

(No Model.)

2 Sheets—Sheet 1.

C. M. ROBINSON.
FIREPLACE HEATER FOR RADIATOR SYSTEMS.

No. 551,651.

Patented Dec. 17, 1895.

Fig. 1.

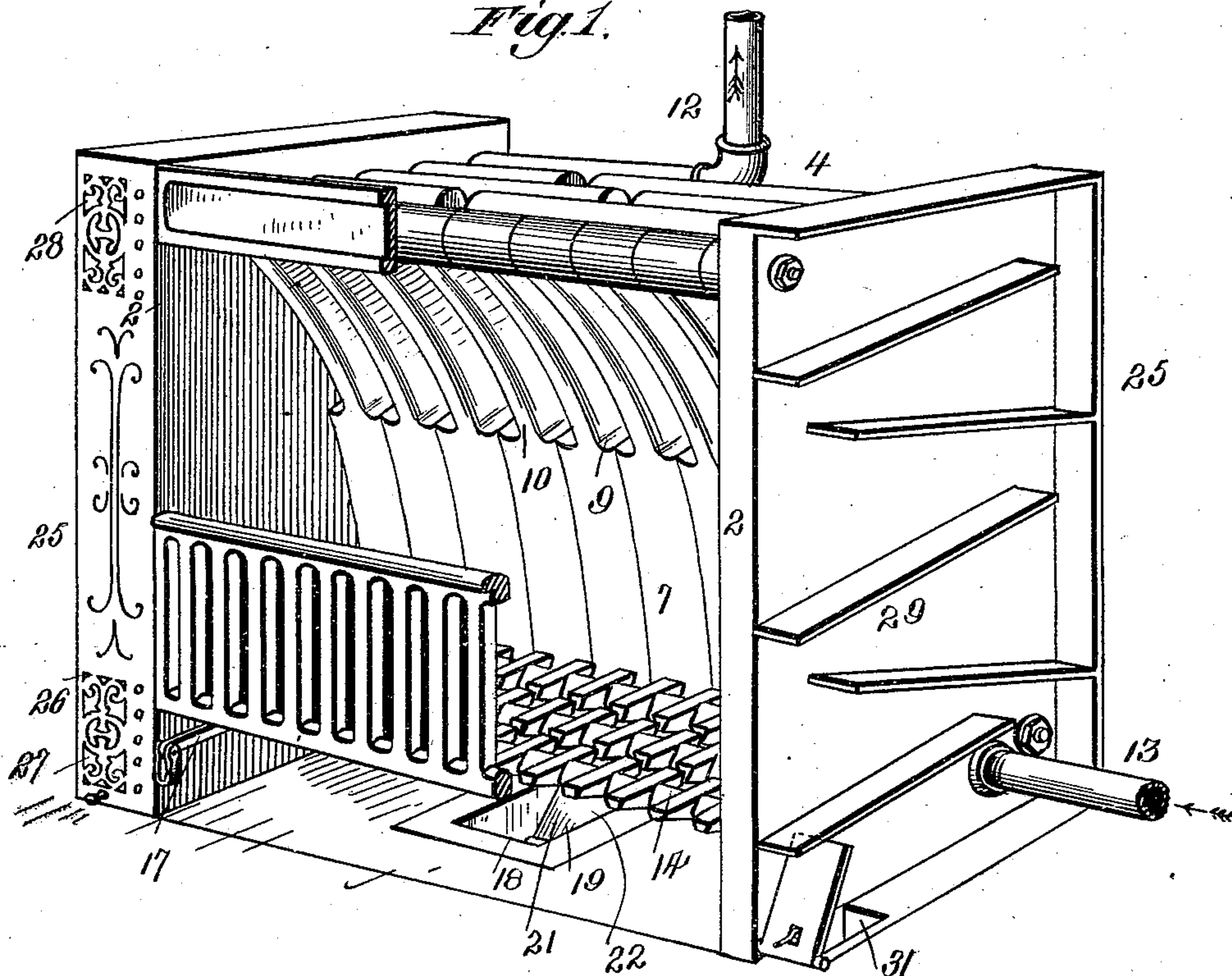
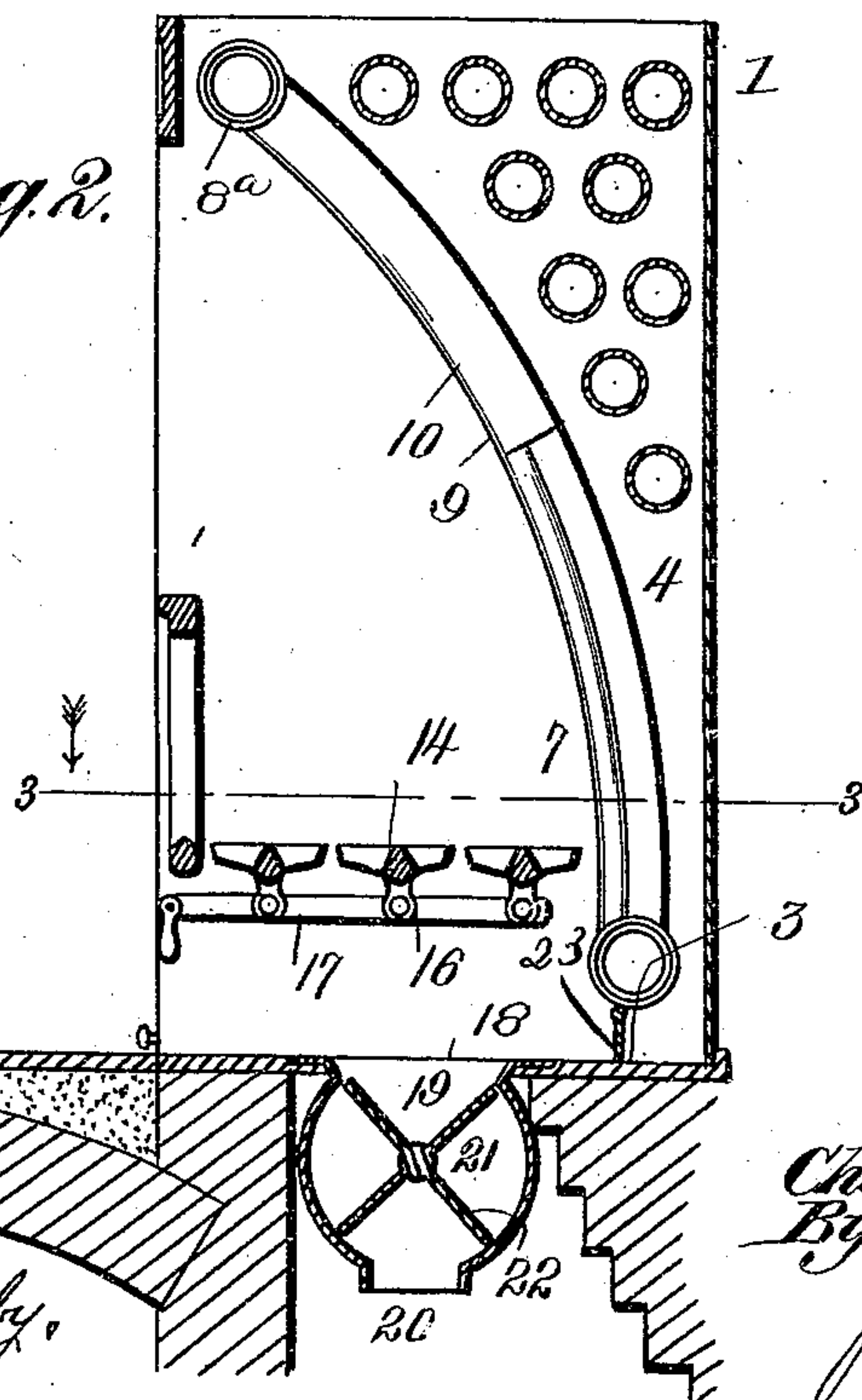


Fig. 2.



