

C. W. BREWBAKER & G. R. SHANKLIN.

HYDROCARBON OIL BURNER.

APPLICATION FILED AUG. 7, 1909.

990,331.

Patented Apr. 25, 1911.

2 SHEETS—SHEET 1.

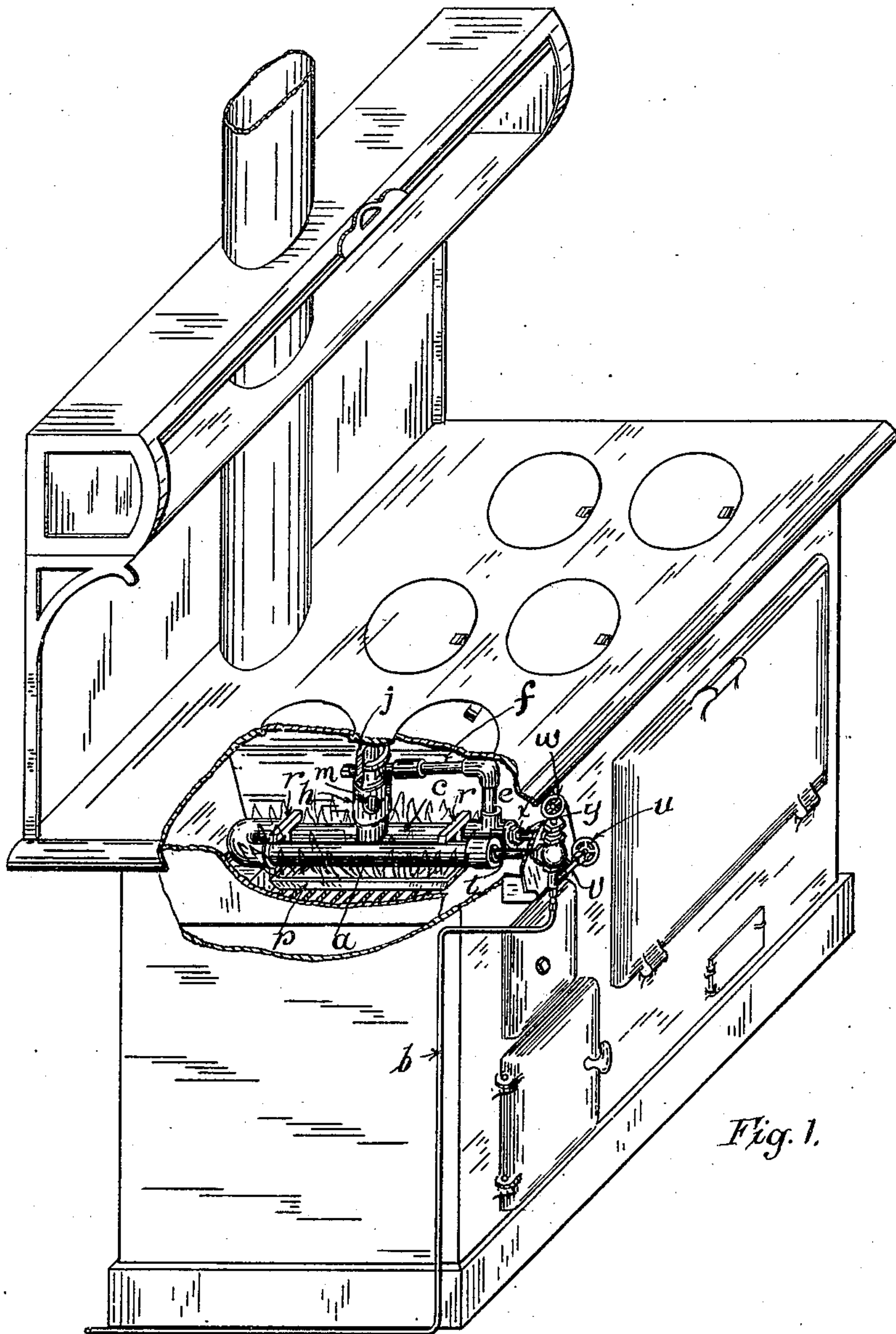


Fig. 1.

