(No Model.)

F. X. BRUNELLE.

STEAM GENERATOR OR HEATER.

No. 491,523. Patented Feb. 14, 1893.

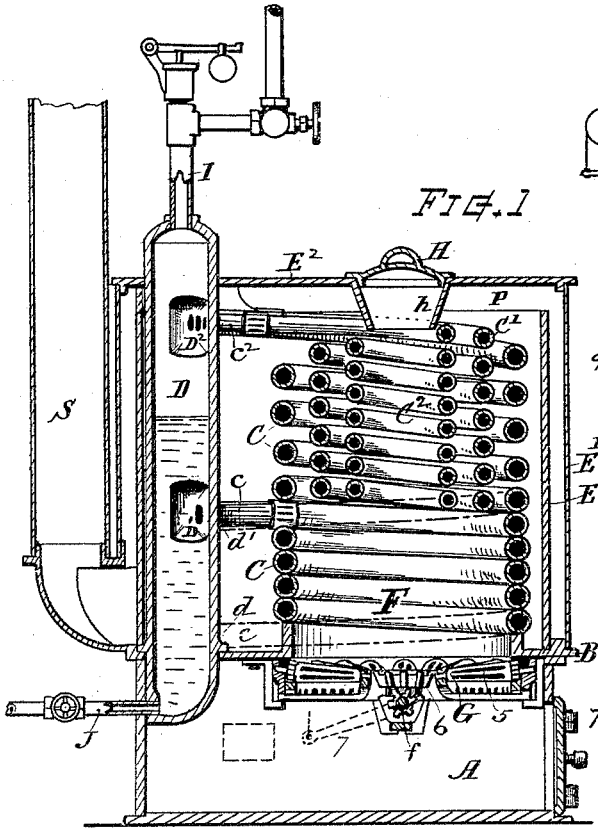


FIG. 1

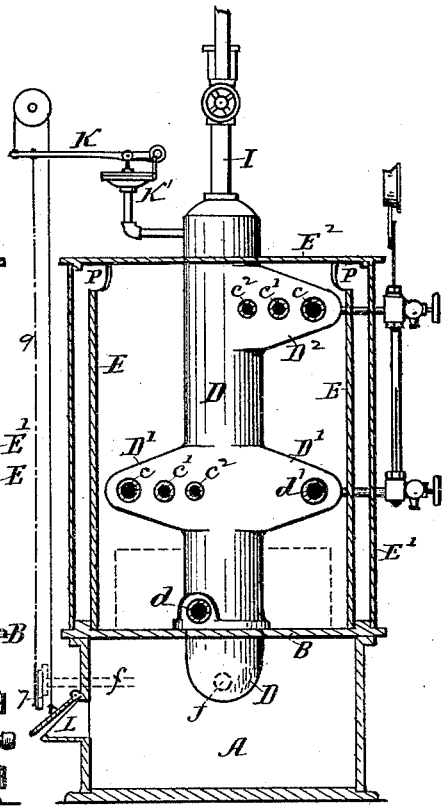


FIG. 2

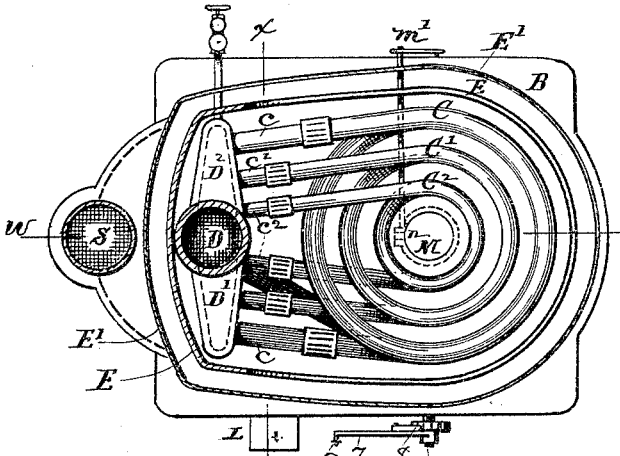
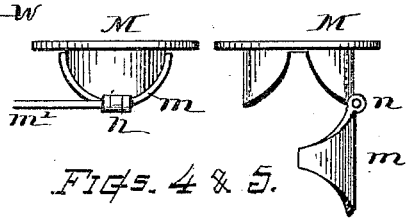


FIG. 3



FIGS. 4 & 5.

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UNITED STATES PATENT OFFICE.

FRANCOIS X. BRUNELLE, OF WORCESTER, MASSACHUSETTS.

STEAM GENERATOR OR HEATER.

SPECIFICATION forming part of Letters Patent No. 491,523, dated February 14, 1893.

Application filed November 4, 1892. Serial No. 450,970. (No model.)

To all whom it may concern:

Be it known that I, FRANCOIS X. BRUNELLE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Steam Generator or Heater, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide an efficient and desirable steam generator or water-heater for warming buildings and for other purposes; which apparatus can be manufactured with practical facility, and economically operated and maintained when in use. These objects I attain by an apparatus constructed and organized as illustrated in the drawings, wherein

Figure 1 is a vertical section of my improved steam generator at line *w w* Fig. 3. Fig. 2 is a vertical section at line *x x* Fig. 3. Fig. 3 is a horizontal section, and Figs. 4 and 5 show side views of the flame-barrier for use in the central passage when desired.

In my improved steam generator or heater the furnace is composed of a series of helically coiled pipes, the ends of which are extended backward and connected with an upright trunk or stand-pipe disposed outside the circle of the coils, and provided with lateral hollow arms into which the pipes are secured. The coiled pipes and stand-pipe are together surrounded by an outer and inner upright casing, and a suitable smoke-flue is provided in connection therewith for conducting the products of combustion away from the space between the casings, the whole being mounted on a suitable base and provided with a grate, grate-operating devices and other essential appliances.

