(No Model.)

2 Sheets—Sheet 1.

C. INGERSOLL.

OIL BURNER.

No. 503,970. Patented Aug. 29, 1893.

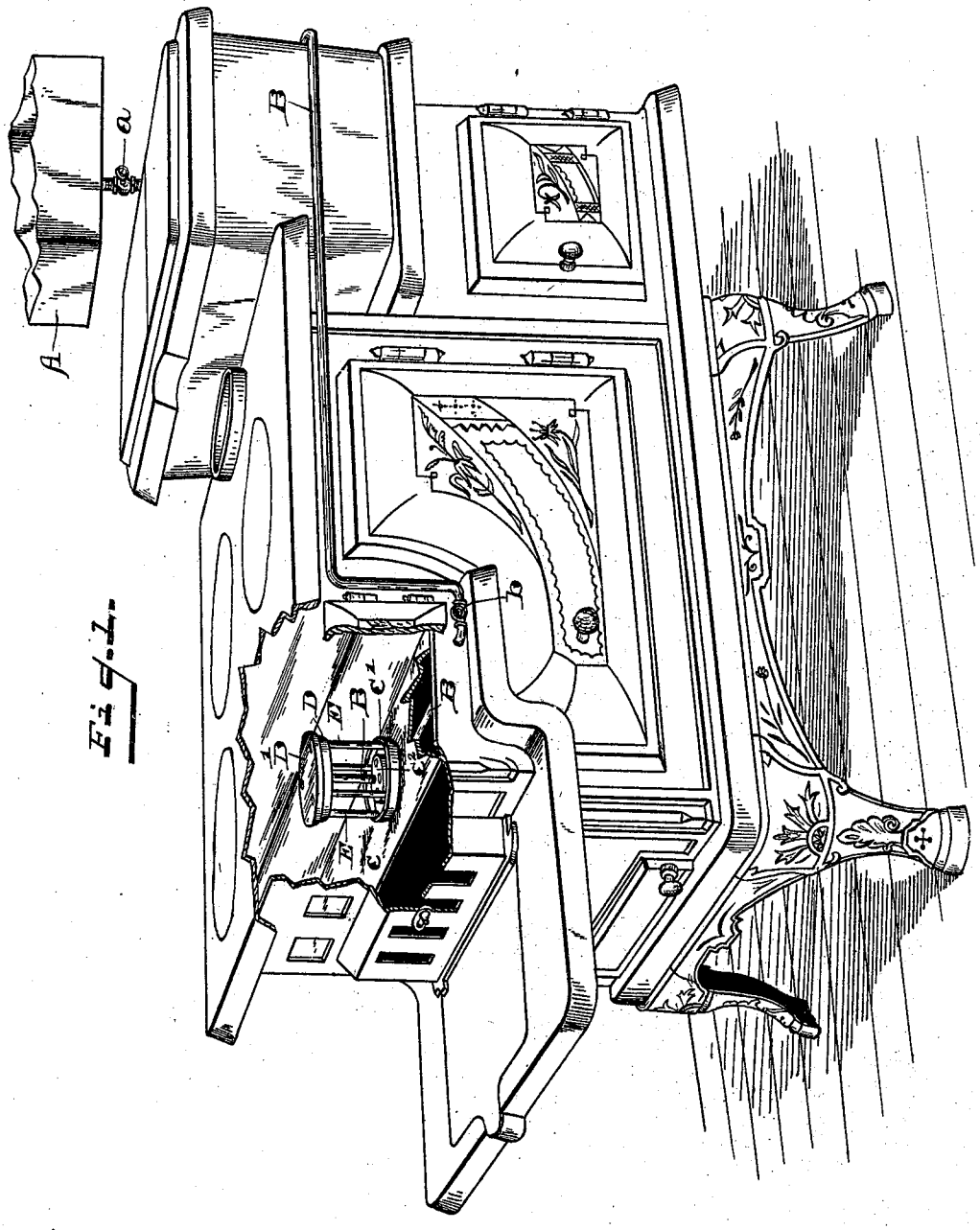

Fig. 1.