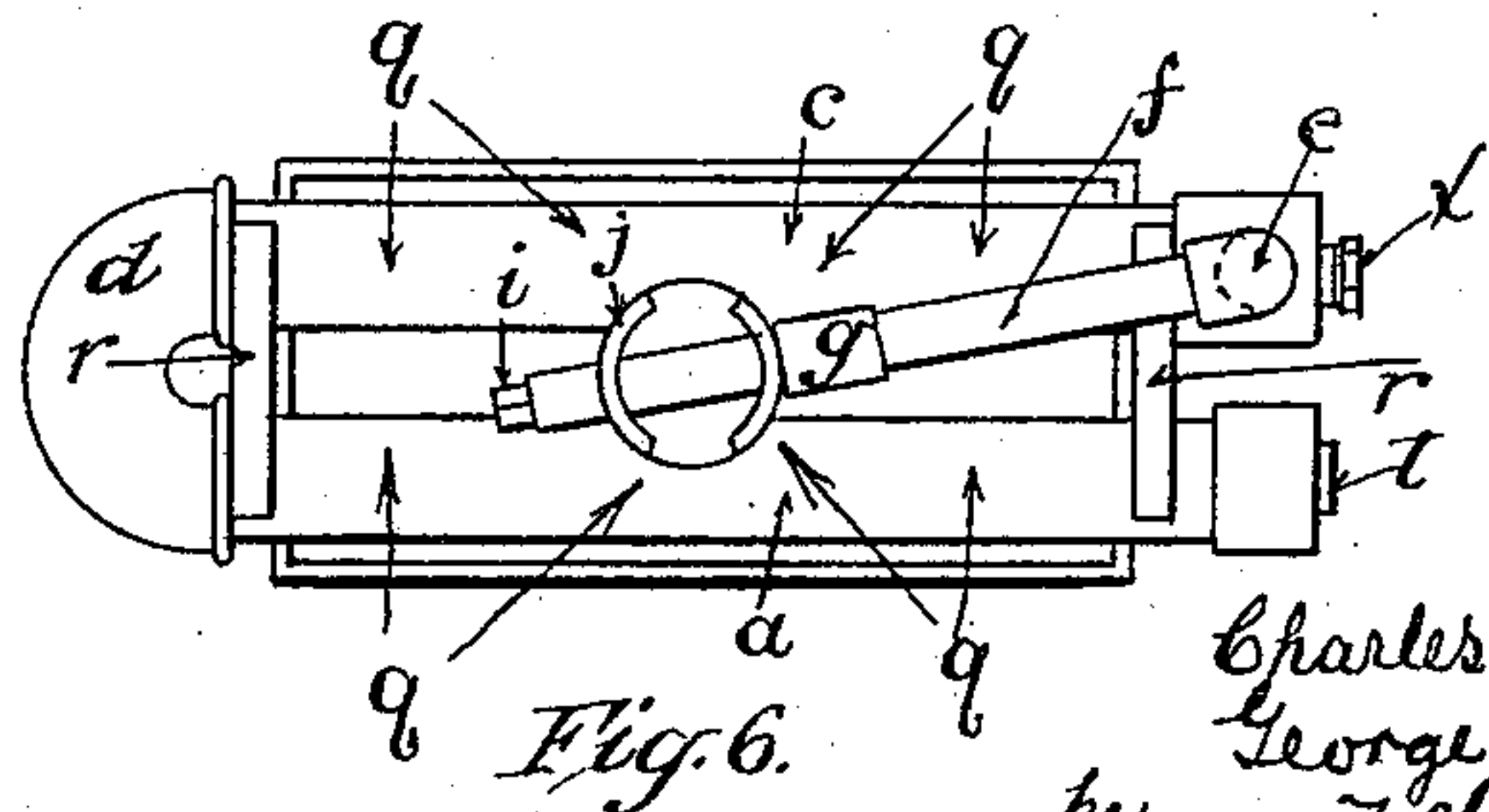


Fig. 6.

Witnesses:
John Spurb
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Inventors:

