

(No Model.)

W. OEHLSTROM.  
FURNACE.

No. 565,214.

Patented Aug. 4, 1896.

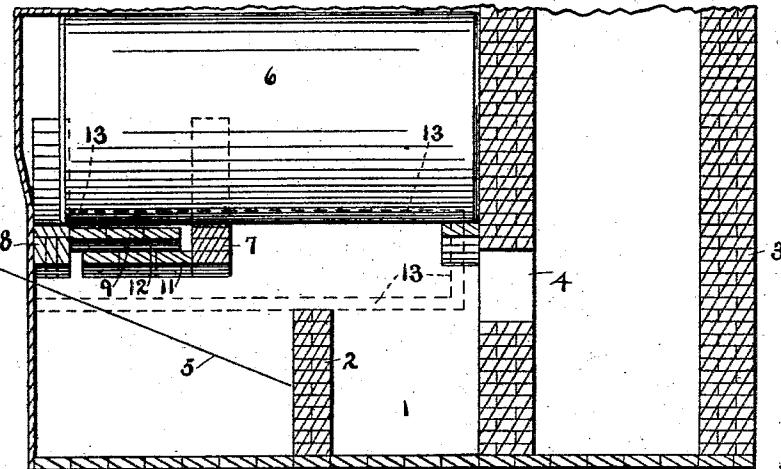


FIG. 1.

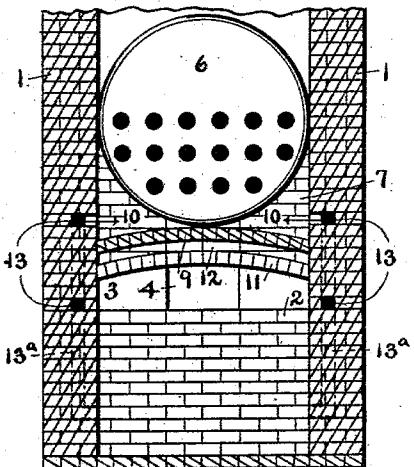


FIG. 2.

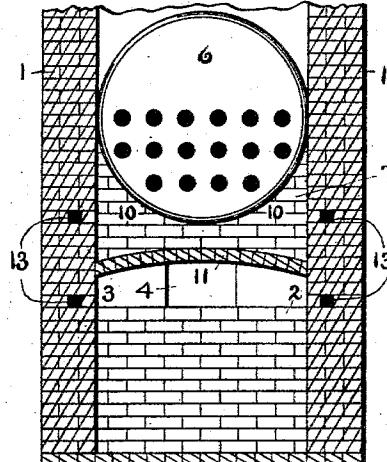


FIG. 3.

WITNESSES:

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*W. Oehlstrom,*

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# UNITED STATES PATENT OFFICE.

WILLIAM OEHLMSTROM, OF CLEVELAND, OHIO.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 565,214, dated August 4, 1896.

Application filed October 10, 1895. Serial No. 565,238. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM OEHLMSTROM, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnaces, of which the following is a full, clear, and exact description.

My invention relates to furnaces for boilers, but especially to those built with stoker-grates; and it consists of the several arches, chambers, and flues hereinafter fully described and specifically claimed.

The object of my improvement is to provide a furnace which utilizes the heat generated from the burning fuel on the grate to a greater extent than is possible in an ordinary furnace by introducing oxygen into the smoke or carbon thrown off from said fuel at the proper place, and incidentally preventing said smoke from contaminating the outside atmosphere. It is well known that carbon united with oxygen, if subjected to heat, burns readily, forming in fact perfect combustion, and I provide for this union of elements in my furnace, as will appear more fully hereinafter.

That my invention may be seen and fully understood by those skilled in the art, reference will be had to the following specification and annexed drawings, forming a part thereof, in which—

Figure 1 is a longitudinal vertical section of my improved furnace; Fig. 2, a transverse vertical section taken forward of the front end of the lower broad arch; and Fig. 3, a transverse vertical section taken between the rear end of the upper broad arch and the transverse narrow arch, both of said transverse sections looking toward the rear.

