No. 724,253. PATENTED MAR. 31, 1903.

J. G. BRANCH.

LIQUID FUEL BURNER.

APPLICATION FILED APR. 1, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

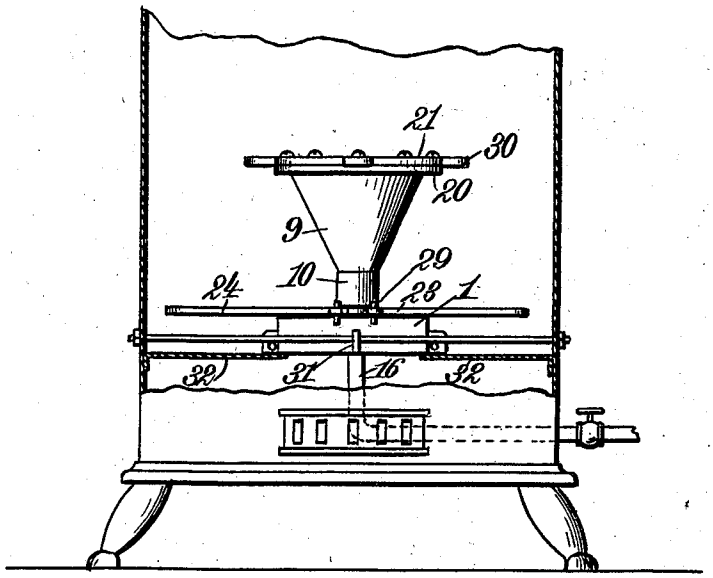
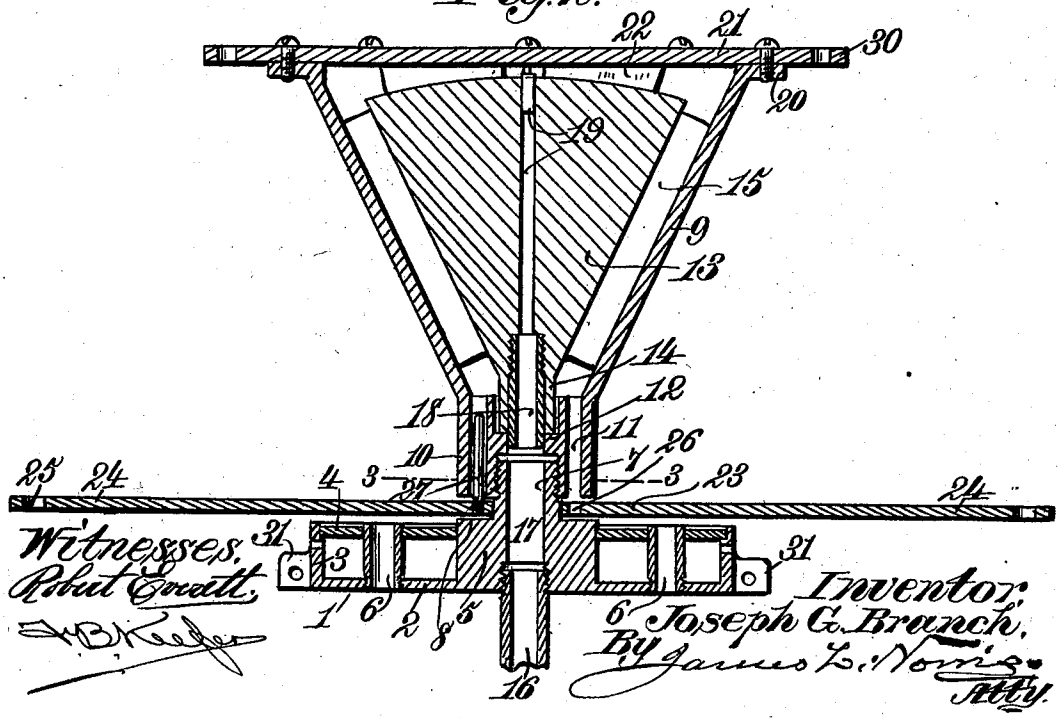



Fig. 2.




