

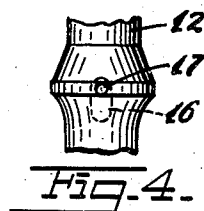
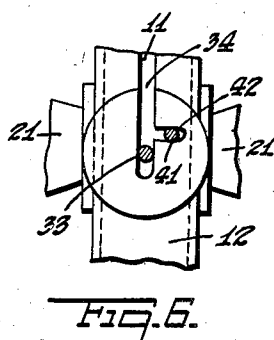
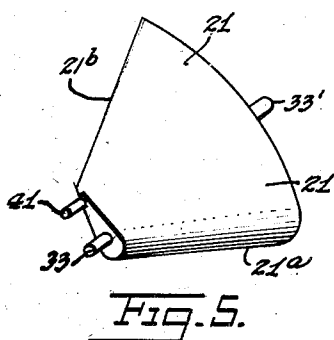
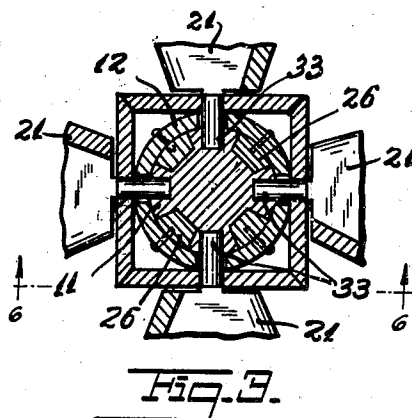
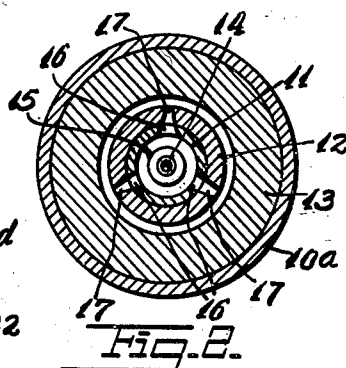
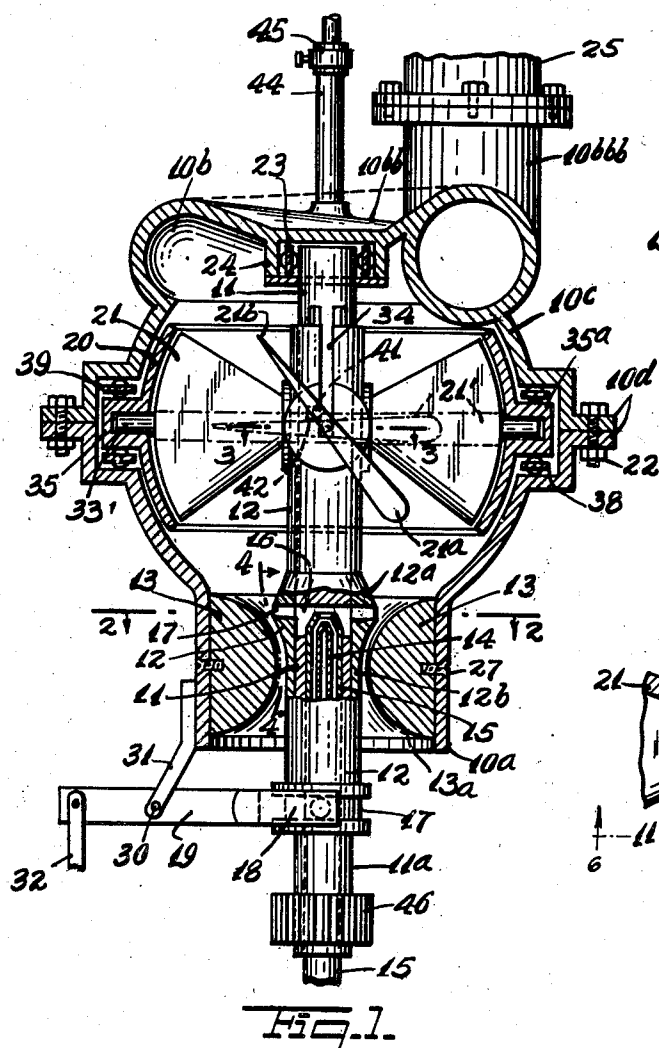
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E. MILLER, JR

2,188,189

COMBINATION CARBURETOR AND SUPERCHARGER

Filed July 26, 1939



INVENTOR
Edmund Miller, Jr.
BY *Gottlieb Holschich*
ATTORNEY

UNITED STATES PATENT OFFICE

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COMBINATION CARBURETOR AND
SUPERCHARGER

Edmund Miller, Jr., Bayside, N. Y.

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9 Claims. (Cl. 261-89)

This invention relates to new and useful improvements in a combination carburetor and supercharger.

