

(No Model:)

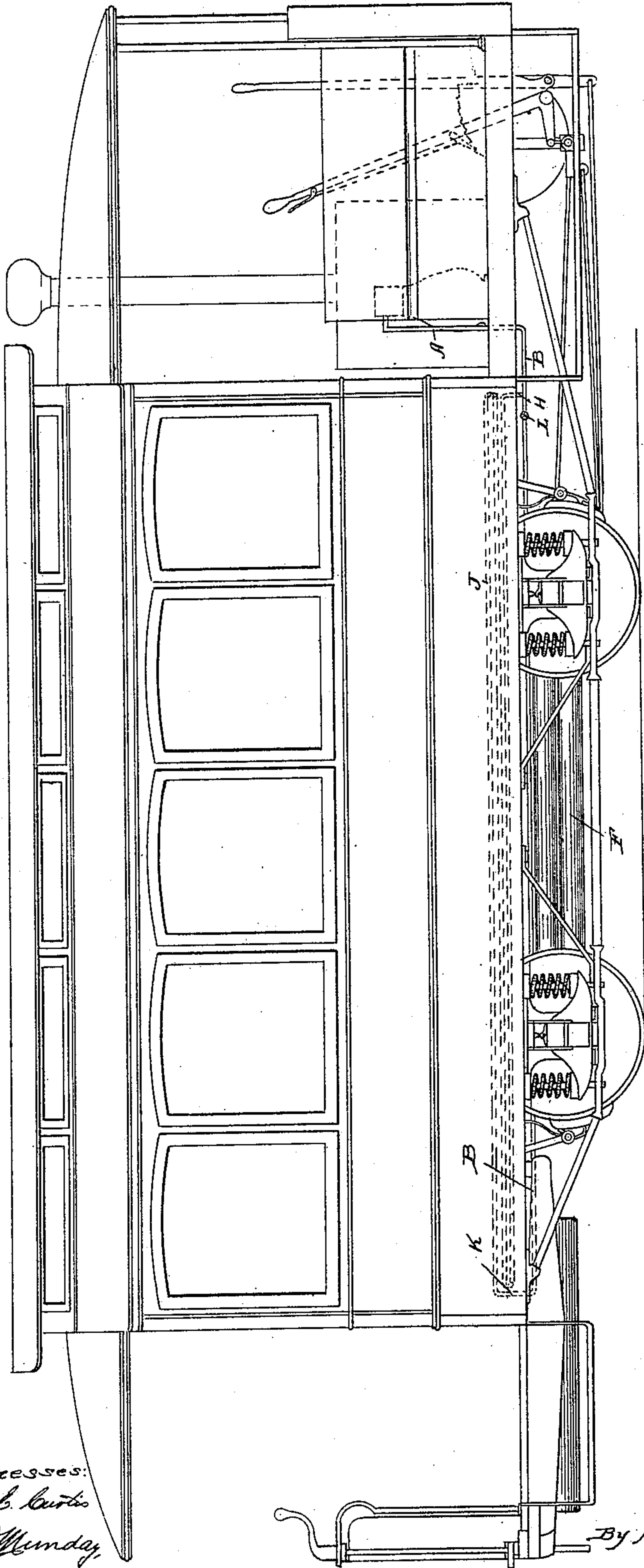
2 Sheets—Sheet 1.

E. PROUTY.  
STEAM CONDENSING APPARATUS.

No. 467,236.

