

(No Model.)

F. C. BATES.
CRUDE PETROLEUM BURNER.

No. 594,317.

Patented Nov. 23, 1897.

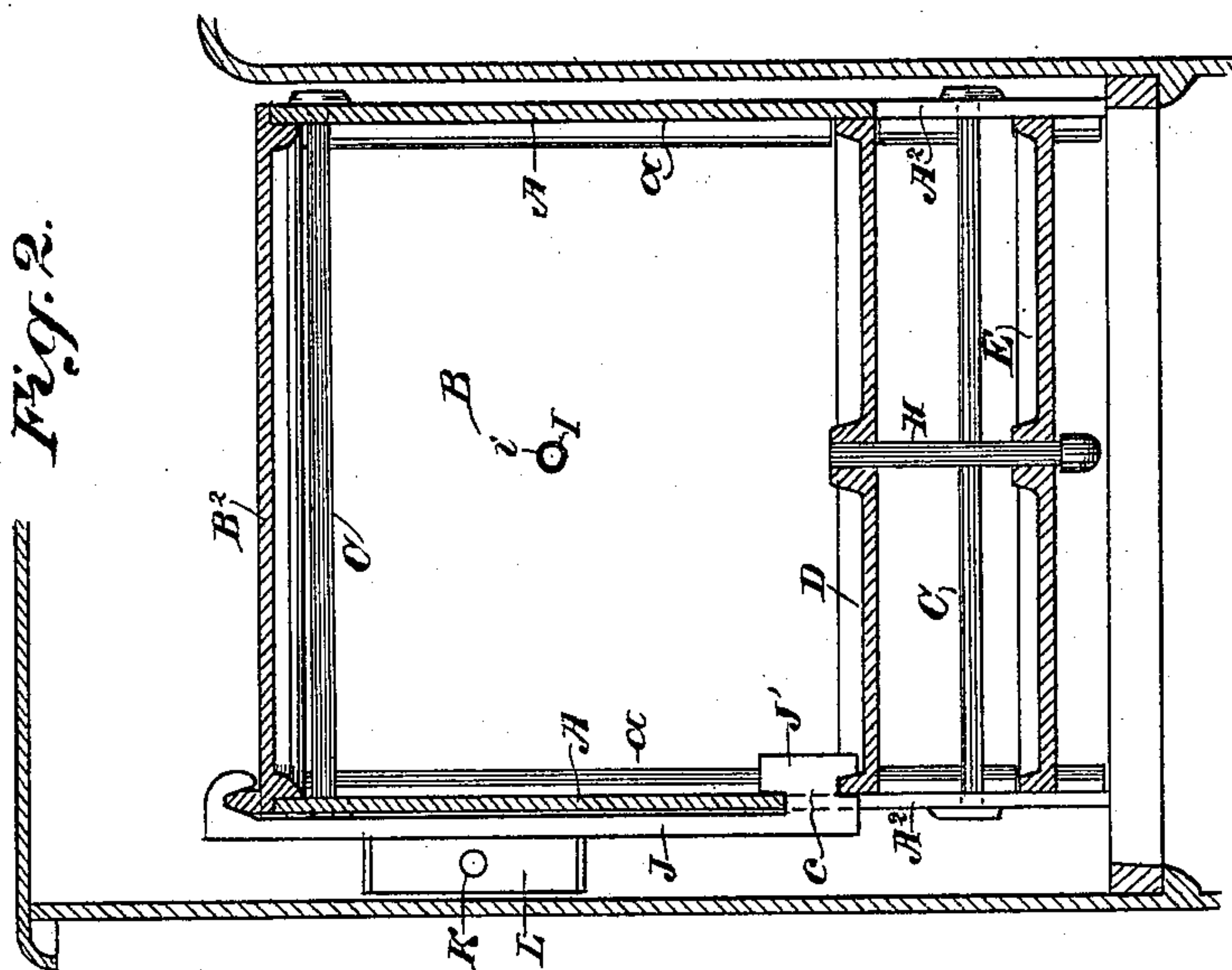


Fig. 2.

