(No Model.) 2 Sheets—Sheet 1.

G. D. BURTON.

APPARATUS FOR LIGHTING CARS BY ELECTRICITY.

No. 282,158. Patented July 31, 1883.

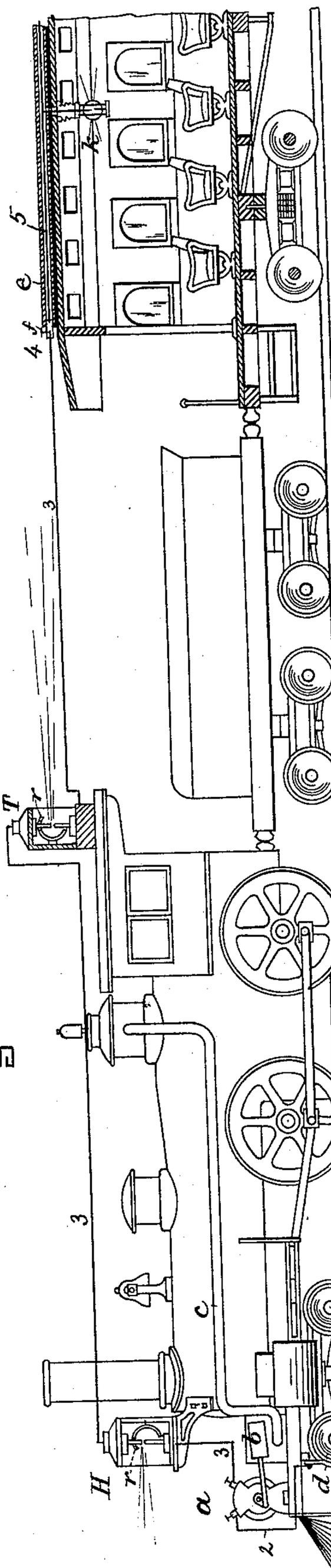

Fig. 1.

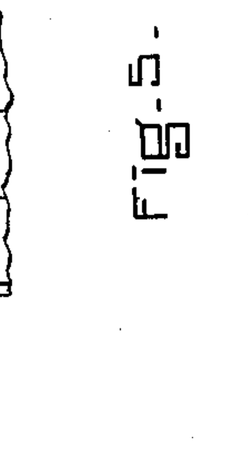

Fig. 5.

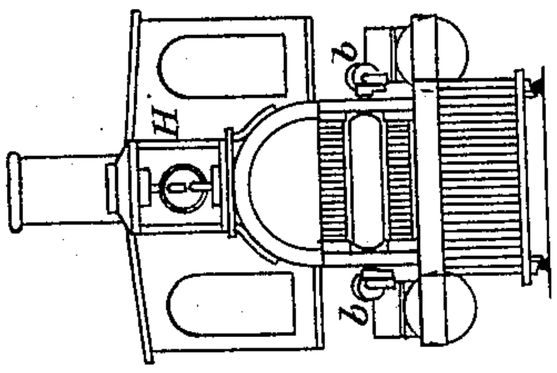

Fig. 2.

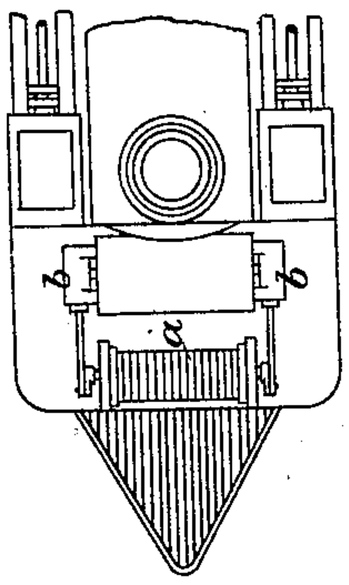

Fig. 3.

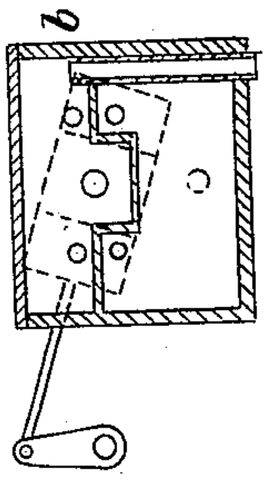

Fig. 4.

