

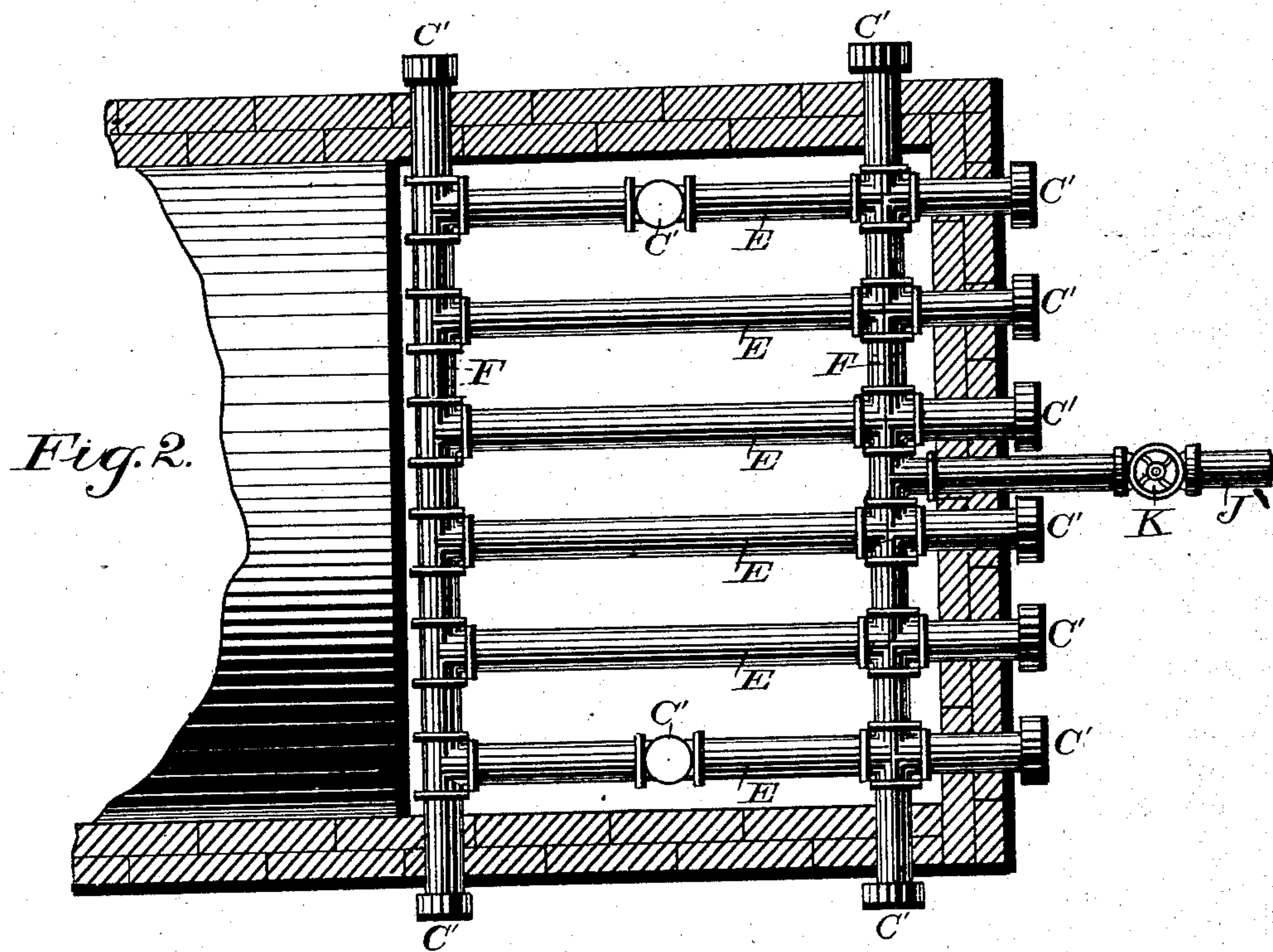
