

E. BRADLEY & J. G. FULGHUM. Railroad-Car Heater.

No. 128,103.

Patented June 18, 1872.

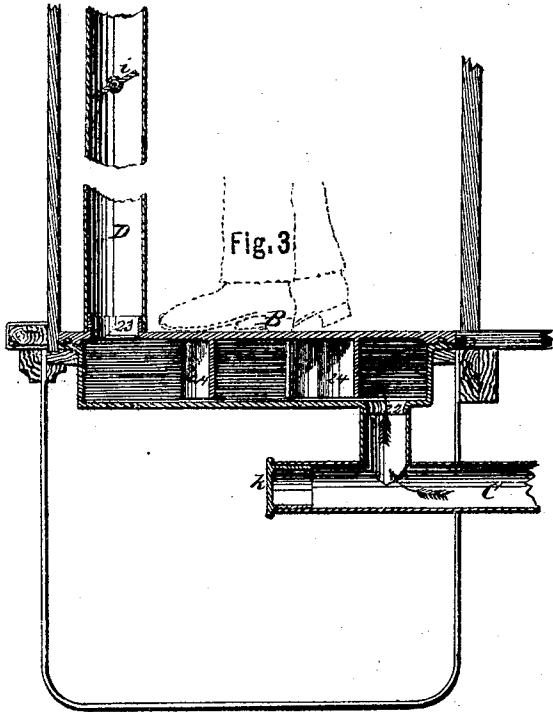


Fig. 3.

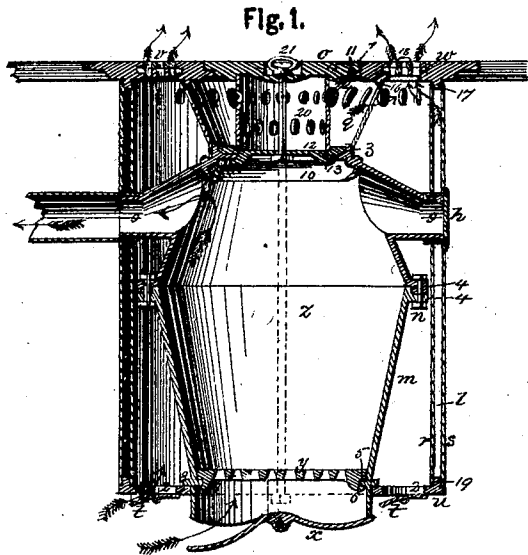


Fig. 1.

Fig. 4.

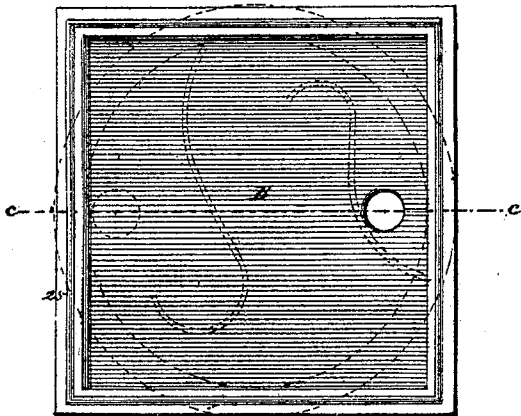


Fig. 5.

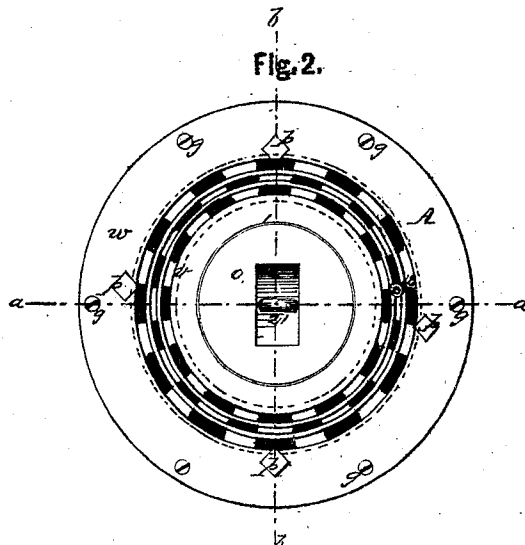
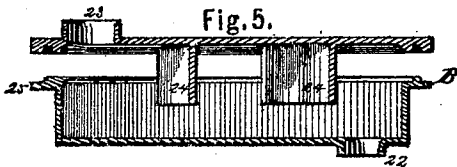


Fig. 2.

