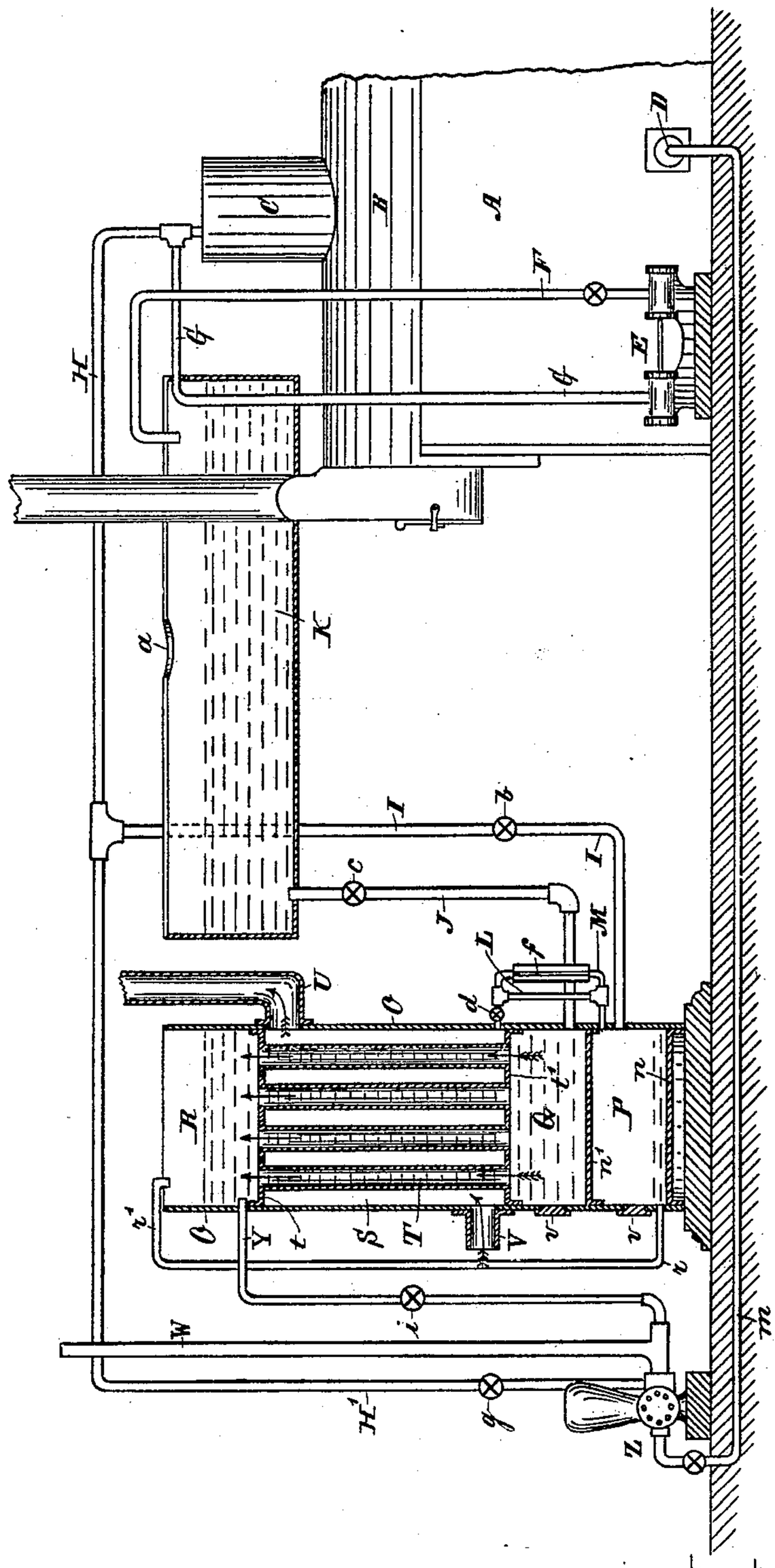
(No Model.)

H. COKER.

HEATER FOR FEED WATER.

No. 246,370. Patented Aug. 30, 1881.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY COKER, OF INDIANAPOLIS, INDIANA.

HEATER FOR FEED-WATER.

SPECIFICATION forming part of Letters Patent No. 246,370, dated August 30, 1881.

Application filed June 13, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY COKER, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Heaters for Feed-Water, of which the following is a specification.

