

(No Model.)

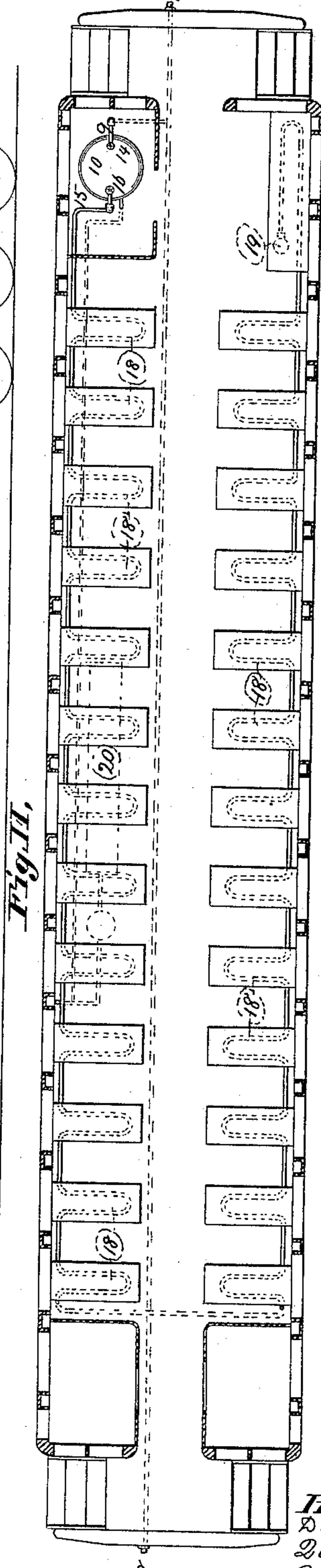
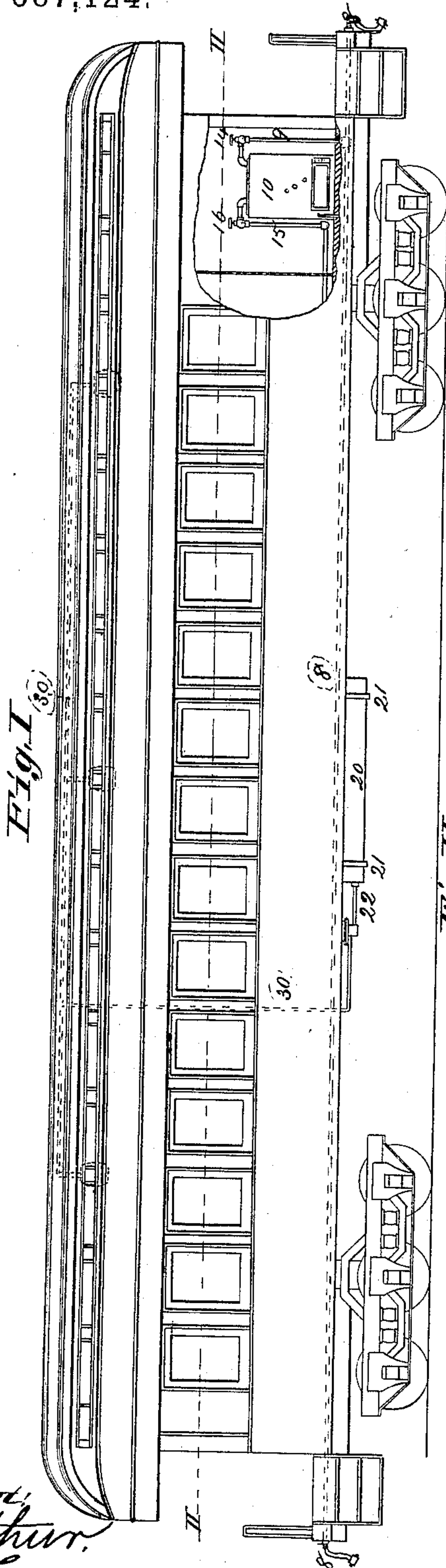
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D. J. TIMLIN & O. B. HEIDINGER.

CAR HEATING APPARATUS.

No. 387,124.

Patented July 31, 1888.



