C. G. TATE.

ELECTRIC VAPORIZER.

APPLICATION FILED FEB. 15, 1913.

1,136,845.

Patented Apr. 20, 1915.

2 SHEETS—SHEET 1.

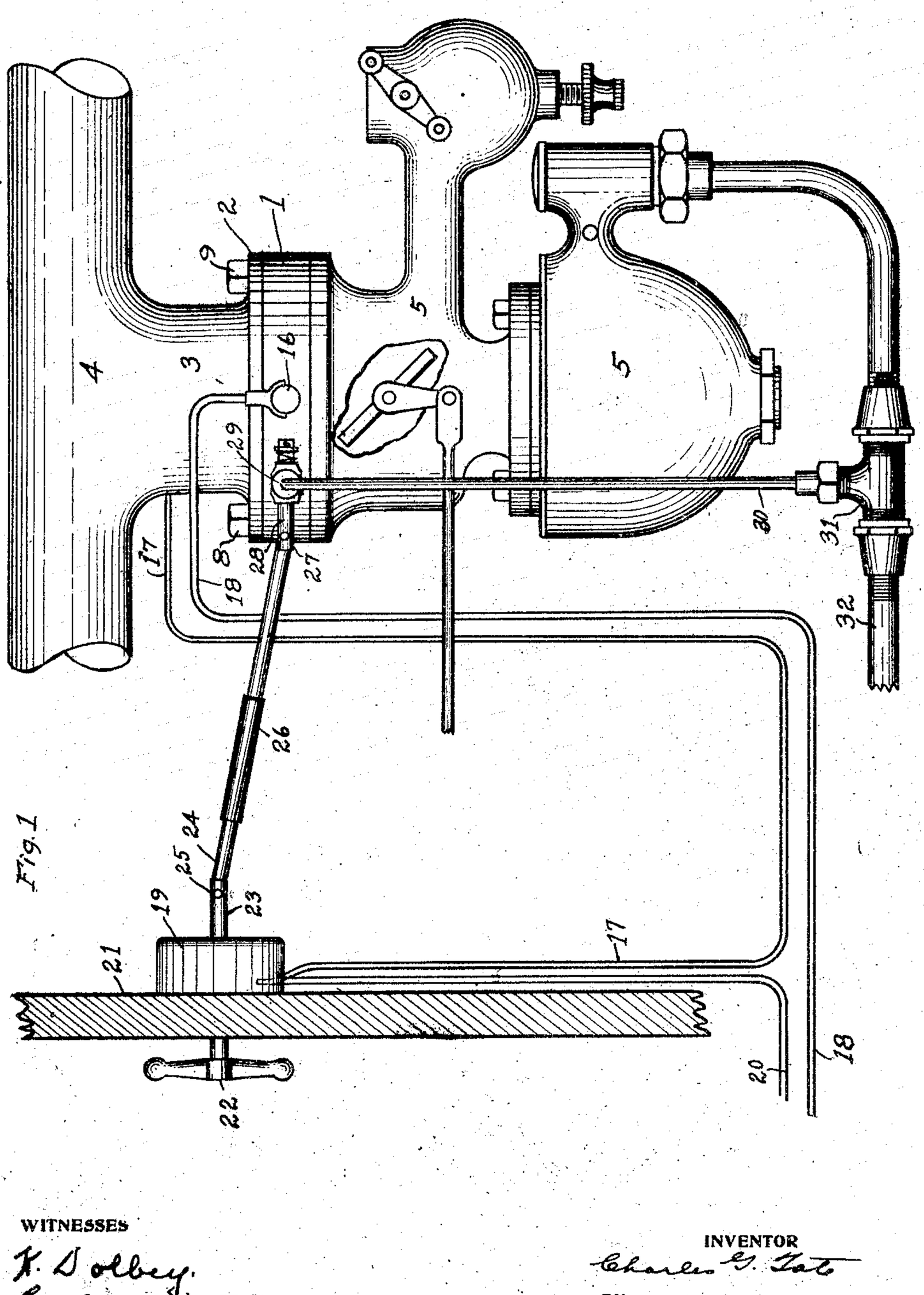


