

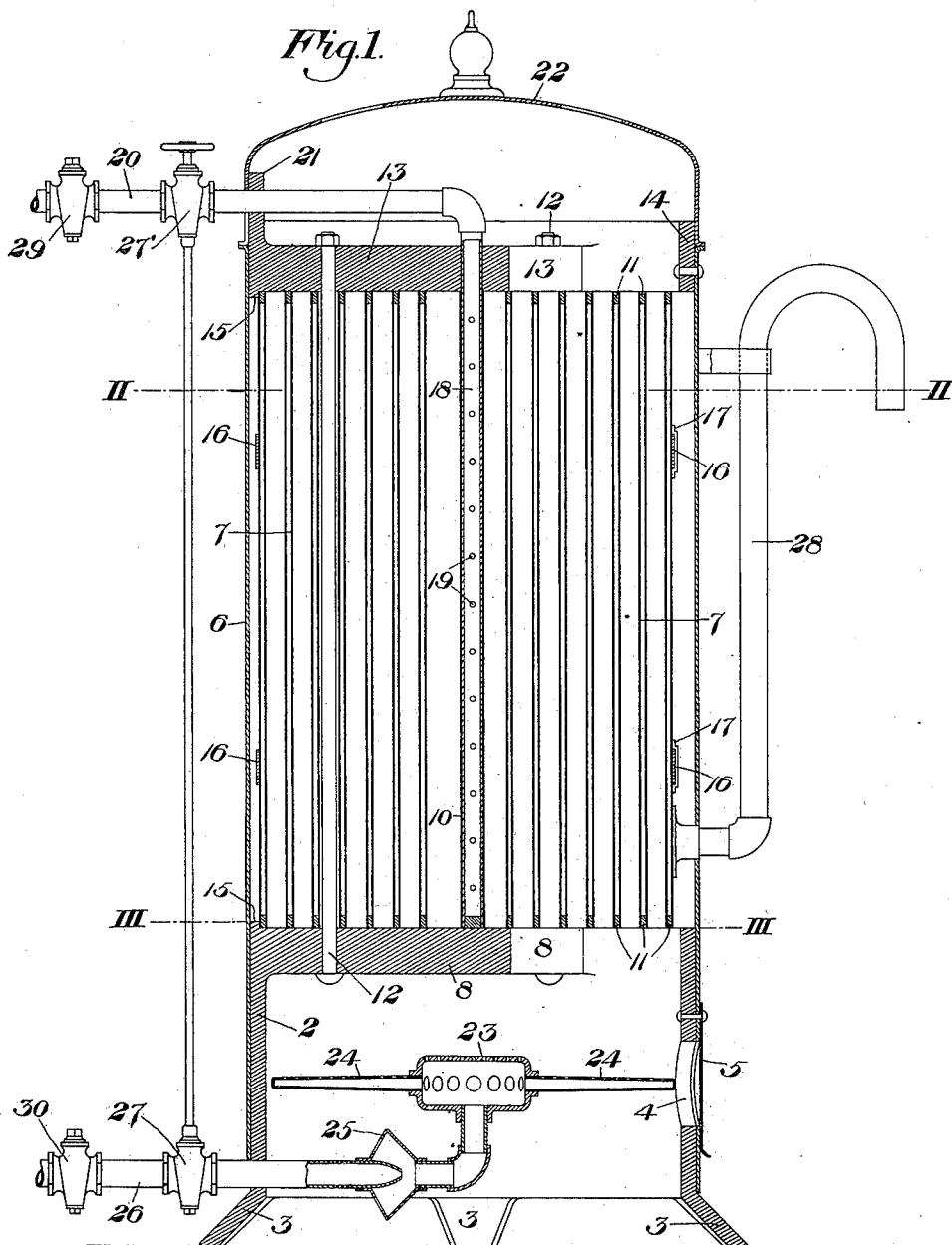
(No Model.)

2 Sheets—Sheet 1.

A. F. PRITSCHAU.
WATER HEATER.

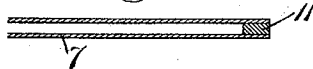
No. 566,409.

Patented Aug. 25, 1896.



WITNESSES
J. S. Mordship
H. M. Mordship

Fig. 6.



