

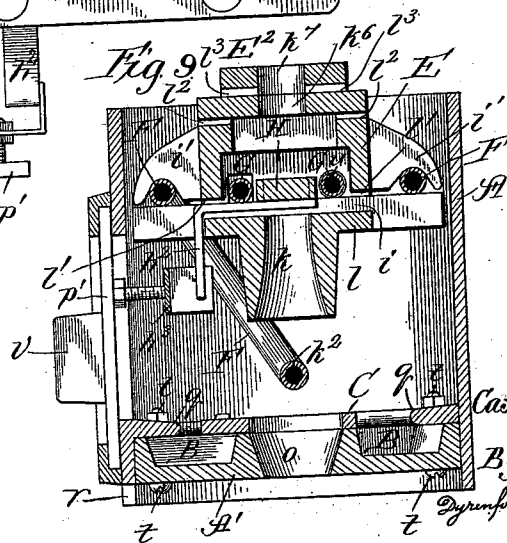
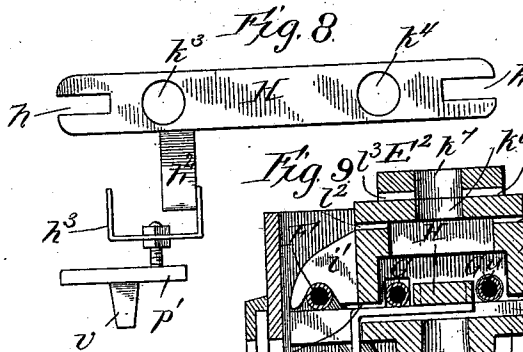
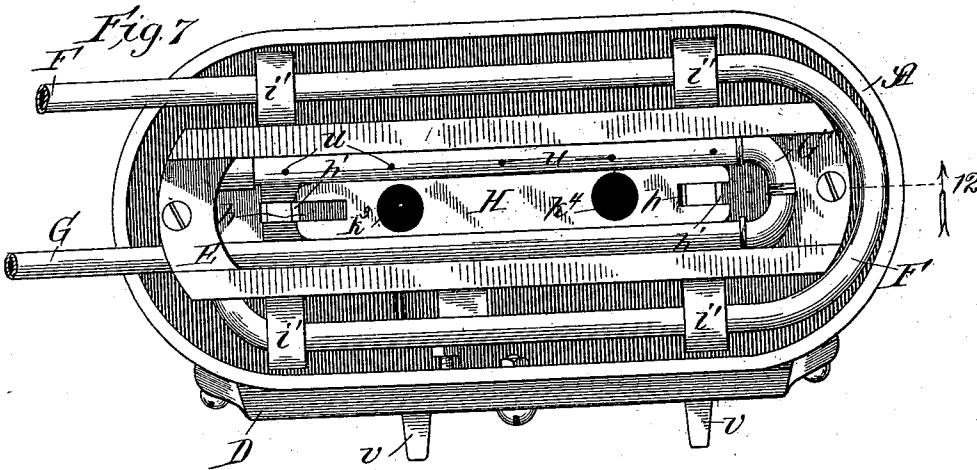
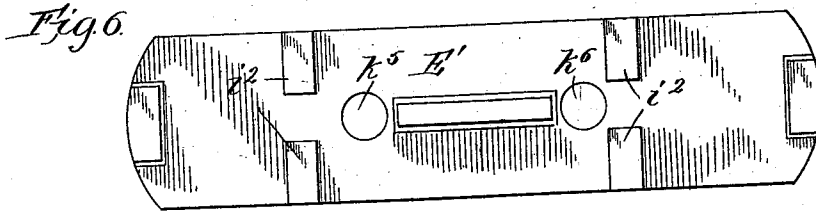
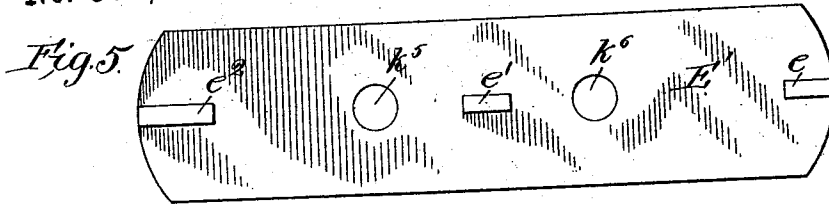
(No Model.)

3 Sheets—Sheet 2.

C. RUTKOSKIE.
HYDROCARBON GAS GENERATING HEATER.

No. 544,593.

