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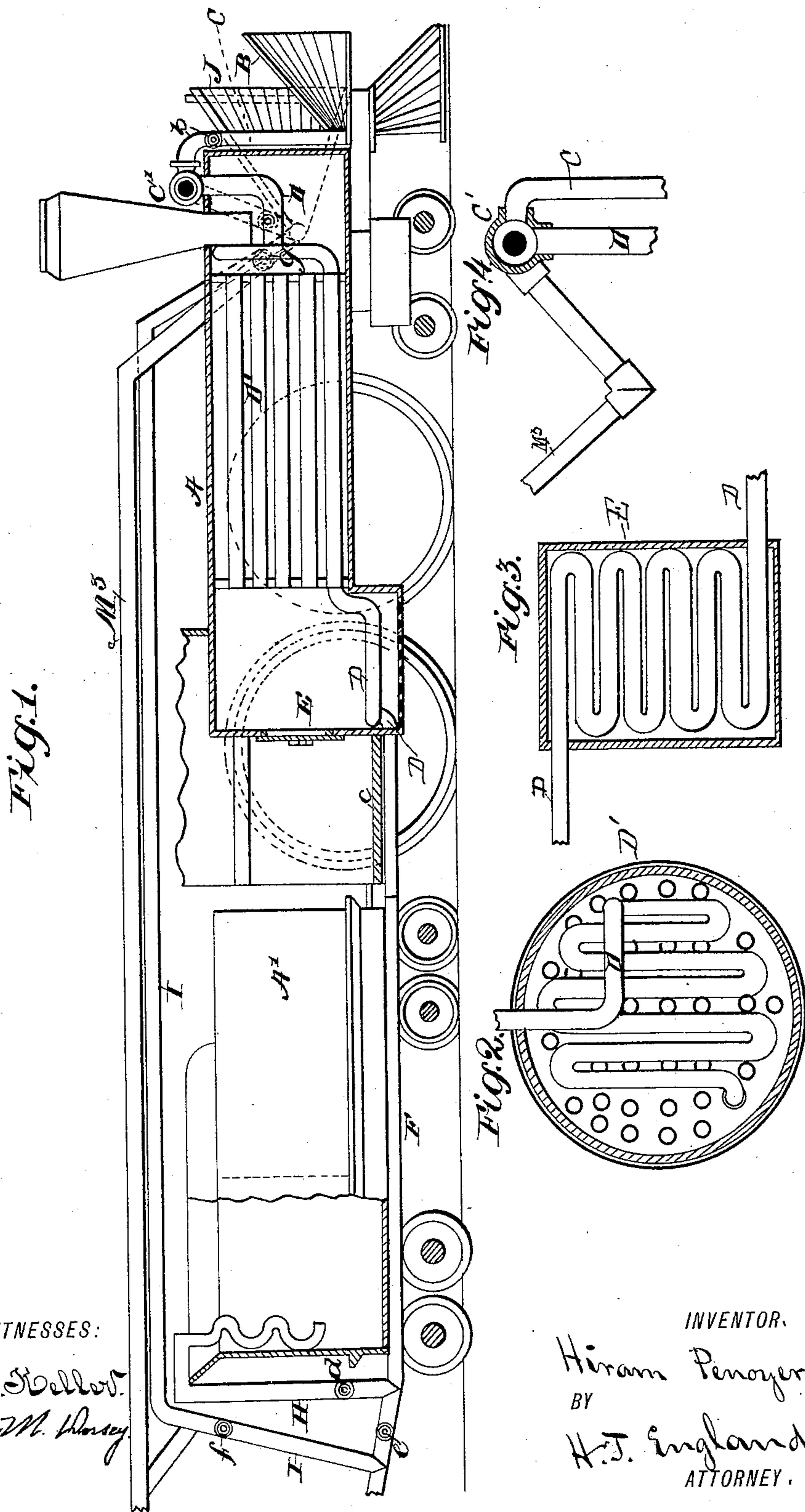
2 Sheets—Sheet 1.

H. PENOYER.

HEATING AND COOLING RAILROAD CARS.

No. 390,701.

Patented Oct. 9, 1888.



WITNESSES:

W. Fred. Bellot.
Vernon M. Halsey

INVENTOR.

Hiram Penoyer.

BY

H. J. England.

ATTORNEY.

(No Model.)

