3 Sheets—Sheet 1.

# G. KELLY.

## Heating Apparatus.

**No. 211,332.** **Patented Jan. 14, 1879.**

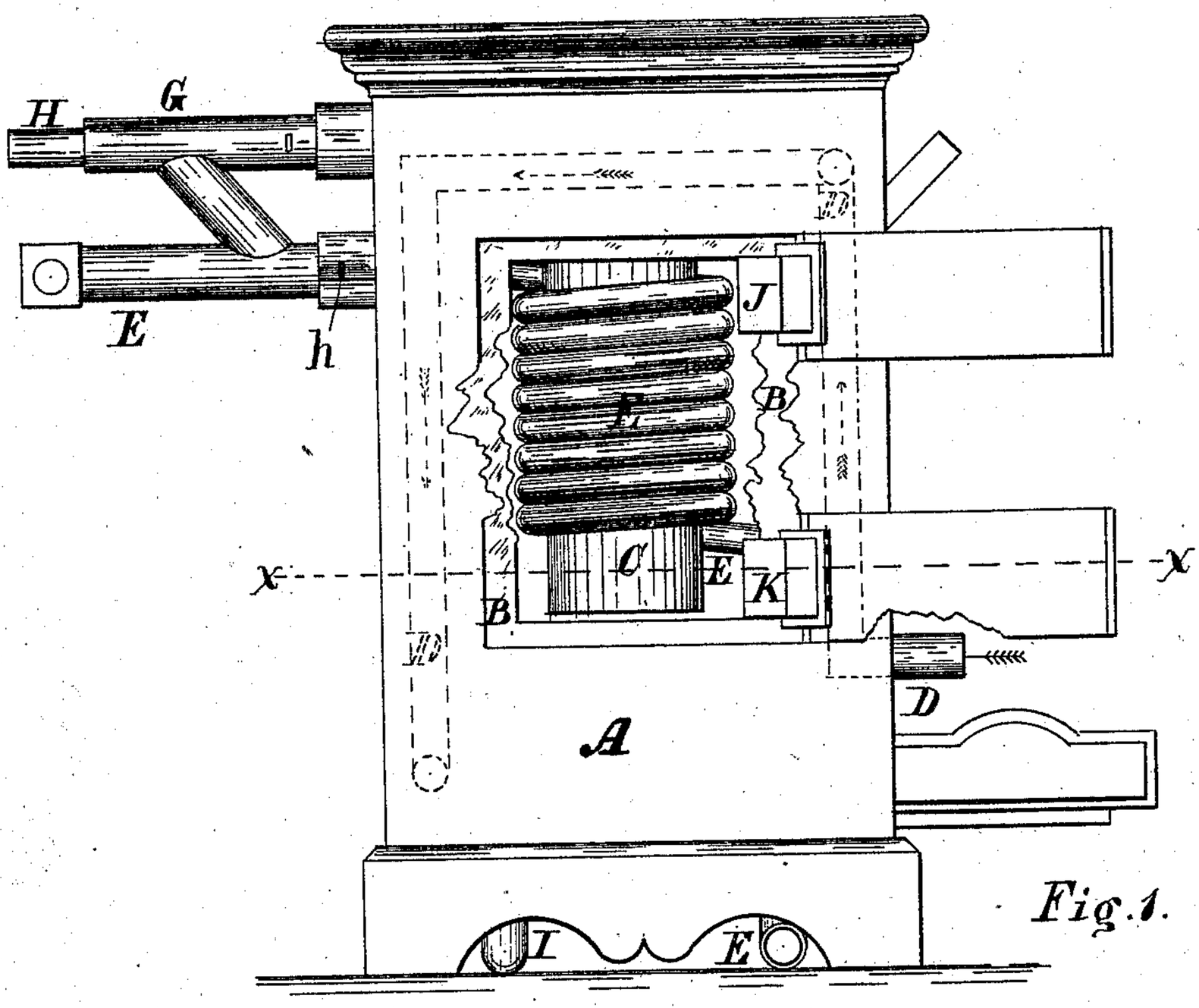


*Fig. 1.*

*Witnesses*

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3 Sheets—Sheet 2.

