(No Model.) 2 Sheets—Sheet 1.

J. WILLIAMS & G. A. CUMMER.

GASOLINE BURNER.

No. 493,540. Patented Mar. 14, 1893.

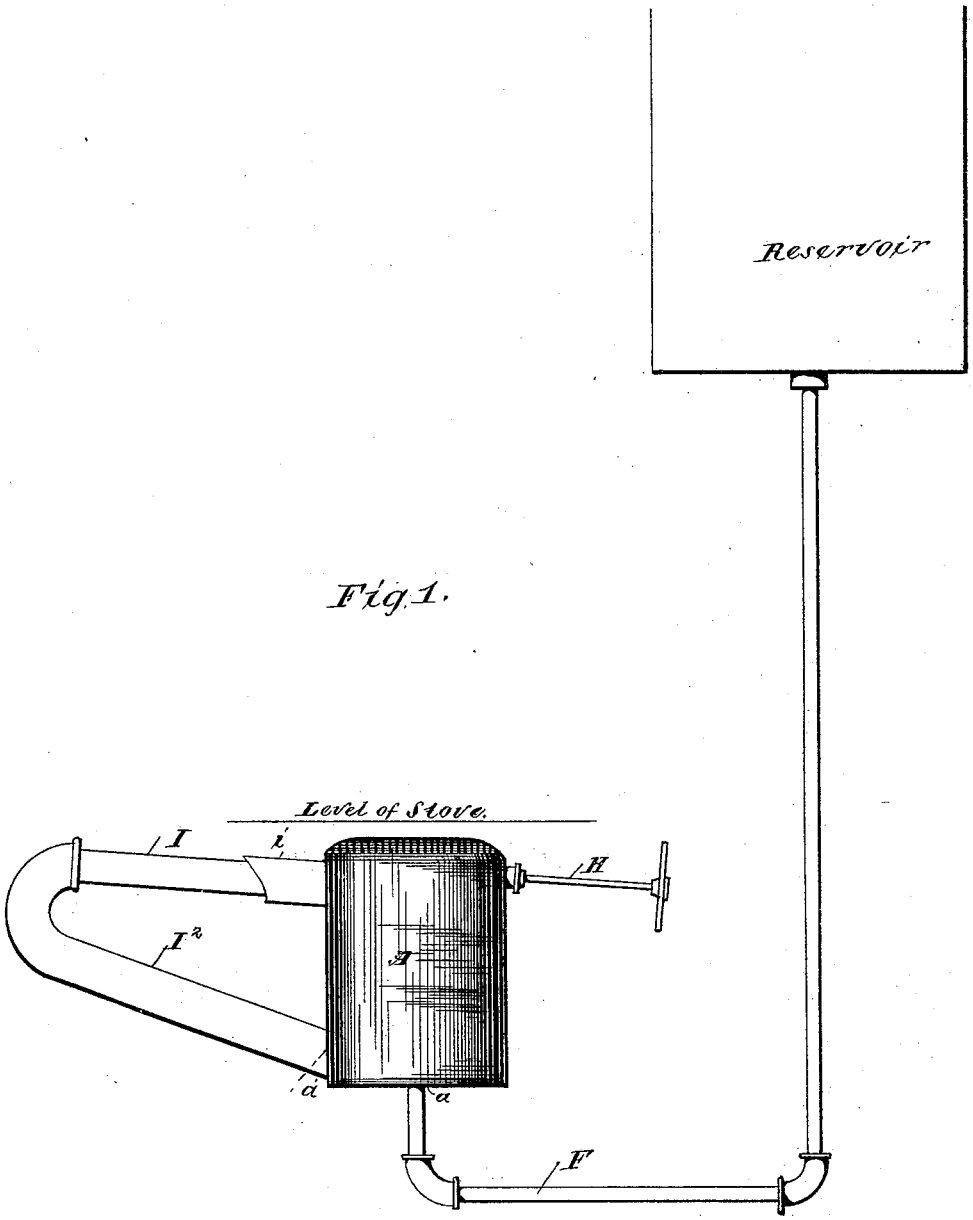

Fig. 1.