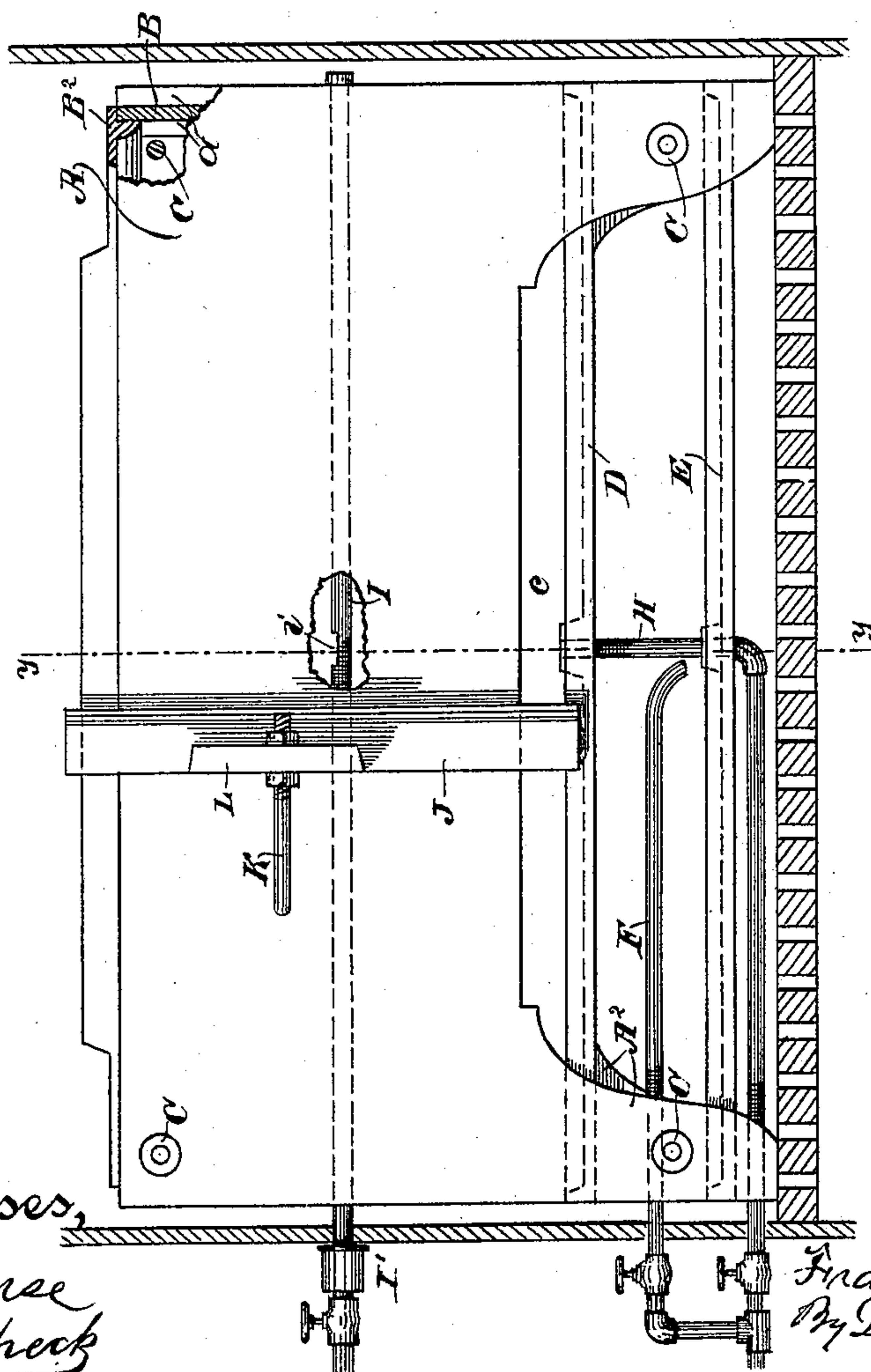


Fig. 1.

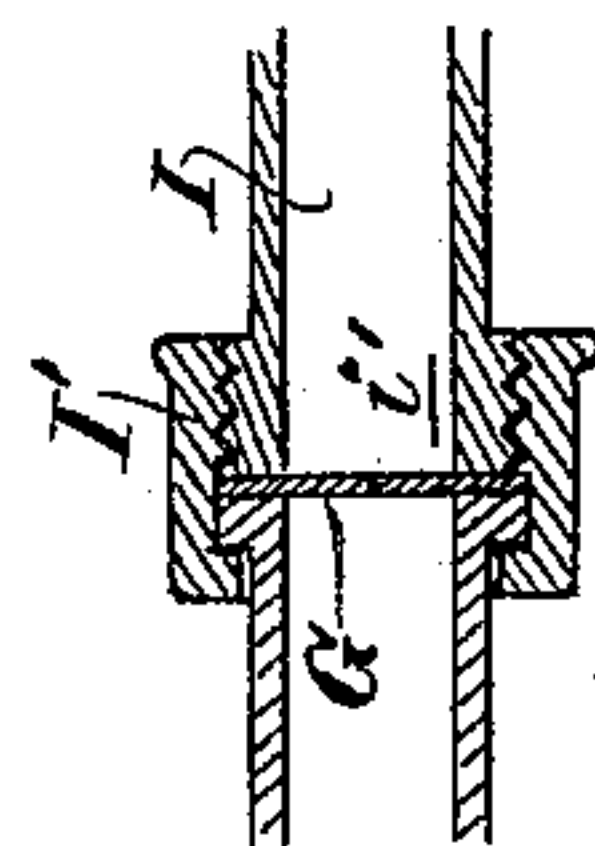


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CRUDE-PETROLEUM BURNER.

