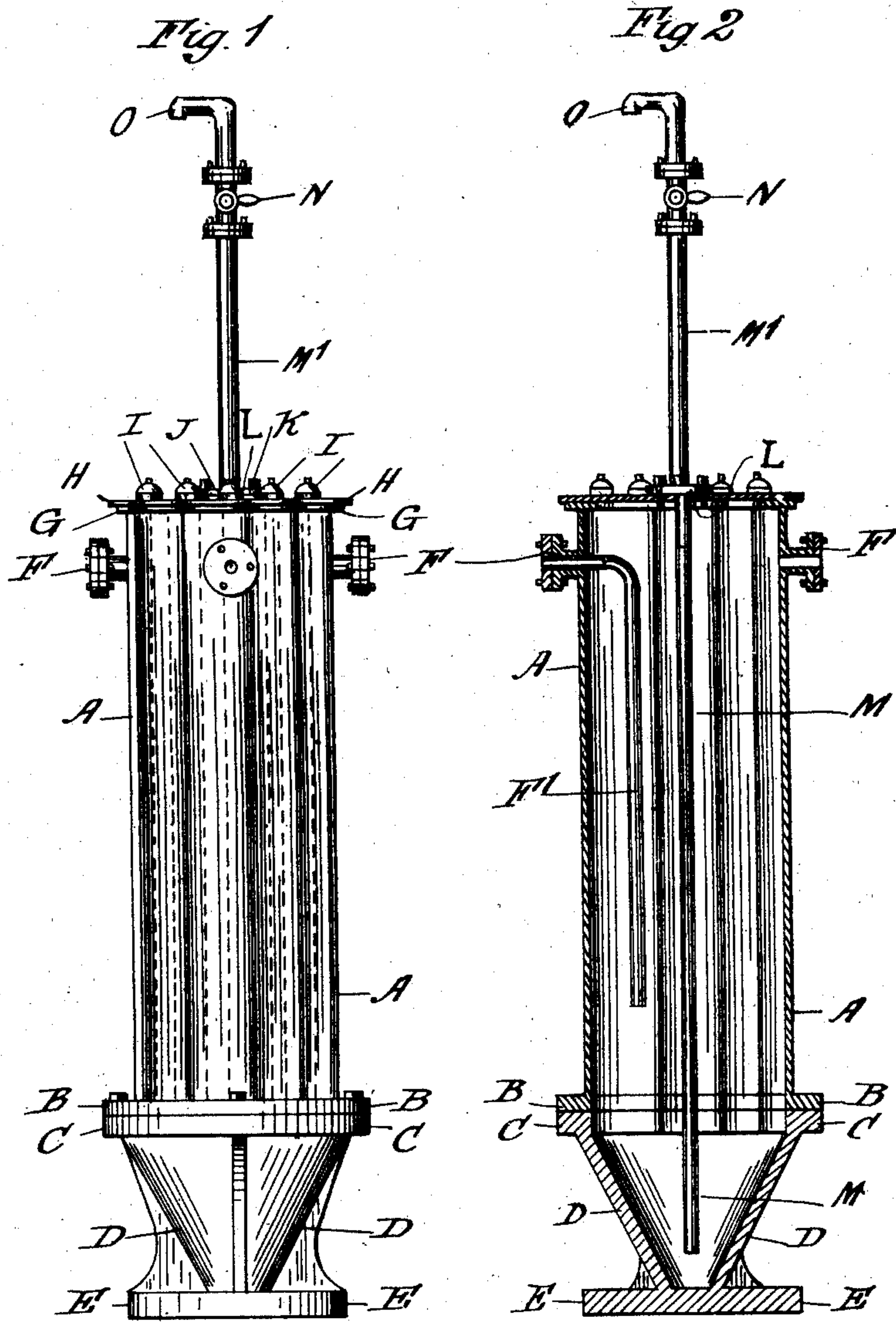


No. 883,191.

PATENTED MAR. 31, 1908.

R. Z. DE GRAU.
FEED WATER HEATER.
APPLICATION FILED JUNE 9, 1905.



Witnesses

A. J. Madden
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UNITED STATES PATENT OFFICE.

RICARDO ZARAGOZA DE GRAU, OF BARCELONA, SPAIN.

FEED-WATER HEATER.

No. 883,191.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed June 9, 1905. Serial No. 271,704.

To all whom it may concern:

Be it known that I, RICARDO ZARAGOZA DE GRAU, a subject of the King of Spain, residing at Barcelona, in Spain, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

The present invention relates to improvements in apparatus for heating the feed water of steam generators but which can also be used for other purposes, such apparatus being adapted to utilize the heat of the gases of combustion passing from a furnace to the chimney.

The improved apparatus is represented in the annexed drawing, wherein

Figure 1 is an elevation and Fig. 2 a vertical central section thereof.

The device comprises a chamber, the vertical wall or walls A A, of which is or are of corrugated or fluted cross section and terminate below in a flange B, B adapted to be connected by bolts or the like to the flange C, C of an inverted conical member D D forming the bottom of said chamber. The member D, D is provided at its lower end with a plate E, E, serving as a base or foot.

The wall A, A, is provided near its upper end with a number, for instance, four, apertures communicating with unions F, F, for connection of pipes for the inlet and outlet of water and for connecting together in series the different apparatus forming each plant respectively. The use of four apertures has been adopted for facility in mounting and connection but usually only two are used, namely those which occupy the most suitable position, the two remaining apertures being then closed by means of plates or disks.

Into the water inlet aperture extends a downwardly directed tube F¹ for feeding the cold water to the lower part of the chamber. The latter is provided at its upper end with a flange G, G, to which is attached the cover H, H, by means of bolts the heads of which are protected from soot or the like by means of caps I, I.

The cover H, H, is provided with a central aperture through which passes a tube M, extending to within a short distance of the bottom of the chamber and held in place by means of a flange or disk L integral therewith. A second flange J or disk secured to the said flange L and attached to the cover

H H by bolts K K, passing through both flanges, is integral with an outer rising tube M¹, which is bent at its upper end as at O and provided with a cock N.

Each plant consists of a suitable number of the apparatus described communicating with each other in series, the first being provided with the inlet pipe for cold water and the last with a pipe for conducting the heated water to its place of use or consumption.

The apparatus may be situated in the smoke-box or conduit in front of the chimney, if the said box or conduit is large enough, or in a separate chamber if necessary.

The water passing into the apparatus through one of the apertures F and the tube F¹ and being discharged through the second aperture, after having filled the chamber, is heated during its passage through the apparatus to a considerable temperature by absorbing the heat of the waste gases surrounding the apparatus. The impurities contained in the liquid settle in the conical bottom D and are removed by opening the cock N whereupon the water rises in the tubes M and M¹ carrying with it the impurities which are discharged at O into any suitable receptacle.

The parts forming the apparatus described are preferably made of cast iron with the exception of the tubes M and F¹ which are usually of sheet metal.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

The combination with a furnace and smoke flue of a feed water heater located in the smoke flue and comprising in combination a closed chamber having an exterior wall of corrugated cross section an inverted conical member forming the bottom of said chamber, a plurality of lateral connections near the upper part of said wall for connection at will of several such chambers in series, a pipe extending from outside the flue for inlet of liquid to the lower part of said chamber, and another pipe extending outside the flue for discharge of heated liquid therefrom.

In witness whereof I have signed this specification in the presence of two witnesses.

RICARDO ZARAGOZA DE GRAU.

Witnesses:

E. M. DRAKE,
STANLEY C. HARRIS.