

No. 741,094.

PATENTED OCT. 13, 1903.

R. W. BARTON.  
STEAM BOILER.

APPLICATION FILED MAR. 2, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig-3.

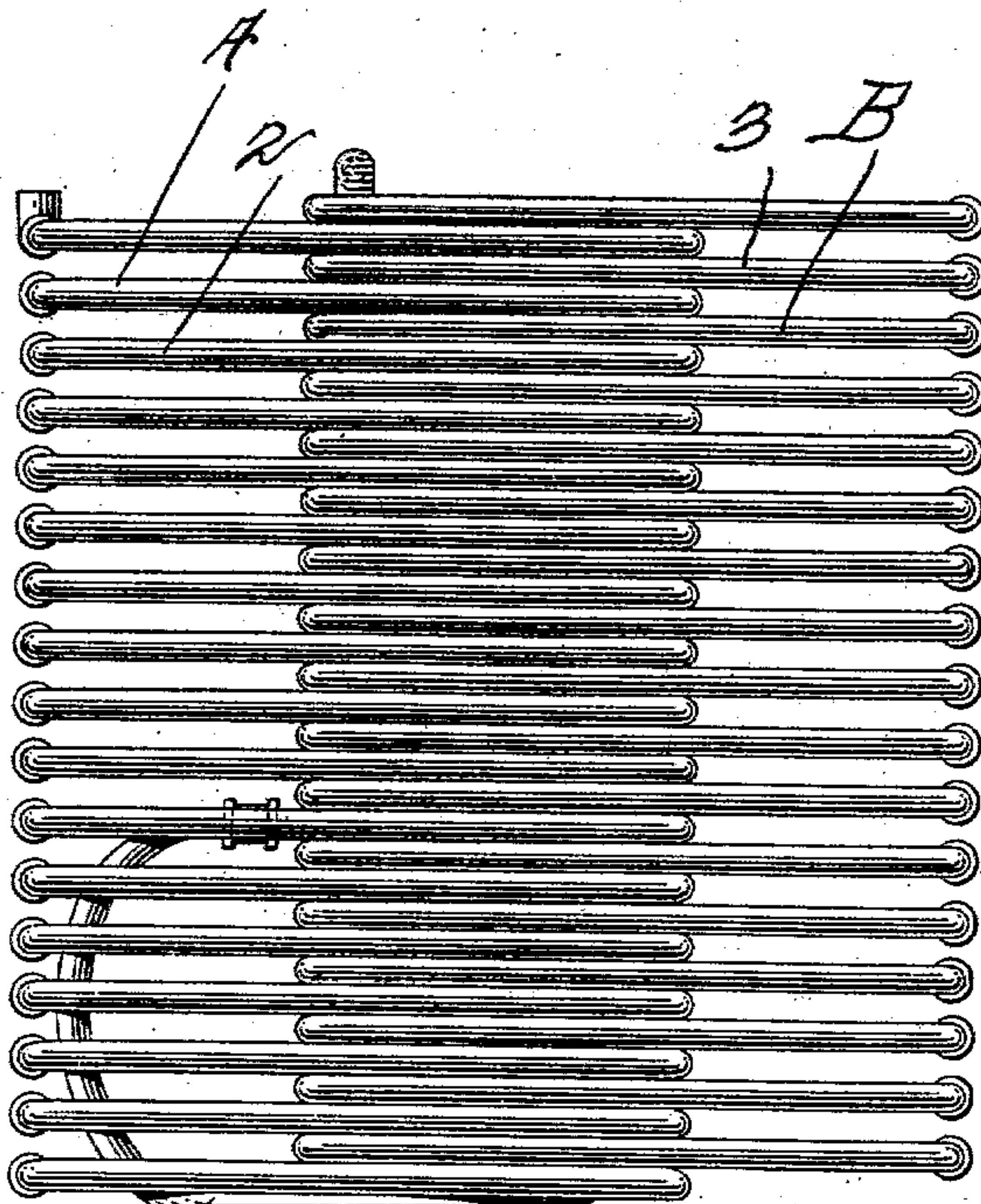
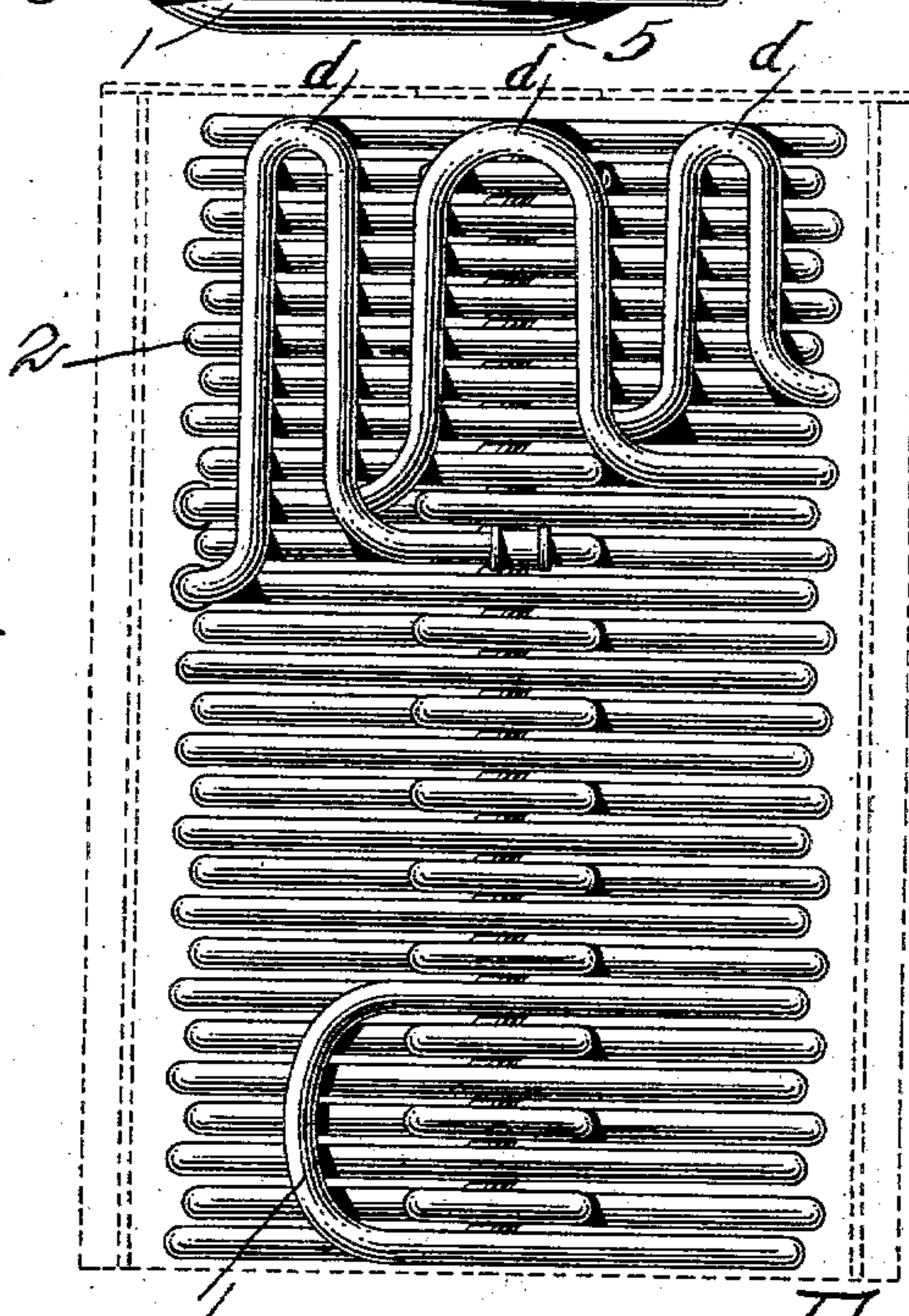