Witnesses.
Robert G. Smith.

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Atty.

(No Model.)

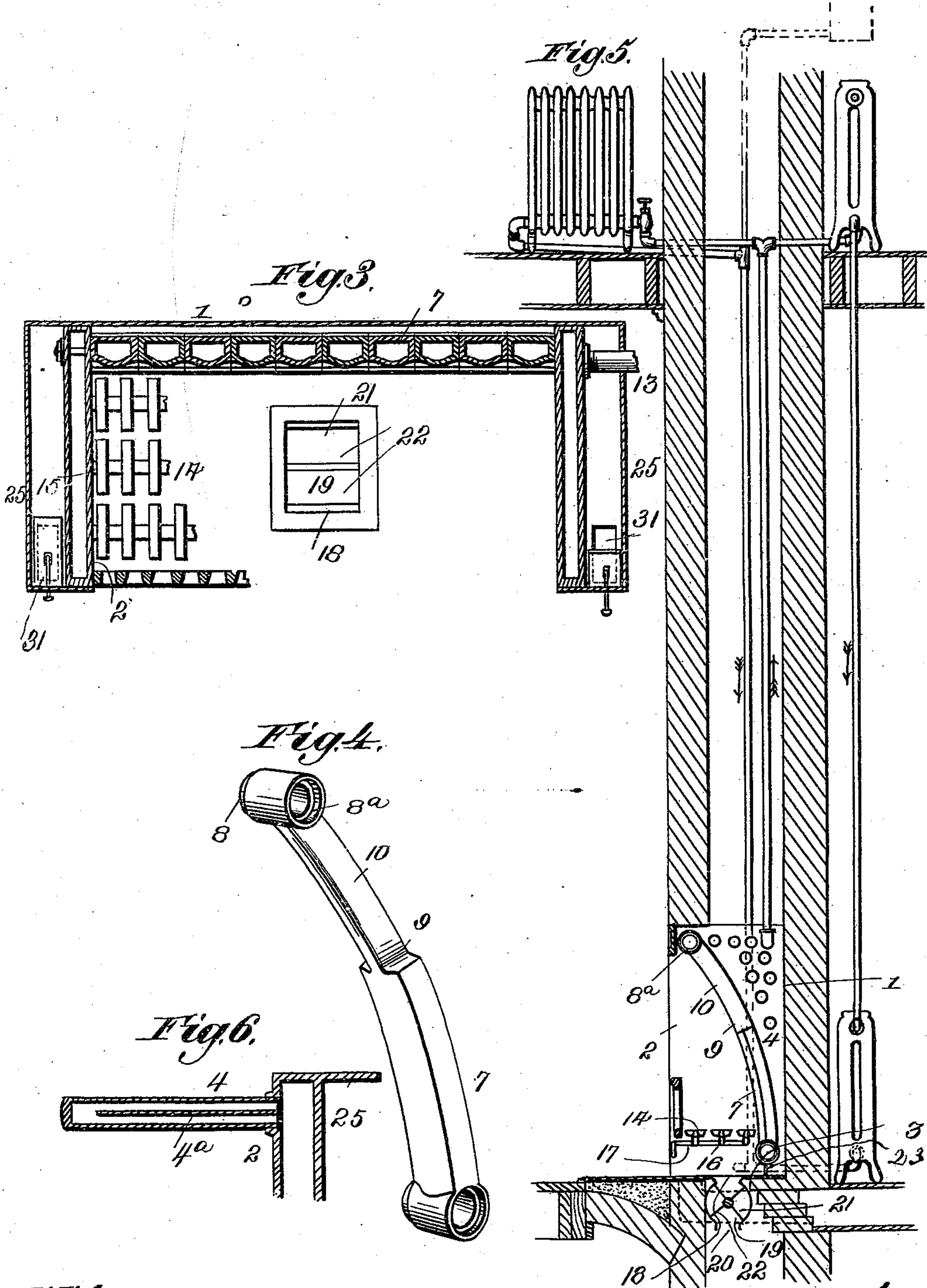
2 Sheets—Sheet 2.