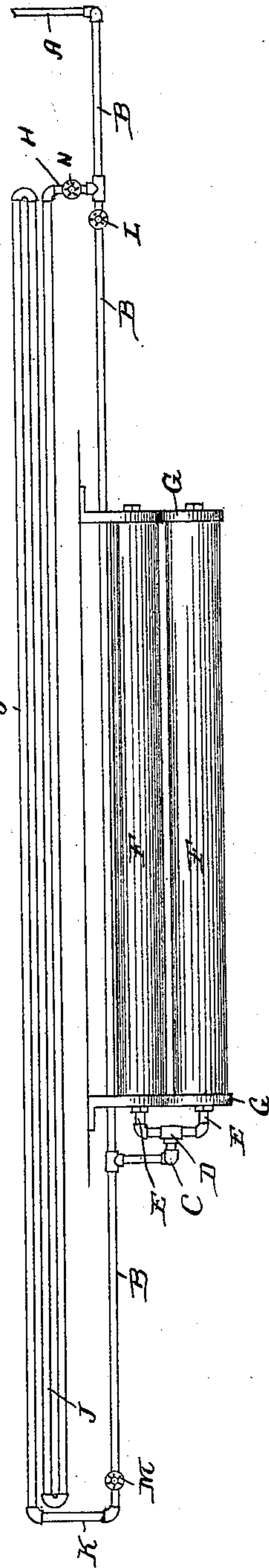
Patented Jan. 19, 1892.

Fig. 1.



Witnesses:  
Geo. C. Curtis  
A. W. Munday

Fig. 2.



Inventor:  
E. Prouty  
By Munday, Everts & Adcock,  
his Attorneys.

(No Model.)

2 Sheets—Sheet 2.

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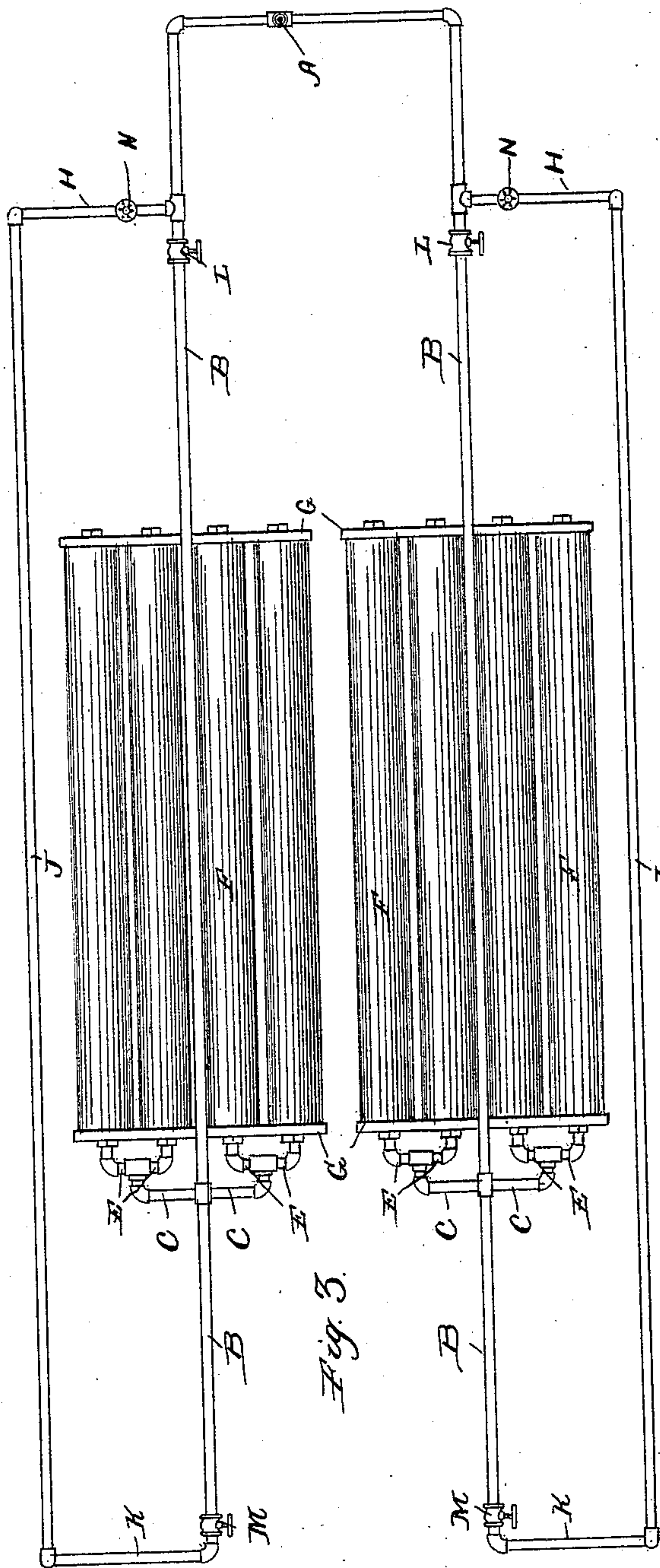


Fig. 3.

