

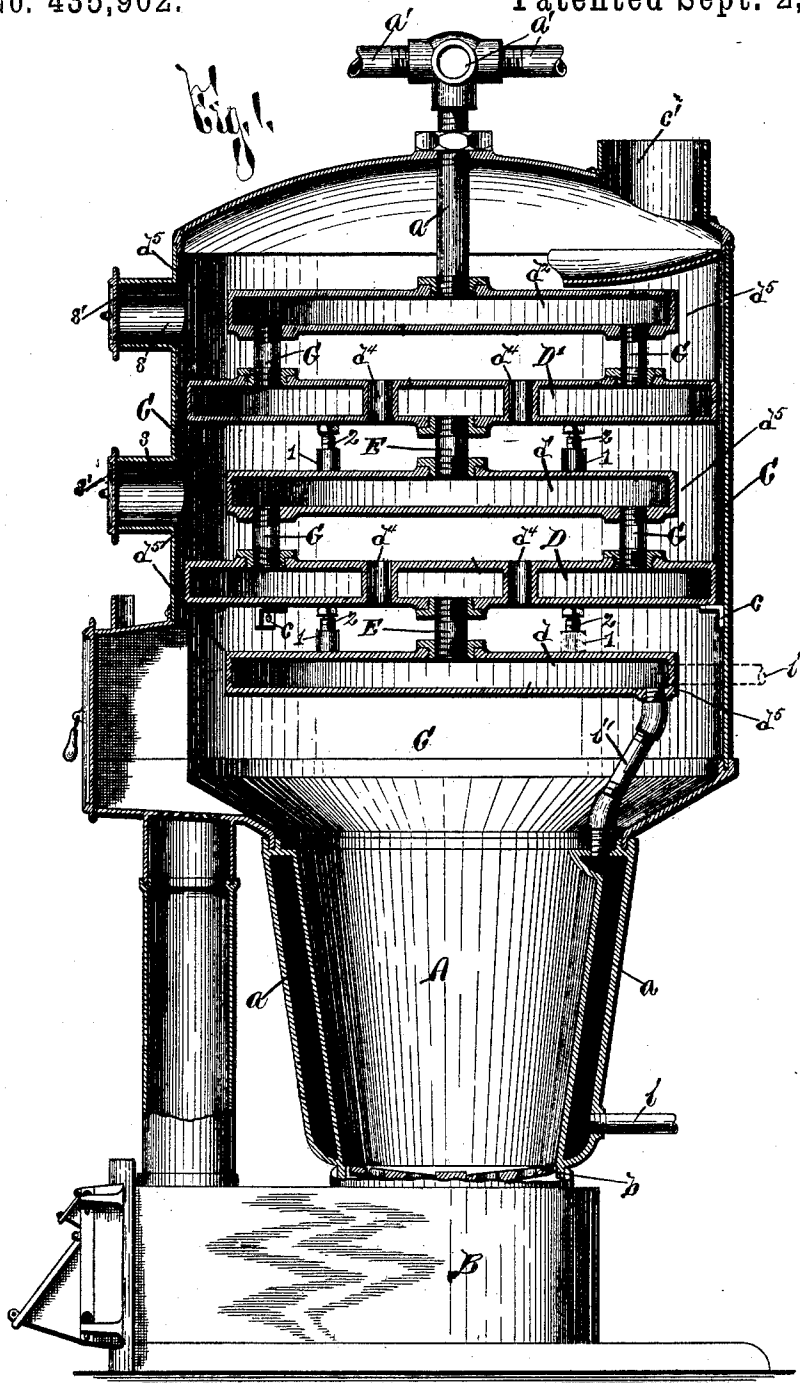
(No Model.)

2 Sheets—Sheet 1.

J. F. PEASE.  
FURNACE.

No. 435,902.

Patented Sept. 2, 1890.



Witnesses.  
H. C. Chase,  
Wm. H. Randall,

Inventor.  
John F. Pease  
by  
Hoy, Wilkin & Jacobs  
Attorneys.

