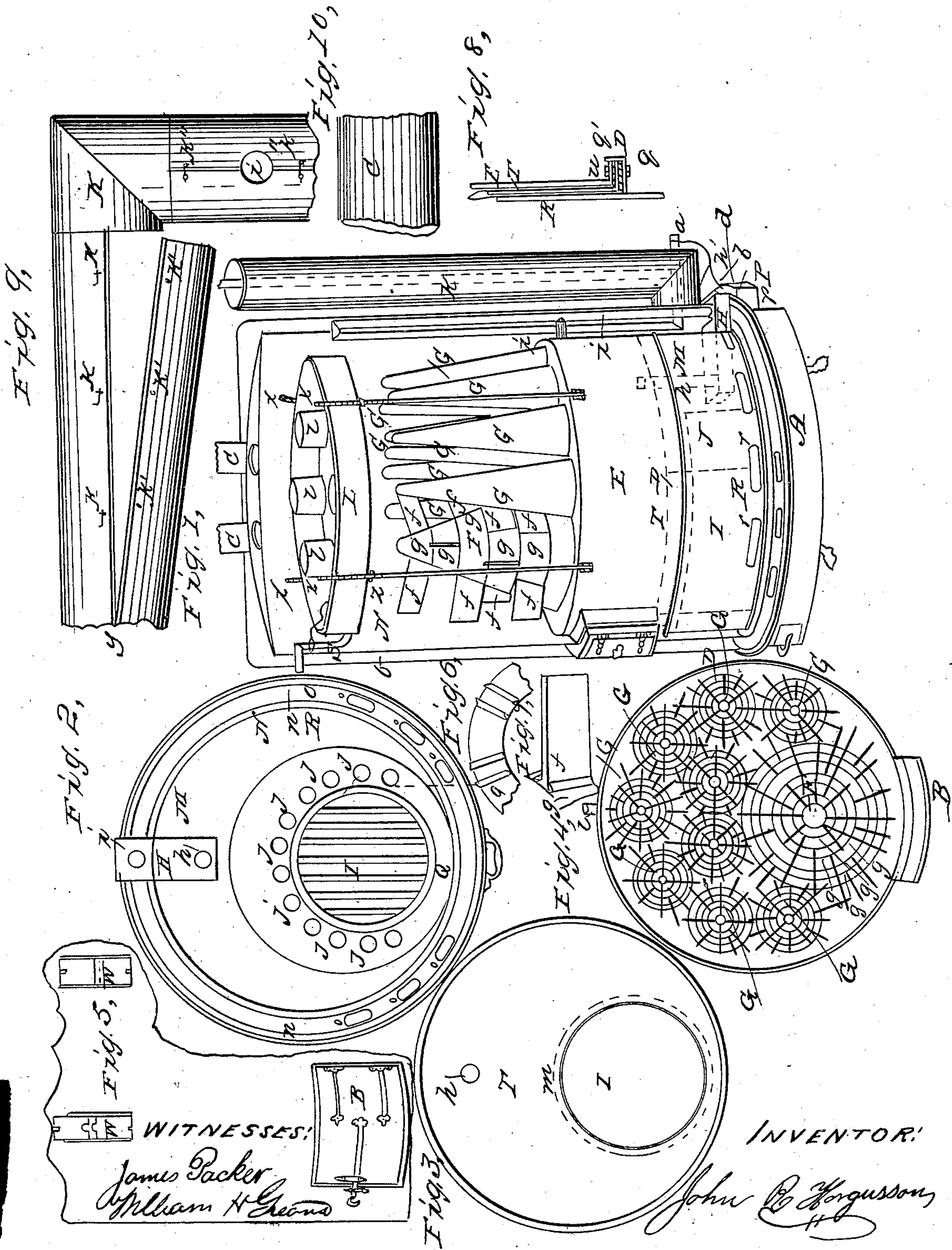


J. R. FERGUSON.

Hot Air Furnace.

No. 22,173.

Patented Nov. 30, 1858.



UNITED STATES PATENT OFFICE.

JNO. R. FERGUSON, OF BROOKLYN, NEW YORK.

HOT-AIR FURNACE.

Specification of Letters Patent No. 22,173, dated November 30, 1858.

