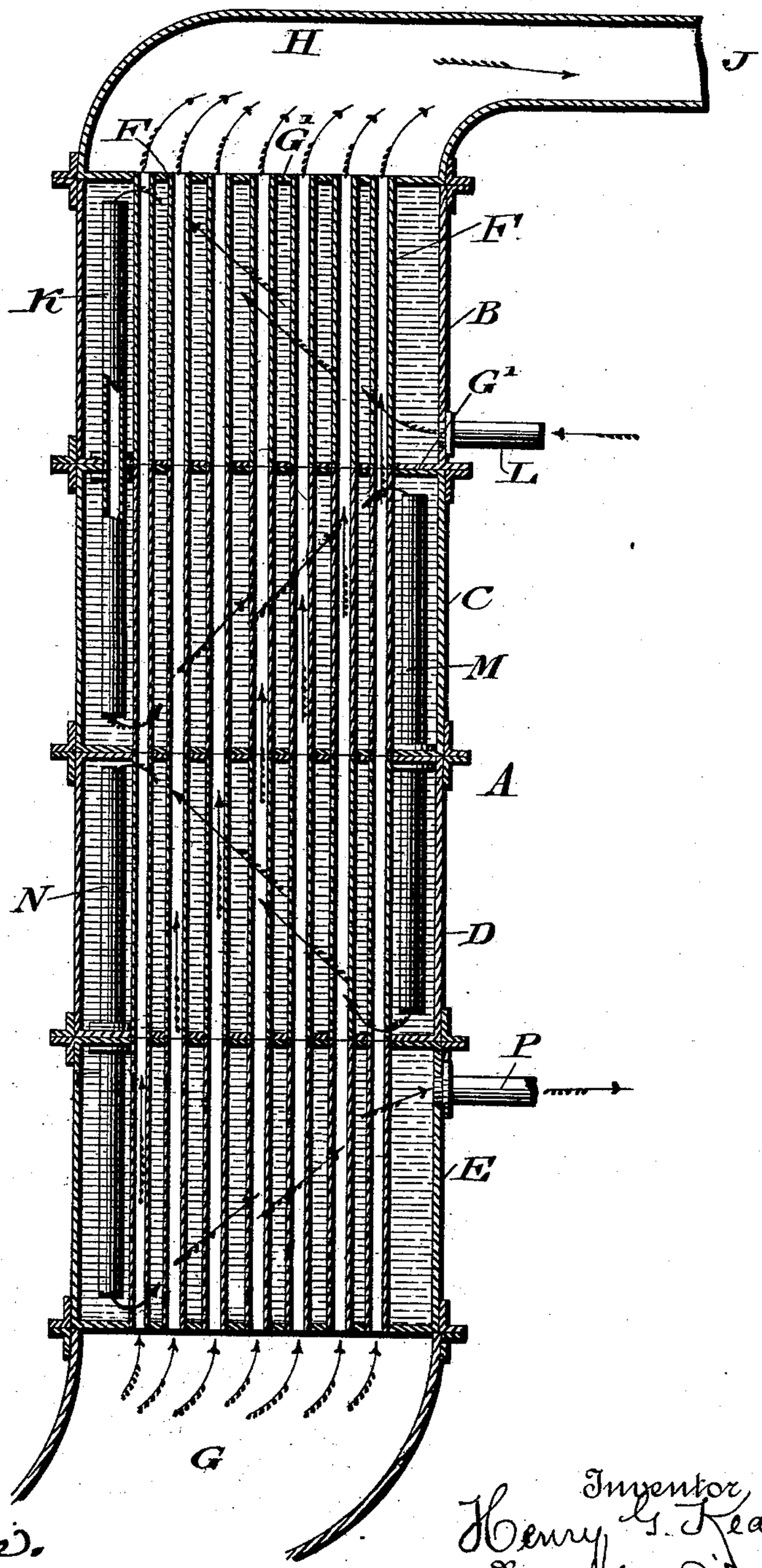
(No Model.)

H. G. KEASBEY.

FEED WATER HEATER.

No. 543,690. Patented July 30, 1895.



Witnesses
P. H. Hagle.
L. Douville.

Inventor
Henry G. Keasbey.
By John A. Diederich
Attorney

UNITED STATES PATENT OFFICE.

HENRY G. KEASBEY, OF AMBLER, PENNSYLVANIA.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 543,690, dated July 30, 1895.