WITNESSES

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Wm. F. Finckel

INVENTOR

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(No Model.) 2 Sheets—Sheet 2.

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APPARATUS FOR LIGHTING CARS BY ELECTRICITY.

No. 282,158. Patented July 31, 1883.

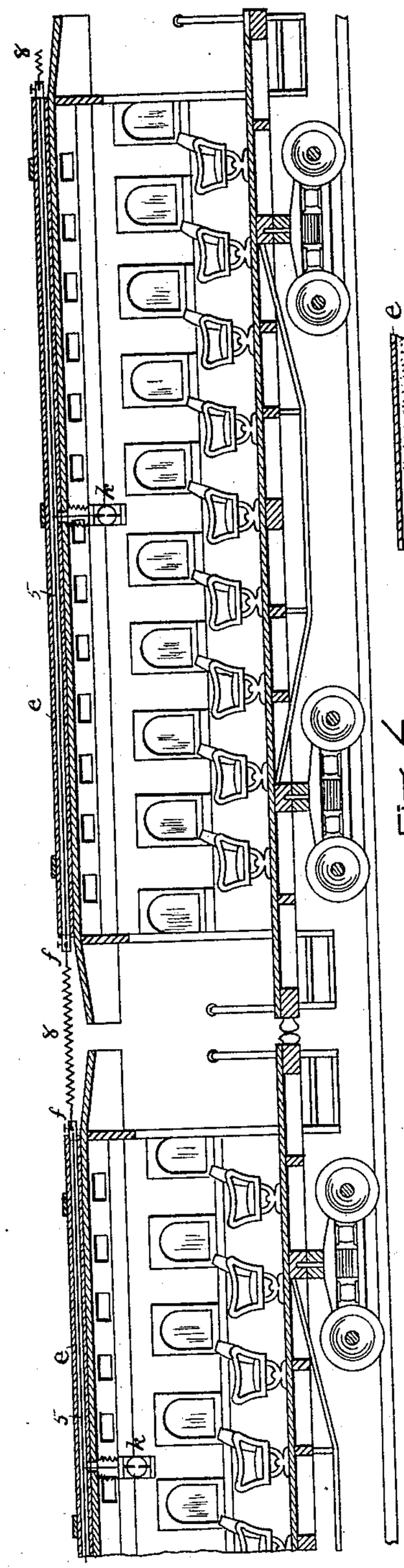

Fig-6-

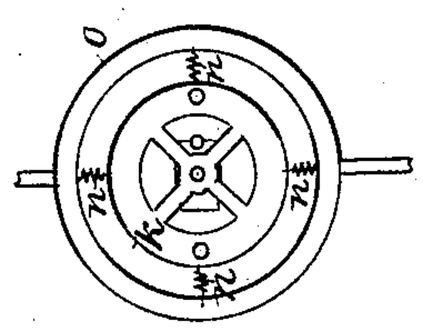

Fig-11-

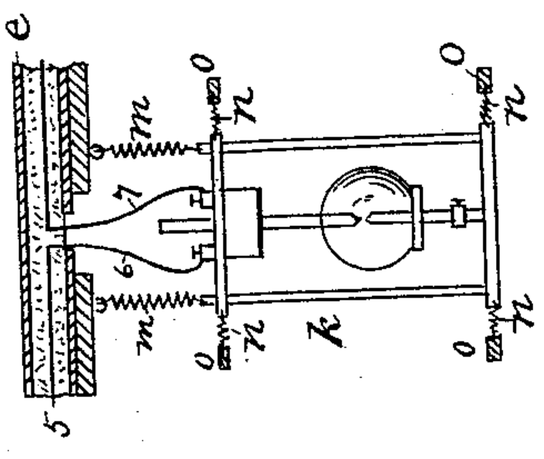

Fig-10-

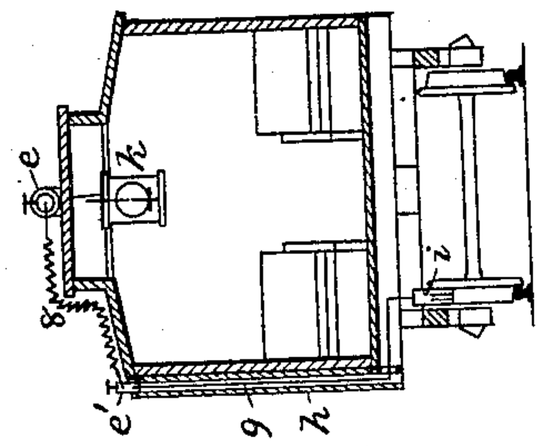

Fig-7-

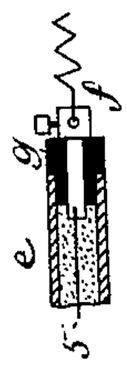

Fig-7-

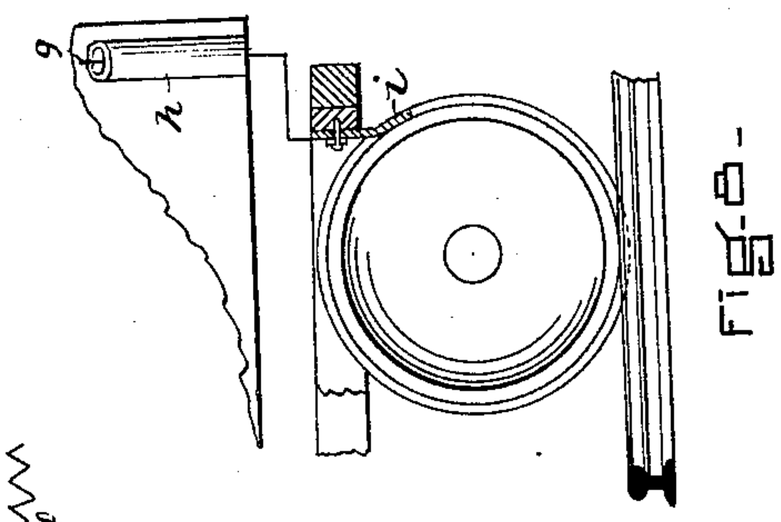

Fig-8-

WITNESSES

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INVENTOR

Geo. D. Burton

UNITED STATES PATENT OFFICE.

GEORGE D. BURTON, OF NEW IPSWICH, NEW HAMPSHIRE.

APPARATUS FOR LIGHTING CARS BY ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 282,158, dated July 31, 1883.

Application filed December 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. BURTON, of New Ipswich, county of Hillsborough, State of New Hampshire, have invented an Improvement in Apparatus for Lighting Cars by Electricity, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to an apparatus for lighting railway-trains by electricity. Means are provided for lighting both the exterior and interior of the train and the track in advance of it. The locomotive carries an electrical generator and actuating-engine for it, driven by the steam from the locomotive-boiler, one terminal of the said generator being connected with the wheels, and through them with the rails of the track, which forms a ground or return-circuit wire. The other electrode is connected with the wire circuit including the various lights. One light is placed at the front of the locomotive, serving as a head-light, and another one is placed on the cab, with its rays directed backward to illuminate the exterior of the train, while each car is provided with a light for illuminating its interior. Each car is provided with a permanent conducting-wire inclosed in pipes running along the top of the car, and each car is provided at each end with a grounding-wire passing downward through a pipe at the side of the car to a spring or brush in contact with one of the wheels. Connecting-wires are used between the cars for continuing the circuit from the permanent wire of one to that of the next car, and at the rear of the train the permanent wire along the top of the car is connected with the grounding-conductor at the side of the car, thus completing the circuit to the wheels and axles and rails and back to the other electrode of the generator connected therewith. The lamps within the cars have their electrodes included in the circuit of the permanent wire along the top of the car, and are suspended by springs in a suitable framework connected with the car, so that the vibrations of the car will not be transmitted to the lamps.

