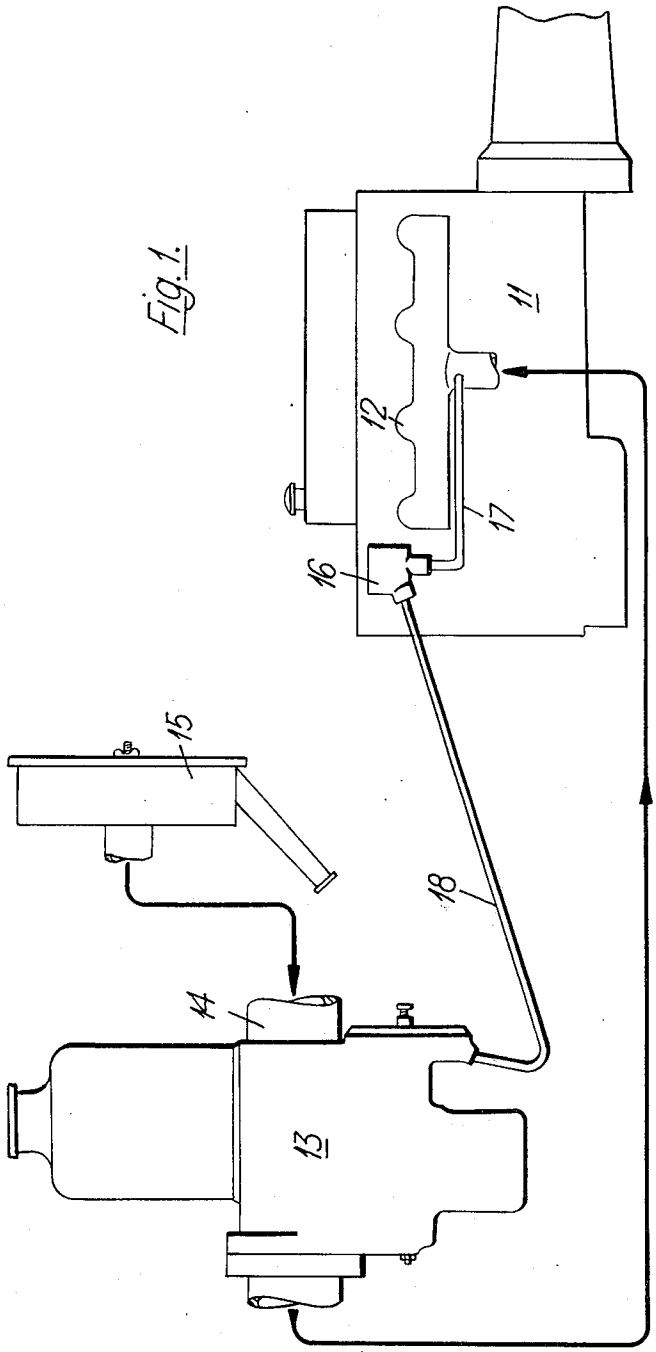


Fig. 1.