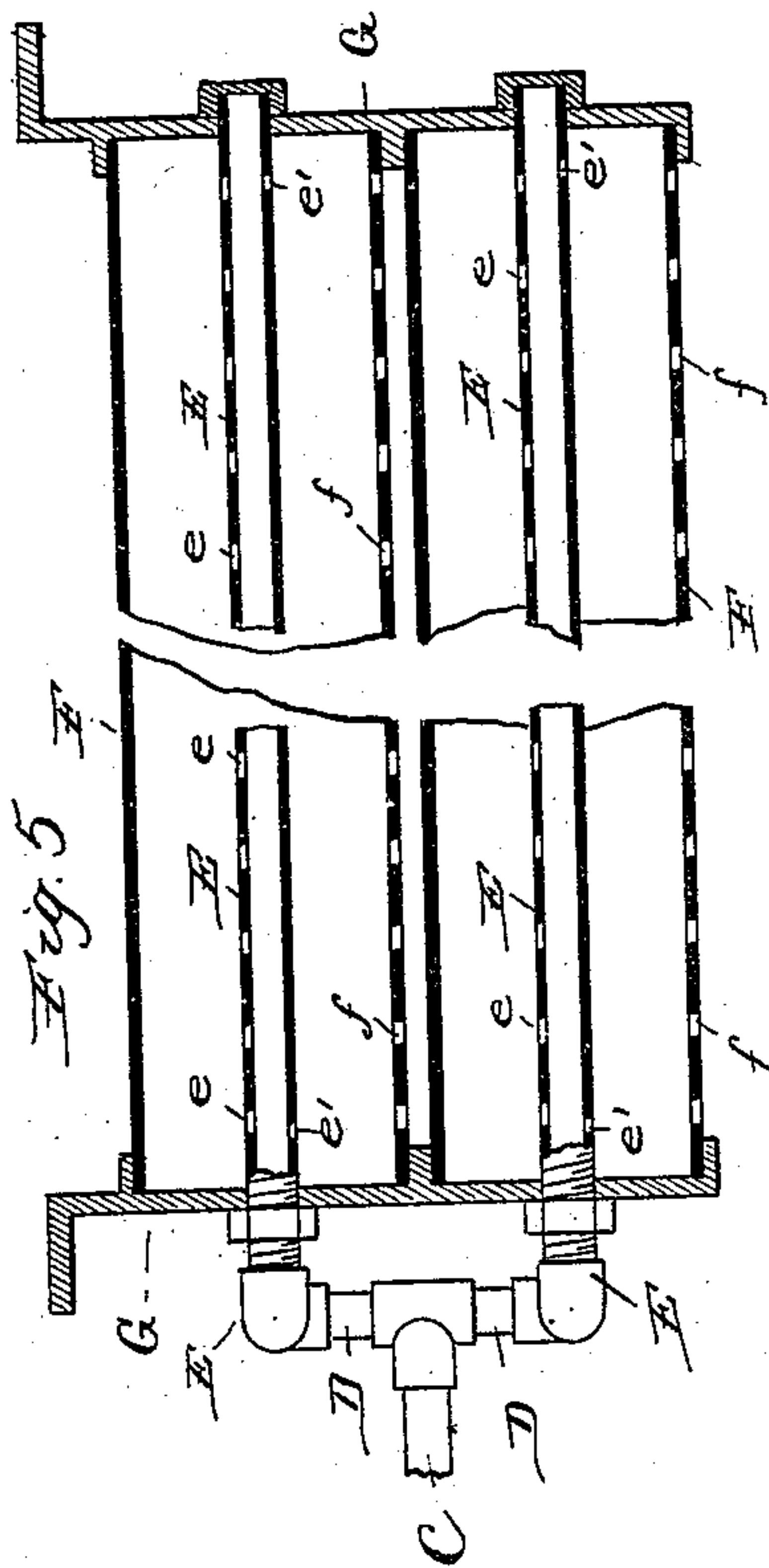


Fig. 5.