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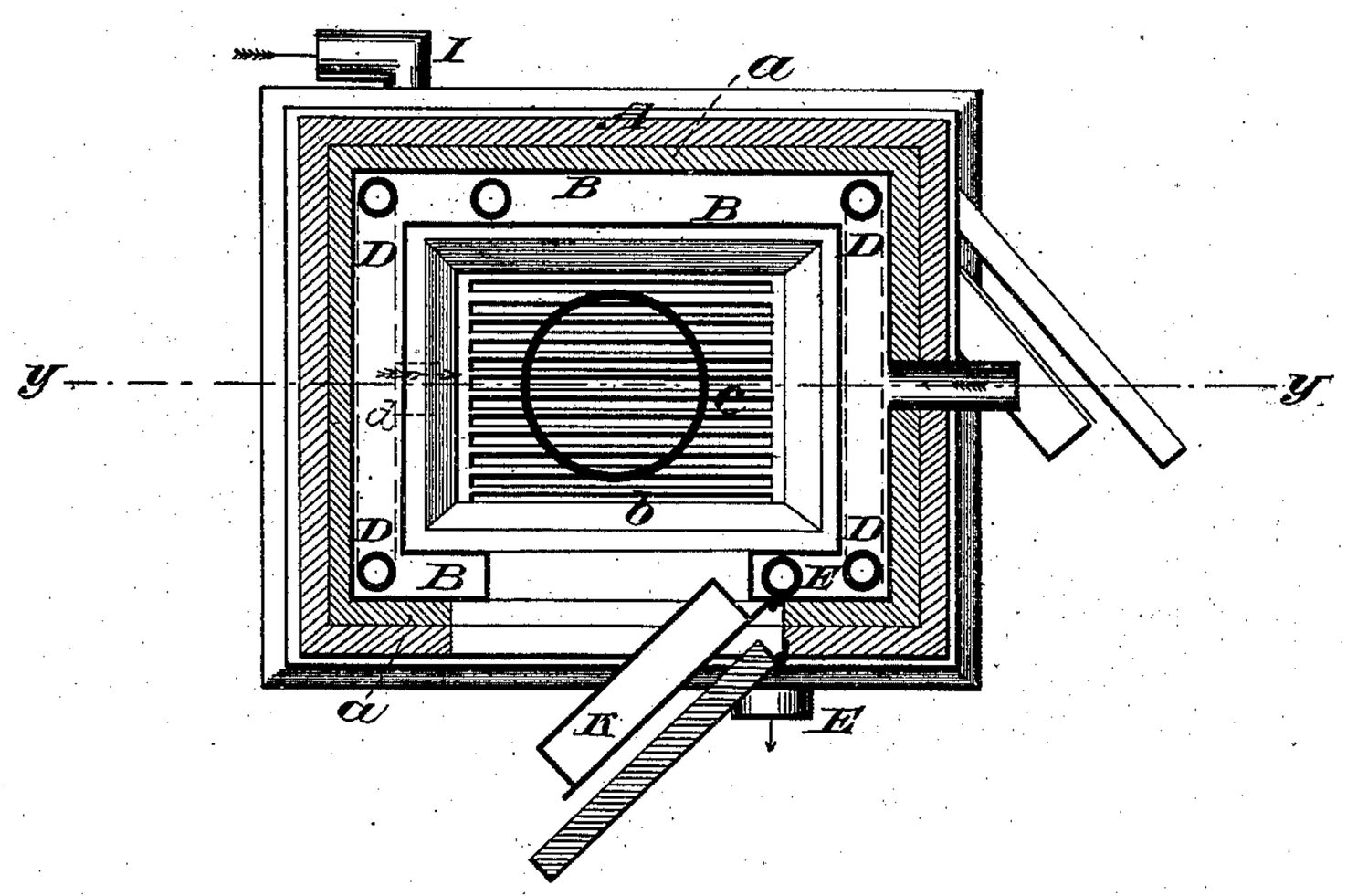
## Heating Apparatus.

No. 211,332. Patented Jan. 14, 1879.

*Fig 2*

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3 Sheets—Sheet 3.

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## Heating Apparatus.

