

June 17, 1941.

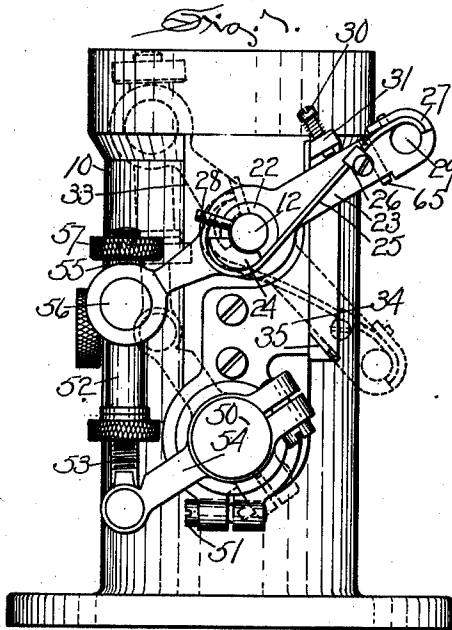
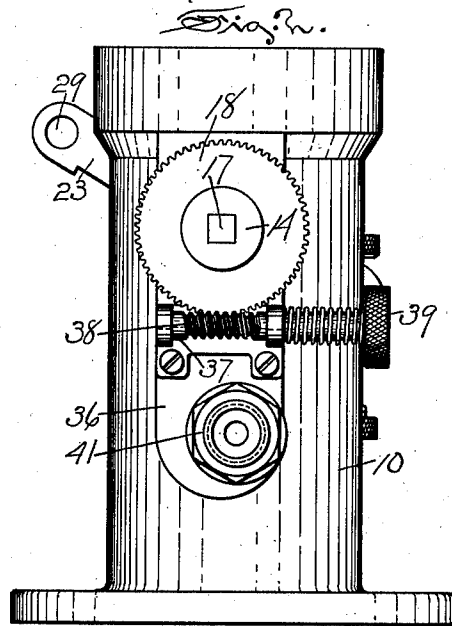
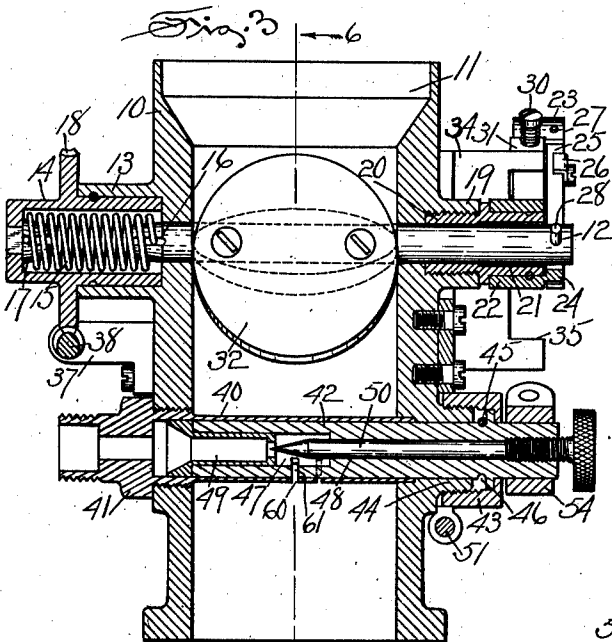
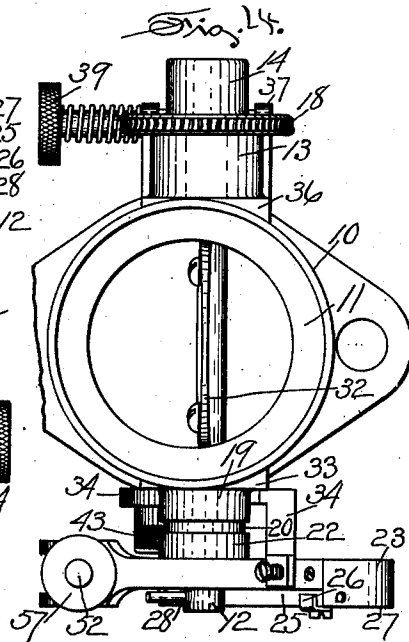
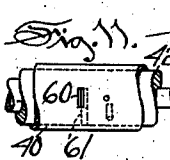
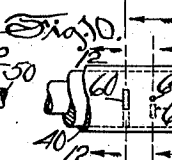
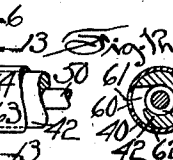
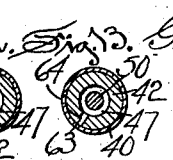
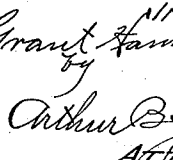
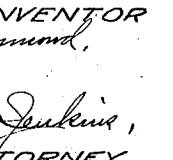
G. HAMMOND

