

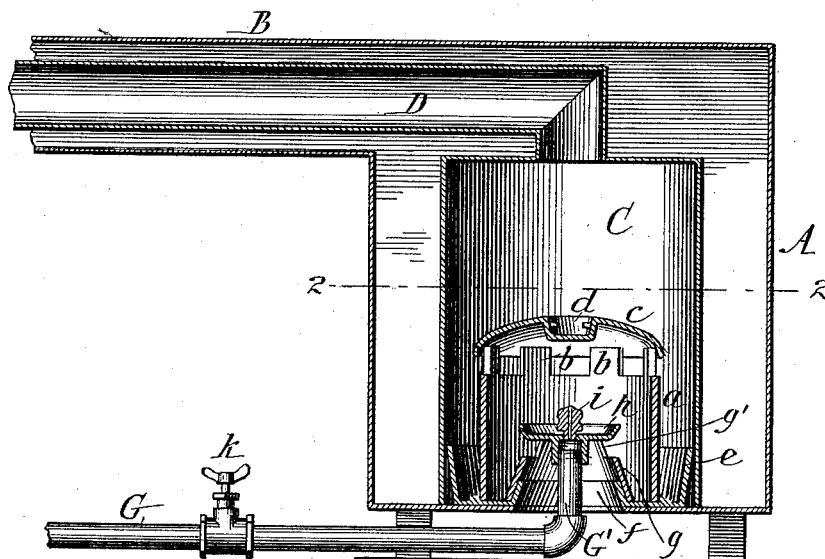
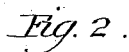
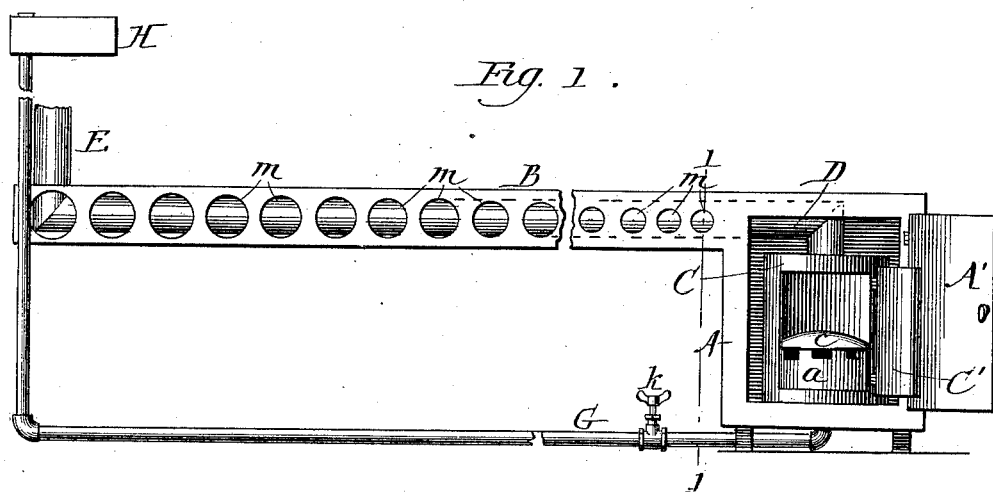
(No Model.)

3 Sheets—Sheet 1.

M. R. FLAGG.  
HYDROCARBON FURNACE.

No. 422,927.

Patented Mar. 11, 1890.



*Witnesses:*

Harry T. Jones.

Robert A. Millar.

*Inventor:*

Margaret R. Flegg.

(No Model.)

