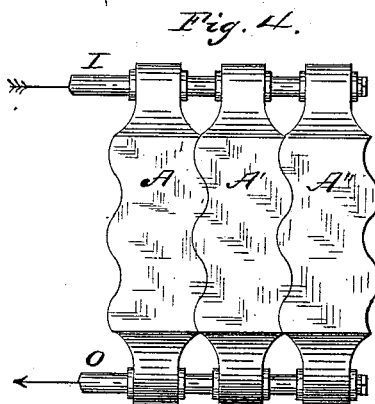
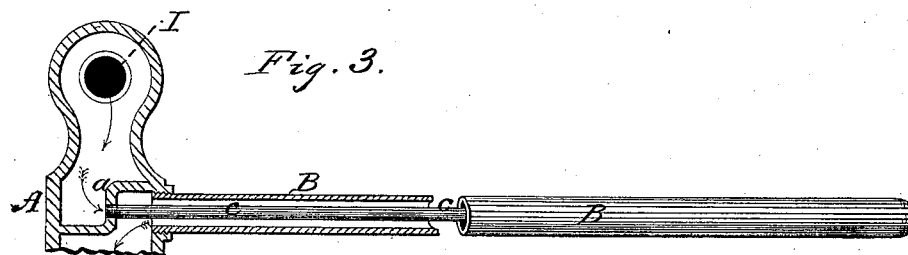
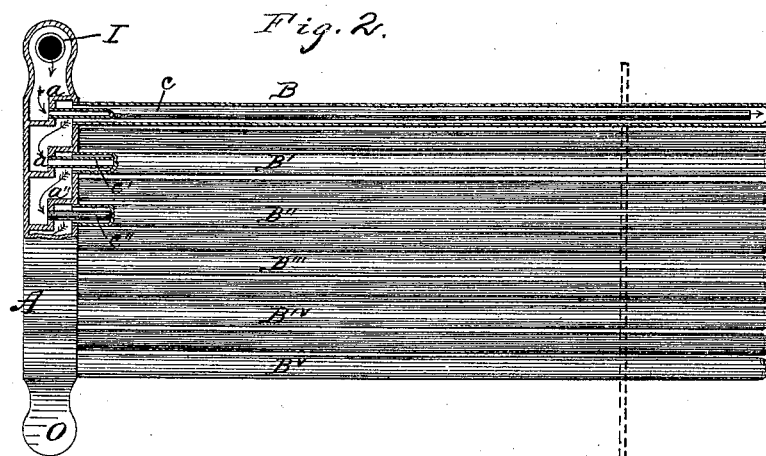
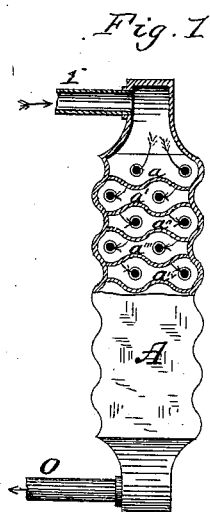


J. T. KELLY.  
Steam-Radiator.

No. 215,823.

Patented May 27, 1879.



Witnesses.

J. A. Pollock.  
G. Smith.

John T. Kelly, Inventor  
by C. M. C. & M. C. Attorneys.

# UNITED STATES PATENT OFFICE.

JOHN T. KELLY, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN STEAM-RADIATORS.

Specification forming part of Letters Patent No. **215,823**, dated May 27, 1879; application filed January 27, 1879.

*To all whom it may concern:*

Be it known that I, JOHN T. KELLY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Radiators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 is an end view of the steam-box, partly sectional. Fig. 2 is a side view, partly sectional. Fig. 3 is an enlarged detail. Fig. 4 shows three headers matched to make a large radiator.

This invention has reference to the construction of steam-radiators of that class in which steam enters a chamber, and thence passes out into and through a series of horizontal pipes, heating them and the surrounding air both by convection and radiation.

Two difficulties have been encountered in the construction of these radiators. They have been built in two ways: in one the radiator is formed by zigzagging a number of lengths of pipe, forming the old-fashioned "box-coil," and in the other a vertical steam-box, having a diaphragm down its center, is fitted with a number of horizontal pipes screwed into one side of the box, their outer ends being closed. Inside each of these pipes is a smaller pipe, open at both ends, passing into the steam-box and screwing into an opening in the diaphragm. The inlet is at the top of the box, on that side of the diaphragm which communicates with the smaller pipes, and the outlet is at the bottom, on the opposite side of the diaphragm.

As to the box-coil, its difficult construction, its cost, and inaccessibility to repair are all well known. As to the second form, there can be no forced and direct circulation of steam through every one of the series of pipes, because the steam can and will pass through the inlet-chamber and directly into the lowest of the small pipes, through it, and back through its surrounding pipe, whence it passes to the outlet, thereby leaving the other pipes untraveled.

Therefore the main portion of such a radiator is useless.

I improve this by my invention, which consists in discarding the central diaphragm and substituting a series of horizontal partitions of peculiar form, and so arranging them relatively to the larger and smaller pipes, inlet and outlet, that the steam must pass first into the nearest small pipe, thence to its surrounding large pipe, and thence into the next small pipe, and so on, the steam having but one pathway successively through each pipe in turn, until it finally reaches the outlet.

More particularly, my invention is as follows: A designates the steam-box or header, having the inlet I and outlet O, as usual. Into appropriate threaded holes in one side of the steam-box A are screwed the pipes B, having their outer ends closed, as shown. The interior of the steam-box is constructed with a number of chambers, one above the other, formed by the horizontal partitions *a*, developed by two horizontal portions projecting at different points from opposite sides, and connected by a central vertical portion, as shown. Each of the partitions *a* shuts off communication between the chamber above it and that below it; but I establish an indirect communication between each chamber and the chamber below it by having an opening in the vertical portion of the partition in line with the pipes B, and screwing the small interior pipes, *c*, into said holes. This is done before placing pipes B in position.

Thus constructed, the operation is as follows: Steam, entering the inlet I, arrives in a chamber from which there is no outlet save through the small pipe *c*. Taking this path, it traverses the pipe *c*, back through pipe B, into the second chamber, formed by the first and second partitions. Here it takes the only outlet, pipe *c'*, comes back through pipe B', and into the third chamber; and so on through one pipe after another until it finally reaches the outlet. In this way the circulation is forced at every point, and the full heating capacity of the radiator is attained. The lateral pipes are slightly inclined toward the header to drain the water of condensation.

Instead of a single vertical series of pipes,

the header may be made to receive two or more pipes in each chamber, as shown in the drawings.

The headers are matched together, as in Fig. 4, with waving edges, so that from a single pattern radiators of varying capacity and size may be made.

What I claim as my invention is as follows:

In a steam-radiator comprising a system of horizontal external and internal pipes, B c, respectively, the combination therewith of a steam-box, A, having the inlet located at its upper port, I, and the exit at its lower port, O,

and having the bent partitions *a a'* dividing said box into compartments, with which the pipes B and c alternately communicate, whereby the steam is caused, in each course, to pass outward through the smaller and return through the larger pipes, as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN T. KELLY.

Witnesses:

T. J. MCTIGHE,

JAS. H. JOHNSTON.