

(No Model.)

4 Sheets—Sheet 1.

R. WHELAN.

CAR HEATER.

No. 387,937.

Patented Aug. 14, 1888.

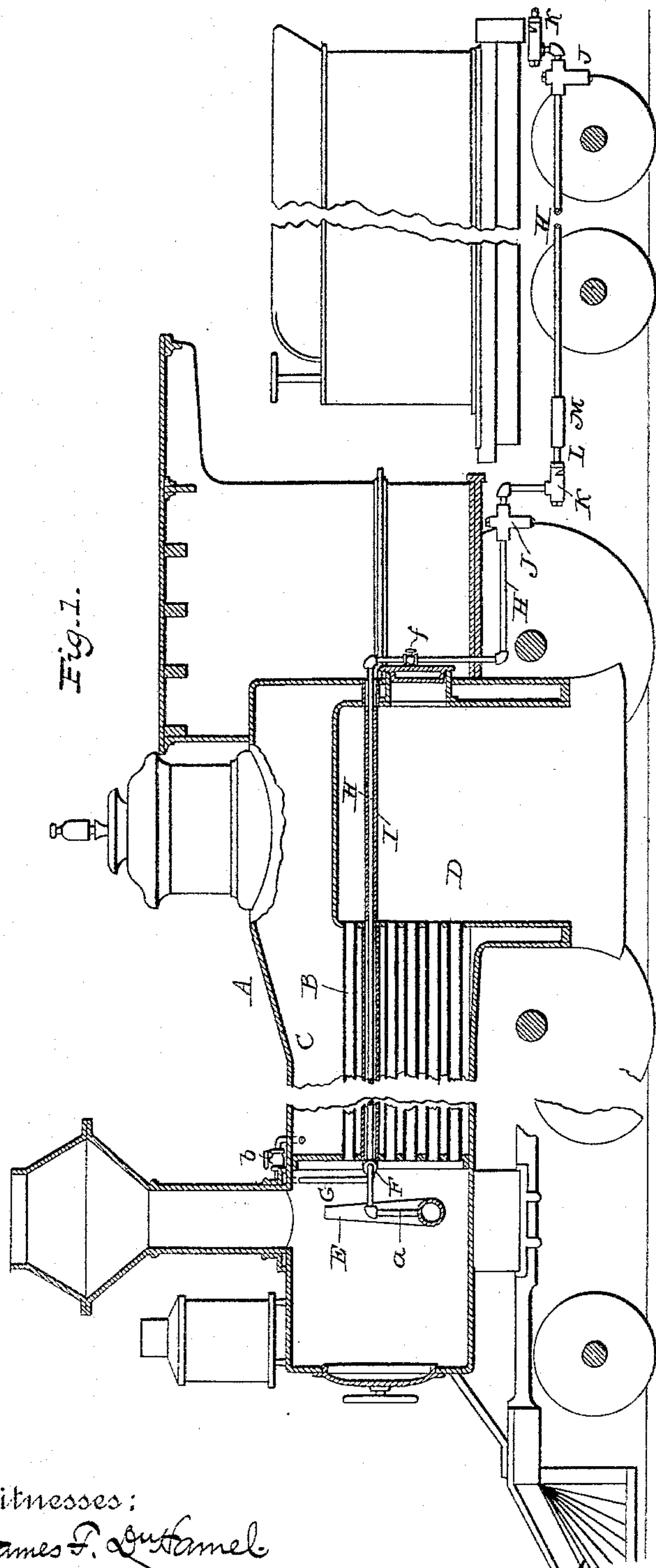


Fig. 1.