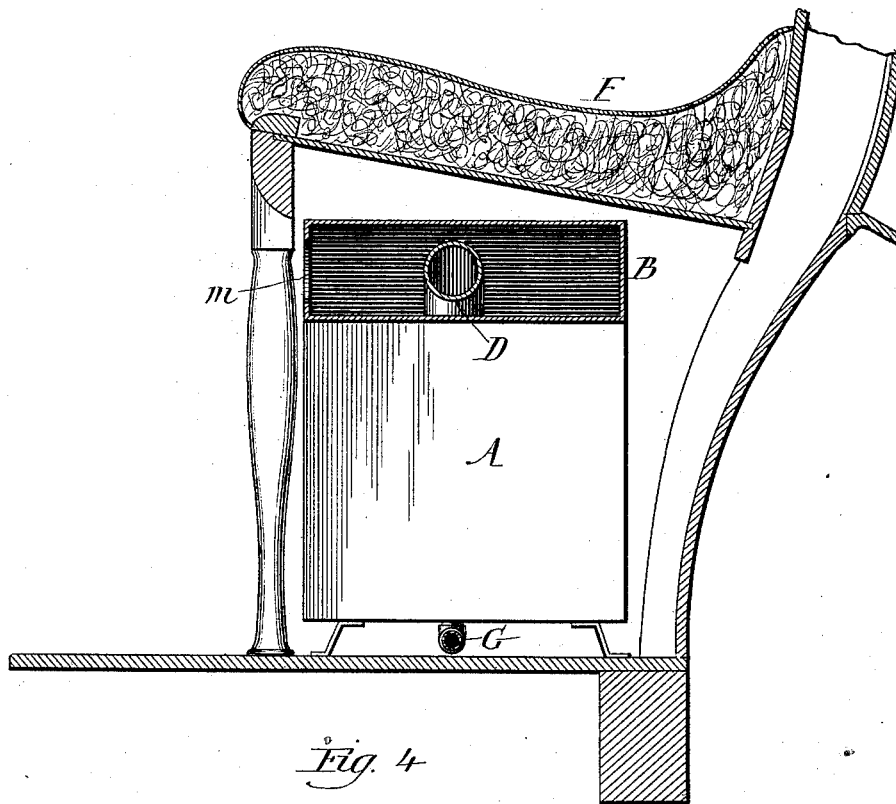
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HYDROCARBON FURNACE.

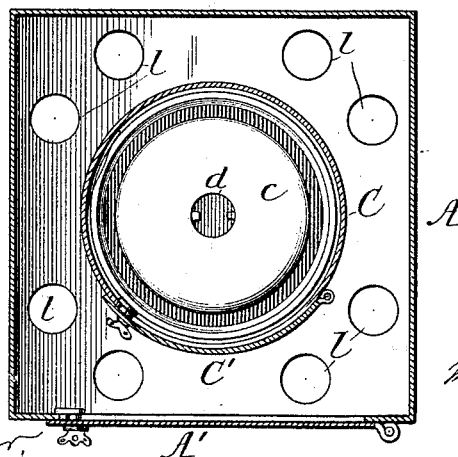
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*Fig. 3.*



*Fig. 4*



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(No Model.)

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*Fig. 5*

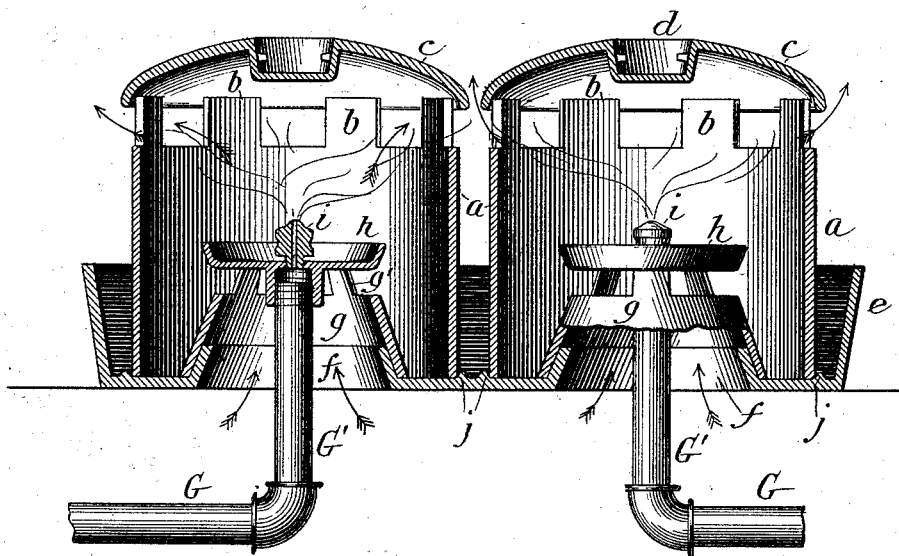
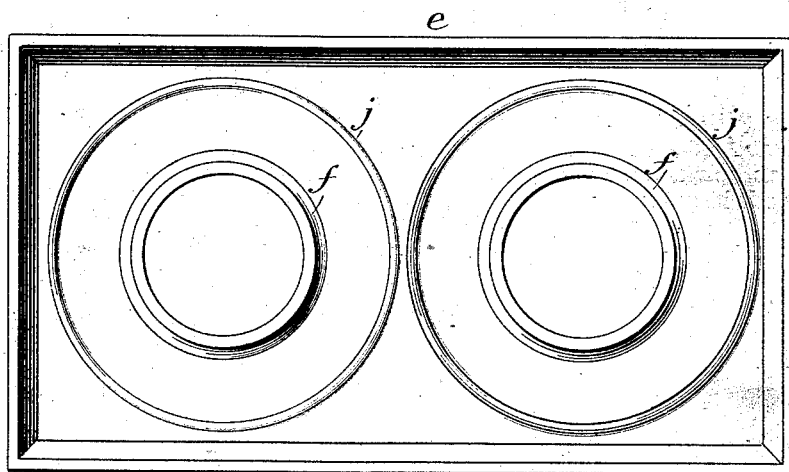