2,246,408

CARBURETOR

Filed Aug. 3, 1938

2 Sheets-Sheet 1



INVENTOR
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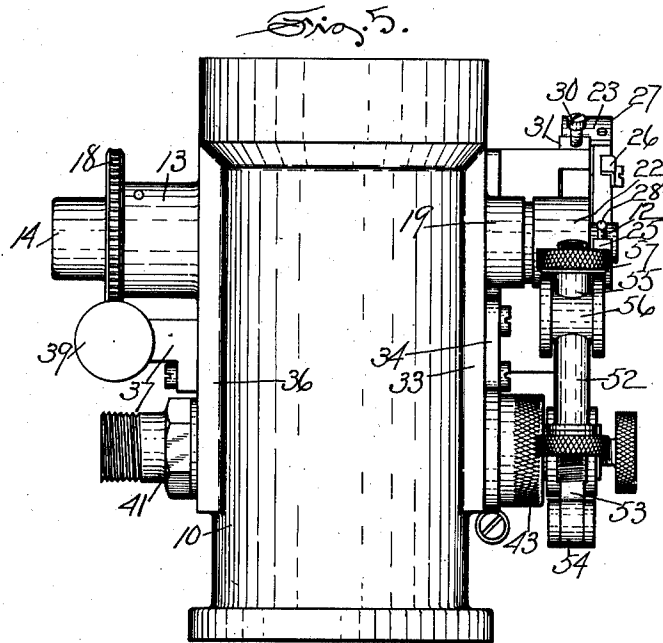
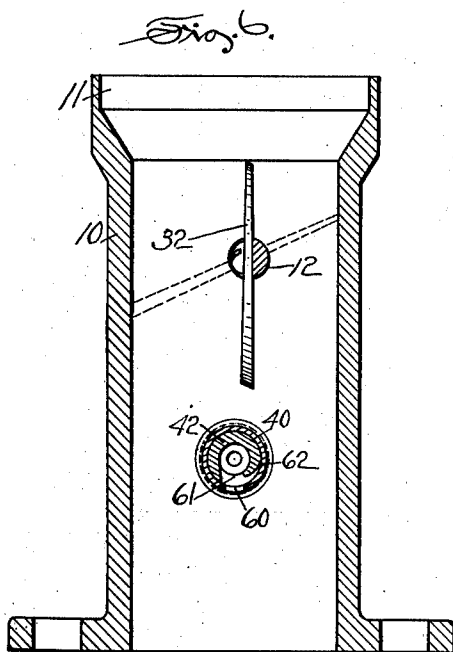
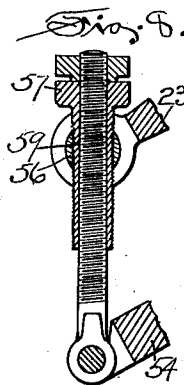
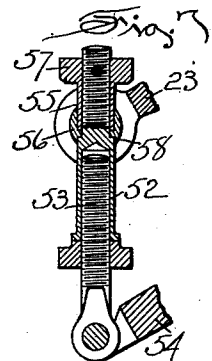
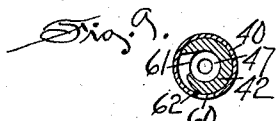
G. HAMMOND

2,246,408

CARBURETOR

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,246,408

CARBURETOR

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mesne assignments, to The Hammond Com-
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necticut

Application August 3, 1938, Serial No. 222,855

3 Claims. (Cl. 261—50)

My invention relates to the class of devices which are employed for regulating a supply of an explosive mixture to the cylinders of an internal combustion engine, and an object of my invention, among others, is the production of a device of this kind that shall be simple in construction, involving a minimum number of parts, and that shall be extremely efficient in the results produced by its operation.

One form of a carburetor embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawings in which—

Figure 1 is a view in side elevation of my improved carburetor.

Figure 2 is a similar view but looking at the side opposite to that shown in Fig. 1.

Figure 3 is a view in central lengthwise section through the device.

Figure 4 is an end view.

Figure 5 is a view in side elevation from a point of view located at the left of the device as seen in Fig. 1.

Figure 6 is a view in section on a plane denoted by the dotted line 6—6 of Fig. 3.

