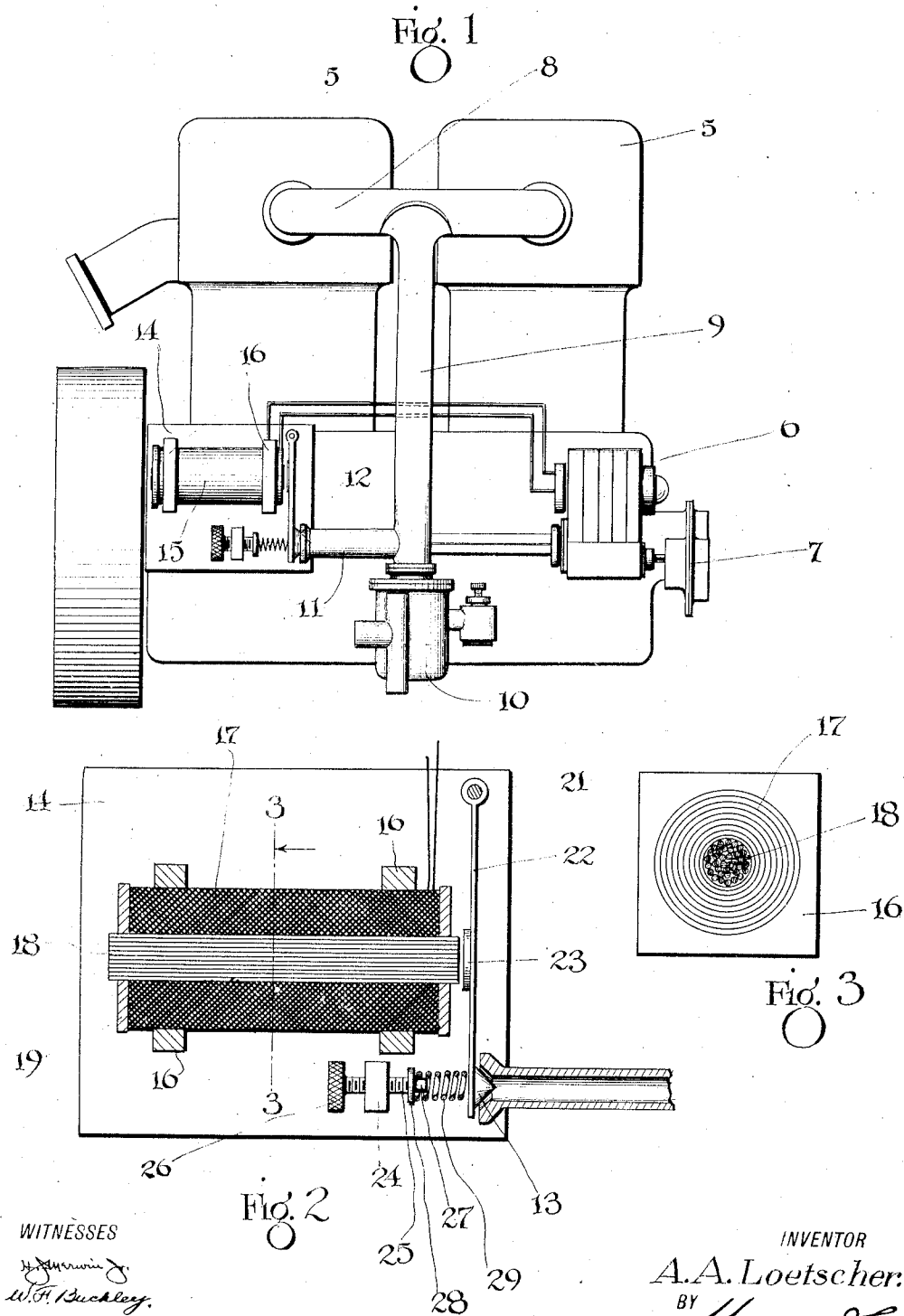


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 AUTOMATIC ELECTRIC FUEL MIXTURE REGULATOR.
 APPLICATION FILED MAR. 24, 1920.

1,360,547.

Patented Nov. 30, 1920.



WITNESSES
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UNITED STATES PATENT OFFICE.

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AUTOMATIC ELECTRIC FUEL-MIXTURE REGULATOR.

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Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed March 24, 1920. Serial No. 368,410.

To all whom it may concern:

Be it known that I, ALVIN ALBERT LOETSCHER, a citizen of the United States, and a resident of Billings, in the county of Yellowstone and State of Montana, have invented certain new and useful Improvements in Automatic Electric Fuel-Mixture Regulators, of which the following is a specification.

10 The present invention relates to internal combustion engines and more particularly to an automatic electric fuel mixture regulator for internal combustion engines.

15 In the type of internal combustion engine with which my invention is employed, fuel being supplied to the cylinder by the pumping effect of the piston, the velocity of the entering gases depends upon the engine speed and as the draft diminishes it will not
20 pick up as much fuel as when it is traveling at a higher rate. The present type of compensating carbureter, which is usually a carbureter provided with a Venturi type of mixing chamber provides for a sufficiently
25 rapid flow of gas at low speed by constructing the mixing chamber bore at the spray nozzle so that the gas speed will be sufficiently high when the engine is pumping slowly. The reduced diameter of the mix-
30 ing chamber increases the velocity of the gases, because the cylinder must be filled through a smaller hole in a certain unit of time than would be the case if the bore were larger. Therefore, to insure a full
35 supply reaching the cylinder, the gases must pass the top of the jet at a high rate of speed even if the piston is working slowly. In view of these features not enough air will be drawn in at high speed, and it is neces-
40 sary to supply it through an auxiliary opening. Heretofore in the art the means that have been employed to control the auxiliary opening so as to maintain it closed at low speeds while permitting it to open at high
45 speeds have not been found effective and efficient in practice.

