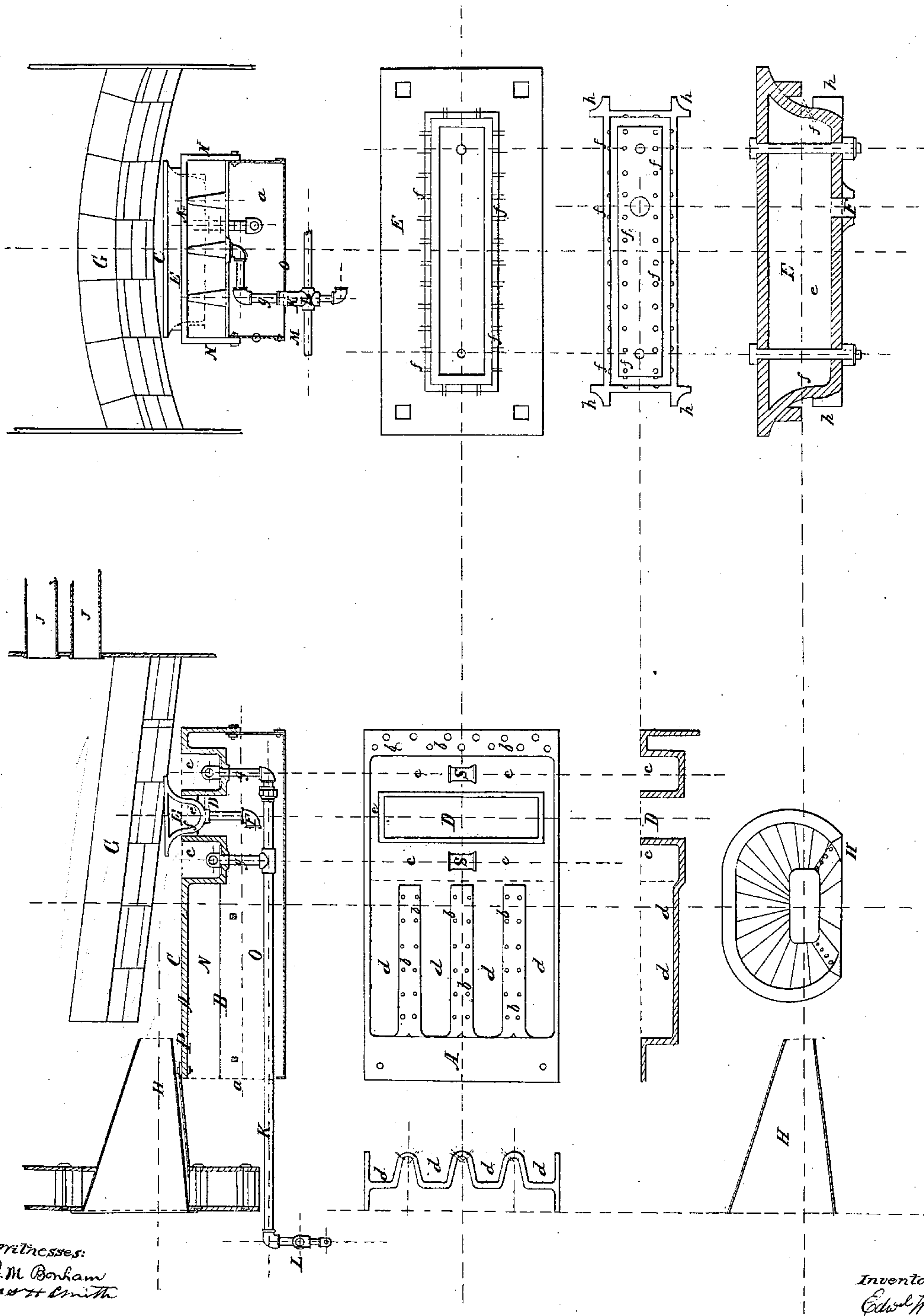


E. W. Taylor, Burning Hydrocarbon.

N^o 84,148.

Patented Nov. 17, 1868.



United States Patent Office.

EDWARD W. TAYLOR, OF NORRISTOWN, PENNSYLVANIA.

Letters Patent No. 84,148, dated November 17, 1868.

IMPROVEMENT IN HYDROCARBON-BURNERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, EDWARD W. TAYLOR, of Norristown, Montgomery county, in the State of Pennsylvania, have made an invention of which the following is a full description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists of a process of producing heat and other effects of combustion through the employment of currents of air and of steam assisting in the combustion of petroleum, shale, and other oils, grease, tar, and other carbonaceous substances upon a grooved plate, A; the fire burning upon the surface of the fuel, which is introduced directly to the combustion, instead of being first reduced to the condition of gas, or otherwise treated in any retort or other preparatory chamber, and without the employment of any blower or donkey-engine, or other supplementary machinery, except ordinary pipes for supplying air, or steam, or fuel.

The apparatus by which the process is applied is illustrated by the drawings aforesaid, and may be thus more specifically described.

The burner proper, Figure 1, B, is box-shaped, of dimensions to accommodate it to the available space underneath the boiler, or to any other space where it is desirable to apply the flame.

The interior is an air-chamber or box, closed on all sides, except that the front end, *a*, is open for the admission of air. Communicating with the fire-chamber C, above, there are the principal air-passage D, at the rear of the burner, and air-holes *b b b*, at the end and along the ridges of the grooved plate, which plate constitutes the top of the air-chamber, and upon it the fuel burns.