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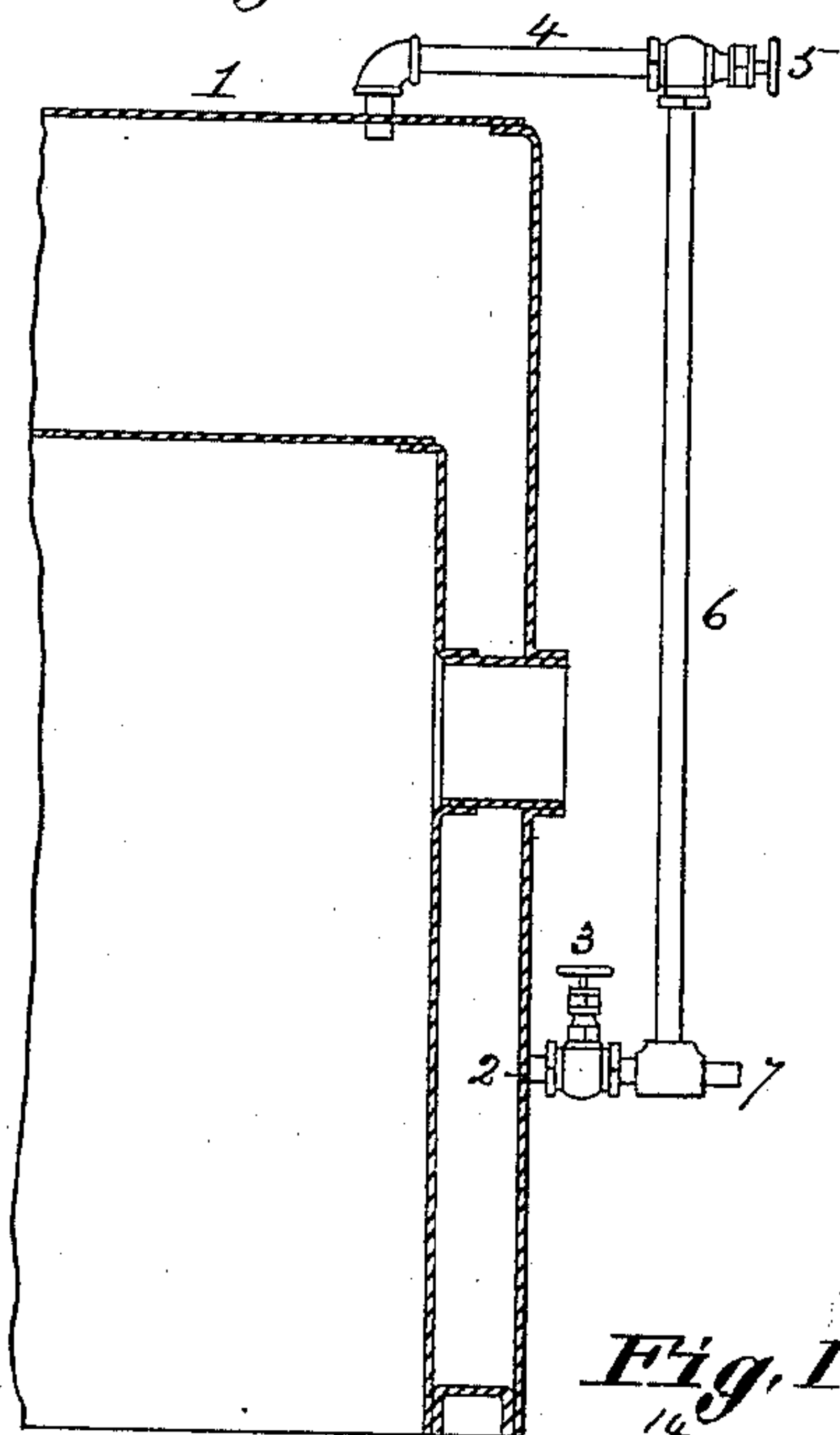
