No. 662,296. Patented Nov. 20, 1900.

C. L. PALMER.

STEAM GENERATOR.

(Application filed Aug. 9, 1900.)

(No Model.)

Fig 1

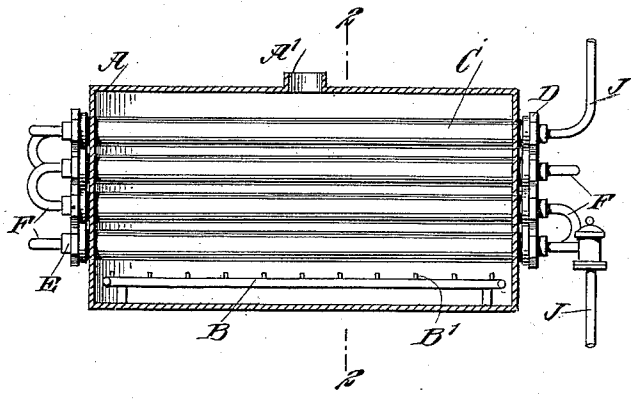


Fig 2

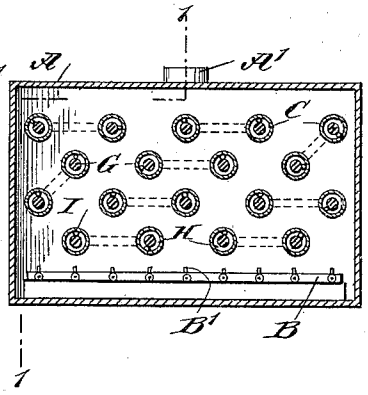


Fig 3

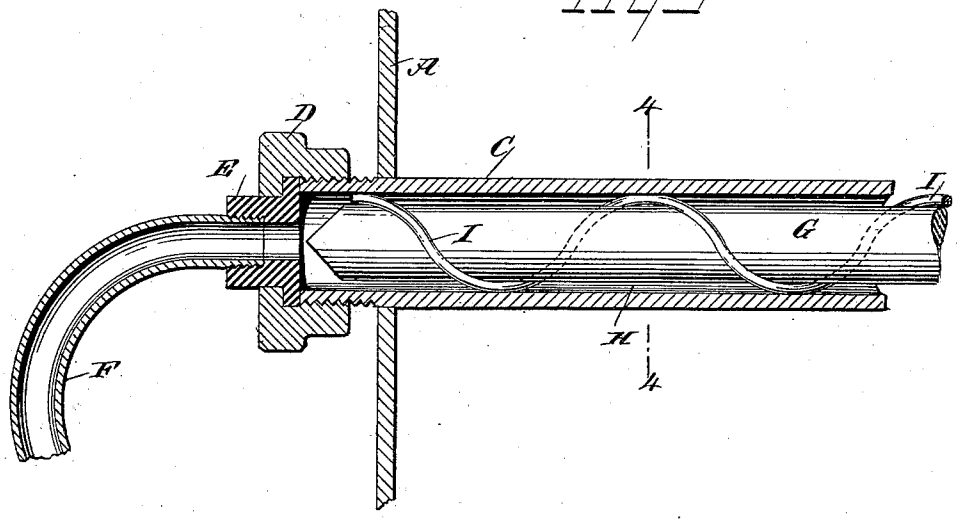
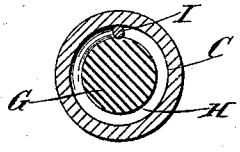


Fig 4



WITNESSES:

A. Walker

John Lotka

INVENTOR

Charles L. Palmer.

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES L. PALMER, OF ALBANY, NEW YORK.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 662,296, dated November 20, 1900.

Application filed August 9, 1900. Serial No. 26,404. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. PALMER, a citizen of the United States, and a resident of Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a full, clear, and exact description.

My invention relates to that class of steam-generators in which the water is vaporized almost instantaneously upon its injection into the apparatus, and has for its object to provide a simple, strong, and efficient construction of the above-indicated class.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal section of my improved steam-generator on line 1 1 of Fig. 2. Fig. 2 is a cross-section thereof on line 2 2 of Fig. 1. Fig. 3 is a detail longitudinal section of one of the generator-tubes and its appurtenances, drawn upon an enlarged scale; and Fig. 4 is a cross-section on line 4 4 of Fig. 3.

The generator comprises a suitable casing or setting A, with a furnace or burner B and an outlet A′ for the combustion products. The burner B may be arranged for the use of liquid fuel, and in this case I prefer to provide it with a great number of nozzles B′, so as to thoroughly distribute the heat.

Within the casing A extend the generator-tubes C, preferably projecting beyond the casing at their ends, which are screw-threaded to receive nuts or unions D, serving to clamp against said tubes sleeves E, screw-threaded interiorly for the reception of the ends of elbows F, by which the tubes are connected with each other, as shown best in Fig. 2, so that the tubes form a continuous passage.

Within each tube C is located a longitudinal solid rod G, chisel-pointed at the ends and of somewhat smaller diameter than the bore of the tube C, so as to leave an annular chamber H around the rod. In this annular chamber is located a spirally-disposed wire or rib I, which may be continuous, as shown, or interrupted. This wire or rib should be of a diameter or thickness equal to the width of the annular chamber H, so that the water and steam will be compelled to travel spirally wherever such rib I is provided. For convenience in construction and to facilitate cleaning and repairs the rib I is constituted by a spiral wire, as shown. It will, however, be understood that the rib might be formed directly either upon the outer surface of the rod G or upon the inner surface of the tube C. The first tube C in the set is connected with the feed-pipe J and the last with the steam-pipe J′, leading to the engine.

The above-described generator is particularly suitable for motor-carriages.

Water injected through the feed-pipe J will be spread into a thin film by the chisel-edged end of the rod G, such film then flowing in contact with the tube C, which is highly heated, and with the rod G, which being solid has a large heat-retaining capacity. The spiral rib I lengthens the path of the water, and thus secures a more energetic vaporization. The tubes C are preferably superposed in staggered relation, so as to secure a uniform distribution of the heat.

While I have shown the construction embodying the rod G, rib I, and tube C applied to straight elements, I wish it to be understood that said parts might be curved or of any other suitable shape. When the tube C is used in the shape of a coil or bent, the rod or core G has the further function of preventing a crushing, denting, or collapse of the tube during the bending operation.

The apparatus may, of course, also be used as a vaporizer for other liquids than water.

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

In a steam generator or vaporizer, a tube, a rod extending within the tube lengthwise and of a smaller diameter than the tube so as to leave an annular chamber between the rod and the tube, the ends of the rod being chisel-pointed, and a spiral rib located in the space between the rod and the tube and in engagement with both.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES L. PALMER.

Witnesses:
J. F. CHAMPLIN,
H. B. SQUIER.