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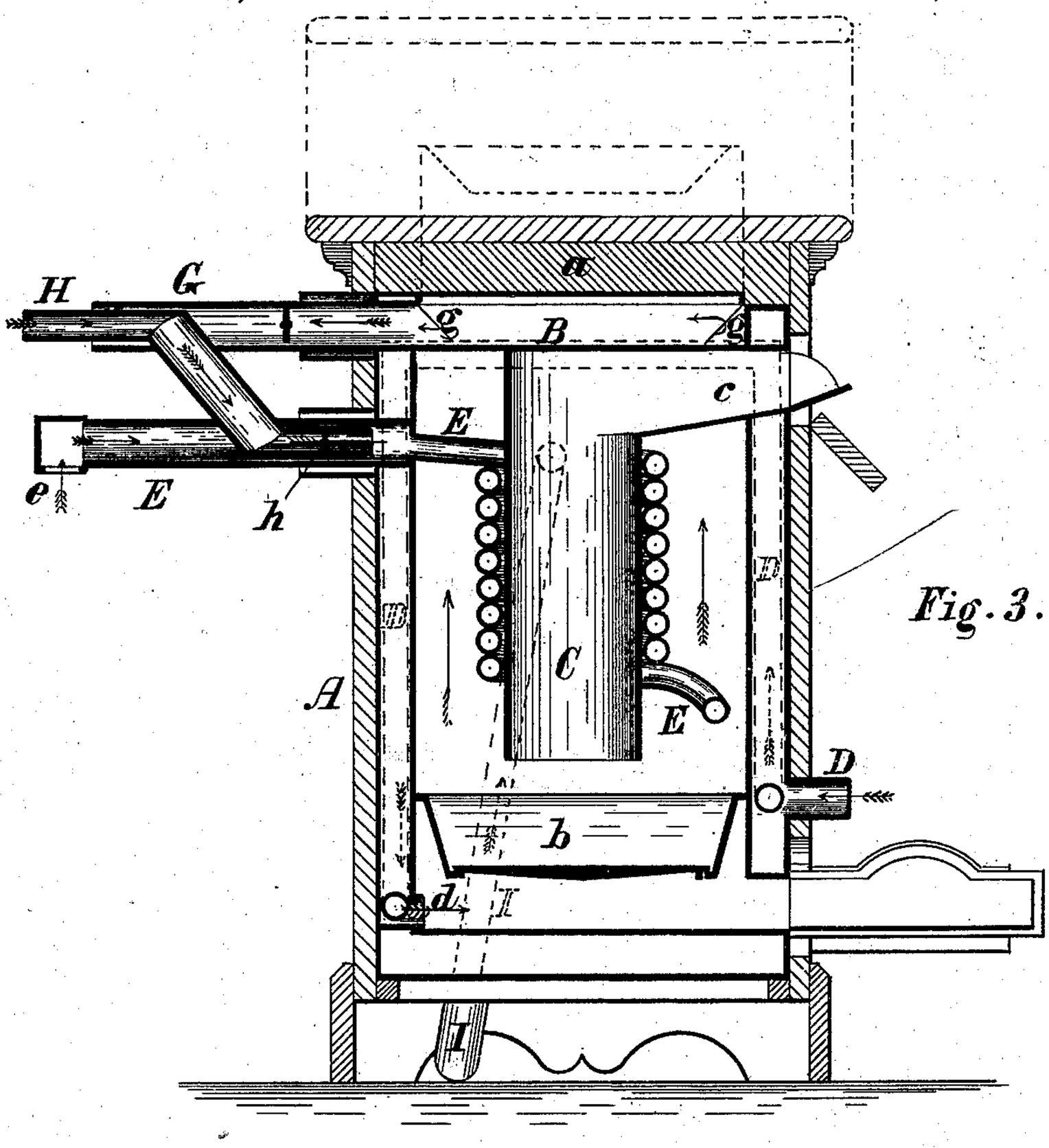


Fig. 3.

