

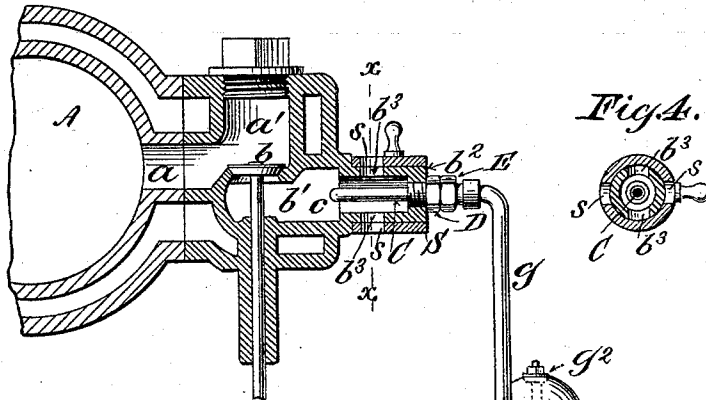
(No Model.)

F. HIRSCH.  
IGNITER FOR GAS ENGINES.

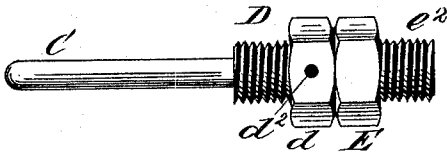
No. 518,717.

Patented Apr. 24, 1894.

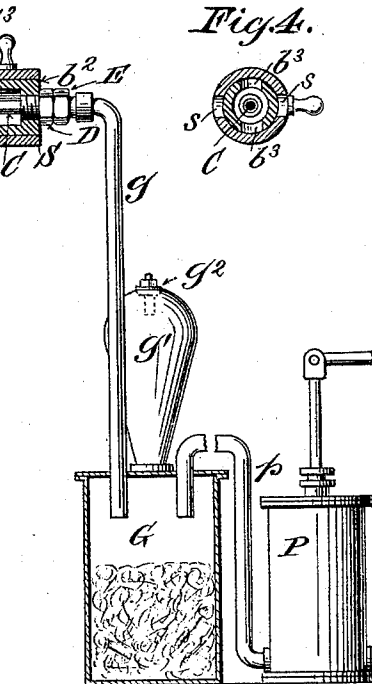
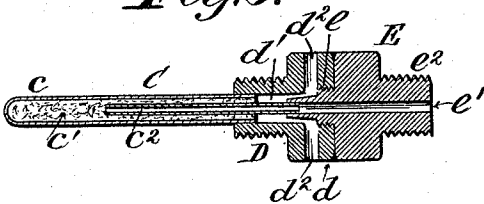
*Fig.1.*



*Fig. 2.*



*Fig. 3.*



**Witnesses:**

D. W. Gardner.  
Harry C. Grund

*Inventor:*

Feodor Kirsch,  
By his Attorney  
George William Miatt

# UNITED STATES PATENT OFFICE.

FEODOR HIRSCH, OF STEINWAY, ASSIGNOR TO HIMSELF, AND EUGENE M. JEROME, OF NEW YORK, N. Y.

## IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 518,717, dated April 24, 1894.

Application filed May 1, 1893. Serial No. 472,494. (No model.)

*To all whom it may concern:*

Be it known that I, FEODOR HIRSCH, of Steinway, in the county of Queens and State of New York, have invented certain new and useful Improvements in Igniters for Gas-Engines, of which the following is a specification, sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My improvements relate to means for igniting and exploding the gases in gas engines during their operation, and are designed to obviate all danger of the extinction of the igniter by drafts of air, jar or otherwise, and to thereby render the operation of the engine more certain, uniform and rapid than heretofore.

My invention involves in the use of an igniting cap or torch of platinum padded with spongy platinum in combination with means for forcing a supply of air mingled with the vapor of a hydro carbon into said cap or torch to maintain the platinum in an incandescent state, the products of combustion of the hydro-carbon vapor being discharged from the cap or torch by the continuous supply of fresh vapor and air under pressure, and there being no communication between the interior of the igniting cap and the interior of the igniting chamber of the engine into which it protrudes.

My invention consists in the special arrangement of the igniting cap or torch with means for effecting the preliminary heating of the same.

In the accompanying drawings I illustrate means for carrying my invention into practical effect, although I do not wish to confine myself to the parts shown since it is obvious that various modifications may be made in construction and arrangement without departing from the essential features of my invention.

