Oct. 19, 1965 J. R. HOGG, SR 3,212,760

CARBURETOR CONSTRUCTION

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Fig. 1

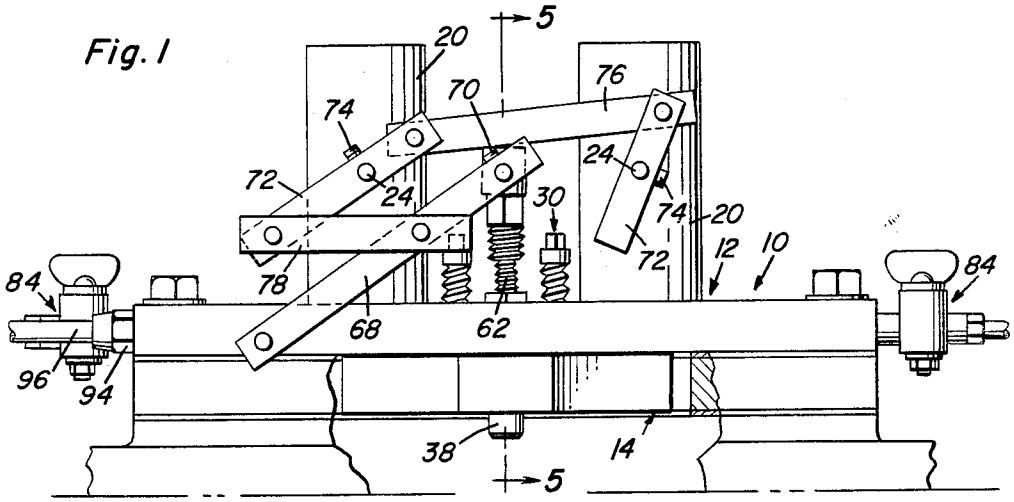


Fig. 2

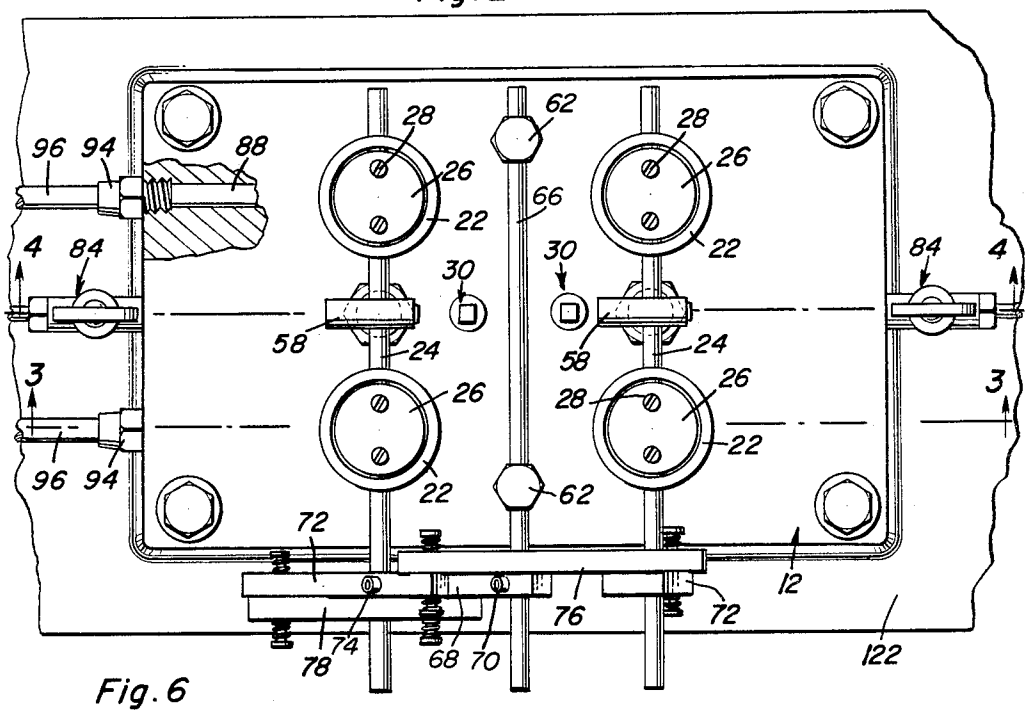
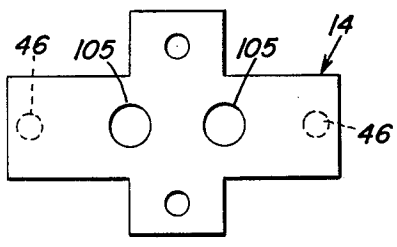


