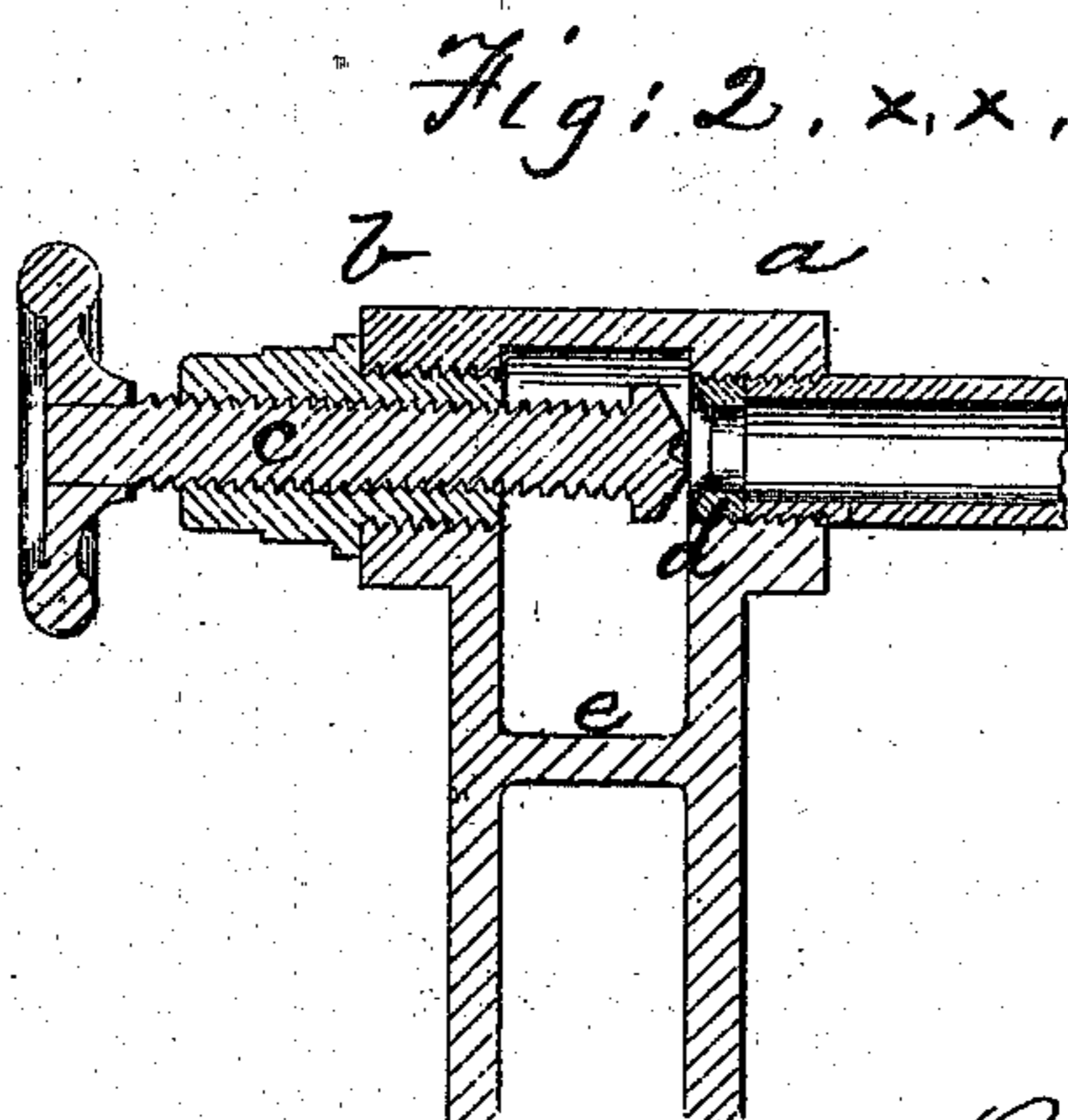
