

(No Model.)

W. EARLEY.
PORTABLE HEATER.

No. 408,469.

Patented Aug. 6, 1889.

Fig. 1.

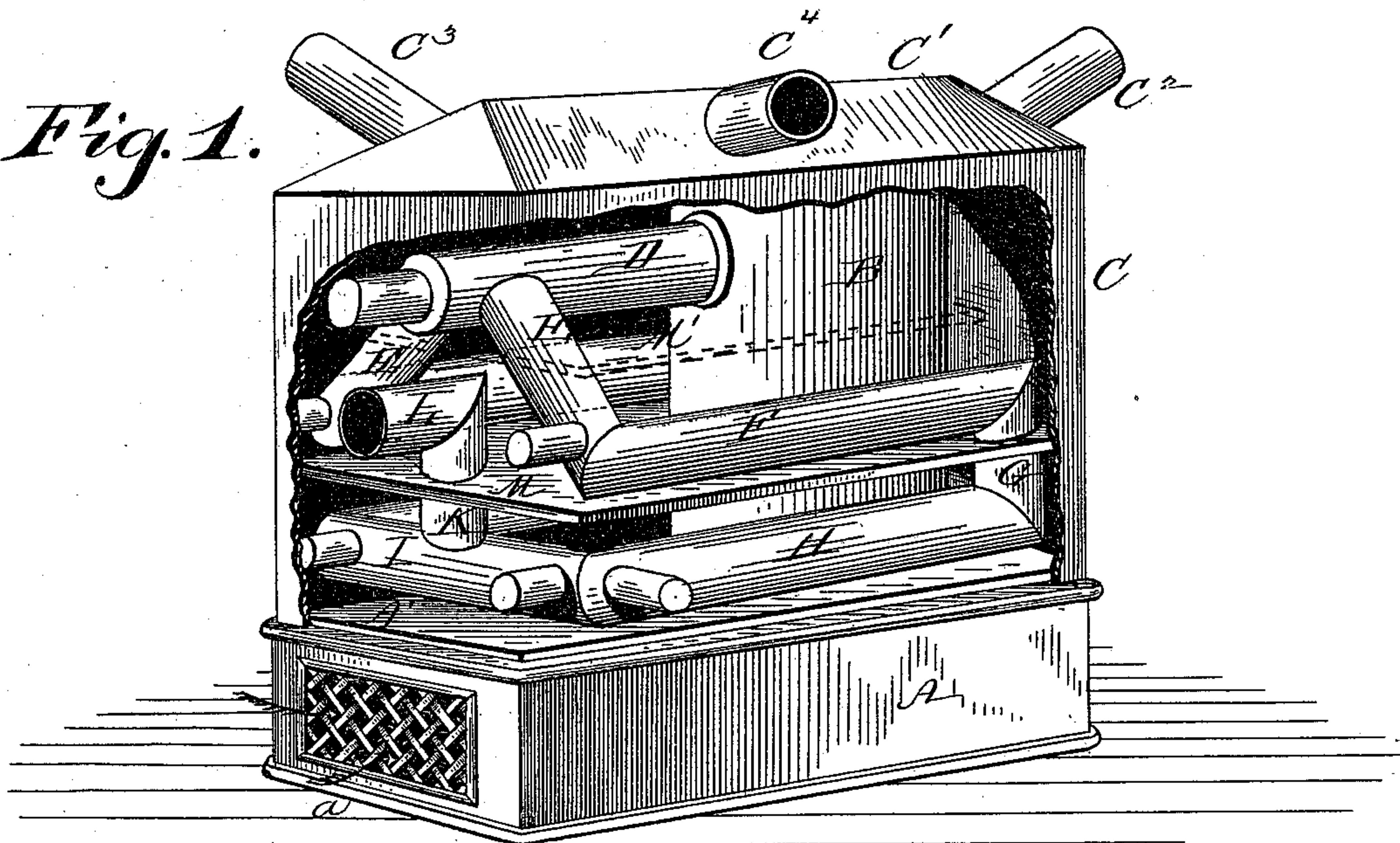
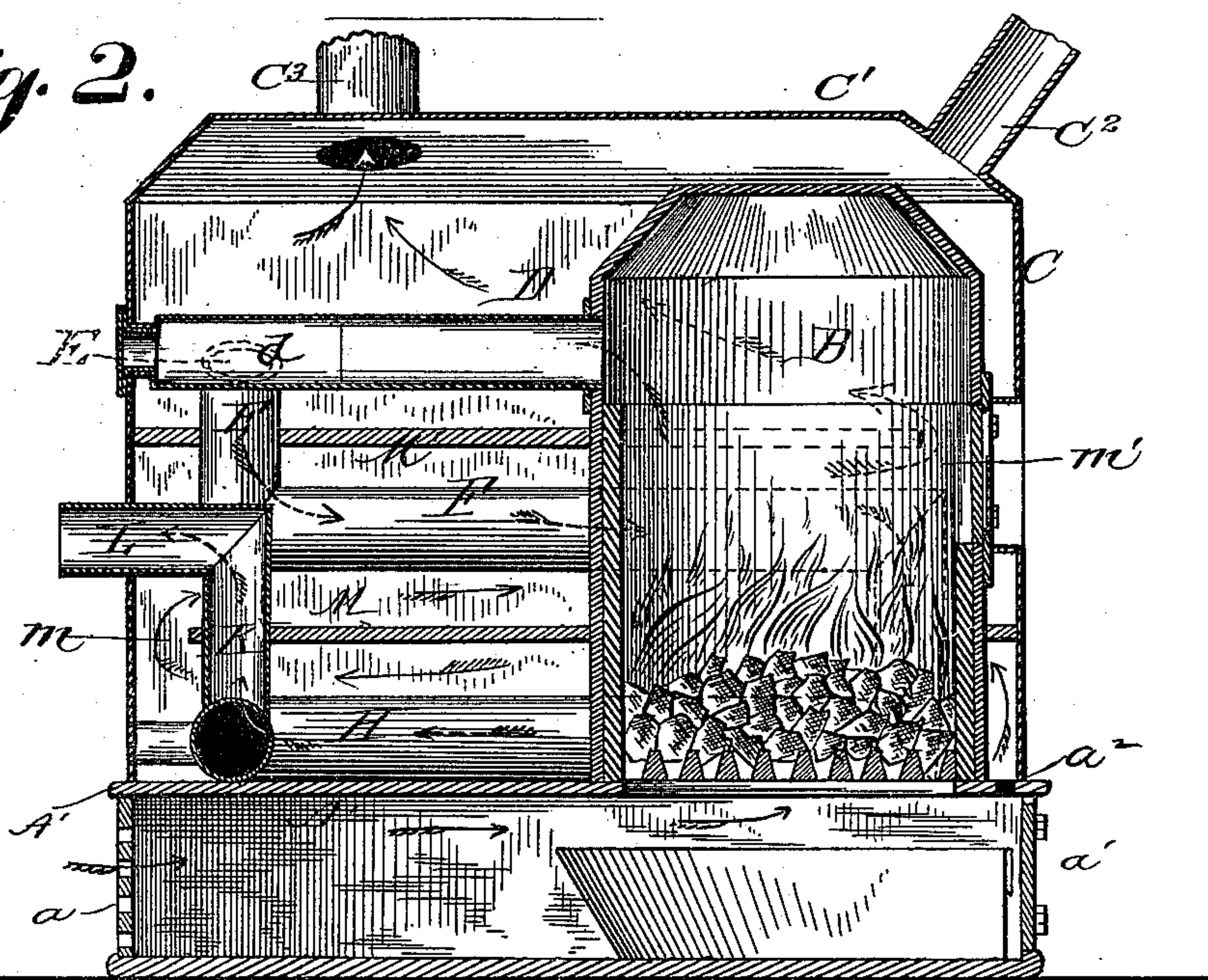


