W. B. Choate.

Heating Drum.

No. 84,089. Patented Nov. 17, 1868.

Fig. 1.

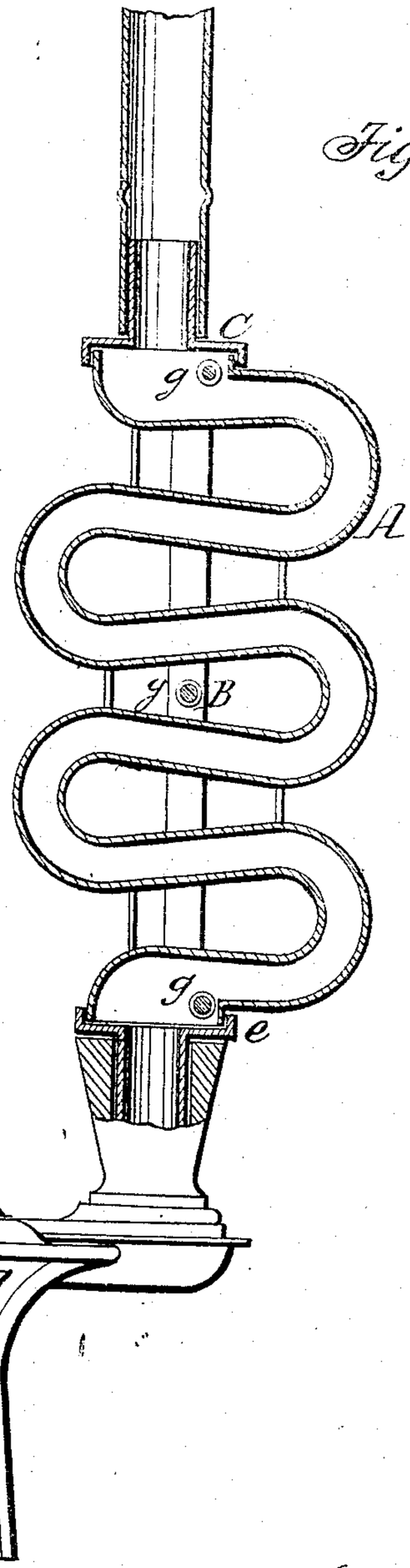


Fig. 2.

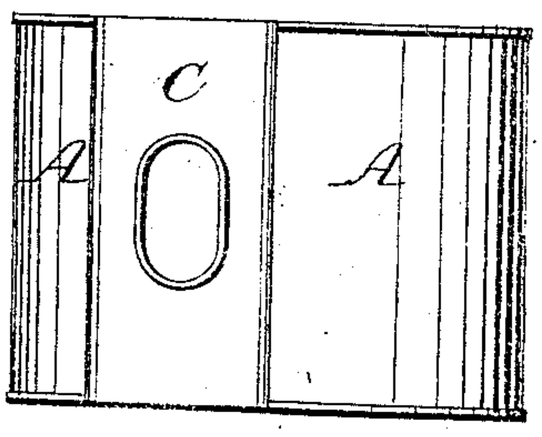
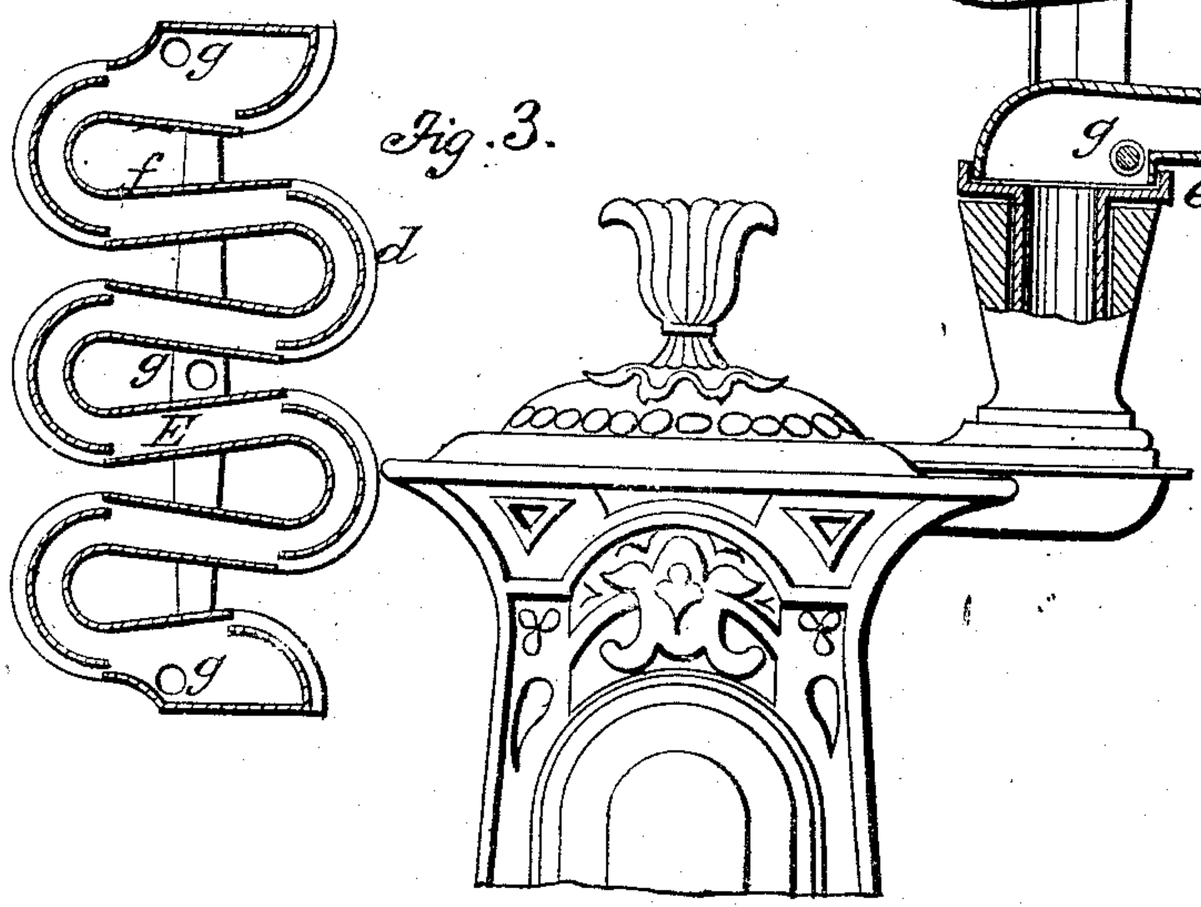


