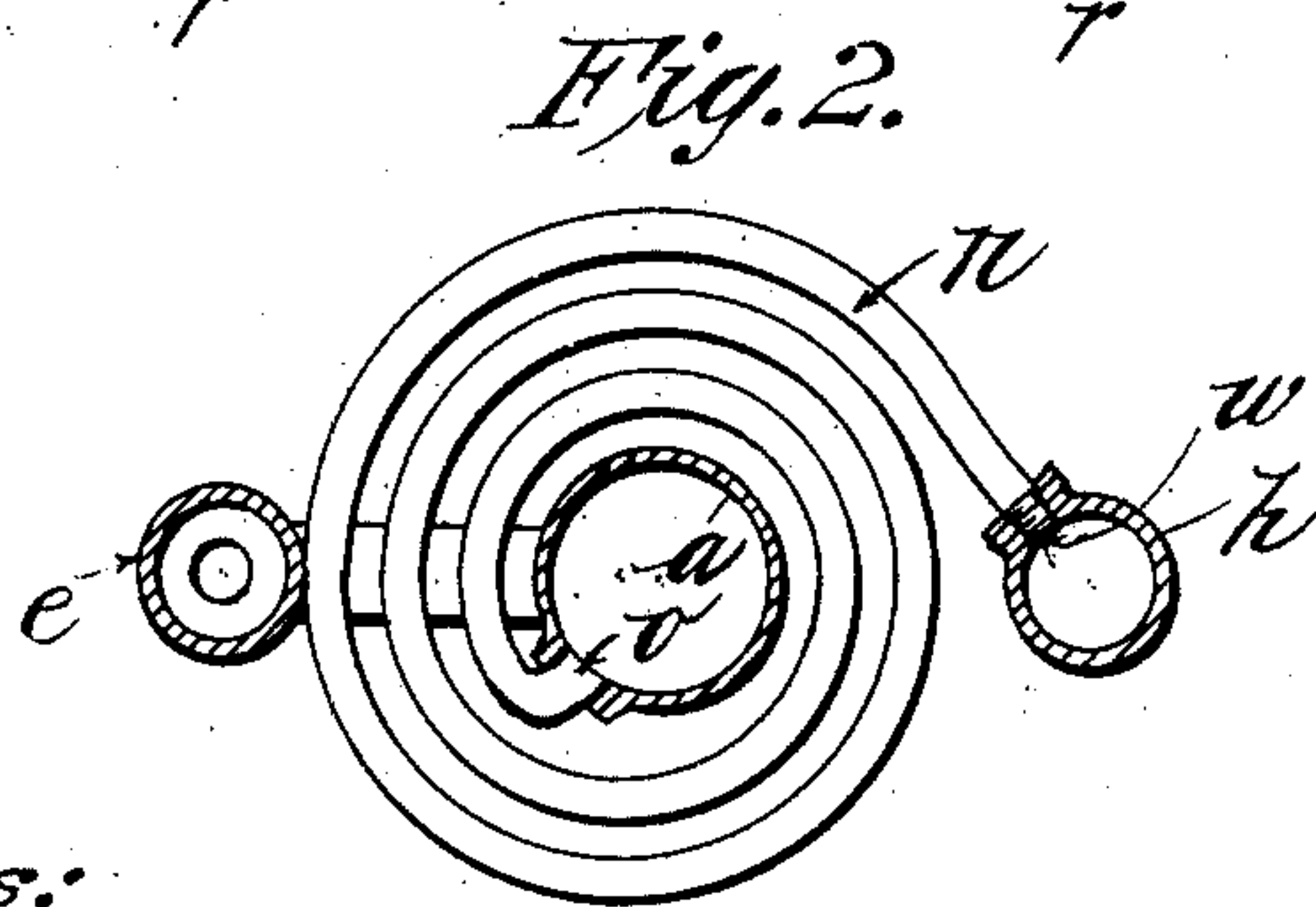
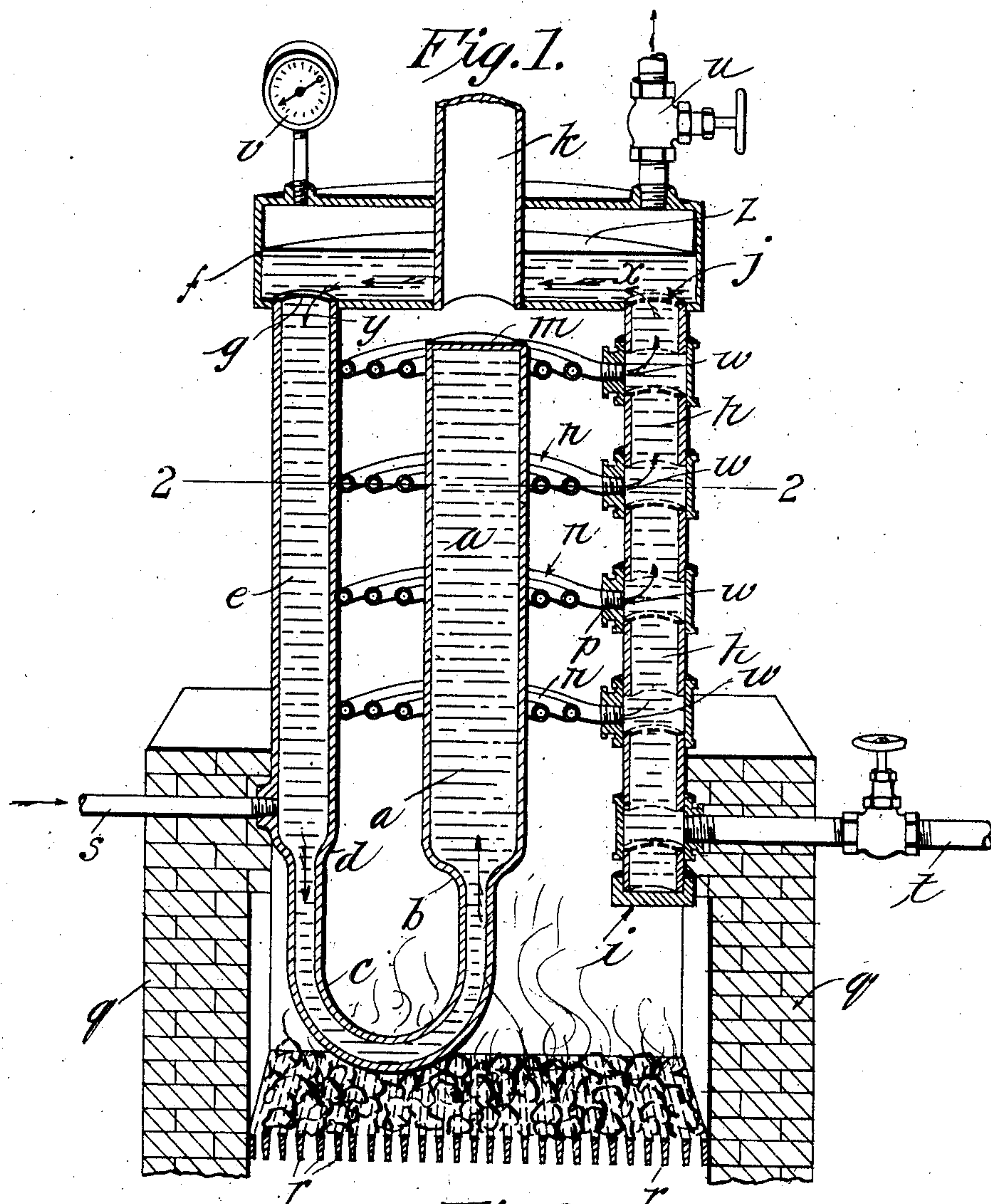