Fig. 1

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2

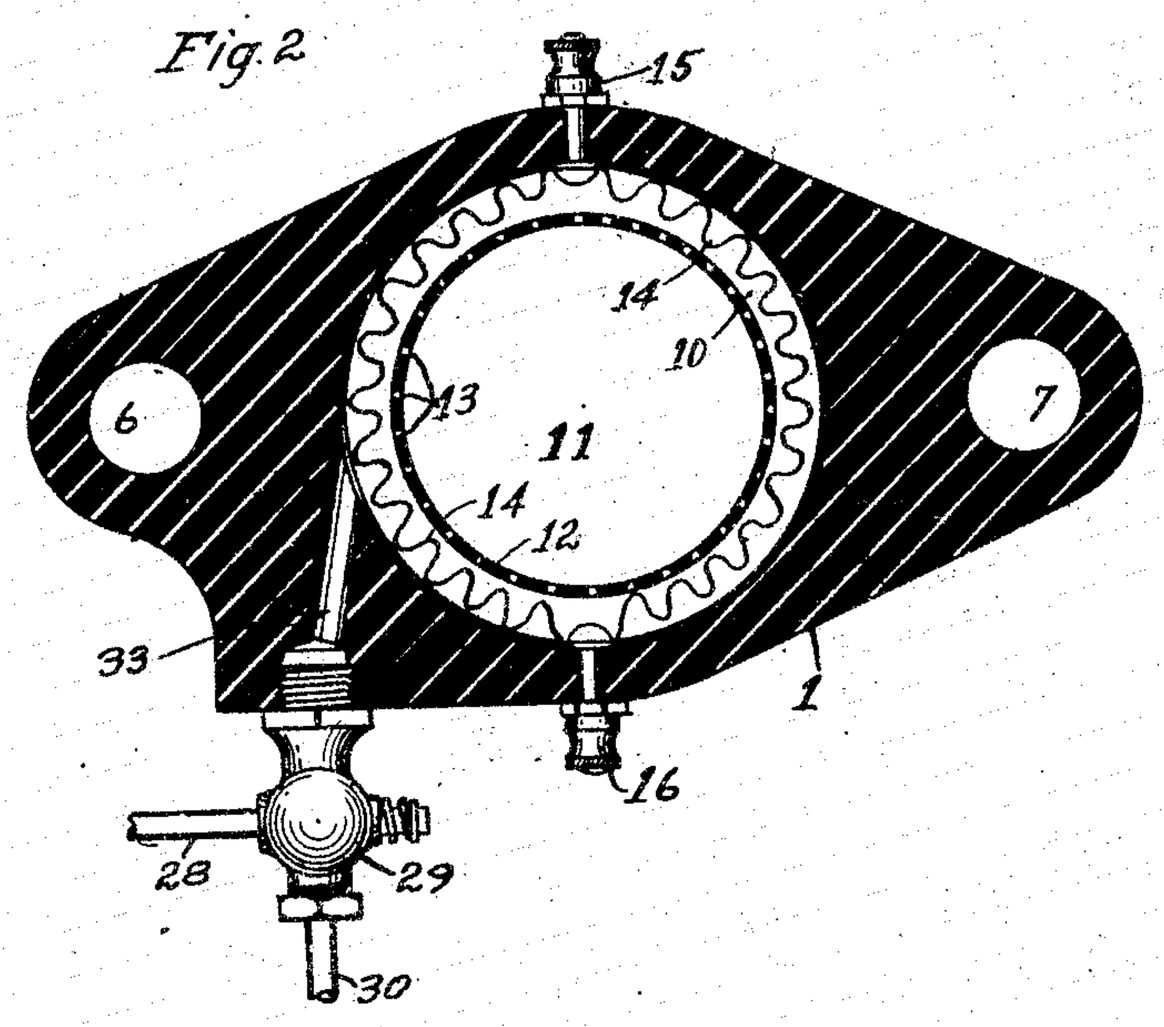
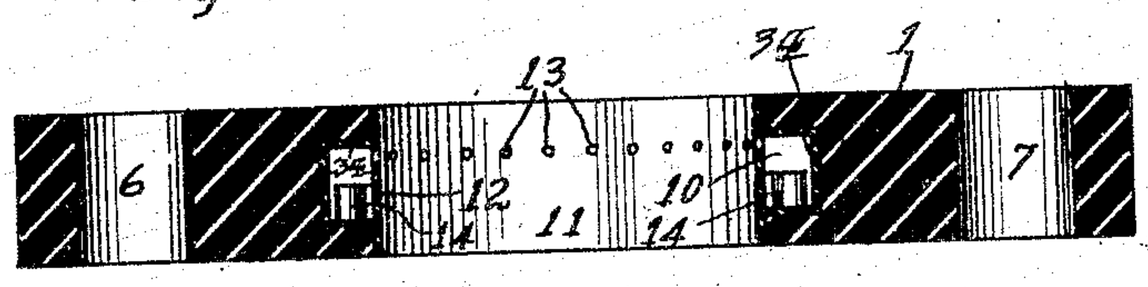


