

(No Model.)

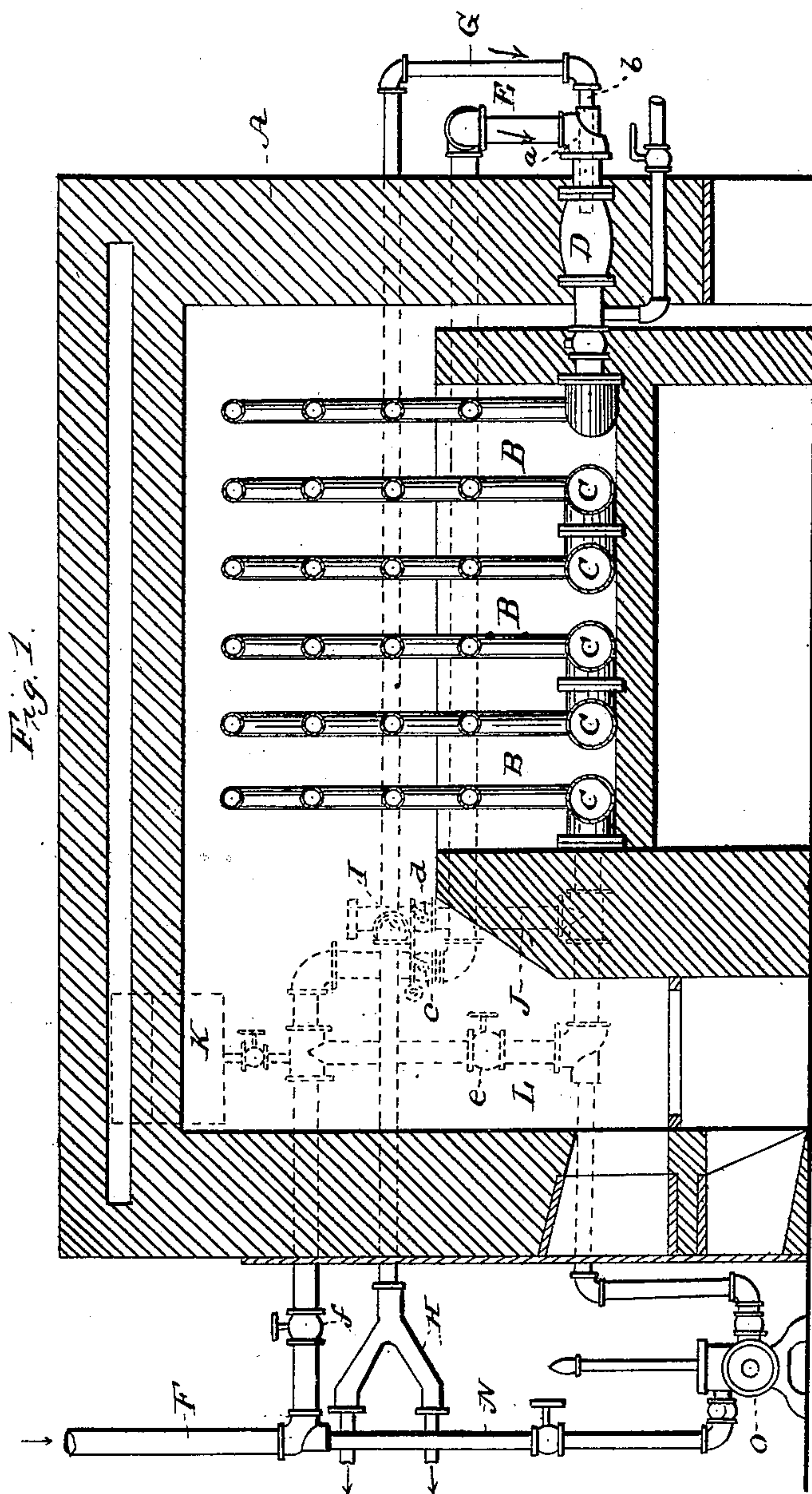
2 Sheets—Sheet 1.

D. RENSHAW.

PROCESS OF MAINTAINING HIGH PRESSURE IN SUPERHEATERS.

No. 282,772.

Patented Aug. 7, 1883.



WITNESSES

Chas. R. Burr  
W. E. Bowen.

