(No Model.) 2 Sheets—Sheet 1.

W. H. PAGE.

STEAM HEATER.

No. 260,046. Patented June 27, 1882.

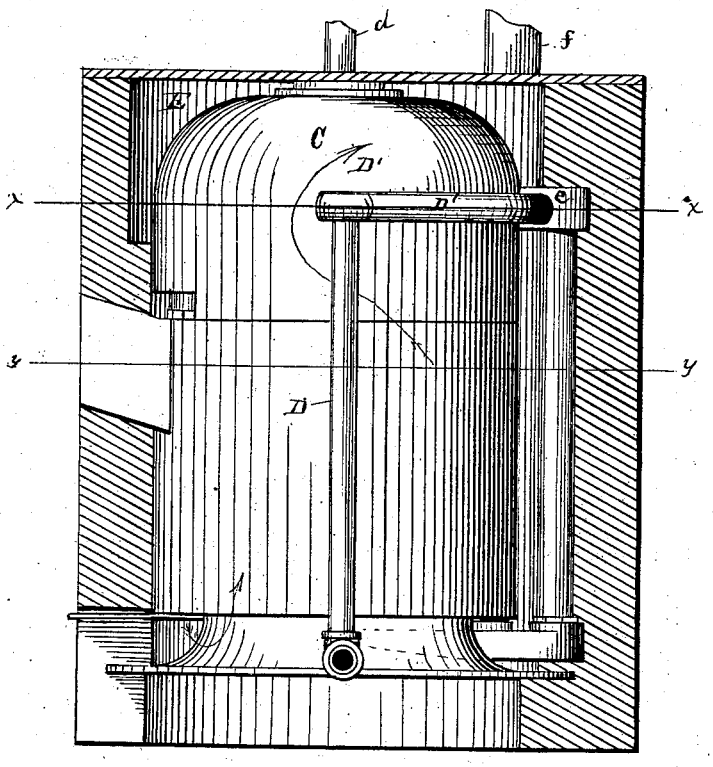

Fig. 1.