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(No Model.)

2 Sheets—Sheet 2.

C. INGERSOLL.

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Fig. 2.

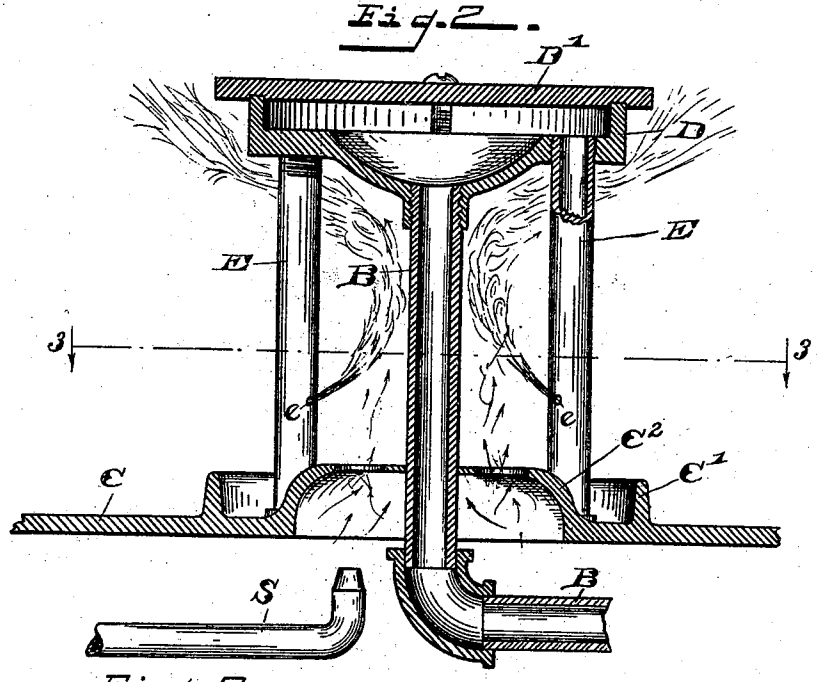


Fig. 3.

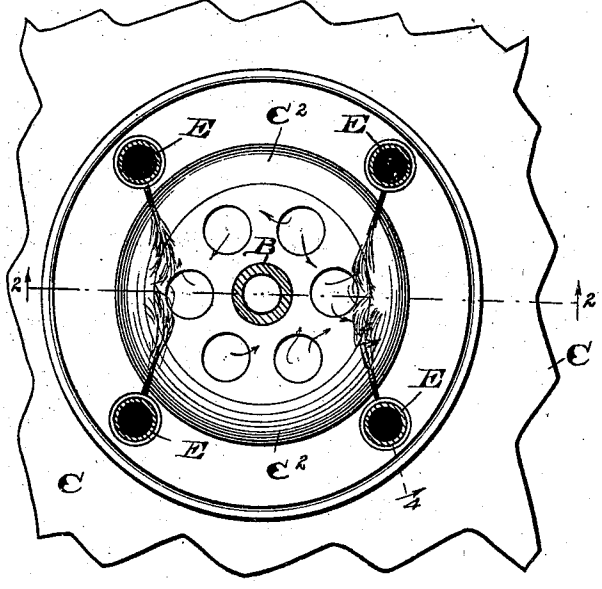
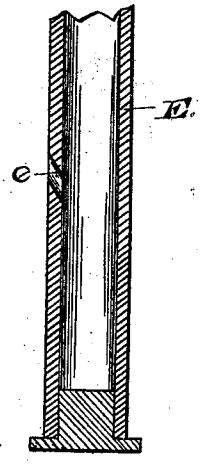


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES INGERSOLL, OF INDIANAPOLIS, INDIANA.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 503,970, dated August 29, 1893.

Application filed April 4, 1892. Serial No. 427,684. (No model.)

