(No Model.)

O. W. KETCHUM.

WATER HEATING AND PURIFYING DEVICE.

No. 491,360. Patented Feb. 7, 1893.

Fig. 1.

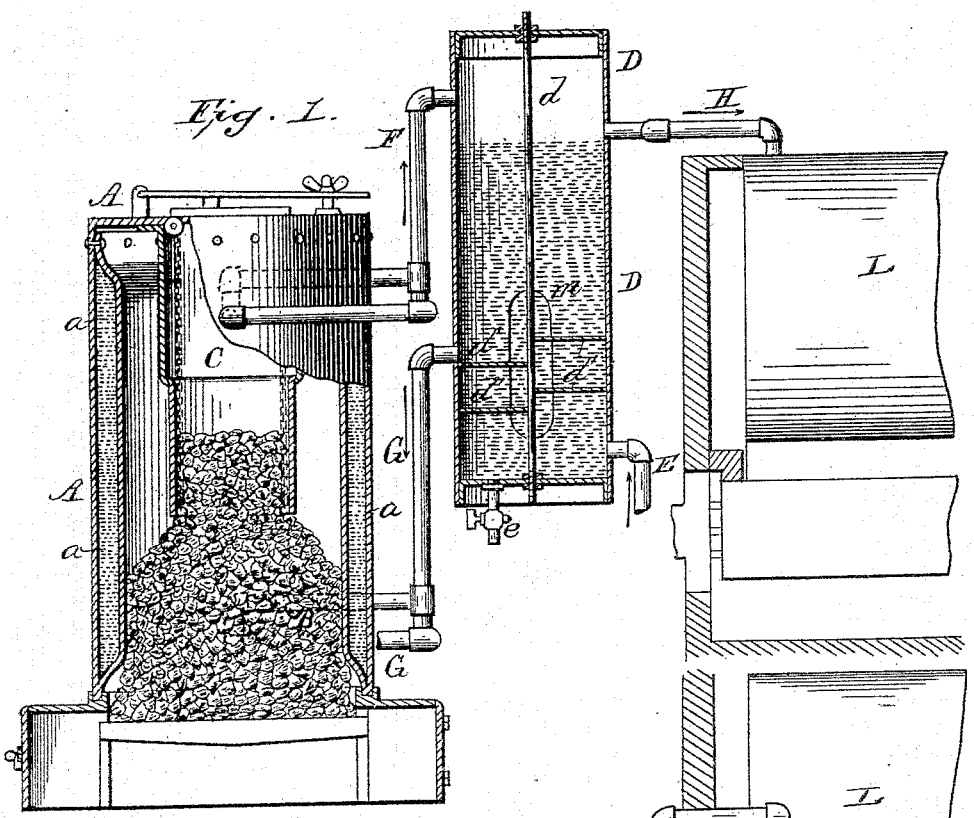
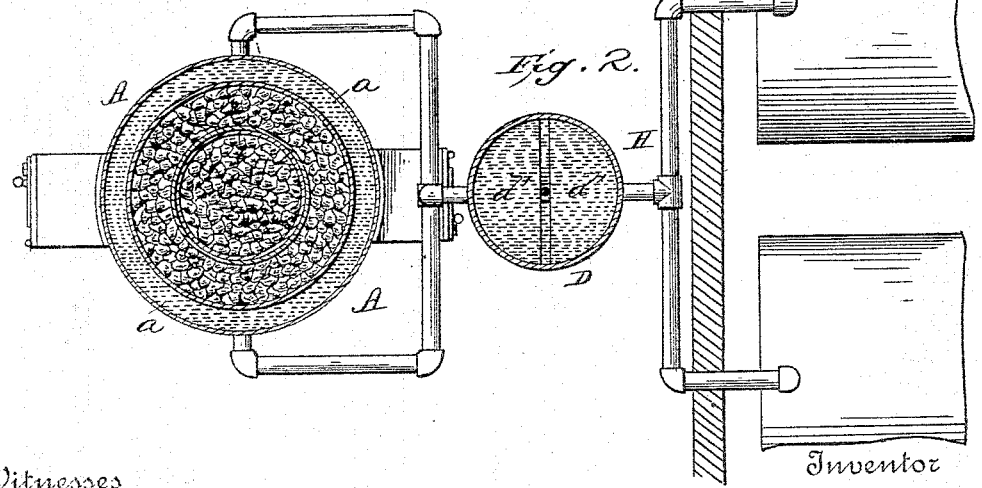


Fig. 2.



Witnesses

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OLIVER WILLIAM KETCHUM, OF TORONTO, CANADA.

WATER HEATING AND PURIFYING DEVICE.

