

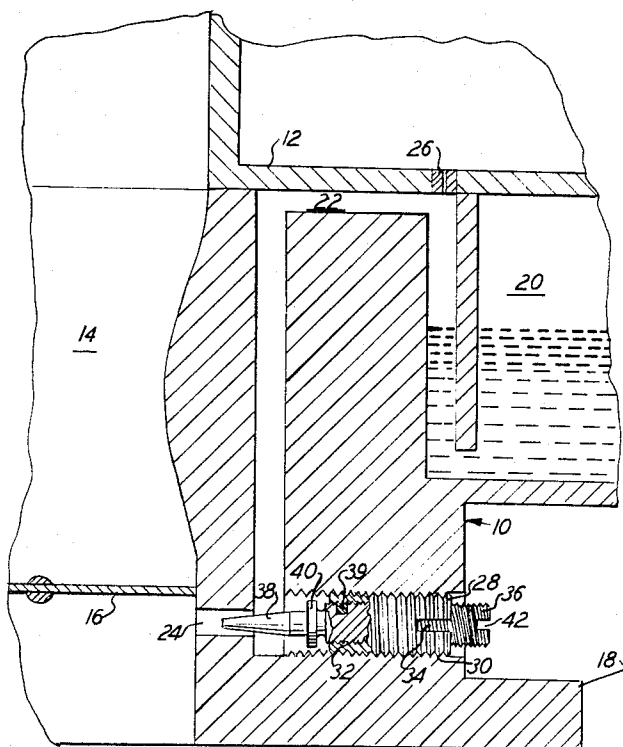
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R. V. PATTERSON, JR

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IDLING FUEL LIMITING DEVICE

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ROBERT V. PATTERSON, JR.
INVENTOR.

BY *John R. Faulkner*
Glen S. Arendsen
ATTORNEYS

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IDLING FUEL LIMITING DEVICE

Robert V. Patterson, Jr., Livonia, Mich., assignor to
Ford Motor Company, Dearborn, Mich., a corpo-
ration of Delaware

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ABSTRACT OF THE DISCLOSURE

This device prevents an increase by personnel in the field of the maximum amount of fuel supplied to an engine through the idling system of a carburetor. A sleeve threadably engages the carburetor body and an idling control needle having a tapered control portion threadably engages the sleeve with the control portion projecting into the idling fuel supply passage. A shoulder formed on the portion of the control needle inside the supply passage bears against the sleeve when the needle is threaded out of the sleeve a certain distance, and means are provided to lock the sleeve to the carburetor body.

Summary of the invention

Exhaust emission standards recently adopted by various governments specify the maximum proportions of certain compounds that can be present in the exhaust of internal combustion engines. The amount of fuel supplied to an engine through the idling passages affects directly the amount of undesirable exhaust emissions from the engine during idling. With proper calibration of the idling system during carburetor assembly, most emission standards can be met; however, an increase in the amount of idling fuel by field service personnel or car owners increases the undesirable emission beyond the standards.

In the past, set screws have been used to lock the idling control needle in a certain position. Of course, the set screws can be removed easily in the field so they do not provide a solution to the problem. Locking blocks fastened to the idling needles also can be removed easily. Generally, all of the prior art devices failed to prevent positively any increase in the maximum amount of idle fuel and rendered more difficult the changes in idling fuel necessitated by varying climate, weather, elevation or engine condition.

The idle limiting device of this invention solves these difficulties by providing a sleeve initially movable relative to the carburetor body with means for permanently locking the sleeve to the body during carburetor flow analysis. An idling control means mounted movably in the sleeve and having a control portion extending into the idling fuel supply passage to control the quantity of idling fuel flowing through the passage has a limiting means thereon preventing movement of the control means relative to the sleeve in the direction increasing the idling fuel flow.

During carburetor flow testing, the limiting means of the control means is moved against the sleeve and the sleeve and control means then are moved as a unit to the position where the idling passage supplies the maximum desired amount of idling fuel. Then the sleeve is locked permanently to the carburetor body and the control means is moved to the position providing the amount of idling fuel required for proper engine operation. Out in the field, it is impossible to increase the idling fuel flow beyond the maximum because of contact between the limiting means and the rigidly positioned sleeve, but adjustments necessary to adapt idling fuel quantity to engine operating conditions can be effected easily.

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Brief description of the drawing

The drawing is a partial sectional view of a carburetor showing the limiting device of this invention and its relationship to the carburetor body and the idling fuel passage therein.

Detailed description

In the drawing, a carburetor body indicated generally by the numeral 10 has a cap portion 12 fastened thereon by conventional means (not shown). An induction passage 14 passes through cap portion 12 and body 10 and has a throttle blade 16 positioned therein to control flow through the induction passage. A flange 18 at the lower side of carburetor body 10 is designed for fastening the carburetor on an intake manifold of an engine so induction passage 14 communicates with corresponding passages in the intake manifold.

