F. N. TILTON.

STEAM GENERATOR.

APPLICATION FILED MAR. 12, 1908.

913,442.

Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.

Fig. 1

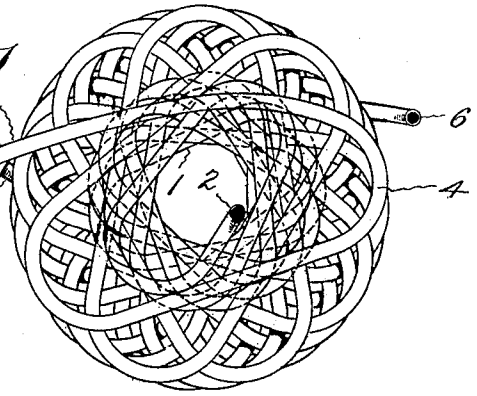
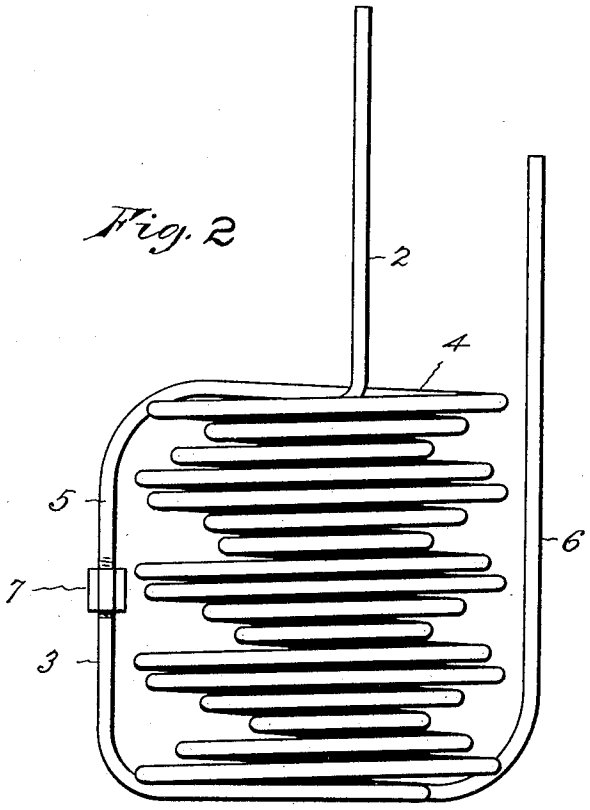


Fig. 2



WITNESSES:

E. Buckland

Josephine M. Strempfer.

INVENTOR

Fred N. Tilton by

Harry P. Williams

atty.

THE NORRIS PETERS CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 3

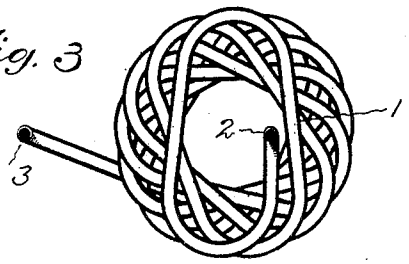
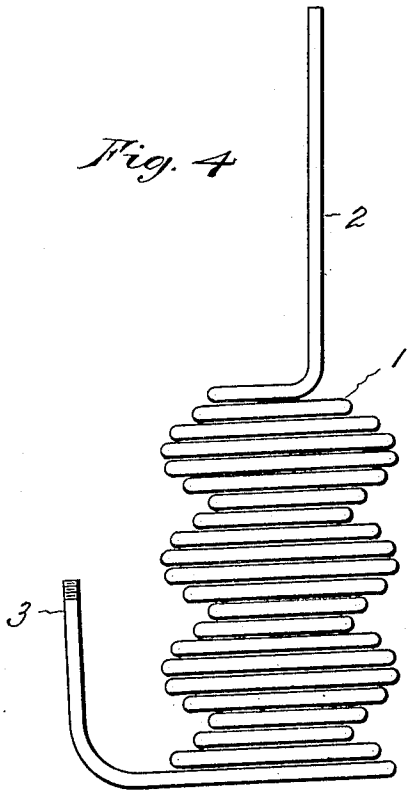


Fig. 4



WITNESSES:

E. E. Buckland

Josephine M. Strempfer

INVENTOR:

Fred N. Tilton by

Harry P. Williams

Atty.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRED N. TILTON, OF HARTFORD, CONNECTICUT.

STEAM-GENERATOR.

No. 913,442. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed March 12, 1908. Serial No. 420,541.

To all whom it may concern:

Be it known that I, FRED N. TILTON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Steam-Generator, of which the following is a specification.