Witnesses
C. H. Moore
Minnie Mauney

Inventors
James Williams
and George A. Cummer
by Wm. M. Monroe
Attorney

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

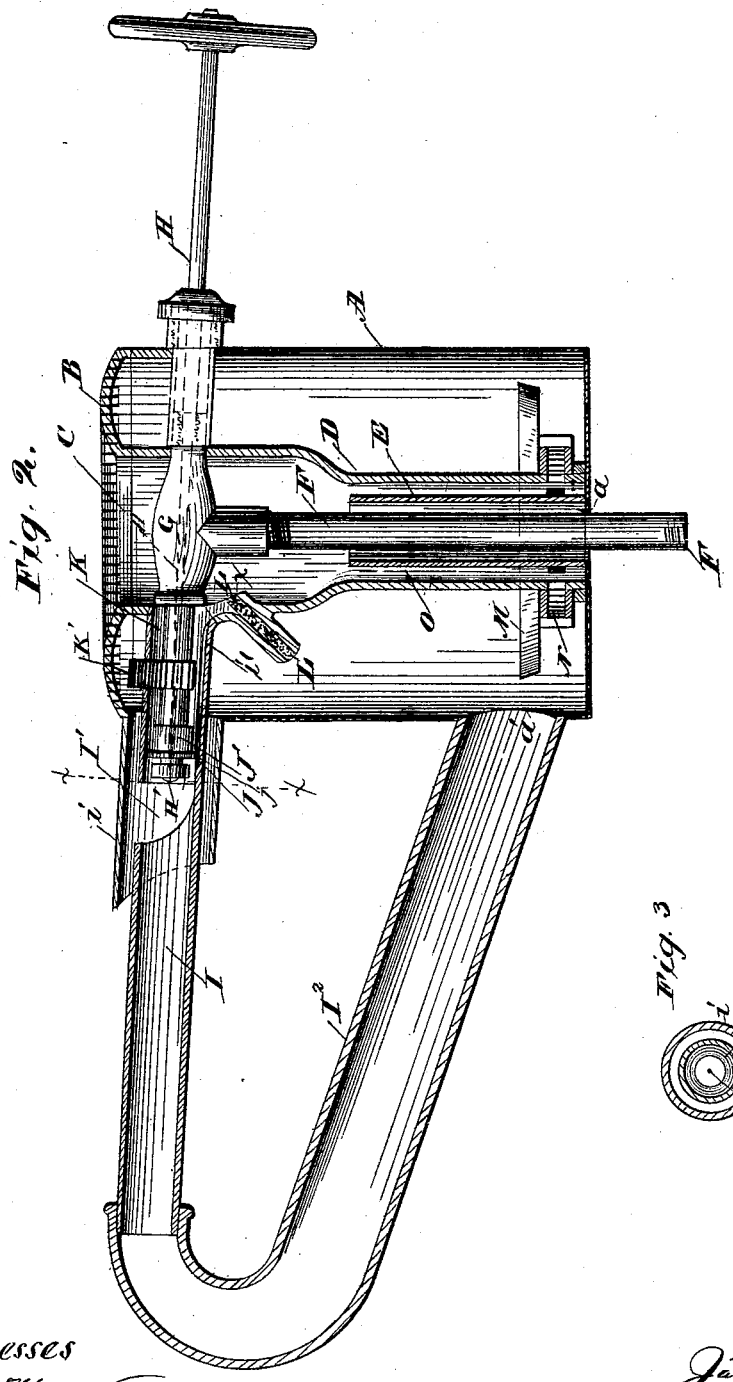
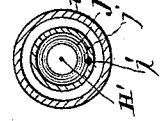


Fig. 3



Witnesses
F. A. Moore
Minnie Hoagney

Inventors
James Williams
and George A. Cummer
by Wm. M. Honor
Attorney

UNITED STATES PATENT OFFICE.

JAMES WILLIAMS AND GEORGE A. CUMMER, OF CLEVELAND, OHIO; SAID WILLIAMS ASSIGNOR TO ROBERT J. CUMMER, OF SAME PLACE.

GASOLINE-BURNER.

SPECIFICATION forming part of Letters Patent No. 493,540, dated March 14, 1893.