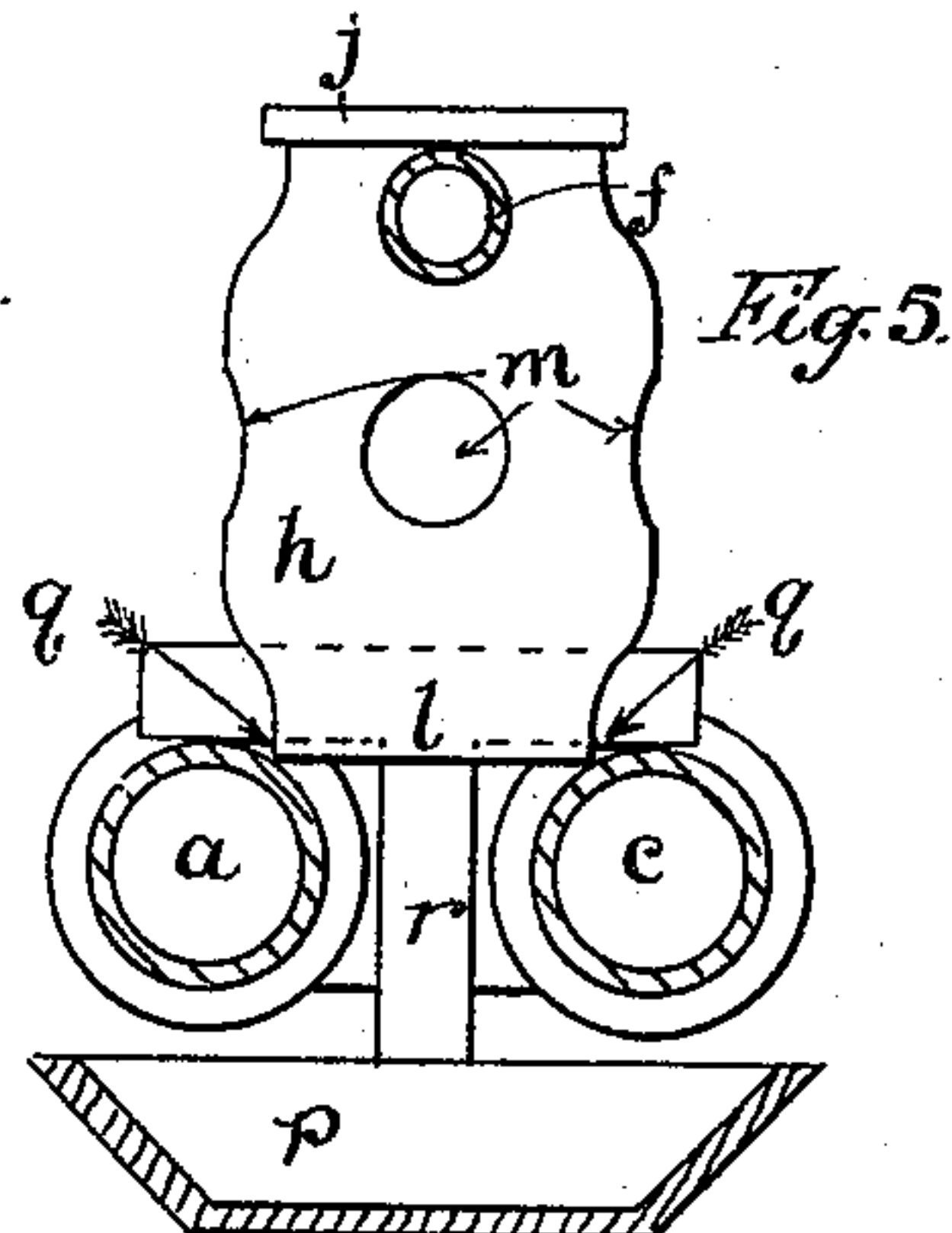
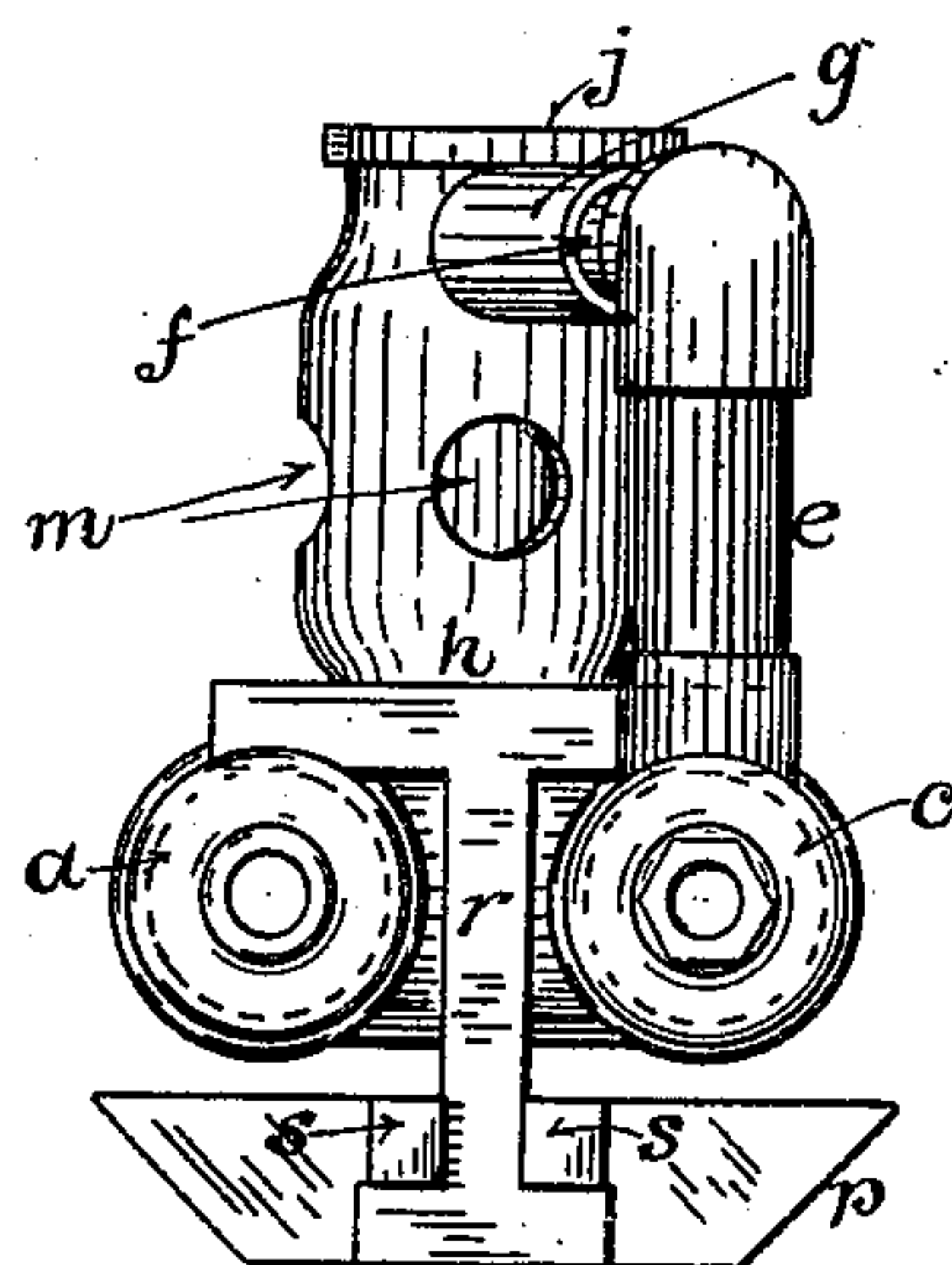