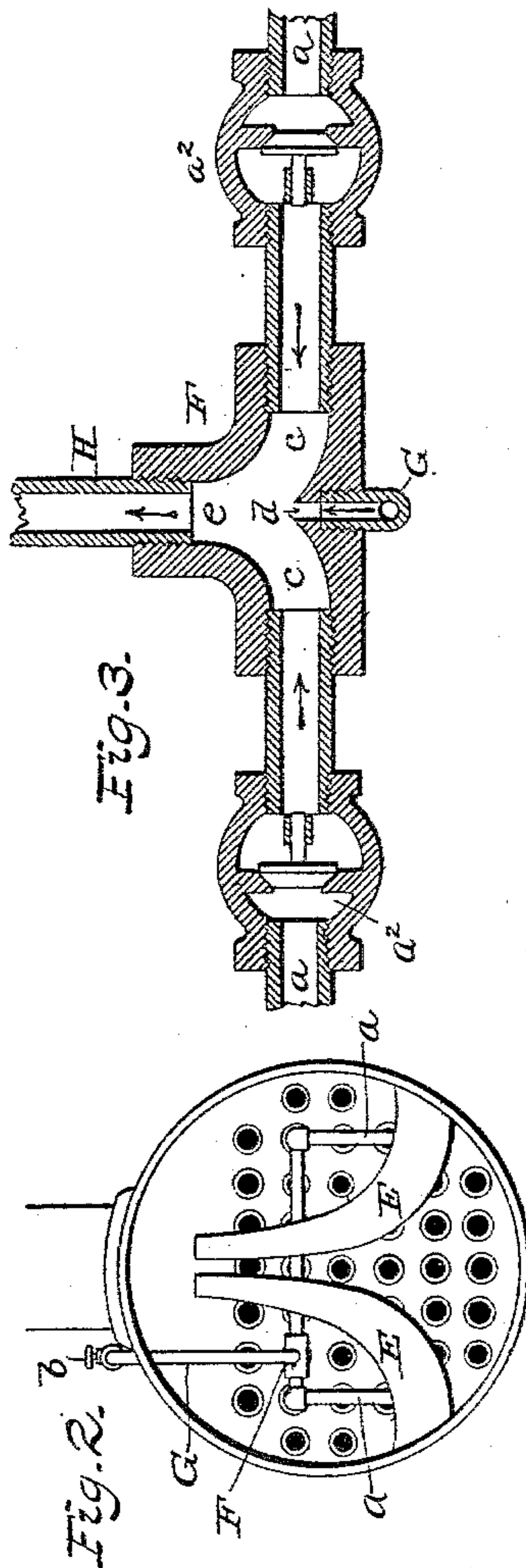


Fig. 3.

Fig. 2.

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Inventor:

Robert Whelan,

By *his* Attorneys,

Budget Low

(No Model.)

4 Sheets—Sheet 2.

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CAR HEATER.

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Patented Aug. 14, 1888.



Witnesses:

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*Inventor:*

Inventor:  
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by Dodger Son,  
his Attys.



(No Model.)