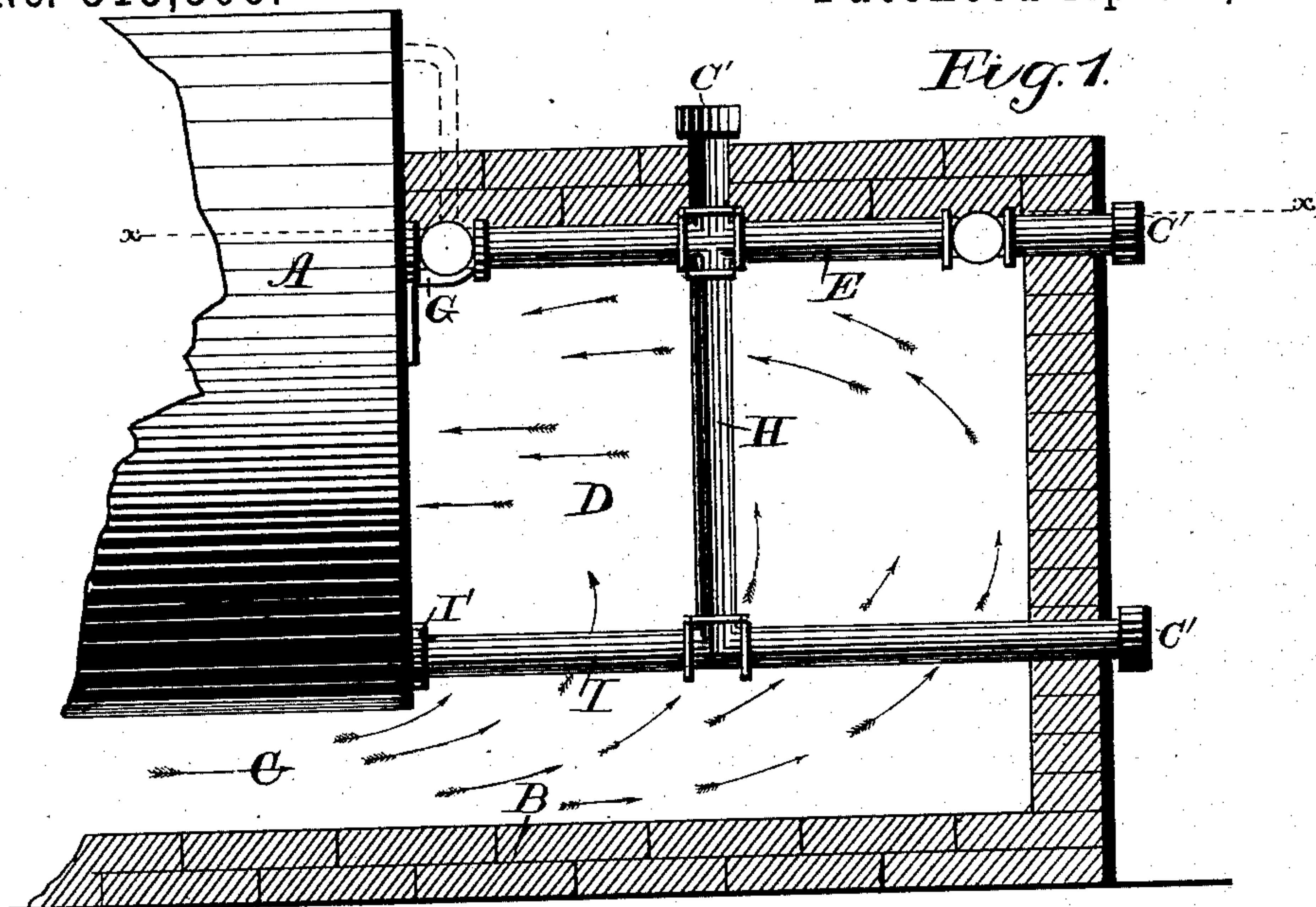
(No Model.)

