No. 673,494. Patented May 7, 1901.

P. W. BURKE.

MULTITUBULAR STEAM BOILER.

(Application filed Jan. 10, 1901.)

(No Model.)

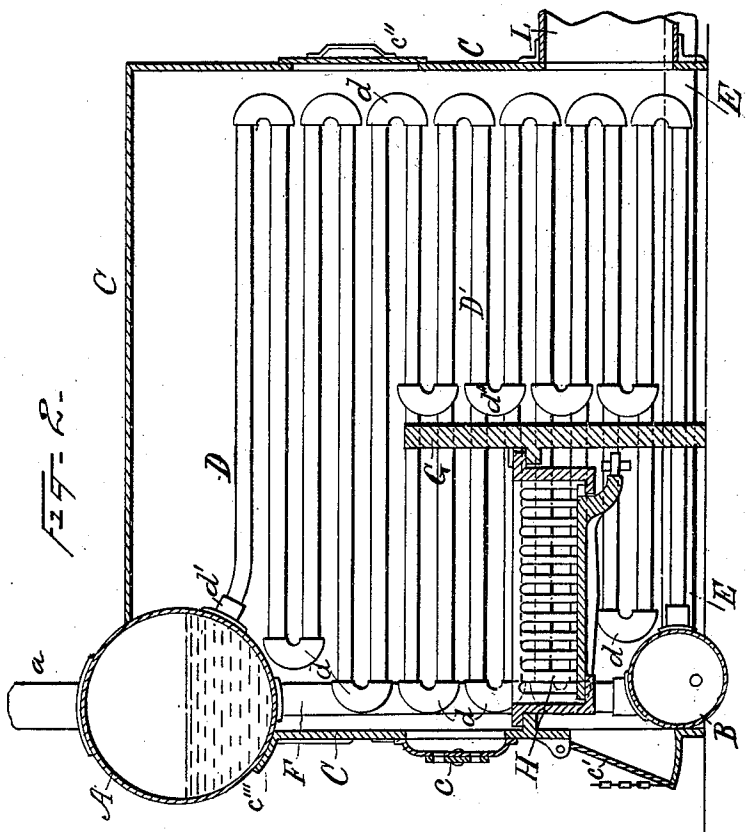

Fig. 2.

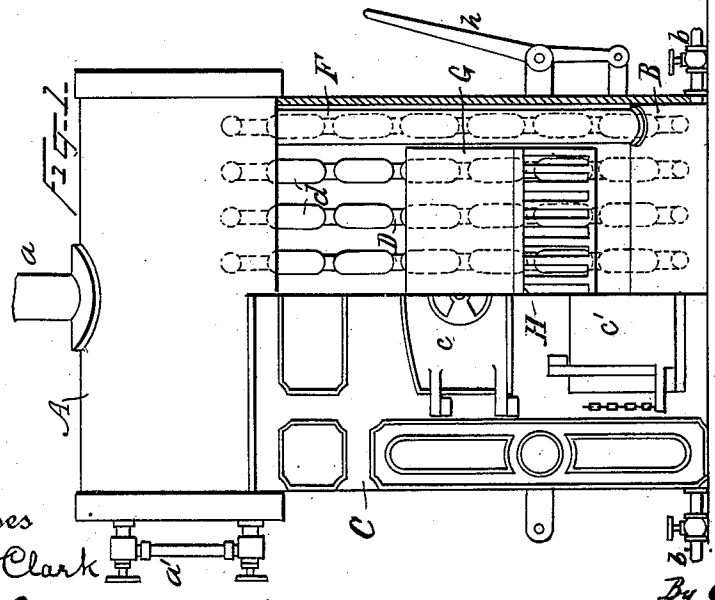

Fig. 1.

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UNITED STATES PATENT OFFICE.

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MULTITUBULAR STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 673,494, dated May 7, 1901.

Application filed January 10, 1901. Serial No. 42,771. (No model.)

To all whom it may concern:

Be it known that I, PERCY W. BURKE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Multitubular Steam-Boilers; 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.

This invention relates to multitubular circulation steam-boilers adapted more particularly for domestic heating purposes.

The object of my invention is to provide a simplified construction of a multitubular boiler in which all of the available heating-space is effectively utilized and the side walls of the fire-box and ash-pit protected by coils of pipe through which water is circulated between a lower mud-drum and an upper steam-drum.

