

No. 670,066.

Patented Mar. 19, 1901.

D. E. SMOAK.
HEATER.

(Application filed Oct. 18, 1900.)

(No Model.)

Fig. 1.

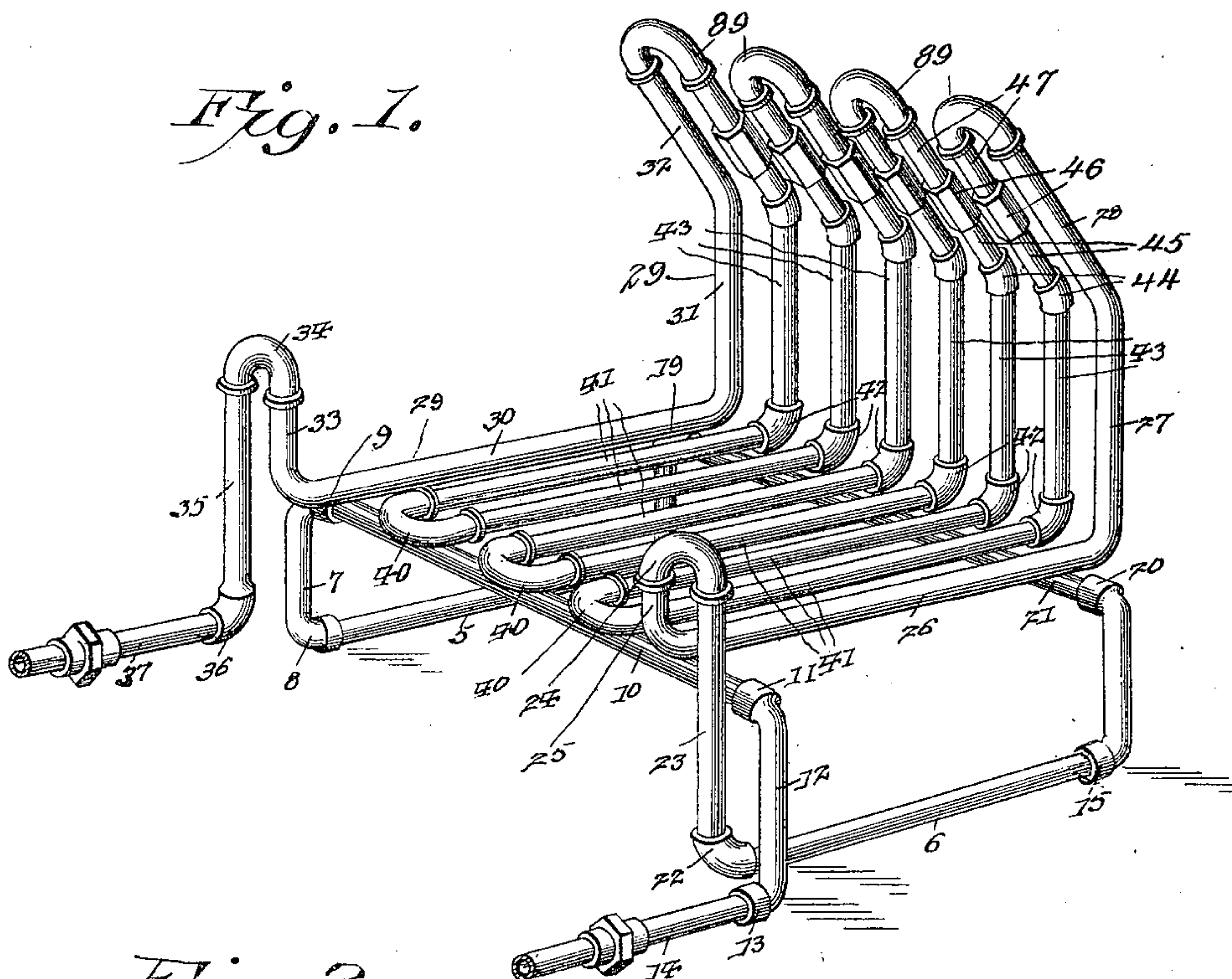
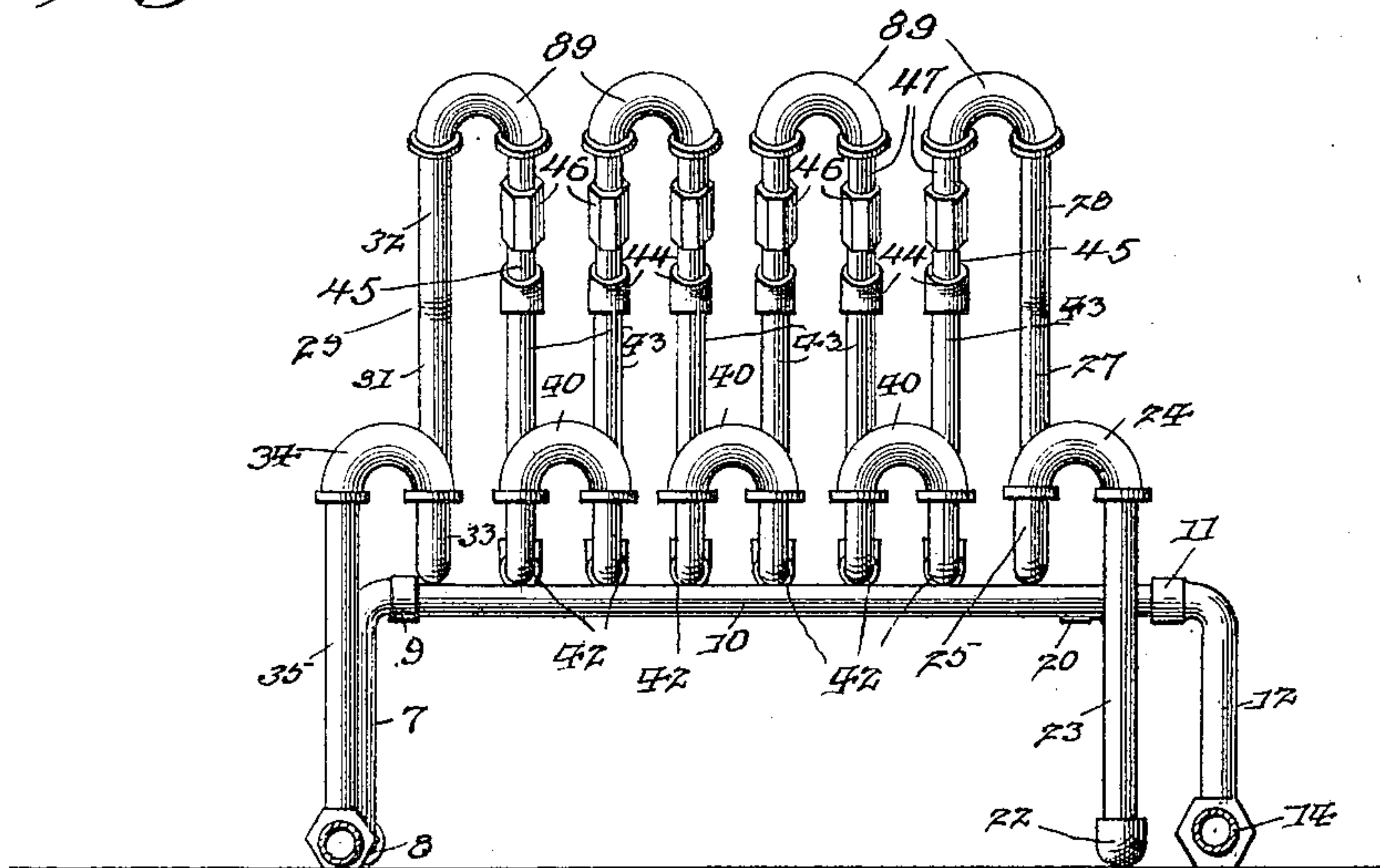