Application filed April 17, 1895. Serial No. 546,151. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. KEASBEY, a citizen of the United States, residing at Ambler, in the county of Montgomery, State of Pennsylvania, have invented a new and useful Improvement in Feed-Water Heaters, which improvement is fully set forth in the following specification and accompanying drawing.

My invention relates to that class of feed-water heaters in which products of combustion are utilized as the only heating medium, means being employed for introducing the feed-water into that portion of the heater where the products of combustion are the coolest and withdrawing the said feed-water from that portion of the heater where said products of combustion are the hottest; and to this end it consists in superimposing a number of water-holding chambers upon each other, with their flues in alignment, and in introducing the feed-water into the base of the upper chamber and conducting the same from the upper portion of said upper chamber to the lower portion of the adjacent chamber thereunder, and so on, all of said conducting-pipes being located interiorly of the heater, all as will be hereinafter set forth.

The figure represents a vertical sectional view of a feed-water heater embodying my invention.

Referring to the drawing, A designates a feed-water heater, the same being composed of the chambers B, C, D, and E, which are superimposed upon each other, and are held in contact by means of lugs or flanges attached to the abutting portions of each chamber, through which bolts and nuts may pass.

Each of the chambers B, C, D, and E is provided with the tube-sheets G′, in which are secured the flues F for the passage of the products of combustion, said flues being substantially in alignment when all of the chambers are in assembled position, the products of combustion being introduced through the inlet flue or passage G, and after passing through the several water-holding chambers or compartments B C D, &c., being conducted therefrom by means of the hood H to the outlet J.

The upper chamber B is provided with the feed-water inlet-pipe L, which it will be noticed enters said upper chamber at the lower portion thereof. The contents of said upper chamber are conducted into the adjacent chamber C thereunder by means of the pipe K, which has its inlet in the upper portion of said chamber B, while its outlet is in the lower portion of the chamber C, said pipe K being located, it will be noticed, within said chambers B and C and being secured in the tube-sheets of the latter in any suitable or convenient manner. In like manner the contents of the chamber C are conducted from the upper portion thereof into the lower portion of the adjacent chamber D thereunder by means of the pipe M, which is suitably secured in the adjacent tube-sheets of the chambers C and D and has its inlet near the upper portion of said chamber C, while its outlet is near the lower portion of the chamber D. In like manner communication is had between the chambers D and E by means of the pipe N.

P designates the outlet-pipe for the feed-water, which leads from the upper portion of said chamber E to the boiler or other desired place.

The operation is as follows: The products of combustion enter by means of the passage N and pass through the flues of the various chambers to the outlet J, as stated, it being apparent that the products of combustion are hottest when they enter the chamber E and coolest when they leave the chamber B. The feed-water entering said chamber B passes successively through the pipes and chambers thereunder, as indicated by the arrows, until it reaches the outlet P, it thus being noticed that said feed-water enters the heater at the point where the products of combustion are coolest and leaves it at the point where said products of combustion are hottest, the temperature of the same thus being gradually and effectively raised to the desired degree.

It will of course be apparent that the tubes K, M, and N may be secured in their respective tube-sheets in any suitable manner and that the chambers B C D, &c., may be held in contact with each other in various ways other than that shown. For example, bolts may be employed which extend through one of the flues, having nuts or washers, &c., on each end.

It will also be evident that the number of chambers may be increased or diminished, according to requirements, and that other

changes may be made which will come within the scope of my invention, and I do not therefore desire to be limited in every instance to the exact constructions I have herein shown and described.

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

1. In a feed water heater of the character described, the chambers B, C, D, &c., having flues therein, means for holding said chambers in contact, the pipes K, M, N, &c., said pipes being located interiorly of the heater and having their inlets near the tops of said compartments, and their outlets near the bottoms thereof, the feed pipe L entering said chamber B, near the bottom thereof, at the point where the products of combustion are coolest, and the feed water outlet pipe P leading from the lowest chamber, near the point where the products of combustion are hottest, in combination with inlet and outlet passages for the products of combustion, substantially as described.

2. In a feed water heater, the chambers B, C, D, &c., provided with suitable tube sheets and flues, means for holding said chambers in contact with each other, pipes passing through adjacent tube sheets, and having their inlet near the top of one chamber, and their outlet near the bottom of a chamber thereunder, a water inlet pipe leading into the lower portion of the upper chamber, and an outlet pipe leading from the upper portion of the lowest chamber, and inlet and outlet passages for the products of combustion, the above parts being combined substantially as described.

HENRY G. KEASBEY. [L. S.]

Witnesses:
N. J. HALL,
F. MARKLEY.