No. 652,739. Patented July 3, 1900.

L. F. N. BALDWIN.

DEVICE FOR DRYING EXHAUST STEAM.

(Application filed Oct. 19, 1899.)

(No Model.)

Fig. 1.

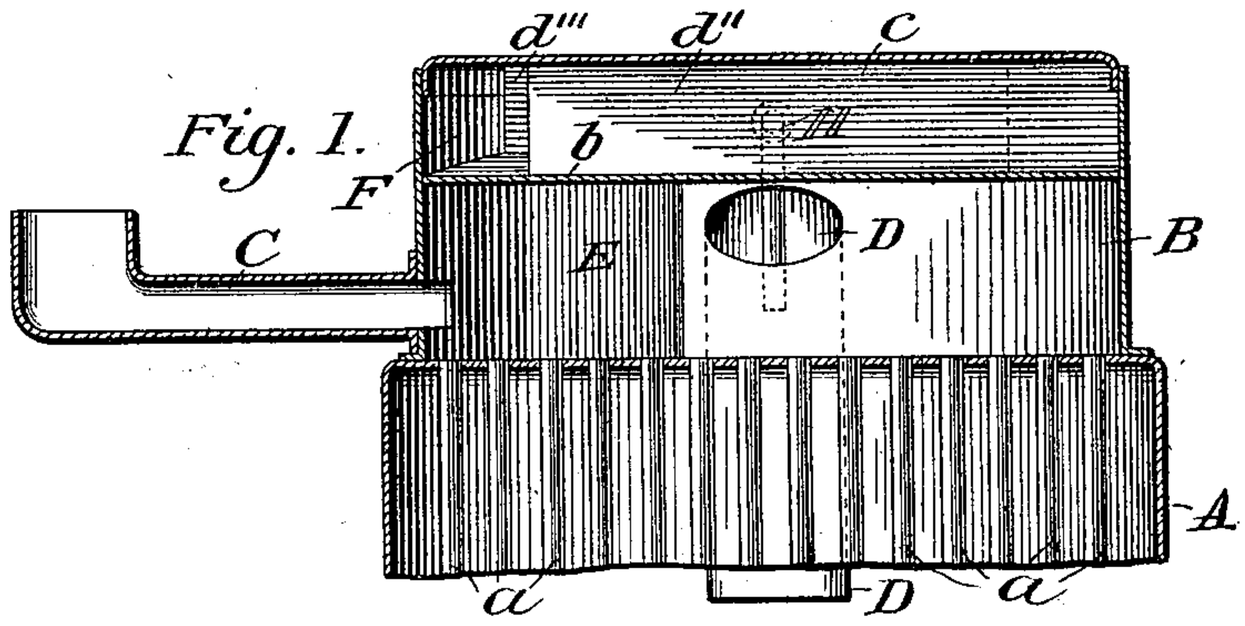


Fig. 2.

