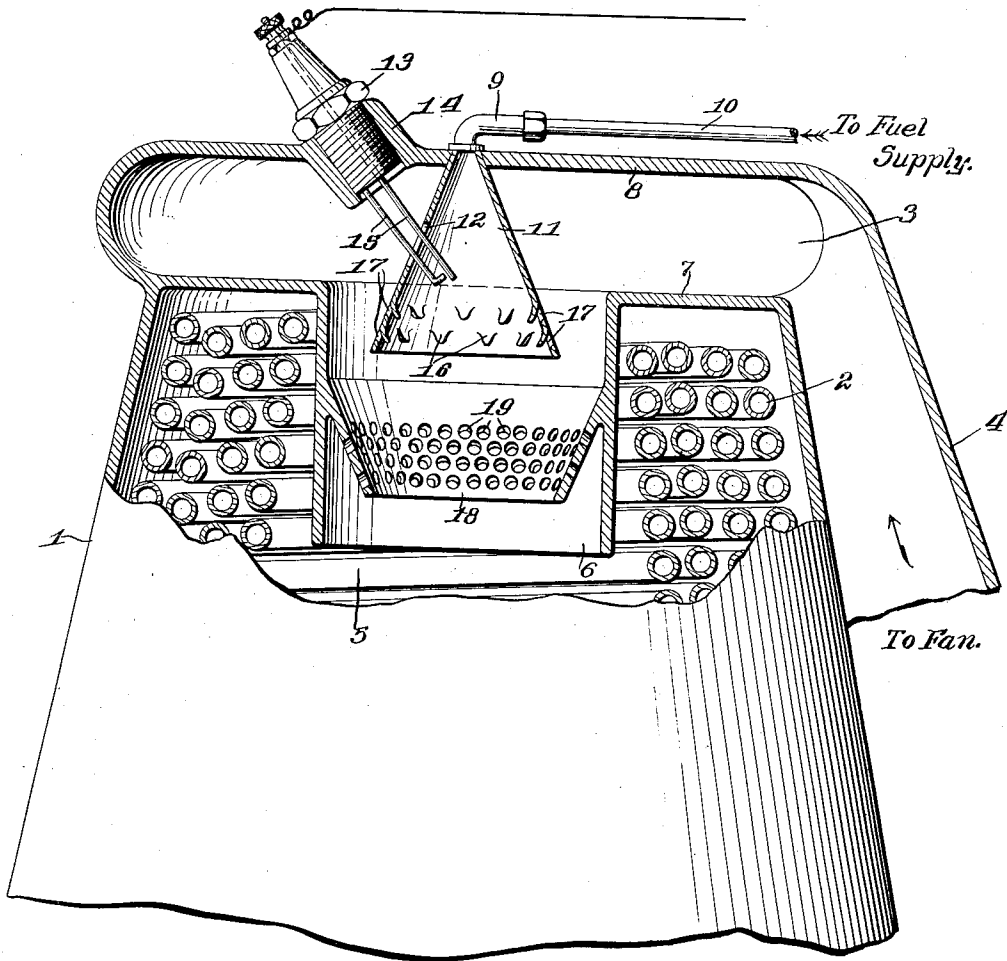


L. L. SCOTT.
COMBUSTION APPARATUS.
APPLICATION FILED AUG. 21, 1919.

1,336,261.

Patented Apr. 6, 1920.



Inventor.
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by *Elliott Ammer*
his Atty.

UNITED STATES PATENT OFFICE.

LEWIS L. SCOTT, OF ST. LOUIS, MISSOURI.

COMBUSTION APPARATUS.

1,336,261.

Specification of Letters Patent.

Patented Apr. 6, 1920.

Application filed August 21, 1919. Serial No. 318,848.

To all whom it may concern:

Be it known that I, LEWIS L. SCOTT, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented new and useful Improvements in Combustion Apparatus, of which the following is a specification.

This invention relates to combustion systems for use primarily in steam automobiles, and of a type fully illustrated and described in my pending application, Serial Number 241,590, filed June 24, 1918.