Carburetor body 10 has a fuel bowl 20 to which fuel is supplied by conventional means. An idling fuel supply passage 22 formed in body 10 connects fuel bowl 20 with a port 24 opening into induction passage 14 posterior to throttle blade 16. An air bleed jet 26 located in cap 12 connects passage 22 with the atmosphere.

Directly opposite port 24, a sleeve 28 having external screw threads 30 and internal screw threads 32 has threads 30 threadably engaging corresponding threads in carburetor body 10. The outer end of sleeve 28 has a slot 34 therein that is located within body 10 when sleeve 28 is in position. Threadably engaging internal threads 32 are corresponding threads of an idling control needle 36. Needle 36 has a tapered control portion 38 projecting into passage 22 with part of control portion 38 extending into port 24 to establish a metering relationship.

The other end of needle 36 extends outside of sleeve 28 and body 10 and a slot 42 is formed in the outer end thereof. A shoulder 40, the limiting means, is formed between tapered control portion 38 and the threaded portion of control needle 36. Shoulder 40 has an outside diameter greater than the minor diameter of internal threads 32 but smaller than the minor diameter of external threads 30 on sleeve 28. An insert 39, which preferably is made of a plastically or elastically deformable polymeric material such as nylon or rubber, is located in the threaded portion of needle 36 where it bears on internal threads 32.

Data collected in tests of the carburetor on its intended engine is used to compute the maximum flow rate that maintains engine exhaust emissions below the emission standards. During assembly of the carburetor, needle 36 is threaded into sleeve 28 and sleeve 28 then is threaded into carburetor body 10. Insert 39 deforms as needle 36 is threaded into sleeve 28 and thereafter maintains sufficient friction between needle 36 and sleeve 28 to retard movement of needle 36, thereby preventing vibration from loosening the needle.

The completely assembled carburetor is placed on a flow test stand capable of measuring the amount of fuel delivered through port 24. Needle 36 is rotated in sleeve 28 until shoulder 40 abuts sleeve 28 and then sleeve 28 is rotated in carburetor body 10 until the amount of fuel flowing through port 24 reaches the maximum flow rate. A conventional screwdriver can be positioned in slot 42 to rotate needle 36 and a screwdriver having a slotted blade fitting into slot 34 around needle 36 can be used to rotate sleeve 28.

When the maximum flow rate is reached, the screwdriver is removed from slot 34 and metal from carburetor body 10 is staked into slot 34. This rigidly locks sleeve 28 to carburetor body 10 and thereby prevents any subsequent movement of sleeve 28. Needle 36 is threaded forward to the point where the amount of idling fuel supplied

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through port 24 satisfies normal engine idling requirements. The carburetor then is removed from the flow test stand and placed in service without fear of adjustments by personnel in the field increasing the idling fuel supply rate beyond the point where engine exhaust emissions no longer comply with emission standards.

In place of staking carburetor body metal into slot 34, other locking means such as adhesives capable of curing in the absence of air can be used if desired. Insert 39 can be ring shaped so it extends completely around needle 36 to provide a seal for the surface between needle 36 and sleeve 28.

Thus, this invention provides a means for positively limiting the maximum amount of idling fuel to prevent subsequent adjustments from increasing the exhaust emissions to the point where the engine violates exhaust emission standards. Field adjustments necessary to adapt the carburetor to varying service conditions are still possible, however, and can be made with no increase in effort over prior art mechanisms.

What is claimed is:

1. In a carburetor for an internal combustion engine having a carburetor body with passage means therein for supplying idling fuel to the engine, an idle fuel limiting device comprising

a sleeve initially movable relative to said carburetor body,
an idling control means mounted movably in said sleeve

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and having a control portion extending into the passage means to control the quantity of idling fuel flowing through the passage means,

means for limiting movement of said control means relative to said sleeve in one direction, and

means for locking the sleeve to the carburetor body.

2. The carburetor of claim 1 in which the sleeve threadably engages the carburetor body and the control means is a threaded needle threadably engaging the sleeve.

3. The carburetor of claim 2 in which the locking means comprises deformed metal of the carburetor body.

4. The carburetor of claim 3 in which the limiting means comprises a shoulder formed on the control means.

5. The carburetor of claim 4 comprising deformable polymeric material located between the sleeve and the control means to retard movement of the control means.

6. The carburetor of claim 1 comprising deformable polymeric material located between the sleeve and the control means to retard movement of the control means.

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HARRY B. THORTON, *Primary Examiner.*

TIM R. MILES, *Assistant Examiner.*