Witnesses.
Robt Gratt.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

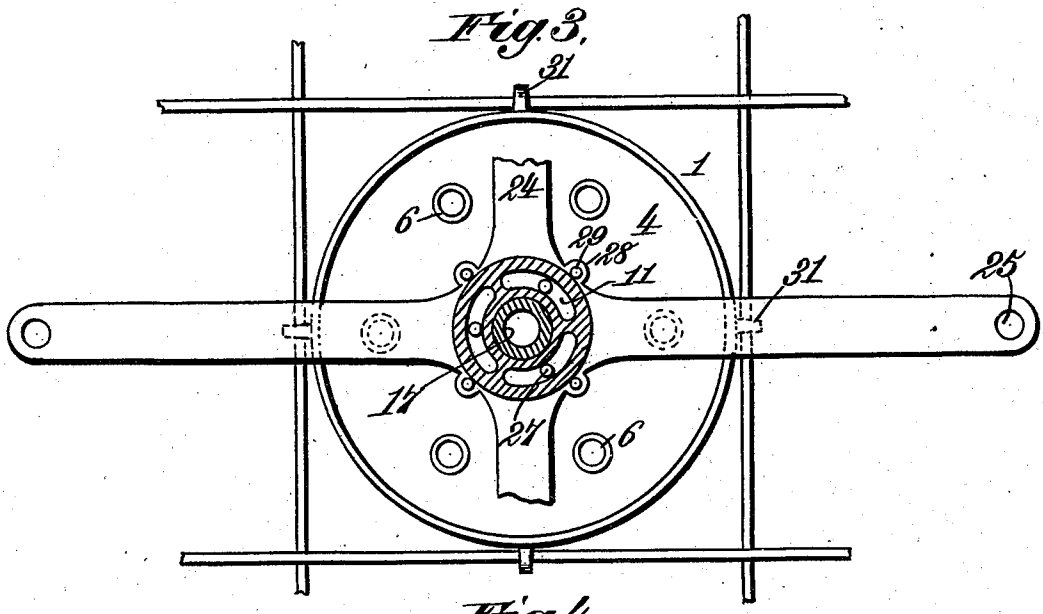



Fig. 4.

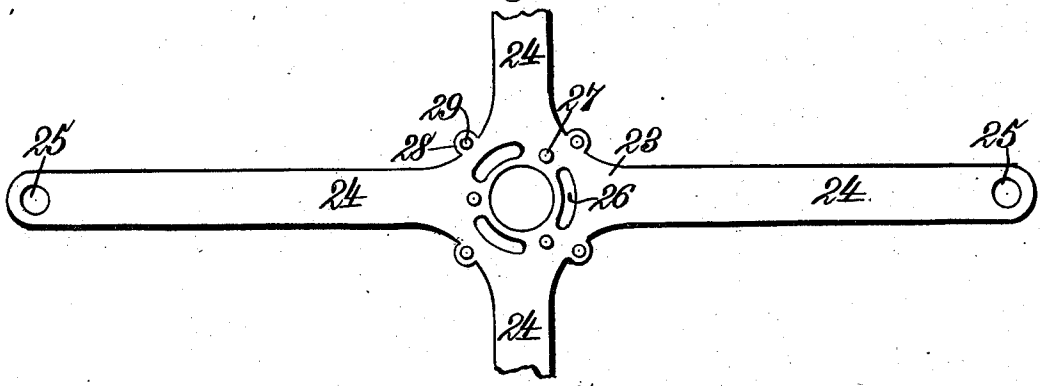
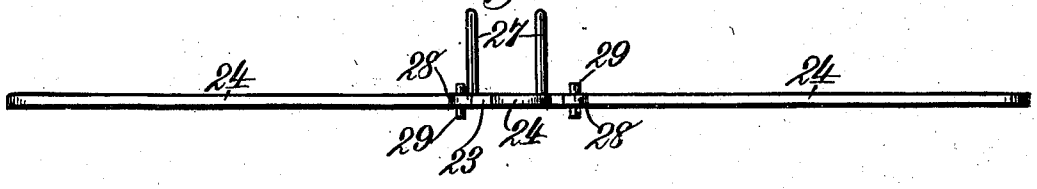



Fig. 5.




Witnesses.
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# UNITED STATES PATENT OFFICE.

JOSEPH G. BRANCH, OF ST. LOUIS, MISSOURI.

## LIQUID-FUEL BURNER.

SPECIFICATION forming part of Letters Patent No. 724,253, dated March 31, 1903.

Application filed April 1, 1902. Serial No. 100,934. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH G. BRANCH, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Liquid-Fuel Burners, of which the following is a specification.

This invention relates to liquid-fuel burners, and particularly to that class of such burners which are adapted to burn crude oil; and it has for its object to provide a burner of the type referred to by means of which the oil will be quickly and thoroughly atomized within the burner and the heavy residuums, which in burners of this class are practically unconsumed, will be deposited outside of the burner, whereby they may be readily removed.

