G. H. RHEUTAN.

Feed-Water Heater.

No. 211,051. Patented Dec. 17, 1878.

*Fig. 1*

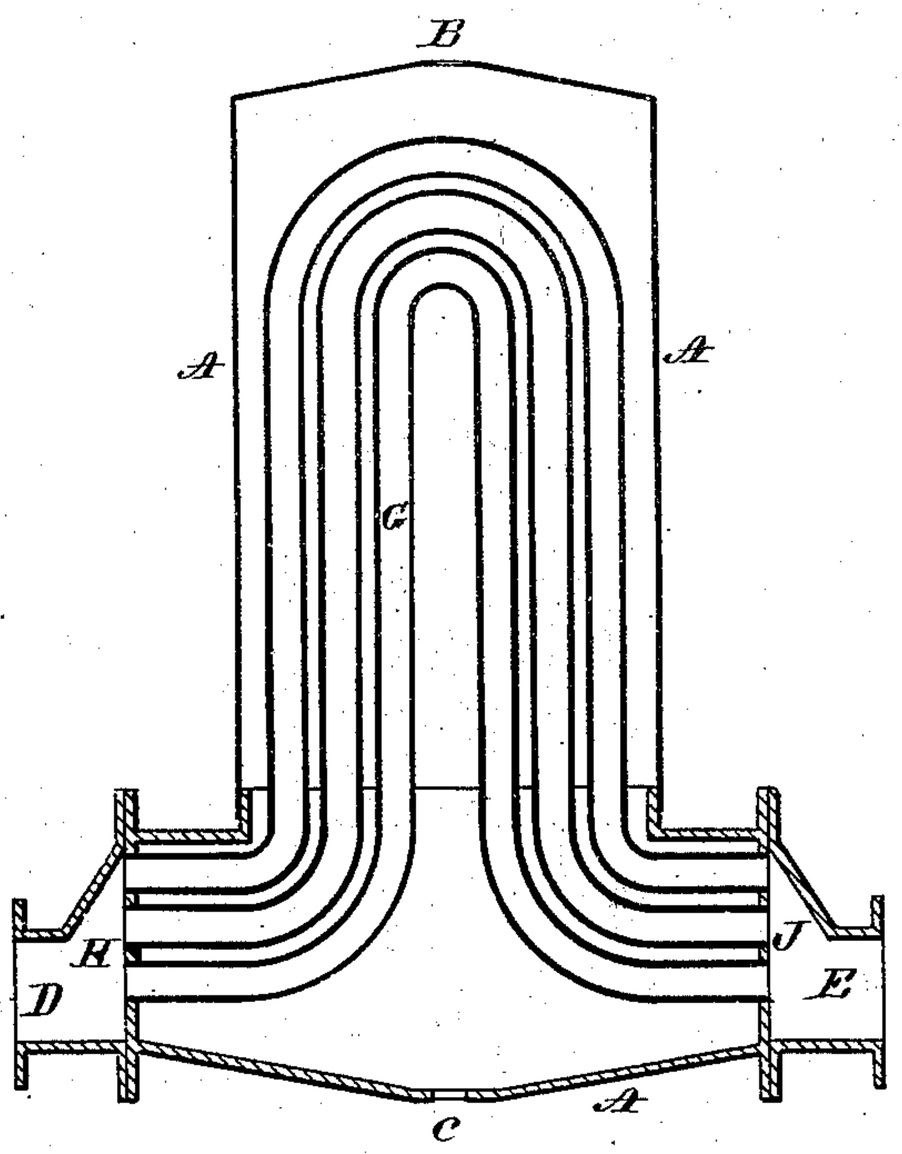



*Fig. 2*

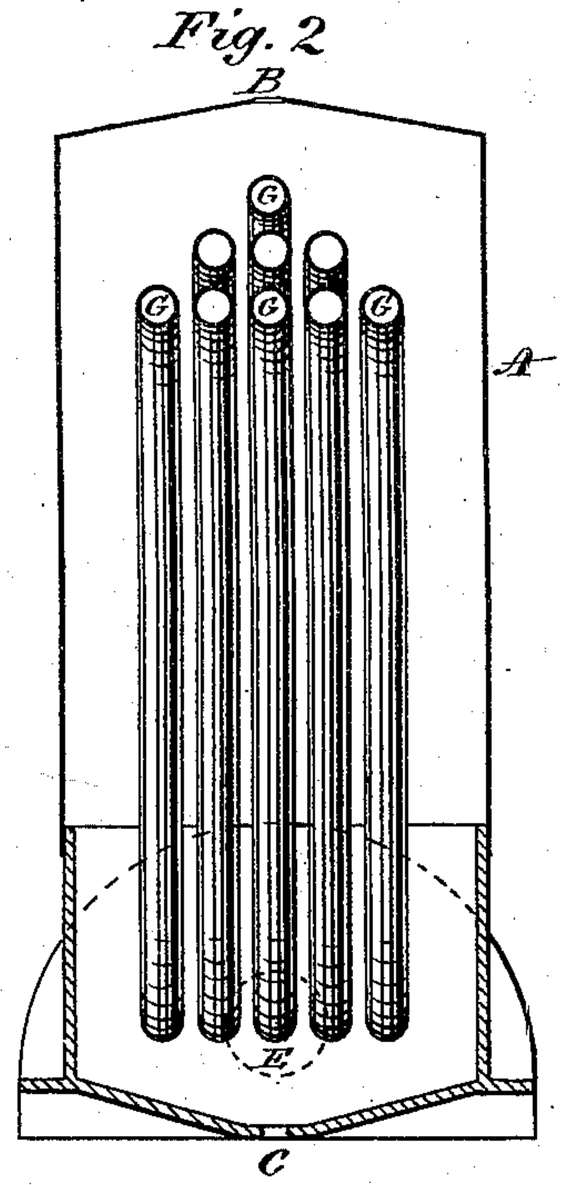
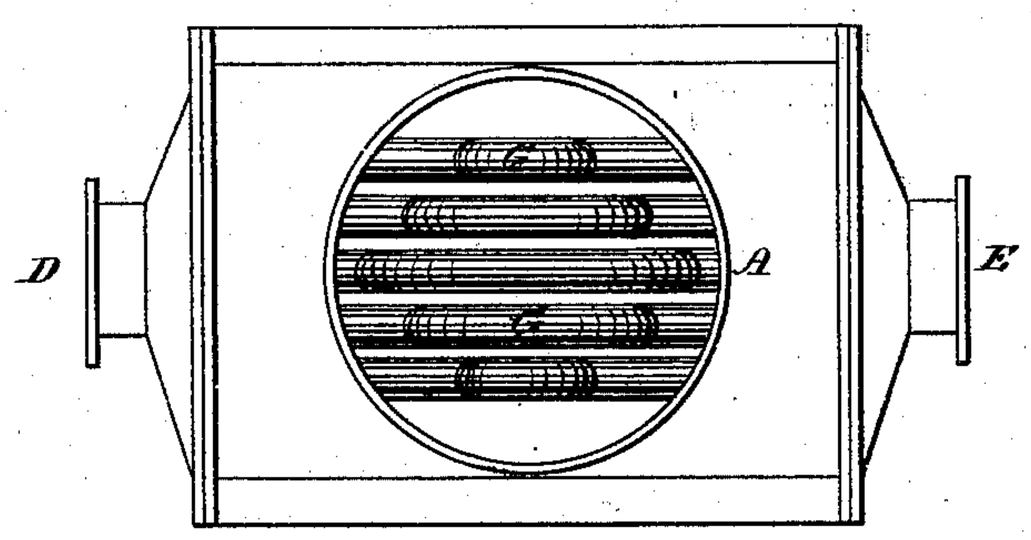