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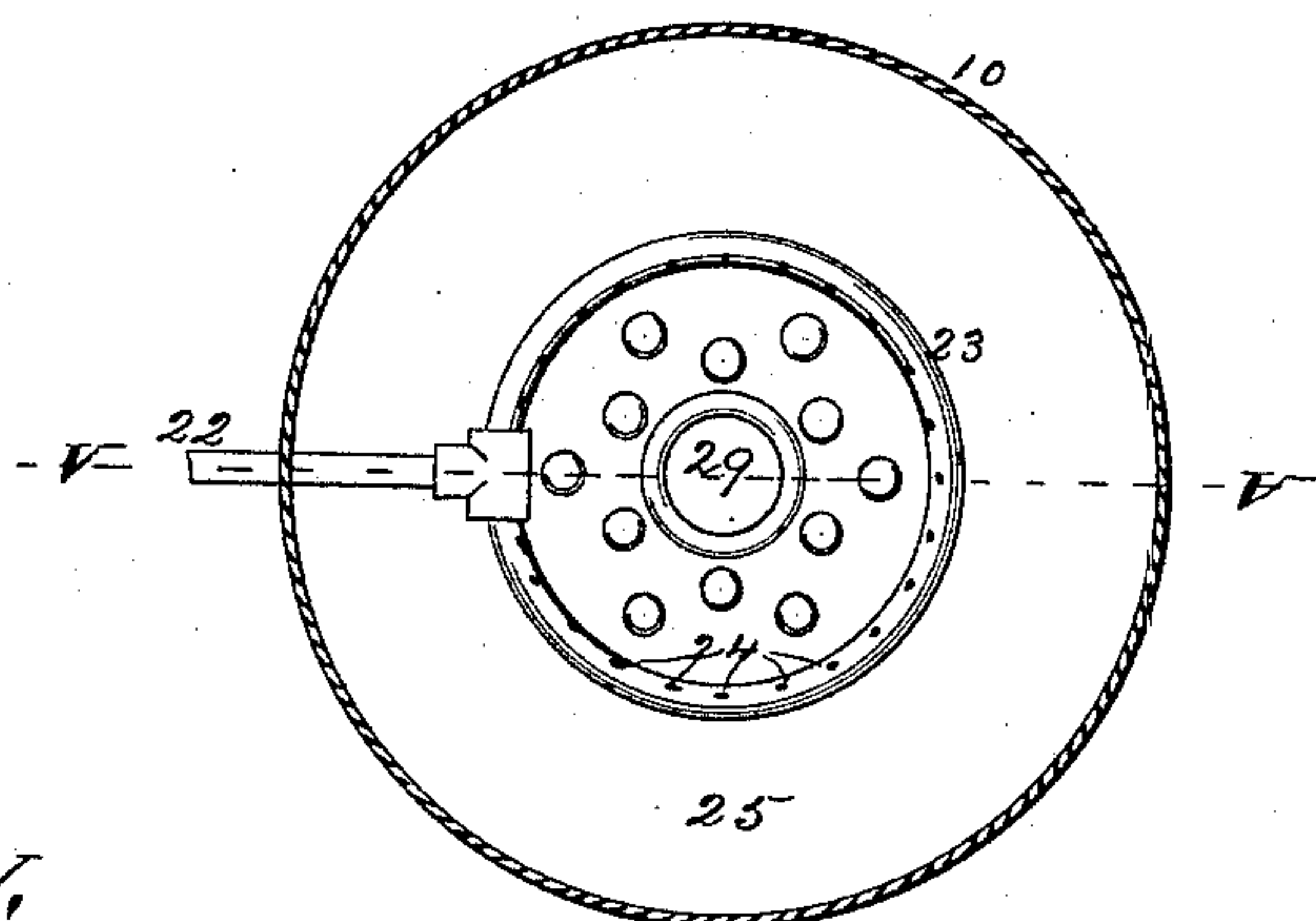