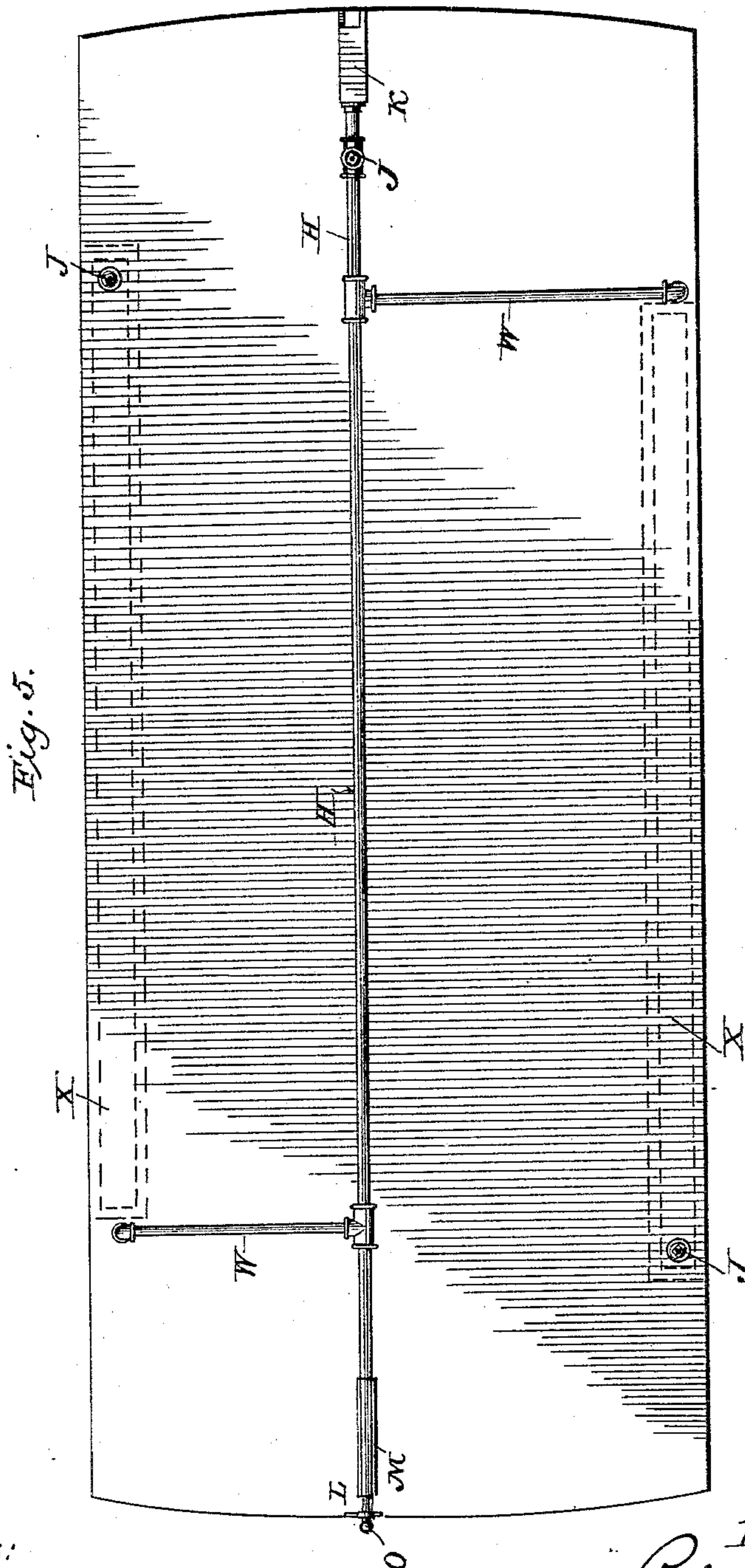
4 Sheets—Sheet 3.

R. WHELAN.

CAR HEATER.

No. 387,937.

Patented Aug. 14, 1888.



Witnesses:

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Malter S. Dodge.

Inventor.

Robert Whelan,  
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Dodge & Son,  
His Attys.

(No Model.)