*Fig. 3*




*Witnesses*

Wendell R. Curtis

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# UNITED STATES PATENT OFFICE.

GARRIE H. RHEUTAN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO HENRY B. BEACH, OF SAME PLACE.

## IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **211,051**, dated December 17, 1878; application filed October 21, 1878.

*To all whom it may concern:*

Be it known that I, GARRIE H. RHEUTAN, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Feed-Water Heaters; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My improvement relates to feed-water heaters for steam-generators, in which the water is heated by being brought into contact with pipes containing steam, which may be either the waste-steam from the cylinder of the engine or live steam from the boiler. My improvement is also applicable to surface-condensers, in which the water which surrounds the steam-pipes is supplied in greater quantity than would be sufficient to supply the boiler, and which then acts to condense the steam in the pipes.

My invention has for its object the construction and arrangement of the steam-pipes within the water-chamber, in such a manner that they will not be deranged by the contraction and expansion of the several parts of the mechanism so as to occasion leaks, and at the same time allow of the bottom of the water-chamber being unobstructed, so that it can be readily cleaned and freed from the impurities that are precipitated from the feed-water in the water-chamber.

My invention consists in the construction and arrangement of the several parts, as will be hereinafter described.

In the accompanying drawings, Figure 1 shows a vertical longitudinal section of my improved mechanism. Fig. 2 shows a vertical cross-section of the same. Fig. 3 shows a top view of my improved heating mechanism, with the top of the water-chamber removed, so as to show the steam-pipes within.

Like letters in the figures indicate the same parts.

A is the exterior shell, forming the water-chamber. This, as shown in the drawing, is intended to be formed with a cast-metal base and a wrought-metal upright cylindrical part; but it may be made of any suitable material. This shell is furnished with entrance and exit openings B and C, for the purpose of passing water through it. They may be of any convenient size, form, and position in the chamber. D and E are the entrance and exit openings for the steam. As shown in the drawing, they are furnished with flanges, so that the mechanism can be connected with any suitable steam-pipe—as, for instance, the exhaust-pipe from the cylinder. G G, &c., are a series of small steam-pipes within the water-chamber. In the upper part of the water-chamber these pipes are bent into the form of an inverted **U**, and the lower ends are bent outward at the bottom of the water-chamber so that they are horizontal and in the same line, and are secured, in the usual manner, into the two vertical diaphragms H and J, which are at the ends of the large steam-pipes D and E.

By means of this construction and the form given to the small pipes G, any difference of the amount of contraction or expansion between the steam-pipes G and the shell A is compensated by the elasticity of the form given to the pipes G, the spring of the pipes laterally in the upper or **U** part being amply sufficient to allow for any difference of length of the parts, whether caused by the parts being of different material, or by their being of different temperatures.

By means of this construction, also, the bottom of the water-chamber is left free and unobstructed, so that it can readily be cleaned at any time through a suitable hand-hole, or through the opening C in the bottom. This unobstructed bottom is especially necessary in a feed-water heater, as there is usually a large amount of deposit from the water which requires to be cleaned out in order to have the heater operate properly, which cannot be done with heaters of ordinary construction where the steam-pipes have their entrance and exit openings in the bottom of the water-chamber.

What I claim as my invention is—

1. In a feed-water heater or condenser, the pipes G, of the form described, having an in-

verted U part, with the ends curved outward, in combination with the two parallel diaphragms H and J in the shell of the water-chamber, constructed and arranged substantially as herein set forth.

2. In a feed-water heater or condenser, the combination of the pipes G, of the form described, with a water-chamber having an unobstructed bottom, arranged substantially as herein set forth.

GARRIE H. RHEUTAN.

Witnesses:
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