. 352,638, for mechanism designed to facilitate the transfer of "secondary batteries" or "accumulators" or other batteries between an electro-motive car and shelves or benches for storing or recharging said batteries at a station, and wherein a saving of time or simplifying of operation in transferring the batteries and substituting recharged ones on the car for those exhausted is effected by means of a car-hoist for conveying the car itself into various positions opposite the battery-shelves.

My herein-described invention comprises three leading features relating to such improvement, consisting, first, in a series of charging-benches located in close proximity to the path or positions occupied by the bed-sill or battery-floor of the car when the same is moved at various levels opposite said benches, dispensing with any intermediate transferring-bridge; second, charging-benches of double depth flanking the car-elevator and its path of movement—that is to say, stationary benches having a breadth sufficient for the reception of two ranks or series of batteries at a time—and, third, means whereby in conjunction with such double benches the exhausted batteries and the recharged batteries may all be transferred in the desired manner to either side of the car during a single stoppage of the elevating apparatus. These several features of the herein-described invention may, however, be used either conjunctively or independently, the same not being limited to the herein-described co-operative use.

1 represents the elevator-platform, bearing the movable section of car-track 4, which coincides with stationary tracks 3 upon a floor, or each of a succession of floors, from whence the car is received when the said platform is moved to a level with the same.

5 5 represent the battery-racks, comprising several tiers or vertical series of recharging-benches 6, upon which the battery-trays 7 are received.

8 8 represent the bed-sills of the car; 9, the battery-receiving closets in which the batteries are stored beneath the car-seats, and 10 10 the outside panels hinged to the bed-sills, which panels form a part of the sides of the car when closed, and which are shown open in Figs. 1 and 4 and closed in Fig. 2. The battery-racks 5 5 are located in as close proximity to the car as the passage of the latter will permit, and the battery-trays 7 are thereby shifted directly from bench to car, or vice versa. The charging-racks 5 5 are of sufficient transverse depth to contain double series of benches 6 6, upon which 7 indicate the charged and 7′ the spent batteries as they would be placed in the order of operation hereinafter explained.

The character of construction of the elevator is immaterial to the invention, as also the mechanical means for actuating it. Such parts as I have herein indicated, however, correspond in general features to those more fully illustrated in my said separate patent application. Among such features, one described and claimed consists in the auxiliary platforms 20 20, connected to the main platform 1 or frame of the elevator for supporting the operators at a permanent height with respect to the car to enable them to reach the various batteries. The platforms 20 are supported upon transverse beams 21, and, as seen in Fig. 3, the structure thus formed surrounds the piers supporting the racks 5 5, affording access to all parts of the latter opposite the car.

The interior panels 51 of the car-receptacles 9 for the batteries composing the foot-boards for the seats are hinged at 52, so as to be swung down and superimposed upon the car-floor between the seats, as illustrated in Fig. 1, forming a continuous way for moving the battery-trays horizontally throughout the breadth of the car from the battery-receptacles on the one side thereof to or through the battery-receptacles upon the other side. The horizontal shifting of the batteries is facilitated by rollers 17 upon the trays 7, and there may be also provided rails 52 in the benches, rails 53 in the car-receptacles, and rails 54 upon the interior of the panels 51, as indicated in a portion of Fig. 3, forming continuous or nearly continuous tramways or guides for the said trays or their rollers in a common plane from the exterior side of one rack 5 throughout the breadth of the car to the exterior side of the opposite rack 5. It will be manifest that the rollers 17 may be located on the transverse transferring-surfaces thus composed by the benches, receptacles, and interior panels in lieu of the construction shown; also that the interior panels 51 may be moved from their closed to their open position upon hinges located at their upper edges, or by lifting said panels out and away from the seats, or that such panels may be omitted altogether. Again, said panels may be constructed in sections and modified to swing in horizontal arcs connectedly, as illustrated in Fig. 5, or separately. In the use of the downward swinging panel 51 in Figs. 1 and 2 the levels of the floors of the closets 9 are elevated slightly above the level of the floor proper of the car (between the seats) to an extent equal to the thickness of such panels, whereby, when the latter are swung down, the transferring-surface formed will be continuous and level throughout. The usual electrical connections are arranged whereby each gang of batteries when they are received upon the benches 6 are included in the recharging-circuit. The closing of the circuit is automatically effected by contact-plates 30 on the battery-trays connected to the poles of the batteries and corresponding springs 31 in the bench racks and in the frame of the car. (See Fig. 3.) The circuits of each charging-bench are thereby initiated as soon as all the batteries of a rank are shifted therein, said circuits being maintained until saturation is reached, which condition is indicated by the ammeter of that particular branch of the circuit pointing to zero.

