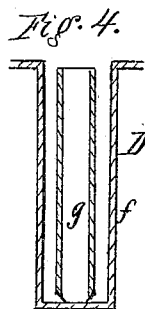
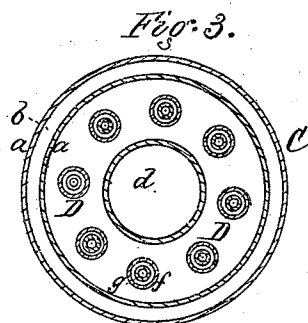
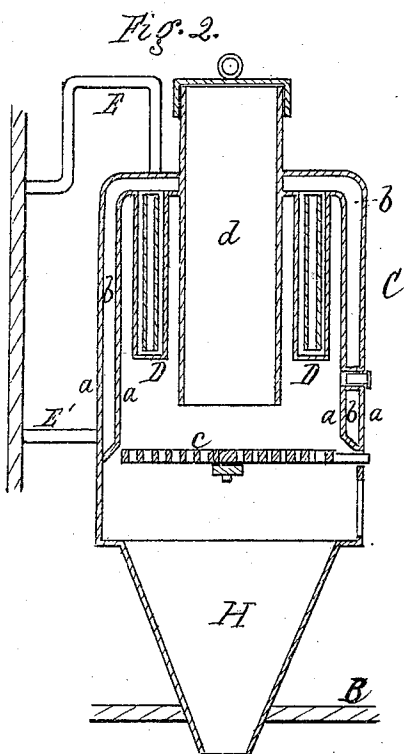
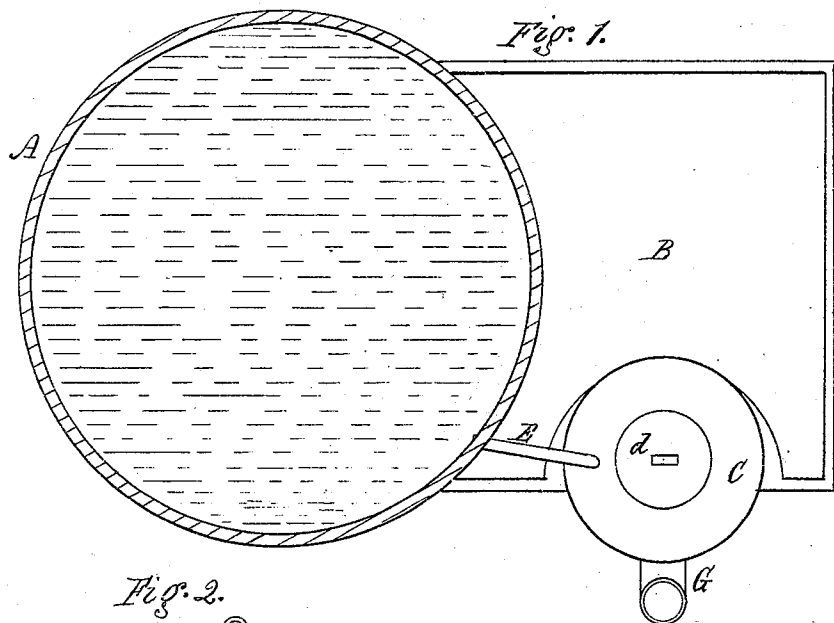


R. GILBERT & J. P. TOPHAM.

Supplementary Heaters for Steam Fire-Engines.

No. 138,880.

Patented May 13, 1873.



Witnesses.

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UNITED STATES PATENT OFFICE.

RICHARD GILBERT AND JOHN P. TOPHAM, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN SUPPLEMENTARY HEATERS FOR STEAM FIRE-ENGINES.

Specification forming part of Letters Patent No. **138,880**, dated May 13, 1873; application filed February 21, 1873.

To all whom it may concern:

Be it known that we, RICHARD GILBERT and JOHN P. TOPHAM, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Supplementary Heaters for Steam Fire-Engines; and we do hereby declare that the following is a clear and exact description of the construction and operation of the same.

Our invention consists of a supplementary heater for a steam fire-engine, constructed and arranged as hereinafter described, and employed for the purpose of keeping the main boiler under constant heat, whereby, when the fire is applied under the main boiler, steam can be raised in less time than in the ordinary engines.