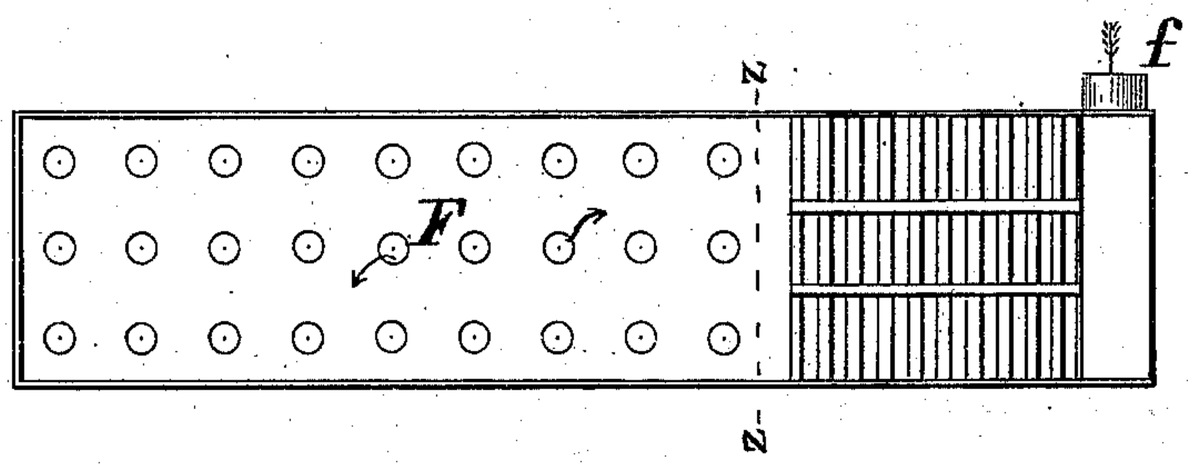


Fig 4

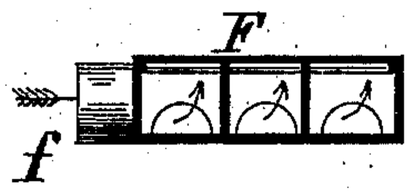


Fig 5

Witnesses

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# UNITED STATES PATENT OFFICE.

GEORGE KELLY, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN HEATING APPARATUS.

Specification forming part of Letters Patent No. **211,332,** dated January 14, 1879; application filed November 17, 1877.

*To all whom it may concern:*

Be it known that I, GEORGE KELLY, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Heating Apparatus, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a front elevation of my improved heating apparatus; Fig. 2, a plan sectional view of the same, taken on the line *x x*, Fig. 1; Fig. 3, a vertical section of the same, taken on the line *y y*, Fig. 2; Fig. 4, a plan view of the register; and Fig. 5, a sectional view of the same, taken on the line *z z*, Fig. 4.

My invention relates to an apparatus for warming buildings, cars, omnibuses, dry-kilns, &c., and is designed to be a safety apparatus when used in cars and other conveyances.

The invention consists in the combination of a wooden casing with metal plates arranged within the casing, and having an air-space between them, and a fire-proof packing between the wood casing and iron plates, with heating and circulating devices arranged in the interior inclosed space.

It also consists in the combination and arrangement of pipes for heating and circulating the air, whereby the apparatus may be used both as a circulator and an ordinary heater, all of which will be hereinafter more fully set forth.

In the drawings, A represents a case, which is made of wood or any other suitable material, within which are fitted metallic linings B B, one within the other, so as to provide an air-space all around the case; and between the inclosing-case A and exterior metal lining-plate, B, is a packing, *a*, of some material which is a non-conductor of heat. I have found the ashes taken from the back head of boilers admirably adapted to this purpose; but any material ordinarily used in fire-proof safes and other similar structures may be employed.

The top of the case is similarly constructed, and the bottom may also be packed, although I have not so shown it in the drawings.

I have also shown the packing in the drawings on only two sides of the case; but I intend, in constructing the apparatus for use, to put it on all four of the sides, so that a perfectly fire-proof inclosing-case may be provided.

Near the bottom of the chamber, within this safety-case, I arrange a fire-pot, *b*, leaving space for an ash-pit below. Above the fire-pot is an ordinary fuel-magazine, C, having an opening, *c*, at its upper end, leading to the outside of the case, for the purpose of introducing fuel, this opening being suitably protected by a door, so as not to endanger the safety of the apparatus.

A pipe, D, enters the case at one side near the bottom of the apparatus, passes into the space between the plates B B, when it branches in each direction, passes up to the top of the space, thence across the apparatus, and then down on the other side, the branches uniting again at the bottom, and opening at *d* into the chamber beneath the grate. This pipe serves the purpose of a draft-passage to supply air for combustion, and may be provided with dampers conveniently arranged for the purpose of regulating the draft.

A pipe, E, enters the case at one side, near the top, passes through into the inner chamber, and is coiled around the fuel-magazine, as shown in Figs. 1 and 3 of the drawings, the lower end of the coil being carried out again into the space between the lining-plates, where it is conducted to the bottom of the apparatus, and is passed outside of the case, underneath the latter, as shown in Figs. 1 and 2 of the drawings. The upper end of this pipe is provided with a protecting-grate of any suitable construction, when it is to be left open in a building or car, as shown at *e* in the drawings, and the lower end is constructed so that a register, F, may be connected therewith by means of a pipe, *f*, the register being located in any position desired in the building or conveyance.

The products of combustion pass up into a chamber made of the lining-plates in the top of the case, as shown in Fig. 3 of the drawings, and thence out through an ordinary smoke-pipe, G, openings *g* being made in the interior lining just over the combustion-chamber to permit the escape of the smoke.

Now, it is evident that if the apparatus thus far described is set up in a car or room in a

building, both ends of the pipe E opening into it, as described, a current of air will be established whenever a fire is built within the chamber, the current passing up through the coil of pipe E becoming heated during its passage, and escaping at the upper end of the pipe.