Fig. 6



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Fig. 3

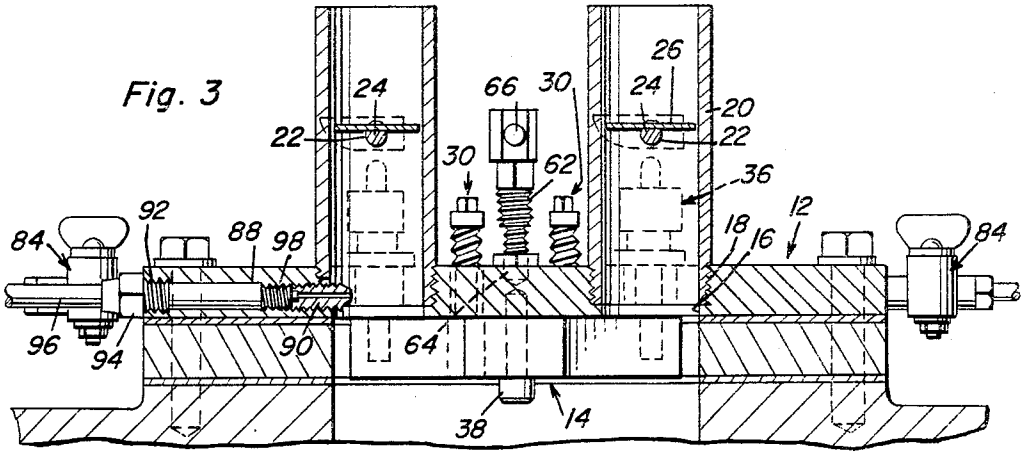


Fig. 4

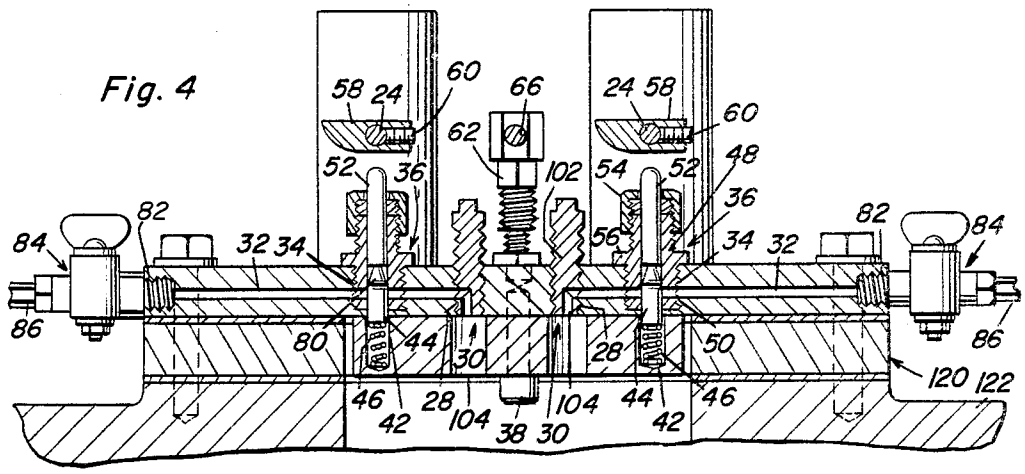


Fig. 5

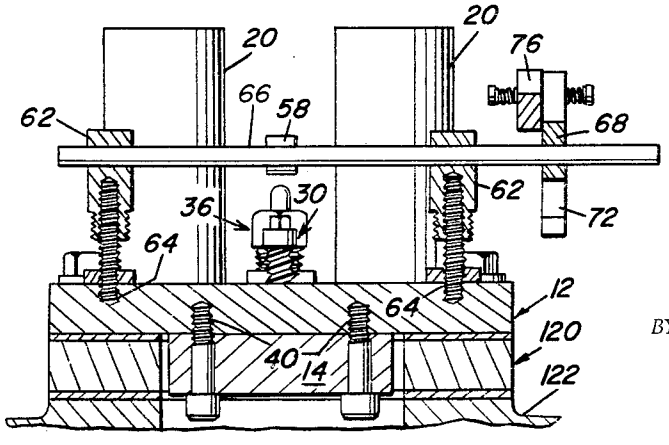
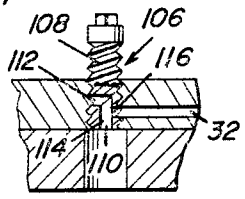


Fig. 7



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United States Patent Office 3,212,760 Patented Oct. 19, 1965

3,212,760

CARBURETOR CONSTRUCTION

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Filed July 10, 1962, Ser. No. 208,725
5 Claims. (Cl. 261—23)

This invention relates to new and useful improvements in carburetors utilized for controlling and metering the flow of fuel and air into an internal combustion engine.

The carburetor of the instant invention differs from more conventional carburetors in that the air and fuel handled thereby are discharged separately into the intake manifold of an internal combustion engine. By separately controlling and metering the flow of air and fuel into the intake manifold of internal combustion engines, more precise metering of the air and fuel may be obtained.

In addition to separately metering the air and fuel handled thereby, the carburetor of the instant invention is designed to inject liquid fuel under pressure into the intake manifold whereby the fuel may be still further accurately metered.

Most conventional automotive carburetors include float chambers for containing a supply of fuel under atmospheric pressure which is constantly replenished by means of a float controlled valve as fuel is charged from the float chamber into the air and fuel passage of the carburetor. Carburetors of the type utilizing a float chamber containing a supply of fuel under atmospheric pressure will operate efficiently under normal conditions when a vehicle is travelling along a straight and level road at a constant speed. However, the inclination of a motor vehicle from a horizontally disposed position, its acceleration and deceleration, and centrifugal force caused by the vehicle executing turns at high speed all have adverse effects upon the preset fuel level in a carburetor float chamber. Inasmuch as all of these operating conditions can appreciably change the effective fuel level in a float chamber, they can cause too much as well as too little fuel to be discharged into the air fuel passages of the carburetor.

