No. 614,296. Patented Nov. 15, 1898.

E. W. DUNN.

OIL BURNER.

(Application filed Jan. 25, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

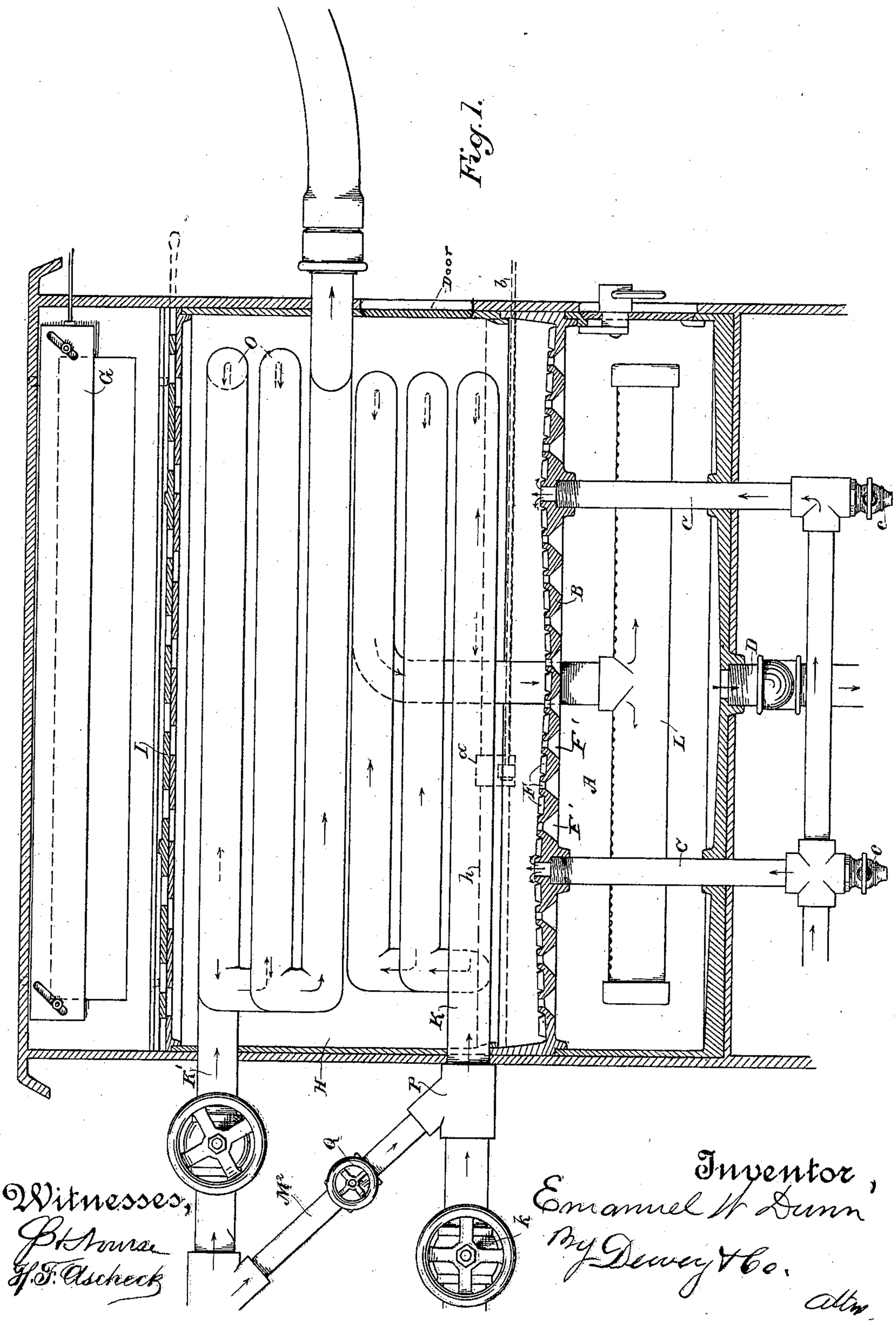

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Fig. 2.