The present invention has to do with improvements in the ignition and combustion portions of such system, and has for one of its objects to provide means for producing a rapid re-action of the fuel mixture when ignited to thereby reduce the roaring sound of the resulting flame. This object is accomplished by so constructing the portion of the apparatus surrounding the zone of initial combustion that the flame will impinge against a metal, or other, wall, which will thereby be highly heated and cause the quick combustion of inflammable gases in the flame as subsequently produced. The reduction in sound of the roar of the flame is further facilitated by slightly reducing, or constricting, the area of the flame at the same time providing for the initial admixture therewith of air.

A still further object of the invention is to prevent the carbonization of the spark plug which ignites the sprayed mixture. In the construction disclosed in the application aforesaid, the spark plug is shown as mounted in the wall of a bell-shaped ignition chamber, both the porcelain and the terminals of the plug being accessible to the products of combustion in said chamber, produced by the ignition by the spark plug of the fuel sprayed therein. It was soon found that the spark plug would become foul by carbon after a relatively short period of operation, so that it became necessary to provide means for preventing such result. This purpose is accomplished in the present instance by mounting the body of the spark plug outside, and beyond the wall of said ignition chamber, thereby isolating it from the zone of combustion therein, and by projecting the spark plug terminals through the opening in the wall of said chamber. With such a construction, only

the terminals of the spark plug are subject to carbon deposits, and even if they form, they soon fall off, or are forced off, by the sprayed fuel and the blast or draft produced by the flame.

A still further object of the invention is to provide for the admixture of an additional quantity of air to the sprayed fuel immediately after igniting it without obstructing or impeding the direction of projection of the ignited flame into the combustion chamber.

With the above objects in view, the invention resides in the construction and combination of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawing, the view illustrates in broken section, the upper portion of a generator such as shown in the application aforesaid, and provided with my improvements.

Referring to this drawing, the numeral 1 indicates the wall of a generating chamber in which are arranged a series of coils or tubes 2 constituting a generator, and these tubes are adapted to be supplied with water to be converted into steam by the heat of a flame, on the well known principle of the flash or semi-flash generator. Mounted on the top of the casing of the generator is an air chamber 3 to which leads an air duct 4 from a fan or other means for supplying air. The tubes 2 surround the combustion chamber 5 into which projects a cylindrical air spout 6 from the bottom 7 of the chamber 3. Mounted on the outer wall 8 of the chamber 3 is a spray nozzle 9, which is connected by means of a pipe 10 to a source of fuel supply under pressure. This nozzle communicates through the upper wall of the chamber 3 with the upper end of a conical chamber 11, flaring downwardly and provided in its side wall with an opening 12. The numeral 13 indicates a spark plug which is adapted to be screwed into the socket 14 provided in the upper wall 8 at some distance from the conical chamber 11. The numeral 15 indicates the spark plug terminals which are elongated to extend through the opening 12 in the chamber 11 and to have their ends located well within said chamber. With the construction thus far described, it will be seen that the body of the spark plug, and particularly the porcelain member thereof

is well removed from the zone of combustion in the chamber 11 and that air is free to circulate between the body of the plug and the wall of said chamber. By thus isolating the spark plug, I prevent any deposit of carbon on the porcelain thereof, and the flow of air over the spark plug tends to maintain the same free from deposits of soot or the like.

Such deposits of carbon as may occur on the spark plug terminals 15, is, of course, inevitable; but, as stated above, this presents practically no objection, as it is found such carbon deposits fall off and their removal is further facilitated by the incoming blast of oil.

In order to provide additional air to support combustion in the ignition chamber 11, I cut a series of triangular tongues 16 out of the wall of said chamber and bend said tongues slightly inwardly. The lower portion of the chamber 11 projects for some distance into the upper portion of the spout 6, and hence the air passing downwardly through said spout may be drawn in through the apertures 17 in the wall of the chamber 11 made by bending the tongues 16 inwardly, and these tongues will cause the incoming air to be directed downwardly and thus not divert or impede the course of the flame which is to be directed into the combustion chamber 5.

Mounted in the spout 6 below the lower end of the ignition chamber 11 is a conical member 18, converging from its upper to its lower end, as shown, and provided in its lower portion with rows of apertures 19. The member 18 constitutes a contact wall for the flame projected from the chamber 11, and as it soon becomes red-hot, the contact of the inflammable gases in the incompletely combustible mixture passing from the chamber 11 mixed with air passing downward in the spout 6 and drawn in through the opening 17, facilitates the heating and combustion of said gases before they emerge into the combustion chamber 5 of the generator. I have found that by thus providing for the rapid re-action of the ignitable fuel, or the inflammable gases produced therefrom by ignition, the roar of the resulting flame is very materially reduced.