SPECIFICATION forming part of Letters Patent No. 491,360, dated February 7, 1893.

Application filed August 22, 1891. Serial No. 403,457. (No model.)

To all whom it may concern:

Be it known that I, OLIVER WILLIAM KETCHUM, a subject of the Queen of Great Britain, residing at Toronto, Canada, have invented certain new and useful Improvements in Water Heating and Purifying Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a water circulating and purifying device connecting with the water-jacket of a gas producing furnace and with one or more steam generators.

The object of the invention is primarily to provide for keeping the water-jacket of a gas producer always full of water and maintain a circulation therein by admitting the supply of water at the bottom as it is forced out at the top by heat of the inclosed fire pot.

Another object is to provide for purifying the water by heating it to a proper temperature and precipitating the scale and other foreign matter in a suitable circulating tank connecting both with the water jacket and with the steam boiler.

The matter constituting my invention will be defined in the claims.

In the accompanying drawings,—Figure 1 represents a vertical section of my circulating and purifying devices in connection with the gas producer and steam boiler; Fig. 2 represents a horizontal section partly in plan view.

The gas producer, A, is constructed with a water-jacket, *a*, and is provided with a fire pot, B, at the bottom and with a fuel feeding magazine, C, at the top.

In order to provide for keeping the jacket, *a*, full of water and properly circulating water through it, I provide a circulating tank, D, elevated as shown with its upper end above the top of the gas producer, and so that water in such tank shall stand at a level above the top of the water jacket. The tank, D, is preferably a closed cylinder, having its heads connected by a rod, *d*, and is provided near its lower end with baffle plates, *d'*, extending alternately from its opposite walls, as shown. The lower head is provided with a blow-off cock, *e*, and its side wall with a hand hole and door, *m*. The feed-water supply pipe, E, connects near the bottom of tank, D, below the baffle plates. A circulating pipe, G, connects with the circulator just above the baffle plates and also with the lower end of the water-jacket, *a*, preferably by branch pipes, as shown entering the jacket at different points in its circumference. A return pipe, F, connecting preferably by branches as shown with the top of the water jacket leads into the top of the circulating tank, D. Pipe, H, for conveying away hot water or hot water and steam connects with the upper end of circulating tank, D, and always at a proper height to maintain the level of the water in such tank, D, above the top of the water jacket. Pipe, H, may convey the hot water or hot water and steam to any desired place of use, but I preferably connect such pipe with a steam boiler, L. Two or more pipes, H, may lead from the circulating tank, D, to two or more steam boilers, as indicated in Fig. 2. The circulating tank, D, and its connections make it possible to circulate water from a single water-jacket of the gas-producer into two or more boilers which are in different conditions and temperatures.

The operation of the device is as follows:—The water-jacket and circulating tank are filled with water up to the level of the outlet pipe, H, after which a fire is started in the gas-producer. By means of the resulting steam generated in the jacket, water is forced from the jacket through pipe, F, into the circulating tank, D and flows back by gravity from the tank into the jacket through the pipe, G, thus keeping the water-jacket full of water, protecting the inside of the gas producer and utilizing the heat thereof in making steam and heating feed-water. The excess of hot water and any steam which may enter tank, D, are conveyed away by pipe, H, into boiler, L, or other desired place of use. As required fresh water is admitted by pipe, E, into tank, D. Since the water circulating between the tank and water-jacket of the producer becomes heated in the water-jacket to about the same temperature as the water in the steam generator, the feed-water which enters, tank, D, will be heated to the same temperature. By means of water-jacket *a*, surrounding the gas-producer, the feed-water for the boiler is heated to the necessary high tem-

perature, viz.: about 290° Fahrenheit to precipitate all its foreign impurities in the circulating tank, D, thus making my device a superior purifier. The baffle plates, *d'*, placed below the outlet pipe, G, serve to check the violent ebullition of water in the lower part of the circulator favoring the deposit of scale and other foreign matter which can be easily removed by the blow-off cock, *e*, and the hand-hole, *m*.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In combination with a water jacketed gas-producer the elevated circulating tank provided with baffle plates, *d'*, a water supply pipe connecting below the plates, a pipe connecting tank, D, with the lower end of the water-jacket, a pipe connecting the upper end of the water jacket with the upper end of tank, D, and a discharge pipe for hot water and steam connecting with tank, D, substantially as described.

2. The combination with a water-jacketed gas-producer of the elevated circulating tank, D, the pipes, F and G, connecting such pipes respectively with the top and bottom of the water jacket, a steam boiler and a discharge pipe, H, leading from the tank at a suitable height to maintain the water level in said tank above the top of the water-jacket and connecting with the steam boiler, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

OLIVER WILLIAM KETCHUM.

Witnesses:
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