C. M. ROBINSON.

FIREPLACE HEATER FOR RADIATOR SYSTEMS.

No. 551,651.

Patented Dec. 17, 1895.



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UNITED STATES PATENT OFFICE.

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FIREPLACE-HEATER FOR RADIATOR SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 551,651, dated December 17, 1895.

Application filed January 29, 1895. Serial No. 536,589. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. ROBINSON, a citizen of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented new and useful Improvements in Fireplace-Heaters for Radiator Systems, of which the following is a specification.

My invention relates to fireplace-heaters for radiator systems, my purpose being to provide a simple, novel, and highly-efficient construction by which an ample supply of water heated to the proper temperature may be supplied to a series of radiators from an open fireplace.

It is my further purpose to combine with an open fireplace a series of heating-tubes so constructed and arranged as to impart to a circulating body of water flowing to and from a system of radiators all the available heat produced; to so construct and arrange the parts as to insure a rapid circulation and a speedy rise of temperature in the time the water is flowing through the tubes or sections of the heater, and to cause the smoke and heated products of combustion to flow over a large heating-surface of the water-tubes or sections, whereby a great part of the contained heat, which would otherwise escape by way of the flue, is made available, and a considerable economy in consumption of fuel is thereby accomplished.

It is one purpose of my invention to provide means whereby the heat of a fireplace or open grate, the greater part of which is usually wasted by escaping through the chimney, may be utilized for the purpose of equalizing the temperature in different parts of the room in which the fireplace is located, for effecting a removal of the impure or vitiated air and replacing it by fresh and pure air, and to enable any ordinary building to be thoroughly warmed and perfectly ventilated by using one or more open grates or fireplaces, without employing any other heating apparatus and without excessive consumption of fuel.

Finally it is my purpose to provide a fireplace-heater for radiator systems which shall have a simple and comparatively inexpensive construction, the separable parts consisting largely of duplicate sections, and the entire

structure being so simple that it may readily be set up or removed by any ordinary workman without requiring special skill or tools of other than usual construction.

The invention consists in the several novel parts and features of construction and in the new combinations of parts hereinafter fully described and then particularly pointed out and defined in the claims which follow this specification.

To enable others to clearly understand and to make and use my said invention I will proceed to describe the same in detail, reference being had for this purpose to the accompanying drawings, in which—

Figure 1 is a perspective view of a fireplace-heater constructed in accordance with my invention, part of the grate-facing and one of lateral walls as well as the sheet-iron jacket being removed. Fig. 2 is a central vertical section of the same from front to rear. Fig. 3 is a horizontal section on the line 3 3, Fig. 2. Fig. 4 is a detail view of one of the water-heating sections forming the fireplace-back. Fig. 5 is a detail section of one of the water-tubes, showing its interior construction. Fig. 6 is a detail section showing the construction of the water-tubes.

The reference-numeral 1 in said drawings indicates the lateral walls of the fireplace-heater, which are duplicates in construction. Each wall is preferably, though not necessarily, of substantially rectangular form, and is constructed of metal, or other material, suitable for resisting the heat. The side wall consists, properly, of a recessed or chambered structure, the chamber 2 inclosed thereby being adapted to contain water circulating to and from the radiators. The side walls stand upon a hearth-plate 3 and rise therefrom to the top of the fireplace, or substantially so. They are provided upon their inner or adjacent faces with water-tubes 4, having their free ends closed and communicating at their other ends with the water-chambers 2. These tubes may be, and preferably are, of different lengths, but they may all be connected with one of the chambers 2, their closed ends lying adjacent to the other chamber. Baffle-plates 4^a may be inserted in each of these water-tubes to compel the cooler water entering be-

neath said plates to pass to the end of the tubes, and then flow back over the tops of said plates. The number of these pipes 4 and the interval separating them may be varied, sufficient space being left for the passage of the smoke, hot gases, and other products of combustion. Their arrangement may be varied in any desired manner, but I usually alternate them in adjacent horizontal rows or series.