In addition to operating as a contact wall, the member 18 also provides a constricted throat through which the ignited mixture of air and gas must pass, and by thus restricting the area of the flame, and at the same time promoting combustion of the inflammable gases therein by the admission of additional air through the openings 19, the reduction in the roar of the flame is additionally promoted.

The construction shown illustrates a preferred embodiment of the invention, and

one which has actually been used; but it is obvious that various modifications of the arrangement and construction shown could be made without departing from the principle of my invention.

I claim:

1. In a combustion system, in combination with an ignition chamber for receiving sprayed fuel, a spark plug having its body isolated from the zone of combustion of said chamber and its spark terminals projecting into the interior of said chamber.

2. In a combustion system, in combination with an ignition chamber for receiving fuel to be ignited, a spark plug having its body separated by a free air space from the zone of combustion of said chamber, and its spark terminals projecting into the interior of said chamber.

3. In a combustion system, in combination with an ignition chamber, and means for supplying fuel thereto to be ignited, a spark plug having its body mounted at a distance from said chamber and its spark terminals extended therefrom and projecting through the wall of said ignition chamber.

4. In a combustion system, in combination with an ignition chamber, and means for supplying fuel thereto to be ignited, a spark plug having its body mounted at a distance from said chamber and out of communication therewith, and its spark terminals extended therefrom and projecting through the wall of said ignition chamber.

5. In a combustion system, in combination with an air duct, an ignition chamber for receiving fuel to be ignited, located in said duct, and a spark plug mounted at a distance from said ignition chamber to provide an intervening free air space and having its spark terminals exposed in said space to the air of said duct and elongated to extend through the wall of said ignition chamber and into the interior of the latter.

6. In a combustion system, in combination with an air duct, an ignition chamber for receiving sprayed fuel located in said duct at a distance from the inner wall thereof, a spark plug having its body isolated from the zone of combustion of said ignition chamber by a free air space and its spark terminals extended therefrom through the space between the wall of said duct and the wall of said chamber and projecting through the latter wall and into the interior of said ignition chamber.

7. In a combustion system, in combination with an air duct, an ignition chamber for receiving sprayed fuel located in said duct at a distance from the inner wall thereof, a spark plug having its body mounted in the wall of said duct and separated from the wall of said ignition chamber by a free air space, and its spark terminals extended from the body through said space and exposed

therein to the air of said duct, and projecting through the wall, and into the interior of, said ignition chamber.

5 8. In a combustion system, in combination with a generator having an air chamber at its upper end communicating with the interior thereof, an ignition chamber for receiving fuel to be ignited located in said air chamber, and a spark plug mounted in the
10 wall of said air chamber at a distance from said ignition chamber and having its spark terminals elongated to extend through the wall of said ignition chamber and into the interior of the latter.

15 9. In a combustion system in combination with an ignition chamber adapted to receive sprayed fuel and having an open end through which the ignited fuel is discharged, a spark plug for igniting the fuel,
20 a series of apertures cut in the wall of said chamber toward the discharge end thereof, and beyond the terminals of the spark plug, each of said apertures having a projecting guard at one end to deflect air passing
25 through the apertures and cause it to travel toward the discharge end of said chamber.

10. In a combustion system, in combination with the ignition chamber adapted to receive sprayed fuel and to discharge the same when ignited, means for igniting the
30 fuel, and a metal contact member in the form of a conical spout located in the path of the flame projected from said ignition chamber, whereby said contact member will be heated and in turn cause rapid re-action
35 of inflammable gases coming in contact therewith.

11. In a combustion system, in combination with the ignition chamber adapted to receive sprayed fuel and to discharge the
40 same when ignited, means for igniting the fuel, and a metal contact member in the form of a conical spout provided in its wall with apertures and located in the path of the flame projected from said ignition cham-
45 ber, whereby said contact member will be heated and in turn cause rapid reaction of the inflammable gases coming in contact therewith.

In testimony whereof I have hereunto set
50 my hand.

LEWIS L. SCOTT.