2 Sheets—Sheet 2.

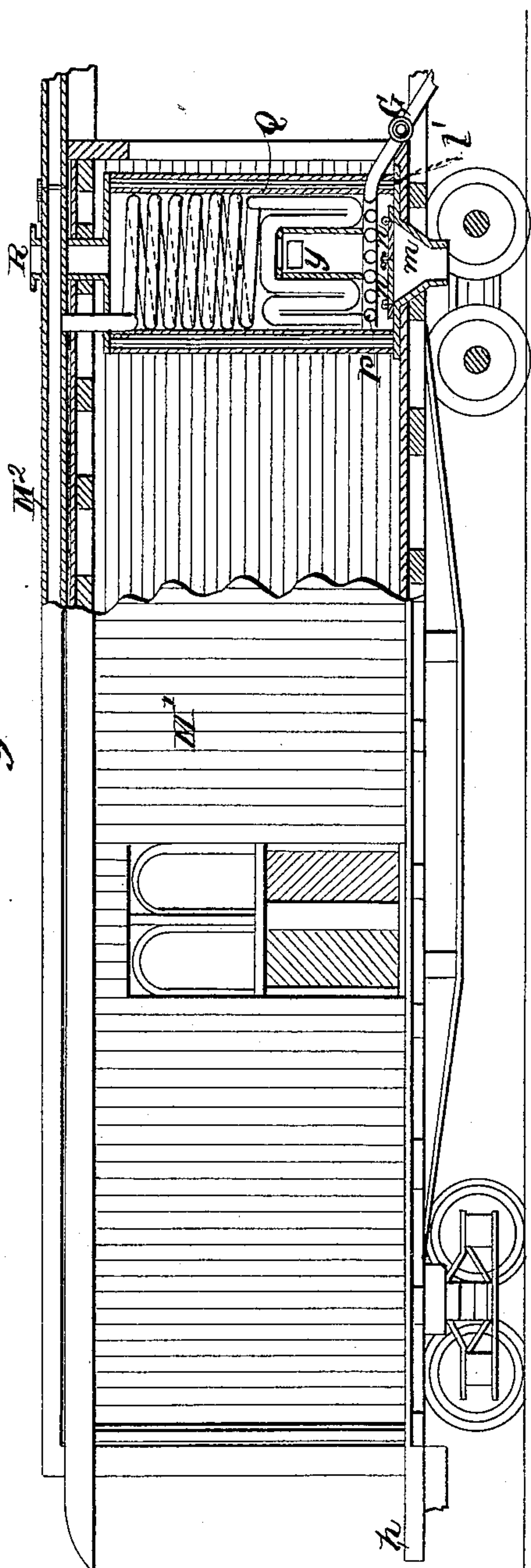
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Fig. 5.



WITNESSES:

D. Fred. Keller.
Vernon M. Worsey.

Fig. 8.