An object of my invention is to provide an automatic electric fuel mixture regulator of this character under the control of and
50 responsive to the speed of the engine to effectively vary the proportion of the hydrocarbon or other combustible and of the air whereby the fuel mixture or charge delivered to the cylinders is accurately propor-
55 tioned and of proper composition as to pro-

vide for perfect combustion and maximum power at all engine speeds.

Another object is to provide an improvement of this kind of simple and durable construction, highly reliable in operation, 60 and easy and inexpensive to manufacture.

Other objects and advantages reside in the certain novel features of construction, arrangement, and combination of parts which will become apparent as the description proceeds, reference being had to the accompany- 65 ing drawing, in which—

Figure 1 is a side elevational view showing my device applied to an internal combustion engine; 70

Fig. 2 is a detail view of the auxiliary air inlet valve and control therefor; and

Fig. 3 is a sectional view on line 3—3 of Fig. 2.

Referring to the drawings, the numeral 5 75 designates the cylinders of an internal combustion engine which may be of any conventional type and preferably embodies an electric generator 6, shown as consisting of a magneto, but which may comprise a dy- 80 namo or the like, and which is driven by gearing 7 from the crank shaft (not shown), of the engine. The intake manifold 8 leads to the cylinders of the engine, and communicating with the manifold is an induction pipe 9 from the carbureter 10, of stand- 85 ard construction.

Between the carbureter and the intake manifold the induction pipe 9 is provided with an auxiliary air inlet 11 preferably in the form of a short pipe and provided at its outer end with a conical valve seat 12. A conical valve 13 is arranged to cooperate with the valve seat of the auxiliary air inlet. 90

A panel 14 of insulating material is bolted 95 or otherwise secured to the side of the internal combustion engine. Electro-magnetic means, indicated generally at 15, preferably in the form of a solenoid, is mounted upon the panel by means of the supporting plates 100 16. The solenoid comprises windings 17 and a laminated core 18, the windings being disposed between the heads 19. The windings of the solenoid are connected in series with the electric generator, 6, as shown in Fig. 1. 105 Pivoted at 21 to the panel is the armature 22 of the solenoid. The armature has intermediate its ends and adjacent the laminated core of the solenoid, an inwardly extending boss 23 adapted to strike against the lami- 110

nated core when the armature is attracted by the magnet.

The outer end of the armature 22 carries the valve 13, the latter being secured thereto in any suitable manner.

Spring means are provided for maintaining the auxiliary valve 13 closed at low engine speeds. This means consists of a post 24 having a threaded aperture therein for operative engagement with the adjusting screw 25. The adjusting screw 25 has a knurled head 26 for manipulation and has its outer end provided with a smooth and reduced extension 27. At the juncture of the reduced extension and the threaded portion, the adjusting screw is provided with an annular collar 28. A compression coil spring 29 bears at one end against the armature 22 and at its other end against the collar 28 of the adjusting screw, the reduced extension 27 extending into the spring. The end of the spring bearing against the armature 22 is seated in a suitable recess formed in the armature.

When the engine is started at low speed the motion transmitted to the armature of the electric generator is of relatively low velocity and the electro-motive force generated being correspondingly small the current through the electro-magnetic means is also of relatively small value. Consequently, the intensity of the magnetic field is not sufficient to attract the armature 22 and open the auxiliary valve against the action of the spring. At the rate of speed at which sufficient air would not be admitted to the cylinder, the current through the electro-magnetic means is relatively high and generates a magnetic intensity of such value that the armature will be attracted against the action of the spring and the auxiliary air valve opened to provide for the admission of the additional air.

I claim:

1. In a device of the character described, an internal combustion engine, an electric generator associated with said engine and driven thereby, a fuel supply for said engine including an intake manifold, an aux-

iliary air inlet to said manifold consisting of a short pipe provided with a conical valve seat, a conical valve adapted to cooperate with said seat for controlling said auxiliary air inlet, means for operating said valve consisting of electro-magnetic means including a solenoid connected in series with said electric generator, an armature operatively associated with the solenoid and carrying the valve, a coil spring engaging said armature opposite said short pipe for maintaining said valve in closed position at relatively low engine speeds, and means for regulating the valve including an adjusting screw having a reduced extension entering into the coil spring and a collar constituting an abutment for the coil spring.

2. In a device of the character described, an internal combustion engine, an electric generator associated with said engine and driven thereby, a fuel supply for said engine including an intake manifold, a panel carried by said internal combustion engine, an auxiliary air inlet to said manifold consisting of a short pipe having its open end overlying said panel and provided with a conical valve seat, a conical valve adapted to cooperate with said seat for controlling said auxiliary air inlet, means for operating said valve and consisting of electro-magnetic means including a solenoid carried by said panel and connected in series with said electric generator, and an armature pivoted to said panel and operatively associated with the solenoid and carrying said valve, a coil spring engaging said armature opposite said short pipe for maintaining said valve in closed position at relatively low engine speeds, and means for regulating said valve, including a post carried by said panel and having a threaded aperture, an adjusting screw operatively engaged in the threaded aperture and having an end entering into the coil spring and a collar constituting an abutment for the coil spring.

ALVIN ALBERT LOETSCHER.

Witness:

J. W. SNELLBACHER.