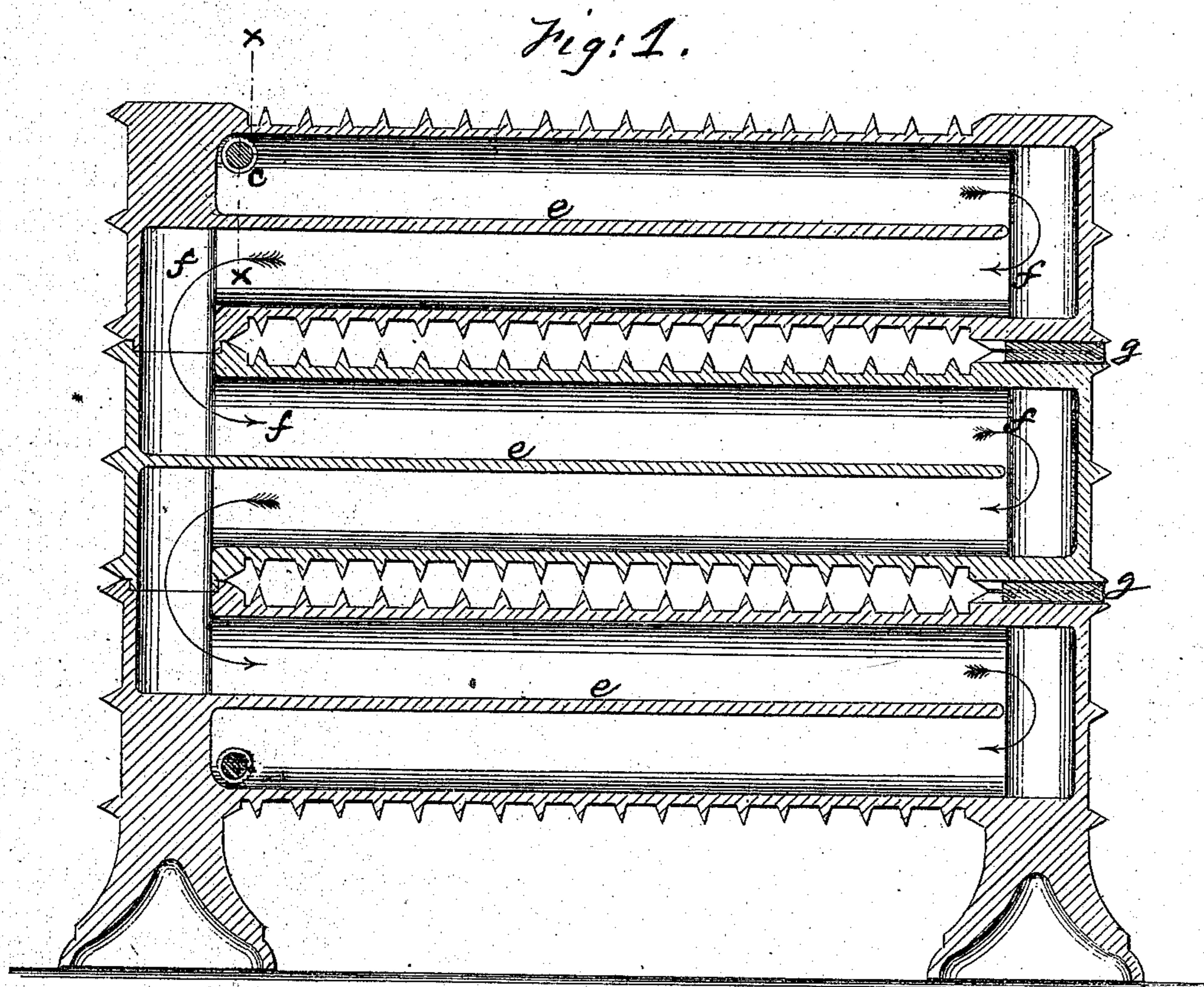


