

(No Model.)

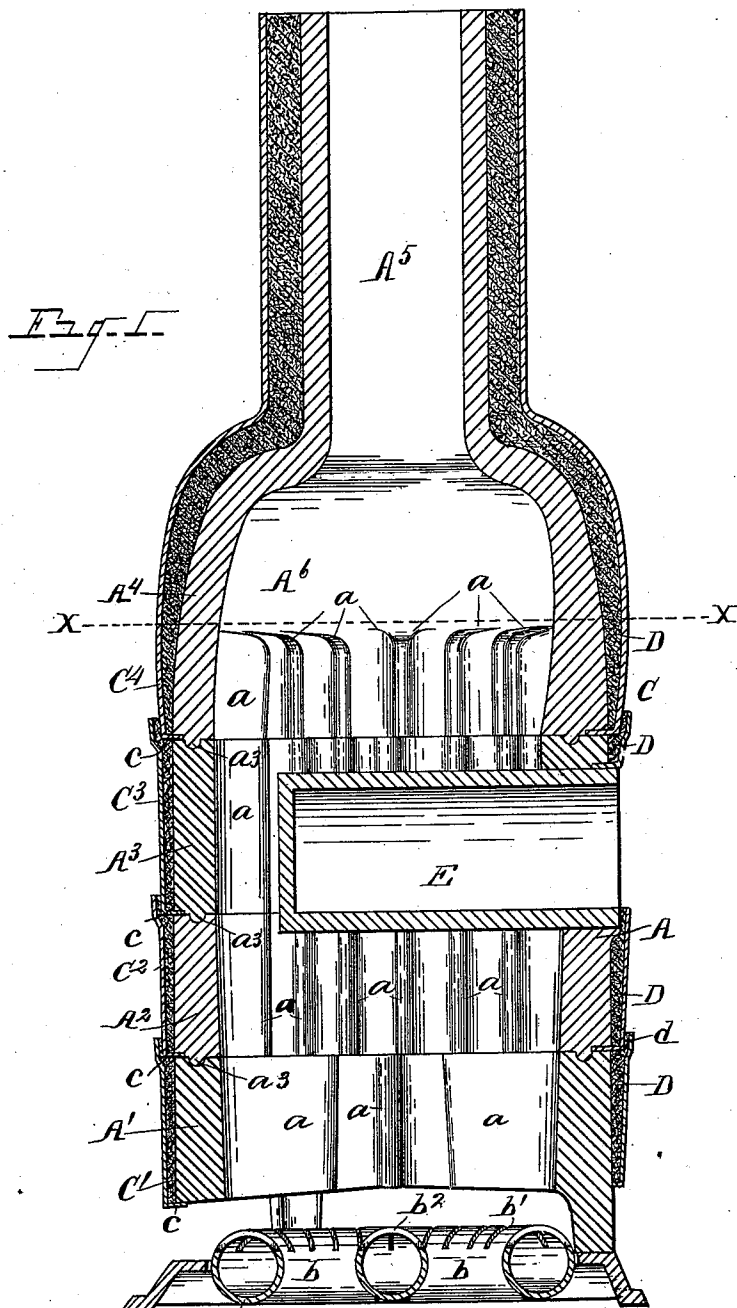
2 Sheets—Sheet 1.

C. H. LAND.

REFRACTORY AND NON-CONDUCTING HEAT MAGAZINE.

No. 528,272.

Patented Oct. 30, 1894.



WITNESSES

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His Attorney.

(No Model.)

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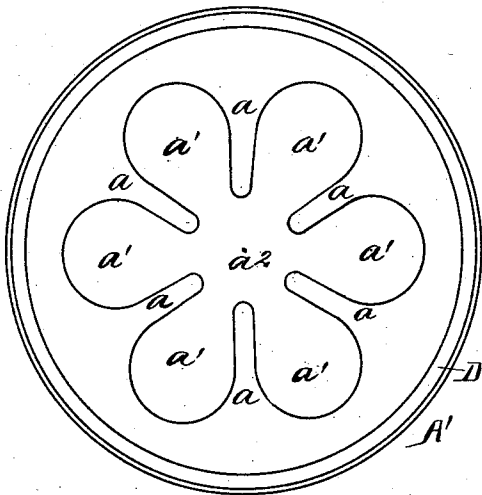


Fig. 2.

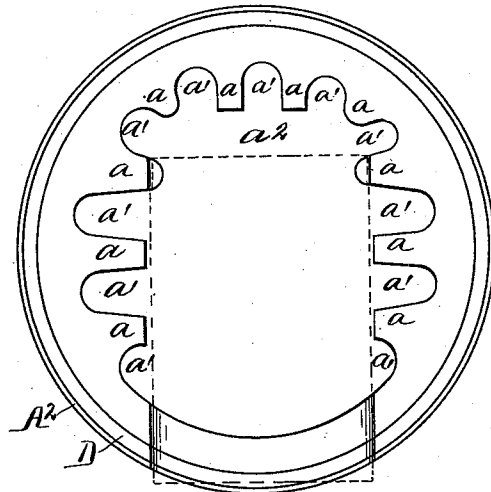


Fig. 3.

