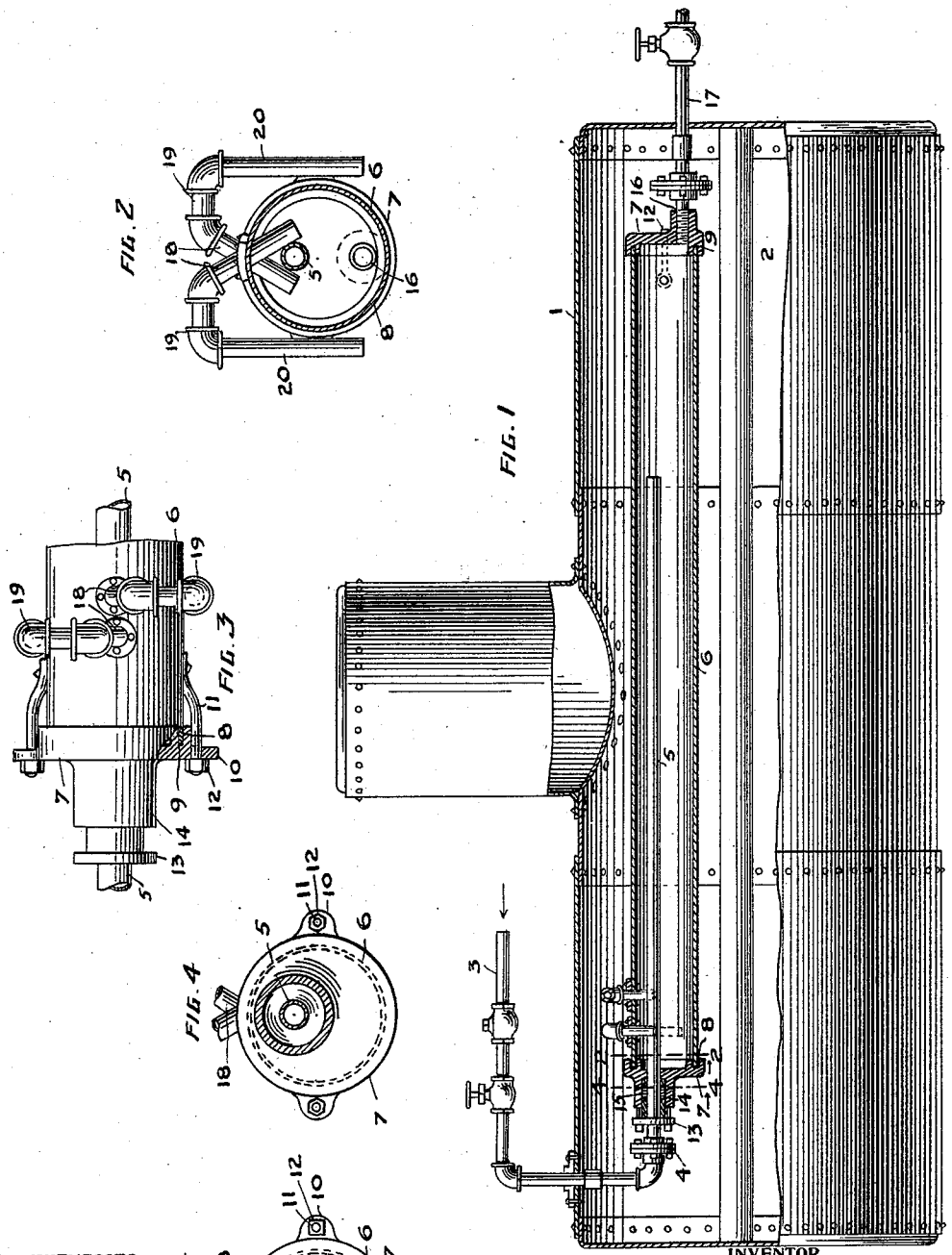
C. H. CORT.

FEED WATER PURIFIER.

APPLICATION FILED OCT. 20, 1910.

1,001,189. **Patented Aug. 22, 1911.**



WITNESSES

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FEED-WATER PURIFIER.

1,001,189. Specification of Letters Patent. Patented Aug. 22, 1911.

Application filed October 20, 1910. Serial No. 588,038.

To all whom it may concern:

Be it known that I, CHARLES H. CORT, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Feed-Water Purifiers, of which the following is a specification.

The present invention relates to improvements in feed water purifiers for boilers of that class in which the purifier is contained within the boiler to which the water is to be supplied, the object of the invention being to provide a purifier in which the water can be fed to the boiler with the least chance of stirring up the sediment in the purifier, or of carrying over scum, oil, or floating mud into the boiler.

In the accompanying drawing, Figure 1 is a vertical section, partly in side elevation of a boiler equipped with my improved purifier; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a broken longitudinal section of the purifier detached; Figs. 4 and 5 are end views thereof detached.

Referring to the drawing, 1 indicates a horizontal boiler having internal flues, one of which is shown at 2. Water is fed to said boiler by a feed water pipe 3, which enters the boiler at the top, and is connected by flanged unions 4 to a pipe 5, which enters one end of a purifier 6. Said purifier is a tube of considerable diameter and extends horizontally the greater part of the length of the boiler, and the pipe 5 extends horizontally therein the greater part of the length of the purifier and in the upper portion of said purifier. The heads 7 of said purifier are formed each with a groove 8, in the bottom of which is a gasket 9 and the ends of said tube 6 are received within said grooves. Each head is formed with diametrically opposite apertured lugs 10. Through each lug is passed the end of a bolt 11, the other end of which is riveted to tube 6, and upon the free end of the bolt is screwed a nut 12. This arrangement for attaching the heads of the tube 6, permits of their being easily removed therefrom without moving the tube 6.

