

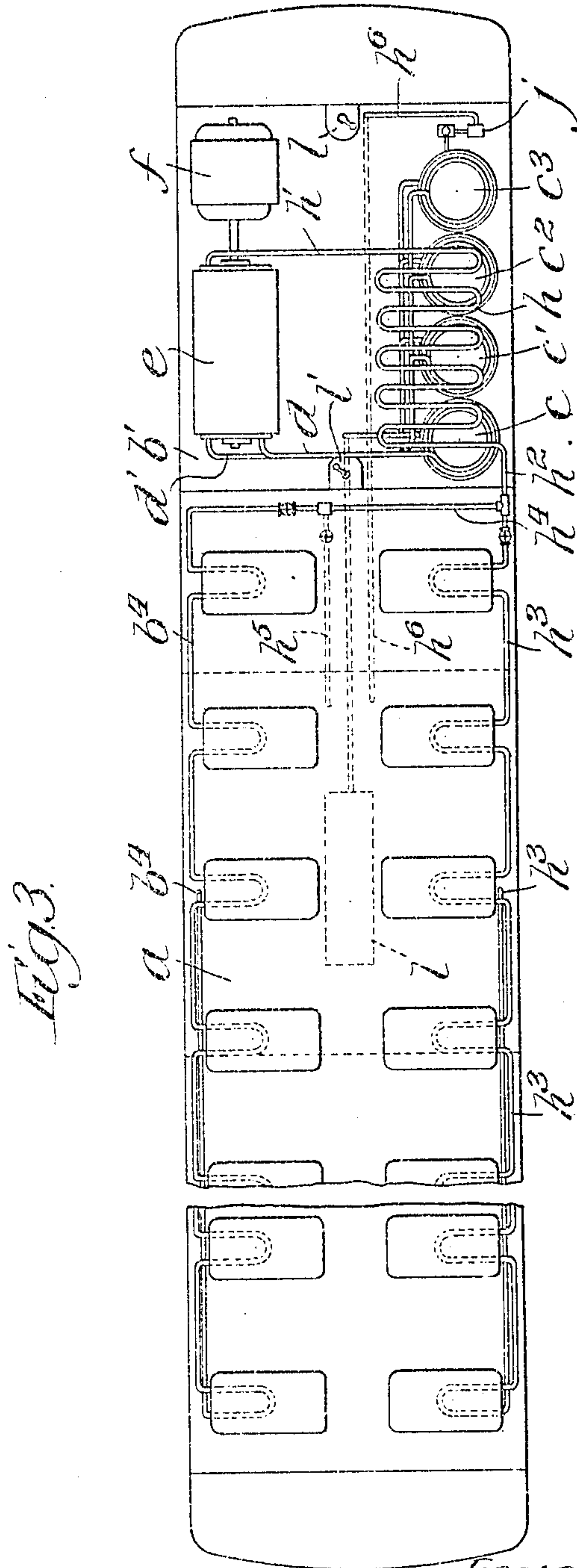
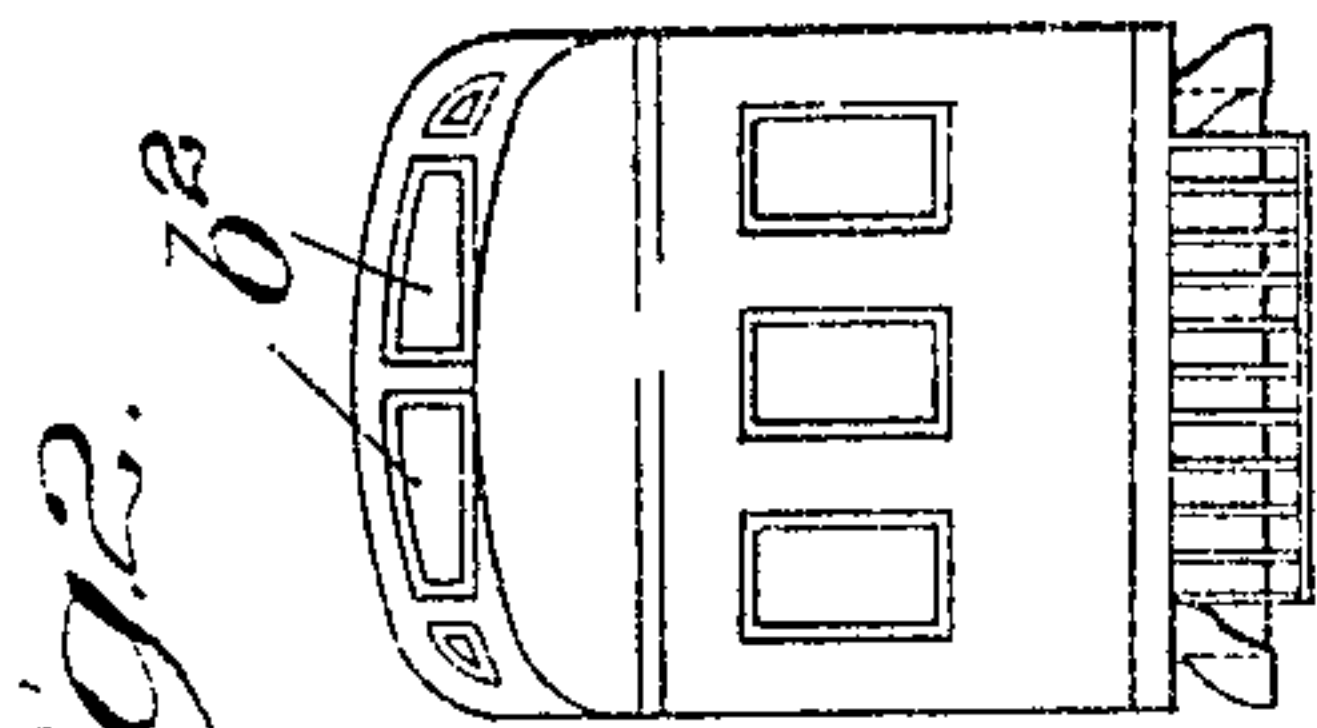