My invention relates to improvements in feed-water heaters in which I employ an upright cylinder having cold-water and condensed-water compartments below, an exhaust-steam chamber above the cold-water chamber, and the cold-water chamber below connected with an open-topped water-chamber above the steam-chamber; and the objects of my invention are, first, to provide a feed-water heater in which the cold water from a tank above is fed into the cold-water chamber and becomes heated as it passes through a series of open-ended flues heated by exhaust-steam to the discharge-chamber above; second, to afford facilities for carrying the condensed water in the steam-chamber into a chamber below the cold-water chamber; third, to provide means by which the condensed water in the chamber below the cold-water chamber is forced therefrom into the open-topped chamber above the steam-chamber; fourth, to provide a means for conveying the water which is condensed in the steam-chamber below the cold-water chamber; fifth, to provide a means for showing when the condensed water has accumulated sufficient to be forced into the open end of the heater; sixth, to provide a means for keeping a head of water on the feed-pump. These objects I accomplish by the devices illustrated in a single figure in the accompanying drawing, in which—

A and B represent an ordinary furnace and boiler, the boiler being provided with the usual steam-dome, C. E represents an ordinary cold-water pump. K is a cold-water tank, located a little distance above the boiler. Z represents the hot-water feed-pump, and O represents a sectional view of the shell of the heater. The shell O is cylindrical, and is provided with a bottom head, *n*, and above the chamber P is another head or partition, *n'*. Above the partition *n'* is the lower flue-sheet, *t'*, with flues T extending from said sheet to the top flue-sheet, *t*, thus forming a steam-chamber, S, in the shell O around the flues T. The upper end of the shell O is left open, forming the chamber R. The chamber P below is to receive the water from the condensed steam in the steam-chamber, and the chamber Q is the cold-water chamber.

The exhaust from a steam-engine and leak-steam from cylinder-cocks is conducted into the steam-chamber S by the pipe V, and the pipe U forms the discharge of steam from said steam-chamber. The cold-water pipe J leads from the bottom of the cold-water tank K into the chamber Q, and is provided with a valve, *c*, for regulating the flow. The water as it fills the chamber Q rises in the flues T to the chamber R, above the upper flue-sheet, *t*. The pipe Y leads from the bottom of the chamber R to the hot-water feed-pump Z, and is provided with a valve, *i*, for regulating its flow. The pipe Y is further provided with a stand-pipe, W, near the pump, which keeps a head of water to the suction of the pump Z. The pump Z is operated by steam from the boiler B through the pipe H H'.

F is the discharge-pipe from the cold-water pump to the tank K, and G is the steam-pipe for operating said pump.

The pipe L connects the lower end of the steam-chamber S with the upper end of the chamber R, and is provided with a check-valve, *d*, arranged to allow the condensed water in the steam-chamber to be conducted to the chamber R.

Outside of the pipe L or at any convenient place on the shell O between the chamber P and steam-chamber S is a glass gage, M *f*, arranged to show when the chamber P is full of condensed water. The steam-pipe I, with valve *b*, connects with the upper end of the chamber P, and the discharge-pipe *r r'* leads from the bottom of the chamber P to the open chamber R of the heater. When the chamber P becomes full of condensed water steam is admitted through the pipe I, and the water in the chamber P is forced through the pipe *r r'* into the chamber R, where it is used as feed-water.

The pipe *m* leads from the feed-pump to the stand-pipe D of the boiler in the usual manner.

In operation cold water is pumped into the tank K and passed through the pipe J to the

chamber Q, flues T, and chamber R. The steam surrounding the flues T heats the water passing through them, and the condensed water collected in the chamber P is utilized, as before described.

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

1. The shell O, with bottom head, *n*, partition *n'*, lower and upper flue-sheets, *t t'*, and flues T, forming the chamber P, for condensed water, the chamber Q, for cold water, the steam-chamber S, and open chamber R, substantially as shown and described.

2. In combination with the heater consisting of the chambers P, Q, S, and R, the inlet-pipe V, for the exhaust-steam, the outlet-pipe U, for the discharge of steam, and the pipe L, with check *d*, connecting the steam-chamber S with the chamber P, substantially as specified.

3. In combination with the chamber P, the steam-pipe I, and water-discharge pipe *r r'*, discharging into the chamber R, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY COKER.

Witnesses:
GEO. H. RENNETT,
E. O. FRINK.