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VAPORIZER.

APPLICATION FILED MAR. 7, 1921.

1,402,585. Patented Jan. 3, 1922.

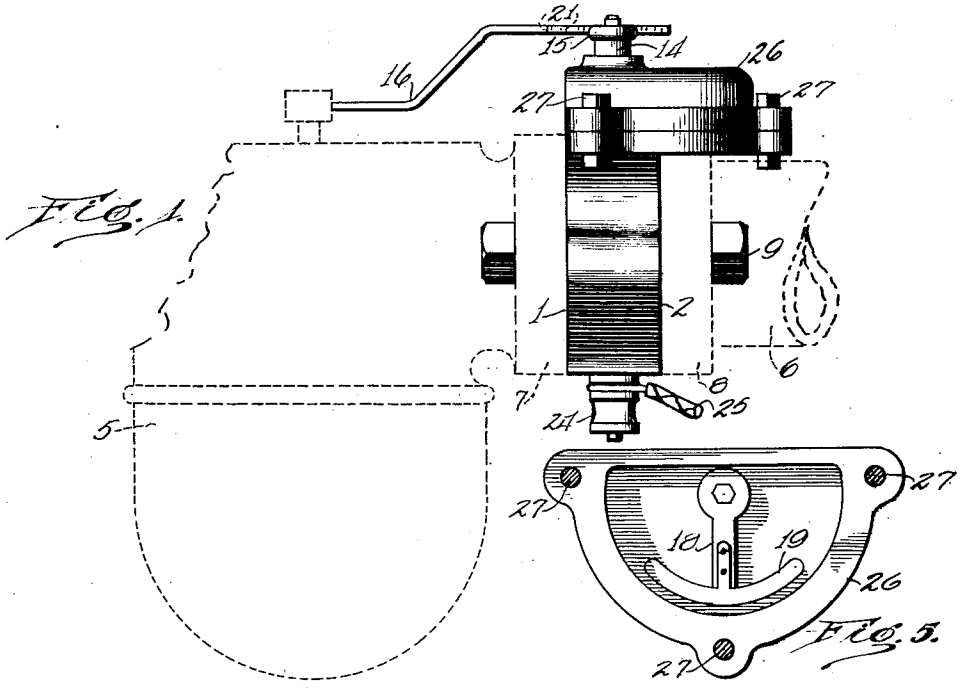


FIG. 1.

FIG. 5.

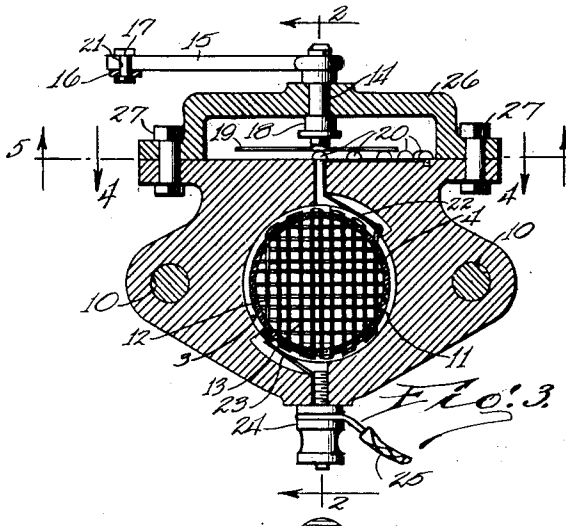


FIG. 3.

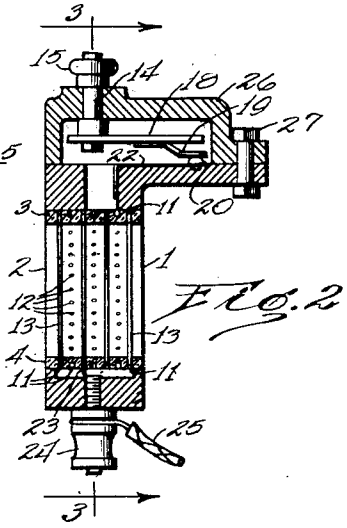


FIG. 2.