INVENTOR

Arthur F. Pritschau
by *Barrett & Barrett*
his Attorneys

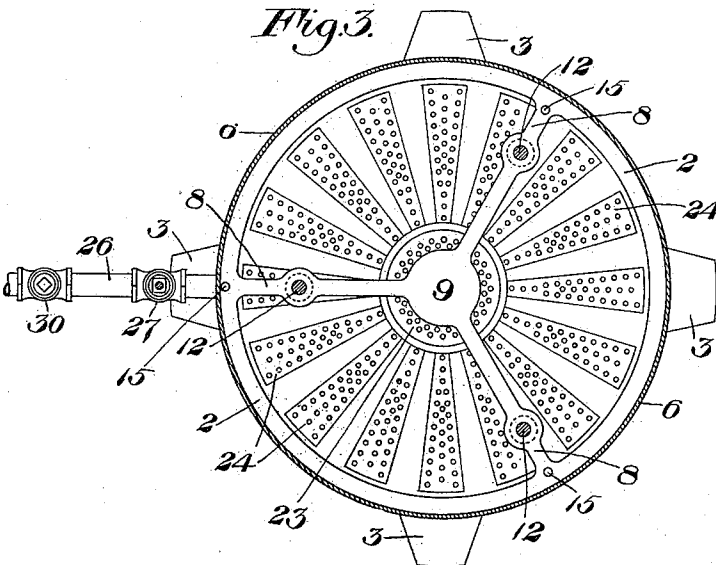
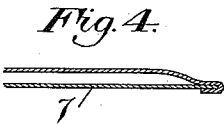
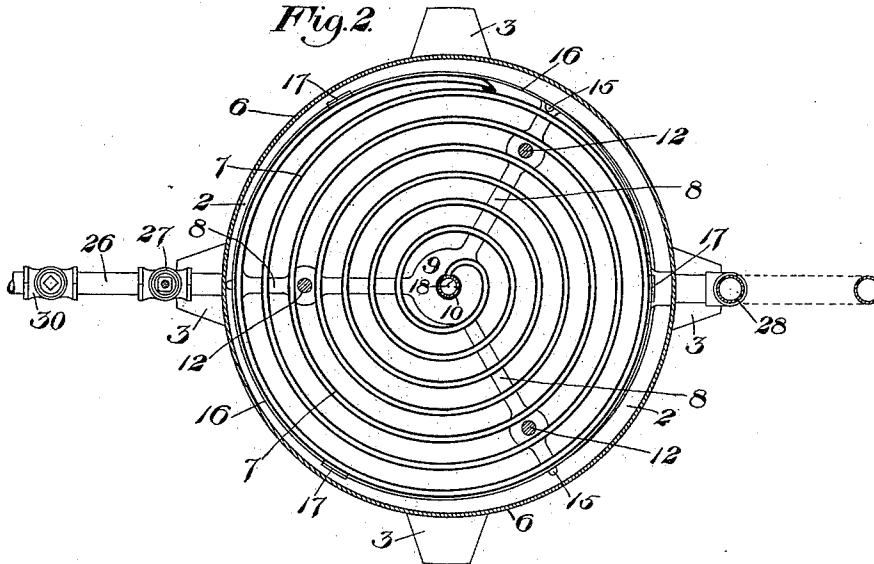
(No Model.)

2 Sheets—Sheet 2.

A. F. PRITSCHAU
WATER HEATER.

No. 566,409.

Patented Aug. 25, 1896.



WITNESSES

L. J. Stoddard
A. M. Connor

INVENTOR

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by Baxendell & Baxendell
his Attorneys

UNITED STATES PATENT OFFICE.

ARTHUR F. PRITSCHAU, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF
ONE-FOURTH TO SCOTT A. WHITE, OF SAME PLACE.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 566,409, dated August 25, 1896.

Application filed May 21, 1895. Serial No. 550,084. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR F. PRITSCHAU, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Water-Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of my improved water-heater, the conduits being shown partly in side elevation. Figs. 2 and 3 are transverse sections on the lines II II and III III, respectively, of Fig. 1. Fig. 4 is a detail view showing the side joint of the shell, and Figs. 5 and 6 show modified constructions of the end joint of the same.

My invention relates to the heaters employed for raising the temperature of water, and is designed to afford a simple, compact, and highly-efficient device of this character.