Fig. 6.



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# UNITED STATES PATENT OFFICE.

MARGARET R. FLAGG, OF CHICAGO, ILLINOIS.

## HYDROCARBON-FURNACE.

SPECIFICATION forming part of Letters Patent No. 422,927, dated March 11, 1890.

Application filed August 30, 1888. Serial No. 284,121. (No model.)

*To all whom it may concern:*

Be it known that I, MARGARET R. FLAGG, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Heaters, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation. Fig. 2 is a longitudinal section through the heater. Fig. 3 is a cross-section at line 1 1 of Fig. 1, and also a cross-section of a car-seat, showing the floor and a part of the side of an ordinary street-car. Fig. 4 is a horizontal section on line 2 2 of Fig. 2. Fig. 5 is a longitudinal vertical section of a double heater. Fig. 6 is a plan view of the bottom or base plate.

The object of this invention is to provide an efficient, simple, and cheap heater for street-railway cars; and its nature consists in the construction of the burner, and the arrangement of the case around the same, as hereinafter described, and pointed out in the claims.

In the drawings, A is the exterior casing or shell, having a door A'.

B is a horizontal extension of such shell passing along under the seat.

C is a burner-casing having a door C'.

D E are pipes or passages for the products of combustion.

F is the car-seat.

G is an oil-pipe.

H is an oil-reservoir.

a is a burner-shell.

b are projections on the top thereof.

c is a top or cap plate having a depression d for the application of a removing hook or handle.

e f are flanges on the base-plate.

g is a cone having upward projections g'.

h is an overflow-cup.

i is an oil-jet.

j are attaching or guide rings in the base-plate.

k is an oil-pipe valve.

l are air or vent holes in the bottom of the casing A.

m are holes or openings for the escape of heated air into the car from the horizontal section B.

The heater herein described is shown as

specially adapted for use in the cars of street-railways; but it may be adapted to or used for other purposes, and I do not confine myself to this special use.

The cases or shells A C, with the extension B and pipe D, are usually made of sheet-iron, while the cone g, the cap c, and the dish h are best made of cast-iron, although sheet-iron may be used for some or all of these parts. The base-plate is provided with flanges e f, as shown, so as to prevent the escape into the car or into the outer casing of any burning fluid that may overflow, and the interior flange f is made of sufficient diameter to admit of the proper inflow of air for supporting the combustion. The cylinder or burner-casing a is made to fit the base-plate closely, and is held in place on said plate by the beads or flanges j. Its upper end is provided with upwardly-extending parts or points b, between which the products of combustion escape into the casing C. The cap c rests upon these projections b, and is held in place by means of a short downwardly-projecting flange, or by other suitable means, as may be desired. It is also provided with a depression d, so that it can be removed by an appliance similar to a stove-hook. A knob, staple, or hook may be used in place of this depression for the purpose of readily removing said cover.

The oil-pipe G is provided with an upward extension G', which passes through the flange f and cone g centrally, and the overflow-dish h is screwed thereon, as shown. A jet i is screwed or otherwise attached to the upper end of the pipe G', which jet may be made of brass or other suitable material, and is provided with a small central vertical hole, through which the oil to be consumed is ejected. The force with which the oil is ejected into the burner is regulated by the height of the reservoir H and the valve k, which valve also regulates the quantity of the oil or other fluid in its flow to the burner.

The collar or cone g fits over the flange f, and is held in place without further attachment, and, as will be seen, the device is so simple in construction that there is no necessity for special fitting or connecting of the parts together other than assembling them, as shown.