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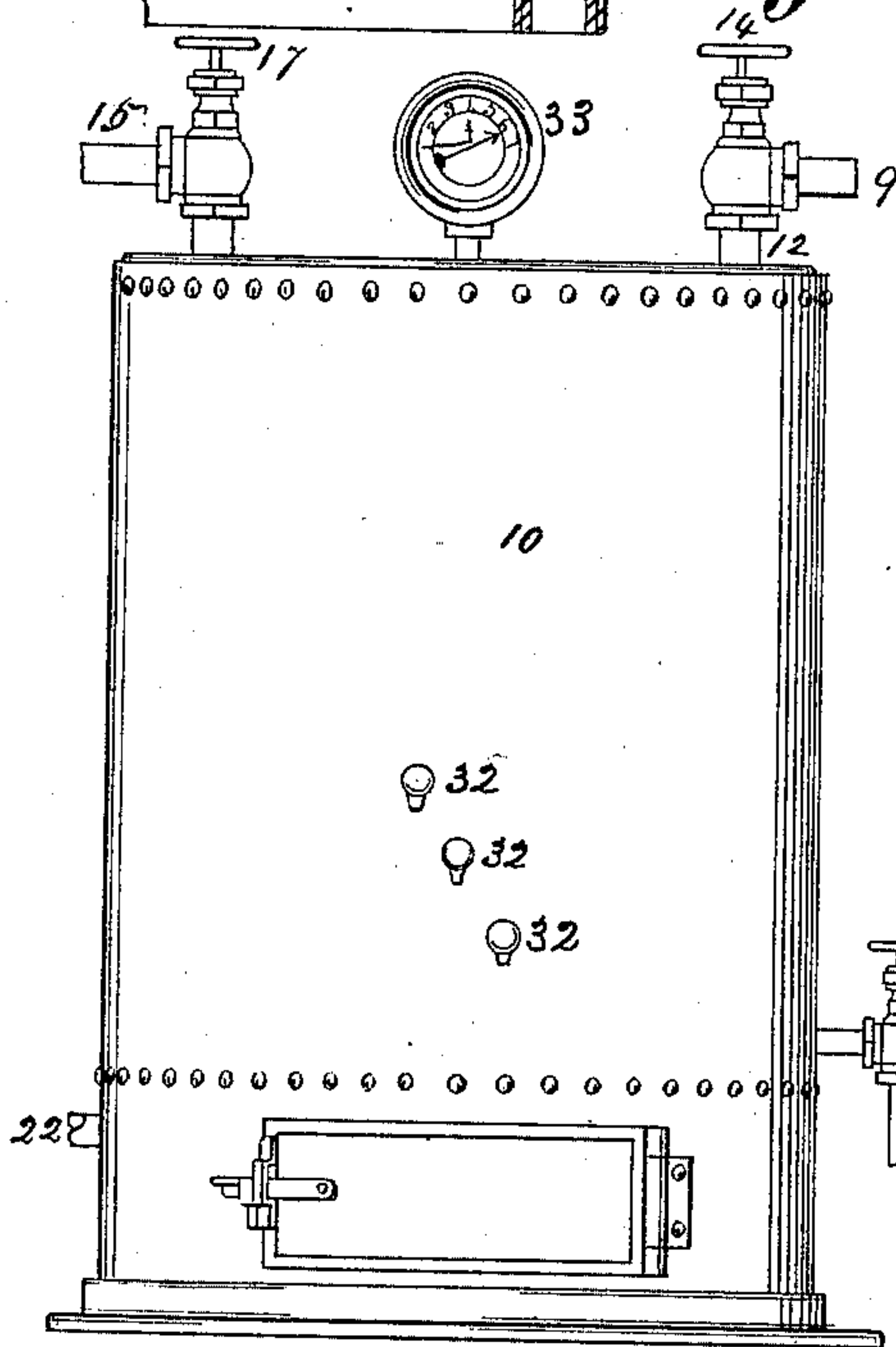
*Fig. III.*