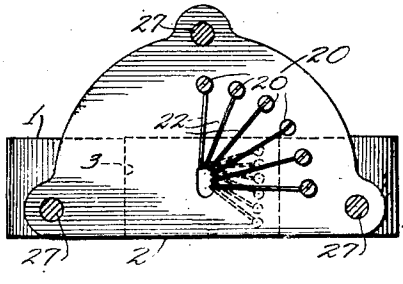


FIG. 4.

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VAPORIZER.

1,402,585. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed March 7, 1921. Serial No. 450,334.

To all whom it may concern:

Be it known that we, HIRSCH EPSTEIN, JACOB J. MITNICK, and JOSEPH M. BERNSTEIN, citizens of the United States, and residents of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Vaporizers, of which the following is a full, clear, and exact description.

Our invention relates to improvements in vaporizers for internal combustion engines and the like, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of our invention is to provide a vaporizer having electrical heating elements so arranged that the maximum amount of heat is transmitted to the gases passing from the carburetor when the throttle valve is at or near closed position, while a minimum amount of heat is given off when the valve is wide open.

A further object of our inventoin is to provide a device of the type described in which the heat given off by the heating elements is gradually decreased from the maximum to the minimum as the throttle valve is moved from open to closed position.

A further object of our invention is to provide a device of the type described that is readily adjustable for winter and summer use, only a portion of the heating surface giving off heat in the summer when the maximum heat is desired, while all of the heating surface is utilized when maximum heat is desired in winter.

A further object of our invention is to provide a device of the type described which can be readily attached to an automobile engine without altering the construction of the latter.

A further object of our invention is to provide a device of the type described that is relatively simple in construction and operation, has few moving parts and is not likely to easily get out of order.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

Our invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a side elevation of the device as shown attached to the carburetor and intake manifold,

Figure 2 is a section along the line 2—2 of Figure 3,

Figure 3 is a section along the line 3—3 of Figure 2,

Figure 4 is a section along the line 4—4 of Figure 3, and

Figure 5 is a section along the line 5—5 of Figure 3.

In carrying out our invention, we provide a body portion of the shape shown in the drawings, which has its front and rear faces 1 and 2 parallel with respect to each other. A centrally disposed passage-way 3 extends transversely between the two faces 1 and 2 and is adapted to receive a sleeve 4 which carries a plurality of heating elements for a purpose hereafter described. As clearly shown in Figure 1, the body portion is disposed between the carburetor 5 and the intake manifold 6 of an internal combustion engine (not shown) so that its faces 1 and 2 abut against the flanges 7 and 8 of the outlet of the carburetor and the manifold respectively. The body portion is secured in position by any suitable means, such as by bolts 9 which project through the alined openings in the flanges 7 and 8 and through openings 10—10 in the body portion. The inner diameters of the sleeve 4, the outlet opening of the carburetor 5 and the manifold 6 are the same so as to afford a continuous and unobstructed passage for the vaporized fuel to pass therethrough.

The sleeve 4 has a plurality of annular grooves 11 in each of which are drilled a number of holes. As is clearly shown in Figures 2 and 3, the holes in one annular groove are so drilled that an electrical resistance wire 12 can be wound back and forth across the sleeve so as to form a series of parallel strands. The holes in the next annular groove are drilled at an angle with respect to the first named holes so that the parallel strands extending therethrough will be disposed at a different angle to the parallel strands aforesaid mentioned. For clearness in the drawings, we have shown the strands in one grid 13 extending at right angles to the set of the grid adjacent thereto, but it will be understood that these grids

of parallel strands can be disposed at any angle with respect to each other so as to make a honey-comb effect through which the vaporized fuel is made to pass.

The electrical grids 13 which are controlled by a switch 14 are connected in parallel with a storage battery or any suitable source of current, none being shown. The switch 14 comprises an arm 15 connected to a link 16 by any suitable means, such as a bolt 17, and has a second arm 18 having a metal contact member 19 which is secured thereto and is adapted to engage a series of stationary contacts 20 carried by the body portion 1. As will be seen in Figure 4, each of the contacts 20 is connected to one of the grids 13 by means of a wire 22, while the wires 23 leading from the grids are connected to a binding post 24 which in turn is connected to the source of current by means of a wire 25. The operation of the switch is controlled by means of the link 16 which is secured to the valve lever of the carburetor. It will be seen that the operation of the throttle valve will cause the member 19 to engage more or less of the contacts 20. The bolt 17 can be inserted in any of the holes 21 in the link 16, thus providing a fine adjustment between the switch and the valve of the carburetor.