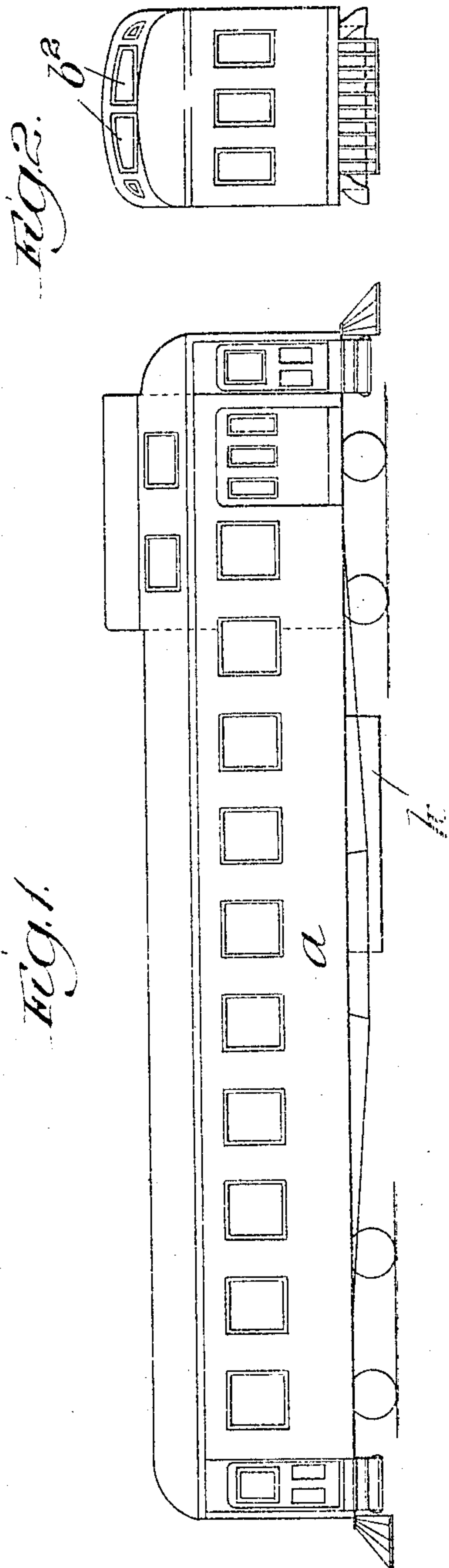
No. 869,455.