Figure 7 is a detail view in lengthwise central section through the throttle adjusting mechanism.

Figure 8 is a detail view showing a modification of this structure.

Figure 9 is a view in cross section through the fuel valve on the same plane illustrated in Figure 6, but showing the valve closed.

Figure 10 is a detail bottom view of a portion of the fuel valve showing the fuel ports fully open and adjusted to full width.

Figure 11 is a similar view showing said ports adjusted to narrower dimensions.

Figure 12 is a view in cross section on a plane denoted by the dotted line 12—12 of Fig. 10.

Figure 13 is a view in cross section on a plane denoted by the dotted line 13—13 of Fig. 10.

In the accompanying drawings the numeral 10 denotes the shell of my improved carburetor which is open from end to end, this opening being preferably cylindrical but with an enlarged intake mouth 11. An air intake valve shaft 12 is rotatably mounted in openings extending through the shell on opposite sides, at opposite ends of said shaft extending beyond the shell at opposite sides thereof. It extends into a recess in a boss 13 on one side of the shell which boss forms a bearing for a valve spring adjusting sleeve 14 in which a valve spring 15 is housed,

one end of the spring extending into a slot 16 in the shaft 12 and the other end of the spring projecting into a slot in a stub 17 secured to one end of the sleeve and projecting inwardly therefrom, as shown in Fig. 3 of the drawings. An adjusting worm gear 18 is secured to the sleeve for a purpose to be hereinafter described.

A boss 19 extends from the side of the shell opposite the boss 13 and a bearing sleeve 20 is screw threadedly engaged with a recess in the boss 19, the shaft 12 having a bearing within the sleeve. The hole in the sleeve for said shaft is larger at its outer end thereby creating a space 21 between the sleeve and the outer end of the shaft, as shown in Fig. 3 of the drawings.

A hub 22 of a control lever 23 is rotatably mounted on the outer end of the bearing sleeve 20, said hub having rotating movement on the sleeve but being prevented from endwise movement thereon as by means of a pin in the hub 22 passing across a circularly formed groove in the sleeve 20, as shown in Fig. 3 of the drawings. A lug 24 extends from the end of the hub 22 and a spring 25 extends around said lug, as shown in Fig. 1 of the drawings. The spring is secured to the lever at its outer end as by means of a clip 26 secured to the lever and a lip 27 formed on the end of the lever, a pin extending from the spring through the lip as shown in Fig. 1.

A control pin 28 projects from the side of the shaft 12 into the path of movement of the lug 24 and end of the spring 25 to close the valve when the lever 23 is swung on its pivot as by means of an accelerator rod of any usual construction secured in a hole 29 in the end of the lever in a manner that will be readily understood. The end of the spring 25 and the lug 24 are as a matter of fact co-acting stops, particularly during idling operations, to contact with the pin 28, the end of the spring being a yielding stop and the lug 24 being a rigid stop. A stop 30 in the form of a screw is adjustably secured in a lug 31 projecting from the side of the shell as shown in Fig. 1, this stop affording a rest for the lever 23 in one of its extreme positions. The valve shaft 12 is flattened intermediate its ends and within that portion located in the opening through the shell, and an intake air valve 32 is secured to said flattened part of the shaft. This valve is preferably of wedge shape, the thin part being on the side of the shaft which opens outwardly and the thick part on the opposite side of said shaft which opens inwardly. This is to prevent locking of the valve by pressure caused by back firing, the thick part

preventing the valve from being embedded in the interior wall of the carburetor. This air intake valve is offset slightly from the center line of the carburetor bore to cause the valve to readily overcome inertia in its opening movement.

A flat boss 33 of substantially rectangular shape is formed on one side of the shell and a bracket 34 is secured to and projects from said boss, the stop lug 31 in fact being secured to or forming a part of said bracket, and a stop shoulder 35 is also formed on said bracket to limit movement of the control lever 23 in a position opposite the lug 31.

A rectangularly shaped boss 36 similar to the boss 33 is formed on the opposite side of the shell 10 from said boss 33, and a bearing 37 for an adjusting worm 38 is secured to and projects from said boss. This worm meshes with the adjusting worm gear 18 hereinbefore referred to and has a finger button 39 secured thereto. This is used to adjust the tension of the valve spring 15 by effecting a turning movement of the gear 18 in a manner that will be readily seen and forms an important feature of my invention.