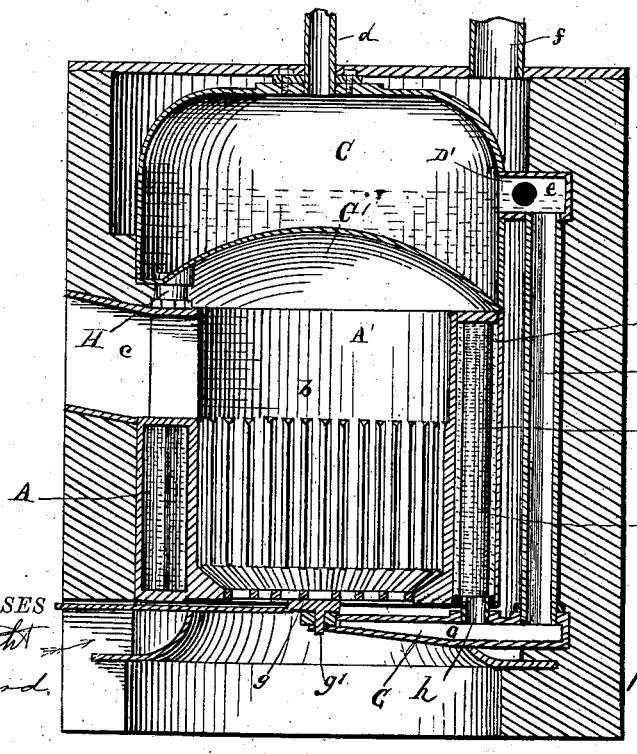

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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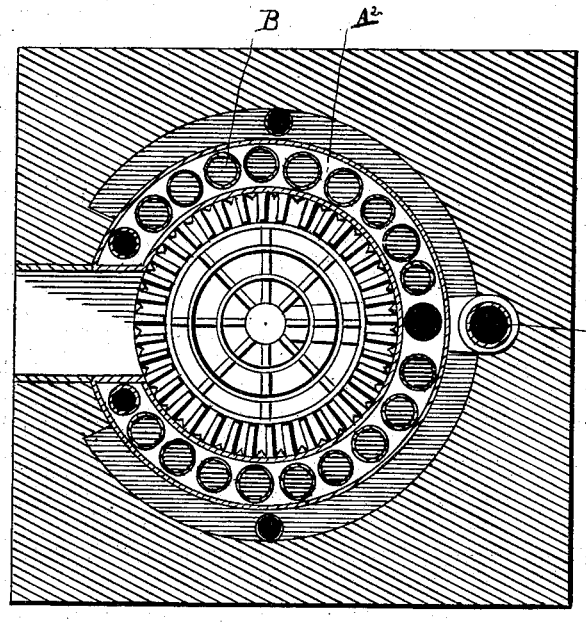


Fig. 3.

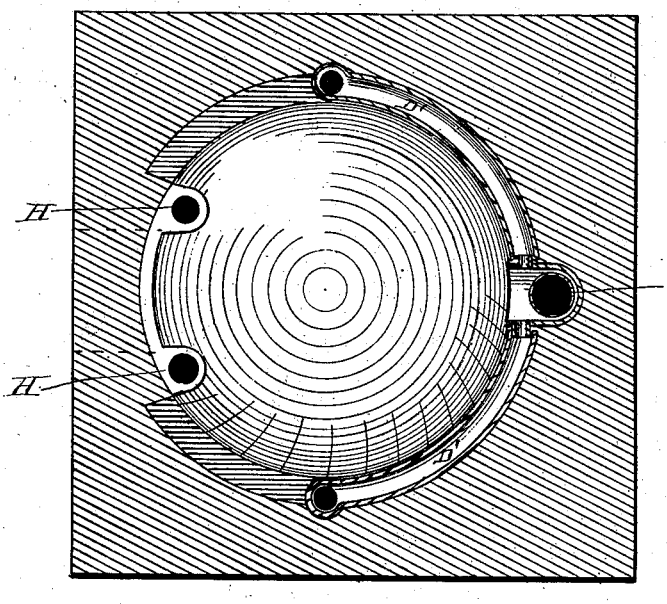
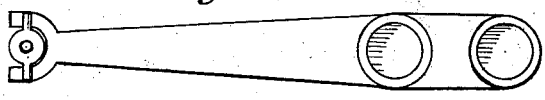


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM H. PAGE, OF NORWICH, CONNECTICUT.

STEAM-HEATER.

SPECIFICATION forming part of Letters Patent No. 260,046, dated June 27, 1882.

Application filed April 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PAGE, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Steam-Heaters, of which the following is a specification, reference being had therein to the accompanying drawings, and in which—

Figure 1 is a view of my improved steam-generator in side elevation, and its surrounding masonry or brick-work taken in section. Fig. 2 is a vertical section thereof. Fig. 3 is a section on the line *y y* of Fig. 1, and Fig. 4 is a section on the line *x x* of the same figure. Fig. 5 is a plan of connecting-pipe G.

This invention pertains to improvements in steam-generators, having for its object chiefly to effect the partial heating of the water before bringing it into contact with the fire-pot or other highly-heated surfaces of the generator preparatory to its conversion into steam, to thoroughly subject it to the heat of the generator, to fully utilize the heat of the products of combustion upon the steam chamber and pipes, and to prevent the direct contact of the products of combustion with the walls of the fire-pot; and it consists of the combination and arrangement of parts substantially as hereinafter more fully set forth and claimed.

To carry out my invention I cast or construct the generator with an outer wall or shell, A, and an inner wall or shell, A′, arranged so as to provide an annular space or chamber, A^2, between them, covered at top and bottom and water-tight, and serving as a water jacket or chamber. Arranged within this chamber is a series of heating-tubes, B, open at top and bottom, which, with the inner wall, A′, forming the fire-pot, effect the heating of the water in said chamber. Cast or formed upon the inner surface of the fire-pot or wall A′ is a series of vertical V-shaped ribs or bars, *b*, having air-passages between them. These bars or ribs prevent direct contact of the products of combustion with the wall of the fire-pot, to avoid chilling the fire and extremes of contraction and expansion of the wall, it forming one side of the water-chamber. The fuel is fed into the fire pot or chamber through the chute *c*.