Fig. 2.



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UNITED STATES PATENT OFFICE.

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HEATER.

SPECIFICATION forming part of Letters Patent No. 670,066, dated March 19, 1901.

Application filed October 18, 1900. Serial No. 33,501. (No model.)

To all whom it may concern:

Be it known that I, DANIEL E. SMOAK, a citizen of the United States, residing at Wilkesboro, in the county of Wilkes and State of North Carolina, have invented a new and useful Heater, of which the following is a specification.

This invention relates to heaters in general, and more particularly to fireplace-heaters, and it has specific reference to grates for burning different fuels, the object of the invention being to provide a construction wherein a portion of the heat from the fire upon the grate may be utilized in heating water, for heating, cooking, or any other purpose, or for generating steam to be used as a motive agent or for any other use.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in both views, Figure 1 is a perspective view showing one form of the invention specifically adapted for use when burning wood as fuel. Fig. 2 is a front elevation of an embodiment of the invention designed for burning coal, coke, and such small fuels.

Referring now to the drawings, and more particularly to Fig. 1 thereof, the grate in this form of the invention comprises a number of sections connected to form a continuous passage, the tubular portions including the supporting-legs, the grate-bars, the fire-dogs, and the back, so that a circulation of water may be established and maintained throughout the heater to secure the most efficient results, as will be understood. The heater is supported upon a frame including spaced pipes 5 and 6, disposed parallel and at the ends of the grate, below the grate-bars, and attached to the forward end of the pipe 5 is an upright section 7, having integral elbows 8 and 9, the elbow 8 directly receiving the pipe 5, while the elbow 9 at the upper end of the upright is turned laterally at right angles and has a pipe-section 10 engaged therewith and extending transversely of the heater. To the end of the pipe 10 is connected the elbow 11 at the upper end of a second upright pipe-section 12, similar to the section 7, the elbow 13 at the lower end thereof, however, extending forwardly instead of rearwardly for engagement by a feed-pipe 14, through the medium of

