

(No Model.)

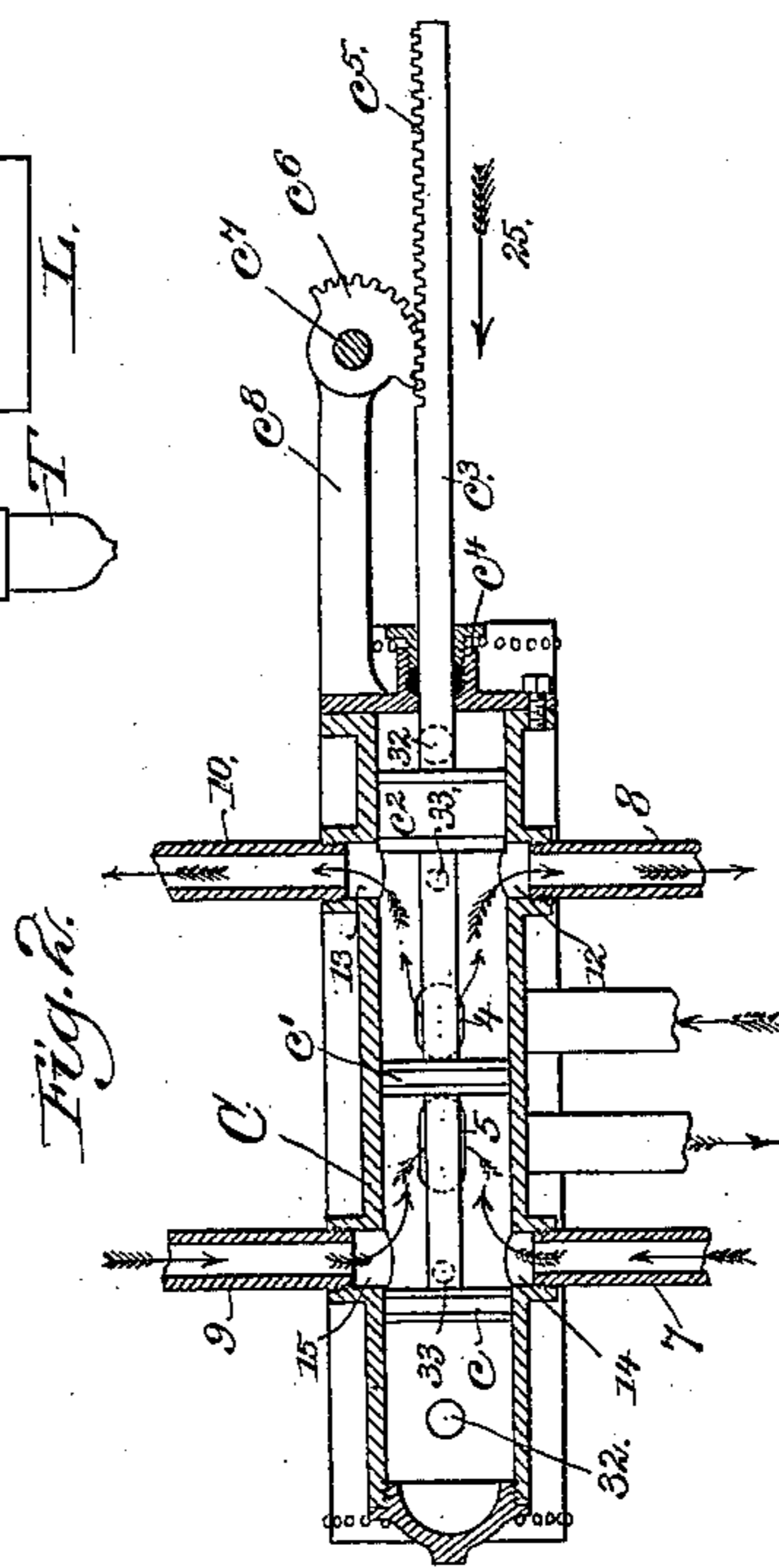
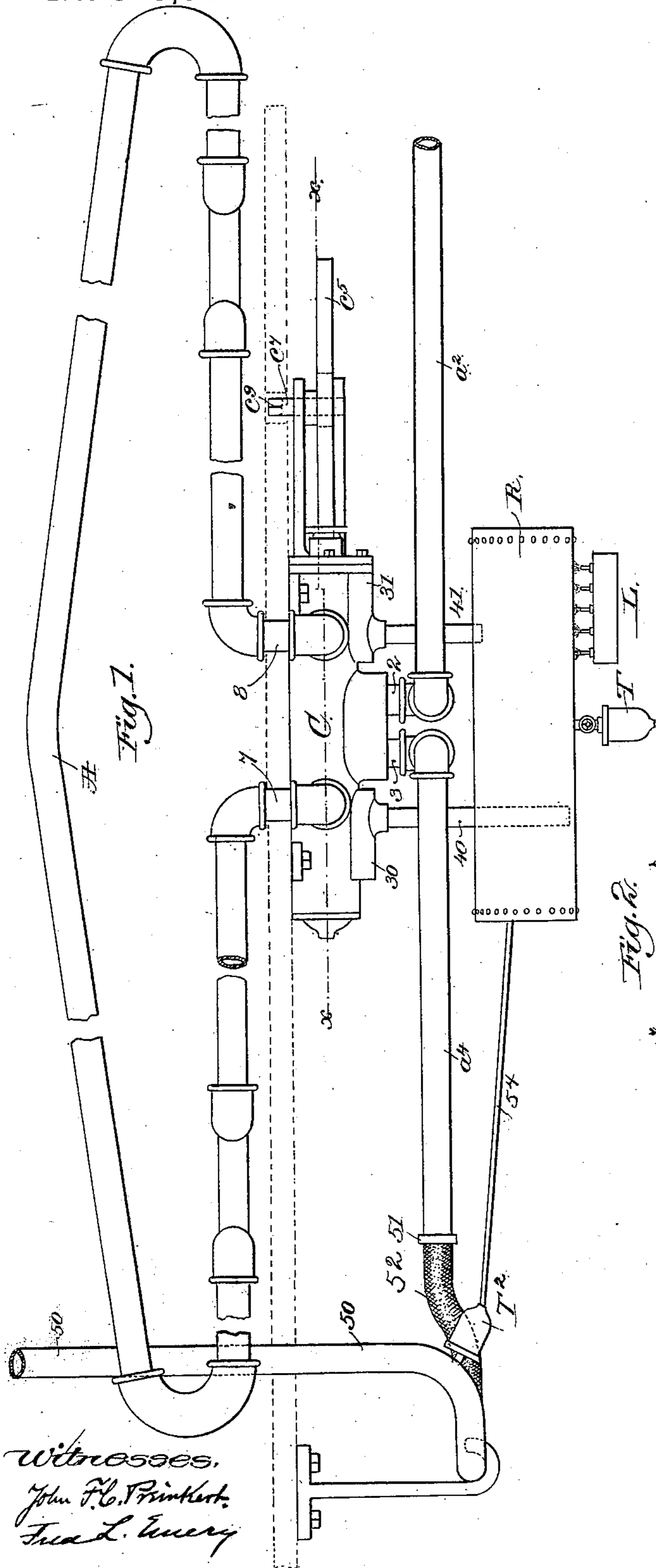
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J. H. SEWALL.