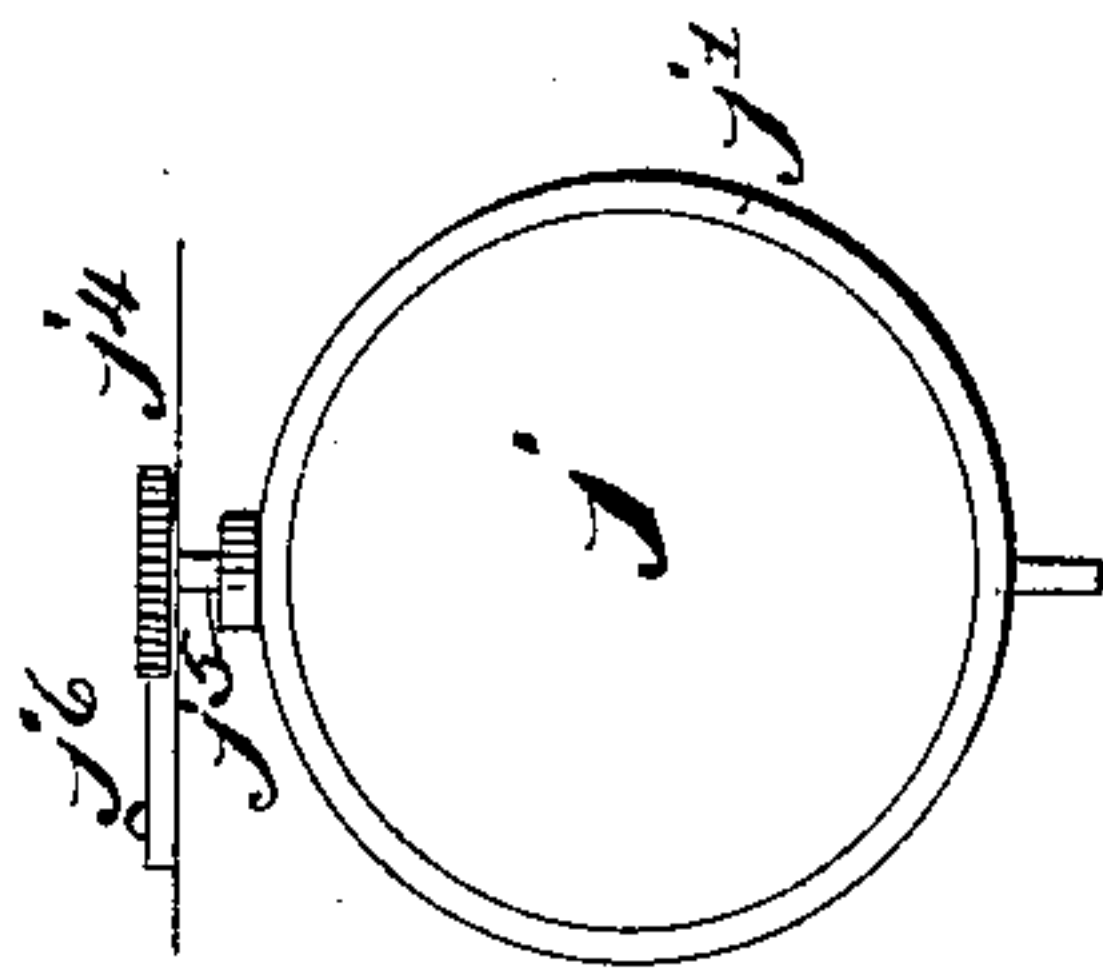


Fig. 7.