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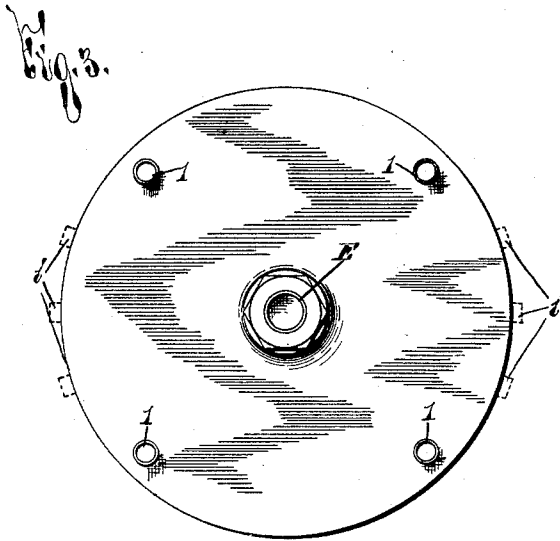
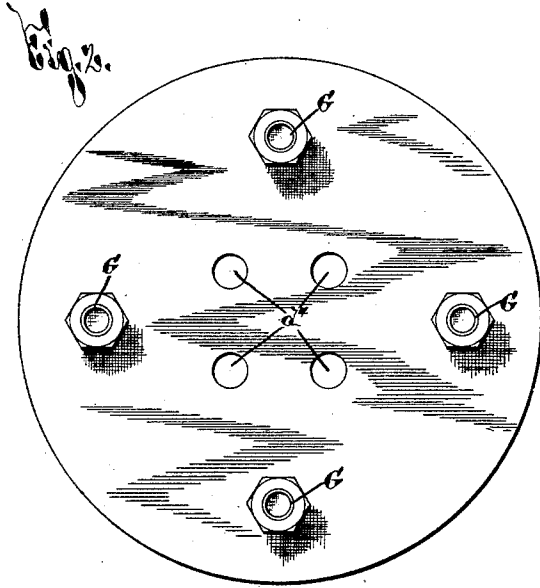
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# UNITED STATES PATENT OFFICE.

JOHN F. PEASE, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE J. F. PEASE  
FURNACE COMPANY, OF SAME PLACE.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 435,902, dated September 2, 1890.

Application filed April 7, 1890. Serial No. 346,850. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. PEASE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful  
5 Improvements in Furnaces, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to an improved heater,  
10 and has for its object the production of a simple and effective construction whereby the heat is generated quickly and is utilized to the greatest extent; and to this end it consists,  
15 essentially, in a suitably-constructed combustion chamber or box, an outer shell above said box, a series of shallow disk-shaped chambers within said outer shell and superimposed one above the other with a space between them;  
20 water-passages connecting the central part of each pair of said chambers; water-passages connecting the adjacent chambers of each separate pair near their outer side, whereby  
25 the water passes from the center to the outer side in one chamber and vice versa in another, thus rising in a zigzag course through the several heating-chambers; air-passages  
30 at the outer side of part of and preferably every other one of said chambers and through the central part of the remaining or alternate chambers for passing the products of combustion over the separate chambers in a zigzag course, whereby the heat is utilized to the  
greatest extent.

The invention also consists in the detail  
35 construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

In describing my invention, reference is had  
40 to the accompanying drawings, forming a part of this specification, in which like letters and figures indicate corresponding parts in all the views.

Figure 1 represents a vertical section of my  
45 improved furnace with the outer case removed. Fig. 2 is a top plan view of one of the water-heating chambers or disks, and Fig. 3 a top plan view of another of said chambers.

A represents the combustion box or chamber,  
50 which may be of any suitable form, size, and construction, and is here shown as formed

or provided with a water-leg *a*. As illustrated, this water-leg extends from the top to the bottom of the combustion-chamber and entirely surrounds the same; but the size of  
55 the same is immaterial, since, if desired, it may surround only a portion of the chamber or, indeed, may be dispensed with entirely.

The combustion-chamber *A* is mounted above any suitable construction of ash-box *B*,  
60 provided with a suitably-constructed grate *b*.

Mounted above the combustion-chamber is a shell *C*, within which are secured by suitable lugs or other support *c* the hollow disk-shaped chambers for receiving and heating  
65 the water. These heating-chambers are of greater diameter or area in their horizontal than their vertical plane for presenting a great surface to the passing products of combustion, and as preferably constructed are  
70 composed of a series *D* and *D'* of a horizontal diameter or area, but slightly less than that of the outer shell *C*, and a second series *d* *d'* and *d<sup>2</sup>* of less diameter. The chambers  
75 *D* and *D'*, as shown, are of substantially the same form as the combustion box or chamber, and only sufficiently smaller to allow of their ready entrance therein, in order to prevent  
80 the upward passage of the products of combustion between said chamber and shell, and, as best seen in Fig. 1 of the drawings, are provided at their central part with passages  
85 or apertures *d<sup>1</sup>*, through which the products of combustion pass to their upper surface. The chambers *d*, *d'*, and *d<sup>2</sup>* are of substantially the same form, and, as previously stated,  
90 of less diameter or area than the chambers *D* and *D'*, and it will thus be seen upon reference to the drawings that a passage *d<sup>2</sup>* is formed at the outside thereof for permitting  
95 the products of combustion when passed to the top of the chambers *D* or *D'* to thence circulate outward between said chambers and the one next above, and then return toward  
the center of the furnace and pass upward above the superimposed chamber and escape  
100 through the smoke-pipe (not illustrated) leading from the heater and mounted on the nipple *c'*. This construction of the parts compels the products of combustion to pass in a zigzag course between the separate chambers

and prevents a premature discharge or excessive rapid passage of the same and a consequent loss of heat. Moreover, the said chambers present a very large surface to the passing current, and thereby cause the water within the heating-chambers to be quickly heated with a minimum amount of fuel.

