Nov. 24, 1931. H. H. TIMIAN 1,832,952

CARBURETOR

Filed Feb. 7, 1929

Fig. 1

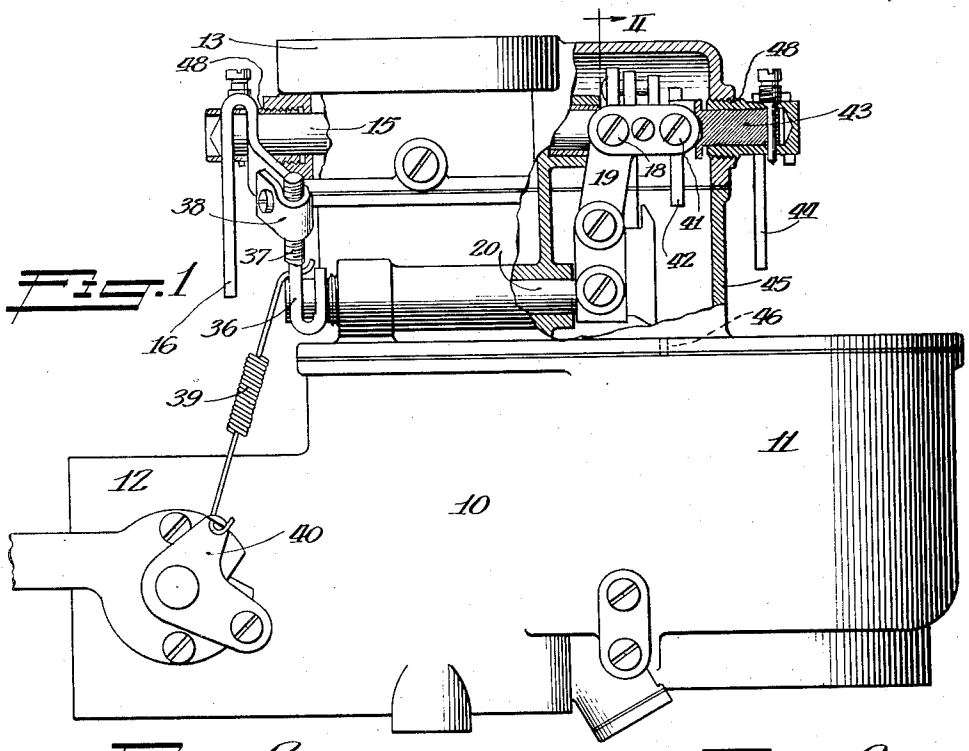


Fig. 2

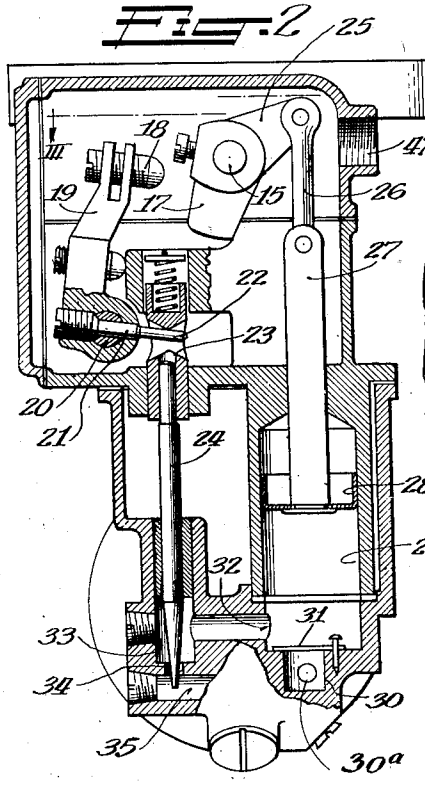
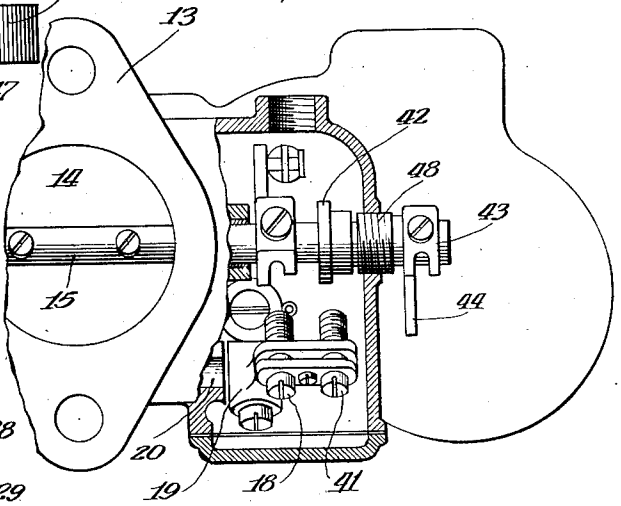