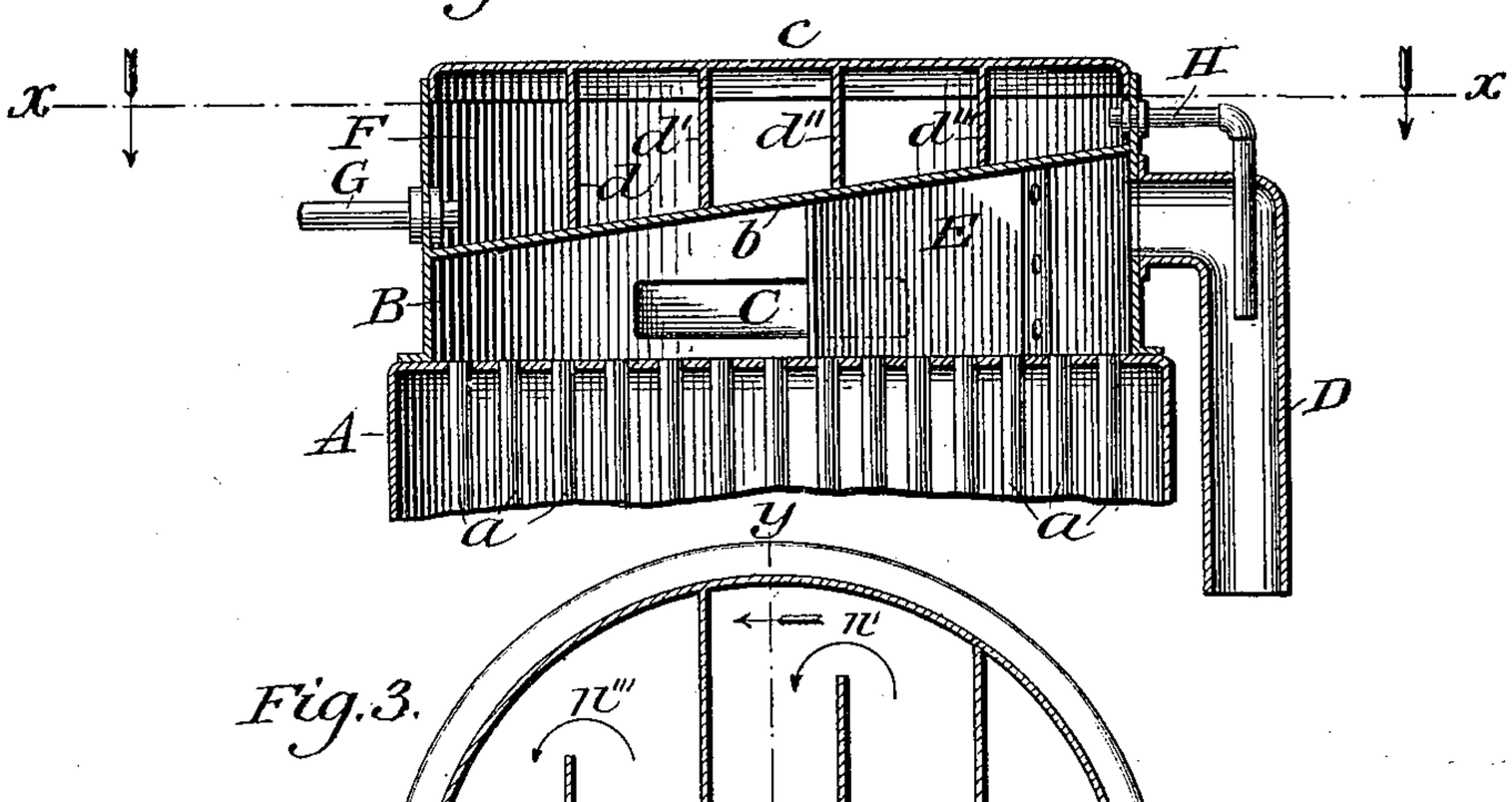
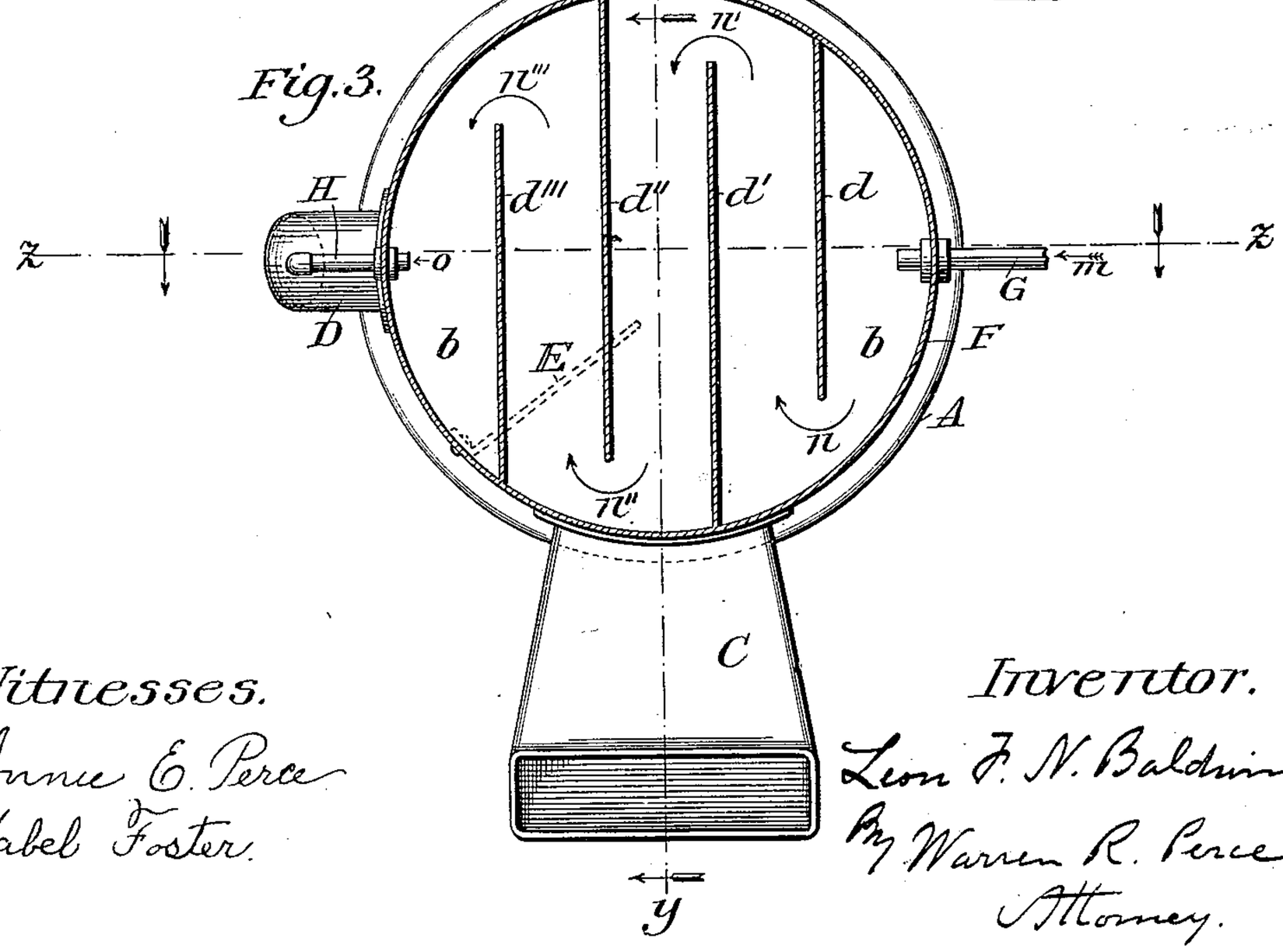