which water is supplied to the system of pipes forming the heater. Connected with the rear ends of the pipes 5 and 6 are the elbows 15 and 16 at the lower ends of upright pipes 17 and 18, said pipes having other elbows 19 and 20 at their upper ends, which are directed toward each other and with which are engaged the ends of a pipe 21, the pipes 10 and 21 being adapted to directly support the grate-bars of the heater. At the forward end of the pipe 6 is a removable elbow 22, it being understood that the elbows of the uprights above referred to are formed integral with their respective uprights, and with the elbow 22 is engaged an upright pipe or vertical pipe 23, which is continued above the pipe 10 and in close relation thereto on its front side, and with the upper end of this vertical pipe is engaged a return connection 24. With the return 24 is also engaged a pipe having an upturned forward end 25, with which connection of the return is directly made, and including also a rearwardly-extending portion 26, which lies upon the pipes 10 and 21 and forms a grate-bar, the rear end of this pipe being bent upwardly at 27 and then forwardly at an obtuse angle at 28, the several elements of this pipe lying in a single vertical plane. A second pipe 29, of the same shape, is disposed at the opposite end of the heater, the horizontal section 30 thereof forming a grate-bar, while its portions 31 and 32 extend upwardly and forwardly over the portion 30. The upwardly-bent front end 33 of the pipe is engaged with a return connection 34, with which is also connected a vertical pipe-section 35, at the lower end of which is an elbow 36, having an outlet-pipe 37 connected therewith, the elbow 36 being integral with the pipe 35. The upturned ends 25 and 33, together with the returns connected therewith, form fire-dogs for the heater. Disposed upon the pipe 10 are a number of return connections 40, with the legs of each of which are connected pipe-sections 41, forming grate-bars and having elbows 42 at their rear ends, and with these elbows 42 are engaged vertical pipe-sections 43, which, in connection with the portions 31 and 27, form a water-back for the heater. With the upper ends of the sections 43 are connected elbows 44, with which in turn are connected nipples 45, having unions 46 for

connection with other nipples 47. The nipples 47 and the portions 28 and 32 are connected in series by returns 89. With this construction the water enters through the inlet-pipe 14 and passes first across beneath the grate-bars at the front ends, then downwardly and rearwardly, and then upwardly and across beneath the rear ends of the grate-bars, after which it passes downwardly and forwardly and then upwardly through a fire-dog and to the first grate-bar. The water then passes rearwardly through a grate-bar and then upwardly and then forwardly through the back of the heater and then returns downwardly and comes forwardly through the next grate-bar. This circulation is continued through the several grate-bars and finally passes through the second fire-dog and out at the outlet-pipe, it being understood that the intermediate grate-bars are formed by the portions 41. Thus the temperature of the water is gradually raised and is finally discharged at a high temperature or in the form of steam, depending, of course, upon the condition and size of the fire.

In Fig. 2 there is shown a similar structure, the ends of the pipes 41, however, at the front of the grate being bent upwardly to form a front for the grate, so that coal and other finely-divided fuel may be used. It has been found that with this construction there is an efficient circulation, while the water may be raised to a high temperature with an extremely small quantity of fuel, so that the structure is well adapted for heating, cooking, or any other purpose for which hot water or steam is used.

In practice modifications of the specific constructions shown may be made, such as forming the back and overhanging portions of a casting, and any suitable materials and proportions may be used for the various parts without departing from the spirit of the invention.

It will be understood that in the place of using jointed pipes to form the elbows and turns continuous lengths of pipes may be employed and may be bent into the proper shapes or that portions may be cast integral to include straight lengths, elbows, and turns; also, that in the place of the unions 46 and their connected nipples single nipples with right and left threads may be employed for

engagement with correspondingly-threaded elbows and turns.

What is claimed is—

1. A device of the class described comprising grate-bars, fire-dogs and supports for the grate-bars consisting of spaced pipes having depending legs, said bars, pipes and legs being connected in series to form a continuous water-passage.

2. A device of the class described comprising grate-bars, an overhanging back and supports for the bars, consisting of spaced pipes having depending legs, said bars, pipes and legs being connected in series to form a water-passage.

3. A device of the class described comprising grate-bars, a back and supports for the bars formed of spaced pipes having depending legs, said bars, pipes and legs being connected in series to form a water-passage.

4. A device of the class described comprising grate-bars, fire-dogs, a back, spaced transverse supports on which the bars are sustained, and legs for the supports formed of pipes connected in series to form a water-passage.

5. A device of the class described comprising a series of parallel pipes having their forward ends bent upwardly and connected in series and having their rear ends bent upwardly and connected in series alternating with the connections of the front ends, and supports for the pipes comprising spaced transverse pipes having depending tubular legs, said pipes, supports and legs being connected in series and adapted for connection of supply and exhaust pipes.

6. A device of the class described comprising spaced pipes having supporting upright pipes connected therewith, and additional pipes disposed upon and transversely of the spaced pipes, said last-named pipes having their ends bent upwardly and the entire number of pipes being connected in series to form a water-passage.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DANIEL E. SMOAK.

Witnesses:

E. M. BLACKBURN,
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