To all whom it may concern:

Be it known that I, JOHN R. FERGUSON, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Mode of Constructing Portable Hot-Air and Vapor Furnaces; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is a side view with half of the inside and outside cylinders removed; Fig. 2 a view of the floor plate showing the lines of the partitions; Fig. 3 a view of the first division plate showing the openings over the fire box and for the descending smoke pipe; Fig. 4 a view of the second division plate showing the situation of the cones and the manner of placing the flanges upon the same; Fig. 5 a view of part of the outside cylinder showing the openings for getting to the water pan, and the fire door; Fig. 6 a section of a band for the cones, showing the dove-tail sockets for the flanges; Fig. 7 a section of the same with the flange inserted; Fig. 8 a sectional view of the 1st and 2nd division plates and the outside partition showing the manner of making the gas tight joint; and Fig. 9 a view of part of the cold air pipe showing the manner of opening the same for the purposes of cleaning and attending to the smoke pipe; Fig. 10 a section of the hot air pipe showing the tooth points.

Fig. 1: A is the boxing under floor plate; B is fire door and boxing to same; C, C, is lower part of register pipes; *c, c*, shows the tooth points to same; D shows the gas tight joint; E is the partition and second division plate; F the large cone; *f* denotes the flanges; G the small cones; *g* the bands around the cones upon which the flanges *f* are put; H smoke chamber; *h* descending smoke pipe; *h'* drafter to smoke chamber; I fire-box and grate; *i* smoke pipe; J, partition around fire box; K, cold air descending pipe; L water pan; *l* openings in same; M air chamber around fire box; N inside cylinder; O, outside cylinder; *o*, openings between cylinders for air to descend; P, volatile liquid box; *p*, faucet to draw off volatile liquid; *a*, end of smoke pipe with cover; *b* pipe to lead off volatile liquid; *d* pipe to lead off volatile liquid from smoke

chamber; Q, ash draw; *e* openings in same; R outside partition; *r* opening in same; S supply water pipe; *s* ball and faucet attached to same; T shows line of first division plate; *x* are standards with screws and nuts *z*.

Fig. 2: *j* are openings for cold air to ascend; *n* are the lines showing a division of the chamber between the cylinders, which division extends up the cylinders about half their height.

Fig. 3: *m* shows the flange or rim around the top of the fire box and the manner of screwing the division plate thereto.

Fig. 5: *v* is the openings with slides to get to the water pan standards to screw the same up or down; *w* is similar opening for supply water pipe.

Fig. 8: D, gas tight joint; E section of partition; T section of rim to division plate; R outside partition; *q* cement; *q'* cement; *u* screw to bind the joint.

Fig. 9: *k* are the hooks; *k'* staples; *k''* shows the same locked; *y* section of pipe showing the manner of locking the same.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

The floor plate Fig. 2 with curbs for the cylinders N, and O, and for the two partitions, R, and J, and the fire box I, to sit upon, the openings *j*, and *o*; the smoke chamber H, is screwed to the floor plate, which has an opening for the pipe *h*, and the one *i*; on the end is a flap opening *h'*, in the lower part is an outlet *d* to volatile liquid box, the partition R set upon the floor plate having outlets *r*, the partition J also sits upon the floor plate and being about $\frac{2}{3}$ ds in height of partition R, the fire box I of the same height as the partition R having a flange or rim as shown on Fig. 3, *m*, by dotted line. The division plate T has openings for smoke pipe *h*, over fire box I, the rim of which is constructed as shown in Fig. 8, T. The marks thus + around the opening are intended to show the manner of screwing the plate T to the flange *m*. The division plate and partition E with the cones F and G sitting thereon is made on the partition part as shown in Fig. 8. The cones F and G are all made closed on the top and sit on the plate as shown in Fig. 4. The bands fitting on the several cones F and G are furnished with sockets as shown in Fig. 6. The flanges are constructed as shown on Fig. 7. Attached to the division plate E are standards

x having nuts z and screw ends so that lugs on a cast iron water pan would rest upon the nuts z , or if the water pan is made of copper or other light metal a cross of iron with
5 holes in the ends may be used instead of lugs.