To all whom it may concern:

Be it known that I, CHARLES INGERSOLL, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Oil-Burners, of which the following is a specification.

The object of my said invention is to convert oil into fuel gas by the action of the products of combustion of such gas itself, which said products of combustion shall also be utilized at the same time for their other and ordinary purposes. Said invention will be first fully described and then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a perspective view of a cooking stove wherein one of my improved burners is employed, a portion of said cooking stove being broken away to show said burner in place; Fig. 2 a central sectional view of the burner separately, on the dotted line 2 2 in Fig. 3; Fig. 3 a horizontal sectional view looking downwardly from the dotted line 3 3 in Fig. 2, and Fig. 4 a detail sectional view of one of the hollow standards forming part of the burner, on the dotted line 4 4 in Fig. 3.

In said drawings the portions marked A represent the tank or other source of fuel supply; B a pipe leading therefrom; C a plate forming the base or lower portion of the burner; D the upper portion thereof, and E hollow standards. The tank A and pipe B are, of course, of any desired form or arrangement. Said pipe extends in below the base of the burner, and up through it centrally, and unites with its upper part D, as shown most plainly in Fig. 2. It is provided with the usual valves or cocks *a b* for cutting off and regulating the supply of oil, as will be readily understood. The plate C may be either formed integrally with the lower portion of the burner as shown, or separately if desired. It occupies the place in the stove where the grate bars are usually situated, or just above said grate bars, and is intended to form a complete division of the combustion chamber at that point, or, perhaps more correctly speaking, divide the front space between what is usually the combustion chamber and that portion below which, with common fuel, forms the ash pit. It has a central opening for the purposes of the burner, as will be presently explained.

Mounted upon or extended upwardly from the plate C are the flanges C′ and C². The flange C′ is a plain annular flange, and incloses a space or cavity which is utilized in starting the burner, as will be presently explained. The flange C² extends upwardly some distance, usually slightly higher than the flange C′, and it may be either left entirely open or have a thin plate at the top through which a number of holes are made, as shown in the drawings. I have made them both ways. Through its open center, or through the holes therein, when the formation is as shown in the drawings, the air passes which forms the draft necessary for the proper operation of the burner. The upper portion D is cup-shaped, and is connected centrally with the supply pipe B. It has a cap D′ which covers and incloses the cup-shaped space, which is the oil and gas chamber, making the same air-tight. The central portion of this chamber, where the pipe D connects therewith, is lower than the peripheral portion, where the hollow standards E enter, and therefore it is adapted to contain a considerable quantity of oil before it will overflow into said standards. A portion of the chamber is above the upper ends of the hollow standards, and therefore there is always a space for gas above the upper level of the oil which may be therein.

The hollow standards E are preferably ordinary pieces of gas pipe closed at the bottom and opening at their upper ends into the chamber in the upper portion of the burner. In their sides, preferably near the bottom, each has a small orifice *e* extending inwardly therefrom, and preferably at substantially the angle indicated in Fig. 3, while said orifices are bored also with a downward inclination, as shown in Fig. 4.

The operation is as follows:—The parts being assembled in place as shown in Fig. 1, the oil is turned on, and forced through the pipe B into the chamber in the top D, and when it reaches the indicated level, it overflows into the hollow standards E. These, when they are filled up to the level of the orifices *e*, overflow into the space or cavity between the flanges C′ and C². When a small quantity of oil, sufficient for the purpose, has been thus deposited in this cavity, it is ignited, usually by applying a small asbestus torch or some inflammable device, and this oil, when ignited, will burn, and heat the burner. When said burner has reached a sufficient degree of heat, it will convert the oil therein into gas, and the flow through the hollow standards and their orifices *e* will thenceforward be gas, instead of oil. The supply is regulated, of course, by the valves *a b*, or one of them. When this point is reached, and the proper adjustment of the flow is also effected, the burner will automatically generate gas in the method indicated, and its operation is thenceforward continuous until the supply is shut off. Naturally, the upper ends of the hollow standards will not be on an exact level, and, therefore, if there is a greater supply of oil than can be converted into gas, the excess of oil will flow down only the one of the standards the top of which is lowest, and thus gas will still issue from the orifices in the others, while oil will issue from the orifice in the one mentioned, and flow into the cavity between the flanges C and C′, where it will be consumed similarly to the supply there deposited at the beginning of the operation, as above described.