Fig-1.



Inventor

Robert W. Barton,

Witnesses

George Hilton  
J. Bullson

By

A. B. Wilson

Attorney

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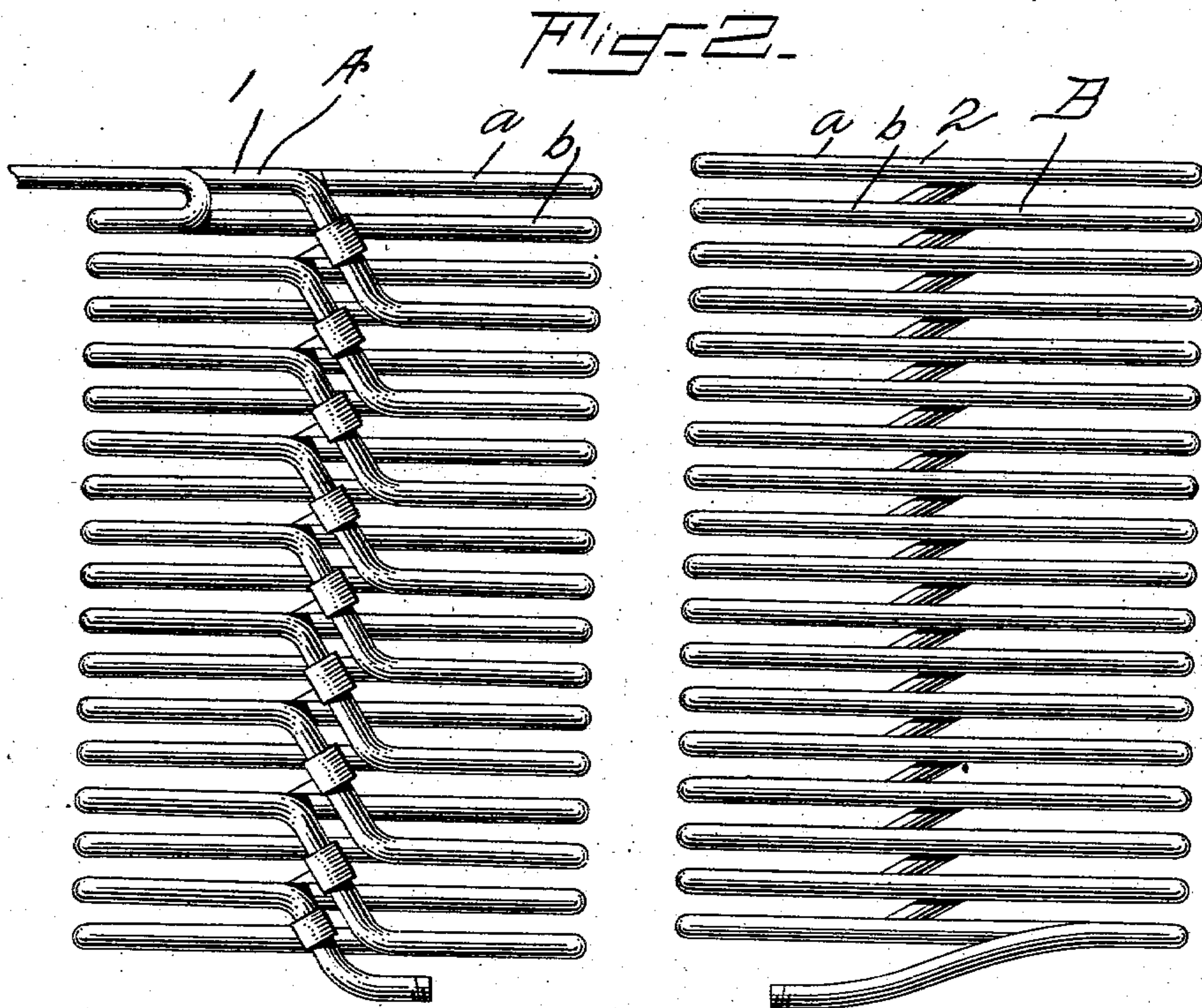
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Robert W. Barton,

Attorney



# UNITED STATES PATENT OFFICE.

ROBERT W. BARTON, OF CHICAGO, ILLINOIS.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 741,094, dated October 13, 1903.

Application filed March 2, 1903. Serial No. 145,749. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT W. BARTON, 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 Steam-Boilers; and I do 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 improvements in steam-boilers of the type known as "flash-boilers;" and it consists in the construction and arrangement of devices substantially as hereinafter described and claimed.

This invention is an improvement on the steam-boiler described and claimed in Letters Patent of the United States No. 719,420, granted to me February 3, 1903.

In the device of my invention a quantity of water within the boiler commensurate with the amount of steam that is being involved is always assured. The boiler is formed of water-tubes which are disposed in superposed (preferably flat) coils. The water is supplied by a suitable feeder to the tubular coils and travels toward the bottom of the boiler, being forced to thus circulate by the feeder; and one object of my invention is to effect improvements in the construction of the boiler whereby some of the water finds its way by gravitation to the lowermost coils of the boiler, thus preventing the overheating of the said coils and enabling me to dispense with means heretofore necessarily employed to regulate the temperature of the heating medium in order to prevent such overheating.

A further object of my present improvements is to combine with means to prevent gravitation of the water through the upper boiler-tubes means to cause such gravitating action of the water in the lower boiler-tubes.

A further object of my present improvements is to construct the boiler of a plurality of sections of superposed water-tube coils with the coils of the respective sections disposed in interlapping and interlocking relation.

