

No. 804,043.

PATENTED NOV. 7, 1905.

C. RENARD.
STEAM GENERATOR.
APPLICATION FILED NOV. 26, 1904.

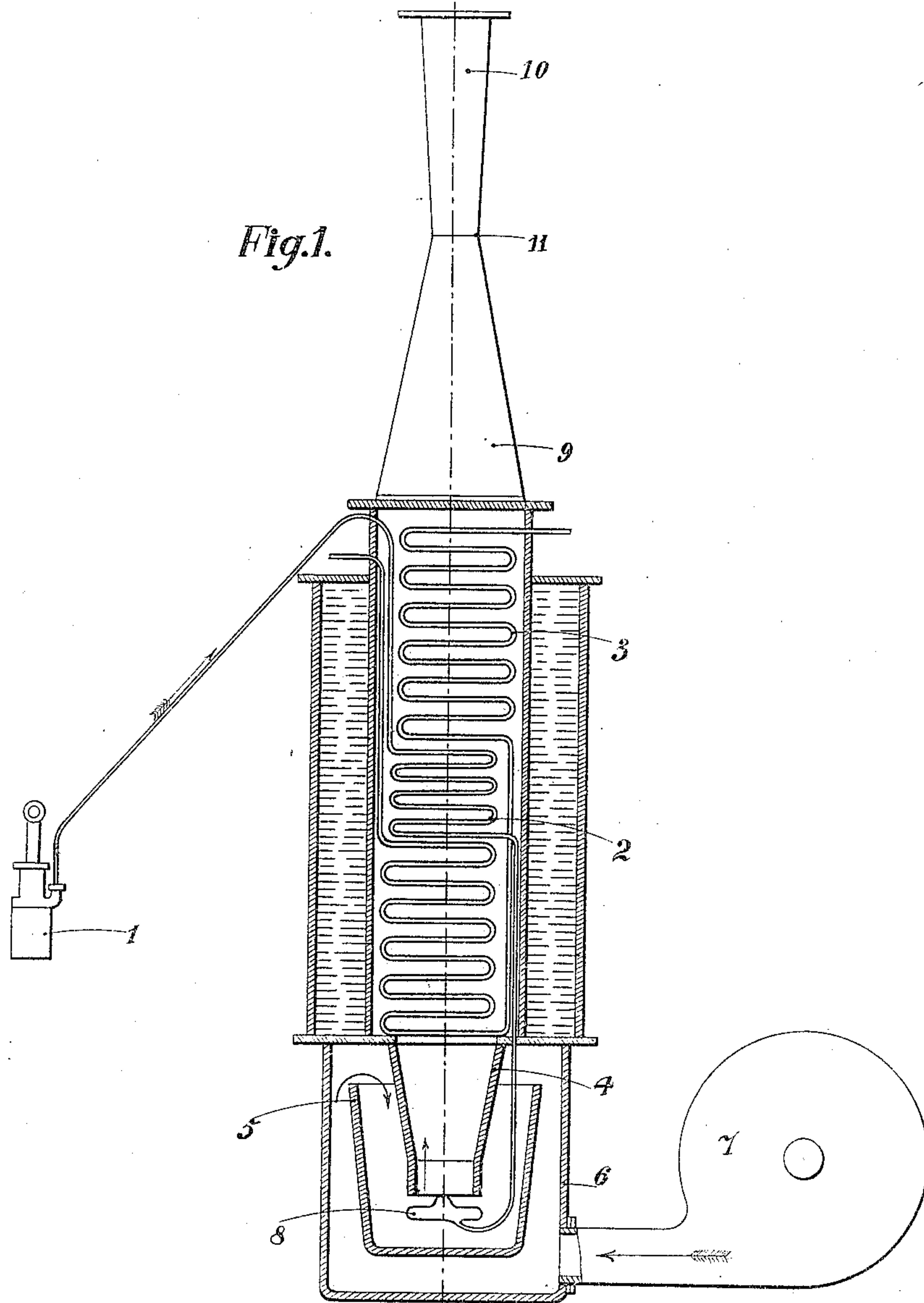
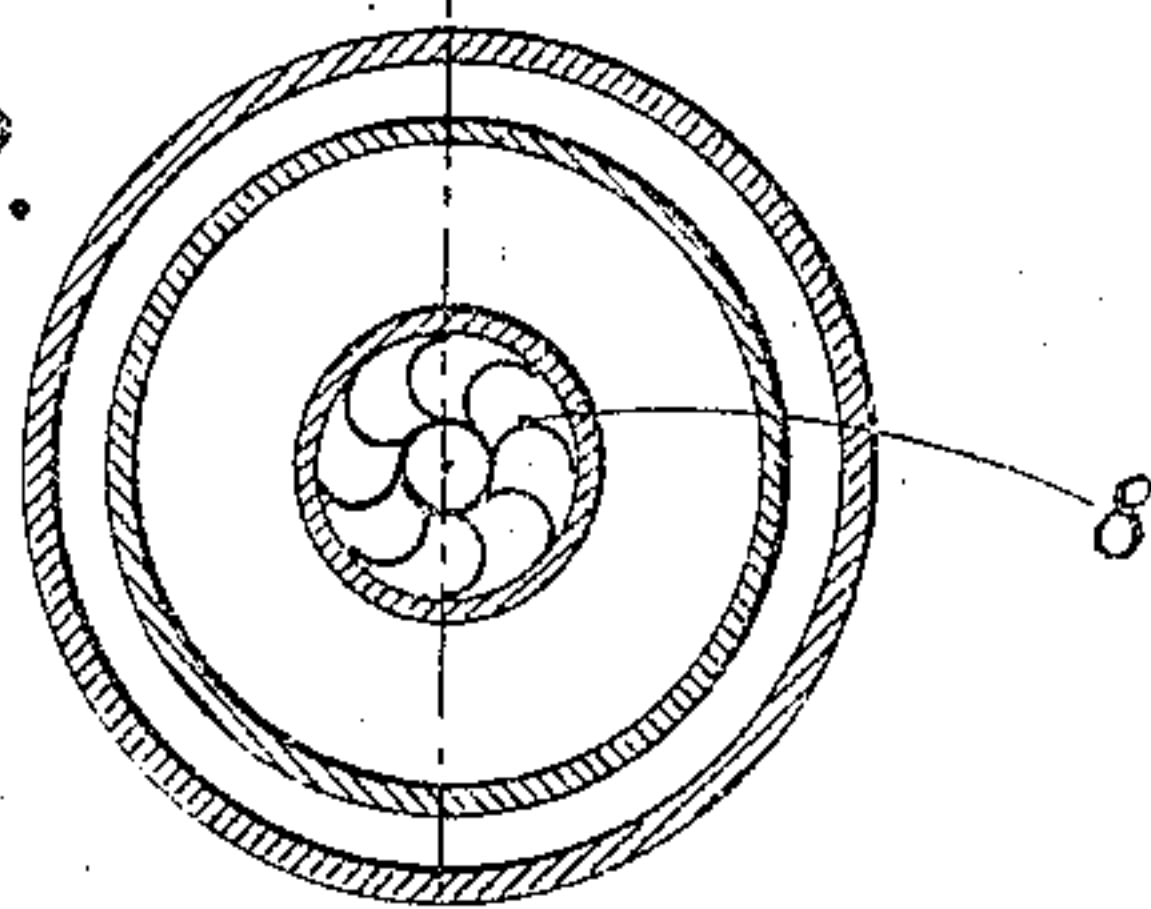