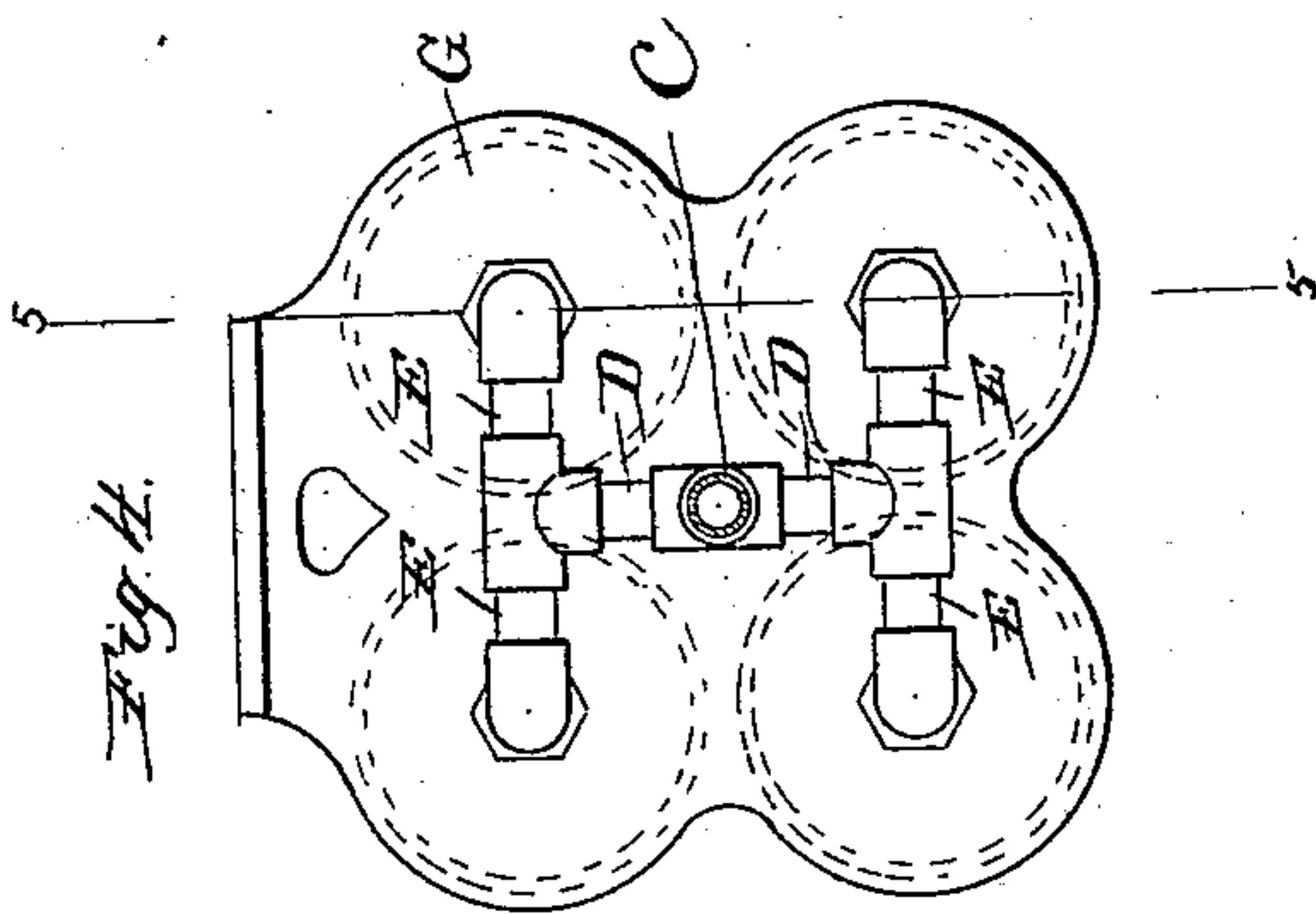


Fig. 4.

