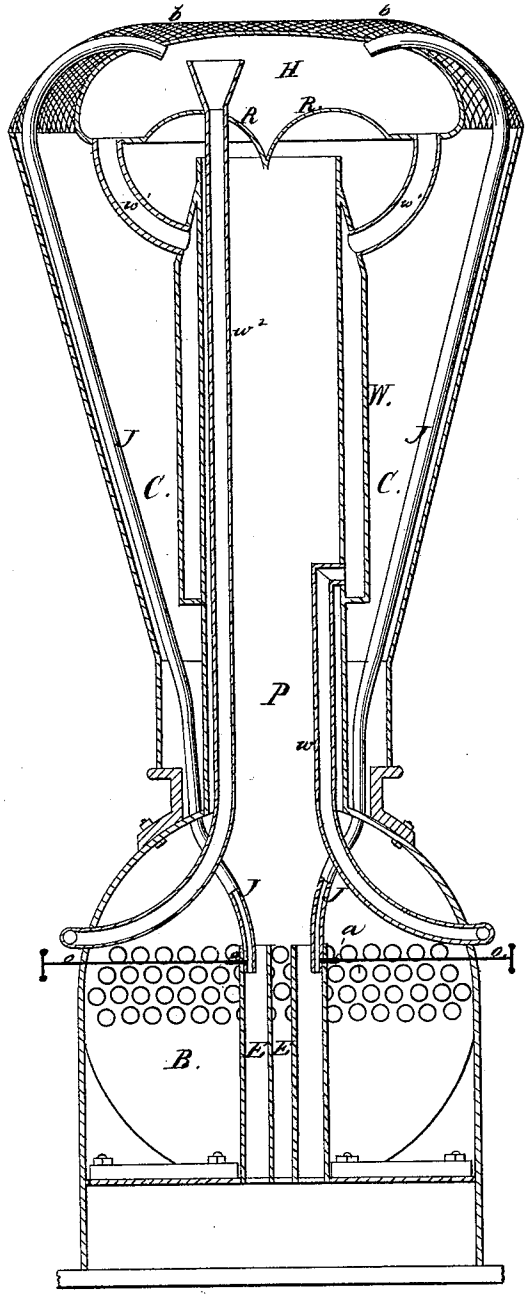
I. P. Magoon,

Spark Arrester,

No. 9,251. Patented Sep. 7, 1852.



N. PETERS, PHOTO-LITHOGRAPHER. WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ISRAEL P. MAGOON, OF ST. JOHNSBURG, VERMONT.

APPARATUS FOR HEATING FEED-WATER OF LOCOMOTIVES, &c.

Specification of Letters Patent No. 9,251, dated September 7, 1852.

To all whom it may concern:

Be it known that I, ISRAEL P. MAGOON, of St. Johnsburg, in the county of Caledonia and State of Vermont, have invented a new and useful Improvement in Steam-Boilers and Chimneys and Particularly in Those of Locomotive Steam-Engines to be Used on Railroads; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawing, letters, figures, and references thereof.

The said drawing represents a transverse, vertical, and central section of a locomotive engine chimney and its exhaust steam or blast pipe, and my improvement applied thereto.

In the said drawings B, denotes the boiler. E, E, the two steam exhaust or blast pipes, which are usually introduced into the smoke box and discharge the waste steam from the engine cylinders into the chimney C, for the purpose of increasing the draft thereof.

P, is what I term the chimney pipe, it being a hollow vertical tube, opening out of the smoke box, and serving to convey the smoke and steam therefrom, directly up against the bottom of the deflector R. This pipe P, makes part of a water heating cylinder or vessel H, that entirely surrounds it, and has a pipe w, leading out of its lower part. Such pipe may be supposed to be connected with a force pump that extracts water from the tank of the engine tender, and forces it through the pipe w, and into the heater W. The deflector R, makes part or the bottom of a hollow steam tight vessel H, which is made above it, and which is connected with the heater W, by means of one or more pipes w', w', that lead out of the upper part of the heater, and into the lower part of the vessel H. A pipe w^2, having its mouth within the vessel H, and near the top of the same as seen in the drawing, opens out of the said vessel H, and is led through its bottom, or the deflector R, and down through the tube P, and out of the smoke box. From thence it may be supposed to be led to the tank of the tender, it being made to open into said tank, at or near its top part.

Out of the top or upper part of either one or both the steam exhaust jet pipes E, E, I carry a tube J, upward through the chimney, and open it into the upper part of the vessel H, or into that of the heater W. I provide each tube J, with a stop cock or gate a, by which its throat or receiving orifice may be diminished in size, in order to regulate the amount of steam to be admitted into, and thrown up the said tube, from the blast pipes. The lower end of the tube J, or that part of it connected with the blast pipe, is so arranged that a portion of the waste steam that is blown up the blast pipe, may be caused to enter the pipe J, while the remainder of it is discharged out of the discharging mouth of the blast pipe, and serves to maintain the draft of the chimney. The stem of the valve a, is seen at o, as proceeding to the outer side of the smoke box.

