Sept. 2, 1941. L. M. ARCHAMBEAU 2,254,927

SUPERCHARGER

Filed Sept. 3, 1940

Fig. 1.

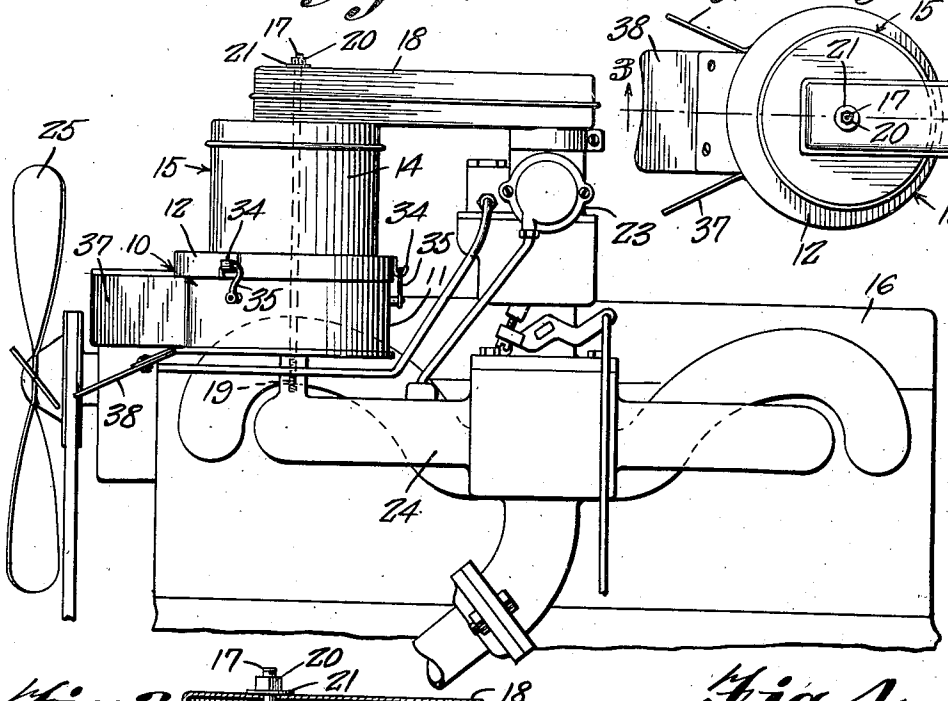


Fig. 2.

Fig. 3.

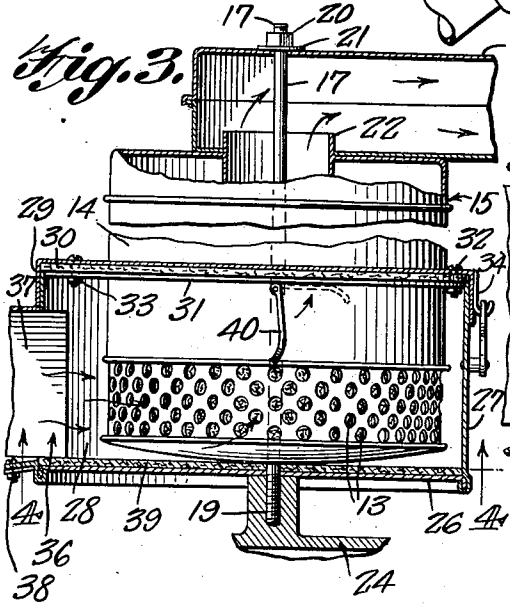
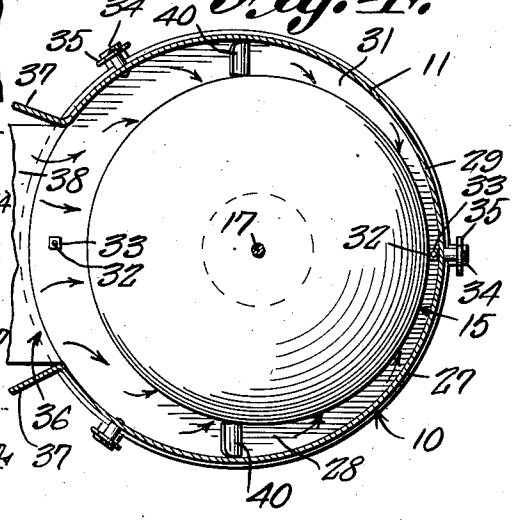


Fig. 4.



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SUPERCHARGER

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Application September 3, 1940, Serial No. 355,260

7 Claims. (Cl. 123—119)

My invention relates to new and useful improvements in superchargers.

An important object of my invention is the provision of a supercharger that may be easily mounted on a conventional air filter of the type used in automotive vehicle construction and that includes means cooperative with the cooling fan of the vehicle to direct air from the fan into a chamber surrounding the inlet openings of the filter, the air being supercharged in the chamber to a pressure substantially greater than atmospheric pressure and introduced into the filter at a substantially equal pressure from all sides.

Another object of my invention is the provision of a supercharger of the above-mentioned character which may be operatively applied to the filter without changing or replacing any of the engine parts and that will effect a substantial fuel economy and improved horsepower by reason of the increased quantity of air entering the carburetor.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the drawing, forming a part of this specification, and wherein like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a device embodying my invention, and showing the same associated with the air filter or cleaner of an automotive vehicle,

Figure 2 is a fragmentary top plan view of the same,

Figure 3 is a longitudinal sectional view taken on the line 3—3 of Figure 2, and showing parts in section and parts in elevation, and

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 3.