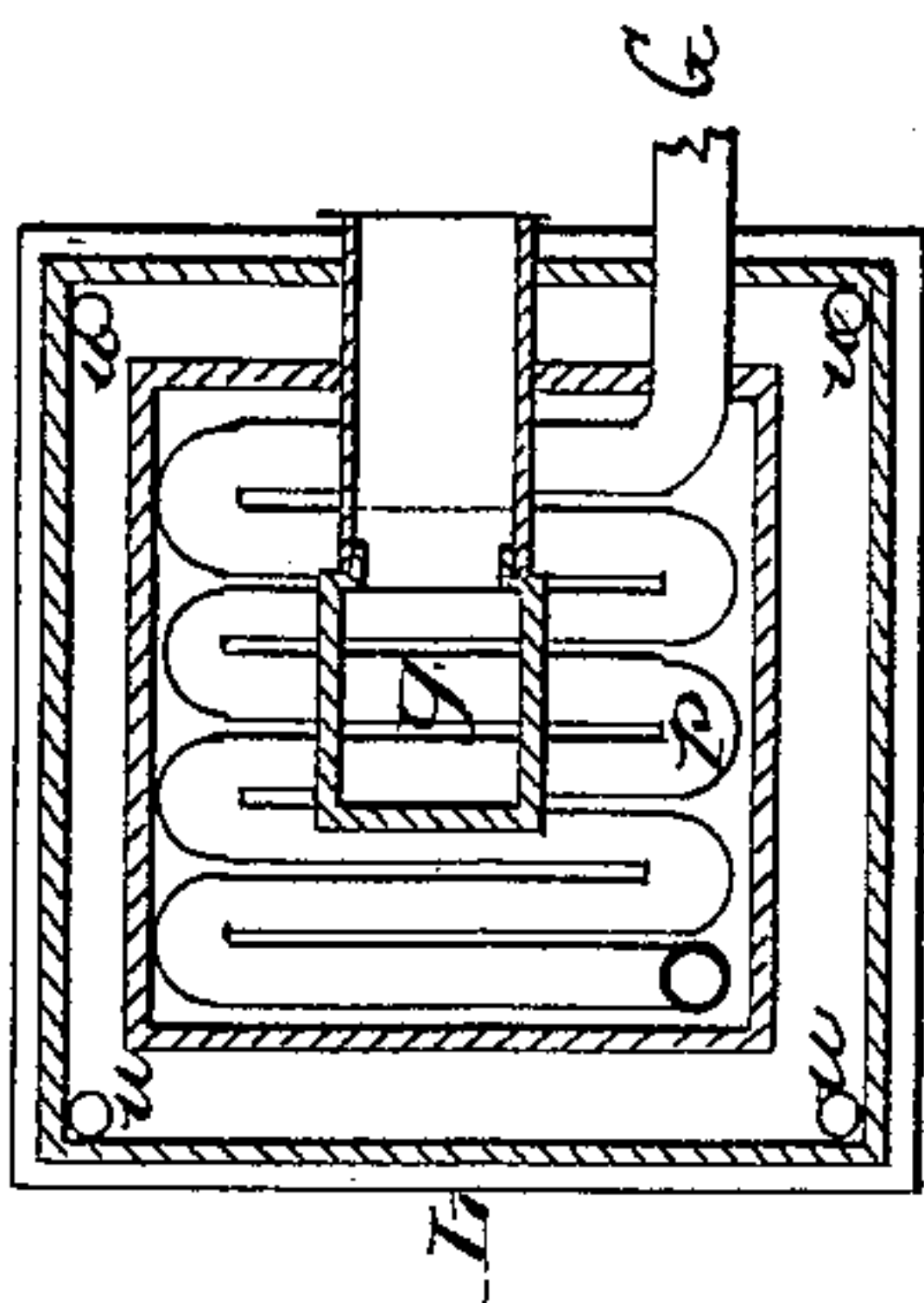
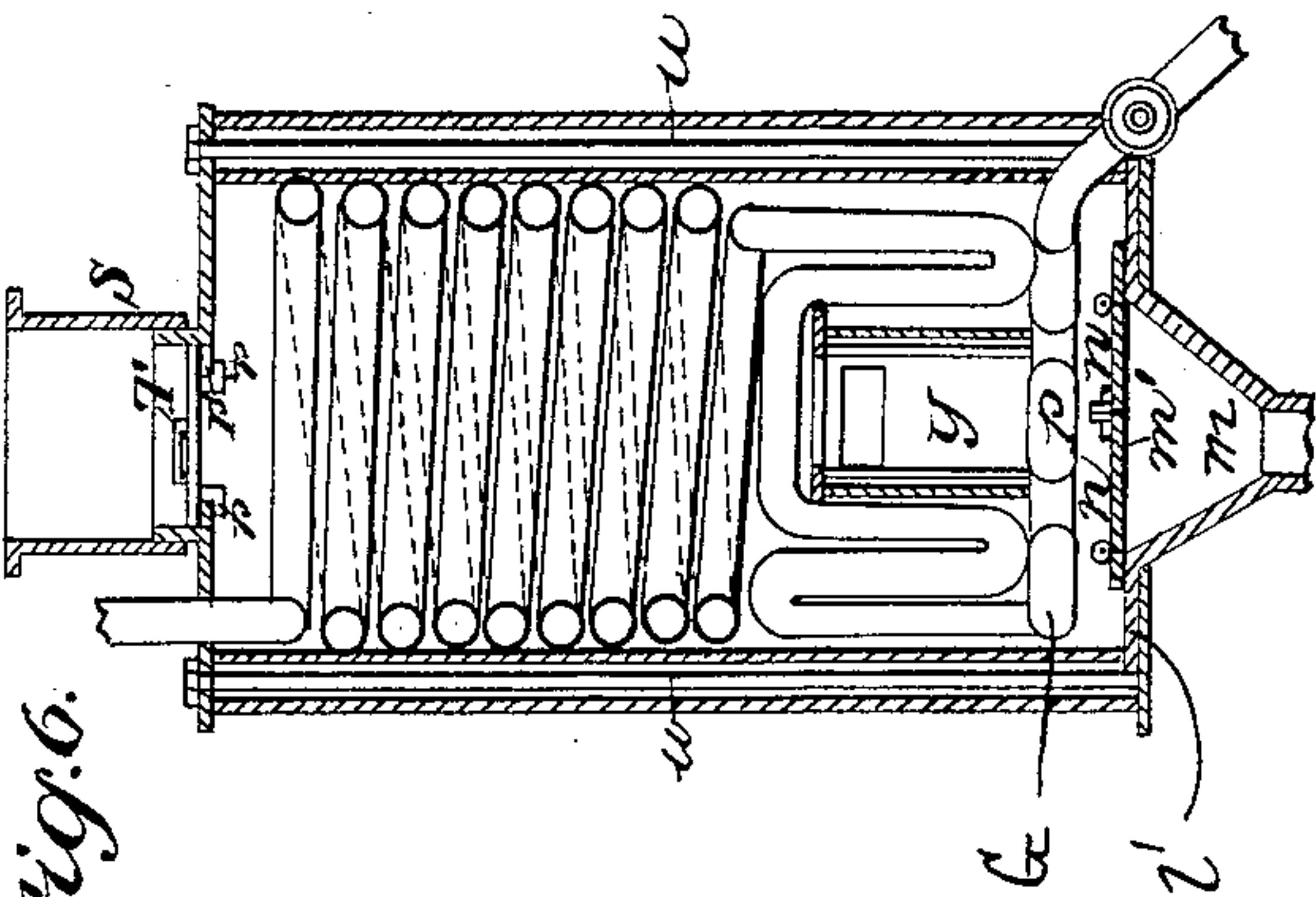