No. 826,546.

PATENTED JULY 24, 1906.

A. M. CUSHING.
BOILER.

APPLICATION FILED MAY 8, 1905.



Witnesses:
H. L. Sprague
E. H. Sealine

Inventor.
Alvin M. Cushing.
by Chapin & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

ALVIN M. CUSHING, OF SPRINGFIELD, MASSACHUSETTS.

BOILER.

No. 826,546.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed May 8, 1905. Serial No. 259,475.

To all whom it may concern:

Be it known that I, ALVIN M. CUSHING, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Steam or Hot-Water Boilers of that Class known as "Coil-Boilers," of which the following is a specification.

10 This invention relates to the class of boilers, and more particularly to that class of boilers used for heating by means of steam or hot water or for power purposes.

15 Broadly considered, the invention consists in employing a central standard or feed-pipe which is located centrally over the fire-box and is closed at its upper end, while the lower end is contracted and bent into a U-shaped form and connected with a vertical stand-
20 pipe. The central standard or feed-pipe has connected therewith a number or series of spirally-arranged coils, the inner ends of which are connected to the standard or feed-pipe and the outer ends of the same are connected to another vertical stand-pipe parallel
25 with the central standard. The coils are arranged in horizontal planes and parallel to each other. Located above the standard or feed-pipe is a drum or steam-chest which is
30 in communication with the two stand-pipes, and passing centrally through this drum is a smoke-flue for the escape of the products of combustion from the furnace or fire-box below.