In the drawings, 2 represents the cylindrical casting forming the base of the apparatus, this base having legs 3 and a side aperture 4 for lighting, which is closed by a swinging door 5. To this casting is secured the vertical circular casing 6, which incloses the water-containing shell 7, this shell resting upon radial arms 8 at the upper end of the base 2, which arms unite at the center in the plate 9. The heating-shell 7 is in the form of a coil, as shown, and is made by taking a flat sheet of metal and bending it at the center line around a central pipe 10, whence the two portions of the sheet extend in parallel convolutions, as shown, the open upper and lower ends of the successive folds being closed by spacing strips or wire 11, as shown more clearly in Fig. 6, these end strips being secured by brazing or other suitable means, or the ends may be turned in and brazed together, as in Fig. 5. I consider myself the first to form a coiled shell from a single sheet in this manner, and intend to claim the same broadly, independently of the other elements described and shown. The coiled shell is held in place by long bolts 12, which extend between the convolutions and pass through the lower arms 8 and through similar radial arms 13, extending inwardly from an upper ring 14, which is riveted to the casing and is provided with cen-

tering-lugs 15 for the coil. The coil is free to expand within the confines of these lugs 15, the outer free end moving upon the next convolution, the coil tending to lengthen.

The coil after its formation is held in shape by inclosing bands 16, which are slipped down over it and are held in place by clamping-strips 17, secured to the outer fold. The coil is set between the arms 8 and 13, which are made smooth, so that the coil may be free to expand when water under pressure is introduced, but such expansion, which manifests itself in an uncoiling action of the heater, is restrained and limited by the bands 16.

Within the central cylinder of the coil is placed a supply-pipe 18, having along one side, in register with the open side of the cylinder, a vertical series of perforations 19, through which the water enters the coil.

From the lower portion of the outer convolution or coil leads an exit hot-water pipe 28, which extends upwardly to a point above the inner shell and thence is reflexed in siphon form. This form of exit-pipe does away with the necessity for a hot-water valve, as water will cease to flow therefrom whenever the cold water is turned off, leaving a body of hot water in the heater. Water is supplied through the horizontal valved pipe 20, which leads through a hole in a lug 21 upon the ring 14, the removable perforated cover 22 for the casing being slotted to pass down over this pipe.

With this heater I preferably employ the gas-burner shown in Figs. 1 and 3, consisting of a central hollow disk 23, having perforations in its upper face and provided with a series of radially-extending hollow arms 24, which are formed of pipe-sections flattened on their outer end and perforated on their upper faces.

The usual air and gas mixer 25 is placed within the base, and into it leads the gas-supply pipe 26, provided with a valve 27, which is connected to the valve 27' of pipe 20 in such a way that in operating the water-valve such valve will open and close simultaneously, thus insuring the supply of the gas whenever the water is turned on. The gas and water pipes have also, preferably, independent valves 29 and 30, so that the heat and flow may be regu-

lated as desired. By regulating the size of the ports of the water-valve 27' so as to throttle the flow of water the pressure of water in the heater can be regulated independently of the pressure in the supply-pipes, and reduced, if desired, below the initial pressure of the water-supply.

The ends of the sheet forming the coils may be joined as shown in Fig. 4, the outer being lapped back over the inner and brazed or soldered. I prefer to bring the outer convolutions of the sheets closer together near this outer joint, narrowing the heat-space, the outer convolution being so made as to make the drum as nearly circular as possible. The outer convolution is thus gradually brought in toward the next convolution, the end of the former being made to rest against the latter, thereby making the water-heating drum approximately circular in form.

The operation is apparent. The water being supplied passes through the various convolutions in thin sheets and thence out through the pipe 28, and the heated gases rise between these folds and pass out through the cover, thoroughly heating the water in their passage. After passing out from the top hole of the

central pipe into the coil the water will gradually descend therein in a spiral course and in a direction counter to the ascending heat-currents, thus affording the most economical conditions of operation.

The advantages of the apparatus result from the large amount of water which is heated in a small space, the thin sheet metal of the coil giving a high efficiency in extracting the heat.

I claim—

A water-heater comprising a coil formed of a flat sheet of the same width as the coil, said sheet having a central reflexed or doubled portion bent about and rigidly secured to the major portion of the circumference of a central feed-pipe, said feed-pipe having perforations opening into the space between the sides of the inner convolution, and filling-strips closing both ends of the coil, said coil having a suitable outlet; substantially as described.

In testimony whereof I have hereunto set my hand.

ARTHUR F. PRITSCHAU.

Witnesses:

H. M. CORWIN,
F. E. GAITHER.