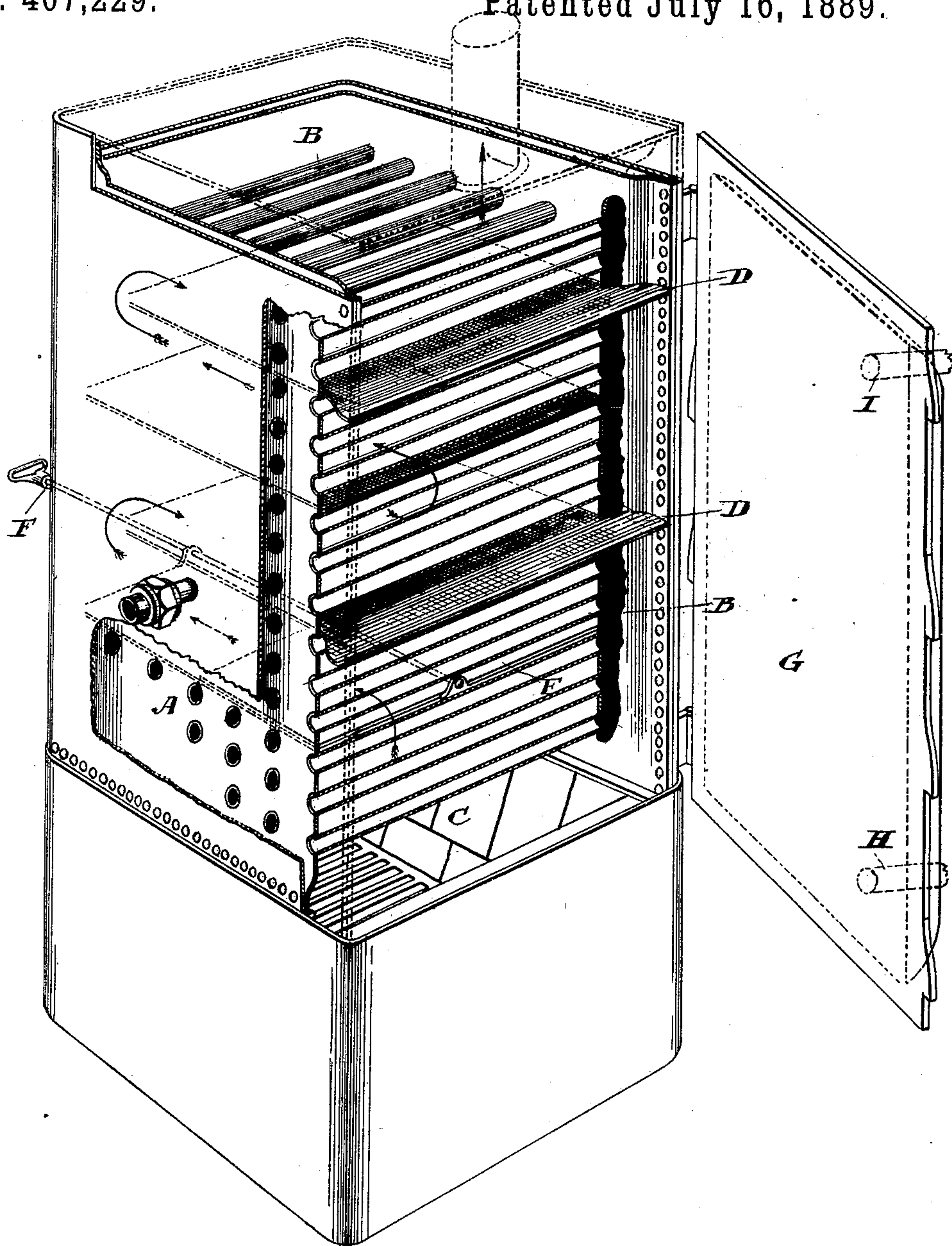


(No Model.)

W. MORRISON.
BOILER.

No. 407,229.

Patented July 16, 1889.



Witnesses.

A. B. Fetherstonhaugh.
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UNITED STATES PATENT OFFICE.

WILLIAM MORRISON, OF TORONTO, ONTARIO, CANADA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 407,229, dated July 16, 1889.

