(No Model.)

C. W. & J. A. MOHR.

BOILER FURNACE.

No. 558,510. Patented Apr. 21, 1896.

Fig. 1.

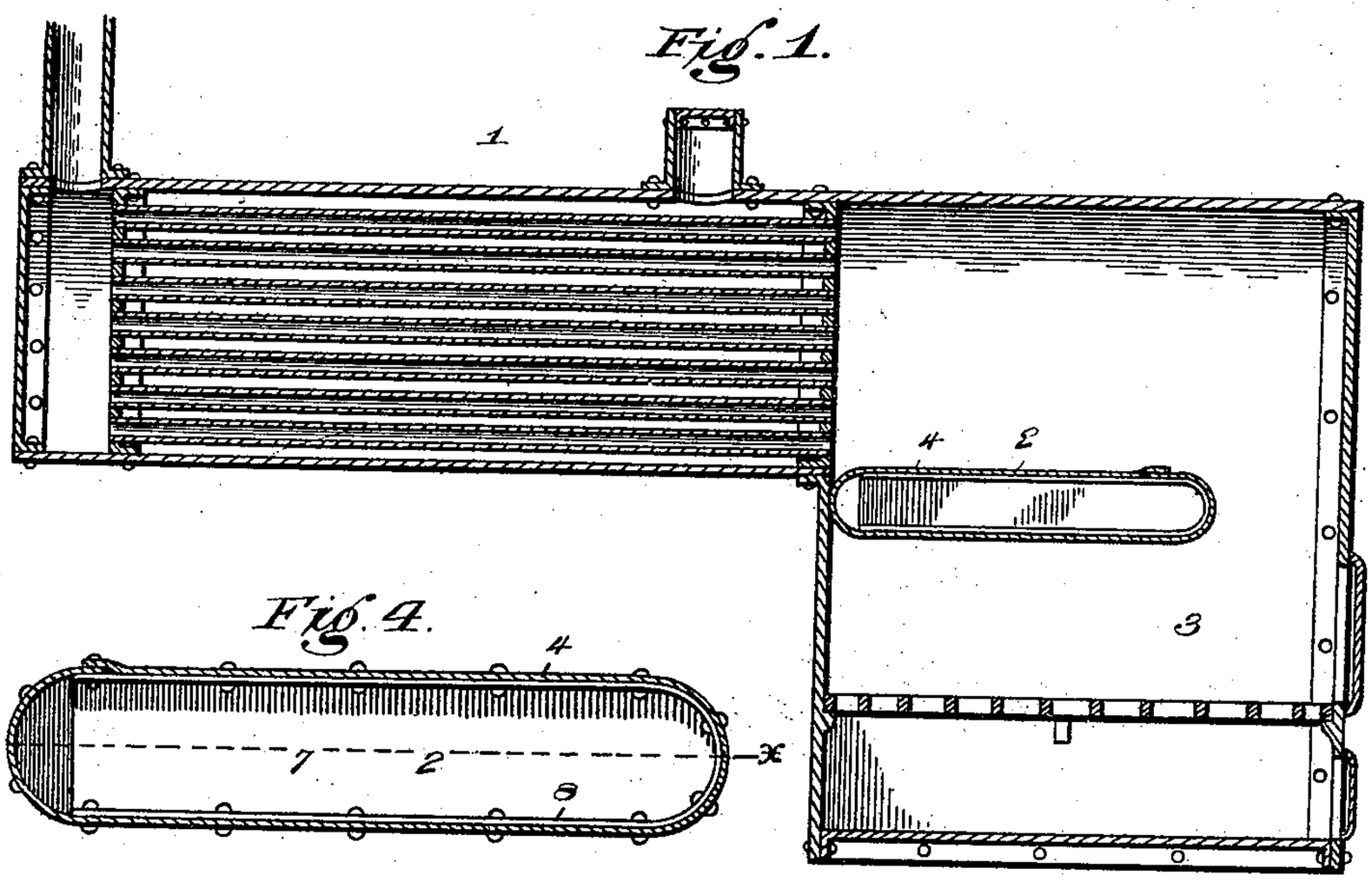


Fig. 4.

Fig. 2.

