

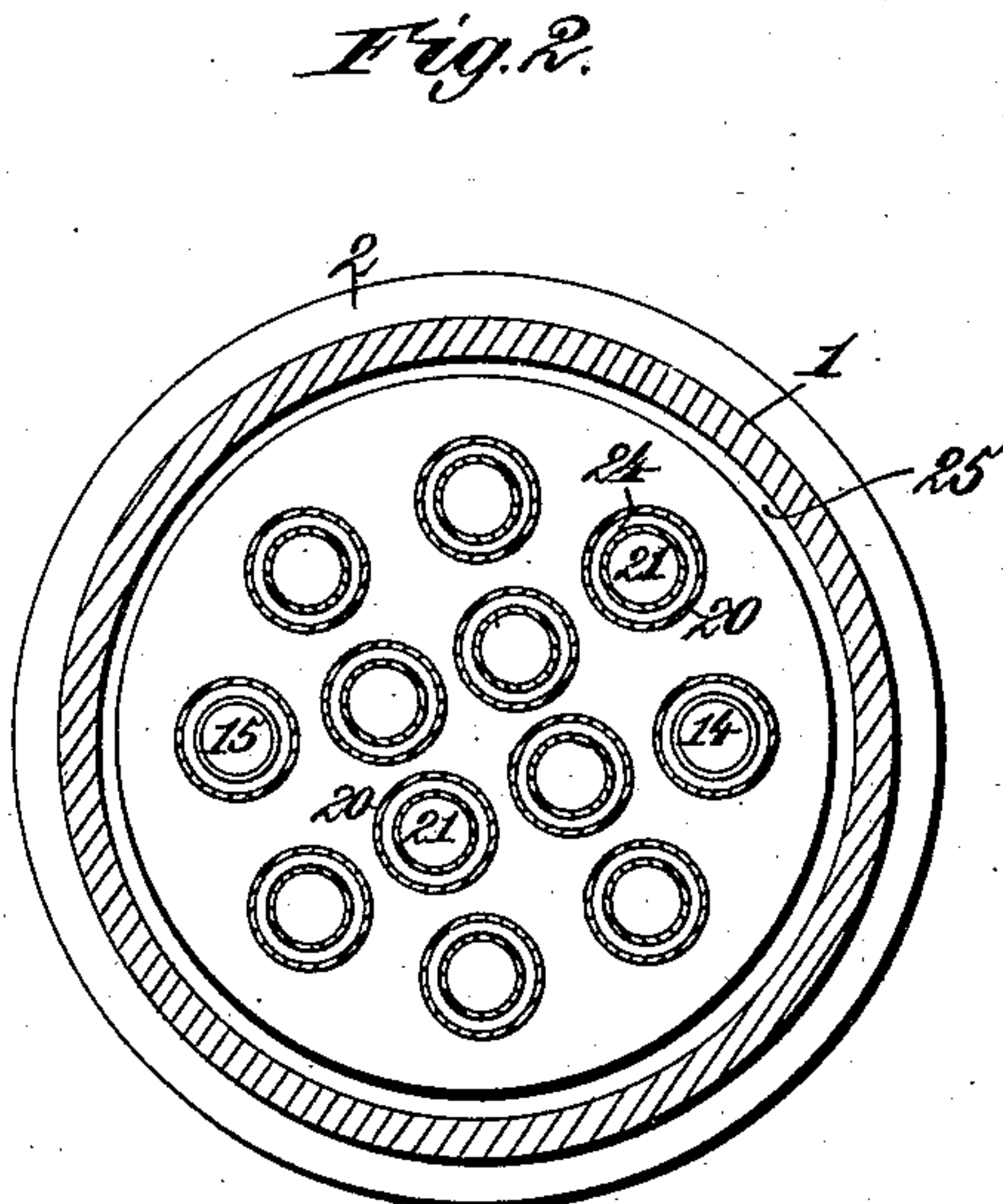