The bottom of the exterior case A is provided with a sufficient number of holes to admit the exterior or cold air within the case, to be there heated, and the extension thereof B is provided at its front with a number of holes *m*, through which the heated air passes from the extension into the body of the car. These holes, as shown at Fig. 1, give the best results when graduated as there shown—that is, small at their commencement near the case A and increasing in diameter or size as they approach or reach the extreme end of the section B—and for the purpose of admitting air freely beneath the case A it is set up from the car-floor by legs or other convenient means, as shown in Figs. 2 and 3.

The case A is designed to be located in the middle of the car, or midway between the ends of the seats, and it will be evident that the extension B may extend both ways or to rear end of the car. Where the cars are short and are turned upon the turn-table, the heater A will be located near the front end, and a single extension B will be all that will ordinarily be required for such cars. For longer cars, and for extending the section B both ways from the middle, I prefer the double form of burner shown in Fig. 5, as in that case the movement of the car does not tend to force all of the heated air toward the rear end of the same when in motion, and when made double the base-plate may have its exterior flange *e* in the form shown in Fig. 6 and be furnished with two interior flanges *f*.

As shown in Fig. 5, the pipes G G' are duplicated; but this is not essential, as the pipe G for the second burner may be flanged or extended from the pipe of the first burner.

In operation the oil or other burning-fluid is admitted into the pipes G G' and flows through the jet-piece *i* in the form of spray, in which form it is ignited and continues to burn, although a part of said oil or other burning-fluid may, by reason of the heat of the burner, become largely or wholly vaporized before its final combustion. The oil is usually, however, spurted against the cap *c*, which soon becomes heated to a red heat, and is, when properly working, consumed above the dish-plate *h*; but in case of any overflow at the beginning, or in case of any spurting of the oil through between the projections *b*, it would be caught by the base-plate *e*, and in a very short time the burner will become sufficiently heated to consume it without injury to the burner or to its operation. The plate *h* also acts as a spreader for the air passing through the central opening within the flange *f*. By regulating the flow of oil a greater or less quantity can be consumed, and a lack of or intense heat can be produced, as desired; and air is admitted into the case A through the holes *l* in the bottom thereof, and, becoming heated, rises to the top and passes along the

extension B, and it is discharged out into the body of the car through the holes *m*. These holes being graduated or enlarged as they recede from the heater, the heated air is more evenly distributed through the car and the section of pipe which passes through this extension to the exit-pipe E to some extent heats the air within the extension.

The apparatus, being arranged beneath the seat, does not reduce the carrying capacity of the car and forms a very efficient heater, as I have determined by actual test.

The case A is shown square or rectangular; but it may be made round, oval, or of other form, as desired, and the jet-piece *i* may have several perforations, if desired, instead of a single one, as shown. As the burner is wickless, there are no wicks to be charred or to get out of order, and the burner is not liable to become overheated or injured if greatly heated.

Instead of a double burner with a single heater located in the center of the car, two heaters, each provided with a single burner, may be used, if desired, located at opposite ends of the car.

The burners shown in Figs. 5 and 6 are well adapted to be used in a cooking-stove, the stove being provided with holes to receive the pipes G.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. The combination of the flanged base-plate with the cylinder *a*, having projections *b b* at its top, the cone *g*, having projections *g'* at its top, the pipe G', overflow-dish *h* thereon, and jet *i*, substantially as described.

2. The combination, with the base-plate having the flanges *e f*, of the cylinder *a*, having projections *b b*, the cap *c*, resting on said projections, the pipe G', the cone *g*, resting against the flange *f*, the overflow-dish *h*, and the jet *i*, substantially as described.

3. The combination of the outer case A, the inner case C, having an outlet for products of combustion, the cylinder *a*, resting on a flanged base-plate, the cap *c*, resting on projections on the top of said cylinder, the pipe G', overflow-dish *h*, and jet *i*, secured to said overflow-dish, substantially as described.

4. The combination of the outer and inner casings A and C, the flanged base-plate having the guiding and attaching rings *j*, the cylinder *a*, resting upon and secured to said base-plate by said attaching-rings, the cone *g*, having projections from its top, the pipe G', the overflow-dish secured thereto, the jet *i*, and the cap *c*, resting upon the top of the cylinder *a*, substantially as described.

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Witnesses:

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