Patented Aug. 13, 1895.



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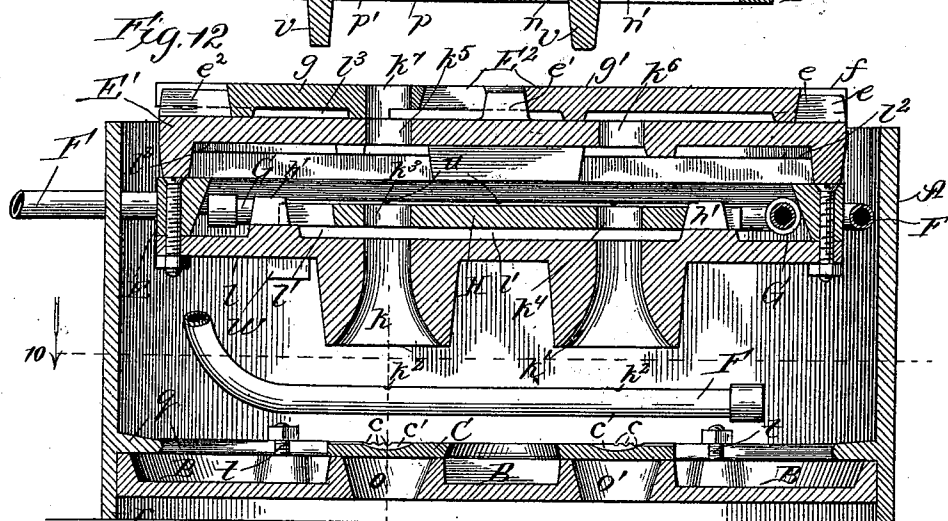
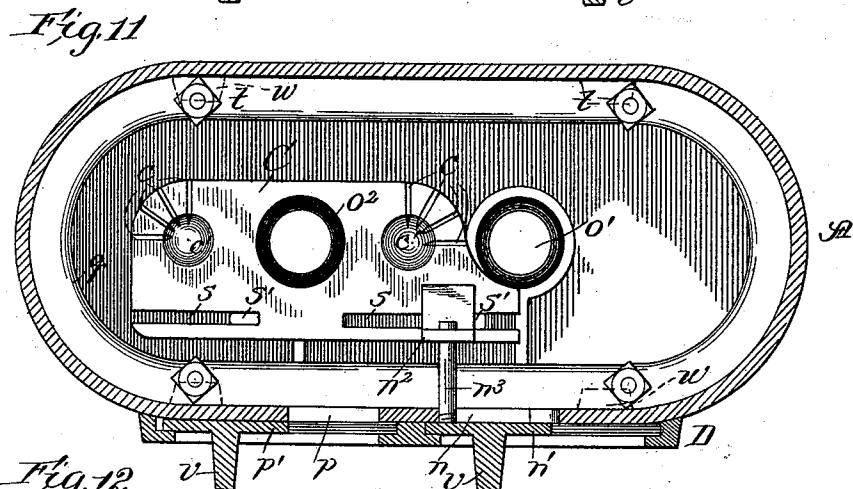
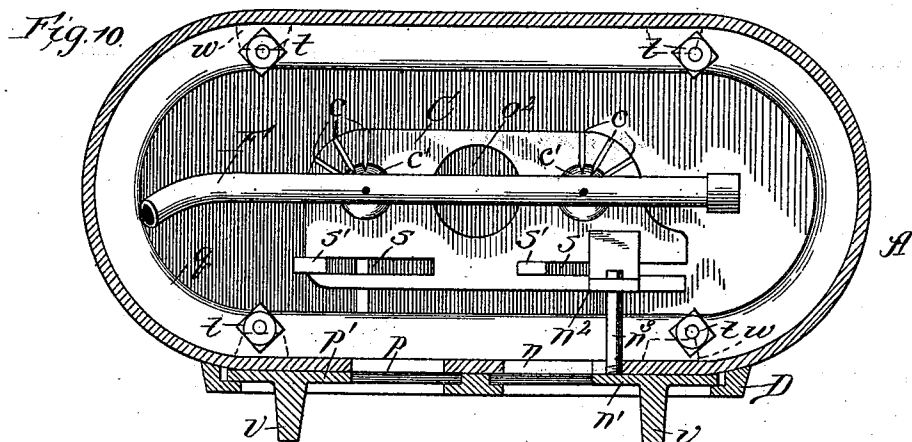
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UNITED STATES PATENT OFFICE.