Fig. 3



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UNITED STATES PATENT OFFICE

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CARBURETOR

Application filed February 7, 1929. Serial No. 338,106.

This invention relates to carburetors for internal combustion engines adapted to be intermittently operated under supercharging pressures.

When superchargers are fitted to internal combustion engines, the carburetor system may be located either outside the supercharger or between the supercharger and the engine cylinders. The present invention relates to the latter location of the carburetor, which presents problems in the variation of pressure in the carburetor when the supercharger is in operation, in the control of the mixture ratio due to the variation in pressure, and in the control of leakage from the carburetor when the pressure therein is above atmospheric. It is desirable to be able to disconnect the supercharger and operate the engine under normal conditions of intake suction when the added power resulting from supercharged conditions is not needed.

Under such conditions of supercharger use, it is necessary that the metering characteristics of a carburetor be materially enriched whenever the motor is operated under the increased pressures produced by the supercharger. This enriching of the mixture is in addition to the normal provisions for adjustment to provide for range and power requirements. When the carburetor is subjected to the supercharger pressure each movable element forms a possible avenue of escape for explosive mixture. It is accordingly an object of this invention to inclose all the adjustable members, including the accessories attendant upon the flexibility of the carburetor, in a housing subjected to the supercharger pressure and to lead one or more control members through the housing, providing packing only for the necessary control members thus eliminating a majority of the possible leakage points from the carburetor.

Other and further important objects of this invention will be apparent from the disclosures in the specification and accompanying drawings.

This invention (in a preferred form) is illustrated on the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is an elevation of a carburetor embodying features of this invention, partly broken away to show details thereof.

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is a section on the line III—III of Figure 2.

As shown on the drawings:

A carburetor body 10 is shown as including a float chamber 11, the main air inlet being indicated at 12, together with a mounting flange 13 for attachment to the manifold system, and a throttle valve 14 mounted on a throttle shaft 15 which is operated in the usual way by a lever 16.

The particular internal arrangement of the carburetor has no bearing on the subject of the present invention, and the particular metering control mechanism has been shown in some detail principally to disclose a specific embodiment of this invention.

The structure shown comprises an enriching cam 17 mounted on one end of the throttle shaft and adapted to engage the end of an adjustable screw 18 carried by an arm 19 pinned on a rocker shaft 20 by a screw 21 having an extension 22 engaging in an aperture 23 associated with a fuel needle valve 24. The screw 21 is made with a variety of sizes of the extension 22 to provide a factory adjustment for the initial needle valve setting.

The cam 17 has a projecting arm 25 which has a link 26 connecting to a rod 27 carrying an accelerating pump chamber 29 the accelerating pump being thus directly operated by an opening movement of the throttle shaft. The accelerating pump draws fuel from the float chamber 11 through a passage 30a into a port 30 past a light flap valve 31 and discharges through a passage 32 leading to a chamber 33 about the shank of the needle valve 24, the tapered point of the valve restricting an outlet port 34 opening into a passage 35 leading to the fuel nozzle. The fuel path just outlined is effective when the pump is inactive because the head of fuel in the float chamber is sufficient to lift the light flap valve 31.

The rocker shaft 20 also carries a cam 36

adapted to engage an adjustable screw 37 carried by a projection 38 on the throttle lever 16 to slightly open the throttle from its extreme closed position when a spring 39, connecting the cam 36 to a choke valve control 40, is tensioned by closing of the choke valve when it is desired to start the engine.