To facilitate the assembly of the device, the switch 14 is mounted in a cap or cover 26 which is secured to the body portion 1 by means of bolts 27.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The switch is so connected in relation to the valve of the carburetor, that the contact member 19 is engaging all of the contacts 20 when the valve is closed, thus assuring the maximum heat to the fuel. As the throttle is gradually opened, the switch 14 is swung around and cuts out the grids 13 one at a time so that the minimum of heat is given to the gas at wide open throttle, and if so desired, the heat can be shut off entirely.

It will be readily apparent that the construction of this vaporizer causes the gas, which is traveling at a low velocity when the engine is started, to pass through the highly heated honey-comb mesh or grids, thus mechanically breaking up the heavier constituents of the fuel, due to their impact on the heated wire. It will also be observed that the greater part of the energy necessary for vaporization is supplied by the electric current. The result is such that all heavy and sluggish components of the charge are completely vaporized and easy starting is thereby assured at almost any temperature.

Crankcase oil dilution is also reduced to a minimum, since all of the liquid fuel entering the intake manifold is thoroughly vaporized. It is a well known fact that especially during the starting period of the engine, the liquid fuel is forced past the piston rings and into the crankcase. As heretofore stated, it is just at this period that the greatest amount of heat is given off by the grids in the vaporizer, thus thoroughly vaporizing the fuel that would ordinarily get into the crankcase.

Another feature of the vaporizer is the adjustment which is provided between the switch and the valve. This permits the vaporizer switch to be adjusted for seasonal settings. During the summer, the switch is so set that only a portion of the coils are in use when the maximum heat is desired, while in winter the switch is so adjusted that all of the coils are in operation during the maximum heat period.

As heretofore stated, the device is simple in construction and operation and is not likely to easily get out of order.

The law according to which this heat regulation takes place is determined separately for each type of engine.

We claim:

1. The combination with a carburetor having a throttle valve, of a vaporizer, heating means carried by said vaporizer, and means controlled by the valve for varying the heat from the heating means as the valve is operated.

2. The combination with a carburetor having a throttle valve, a vaporizer, electrical heating means carried by said vaporizer, and means controlled by the valve for gradually varying the heat from the heating means as the valve is gradually opened or closed.

3. The combination with a carburetor having a throttle valve, of a vaporizer, a plurality of electrical heating elements carried by said vaporizer, and means operably connected to and controlled by the valve for cutting out said heating elements one at a time as the valve is opened and for supplying current to said heating elements successively as the valve is closed.

4. The combination with a carburetor and an intake manifold, of a vaporizer disposed between said carburetor and said manifold, a plurality of electrical heating grids carried by said vaporizer for heating the fuel as it passes therethrough, and means for cutting out one or more grids.

5. The combination with an intake manifold and a carburetor having a valve, of a vaporizer disposed between said carburetor and said manifold, a plurality of electrical heating grids carried by said vaporizer for heating the fuel as it passes therethrough, means for cutting out one or more grids, and means operably connecting said last named means with said butter-fly lever.

6. A vaporizer comprising a body portion,

a plurality of electrical heating grids carried by said body portion, and means for cutting out one or more of said grids.

7. A vaporizer comprising a body portion having a central bore extending therethrough, a sleeve disposed in the bore, a plurality of electrical heating grids carried by said sleeve and an electric switch being adapted to cut out one or more of said grids.

8. In a vaporizer having a central bore extending therethrough, a sleeve disposed in the bore and having a plurality of annular parallel grooves in its outer surface, a plurality of holes communicating with each of the grooves and with the inner surface of the sleeve, an electrical resistance wire wound back and forth through the holes in each groove and extending transversely across the opening of the sleeve, the wires in each groove being disposed at a different angle to each other.

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