4 Sheets—Sheet 4.

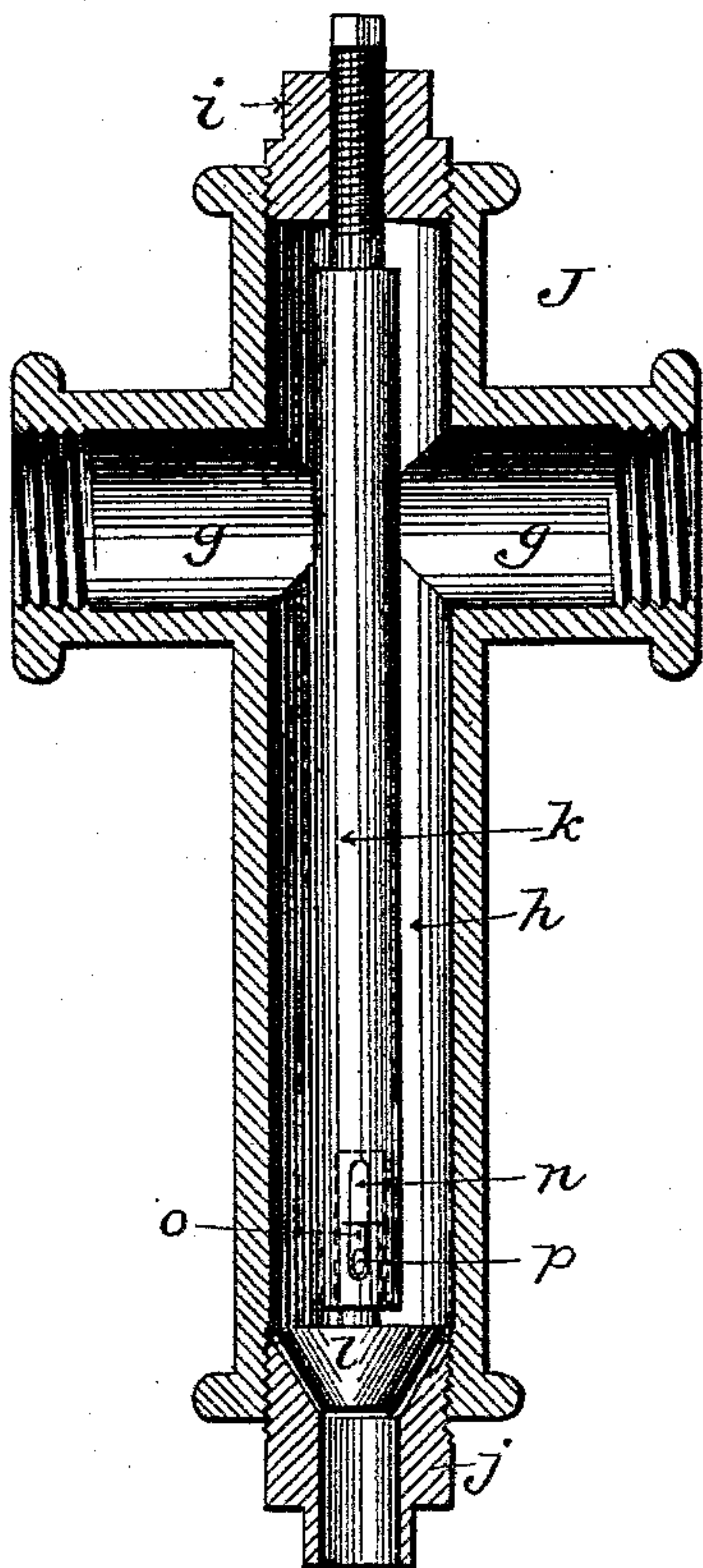
R. WHELAN.

CAR HEATER.

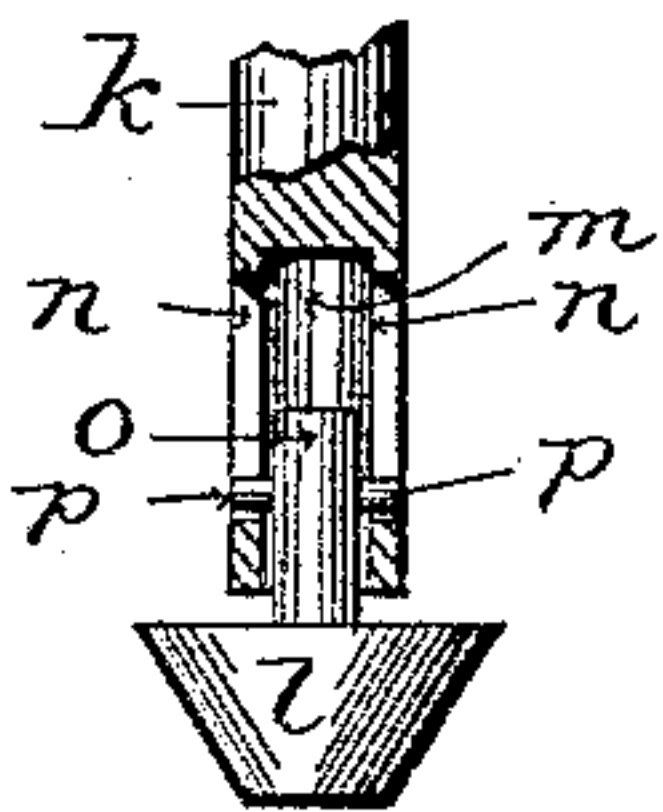
No. 387,937.