In addition to being readily effected by the aforementioned operating conditions, conventional types of carburetors employing the use of float chambers for containing a supply of fuel under atmospheric pressure have become highly complex and thus are extremely expensive in comparison to the same general type of carburetors which were commonly used in the past. Realizing the shortcomings of the general construction and operation of conventional types of carburetors, carburetor designers have incorporated into the carburetors presently being used in motor vehicles numerous additional features in an attempt to alleviate some of the aforementioned problems inherent with carburetors which utilize float chambers for receiving quantities of liquid fuel under atmospheric pressure. As a result, conventional present day automotive carburetors have gotten so complex in construction and operation that it takes a skilled mechanic to overhaul or to make proper adjustments on these carburetors whereas in the past an average mechanic employed in a gasoline station or the like could confidently make substantially all of the adjustments which might be necessary to the carburetors used in the past before the development of carburetors for internal combustion engines became so complex.

Accordingly, the main object of this invention is to provide a carburetor construction which will be capable of accurately metering the air and liquid fuel handled thereby regardless of any operating conditions aforementioned herein.

A further object of this invention in accordance with the immediately preceding object, is to provide a carburetor construction which is extremely simple in design and which will require a minimum amount of adjustment once it is initially set.

A still further object of this invention, in accordance with the preceding object, is to provide a carburetor construction whose operational features are so simple that even a mechanic or service station attendant having less than average experience will be fully capable of making adjustments to the carburetor and diagnosing any malfunction thereof.