The back of the fireplace is formed of a series of chambered sections 7, their form being shown in transverse section in Fig. 3. These sections are curved slightly to give the usual form of the back, and their rearward faces are flat, the opposite or front surfaces being swelled outward in the central longitudinal line, so that when the entire series of these chambered sections is in place the outer surface of the back will have the vertical corrugations usually seen in open grates. At their upper and lower ends the chambered sections communicate with the water-chambers 2 and with each other, their lower ends extending usually a little below the level of the grate. From this point the water-sections rise, curving slightly forward, their width being such that their lateral edges lie close together, forming, in practical respects, a continuous back. At a suitable point between the grate and the top of the fireplace each section is contracted in width to form vertical openings 9 for the smoke. The diminished portions 10 continue, with substantially the same curvature, upward and outward, their upper ends having communication with the water-chambers 2 and with each other. Both upper and lower ends are connected to form continuous channels by any preferred construction—as, for example, by forming a neck 8 on one and a countersink 8^a upon the next, as shown in the detail view, Fig. 4.

The circulation to and from the radiating system is by way of an outlet and an inlet pipe 12 and 13, respectively, the former having connection with one of the water-tubes 4, and preferably at or near the middle of the fireplace, while the inlet, by which the water is returned to the heater, enters the latter at or near the bottom of one of the side walls. This arrangement, however, is subject to considerable variation without departing from my invention.

The grate of the furnace is composed of bars 14, rocking upon pivotal axes 15, each grate-bar having a hanging-lug 16, which is pivotally connected to a shaking-bar 17. Beneath the grate is the ash-box, and in the floor of the latter is formed an opening 18, beneath which is an ash-trap 19. This trap consists of a substantially circular casing, having an outlet 20 in its lower part, and within said casing is a rotary valve or fan-wheel 21, having a plurality of plates 22 radiating from its pivotal axis and approaching the inclosing wall closely enough to prevent the upward passage of light ashes and dust.

By rotating this wheel or valve the ashes may be discharged into a chute or pit below the trap without any escape of dust into the apartment. In order to prevent even a slight and practically imperceptible escape of dust, a dust-damper 23 is arranged in rear of the grate, its pivotal support being located immediately beneath the pipe 8, its lower edge just clearing the hearth-plate. This dust-damper extends entirely across the fireplace and is operated by a rod or damper-stem 24.

As an adjunct to a fireplace-heater, and as an important economic part of a fireplace structure in which the lateral walls are provided with water-heating chambers, I may, and in many cases do, form two additional lateral chambers 25, their vertical front walls being formed of facings 26, which are suitably ornamented and provided at top and bottom with valved openings 27 and 28. The outer faces of the chambered walls 2 are provided with projecting ribs, points, or plates 29, so placed as to baffle the air entering through the lower openings 27 and cause it to pursue a zigzag or tortuous course in traversing the chambers. The latter being heated by the water of circulation, and as this heat is also imparted to the ribs or projections 29, which latter add largely to the surface area with which the air comes in contact, it acquires a considerable degree of heat before reaching the upper openings 28, through which it may be discharged into the room, or into conduits conveying it to upper apartments.

The valves 30, which may be used to close the air-inlets 27, are preferably pivoted by their lower ends upon the hearth-plate and are thus adapted to cover auxiliary openings 31 in the floor, through which air may, if desired, be admitted from outside the room or house. While I regard these air-heating chambers as a desirable feature, they are evidently not a necessary part of my invention, as I may entirely dispense with them without affecting the water-heater in any manner. As a part, however, of the fireplace structure containing the chambered side walls for heating the water, the air-heating chambers which derive their heat from said water-chambers are economic factors in maintaining the temperature of a room at a suitable point, since they impart to the air of the apartment a portion of the heat acquired by the water circulating through said chambers. The air thus heated is drawn from the lower or coldest stratum of air in the room and is thrown out into the room at a point or points between the lower and the upper strata, thereby causing an interior circulation of air and aiding materially in preserving a uniform warmth throughout the room.