Fig. 3.



WITNESSES.

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WILLIAM B. CHOATE, OF GALT, CANADA WEST.

Letters Patent No. 84,089, *dated November* 17, 1868.

IMPROVEMENT IN HEAT-RADIATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM B. CHOATE, of Gait, Canada West, have invented a new and useful Improvement in Heat-Radiators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a new and useful improvement in radiators for heat, to be attached to stoves, and used in all situations where they may serve the purposes for which they are intended.

And the invention consists in the combination, with a radiator of serpentine form, of the method of placing the flanges on the end-plates, and in depressing the flue of the radiator after the curves or turns, so as to form a series of diving-flues.

The drawing, Figure 1, represents a vertical sectional elevation of my radiator attached to a stove, and connected with a stove-pipe, the stove and the stove-pipe being shown in red color in the drawing.

Similar letters of reference indicate corresponding parts.

A represents the radiator, of serpentine shape, or formed into a succession of curves or turns, as seen in the drawing.

B represents stays, which are attached to each of the horizontal sections of the serpentine flue or radiator, for supporting it and keeping it in place.

The end-pieces C C of this radiator may be made of either cast or sheet-metal.

The radiator itself is made of sheet-iron.

The heated products of combustion, in passing up through this radiator, will impinge against the upper surface, and the heated current will repeatedly change its position during its progress, thereby exposing every portion of the moving current to the heat-radiating surface.

This radiator is a flattened tube, as seen in the top view, Figure 2, and it will be seen that, with the few curves and turns shown in this example of my invention, a very extensive heat-radiating surface is presented to the air.

The importance of this feature in a heat-radiator becomes apparent when we consider that air will not heat air, and that to heat or warm the air in a room, every particle of air must be brought in contact with a heated surface.

A current is thus formed, setting towards the radiator. The air, as it is heated by contact with heated metal, becomes rarefied and flies upward, while the colder air rushes in to take its place.

The heated products of combustion passing into this radiator are forced to part with their contained caloric, from the peculiar shape or form of the channel through which they pass, and from the fact that there can be no centre of draught to the current, as the current is compelled to change its position at every turn.

Figure 3 is a detached view of one of the cast end-plates, showing the manner in which the flat, serpentine, or corrugated sides of the tube are kept in place, and supported.

It will be seen that the flanges *d*, on the inner sides of the plates, are not continuous or unbroken, but that a portion (that portion which forms the outer or large curve) is set inward on the plate, and that the part of the flange *f*, which forms the inner and small curve, and also the straight portion of the tube, encloses the serpentine sides of the tube.

By this method of formation the corrugated sides are much more easily managed in putting the radiator together, and much more easily kept in place, as they are not so much affected by the expansion and contraction by heat.

The end-plates of the radiator E can be most readily made of cast-iron, and they are held together (with the serpentine or corrugated sides between them) by transverse rods with screw-nuts, which pass through holes *g*, as seen in the drawing.

It will be noticed that the outer curves of the serpentine tube are depressed, so that each forms (to a certain extent) a diving-flue.

The tendency of heat to seek the highest portion of a horizontal tube will produce a change in the current at every turn; and that change is made more perfect, and all central current more completely destroyed, by compelling the current to descend after every turn.

Having thus described my invention,

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

1. In combination with a radiator of serpentine form, the method of placing the flanges *d* and *f* on the end-plates, substantially as shown and described.

2. Depressing the flue of the radiator after the curves or turns, so as to form a series of diving-flues, substantially as and for the purpose set forth.

WILLIAM B. CHOATE.

Witnesses:

FRANK BLOCKLEY,

ALEX. F. ROBERTS.