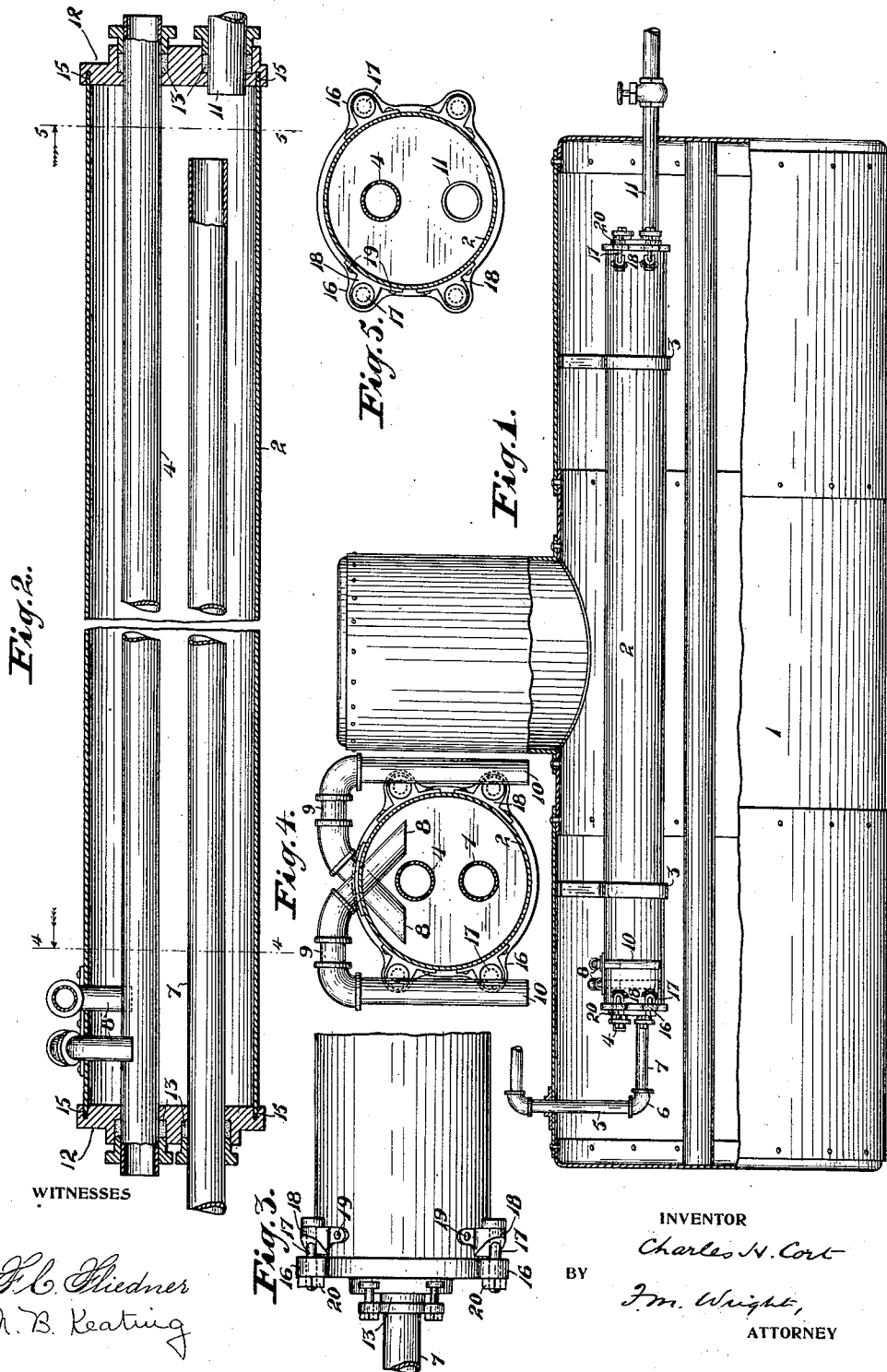


C. H. CORT.
 FEED WATER PURIFIER.
 APPLICATION FILED AUG. 12, 1912.

1,064,195.

Patented June 10, 1913.



UNITED STATES PATENT OFFICE.

CHARLES H. CORT, OF SAN FRANCISCO, CALIFORNIA.

FEED-WATER PURIFIER.

1,064,195.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed August 12, 1912. Serial No. 714,583.

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 feed water purifiers for steam boilers, the object of the invention being to provide a device of this character in which the solid substances, dissolved in the water supplied to the boiler may be completely precipitated therefrom before being actually fed thereto.

The invention also resides in various details of construction for attaining the above object, hereinafter fully specified and particularly pointed out in the claim.

