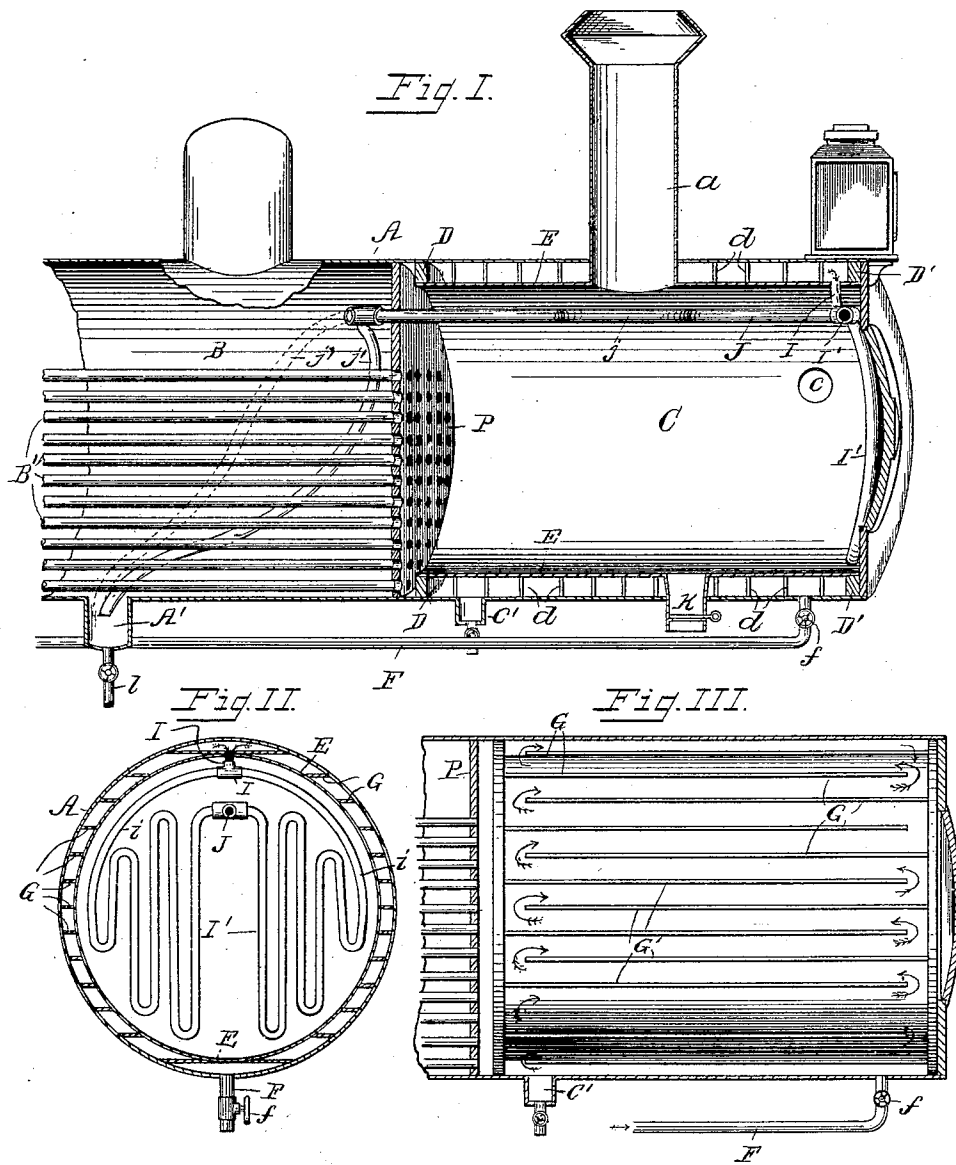


(No Model.)

N. S. CHAPMAN.
LOCOMOTIVE FEED WATER HEATER.

No. 479,348.

Patented July 19, 1892.



Witnesses.

Pearl Young
W. W. Baker

Inventor.

Newton S. Chapman

By Lathy & Balderson,
His Attorneys.

UNITED STATES PATENT OFFICE.

NEWTON S. CHAPMAN, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF
TO FRANK HAGERMAN, OF SAME PLACE.

LOCOMOTIVE FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 479,348, dated July 19, 1892.

Application filed April 4, 1892. Serial No. 427,633. (No model.)