Fig 3



WITNESSES

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ELECTRIC VAPORIZER.

1,136,845. Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed February 15, 1913. Serial No. 748,509.

To all whom it may concern:

Be it known that I, CHARLES G. TATE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Electric Vaporizers for Use in Connection with Gas-Engines.

My invention relates to that class of devices which are designed to vaporize the initial charges of gas by the application of heat, generated by electricity so as to enable the operator to start his engine with comparative ease, regardless of the atmospheric temperature. Devices of this kind with which I am familiar, are objectionable from the fact that they use too much current and require too long a time to vaporize the fuel.

A further objection is that they require a good many changes to be made in adapting them to engines which are used in automobiles.

My invention has for its object to provide a form of vaporizer which when used will be practically instantaneous in vaporizing, and has for its further object to provide a device which can be employed with any standard type of engine without materially changing the same.

My means of accomplishing the foregoing objects may be readily understood by having reference to the accompanying drawings which are hereto annexed and are a part of this specification, in which—

Figure 1 is a side elevation of a carbureter, intake pipe and a fragment of the manifold of the engine, a fragmentary portion of the dash of the automobile being shown with the fuel and electric control mounted thereon. Fig. 2 is an enlarged cross section of my improved vaporizer. Fig. 3 is a vertical longitudinal section of the same.

Similar reference numerals refer to similar parts throughout the entire description.

As shown in the drawings, 1 is the vaporizer preferably formed of insulation material, which is secured to the flange 2 of the intake pipe 3 which leads to the manifold 4, a fragmentary portion of the latter only being shown.

5 is the carbureter which is of the usual form, one of the standard makes being shown for illustration; it being apparent that the use of my device is not dependent upon any particular type or kind of carbureter.

The vaporizer 1 is formed as more clearly seen in Figs. 2 and 3, with holes 6 and 7 which are adapted to register with bolts 8 and 9 which secure the carbureter to the flange 2 of the intake pipe 3. The vaporizer 1 is formed with an annular chamber 10 and a central passage 11 which corresponds to the size of the inlet pipe 3. The inner wall 12 of the annular chamber 10 is provided with a plurality of minute perforations 13 which lead from the interior of the chamber to the central passage 11. 14 is a wire ribbon formed of suitable electrical resistance material and is secured to binding posts 15 and 16 which are connected by means of wire cables 17 and 18, the wire 17 leading to the switch 19, the wire 18 leading to one terminal of a battery (not shown). The annular chamber which I have described above is of relatively small capacity; the resistance element is located centrally of said chamber; the fuel flows directly over and around the resistance element; the inner wall of the chamber is provided with a series of minute perforations which not only confine the fuel within the chamber while gasification takes place but which are also of such small size that the escaping vapor being under greater pressure than atmospheric practically acts to seal said chamber against the admission of air as soon as gasification begins with the important result that, oxygen being excluded, the resistance element may be heated to incandescence, thus rapidly gasifying the liquid fuel without effecting the ignition of the gas. The wire 20 leads from the other terminal to the opposite contact in the switch 19. The switch 19 is secured to the dash 21 of the vehicle.

22 is the handle for closing the switch and it is provided with an extension 23.