INVENTOR

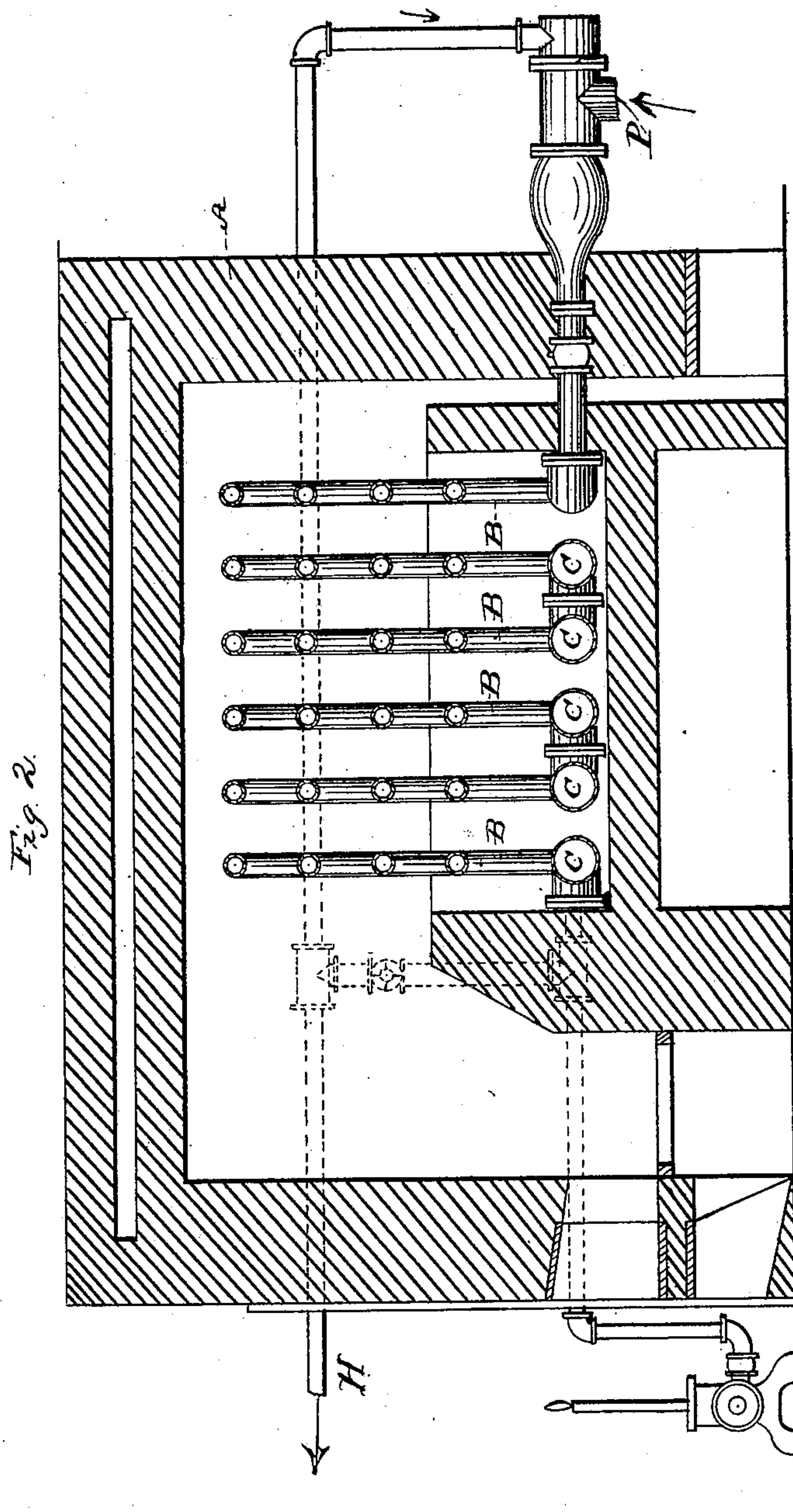
David Renshaw  
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# UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF BRAINTREE, MASSACHUSETTS.

## PROCESS OF MAINTAINING HIGH PRESSURE IN SUPERHEATERS.

SPECIFICATION forming part of Letters Patent No. 282,772, dated August 7, 1883.