SPECIFICATION forming part of Letters Patent No. 594,317, dated November 23, 1897.

Application filed June 1, 1897. Serial No. 638,889. (No model.)

To all whom it may concern:

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

My invention relates to an apparatus which is especially designed for the purpose of burning crude petroleum, and particularly for burning it in stoves which are employed for cooking, heating, &c.

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

Figure 1 is a front view of my burner. Fig. 2 is a cross-section of the same on line *y y* of Fig. 1. Fig. 3 is a section through the controlling-valve.

The object of my invention is to provide an apparatus in which crude petroleum, in conjunction with such gas as may be produced by the decomposition of a jet of steam, may be burned for fuel and heating purposes in ordinary stoves; in a means for igniting and commencing the burning; means for regulating the steam and oil supply; means for relieving the apparatus of pressure in case of any clogging or sudden pressure, and means for clearing the surfaces from time to time.

In the present case I have shown my apparatus, consisting of longitudinal plates *A A* and end plates *B B*, made of such dimensions as to form a case or box which will fit into the fuel-space of an ordinary stove, such as a cook-stove. These plates are all made to a pattern in the same manner that stove-plates are made, so that all the parts are interchangeable and any set of parts can be fitted together at any time. The said plates may have, as shown in the present case, grooves or channels formed as shown at *a*, and the end plates slip into these grooves or channels, and the whole are then drawn together by bolts and nuts, as shown at *C*. Within the chamber thus formed is a rectangular pan *D*, which serves for the combustion of the liquid

fuel, and beneath this again is a similar rectangular pan *E*. The lower pan *E* is here shown as fitting between the downwardly-projecting legs *A²* of the side plates and shows an open space all around for the admission of air and for easy access. This plate has upturned sides forming a sort of shallow tray and may be covered with ashes or any suitable covering which will absorb and distribute the liquid hydrocarbon, which is delivered upon it through a pipe *F*, entering at the end or other convenient point and extending to near the middle of the apparatus. The oil furnished through this pipe is for the purpose of commencing the operation and is discharged upon the surface of the pan beneath the pan *D*, and it serves to heat the plate above where the operation is afterward continued and carried on.

Above the upper tray is a pipe *I*, extending through the end plates, as here shown, and passing across from one end to the opposite end, where it is capped. This pipe has a small opening or openings *i* made in the upper part and is connected with a water-supply, the water being brought in after the combustion has commenced and distributed in such quantity as to be converted into steam and decomposed to provide the constituents for assisting in a more intense and complete combustion of the hydrocarbon vapor or gas and prevent the formation of soot or smoke, which would arise when the compound shows a surplus of carbon. The control of the water from this water-pipe may be by a needle or other suitable valve at *I'*, and in addition to this a small plate *G* is introduced transversely into the pipe, having a needle-opening *i'* in it, which will serve as a check for the passage of the water in case the main inlet-valve be opened too far.

The fuel, which consists of crude petroleum, is admitted to the upper tray *D* through a pipe *H*, which is here shown as passing through the lowermost tray, terminating in a raised boss or projection on the bottom interior to the uppermost tray *D*. The supply of oil is controlled in this case, as previously described, by any suitable or desired form of valve which will admit the