This invention relates to the construction of a continuous coil generator which is particularly adapted for the engine of a steam propelled automobile, but which can also be advantageously employed as a steam generator for other engines or as a feed water heater or heater of water for domestic purposes.

The object of the invention is to produce a simple and compact generator or heater with few joints and with the continuous pipe or tube arranged in coils so disposed that a maximum amount of surface will be exposed to the heat from the burner or furnace.

This generator or heater is built of a plural number of coils of seamless tubing or pipe so formed that the turns of each coil are staggered with relation to each other in such manner that each smaller coil can be turned or threaded into the next larger coil whereby apparently a tangled mass of continuous tubing results, yet which is substantially symmetrical with practically no two turns of each coil above each other, as more particularly hereinafter described and pointed out in the claims.

Figure 1 of the accompanying drawings shows a plan of a generator or heater which embodies this invention built of two coils. Two coils only are shown for they fully illustrate the nature of the invention, but in practice more coils are preferably employed. Fig. 2 shows a side elevation of this two coil generator or heater. Fig. 3 shows a plan of the inner coil only, and Fig. 4 shows a side view of the inner coil.

In constructing this generator the smaller or inner coil 1 of seamless tubing or pipe of the desired diameter and length is wound spirally, with the turns practically close together, upon a mandrel of oblong cross section. When the mandrel is withdrawn from these turns of this coil, each turn, owing to the resiliency of the metal, springs a little distance backwardly with relation to the preceding turn, and this results in a coil with the short turns or bends at the outer ends lying spirally and forming what amounts to a screw thread, as shown in plan in Fig. 3 and in side elevation in Fig. 4. The upper end 2 of this coil is preferably turned so that it projects vertically upward and the lower end 3 is brought out and turned upwardly. The next larger coil 4 is produced by winding a continuous length of seamless tubing or pipe of the same diameter in a similar manner, that is, spirally with the turns lying close together, about a mandrel having the same oblong configuration as the mandrel for the smaller coil but somewhat larger in diameter. This produces a coil like the smaller coil, but larger in diameter. When this coil is removed from the mandrel, the resiliency of the metal causes each short bend to spring slightly backward with relation to the preceding turn so as to produce a coil in which the short bends are staggered in relation to each other and which form practically an interior and an exterior screw thread.

The upper end 5 of the larger coil is carried to the outside and turned downwardly, while the lower end 6 of the larger coil is turned upwardly. In assembling these coils the upper end of the smaller coil is inserted into the lower end of the larger coil and the two threaded together by simply turning the smaller into the larger. After the smaller coil has been turned until its upper end is in the plane of the upper end of the larger coil, the upwardly extending end 3 of the smaller and inner coil is connected with the downwardly extending end 5 of the larger and outer coil by a coupling 7. This produces a continuous generating chamber from the upper end 2 of the inner coil to the upwardly extending end 6 of the outer coil, which ends may then be connected in any desired manner with the piping of the system in which the generator is to be used. As previously stated, as many coils as desired can be formed in this manner, each being wound upon a mandrel larger than the mandrel for the next smaller coil, and then the coils threaded together in the manner described and the lower end of one connected by a coupling with the upper end of the other. This construction produces a generator which is very simple to build and which has a continuous generating chamber with but few short bends and joints, which bends and joints lie in such relation that they are not subjected to any strain resulting from expansion or contraction, and in

which the water necessarily travels from either the upper end of the inner coil to the lower end of the outer coil, or from the lower end of the outer coil to the upper end of the inner coil, depending upon which end is connected with the water supply and which with the engine or discharge.

Not only are the coils easily formed in this manner, but they are so staggered that a very great amount of heating surface is exposed to the direct action of the flames from the burner or to the heat from the fuel of the furnace that may be provided for raising the temperature of the water. The device is compact so that it occupies but a small space and it is elastic so that it will readily expand and contract under temperature and pressure influences and water can be almost instantaneously changed from a liquid to a superheated gaseous state if desired, with a minimum amount of fuel.

The invention claimed is:

1. A generator consisting of a plural number of coils of pipe, each being bent into the form of a screw thread, said coils having different diameters whereby the smaller is screwed into the larger, and having their ends connected so as to form a continuous chamber from end to end of the pipe, substantially as specified.

2. A generator consisting of a plural number of coils of pipe joined so as to form a continuous chamber from end to end of the pipe, each coil being formed of spirally lying oblong turns, and said coils being of different diameters whereby the smaller is screwed into the larger, substantially as specified.

3. A generator consisting of a plural number of coils of different diameters threaded together, each coil being formed of a continuous length of tubing wound into oblong spirally disposed turns, substantially as specified.

FRED N. TILTON.

Witnesses:
MORTON F. MINER,
GRACE GAULT.