To this end my invention consists in the features and in the construction, combination, and arrangement of parts, hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a vertical sectional view of a portion of a stove, showing my improved burner fitted thereto. Fig. 2 is a vertical sectional view of the burner. Fig. 3 is a horizontal sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a top plan view of the scraper, and Fig. 5 is a side view thereof.

Referring to the drawings, the numeral 1 indicates a closed pan or heating-chamber, comprising a flat circular bottom 2, having an annular vertical flange or wall 3 and a cover 4. Formed centrally on the upper side of the bottom 2 is a cylindrical boss 5, the top of which preferably extends slightly above the upper edge of the wall 3. The cover 4 is fitted around the boss 5, and the upper edge of the wall 3 preferably extends slightly above the upper surface of the cover 4. Fitted in suitably-threaded openings formed in the bottom 2 is a plurality of tubes 6, which extend through corresponding openings in the cover 4, whereby air may freely circulate through the pan or heater. The boss 5 is provided centrally on its upper side with a reduced and threaded nipple or extension 7, forming a shoulder or seat 8 on the upper side of the boss 5 for the purpose hereinafter described. Screwed on the nipple 7 is an atomizing-chamber comprising an inverted cone or funnel-shaped shell or casing 9, provided at its lower contracted end with a neck 10, said neck being interiorly threaded at its lower end and screwed on the nipple 7. Said neck is provided with vertical segment-shaped ports or passages 11, which communicate at their upper ends with the interior of the shell or casing 9. Formed in the upper portion of the neck 10 is a seat or socket 12.

The numeral 13 indicates a core which is of the shape of an inverted cone and is of less dimensions than the internal dimensions of the shell or casing 9. Said core is preferably cast from a solid piece of metal and is provided at its lower end with a depending cylindrical portion 14, which is seated in the socket 12, formed in the neck 10 of the shell or casing. The outer surface of the core 13 is separated from and concentric with the inner surface of the shell 9, and said core has formed on its conical side a plurality of ribs 15, which operate as distance-lugs to hold the core properly centered in the casing. An oil-pipe 16 is screwed into the lower end of a tubular passage 17, formed in the boss 5 and its extension 7, and a similar pipe 18 is screwed in the lower end of the core 13 and communicates with a pipe 19 of less diameter, which is fitted centrally in the core 13 and preferably projects at its upper end slightly above the upper end of said core. The upper end of the core 13 is made slightly convex, as shown, in order that oil may not collect on top of said core. The upper edge of the casing 9 is provided with a laterally-extending flange 20, to which is bolted a flat metallic cover 21, and said cover is provided on its under side with a plurality of lugs 22, which radiate outwardly from the center of said cover and are for the purpose of preventing the gas from pressing the top of the core up against the bottom of the cover. The lower portion of the nipple 7 is smooth or unthreaded, and rotatably arranged around such smooth portion and between the shoulder 8 and the bottom of the neck 10 of the shell or casing is a scraper consisting of a flat plate 23, provided with a plurality of radially-projecting arms 24, each of which latter is provided at its

outer end with a perforation 25, adapted to be engaged by a poker or similar implement to rotate the scraper about the nipple 7. The plate 23 is provided with a plurality of segment-shaped openings 26, that register with the openings 11, formed in the neck of the casing 9, and screwed into said plate between the ports or openings 26 are vertically and upwardly extending pins or scraper-arms 27, that extend into the passages 11 and when said scraper is oscillated operate to scrape off the deposit from the walls of said passages. Projecting laterally from the outer edge of the plate 23 is a plurality of perforated ears or lugs 28, in which are fitted vertical pins 29, which project both above and below said plate, and when the latter is oscillated operate to scrape off the residuum that oozes between the lower edge of the neck 10 of the casing and the upper face of the shoulder 8 of the boss. The cover 21 of the casing 9 is provided at its outer edge with a plurality of radially-extending perforated ears or lugs 30, which are adapted to be engaged by a poker or similar instrument to rotate the casing, so as to adjust the latter vertically about the threaded nipple 7, on which the casing is supported. The pan 1 is provided with a plurality of perforated lugs 31, preferably four in number, through which are adapted to be inserted rods, (not shown,) said rods in practice being passed through the wall of the stove or combustion-chamber and secured in place by nuts, so as to support the pan rigidly in place. Attached to the under side of the pan is a disk or diaphragm 32, preferably of galvanized iron, said disk in practice extending from the outer edge of the pan to the stove-casing or the interior of the combustion chamber, whereby all the air that is fed to the burner is compelled to pass up through the tubes 6, which extend through the pan or heater.