CASIMIR RUTKOSKIE, OF BENTON HARBOR, MICHIGAN, ASSIGNOR TO
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JOSEPH, MICHIGAN.

HYDROCARBON-GAS-GENERATING HEATER.

SPECIFICATION forming part of Letters Patent No. 544,593, dated August 13, 1895.

Application filed June 7, 1895. Serial No. 551,970. (No model.)

To all whom it may concern:

Be it known that I, CASIMIR RUTKOSKIE, a citizen of the United States, residing at Benton Harbor, in the county of Berrien and State of Michigan, have invented a new and useful Improvement in Hydrocarbon-Gas-Generating Heaters, of which the following is a specification.

My invention relates to an improvement in the class of heaters which are adapted to be seated inside a stove to burn liquid hydrocarbon as the fuel by reducing it to gaseous form by the heat generated from its combustion in the heater.

The object of my invention is to provide a heater of the class referred to improved in matters of detail to facilitate and render more effective the operation of starting it to burn and generate gas from the hydrocarbon fuel fed to it and thereafter to permit more perfect regulation of the heater.

Referring to the accompanying drawings, Figure 1 shows my improved heater by a view in side elevation. Fig. 2 is a plan view of the same; Fig. 3, a top plan view of the upper deflecting-plate detached from the mixing-chamber and with its two sections distended; Fig. 4, a bottom plan view of the same; Fig. 5, a top plan view of the lower deflecting-plate; Fig. 6, a bottom plan view of the same; Fig. 7, a plan view of the heater with the deflecting-plates removed; Fig. 8, a plan view of the sliding valve-plate employed in the mixing-chamber and showing the means for working it; Fig. 9, a section taken at the line 9 on Fig. 12 and viewed in the direction of the arrow; Fig. 10, a section taken at the line 10 on Fig. 12 and viewed in the direction of the arrow; Fig. 11, a view like that presented in Fig. 10, but showing the slide-valve in the base of the heater open; and Fig. 12, a section taken at the line 12 on Fig. 7 and viewed in the direction of the arrow.

A denotes the shell of the heater, shown in its preferred oblong form with rounded ends and having a circumferential base-flange *r* cut away at *a*, as indicated in Fig. 1. Inside the shell, which may be of cast metal, is formed, near its base, a circumferential flange *q*, to which the separately-formed bottom *A'* is fas-

tened by bolts *t*, as shown, and the space in the shell below the flange *q* affords a kindling-pan B. I provide in the bottom *A'* two openings *o* and *o'*, affording base air-inlets, which are flanged, as shown, about their inner ends, the flanges extending about to the plane of the flange *q* and affording a seat for a slide-valve C, guided in its movements by slots *s*, engaging studs *s'*, the valve being provided to control the air-supply and adapted in one position to cover both openings *o* and *o'* and in its other position to uncover the opening *o'* and coincide at an opening *o²* provided in it with the opening *o*. In one side of the shell are door-openings *p* and *n*, adapted to be closed and opened by sliding doors *p'* and *n'*, each provided with a handle *v*, by which to manipulate it, the doors being supported in a suitable frame D, fastened to the outer side of the shell. The door *n'* is connected with the slide-valve C at a stud *n²* thereon through he medium of a rod *n³*.

E is the mixing-chamber, seated on lugs *w*, projecting from the inner sides of the shell. The bottom *l* of the mixing-chamber and the opposite sides thereof are arranged to afford the lateral longitudinal spaces or openings *l'*, and in the bottom are provided, to coincide with the air-inlet openings *o* *o'* in the base *A'*, the downwardly-flaring flanged openings *k* and *k'*. To afford the spaces *l'* in the sides near the base of the mixing-chamber, ribs *i* are cast on the bottom *l* to extend transversely across and beyond it near its opposite ends, and the projecting ends of the ribs form, with ears *i'*, extending from the sides of the mixing-chamber, jaws for holding the oil-supply pipe F, which enters the shell A at one end of the mixing-chamber, extends along one side of the latter and about its opposite end to the other side thereof, along which it extends nearly to the end at which it is introduced, where it is bent downward and extended back again underneath the openings *k* and *k'*, at each of which it is provided with a perforation *k²* and being closed at its extremity. I also show a steam-pipe G, entering the mixing-chamber at one end and extending along both inner sides thereof, being connected at the farther end by a coupling

G', Fig. 7, and provided with perforations *u*. This pipe may be used at will by connection with a water-supply to admit water, which is vaporized in the pipe by the heat in the mixing-chamber and discharges into the latter as steam to mix with the products of combustion.

