

(No Model.)

G. G. PAULL & W. F. BROWN.
HEATER AND CONDENSER.

No. 507,385.

Patented Oct. 24, 1893.

Fig. 2.

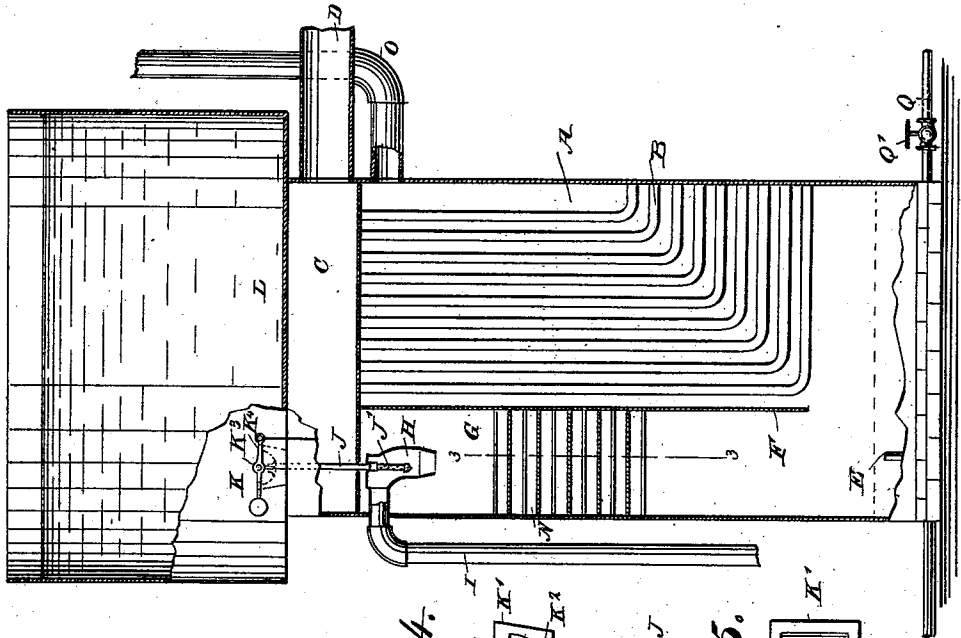


Fig. 4.

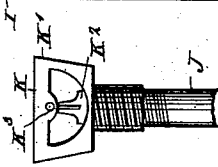


Fig. 5.

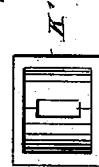


Fig. 1.

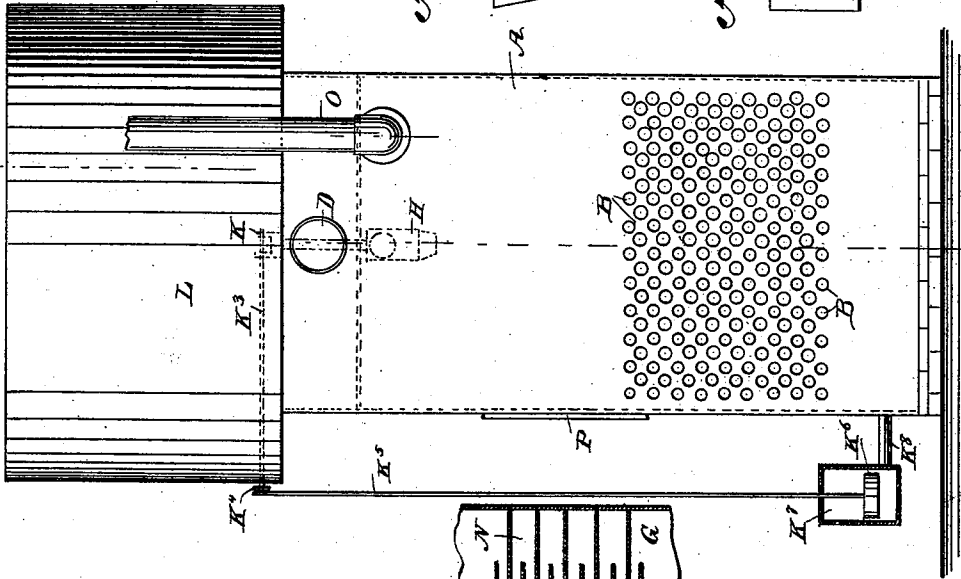
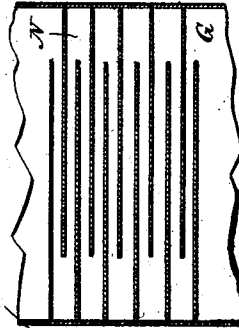


Fig. 3.



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UNITED STATES PATENT OFFICE.

GUEVA G. PAULL AND WALTER F. BROWN, OF WILSON, KANSAS.

HEATER AND CONDENSER.

SPECIFICATION forming part of Letters Patent No. 507,385, dated October 24, 1893.

Application filed March 21, 1893. Serial No. 467,005. (No model.)

To all whom it may concern:

Be it known that we, GUEVA G. PAULL and WALTER F. BROWN, of Wilson, in the county of Ellsworth and State of Kansas, have invented a new and Improved Heater and Condenser, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved heater, which is simple and durable in construction, very effective in operation, and designed to purify feed water for boilers, to condense exhaust steam and to heat buildings.

The invention consists of a steam condensing chamber into which discharges the exhaust heat of a steam engine, a valved outlet pipe connected with a water supply and discharging into the said head, and air tubes passing through the said chamber.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improvement. Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1. Fig. 3 is a sectional front elevation of the lime collecting plates for the feed water. Fig. 4 is an enlarged side elevation of the valve connecting the water supply tank with the exhaust head; and Fig. 5 is a plan view of the valve body for the said valve.

