(No Model.)

W. W. WELLS.

FEED WATER HEATER.

No. 452,049. Patented May 12, 1891.

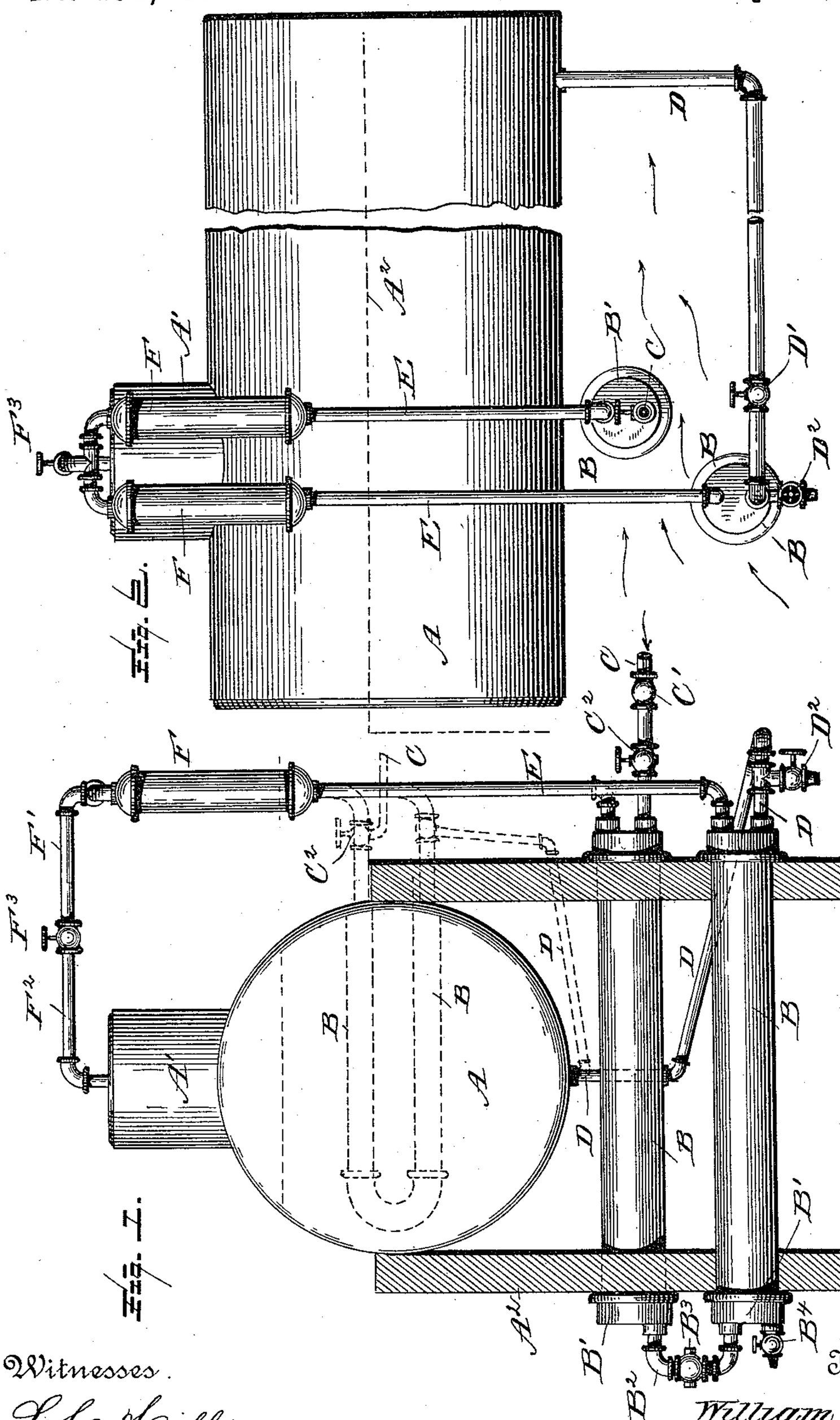

Fig. 2.

Fig. 1.

Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM W. WELLS, OF LITCHFIELD, MINNESOTA.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 452,049, dated May 12, 1891.