Witnesses:  
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Inventor:  
Enoch Prouty  
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His Attorneys.



# UNITED STATES PATENT OFFICE.

ENOCH PROUTY, OF CHICAGO, ILLINOIS.

## STEAM-CONDENSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 467,236, dated January 19, 1892.

Application filed July 17, 1891. Serial No. 399,816. (No model.)

*To all whom it may concern.*

Be it known that I, ENOCH PROUTY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Steam-Condensing Apparatus for Locomotive Street-Cars, of which the following is a specification.

This invention relates, primarily, to a steam-condensing apparatus especially useful in connection with street locomotives and cars, where it is desirable that there should be no show or noise of escaping steam, and, secondarily, to the combination, with a steam-locomotive street-car or passenger-vehicle provided with the improved condenser, of steam-pipes for warming the interior of the car, connected to the condenser in such manner that steam from the engine on the car may at will be made to pass either directly to the condenser in warm weather or first through the heating-pipes for warming the car in cold weather and thence to the condenser.

One of the reasons, if not the chief, why steam-engines have not been employed mounted upon street-cars as the motive power for driving the car has been the noise and show of escaping steam, which, especially in crowded streets, has been such a source of annoyance to the people themselves and a cause of fright to horses that the steam-engine has never come into favored use for this purpose.

By means of the present invention I am able to use the ordinary small-sized high-pressure boiler and engine upon a street-vehicle without any noise and with practically no show of escaping steam. The principle of the condenser by means of which I accomplish this purpose is the confining of the steam in pipes which are divided into branches until finally the pressure of steam in the ultimate branches is so diminished that it will no longer blow out with a noise. In the practical application of this principle I lead the escape-pipe of the engine to some convenient point in the car, usually underneath the car-body, there divide it into two branch pipes of the same or about the same diameter, repeating this division as often as may be desired in the same manner, until a final series of pipes is reached where the pressure of the

steam is practically that of the external atmosphere, when the steam will escape from said final pipes without any noise. To facilitate the escape, I prefer that the final pipes should be perforated along their lengths, and to avoid all show of steam I prefer to surround said final pipes with a casing perforated below for the escape of the water of condensation.

For warming the car in cold weather I provide a congeries of steam-pipes connected to said exhaust or escape pipe and provided with a valve, so that the escaping steam may be made to pass through said heating-pipes and thence to the condenser or to pass directly to the condenser at will.

In the accompanying drawings, which form a part of this specification and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of a street-car with my apparatus applied thereto. Fig. 2 is a side elevation of the apparatus itself. Fig. 3 is a plan view of said apparatus. Fig. 4, upon a somewhat larger scale, is an end view of one of the groups of final jacketed branches, there being in the apparatus illustrated four of such groups; and Fig. 5 is a vertical section on the line 5 5 of the last-named figure.

In said drawings is shown a street-car provided with a steam-locomotive high-pressure engine, boiler, and motor mechanism, none of which need be here described, and any of which parts or devices may be of well-known construction. The condensing apparatus now about to be described is most conveniently carried under the floor of the car, as indicated in Fig. 1, and is constructed and arranged with special reference to being so carried in the form illustrated in the drawings.

Upon said drawings, A is a pipe connected to the exhaust of the engine. The pipe A is in turn connected to two branches B B, which in practice I make of the same diameter as the pipe A, although the diameter of these pipes may vary somewhat in either direction without materially interfering with the result.