Fig. 6.



INVENTOR.

Hiram Penoyer
BY
H. J. England.
ATTORNEY

UNITED STATES PATENT OFFICE.

HIRAM PENOYER, OF WESTERN SARATOGA, ILLINOIS.

HEATING AND COOLING RAILROAD-CARS.

SPECIFICATION forming part of Letters Patent No. 390,701, dated October 9, 1888.

Application filed May 2, 1887. Serial No. 236,846. (No model.)

To all whom it may concern:

Be it known that I, HIRAM PENOYER, a citizen of the United States, residing at Western Saratoga, in the county of Union and State of Illinois, have invented certain new and useful Improvements in Heating and Cooling Cars; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to heating and cooling railroad-cars; and it consists in the novel construction and combination of parts, hereinafter described and claimed, reference being had to the drawings accompanying this application and forming part of the same, in which—

Figure 1 is a longitudinal sectional view, partly in elevation, of my invention. Fig. 2 is a cross-section of front end of boiler, showing the position of the pipes in front of boiler-tubes. Fig. 3 is a horizontal section of furnace-grate, formed by pipes. Fig. 4 is a sectional view of the receiving-globe with pipe connections. Fig. 5 is a front elevation of a baggage-car, partly in section, showing furnace in place. Fig. 6 is a vertical section of furnace. Fig. 7 is a horizontal cross-section of furnace. Fig. 8 is a detail view of damper cut-off valve.

Similar letters refer to like parts throughout the drawings.

Referring to the drawings, A represents an engine and tender provided with my improvements. Projecting forward in front and on either side of the boiler are secured the open-mouthed adjustable funnels B and J, formed of suitable material—such as wood, leather, metal, and rubber.

The inner end of funnel B is formed open and connected with a pipe, C, which extends upward in front of the boiler, and, curving backward, terminates in a drum-cylinder, C'. Between the funnel B and cylinder C' a cut-off valve, b, is placed to control the inflow of air which is admitted into the funnel B free from dust or smoke.

From the under face of drum C' extends a pipe, D, which crosses vertically in worm

shape the end of boiler D' near the flue-openings, thereby receiving the heat coming through the flues from the fire-box E.

Pipe D extends through an opening in boiler D' (formed longitudinally in its lower portion) and enters fire-box E, crossing the bottom longitudinally in worm shape, forming a grate to support the wood or coal used and become heated by the fire built thereon, thus intensely heating the air passing in the said pipe.

Pipe D passes out through an opening at the opposite side of fire-box E and extends rearward under the foot-board e, and is joined to pipe F by flexible connections. Pipe F extends rearward under tender A', and is joined to pipe G by flexible connections. At the rear of tender A' a vertical pipe, H, is connected to pipe F, and its free end, passing over the edge of the water-tank in tender A', terminates in worm shape with open end in water, the purpose of this construction being to heat the water by forcing hot air through pipe H into the same, whereby the water is raised to near the boiling-point before being injected into the boiler, which saves a large amount of fuel and loss of time in raising cold water to the boiling-point, and preserves the pipes.