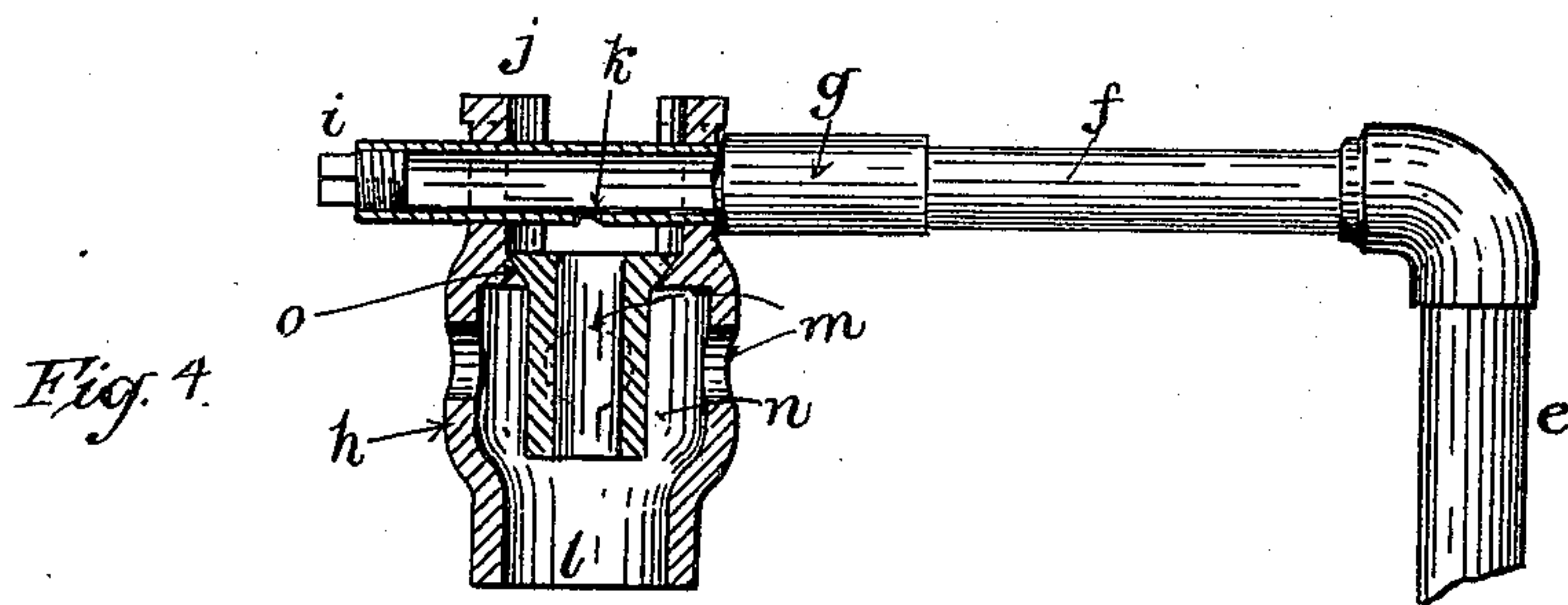
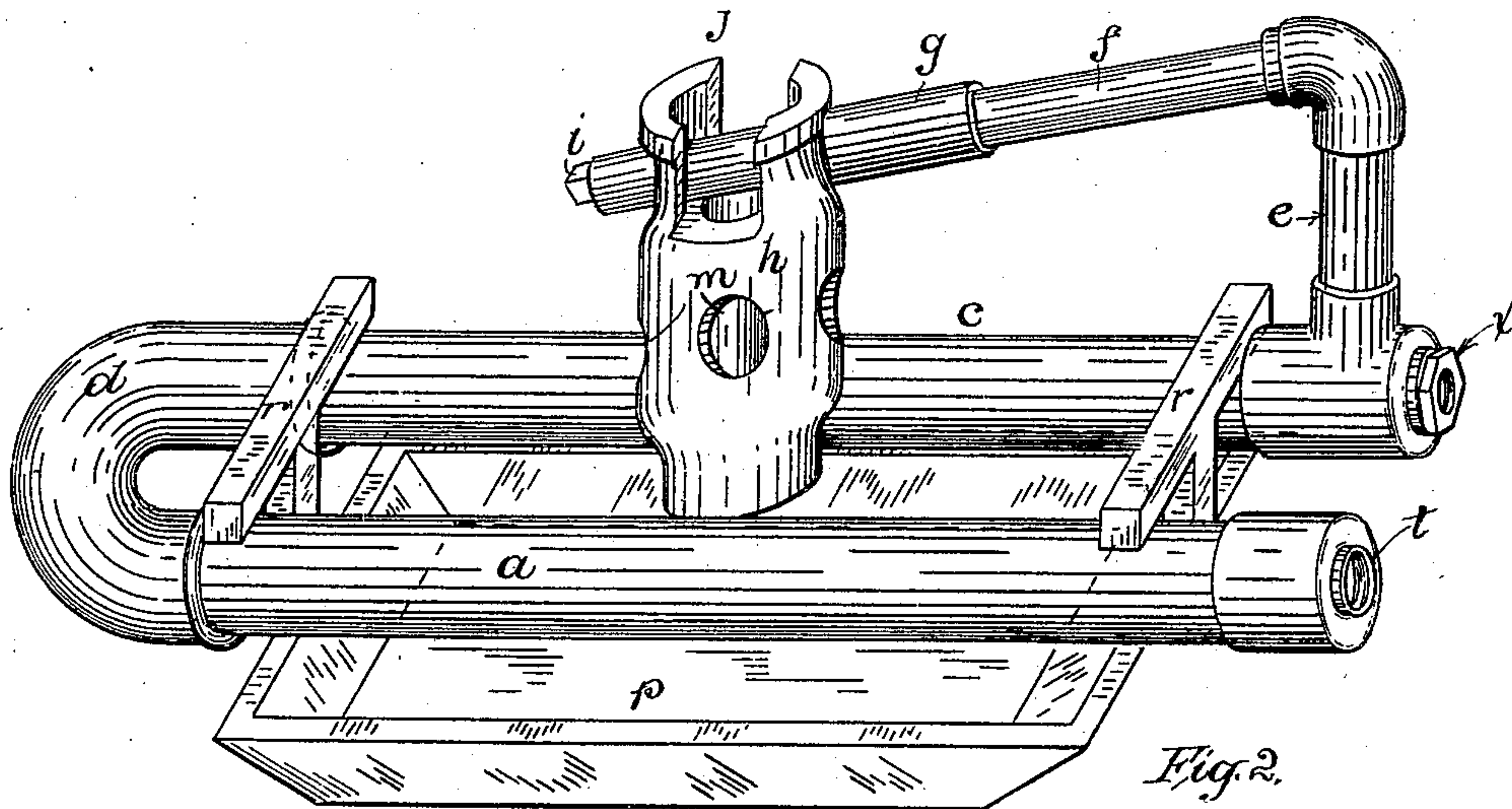
Charles W. Brewbaker
George R. Shanklin
by Zgleiser Atty.