The invention has for an object the construction of a device as mentioned which is characterized by a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a fan associated with said shaft and hollow body in a particular way, and gas or air tubes also associated with the shaft in a way so that the fan acts to thoroughly vaporize and mix the air and gas.

More specifically the invention proposes to so arrange the blades of the fan that during the operation of the carburetor it is possible to change the pitch of the blades for causing the fan to act in the place of the conventional butterfly throttle valve used in present day carburetors. In one position of the blades it is proposed that they extend transversely across the hollow body and substantially close the entire passage through the body. In other positions of the blades it is proposed that the blades act as a fan for forcing the vaporized mixture through the spiral outlet.

Still further the invention proposes the construction of a device as mentioned which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawing forming a material part of this disclosure:

Fig. 1 is a longitudinal sectional view of a combination carburetor and supercharger constructed in accordance with this invention.

Fig. 2 is a transverse sectional view taken on the line 2-2 of Fig. 1.

Fig. 3 is a fragmentary sectional view taken on the line 3-3 of Fig. 1.

Fig. 4 is a fragmentary elevational view looking in the direction of the line 4-4 of Fig. 1.

Fig. 5 is a perspective view of one of the fan blades per se.

Fig. 6 is a sectional view on the line 6-6 of Fig. 3.

The combination carburetor and supercharger in accordance with this invention includes a hollow body 10 having a tubular axial inlet portion 10^a and a spiral outlet portion 10^b. A shaft 11 is rotatively supported axially through the body

10. A sleeve 12 is mounted upon the shaft 11 and is keyed thereto to slide longitudinally. A Venturi restriction 13 is mounted within the inlet portion 10^a. A complementary Venturi projection 12^a is arranged upon the movable sleeve 12 and is adapted to coact with the restriction 13.

Gas and air tubes 14 and 15 are mounted through the shaft 11 and connect with aligned passages 16 and 17 formed in the shaft 11 and in the sleeves 12, and discharge at the Venturi 12 area. A means is provided for moving the sleeve 12 longitudinally, and this means includes a grooved collar 17 mounted on the sleeve. A fork engages this collar and is mounted on a movable lever 19. A fan shell housing 20 is rotatively supported in the hollow body 10 immediately adjacent the side wall thereof. Fan blades 21 are pivotally mounted between the housing 20 and the shaft 11 and in transverse positions are adapted to substantially close passage through the hollow body 10. A means is provided for changing the pitch of the fan blades 21 controlled by the movement of the sleeve 12 as hereinafter more fully described.

The hollow body 10 has a central portion 10^c which is in the shape of a zone of a sphere. This central portion is made from two sections each provided with a flange 10^d. These flanges are secured together by bolts and nuts 22 to join the parts of the body in one connected unit. The inner end of the shaft 11 is rotatively supported by a ball bearing 23 which is mounted in a ball bearing housing 24 arranged upon the end of the body 10. The spiral outlet 10^b starts at a point 10^{bb} which is relatively small and gradually expands in diameter until it discharges at the point 10^{bbb}. At this point it connects with the intake manifold of the engine through a pipe connection 25.

The sleeve 12 has several key members 26 attached to its inner side and these key members engage corresponding longitudinally extending grooves in the shaft 11. Thus the sleeve is keyed to the shaft in a manner so that it may move longitudinally thereof, but these parts must rotate in unison. The Venturi projection 13 has a curved inner surface 13^a through which the outer end of the sleeve 12 passes. The projection 13 is held in position by several screws 27 engaging through the wall of the tubular axial inlet of the hollow body 10. The complementary Venturi projection 12^b upon the sleeve 12 comprises merely a curved area on the sleeve which is partially extended along the curved surface 13^a. The passages 16 formed in the shaft 11 are of elongated

shape, see Fig. 4. The passages 17 formed in the sleeve 12 and aligned with the passages 16, are circular in shape, and consequently of smaller size. The arrangement is such that these passages maintain their connection with each other in all longitudinal adjusted positions of the sleeve 12.

The means for longitudinally moving the sleeve 12 includes a movable lever 19. This lever is pivotally supported by a pintle 30 mounted on a stationary bracket 31. The outer end of the lever is provided with a connecting rod 32 by which it may be moved.

Each blade 21 has a thick rounded end 21^a normally directed towards the Venturi area, and a knife shaped end 21^b remote from the Venturi area. Each blade 21 is turnably supported by a trunnion having a trunnion element 33 extending through a slot 34 formed in the sleeve 12, and rotatively engaging on the shaft 11. The other trunnion element 33' is mounted upon the outer end of the blade and engages a bearing 35 formed in the shell housing 20. The arrangement is such that each of the blades 21 is capable of pivoting around the trunnion as a central axis of pivoting. The shell housing 35 has a circumferential flange portion 35^a which engages into a corresponding groove 38 formed in the hollow body 10. Thrust ball bearing races 39 are mounted between the side walls of the groove 38 and the flange 35^a for rotatively supporting the shell housing 20.