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PORTABLE HEATER.

SPECIFICATION forming part of Letters Patent No. 408,469, dated August 6, 1889.

Application filed August 22, 1888. Serial No. 283,418. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EARLEY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Portable Heaters; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 the letters and figures of reference marked thereon, which form a part of this specification.

My invention has relation to portable heaters, and has for its object the provision of a heater of novel form and construction, wherein a greater area of radiating-surface is exposed to the air passing through the air-heating space of the furnace than in heaters of the ordinary construction, and without increasing the capacity of the fire-box or the consumption of fuel.

Heretofore in heaters of the above class the products of combustion have in some cases been caused to pass directly from the fire-box to the chimney, while in others said products pass through a series of vertical or horizontal drums arranged within a suitable air-chamber, the air therein passing directly from its inlet to its outlet before it becomes thoroughly heated.

In carrying my invention into effect I employ a series of horizontal drums or pipes so arranged relatively to the fire-box of the heater and the chimney that the products of combustion will pass to and fro on both sides of the fire-box from a point in the rear of the same to a point in front or in a line with the front of the fire-box, and will descend from one such horizontal drum or pipe to the one next below, thus traveling in an opposite direction to the direction of the incoming cold air.

In addition to the horizontal drums or pipes arranged as above described, I provide a series of horizontal metallic partitions so arranged between adjacent drums as to divide the air-space of the heater into a number of horizontal passages communicating with each other at alternate ends, so that the incoming cold air will be caused to follow a sinuous path around and with said drums, thus thor-

oughly heating the air before it reaches the flues and effecting a great saving in the quantity of fuel consumed, and to travel in opposite direction to the outgoing products of combustion.

My invention consists in the novel arrangement of the pipes or drums for conveying the products of combustion from the fire-box to the chimney, in the novel construction and arrangement of the flues or passages for conveying the incoming cold air through the air-space, and in the novel construction, combination, and arrangement of parts hereinafter described and specifically claimed.

Referring to the accompanying drawings, Figure 1 is a perspective view of my improved portable heater with a portion of the exterior casing broken away and one of the horizontal partitions of the air-space removed to show the arrangement of the smoke-pipes, and Fig. 2 a vertical longitudinal sectional view of the same.