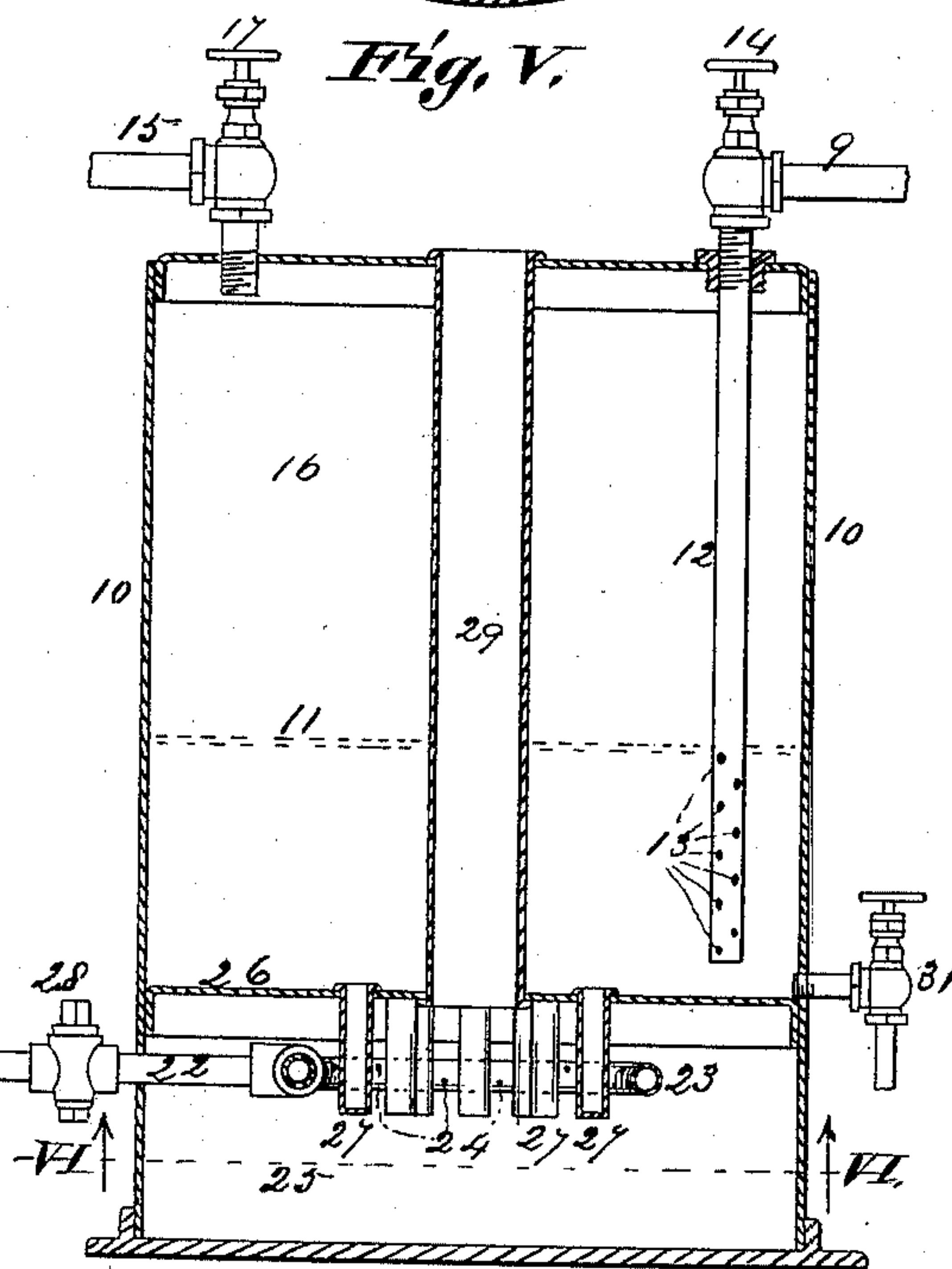
*Fig. VI.*



*Fig. IV.*



*Fig. V.*



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# UNITED STATES PATENT OFFICE.

DAVID J. TIMLIN AND QUITO B. HEIDINGER, OF BELLEVILLE, ILLINOIS.

## CAR-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 387,124, dated July 31, 1888.

Application filed December 20, 1887. Serial No. 258,499. (No model.)

*To all whom it may concern:*

Be it known that we, DAVID J. TIMLIN and QUITO B. HEIDINGER, of Belleville, in the county of St. Clair and State of Illinois, have  
5 invented a certain new and useful Improvement in Car-Heating Apparatuses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This apparatus is designed to prevent the possibility of accident from fire while the car is in motion or at rest for several hours only by the absolute exclusion of fire from the car  
15 for heating purposes, either while in motion or while at rest for a period of several hours at a time. When necessary, however, to warm the cars for a longer time than three hours, the danger from fire is reduced to a minimum by  
20 the use of common city illuminating-gas as a means of heating water to generate the steam for warming the car. This auxiliary method is only used when from any unusual cause the car or cars are required to be separated  
25 from the locomotive for more than two or three hours in extreme cold weather.

