(No Model.)

C. R. MERES.

FURNACE.

No. 536,837. Patented Apr. 2, 1895.

Fig. 1

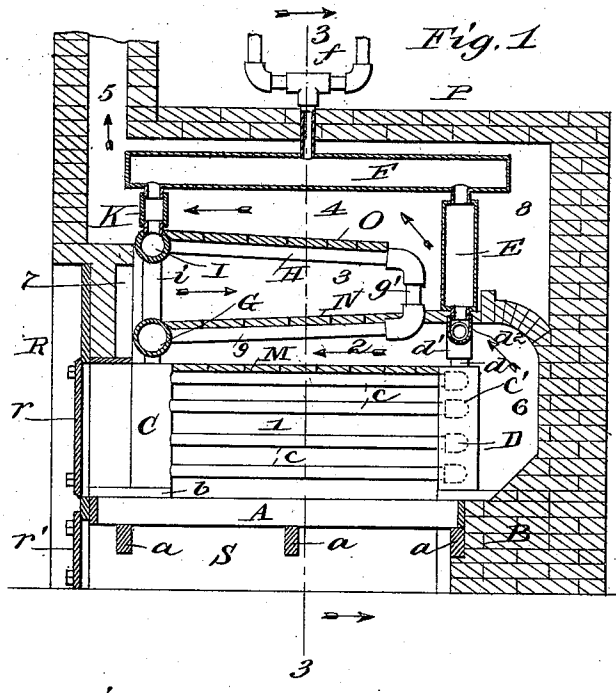


Fig. 2

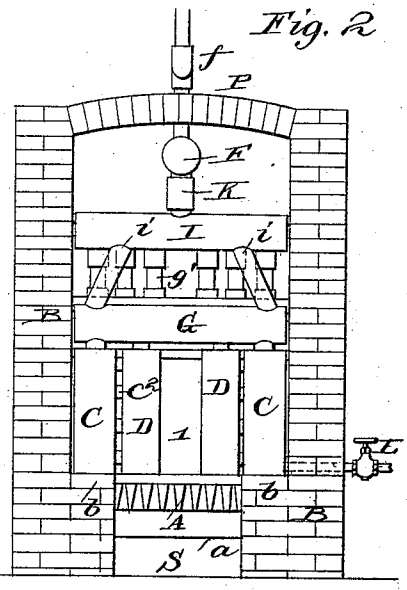


Fig. 3

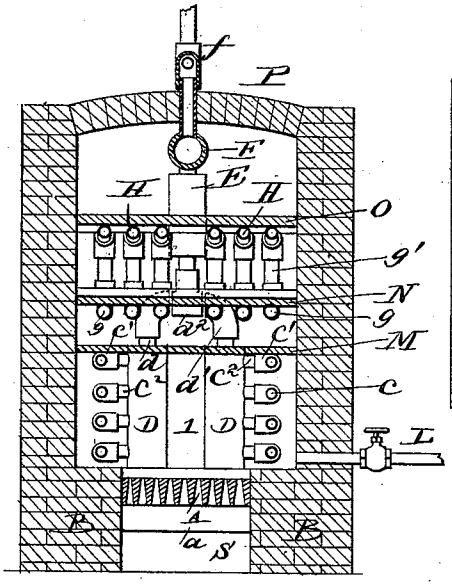
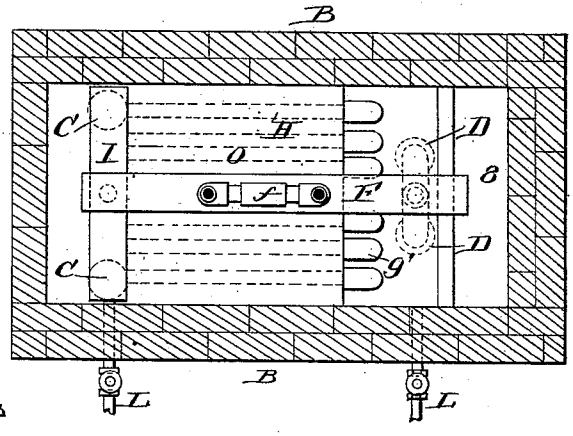


Fig. 4



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES R. MERES, OF NORWALK, OHIO.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 536,837, dated April 2, 1895.

Application filed August 10, 1894. Serial No. 519,945. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. MERES, a citizen of the United States, residing at Norwalk, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in furnaces.

The invention will first be described in connection with the accompanying drawings, and then particularly pointed out in the claims.

In the drawings—Figure 1 is a longitudinal sectional view of a furnace embodying my invention. Fig. 2 is an end view of the same with the boiler front removed. Fig. 3 is a transverse section through the center of the apparatus, on the line 3—3, Fig. 1, looking in the direction of the arrows. Fig. 4 is a plan view showing the masonry arch broken away.