The apparatus would thus operate simply as a circulating-heater in a well-known way, and would not ventilate the apartment in which it was placed.

In order to supply fresh air for the room, a pipe, H, communicating with fresh air outside, is brought into the apartment in the interior of the smoke-pipe G until it reaches the apparatus, when it is conducted outside the pipe G into the pipe E, as shown in Figs. 1 and 3 of the drawings. The cold fresh air entering through the pipe H will have the effect of changing the direction of the current, which will now be down through the coil in the heating-chamber and out at the lower end of the pipe E, air being also taken from the room and mixed with the fresh air entering through the pipe H, as indicated by arrows in Fig. 3.

With this additional device fresh air suitably warmed is supplied to the car or building, and the apparatus becomes both a heater and ventilator.

The pipe H should be provided with a damper, *h*, by means of which the admission of cold air may be controlled.

A pipe, I, may be carried underneath the apparatus, and thence conducted into the free space between the metal lining, extended up therein nearly to the top of the chamber, and then passed into the heating-chamber, and connected with the upper part of the coil of pipe E. This pipe may open into the apartment in which the apparatus is situated, or it may be conducted into the outer atmosphere. In the former case it would merely operate as a circulating medium in connection with the pipe E; but in the latter case it would serve as the means of conducting fresh cold air to the heater, and may be used either with or without the pipe H, and with the upper end of the pipe E open or closed, as may be desired, the latter being constructed so as to be closed up whenever wished.

I prefer to construct the apparatus with a removable fire-pot, so that it can be taken out through a door in the side of the apparatus opening into the ash-pit. This construction enables me to substitute an oil-lamp of sufficient capacity for heating the pipes, and constructed so as to be introduced through the opening above referred to and set in the place of the fire-pot. This arrangement is sometimes desirable for an apparatus for heating a small apartment.

It is evident that the safety-case may be located in any position which is convenient. For instance, in heating cars it may be located within the car, or just outside on the platform, or upon the top of the car; and in rooms and buildings it may be set up in any corner, or in one single apartment, with pipes leading thence to other rooms, for the purpose of conducting warm air to them.

I have not shown any system of connecting-pipes, for the reason that that is a matter which will be readily understood, as it is only necessary to attach pipes to those which are shown and described for the purpose of either conducting warm air to any place desired, or supplying fresh cold air to the heater.

The case, if desired, may be supplied with doors J and K, opening, respectively, into the upper and lower portions of the heating-chamber. These doors are double, however, and correspond in construction to the adjoining walls of the case, so as not to destroy its character as a safety apparatus.

This last characteristic is given to the heater by reason of the peculiar construction of the walls, and the arrangement of the heating-chamber within them, as already described.

If the apparatus should be overturned—as, for instance, in a railway accident—the fire would be retained within the fire-proof casing, and could not be communicated to the car outside unless completely demolished.

I do not confine myself to the precise arrangement of pipes shown and described, for it is evident that they may be changed to suit the peculiar location of the apparatus and the operation which it is desired to obtain. Suitable doors are provided in the top of the apparatus, for the purpose of gaining admission to the smoke-chamber, so as to repair or clean the smoke-flues.

With my improvement I am enabled to make a small apparatus suitable for warming coaches and street-cars, while at the same time it is easily enlarged to meet the wants of larger cars and buildings.

Owing to the safety-case there is no radiation of heat, and consequently the space immediately around the apparatus may be utilized in a car or coach for the accommodation of passengers without objection.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a heating apparatus, the outer casing, A, of wood, in combination with the inner metal plates, B, arranged with an air-space between them, the fire-proof packing *a* between the wooden casing and the plates, and air heating and circulating devices arranged within the interior inclosed space, substantially as and for the purpose set forth.

2. The pipe E, coiled in the heating-chamber within the safety-casing, and extending outward through the latter at its upper and lower ends, substantially as and for the purpose set forth.

3. The circulating-pipe E, coiled within the heating-chamber, as described, in combination with the auxiliary fresh-air pipe H, substantially as and for the purpose set forth.

4. The air-pipe I at the bottom of the apparatus, in combination with the heating-coil E,

with the upper part of which it communicates, substantially as and for the purpose set forth.

5. The draft-pipe D, entering the space between the lining-plates B, within which it is branched and arranged as described, and led into the heating-chamber underneath the fire-pot on the opposite side of the case, substantially as set forth.

6. The smoke-chamber formed from the plates B, above the combustion-chamber, and provided with openings *g* into the latter, and communicating with a smoke-pipe, G, substantially as described.

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Witnesses:
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