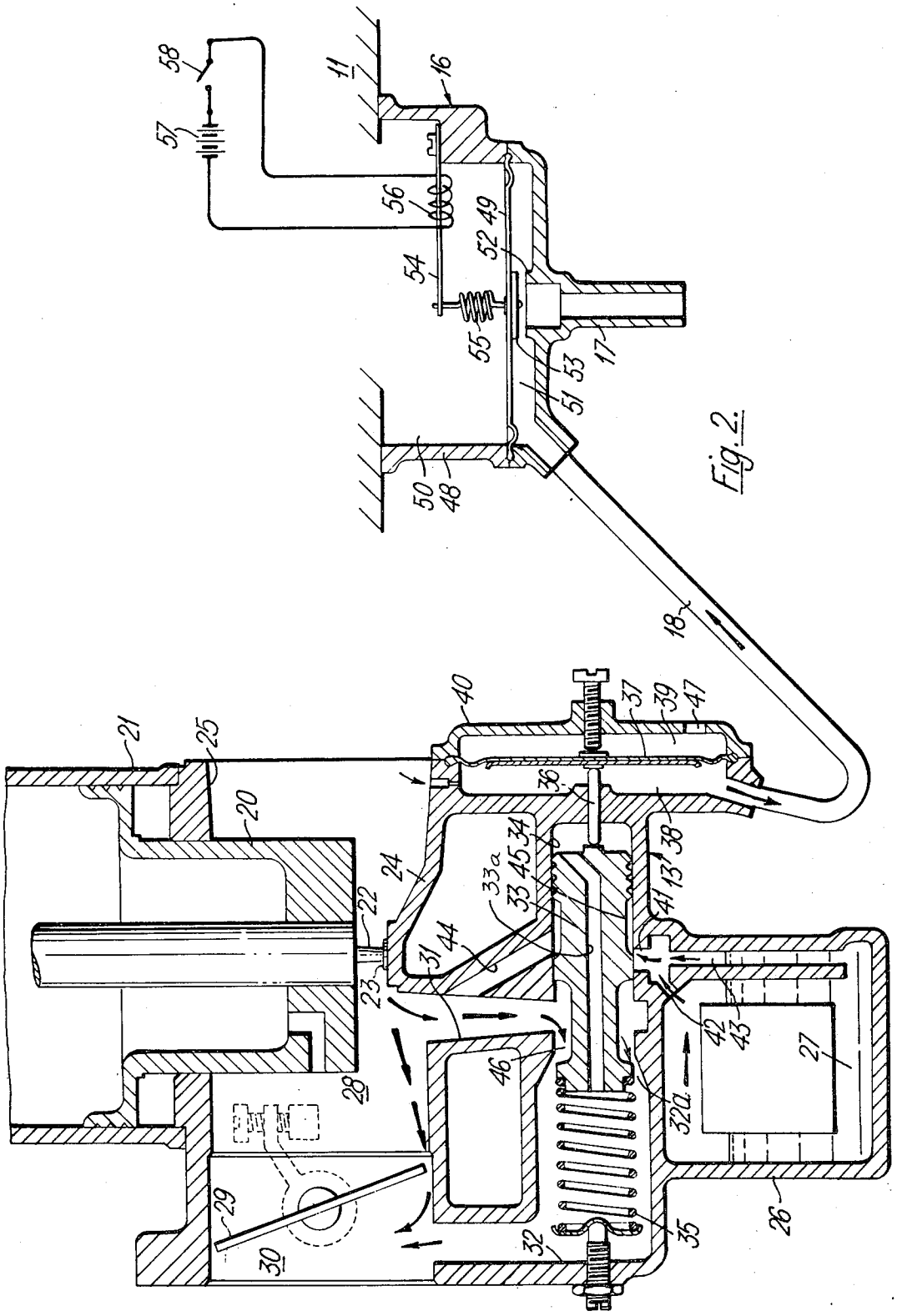

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Fig. 2

CARBURETTERS FITTED TO INTERNAL COMBUSTION ENGINES

This invention relates to carburetters fitted to internal combustion engines either of the constant depression or constant velocity type. Both types are characterised by having a region of depression of several inches of water within the carburetter (referred to subsequently as the constant depression region). The depression in the constant depression region is used to maintain fuel flow into an air stream passing a jet fed with fuel from a flow chamber or other constant fuel level device open to atmospheric pressure. Downstream of the jet a throttle disc is used to govern the total air/fuel mixture flow.

According to the present invention a carburetter of the constant depression or constant velocity type having a region of constant depression within the carburetter includes:

a. a temperature-sensitive device adapted to provide an output signal which varies from a first to a second value in inverse proportion to engine operating temperature, the first value corresponding to normal engine operating temperature, the second value corresponding to a low engine operating temperature; and

b. an enrichment means adapted, in response to the output signal, to control the degree of enrichment of fuel mixture leaving the carburetter the variation of output signal from the first to the second value causing the degree of enrichment to increase; and the variation of the output signal from the second to the first value causing the degree of enrichment to decrease.