The operation of my improved burner is as follows: Oil is fed by any suitable means through the pipe 16 to the burner and passes up centrally through the latter by means of the passage 17 and pipes 18 and 19 and flows through the top of the latter onto the convex upper surface of the core 13, thence flows down over the latter and between the inclined sides of said core and the casing 9 until it reaches the bottom of said casing. It thence flows through the vertical apertures 11, formed in the neck 10 of the casing, and a portion of it escapes between the upper side of the plate 23 and the lower edge of the neck 10, and the other portion flows down through the apertures 26 in said plate and escapes between the under side of the plate and the upper side of the shoulder 8 of the boss 5. As the oil escapes at the points mentioned it is ignited and the flames impinge against the under-inclined sides of the shell or casing 9 and quickly heat the latter to a high temperature. After the shell or casing has been heated to a high temperature the oil in its passage through the burner, as above described, becomes thoroughly atomized and escapes from the burner in the form of a gas or vapor which burns with a blue flame. All the air that is admitted to the combustion-chamber to support combustion is compelled to pass through the tubes 6, and inasmuch as the pan or heater 1 is highly heated by the burning vapor the air in its passage through the tubes 6 also becomes highly heated, thus promoting the combustion of the gas or vapor. As before stated, the oil in its passage through the burner and before its escape from the latter is thoroughly atomized, and but very little of the residuum will be precipitated or deposited until it escapes from the burner. As the atomized oil escapes from the burner and is consumed, the heavy uncombustible residuums will drop onto the heated cover 4 of the pan and will there be charred, so that from time to time such charred deposits may be easily and conveniently scraped off. From time to time the scraper may be oscillated about the nipple 7, thus causing the scraper-pins 27 to oscillate back and forth in the segment-shaped ports or passages 11 and scrape off any residuum that may be collected on the interior of said ports or passages, and in the same manner the upper and lower surfaces of the plate 23 will operate to scrape off any residuum that may be deposited on said surfaces and between the latter and the bottom of the neck 10 and the upper side of the shoulder 8. The oil flowing through the burner will operate to force out the deposits thus scraped off from the said surfaces, and the pins 29 will operate to scrape the same from around the joint formed between the shoulder 8, scraper 23, and lower edge of the neck 10, and cause it to drop down onto the cover 4 of the pan, from which it may be easily removed in the manner before described. By means of a poker or similar implement the casing 9 may be turned, as before stated, and inasmuch as the neck of said casing is threaded on the threaded nipple 7 said casing will be raised and lowered, according to the direction in which it may be turned, thus regulating the distance between the lower edge of the neck 10 and the scraper 23, whereby the passage of the fuel from the burner to its point of ignition can be regulated.

The important feature of my invention resides in the fact that the oil is thoroughly atomized in the burner before its escape from the latter, so that nearly all the residuum collects on an exposed surface outside the burner, from which it may be readily removed, and another important feature consists in providing the scraper, by means of which the small portion of the residuum which collects in the bottom of the burner may be scraped off and removed without detaching or separating any portion of the burner.

Having described my invention, what I

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

1. In a liquid-fuel burner, the combination with a closed hollow pan having a seat on its upper side provided with an upwardly-extending threaded nipple, of an atomizing-chamber provided at its lower threaded end with outlet ports or discharges and vertically adjustable on said nipple toward and from said seat, an oil-feed pipe arranged centrally within the atomizing-chamber and forming a continuation of the nipple for supplying oil to the vaporizing-chamber, and a pipe for feeding oil to the nipple, substantially as described.

2. In a liquid-fuel burner, the combination with a closed hollow pan having a seat on its upper side provided with an upwardly-extending nipple, of an atomizing-chamber provided at its lower end with outlet ports or passages and vertically adjustable on said nipple toward and from said seat, an oil-feed pipe for supplying oil to the vaporizing-chamber, and a scraper movably arranged between the seat and the lower apertured end of the atomizing-chamber, substantially as described.

3. In a liquid-fuel burner, the combination with a closed hollow pan having a seat on its upper side provided with an upwardly-extending threaded nipple, of an atomizing-chamber screwed at its lower end onto said nipple and provided with outlet-ports in its bottom, an oil-feed pipe for supplying oil to the atomizing-chamber, and means whereby the latter may be turned to adjust its lower end toward and from the said seat, substantially as described.