The feed water pipe is provided with a gland 13, which enters a stuffing box 14, formed on the adjacent head 7, suitable packing 15 being provided in said stuffing box. This arrangement provides for relative movement of the tube and stuffing box to one another, owing to expansion or contraction due to changes in temperature. Into the other head of the purifier at the lowest portion thereof is screwed a blow-out pipe 16, which is connected to a pipe 17 leading through the adjacent head of the boiler. Water is conveyed from the purifier by two pipes 18, extending obliquely into said purifier through the upper side thereof, and terminating substantially at the same level as the pipe 6, the upper ends of said pipes being connected by elbows 19 to pipes 20 depending below the water line of the boiler.

The sizes of the pipe 5 and tube 6 are so proportioned that there is a sufficient rapidity of flow through the pipe to maintain it substantially free from any deposit which might take place while the water is passing through said pipe. The water flowing from the free end of said pipe 5 flows through the tube 6 comparatively slowly and quietly so that the finer and lighter impurities have an opportunity to settle as the water moves toward the pipes 18, and by the time it reaches said pipes it is substantially clear of said impurities.

The advantages of my improved purifier arise from the arrangement of the feed water pipe, discharge pipes and blow-off pipe, relative to said purifier. The feed water pipe feeds into the upper portion of the purifier, and extends the greater part of its length, and the discharge pipes are located in the purifier at the end at which the feed pipe enters, so that the water in the process of being purified flows in the reverse direction to that at which it enters, and consequently the entering water does not have a tendency to stir up the sediment or deposits in the purifier. The discharge pipes lead from the purifier at about the level of the feed water pipe, so that they are below the water line in said purifier. Consequently steam can never enter the purifier, and the oil, floating mud and scum which float on the top of the water in the purifier cannot pass out into the boiler through said discharge pipes. The blow-off pipe is located at the far end of the purifier from the discharge pipes. This renders it easy to clean the boiler by opening the valve in the blow-off pipe and allowing steam to enter the purifier through said discharge pipes, as all the sedi-

ment in the purifier is exposed to the scouring action of the steam and water in the purifier. This action is increased by the oblique direction of said pipes, since the two streams of steam, entering the boiler obliquely, produce a rotating or whirling motion and thoroughly scour and remove the sediment from the bottom of the purifier.

I am aware that it has been proposed to employ a purifier divided into upper and lower compartments by a horizontal partition, and the feed water enters the lower compartment at the bottom and travels the whole length of said compartment before entering the upper compartment, and then travels in the reverse direction in said upper compartment before entering the boiler, and therefore I do not claim broadly a purifier having a reverse flow. My device, however, is superior to that above referred to, in that the feed water enters the boiler by the upper portion thereof and flows through a comparatively small pipe to near the end of the purifier before returning. Consequently, the return motion of the feed water is very slow and the sediment has a chance to settle. Moreover, in my device there is no possibility of the feed water being clogged up by sediment, whereas, in the device above referred to, in which the water escapes from the lower compartment through a number of perforations, it is possible for all of said perforations except the first one to be clogged up by sediment. Moreover, in prior devices, the discharge pipes either open upward into the boiler, with the result that it was possible for steam to enter the purifier and agitate the sediment therein or else have opened at the end of the purifier and have depended downward into the boiler with the result that mud floating on the top of the water in the purifier would flow out therefrom into the boiler. I believe that I am the first to provide a purifier in which the water escapes from the purifier into the boiler first upwardly and then downwardly, in other words, in which the discharge pipe forms a double trap, preventing both the steam entering the purifier and the mud and oil or scum entering the boiler from the purifier.

I claim:—

1. A feed water purifier for boilers, comprising a tube arranged horizontally in the boiler, a feed water pipe entering said tube at the upper portion at one end thereof, and extending within the tube the greater part of its length, and a discharge pipe leading from the interior of the purifier below the level of the feed pipe upwardly to the exterior thereof, the outlet end of said pipe being below the level of said feed water pipe, substantially as described.

2. A feed water purifier for boilers, comprising a tube arranged horizontally in the boiler, a feed water pipe entering said tube at the upper portion at one end thereof, and extending within the tube the greater part of its length, and a discharge pipe leading from the interior of the purifier at the end of the purifier at which the feed water pipe enters, below the level of the feed pipe upwardly to the exterior thereof, the outlet end of said pipe being below the level of said feed water pipe, substantially as described.

3. A feed water purifier for boilers, comprising a tube arranged horizontally in the boiler, a feed water pipe entering said tube at the upper portion at one end thereof, and extending within the tube the greater part of its length, a discharge pipe leading from the interior of the purifier at the end of the purifier at which the feed water pipe enters, and a blow off pipe leading from the lowest portion of the other end thereof, below the level of the feed pipe upwardly to the exterior thereof, the outlet end of said pipe being below the level of said feed water pipe, substantially as described.

4. A feed water purifier for boilers comprising a tube arranged horizontally in the boilers, a feed water pipe entering said tube at one end thereof, and extending the greater part of its length in the upper portion of the purifier, a discharge pipe leading from the purifier at the same end, and a blow off pipe leading from the lowest portion of the other end of the purifier, substantially as described.

5. A feed water purifier for boilers comprising a tube, heads closing the ends of the tube, said water and blow-off pipes passing through said heads respectively, said heads being formed with grooves, the ends of the tubes being received within said grooves, each head having diametrically opposite apertured lugs, bolts on the ends of the tubes passing through said lugs, and nuts screwed on the ends of the bolts, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES H. CORT.

Witnesses:
F. M. WRIGHT,
D. B. RICHARDS.