The purpose of the invention is to provide a means of enrichment of the normal mixture metered by the carburetter for engine cold start and during warm up.

In a preferred form of the invention engine manifold depression sensing means are provided adapted to cause the output signal to be varied in inverse proportion to the engine manifold depression. Preferably the temperature sensitive device includes a depression control valve which provides as output signal a depression varying from a small or zero amount as first value to a larger amount of several inches water gauge as second value.

The invention also encompasses a vehicle fuel system including a carburetter according to the present invention and also a motor vehicle incoporating such a fuel system.

The carburetter of the invention essentially consists of a temperature sensitive device which is a depression control valve which transmits a depression which is nil at normal engine operating temperatures and which increases as the engine temperature gets colder and which may also be subject to the influence of inlet manifold depression so that the depression signalled by the device increases as manifold depression decreases, the source of the depression to the depression control valve being manifold depression. The device is so arranged that the maximum depression signalled is somewhat less than the minimum manifold depression when the engine is on full load. For example when the sensor temperature is 50°C the depression could be 0 min. water gauge and when −30°C 8 min. water gauge.

The depression thus controlled is transmitted via a flexible small bore pipe to operate an enrichment device which can take various forms. It may be part of the carburetter or a separate device feeding into the induction tract downstream of the throttle disc of the carburetter.

In each arrangement the depression from the sensor unit is applied to a diaphragm or other pressure sensitive member of known area loaded by a rated spring the diaphragm being mounted in a sealed chamber on one side and open to atmospheric pressure on the other, the depression transmitted causing the diaphragm to assume a given position for a given depression.

Movement of the diaphragm thus engendered controls the degree of enrichment and the engine fast idle speed.

In one considered arrangement movement of the diaphragm imparts movements to a pressure balanced valve which controls the degree of communication between the constant depression region of the carburetter and the induction system downstream of the throttle disc. Initial movement of the valve opens a limited connection area to provide a faster idling speed than normal at normal mixture ratios. Further movement of the valve uncovers a cross drilling or orifice which admits additional fuel or rich fuel air mixture into the communication passage on the constant depression side of the zone which enriches the overall mixture passing to the engine. Further movement uncovers successive cross drillings which may be graduated in size to provide an appropriate overall degree of enrichment for the temperature prevailing.

The area of the communicating port to the manifold may be tailored by means of a profiled orifice arranged so that movement of the valve gives a non-linear opening relationship with its excursion.

An adjustable screw may be provided at the centre of the housing on the atmospheric side of the diaphragm to limit its movement towards atmosphere and so control communicating port area at zero depression conditions thus providing an idle speed adjustment which replaces the normal idling adjusting screw which limits throttle disc closure.

In another arrangement the sensor unit is used in conjunction with an auxiliary miniature constant depression carburetter tuned so that the mixture it provides is akin to the mixture ratios of the main carburetter at idling air flows but increases in richness with increasing air flows. The depression from the sensor is then arranged to control the degree of air/mixture communication between the auxiliary carburetter and the inlet manifold by means of a balanced valve.

The sensor unit can in fact be used to signal any enrichment system which requires virtually zero effort to operate it.

An embodiment of the invention will now be described with reference to the accompanying drawing of which:

FIG. **1** is a diagrammatic layout of an internal combustion engine and intake system; and

FIG. **2** is a part sectioned view of two components represented diagrammatically in FIG. **1**.

FIG. **1** shows a four cylinder spark ignition engine block **11** having an intake manifold **12**. The intake manifold **12** is fed fuel mixture from a constant depression carburetter **13** adapted to draw in air along intake **14** from a conventional air filter **15**. A temperature sensitive device **16** is mounted on block **11** and communicates with manifold **12** by duct **17** and with carburetter **13** by duct **18**.