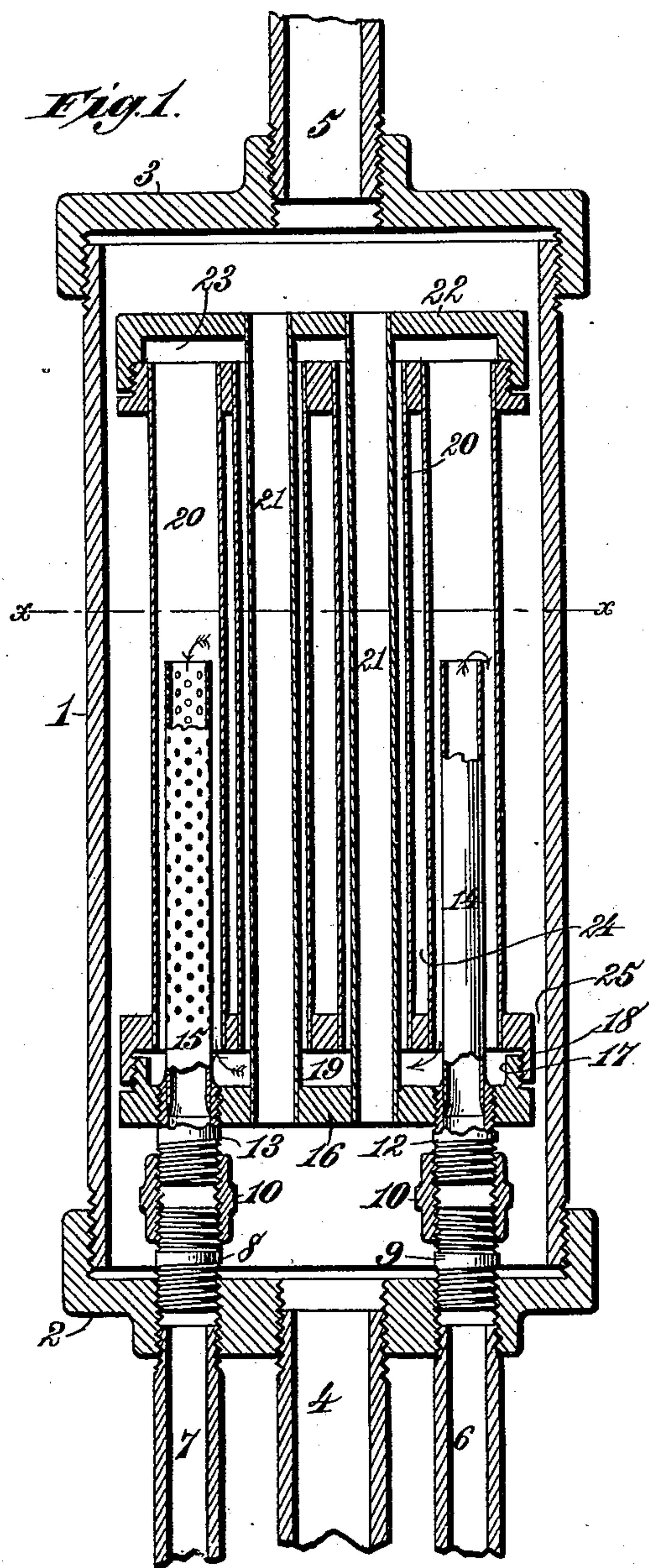
(No Model.)