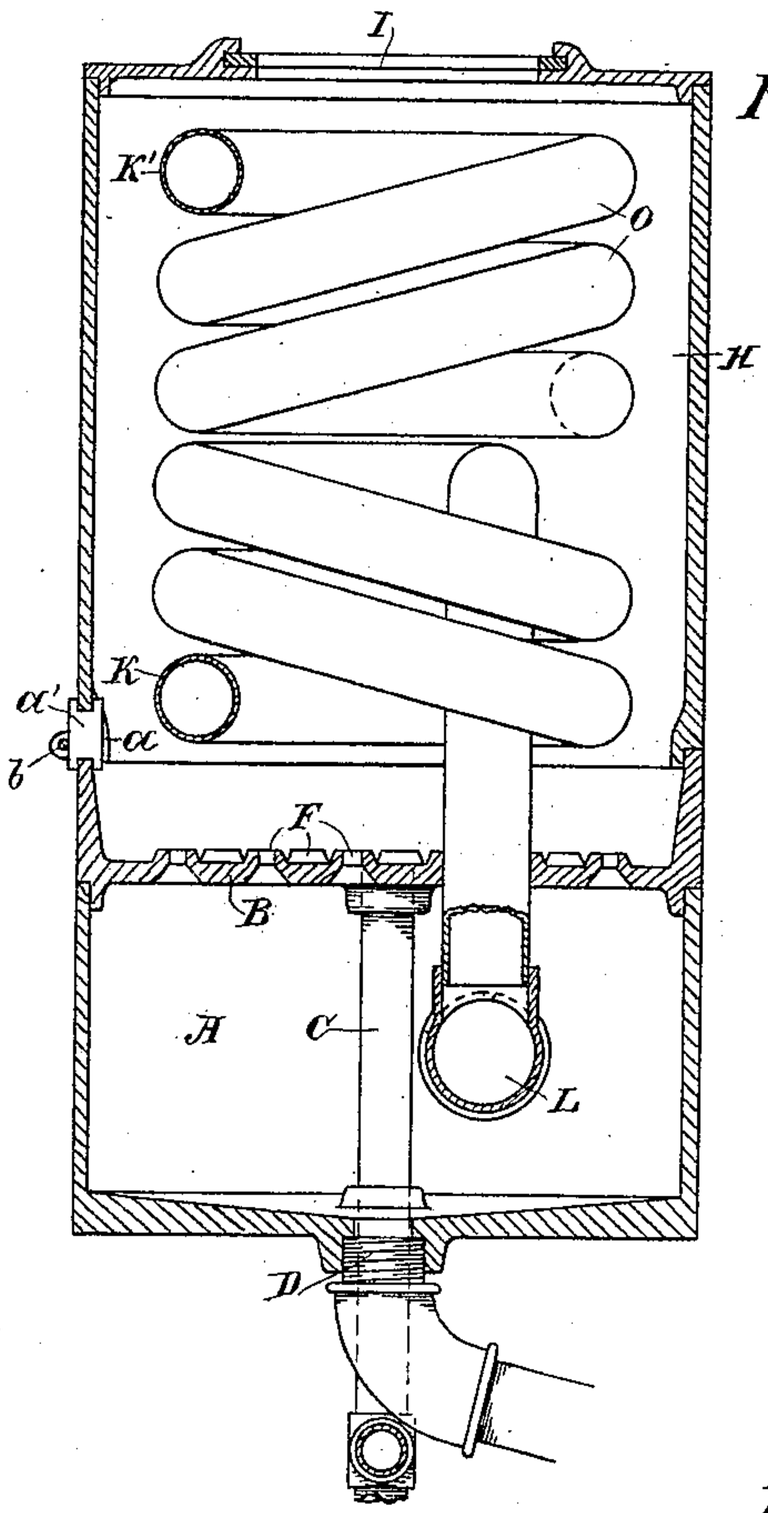


Fig. 3.