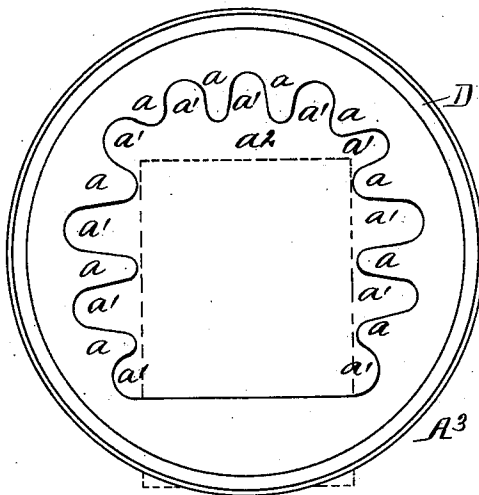


Fig. 4.

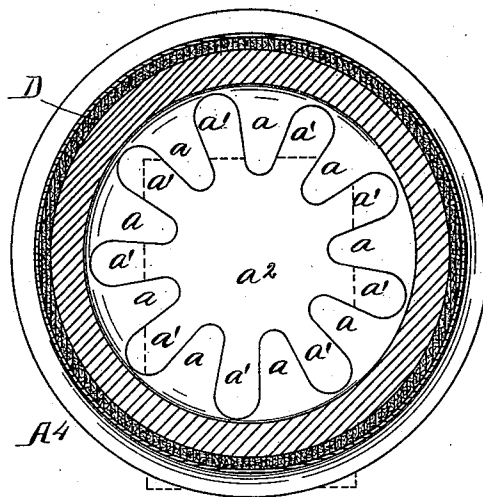


Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES H. LAND, OF DETROIT, MICHIGAN.

REFRACTORY AND NON-CONDUCTING HEAT-MAGAZINE.

SPECIFICATION forming part of Letters Patent No. 528,272, dated October 30, 1894.

Application filed September 29, 1893. Serial No. 486,786. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. LAND, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Refractory and Non-Conducting Heat-Magazines; and I 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, which form a part of this specification.

My invention has for its object a refractory and non-conducting heat magazine for securing more perfect combustion and super-heating flame, the same being constructed and combined, in the example shown herewith, to form a furnace.

The device embodying my invention is designed for the purpose of accumulating, holding and concentrating the heat originating from combustible substances, more especially, such as coal-gas, natural gas, petroleum, or the vapor of gasoline.

My invention consists of the construction, combination and arrangements of devices and appliances herein specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section. Fig. 2 is a plan view of the lower or first magazine section. Fig. 3 is a plan view of the second section of the magazine. Fig. 4 is a plan view of the third magazine section, and Fig. 5 is a horizontal section of the upper or fourth magazine section on the line $x-x$ of Fig. 1.

I carry out my invention as follows:—A is a heat magazine constructed of refractory material adapted to accumulate, concentrate, store up, and hold heat. I prefer to construct this magazine in several sections imposed one upon another in the order shown.

A' is the lower section; A², the next or second section located upon the lower section. A³ is the third or next higher section, and A⁴ is the upper or fourth section. Each of these sections is constructed, preferably, of fire-brick, provided with a series of partitions, or calefactory walls, projecting well inward toward the center, so constructed and arranged as to form a central contracted draft-open-

ing and outer spaces or flues thereabout, communicating therewith. I construct the lower section A' with a series of refractory partitions or walls "a" located therein preferably arranged in radial lines, adapted and designed to secure more perfect combustion, the partitions being designed and constructed so that the flame may readily pass therebetween, and upward through the flues formed thereby. Thus the partitions "a" may be so constructed as to form spaces, or flues, "a'" therebetween. These spaces are preferably enlarged toward the exterior of the magazine, the same having contracted openings between the extremities of the partitions communicating with the central flue or passage a².

The second section of the magazine A² carries out the same principle of construction although the partitions "a" may be modified in form to receive a suitable receptacle, as a muffle E, or in other instances a crucible. The muffle if employed, is supported at one end upon the outer wall of the section and at the inner end the adjacent partitions may be extended and shaped to form supports for the muffle.

The third section A³ is cut away to set over the outer end of the muffle and permit free access thereto. The upper section A⁴ is of analogous construction to the lower section of the magazine. The upper portion of this section communicates with a flue A⁵ which may lead to a chimney. The space A⁶ at the top of the section A⁴ is designed to make plenty of room for the free passage of the flame and also get more distance for the radiation of heat back on the muffle.

B is a burner located below the lower section A'. This burner may be of any suitable construction. I prefer to employ a burner so constructed and arranged as to cause the outer or greater mass of flame to pass upward through the outer flues "a'", and a central flame passing upward mainly through the central flue a².