Heretofore in the application of steam taken from the locomotive for the purpose of heating cars difficulty has been experienced from  
30 the waste of heat, and also from the fluctuation of temperature in the car to be heated, caused by the unequal supply of steam to the radiating pipes while the car is in motion and from the constant fall of temperature while  
35 the car is temporarily separated from the locomotive for any considerable period of time.

To avoid all these difficulties, our invention consists in so applying steam to the heating of cars as to prevent any waste of heat, all parts  
40 of the apparatus being contained within the car to be heated, except a small portion of the ends of the pipes and the couplings, and also so as to secure a uniform temperature both while running and when at rest. We accomplish these ends by the use of a large steam-storage chamber located within the car to be heated, which storage-chamber receives the live steam direct from the locomotive, and, having first stored a sufficient quantity of live  
50 steam, distributes it uniformly as required. The construction is such as to render each car capable of being heated from the loco-

motive either independently of or in connection with the other cars of the train. To provide for the contingency that the car or cars may be  
55 required to be separated from the locomotive for a longer time than about three hours in extreme cold weather, the storage-chamber is so constructed that it may also be used as a steam-generator and supplied with hot water  
60 from the locomotive water-space before the separation of the car and locomotive, and is capable of being heated by a gas burner or burners placed beneath it and supplied from a reservoir containing city gas under a pressure of about three hundred pounds to the  
65 square inch and located beneath the car and governed by proper automatic regulating-valves to control the supply of gas, and supplied with an automatic cut-off cock to automatically shut off the supply of gas in case of  
70 accident.

Figure I is a side view of a railway car containing our improvement. Fig. II is a horizontal section at II II, Fig. I. Fig. III is a  
75 detail vertical section showing the connection of the pipe to the locomotive-boiler. The tender of the locomotive is not shown. The main supply-pipe is insulated and boxed to prevent loss of heat by radiation, being carried  
80 at any convenient place upon the tender and joined to locomotive and car with the ordinary flexible coupling used for air-brakes. Fig. IV is an elevation of the storage-chamber or boiler within the railway-car. Fig. V is a  
85 horizontal section of the storage-chamber or car-boiler at V V, Fig. VI. Fig. VI is a vertical section at VI VI, Fig. V.

At 1 is shown a part of a locomotive-boiler.

2 is a pipe connecting with the water-space  
90 of the locomotive-boiler 1, the use of which is auxiliary and convenient under certain circumstances, hereinafter noted.

3 is a valve by which the pipe 2 may be opened or closed.

4 is a pipe connecting with the steam space or drum of the locomotive-boiler, furnished with a steam-pressure gage, (not shown,) and  
5 is a valve by which the pipe 4 may be closed.

6 is a pipe connecting the pipes 2 and 4  
100 upon the outside of the valves 3 and 5 and connecting with pipe 7, so that pipe 7 may be used either as an extension of pipe 4, or, when desired, it may be used as an extension of pipe



2, pipe 7 also extending from the pipe 6 to a pipe, 8, upon the railway-car. The pipes 7 and 8 are connected by the ordinary flexible coupling used for air-brakes, which serves the double purpose of conducting the steam through a non-radiating body, thus preventing loss of heat, and also the purpose of a safety-valve, since the coupling will be disrupted by the pressure of the steam before any other part of the apparatus, thus preventing the overcharging of the storage-boilers from the locomotive by any accident or inattention on the part of the engineer. This coupling will allow the independent movement of the car and locomotive incident to running. The pipe 8 is shown extending from end to end of inside the car, and is connected with a similar flexible coupling, as before, at 8, Fig. I, to a similar pipe on another car of the train.