The wire netting or cap of the chimney is seen at b. The water that is forced into the heater W, fills it, and passes out of it through the pipes w', w', and into the vessel H. From thence it passes into the pipe w^2, and through it to and is discharged into the tank of the tender.

I am aware that it is not new to introduce into a chimney a close vessel or heater for the purpose of heating water for the boiler, as I am cognizant of the fact that a patent was granted on the tenth day of March, eighteen hundred and thirty eight, to Zadoc H. Mann, and Levi B. Thyng, for an invention for such purpose, also that applications for patents for such invention, or improvements thereon, have been made to the Commissioner of Patents by one Thomas W. Allen, and one Denis Mulkay, as will be seen by reference to the files of the United States Patent Office. I therefore do not pretend to claim such an invention. In neither of the inventions of the said Mann and Thyng, Allen and Mulkay, is there a hollow vessel placed over the smoke and steam deflector, and so that such deflector shall make part of, or the bottom of such vessel, such vessel being connected with the heater by one or more pipes as seen in the drawing making part of this my specification. In the said Allen's invention, the waste steam passes up through the heater and over its top; a great part of the heat of all that part of the steam blast which strikes upward against the deflector, (and such would be the largest portion of the heat of the steam blast,) being lost, whereas by combining with the deflector R, and the heater W, the hollow vessel H, placed directly over the deflector, so that both the steam and smoke that strikes upward against the deflector

may impart heat to the water above it, we effect a saving of heat which cannot possibly take place in Allen's invention. Besides this we get rid of the great obstruction to the draft of smoke, that is presented by the bends or flexures of the heater of said Allen. It is well known that a column of smoke or steam made to impinge vertically or nearly so, or directly against a surface at or about at right angles to the direction of such column, will impart to such surface a much greater quantity of heat than it will when it simply passes over and in contact with a surface parallel or nearly so to its direction. Besides this the tendency of heated air, smoke, or gases, is always upward, and when made to pass between horizontal or inclined surfaces, naturally heat the upper of the said surfaces the most.

The advantages gained by combining the vessel H, with the deflector R, pipe P, and heater W, as described, and so that both the smoke and waste steam shall impinge directly against the bottom of the vessel H, will readily be seen by persons skilled in the use or art of constructing and using engines and their furnaces and boilers.

I would further remark that I am aware that in the specification and drawings of the said patent, of the said Mann and Thyng, there is described and represented an apparatus or means of returning the waste steam to the tender or tank thereof, such apparatus being a pipe and valve, so combined with the blast pipe, as to enable a person to cause all or part of the waste steam to pass through the additional pipe, and into the tender. The great length of pipe which is required to convey such steam from the blast pipe to the tank of the tender, causes so much friction in the pipes besides loss of heat, as to enable but a small portion of the steam to be blown into the tender by the force of the blast, the whole or nearly all the steam escaping into the chimney.

My improvement consists in combining the blast pipe directly with the heater in the chimney, or the vessel H, by means of a pipe J, as seen in the drawings, whereby the steam is made to pass into the heater or vessel H, and to there condense and aid in heating the water therein, before the water passes into the tender. By such an arrangement we make use of a much shorter pipe to convey the steam from the blast pipe, and thereby get it into the water with less friction, and pass it in the shape of water, or in a condensed state, through the long pipe that connects the heater with the tank of the tender. If we should extend the steam pipe from the blast pipe to and into the tender, there would be two long pipes required when the heater is used in the chimney; viz, such pipe and a pipe leading from the heater or the vessel H. The waste steam would pass entirely through one, while not a particle of it would pass through the other. By my arrangement the waste steam not only passes through the pipe J, but in a condensed state it passes through the pipe w^2, and into the tender, the same effecting a saving in the length of pipe used, besides preventing a considerable loss of heat.

What therefore I claim as my invention is—

1. To combine the vessel H, with the deflector R, the heater W, and the chimney pipe P, substantially as described, whereby such deflector shall not only form the bottom of the said vessel H, but that the smoke and exhaust steam may be made to heat said vessel by impinging against the deflector as specified.

2. And I also claim the improvement of throwing the waste steam directly into the heater or vessel H, and there partially or wholly condensing it before it is passed into the tank of the tender, not meaning to claim the throwing of it into the tender from the blast pipe and through a single pipe connecting the blast pipe and tender, but the combining the tender and the blast pipe E, and the heater or vessel H, by pipes substantially in the manner represented in the drawing, whereby the advantages hereinbefore stated as well as others, are obtained.

In testimony whereof, I have hereto set my signature this sixteenth day of August A. D. 1852.

ISRAEL P. MAGOON. [L. S.]

Witnesses:
P. Du. Blodgett,
Hiram Knapp.