In the accompanying drawing, Figure 1 is a longitudinal section, partly in side elevation, of a boiler provided with a feed water purifier constructed in accordance with my invention; Fig. 2 is an enlarged broken longitudinal section of the device itself detached; Fig. 3 is a broken bottom plan view of the device; Figs. 4 and 5 are sectional views thereof on the lines 4—4, 5—5 of Fig. 2.

Referring to the drawing, 1 indicates a steam boiler of any preferred construction, and 2 indicates the main body of my feed water purifier. Said main body is cylindrical in form and extends very nearly the full length of the boiler, being supported therein by hangers 3 depending from the shell or braces of the boiler. Through the upper portion of said purifier extends longitudinally a steam tube 4, open at both ends.

5 indicates a feed water pipe leading through the top of the boiler and connected, as shown at 6, with a tube 7 leading through a lower portion of one end of the feed water purifier and extending in said purifier near the bottom thereof to a point near the opposite end. The water issuing from the open end of the feed water tube flows in the top of said purifier around the steam pipe 4 to the first-named end thereof, and flows outwardly through two outlet tubes 8, which extend upwardly, one on each side of the steam tube 4, and out through the top of the purifier, and are connected with horizontal pipes 9, which themselves are connected with vertical depending pipes 10, which depend below the water line of the boiler and there-

fore also below the feed water tube in the purifier. Into the end remote from the entrance of the feed water is inserted a blow-off pipe 11. All of said pipes 4, 7, 11 are secured in the heads 12 of the purifier by stuffing boxes 13.

In my former U. S. Patent No. 1,001,189, I disclosed an arrangement of feed water purifier in which the feed water tube was located in the upper portion of the purifier body. The action of that purifier was imperfect when feeding water charged with much soluble matter, for, on account of being located in the upper portion of the purifier, the water discharged through said feed water tube into the purifier was not sufficiently heated to cause all of said solid matter to be precipitated therefrom in the purifier, but some of the solid matter was carried in solution in the water and discharged into the boiler outside the purifier, and, when the water was more highly heated was afterward deposited in the form of scale upon the walls and tubes of the boiler. The reason for this was that the feed water passing through the feed water tube in the top of the purifier would cool the water which had already been discharged from the feed water tube into the purifier, and was then flowing outward, in the reverse direction, at the top of the purifier to be discharged by the pipes 10 into the boiler.

By placing the feed water tube at the bottom of the purifier I have found that the cold water in the feed tube is so remote from the water flowing backward in the top of the purifier that it does not have this effect, but that said return stream of water is heated by conduction through the surrounding walls of the purifier and by the heat of the boiler so that it is sufficiently near the temperature of the steam and water in the boiler to precipitate practically all of the solid matter contained therein. This heating effect is greatly increased by the provision of the steam tube extending through the upper portion of the feed water purifier. The steam entering this tube immediately gives off its latent heat through the walls of the tube to the water flowing rearwardly around the same, and while the steam is condensed into water, which escapes from the lower end of the tube whichever that may be, the heat of condensation of the steam serves to highly heat the water in the upper portion of the purifier and thus to raise it to the same tem-

perature as the water in the boiler outside the purifier. By this means I am enabled to precipitate all of the solid matters originally contained in solution in the water.

- 5 It is very necessary in devices of this character to be able to remove the heads from the purifier so as to be able to inspect the interior thereof at intervals. For this purpose, as in my patent hereinbefore referred to, I form grooves 15 in said head having
10 suitable packing material therein, in which grooves the end of the shell of the purifier enters. I have found, however, that the devices disclosed in said patents for securing the heads to the shell do not prevent
15 leakage, and I have therefore adopted the construction disclosed herein, in which each head is formed with four apertured lugs 16, through the apertures of which pass bolts
20 17, the heads of which are engaged by pairs of apertured blocks 18, riveted, as shown at 19, upon the shell of the boiler, nuts 20 being screwed upon the ends of said bolts projecting through said apertures to firmly

draw the heads to the shell. I have found 25 that by this contrivance leakage is absolutely prevented through the heads.

I claim:—

In a feed water purifier for boilers, an elongated feed-water vessel located in the 30 upper portion of the boiler, a steam tube open at both ends extending longitudinally in the upper portion of the vessel and through both its ends, a feed-water pipe entering one end of said vessel, extending 35 longitudinally in its lower portion, and opening at a point adjacent to its other end, and outlet pipes leading upwardly through the top of said vessel near its first-named end. 40

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

CHARLES H. CORT.

Witnesses:

FRANCIS M. WRIGHT,
D. B. RICHARDS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."