A fuel intake feed sleeve 40 is screw threaded into one side of the shell 10 and extends across the bore of the shell into a recess on the opposite side of said bore. A nipple 41 provided with means for connection to a fuel pipe line projects from one end of said sleeve. The opening through this sleeve is of a diameter to form a close turning fit for a fuel regulating valve 42 that is rotatably mounted in said sleeve. This valve is adjustable lengthwise within the sleeve by means of an adjusting cap 43 screw threadedly engaged with a boss 44 projecting from the side of the shell, as shown in Fig. 3, to vary the sizes of valve ports to be hereinafter described. Said valve is held from lengthwise movement independently of said cap by means of a pin 45 secured to the cap end projecting across a scarf 46 annularly formed in the valve.

This valve is bored out for a certain distance from the end adjacent the nipple 41, forming a recess 47 extending a short distance past the center of the bore through the carburetor shell. A smaller hole 48 extends to the opposite end of the sleeve. A bushing 49 is snugly secured in the recess 47, as shown in Figure 3, the inner end of the bushing having a small hole for the reception of the pointed end of a needle valve 50 located in the hole 48. When the cap 43 is turned for adjusting the position of the valve the engagement of the pin 45 in the groove 46 in said valve will cause the latter to follow the movement of the cap in one direction. After the adjusted position of the valve has been determined the cap is held against movement as by means of a clamp constituted by splitting the end of the bracket 34 and drawing the split parts together by means of a screw 51, as shown in Fig. 1 of the drawings. The needle valve 50 is screw threadedly engaged in the hole in the valve 42 at its outer end, and the pointed end of the needle valve registers within the hole in the bottom of the bushing 49, hereinbefore mentioned.

The valve 42 is connected with the control lever 23 for operation thereby by means of an adjustable connection comprising a connecting rod 52 and a connecting pin 53. One end of the rod is bored and threaded to receive the threaded end of the pin, and the latter is pivotally attached to a fuel valve operating lever 75

54 secured to the projecting end of the fuel valve 42, as shown in Fig. 1 of the drawings. The opposite end of the connecting rod is threaded into and pinned to a locking sleeve 55 extending into a journal 56 rotatably mounted in the end of the control lever 23, as shown in Fig. 7. This locking sleeve has a finger piece 57 as a means for turning the rod 52 for adjusting purposes and the inner end of the sleeve abuts a shoulder in the opening in the journal as shown in Fig. 7. The thrust of the inner end of the sleeve against the shoulder in the journal draws a shoulder 58 on the connecting rod against the journal 56, but with a loose fit to permit the rod to be readily turned for adjusting purposes as just mentioned.

In the modified form of this connection, shown in Fig. 8, this locking sleeve 59 is threaded into a hole in the journal, this thread having a different pitch from the thread on the interior of the sleeve so that when the sleeve is turned the rod is moved up or down, thereby securing a very fine adjustment of the connection of the rod to the lever 23. A lock nut abutting the finger piece 57 may be employed for locking the sleeve 59 in place.

The fuel intake feed sleeve 40 has a slot 60 cut through its inner wall, this slot forming an outlet port for gas into the carburetor shell. The fuel regulating valve 42 has a slot 61, of a width approximately that of the slot 60, cut into its peripheral surface. This slot 61 comprises a valve port for supply of fuel to the outlet port 60 and extends for approximately ninety degrees around the valve and it gradually increases in depth from a zero point 62 at the periphery of the valve to the point where it reaches the hole in the center of the valve at which point the two ports are substantially of the same width. An auxiliary port comprising openings adapted to register in the valve 42 and sleeve 40 respectively is located a short distance from the ports comprising the slots 60 and 61, as shown in Figs. 10 and 11 of the drawings, this auxiliary port being for the purpose of supplying additional fuel to prevent faulty action of an engine during critical periods which vary in different engines. The slot comprising a part of this auxiliary port may be similar in construction to the slot 60 hereinbefore described, in which case it gradually increases in depth to the point at which it enters the recess 47 in the valve 42 and the hole 64 comprising the other portion of the port has a diameter equal to the width of the slot. As the valve is rotated in a direction to open, the shape of this auxiliary port causes it to gradually increase in depth and thereby progressively enlarge to its maximum, whereupon further opening movement of the valve closes this port, its function having been completed. This prevents objectionable popping noises owing to a too lean mixture when an engine is gaining speed, the port being promptly shut off and closed when the need for an enriched mixture ceases.

The supply of fuel to suit any running conditions required may be regulated by varying the width of the port comprising the slots 60 and 61 and the port comprising the slot 63 and hole 64, by means of the adjusting cap 43. The screw 51 having been loosened, said cap may be turned to vary the widths of said ports as shown in Figs. 10 and 11 and the proper width having been obtained, the screw 51 is tightened to hold the cap 43 in such adjusted position. The needle valve

50 is adjusted in the usual manner to regulate the supply of fuel to the carburetor.