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

LEON F. N. BALDWIN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SLAYMAKER-BARRY COMPANY, INCORPORATED, OF CONNELLSVILLE, PENNSYLVANIA.

DEVICE FOR DRYING EXHAUST-STEAM.

SPECIFICATION forming part of Letters Patent No. 652,739, dated July 3, 1900.

Application filed October 19, 1899. Serial No. 734,119. (No model.)

To all whom it may concern:

Be it known that I, LEON F. N. BALDWIN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Devices for Drying Exhaust-Steam, of which the following is a specification, reference being had therein to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a view of my invention as seen in vertical diametrical section on line *y y* of Fig. 3. Fig. 2 is a view of the same in vertical diametrical section on line *z z* of Fig. 3. Fig. 3 is a plan view as seen on line *x x* of Fig. 2.

My invention is particularly adapted to be used in automobile vehicles operated by steam, and has for its purpose the drying of the exhaust-steam from the cylinder of the engine, so that it is discharged into the external atmosphere as an invisible vapor.

My invention consists in the combination of a steam-boiler having hot-air flues through it, with two inclosed chambers, one of which, just above said boiler, has two discharge-pipes for the exit of smoke and hot air, and the other of which, above the chamber last mentioned, has a series of parallel baffling-plates and is provided with two pipes, one to conduct the exhaust-steam thereto from the cylinder and one to discharge said steam when sufficiently dried into one of the discharge-pipes of the first-named chamber, all as hereinafter more fully described and claimed.

In the drawings, A is the steam-boiler, through which hot-air pipes or flues *a a* extend vertically, opening through the crown or top plate of the boiler, as shown.

B is an inclosed chamber secured to the top of the boiler and having an inclined top plate *b*. The chamber B has two pipes C and D opening therefrom, the former being bent upwardly at its end and the latter being bent downwardly, as shown, both serving to conduct the hot air and products of combustion which pass up through the flues *a* of the boiler A into the chamber B and out therefrom into the external atmosphere. A baffler-plate E extends angularly, as shown, from one side of the chamber within the same.

F is an inclosed chamber having the inclined plate *b* for its bottom and the plate *c* for its top. Said chamber is provided with a series of baffler-plates *d d' d'' d'''*, arranged parallel with each other, partially across the chamber, and extending from the top to the bottom thereof and alternately from the sides, leaving open spaces from the edges of each, respectively, with the alternate arrangement shown in Fig. 3. A steam-pipe G from the cylinder of the engine conducts the exhaust-steam into the chamber F, and the pipe H conducts the dried steam from the chamber F into the pipe D of the chamber B.

Gasolene, kerosene, or any other suitable fuel, whether a gas, liquid, or solid, may be used. The smoke and other products of combustion, together with the heat from this fuel, pass up through the tubes *a* of the boiler A and enter into the chamber B, and thence escape through the smoke-pipes C and D to the external air, principally through the upwardly-directed pipe C. The hot air impinging upon the under surface of the inclined plate *b*, which constitutes the top of the chamber B imparts an intense heat to said plate. The radiation from the plate *b* into the chamber F raises the temperature of said chamber to a high degree.