WITNESSES.

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Fig. 8.

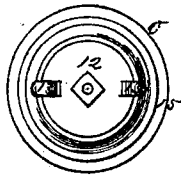


Fig. 7.

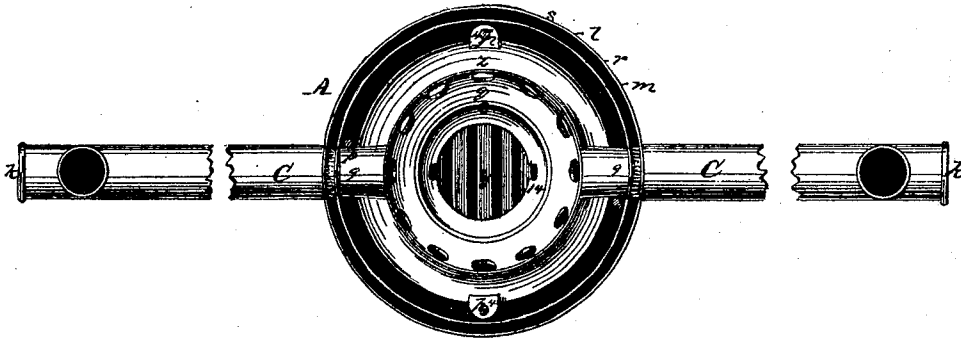
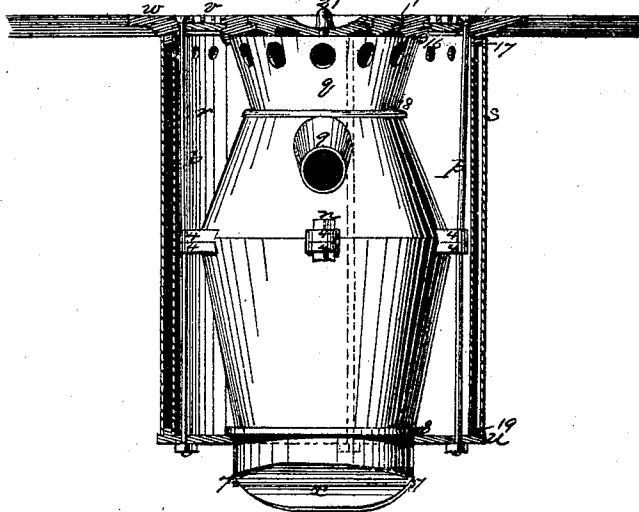


Fig. 6.



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UNITED STATES PATENT OFFICE.

EBENEZER BRADLEY AND JOHN G. FULGHUM, OF NASHVILLE, TENNESSEE,
ASSIGNORS OF ONE-THIRD OF THEIR RIGHT TO MERRILL G. PHILLIPS,
OF SAME PLACE.

IMPROVEMENT IN RAILROAD CAR-HEATERS.

Specification forming part of Letters Patent No. 128,103, dated June 18, 1872.

Specification describing an Improved Heater for Cars, &c., invented by EBENEZER BRADLEY and JOHN G. FULGHUM, both of Nashville, in the county of Davidson, State of Tennessee.

This invention relates to improvements in means for heating cars and other vehicles.

The furnace or stove is arranged beneath the floor, and surrounded at top and sides by an air-chamber within double walls, and securely closed by a double trap-door with lock-joint. The grate is securely locked in place, or it may be arranged to dump. The fire and air chambers are supplied with external air through openings furnished with self-reversing hoods or valves, and the heated air is discharged into the car through an annular register. The furnace has two smoke-discharge arms, leading, in the case of street-cars, to drums in the two platforms, for heating the driver. These drums are each furnished with a discharge-pipe with damper, so that the current may be confined to the front platform. The fuel is conducted through the air-space by a funnel, perforated, so as not to impede the circulation. The smoke is deflected from the feed-door by an internal flange or guide. The horizontal pipes are extended, and furnished with removable caps to facilitate cleaning them.