To all whom it may concern:

Be it known that I, NEWTON S. CHAPMAN, a citizen of the United States, residing at Kansas City, in the county of Jackson, State of Missouri, have invented certain new and useful Improvements in Locomotive Feed-Water Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in locomotive-heaters, and my objects are to utilize the escaping heat which has heretofore been lost, to heat a circulating body of water, which is fed to the front extension of the boilers, by means of the escaping heat from the furnace, as it passes out of the fire-tubes, a further object being to construct in the front extension of a locomotive-boiler a casing provided with partitions, all of which are so arranged as to be connected, so that the water may circulate around the entire surface of said extension and then pass into coil-pipes located in the front of same, and then back into the boiler, as shown in the accompanying drawings, in which—

Figure I is a sectional perspective view of a locomotive-boiler with the rear part broken away. Fig. II is a cross-section of same, showing clearly the partitions and coil-pipes; and Fig. III is a sectional view of the outer casing of the front extension, showing the partitions, &c.

Referring to the drawings by letter, A represents the outer casing of a locomotive-boiler secured and riveted in a suitable manner.

A' is a mud-drum, through which the water-sediment is blown off through valve *l*.

B represents the boiler, through which the heating-tubes B' pass. C is the front extension, into which the heat escapes before it passes out through smoke-stack *a*. Said boiler B and extension C are separated by a partition P, into which the fire-tubes are secured.

D and D' are collars located at the rear and front of the extension C, respectively, and to these collars the inner casing E is rigidly bolted, as seen in Fig. I. *d d* are stay rods or bolts provided to strengthen the casings. This

extension is provided with a blow-off C', 50 through which the sediment, and, when desired, all the water, may be blown or drawn off.

F is the water-supply pipe, provided with a valve *f*, through which the water is fed into the chamber between casings A E.

G represents a series of horizontal partitions, which are secured rigidly in the water-chamber between casings A and E and are so arranged as to form a continuous water channel or passage from the point of supply to the 60 entrance into coil-pipe.

I is a drain or connecting pipe which conveys the water from the space between casings to the circular pipes *i*, which are designed to correspond to the contour of the boiler until it passes a little below the center, and then it is formed into a series of coils I', so as to give as much heating-surface as possible. This coil is built in the front end of extension C, so as to be protected from the coarse cinders which escape from fire-tubes. To said coil I' is connected a return-pipe J, which conveys the water to the boiler B, as seen in Fig. I. Said pipe J is bent so as to pass around the passage of the cinders, &c., which pass out of smoke-stack, as seen at *j* in Fig. I. Where said pipe enters the boiler it is provided with two branches which branch out in opposite directions, pass close to the wall of the boiler, and meet and deposit the 80 water in the mud-drum or blow-off A', thereby allowing the water to commingle with that already in the boiler, while the sediment remains in the mud-drum, where it may be blown off through valve *l*.

The water, when fed into the chamber between the cases A and E, enters at a point, preferably, near the front of the locomotive and at the bottom of same, and after said chamber fills the water circulates around the partition G, as indicated by arrows in Fig. III, and while this circulation is going on the water is being heated by means of the heat which heretofore has passed into the front extension and out through smoke-stack. It 95 will be seen that by this means the water, instead of being fed direct to the boiler in its cold state, is partially heated before being fed

to said boiler, which serves a double purpose—that of saving a large per cent. of fuel by utilizing all the heat and also of preserving the front extension from the intense heat, and at the same time to protect the boiler from uneven expansion and contraction.

The extension is provided with a grating K, through which the cinders may be removed.

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

1. A locomotive-heater, the casings A E, forming a space which is provided with horizontal partitions G, around which the water circulates, the coil-pipe I', connected to said chamber by drain-pipe I, and the return-pipe J, all in combination with a locomotive-boiler,

substantially as and for the purposes set forth and described.

2. In a locomotive-heater, the water-chamber and the front extension, the horizontal partitions G, which keep up a circulation, the coil-pipe and return-pipe conveying the partially-heated water to the mud-drum, in combination with a locomotive-boiler, substantially as and for the purposes set forth and described.

In testimony whereof I affix my signature in presence of two witnesses.

NEWTON S. CHAPMAN.

Witnesses:

H. A. STEVENS,
PEARL YOUNG.