PATENTED OCT. 29, 1907.

S. OTIS & H. S. HART.  
MOTOR CAR.

APPLICATION FILED JULY 26, 1906.

3 SHEETS—SHEET 1.



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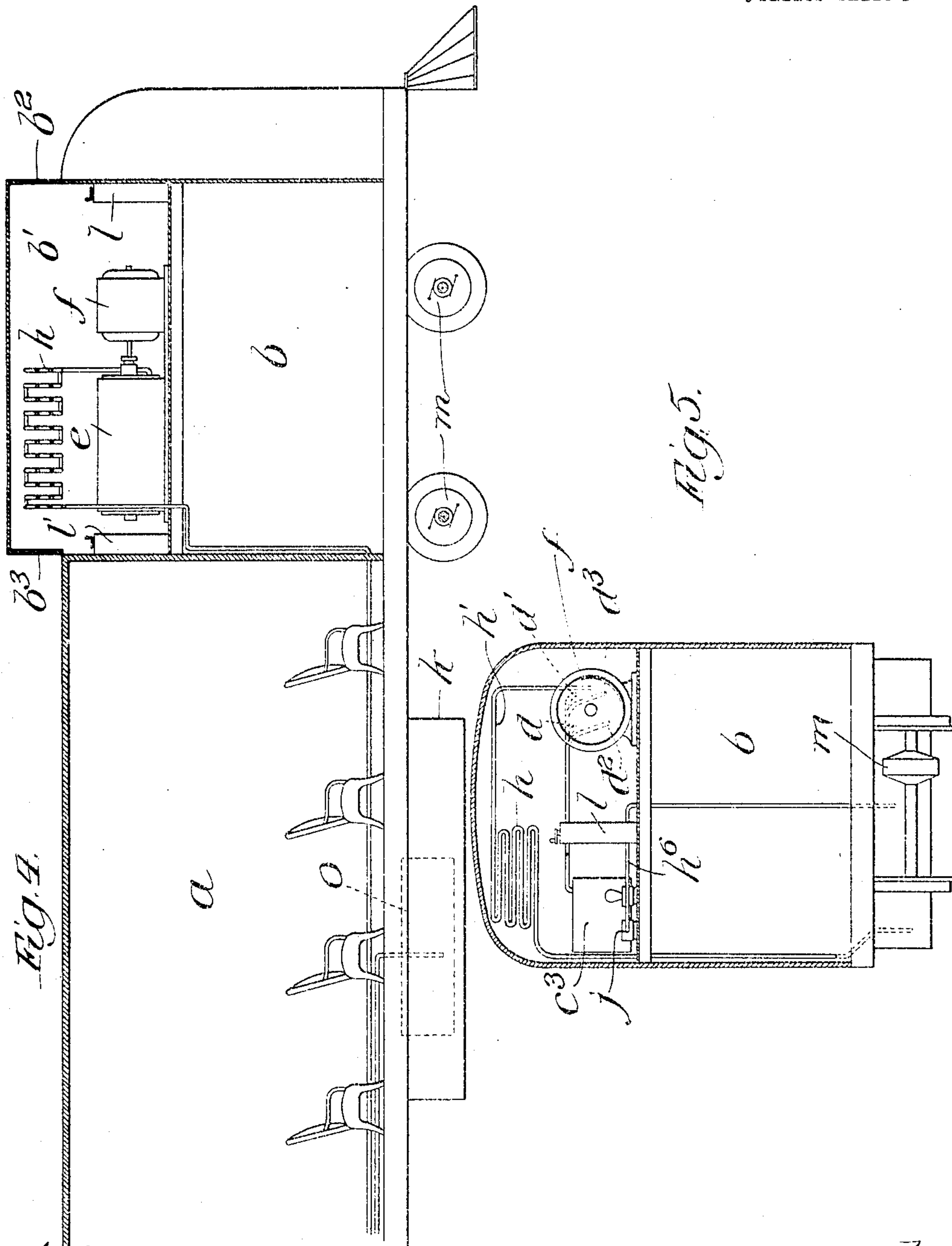


Fig. 4.

Fig. 5.