quantity necessary for the desired purpose. This oil, overflowing upon the bottom of the tray D, is heated by the flame from the lower tray until the gas or vapor is produced, which
 5 is ignited and burns within the casing or box above the tray. This tray is situated a little below the top of the front opening of the box, (shown at *c*,) or an independent opening may be made, so that the products of combustion
 10 which fill the box escape through this opening and, passing up along the front and around the box, escape through the usual flues to the chimney. By thus passing the products of combustion over and around the
 15 box I provide for an additional heating-surface. As soon as the heat of the burning fuel has become sufficient to vaporize the water which is introduced through the pipe I, as previously described, the water-supply
 20 valve may be opened and the water, being converted into steam, is ejected upwardly toward the cover B², and the gas produced by its decomposition will mingle with the hydrocarbon vapor, furnishing a sufficient supply
 25 of oxygen and hydrogen to prevent in a great measure a production of smoke and soot, experience showing that burned in this manner the combustion is so complete that there is almost no soot deposited in the interior of the
 30 box and little or no deposit is found at the delivery-opening or upon the exterior sides. The top of the box is closed by a movable cover B², which is essentially hinged or held in place upon one side by means of a flange
 35 which is engaged by a hook-shaped upper end of a slidable bar J, which serves as a scraper or cleaner, as will be hereinafter described. The back edge of the cover being free to lift, serves to relieve any interior pres-
 40 sure caused by a surplus of gas or by the clogging of the discharge-opening *c*, so as to temporarily prevent the escape of the gas in the direction which it should usually take. The bar J, the hooked end of which holds
 45 the front edge of this top plate, extends down along the front exterior side of the box, and it has a lug J', extending inwardly with grooves or notches on the top and bottom. The upper groove clasps the lower edge of
 50 the front opening *c* of the side A and the bottom groove fits over the edge of the upper tray D, as shown. A lug L projects from this bar and has an opening in it for the connection of a rod K, which, extending exterior
 55 to the stove, serves to slide the bar longitudinally, and this bar acts as a scraper to clear away any collection of soot or other deposit which might interfere with the proper operation of the apparatus.

60 Although hereinbefore described as being peculiarly adapted for use in stoves, I do not confine myself to this use, as it is manifest that the apparatus may, by changes of form to suit varying conditions, be adapted for
 65 many other purposes.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. A device for burning petroleum, consisting of an inclosing case, a horizontally-disposed pan situated intermediate between the
 70 top and bottom of the case, said case having an opening made in it just above the edge of the tray for the delivery of the burning gases whereby they are carried up over the outside
 75 of the case, a pipe with a controlling-valve through which petroleum is supplied to the tray, a horizontal perforated jet-pipe extending through the case above the pan and adapted
 80 to vaporize water and deliver steam-jets therethrough to mingle with the petroleum-vapors, and a means for heating the pan preliminary to the supply of oil to it.

2. An apparatus for burning crude petroleum consisting of an inclosing case provided
 85 with a discharge-opening in its side, for the products of combustion, said case having means for relieving an excess of pressure therein, a shallow tray within said case and means for supplying oil thereto, means for
 90 supplying steam-jets to mingle with the petroleum-vapors and a means proximate to the tray and adapted to heat the same preliminary to the supply of oil to said tray.

3. A device for burning crude petroleum
 95 consisting of an inclosing box or case adapted to fit the fire-box of the stove or other structure within which it is to be used, a horizontally-disposed tray having shallow peripheral side flanges, and means for introducing a
 100 regulated supply of petroleum to the bottom of the tray, a perforated pipe with means for controlling the supply of water thereto, said pipe passing through the box above the tray whereby the water is converted into steam
 105 and the jets discharged and decomposed to mingle the resultant gases with the vapors of the hydrocarbon, said case having an opening made in its side just above the edge of the tray for the delivery of the burning gases
 110 whereby they are carried up over the outside of the box, and a preliminary heating and igniting tray situated below the main tray with a means for supplying the hydrocarbon thereto so that by its ignition the main tray is
 115 heated preliminary to the supply of oil to it.

4. An apparatus for burning petroleum consisting of a box or case fitted to the fire-box in which it is to be used, superposed trays
 120 within said case, the upper tray of which is adapted to contain the petroleum, and the lower one serving as a preliminary heater and igniter, and pipes and valves through which petroleum is supplied to each of the trays when desired, and water supplied within the
 125 upper part of the case.

5. In an apparatus for burning petroleum, the inclosing casing, having an opening in its side for the delivery of the burning gases whereby the latter are carried up over the out-
 130 side of the casing, means for burning oil in said casing and a scraper slidably mounted

on the casing and having a lug engaging the walls of the discharge-opening to remove deposits therefrom.

5 6. An apparatus for burning petroleum consisting of a box or case with a horizontal burning-tray and means for supplying oil thereto, a loosely-attached safety-cover having a flange upon one edge, a slidable scraper having the lower edge provided with a grooved
10 lug slidable upon the flanged edge of the tray,

and the upper end with a grooved lug slidable upon the exterior cover-flange and forming a hinge for the same.

In witness whereof I have hereunto set my hand.

FRANCIS C. BATES.

Witnesses:

S. H. NOURSE,

H. F. ASCHECK.