The improved apparatus is provided with a steam condensing chamber A, through which passes a series of air pipes B, preferably arranged L-shaped as shown in Fig. 2, and discharging at their upper ends into an air chamber C, from which leads a flue D, either connected with the rooms to be heated or with a suitable exhaust fan to draw the air from the said chamber C.

Into the bottom of the exhaust steam condensing chamber A extends the outlet pipe E, connected with a pump or other suitable means for forcing the purified feed water into the boiler. The inner end of the pipe E extends a suitable distance above the bottom of the chamber A, so as to prevent sediment

collecting on the bottom, from passing into the said pipe.

In the chamber A is arranged a transversely-extending partition F, leading downward from the top of the chamber A to a suitable distance above the bottom of the chamber, preferably to the horizontal part of the lowest air pipe B, as plainly shown in Fig. 2. This partition F forms within the chamber A, a compartment G into which the exhaust steam from the engine and water for condensing the same are discharged, the said compartment containing near its upper end the exhaust head H, connected with the exhaust pipe I, into which discharges the exhaust steam of the engine.

The exhaust head H discharges in a downward direction, as plainly shown in Fig. 2, and into the said head extends the perforated nozzle J' of the water supply pipe J, extending upward through the air chamber C to connect with a pipe valve K held in the water supply tank L supported on top of the air chamber C. This valve K shown in detail in Figs. 4 and 5, is provided with a valve body K' having a segmental valve seat on which is adapted to be seated the segmental valve K² arranged to open and close the inlet of the valve seat to the pipe J to regulate the amount of water passing from the tank L to the pipe J and from the latter through the perforated nozzle J' in a spray into the head H. The segmental valve K² is held on shaft K³ extending through one side of the tank L to the outside thereof, as plainly shown in Fig. 1. On the outer end of this shaft K³ is held a weighted arm K⁴ connected by a rod K⁵ with a float K⁶ fitted in a closed vessel K⁷ connected at its lower end by a pipe K⁸ with the lower end of the condensing chamber A, the entrance of the pipe K⁸ into the said chamber A being a short distance above the top of the outlet pipe E. Thus, when the water accumulates in the chamber A above a certain level, then it flows through the pipe K⁸ into the vessel K⁷ and there raises the float K⁶ which, by the rod K⁵ imparts a swinging motion to the arm K⁴ to turn the shaft K³ so as to close the valve K² and thereby shut off the supply of water from the tank L to the chamber A.

In the compartment G is arranged a series

of purifying plates N, arranged horizontally one above the other, the said plates extending alternately from opposite sides to extend within a short distance of the opposite side as plainly shown in Fig. 3. By this arrangement the water and steam entering the upper part of the compartment G pass through the space between the adjacent plates so as to deposit any impurities which may be contained in the water and steam on the said plates, so that the water and steam finally pass in a comparatively pure state into the lower part of the chamber A, the water being withdrawn therefrom through the pipe E. The steam not condensed rises in the chamber A and circulates around the pipes B to finally pass into a pipe O leading to the outside so that the exhaust steam not condensed is readily carried off at all times.

In order to clean the plates N, we provide one side of the chamber A with a suitable door P which gives access to the said plates N to remove the impurities collecting thereon.

In the bottom of the chamber A extends a blow-off pipe Q provided with a suitable valve Q' which when opened permits the cleaning of the chamber of sediment collecting in the bottom thereof. It will be seen that by this arrangement, air circulating through the pipes B is heated by the exhaust steam not condensed, to heat buildings or to utilize it for other purposes. It will also be seen that the exhaust steam of an engine has a free discharge in the compartment G, is partly condensed therein and serves to heat the feed water coming from the tank L through the valve K and pipe J, as above described.

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

1. The combination with the condensing chamber, the water tank thereabove and the intermediate hot air chamber provided with an offtake pipe, and air pipes leading through the condensing chamber into the air chamber, of the exhaust nozzle discharging into the condensing chamber a valved feed water pipe entering the latter chamber from the tank and a float valve operated by the water in the condensing chamber and connected with the valve of the said pipe, substantially as set forth.

2. An apparatus of the class described, com-

prising a steam condensing chamber provided in its bottom with a water discharge and also provided with a steam outlet, air tubes passing through the said chamber, an air chamber into which discharge the said air pipes and provided with an outlet to carry off the heated air, a water supply tank, a pipe leading therefrom and containing a valve controlled automatically by the water accumulating in the said steam condensing chamber, and an exhaust head arranged in the said condensing chamber and into which discharges the said water outlet pipe from the tank, substantially as shown and described.

3. An apparatus of the class described, comprising a steam condensing chamber provided in its bottom with a water discharge and also provided with a steam outlet, air pipes passing through the said chamber, an air chamber into which discharge the said air pipes and provided with an outlet to carry off the heated air, a water supply tank, a pipe leading therefrom and containing a valve controlled automatically by the water accumulating in the said steam condensing chamber, an exhaust head arranged in the said condensing chamber and into which discharges the said water outlet pipe from the tank, and purifying plates arranged in the said condensing chamber, substantially as shown and described.

4. An apparatus of the class described, comprising a steam condensing chamber provided in its bottom with a water discharge and also provided with a steam outlet, air pipes passing through the said chamber, an air chamber into which discharge the said air pipes and provided with an outlet to carry off the heated air, a water supply tank, a pipe leading therefrom and containing a valve controlled automatically by the water accumulating in the said steam condensing chamber, an exhaust head arranged in the said condensing chamber and into which discharges the said water outlet pipe from the tank, and means, substantially as described, for automatically controlling the said valve, substantially as shown and described.

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Witnesses:

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