I have observed that when steam under pressure escapes from a pipe or orifice into the open air or into another pipe or a chamber of considerably-increased capacity the



noise of escaping steam will be produced, whereas if the same steam escapes from the same orifice into two pipes, each of practically the same diameter as the orifice, no noise  
 5 whatever will result. Just how great a variation in the diameter of the pipes may be made without producing a noise I am not at present able to state, but am able to say that the pipes B may, on the one hand, be made of  
 10 somewhat larger dimensions than the pipes A, if desired, or, on the other hand, may be made of somewhat smaller dimensions. In the former case the steam will expand more rapidly and in the latter case less rapidly. I  
 15 prefer from my experience to make the pipes throughout the series described and to be described from the engine to the final branches of the same diameter.

The pipes B B are each divided into two  
 20 branches C C, which in turn are divided into two branches D D, and these again into two branches E E, so that in the instance illustrated there will be sixteen final pipes E of the same diameter as the original exhaust-  
 25 pipe A, in each of which the now expanded steam will be admitted with equal pressure, which pressure will not exceed or materially exceed that of the external air, for the steam is constantly escaping from these sixteen  
 30 final pipes. The final pipes E are shown to be perforated along their length in numerous holes *e* above, through which the escaping steam may pass, and also with drip-holes *e'* below, through which the water of con-  
 35 densation may drip.

As a further precaution against the show of steam or vapor I prefer to surround each of the final pipes E with a jacket F, perforated below with holes *f* to permit the ready  
 40 escape of the waters of condensation. By making the holes in the final pipes in the upper side of the pipes and the holes in the jackets in the lower side of the latter anything in the nature of a current which would  
 45 tend to blow into the outer air the vapor which may accumulate in the jackets is effectually avoided, and thus all exterior show of vapor prevented. These jackets may be  
 50 conveniently constructed in groups of four out of tubing headed and held at each end in position by the heads G G, which are formed with shoulders, sockets, and apertures suitable to receive and retain in position both the pipes and jackets and furnished with  
 55 flanges by means of which each group may be secured to the bottom of the car.

Connected to the pipes B B are shown the pipes H H, leading to the steam-heating coils J J inside the car, from whence pipes K K  
 60 lead back to the pipes B. Stop-valves L L

and M M are placed in the pipes B and similar valves N N in the pipes H. In order to send the steam directly to the condenser, the valves L are opened and the valves M and N closed. In order to send the steam through  
 65 the heating-pipes and thence to the condenser, the valves L are closed and the valves M and N opened. By a proper adjustment or partial opening of these valves, as will be readily understood, a portion of the steam may be  
 70 made to pass directly to the condenser and another portion, varied at pleasure, to the heating-pipes, so that the amount of heat given to the car may be regulated.

I claim—

1. The steam-exhaust condenser composed of branching branch pipes, having the final series of branch pipes perforated with holes along their length, substantially as specified. 75

2. The condensing apparatus for steam-lo-  
 comotive street-cars, consisting of the exhaust-  
 pipes divided into two branches, each of which  
 in turn is divided into two branches, which in  
 turn are divided into two other branches and  
 each again divided into two final branches,  
 85 each of which final branches is perforated and jacketed by a perforated jacket, substantially as specified. 80

3. The condensing apparatus for steam-lo-  
 comotive street-cars, consisting of the exhaust-  
 pipes divided into two branches, each of which  
 in turn is divided into two branches, which in  
 turn are divided into two other branches and  
 each again divided into two final branches,  
 each of which final branches is perforated  
 95 and jacketed by a perforated jacket, the jacketed tubes being arranged in four groups of four each underneath the car-body and between the wheels thereof, substantially as specified. 90

4. As a means for condensing steam, a series of pipes commencing with a single pipe, which branches into two pipes of substantially the same diameter as the single pipe and which division is repeated to a final series of pipes,  
 105 from which the steam escapes freely, substantially as set forth. 100

5. As a means for condensing steam, a series of pipes commencing with a single pipe, which branches into two pipes of substantially the  
 110 same diameter as the single pipe and which division is repeated to a final series of pipes, from which the steam escapes freely, said final series being perforated with lateral holes for the escape of the contents, substantially as  
 115 set forth.

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Witnesses:

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