(No Model.)

T. A. MacDONALD.

COMBINED WATER AND AIR HEATING APPARATUS.

No. 329,923. Patented Nov. 10, 1885.

Fig.1.

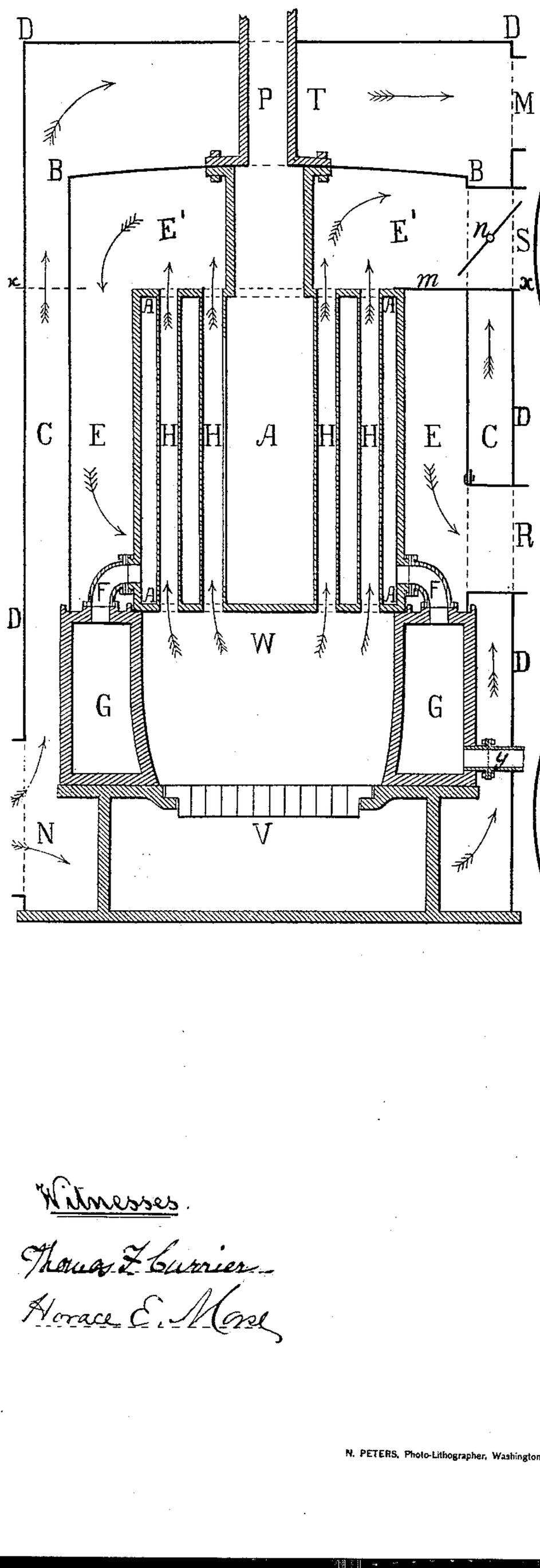


Fig.2.