4. In a liquid-fuel burner, the combination with a closed hollow pan having a seat on its upper side provided with an upwardly-extending threaded nipple, of an atomizing-chamber screwed at its lower end onto said nipple and provided with outlet-ports in its bottom, a scraper rotatably arranged about said nipple and between the bottom of the atomizing-chamber and said seat, and an oil-feed pipe for supplying oil to the atomizing-chamber, substantially as described.

5. In a liquid-fuel burner, the combination with a closed pan having a flat top and provided with open-ended air-tubes extending vertically through the pan, of a seat extending upwardly through the pan and above the cover thereof and provided with a reduced and threaded nipple, of an atomizing-chamber screwed on the nipple and adjustable on the latter toward and from said seat, said atomizing-chamber being provided at its bottom above the seat with outlet-ports, means for turning said atomizing-chamber to adjust it toward and from the seat, and an oil-feed pipe for supplying oil to the atomizing-chamber, substantially as described.

6. In a liquid-fuel burner, the combination with a closed pan having a flat top and provided with open-ended air-tubes extending vertically through the pan, the edges of the pan extending above the edges of the cover, of a seat extending centrally upward from the cover and provided with a reduced and threaded nipple, an atomizing-chamber screwed at its lower end on the nipple and adjustable thereon toward and from the seat, said atomizing-chamber being provided with outlet-ports in its bottom, and an oil-feed pipe for supplying oil to the atomizing-chamber, substantially as described.

7. In a liquid-fuel burner, the combination with a closed hollow pan having a seat on its upper side provided with an upwardly-extending nipple, of an outer casing inclosing said pan, open-ended air-tubes extending vertically through said pan, an imperforate partition attached to and extending laterally around the pan to the inclosing casing, an atomizing-chamber supported at its lower end on the nipple and adjustable thereon toward and from said seat, and an oil-feed pipe for supplying oil to the atomizing-chamber, substantially as described.

8. In a liquid-fuel burner, the combination with a closed hollow pan having a seat on its upper side, of an atomizing-chamber supported at its lower end above and adjustable toward and from said seat, said atomizing-chamber having segment-shaped outlet-ports in its bottom, a rotatable scraper arranged between said seat and the bottom of the chamber and provided with upwardly-projecting scraper-arms movably fitted in the outlet-ports, and an oil-feed pipe for supplying oil to the atomizing-chamber, substantially as described.

9. In a liquid-fuel burner, the combination with a closed hollow pan having a circular seat on its upper side, of an atomizing-chamber supported at its lower cylindrical end above and adjustable toward and from said seat, said atomizing-chamber having outlet-ports in its bottom, a scraper rotatably arranged between the seat and the bottom of the atomizing-chamber, and scraper-arms carried by said scraper and arranged to scrape the adjacent cylindrical edge portions of said seat and the lower end of the atomizing-chamber, substantially as described.

10. In a liquid-fuel burner, the combination with a closed hollow pan having a circular seat on its upper side, of an atomizing-chamber supported at its lower cylindrical end above and adjustable toward and from said seat, said atomizing-chamber having outlet-ports in its bottom, a scraper rotatably arranged between the seat and the bottom of the atomizing-chamber, pins carried by the scraper and projecting vertically above and below the same, said pins being arranged to scrape the adjacent cylindrical edge portions of the seat and the lower end of the atomizing-chamber, substantially as described.

11. In a liquid-fuel burner, the combination with a closed hollow pan having a circular seat on its upper side, of an atomizing-cham-

ber supported at its lower end above and adjustable toward and from said seat, said atomizing-chamber having outlet-ports in its bottom, a scraper rotatably arranged between the seat and the bottom of the atomizing-chamber, said scraper comprising a flat plate provided with a radially-projecting arm for rotating it, substantially as described.

12. In a liquid-fuel burner, the combination with a closed hollow pan having a circular seat on its upper side, of an atomizing-chamber supported at its lower end above and adjustable toward and from said seat, said atomizing-chamber being provided in its bottom with outlet-ports, and a scraper rotatably arranged between the seat and the bottom of the atomizing-chamber, said scraper comprising a flat plate provided with a radially-projecting arm having an aperture in its outer end, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH G. BRANCH.

Witnesses:
ROYDEN K. PRETTY,
PAUL WILKINSON.