Referring to parts, A denotes the ash-pit, B the supporting plate or top of the base.

C, C′ and C^2 indicate the series of helically coiled pipes having their backwardly extending ends coupled to portions *c*, *c′* c^2 that connect with the upright trunk or stand-pipe D, which is provided with laterally projecting hollow arms D′ D^2 into which the pipe ends *c c′* c^2 are connected in the order illustrated.

E indicates the inner inclosing wall of cast iron having a space P between it and the top-plate E^2, and E′ the outer inclosing wall of sheet or rolled iron.

F denotes the fuel chamber or fire space, and G the grate. An inclosing wall of brick may be used when desired.

The upright trunk or stand-pipe D is preferably made of cast iron with a cylindrical body portion disposed with its longitudinal axis in vertical position, and having at suitable intervals of its height the laterally projecting hollow arms D′ and D^2 of conoidal form, and perforated on their fronts with threaded openings into which the threaded ends *c c′* c^2 of the coil extensions are screwed. The top end of the trunk D is tapped for receiving the steam delivery-pipe I, and the low end thereof is tapped for the water supply-pipe J, which pipes are best connected therewith as indicated in Fig. 1. The coils of pipe are formed in sections each of a size that can be made from a single piece of piping of the ordinary market length, which is wound into a coil with its ends left straight for coupling on the extensions or connecting with the stand-pipe at *c c′* or c^2. Any convenient number of such coil sections, more or less, can be employed to make the generator of the required dimension or capacity, and the trunk D can have such number of lateral arms as will accommodate the number of coil sections.

The fuel chamber wall is formed by a series of coils of the outer pipe C, which coils are laid closely upon each other without intervening space. The lower end of this coil section is coupled to the lower part of the stand-pipe, as at *d*, and the upper end of said coil section is coupled, as at *d′* to the arm D′ at the opposite side or right of the stand pipe. Above these coils that form the fuel chamber wall is a more open coil section C of similar diameter, having its lower end coupled to the arm D′ at the left of the stand-pipe, while its upper end leads into the upper arm D^2 at the right of the stand-pipe. Above the fuel-chamber there is arranged a number of inner coils, as C′ and C^2, having their ends respectively connected with the arms D′ D^2 in the manner above stated, and as indicated at *c′* and c^2 on Fig. 2 of the drawings. The inner coil C^2 is arranged to serve as a chute for directing the coal or fuel from the cover H down

into the chamber F. A short funnel *h* is best provided from the opening in the top plate E^2 into the upper part of the coil C^2.

The grate G is best composed of a series of rolling radially arranged bars 5 and revoluble center 6 operated by a rotatable ring-gear 4 and shaft *f* having pinions *f'* f^2 fixed thereon, and provided with a lever 7 and ratchet or actuating devices 8, whereby motion can be imparted for agitating the grate.

(A grate of the nature here referred to has been described and claimed in an application for Letters Patent executed by me on even date herewith.)

The smoke flue S connects with the lower rear part of the space between the outer and inner walls E and E', as indicated.

In some instances, when desired, a fire stop or barrier M can be used within the central coil C^2 at any convenient height above the fire for deflecting the hot gases outward among the coils. Said barrier is shown in Figs. 3, and 5, and consists of a flanged circular frame having a hinged semicircular valve *m* hinged thereto at *n* and adapted to swing downward, to permit passage of fuel. A rod and operating handle *m'* extend from the hinge to the exterior of the casing, by means of which the valve *m* can be opened and closed or regulated as desired.

The water for heating is contained within the trunk D and coiled pipes C, C' and C^2; the fire in the chamber F and the hot gases surround the parts within the inclosing walls. Steam or hot water for house-warming purposes can be produced with this apparatus readily, conveniently and with extreme economy of fuel.

It will be understood that I do not broadly claim a coiled pipe employed in a heater or steam generator irrespective of the particular arrangement thereof and its combination with other parts in the apparatus, as I am aware that coiled pipes have heretofore been used in different apparatus for steam-generating purposes.

I claim as my invention herein to be secured by Letters Patent,

1. In a steam generator or heater, the combination as described, of the helically coiled pipes having straight backwardly extended ends, with screw-threaded connections, the trunk or stand-pipe having laterally projecting hollow arms into which said extended ends are connected, the outer and inner upright casings, surrounding both said coils and stand-pipe, and the smoke flue leading from the intermediate space, substantially as set forth.

2. In a steam generator or heater of the character described, the fuel chamber wall formed by a cylindrical section of helically coiled pipe, its coils laid closely upon each other and having backwardly extended ends, in combination, with the base-plate fitted for supporting its lower coil, the upper series of coils comprising several independent sections formed in more open order, and the trunk or stand-pipe, disposed within the furnace-wall but outside the circle of the coils, and provided with laterally projecting hollow arms into which the backwardly extended ends of said coil-sections are connected in their order, substantially as set forth.

3. The fuel-chamber walls formed of closely laid coiled pipes, the overlying coils of more open order, and the central coils of smaller diameter above the fuel chamber forming a passage for the introduction of fuel to said fuel chamber, in combination with the stand-pipe, the fire-grate and the outer and inner inclosing casings having a removable cover above said center coil, as set forth.

4. In a heater or steam generator of the character described, the barrier device M consisting of the flanged frame and swinging valve *m* hinged thereto at *n;* in combination with the pipe coils C^2, and the handle rod *m'* for operating said valve, substantially as and for the purpose set forth.

Witness my hand this 2d day of November, A. D. 1892.

FRANCOIS X. BRUNELLE.

Witnesses:
CHAS. H. BURLEIGH,
ELLA P. BLENUS.