G. P. B. HOYT.

HOT AIR REGULATOR.

APPLICATION FILED OCT. 9, 1920.

1,412,245. Patented Apr. 11, 1922.

Fig. 1.

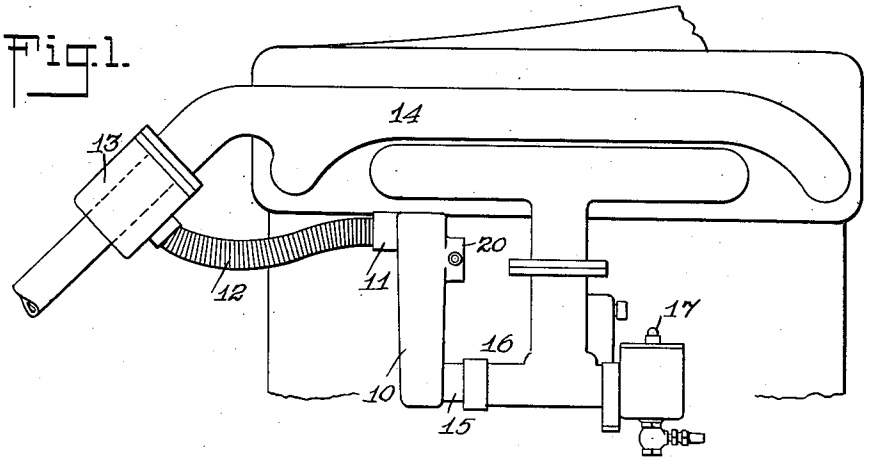


Fig. 2.

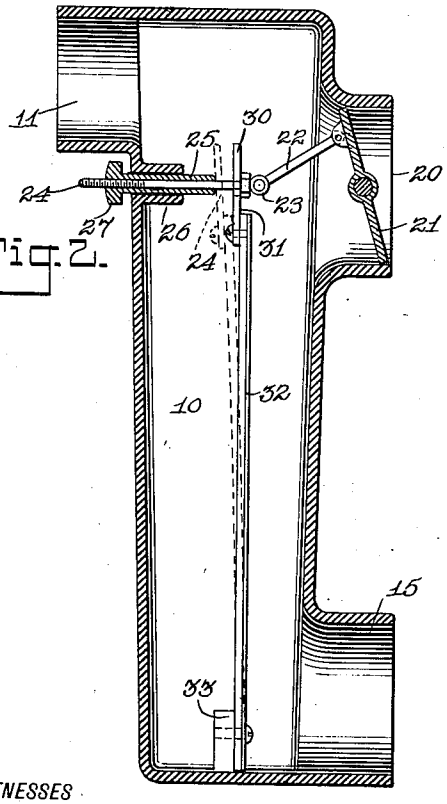
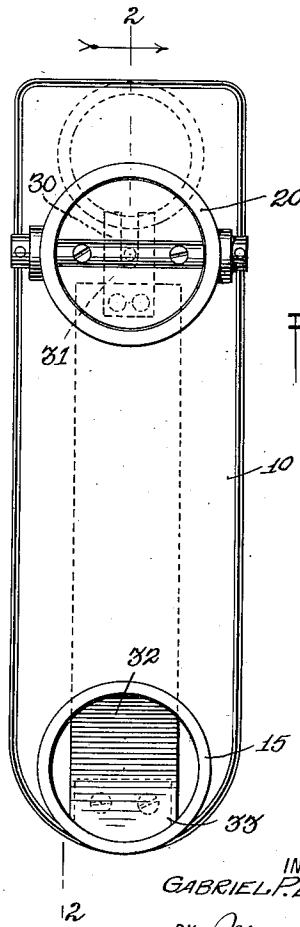


Fig. 3.



WITNESSES

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HOT-AIR REGULATOR.

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To all whom it may concern:

Be it known that I, GABRIEL P. B. HOYT, a citizen of the United States, and a resident of the city of New York, Jamaica, borough of Queens, in the county of Queens and State of New York, have invented a new and Improved Hot-Air Regulator, of which the following is a full, clear, and exact description.

The invention relates to internal combustion engines and its object is to provide a new and improved hot air regulator arranged to control the temperature of the hot air passing into the carbureter to insure the formation of a proper explosive mixture for effective use in the engine cylinders.

Another object is to compensate for the difference in the temperature of the atmospheric air drawn into the carbureter and encountered during different parts of the day or when traveling over hills and through valleys.

Another object is to permit of readily applying the hot air regulator to internal combustion engines as now generally constructed.

With these and other objects in view, the invention consists of certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improved hot air regulator as applied;

Figure 2 is a cross section of the same on the line 2—2 of Figure 3; and

Figure 3 is a face view of the same.

In internal combustion engines as now generally constructed the exhaust manifold is jacketed to provide a hot air chamber open to the atmosphere and connected with the carbureter for supplying the latter with heated air for evaporating the liquid fuel and forming with the vapors thereof the desired explosive mixture. It has been observed that when the engine is running above a normal rate of speed the exhaust manifold becomes highly heated and likewise the hot air for the carbureter and hence a too rich explosive mixture is formed. The temperature of the atmospheric air usually varies during different times of a day and hence when heated by the exhaust gases varies in temperature as it passes into the carbureter and hence the explosive mixture formed varies accordingly, that is, during the hotter part of the day the explosive mixture is rendered too rich and during the colder part of the day the mixture is too poor to do effective work in the engine cylinders. Again, in the case of an automobile traveling over a hill or through a valley, its carbureter draws in atmospheric air of different degrees of temperature, that is, air of higher temperature while going over a hill, and air of lower temperature while traveling through a valley. With my invention presently described in detail the temperature of the hot air for the carbureter is controlled to a nicety by mixing more or less cold air with the heated air prior to the air entering the carbureter thus rendering the admitted air uniform in temperature and thereby insuring the formation of a proper explosive mixture.