Fig. 2.



Witnesses.
Dennis Sully.
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Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES RENARD, OF MEUDON, FRANCE.

STEAM-GENERATOR.

No. 804,043.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed November 26, 1904. Serial No. 234,393.

To all whom it may concern:

Be it known that I, CHARLES RENARD, colonel of engineers, a citizen of the French Republic, residing at Meudon, Department of Seine-et-Oise, France, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

This invention has for its object new and useful improvements in steam-generators particularly suitable for steam-generators wherein water is evaporated with great rapidity, described in the application, Serial No. 214,385, filed June 27, 1904.

The main object of this invention is to provide beneath the steam-generator a furnace for liquid or gaseous fuel disposed for preventing the radiation of heat from the furnace to the surroundings and for reducing thus to the minimum the loss of heat.

Another object of this invention is to provide the steam-generator with a particular chimney for the escapement of the burned gases of the furnace and disposed for preventing the roaring noise which would be caused by the intense draft.

In the accompanying drawings, Figure 1 shows a diagrammatic section of a steam-boiler of the kind described in the application, Serial No. 214,385, filed June 27, 1904, and provided with a liquid or gaseous fuel furnace and a chimney according to this invention. Fig. 2 is a plane section through the furnace.

The furnace of the steam-generator is situated beneath the evaporating-coil and is adapted to burn liquid or gaseous fuel. I will presume that liquid fuel is used. It is first completely vaporized, for which purpose a pump 1, Fig. 1, forces the liquid fuel into a coiled tube 2, preferably arranged about midway of the water-evaporating coil 3. Where the liquid fuel is not light, like alcohol and petrol, for example, but is a heavy hydrocarbon oil, the temperature of the region of the boiler in which the oil-evaporating tube is situated should be just sufficient to volatilize the liquid fuel without decomposing it and producing coke. The construction of the water-evaporating coil 3, which is closely packed, is such that the temperature of the gases from the furnace varies along the said coil according to a regular law, the said temperature being at a maximum at the bottom of the coil and at a minimum at the top thereof. It is therefore easy to find by trials the part of the

boiler which is suitable for the oil-vaporizing tube 2, so that the oil is vaporized without being decomposed and provides a combustible vapor for burning in the furnace.

The furnace consists at least of three concentric casings 4 5 6. The inner casing 4 is of refractory and inoxidable metal (nickel or nickel steel, for example) and is the furnace proper. Air forced into the furnace by a fan 7 first enters the outer casing 6 and then passes into the intermediate casing 5 by ascending the annular space between the outer casing and the intermediate casing, and then it descends between the intermediate casing 5 and the inner casing 4, so that the said air becomes heated in the circuitous path which it has to take before reaching the lower opening of the inner casing or furnace proper. By this arrangement the outer casing 6, which is in contact with cold air only, does not radiate heat to the surroundings, while air reaches the furnace proper at such a high temperature that the heat of the flame is at its maximum intensity. At the base of the furnace proper, 4, is arranged a burner 8, Fig. 3, which consists of a rose or the like, distributing in a regular manner the liquid fuel through numerous small apertures arranged within the air-inlet opening to the furnace proper. A perfect mixture of air and combustible vapor is thus insured, together with the production of a short and smokeless blue flame. The escape of the burned gases takes place through a chimney 9, which is formed so as to prevent the roaring noise which would otherwise be caused by the intense draft. The said chimney is made of two conic frustra 9 and 10, connected together at their smaller ends 11, the small sectional area of the chimney at this part preventing the aforesaid noise. The upper conic frustum 10 is long enough to act as a reducer of pressure or a diffuser, counteracting the injurious effects of the narrow section which would otherwise oppose a great resistance to the flow of the gases. The chimney, as described, operates to cause a cessation of roaring noise due to the draft and combustion of the burner or furnace attachment, also heretofore explained, by reason of the fact that the upper reduced inverted conical section or frustum is much smaller than the lower conical frustum with which it connects, and also in view of the association of the reduced terminals of the frustra 9 and 10 at an intermediate point. The lower larger frustum 9 receives the full force of the draft through the gen-

erator, and if there be any roaring present within this frustum it will be immediately dissipated when passing through the contracted intermediate portion of the chimney at the point where the reduced extremities of the frustra are connected—an advantage which is material in this class of devices from a noiseless standpoint. It is appreciated that mufflers have been applied in various positions with respect to furnaces, but not a chimney which is so arranged as to dispense with the ordinary muffler and yet destroy any roaring or other noise emanating from the furnace of a generator.

If the furnace be fed with gaseous fuel, the gas is forced directly into the burner 8 by a fan, delivery of which relatively to the air is so calculated as to effect perfect combustion.

Having thus described and ascertained the nature of my invention and in what manner the same may be performed, I declare that what I claim is—

1. A steam-generator having a blast-furnace cooperating therewith and an opening or passage therethrough, the furnace comprising concentrically-arranged inclosing communicating casings, a liquid-fuel burner located in

the lower portion of the casing next to the innermost casing, means for forcing air into the furnace and connected to the outermost casing, and means on the generator for preventing roaring noise caused by the draft of the furnace.

2. A steam-generator having a refractory furnace beneath the same consisting of three concentric inclosing casings, the inner casing having an open bottom, the next outer casing having a closed bottom and side and an open top, and the outside casing wholly inclosing the two first-named casings, a liquid-fuel burner located in the lower portion of the casing next to the innermost casing and in line with the open bottom of the latter, means for forcing air into the casing connected to the outermost casing, and means on the generator for preventing roaring noise caused by the draft of the furnace.

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

CHARLES RENARD.

Witnesses:

PIERRE LEISRE,
PAUL BLUM.