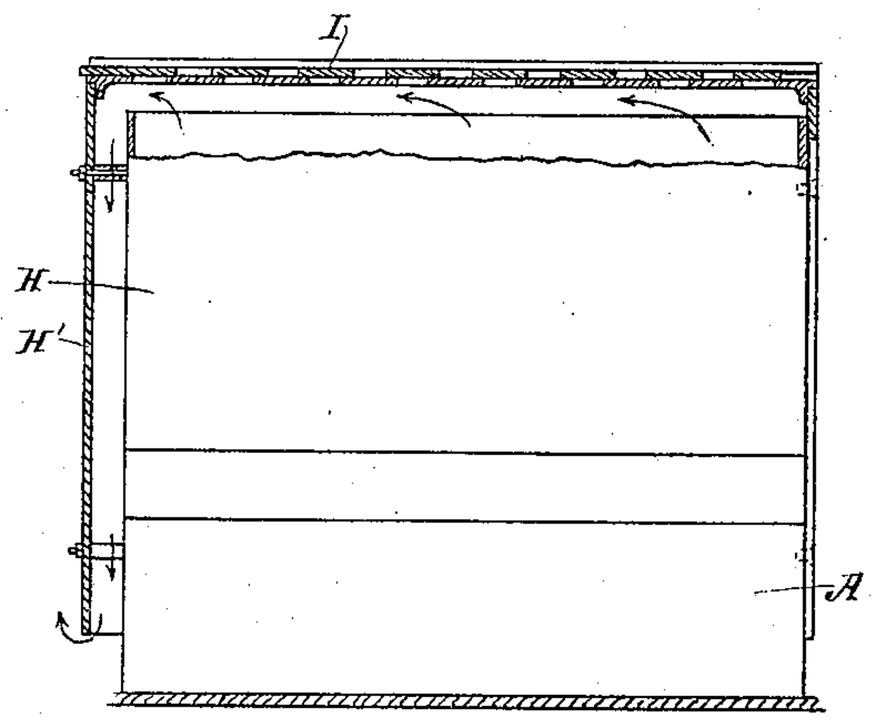
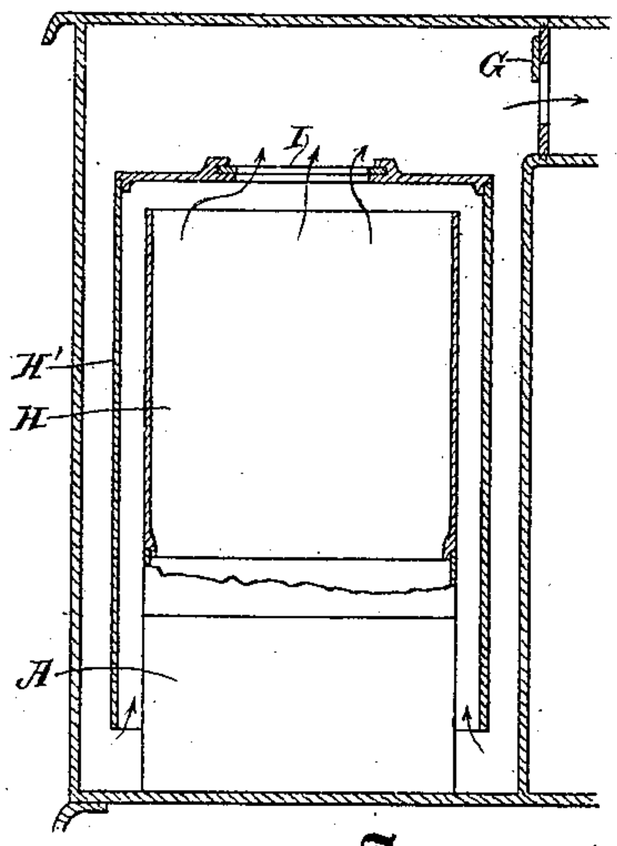


Fig. 4.