9 is a branch pipe extending from the pipe 8 to the car storage chamber or boiler. This storage-chamber is provided with a steam-gage, and is made of boiler-iron and capable of resisting a high degree of pressure. It may be of any convenient shape; but in practice we make it in the common cylindrical form of a boiler about eighteen inches in diameter and about fifty inches in height. To provide for the contingency that it may be necessary to heat a car when detached from the locomotive for more than two or three hours in extreme cold weather, this storage-chamber may be made so as to act as a steam-generator, to be operated as hereinafter described, and in practice we so construct it. The branch pipe 9 is carried into the storage chamber or boiler—say above the top of the boiler, as shown. The pipe has a part, 12, extending downward into the chamber or boiler, where it may have a number of holes, 13, from which its contents can be carried into the storage-chamber. The branch pipe has a valve, 14, by which the pipe may be closed. If the valves 3 and 31 are open and the valve 5 closed, water will escape from the locomotive-boiler to the car-boiler by reason of the pressure of the steam in the locomotive-boiler, (this is never done except in the contingency, to be noted hereinafter, when the car is to remain for hours detached from the locomotive in extreme cold weather;) but if the valve 3 is closed and the valve 5 opened (the valve 14 remaining open) steam alone from the locomotive will pass into the steam-chamber or car-boiler.

15 is a pipe whose end connects with the steam-space 16 of the car-boiler, and which has a valve, 17. The pipe 15 extends along both sides of the interior of the car and has a U-bend, 18, beneath each seat. The pipe 15 does not return the water of condensation to the storage-chamber; but the other end of the pipe from that connected with the storage chamber or boiler has a valve and a water-trap of any suitable construction, (shown in broken lines at 19.) This trap allows the es-

cape of the water which forms in the heating-pipes as the result of condensation.

While the locomotive and cars are coupled together steam at a high temperature and pressure constantly passes from the locomotive-boiler into the car storage chamber or boiler, and is there stored in suitable quantity and of lower pressure than in the locomotive, and thence it is distributed to the car through pipes 15 and bends 18. By first storing the steam within the car and then distributing it over the car by the radiating-pipes, which do not return the water of condensation to the boiler, we are able by a small supply of live steam—say from three to five pounds pressure (which amount the locomotive is always capable of supplying without injury to its own effectiveness)—to keep up an undiminished supply of steam in the storage-boilers and distribute it with perfect regularity at all times while the train is in motion.

While the car is in motion live steam from the locomotive-boiler is thus constantly stored in the car storage chamber or boiler, and whatever water of condensation forms within these chambers may from time to time be discharged therefrom through valve 31. Whatever heat is radiated from the storage-chamber or main supply-pipe becomes, by reason of the location within the car, effective in heating the car. This saving of heat insures the effectiveness of the apparatus.

In order to provide for occasions when the car may require to be heated independently of the locomotive when disconnected therefrom for hours at a time, either by accident or design, we have made the storage-chamber capable of being used as a steam-generator, and have provided a safe means of heating it by the use of common city gas stored in cylinders carried under the car, as follows:

20 is a tank capable of resisting a high pressure. This may properly be attached to the bottom of the car by straps 21. This tank is filled with city gas at a high pressure.

22 is a pipe leading from the tank or reservoir 20 to a circular pipe, 23, having jet-holes 24. The jet-pipe 23 is within a combustion-chamber, 25, beneath the bottom sheet, 26, of the storage chamber or boiler. The bottom sheet has a number of tubes, 27, depending from the plate and closed at the lower ends. The tubes are open at the upper ends to the water-space of the boiler, so that they are constantly filled with water. These depending tubes are shown only within the circle of the jet-pipe, and the jet-holes of the pipe are shown upon the inner side, so that the jets are thrown toward or against the depending tubes and rapidly heat the water within them; but the depending tubes may be located outside the circle of the jet-pipe also, if desired. The pipe 22 has a cock or valve, 28, by which it may be stopped or the passage of gas limited, as may be desired.

29 is the vertical flue passing up through



the center of the boiler, which serves to draw the jets of flame about the depending tubes.

The car storage chamber or boiler 10 is also provided with a safety-valve (not shown) to prevent the accumulation of too great an amount of steam generated and stored. By this process it is also provided with try-cocks 32 (or a water-glass) to regulate the amount of water which shall be supplied from the locomotive to the chamber when it is anticipated that it will be necessary to use the storage-chamber as a steam-generator.