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2 SHEETS—SHEET 2.



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Fig. 3.

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UNITED STATES PATENT OFFICE.

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HYDROCARBON-OIL BURNER.

990,331.

Specification of Letters Patent.

Patented Apr. 25, 1911.

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To all whom it may concern:

Be it known that we, CHARLES W. BREWBAKER and GEORGE R. SHANKLIN, citizens of the United States, and residents of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Improvement in Hydrocarbon-Oil Burners, of which the following is a specification, reference being had to the accompanying drawings, constituting a part thereof.

This invention has for its object to provide an oil burner which is especially adapted to be installed in the fire box of an ordinary kitchen range; which is cheap in construction, and is so arranged as to promote perfect combustion of the oil gas, producing a blue non-smutting flame, and keeping the burner and the interior of the fire box in clean condition.

We attain our object in the device comprising the features hereinafter fully described and illustrated in the drawings.

In the drawings: Figure 1 is a perspective view of a kitchen range with a portion of the front walls and top of the range around the fire box broken away, and showing our burner installed in such fire box, and connected with the oil-supply pipe; Fig. 2 is a perspective view of our burner by itself; Fig. 3 is a right end view of our burner, viewing the same as shown in Fig. 2; Fig. 4 is a sectional detail showing more particularly the gas orifice, an outlet end of the retort pipe, and the mixing chamber suspended below such orifice; Fig. 5 is a transverse section taken directly in front of the mixing chamber; and Fig. 6 is a plan, on a smaller scale, of our device.

The retort of our burner consists of a horizontally arranged U-shaped pipe, the parallel members of which are spaced apart. This retort is inexpensively made by two pieces of pipe *a*, *c*, connected by a return bend *d*. In this retort of our burner the oil is converted into gas. The inlet end *t* of the retort is connected with an oil feed pipe *b*, controlled by a valve *w*, and the outlet end *x* is provided with a riser *e*, from which extends a horizontal pipe *f* to a point approximately central above the retort. The horizontal pipe extension *f* is preferably provided with an annular enlargement or collar *g* to provide a shoulder against which to position the mixing chamber *h*, which is suspended from the extremity of the pipe ex-

tension *f*. The bottom of the pipe extension *f* is provided with a discharge orifice *k*, and the outer end of the pipe extension is closed by a plug *i*.

The mixing chamber consists of a hollow body, preferably cylindrical, the upper end or top *j* of which is made with bifurcated portions and provided with alined perforations, through which the outer end of the extension *f* is inserted. The mixing chamber *h* is suspended centrally under the discharge orifice *k* of the pipe extension *f*. The mixing chamber is provided with a bottom discharge orifice *l* and air apertures, *m*, in its side walls. A single aperture, as *m*, would answer, but we prefer a series of apertures located equi-distant from each other so as to draw air into the mixing chamber all around the nipple *n*. The mixing chamber is further provided with a horizontal partition suspending a centrally positioned pendent nipple *n*, the bottom or discharge end of which extends below the air apertures *m*. The nipple *n* may be an integral part of the mixing chamber *h*, but since such nipple is the part which is apt to wear out first, we prefer to make the same renewable, and to this end prefer to construct the mixing chamber and nipple as illustrated in Fig. 4. That is to say, the mixing chamber is provided near the top with a bevel-faced interior flange *o*, and the nipple is a casting provided with a correspondingly bevel-faced exterior flange at the top, so that the interior flange *o* and the flange at the top of the nipple *n* will, when the parts are arranged as shown, constitute a horizontal partition or closure. The purpose of the closure is to cause the gas, discharged from the orifice *k* of the pipe *f* while passing through the nipple *n*, to draw in and become mixed with air admitted through the space within the bifurcated top-portion, *j*, of the mixing chamber. The intermixture so obtained is a primary intermixture, and this is next subject to a second intermixture with the air drawn in through the air apertures *m* of the mixing chamber *h*, before the resulting gas mixture is discharged through the outlet *l* of the mixing chamber.

In starting our burner a small quantity of oil is allowed to drip in the spreader plate *p*, so as to heat the two members of the retort pipe. When the gas-generating process has

been started, the operation of our burner will be as follows: The gas issuing out of the orifice *k* of the retort pipe in passing through the nipple *n*, to the discharge opening, *l*, in the bottom of the mixing chamber *h*, expands in the mixing chamber *h*, and draws in more air through the wall apertures *m*, and thus a further intermixture is obtained which is discharged from the mixing chamber *h* upon the dish-like spreader pan *p*. The retort pipe members, *a*, *c*, are located approximately an inch above the top or rim of the spreader pan *p*.