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UNITED STATES PATENT OFFICE.

EMANUEL W. DUNN, OF SAN JOSÉ, CALIFORNIA.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 614,296, dated November 15, 1898.

Application filed January 25, 1898. Serial No. 667,860. (No model.)

To all whom it may concern:

Be it known that I, EMANUEL W. DUNN, a citizen of the United States, residing at San José, county of Santa Clara, State of California, have invented an Improvement in Oil-Burners; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in apparatus for burning oil, and is especially designed for the burning of petroleum or equivalent oils in connection with stoves and heating apparatus.

It consists in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through the center of the burner. Fig. 2 is a similar section at right angles to Fig. 1. Fig. 3 is a modification showing the application of two fire-boxes. Fig. 4 is a lateral section of the same.

The apparatus consists, essentially, of a gas-chamber A, of any suitable area and shape to fit the fire-box or furnace into which it is to be placed or applied, and the burner or combustion-plate B, situated above and forming a top for the gas-chamber beneath. The bottom of the gas-chamber converges to a central point, having a drain-pipe D connecting with the gas-chamber and leading to a tank for surplus oil and water. At the point of deposit is an **S**-trap with the end submerged in water, which is kept in the tank of deposit at the discharge end.

Through the bottom of the gas-chamber A, at suitable points, the oil-feed pipes C enter. These feed-pipes may enter at any place, so that they discharge their contents on the burner-plate B, which should be on the highest point or points on the surface of the burner-plate.

When the oil-feed pipes enter through the bottom of the gas-chamber, a valve *c* is placed in said pipes for cleaning them of sediment.

The gas-chamber has low sides, and upon the top of it is fitted the burner-plate B, having also low sides. The burner-plate has openings vertically above the openings in the bottom of the gas-chamber, and the oil-feed pipes, which enter therethrough, are screwed into the openings, so that oil which is delivered through the oil-feed pipes is discharged on the surface of the burner-plate and may be vaporized and also flow over the surface of the burner-plate and around the nipples or perforations F. The burner-plate is made with an uneven surface, as shown in the drawings, declining from the highest points through which the oil-feed pipes may enter or at which points they discharge their contents, so that oil from these pipes will flow and be distributed over the uneven surface of the burner-plate.

Numerous openings F are made through the burner-plate, as shown, forming continuations of enlarged upwardly-converging openings F′ in the under side of said plate for concentrating the steam and air used and forcibly discharging the same into the space above the plate, said openings F having upwardly-projecting flanges above the surface of the burner-plate, and these serve for the free passage of air, gases, and vapors from the gas-chamber and also allow any surplus of oil to flow through to the gas-chamber below, where it is collected by the converging bottom and discharged through the drain-pipe D, as before described.

The apparatus may be fitted directly into the fire-box of a stove, range, or furnace, in which case this fire-box serves as an inclosure for the products of combustion from the apparatus just previously described, and when so used a damper G is fixed to cross the opening of fire-box, through which the products of combustion escape to other parts of stove, range, or furnace and to the chimney, thus confining and controlling the ignited gases in the fire-box to heat a water-back, and steam and air pipes, which are mostly located above and around the burner-plate and front part of stove, range, or furnace, regulating heat in the other parts of stove, range, or furnace by means of the damper.

The ordinary damper used in stoves, ranges, and furnaces is used to control the fire in the main body of the stove, range, or furnace.

When the fire-box in stove, range, or furnace is not complete with the use of the damper, then a fire-box H is fitted upon the top of the burner-plate, the burner-plate forming the bottom of the fire-box and discharging its vapors, gases, &c., into said fire-box. On top

of this fire-box is a sliding shutter I, controlled by means of an iron rod and used to regulate the amount of ignited gases needed at this point and assist in operating the apparatus. When the shutter is closed or the top lid without the sliding shutter is used, then the gases and vapors escape through a slot *h*, just above the burner-plate B. In this slot is the scraper *a*, to which is attached a rod *b* at a point below the slot and is used by sliding back and forth to remove any carbon or soot which may form in the slot when starting up the fire.

