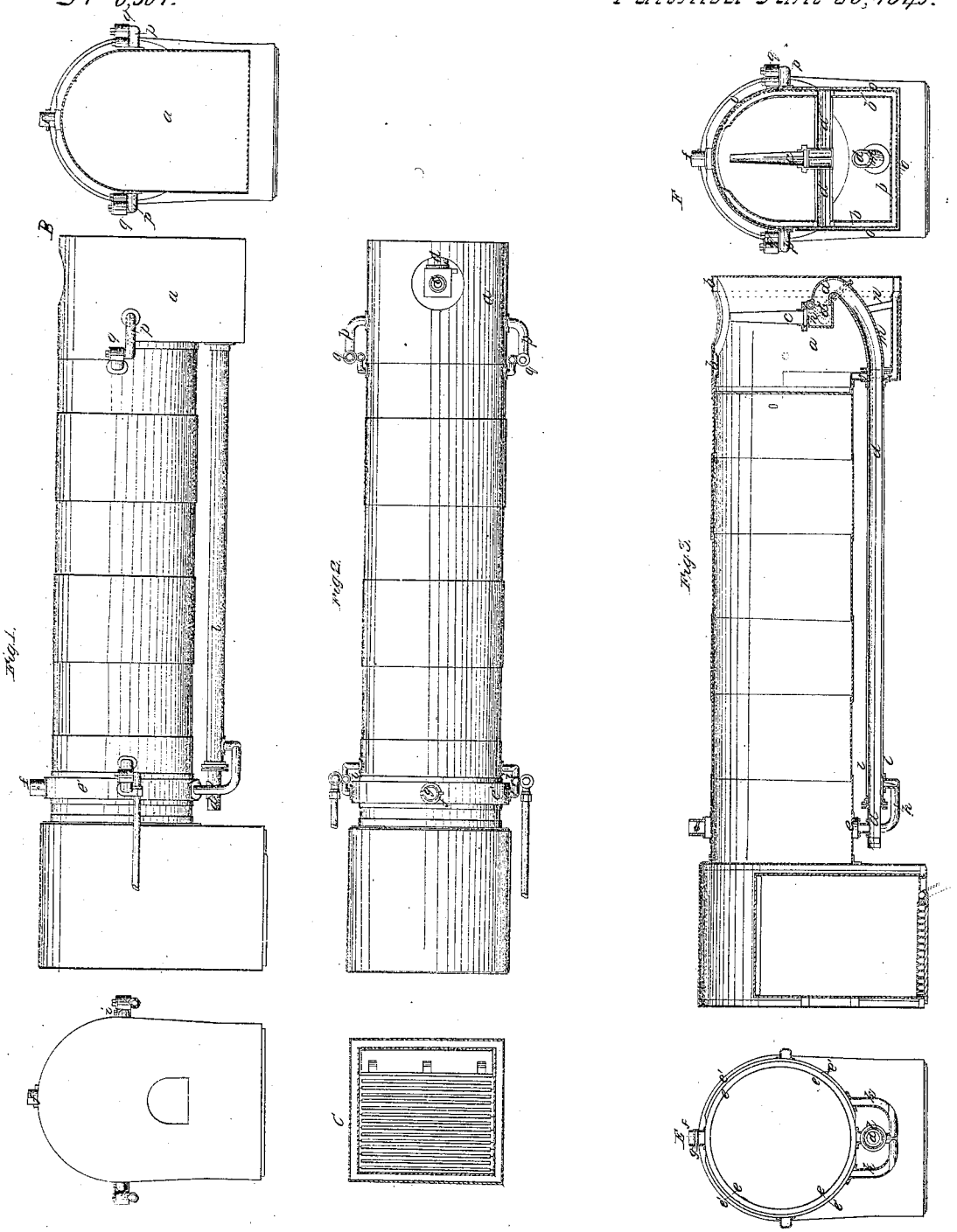
T. Perkins,

Steam-Boiler Water-Heater.

No. 6,561. Patented June 26, 1849.



UNITED STATES PATENT OFFICE.

THATCHER PERKINS, OF BALTIMORE, MARYLAND, ASSIGNOR TO LEVI B. TYNG, OF LOWELL, MASSACHUSETTS.