My water-circulating pipes are connected at opposite ends by simple vertical return-bends, forming single vertical coils or serpentines, filling all of the space from the level of the ash-pit floor back of the bridge-wall and above the fire-box to their connections with the steam-drum below the water-line therein. The steam-drum at the top of the furnace and the mud-drum in the ash-pit below the grate are also connected at each end by a vertical pipe or column, the two pipes being of sufficient capacity to supply all of the coils and serving to complete the circuit of water circulation.

The matter constituting my invention herein will be set forth in the claims.

I will now describe the details of construction of my improved multitubular boiler by reference to the accompanying drawings, in which—

Figure 1 represents a front elevation with part of the front wall of the furnace broken away for showing the return-bend ends of the circulating-coils. Fig. 2 represents a vertical longitudinal section.

The upper drum A, serving as the steam-drum, is preferably set transversely at the top and front of the furnace-shell C, resting partly on the flange c''' of the front wall and partly on the side walls of the furnace, and is provided with the steam-outlet pipe a and at one end with a water-gage a'.

The drum B, serving as the mud-drum, is located at the bottom of the ash-pit and preferably at the front of the furnace, as shown in Fig. 2. A blow-off pipe b, having a valve b', is connected with each end of drum B and near the bottom for blowing off sedimentary matter.

The furnace-shell C may be of brick or iron and is provided in front with the usual doors $c\,c'$, opening, respectively, into the fire-box H and ash-pit K, and at the rear with a clean-out door c''.

The coil or serpentine sections D connect the steam-drum A with the mud-drum B and fill all of the available space above the fire-box and back of the bridge-wall from the level of the ash-pit floor to their connections at d' with drum A below the water-line, as shown in Fig. 2. The coils are made in single vertical sections composed of horizontal pipes connected at opposite ends by the malleable-iron return-bends d, which are vertically disposed, as shown. Adjacent to the side walls of the furnace and on each side of the fire-box and ash-pit is placed a coil or serpentine to receive the heat and protect the walls. Back of the bridge-wall G each section of coil is continued with short lengths of pipe, connecting by return-bends d'' adjacent to bridge-wall and by the other return-bends d at the rear of the furnace to the level of the ash-pit floor and finally connects by a pipe extending through the bottom of the ash-pit to the mud-drum B. It will therefore be understood that the floor of the ash-pit is covered with single pipes of the coil-sections connecting with the drum B. The connections will be made in a manner well known to pipe and steam fitters. The bridge-wall G is made high, as shown, to direct the flame and hot products well up into contact with the coil-sections D, and upon it and the front wall is supported the rocking grate, of any well-known pattern. To the grate is connected a lever-handle h. A removable ash-pan may be set upon the pipes below the grate. A feed-water pipe E connects with drum B. The steam-drum A and mud-drum B are also connected at their ends by the two vertical columns F F', which will be of sufficient capacity to conduct the water delivered by the

coils into drum B, from which it again passes into the coil-sections D. It will thus be seen that a complete circulation of water is effected and that the impurities will be deposited in drum B, from which they may be blown off when necessary. The smoke-pipe L is connected at the bottom of the rear wall, so that the flame and hot products after passing over the bridge-wall are compelled to pass by down-draft in contact with the coil-section back of the bridge-wall down to the ash-pit-floor level, as indicated in Fig. 2. The most economical and satisfactory results in heating the coils are thus effected.

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

1. The combination with the steam-drum at the top of the furnace and the mud-drum below the grate, of circulation coils or serpentines constructed of horizontal pipes and vertically-disposed return-bends, forming single vertical sections of coils, filling the space above the fire-box and back of the bridge-wall, from the level of the ash-pit floor to their connections with the steam-drum, below the water-line therein, and two vertical lateral pipes or columns connecting the upper and lower drums at the front of the furnace to complete the circuit of water circulation, substantially as described.

2. The combination with the steam-drum at the top of the furnace and the mud-drum below the grate, of sections of circulation coils or serpentines constructed of horizontal pipes and vertically-disposed return-bends, a vertical serpentine section being placed on each side of the fire-box and ash-pit to receive the heat and protect the side walls of the furnace, and the remaining sections filling the space above the fire-box and back of the bridge-wall, from the level of the ash-pit floor to their connections with the steam-drum, below the water-line therein, and vertical pipes or columns connecting the ends of the upper and lower drums at the front of the furnace to complete the circuit of water circulation, substantially as described.

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

PERCY W. BURKE.

Witnesses:
J. F. HEPNER,
L. J. MYERS.