The means for changing the pitch of the fan blades 21, controlled by the sleeve 12, includes a pin 41 mounted on the inner end of each blade 21 eccentric of the central axis of pivoting, and engaging into a branch slot 42 in the sleeve 12 and communicating with the longitudinal slot 34. As the sleeve 12 is moved longitudinally, the blades 21 will be simultaneously pivoted in direct relationship to the amount to which the sleeve is moved.

A small bleed tube 44 is connected with some point on the hollow body 10, past the fan, preferably at the small end of the spiral outlet 10^b. This tube 44 is provided with a valve 45. It is intended that this tube 44 be connected with a supply of air. For example it may be connected with the air jet tube 15, or with another supply of air. This tube is for the purpose of changing the fuel to air ratio, if this is found to be necessary. However under normal operating conditions the valve 41 may be always closed. Under extreme conditions, when necessary, the valve may be opened in any desired amount. In place of this valve any suitable automatic valve arrangement may be used.

The shaft 11 has its outer end 11^a projecting through the outer end of the sleeve 12. A gear 46 is shown mounted on the shaft end 11^a. A suitable driving mechanism not shown on the drawing, is intended to be connected with the gear for driving the shaft 11 during the operation of the carburetor. Or, if desired, driving means without the use of a gear, such as the gear 46, may be used.

The operation of the device is as follows:

The shaft 11 is continuously rotated. This causes the fan which includes the fan blades 21 and the housing 20 to continuously rotate within the body 10. The fan blades will draw in air through the venturi 13, 12^a. This air will be mixed with a mixture of fuel and air which is also drawn in through the passages 16 and 17. This mixture of fuel and air is obtained from the

tubes 14 and 15. The rotating fan will serve to thoroughly mix and vaporize the fuel and air, which is then forcibly discharged through the spiral outlet 10^b.

The carburetor is controlled by operating the lever 19 so as to longitudinally move the sleeve 12, during the rotation of the shaft 11. The sleeve 12 may be moved into positions in which the blades 21 are transversely within the housing 20 indicated by the dot and dash lines 21'. In this position of the blades, passages through the carburetor is substantially cut off. The blades 21 therefore function to replace the conventional butterfly throttle valve used in carburetors. Moreover the blades also function as a fan to force the gas and air mixture through the carburetor at speeds depending upon the pitch of the blades. The pitch of the blades is controlled by the position of the sleeve 12. The branch slots 42 engage the pins 41 to pivot the blades 21 about the central axis of pivoting which includes the trunnion 33 and 33'.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve.

2. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, said shell housing being of a shape similar to that of a sphere and the central portion of said body in which said housing is located being similarly shaped.

3. A combination carburetor and supercharger,

comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, said shell housing having a flange portion engaging in a groove formed in said hollow body, and bearings disposed between said flange and groove for rotatively supporting housing.

4. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, the inner end of said shaft being mounted in a bearing arranged upon one end of said hollow body.

5. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, said aligned passages comprising circular passages formed in the sleeve and aligning with elongated passages formed in the shaft so that the passages are in alignment with each other in position of the sleeve.

6. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said mov-

able sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, said means for longitudinally moving the sleeves including a grooved collar mounted on the sleeve, a fork connecting with said grooved collar, and means for moving said fork.

7. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, each of said blades being provided with a trunnion at its inner and outer ends, one element of the trunnion being turnably engaged in said shaft and the other end of the trunnion being turnably engaged in said housing.

8. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longitudinally, a Venturi restriction in said inlet, a complementary Venturi projection on said movable sleeve coacting with said restriction, gas and air tubes mounted through said shaft and connecting with aligned passages in said shaft and sleeve discharging at the Venturi area, means for longitudinally moving said sleeve, a fan shell housing rotatively supported in said hollow body intimately adjacent the side wall thereof, fan blades pivotally mounted between said housing and shaft and in transverse positions adapted to substantially close said hollow body, and means for changing the pitch of said fan blades controlled by longitudinal movement of said sleeve, each of said blades being provided with a trunnion at its inner and outer ends, one element of the trunnion being turnably engaged in said shaft and the other end of the trunnion being turnably engaged in said housing, said means for changing the pitch of the fan blades including pins on the inner ends of the fan blades engaging in offset slots formed in said sleeve, said offset slots communicating with said longitudinal slots formed in the sleeve through which the inner trunnion elements pass.

9. A combination carburetor and supercharger, comprising a hollow body having a tubular axial inlet and a spiral outlet, a shaft rotatively supported axially through said body, a sleeve mounted on said shaft and keyed thereto to slide longi-

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driving said shaft.

EDMUND MILLER, JR.