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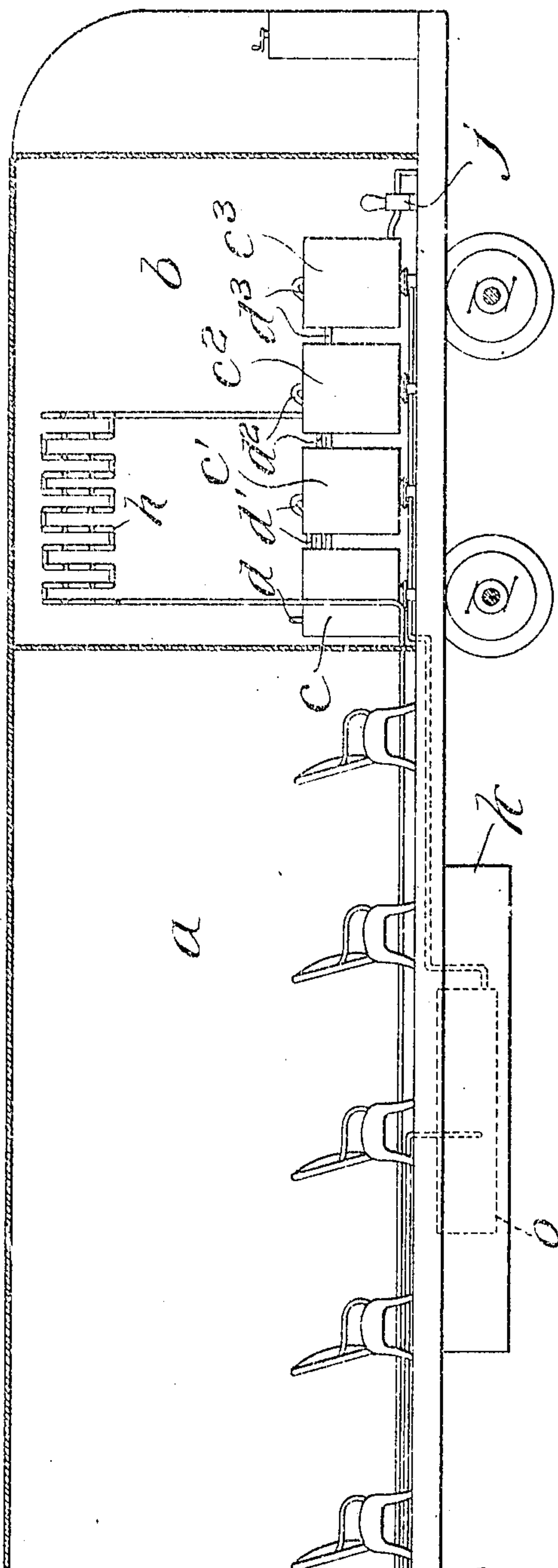
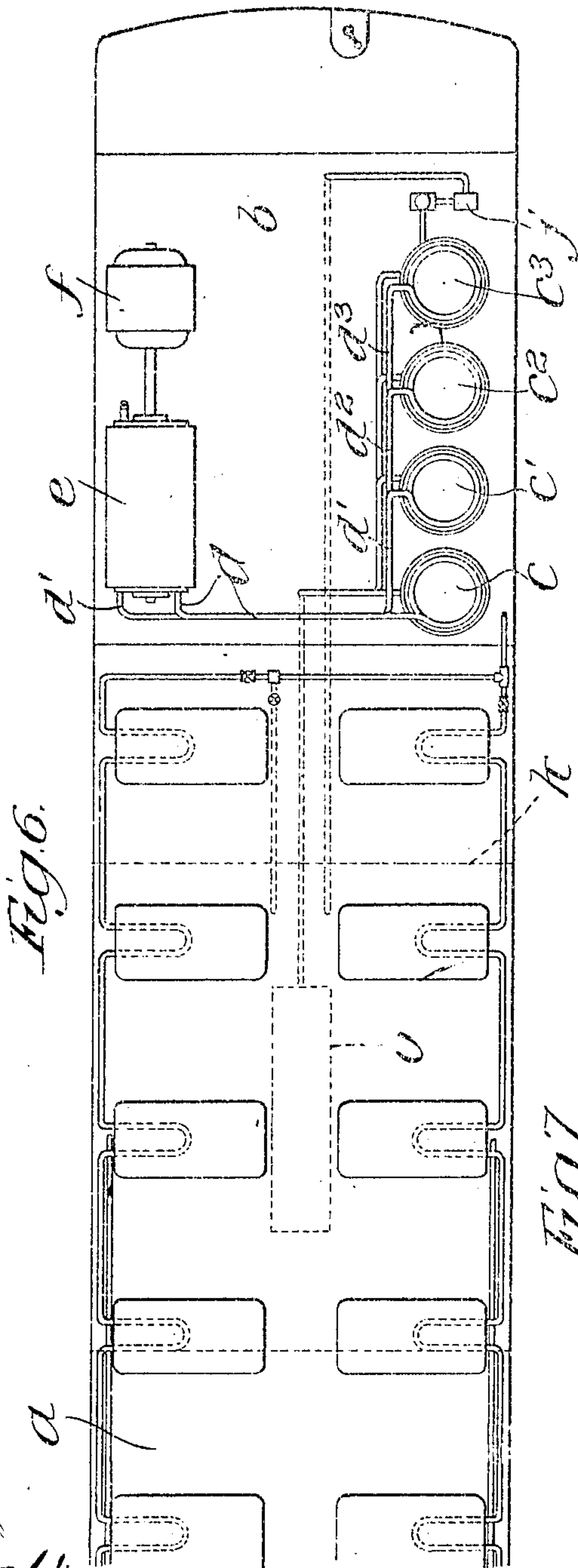
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3 SHEETS--SHEET 3.