Application filed August 31, 1891. Serial No. 404,214. (No model.)

To all whom it may concern:

Be it known that we, JAMES WILLIAMS and GEORGE A. CUMMER, citizens of the United States, and residents of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Gasoline-Burners, of which we hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in burners for gasoline stoves, and its objects are to produce a perfect and economical form of burner without the usual waste in lighting and starting the burner into action, and the consequent annoyance attending upon the use of a drip cup, and also to produce a self cleansing burner of great purity and power and a constant generator, and it consists in the union of a preliminary vapor generating and combustion chamber and a mixing chamber and in the combination and arrangement of parts and construction of details, as hereinafter described, shown in the accompanying drawings and more specifically pointed out in the claims.

In the accompanying drawings Figure 1 is an exterior view of the burner showing connection with tank. Fig. 2 is a vertical longitudinal central section of the same showing relations of all the parts. Fig. 3 is a cross section on line *x*—*x*, Fig. 2.

It will be seen by reference to the drawings that A is the exterior shell of the burner, and consists of a cylindrical vessel with a nearly entirely inclosed bottom and an annular burner cap B, reserving the central opening C. A pipe D of equal diameter with this opening extends from the burner cap to the bottom of the vessel A, and the vertical tube E within the pipe D communicates with the air exterior to the cylinder A through the bottom at *a*, the function of this tube being to insure a strong central draft through the burner. Centrally through this tube and projecting above it, rises the gasoline supply pipe F which terminates near the top of the burner in the cross-T G, through which passes the valve stem H at nearly right angles.

At one side of the cylinder A and in continuation of the axis of the valve is placed the receiving tube I into which the gasoline jet is directed; this tube is provided with the opening I′, at its union with the cylinder A for air admission, and the opening is preferably provided with a guard as *i*. In further continuation the receiving tube I is turned downward at some distance from the cylinder A and returned at I^2 to re-enter the cylinder near its base at *a*′, thus presenting a V-shaped formation on the exterior of the cylinder. The valve H′ is located near the juncture of the tube I, with the cylinder and the sleeve disk J is placed in the rear of the valve opening over the pipe J′ which with the extremity of the cross-T G, incloses the generating chamber K, the uses of which will be explained hereinafter in detail. A slight notch *j* in the bottom of the disk J and channel *i*′ in the bottom of the pipe I permits the fluid discharged into the pipe I to traverse the incline of the pipe by gravity and to fall into the inclined opening L in the upper part of the pipe D through which it is discharged within the chamber A. This opening is filled with asbestus. Within this chamber and mounted upon the pipe D near the base of the chamber is the evaporating pan M upon which the fluid discharged from the opening L will fall, in a vaporous state. This is due to the fluid being volatile and evaporating as it enters the opening L. The asbestus also has the effect of further volatilizing the fluid as it acts as a sponge and disperses the molecules. Beneath this pan and communicating with the annular chamber O formed between the outer pipe D and inner tube E is the flattened and exteriorly perforated or slotted cylindrical chamber N. The burner cap on the chamber A is seen to be similarly slotted or perforated for the escape of gas.

In operation it will be seen that two distinct generating chambers are formed by this construction in one of which a central flame is produced by a cold draft and in the other or annular chamber a final and continuous annular flame is fed by heated gas. It will therefore be observed that when the gasoline fluid is first admitted into the inclined pipe

I it trickles downward through the opening L into the pan M. A light is then applied at *x*, the inner extremity of this opening when a flame is produced centrally within the burner which rises through the opening C. By this means a strong draft is produced through the tube E which excites a similar draft through the chamber O, the effect of this draft being to siphon the vaporous fluid resting upon the pan M into the chamber O through the perforated cylinder N and carry it upward till it meets the flame at *x* and gives continuous support to the combustion. The condition of the flame is not yet such as to admit of a large heating volume, since to produce this the gas should be admitted into the exterior chamber. The effect however of this central fire is to thoroughly heat the cross-T G, and admission tube through which the fluid passes, so that almost immediately the fluid is discharged in the form of gas into the tube I whence it is carried by the draft into the interior of the annular chamber A which it fills and ascending through the perforated cap B is lighted and burns in the completed form in an annular blue flame. It will be seen that no fluid escapes longer from the valve and that therefore no more trickles into the chamber A through the opening L, for this reason no more vaporous fluid is supplied to the central flame which therefore stops of its own accord, from want of nourishment, the stronger draft passing through the exterior chamber. The supply of gasoline to the asbestus is automatically cut off as soon as the supply pipe F becomes sufficiently heated, the gasoline at this moment being turned into gas and is carried by the strong draft through the pipe I into the chamber A at *a'*. The internal burner having served its purpose as a heater it is no longer needed. In order to consume any remaining vapor left in the chamber A in case the flame is put out, the small generating chamber K is employed, the gas being admitted thereto through the perforated periphery of the burner K'. The draft at this time not being strong, any remaining gas may be consumed within this burner.