The hot air regulator in its general construction comprises a conduit or hot air chamber 10 provided at one end with a hot air inlet 11 connected by a flexible tube 12 with the hot air jacket 13 of the exhaust manifold 14 of the internal combustion engine on which the hot air regulator is used. The other end of the conduit 10 is provided with a hot air outlet 15 connected with the air inlet 16 of a carbureter 17 of usual construction. The conduit 10 is provided with a cold air inlet 20 remote from the hot air outlet 15 and preferably located approximately opposite the hot air inlet 11. This cold air inlet 20 is controlled by a valve 21 preferably of the butterfly type and pivotally connected by a link 22 with the head 23 of a screw rod 24 on which screws a nut 25 mounted to slide in a bearing 26 formed in the wall of the conduit 10, as plainly illustrated in Figure 2. The outer end of the nut 25 is provided with a knurled head 27 to permit of conveniently adjusting the screw rod 24 for the purpose hereinafter more fully explained. The inner end of the screw rod 24 extends in a fork 30 formed on the outer end of an arm 31 bolted or otherwise fastened to the free end of a thermostatic bar 32 extending within the conduit 10 and secured to a lug 33 forming part of the conduit 10. The thermostatic bar 32 is preferably made of two thin strips of ma-

terial (say brass and nickel) having different expansion coefficients, the strips being rolled or riveted together. The valve 21 is normally closed and the fork 30 normally abuts against a collar 35 formed on the screw rod 24 adjacent the head 23, and the said fork 30 is normally spaced from the inner end of the nut 25, as shown in Figure 2. It will be noticed that when the thermostatic bar 32 is subjected to the action of hot air passing through the conduit 10 it expands and the fork 30 of its arm 31 moves from the collar 35 into engagement with the inner end of the nut 25 at about the time the temperature of the hot air passing through the conduit 10 is normal. In case the temperature of the hot air increases then a further expansion of the thermostatic bar 32 pushes the nut 25 outward, and with it the screw rod 24 whereby the link 22 exerts a pull on the valve 21 thereby moving the latter into open position to allow cold atmospheric air to pass through the cold air inlet 20 into the conduit 10 to mix with the hot air therein and thus reduce the temperature of this hot air to the predetermined normal degree. In case the temperature of the hot air passing through the conduit 10 drops below the predetermined degree then the thermostatic bar 32 swings to the right and in doing so the fork 30 engages the collar 35 and thereby moves the screw rod 24 and the nut 25 in the same direction. This movement of the screw rod 24 causes the link 22 to move the valve 21 into closed position thus shutting off the cold atmospheric air from the conduit 10.

From the foregoing it will be seen that the valve 21 moves into open position to admit cold air into the conduit 10 to mix with the heated air therein and thus reduce the temperature thereof prior to its passage into the carbureter. By the arrangement described the heated air passing into the carbureter is maintained at a predetermined normal temperature and hence the formation of a proper explosive mixture is had at all times. Thus the explosive mixture is not liable to become too rich or too poor while the engine is running.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In an internal combustion engine, a hot air conduit provided at one end with a hot air inlet adapted to be connected with a hot air supply, the other end of the conduit being provided with an outlet adapted to be connected with a carburetor, the said conduit being provided with a cold air inlet remote from the said outlet, a thermostatic bar arranged within the conduit and fixed at one end thereto, and adjustable connecting means mounted on the said conduit and connected with the said valve and the said thermostatic bar, the said connecting means being constructed and arranged to hold the said valve in closed position during the time the temperature of the hot air passing through the conduit is normal and to move the said valve into open position on an increase of the temperature of the hot air.

2. In an internal combustion engine, a hot air conduit provided at one end with a hot air inlet adapted to be connected with a hot air supply, the other end of the said conduit being provided with an outlet adapted to be connected with a carburetor, the said conduit being provided with a cold air inlet approximately opposite the said hot air inlet and remote from the said outlet, an auxiliary valve mounted in the said cold air inlet, a thermostatic bar within the said conduit and fixed at one end thereto, and means mounted on the conduit and connected with the said valve and the said thermostatic bar to hold the said valve in closed position during the time the temperature of the hot air passing through the conduit is normal and to move the said valve into open position on an increase of the temperature of the hot air.

3. In an internal combustion engine, a carbureter, a hot air conduit having an outlet connected at one end with the said carbureter to supply the latter with hot air, the other end of the said conduit being provided with a hot air inlet connected with a hot air supply, the said conduit having a cold air inlet remote from the said outlet, a valve controlling the said cold air inlet, a thermostatic bar within the said conduit and fixed at one end thereto, and an adjustable connection loosely connected with the free end of the said thermostatic bar and pivotally connected with the said valve.

4. In an internal combustion engine, a carbureter, a hot air conduit having an outlet connected at one end with the said carbureter to supply the latter with hot air, the other end of the said conduit being provided with a hot air inlet connected with a hot air supply, the said conduit having a cold air inlet remote from the said outlet, a valve controlling the said cold air inlet, a thermostatic bar within the said conduit and fixed at one end thereto, a screw rod, a link connecting the said screw rod with the said valve to open and close the latter, and a nut slidable on the conduit and screwing on the said screw rod, the free end of the said thermostatic bar having a loose connection with the said screw rod and nut.

GABRIEL P. B. HOYT.