

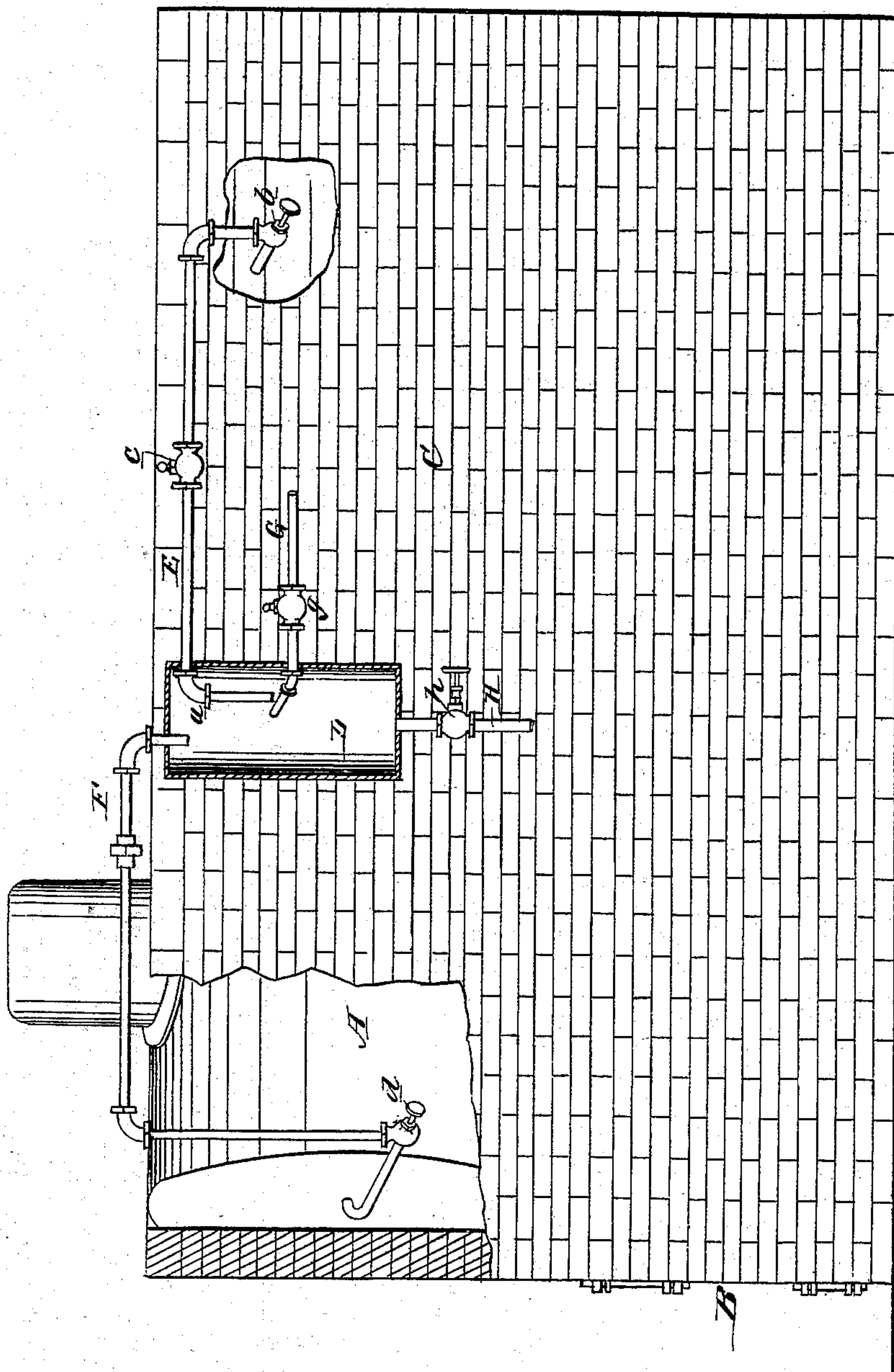
(No Model.)

C. H. SHIELDS.

FEED WATER HEATER AND PURIFIER.

No. 252,147.

Patented Jan. 10, 1882.



WITNESSES:

Francis Mc Ardle,
C. Sedgwick

INVENTOR:

C. H. Shields
BY *Munn & Co*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES H. SHIELDS, OF MAYWOOD, ASSIGNOR OF ONE-HALF TO HIMSELF
AND JOHN S. LIZARS, OF CHICAGO, ILLINOIS.

FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 252,147, dated January 10, 1882.

Application filed April 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. SHIELDS, of Maywood, in the county of Cook and State of Illinois, have invented a new and Improved Feed-Water Heater and Purifier for Steam-Boilers, of which the following is a full, clear, and exact description.

The object of this invention is to prevent the deposit of sediment and scale in boilers.

10 The invention consists of a drum into which the feed-water is forced by pump or injector, which drum is connected with one end of the boiler by a check-valved pipe, through which steam and water pass from boiler to drum to
15 heat the feed-water and cause a deposit of the sediment in the drum, and is connected with the other end of the boiler by a valved pipe, through which the heated feed-water from the drum enters the boiler.

20 The drawing represents a boiler and its setting, with parts broken away to exhibit the other parts, with my improved heater and purifier, partly in section, attached thereto.

25 In the drawing, A represents the boiler, B the boiler-front, and C the brick boiler-setting.

D represents the heater and purifier, consisting preferably of a boiler-iron cylindrical drum about twelve inches in diameter and three feet long, its dimensions depending up-
30 on the size of the boiler to which it is applied, fixed about midway of the length of the boiler A in the brick work or setting C. Said drum D is connected with the rear end of the boiler A by a pipe, E, an inch and a half in diameter, or thereabout, which has one end tapped
35 into the side of said boiler A on the side thereof, at about the height of the upper tier of boiler tubes or flues, said pipe then extending upward on the outside of the boiler A, and then
40 parallel with it to the drum D, into which it is entered, and then bent downward at right angles, as shown at *a*, for a third or more of the length of said drum D. Said pipe E is provided with a valve, *b*, to regulate the flow of water
45 and steam through it from the boiler A to the drum D, and with a check-valve, *c*, to prevent the return of water through said pipe E from the drum D to the boiler A. From the top of said drum D a pipe, F, extends to the front

of the boiler A, said pipe F being preferably 50 about an inch and a half in diameter, and, making a downward turn, is entered into the front of said boiler A at about midway between its sides, as shown. Said pipe F is also provided with a valve, *d*, to regulate the flow of
55 feed-water through it.

In the side of the drum D is a pipe, G, provided with a regulating-valve, *g*, that is designed to be connected with a feed-water pump or injector, and at the bottom of said drum D 60 is a blow-off pipe, H, provided with a blow-off cock, *h*, whereby the sediment collecting in the drum D from the feed-water is ejected therefrom.

On the boiler A being fired and the engine 65 started steam and water flow from the boiler A through the pipe E into the drum D, and, there coming in contact at an angle with the feed-water that is entering through the pipe G, heats the incoming water, which hot feed- 70 water is then forced, by the combined pressure from the pump or injector (not shown) and of the water and steam from the boiler, through the pipe F into the front of said boiler A, and, the feed-water entering the boiler 75 A thus heated, the boiler A suffers no check in making steam, as is commonly the case with boilers not provided with the best feed-water heaters. The heating of the feed-water in the drum D causes the sediment to deposit 80 from the water in the bottom of the said drum D, whence it may be blown out on the opening of the blow-off cock *h*, and the steam and water from the boiler A coming in contact at an angle with the feed-water in the drum D 85 creates counter currents or eddies therein, which create or maintain a comparative calm or still water below the mouth of the feed-pipe G, which materially assists in the ready precipitation of sediment from the heated feed- 90 water.

It will be seen that by this device a constant forced water-circulation of hot water is maintained through the boiler and heater D, and, the feed-water being heated in the heater 95 or drum D and the sediment being thereby precipitated therefrom, that little or no deposit of scale or sediment can be formed in the boiler.

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

5 In a feed-water heater, the combination, with
the boiler A and drum D, of the pipe E, con-
necting said parts and extending downward
into said drum with a rectangular bend, *a*, the
feed-water pipe G entering said drum and
having its inner end arranged near the end of
pipe E and at right angles thereto, and the

pipe F connecting the top of said drum with 10
the boiler, substantially as shown and de-
scribed, the said drum being provided with a
suitable blow-off pipe, as set forth.

CHARLES H. SHIELDS.

Witnesses:

H. B. STEVENS,
H. SIEMAN.