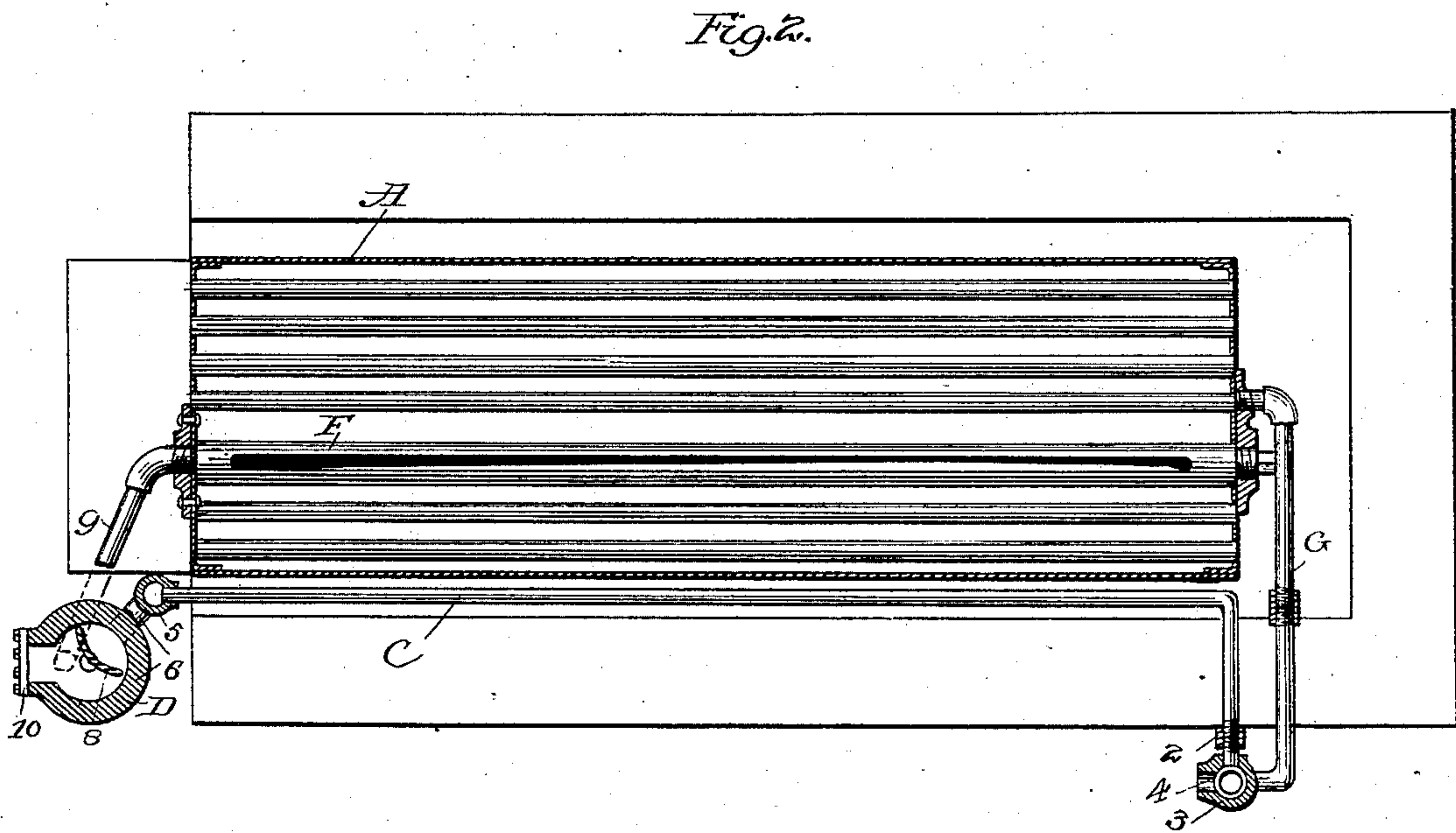