W. LOVE.

FEED WATER HEATER.

No. 315,306.

Patented Apr. 7, 1885.



WITNESSES

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Geo. Loring  
J. J. Henderson.

William Lowe INVENTOR

By J. D. Charleston  
his Attorney



# UNITED STATES PATENT OFFICE.

WILLIAM LOVE, OF PORT HURON, MICHIGAN.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 315,306, dated April 7, 1885.

Application filed February 5, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM LOVE, a citizen of the United States, residing at Port Huron, St. Clair county, and State of Michigan, have invented a Feed-Water Heater; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in water-heaters for steam-boilers; and the objects of my improvements are, first, to so locate the heater-pipes with relation to the fire as to impart the greatest possible amount of heat to the water in said pipes consistent with the other objects of my improvements; second, to utilize said pipes for sustaining the arch of the smoke-box, and, third, to so construct and arrange said pipes as to enable the operator to clean them at will without taking them apart or disturbing the brick-work of the smoke-box. I attain these objects by the mechanism illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of the smoke-box located at the rear end of the boiler, with the brick walls partly removed to show the arrangement of the heater-pipes, and Fig. 2 is a top or plan view of the said pipes on the line *xx* of Fig. 1, with the arch or roof of the smoke-box removed.

The same letters of reference refer to corresponding parts in both the figures.

The boiler A is constructed in the usual manner, with flues extending through the same for the passage of heat and the products of combustion, the rear end only being shown. It rests on brick-work B, constructed in the usual manner, the furnace (not shown) being located under the front end of the boiler. The products of combustion pass under the boiler through the passage C the entire length thereof, thence into the smoke-box D, and return through the return-flues located within the boiler to the smoke-stack at the front end. It is obvious, however, that any other form of boiler may be used—as, for instance, the locomotive-boiler commonly used with portable engines where the products of combustion pass directly through the flues to the smoke-stack at the rear end.

The heater consists of the pipes E, located in the upper part of the smoke-box D, and are connected together by transverse pipes F. These pipes are held to the boiler by resting on brackets G, or in any other suitable manner, and serve to sustain the roof or arch of the smoke-box. The vertical pipes H and the horizontal pipes I serve to convey the heated water from the heater-pipes proper to the boiler at I'. There are two of these passages, one connected to each of the outside pipes, E, of the series. Each of the pipes E, the transverse connecting-pipes F, the vertical pipes H, and the horizontal pipes I are extended through the walls and roof of the smoke-box, and terminate outside thereof, and the end of each pipe is fitted with a removable cap, C', to enable the operator to clean the whole series of pipes whenever it becomes necessary to do so. The series of pipes E are usually located just below the water-line of the boiler and just above the upper row of flues in the boiler; but it is obvious that they may be placed partially above and partially below the water-line, in which case a connecting-pipe should lead from the upper side of one or more of the pipes to the steam-space in the boiler, as shown in dotted lines, in order to convey the steam found in the pipes direct to the boiler, thus equalizing the pressure and obviating the liability to force all the water out of the pipes by the steam generated within them. The water is fed to the pipes E through the pipe J, having a regulating-cock, K. It is obvious, however, that it may be fed at any other point without departing from the spirit of my invention. Modifications may be made in the arrangement of the pipes, not only in reference to the point at which they are fed, but with reference to the course which the water takes after entering the pipes. I therefore do not limit myself to the particular form of apparatus here shown; but,

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a feed-water heater, the combination of a series of horizontal pipes arranged in the top of the smoke-box and supporting the arch thereof with the boiler and the connecting-pipes, substantially as and for the purpose described.



2. In a feed-water heater, the combination of the boiler with a series of horizontal pipes arranged in the top of the smoke-box and having their ends projecting therefrom, and each  
5 provided with a removable cap, substantially as and for the purpose set forth.

3. In a feed-water heater, the combination of the boiler with a series of horizontal pipes and vertical connecting-pipes located in the

smoke-box, each of said pipes having one or 10 both of its ends projecting through the outside of said smoke-box, said projecting ends being provided with removable caps, substantially as and for the purpose described.

WM. LOVE.

In presence of—

JNO. C. JOHNSTON,

E. C. CARLETON.