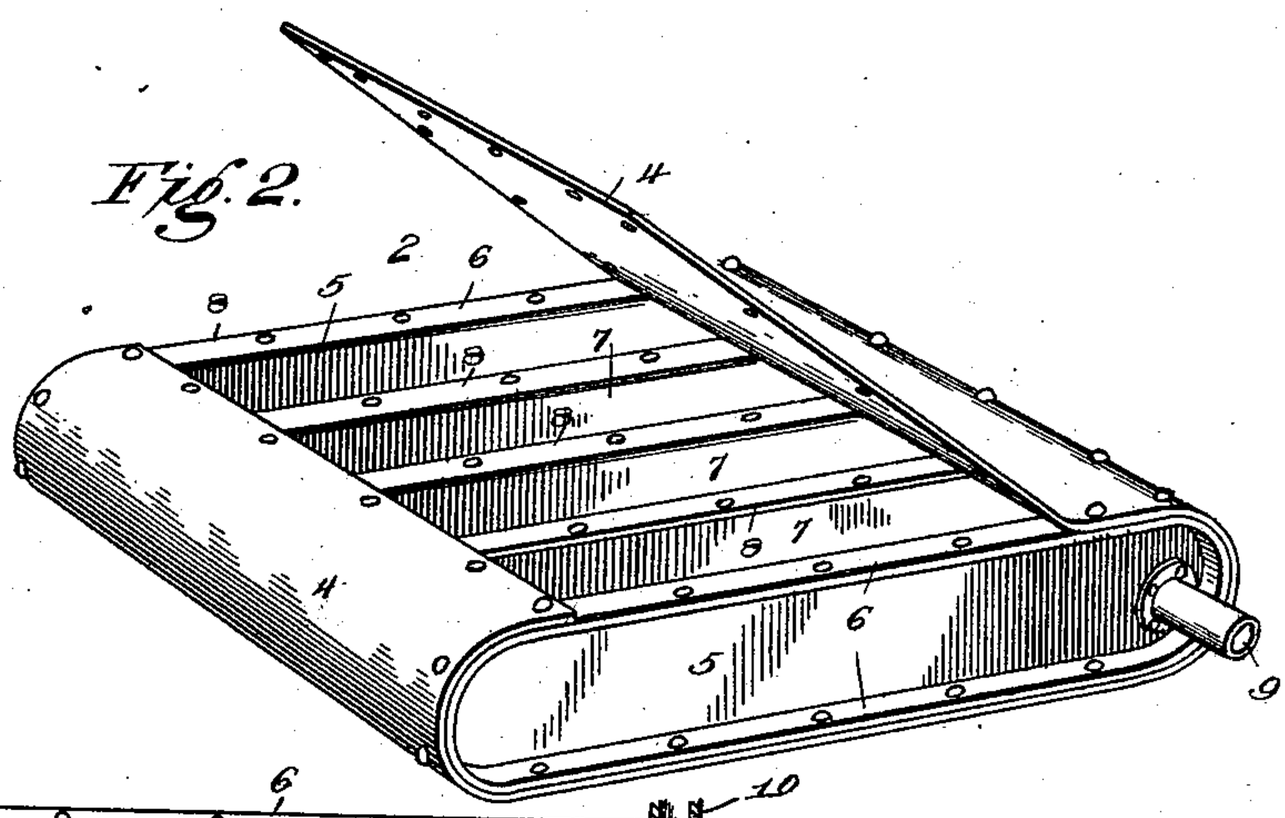
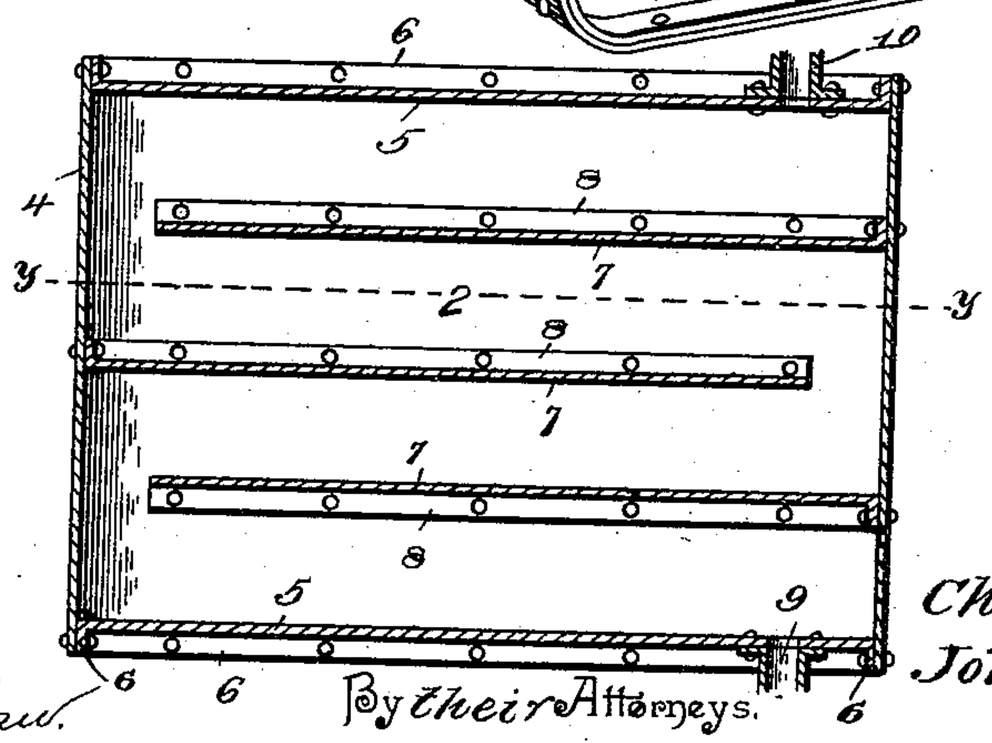


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES W. MOHR AND JOHN A. MOHR, OF SPOKANE, WASHINGTON.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 558,510, dated April 21, 1896.