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# UNITED STATES PATENT OFFICE.

SPENCER OTIS AND HARRY S. HART, OF CHICAGO, ILLINOIS, ASSIGNORS TO NATIONAL PATENT HOLDING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## MOTOR-CAR.

No. 869,455.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed July 26, 1906. Serial No. 327,917.

To all whom it may concern:

Be it known that we, SPENCER OTIS and HARRY S. HART, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Motor-Cars, of which the following is a specification.

Our invention relates to motor cars; and has for its object to provide an improved car in which the motor mechanism is so located as to take up a minimum amount of space and to be readily accessible at all times to the motorman; also to provide an improved motor with these and other objects, which will hereinafter appear.

Our invention comprises the details and combinations to be described and claimed.

In the accompanying drawings—Figure 1 is a side elevation of a car constructed in accordance with our invention. Fig. 2 is an end elevation thereof. Fig. 3 is a longitudinal plan view, certain parts being removed to show more clearly the operating mechanism. Fig. 4 is a longitudinal elevation of one end of my car, certain parts being removed to show clearly the structure. Fig. 5 is an end elevation showing the operating mechanism. Fig. 6 is a plan view showing a modified form of our invention. Fig. 7 is a longitudinal elevation of the form shown in Fig. 6.

As is well-known many attempts have been made to provide a self-contained motor car, and many forms of operating mechanism for such cars have been proposed and some have been used with more or less success.

In carrying out our invention we provide a car having a main or passenger compartment *a*. At one end we provide a compartment *b* divided—as shown in Figs. 1 to 5 inclusive—into a lower compartment *b* and an upper compartment *b'*, the roof being elevated over the compartment *b'*, as clearly shown in Figs. 1, 2 and 4, above the remainder of the car roof. We thus provide an upper chamber adapted for the reception of the generator and motor of my car. We provide this chamber with windows *b*<sup>2</sup>, *b*<sup>3</sup>, one at each end, so that the motorman may operate the car when running in either direction from this chamber. By carrying the operating mechanism in the upper compartment, the entire floor space of the car may be used for passengers or the main compartment may be used for passengers and the lower portion of the auxiliary compartment *b* may be for baggage.