CAMPBELL & WHITTIER.

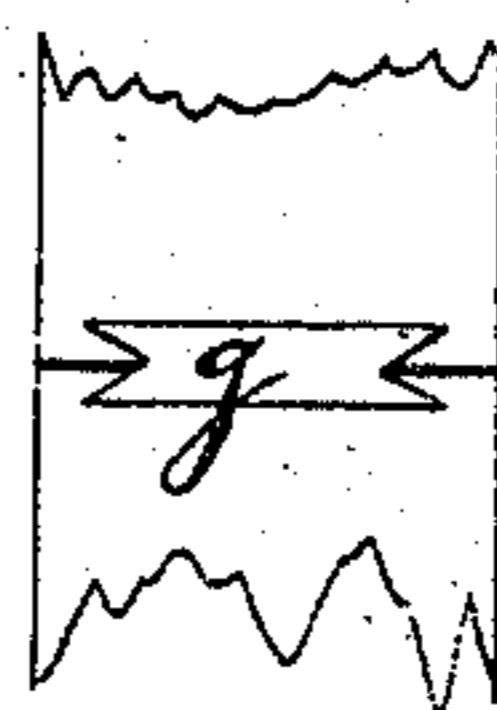
Steam Heater.

No. 105,640.

Patented July 26, 1870.



*Fig: 3*



Witnesses  
 { F. B. Perkins  
 J. B. & C. H. R. M. Turner  
 J. C. W. { Wm. H. Hicks  
 Wm. H. Morse

Benjamin J. Campbell  
 Charles Whittier

# UNITED STATES PATENT OFFICE.

BENJAMIN F. CAMPBELL AND CHARLES WHITTIER, OF BOSTON, MASS.

## STEAM-HEATER.

Specification forming part of Letters Patent No. 105,640, dated July 26, 1870.

*To all whom it may concern:*

Be it known that we, BENJAMIN F. CAMPBELL and CHARLES WHITTIER, both of the city of Boston and State of Massachusetts, have invented certain Improvements in Steam-Radiators, of which the following is a specification.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of the radiator. Fig. 2 is a section through the valve at *xx*, Fig. 1. Fig. 3 is an end view, showing the manner in which the sections are keyed together.

Our improvements consist, first, in making the valve in and a part of the radiator; second, in a new construction of the radiator itself.

We cast a projection, *a*, on the end of one of the series of members or sections comprising the radiator into which it is proposed to take steam, and another projection, *b*, opposite to it. The latter projection is to receive the nut part of the valve through which passes the spindle *c*. On the interior of the first projection is fitted a composition bearing, *d*, beveled to receive the end of the valve-spindle *c*, which has a corresponding bevel. The same valve is fitted within the member of the series from which the steam passes into the drip-pipe. This construction is simple and compact.

In each member of the series of radiators is constructed a diaphragm, *e*, which is cast therein from one extreme end to within a short distance of the other, leaving only sufficient space for the free passage of the steam around from one side to the other of such diaphragm. The passages

*ff* for the inlet and outlet of the steam are consequently opposite each other on the same side of each member, but not admitting of a direct flow to each other, except around this diaphragm. This construction admits of all the members of the series being keyed by the keys *g g g* on the one side and connected together at the other side by steam-joints, thus admitting of free expansion in one direction without danger of leakage of such joints. Besides, the drip and supply are on the same side of the radiator, steam being always taken in and let out at the same end and in the same direction, no matter whether the members or sections of the radiator are of an even or odd number.

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

1. The construction of valve and valve-seat within the body of the radiator, substantially as described.

2. The section of radiator constructed with a diaphragm running from one extreme end to within a short distance of the other, substantially as and for the purpose described.

3. A series of sections of radiator, when keyed at one end and jointed at the other, substantially as described.

BENJAMIN F. CAMPBELL.  
CHARLES WHITTIER.

Witnesses as to Benjamin F. Campbell:  
H. H. MCBURNEY,  
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Witnesses as to Charles Whittier:  
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