The burner shown is constructed with one or more air passages "b" to admit an excess of air between the outer and inner flames, above mentioned. This burner may be constructed of a series of ordinary Bunsen burners or of an ordinary slotted burner as shown

in the drawings. The burner which is shown is formed with an exterior annular set of orifices as shown at b' , and with an interior set of central openings as shown at b^2 . The air passages " b " open between the exterior and interior set of orifices so as to supply the greatest volume of air between the exterior and interior flames and into the interior flue a^2 of the magazine, whereby said magazine with its partitions or walls " a " and the central flame, becomes highly superheated. It will be seen that the passage of the flames upward through the outer passages " a' " and central flue a^2 heats the partitions " a ," which are made thin at their inner extremities, into incandescence; and it will also be seen that the central flame becomes superheated through this agency to such an extent that the excess of oxygen drawn into the central opening a^2 through the air passage " b " causes the perfect combustion of every atom of carbon in the central flame.

I have designated the apparatus above described as a heat magazine for securing more perfect combustion and superheating flame, for the practical reason that in the particular arrangement of its parts, the functions sought after are secured by these particular features of construction, and the new functions secured are entirely within itself, in connection with the burner, the same being useful for many purposes, outside of a mere furnace, as for example in stoves, grates, &c., for heating buildings.

It will be evident that the burner alone cannot of itself produce the high heat efficiency above described, as the superheating of the central flame, the accumulation, concentration, storing and holding of the heat are caused by the construction of the heat magazine alone. The partition walls " a " are so constructed that the flame in passing upward therebetween and thereabout through the outer flues and central flue converts them into incandescent points and being made of non-conducting refractory material, and arranged with numerous air spaces " a " therebetween, communicating with the central flue, the essential features are furnished by this construction to form a heat magazine of highest efficiency.

I contemplate making the various sections of the heat magazine in duplicate so that the parts can be readily renewed whenever desired. I would have it understood also, that while I have shown and described the heat magazine as made in various sections, I do not limit its construction to any particular number of sections nor indeed do I limit myself to the construction of the magazine whether of a single integral structure or in sections as coming within the scope of my invention.

In the drawings I have shown the heat magazine surrounded by a metal jacket C. This metal jacket may also be constructed in sections C' , C^2 , C^3 , and C^4 corresponding to

the sections of the magazine. The sections of the jacket may be constructed with inwardly directed flanges " c " at their base to project inward between the edges of the corresponding magazine sections. This will facilitate the firmness of the construction of the whole and yet allow the jacket to be removed, or such portion thereof as may be necessary, in repairing the magazine. Between the metal jacket sections and the corresponding magazine sections, may be interposed a layer of asbestos D, or other suitable material which will also add to the stability of the entire construction. So also the adjacent edges of the magazine sections may have a groove and tenon engagement, one with another, as shown at a^3 .

I prefer to make the metal jacket sections flaring outward at the top to facilitate the introduction of the asbestos between the adjacent sections. I prefer also that the metal jacket sections should telescope one another loosely leaving room indicated by the heavy line at " d " for asbestos therebetween to make an air-tight joint.

It is well understood that metal coming in contact with the flame of combustion, the metal being a conductor of heat, chills the carbon in the flame and prevents perfect combustion, while a non-conducting substance, such as fire-brick, has a tendency to hold and concentrate the heat, thereby accumulating and storing the heat, so that the carbon in the flame is more readily consumed in consequence. For this reason I have devised the above described heat magazine made of refractory material provided with non-conducting, calefactory walls or partitions projecting well inward toward the center into the midst of the combustion chamber, in order to hold and concentrate and store up the heat and thereby maintain a high degree of heat therein sufficient to enable the oxygen to combine freely with the carbon, which it does not readily and perfectly do in the use of the ordinary metallic linings. It is thus evident that the zone of the flame is throughout the central and outer communicating flues, so that the inner ends of the partitions or walls form calefactory points within the central portion of the zone of the flame.

What I claim as my invention is—

1. The heat magazine herein described, constructed of refractory material with walls or partitions projecting inward close to the center of the magazine, forming a central flue and surrounding flues opening thereinto, the inner ends of said partitions or walls forming calefactory points within the central zone of the flame, and said magazine having in combination therewith a receptacle located therein supported upon the inner ends of portions of said calefactory points and closely surrounded by other of said calefactory points, substantially as set forth.

2. A heat magazine constructed of refractory material having lateral partitions or

walls projecting inward close to the center of the magazine, forming a central contracted flue and outer deeply recessed flues communicating with the central flue, a burner or
5 heater extending beneath the central flue and the outer flues, said flues open at the base and top to admit the passage of flame and air through the central and outer flues, the inner
10 ends of said partitions or walls forming calefactory points within the central zone of the flame, substantially as set forth.

3. In combination a heating device and a heat magazine constructed of refractory material having inwardly projecting partitions
15 or walls forming a central contracted flue and

interior flues communicating therewith, the inner ends of said partitions or walls forming calefactory points within the central zone of the flame in said magazine, the central and outer flues receiving the flame from the heat- 20 ing device, and air inlets into said outer flues and interior flues, and between the flame admitted into the outer flues and central flue, substantially as set forth.

In testimony whereof I sign this specifica- 25 tion in the presence of two witnesses.

CHARLES H. LAND.

Witnesses:

N. S. WRIGHT,
H. R. WHEELER.