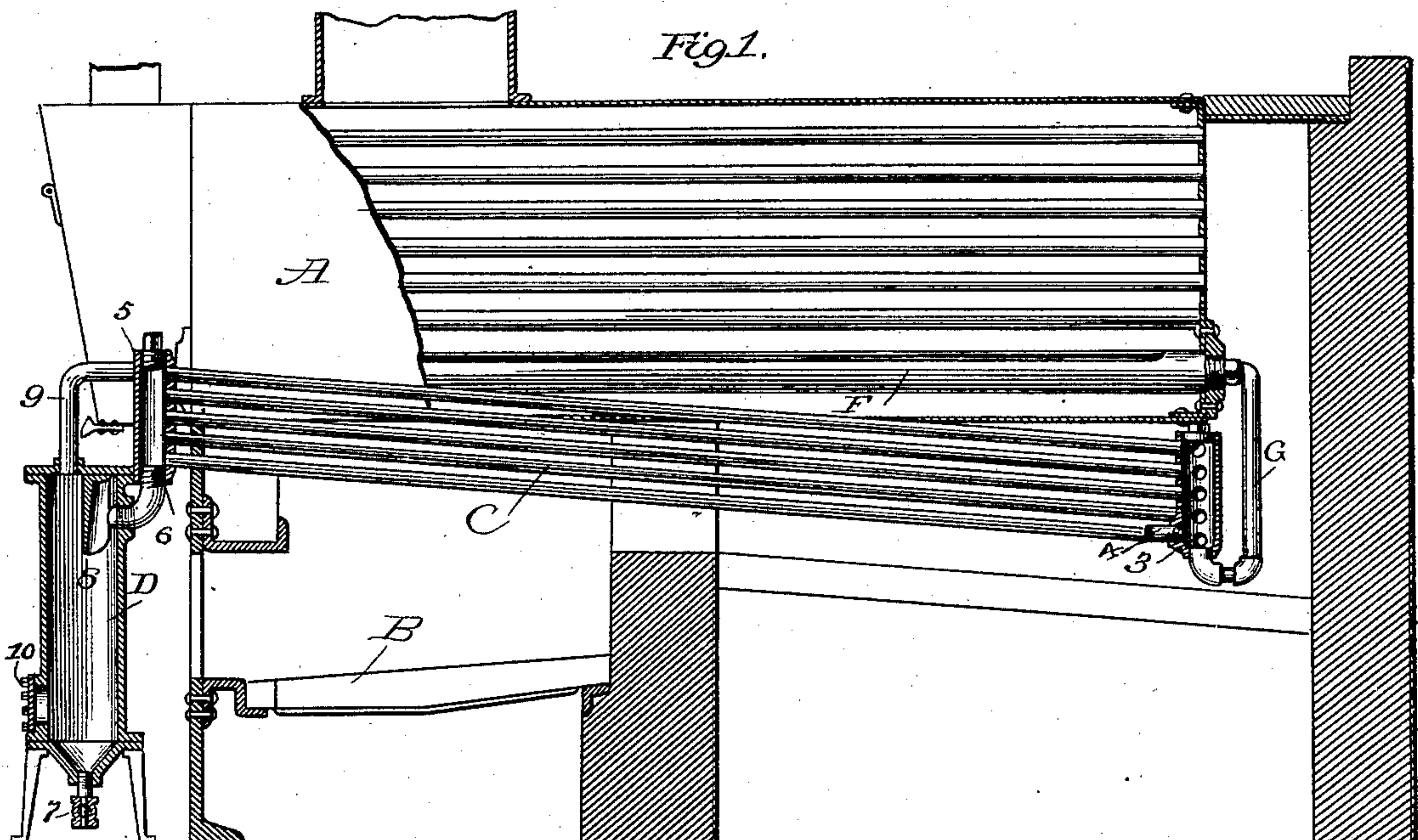