In this plate, and surrounding the main air-passage D, are grooves or channels *c c c c*, in its surface, which hold the fuel; and which principal grooves have connected with them supplementary grooves *d d d d*, somewhat more shallow, extending forward to the front of the plate, which take up a portion of the fluid fuel, if over abundant; and also, if filled when the fire is first started, assist, by this increase of burning-surface beyond what is needed after steam is up, in raising steam without delay.

The air-passage D is surmounted by a hollow incombustible receptacle, E, to which steam is conducted, the moment it begins to form, by the pipe F. This pipe supplies the receptacle E with the exhaust steam from the cylinders in all cases when it is practicable, as in high-pressure engines, thus effecting a saving of so much live steam, besides increasing the supply of steam to the combustion, in proportion to the increased speed of the pistons, which are also in this manner relieved from the backward pressure of the exhaust steam.

The steam-receptacle is made with retreating sides, a convenient form of which is seen in comparing letter E in the various figures in the drawing, and the base of it, *e e*, Figures 1, 7, and 10, has projecting arms *h h*,

which fit closely the sides of the air-passage, holding the steam-receptacle steady in its position, at the same time allowing it to be moved up or down, so as to regulate the size of the opening or crevice between its sides and those of air-channel D, and so regulating the amount of air ascending that passage.

The flames from the fuel surrounding this receptacle, heat to intensity the steam in it, which issues through apertures *f f f f*, extending upwards from within, outwards through the sides of the receptacle, and, striking the ascending air just before it arrives at the point of combustion, throws a current of mixed air and steam, highly heated or decomposed, with great force, into the flame of the burning fuel.

The flames rising against an arch of fire-brick, or other incombustible material, G, which covers closely the burner-plate, are doubled upon themselves, and rolled forward, receiving fresh oxygen from the apertures *b b b*, and at the front H, until they escape by passing over the arch G, and back again over the top of it, and beneath the boiler I, or other object to be heated, and so into the flues or tubes of the boiler J J.

By this process, heat of great intensity is produced, and combustion so perfect of the material supplied, that no portions remain unconsumed to pass, in the shape of smoke, into the smoke-stack. Neither is there any waste, in the shape of ashes and coke.

In case the flame is used for metallurgic or other purposes than in connection with a boiler above, the arch G may have to be differently arranged, for instance, when used in the ordinary-shaped steam-fire engines, as hereinafter referred to.

The fuel, if liquid, is supplied by a pipe, K, passing through the air-chamber B, from which pipe, branch-pipes *g g* ascend through the air-chamber, and discharge their contents into the grooves or channels *c c* of the burner-plate. I arrange these pipes with T-shaped heads, which discharge at both sides, S S.

To supply more steam, and in more intimate union with the fuel, as well as to prevent any incrustations of the nozzles of the T-heads, and the possibility of stoppage in the pipes, I supply steam to the oil-pipe, at any convenient point, as L, in the drawing.

M is a pipe connecting with the oil-pipe, for the purposes of supplying an additional fuel, in the shape of gas from oil-wells, when the burner is employed in connection with such wells; the gas being conducted into the fuel-pipe at the most convenient point, as L, passing through a piece of wire gauze, inserted at the point of connection of the pipes, which may be by an ordinary union. This gauze prevents the possibility of any danger from the use of the gas aforesaid.

In accommodating the plate-burner to steam-fire engines, as now constructed, the shape of the arch must be varied to suit that of the fire-chamber, and the supplementary grooves, *d d d d*, would probably have to radiate from the principal grooves surrounding the air-passage and steam-receptacle as a centre.

To prevent cracking of the lower by the sudden expansion of the upper portions of the air-box B, I make the box in two portions, the upper portion being of cast-iron, and being bolted on the lower portion, O, as seen in Figure 2, which is best made of boiler or sheet-iron.

To increase the supply of air, instead of a door, I use a scoop of sheet-iron, projecting inwards and downwards, as seen in H, Figures 1, 8, and 9.

Bolted to the front end of the plate-burner, at P, is an iron sliding plate, of the width of the burner-plate, made with slots to accommodate the bolts. This slide can thus be drawn out to a greater or less distance, according to the size of the fire-box, and closing up the space between the end of the plate-burner and the front opening.

Earth is then filled in alongside of the plate-burner, making a fire-chamber, C, open only in front, at which point is placed the scoop-draught H, or ordinary door.

The supply of fuel, or gas, or steam is regulated by stop-cocks placed at any convenient point in the pipes conducting them respectively.

What I claim as original in the process and apparatus described, and desire to have protected by Letters Patent, is—

1. The improved process of producing in intensity, and at small expense, heat and other effects of combustion by burning petroleum and other liquid and liques-

cent fuel on the surface of an open plate, surmounted and combined with an incombustible covering, without the intervention of sand or other materials, the combustion being facilitated and the effects intensified by the employment of a current of steam passing into the fire-chamber, substantially as shown and described.

2. The blast-apparatus assisting in said process, being the arrangement described, of the air-passage D, in combination with the steam-receptacle E, arranged to move up and down, and the method of bringing heated steam into union with the air at a point and in a mode as described, so as to form a most intimate union, and at the same time creating a powerful blast, conveying the mixture into combination with the burning fuel.

3. The combination of a fuel-plate with a blast-apparatus, assisting in the combustion of liquid and liquescent fuel, substantially as shown and described.

4. The slide P, as a device for the purpose of accommodating hydrocarbon-burners to fire-boxes and other spaces of varying sizes, without requiring the burners in such cases to be constructed on different scales.

New York, August 4, 1868.

EDWD. W. TAYLOR.

Witnesses:

I. M. BONHAM,
JAS. H. SMITH.