C is the steam-chamber, which consists of an outer shell or dome adapted to rest upon the top of the wall A and conform to its outer surface, and of an inner arched bottom or plate, C′, united to the lower edge of the outer case or shell. This bottom plate forms the crown-sheet of the fire-pot, and therefore receives the direct action of the products of combustion to effect the better heating of the water in the chamber C. This chamber has a steam exit or egress pipe, *d*, from which, by other pipes, the steam is conducted to a steam-radiator or other place where desired.

D D are return-pipes from radiators and the water-supply pipes, arranged one on each side of the generator, for feeding the water thereto at either side, as may be desired. The vertical portions D of either supply-pipe can be connected to a pipe of the water-main or other head of water, and is designed to have a supply and cut-off cock. The vertical pipes D are connected to curved pipes D′. The pipes D′ are arranged on each side of and a short distance below the top of the dome of the steam-chamber C and connected to a short pipe, *e*. This pipe *e* is closed at its outer end and discharges into the steam-chamber C in the same plane with the arrangement of the pipes D′, as clearly seen in Fig. 2.

The curved pipes D′ are adapted to stand out beyond the vertical pipes D, and the masonry is built with a space, E, between it and that part of the generator below and above the pipes D′ and in front of them. This causes the heat and products of combustion issuing from the generator at the bottom between the two walls A A′ to travel in a tortuous route outside of the generator, and thus heat the water-supply pipes and reheat the water and steam chambers. The smoke passes off through the chimney or exit-pipe *f*, communicating with the space E.

F is another vertical water-pipe, with its upper end connected to the short pipe *e* and its lower end connected to a horizontal pipe, G. The pipe G extends under the grate-bar *g* of the fire-pot, and is connected to a central pin, *g′*, cast upon and depending therefrom, as seen in Figs. 2 and 5. This, however, may be accomplished in any other suitable way. The

pipe G exposes the water therein to the heat from the bottom of the fire-pot. It connects with the water space or chamber A^2 by a short tube, *h*, and thus feeds water therein.

It will be observed that, the water having been subjected to the heat passed externally to the generator in contact with the supply-pipe and the pipe leading under the fire-grate, it will reach the chamber formed partly by the fire-pot in a partially-heated state, and thus prevent the liability of the cracking of the fire-pot, as would be the case were the water passed without this partial heating into contact therewith. The water-chamber A^2 is connected at the front of the generator with the steam-chamber C by two pipes, H, one arranged on each side of the chute or door thereof. This arrangement permits the keeping up of a continuous and uninterrupted circulation of the water in ebullition throughout the generator.

It will be remarked that the water from the supply-pipe entering the tube *e* in line with the supply-pipe F after the generation of steam in the steam-chamber C will be caused by the action of the currents of water in ebullition to flow down into the pipe F, and thus enter the steam chamber or boiler through the pipes H in a heated state, preventing the chilling of the water in the boiler. It will be further remarked that the capacity of pipe F is equal to the capacity of the pipes H.

I claim and desire to secure by Letters Patent—

1. In a steam-generator, the combination, with the annular water-chamber having heating-tubes, of the supply water-pipes leading to vertical pipe connected with a pipe arranged under the fire-grate and connected with the said water-chamber, substantially as and for the purpose set forth.

2. In a steam-generator, the combination, with the fire-pot and the surrounding water-chamber, of the steam-chamber superposed upon the water-chamber, and the water-tubes connecting the said chambers together at the rear below the fire-pot and in front at the top of said surrounding water-chamber, substantially as and for the purpose set forth.

3. The combination, with the steam-generator adapted to allow the return and upward passage of the products of combustion external to itself, of the vertical water-supply pipes having horizontal branch pipes extending beyond them, and the inclosing casing of masonry or other suitable material, having a combustion-space between itself and the generator, said space being subdivided by said branches of the supply-pipe from the rear to the front ends of said branch pipes, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. PAGE.

Witnesses:

JOSEPH R. EDSON,

HARRY BERNHARD.