Connecting the center of each pair  $d$  and  $D'$ ,  $D$  and  $D'$  of the heating-chambers is a water pipe or passage  $E$ , and connecting the outer side of the adjacent chambers of each pair are water-passages  $G$ . It will thus be understood that the water within the heating-chambers also passes from the center to the outer side of one chamber and vice versa in another, and that this is a further feature of advantage in my improved heater, whereby great efficiency is produced.

Connected to the upper part of the highest chamber  $d^2$  is the hot-water pipe  $a$ , which by means of branch pipes  $a'$  distributes the heated water to the desired locality. The water, having been passed to the radiators in the usual manner, is returned by means of a pipe or pipes  $i$  and discharged into the water-leg  $a$ , whence by the pipe or passage  $v'$  it is conducted to the heating-chambers, thus forming a continuous circuit for raising the temperature of the water to the desired degree to produce the required heat.

As previously described, and as illustrated in the drawings, the chambers  $d$   $d'$   $d^2$  are connected to the superimposed chambers  $D$  and  $D'$  at their central part by a pipe  $E$ , which, being a water-passage in a hot-air chamber, must necessarily be sufficiently tight to prevent leakage of the water, and it will readily be understood that as the weight of either the lower or the higher chamber must rest upon the said pipe it would necessarily become cramped, and the weight would greatly tend to loosen the joint. To obviate this difficulty, I provide on one of said chambers, and as illustrated on the chambers  $d$  and  $d'$ , bearings 1, in which are guided the movable supports 2. After the separate chambers are operatively assembled these movable supports are screwed outward and forced to bear against the under side of the superimposed chambers for supporting the same and preventing all undue straining of the pipe  $E$ . It will readily be understood that when the water-leg  $a$  is dispensed with the return-pipes  $i$  discharge into the lowest section  $d$  without further change in the construction of my improved furnace.

In order to clean the disks, I provide openings  $s$ , of suitable number and size, closed by suitable doors  $s'$ , and as preferably constructed the opening or openings  $s$  are arranged opposite to the chambers  $d'$  and  $d^2$ , for preventing any deflection in the described path of the products of combustion, as would be the case if said opening were arranged opposite to the chambers  $D$  and  $D'$ .

The operation of this heater will be readily perceived from the foregoing, and it will be

understood that the same presents features of advantage and novelty which are desirable, useful, and practical; that the said heating-chambers can be very readily and cheaply constructed of cast metal when so desired; that any desired height thereof may be produced by adding to the number of water-containing chambers, and that a maximum amount of heat is effected with a minimum degree of fuel. It will be understood, however, that I do not limit my invention to the precise detail construction and arrangement of the parts, since the same may be somewhat varied from that described without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a heater, the combination of a combustion-chamber, an outer shell above said chamber, a shallow disk-shaped chamber within the outer shell and of substantially the same diameter as the same, flues passing through the said chamber, and a second disk-shaped chamber directly above the combustion-box and beneath the first chamber, said latter chamber being of less diameter than the outer shell, whereby the products of combustion surround the latter and pass through the flues in the former chamber, substantially as set forth.

2. In a heater, the combination of a combustion-chamber, an outer shell above said chamber, a shallow disk-shaped chamber within the outer shell and of substantially the same diameter as the same, flues passing through the said chamber, a second disk-shaped chamber between the first chamber and the combustion-box and formed of less diameter than the outer shell, whereby the products of combustion surround the latter and pass through the former chamber, a third disk-shaped chamber above said first chamber, and water-passages opening into the center of said first chamber from the chamber on one side thereof and opening into the outer side of said first chamber from the chamber on the opposite side thereof, substantially as described.

3. In a heater, the combination of a combustion-chamber, an outer shell mounted above said chamber, a series of disk-shaped chambers superimposed one above the other at intervals within said outer shell and of substantially the same diameter as said shell, flues passing through said chambers, a second series of shallow disk-shaped chambers of less diameter than the former series and alternately interposed between said former series of chambers, whereby the products of combustion pass in zigzag course and surround the chambers of less diameter, water-passages opening from the center of the second series of chambers into the center of the chamber on one side thereof, and water-passages opening from the outer side of said second series of chambers into the chamber on the opposite

side thereof, whereby the water passes in zig-zag course, substantially as specified.

4. In a heater, the combination of an outer shell having a combustion-chamber, a pair of  
5 shallow disk-shaped heating-chambers suspended above said combustion-chamber within said outer shell, a support on said outer shell for one of said chambers, a water-connection at the central part of said chambers  
10 for connecting them together, sockets on one of said chambers on the outside of said central connection, and supports movably mounted in said sockets and adapted to be moved into contact with the adjacent surfaces of the

other of said chambers for supporting the 15 same and preventing strain on said central connection, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 1st day of April, 1890. 20

JOHN F. PEASE.

Witnesses:

CLARK H. NORTON,  
H. E. CHASE.