BOILER AND WATER-HEATER OF LOCOMOTIVE-ENGINES.

Specification of Letters Patent No. 6,561, dated June 26, 1849.

To all whom it may concern:

Be it known that I, THATCHER PERKINS, of Baltimore, in the State of Maryland, have invented certain Improvements in Boilers for Locomotive-Engines and Heating Water to Supply the Same, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawing, in which—

Figure 1 is a side elevation, A, and B, being end elevations. Fig. 2 is a top plan, and C, the fire grate in sectional plan. Fig. 3 is a vertical section, E and F being sections of the two ends.

The nature of my improvement consists in the mode of heating water to supply the boiler, and in constructing the parts of the locomotive boiler therefor, by which I protect and preserve the smoke box, and employ the waste heat to advantage.

The construction of the apparatus is as follows: The fire chamber flues and boiler are the same as those of any ordinary horizontal boiler, and will require no particular description. The smoke box (*a*,) is made double, somewhat like the fire box in ordinary engines, but does not open into the boiler, the bottom, as well as the sides, are double, as clearly shown in Fig. 3, F, and the water from the supply pump is forced into the space (*b*, *b*,) as will be presently described; from the lower end of the exhaust pipe (*c*,) a branch (*d*,) turns off, curving downward, and extending backward under the boiler nearly to the fire box in a horizontal line, or in any other convenient position above or below the boiler. This tube is then connected near its rear end with an annular tube (*e*,) that passes up around the boiler in a flat band, and opens in a pipe (*f*,) in which a throttle valve (*g*,) is situated, as clearly shown in the drawings. There is a swing valve (*h*,) in the bottom of the exhaust pipe, by which all the steam may be turned up through it, or down through the branch (*d*,) before named. In some cases I omit the valve (*h*,) and employ only the throttle valve (*g*,). Outside the flat band (*e*,) a jacket (*e*,′) is made, that envelops it, and forms a recess between them, into which the water is forced from the supply pump through the valve (*i*,), or the valve may be so turned as to direct the cold water at once into the boiler. When the water passes into the above named jacket (*e*,′) it descends down through two short curved branch pipes (*k*,) that connect with it on each side, and unite under the pipe (*d*,) before entering a casing tube (*l*,) that surrounds the pipe (*d*,) where it discharges the water into the space between them, as clearly shown in Fig. 3. This casing tube (*l*,) extends forward to, and opens into the space (*b*, *b*,) in the smoke box. (The course of the water is shown in the drawing by arrows.) For a further economy of heat, I form a water jacket (*m*,) around that portion of pipe (*d*,) that is within the smoke box, and open a communication between it and the water space (*b*,) through a pipe (*m*). Outside of the water space (*b*, *b*,) I form a steam chamber (*o*, *o*,) that communicates with the exhaust pipe (*d*,) by means of lateral pipes (*d*,′ *d*,′) one on each side thereof, and by means of which great saving of heat is effected. The water from the water space (*b*, *b*,) enters ahe boiler in a highly heated state through side pipes (*r*,) in which are check valves (*q*,) of ordinary construction.

By the above described arrangement I am enabled to heat the water without any great complication of machinery, maintaining the proper and usual configuration of the engine. I protect the smoke box from burnout out, without an extra lining, which, as all experienced engineers well know is a great source of expense, and annoyance, especially in burning coal, and produces a great economy generally in running the locomotive.

I do not claim heating water to supply a locomotive as that has been many times before essayed, but with apparatus more complicated and expensive, and changing the whole structure of the ordinary engine, therefore, having thus fully described my improvement in said engine, and its application thereto.

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

1. The branch exhaust pipe, surrounded by a water space, combined with the ordinary exhaust pipe, so that a portion, or the whole of the steam may be directed through

either pipe, the whole being constructed substantially in the manner and for the purpose herein described.

2. I claim the water case surrounding the smoke box into which the supply water is forced to be fed into the boiler by which I effect the double purpose of heating the water by the waste heat before it enters the boiler, and also protect the smoke box from destruction by the intense heat of the flues and cinders.

THATCHER PERKINS.

Witnesses:
H. W. PENNINGTON,
WM. V. TATE.