The gas-tank 20, made of boiler-iron, is supplied with gas at a pressure of about three hundred pounds to the square inch, and fitted with an automatic supply-pipe, 22, and an automatic gravity-cock to shut off the flow of gas in case of the upsetting of the car from being run into while at rest, or from any accident. The gas may also be used to illuminate the car, and will be shut off automatically by the cut-off valve in case of accident, as before stated.

Having now described the arrangement of the different parts of our apparatus, we will describe how the same is operated under the various conditions under which it is designed to be used—to wit, first, while attached to the locomotive; second, when detached from the locomotive for a period of time not exceeding about three hours in extreme cold weather; and, third, when it is necessary to heat the car for a longer period than about three hours.

First. As soon as a train equipped with this apparatus is made up and the locomotive attached, the steam-valve 5 is opened, (the water-valve 3 being closed.) The steam from the locomotive (the pressure of which is indicated to the engineer by the steam-gage, not shown) passes into pipe 6 7, steam-couplings and pipe 8 into branch 9, valve 14 being open, and into the storage-chamber 10 through pipe 12 and openings 13. The valve 17 being open, the steam passes through pipe 15 into radiating-pipes 18, driving out the water of condensation remaining in the radiating-pipes and through the trap 19. Valve 31 is also opened to let off any water of condensation which may have formed and remains in the storage-boiler 10, after which valve 31 is closed and trap 19 arranged so as not to be blown out, but still permitting the water formed by the condensation of the steam to pass through. The car being now warm, valve 17 may be closed or opened, as may be desired, to regulate the amount of heat required in the radiating-pipes 18. When the storage-chamber 10 is sufficiently charged—say with a pressure of twenty to thirty pounds—the engineer partially closes valve 5 and reduces the pressure from the locomotive to about three to five pounds, which amount is found sufficient to supply the heat lost by ventilation of the cars while in motion. With this constant slight pressure and supply from the locomotive the cars may be kept at a uniform temperature so long as the locomotive is attached to the train.

Second. When it is required to heat the car several hours only while detached from the locomotive, the storage-chamber 10, having been emptied of any water of condensation which may have collected therein by opening valve 31, is charged with live steam at from twenty to eighty pounds pressure, as the case may require. Valve 31 having been closed, valve 14 is also closed and the coupling unfastened from the locomotive. The entire apparatus being within the car to be heated, the car can be kept warm for hours, even in the coldest weather, by distributing the steam stored in the storage-chamber through the valve 17.

Third. When it is apprehended that the car may require heating for a longer time than about three hours in extreme cold weather, the valve 5 is first closed and the valve 3 is opened, valve 14 being also opened, when the hot water in the locomotive-boiler by the pressure of the steam in the locomotive will be forced into the pipes 7 and 8, and thence into the storage-chamber to the desired height—say to the height of one of the try-cocks 32. When sufficient hot water has been stored, the valve 3 is then closed and the valve 5 again opened, and the storage-chamber, thus partially filled with hot water from the locomotive, is then charged with steam, as before, to, say, from twenty to eighty pounds pressure, as required, and the valves 5 and 14 closed and the car uncoupled, as before. The gas-burner is then lighted and steam generated, as required, for an indefinite period, or until the water in the car-boiler is exhausted.

While we have described our invention and particularly shown its efficiency by applicability to railway-cars, it is to be understood that the same may with equal facility be applied to the heating of any apartment or apartments when a steam-boiler is available.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is as follows:

1. In a heating system, the combination, with a steam-generator and a vessel or boiler forming part of said system, of a pipe or pipes communicating with said vessel or boiler and with the water and steam spaces of the generator respectively, substantially as described.

2. In a heating system, the combination, with a steam-generator and a vessel or boiler forming part of said system, of a pipe or pipes communicating with said vessel or boiler and with the water and steam spaces of the generator respectively, and an independent heater in connection with said system, whereby the said vessel or boiler may act either as a steam-heater or a generator, substantially as described.

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Witnesses:

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