Application filed February 13, 1889. Serial No. 299,760. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MORRISON, manufacturer, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented a certain new and useful Improvement in Boilers, of which the following is a specification.

The object of the invention is to design a boiler for house-heating, power, and other purposes which shall have a large heating-surface and a small water-space to secure a maximum of heating capacity with a minimum consumption of fuel; and it consists, essentially, of a boiler having a water-space formed on three sides, the fourth side being hinged, so that the exterior of the tubes may be got at and cleaned, horizontal partitions being arranged between the tubes at suitable distances apart in such a manner that the flame and heated gases ascending from the fire-box will be directed in a zigzag course through a series of water-tubes extending across the boiler and connecting the water-spaces, the boiler being otherwise made substantially as and for the purposes hereinafter more particularly explained.

The figure is a perspective view of my improved boiler, showing the hinged side open to expose the interior of the boiler, the outer plate on one side and the inner plate on the other side being broken away, so as to show the manner in which the water-tubes connect the water-spaces on opposite sides of the boiler.

A represents the water-spaces, which extend around three sides of the boiler, and are connected together, as indicated.

B represents a series of tubes extending across the boiler and connecting together the opposite water-spaces. When the boiler is filled with water, the water-spaces A and the tubes B are all full.

C is the fire-box, and D represents plates placed between the tubes B at suitable distances apart, and arranged as indicated, so that one plate D shall butt against the inside shell of the boiler, while at the same end the plate next above it will be a short distance from the inside shell of the boiler, leaving space for the passage of the smoke and heated gases arising from the fire-box. By this arrangement the flame and heated gases from

the fire-box C will ascend in a zigzag course, as indicated by arrows, through the tubes and finally escape through the smoke-stack. In this way the heated gases ascending are retained in the boiler until the caloric is absorbed by the tubes and water-spaces. In order to cut off the tubes above the lower plate from the fire-box when it is desired to shake or dump the contents of the said box, and thereby prevent the dust from ascending and lodging on the tubes, I place an adjustable damper E on top of the lower plate D and provide it with a rod F, by which the said damper may be adjusted for closing or opening it, as required. The door G is hinged, as indicated, so that it may be readily opened in order to obtain access to the exterior of the tubes for the purpose of cleaning, or to remove any dust or dirt which may be carried up over them by the heated gases ascending from the fire-box.

A boiler constructed in accordance with my invention will have a very large heating-surface and a very small water-space containing a maximum of heating capacity with a minimum consumption of fuel, and as the tubes are easily got at they may be kept perfectly clean without the employment of any skilled workman.

It will be seen on examination of the drawing which shows the general construction of the boiler, that the figure represents a hot-water boiler, and it will be readily understood by any mechanic how readily a steam-dome could be added, thus making it a steam-power boiler, in which case I would make the door G an independent water-space, thus converting it into a heater, (as shown by dotted lines,) and which can easily connected with the boiler and feed-water pump by detachable connections. These connections are also shown in dotted lines, II representing a pipe which leads to the feed-pump or injector, and I the pipe which connects the water-space in the door G with the water-space A in the boiler, so that when it is necessary to open the door G for the purpose of cleaning the tubes the pipe I may be easily disconnected.

What I claim as my invention is—

1. A boiler having a water-space A formed on three of its sides, the two opposite sides being connected together by tubes B, and the

side on which no water-space is formed having a door G, arranged substantially as and for the purpose specified.

2. A boiler having a water-space A formed
5 on three of its sides, the two opposite sides being connected together by tubes B, and the side on which no water-space is formed having a door G, in combination with a series of plates D, arranged between the tubes B, substantially as and for the purpose specified.
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3. A boiler having a water-space A formed on three of its sides, the two opposite sides being connected together by tubes B, and the side on which no water-space is formed having a door G, in combination with a plate D
15 and adjustable damper E, provided with a rod

F, and designed substantially as and for the purpose specified.

4. A boiler having a water-space formed on three of its sides, the two opposite sides being connected together by tubes B, in combination with a hinged door G, having a water-space formed in it, which latter water-space is connected to the water-space A by a pipe I, provided with a suitable coupling, substantially as and for the purpose specified.
20 25

Toronto, February 1, 1889.

W. MORRISON.

In presence of—

CHARLES C. BALDWIN,
CHAS. H. RICHES.