It is to be noted that the intermixture of gases discharged from the bottom of the mixing chamber *h* has an unrestricted flow. After ignition such gases impinge upon the bottom of the spreader-pan *p* and are caused, by the sloping sides of the latter, to spread radially over the entire surface of the spreader, and since the openings between the retort members, *a*, *c*, and the rim of the sloping sides of the spreader-pan provide only a limited escape for the burning gases, the greater portion of such gases are forced to seek an outlet at the ends of the spreader-pan, with the effect that the resultant flame is elongated lengthwise of the fire box. Furthermore, the burning gases, in being thus spread over the entire surface of the spreader-pan, suck in and intermix with more air, as indicated by the arrows, *q*, *q*, and in this wise is produced a gas mixture which will burn with an intensely hot flame along the entire length of, and envelop, the retort pipe members, *a*, *c*, above the spreader pan *p*. As further apparent from the illustration, the gasifying of the oil begins at the inlet of the retort pipe-member *a*, and the gas travels thence the distance of the whole lengths of the retort pipe members to the outlet end thereof, which in practice will equal approximately a length of forty inches for the size of our burners used in the ordinary kitchen range. The retort pipe-members, *a*, *c*, become highly heated and likewise the gas passing there-through, rendering the latter very light and in a condition suitable for an instantaneous and effective intermixture therewith of atmospheric air. In this connection, it is of course to be borne in mind that in referring to atmospheric air we refer to the air which has been drawn through draft openings of the range into the fire box in which our burner is located, and thus the air has itself become heated to a very high degree, and is in a proper state for an effective intermixture with the intensely heated gas, and promotes the result described. By reason of the described features of our burner, the flame resulting from the gases ignited in the spreader pan *p* is of the proper bluish color, having no white fringe of unburned carbon whatsoever, and the process of combustion

is carried on in the most economic and effective manner.

In the practical use of our burner, we have found that we can effectively use the so-called stove oil or distillate of thirty-four degrees gravity, and of course other grades of distillate of lighter gravity.

It is to be noted that in order to obtain a perfectly burnable intermixture of gas and air, it is necessary to provide means for accomplishing and facilitating such intermixture during the interval the gas is discharged from the discharge orifice *k* of the retort pipe, and after its primary and secondary intermixture, as above described, is finally impinged upon the spreader pan *p*, which is heated to a high degree. To accomplish this end we provide ample space under the orifice *k* of the retort pipe and the top of the nipple *n*, so as to cause a partial intermixture of gas and air at this point. Next, as the gas discharges through the nipple *n* into the mixing chamber *h*, by reason of the larger area of the latter, there is an expansion of the intermixed gases and the same are thus placed in suitable condition for a further intermixture with an additional volume of air drawn in through the apertures *m* of the mixing chamber *h*.

The spreader pan *p* is removably suspended from the members of the retort pipe by means of hangers *r*, provided at their top with a cross piece adapted to rest on the members of the retort pipe, and at the bottom with a shorter cross piece adapted to be inserted between the lugs *s*, projecting from the ends of the spreader pan.

To the inlet end, *t*, of the retort pipe is connected the discharge end of the oil supply-pipe *b*, which, in practice, is connected with a pressure tank. The pipe *b* is of the kind commonly termed wire pipe. The valve *u* controls a short branch *v* leading off from the oil feed pipe *b* and through which a small quantity of oil is injected into the spreader pan *p* when our pan is to be started. After having been started the valve *w* is opened to the degree required to supply a proper quantity of oil for operating our burner. These features are substantially like others of the same character employed in other burners, and therefore do not require more particular description.

At the outlet end, *x*, of the retort pipe is inserted a threaded pin, *y*, for the purpose of supporting our burner in the fire box. The pin *y* may be made of a short piece of pipe extending through a hole therefor made in the door of the fire box of the range or stove; and the oil supply pipe also extends through a hole therefor made in said door of the fire box.

The outlet end, or bottom opening, of the mixing chamber is contracted, so as to cause the gases to rush there-through with in-

creased speed, and thereby promote the further intermixture thereof with air, upon issuing from the mixing chamber.

We claim:

5 1. In a hydrocarbon burner the combination of a retort consisting of a horizontally arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from said retort, a horizontal pipe-extension from
10 such riser to approximately the center of the retort, the outer end of such pipe-extension being closed and having a bottom discharge orifice located centrally above the retort; a
15 mixing chamber suspended from said horizontal pipe-extension of the retort and under the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow body open at the bottom and provided
20 with air apertures, one or more, in its sides; and a nipple of smaller cross section than the mixing chamber suspended centrally within the mixing chamber; the lower end
25 of said nipple extending below the air apertures in the sides of the mixing chamber; and the parts being arranged to position the inlet end of the nipple below the orifice of the horizontal pipe-extension of the retort.