In Figs. 3 and 4 I have shown two boxes H and H′, the latter inverted over the former to form a telescope, and when these two are used together then the slot is omitted and also the closed top on the box H. The box H′ has a top, and the sliding shutter I, differing only in size, is used on this top of H′. The box H′ is made large enough so that when the closed top or the sliding shutter I is used and closed tight then the vapors, gases, &c., from within escape from between the sides and end or any one of these three desired by passing down and out at the mouth or opening below. The boxes H H′ are secured and kept in place by means of bolts passing through each of them. One end of the box H′ is left open, so that it can be bolted onto the end of the box H in such a way as to prevent any of the gases from escaping at that end, yet not interfering with the operation of the door in end of the box H. When it is necessary, the low sides on the burner-plate can be extended to take the place of the fire-box H.

In some cases the fire-box H is used alone, and in other cases it is used in connection with the box H′, as heretofore described.

In some cases the box H′ is used alone, and when so used is placed over the burner-plate B in such a way as to receive the vapors, gases, &c., as they rise from the burner-plate, and is as much larger than the burner-plate as is necessary for the vapors, gases, &c., to enter the box H′ and return along its sides and escape at the opening between the burner-plate and the fire-box. When the box H′ is so used, then the doors and shutters as used in connection with the box H are applied to H′ as needed. When used alone, the box H′ can be bolted or suspended above the burner-plate B in any way most convenient in the fire-box or stove, range, or furnace to which it is applied.

At one end of the gas-chamber and also at one end of the fire-box H are doors, properly controlled, so that whenever it is necessary the interior can be inspected and cleaned, and they may be used for lighting the fire or giving draft when needed. These doors and either the closed or shuttered top are used on the box H′ when it is used alone, and the door in the box H is added to H′.

Arranged in suitable relation to the apparatus are the water or steam and air coils of pipe K and K′, which are adapted to receive water or steam and air, converting the water or steam into vapor or gases, which, with the air, are discharged through the perforated pipe L into the gas-chamber and escape through the nipples or perforations in the burner-plate and mingle with the vapor or gases which are being produced from the oil on the burner-plate. This assists in the combustion, destroying the carbon and soot and odor from the oil, making a clean and almost smokeless fire. Water or steam is introduced into the coils in the fire-box through a water or steam valve *k*. This valve is made to allow less than the amount of water which the coil-pipe in the fire-box is capable of holding to pass into it from the supply-pipe and can be set so that only so much water or steam as is necessary can enter the coil-pipe.

An air-pipe K′ from any suitable air-forcing mechanism connects with coils O for hot air within the fire-box, and the air is heated as it passes through the coils and from the outlet end of the coils may be conveyed to any point where it is desired to use hot air for heating purposes, &c.

A branch pipe M^2 from the main air-pipe has a controlling-valve Q by which air is admitted to the water or steam pipes at a point beyond the valve which controls the supply of water or steam. This air enters the water or steam pipe through a passage P and is regulated by an air-valve located in the branch air-pipe M^2.

The water or steam and air-pipes, as well as the oil or feed pipes, each have controlling-valves.

The water or steam valve is so small that it will not admit sufficient water to ever fill the delivery-pipe. Consequently there will be sufficient room left for the ingress of a certain amount of air, which may be supplied from the branch pipe M^2, as previously described, and carried along with the water or steam through the coiled pipe and delivered into the gas-chamber, and from the gas-chamber it passes up through the nipples or perforations in the burner-plate into the fire-box or space above and there mixes with gases from the oil and aids in its combustion.

The valve on the oil-feed pipe is so small or can be set so that it will not admit any more oil into the feed-pipes than the burner-plate when in operation can use up, and the drain or waste pipe is large enough to carry off all the oil and water that the oil-feed pipes and the water or steam pipes can discharge into the apparatus. The oil and the water mixing below the burner-plate makes it absolutely safe for them to come together while the apparatus is in operation.