The water pan L may be constructed of cast iron, copper or other metal and has openings l , the supply water pipe S passing in at the bottom of the pan, having a faucet
10 and ball s attached so as to regulate the supply of water. The cylinder N can be made of sheet iron or brick and is to be provided with openings similar to those shown on Fig. 5, w , and v , and for the fire door boxing
15 B. The cylinder O can also be made of iron or brick and has openings as shown on Fig. 5, w , to the water supply pipe v to each of the standards x . The smoke pipe i starts from the partition E as shown on the drawings in Fig. 1, thence ascends to a height
20 a little above the top of the cones G, then turns with a square head as shown or one made on the crown around, down till it comes to the opening in the cylinders for the cold air pipe, thence out and through the
25 cold air pipe K, as shown, having a continuation thereof passing out at the bottom of the pipe K and having a cover a which can be removed for the purpose of cleaning, and inside the same on the end is closed half
30 the depth i of the pipe. The smoke pipe also passes upward from the chamber H to the point where the description before began (see drawing). The ash box Q is situated under
35 the grate to the fire box I and is as shown on Fig. 2, dotted lines. In the front are openings to create a draft for the fire, marked e . The volatile liquid box P is situated under the chamber H having a faucet p and a
40 plate inside, dividing it into two parts, a little raised from the bottom, so as to allow the fluid to pass from one side to the other. In the top of the cylinders N, and O, are openings for the hot air pipes C made so
45 that they will not come over the openings l in water pan L. The hot air pipes C are inserted through both cylinders and on the bottom are tooth points as shown in Fig. 10, c . The fire door B is carried to the outside
50 of cylinder O with a boxing as shown in Figs. 1 and 4. The cold air pipe Fig. 9, K, is constructed in two parts, except where the elbows come, and have the edges of the parts made as shown at letter y , and having
55 hooks and staples k and k' placed in such a manner that they will hold the two parts together tight when locked as shown at k'' . The gas tight joint Fig. 8, u , is a screw and nut to draw the parts closely together.
60 q, q' , is the cement between the parts and in the opening t between the plates R and T and T and E is sand.

The manner of using the foregoing described invention is as follows: 1st, a fire
65 is made in the box I, the cold air passes in

through the pipe K between the cylinders O and N, passing over the divisions n , Fig. 2, to the opening o , thence up through the opening j over the partition J out through the openings r in partition R up between the
70 cylinder N and the partitions R and E to the cones, passing thence through the intermixture of flanges F to the openings l in the water pan L, thence through the openings l to the register or hot air pipes C. 75
The smoke from the fire has to pass into the cones and its passage is thereby retarded until the gas is all burned. Thence it passes out at the pipe h into the smoke chamber H, also at the pipe i , following its course, as
80 shown in Fig. 1, the quantity of vapor to be regulated by the nuts and screws to the water pan, the flow of water to the pan to be regulated by the ball and faucet, the fire to be regulated by the openings e in ash box Q
85 and also by using the flap damper to the smoke chamber H.

The importance of moistening the air of an apartment heated by artificial means is well understood, but the means heretofore
90 used to attain that end have not possessed the capability of regulation according to varying circumstances of temperature or conditions of the atmosphere in relation to excess or deficiency of humidity. The evapo-
95 ration pan which I have placed in the interior of the apparatus can be elevated or depressed by the means I have described or in any convenient manner, its temperature, and consequent rate of evaporation of the
100 water contained therein, depending upon its distance from the radiating cones, and flanges. The pan L is furnished with open tubes through its bottom, which are so arranged as not to coincide with the tubes C,
105 which convey the heated air to the registers. These admit of the pan being made wide enough to extend to the sides of the hot air chamber without obstructing the upward flow of the heated air, while all condensed
110 moisture from the tubes C, flows back into the pan instead of on the cones and other heated surfaces. The unpleasant effects of the decomposition of water by contact with hot iron is thus avoided. 115

Disclaiming the devices used, separately considered, what I claim as my invention and desire to secure by Letters Patent is—

1. The combination and arrangement of the various parts as herein described for the
120 purposes specified.

2. Also the evaporation pan L in the hot air chamber of the furnace when made adjustable vertically for the purpose specified as herein set forth.

JOHN R. FERGUSON.

Witnesses:

C. S. BUXTON,
JOHN C. SMITH.