The operation of the parts thus far described consists as follows: As a spent car is brought toward the elevator upon a floor or level lying opposite thereto and before it enters thereon the outside panels 10 are first opened. The car is then run into proper position upon the platform opposite the vertical line of the shelves and elevated to a level—such, for instance, as that indicated in Fig. 1—opposite the plane of the benches 6′ 6′. The spent batteries 7′ 7′ are then horizontally transferred from the car to one of the benches in the direction indicated by the arrow and the recharged batteries 7 7 simultaneously transferred in a common direction from the opposite bench to the car, the respective batteries being moved to their proper places at a single operation. An operator or operators occupy positions upon the auxiliary platforms 20 20 at the exterior sides of the racks 5 5 to move the trays, and an operator or operators may also take the position 60 between the car-seats to further aid such transfer. The transfer may be performed by hand, moving one cross series of battery-trays at a time or moving the trays singly, or, to the herein-described system of shifting the trays, automatic devices—such as described in my separate patent application, Serial No. 354,791—may be applied, whereby to move each complete rank together, the several ranks being advanced in a common direction simultaneously, thus greatly economizing time. The platform 1 is then returned to a floor-level and the replenished car substituted by a spent one, the transferring operation being repeated at the level 6″ 6″ of the benches, then 6‴ 6‴, and so on in descending succession until the lowermost tier is reached, (which is preferably at the level occupied by battery-closets 9 at the initial position of the elevator,) the subsequent operations then again recommencing with the upermost tiers of benches. It is of course immaterial whether the operations be thus performed in descending or ascending succession or an irregular order of the same.

In the modification in Fig. 4 I have illustrated the application of the double-ranked arrangement of benches for use upon a single side of the car. In this adaptation the car-elevator is necessarily moved vertically at an interval between the shifting of the batteries, the exhausted batteries being transferred upon one level—such as 6′—the recharged batteries upon another, such as 6″. Such modification may be employed in situations where it is desired to greatly economize horizontal space, and, moreover, a series of double-ranked benches may be thus located upon one side each of several adjacent stalls in stations where a large number of batteries are to be handled.

It will also be obvious that the herein-described double-depth racks may be used without reference to cars having the transferring-passages traversing their entire floors. In use with reference to independent battery-receptacles in the sides of the car the double racks would be required at each side of the stall, as in Fig. 1, one vacant bench at either side, or a half portion of each of two benches at either side, being required to be kept vacant between the times of occupancy of the stall. The car would thereby be required to be moved from one level to another between the operations of delivering the exhausted

batteries and receiving the charged ones; but a saving of substantially one-half the vertical space occupied by the structure, as represented in Fig. 1, would be effected, correspondingly reducing the required movement of the elevator. The double benches may also be adopted in cases where the battery-racks themselves are movable, as set forth in my patent application filed June 4, 1890, Serial No. 354,289.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for transferring and recharging electric-car batteries, the combination, with a movable platform or section of car-track for receiving the car and transporting it to different levels and a car having battery-receptacles opening at the side thereof, of a charging-rack (or pair of racks) which flank the platform or movable track and its path of movement in immediate proximity to the vertical plane of movement of the sills of the said battery-receptacles.

2. In an apparatus for transferring and recharging electric-car batteries, the combination, with a movable platform or section of car-track for receiving the car and transporting it to different levels, of a charging-rack (or pair of racks) flanking the said platform or movable track and its path of movement and composed of series of benches having a capacity to receive a plurality of ranks of battery-trays in the breadth of each thereof.

3. In an apparatus for transferring and recharging electric-car batteries, the combination, with a movable platform or section of car-track for receiving the car and transporting it to different levels, of a charging-rack (or pair of racks) flanking the said platform or movable track and its path of movement provided with benches for receiving a plurality of ranks of battery-trays in each thereof, and a car having an uninterrupted transverse passage for said battery-trays, whereby batteries located within either side of the car may be shifted into or from a bench-rack located on one side thereof.

4. An apparatus for transferring and recharging electric batteries, consisting of a car-hoist, a pair of battery-racks having respective tiers of benches lying in common horizontal planes flanking the path of movement of the car when conveyed by the hoist, a car provided with battery-closets, and a transverse passage for the battery-trays, whereby when brought into coincidence said car and said benches combine to form a continuous transverse transferring-way for the batteries.

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