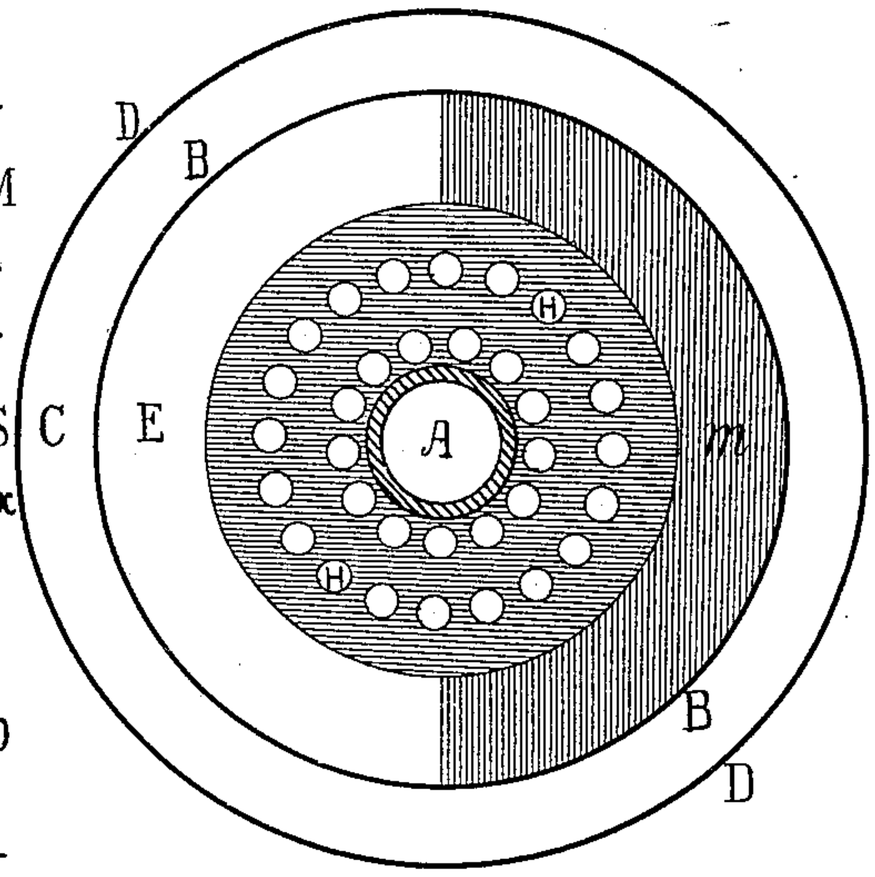
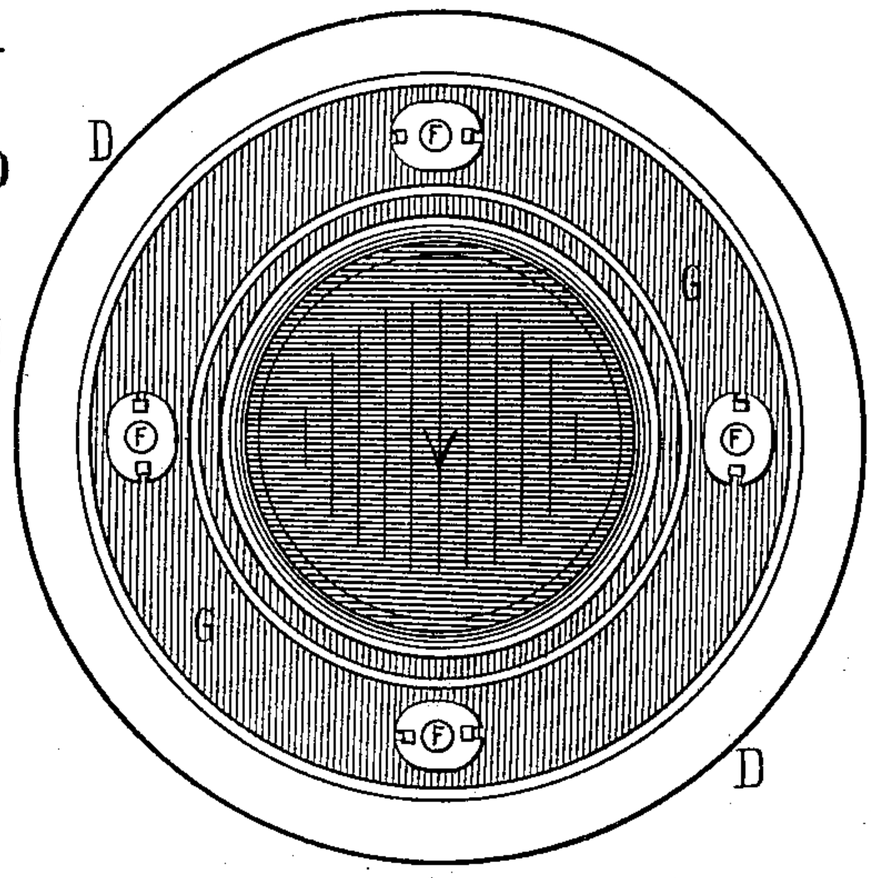


Fig.3.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS A. MACDONALD, OF BOSTON, MASSACHUSETTS.