## CAR HEATING APPARATUS.

No. 373,314.

Patented Nov. 15, 1887.



Witnesses,  
John F. C. Prinkert.  
Fred L. Avery

Traveler;  
by James H. Sewall.  
L Crosby & Gregory, Agents.

(No Model.)

2 Sheets—Sheet 2.

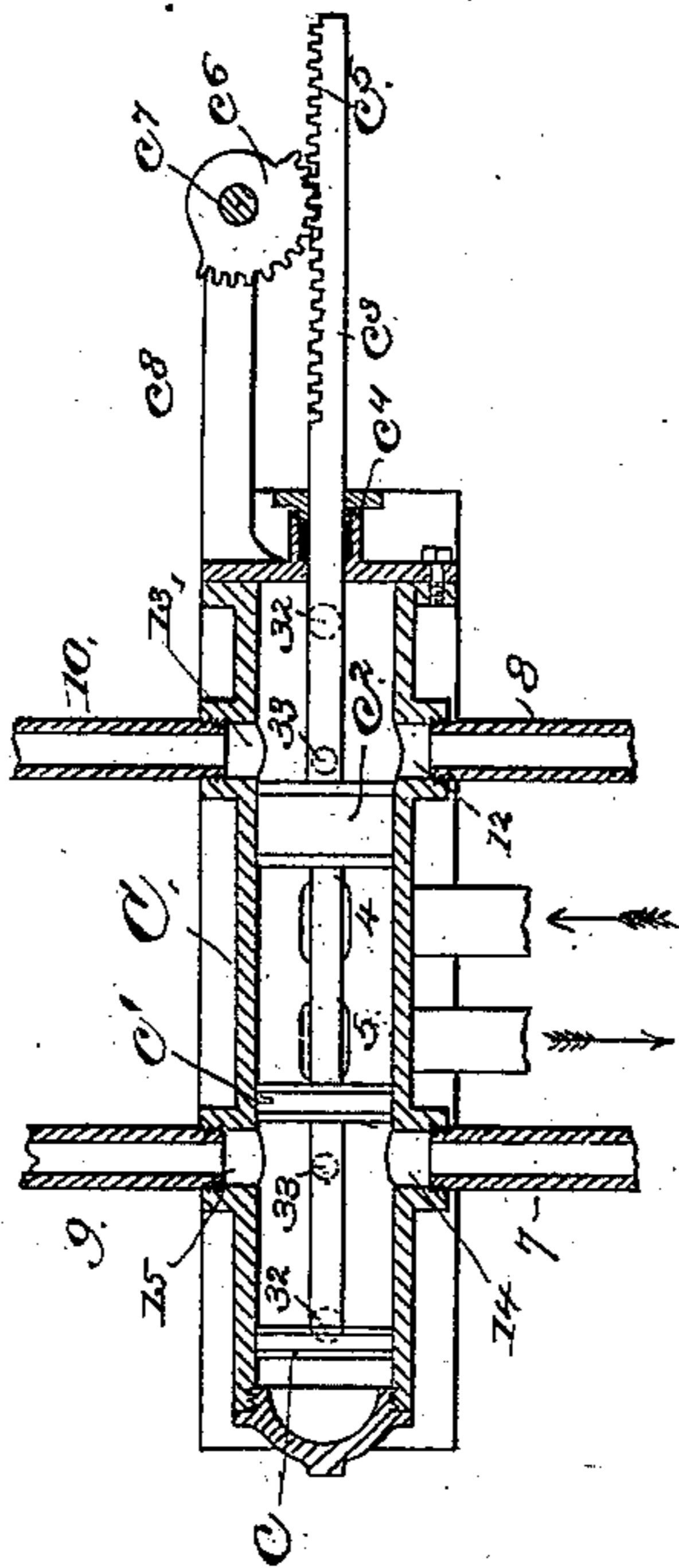
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Fig. 3.



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# UNITED STATES PATENT OFFICE.

JAMES H. SEWALL, OF PORTLAND, MAINE.

## CAR-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 373,314, dated November 15, 1887.

Application filed September 25, 1886. Serial No. 214,520. (No model.) Patented in Canada May 11, 1887, No. 26,696, and in England May 25, 1887, No. 7,510.

*To all whom it may concern:*

Be it known that I, JAMES H. SEWALL, of Portland, county of Cumberland, and State of Maine, have invented an Improvement in Car-Heating Apparatus, (for which I have obtained a patent in Great Britain, No. 7,510, dated May 25, 1887, and a patent in Canada, No. 26,696 dated May 11, 1887,) of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention is an improvement upon Letters Patent No. 265,284, granted to D. D. and J. H. Sewall, October 3, 1882, and has for its object to provide more efficient means for controlling the passage of steam from the main steam-pipe to the circulating-pipes, the main steam-pipe passing beneath the car and conveying steam from the locomotive to the circulating-pipes.

The controlling means herein shown consists of a steam-cylinder having suitable inlet and outlet ports, through which the steam passes from the main steam-pipe to the circulating-pipes, a suitable piston-valve having three disks joined together by a common rod being employed to open and close the said ports, movement of the piston-valve being controlled manually or otherwise from within the car. Suitable drip-pipes lead from the steam-cylinder into a reservoir, which latter may, when needed, be employed as a boiler, it being heated by a suitable heating apparatus located beneath it. A suitable trap is employed to discharge the water of condensation contained within the reservoir, such trap being actuated by means sensitive to a rise and fall of temperature, so that the water may be discharged as the temperature falls, to thereby prevent the same from freezing in cold weather.

Figure 1 shows in elevation an arrangement of pipes and controlling devices for one car, the dotted lines representing the floor of the car-body; Fig. 2, a longitudinal section on the dotted line  $x x$  of the steam-cylinder and the piston-valve therein, (shown in Fig. 1,) the piston-valve occupying a position to admit steam to the radiating-pipes of the car; and Fig. 3, a

longitudinal section of the steam-cylinder similar to Fig. 2, the piston-valve occupying a position by which the steam generated in the auxiliary boiler may enter the radiating-pipes or the steam from the main pipes may be shut off from the car.