The pipe G conducts the exhaust-steam from the ports of the cylinder into the heated chamber F, as indicated by the arrow *m* in Fig. 3, and such steam striking against the baffler-plate *d* flows between the plates *d d'*, then between the plates *d' d''*, then between the plates *d'' d'''* and around the plate *d'''*, and out through the pipe H into the smoke-pipe D, as indicated by the arrows *n*, *n'*, *n''*, *n'''*, and *o*. The purpose of this series of parallel plates, alternately arranged as described, is to give an extended circuit or course for the steam flowing through the chamber F. This chamber F being heated to a high temperature, as already specified, serves as a drying-chamber and dries up the moisture of the exhaust-steam, which is discharged there-

from by the pipe G, so that when it has thus been dried it passes off as an invisible vapor through the pipe D into the external atmosphere.

The condensation of steam into masses of white aqueous vapor, which results from the immediate discharge of exhaust-steam into the open air, constitutes a serious objection to the use of steam automobile vehicles in the streets of a city or town, because such quantities of escaping condensing steam are liable to frighten horses, and thereby to cause accidents and consequent damages. By the use of my said invention this difficulty is obviated.

The discharge of the dry stream through the pipe H into the smoke-pipe D has a tendency to suck out the air from the chamber B through the pipe D, and as a consequence air is liable to be drawn into the chamber B from the outside through the pipe C. Such air-drafts would naturally pass from the pipe C through the chamber B in a direct course to the pipe D and thence into the outer air again, thus tending to reduce the temperature of the plate *d*, and consequently the heat in the chamber F. To avoid this result, I use the radially-arranged baffler-plate E, so that any air-currents entering the chamber B through the pipe C from without are deflected and carried toward the center and mingle with the contents of said chamber B to maintain a uniform temperature.

The pipe G does not necessarily lead directly from the ports of the cylinder of the engine to convey the exhaust-steam therefrom; but a condenser, muffler, or other device may be interposed, if desired, between said pipe and cylinder.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. The combination of a steam-boiler having hot-air flues, a chamber into which said flues open and made with a continuous top plate arranged above the open ends of said flues, a discharge smoke-pipe opening out of said chamber, a chamber above the first-named chamber and separated therefrom by said plate only, a steam-pipe adapted to convey exhaust-steam into said upper chamber, and a pipe opening from said upper chamber and discharging into said smoke-pipe, substantially as specified.

2. The combination of a steam-boiler having hot-air flues, a chamber into which said flues open and made with a continuous top plate arranged above the open ends of said flues, a discharge smoke-pipe opening out of said chamber, a chamber above the first-mentioned chamber and separated therefrom by said plate only, a series of parallel baffler-plates in said upper chamber, arranged alternately to form an extended circuit, a steam-pipe adapted to convey exhaust-steam into said upper chamber and a pipe opening from said upper chamber and discharging into said smoke-pipe, substantially as described.

3. The combination of a steam-boiler having hot-air flues, a chamber into which said flues open and made with a continuous top plate arranged above the open ends of said flues, two discharge-pipes opening out of said chamber, one of which has its outer end bent upwardly and the other of which has its outer end bent downwardly, a baffler-plate extending radially into said chamber in a line intermediate between said discharge-pipes, a chamber above the first-mentioned chamber and separated therefrom by said top plate only, a steam-pipe adapted to convey exhaust-steam into said upper chamber and a pipe opening from said upper chamber and discharging into the downwardly-directed discharge-pipe of the lower chamber, substantially as set forth.

4. The combination of a steam-boiler having hot-air flues, a chamber into which said flues open and made with a continuous top plate arranged above the open ends of said flues, two discharge-pipes opening out of said chamber, one of which has its outer end bent upwardly and the other of which has its outer end bent downwardly, a baffler-plate extending radially into said chamber in a line intermediate between said discharge-pipes, a chamber above the first-mentioned chamber and separated therefrom by said top plate only, a series of parallel baffler-plates in said upper chamber, arranged alternately to form an extended circuit, a steam-pipe adapted to convey exhaust-steam into said upper chamber and a pipe opening from said upper chamber and discharging into the downwardly-directed discharge-pipe of the lower chamber, substantially as shown.

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

LEON F. N. BALDWIN.

Witnesses:
WARREN R. PERCE,
HOWARD A. LAMPREY.