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*Fig. 6.*



*Fig. 7.*



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Walter S. Dodge

Inventor:

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# UNITED STATES PATENT OFFICE.

ROBERT WHELAN, OF CHICAGO, ILLINOIS.

## CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 387,937, dated August 14, 1888.

Application filed June 18, 1887. Serial No. 241,755. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT WHELAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful  
5 Improvements in Car-Heaters, of which the following is a specification.

My invention relates to car-heaters, and more particularly to that class in which steam is employed as the heating agent. In carrying out  
10 my invention I propose to utilize the exhaust-steam, which, together with a small amount of live steam from the boiler, (used to force or inject the exhaust-steam through the pipes,) is superheated and delivered to the separate  
15 cars by means of the devices hereinafter described.

In the drawings, Figure 1 is a longitudinal sectional view through a locomotive, showing the manner in which the steam is collected for  
20 use; Fig. 2, a front end view of the same; Fig. 3, a sectional view showing the construction of the injector; Fig. 4, a side elevation, partly in section, of two cars provided with my improved heating apparatus, and also showing  
25 the heater employed when the train is not running; Fig. 5, a bottom plan view of the floor of a car, showing the disposition and arrangement of the radiators; Figs. 6 and 7, views illustrating the construction of the automatic  
30 trap.

Referring again to the drawings, A indicates a locomotive provided with fire-tubes B, boiler C, fire-box D, and exhaust-nozzles E E, all of which parts will vary in construction accord-  
35 ing to the build of the locomotive to which my invention may be applied. As shown in Figs. 1, 2, and 3, each of the exhaust-nozzles is tapped on its upper side at a point near the cylinders to receive a pipe, *a*, which pipes *a a*  
40 extend upward and inward toward each other and screw into opposite ends of a hollow box or casing, F.

G indicates a small pipe provided with a valve, *b*, opening at one end into the steam-space of the boiler and communicating at its  
45 other end with the front face of the box F, as clearly shown in Figs. 1, 2, and 3. This pipe is for the purpose of admitting live steam at a considerable pressure into the box or casing F  
50 in order to create a suction or partial vacuum within the casing or box, and thereby inject

or cause the exhaust-steam to enter more readily from the pipes *a a*.

Upon reference to Fig. 3 it will be noticed that the channels or passages *c c*, into which  
55 the pipes *a a* open, or with which they communicate, curve toward each other, and finally unite at a point in the box or casing F directly opposite to and in line with the live-steam inlet *d*, thereby forming a discharge channel or  
60 outlet, *e*. Screwing into the rear face of the box or casing F and communicating with the outlet *e* is a pipe, H, which extends rearwardly through the steam-space of the boiler C, or through one of the fire-tubes B and  
65 through the upper part of the fire box or chamber D, as shown in Fig. 1.

Within the locomotive-cab the pipe H is provided with a regulating-valve, *f*, and extends downward and beneath the floor of the  
70 cab, where it is provided with a trap and with a coupling or connection, both of which will be presently explained in detail. Where the pipe H passes through the fire-box it is provided with a covering, I, to prevent its being  
75 burned out, said covering consisting of an encircling pipe or a covering of fire-brick or any other suitable material that will enable the steam to become superheated, but prevent the pipe from being burned out. The steam will  
80 also be superheated by the products of combustion passing through the flue B, through which pipe H passes.

