W. A. BENTLEY.

CARBURETER.

APPLICATION FILED MAR. 10, 1913.

1,096,989. Patented May 19, 1914.

Fig. 1.

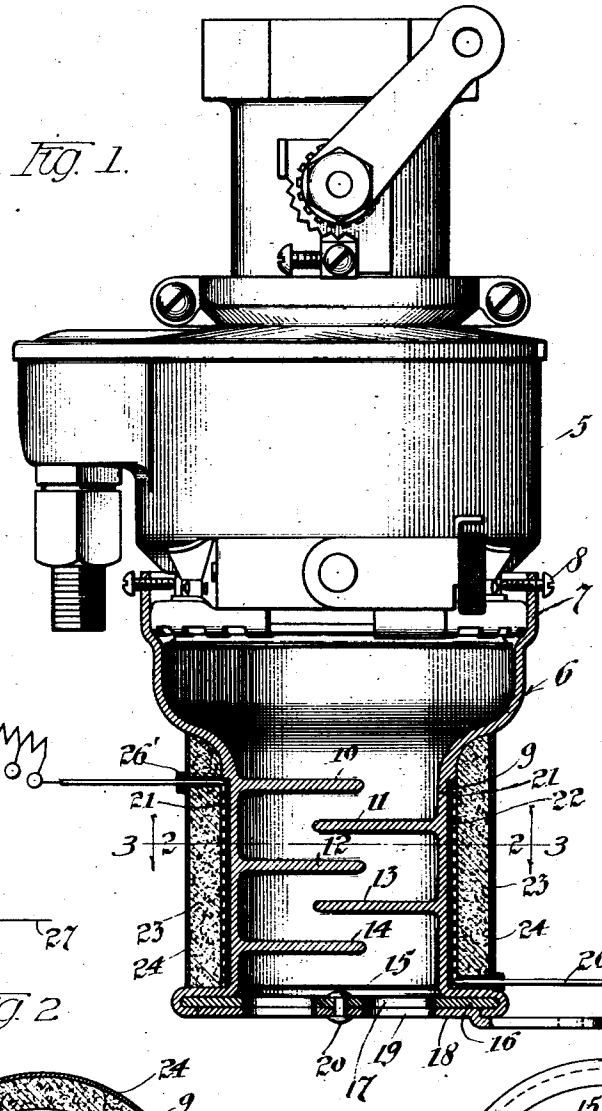


Fig. 2

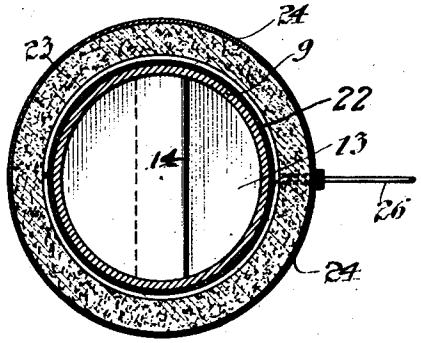
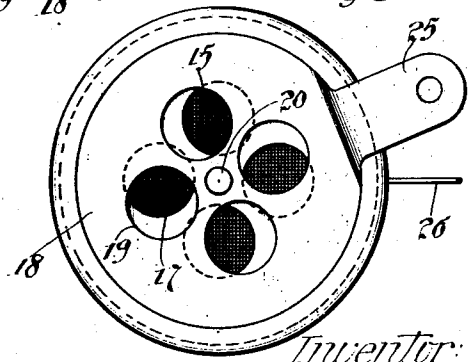


Fig. 3.



Witnesses:
Robert H. Weir
J. M. Daggett.

Inventor:
William A. Bentley
Jones Bain May
Attys

UNITED STATES PATENT OFFICE.

WILLIAM A. BENTLEY, OF CHICAGO, ILLINOIS.

CARBURETER.

1,096,989. Specification of Letters Patent. Patented May 19, 1914.

Application filed March 10, 1913. Serial No. 753,190.

To all whom it may concern:

Be it known that I, WILLIAM A. BENTLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to improvements in attachments for carbureters.

One of the objects of my invention is to provide a means for pre-heating the air that is to enter the carbureter for admixture with the vapor of the liquid fuels to provide the combustible charge of an engine.

In the use of liquid fuel that volatilizes at a relatively high temperature, and in the use of fuels that volatilize at a relatively lower than normal temperature when chilled by low atmospheric temperature, it is difficult to start an internal combustion engine without the application of heat from some extraneous source.

The modern carbureter is so arranged that after the engine has been started the hot gases of exhaust are utilized to supply the necessary heat to maintain and continue the proper volatilization of the fuel, especially when the engine is drawing a relatively heavy load, or running at a relatively high speed. Difficulty, however, is experienced when the engine is to be initially started and when high flash fluid, such as kerosene, denatured alcohol, and the like, are used as fuel the application of heat to such fuel, in the starting of the engine, becomes substantially imperative. It furthermore becomes necessary to use extraneous heat with such fuels when the engine is running at a lower speed and means for graduating the intensity of the heat contributes greatly to the utility and convenience of such devices.

In the drawing, in which I illustrate a single embodiment of my invention, Figure 1 is an elevation of a typical carbureter showing my attachment thereto in section; Fig. 2 is a transverse section taken on line 2—2 of Fig. 1; and Fig. 3 is a view looking toward the bottom showing the means for regulating the air admitting register for controlling the air admitted into the carbureter.