The structure heretofore described forms the normal range and power adjustments and the accessories provided to secure flexibility in an unsupercharged carburetor. In order to provide the required additional fuel when the increased supercharger pressures are imposed on the carburetor, the arm 19 is provided with a second adjustable screw 41 which is adapted to be engaged by a cam 42 carried by a stub shaft 43 independent of but coaxial with the throttle shaft 16. This stub staft is provided with an operating lever 44 which is intended to be linked to the supercharger control in such a manner that when the supercharger is placed in operation the cam 42 will be turned to engage its screw 41 to rock the shaft 20 and thereby lift the needle valve to enrich the mixture by allowing the passage of more fuel through the port 34.

When using the supercharger pressure in the carburetor the pressure becomes above atmospheric and causes each journal to become a possible leakage point for the fuel and air mixture. In order to reduce the number of points where provision against leakage must be made, the enriching mechanism is enclosed in a sealed casing 45 having a vent hole 46 opening into the float chamber, and having a tapped inlet 47 to the housing which is intended to be connected to the supercharger, thus in effect forming a jacket subjected to pressures at least equal to the abnormal pressures imposed on the carburetor.

Those connections which must necessarily be externally operatable are provided with packing members adapted to increase the sealing surfaces. The packing comprises externally threaded sleeves 48 secured to the shafts and engaging in threaded apertures in the carburetor walls or casing walls. The sleeves rotate with the shafts and hence displace the latter slightly although the extent of longitudinal movement is slight due to the small angle of movement and fine pitch of threads, so that the normal manufacturing clearances are ample to permit the necessary movement, while the thread's surfaces materially increase the bearing area of the seal.

It will thus be seen that I have provided means for enriching the mixture when the carburetor is operated under supercharging conditions and have at the same time reduced the possibility of leakage from the carburetor and balanced the pressure in the float chamber.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted, otherwise than necessitated by the prior art.

I claim as my invention:

1. A carburetor adapted for use with superchargers, comprising a fuel metering system having enriching means for normal full power operation, independent means adapted to actuate said enriching means for use under supercharged conditions, a housing enveloping said enriching means and having a pressure connection whereby to subject said means to supercharger pressure, said housing having a connection to the carburetor float chamber, outside operating members for said carburetor extending through the walls of said housing, and movable threaded packing members engaging in said housing about said operating members to increase the sealing surface at said operating members.

2. A carburetor adapted for use with superchargers, comprising a fuel metering system having enriching means for normal full power operation, independent means adapted to actuate said enriching means for use under supercharged conditions, a housing enveloping said enriching means and having a pressure connection whereby to subject said means to supercharger pressure, said housing having a connection to the carburetor float chamber, outside operating members for said carburetor extending through the walls of said housing, and packing members associated with said operating members having a threaded surface rotatable against a similar threaded surface in the housing wall to prevent leakage at said outside operating members.

3. A carburetor adapted for use with superchargers, comprising a fuel metering system including means for normally enriching the mixture for full power operation under non-supercharged conditions, means for independently actuating said enriching means whereby to provide additional fuel for supercharged conditions, a housing enveloping said enriching means, control members projecting through threaded openings therefor in said housing and threaded surfaces associated with said control members and engaging in said threaded openings.

4. A carburetor adapted for use with superchargers, comprising a fuel metering system including means for normally enriching the mixture for full power operation under non-supercharged conditions, means for independently actuating said enriching means whereby to provide additional fuel for supercharged conditions, a housing enveloping said enriching means, a pressure connection to said housing whereby to subject the interior thereof to supercharg-

er pressure, control members projecting through threaded openings therefor in said housing and threaded surfaces associated with said control members and engaging in said threaded openings.

5. A carburetor adapted for use with an intermittently operating supercharger, comprising a fuel metering system, said fuel metering system comprising means for enriching the normal or economy setting to provide for full power operation under non-supercharged conditions, and means providing an independent and more extended range of enrichment for said fuel metering system for supercharged conditions.

6. A carburetor adapted for use with an intermittently operating supercharger, comprising a fuel metering system, said fuel metering system comprising means for enriching the normal or economy setting to provide for full power operation under non-supercharged conditions, means providing an independent and more extended range of enrichment for said fuel metering system for supercharged conditions, a housing enveloping said enriching means, and a pressure connection to said housing whereby to subject the interior thereof to the supercharger pressure when the latter is in operation.

In testimony whereof I have hereunto subscribed my name at Indianapolis, Marion County, Indiana.

HAROLD H. TIMIAN.