We thus produce a cheap, safe, and economical external heater, applicable without modification of cars, and serving to supply the interior with heated fresh air, and to warm the driver's platform by means of the "waste heat."

The drawing represents the apparatus applied to a street-car.

Figure 1 is a vertical longitudinal section of the furnace and fragments of the car-floor and smoke-flues. Fig. 2 is a plan of the same. Fig. 3 is a vertical longitudinal section of one of the drums, with contiguous portions of the car-platform and smoke-flues. Fig. 4 is a plan of one of the platform-drums detached and with cap removed. Fig. 5 is a vertical longitudinal section of both parts of a drum detached and separated. Fig. 6 is a vertical section of the furnace and contiguous parts in a plane at right angles to that of Fig. 1, the fire-pot and its funnel being shown in elevation. Fig. 7 is

a plan of the furnace detached from the car and with top removed. Fig. 8 is an under-side view of the furnace-door.

The lines *a a b b*, Fig. 2, indicate the planes of Figs. 1 and 6; *c c*, Fig. 4, the plane of Figs. 3 and 5.

Our improved heater, in its preferred complete form, is composed of a furnace or stove, A, Figs. 1, 2, 6, and 7, placed centrally in the floor of a car; and projecting beneath the same two drums, B, Figs. 3, 4, and 5, arranged in the platforms, flush with the floors of the same; and pipes C leading to said drums, and pipes D leading from the same through the roof of the car. The furnace A is composed of a cast fire-pot, *z*, with grate *y* and oscillating air-valve or hood *x* at its lower end; a floor-plate, *w*, containing an annular register, *v*, and a central fuel-opening, 1; a bottom plate, *u*, with air-apertures 2, furnished with valves or hoods *t*; two eccentric cylinders, *s r*, which may be of sheet metal, and form the sides; a funnel, *q*, surrounding the mouth 3 of the fire-pot, which funnel may also be of sheet metal; bolts *p*, uniting all these parts; and a double door or lid, *o*, closing the fuel-opening 1 in the floor-plate *w* and the mouth 3 of the fire-pot *z*. The fire-pot *z* is cast in two horizontal sections, constituting a flaring base and a reverberating dome, and with external perforated lugs 4, by which to unite these. This is accomplished, in part, by two of the bolts *p* passing through the side lugs. The other lugs receive short bolts *n*. The fire-pot is also cast with an internal notched flange, 5, at its lower end, to support the grate *y* and to receive the locking-hooks 6 of the same; and with lugs 7, to hinge its air-valve or hood *x*; and with an external flange, 8, to rest on the bottom plate *u*; and with two hollow arms, 9, to constitute smoke-discharges; and with an internal flange or smoke-guide, 10, above these and projecting downward, to deflect the smoke from the mouth or feed-door; and with an internal notched flange, 11, at its mouth, to form the seat of the lower disk 12 of the door or lid *o*, and to receive the locking-hooks 13 thereof.

The air-valves or hoods *x t* reverse automatically under the action of the wind or draught on their elevated ends, and serve to force fresh

air into the fire-pot *z* and the air-chamber *m* around the same, respectively. The former also serves to catch and retain the ashes, the greater weight of which on its horizontal wing facilitates reversing.