FIG. **2** shows in more detail carburetter **13** and device **16**. The carburetter **13** contains a piston **20** slid-

via a thermal sensitive switch to the starter motor circuit so that the solenoid is energised coincidental with engagement of the starter. Immediately the solenoid is energised its armature moves so as to move diaphragm **37** push pin **36** and spool valve **33** into a position where maximum enrichment is provided.

When the engine fires and the starter circuit is disengaged spool valve **33** will return to its normal position of enrichment dictated by temperature in volume **50** and depression in volume **51.**

The thermal sensitive switch is arranged to pass current at a temperature when additional enrichment is required such as −5°C and below.

We claim:

1. A vehicle engine fuel system comprising:

1. a temperature-sensitive device adapted to provide an output signal which varies from a first to a second value in inverse proportion to engine operating temperature, the first value corresponding to normal engine operating temperature, the second value corresponding to low engine operating temperature;

2. a carburetter of the constant depression or constant velocity type having a housing defining a duct and a throttle disc dividing said duct into a region of constant depression upstream of said disc and an induction region downstream of said disc, said carburetter further comprising:

a. a passage by-passing said disc and providing communication between said constant depression region and the duct downstream of the throttle disc;

b. enrichment means connected to said temperature-sensitive device and comprising a plurality of orifices communicating with said passage, which orifices are connected, when open, to admit fuel or a mixture of fuel and air into said passage, and a pressure balanced valve in said passage which is adapted to control the degree of communication between said constant depression region and said duct downstream of the throttle disc in dependence on the value of said output signal by at least partially opening and closing at least one of said orifices.

2. A vehicle engine fuel system as claimed in claim **1** comprising an engine manifold depression sensing means connected to said signal providing means to vary the output signal in inverse proportion to engine manifold depression.

3. A vehicle engine fuel system as claimed in claim **1** in which the temperature sensitive device includes a depression control valve providing as the output signal a depression varying from a small or zero amount as said first value to several inches watergauge as said second value.

4. A vehicle engine fuel system as claimed in claim **1** comprising engine idle speed control means, said control means being connected to provide a faster idling speed than normal with the output signal at the first value.

* * * * *

United States Patent [19]

Scheuerlein et al.

[11] **3,917,761**

[45] **Nov. 4, 1975**

BEST AVAILABLE COPY

[54] **PROCESS OF MAKING A POROUS POLYIMIDE SHAPED ARTICLE**

[75] Inventors: **Edwin Louis Scheuerlein; Frank Clyde Starr, Jr.,** both of Wilmington, Del.

[73] Assignee: **E. I. Du Pont de Nemours & Company,** Wilmington, Del.

[22] Filed: **Dec. 3, 1974**

[21] Appl. No.: **529,077**

Related U.S. Application Data

[62] Division of Ser. No. 360,582, May 15, 1973.

[52] **U.S. Cl.**..... **264/41;** 51/298; 260/2.5 M; 260/2.5 N; 260/2.5 D; 260/33.6 UA; 260/33.6 R; 260/37 N; 260/857 PI; 260/857 F; 260/857 UN; 264/126; 264/41

[51] **Int. Cl.**[2]..... **C08J 9/24;** C08J 9/02; C08J 9/26

[58] **Field of Search** ..... 260/2.5 M, 2.5 N, 857 PI, 260/857 OX; 264/41, 126

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Primary Examiner—Morton Foelak

[57] **ABSTRACT**

A composition of a coalescible polyimide powder and a polymer of formaldehyde is provided, said composition adapted for fabricating porous polyimide shaped articles by subjecting said composition to a forming pressure of about 100,000 psi to provide a preform, and thereafter sintering said preform by heating said preform to a temperature above about 300°C. to provide a porous polyimide shaped article having interconnecting pores; said porous polyimide shaped articles being useful as, for example, oil-impregnated bearings.

5 Claims, No Drawings