Pipe H is provided with a cut-off valve, d, whereby the heat may be deflected into pipe F, and a short distance rearward from the pipe-connections H and F a cut-off valve, e, is inserted in pipe F to deflect all of the hot air through pipe H into the water-tank, if desired.

Pipe I is joined to pipe F in rear of the cut-off e, and extends upward and forward over the tender and engine, terminating in the adjustable funnel J, secured to one side of the engine and extending in front to receive cool fresh air.

Pipe M³ is connected at one end to cylinder C' and extends upward and rearward over engine and tender, and its opposite end connects with pipe M², which extends along the top of the baggage-car and downward, connecting with the distributing-pipes as ordinarily arranged in cars for distributing hot air. Cylinder C' is a receiving and distributing reservoir by which air passes through pipes D and M³, as desired. The flow is controlled by valves b and g. Pipe I connects with adjustable funnel J.

Pipe I is provided with a cut-off valve, *f*, near its connection with pipe F to control the flow of air.

In detail view, Fig. 4, the connection of pipe M³ is shown.

The cut off valves in all the pipes are made of metal, circular in form, and their peripheries covered with flexible gaskets or bands, made of rubber or like material, by which, when turned, a tight joint is formed within the pipes and air prevented from passing.

Fig. 8 shows the form of all the valves, *j* being the circular blade, *j'* being the flexible band, *j*² being the central cross-loop, *j*³ the pivot-bolt, which is removable and provided with a milled wheel or handle, *j*⁴, at one end, the opposite end being formed to fit in a perforation in the pipes, and the shoulder below the milled wheel *j*⁴ having a ratchet-wheel, *j*⁵, formed to engage with a spring-pawl, *j*⁶, by which it is held in place, so that the amount of air passing in the pipes may be controlled.

At one end of a baggage-car, M', a furnace, Q, is secured. The base-plate *l'* rests on or near the floor of the car, and is provided with a discharge-funnel extending below the car, and provided with a cover, *n*, formed in two parts hinged to the edges of the ash-pan *m*, opening centrally downward to convey the ashes out, and when closed secured by a clasp or button. Above the discharge-funnel the air-pipe G enters the furnace through an opening made in the outer and inner lining, and crosses transversely, forming a grate, *p*. After forming the grate *p* the pipe G is bent upward and downward and across the top of a fire-pot, *y*, which is centrally secured within the furnace and resting with open bottom on the grate-pipes *p*. The pipe G is further bent in on the opposite side of fire-pot *y*, and, extending upward, coils centrally around the inside of the furnace Q, passing outward at the top of said furnace and connecting with the pipe M². By this means the pipe G within the furnace is intensely heated, thus heating the passing air within, and in warm weather when no fire is used and the furnace is filled with ice the passing air in the coiled pipe G is cooled to the desired temperature. A smoke-flue outlet, R, extends upward through the top of the car

and is provided with a sleeve-extension, S, which may be removed when the furnace is used for a refrigerator. There is provided a metal cover, T, having projecting lugs *r* on its lower face formed to engage with the lip projection *r'* of the furnace-top to permit the removal and replacement of the cover T when necessary. The casing of the furnace is formed with double walls, in the space between which is placed asbestos or other suitable non-conductor of heat, and the parts are held together by metal rods *u*, with heads and nuts. The tops of the cars are provided with ventilators, formed four or eight square, with openings and outside weather-caps.

The end of the air-conveying pipe G at the rear of the train is closed by a suitable cap, so that the current of air coming from in front of the engine must pass through the distributing-pipes between the floors of the cars and opening under the seats.

The short inclined pipe connecting pipe M³ and pipe I above the valve *f* is simply inserted as a brace to hold said pipes in place.

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

In a car heating and cooling apparatus, the combination, with the engine, boiler, fire-box, and tender provided with the pipes D, F, and I, having cut-off valves *e* and *f*, of the valved pipe C, connecting the funnel B to the cylinder C' on the pipe D, the double-walled furnace secured in the end of car and having inside the coiled pipe P the covered funnel-shaped bottom, the pipe G connecting the pipes F and D, the funnel B, connected to front end of pipe C, the funnel J, connected to front end of pipe I, and the pipe M³, connected to the cylinder C', whereby by manipulating the proper valves either heated air or cold air may be supplied to the cars in rear of engine, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

HIRAM PENOYER.

Witnesses:

EMMA M. GILLETT,
C. FRED. KELLER.