Similar figures of reference designate like parts in the drawings and specification.

The furnace shown in the drawings has the side walls 1 and the bridge-wall 2, and opens into the chimney 3 through the flue 4. The chimney 3 is necessary to provide a draft for the furnace, but all or the greater portion of the smoke is consumed and does not pass through said chimney. The location and pitch of a stoker-grate are indicated by the line 5 in Fig. 1. The boiler 6 is mounted over

the furnace and its sides are contiguous with the walls 1.

The narrow transverse arch 7, extending from one side wall 1 to the other, is built tight to the boiler 6 and projects below the same. The arch 7 is located some distance in front of the face of the bridge-wall 2. The narrow transverse arch 8 is built tight to the lower half of the boiler 6 at the front, between the walls 1, to form with the arch 7 and the broad arch 9 the chambers 10, one each side of and beneath said boiler. The broad arch 9 extends between the walls 1 and from the arch 8 rearward nearly to the arch 7, and said arch 9 may be a little remote from the bottom of the boiler 6, as shown, or it may be contiguous therewith. As illustrated in the drawings, the chambers 10 communicate with each other between the boiler 6 and the arch 9. Below the arch 9 and remote therefrom is the broad arch 11, extending between the walls 1 and from the narrow arch 7 forward nearly to the arch 8. The wide flue 12 is formed by the arches 9 and 11.

Air is supplied to the chambers 10 through the flues 13, which open into the front of said chambers, near the arch 9, from the walls 1. In a new furnace it is desirable to carry the flues 13 from the front of the chambers 10 rearward, downward, and then forward, as indicated by the dotted lines in Fig. 1, to open through the front ends of said walls; but in an old setting the flues 13 may be carried directly downward to open into the ash-pit, as shown by the dotted lines 13<sup>a</sup> in Fig. 2, or through either the front or outside of the walls 1. The object of carrying the flues 13 as far as possible in the walls 1 is to utilize the heat contained in said walls, which would otherwise be lost.

Air is drawn into the chambers 10 through the flues 13 and passes thence between the arch 7 and the end of the arch 9 into the wide flue 12. The air is heated before it reaches the wide flue 12, but there, owing to the extremely high temperature to which the arches 9 and 11 are subjected, said air is superheated, as it were. The oxygen, now separated from the nitrogen, passes from the flue 12, between the arch 8 and the end of the arch 11, into

the front of the fire to spread over the entire body of the same and mingle with the smoke or carbon rising from the burning fuel. The commingled oxygen and carbon at once ignite 5 and burn with a bright flame.

The consumption of smoke arising from the burning fuel both utilizes heat which would otherwise be lost and prevents the contamination of the outside atmosphere by said smoke.

10. A stoker-grate enhances the usefulness of my invention, because a greater amount of heat is obtained therefrom.

The arches 9 and 11 may be longer or shorter than shown in the drawings without departing 15 from the nature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination in a furnace, of narrow transverse front and rear arches built tight to 20 the boiler and extending below the same, and upper and under broad arches below said boiler and remote from each other, the former extending from said front arch nearly to said rear arch and the latter extending from said 25 rear arch nearly to said front arch, substantially as and for the purpose set forth.

2. The combination in a furnace, of side

walls, narrow transverse front and rear arches built tight to the boiler and extending below the same, upper and under broad arches below 30 said boiler and remote from each other, the former extending from said front arch nearly to said rear arch and the latter extending from said rear arch nearly to said front arch, and flues opening into the space between 35 said upper broad arch and boiler from said side walls, substantially as and for the purpose set forth.

3. The combination in a furnace, of a chamber or chambers formed by the boiler, the side 40 walls, narrow transverse front and rear arches and a broad arch; flues opening into said chambers from said side walls, and a wide flue formed by broad arches beneath said boiler opening at the rear into said chambers 45 and at the front over the fire, substantially as and for the purpose set forth.

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

WILLIAM OEHLSTROM.

Witnesses:

F. A. CUTTER,

L. A. STRATTON.