Figure 1, is a diagrammatical representation of the parts essential in carrying out my invention; showing a portion of a gas engine in section with my improved igniter attached, and indicating symbolically the use of an air pump and vapor-charging chamber in connection therewith. Fig. 2, is an elevation of my improved form of igniter upon a larger

scale, and removed from the gas engine. Fig. 3, is a central longitudinal section of the same. Fig. 4, is a transverse section upon plane of line  $x, x$ , Fig. 1.

A, represents the piston chamber of a gas engine, connected by the port  $a$ , with the valve chamber  $a'$ . The valve  $b$ , is interposed between the valve chamber  $a'$ , and the ignition chamber  $b'$ , into which the cap or torch  $c$  of the igniter C, protrudes. In action the valve  $b$ , is raised automatically by an operative part of the engine or otherwise, to admit a portion of the gases from the cylinder A, into the ignition chamber  $b'$ , where their contact with the incandescent cap or torch  $c$ , causes the explosion of the whole charge.

The igniter C, consists essentially of a tube or cap  $c$ , of platinum closed at its outer end, provided with a filling  $c'$ , of more or less spongy platinum, platinum wire coils, or platinum netting, and with a platinum tube or nozzle  $c^2$ , for delivering a supply of mingled air and hydro-carbon vapor to the interior of the loose platinum filling  $c'$ . The means of connecting these parts are of secondary importance, the structure shown in the drawings however being a preferable form. In that, the cap  $c$ , is secured to and projects from a tap D, screwing into the end of the cylindrical extension  $b^2$ , of the ignition chamber  $b'$ , and receives in turn a tap E, the stud  $e$ , of which screws into the enlarged head  $d$ , of the said tap D, and supports the platinum nozzle or tube  $c^2$ , centrally. The interior of the first tap D, is so formed as to leave an annular chamber  $d'$ , around the platinum tube  $c^2$ , and the end of the stud  $e$ , of the second tap E, and radial passages  $d^2, d^2$ , connect this chamber  $d'$ , with the atmosphere. The second tap E, is formed with the central longitudinal passage  $e'$ , of which the platinum tube  $c^2$ , is an extension; and its outer end  $e^2$ , is connected with the pipe  $g$ , which leads to the vapor chamber G.

The vapor chamber G, is a closed compartment containing felt, cotton or other absorbent material saturated with benzine, gasoline, turpentine or other volatile hydro-carbon. It is connected with an air pump P, or other device for forcibly introducing air into it by a pipe  $p$ .

The pump P, is operated continuously by any suitable means during the use of the gas engine, either a separate motor being employed, or, preferably, connection being made with a movable part of the gas engine itself.

5 The cylindrical extension  $b^2$ , of the ignition chamber  $b'$ , is formed with coinciding ports  $b^3, b^3$ , upon opposite sides, which ports are closed normally by the sleeve S. This sleeve  
10 S, is also formed with ports  $s, s$ , which may be brought into coincidence with the ports  $b^3, b^3$ , by turning the sleeve S, upon the cylindrical extension  $b^2$ . The object of this is to provide for the preliminary heating of the  
15 cap or torch  $c$ , by means of a flame admitted through the ports  $b^3, b^3, s, s$ , so as to start the combustion of the mingled air and vapor forced through the cap or torch and its loose platinum filling. The sleeve S, is then turned  
20 so as to shut the ports  $b^3, b^3$ , and the action upon the platinum of the continuous supply of air and vapor under pressure maintains a temperature in the torch or cap  $c$ , sufficient to ignite the gases when admitted to contact  
25 therewith.

The hydro-carbon reservoir may be con-

structed in any desired manner provided ample provision is made for the admixture of air and vapor. The reservoir is provided with a pressure-equalizing chamber  $g$ , for the purpose of rendering the supply of air and vapor to the igniter more uniform and continuous; and this chamber  $g$ , is provided with a relief valve  $g^2$ , which opens to relieve internal pressure when the latter exceeds a prescribed degree.

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

The combination of a gas engine ignition chamber formed with a cylindrical extension having lateral ports, an igniter having a torch or cap of platinum projecting into said extension of the ignition chamber, and an annular sleeve surrounding the said cylindrical extension formed with ports which may be brought into coincidence with the said ports in the extension, for the purpose and substantially in the manner described.

FEODOR HIRSCH.

Witnesses:

GEORGE WILLIAM MIATT,  
D. W. GARDNER.