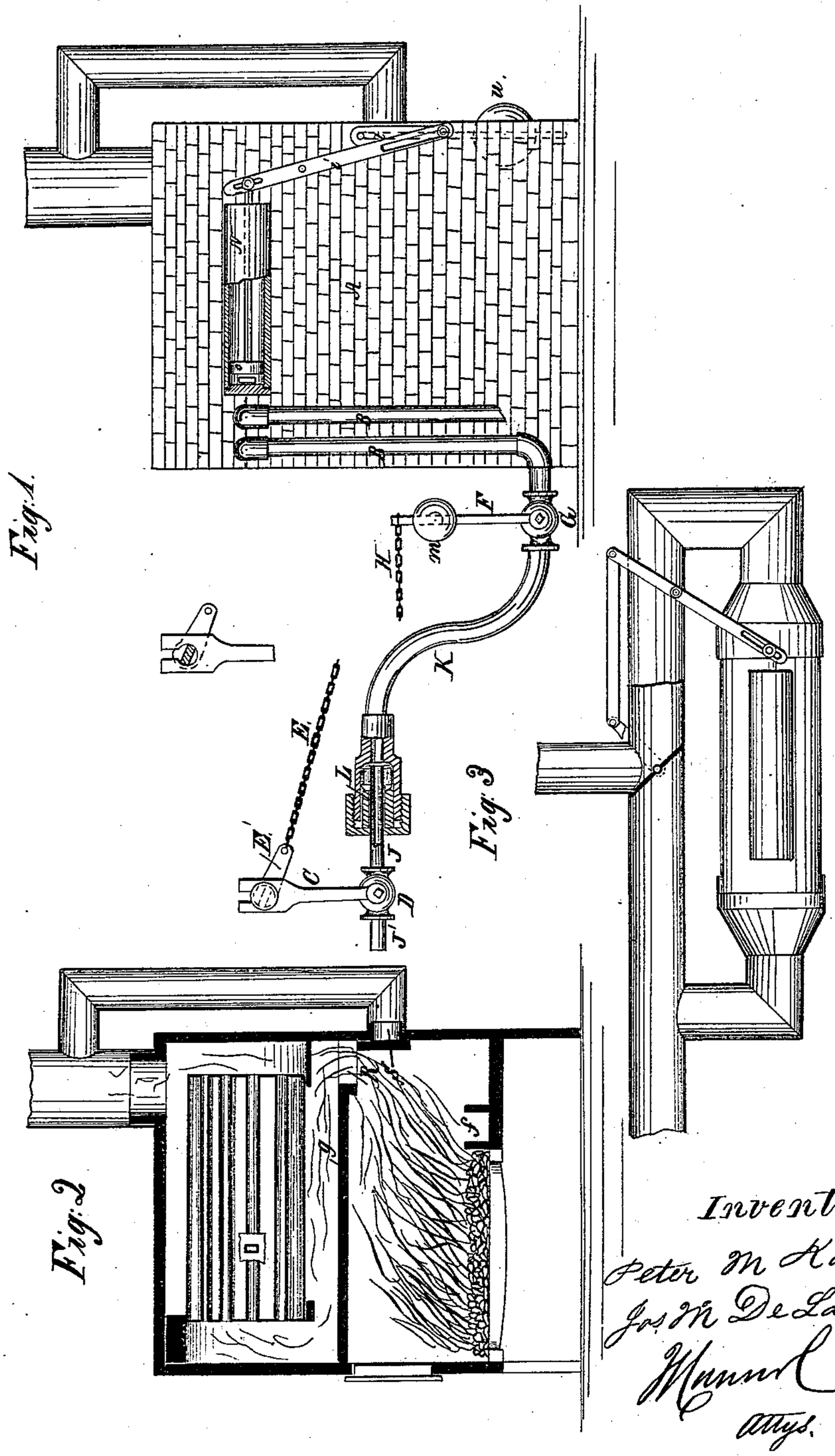
Kafer & DeLacy,

Steam-Boiler Water-Heater.

No. 64,540. Patented May 7, 1867.



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PETER M. KAFER AND JOSEPH M. DE LACY, OF TRENTON, NEW JERSEY.

Letters Patent No. 64,540, *dated May* 7, 1867.