2. In a hydrocarbon burner the combination of a retort consisting of a horizontally
30 arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from said retort; a horizontal pipe-extension from such riser to approximately the center of the retort, the outer end of such pipe-extension
35 being closed and having a bottom discharge orifice located centrally above the retort; a mixing chamber suspended from said horizontal pipe-extension of the retort and under the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow
40 body open at the bottom and provided with air apertures, one or more, in its sides; and a nipple of smaller cross section than the mixing chamber removably suspended centrally within the mixing chamber; the lower
45 end of said nipple extending below the air apertures in the sides of the mixing chamber; and the parts being arranged to position the inlet end of the nipple below the orifice of the horizontal pipe-extension of the
50 retort.

3. In a hydrocarbon burner the combination of a retort consisting of a horizontally
55 arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from said retort; a horizontal pipe-extension from such riser to approximately the center of the retort, the outer end of such pipe-extension being closed and having a bottom discharge
60 orifice located centrally above the retort; a mixing chamber suspended from said horizontal pipe-extension of the retort and under the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow
65 body open at the bottom and provided with

air apertures, one or more, in its sides; a nipple of smaller cross section than the mixing chamber suspended centrally within the mixing chamber; the parts being arranged
70 to position the inlet end of the nipple below the orifice of the horizontal pipe-extension of the retort; and a dish-like spreader suspended lengthwise under, spaced from and below the parallel members of the retort.

4. In a hydrocarbon burner the combination of a retort consisting of a horizontally
75 arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from said retort; a horizontal pipe-extension from such riser to approximately the center of the
80 retort, the outer end of such pipe-extension being closed and having a bottom discharge orifice located centrally above the retort; a mixing chamber suspended from said horizontal pipe-extension of the retort and under
85 the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow body open at the bottom and provided with air apertures, one or more, in its sides; a nipple of smaller cross section than the
90 mixing chamber removably suspended centrally within the mixing chamber; the lower end of said nipple extending below the air apertures in the sides of the mixing chamber; the parts being arranged to position the
95 inlet end of the nipple below the orifice of the horizontal pipe-extension of the retort; and a dish-like spreader suspended lengthwise under, spaced from and below the parallel members of the retort.
100

5. In a hydrocarbon burner the combination of a retort consisting of a horizontally
105 arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from said retort; a horizontal pipe-extension from such riser to approximately the center of the retort, the outer end of such pipe-extension being closed and having a bottom discharge
110 orifice located centrally above the retort; a mixing chamber suspended from said horizontal pipe-extension of the retort and under the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow body open at the bottom and provided
115 with air apertures, one or more, in its sides; said mixing chamber being provided with perpendicular members at its top and by which it is suspended from said horizontal pipe-extension and spaced therefrom; a nipple of smaller cross section than the mixing
120 chamber suspended centrally within the mixing chamber; the lower end of said nipple extending below the air apertures in the sides of the mixing chamber; the parts being arranged to position the inlet end of the
125 nipple below the orifice of the horizontal pipe-extension of the retort; and a dish-like spreader suspended lengthwise under, spaced from and below the parallel members of the retort.
130

6. In a hydrocarbon burner the combination of a retort consisting of a horizontally arranged U-shaped pipe, the parallel members thereof being spaced apart; a riser from
5 said retort; a horizontal pipe-extension from such riser to approximately the center of the retort, the outer end of such pipe-extension being closed and having a bottom discharge orifice located centrally above the retort; a
10 mixing chamber suspended from said horizontal pipe-extension of the retort and under the discharge orifice of said pipe-extension, said mixing chamber comprising a hollow body open at the bottom and provided
15 with air apertures, one or more, in its sides; said mixing chamber being provided with perpendicular members at its top and by which it is suspended from said horizontal pipe-extension and spaced therefrom; a
horizontal centrally apertured partition near
the top of the mixing chamber; a nipple of
smaller cross section than the mixing chamber suspended from such partition, centrally
within the mixing chamber; the lower end
of said nipple extending below the air aper-
25 tures in the sides of the mixing chamber; the parts being arranged to position the inlet end of the nipple below the orifice of the horizontal pipe-extension of the retort; and
a dish-like spreader suspended lengthwise
30 under, spaced from and below the parallel members of the retort.

CHAS. W. BREWBAKER.
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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