Another object of this invention is to provide a carburetor construction which will be capable of metering liquid fuel under pressure and thus eliminate the necessity for the float chamber for containing liquid fuel at atmospheric pressure.

A final object of this invention to be specifically enumerated herein is to provide a carburetor construction in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and readily adaptable to substantially all type of internal combustion engines to as to provide a device that will be economically feasible, long lasting and capable of being mass produced for consumer consumption at a low cost.

These together with other objects and advantages will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of the carburetor construction of the instant invention shown mounted atop a conventional type of intake manifold with portions of the latter being broken away to more clearly illustrate the structural details of the carburetor;

FIGURE 2 is a top plan view of the embodiment illustrated in FIGURE 1 with portions of the carburetor being broken away and shown in section;

FIGURE 3 is a vertical sectional view taken substantially upon the plane indicated by section line 3—3 of FIGURE 2 ;

FIGURE 4 is a vertical sectional view taken substantially upon the plane indicated by section line 4—4 of FIGURE 2 ;

FIGURE 5 is a vertical sectional view taken substantially upon the plane indicated by section line 5—5 of FIGURE 1;

FIGURE 6 is a bottom plan view of a portion of the carburetor; and

FIGURE 7 is an enlarged fragmentary vertical sectional view showing a modified form of metering jet of the carburetor.

Referring now more specifically to the drawings, the numeral **10** generally designates the carburetor construction of the instant invention which comprises a base plate generally referred to by the reference numeral **12** and a distributing block generally referred to by the reference numeral **14**.

With attention now directed to FIGURES 3 and 4 of the drawings in particular it may be seen that the base plate has a plurality of air intake passages **16** formed therethrough whose upper ends are threaded as at **18**. A plurality of cylindrical air horns **20** are threaded on their lower end and are threadedly engaged in the upper ends of the air intake passages **16**. The air horns **20** are arranged in pairs and each is provided with a pair of diametrically aligned bores **22** and a control shaft **24** extends through and is rotatably journalled by the bores **22** formed in each pair of air horns **20**, each of the control shafts having a pair of butterfly valves **26**

mounted thereon by means of screws 28 for controlling the flow of air through the corresponding air horns 20.

A pair of threaded bores 28 are formed through the base plate 12 and each has a metering jet generally referred to by the reference numeral 30 threadedly engaged therein. The base plate 12 is also provided with a pair of fuel inlet passages 32 which each open outwardly of one side edge of the base plate 12 at its inlet end and into the corresponding threaded bore 28 at its outlet end. In addition, the base plate 12 is also provided with a pair of threaded blind bores 34 in which a control valve assembly generally referred to by the reference numeral 36 is threadedly engaged and it may be seen that each control valve assembly 36 is in communication with the corresponding fuel inlet passage 32 and controls the flow of fuel therethrough.

The distributing block 14 is cross-shaped in plan and has a pair of bores formed therethrough for the reception of a pair of fasteners 38 which are passed therethrough and secured in threaded blind bores 40, see FIGURE 5, formed in the base plate 12 for securing the distributing block 14 to the base plate 12. The distributing block 14 includes a pair of upwardly opening blind bores 42 which are concentric with the threaded bores 34 formed in the base plate 12 and the lower end of a needle valve 44 is received in the upper end of each of the blind bores 42 for reciprocal movement therein. A compression spring 46 is disposed between the lower end of each needle valve 44 and the bottom end of the corresponding blind bore 46 for normally resiliently urging the needle valve 44 to its uppermost position within the corresponding control valve assembly 36 which defines an off position.

Each control valve assembly 36 includes a sleeve member 48 which is externally threaded on its lower end and threadedly engaged in the corresponding threaded blind bore 34. The lower end of each sleeve 48 is provided with a transverse bore 50 which is registered with the corresponding fuel inlet passage 32 and a rod-like movable actuator 52 is disposed in the upper end of each sleeve 48 and bears against the upper end of the corresponding needle valve 44. A packing gland assembly 54 is threadedly engaged with the externally threaded upper end of each sleeve 48 and the upper end of each actuator 52 projects upwardly beyond the corresponding packing gland assembly 54. Each sleeve 48 is provided with an annular abutment 56 that abuts the upper surface of the base plate 12 and each of the control shafts 24 has a pair of cam members 58 fixedly secured thereon by means of a setscrew 60 for engagement with the upper end of the corresponding actuators 52 upon rotation of the control shaft 24. Accordingly, it may be seen that rotation of the control shafts 24 will open the butterfly valves 26 and also urge the needle valves 44 toward an open position.