H is a valve-plate (see Fig. 8) supported on the ribs *i* at the base of the mixing-chamber and having the extent of its movement limited by slots *h* in its opposite ends engaging with studs *h'*, extending upward from the ribs, the lugs and slots affording guides for the valve-plate, in which are provided openings *k*³ and *k*⁴ the same distance apart as the openings *k* and *k'*. This valve-plate is provided with a side lug *h*², projecting between the arms of a yoke *h*³, which extends inward from the sliding door *p'*, whereby opening the door effects sliding of the valve-plate to cause it to close the openings *k* and *k'* by bringing its openings out of coincidence therewith, and closing the door brings the openings *k*³ and *k*⁴ in the valve-plate into coincidence with the openings *k* and *k'*.

The mixing-chamber is surmounted by a plate E', having ribs *i*² extending across its under side and at which it rests on the edges of the chamber, thus affording side spaces or openings *l*², (see Figs. 9 and 12,) and in the plate E' are provided openings *k*⁵ and *k*⁶, coinciding with the openings *k* and *k'*. The plate E' is in turn surmounted by a plate E², formed in two longitudinal sections *g* and *g'*, having ribs *i*³ on their under sides to afford side openings *l*³ between them and the plate E', the section *g'* being stationary by engagement at a slot *f* in one end with a lug *e* on the upper side of the plate E' and having a slotted tongue *d* in its opposite end to enter a recess *f'* at the adjacent end of the section *g*, the slot in which tongue is guided by a lug *e'* on the lower plate in the longitudinal movements of the section, the latter being further provided with an opening *k*⁷ and a recess *f*² in its outer end to engage and be guided by a stud *e*² on the plate E'.

To start the burning of the heater, the door *n'* is opened to cause the valve-plate C to cover and thus close both air-inlets *o* and *o'*, and the door *p'* should then be opened also to cause the valve-plate H to close both openings *k* and *k'* to the openings *k*⁵ and *k*⁶ in the lower deflector-plate E'. The supply of hydrocarbon oil is then opened to the pipe F, through which it flows and discharges at the perforations *k*² upon the valve-plate C, which is provided with channels *c*, leading from depressions *c'*, to direct the oil into the kindling-pan B. When the desired quantity of the liquid fuel has been thus admitted, it is ignited, the heat partially vaporizing the oil in the depending length of the pipe F and causing it to spurt out of the perforations *k*² through the openings *k* and *k'*. By keeping, during this period, the slide-valve H in position to cover the openings *k* and *k'* the oil

thus spurted cannot reach higher than the base of the mixing-chamber, whence it flows out at the sides through the spaces or openings *l'*, adjacent to which are the lengths of the pipe F, and as the oil burns at these openings the generated heat is directed against the sections of pipe F, thereby heating the oil as it passes through the pipe, so that it is gasified when it emerges from the perforations *k*². When the heater has been thus started the door *n'* is closed to open the air-inlets *o* and *o'* in the bottom of the heater, whereby all the air for promoting combustion is taken in at the base, an arrangement which prevents the roaring noise which ensues when the air is fed from above the base, and the door *p'* is closed to slide the valve-plate H into the position of bringing its openings *k*³ and *k*⁴ coincident with the openings *k* and *k'* in the base of the mixing-chamber and the openings *k*⁵ and *k*⁶ in the plate E', the plate-section *g* being normally kept in the position to maintain its opening *k*⁷ out of coincidence with the opening *k*⁵. Thus the flame which shoots from the perforations *k*² through the opening *k'* and *k*² enters the mixing-chamber and emerges therefrom through the side openings *l*² and *l*³ after the products of combustion have undergone thorough mixture in the mixing-chamber, and thereby a steady hot flame is generated to emerge throughout the length of the openings, extending along both sides of the plates E' and E².

When it is desired to employ the flame through the top of the plate E² the section *g* is moved to bring its opening *k*⁷ coincident with the opening *k*⁵, and this may also be done when it is desired to reduce the temperature inside the heater by directing a portion of the flame from impingement against the pipe F. The slide-valve H, moreover, may be used to keep the heater burning at a low heat, when it is desired to discontinue the use of the heater, without allowing it to go out entirely. This is done by opening the door *p'*, which causes the slide-valve H to close the openings *k* and *k'* and direct the products of combustion from a reduced supply of the liquid fuel, regulated accordingly, through the side openings *l'* at the base of the mixing-chamber against the adjacent sections of the pipe F to keep up sufficient heat for generating gas from the oil and maintaining the heater in condition for starting up at any time.