Application filed March 14, 1895. Serial No. 541,765. (No model.)

To all whom it may concern:

Be it known that we, CHARLES W. MOHR and JOHN A. MOHR, citizens of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented a new and useful Improvement in Boiler-Furnaces, of which the following is a specification.

This invention relates to steam-boiler furnaces, and aims to provide the same with an attachment for heating the water prior to its entrance into the boiler, and also to secure a circulation of the water through the boiler.

A further object of the invention is the provision of a heater, of box form, which will not choke readily, will facilitate the burning of straw and like fuel, and which will obviate leaky joints, the necessity for baffle-plates or other covering, and which will stand a high degree of heat without warping or getting out of shape.

The improvement consists, essentially, of a box-shaped heater of novel formation which can be applied to boiler-furnaces of various styles, shapes, types, and sizes at a comparatively low cost, considering the resultant advantages and the expense attendant upon the maintenance of similar attachments in furnaces for a like purpose.

Referring to the accompanying drawings for a more complete explanation of the invention, Figure 1 is a central longitudinal section of a boiler-furnace, showing the application of the invention. Fig. 2 is a perspective view of the attachment, a portion of the casing being loosened and turned up out of the way. Fig. 3 is a plan section on the line X X of Fig. 4. Fig. 4 is a cross-section on the line Y Y of Fig. 3.

The boiler-furnace 1, which may be of any desired type, size, or pattern, is shown simply to illustrate the application of the present invention. The attachment or heater 2 is located in the fire-box 3 of the furnace a proper distance above the grate, so as to cause the draft to take a more extended passage before passing through the boiler-tubes on its way to the smoke-stack. This attachment or heater 2 is of box form and will be provided in various sizes to suit the construction of the furnace for which it is designed. The casing 4 is formed of sheet metal, preferably steel, and is provided in a single length and bent in the required form, the meeting ends overlapping and being riveted together in the usual manner common in the construction of boilers. The heads or ends 5 of the casing have outwardly-extending flanges 6, which are secured to the edge portions of the casing by means of rivets or similar fastenings. These heads or ends are formed from sheet metal and are struck up to provide the flanges 6, or the latter may be formed by spinning or swedging, common in the art of sheet-metal working. A series of partitions 7 are arranged in parallel relation and divide the space between the heads 5 into longitudinal compartments, which unitedly provide a tortuous path for the circulation of the water in its passage through the heater. These partitions 7 extend from the opposite ends of the casing in alternate relation, so as to provide a space at the opposite end of each partition, so as to cause the water to take a zigzag course in its travel through the heater. These partitions have their edge portions 8 flanged and secured to the casing by being riveted thereto. The ends of the partitions touching the ends of the casing will be likewise flanged and secured to the casing by rivets or like fastenings.

A heater constructed as herein specifically defined is simple in its organization and can be cheaply manufactured, and is free from threaded joints, which frequently loosen under the varying changes of temperature to which boiler-furnaces are subjected. A short pipe 9 is located at one end of one of the heads to receive and form connection with the pipe by means of which water is supplied to the boiler, and a similar pipe 10 is provided at the end of the opposite head for attachment to the heater of the pipe leading to the boiler. Thus it will be seen that the water is not supplied directly to the boiler, but is caused to pass through the heater and has its temperature raised before entering the boiler.

The salient feature of the present invention resides in the structural formation of the heater, whereby the same shall consist of as few parts as possible, while at the same time provide a construction especially well adapted for the purposes contemplated; but in connection with the structural formation of the heater a point of considerable importance to

be noted is that a single continuous metal sheet forms the top, bottom, and ends of the heater and thereby exposes a minimum number of joints to the action of the fire. In connection with making the casing of the heater from a single continuous metal sheet, an additional feature of importance is the fact that said continuous metal sheet is bent at opposite points to produce rounded ends, and the inner rounded end of the heater-casing directly contacts with the rear wall of the fire-box to cut off upward draft at that point; but by reason of the curvature or rounded shape of this end of the heater-casing it will be obvious that said end of the heater-casing has substantially its entire area exposed directly to the action of the heat, so that practically the entire metal sheet forming the casing of the heater is exposed at every point to the heat, thereby insuring a uniform heating of the heater.

Changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

In a boiler-furnace attachment of the class described, the combination with the fire-box of a steam-boiler furnace, of a water heater and circulator arranged in a horizontal position within the fire-box above the grate and comprising a single continuous metal sheet bent upon itself at opposite points and fastened at its meeting ends to form a casing having flat top and bottom portions and rounded ends, one of which rounded ends contacts directly with the rear wall of the fire-box to cut off upward draft at that point, while at the same time having substantially its entire area exposed to the action of the heat, oblong head-pieces registering within the open sides of the casing and having outturned flanged edges secured to the edges of the casing-sheet, and a series of parallel alternately-arranged sheet-metal partitions fitted within the casing, and each having a rounded end registering with one of the rounded ends of the casing, and edge flanges secured to the inner faces of the casing, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CHARLES W. MOHR.
JOHN A. MOHR.

Witnesses:
K. H. KENNY,
DAVID HERMAN.