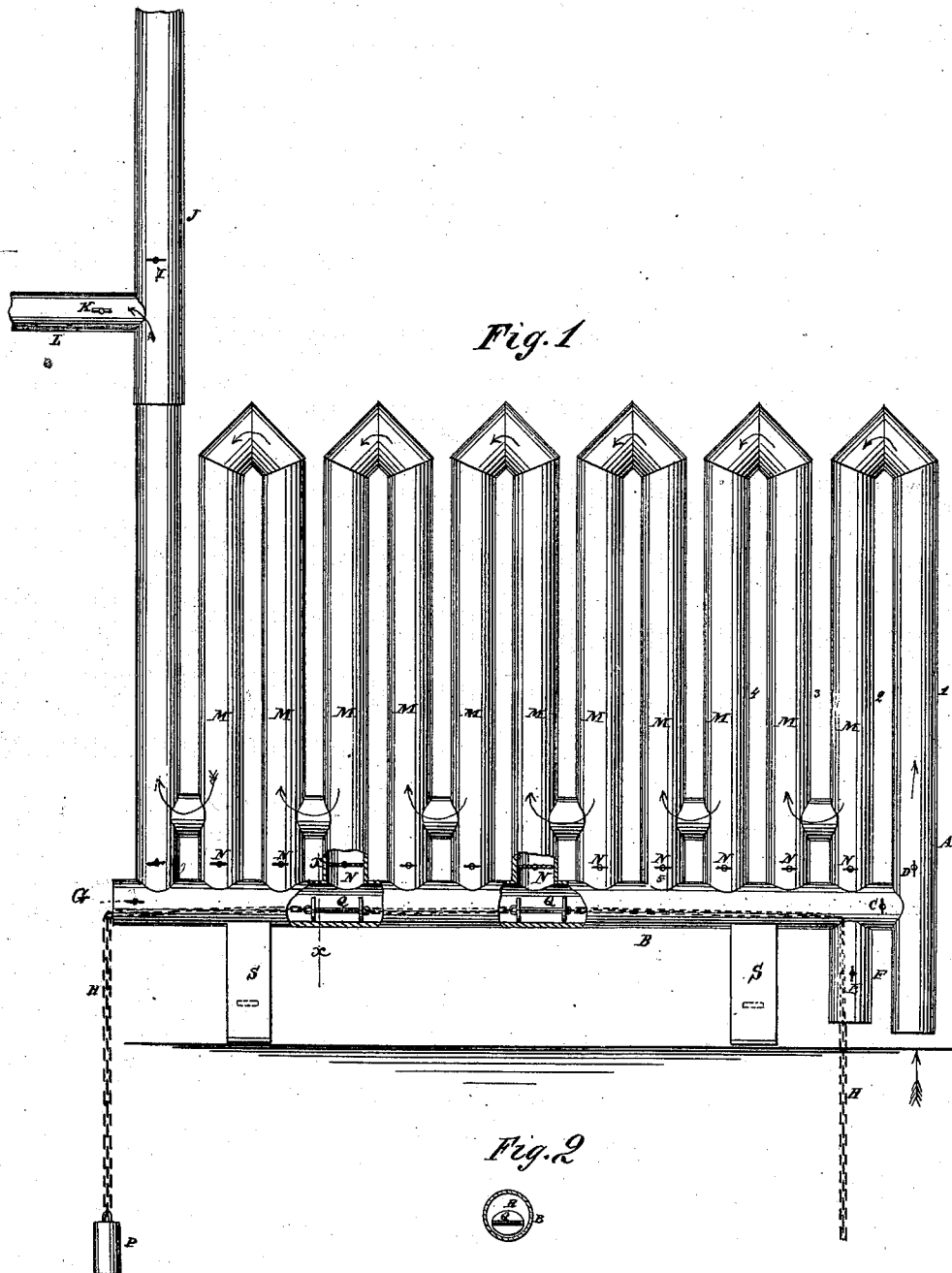


E. C. ANGELL.
HEAT RADIATOR.

No. 173,571.

Patented Feb. 15, 1876.



WITNESSES:

WITNESSES:
A. W. Almquist
A. F. Terry

INVENTOR:

INVENTOR:
E. C. Angell
BY *Munnell*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

EMERSON C. ANGELL, OF NEW YORK, N. Y.

IMPROVEMENT IN HEAT-RADIATORS.

Specification forming part of Letters Patent No. **173,571**, dated February 15, 1876; application filed January 20, 1876.

To all whom it may concern:

Be it known that I, EMERSON C. ANGELL, of the city, county, and State of New York, have invented a new and useful Improvement in Heat-Radiators, of which the following is a specification:

The invention will first be fully described, and then pointed out in the claim.

In the accompanying drawing, Figure 1, partly in section, illustrates my invention. Fig. 2 is a cross-section of Fig. 1, on the line *x x*.

Similar letters of reference indicate corresponding parts.

This radiator is connected with a stove or furnace by means of the upright tube A. B is a direct-draft tube. C is a damper in the draft-tube. D is a damper in the upright tube A. E is a valve or damper in the vertical tube F, and G is a valve in the direct horizontal tube B. The two latter dampers are slotted to allow them to be turned when the clearing-chain H is in place. When starting a fire to heat up the radiator the damper C is opened and the dampers D, E, and G are closed. The damper I, in the upright tube J, is also closed, and the damper K, in the discharge-tube L, is opened. With this arrangement a direct draft to the chimney is obtained, and the radiator is made ready for use. When the fire is well going the damper D, in the upright tube A, and damper I, in the upright tube J, are opened, and the products of combustion are allowed to pass through the series of tubes M, as indicated by the arrows, and discharged into the pipe L, or continued upward to another radiator in the apartment above.

Any number of the vertical tubes M may be used for radiating purposes by a proper arrangement of the dampers. For instance, the dampers in the direct-draft flue B being closed, and the dampers D and I being opened, if the damper marked N⁵ is opened the tubes numbered 1, 2, 3, and 4 will radiate heat as the

products of combustion will pass into the direct-draft flue at 5, and so if any other one of the dampers N is opened. This is, of course, assuming that the draft through the direct flue B will overcome the draft through the balance of the flues M.

In cleaning the radiator all the dampers N are opened, so that the ashes contained in the tubes M will be discharged into the flues B.

Q Q are scrapers attached to the chain H. P is a weight at one end of the chain. This chain may pass upward over a pulley, if desired. The scrapers Q are drawn through the flue, and the loose ashes and soot are discharged through the vertical tube F. The scrapers Q may be either double or single, and any number may be used. These scrapers may remain in the flue, as the space R above them will be sufficient for the direct draft.

This radiator presents a very extended radiating-surface. The products of combustion are so cut up and divided that, after passing through it, but little heat can be carried to the chimney and lost. The radiator is supported on legs S, independently of any stove or furnace below it, and it is admirably adapted for economizing fuel.

I am aware that radiators through which the products of combustion are carried back and forth in a vertical or horizontal direction are not new; but

What I claim is—

The combination, with tubes A J, of tubes M, rising from a continuously-open draft-flue, B F, that has a valve near each end, provided with valves N just above said flue, and above these valves connected by cross-pipes, all as shown and described, so that all the flues M will empty into a continuous tube, being thus easily cleaned, and a direct or indirect draft being had, as wanted.

EMERSON C. ANGELL.

Witnesses:

T. B. MOSHER,
ALEX. F. ROBERTS.