The temperature within the apparatus will be sufficient to convert the water and steam into their natural gases and to heat and expand the air which is delivered simultaneously with the water or steam and emptied into the gas-chamber. These hot vapors, steam, gases, and hot air, acting on the burner-plate as they pass through the nipples

or perforations in said plate, raise it to a temperature, together with the heat from the ignited oil on the top of the burner-plate, to convert the oil into its gases as fast as the oil is delivered on the burner-plate from the feed-pipes. In starting the fire only air should be admitted until the apparatus is hot. The combination of these gases destroys soot or carbon and odor from the oil and produces a clean, odorless, and almost smokeless fire for all heating purposes.

The main portion of the air-pipe is continued into the coils in the fire-box or heating-chamber of the stove and from there delivered into pipes or vulcanized hose for distribution.

The coils for hot air are of a sufficient number to heat the air to a high temperature. This air-heating apparatus can be used in any kind of a fire without the oil-burner.

The supply of air passing through the pipes and being heated therein is controlled by means of a valve, and the supply is only limited as to the amount by the size of fan or air-forcing device, valves, and pipes and is capable of ventilating and raising the temperature of any room or space of a reasonable proportional size to any desired degree.

The air is always fresh and pure, and for heating and ventilating railroad-coaches, ships, residences, &c., it is perfect.

The apparatus is exceedingly simple and effective for the purpose desired. Any person can operate it. It will burn any crude oil and up to the highest refined products, also manufactured and natural gases, and will consume eight to ten times as much water as oil, thus making the cheapest and cleanest fire ever known.

It will be understood that, if desired, the coils O may be used to heat water instead of air, and the water thus heated may be conveyed to distant points and circulated for heating purposes in the same manner as for the air. When water is used, it is necessary to add a return-pipe to connect with the inlet end of the coil in the manner customary for such heaters.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for burning petroleum, a table having an undulating surface, oil-supply pipes delivering oil at the highest points in said surface whereby it is spread and delivered therefrom to the lowest points, openings made through the surface having surrounding flanges projecting above them whereby the oil is directed over the surface between said openings and prevented from overflowing into them, a chamber situated beneath the burner-plate, a perforated distributing-pipe located in said chamber, a combustion-box situated above the burner-plate having a heating-coil located therein, steam and air supply pipes connecting with said coil and a connection between said coil and the distributing-pipe below the burner-plate, substantially as described.

2. In an apparatus for burning petroleum, a burner-plate having an undulating surface with openings made therethrough having raised lips or flanges, said openings being made conical or divergent from the lower side, oil-supply pipes discharging at the highest points of said burner-plate whereby the oil flows by gravitation and is distributed between the flanged openings, a combined air and steam perforated distributing-pipe located in the chamber beneath the burner-plate and discharging through the conical openings therein whereby the air and steam are mixed with the oil-vapor above the burner-plate, a combustion-chamber above the burner-plate and means whereby the products of combustion may be discharged from the npper portion of the chamber, or diverted and discharged from the lower portion thereof.

3. In a petroleum-burner of the character described, a perforated burner-plate with undulating surface and surrounding rim, perforations made through the surface for the admission of air and steam, oil-pipes discharging through the highest points in the surface, a chamber below the burner-plate with a perforated distributing-pipe, means for mixing air and steam and heating and delivering them into the distributing-pipe, a combustion-chamber situated above the burner-plate with means through which the products of combustion are allowed to escape.

4. In an oil-burner and in combination with a casing, an oil-supply and a steam and air supply, a burner-plate having an undulating surface and receiving at its highest point the oil-supply, said plate having flanged openings in its upper surface forming continuations of converging openings below whereby the steam and air are concentrated and injected under pressure through the flanged openings.

In witness whereof I have hereunto set my hand.

EMANUEL W. DUNN.

Witnesses:
ELI WRIGHT,
WILL M. BEGGS.