A further object of my present invention is to effect improvements in the disposition of the tubular coils and in the construction

of the boiler, whereby the latter is adapted for highly superheating the steam without danger of the overheating of any of the coils of the boiler.

In the accompanying drawings, Figure 1 is a side elevation of a boiler embodying my improvements. Fig. 2 is a similar view of a modification of the same, showing the vertical sections thereof separated and in position to be assembled with their respective coils in interlapping interlocking relation. Fig. 3 is a side elevation showing another modified form of my invention.

My improved boiler is provided with a pressure non-gravitating downflow section of coils 2, an upper section of coils 3, and means, as a loop, to conduct water by gravity from the pressure downflow-section to the upper section to prevent overheating of the lowermost coils, in which the water is flashed into steam and which are nearest the fire.

In the form of invention shown in Fig. 1 the downflow-section 2 is provided with water-traps *d*, formed by riser-offsets bent in certain of the coils and having their upper portions disposed at the same level. These offsets or traps are specifically described and claimed in another application for Letters Patent of the United States which I am about to file.

In the forms of my invention shown in Figs. 2 and 3 the boiler is composed of units of coils, each unit comprising a pair of coils *a b*, which within the scope of my present improvements may be of any suitable construction. The lowermost coil *b* of each unit is in more direct communication with the source of feed-water supply, while the uppermost coil *a* of each unit is in more direct connection with the engine or that instrumentality to which the steam is to be supplied. These units are preferably assembled in vertical line and are so joined in succession that the top layer or coil of one unit is in connection with the bottom layer or coil of the unit immediately adjacent. In this manner a series of traps are provided which entail the presence of water within them, and, assuming that the feed-water mechanism is in working order, prevent the upper portion of the boiler from becoming dry, because they pre-



vent the water from descending by gravity, it being caused to thus circulate or flow solely by pressure caused by the action of the feed-water mechanism; but in the lower coils of the boiler as heretofore constructed there is little or no water, but steam only, and heretofore to prevent the lower coils from becoming overheated it has been necessary to resort to the use of a thermostatic or other form of regulator to automatically control the supply of fuel or air to the heater. This expedient has been found to be somewhat ineffective, and I have invented improved means to prevent the overheating of the lower boiler-coils and enable the heat-regulator to be dispensed with, one embodiment of which improved means I will now describe.

At a suitable distance from the lower end of the boiler I provide a drop or gravity loop 1 in the water-tube, which leads from the pressure downflow-section 2 of the boiler to the lowest coil of an upflow-section 3, which in the form of my invention shown in Fig. 1 terminates at 4 and in the form shown in Fig. 3 terminates at 5. The points at which the pressure downflow-section is thus caused to terminate by the provision of the gravity-loop 1 must be determined by the conditions, the function of the loops being to cause the water to be fed by gravity to the lowermost coils of the boiler, so that they cannot become dry and overheated. It is in these lowermost coils that the water "flashes" into steam; but the provision of the gravity-loop insures the constant supply of a sufficient quantity of water to them to prevent their being overheated.

Another feature of my invention is the construction of the boiler in two vertical sections A B of coils, which are united at their lower ends to cause a down circulation in one and an up circulation in the other and the respective coils of which sections are interlapped and interlocked, as shown in Figs. 2 and 3. These vertical sections may or may not contain the same number of coils, as may

be desirable, and I do not, therefore, desire to limit myself in this particular.

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

1. A boiler of the class described, comprising a downflow coil-section, means to prevent the passage of water through the upper portion thereof by gravity, an upflow flash coil-section, and means to supply the same with water from the downflow coil-section.

2. A boiler of the class described, comprising a downflow coil-section, means to prevent the passage of water through the upper portion thereof by gravity, an upflow flash coil-section, and gravity-acting means to supply water thereto from the downflow coil-section.

3. A boiler of the class described, comprising a downflow water-feed coil-section, and an upflow flash coil-section supplied with water thereby.

4. A boiler of the class described having a plurality of downflow water-coils, a descending gravity-acting loop-tube at the lower end thereof and upflow flash-coils supplied with water from said water-coils by said loop-tube, said water-coils flash-coils being disposed in interlapped relation.

5. A boiler of the class described having a plurality of downflow-coils disposed in successively lower planes, provided at an elevated point with means to prevent water from passing downwardly therethrough by gravity, provided at a lower point with descending, gravity-acting water-conveying means, and upflow-coils disposed in successively higher planes and supplied at a lower point with water by said gravity-acting water-conveying means.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT W. BARTON.

Witnesses:

MILLARD E. MOGG,  
WM. A. THIRLWALL.