The main steam-pipe which leads from the locomotive along under each car, as usual, has at each car portions  $a^2 a^4$ , which I denominate "inlet" and "outlet" portions, the said portions being coupled together between the cars and the locomotive by any suitable couplings, the said portions receiving either live or exhaust steam from the locomotive and conveying the same the entire length of the train. The inlet or outlet portions  $a^2 a^4$  of the main steam-pipe of each car are connected with a steam-cylinder, C, suitably bolted to the car beneath its floor by pipes 2 3, so that steam continually enters the cylinder C through the port 4 and passes out through the port 5. (See Fig. 2.)

Each car has within it two main circulating-pipes, A, extending lengthwise thereof upon each side, one of said circulating-pipes being herein shown in Fig. 1, and the ends 7 8 9 10 of the said circulating-pipes A being joined with or leading into the said steam-cylinder C at opposite sides, as shown in Fig. 2, so that steam contained within the cylinder C may enter the said circulating-pipes A through the ports 12 13, as indicated by the arrows, Fig. 2, and return to the cylinder through the ports 14 15. Each main circulating-pipe A has suitable branches extending under the seats of the car in the usual manner.

The steam-cylinder C contains a piston-valve composed of a stem,  $c^3$ , having attached to it three disks,  $c c' c^2$ , the said stem having its bearings in any usual stuffing-box,  $c^4$ . The outer end of the stem  $c^3$  is provided with a series of rack-teeth,  $c^5$ , which are engaged by the teeth of a segment or wheel,  $c^6$ , fixed to a shaft,  $c^7$ , extending upward through the floor of the car, as shown in Fig. 1, said shaft having its bearings in a frame,  $c^8$ , attached to the cylinder-head. The upper end of the shaft  $c^7$  is provided with a squared end,  $c^9$ , which receives a suitable wrench to turn the same. As the shaft is turned in opposite directions, the

piston-valve is moved back and forth in the cylinder.

As shown in Fig. 2, the disks or pistons  $c$   $c'$   $c''$  are in suitable position to allow the steam to enter the cylinder through the port 4, pass outward through the ports 12 13, and return to the cylinder through the ports 14 15, and escape through the port 5, thereby permitting a free passage for the steam to freely circulate through the main circulating-pipes within the car.

When it is desired to shut off the steam, the shaft  $c'$  is turned, moving the piston-valves in the direction of the arrow 25 until the disk or piston  $c'$  passes beyond the port 5, as shown in Fig. 3, and the disk or piston  $c''$  beyond the ports 12 13, thereby placing one disk or piston at each side of the ports 4 5, causing the steam entering the cylinder through the port 4 between the two disks or pistons  $c'$   $c''$  to leave the cylinder through the port 5, to thus complete the circulation of the steam through the main steam-pipe and allow steam to pass to the next car. By this arrangement any one or all of the cars of a train may be heated, the admission of steam into any car of the train being controlled from within the car.

The steam-cylinder C is provided upon its under side with two elongated reservoirs, 30 31, one at each end, two openings or vents, 33 33, being formed in the lower side of the cylinder and communicating with the reservoirs 30 31, to allow free discharge at all times of water of condensation and the like, such water passing through the pipes or drip-passages 40 41 into the closed reservoir R. One of the said drip-passages, as 40, extends downward nearly to the bottom of the said reservoir R, while the other drip-passage, 41, merely enters and terminates just within the reservoir.

In case of accidents to the locomotive, or for any other reason should the supply of steam to the cylinder be inadequate to heat the car, then the reservoir R may be employed as a boiler, it being heated by any suitable heating apparatus, herein shown as a lamp, L. While the reservoir is thus employed as a boiler the steam passes up through the passage 41 into the elongated reservoir 31, thence through the steam-passage 32, formed in the under side of the cylinder C, and thence into the connecting-pipes 8 10, returning through the connecting-pipes 7 9 to the cylinder C and passing out through the steam-passage 32, reservoir 30, and escape-pipe 40 to the auxiliary boiler.

The piston  $c''$  is made somewhat thicker than the other piston, so that when moved to shut off the steam coming from the main steam-pipe to the radiating-pipes it may completely pass the ports 12 13, and yet occupy a position between the port 4 and the drip-passage 33.

It will be seen that irrespective of the position of the piston-valves the small drip-passages 33 are always exposed to provide an escape for the water of condensation. It will also be seen that the pipes 40 and 41, opening into the small reservoirs 30 and 31, and the

said reservoirs opening into the cylinder C through the ports or drip-passages 33, form conduits for conveying the water of condensation from the said cylinder to the reservoir R.