As shown in the drawings, the heater-casing is in the form of a parallelogram, for the reason that it permits of the proper arrangement of pipes and flues necessary to the accomplishment of the objects of my invention within a comparatively small space.

A designates the base of the heater, consisting of a cast-iron frame with sheet-iron sides and ends and having a suitable air-inlet *a* and ash-pan door *a'*.

B designates the fire-box, comprising a cylindrical metallic shell lined with fire-brick and provided with the usual grate, ash-box, &c.

C designates the exterior casing of the heater, conforming in shape to the base A and provided with the dome C' and hot-air flues C² C³ C⁴.

The fire-box B is arranged as closely as may be convenient to one end of the casing, and having extending from near the top and at the rear of the same a horizontal smoke-pipe D, that is divided near its rear end by a vertical partition *d*. Upon each side and near the rear end of pipe D are laterally and downwardly projecting pipes E E, jointed to horizontal pipes F F, that extend forward to or nearly to the front of the heater, passing between the fire-box B and the exterior casing C.

At their forward ends the pipes F F com-

municate, by short vertical pipes G G, with
 horizontal pipes H H, which extend from the
 front to near the end of the casing C, parallel
 with and of the same length as pipe E, and
 5 are connected by a horizontal pipe I at right
 angles therewith, and having at its center a
 vertical pipe K, with a horizontal connection
 L, leading out through the casing C to the
 chimney. The direction of travel of the pro-
 10 ducts of combustion through the pipes D E
 E F F G G H H I K to the chimney is indi-
 cated by the arrows therefor in dotted lines.
 The object of the vertical partition d in the
 pipe D is to divide the products of combus-
 15 tion as evenly as possible between the pipes
 on each side of the fire-box.

The base A is surrounded by a plate A',
 having ports a^2 a^2 near the front of the
 heater for the admission of air which has be-
 20 come partially heated in its passage through
 the base and between the grate and ash-pan.
 Parallel with the plate A', I arrange a sheet-
 metal partition M, which extends over the
 pipes H H from the front of the exterior cas-
 25 ing C almost to the back of the same, leaving
 a space m between the rear edge of said par-
 tition and said casing for the passage of the
 air into the next-above space, said partition
 also being formed with suitable holes for the
 30 passage of the vertical pipes G G K and the
 fire-box B.

Above the horizontal pipes F F is arranged
 a second horizontal partition M', that extends
 from the rear of the exterior casing almost to
 35 the front of the same, leaving a space m' simi-
 lar to space m between the front edge of this
 partition and said casing, allowing of the
 passage of the now hot air into the dome C'.
 Said partition M' also is formed with holes for
 40 the passage of the fire-box B and the slanting
 pipes E E.

The horizontal partitions M M', in connec-
 tion with the plate A' and the dome C' of the
 heater, divide the air-space of the heater into
 45 horizontal flues communicating with each
 other at alternate ends, and through which
 the air follows a sinuous path in opposite di-
 rections to the products of combustion and
 all the while in contact with the pipes through
 50 which the latter is conveyed.

The direction of travel of the products of

combustion, as before suggested, is indicated
 by dotted arrows in the drawings, while that
 of the air-currents is indicated by full ar-
 rows. By the employment of the horizontal 55
 smoke-pipe and the horizontal partitions I
 claim that within the same cubical space a
 much larger extent of effective radiating-sur-
 face is obtainable than where the smoke or
 combustion flues are constructed and ar- 60
 ranged as in the ordinary manner—that is, in
 a vertical position and without the horizon-
 tal partitions which I employ.

While I have shown and described but two
 sets of horizontal pipes F F G G and but two 65
 horizontal partitions M M', it is obviously
 within the spirit of my invention to increase
 the numbers of pipes and partitions, if found
 necessary or expedient; but I prefer the ar-
 rangement specifically shown and described. 70

I am aware that a heater has heretofore
 been constructed with a chamber at the rear
 of the fire-box divided by an S or similarly-
 shaped sheet of metal secured to the sides of
 said chamber into two broad and shallow 75
 tortuous heat and air passages of similar curv-
 ature, and having in their concavities shelves
 secured to said sides. Therefore I do not wish
 to be understood as claiming, broadly, such a
 construction; but 80

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

In a portable heater, the combination, with
 the fire-box B in the casing C, having the
 dome C', with hot-air outlets, mounted on the 85
 base A, with the cold-air inlet a , of the pipe
 D, with the partition d therein, leading from
 the rear of said fire-box and communicating
 with the branches E E of the pipes F F, which
 pipes communicate with the branches G G of 90
 the pipes H H, which latter communicate with
 the smoke-outlet L through the pipe I and its
 branch K, the plate A', mounted on the base
 A, and the plates M M', sustained in the cas-
 ing C, having the inlets a^2 , m , and m' at alter- 95
 nate ends, as and for the purpose described.

In testimony whereof I affix my signature in
 presence of two witnesses.

WILLIAM EARLEY.

Witnesses:

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THEO. H. M'CALLA.