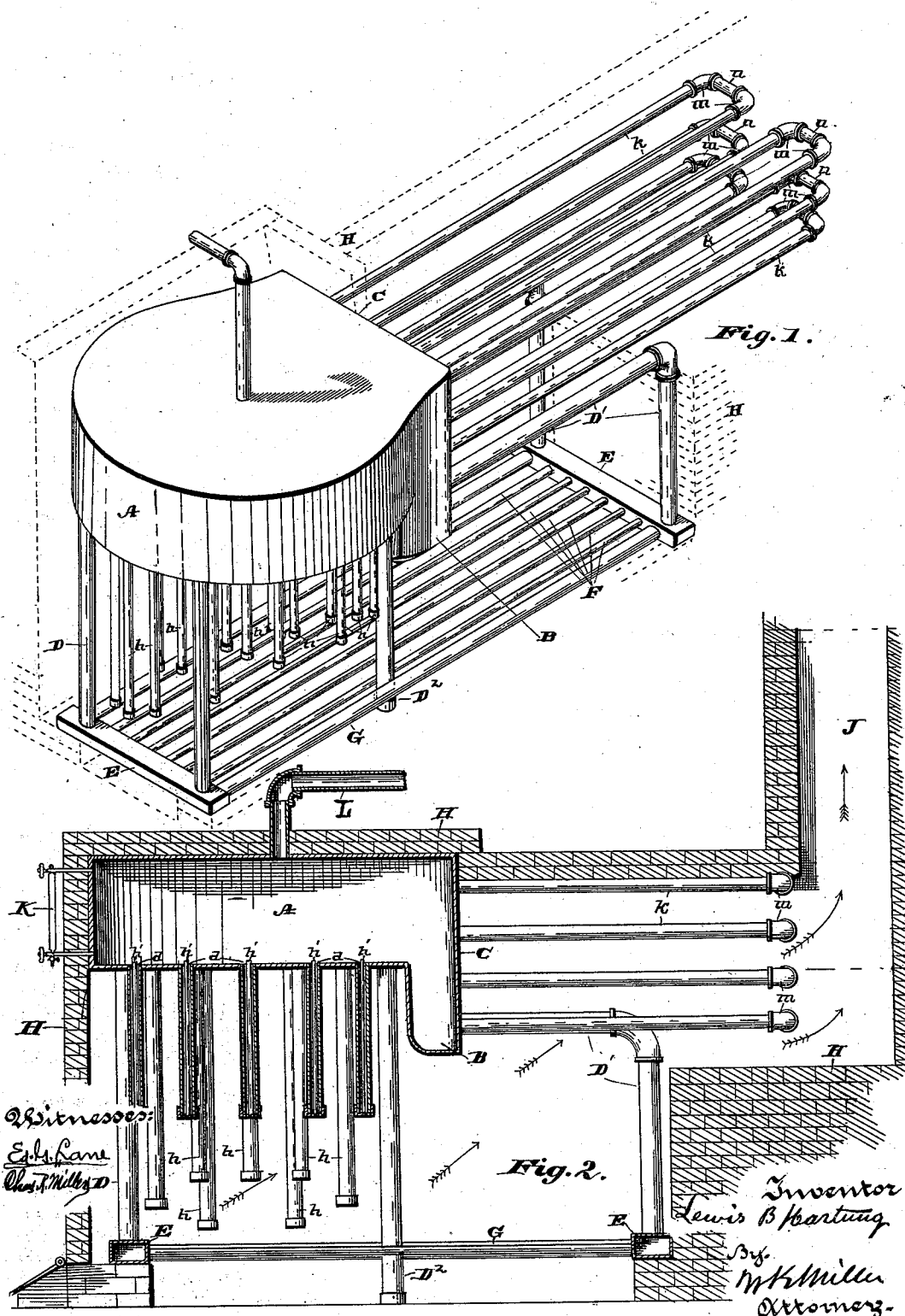


(No Model.)

L. B. HARTUNG.
HEATING APPARATUS.

No. 400,453.

