

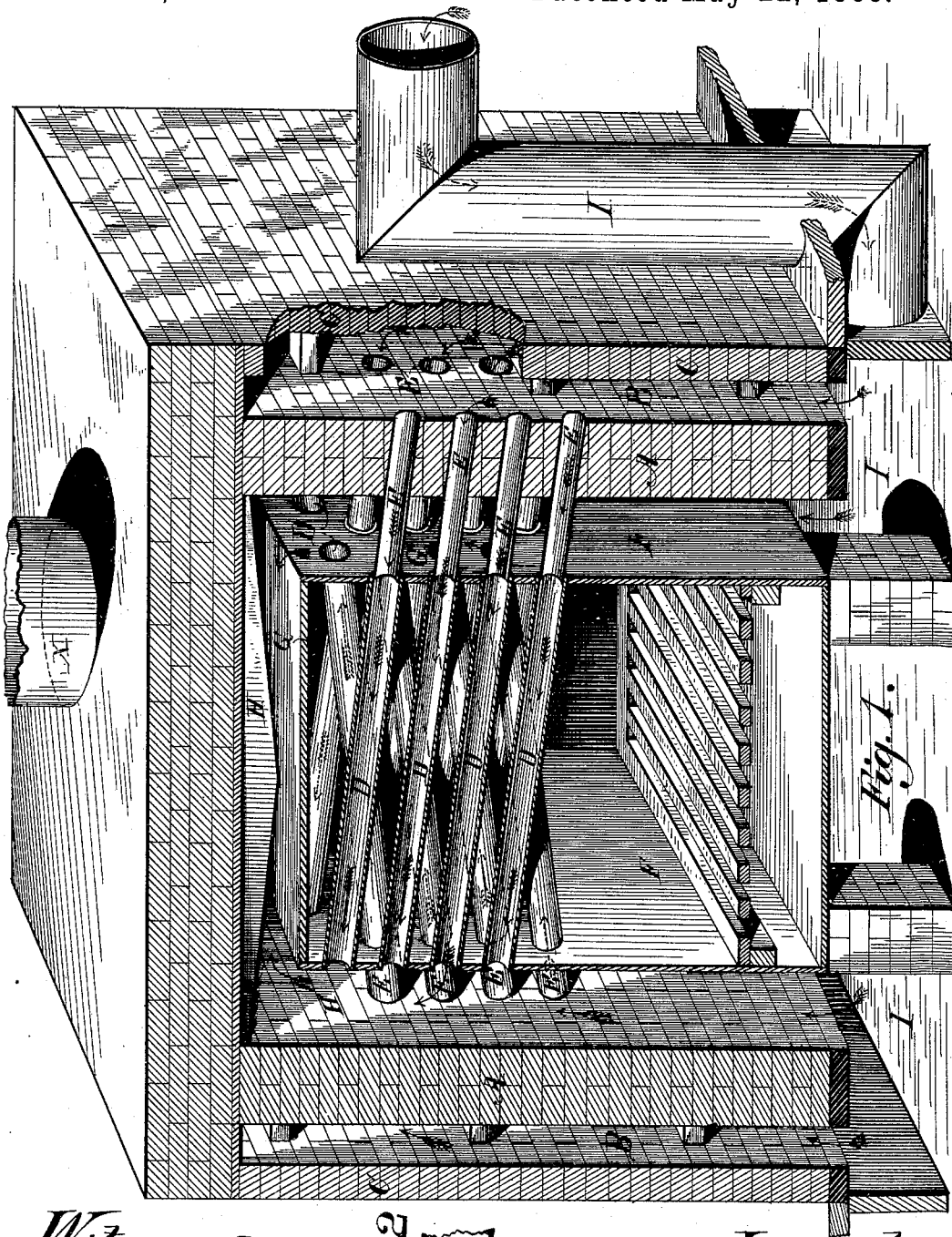
(No Model.)

H. CALLAHAN.

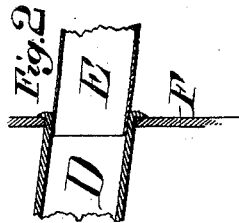
HOT AIR FURNACE.

No. 383,100.

Patented May 22, 1888.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY CALLAHAN, OF DAYTON, OHIO.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 383,100, dated May 22, 1888.

Application filed November 16, 1887. Serial No. 255,347. (No model.)

To all whom it may concern:

Be it known that I, HENRY CALLAHAN, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful

5 Improvements in Hot-Air Furnaces, of which the following is a full, clear, and exact specification, such as will enable one skilled in the art to which my invention appertains to make and use the same.

10 The object of my invention is to produce a furnace having a large amount of heating-surface, which is at the same time very simple and easily constructed, and very durable when in use.