COMBINED WATER AND AIR HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 329,923, dated November 10, 1885.

Application filed October 20, 1884. Serial No. 146,040. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. MACDONALD, a citizen of Canada, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Combined Water and Air Heating Apparatus, of which the following is a specification.

My invention relates to an improvement in combined hot-water and hot-air heating apparatus whereby I gain the following advantages—viz., economy of construction and in the use of fuel, durability, efficiency, and simplicity of operation, and also safety and facility of management, and resulting in the production of a pure warm atmosphere, and also in which the air shall not be injuriously affected by being brought in contact with surfaces of high temperature.

Referring to the accompanying drawings, Figure 1 is a vertical section of an apparatus embodying my invention. Fig. 2 is a section, on a line at the top of the boiler, of Fig. 1. Fig. 3 is a plan or top view of the fire-pot and surrounding water-chamber.

A is an upright tubular boiler resting upon the inner edge of the water-chamber G, which surrounds the fuel and combustion chamber W. The outer lower portion of boiler A is connected to the upper ends of the water-chamber G by means of flanged elbows or fittings F, which are securely bolted to the boiler and water-chamber, and through which the water passes freely.

B is a thin wrought-iron casing having its seams riveted and calked, so as to be perfectly air-tight, and serves as a hot-air radiator. The said casing rests upon the outer edge of the water-chamber G.

D is an outer casing, of thin galvanized iron, surrounding the entire apparatus at the sides and top, with the exception of the necessary openings, and leaving a space, C, between it and the casing B for the passage of air, which enters the inlet-opening N and passes around the water-chamber G and the radiator B to the chamber T and out through opening M. The air will thus be heated by contact with or absorbing the heat given off by the casting B, thereby utilizing heat which is ordinarily lost or wasted in hot-air boilers. The heated air passing from chamber T through outlet M is distributed through pipes to rooms, as required. The hot water passes from boiler A up through the pipe P to radiators in the building, and as it becomes cool is conducted back by means of suitable pipes to the water-chamber through pipe *y*. The products of combustion pass up from the combustion-chamber W through the tubes H of boiler A into the space or chamber E′, and, when the damper *n* in the exit S is closed, down into and through the chamber or space E, and escapes through the exit R to the smoke-flue. The damper *n* in exit S is to be opened when the fire is first started, so as to increase the draft. Over one-half of the space of the lower part of the chamber E′, and between the top of the boiler and the casing C, is a semicircular thin iron plate, *m*, which deflects the products of combustion and causes the same to pass around the sides of the boiler before escaping through the exit R. It will be seen that as the boiler A sits immediately over the combustion-chamber, and the water-chamber G surrounds the fire-pot and combustion-chamber, the water will absorb the intense heat, and only the milder gases will come in contact with the hot-air radiator B, and, consequently, the air heated by said radiator is not injuriously affected, as in the ordinary hot-air furnace, where the whole heat of the fire, &c., comes in contact with the radiator, while the radiator in my apparatus, not being exposed to an intense heat, is not so liable to become porous, and thus allow the escape of gas through the same. The top of the casing B is made of thin steel-plate, the shell or upright part being wrought-iron. The seams are riveted and calked, so as to be perfectly air-tight, thus preventing the gases from getting into the hot-air-chamber.

It will be seen that as the products of combustion are exposed to the casing B, after passing through the tubes in boiler A, the heat which could not be abstracted by the boiler is absorbed by the air in space C, which is of a lower temperature than the contents of the boiler, and thus economy in the use of fuel is attained.

I am aware of the construction of the boiler in the patent of J. Mason, No. 259,566, June

13, 1882, and also of the steam-boiler fire-tube shown in the German patent to Quint, No. 16,069. These I do no claim; but

What I claim as my invention is—

In a combined hot-water and hot-air heating apparatus, the combination of the tubular boiler A, water-chamber G, and casing B, the lower edges of the boiler resting upon the upper inner edge of the water-chamber, the two being connected by the curved fittings F, and the casing B resting upon the outer edge of the water-chamber G and inclosing the space E E′, substantially as shown and described.

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

THOMAS A. MACDONALD.

Witnesses:

J. H. ADAMS,

E. PLANTA.