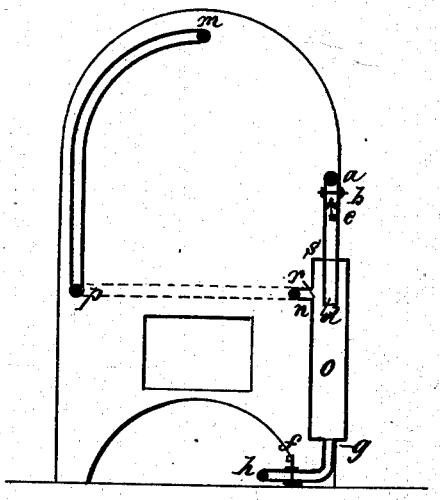
E. THAYER.

SEDIMENT EXTRACTOR FOR STEAM BOILERS.

No. 47,232. Patented Apr. 11, 1865.



Witnesses:

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UNITED STATES PATENT OFFICE.

ELI THAYER, OF WORCESTER, MASSACHUSETTS.

IMPROVED SEDIMENT-EXTRACTOR FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **47,232**, dated April 11, 1865.

To all whom it may concern:

Be it known that I, ELI THAYER, of the city and county of Worcester, in the State of Massachusetts, have invented a new and useful Method of Extracting the Sediment from the Water in Steam-Generators; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The nature of my invention consists in so connecting another vessel with a steam-generator that the water in the generator shall continue to pass through it, depositing therein the sediment, whence it may be removed at any time without hinderance to the work of the boiler or engine.

To enable others skilled in the art to make and use my invention, I proceed to describe its construction and operation.

The figure 1 in the accompanying drawing represents a vertical section of so much of the same as is outside of the furnace, and exhibits all the valves and connections, that part represented by the dotted lines between *n* and *p* being only a portion of the pipe or tube *e m*, and lying inside the furnace.

O represents the vessel which I call the "sediment-extractor." *a d* represent the pipe conveying the water into the same from the boiler; *e n p m*, the pipe leading from the same into the steam-chamber of the boiler; *g h*, the pipe leading from the bottom of the extractor into the ash-pit under the furnace, through which the sediment is blown off at pleasure.

a represents the point in the boiler-head below the water-line from which the water is taken.

b represents a stop-cock; *c*, an inverted check-valve; *f*, a stop cock; *d*, the end of the pipe leading into the extractor; *e*, the end of the pipe leading from the extractor, and *m* the other end of the same pipe in the steam-chamber of the boiler.

I will now proceed to describe the mode of operation of my invention. Suppose that the boiler is filled with water to the ordinary height, and that a fire is made in the furnace. That portion of the pipe *e m* which lies within the furnace—viz., from *n* to *p*—is at once exposed to a high heat, and a portion of the water within it is converted into steam, and as the water in the pipe extends to the same level as the water in the boiler, the steam presses with equal force toward the two points *a* and *m;* but as the water moves through the vessel O toward the point *a* it raises the valve *c*, and by its own action prevents its further progress in that direction. The whole force of the steam and the expansion of the water is then directed toward the point *m*. The water is thus forced out of the pipe into the steam-chamber of the boiler, and there remains in the ascending part of the pipe—that is, the part near *m*—only a column of steam to balance a column of water in the pipe *a d*. The valve *c*, therefore, falls by its own weight and the pressure of the water, and more water is thus furnished to the vessel O and to the pipe *e m*. In this way a constant circulation is caused and maintained, so that in a short time all the water in the boiler will pass through the vessel O, which collects and retains the sediment in the following manner: We will suppose that the pipes leading to and from the extractor are one and a half inch internal diameter, and that the vessel O is four inches internal diameter and two feet high; also, that the distance of the end of the pipe *d* (which extends a little below the end *e* of the pipe *m e*) is two inches from the end *e*.

It will now be readily seen that the speed of the current through the vessel O will be as many times less than it is in the pipes *e m* and *a d* as the capacity of the cylinder O is greater than that of a cylinder two inches long and one inch and a half in diameter, which is less than one eighty-fourth of the vessel O. On account, therefore, of the comparative stillness of the water in the vessel O, the sediment falls and collects upon the bottom of the vessel. It may be discharged into the ash-pit at any time by opening for a single second the stop-cock *f* in the blow-off pipe *g h*. By closing at the same time the stop-cock *b* the sediment may be blown off by steam passing through the pipe *m e*.

I have used this extractor in connection with my tubular grate with invariable success. In such use I dispense with the pipe

e m, or, rather, the pipe *e m* becomes the grate. In either case I use either hydraulic or extra strong iron steam-pipes, especially for that part exposed to the heat of the furnace.

Having thus described the construction and mode of operation of my invention, what I claim as my invention, and desire to secure by Letters Patent, is—

The vessel O, when arranged in the manner and for the purposes substantially as set forth.

ELI THAYER.

Witnesses:
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