(No Model.)

W. S. McKINNEY.
HEATER AND PURIFIER FOR FEED WATER.
No. 281,775. Patented July 24, 1883.



Attest:
Walter S. McKinney
J. L. Middleton

Inventor:
Walter S. McKinney
by *Joyce & Spear*
Attys.

UNITED STATES PATENT OFFICE.

WALTER S. McKINNEY, OF BINGHAMTON, NEW YORK.

HEATER AND PURIFIER FOR FEED-WATER.

SPECIFICATION forming part of Letters Patent No. 281,775, dated July 24, 1883.

Application filed May 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. McKINNEY, of Binghamton, in the county of Broome and State of New York, have invented a new and useful Improvement in Heaters and Purifiers for Feed-Water; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to improvements in devices for heating and purifying the water supplied to steam boilers and generators.

The invention consists in combining with a boiler a heater composed of tubes or coils of pipe arranged near the fire, and a mud-drum into which the feed-water flows from the heater before it enters the boiler. These are the general features of my device; but the invention consists, also, in details of construction, which will be more particularly hereinafter described.

In the accompanying drawings, Figure 1 is a side elevation, with the boiler-shell broken away and the mud-drum in section. Fig. 2 is a plan view.

A represents a steam boiler or generator of the ordinary tubular type, and B shows the grate-bars of the furnace below the boiler.

C represents the feed-water heater, which is here shown to consist of a number of slightly-inclined longitudinal tubes, which are preferably located below and at one side of the boiler. Any number of these tubes may be used, according to the size and capacity of the boiler to be supplied.

Near the end of the boiler, and remote from the fire, the tubes are bent at right angles, and are connected by left and right couplings, 2, to a head, 3. This bending of the tubes prevents the joint from being exposed to the fire. The head 3 is a vertical tube or pipe, having near the bottom an inlet, 4, for the feed-water, and closed at the top by a suitable screw-cap.

At the end of the boiler, in proximity to the fire, the tubes discharge into a similar head, 5, which has tapped into its bottom a pipe, 6, which enters the upper part of the mud-drum D. The mud-drum is a cylindrical vessel mounted on suitable supports, and having a sunken or funnel-shaped bottom with a

blow-off cock, 7, and a hand-hole plate for cleaning, &c., (shown at 10.)

Secured to the cover or top of the mud-drum is a downwardly-projecting deflector, 8, of the concave shape shown in Fig. 2. This deflector is suspended opposite the discharge-pipe of the heater 6, and the water entering the drum from such pipe will be caused to flow downward upon that side of the drum, and will stand in considerable depth upon the bottom. Scale forms in boilers when the water is at or near the boiling-point of temperature, and as the water in the heater will be warm to about that heat, the current will carry the scale and sediment into the mud-drum, where the heavy particles will be precipitated. The ascending current of water in the drum passes up outside of the deflector to the outlet-pipe 9, which enters the boiler.

For boilers already in use the apparatus thus far described will be found sufficient. I prefer, however, to have the pipe 9 communicate with a pipe, F, placed in the bottom of the boiler. This pipe has a wide open slot in the top, making it more properly a trough, from which the water rises into the boiler, and on the bottom of which any scale which has passed the mud-drum will be deposited on the bottom of the pipe. At the end of the pipe F is a plug fitting a hand-hole, by means of which the interior of the pipe may be examined and cleaned.

G represents a circulating-pipe, which connects the heater at its inlet end with the boiler, so that when water is not being fed to the heater a constant circulation will be maintained between the boiler and heater.

I am aware that a pipe having a graduated series of perforations has been placed in a boiler to receive and distribute feed-water in small jets throughout the boiler, and I desire to disclaim such a device.

Having thus described my invention, I claim—

1. In a feed-water heater, the combination of a boiler, a heater composed of a coil or series of pipes outside of the boiler, an inlet for feed-water at one end of the heater, an independent mud-drum or sediment-collector connected to the other end of the coil, and a wa-

ter-pipe leading from the drum to the water-space of the boiler, the water passing through the heater before reaching the mud-drum.

2. The combination of a boiler, a heater for
5 feed-water, an upright mud-drum intermediate between and communicating with both the boiler and heater, and a deflector opposite the inlet-opening of the mud-drum.

3. The combination of a boiler, a heater ex-
10 terior to such boiler and exposed to the fire, and a mud-drum connected to the heater and to a slotted or open-topped tube or trough in the bottom of the boiler.

4. The combination, with a boiler having an inlet for feed-water, of an open trough placed
15 in the bottom of the boiler, for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER S. McKINNEY.

Witnesses:

WILLIAM A. McKINNEY,
J. W. MANIER.