Figure 1 is a side elevation, partly in section, of a locomotive and portion of a train provided with apparatus for lighting them in accordance with this invention; Fig. 2, a front elevation thereof; Fig. 3, a plan view of the forward end of the locomotive and generator therein; Figs. 4 and 5, vertical and longitudinal sections of one of the engines for actuating the generator; Fig. 6, a longitudinal section of a portion of the cars of a train; Fig. 7, transverse sections thereof, showing the grounding-wire; Fig. 8, a detail showing the connection of the ground-wire with the wheel; Fig. 9, a detail, showing the connection of the permanent wire upon the car with the connecting-wire; Fig. 10, a side elevation of one of the lamps at the interior of a car, its frame-work and a portion of the car being shown in section; and Fig. 11, a plan view of the said lamp.

The electricity for illuminating the train may be produced by a generator, *a*, of any suitable or usual construction, (shown in this instance as mounted just above the cow-catcher or pilot,) and actuated by two oscillating engines, *b*, of usual construction, actuated by steam taken from the locomotive-boiler by the pipe *c*. One of the terminals of the generator *a* is connected by wire 2 with a spring or brush, *d*, bearing on the wheels of the engine, and thus bringing the generator into electrical connection with the track. The other electrode of the said generator is connected with wire 3, which includes in its circuit the head-lamp H at the front of the locomotive and the train-lamp T on the cab thereof, and is continued to the first car of the train, where it is connected at 4 with the permanent wire or conductor 5, inclosed in a pipe, *e*, extending along the car from end to end. The said wire 5 is surrounded with insulating material, and is perfectly protected by the pipe *e*, it being connected with the terminals 6 7 of the lamps in the interior of the car, as best shown in Fig. 10. The ends of the said wire are connected with the binding-posts or wire clamps *f*, inserted in plugs *g*, of insulating material, in the ends of the pipe *e*, as shown in Fig. 9. The said binding-posts are connected throughout the train by connecting-wires 8 to make a complete circuit, and at the rear end of the train the said connecting-wire 8 is attached to the binding-post *e'* of a permanent ground-wire, 9, contained in a pipe, *h*, the said wire 9 being connected with a spring, *i*, resting in contact with the wheels of the car, as shown in Fig.

7, there being such a permanent wire and pipe at each end of each car, so that the circuit-wire can be connected to the wheels and rails at the rear end of any car which happens to be the last of the train, or the last that it is desired to light by electricity.

The lamps *k* within the cars, which may be of any suitable construction, are supported from the roof of the car upon springs *m*, and are connected by lateral springs *n*, as shown in Figs. 10 and 11, with suitable inclosing-frames, *o*, fixed to the car, the said lamp thus having no rigid or positive connection with the car, and thus receiving but little vibration.

The reflectors *r* of the head-lamp H and cab-lamp T have the upper portions of their surfaces curved over a short distance in front of the point where the arc is produced, as shown in Fig. 1, thus reflecting the light downward to illuminate the track and exterior of the train; but this matter is reserved for a future application, and so, also, is the construction of the car-lamp.

Instead of the arc lamps shown, incandescent or other kinds of electric lights might be employed, especially for the lights within the cars.

I claim—

1. A system of electric lighting for the interior and exterior of railway-trains, the same comprising the following elements, combined and arranged substantially as shown and described, namely: the steam-actuated generator having one terminal connected with the wheels, permanent conducting-wires inclosed in tubes mounted on each of the cars of a train, and in electric continuity, and connected with the other electrode of the generator, the grounding-conductor inclosed in a pipe, and having an electrical connection with the wheels, and electric lamps inside and outside the cars included in the circuit thus formed.

2. In a system of electric lighting for railway-trains, the combination, with a railway-car and a permanent electric conductor inclosed in a tube extending along the top of the car and including an electric lamp, of the grounding-conductor inclosed in a pipe, and having an electrical connection with the wheels, and the electric lamp in circuit with the said permanent wire along the car, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. D. BURTON.

Witnesses:
JOS. P. LIVERMORE,
B. J. NOYES.