Referring to the drawings, A is a grate of any suitable construction supported upon bearing bars *a*, built into the masonry B, the latter having shelf-like projections *b* on which rest the lower ends of two forward vertical manifolds, C, from each of which extend rearward a set of lower side tubes or pipes *c* having elbows *c'* at their rear ends, these elbows being each provided with inward projecting nipples c^2, which enter a pair of rear vertical manifolds D connected at their upper ends by nipples *d* and elbows *d'* to a T, d^2, from which projects an upward extending rear pipe E connected to a horizontal dome-pipe F. At the front end the manifolds, C, are united to a lower longitudinal manifold G from which extends a set of lower longitudinal pipes *g*, provided with return bends, *g'*, by means of which they are connected with a set of upper longitudinal pipes H whose forward ends connect with an upper transverse manifold I which is connected to the lower transverse manifold G by small pipes, *i*. From the upper transverse manifold projects a forward vertical pipe K which connects with the forward end of the dome pipe F. The latter is provided with a duplex or branched outlet, *f*, when used for hot-water or steam-heating apparatus. At the bottom of the forward and rear vertical manifolds, C and D respectively, are provided with water-inlets L. On top of the upper side tubes *c* are placed a series of transverse lower arch plates M preferably of fire brick and removable. A similar set of middle arch plates N is placed upon the lower longitudinal tubes or pipes *g*, while another set of upper arch plates O is placed on the upper longitudinal tubes H. By this arrangement the interior of the furnace is divided in a combustion chamber 1, a lower flue 2, a middle flue 3, and an upper flue 4, the latter connecting at its forward end to a stack or chimney 5, as shown.

The combustion chamber 1 communicates with the flue 2 by means of a lower rear chamber 6 made in the masonry in any convenient manner, as shown. The flue 2 in turn communicates with the flue 3 by a forward chamber 7, while the flues 3 and 4 communicate through an upper rear chamber 8, the said chambers 7 and 8 being made in the masonry in any suitable manner.

Above the dome pipe the furnace is arched over by the top P, through which the outlet pipe projects, while the front of the furnace is provided with any suitable boiler front R having fuel doors *r* and ash-pit doors *r'* the latter connecting with the ash-pit S.

It will be observed that by my construction, the combustion chamber has water tubes at both sides and at the top, while the flues 2, 3 and 4 have tubes at their bottoms and tops. Moreover, the manifolds and the dome pipe are all within the sphere of influence of the heat and all assist in generating steam or heating the water. Furthermore, the circulation is complete in all parts, and the length of the flues through which the heated gases must pass is a maximum. As the flues and combustion chamber are divided from one another by plates M, N and O, which may be of fire-brick, iron or other suitable material, the said plates may be readily removed when desired to inspect the tubes; but the important features of my construction are that my device is cheap, the heating surface large, and, finally, the furnace may be readily taken apart for transportation in a knock-down condition, the upper and lower transverse manifolds and their attached upper and lower longitudinal pipes being left in one section, each set of side

pipes and its respective rear and forward vertical manifolds in another, and the dome-pipe and its rear and forward vertical pipes in another.

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

1. The combination in a furnace, of two sets of side pipes, one set on each side of the combustion chamber, the pipes of each set arranged above each other; two sets of longitudinal pipes located above the side pipes and having an intervening space between each set of pipes; the pipes comprising each set of longitudinal pipes arranged side by side, means for connecting the several sets of pipes, and sets of removable arch plates resting on the side pipes and longitudinal pipes, substantially as described.

2. The combination in a furnace, of a pair of front and rear vertical manifolds, a set of side pipes extending from each of the front to each of the rear manifolds, a rear vertical pipe connecting the upper ends of the rear manifolds with the rear end of a dome pipe, two horizontal manifolds arranged above the front vertical manifolds and connecting the latter with the front end of the dome pipe by means of intermediate vertical pipes, and a duplex outlet pipe extending from the dome pipe, substantially as described.

3. The combination in a furnace, of a pair of front vertical manifolds a pair of rear vertical manifolds, a set of side pipes connecting each of the front manifolds with each rear manifold; two horizontal manifolds arranged above the front vertical manifolds, two sets of longitudinal pipes connected at their forward ends to the horizontal manifolds, and at their rear ends to each other by means of short tubes; a dome pipe, a rear vertical pipe removably connecting the rear end of the dome pipe with the rear vertical manifolds; short vertical pipes removably connecting the horizontal manifolds with the forward end of the dome pipe and with the front vertical manifold pipes, whereby the furnace may be separated into sections and also the sections easily united; and sets of transverse removable arch plates resting on the side pipes and longitudinal pipes, substantially as described and shown.

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

CHARLES R. MERES.

Witnesses:
FRANK M. ROTH,
CHARLES P. VENUS.