24 is a link which is connected to the extension 23 by a universal joint 25. This link is adapted to telescope in a sleeve 26 whose opposite end is secured to a universal joint 27 and is attached to a valve stem 28 which controls the flow of fuel through a valve 29 mounted in the supply pipe 30, which leads from a T 31 mounted in the main feed line 32, which conveys the fuel to the carbureter 5. The walls of the chamber 10 are lined with mica 34 or some suitable heat insulation, so that in the event the switch 19 is closed when the supply of fuel is exhausted, the heat of the resistance

will not damage the vaporizer. The valve 29 leads to a passage 33 which extends to the interior of the annular chamber 10.

The operation of the device is as follows: The operator rotates the handle 22. This results in closing the electric circuit so that the current flows to the resistance coil 14, which is connected in multiple so that it flows in both directions in the annular chamber 10, as the ribbon employed for this purpose is very thin, it becomes red hot almost instantaneously. The operation of closing the electric circuit also opens the valve 29 and this permits the fuel to flow into the annular chamber 10, as the opening in the valve 29 is very minute, only a very small portion of fuel is permitted to enter the chamber, with the result that as it comes in contact with the red hot resistance coil, it is instantly vaporized and finds its way through the vaporizer openings 13, into the central passage 11, whence it is drawn by the suction of the piston into the explosion chamber in the cylinders of the engine.

Practice has shown that by the use of this device, an engine can be started with a quarter turn even in zero weather. At the same time it will be apparent to persons skilled in the art, that it can be adapted to practically every automobile without making any material changes in the machine. As soon as the engine has picked up speed the operator reverses the handle 22, cutting out the switch and closing the valve 29 by shutting off the further flow of fuel to the annular chamber 10, and the engine draws in its fuel through the carbureter in the usual manner.

The particular construction which I have above described and illustrated may, of course, be modified, but it apparently has the following important structural advantages which produce corresponding results, that is to say, in order to effectually vaporize the fuel practically instantaneously, the vaporizing chamber must be of limited area; the fuel to be vaporized must be brought into immediate contact with the resistance element; the fuel must be confined within the vaporizing chamber until vaporization has taken place; the vaporizing chamber must be sealed or practically sealed to the atmosphere while the vaporization of the liquid and the discharge of the vapor from the chamber is taking place.

Having described my invention what I regard as new and desire to secure by Letters Patent, is:

1. A liquid fuel vaporizer having a vaporizing chamber, an exposed electrical resistance unit located within said chamber, a liquid fuel supply communicating with said vaporizing chamber, said vaporizing chamber having a restricted outlet for the vapor, whereby the vaporizing chamber is sealed to the atmosphere by the excess pressure of the vapors passing through said restricted outlet.

2. In a device of the class described, the combination of an engine cylinder, a combustible mixture intake for said cylinder, a vaporizer in said intake, said vaporizer including a body portion having a recess provided with a restricter communicating with said intake, a resistance wire in said recess, said wire being adapted to be electrically heated to incandescence, and means for admitting combustible fluid to said recess and directly into contact with said incandescent wire, substantially as described.

3. In a device of the class described, the combination of an engine cylinder and a carbureter, a conduit between said cylinder and carbureter, a vaporizer interposed in said conduit, said vaporizer including a body having a chamber communicating with said conduit by a plurality of minute perforations, a bare resistance unit in said chamber, said unit being adapted to be electrically heated to incandescence, and means for admitting liquid fuel to said chamber.

4. In a device of the class described the combination of an engine cylinder, a carbureter, a vaporizer interposed in a conduit between said cylinder and carbureter, said vaporizer being provided with a chamber having communication with said conduit by a plurality of minute apertures, means for supplying liquid fuel to said chamber, a resistance unit in said chamber, electrical means for heating said unit to incandescence, whereby the fuel is instantly vaporized by direct contact with said unit, ignition of said fuel being prevented by the exclusion of oxygen from said chamber, substantially as described.

5. A liquid fuel vaporizer having a vaporizing chamber, a heating unit within said chamber, means for heating said unit to incandescence, a liquid fuel supply communicating with said vaporizing chamber, and adapted to direct the fuel into actual contact with said incandescent unit, said chamber having a restricted outlet for the vapor whereby said chamber is sealed to the atmosphere by the excess pressure of the vapors passing through said restricted outlet, substantially as described.

In witness whereof I have signed the foregoing specification.

CHARLES G. TATE.

Witnesses:
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C. M. BAUMEISTER.