From the foregoing description it will be seen that the air intake valve 12 is free to close at any time, regardless of the position of the control lever 23, and said valve is restricted in its opening movement at all times by the stops of the control lever, first resiliently by the resilient stop 25 and then rigidly by the rigid stop 24 should the vacuum cause the stop 25 to yield. I have thus provided a particular means, as disclosed herein, for resisting opening movement of the air intake valve and which regulates the vacuum tension within the shell below said air intake valve. When the control lever is in its closed position the air intake valve is held in its closed or idling position by contact of the end of the resilient stop 25 or the rigid stop 24 with the control pin 28, as hereinbefore mentioned. When the control lever is moved to open the throttle the said stops move away from contact with the pin 28, leaving the air valve free to follow and to open against the resistance of its closing spring but limited in such movement by the position of the control lever, first resiliently by contact of said pin with the stop 25 as above mentioned, the resilient stop thereby permitting a slight opening movement of the air valve independently of the control lever, should the vacuum suddenly increase to a point to effect this movement, and this also applies when the air valve is in its idling position above described, the pin 28 being slightly spaced from the stop 24 so that the valve may have a slight further opening movement under increased vacuum.

It is here remarked that the full lines indicate the positions of the parts with the throttle open and the dotted lines indicate the positions of the parts when the throttle is closed. The size of the opening of the port comprising the slots 60 and 61 when the throttle is wide open may be determined by the adjustment provided in the connecting rod and pin 52 and 53. By use of either of the screws 30 or 65 the size of the opening at either end of the path of movement of the valve may be alone changed, in this case the degree of movement of the control lever being changed whereas, by the use of the connecting rod, the degree of movement of the control lever is not changed but the zone of movement is changed.

The adjustment of the fuel valve for idling purposes is accomplished by means of the screw 65 in the operating lever against the lower lever stop 35 to get the proper opening in the valve. The lever 23 is then adjusted to its proper position by loosening the finger lock nut in the bottom of the rod 52 and turning said rod by means of the head 57 until the lever 23 is in its proper position. The lock nut is then tightened against the end of the rod 52.

The lever 23 is shown with means for connecting an operating member thereto, but it will be obvious that this connection need not necessarily be with the lever 23 but it may be equally well connected to the lever 54 instead, the results being the same in either case.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the de-

vice which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A carburetor including a shell having an opening through it from end to end, a shaft pivotally supported by said shell, an air valve secured to said shaft in an unbalanced position thereon and subject to opening movement by vacuum within the shell, a spring attached to said shaft for resiliently closing said valve, a pivotally mounted control lever, and a connection between said lever and valve, said connection including a stop member rigid with said air valve, a lug carried by said control lever in the path of said stop member and adapted to be engaged thereby to positively limit the opening of said air valve and a resilient member mounted on and carried by said control lever and extending farther into the path of said stop member for contact of the latter with said resilient member to constitute additional resilient resistance to opening of the valve through a limited range in different positions of said control lever and independent thereof.

2. A carburetor including a shell having an opening through it from end to end, a shaft pivotally supported by said shell, an air valve secured to said shaft in an unbalanced position thereon and subject to opening movement by vacuum within the shell, a spring attached to said shaft for resiliently closing said valve, a pin projecting radially from said shaft, a pivotally mounted control lever, a lug extending laterally from said lever in position to engage said pin and thereby force the valve toward closed position, and a spring carried by said control lever and having its free end normally extending beyond the lug to encounter said pin to constitute additional resistance to opening of the air valve through a limited range.

3. A carburetor including a shell having an opening through it from end to end, a shaft pivotally supported by said shell, an air valve secured to said shaft in an unbalanced position thereon and subject to opening movement by vacuum within the shell, a spring attached to said shaft for resiliently closing said valve, a pivotally mounted control lever, a connection between said lever and valve, said connection including a stop member rigid with said air valve, a lug carried by said control lever in the path of said stop member and adapted to be engaged thereby to positively limit the opening of said air valve and a resilient member mounted on and carried by said control lever and extending farther into the path of said stop member for contact of the latter with said resilient member to constitute additional resilient resistance to opening of the air valve through a limited range in different positions of said control lever and independent thereof, a fuel valve for supply of fuel to said shell, and a connection between said control lever and said fuel valve for operation of the latter.

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