Application filed January 6, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID RENSHAW, of Braintree, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Processes of Maintaining High Pressure in Superheaters; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention has for its object to maintain a higher degree of pressure in a superheater than is maintained in or at its source of supply; and it consists in the process of introducing steam, or steam and water combined, atmospheric air, or other expansible gas, into a superheating-vessel of suitable construction for producing and maintaining therein a pressure greater than that of the source of supply.

For a better and clearer understanding of my invention reference is made to the accompanying drawings, which illustrate one means of carrying out my invention, and which in part illustrates the subject-matter of a separate application.

Figure 1, Sheet 1, shows a side elevation, partly in section, of my apparatus; Fig. 2, Sheet 2, a modification of the same designed for air and gases.

The same letters denote like parts in all the figures.

A is the casing or brick setting.

B B B are sections of a superheater, which are joined and communicate with each other. There may be as many of these sections as may be required. The contours of these sections are segments of circles, or may be fully semi-cylindrical, each end of which is connected to a horizontal pipe, C, and all of which are located within the setting A.

At the rear end of the furnace, connecting with a rear section of the superheater and extending through the wall of the setting, I locate an injector, D, of any ordinary construction; and communicating with this injector is a pipe, E, leading to the steam-boiler pipe F. Upon the end of pipe E, I place a return bend or elbow, *a*, for the purpose of receiving an

injection-nozzle, *b*, to which is attached a pipe, G, leading to and forming a junction with the power-escape pipe H, as shown by letter I. The pipes G and H also join a pipe, J, at junction I, through which steam from the superheater passes to and through the pipes H and G. The junction-pipes G, H, and E are provided with controlling-valves *c d*, which simultaneously open and close them, the purposes of which will be hereinafter described.

Upon the outside of the brick setting I locate a small water-tank, K, which communicates with pipes L and E for the supply of a small quantity of water before steam is admitted to the superheater.

Should it be preferred, a small pump, *o*, may be used, it being supplied with steam by a branch pipe, N, from the steam-pipe F.

With reference to the modification shown on Sheet 2, like parts are used as those shown on Sheet 1, and embodying the same principles, only in the former case atmospheric air or gases that are capable of expansion may be operated with, and the injectors shown are somewhat different.

The operation is as follows: Steam being up in the boiler and fire being made in the furnace of the superheater, a small quantity of water is admitted from the tank K to the lower portion of pipe L, where steam from the boiler is also admitted and the valve *f* again closed. The steam and water just mentioned expand within the superheater, thus creating the required pressure for working operations. Valve *e* is now closed and valve *f* opened, and also valves *c* and *d* simultaneously, which permits steam from the superheater to take two directions from the same section—the front and hottest one—the steam from valve *d* to the engine, and from the same valve through G to the injector, where it meets boiler-steam, passing through valve *c* and pipe E, also to the injector, where the superheated-steam jet, coming in contact with the boiler-steam of less temperature, gains in momentum without loss of velocity, and thence passes into the superheater, establishing a current and maintaining the pressure. The steam-pipes may be used for supplying air or gas, if desirable, or they may be introduced at the injector or rear end of the superheater, as shown by pipe P. (See Sheet 2.)



I claim as my invention and desire to secure by Letters Patent—

1. The process of maintaining pressure within a superheater greater than that of the source of supply by creating a current of the superheated steam or gases through a superheater, said current being created by withdrawing steam or gas from one end of the superheating-vessel, and injecting a portion of it at the other with steam or gas of greater density, as described.

2. The process of maintaining pressure greater than that of the source of supply, consisting of forcing an elastic expansible gas or vapor through a superheater, and withdrawing therefrom a portion of such gas or vapor and injecting it, with a gas or vapor of greater density, into said superheater by reason of its increased momentum and velocity.

3. The combination, in an apparatus for maintaining pressure in a superheating-vessel greater than that of the source of supply, consisting of the superheater, the boiler-steam pipe, and the superheated-steam pipe, and the injector, substantially as described.

4. The combination, in an apparatus for maintaining pressure greater than that of the source of supply, consisting of the superheater, the boiler-steam pipe, the superheated-steam pipe, and the injector, with the intermediate operating-valves, as described.

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

DAVID RENSHAW.

Witnesses:

B. F. MORSELL,  
EUGENE D. CARUSI.