The reservoir R may be provided with any suitable feed-pipe, (not shown,) by which the same may be filled when necessary—in such instances as when the water of condensation remaining in the boiler is deemed an insufficient supply.

To prevent the water contained within the reservoir R from freezing in cold weather, it is necessary to empty the same at intervals—as at night—and to do this automatically I preferably employ a steam-trap, T, actuated by a device sensitive to a rise and fall of temperature. A trap especially adapted for this purpose forms the subject-matter of another application filed by me September 14, 1886, Serial No. 213,515, to which reference may be had.

Each car is provided with an upwardly-extended pipe, 50, which, when desired—as, for instance, when the car is placed at the rear end of a train—may be connected with the exhaust portion  $a^4$  of the main steam-pipe by a flexible hose, 52, and suitable hose-couplings, 51, such upwardly-extending pipe serving to conduct the exhaust to a point above the roof of the car. A drip-passage,  $T^2$ , is connected with the flexible hose 52, conveying water of condensation to the reservoir R by the pipe 54.

It is obvious that the reservoir R could be made of any suitable shape desired, and also, in lieu of the trap herein shown, any suitable valve could be employed. It is also obvious that instead of employing a toothed segment or wheel adapted to engage the rack-teeth of the stem  $c'$  to move the piston-valve any other means may be employed, it being desirable, but not necessary, that such means should be accessible from within or on the car.

I claim—

1. In a car-heating apparatus, the combination, with the main steam-pipe and the main circulating-pipes, of the cylinder C, having the inlet and outlet ports 4 and 5, the outlet and inlet ports 12, 13, 14, and 15, connected with the said circulating-pipes, and the ports or drip-passages 33, and valves or disks movable in the said cylinder for controlling the passage of steam through the said cylinder and also for controlling the escape of water of condensation through the said passages 33, substantially as set forth.

2. In a car-heating apparatus, the main steam-pipe passing from end to end of the car and the main circulating-pipes within the car, and controlling devices for controlling the passage of steam that it may enter the main circulating-pipes or pass onward directly through the main steam-pipe at will, and the drip-passages for the escape of water of condensation from the main circulating-pipes, combined with an auxiliary reservoir, R, to receive the water of condensation, conduits connecting

said drip-passages with the said reservoir and the controlling-cock or outlet-passage for the reservoir R.

3. In a car-heating apparatus, the main steam-pipe passing from end to end of the car and the main circulating-pipes within the car, and the cylinder C, having the inlet and outlet ports through which steam from the main steam-pipe passes to the main circulating-pipes and returns, and also having the ports 32 and drip-passages 33, combined with the auxiliary reservoir R, conduits connecting said drip-passages with said reservoir, and the valve moving within the cylinder C, which valve when in one position offers a free passage from the main steam-pipe to the main circulating-pipes and when in another position offers a free passage between the main circulating-pipes and the auxiliary reservoir R, substantially as described.

4. In a car-heating apparatus, the main steam-pipe passing from end to end of the car and the main circulating-pipes within the car, and the cylinder C, having the inlet and outlet ports through which steam from the steam-pipe passes to the main circulating-pipes and returns, and also having the ports 32, reservoirs 30 31, and drip-passages 33, combined with the auxiliary reservoir R, into which the drip-passages lead, and the valve moving within the cylinder C, which valve when in one position offers a free passage from the main steam-pipe to the main circulating-pipes and when in another position offers a free passage between the main circulating-pipes and the auxiliary reservoir R, substantially as described.

5. In a car-heating apparatus, the main steam-pipe passing from end to end of the car and adapted to be coupled to the next car or to the locomotive, the main circulating-pipes located within the car, and drip-passages for the said main circulating-pipes, combined with a controlling device for simultaneously controlling the passage of steam from the main steam-pipe to the main circulating-pipes and for controlling the passage from the main circulating-pipes to the drip-passages, the said controlling device being adapted when in either position to maintain the drip-passages in communication with the main circulating-pipes, to thereby provide a suitable escape, substantially as described.

6. In an apparatus for heating cars, the main steam-pipe for each car adapted to be coupled to the next car or to the locomotive, and the main circulating-pipes A, located within the car, combined with the steam-cylinder C, having suitable ports permitting the steam from the main steam-pipe to enter therein and to pass to the main circulating-pipes, and a piston-valve, as described, moving within the cylinder to control the passage of steam through said ports, the discharge-pipe 50, and a pipe or hose, 52, by which the said pipe 50 may be connected with the main steam-pipe when desired, substantially as described.

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

JAMES H. SEWALL.

Witnesses:

DANIEL D. SEWALL,  
HORATIO HIGHT.