In all the views the same reference characters indicate similar parts.

5 is a carbureter which may be of any desired type or form and 6 is my pre-heating attachment. It consists of a structure generally of cylindrical shape being somewhat larger at the top, as at 7, for attachment to the carbureter as by screws 8. It is somewhat contracted, as at 9, and the cylindrical part 9 is provided with transversely extending, preferably integral, metal walls or baffle plates 10, 11, 12, 13, and 14. The lower opening of the cylinder 9 is covered by a dust guard or wire screen 15. A plate 16 overlies the bottom opening 10 and is provided with a plurality of perforations 17 for admission of air. A register plate 18 is provided with similar openings 19 that register with the opening 17 in the plate 16 when the said register is rotated to proper position, as shown clearly in Fig. 3. The register plate 18 is pivotally connected to the fixed plate 16 as at 20. A handle 25 is shown to be an integral part of the registering plate 18 and extends laterally as a means for rotating the plate for varying the area of the air openings through the perforations 17 and 19.

Most internal combustion engines are provided with a battery of primary or storage cells for producing the electric spark to ignite the combustible charge within the cylinder. I therefore provide an electrical means for heating the air before it enters the carbureter, consisting of the coil 21 wound over an insulating covering 22 that overlies the cylindrical portion 9 of my device. The wires of the coil 21 are made of such material as to withstand considerable temperature and, being embedded in a substantially refractory insulating material free from exposure to oxygen and being maintained at all times substantially dry, there is very little if any electrolytic action or other disintegrating effect of the wires, and therefore a device of this character may be maintained almost for an indefinite period of time without the necessity of repair or renewal.

To maintain the heat within the prescribed limits and to prevent radiation I immediately surround the coil with heat insulating material, such as magnesia or the like 23, and then in order to protect the magnesia covering I prefer to place a metal jacket 24 over the outside of the magnesia

covering. I prefer to include an adjustable rheostat R in circuit with the coil 21 and of course it is to be understood that the coil and rheostat are connected with the battery that is associated with the engine.

The operation of the device is as follows: In the process of initially starting the engine, circuit is closed through the rheostat R and coil 21 and maintained closed for a short period of time before effort should be made to start the engine. The coil 21 will heat the body portion of the cylinder 9 and the heat will be conducted to the baffle plates 10 to 14 inclusive, that lie across the path of the incoming air. The air will enter the perforations 17 and 19 and will take a tortuous path between the baffle plates 10 to 14 inclusive, and in its passage is brought into contact with the large heated surfaces of these portions, so that when it arrives at the upper part of my heating device its temperature has been raised to a relatively high degree. Therefore, when it enters the carbureter proper, it is heated to such an extent as to cause ready volatilization of the fuel contained in the carbureter. After the engine has been started, the electric circuit containing my heating device may be opened or, if it becomes desirable to maintain a less degree of temperature in the incoming air, the rheostat may be manipulated so as to increase the electrical resistance in the path of the heating device and therefore reduce the current passing through it and consequently reduce its heating efficiency.

To connect the device to the battery, the terminals 26 of the coil and the terminal 27 of the rheostat may be extended to the battery or any other source of electric current, such as a magneto or direct current generator, in a manner well understood by persons skilled in the art.

It is, of course, obvious that my heating device is operative irrespective of whether the current be of an alternating character or of a direct current character, and it is also obvious that it may be constructed as an integral part of a carbureter instead of an attachment thereto.

When using high flash fuels the rheostat may be employed to reduce the heat produced by my heating device as when the engine of an automobile is running slow in the city, or other places, and a small amount of extraneous heat becomes necessary to assist in the carburation of the fluid fuel.

It is, of course, to be understood that my device is adaptable for use with stationary engines, as well as with engines employed on automobiles, boats, or the like, and that its special function is to heat the air preliminarily to starting the engine, so that the engine may be promptly started under all conditions of atmospheric temperature and independently of the engine-generated temperature necessary to cause volatilization of the fluids.

While I have herein shown a single embodiment of my invention for the purposes of clear disclosure, it is evident that many changes may be made in the structure within the contemplation of the appended claims.

What I claim is:

1. An air heating device for the air intake duct of a carbureter, comprising a cylinder, communicating at one end with the air intake duct of the carbureter, the other end being contracted to present a smaller cross sectional area to the incoming air; baffle plates, positioned within the contracted portion of the cylinder; and an electric heating coil, surrounding this contracted portion of the cylinder to raise the temperature of the air passing therethrough.

2. An air heating device for the air intake duct of a carbureter, comprising a cylinder, communicating at one end with the air intake duct of the carbureter, the other end being contracted to present a smaller cross sectional area to the incoming air; an electric heating coil, surrounding the contracted portion of the cylinder; heat insulating material, enveloping the outer surface of the coil; an air regulating valve, positioned at the contracted end of the cylinder, the end of the cylinder adjacent the valve being flared out and bent over to provide a support for the valve; and baffle plates, in the contracted portion of the cylinder to provide a tortuous path for the air through the heating passage.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

WILLIAM A. BENTLEY.

In the presence of—
W. LINN ALLEN,
MARY F. ALLEN.