A pair of vertically adjustable stud standards 62 have their lower ends threadedly engaged in complementary blind bores 64 formed in the base plate 12 and the upper ends of the stud standards rotatably journal a support shaft 66 extending therebetween. One end of the support shaft 66 has an actuating lever 68 mounted thereon by means of a setscrew 70 and each of the control shafts 24 has an actuating lever 72 mounted on the corresponding end by means of a setscrew 74. Corresponding ends of the actuating levers 72 have a connecting link 76 pivotally secured therebetween and a control link 78 is pivotally secured at one end of the actuating lever 68 and the end of one of the actuating levers 72 remote from the connecting lever 76. In this manner, the actuating lever 68 may have its free end operatively connected to any suitable form of throttle control linkage whereupon its rotation about the longitudinal axis of the support shaft 66 will effect movement of both the butterfly valve 26 and the needle valve 44. It may be observed from FIGURE 4 of the drawings that the upper end of each of the needle valves 44 is provided with a conical terminal end portion 80 and that as the needle valves 44 are urged downwardly by engagement of the cams 58 with the corresponding actuators 52 the portions of the fuel inlet passages 32 disposed on opposite sides of the control valve assemblies 36 will be placed in communication with each other.

The outer end of each of the fuel inlet passages 32 is diametrically enlarged and internally threaded as at 82 and has one end of a petcock assembly generally referred to by the reference numeral 84 threadedly engaged therein. Suitable pressurized fuel lines 86 are operatively communicated with the petcock assemblies 84 and may be connected to any suitable source of fuel under pressure at their ends remote from the petcock assemblies 84.

With attention now directed to FIGURES 2 and 3 of the drawings, it will be seen that a pair of the air intake passages 16 each have the discharge end of an idle fuel passage 88 communicated therewith which is internally threaded at its discharge end and has an idle jet 90 threadedly engaged therein. The inlet end of each of the idle fuel passages 88 is diametrically enlarged and internally threaded as at 92 for the reception of a coupling 94 by which a fuel line 96 is communicated with the idle fuel passage 88. It is to be understood that the idle jets 90 are provided with suitable kerfs whereby they may be removed by the insertion of a screwdriver blade or similar tool into the inlet end of the idle fuel passage 88.

With attention now invited to FIGURES 4 and 7 of the drawings it will be seen that each of the metering jets 30 comprises a threaded shank portion 102 which has an L-shaped passage 104 formed therein. Each of the L-shaped passages includes a horizontal leg portion which is communicated with the corresponding fuel inlet passage 32 at its discharge end and a vertical leg which opens downwardly into the upper end of a fuel discharge bore 104 formed through the distributing block 14 in alignment with the corresponding threaded bore 28.

In FIGURE 7 of the drawings there may be seen a modified form of metering jet generally referred to by the reference numeral 106 which includes a threaded shank portion 108 similar to the threaded shank portion 102. The metering jets 106 each include an L-shaped passage 110 including a horizontal leg 112 and an upstanding leg 114 which correspond to the horizontal and upstanding legs of the passages 104 formed in the metering jets 102. However, the metering jets 106 each also include a larger horizontal leg 116 which is in communication with the upstanding leg 114. It will be noted that the threads on the metering jet 106 are of a pitch such that the horizontal legs 112 and 116 may be alternately brought into registry with the corresponding fuel inlet passage 32 upon rotation of the fuel metering jet 106, 180 degrees.