35 In the drawings forming part of this application, Figure 1 is a vertical sectional view of my invention, and Fig. 2 is a plan view taken on the broken line 2 2 of Fig. 1.

Referring to the drawings in detail, *a* designates the central feed-pipe or standard, which
40 is contracted at its lower end at the point *b*, and from this point it extends downward and is bent into a substantially U-shaped form, as designated at *c*. From this point it extends upward and leads into a stand-pipe, at
45 which point the U-shaped pipe is increased in diameter, as shown at the point *d*.

e designates a stand-pipe at the left of the central standard or feed-pipe and extends
50 parallel therewith and slightly above the top of the standard *a*, where it is connected with a drum or head *f* by means of the opening *g*.

At the right of the standard or feed-pipe *a* is a stand-pipe *h*, which is made or composed
55 of sections, as shown. This stand-pipe is closed at its lower end by a cap *i*, and the up-

per end of the same communicates with the interior of the drum or steam-chest *f* by the opening *j*. The drum *f* has the smoke-pipe or flue *k* passing centrally through the same
60 and immediately over the upper closed end *m* of the standard or feed-pipe.

A series *n* of spirally-coiled pipes are connected to the standard or feed-pipe *a* at their inner ends, as shown at *o* in Fig. 2, while
65 their outer ends are connected with the stand-pipe *h* in any suitable manner, as by the screw-threads *p*.

q designates a portion of the brickwork of the fire-box, and *r* designates a portion of the
70 fire-grate, which is located in the brickwork in the ordinary manner.

The reference-letters *s*, *t*, *u*, and *v* designate, respectively, the feed-pipe, blow-off pipe, the steam-pipe, and the ordinary steam-
75 gage, the location and arrangement of which, however, forms no part of my invention, they being merely shown in a conventional way.

The operation of my improved boiler is as follows: As the water in the standard or feed-
80 pipe *a* becomes heated, even only a few degrees, circulation of the same immediately takes place, causing the heated water in the pipe *a* to rise and flow from the same into the spiral coils *n*, through the opening *o*, and
85 around the coils to the outlet *w* and into the stand-pipe *h*, where the heated water will rise and flow from the pipe *h* into the drum or steam-chest *f* through the opening *j*, as indicated by the arrow *x*. The heated water
90 after circulating through the drum *f* descends through the stand-pipe *e*, as indicated by the arrow *y*, passing from thence to the contracted point *d* in the pipe *e*, and from this point it circulates through the portion *c* of the U-
95 shaped bend which connects the pipes *a* and *e*. As the water flows from the pipe *e* through the U-shaped parts *c* and into the standard or feed-pipe *a* it is again reheated and rises in the pipe *a*, where it flows out into the spiral
100 coils *n* through the openings *o* at the inner ends of the coil, thus repeating the operation of circulation.

z designates the level of the water in the drum or steam-chest *f*.
105

It is thus seen that by my improved boiler I provide a large heating or radiating surface for the heated gases from the furnace to come in contact with. This large heating surface is accomplished by means of the series of coils
110 *n*, which are attached to the standard or feed-pipe *a*, and it is to be understood that a large

or small number of these can be attached to the standard *a*, as required, thus materially increasing the efficiency of the boiler either when the same is used for heating or for power purposes. It is also to be understood that my boiler may be used as a feed or return supply without changing any of the essential features thereof.

The dimensions shown in the drawings being only for the purposes of illustration, I may vary them in any way that I see fit without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a boiler of the class described, a central standard or feed-pipe having a closed top, the lower end of which has a contracted portion and bent into a substantially U-shaped form and extending upward and converging into the lower end of a stand-pipe, said stand-pipe being in parallel arrangement with the standard or feed-pipe, a second stand-pipe located on the opposite side of the standard or feed-pipe from the stand-pipe previously mentioned, said second stand-pipe being also arranged in parallel alinement with the standard, a drum or steam-chest located

above the upper closed end of the standard and communicating with the two stand-pipes, a series of spiral coils arranged horizontally, the inner ends of which are connected to the standard or feed-pipe and their outer ends to the said second stand-pipe.

2. In a boiler of the class described, a central standard or feed-pipe, a stand-pipe parallel therewith, a second stand-pipe also parallel with the standard, and communicating means between the standard and the two stand-pipes consisting of a series of spiral coils forming communication between the standard and one of said stand-pipes, and a drum for connecting the two stand-pipes at their upper ends, and forming communication between them, a curved or U-shaped element connecting the lower end of the standard and one of said stand-pipes at its lower end, the upper end of the standard or feed-pipe, and the lower end of the other stand-pipe being closed.

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

ALVIN M. CUSHING.

Witnesses:

FRANK G. HODSKINS,
FREDERIC BEMENT.