K' is an ordinary perforated ring burner open at its bottom for the entrance of gas rising from the large outside chamber or which may remain in the pipe.

It will be seen that a slight air admission is obtained into the chamber K sufficient to insure combustion. We believe ourselves to be the first to employ a preliminary combustion chamber in immediate combination with and in juxtaposition to be a final combustion and a commingling chamber, and to employ a final combustion chamber without the necessity of an exterior drip-cup and the attendant waste thereto.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A gasoline burner provided with an initial combustion chamber and a mixing chamber, a supply pipe provided with a regulation valve, a circulation pipe from which the fluid, before being vaporized, flows into the mixing chamber through a passage in communication with the initial chamber, whereby a portion of the fluid is caused automatically to flow to the starting burner of the initial chamber, and then without any adjustment of the feed valve or any other part of the apparatus this flow is caused to cease, and the vaporization of the fluid caused to commence and go on until the supply of fluid is cut off, substantially as described.

2. The gasoline burner having an initial combustion chamber and a mixing chamber, a supply pipe with regulation valve, a circulation pipe, the said mixing chamber being in communication with the initial combustion chamber, and the initial combustion chamber being provided with a tubular projection L filled with vaporizing material, as asbestus, and with a perforated portion N, the said chambers being arranged within one another, and in communication with each other by means of the projection L and the perforations in the portion N, and supplied with air, substantially as and for the purpose described.

3. A gasoline burner comprising an initial burner chamber, a mixing chamber outside said initial chamber, a heating pipe forming a portion of the supply pipe and arranged to be under the action of the burning vapor of the initial heating chamber, a vapor circulation pipe in communication with the supply and heating pipe, and with the initial heating chamber and mixing chamber, and air induction passages for insuring combustion, substantially as described.

4. In a gasoline burner, the combination of the internally arranged initial combustion chamber into which the supply fluid is introduced in a cold fluid condition, an outer surrounding final combustion chamber into which the fluid is introduced in a vaporous heated condition, a supply pipe passing through said initial chamber and adapted to be heated thereby, the upper end of said initial chamber being inclined and provided with an opening for the entrance of cold fluid, a conducting passage L in said chamber at its upper end, a vaporizing pan M near its bottom, a perforated cylinder N forming a communication between the two chambers, and a central draft passage, whereby the vaporous fluid on the drip pan will be automatically siphoned or drawn into the initial combustion chamber to be ignited and the supply of fluid to the initial chamber automatically cut off and the fluid in the form of vapor caused to continuously enter the final combustion chamber, to be consumed, substantially as described.

5. In a gasoline burner, an interior initial combustion chamber an exterior final com-

bustion chamber for gas, a commingling chamber exterior to both chambers and means substantially as described for introducing cold fluid into the exterior chamber, siphoning the same into the interior chamber and initial means for introducing the heated gas into the exterior chamber, all combined as and for the purpose set forth.

6. In a gasoline burner an interior initial combustion chamber, a fluid supply pipe and induction valve passing through said chamber, a commingling chamber in line of the axis of the induction valve and arranged diagonally to discharge into the cold chamber and a chamber for the combustion of gas annularly placed about the initial combustion chamber and a circulation pipe for gas connecting the commingling gas combustion chambers, substantially as described.

JAMES WILLIAMS.
GEORGE A. CUMMER.

Witnesses:
WM. M. MONROE,
CHAS. W. DIEHL.