From the foregoing construction it will be seen that if the valve *b* be opened to allow a  
85 small amount of live steam to pass into the pipe G the steam, being under considerable pressure, will discharge with great force into the outlet *e*, or the pipe H, communicating therewith, and, acting as an injector, will draw  
90 the exhaust-steam through the pipes *a a* into the pipe H with it. The exhaust-steam from the pipes *a a* and the live steam from the pipe G are thus thoroughly commingled and forced through the pipe H toward the rear of the lo-  
95 comotive, and during their passage through said pipe H are highly superheated. The steam in its highly-superheated state is delivered by pipe H into a trap, J, (shown in detail in Figs. 6 and 7,) which is secured to the  
100 rear or under face of the foot-board of the locomotive, as shown in Fig. 1. This trap J is



provided with lateral openings or passages *g*, that permit the steam to pass through the same from car to car, and is also provided with a water-chamber, *h*, closed at its upper and lower ends by adjustable hollow plugs *i* and *j*, as shown in Fig. 6. The plug *i* is threaded externally to screw into the body of the trap and internally to receive the threaded upper end of a valve-stem, *k*, while the plug *j* is threaded only on the interior to screw into the body of the trap. This lower plug is, however, provided with a conical seat in its upper face to receive a plug, *l*, carried at the lower end of valve-stem *k*, as shown in Figs. 6 and 7. The lower end of stem *k* is provided with a socket, *m*, and with vertical slots *n* communicating with said socket, while plug *l* is provided with a stem, *o*, and lateral arms or pins *p*, fitting, respectively, within the socket *m* and slots *n*. When the parts are in their normal position, the valve-plug *l* will close the opening in the hollow plug *j*, the pins *p* resting in the lower ends of the slots *n*, as shown. The trap as a whole, with the exception of rod or stem *k*, which is made of brass, will advisably be made of cast-iron, so that there will be a difference between the expansive properties of the shell or body of the trap and the valve-stem. As the steam condenses, it falls into the chamber *h*, upon the upper face of plug *l*, and, owing to the expansion of rod *k*, which is acted upon by the steam, the valve will be kept to its seat. When, however, the water of condensation rises high enough in the chamber *h* to cool the rod *k*, overcoming the effect of the steam upon the rod, the latter will contract and lift the valve-plug *l* from its seat and allow the water to escape through plug *j*. The steam again acting on the rod causes it to expand and permit the valve-plug *l* to seat itself in the plug *j*, and thereby prevent the escape of steam. A trap *J* will advisably be placed at one end only of each car, the lateral outlets *g g* being threaded to receive the main supply-pipe *H*.

The pipe *H* extends from the trap *J* toward each end of the car and is provided at one end with a male coupling, *K*, and at the other end with a female coupling, *L*.

Upon reference to Figs. 4 and 5 it will be seen that the pipe *H* extends along the under side of each car and is provided at opposite ends with branch pipes *W*, which extend outward beneath the sides of the car. These pipes *W W* pass upward through the car-floor, as shown in Fig. 4, and connect with the radiators *X*, which latter rest upon the floor and extend longitudinally of the car along its sides, as indicated by dotted lines in Fig. 5. Steam being admitted to the radiators at opposite ends of the car tends to equalize the temperature therein, and in order to regulate and control the amount of steam supplied to each radiator the pipes *W W* will be provided with valves *x*. (Shown in Fig. 4.)

Each radiator *X* will advisably be provided

with one of my improved traps *I* which are adapted to collect the water of condensation in the radiators and discharge it through the bottom of the car. These traps are indicated in Fig. 4, and it is of course to be understood that one of the passages *g* in each trap will be closed up when the trap is applied to the radiator.

It is of course necessary to provide means for heating the cars when the train remains on a siding or before the train starts, and to secure this result I adopt the construction shown in Fig. 4, in which *Y* indicates a boiler or steam-generator, the construction of which may obviously be varied as desired.

The boiler *Y* will generally be located in the baggage-car and is surrounded by a water jacket or tank, *Z*, which communicates by means of a pipe, *y*, with the water-tank on the tender.

The water tank or jacket *Z* serves not only to supply the boiler *Y* with water, but also acts as an extinguisher in case the car meets with an accident and the boiler should be upset.