E. A. LELAND.

STEAM HEATER FOR RAILWAY CAR HEATING APPARATUS.

No. 471,869.

Patented Mar. 29, 1892.



Witnesses,  
*Robert Gruett,*  
*J. A. Rutledge,*

Inventor,  
*Edwin A. Leland,*  
By *James L. Norris,*  
Atty.



# UNITED STATES PATENT OFFICE.

EDWIN A. LELAND, OF BROOKLYN, NEW YORK, ASSIGNOR TO CHARLES M. PRATT, OF SAME PLACE.

## STEAM-HEATER FOR RAILWAY-CAR-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 471,869, dated March 29, 1892.

Application filed January 15, 1891. Serial No. 377,912. (No model.) Patented in England September 8, 1891, No. 15,166.

*To all whom it may concern:*

Be it known that I, EDWIN A. LELAND, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Steam-Heaters for Railway-Car-Heating Apparatus, (for which a patent has been obtained in Great Britain, No. 15,166, dated September 8, 1891,) of which the following is a specification.

My present invention relates to certain improvements in that class or type of car-heating apparatus shown in the United States Letters Patent granted me upon the 25th day of November, 1890, No. 441,497, and the purpose thereof is to secure a largely-increased heating-surface for the water traversing the heater; to simplify and improve the construction of the latter; to provide for the speedy and ready attachment and detachment of the steam outlet and inlet pipes from the end or cap of the heater and from the interior steam-head, and to so construct and organize the several parts that the live steam from which the water derives its heat shall be supplied to a series of annular steam chambers or spaces, which not only inclose water-passages but are surrounded by a water space or spaces, whereby a small body of steam may be distributed over a very considerable surface and impart heat to water-contacting surfaces having more than double the area of heating-surface afforded by heaters having water-pipes in the drum surrounded by steam.

To these ends my invention consists in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then more particularly pointed out and defined in the claims following this specification.

To enable others skilled in the art to make and use my said invention, I will proceed to describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical section of a steam-heating apparatus embodying my invention, and Fig. 2 is a horizontal section of Fig. 1 on the line *x x*.

In the said drawings, the reference-numeral 1 designates the cylindrical casing or jacket of the heater, having its lower end closed by

a cap 2, having an internally-threaded flange which receives the end of the jacket, the latter being provided with a male thread. The upper end of the cylindrical body is likewise closed by a cap 3, secured in a similar manner. Through the center of the cap 2 is tapped a pipe 4, through which the cold water or the water which has been partly deprived of its heat is admitted to the heater, and through the upper cap 3 is inserted in a similar manner a pipe 5, through which the water which has traversed the heater finds exit. This outlet-pipe is usually connected to any suitable form of expansion tank or chamber (not shown in the drawings) and thence to the circulation-pipe or radiators in the interior of the car.

Tapped into the lower cap 2, upon opposite sides of the inlet-pipe 4, are two separate pipes 6 and 7, the former being connected with the train-pipe in any suitable manner, in order that live steam may be supplied thereto.

The pipes 6 and 7 have communication with short tubular pieces 8 and 9, having right and left hand male threads upon their opposite ends, respectively, one end of each being inserted in the threaded openings in the cap 2 and screwed in upon the interior of said cap, which is thickened to provide threaded openings of sufficient length to receive these tubular pieces as well as the pipes 6 and 7. Upon the inwardly-projecting ends of said pieces are turned couplings 10, having right and left hand female threads in each, and to these couplings are connected tubular pieces 12 and 13, each having one end screwed into one of the couplings 10. Into the tubular opening in the piece 12 is inserted a thin copper tubing 14, having its end brazed or similarly fastened in said tubular piece, above which the tube projects for some distance, its upper open end, as shown in the drawings, passing the center of the cylindrical casing or body of the heater. Into the tubular piece 13 is inserted in a similar manner a tube 15 of the same length as the tube 14 and brazed within the piece 13. The length of these tubes may be subject to variation, but I prefer using the proportions substantially as shown in the drawings.

The reference-numeral 16 denotes a steam-



head composed of two substantially similar metallic disks having a diameter somewhat less than the interior diameter of the body 1 of the heater. One of these disks is provided with a flange 17, concentric therewith and projecting from its flat face at a little distance from the edge of the disk, a male screw-thread being cut upon the outer surface of said flange. Upon the other disk is formed a like flange 18, the outer surface of which is flush with the edge of said disk, while its inner surface is provided with a female thread adapted to receive the male thread on the flange 17. When thus attached, a chamber 19 will be formed between the said disks, as shown in Fig. 1. In the upper of the two disks is formed a series of circular openings which receive the ends of pipes 20; brazed or otherwise fastened in place within said openings. In the lower disk and concentric with said openings are formed a series of openings which are less in diameter than those in the other disk and receive the ends of pipes 21, which pass upward within the pipes 20. In one of the openings in the lower disk, which is threaded for that purpose, is screwed the end of the tubular piece 12; the pipes 14 extending upward concentrically within the pipe 20 above and in an opening in the same disk, diametrically opposite, or substantially so, is inserted in the end of the tubular piece 13 its pipe 15, which is provided with perforations at close intervals, extending upward in one of the tubes 20. The steam-head 16 is raised some little distance above the lower end of the heater.