15 The invention comprises a central portion having the usual fire-box, a compartment for the products of combustion above said box, and transverse heating-tubes extending from side

20 to side of said compartment. Around said central portion is formed an inclosure of suitable material in such manner as to leave between it and as much as possible of the radiating-surface of the central portion a hot-air

25 chamber. Cold air is introduced into this chamber, circulates about the central compartment, and is conducted therefrom for heating purposes in the usual manner. The transverse heating-tubes, however, are supplied with air

30 independently of that which enters the hot-air compartment in the usual way, by means of pipes which extend through the surrounding walls and are connected with the ends of said tubes. The air passed through these tubes is

35 highly heated by the direct action of the products of combustion, and, passing from the farther ends of the tubes into the hot-air compartment, joins that body of air which is heated by the exterior of the furnace and is conducted

40 away with it. The portion of the furnace immediately above the fire-box is occupied by as many as possible of these transverse tubes, of which there are two sets, conducting air in opposite directions across the furnace, thus furnishing a large amount of heating-surface.

45 In order to make my invention clearly understood, I have shown in the accompanying drawings a means for carrying the same into effect.

50 In said drawings, Figure 1 represents a sectional perspective view of a hot-air furnace

embodying my invention. Fig. 2 is a detail view illustrating the arrangement of the transverse pipes.

Referring to the drawings, F indicates the lower section or fire-box of the furnace, which 55 may be of any usual or preferred construction. Above this fire-box is situated the compartment G, through which the products of combustion pass. This central portion of the device is inclosed by the walls A, preferably of 60 brick, as shown, forming around the fire-box and the upper compartment a hot-air chamber, H.

I indicates the cold-air duct, which communicates directly with the lower portion of the 65 chamber H and supplies the same with air, which, after circulating through said chamber and around the central portion of the furnace, is conducted away for heating purposes by a suitable pipe or pipes, X. The smoke-pipe 70 leads from the back of chamber G, and is not shown.

In the upper compartment, G, and at sufficient distance above the fire-box to prevent 75 burning out, are situated a number of transverse tubes, D, which in practice will be constructed of heavy wrought-iron and formed

permanently with the casing of said compartment. The interior of said compartment is thus provided with a large extent of radiating 80 and heating surface, which will receive the direct action of the products of combustion. These heating-tubes will be of very high temperature and capable of rapidly heating at one

passage air which is of very low temperature when it enters the tubes. Each tube is 85 supplied with an independent body of cold air by means of the separable pipe-sections E, of thin and durable metal—such as tin or gal-

vanized iron—which pass through the walls A 90 and connect with the ends of the tubes. The cold-air space or flue is formed upon each side of the furnace and practically across its whole lateral face by means of outer walls, C, which

are situated at a distance from the walls A. 95 The space B thus formed is inclosed at the top and at the front and back. The walls C are also, by preference, constructed of brick, though they may be much thinner than it is

advisable to build the walls A. They may be 100

connected with the walls A by extending bricks across said space B and building them into each wall.

5 The flues B are supplied with cold air, preferably, as shown, from the same duct, I, that supplies the main hot-air chamber.

The furnace is one which, while very effective for heating purposes, may be easily and cheaply constructed. The central portion, F, 10 G, and D, will ordinarily be formed of heavy iron, and said parts permanently secured together. This central portion having been set up, the walls A are built around it, the pipe-sections E being added one after the other as 15 the walls rise and being built securely into the same. A furnace of large heating capacity may thus be constructed in a relatively small space.

20 Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is—

1. In a hot-air furnace, the combination, with the fire-box, of the compartment above the same, the walls A, inclosing the said fire-box and compartment and forming a hot-air 25 chamber, the outer cold-air flues, B, and the pipes D, extending from said flues and diagonally upward through said upper compartment and opening at a higher point into the hot-air 30 chamber upon the opposite side of the furnace, substantially as set forth.

2. In a hot-air furnace, the combination of

the fire-box, an upper compartment above said box, walls inclosing the fire-box and upper compartment and forming a hot-air chamber, 35 the outer cold-air flues, the pipes extending through said upper compartment from one side to the other and opening into the hot-air chamber, and separable pipe-sections connecting the cold-air flues with the ends of the first-men- 40 tioned pipes, substantially as set forth.

3. In a hot-air furnace, the combination, with the fire-box and the upper compartment, of the walls A, inclosing said fire box and compartment and forming a hot-air chamber, the 45 outer walls, C, forming with the first-mentioned walls cold-air flues, and pipes extending from said flues diagonally upward through the said upper compartment and to the hot-air chamber upon the opposite side of the furnace, sub- 50 stantially as set forth.

4. In a hot-air furnace, the combination, with the fire-box and the compartment above the same, of the heavy heating-pipes B, extending across said compartment, the separ- 55 able sections E, of light material, forming extensions of said pipes, the inclosing-walls A, and the cold-air flues communicating with the outer ends of said sections, substantially as set forth.

HENRY CALLAHAN.

Attest:

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