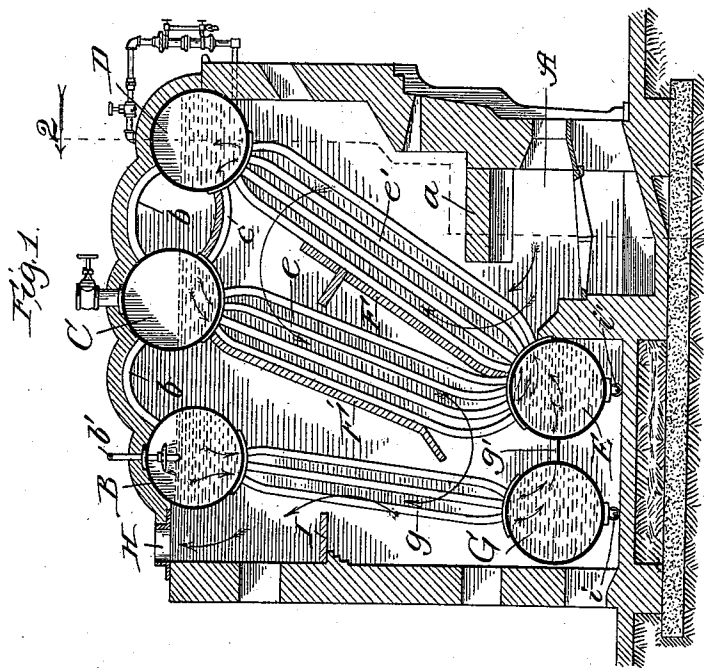
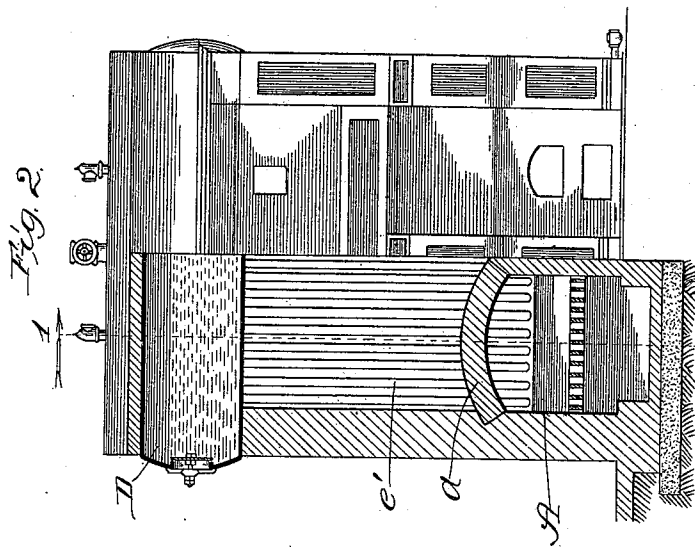


(No Model.)

H. S. PELL.
STEAM BOILER.

No. 549,012.

Patented Oct. 29, 1895.



Witnesses:
E. S. Gaylord,
L. B. Allen.

Inventor:
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UNITED STATES PATENT OFFICE.

HARRY S. PELL, OF AKRON, OHIO, ASSIGNOR TO THE STIRLING COMPANY,
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STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 549,012, dated October 29, 1895.

Application filed June 9, 1894. Serial No. 514,085. (No model.)

To all whom it may concern:

Be it known that I, HARRY S. PELL, of Akron, Summit county, Ohio, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

The object of my invention is to improve the construction and operation of water-tube boilers of the type known as the "Stirling boiler;" and the invention consists in the features and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section taken on line 1 of Fig. 2; and Fig. 2, a vertical elevation, partly in section, taken on line 2 of Fig. 1.