If it is required, an adapter plate generally referred to by the reference numeral 120 may be provided and interposed between the base plate 12 and the intake manifold 122. As the stud standards 62 are vertically adjustable, the raising and lowering of the base plate 12 because of the insertion or removal of the adapter plate 120 may be compensated for enabling throttle linkage which is to be connected to the actuating lever 68 to remain unaltered. In addition, inasmuch as the stud standards 62 are vertically adjustable, throttle linkage adjustments may be made by the raising and lowering of the support shaft 66. Still further, it will be noted that the connecting lever 76 may be of any desired length and that the levers 72 may be secured in various rotated positions relative to the corresponding control shaft 24. In this manner, the butterfly valves 26 of one pair of air horns 20 and the corresponding pair of control valve assemblies 36 may be actuated before the corresponding components of the other pair of air horns 20.

In operation either one or two pairs of the air horns **20** may be rendered operative by the petcock assemblies **84**. If it is desired to utilize the carburetor construction **10** as a two barrel carburetor, one of the petcock assemblies **84** may be closed. As the carburetor construction is viewed in FIGURE 3 of the drawings, if one pair of air horns **20** are to be rendered inoperative, the petcock assembly **84** to the right of the base plate **12** would be closed in order that the idle jets **90** may be more efficiently used. However, it is to be understood that the right side of the base plate **12** as viewed in FIGURE 3 of the drawings could also be provided with a pair of idle jets **90**.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A carburetor construction comprising a base including means defining a plurality of air intake passages formed therethrough, a pair of generally parallel throttle shafts, means journaling said shafts from said base with said shafts extending transversely through corresponding intake passages, butterfly valve means carried on said shafts and disposed in said intake passages for controlling the flow of air therethrough, an actuating lever carried by each of said shafts and disposed outwardly of the corresponding intake passages, said levers having free end portions, a connecting lever pivotally secured between the free end portions of said actuating levers, said base including fuel passages having inlet and outlet end portions, said inlet end portions being adapted for communication with a suitable source of fuel under pressure, said fuel passages each including control valve means for controlling the flow of fuel therethrough, each of said control valves including actuator means adjacent and reciprocally mounted generally radially of each shaft, and cam means mounted on said shafts and engageable with said actuators to effect reciprocation of the latter in response to oscillation of said shafts, said cams and levers having means for individually adjusting their positions about said shafts.

2. The combination of claim **1** wherein said outlet ends of said fuel passages open into threaded bores, a threaded shank-type metering jet threadedly engaged in each of said bores and including a longitudinal bore opening outwardly of one end of said jet, said jets each also including a transverse bore opening at one end inwardly into the corresponding longitudinal bore and at the other end laterally outwardly of said jet, the other ends of said transverse bores being at least partially aligned with the outlet end of the corresponding fuel passage.

3. The combination of claim **2** wherein said jets each also include a second transverse bore opening at one end inwardly into the corresponding longitudinal bore and at the other end laterally outwardly of said jet, said other ends of said second transverse bores each also being at least partially registrable with the outlet end of the corresponding fuel passage as the jet is rotated to move the first-mentioned transverse bore out of registry with the associated fuel passage.

4. The combination of claim **1** wherein said base includes additional fuel passages formed therein having inlet ends adapted to be communicated with a source of fuel under pressure and outlet ends opening into said air intake passages.

5. A carburetor construction comprising a base including means defining a plurality of air intake passages formed therethrough, a pair of generally parallel throttle shafts, means journaling said shafts from said base with said shafts extending transversely through corresponding intake passages, butterfly valve means carried on said shafts and disposed in said intake passages for controlling the flow of air therethrough, said base including fuel passages having inlet and outlet end portions, said inlet end portions being adapted for communication with a suitable source of fuel under pressure, said fuel passages each including control valve means for controlling the flow of fuel through said fuel passages, said outlet ends of said fuel passages opening into threaded bores formed in said base, a threaded shank-type metering jet threadedly engaged in each of said bores and including a longitudinal bore opening outwardly of one end of said jet, said jets each also including a transverse bore opening at one end inwardly into the corresponding longitudinal bore and at the other end lateraly outwardly of said jet, the other end of said transverse bores being at least partially aligned with the outlet end of the corresponding fuel passage.

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