Patented Apr. 2, 1889.



UNITED STATES PATENT OFFICE.

LEWIS B. HARTUNG, OF CANTON, OHIO.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 400,453, dated April 2, 1889.

Application filed December 10, 1888. Serial No. 293,213. (No model.)

To all whom it may concern:

Be it known that I, LEWIS B. HARTUNG, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have
5 invented a new and useful Improvement in Heating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

10 My invention relates to improvements in steam-heating apparatus; and it consists in providing a generator comprising a water-chamber and steam-dome having tubes projecting downwardly and return-tubes projected laterally, and a fire-grate constructed
15 of tubes through which the water may circulate.

With these ends in view my invention consists in certain features of construction and
20 combination of parts hereinafter described, and set forth in the claims.

Figure 1 of the accompanying drawings is a view in perspective of a steam-generator illustrating my invention; and Fig. 2, a vertical
25 sectional view longitudinally through the generator and inclosing walls.

A represents a water-chamber and steam-dome made of cast metal; or, if preferred, it may be made of sheets of wrought-iron or
30 steel and riveted together, said chambers having a rearwardly and downwardly projected portion, as B. The chamber A is supported on pipes D D', which communicate with the fire-grate pipe E. The said grate is formed
35 by the use of the pipes F, which connect the pipes E, thus forming a means of communication between the chamber A and the fire-grate G. The tubes D², which support the inner portion of the water-chamber, rest on the
40 foundation-wall. The lower face of the water-chamber A has a series of perforations, *d*, into which is secured depending pipes *h*, the lower ends of which terminate just above the fire on the grate G. In each of said vertical
45 pipes *h* is placed a small open-ended pipe, *h'*, resting on the bottom of the tube *h* and extending into the chamber A, as shown in Fig. 2, through which the water may circulate, passing down on the outside and up through the
50 pipe *h'*.

The vertical face C of the water-chamber A is provided with a series of perforations, into which are secured the pipes *k*, which are united at their outer ends by elbows *m* and thimbles
55 *n*, thus forming a continuous open pipe, through which the water may circulate out of and back into the chamber A.

The generator, as shown in Fig. 1, is inclosed in a brick wall, H, as shown in Fig. 2. The fuel-door may be placed either at the
60 side or end of the wall below the water-chamber A. It will be apparent that by this construction a great amount of heating-surface is exposed to and brought in contact with the fire, the flame and heat striking the under
65 side of the water-chamber - circulating about the tubes *h*, and under and up between and about the pipes *k* before reaching the chimney J, the water having a free circulation from the chamber down the pipe D,
70 through the grate-pipes F, and up through the pipe D' and back into the chamber.

K represents one of the common and well-known forms of water-gages. Other forms,
75 however, may be used in this connection if preferred.

L is the steam-pipe, through which steam is conducted to radiators or other places of use.

Any of the approved dampers, doors, and safety-valves may be used in connection with
80 the generator; but, as I make no claim to such devices, I have not shown them.

I am aware that water-chambers having a series of downwardly-projected tubes have been used. I therefore make no claim to them,
85 broadly; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, with a water-chamber, as A, having a rearwardly and downwardly
90 projected portion, as B, of the vertical tubes *h* and laterally-projected tubes *k*, substantially as described, and for the purpose set forth.

2. The combination, with the water-chamber, as hereinbefore described, having the
95 vertical tubes *h*, having interior open-ended tubes, *h'*, of laterally-projected tubes *k* and supporting-tubes D and D², substantially as set forth.

3. The combination, with the water-cham- 100

ber having a rearwardly and downwardly projected portion B, of the vertical tubes *h*, laterally-projected tubes *k*, supporting-pipes D D' D², and the fire-grate G, composed of the
5 pipes E and F, communicating with chamber A through the pipes D and D', substantially as described, and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 30th day of November, A. D. 1888.

LEWIS B. HARTUNG.

Witnesses:

W. K. MILLER,

CHAS. R. MILLER.