As above stated, I prefer that the angle of inclination of the orifices *e* toward each other shall be substantially that indicated in Fig. 3. This is so that the flame from the two orifices of each pair of hollow standards shall impinge at the point indicated, and thence turn upward and outward toward the ends of the combustion chamber of the stove, instead of toward the sides, which is obviously, in the character of burner shown, a considerable advantage, as thus the burner is situated centrally, while the flame extends out toward the ends of said combustion chamber beneath the holes in the top of the stove, where it is needed in operation. In arranging burners for different kinds of work, as for heating-stoves, and steam purposes, the angle of inclination of these orifices may require to be changed in order to produce the best results. It is a perfectly simple matter to turn the standards slightly, and thus the direction of their inclination will be correspondingly changed. It is highly important, however, that the angle be such that it will direct the discharge of gas to below the upper portion of the burner, in which is the oil and gas chamber, and thus produce an intense heat below said portion. Otherwise the generation of gas from the oil would not be perfect, and imperfect combustion results in waste and smoke. The jets of ignited gas impinging on each other and centering under the chamber in the burner containing the oil, produce a very hot flame, and also a considerable draft through the air holes below, which draft in turn drives the products of combustion with considerable force against the bottom of the upper portion of the burner. I have found by practical test that a burner of my improved construction, as herein described, will give substantially perfect combustion, leaving no residuum in the chamber, and producing no smell. I may say in this connection, that I prefer to use in this burner what is known as "distilled oil," but, of course, I do not confine myself to any special grade. The draft, as above indicated, is occasioned by the upward flow of the air through the space, or air holes, surrounding the pipe B in the bottom of the burner. In some cases where my burner is employed, especially in steam plants, this draft may not be sufficient, and therefore should be aided artificially. This I may do by extending in a small steam nozzle, S, as shown in Fig. 2. As will be readily understood, the escape of steam will create an artificial draft, proportioned to the force of its discharge, and which may be conveniently regulated by ordinary and well known means.

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

1. A burner consisting of a hollow top constituting an oil and gas chamber, an oil ingress pipe entering the same at a lower level, hollow pipes or standards communicating therewith at a higher level and extending downwardly, and orifices at a lower level in said pipes or standards, the oil in the chamber being thus generated into gas by the action of the products of combustion of said gas itself, which impinges upon and heats said burner, said burner being mounted upon a plate or base which forms one side of an inclosure, and the openings into which inclosure are through said plate or base directly under said burner, substantially as set forth.

2. The combination, in a burner, of a hollow or chambered upper portion, hollow pipes or standards entering the same at a point intermediate the top and bottom of the chamber, an oil ingress pipe entering the same, centrally and from directly underneath, its upper end terminating at the lowest point of said chamber, and adapted to fill the lower portion of the chamber below the tops of said hollow standards or pipes with oil, said standards or pipes being provided with orifices through which said oil or the gas generated therefrom may emerge and be ignited, substantially as set forth.

3. The combination of a plate C having an annular groove or depression therein, hollow standards E the bottoms of which rest in said depression, which standards are provided

with orifices *e*, a hollow top consisting of the parts D and D′ said part D being cup-shaped in its center, and a fuel ingress pipe B communicating with said hollow top, said several parts being arranged and operating substantially as shown and described.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 29th day of March, A. D. 1892.

CHARLES INGERSOLL. [L. S.]

Witnesses:
CHESTER BRADFORD,
J. A. WALSH.