IMPROVEMENT IN FEED-WATER HEATERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, PETER M. KAFER and JOSEPH M. DE LACY, of Trenton, in the county of Mercer, and State of New Jersey, have invented a new and improved Water-Heater for Steam Fire-Engines; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to facilitate the extinguishment of fires in cities and towns by supplying the steam fire-engines boiler with water already heated to near the boiling temperature before it is started from the engine-house; and the invention consists in arranging a stationary heater and connecting it with pipes and flues in such a manner that the water in the engine boiler is made to pass through the heater, and thereby become charged with heat to such a degree that no time is lost in getting up steam, as is frequently the case. At the same time the apparatus, through the pressure of steam generated in the heater, and by dampers in the flues, is made self-regulating, as will be hereinafter more fully described.

Figure 1 represents a side elevation of the apparatus, showing the water pipes and smoke flues; also a regulating cylinder with a piston upon the side of the boiler, the piston of which is connected with the chimney damper.

Figure 2 is a vertical sectional elevation of the same, showing the boiler with its flues, the furnace or fire-box, and the smoke passages.

Figure 3 is a modification of the heating arrangement, by which it may be adapted to other purposes or to other situations.

Similar letters of reference indicate like parts.

A represents the arch or box which contains the fire and supports the heater. B B′ are water pipes, which are connected with the heater. When heating the water in the fire-engine boiler, one of these pipes contains the cold water which is passing from the steam boiler into the heater, and the other contains the hot water which is passing from the heater to the steam boiler, so that, in heating the water, a circulation is kept up between the heater and the boiler. It has not been considered necessary to show more than one of the pipes (in full) which extend from the heater to the fire-engine boiler, they being alike as to their construction and arrangement. C represents a lever, which operates a cock in the pipe at D. E is a chain, which is attached to the lever by a slip-key, E′. F is another lever, which operates the cock G; and H is another chain, which is attached to the lever by a ring, as seen in the drawing. J is a pipe, which forms a slip-joint with the rubber pipe K at L. This joint is arranged with stuffing-box and packing, to prevent the escape of water around the pipe J. This arrangement of the cocks and the rubber or elastic pipe, as will be seen, is attached to the pipe B from the heater; and it must be borne in mind that B′ has the same arrangement, except that the levers or wrenches C and F operate the cocks in each pipe. When the steam fire-engine leaves the engine-house the other end of the chain E is attached to the floor, and the chain H is drawn forward by the engine, so as to operate the lever F with the assistance of the ball *m*. The elastic pipe K allows the pipe J to slip from the box at L. The chain E, being fast to the floor, draws the lever C back, and closes the cock D, while the key E′ slips from the lever C. Thus both the cocks are closed by the movement of the fire-engine from the house, while the engine is liberated from the water pipes. After the cocks are thus closed steam is generated in the heater, which enters the cylinder N, (seen in fig. 1,) and forces the piston *o* back from the position seen in the drawing. This movement of the piston *o* operates upon the damper *p*, through the lever and rod *i t*, seen in fig. 2, closing the flue R, which is seen open in fig. 2, and opening the flue S, thus changing the direction of the products of combustion from around the boiler to through the flue S, which conveys them directly to the chimney, so that no more steam is generated. The movement of the piston and the shutting of the damper at S raise a weight, *u*, which is attached to the rod or shaft of the damper. When the pressure is reduced by the withdrawal of the heat or products of combustion from around the heater the ball *u* falls by its own gravity to its former position, thereby reversing the damper, and forcing the piston *o* back to its former position. In this manner the heater is made to regulate itself. When steam is generated of sufficient pressure to force back the piston the generation of steam is stopped by the change effected in the course of the heat or products of combustion. The pressure may be graduated

by the size or heft of the weight *u*, or by its position on its lever. A bridge wall of fire-brick may be constructed in the furnace, as indicated by the projections at *f*, fig. 2; and the crown of the fire-box or furnace may be protected by fire-brick, as indicated at *g*. The arch or box which contains the heater may be constructed either of masonry or metallic plate. The modification represented in fig. 3 has reference to the adaptation of the heater and cylinder flues, &c., to other situations as a self-regulating apparatus, attached to stoves or otherwise.

What we claim as new, and desire to secure by Letters Patent, is—

A water-heater for steam fire-engines, constructed substantially as shown and described, combining in its arrangement the regulating cylinder N, operating upon the damper, substantially as set forth.

We claim the pipes B B′, and the rubber or elastic pipes K, with their cocks, levers, and chains, the slip-joint at L, and the slip-key E′, constructed, arranged, and operating substantially as described for the purposes specified.

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Witnesses:
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