In the drawing, Figure 1 is a cross-section of the main boiler of a steam fire-engine, and a plan of the tender and the supplementary heater or boiler which constitutes our improvement; Fig. 2, a vertical section of the supplementary heater or boiler; Fig. 3, a cross-section of the same; Fig. 4, a vertical section of one of the water-legs of the supplementary heater.

A represents the main boiler of an ordinary steam fire-engine, which may be either upright or horizontal. B is the ordinary tender for carrying fuel. C is the supplementary heater or boiler, which constitutes our invention. This heater may be made of any desired size, and is mounted in a stationary manner upon the tender so as to be carried with the engine wherever it goes; but it may also be arranged so as to be unshipped in the engine-house and run over to any part of the room, and still keep up the heat in the main boiler by a proper connection of the water-pipes. This heater is preferably made of cylindrical form; and it has double walls *a a*, which leave a water-jacket, *b*, surrounding the top and sides and extending as low as the grate *c*. In the center of the heater is a magazine or fuel-chamber, *d*, extending through the top, and having a suitable cover, and in this magazine is placed the fuel. It forms, in fact, what is known as a "base-burner." Surrounding the magazine, and lying in the annular space between it and the walls of the heater, is a series of water-legs, D D. These open

into the water-jacket *b*, and depend therefrom, as shown. Each of these legs consists of an outer tube, *f*, open at the top and closed at the bottom, and an inner tube, *g*, which is open at both ends to communicate with the water in the outer tube. This construction is shown most clearly in Fig. 4. Water-pipes E E', one above and one below, connect the upper and lower ends of the supplementary heater with the water-space of the main boiler. These pipes may have suitable cocks for letting on and turning off the water from the main boiler to the heater. The supplementary heater also has a smoke-pipe, G, which opens through the water-jacket to the interior near the top, and thence extends to the smoke-stack of the engine. It may be hinged or otherwise arranged so as to be connected or disconnected at pleasure; and in running to a fire it may be opened or turned back so as to accelerate the draft. Beneath the ash-pit of the supplementary heater is a funnel-shaped conductor, H, which extends through the bottom of the tender and serves to convey off the ashes which are shaken down, and also admits draft to the fire.

The operation is as follows: The magazine *d* is filled with coal and a fire is kept constantly burning in the heater. The latter being only of small size, it will cost but a few cents a day to keep it in operation. The fire coming in contact with the walls of the water-jacket *b*, the water becomes highly heated and rises. Passing over the top it descends through the inner tube *g* of the water-legs D, and thence passes outward at the bottom into the outer tube, when it rises again. This is caused by the excess of heat outside the legs. The water-legs, being confined in the closed space between the magazine and walls of the heater, are thereby subject to intense heat, and the water circulates rapidly. From the water-jacket the water then passes through the upper pipe E to the water-space of the main boiler, and its place is supplied by the cooler water of the main boiler passing through the lower pipe E' to the heater. In this manner a very rapid and continuous circulation is produced, and the water in the main boiler becomes quickly heated.

A light pressure of steam can be kept as a reserve in the main boiler at all times; and in

starting, at an alarm, heavy steam can be got on the engine much quicker than in ordinary engines, where the water is cold at the time of starting. Of course, a fire is started in the furnace of the main boiler in the usual manner on an alarm, the supplementary heater only acting as an auxiliary to the main heating-furnace.

We do not broadly claim the combination of a heater with the boiler of a steam fire-engine; but,

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In combination with the main boiler of a steam fire-engine, a supplementary heater or boiler, C, connected with the main boiler by pipes E E' when said supplementary heater is constructed with vertically-arranged water-legs D, a water-jacket, *b*, and a central magazine, *d*, all constructed and operating substantially as described.

2. In a supplementary heater for fire-engines, the series of vertically-arranged water-legs D located between the central magazine *d* and the walls of the heater, each leg being provided with an inner tube, *g*, open at both ends, substantially as described, for the purpose set forth.

3. The supplementary heater C, constructed with the water-jacket *b*, depending hollow water-legs D D, and central magazine or fuel-chamber *d*, and connected with the main boiler of the engine by pipes E E', in the manner and for the purpose specified.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

RICHARD GILBERT.
JOHN P. TOPHAM.

Witnesses:

R. F. OSGOOD,
H. SPRAGUE.