Application filed January 9, 1891. Serial No. 377,260. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. WELLS, a citizen of the United States, residing at Litchfield, in the county of Meeker, State of Minnesota, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in feed-water heaters; and it has for its object, among others, to provide a simple and efficient attachment to boilers whereby steam is quickly generated and the water fed to the boiler in a heated condition, utilizing the heat from the products of combustion to warm the water within the generators, which I arrange within the combustion-chamber beneath the boiler, and provide connections, as will be hereinafter more fully described.

Other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is an end elevation illustrating my improvements, the brick-work or supporting-walls of the furnace being shown in vertical section; and Fig. 2 is a side elevation of the parts shown in Fig. 1.

Like letters of reference refer to like parts in both the figures of the drawings.

Referring now to the details of the drawing by letter, A designates the boiler of any known construction, provided with a dome A′ and supported in any suitable manner—as, for instance, by the brick-work A^2; but as the manner of supporting the boiler forms no part of the present invention a further description thereof is not deemed necessary.

Within the combustion-chamber I arrange a plurality of generating-chambers B of any suitable material and of a size governed by the size and type of the boiler with which they are designed to be used. These generators are supported—as, for instance, by the brick-work A^2—with their ends extending outside thereof and provided with detachable caps B′. The extended ends of these chambers are connected to their caps by means of the elbow-pipes B^2, provided with suitable cocks or valves B^3, the connection being with the under side of the upper end of the chamber and to the upper side of the lower chamber. Two of these chambers are shown in the drawings; but I contemplate using in some cases a greater number. Upon the same end as the connection B^2 the lowermost of the chambers is supplied with a removable cock or plug B^4 for the purpose of removing the sediment when desired, the sediment settling in the lowermost chamber.

C is a supply-pipe for admitting the supply of water to the lower part of the uppermost of the generating-chambers, the said pipe being provided with a check-valve C′ and a stop-cock C^2.

D is a pipe connected with the lower portion of the lowermost of the generating-chambers and communicating with the boiler, being provided with a stop-valve D′ and a blow-off cock D^2 between said stop-cock and the connection of said pipe with the generator.

From the top of each of the generators D there extends a pipe E, each of which empties into a separating-chamber F, suitably supported and connected with the steam-drum A′ of the boiler by means of the pipes F′, the pipes leading from the two separating-chambers emptying into a common pipe F^2, which empties into the said drum, and is provided with a suitable valve F^3, as illustrated in Figs. 1 and 2.

The operation will be readily understood. When fire is started in the furnace, the valves are opened to admit the water into the generators and to allow the passage of steam therefrom as the latter is generated, the products of combustion passing over and around the generating-chambers B, heating the water therein, which passes therefrom through the outlet-pipe D in the lowermost of the generators into the boiler, the steam passing from both generators through pipes E to the separating-chambers F, and from thence to the drum of the boiler, the several

valves being employed for the purpose of shutting off the steam or water in case of accident or injury to any of the parts.

Instead of the construction above described and shown, I may arrange the generators within the boiler itself at the end thereof, as indicated in dotted lines in Fig. 1, heating the water in the same by means of the products of combustion which pass through the flues of the boiler; but the construction hereinbefore described is greatly preferred.

Various modifications in detail may be resorted to without departing from the spirit of the invention, the form illustrated in dotted lines being simply one of the modifications which may be resorted to.

What I claim as new is—

1. The combination, with the boiler and the generating-chambers arranged within the combustion-chamber, of the separating-chambers and pipe connecting the generators with the separating-chambers and with the boiler, substantially as specified.

2. The combination, with the boiler and the generating-chambers arranged in the combustion-chamber and connected with each other, of the separating-chambers, the supply-pipe to the generators, and the pipes connecting the separating-chambers with the generators and with the steam-space of the boiler, and the pipe connecting one of the generators with the water-space of the boiler, substantially as specified.

3. The combination, with the boiler and the generators arranged within the combustion-chamber, of the separating-chambers connected with the steam-drum, the pipes connecting the separating-chambers with the steam-spaces of the generators, the connection between the generators, and the pipe connecting the lowermost of the generators with the water-space of the boiler, substantially as specified.

4. The combination, with the boiler, the generators, and the separating-chambers, of the pipes connecting the separating-chambers with the generators and with the steam-space of the boiler, the connection between the generators, the supply-pipe to the uppermost generator, the pipe leading from the bottom of the lowermost generator to the water-space of the boiler, and suitable valves in said pipe, arranged for operation as set forth.

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

WILLIAM W. WELLS.

Witnesses:

O. H. CAMPBELL,

CHAS. H. DART.