It has been estimated that in an ordinary fireplace over ninety per cent. of the heat developed by the combustion of coal is lost, practically speaking, by absorption by the brick and iron surrounding the fireplace and

by escaping up the chimney. Moreover, as radiant heat varies in intensity inversely as the square of the distance, it is evident that an ordinary fireplace cannot, under the most favorable circumstances, properly heat the whole of an apartment of more than limited size without an excessive consumption of fuel, which will throw out too great a heat in the immediate vicinity of the fireplace. Moreover, in heating an apartment by an open fireplace, the impure or vitiated air, which usually lies upon or near the floor, is not removed by the direct draft, but the purer portion above is drawn off and carried up the chimney. If the heat is raised to such a point as to consume the oxygen of the air in contact with it, carbonic oxide is produced, which may mingle with the air in the room and largely add to the deleterious effects of other impurities which may be present.

An open fireplace is unquestionably the most perfect and reliable means of ventilating dwellings, and hot water circulating through suitable pipes and radiators is regarded as the most healthful and satisfactory method of heating such interiors. My invention combines all these advantages and enables an entire house, or other building of ordinary size, to be thoroughly warmed in every part by a single open fireplace which supplies hot water in ample quantity to radiators suitably distributed. Houses of more than ordinary size can be equally well heated by two or more such fireplaces, the number being proportioned to the size of the house.

It has already been explained that air may be supplied to the air-heater, and thence to the apartment, either from the inside or outside of the building, and by a simple change in the position of the air-valve or damper air may be taken from both points in any proportions desired.

My invention thus enables me to secure the essential advantages of the open fireplace and the hot-water system for interior heating; and to secure a most important economy in the consumption of fuel, since they utilize the greater portion of the ninety per cent. of heat which is usually permitted to escape up the chimney, and apply the same to maintaining the hot-water circulation.

Inasmuch as the lateral air-heating chambers derive their heat from the water circulating through the water-chambers in the side walls, it will be seen that an economy in construction is obtained by using said air-chambers, as they may be formed by the sides of the sheet-iron jacket which surrounds the whole structure.

What I claim is—

1. A fire-place water-heater for radiator systems, consisting of a grate arranged between chambered side-walls which have hori-

zontal water-tubes, a fire-place-back consisting of chambered sections communicating at their ends with said chambered side walls, the lower portions of said sections being of such width as to form a practically continuous back, and their upper portions being contracted to form intermediate passages for the products of combustion, substantially as described.

2. In a fire-place water-heater, the combination with the grate of a fire-place back composed of a series of chambered sections having communication at their upper and lower ends with lateral water heating chambers, their lower portions being of such width as to form a practically continuous back, and their upper portions being contracted laterally to provide intermediate passages for the smoke and products of combustion, the fronts of said lower portions being swelled outwardly in their central longitudinal lines to provide draft corrugations, substantially as described.

3. In a fire-place water-heater for radiator systems, the combination with the grate, of chambered side-walls having horizontal water-tubes, a fire-place back composed of chambered sections having lower portions extended laterally to form a practically continuous wall and upper portions contracted to form intermediate draft openings, said sections communicating at their ends with the water-chambers in the side-walls, and an inlet and outlet communicating with the lower and upper portions of the structure and communicating with pipes leading to and from the radiators, substantially as described.

4. In a fire-place water-heater, the combination with chambered side walls having horizontal water tubes, of a series of chambered sections composing the back, their upper portions being diminished in width to form draft passages, and their ends communicating with the chambered side-walls, substantially as described.

5. In a fire-place water-heater, the combination with side walls having chambers to receive the water and provided with water-tubes projecting from the inner faces, of a fire-place back composed of a series of separable sections supported on and communicating with the lateral water-chambers, the upper portions of said sections being of less width than the lower to provide passages for the smoke, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES M. ROBINSON.

Witnesses:

THOS. A. GREEN,
HOWARD M. NORRIS.