The floor-plate *w* is perforated and countersunk, to receive the bolts *p*; and furnished with a horizontal flange, 14, in its feed-opening 1, to receive the upper disk 15 of the lid *o*, so that its top shall be flush; and with annular flanges 16 17 on its under side, to support the walls *s r* and funnel *g*; and with the described annular register *v*. This register is for the discharge of the heated air into the car, and is formed by casting the said plate with an annular depression in its under side, with perforations and inwardly-projecting lugs, and introducing into this depression a properly-fitted ring, correspondingly perforated and notched, and turning this so as to bring said lugs and notches out of line, and then applying the knob 18. The annular bottom plate *u* has, in addition to its air-openings 2, perforations for the nut ends of the bolts *p*, and a circular flange, 19, on its upper side, corresponding with 16 on the under side of the floor-plate *w*, to support the walls *s r*. Between the said walls is a dead-air space, *l*, having vent through perforations at the top of the inner wall *r* into the air-chamber *m*. Said walls are also perforated to accommodate the smoke-discharge arms 9, which project through the same. The funnel *g* serves to prevent fuel falling into the air-space *m*, and is perforated at its upper edge, so as not to impede the circulation of air. The disks 12 and 15 of the door *o* are united by a perforated cylinder, 20, which may be of sheet metal, and an angular bolt, 21, furnished at top with a handle by which to lift the lid, and to turn the same in locking and unlocking it. The drums B may also be cast, being made in two sections, as represented, and furnished with tongue-and-groove joint to prevent leakage. They are preferably made square, but may be round in outline, as indicated by dotted lines in Fig. 4. For circulating the heated products of combustion, they are constructed with two smoke-collars, 22 23, diametrically opposite, and with alternating partitions 24, which may project either from the caps, as represented in Figs. 3 and 5, or from the base. They will present marginal flanges 25, and be supported by them, with or without fastening, flush with the floor. The driver will stand on these, and to give foot-hold the caps may be roughened. The pipes C are extended horizontally, and made with branches leading to the collars 22 of the drums B, and with caps *k* to their outer ends, by removing which the accumulated soot may be forced by a swab or scraper into the fire-pot whenever required. The pipes D extend above the roof, where they may be furnished with cowls. They may project from the edges instead of the tops of the drums, and be carried up in any suitable way. At convenient height they contain dampers *i*, by which the draught, and consequently the heat, may be

confined to the front or driver's platform. Where the car has but one platform the rear smoke-discharge arm 9 may be closed by a cap, *h*, Fig. 1. The furnace may be securely attached to the floor by bolts or screws *g*, Fig. 2, or their equivalent, so as not to be displaced by the overturning of the car.

With this precaution, the furnace being entirely external, and both door and grate locked, as described, the car would be as nearly as possible absolutely insured against fire from the stove.

The grate of the furnace or stove may be either stationary, as represented, or dumping. The dumping of the grate may be effected by means of a connection from above through the air-chamber.

In operation, fresh air, heated in the chambers *m l*, is discharged into the car through the register *v*, while the driver is warmed by the "waste heat" and escaping smoke passing through the drums B beneath his feet.

During the summer season the openings and registers in the floor of the car form efficient ventilators, the stove being removed or not, as preferred.

What we claim as new herein is—

1. The furnace A, having the double walls *s r*, with dead-air space *l*, fresh-air inlets 2, air-chamber *m*, and annular register *v*, surrounding the feed-door *o*, substantially as shown and described, for the purposes set forth.

2. The furnace A, composed of the cast sectional fire-pot *z*, floor-plate *w*, bottom plate *u*, cylinders *s r*, funnel *g*, bolts *p*, and door or lid *o*, constructed and combined substantially as shown and described.

3. The grate *y*, constructed with locking-hooks 6, as shown and described.

4. The automatic double air-valve or hood *x*, applied to the lower end of the fire-pot, and serving to collect the ashes and to insure a draught, substantially as shown and set forth.

5. The funnel *g*, as and for the purpose specified.

6. The door or lid *o*, composed of the disks 12 15, with locking-hooks 13, perforated cylinder 20, and handle-bolt 21, substantially as shown and described.

7. The register *v*, composed of an annular notched and perforated slide, a corresponding series of perforations in the floor-plate *w*, an annular depression in the under side of the same, lugs formed thereon, and a knob, 18, all as herein shown and described, for the purpose specified.

8. The smoke-drums B, arranged as supplemental heaters in the driver's platform or platforms of a street-car, in combination with the central furnace A and pipes C D, substantially as herein set forth, for the object stated.

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Attest:

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