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

1. In a heater of the character described, the combination with the shell having an air-inlet in its base, the mixing-chamber supported in the shell above said base and opening into the latter, and the feed-pipe for liquid hydrocarbon, of a kindling-pan in said base, into which said feed-pipe discharges, a slide-valve covering said air-inlet, and a door in an opening in the side of the shell con-

nected with said slide-valve to move it by opening and closing the door, substantially as and for the purpose set forth.

2. In a heater of the character described, the combination with the shell having air-inlets o and o' in its base, the mixing-chamber supported in the shell above said base and opening into the latter, and the feed-pipe for liquid hydrocarbon, of a kindling-pan in said base, into which said feed-pipe discharges, a slide-valve C having an opening o^2 and covering said air-inlets, a door n' supported to slide at an opening n in said shell, and a connection between said door and slide-valve, whereby opening and closing the door moves the slide-valve to close and open said air-inlets, substantially as and for the purpose set forth.

3. In a heater of the character described, the combination with the shell, of a mixing-chamber supported thereon and having side-openings near its base and an opening in its bottom, a slide-valve in said mixing-chamber, means for adjusting said slide-valve at will, from without the shell, to open and close said bottom-opening, and a feed-pipe for liquid-hydrocarbon, extending about the mixing-chamber adjacent to said side-openings, and extended underneath the mixing-chamber, being provided in said extended portion with one or more discharge-apertures, substantially as and for the purpose set forth.

4. In a heater of the character described, the combination with the shell, of a mixing-chamber supported therein and having side-openings l' near its base and openings k and k' in its bottom, a slide-valve H in the mixing-chamber, a door p' supported at an opening p in the side of the shell, a connection between said slide-valve and door whereby opening and closing the door moves the slide-valve to close and open said openings k and k' , and a feed-pipe F for liquid hydrocarbon, extending about the mixing-chamber adjacent to said side-openings and extended underneath the mixing-chamber, being provided with apertures k^2 at said openings k and k' , substantially as and for the purpose set forth.

5. In a heater of the character described, the combination with the shell, of a mixing-chamber supported therein and having side-openings near its base and an opening in its bottom, a slide-valve in said mixing-chamber, means for adjusting said slide-valve at will, from without the shell, to open and close said bottom-opening, a feed-pipe for liquid hydrocarbon, extending about the mixing-chamber adjacent to said side-openings and extended

underneath the mixing-chamber, being provided in said extended portion with one or more discharge apertures, a deflecting-plate having an opening and surmounting the mixing-chamber to afford side-openings leading therefrom, and a second deflecting-plate surmounting said first-named deflecting-plate and forming intermediate side-openings therewith, substantially as and for the purpose set forth.

6. In a heater of the character described, the combination with the shell, of a mixing-chamber supported therein and having side-openings near its base and an opening in its bottom, a slide-valve in said mixing-chamber, means for adjusting said slide-valve at will, from without the shell, to open and close said bottom-opening, a feed-pipe for liquid hydrocarbon, extending about the mixing-chamber adjacent to said side-openings and extended underneath the mixing-chamber, being provided in said extended portion with one or more discharge apertures, a deflecting-plate having an opening and surmounting the mixing-chamber to afford side-openings leading therefrom, and a second deflecting-plate adj-justably surmounting said first-named deflecting-plate and forming side-openings therewith and provided with an opening extending through it, substantially as and for the purpose set forth.

7. In a heater of the character described, the combination with the shell, of a mixing-chamber E supported therein and having side-openings l' near its base and openings k and k' in its bottom, a slide-valve H in said mixing-chamber, a door p' supported to slide at an opening p in the shell, a connection between said door and slide-valve to move the latter by opening and closing the door, a feed-pipe F extending about the mixing-chamber adjacent to said openings l' and extended underneath the mixing-chamber, being provided in said extended portion with apertures k^2 , a plate E' having openings k^4 and k^5 and surmounting the mixing-chamber to afford side-openings l^2 , and a plate E^2 formed of a section g containing an opening k^7 and a section g' , the plate E^2 being supported on the plate E' to afford side-openings l^3 and permit adjustment of the section g with relation to the section g' , substantially as and for the purpose set forth.

CASIMIR RUTKOSKIE.

In presence of—
M. J. FROST,
J. H. LEE.