In or near the upper end of the heater is a second steam-head 22, constructed, in the manner already described, of two flanged disks inclosing a chamber 23, the pipes 20 of greatest diameter penetrating the lower disk only, while the smaller concentric pipes 21 pass through the upper disk. It will be seen from this construction that the series of pipes 20 have free communication with the two chambers 19 and 23 in the lower and upper steam-heads; respectively, while the pipes 21 traverse both these chambers, as well as the surrounding pipes 20; and communicate with the space inclosed by the cylindrical body 1 and caps 2 and 3.

If steam is now introduced through the steam-inlet pipe 6, it will flow in the directions indicated by the arrows in Fig. 1, filling the annular spaces 24 between the pipes 20 and 21, while the water entering by the inlet-pipe 4 will not only flow through the pipes 21, but, passing through the annular spaces between the edge of the steam-head 16 and the inner face of the cylindrical body 1, will surround the larger pipes 20, thereby giving a series of double water-contacting surfaces, one of said surfaces being the interior faces of the pipes 21 and the other the exterior faces of the pipes 20. Moreover, the steam being confined to the annular spaces

24, these surfaces are heated with a comparatively small body of live steam.

By this construction I not only avoid the use of an interior steam-drum, but I obtain an economy of steam, and in virtue of the largely-increased heating-surface contained within the body portion 1, I obtain a much more rapid heating of the water and a more speedy circulation of the same.

What I claim is—

1. In a steam-heater for railway-car-heating apparatus, the combination of an outer cylindrical drum closed at its ends and having a water-inlet at one end and a water-outlet at the other end, steam-heads arranged within said drum and each having a steam-chamber, a steam-inlet pipe and a steam-outlet pipe, both extended between the said steam-heads on opposite sides of the drum-center and communicating with the steam-chambers in said heads; a steam-inlet tube, of less diameter than the steam-inlet pipe, passing through the end of the drum, through the adjacent steam-head and steam-chamber therein, and extended into the steam-inlet pipe, a steam-outlet tube having perforations and similarly arranged in the steam-outlet pipe, a series of pipes of large diameter having their ends communicating with the steam-chambers in the steam-heads, and a series of smaller pipes concentrically arranged in the said larger pipes, their ends passing through the steam-heads and steam-chambers and communicating with the ends of the space inclosed by the drum, substantially as described.

2. In a steam-heater for railway-car-heating apparatus, the combination, with a drum 1, having closed ends or caps 2 and 3, of a water-inlet 4 and a water-outlet 5, located in the lower and upper ends of the drum, respectively, a steam-inlet pipe 6 and a steam-outlet pipe 7, entering the cap 2, right and left hand threaded pipe-sections 8 and 9, connected by unions 10 to the threaded ends 12 and 13 of the steam inlet and outlet pipes, a steam-head 16, mounted on and supported by the pipes 12 and 13 and having a steam-chamber 19, pipes 20, communicating with the steam-chamber 19, a steam-inlet tube 14 and steam-outlet tube 15, the latter having perforations, said tubes passing through the steam-head 16 into two of the pipes 20 on opposite sides of the center of the steam-head, a steam-head 22, having a chamber 23, with which the upper ends of pipes 20 communicate, and a series of water-conducting pipes 21, arranged within the steam-pipes 20; their ends passing through both steam-heads and the steam-chambers therein, an annular steam-space 24 being provided between the pipes 20 and 21 and the water being free to pass around the steam-heads and come in contact with the pipes 20 and to pass through the pipes 21, substantially as described.

3. In a steam-heater for railway-car-heating



apparatus, the combination, with an inclosing jacket or body portion having a water inlet and outlet in its respective ends, of steam-heads, each composed of two separable  
5 flanged disks, steam-pipes arranged between said steam-heads and having communication with the steam-chambers therein, concentric water-conducting pipes traversing said steam pipes and chambers and passing entirely  
10 through the steam-heads, and a steam inlet and outlet, the steam-heads being arranged

concentrically in the jacket to provide an annular water-passage between their edges and the inner face of the jacket, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

EDWIN A. LELAND. [L. S.]

Witnesses:

CLARKSON A. COLLINS,  
BENJAMIN BARKER, Jr.