In constructing my improved boiler I provide a fuel-chamber A, of any desired form and size, and preferably covered with a fire-brick arch *a* to aid in securing complete combustion of the gases and to direct the heated gases and products of combustion into the furnace-chamber or boiler proper. Arranged in the upper part of the boiler are water and steam drums B, C, and D, connected together by steam-pipes *b b*, while the last two, the front and middle drums, are also preferably connected together by water-pipes *c*, which may be direct or circuitous, as desired. Arranged in the lower part of the boiler is a mud-drum E, connected to the front and middle elevated drums by means of banks of tubes *e e'*, so as to afford water communication between them. Fire-brick partitions F and F' may be arranged behind the front and middle banks of tubes, respectively, so as to deflect the heated gases and products of combustion upward through the first bank of tubes and down through the second bank, which of course exposes a great portion of their length to the heated gases or products of combustion.

A rear lower mud-drum G is placed in the lower part of the boiler, which mud-drum is provided with a bank of tubes *g*, affording water communication with the feed-water drum B. This lower drum G is preferably provided with a pipe or pipes *g'*, which connect it with the lower drum E, so that water communication may be furnished through these two drums. This water communication may be direct or circuitous, as desired. In

fact, the water may in some cases be passed up through a separate drum while on its passage from one mud-drum to the other.

The rear bank of tubes and mud-drum G are located in the path of the heated gases and products of combustion as they pass out through the opening or chimney H to the smoke-stack. I provide the rear wall of the furnace with a deflecting or baffle plate I, which more surely compels the heated gases or products of combustion to keep in contact with the rear bank of tubes before they pass out through the smoke-stack.

In operation, the supply of water enters the upper feed-drum B through pipe *b'*, where it may be passed over a cup-shaped disk, so as to fall gently against the surface of the water or sides of the drum, after which it passes down through the rear bank of tubes into the lower mud-drum G. While passing down through the rear upper mud-drum and rear bank of tubes the water is warmed or heated to such an extent that when it enters the lower mud-drum G a portion of its sediment is precipitated or settles therein. The water then passes on through the pipe or pipes *g'* into the mud-drum E, where it takes the course indicated by the arrows, flowing upward through the front bank of tubes into the front water and steam drum, then through the connecting-pipes into the middle water and steam drum, and down through the middle bank of tubes into the lower mud-drum E, and so on in circuit. This circulation being old, however, it will be understood that I do not intend to limit myself to it or to a construction in which it is produced or secured.

The lower mud-drums are each provided with blow-off cocks *i*, through which mud or sediment may be expelled or removed from the boiler.

As will be seen, my invention provides for introducing water into the upper feed-drum and then passing it down through the rear bank of tubes into the lower mud-drum G in such manner that it is partially heated by the escaping gases and products of combustion, this resulting in the deposition of a large amount of sediment before the water enters the other drums and tubes and goes into general circulation, and for the feeding

of this water, from which a large amount of sediment has been already removed, into a second lower mud-drum, where it comes in contact with the heated currents of water and is raised to a higher temperature before entering the front bank of tubes, so that nearly all the remaining sediment is deposited in this second mud-drum before the water passes into the hottest part of the boiler. In this way the formation of scale in the hottest part of the boiler is prevented.

As the essential feature of my invention consists in providing for the introduction of feed-water through an upper drum in the rear part of the boiler and in passing the water through more than one mud-drum in the lower part of the boiler, it will of course be understood that I do not intend to limit myself to minor features or details of construction or to the use of parts not mentioned in the claims. On the contrary, I contemplate making formal changes and adding or omitting parts or using equivalents, as circumstances may suggest or render expedient.

I claim—

1. In a water-tube boiler, the combination of elevated steam and water drums, a lower mud drum, tubes connecting the lower mud drum with the elevated steam and water drums, a rear elevated feed drum, a rear lower mud drum, tubes connecting the feed drum with the rear lower mud drum, and means for introducing water into the elevated feed drum and passing it to the forward part of the boiler, substantially as described.

2. In a water-tube boiler, the combination of a rear elevated feed drum, a rear lower mud drum, tubes connecting the rear lower mud drum with the elevated feed drum, a front lower mud drum, a pipe or pipes connecting the rear and front lower mud drums, elevated steam and water drums having steam and water communication with each other, and tubes connecting the front lower mud drum with the elevated steam and water drums, substantially as described.

HARRY S. PELL.

Witnesses:

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