For many reasons attempts to use a reciprocating steam engine as the motor for a self-contained motor car has hitherto met with but little success, principally on account of great vibration, difficulty of providing suitable steam generators and for other reasons. We provide a combined steam and electric generator comprising a steam turbine *e* and an electric generator *f* directly connected—as shown in Fig. 3. It has hith-

erto been impractical to use a steam turbo generator because of the practical impossibility of using an ordinary steam generator in connection therewith. A generator of the type known as the "flasher" type, while adapted to produce small quantities of steam at high pressure and temperature and suitable for use in connection with a turbo generator, it has not been possible hitherto to use on account of the limited capacity of these flasher generators, it proving a practical impossibility to build a flasher generator or boiler of sufficient size. We have discovered, however, that by using a plurality of flasher generators, each of which may be independently connected to the turbine that the difficulties hitherto existing may be entirely overcome. We provide, therefore, a series of such generators, showing in the drawings four of such generators *c*, *c'*, *c*<sup>2</sup> and *c*<sup>3</sup>. Each of these generators is independently connected by steam-pipes *d*, *d'*, *d*<sup>2</sup> and *d*<sup>3</sup> to the high pressure end of the turbine *e*. We are thus enabled to provide steam in such quantities and at such pressure as may be desired. For example, we may connect one or more of the generators to the turbine or they may be all connected so as to deliver steam thereto simultaneously. The steam produced in these generators may be at the same pressure or at different pressures for, owing to the independent connection of each of the generators to the turbine, the full advantage of the pressure in each generator is obtained. For instance, steam at a pressure of 200 pounds being admitted from the generator *c* and steam at a pressure of 300 pounds being simultaneously admitted from the generator *c'*, a combined steam pressure of 500 pounds will be made effective at the high pressure end of the turbine, should such a pressure be necessary or desirable.

The electric generator *f* will supply current to the usual motors *m* at the axle and will be controlled in any ordinary manner by controllers *l*, *l'* depending upon the direction in which the car is running. By locating the motor mechanism in the upper chamber *b'*, we utilize a space which has hitherto been wasted, thus using none of the floor space of the car for the operating mechanism thereof. As above stated, the compartment *b* may be used for passengers or freight, as may be desired. The steam from the low pressure end of the turbine is conducted to a condenser *h* through the pipe *h'*, thence through the pipe *h*<sup>2</sup>. The condensed product may be carried through the pipe *h*<sup>3</sup>, *h*<sup>4</sup> and circulated around the body of the car for heating the same—the pipe *h*<sup>4</sup> terminating in the tank *k* carried beneath the body of the car, this tank being for the storage of water to be supplied to the boilers.

In case it is not desired to heat the car, the condensed products may be carried directly to the tank through the pipe *h*<sup>5</sup>. The pipe *h*<sup>5</sup> conveys water from



the tank to the boilers, being drawn from the tank by means of a pump *j*. We also provide a gasoline storage tank *o* for supplying fuel to the burners. This gasoline tank we preferably place within the water tank *k*, where it is entirely surrounded by water, thus keeping the gasoline in a comparatively cool place and in a place where it cannot be exploded or ignited from any outside source.

Instead of locating the operating mechanism upon the floor of the upper compartment, we may locate the mechanism—as shown in Figs. 6 and 7—upon the floor of the car, the construction of this car otherwise being substantially the same as that shown in Figs. 1 to 5.

We claim:

15 1. In combination with a motor car, a turbo generator carried by said car, a series of fluid pressure generators also carried by the car, each fluid pressure generator being independently directly connected to the turbine to supply motive fluid thereto, and suitable controllers governing the supply of current to the motors.

20 2. In a motor car, the combination of a turbo generator carried by the car body for supplying current to the motors, and a series of independent fluid pressure generators also carried by the car body, said fluid pressure generators being each independently directly connected to the turbine.

25 3. In a motor car, the combination of a turbo generator

carried by the car body for supplying current to the motors, and a series of independent fluid pressure generators of the flasher type also carried by the car body, said fluid pressure generators being each independently directly connected to the turbine. 30

4. The combination with a motor car, of a turbo generator carried by the car body for supplying current to the motors, a series of fluid pressure generators also carried by the car body, each fluid pressure generator being independently directly connected to the turbine, means for condensing the exhaust products from the fluid pressure generators and for circulating these products around the body of the car, means carried by the car body for storing the exhaust products, and means for returning these products to the fluid pressure generators. 35 40

5. The combination with a motor car, of a turbo generator carried by the car body for supplying current to the motors, a series of fluid pressure generators of the flasher type also carried by the car body, each fluid pressure generator being independently directly connected to the turbine, means for condensing the exhaust products from the fluid pressure generators and for circulating these products around the body of the car, and means carried by the car body for storing the exhaust products and for returning them to the fluid pressure generators. 45 50

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