The pipe *y* is provided with a valve, *z*, by which the amount of water to be fed to the tank may be regulated. The steam-pipe *H* passes from the engine along the under side of the tender and up into the baggage-car, where it enters the steam-space of this supplemental generator *Y*. Now when the train is delayed on a siding, or just before the train starts on a journey, it is only necessary to start a fire in the boiler *Y* and generate steam, the latter passing from the boiler through the pipe *H* into the radiators in the cars. After the train starts, the fire may be allowed to go out, or it may be kept up in order to increase the supply, if necessary. When the boiler is first used, the valve *a'* in pipe *H* will be closed in order to prevent the steam from escaping through the warm pipe in the engine.

The boiler *Y* will of course be provided with steam and water gages and with a safety-valve; but these devices are so common as to render their representation unnecessary. As shown in Fig. 3, the pipes *a a* will each be provided with a check-valve, *a'*, which only opens inward to permit steam to enter the box *F*. While in the drawings I have shown the pipe *H* as passing through one of the fire-tubes, I do not wish to limit myself to such an arrangement, as I prefer to pass the pipe through the steam-space of the boiler, as before intimated. When this latter plan is adopted, the pipe *H* will be provided with a packing-gland where it passes through the front and rear sheets of the boiler, to provide for expansion and prevent the escape of steam.

Having thus described my invention, what I claim is—

1. In a car-heating apparatus, the combination, with a locomotive and its exhaust-nozzles *EE*, of a hollow box or casing, *F*, located within the smoke-box, pipes *a a*, communicating with



the exhaust - nozzles and entering the box F from opposite sides, a discharge-pipe, H, and a live-steam pipe, G, also connected with the box in line with the discharge-pipe.

5 2. In a car-heating apparatus, the combination, with the locomotive and its boiler and exhaust - nozzles, of a hollow box, F, located within the smoke-box of the locomotive, pipes *a a*, each connected with one of the nozzles and entering the box F from opposite  
10 sides, passages *c c* within the box F, extending from pipes *a a* toward each other and merged to form an outlet, *e*, a pipe, H, extending from said outlet, and a live-steam pipe,  
15 G, connected at opposite ends with the boiler and the box F and arranged in line with the outlet.

3. In combination with a locomotive and its exhaust-nozzles, a hollow box, pipes connected at opposite ends with the hollow box  
20 and the nozzles, valves located in the said pipes and adapted to open inwardly toward the box, a live-steam pipe, and a discharge-pipe also connected with the box, all substantially as  
25 shown.

4. The herein-described trap J, comprising a steam inlet and outlet, *g*, a water-chamber, *h*, a hollow plug, *j*, secured to the lower end  
of chamber *h*, a plug, *i*, secured to the upper  
30 end of the trap, a valve-stem, *k*, and a valve-plug, *l*, loosely connected to the stem *k*.

5. In combination with the trap-casing having a through steam-passage and a water-chamber, an expansible rod or stem, *k*, se-

cured at one end to the casing, and a valve- 35 plug loosely connected with the stem and adapted to close the water-outlet.

6. In combination with the trap-casing having a through steam-passage and a water-chamber communicating therewith, plugs *i* 40 and *j* at the upper and lower ends of the casing, and valve-stem *k*, screwing at its upper end into the plug *i*, and provided at its lower end with a valve-plug, *l*, adapted to close the water-discharge outlet.

7. In combination with the trap-casing having steam-passages *g g* and a water-chamber, *h*, plugs *i* and *j*, screwing at opposite ends into  
the casing, a valve-stem, *k*, secured to plug *i*, and provided at its lower end with socket *m* 50 and slot *n*, and a valve-plug, *l*, provided with stem *o* and pin *p* and adapted to fit within the end of the valve-stem.

8. In a car-heater, the combination, with one or more cars, of a main steam-supply, a 55 distributing-pipe, a supplemental steam-generator located within one of the cars and connected with and adapted to supply steam to the main distributing-pipe, and a water-tank surrounding and forming a part of the sup- 60 plemental generator, all substantially as shown.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ROBERT WHELAN.

Witnesses:

BASSETT CONNOR,  
RICHARD CONNOR.