In the accompanying drawing, wherein for the purpose of illustration, is shown a preferred embodiment of my invention, the numeral 10 designates a supercharger constructed in accordance with the present invention. As generally illustrated in Figure 1 and as specifically illustrated in Figure 3, the supercharger comprises a casing or body 11 having an open top which is closed by the removable cover 12. The casing and cover enclose the air inlets 13 in the lower end of the cylindrical body 14 of the conventional air filter or cleaner 15.

The air filter is associated with the engine 16 in the conventional manner. An elongated mounting bolt 17 extends through the connecting end of the air conduit 18, longitudinally through the body 14 of the filter and screw-threadedly enters an opening 19 provided in the engine block. The end of the bolt extending beyond the conduit 18 is preferably screw-threaded to receive the nut and washer 20 and 21 which hold the conduit snugly fitted to the upwardly projecting air tube 22 of the filter. The end of the air conduit remote from the filter connects with the air intake of the carburetor 23 which is connected to the intake manifold 24 in the conventional manner.

An inspection of the drawing will disclose the fact that my device is arranged directly behind the cooling fan 25 of the motor and it is the association and correlation of my supercharger with the air filter 15 and the fan 25 that permits the device to operate in the particular manner hereinafter described in detail. The casing 11 is provided with a flat circular bottom 26 which is interposed between the bottom of the filter and the engine block below the air inlets 13. The bolt 17 extends therethrough and the bottom is eccentrically disposed with relation to the filter, as best illustrated in Figure 4. The side of the filter body remote from the fan 25 is in closest proximity to the cylindrical side wall 27 of the casing and the side of the filter in closest proximity to the fan is disposed the farthest distance from the wall 27. Obviously then, the annular channel or passage 28 thus provided between the outer surface of the filter body and the inner surface of the wall 27 will be of gradually increasing cross-sectional area from the side of the filter remote from the fan to the side thereof in closest proximity thereto. The side wall 27 extends a substantial distance above the air inlets and, as hereinbefore stated, the top of the casing is open. The cover 12 is provided with an eccentrically positioned central opening which slidably receives the upper portion of the filter body to permit the annular flange 29 of the cover to snugly enclose the upper marginal edge of the wall 27.

It is highly desirable that an air-tight union be effected between the cover and the body of the filter and between the cover and the body of the supercharger. I have, therefore, provided a disk-shaped pad of felt 30, or the like, within the cover 12, the periphery of which pad is coincidental with the inner surface of the flange 29. A plate 31 is placed against the inner face of the felt to hold the same tightly pressed against the top of the cover and the peripheral edge of the plate is substantially coincidental

with the inner surface of the side wall 27. The plate, felt, and cover are securely held in mutually pressed relation by the bolts 32 and nuts 33. Obviously, the felt pad 30 and plate 31 are each provided with a central opening which registers with the cover opening to accommodate the body 14 of the filter. The inner periphery of the felt pad will, therefore, snugly contact the filter body to effect an air-tight union therewith and the outer peripheral margin thereof projecting beyond the plate 31 will abuttingly engage the upper edge of the wall 27 to effect an air-tight union therebetween. In order to assure the secure engagement of the cover with the casing 11, I have provided a plurality of hook members 34 at circumferentially spaced intervals about the cover flange 29. The latch members 35 pivotally attached to the side wall of the casing 11 swing upwardly to engage the hooks and to normally hold the cover tightly associated with the body even though considerable pressure is developed within the inner channel or passage 28.

The portion of the side wall 27 confronting the fan 25 is cut away to provide an air inlet 36. The opening extends from the lower edge of the cover flange to the bottom 26 and is of considerable width to permit the fan to direct a relatively large amount of air into the passage 28. Radially extending vanes or fins 37 project from the sides of the opening and extend to a position slightly rearwardly of the fan to receive the current of air generated by the fan and to direct or guide the same through the opening 36. Other fins 38 extend angularly outwardly and downwardly from the bottom of the opening 36 and outwardly from the top thereof, which bottom fin terminates slightly rearwardly of the fan and similarly operates to direct the air upwardly through the opening 36 and into the upper or lower portion of the passage 28.

In order that the air blown into the supercharger may be rendered as free from foreign particles as possible, I have covered the bottom of the casing 11 with a layer of asbestos 39. The asbestos is preferably oil-soaked or similarly prepared so that solid particles, such as dust or the like, will adhere thereto when the air is caused to circulate within the passage 28.

Thus, the fan will generate a current of air which will be directed through the opening 36 and into the passage 28. By reason of the fact that the opening 36 is disposed in closest proximity to the fan the pressure developed at this point will be greater than the pressure developed at the diametrically opposed side of the filter. It is an object of the present invention to provide a device which will provide a substantially equal pressure at all sides of the filter, and the unique manner in which the casing 11 is mounted with respect to the filter body to provide the uniquely shaped passage 28 will permit the equalization of the pressure to be simply and expeditiously achieved. The fact that the pressure is greatest in the portion of the passage directly rearwardly of the opening 36 will be counterbalanced by the fact that the area of the passage is substantially greater at that point. As the air is caused to move in opposite directions around the opposite sides of the filter, the passage 28 becomes increasingly smaller so that the reduction in the air pressure will be counterbalanced by the reduction in the size of the passage. As the air flows around the passage in the manner described, the foreign particles will be removed therefrom by the layer 39 and the air entering the air inlets 13 of the filter will be substantially clean. Obviously, the air blown into the passage 28 by the fan will exist at a pressure substantially greater than atmospheric pressure in a manner to supply an increased quantity of air to the filter and, consequently, to the carburetor 23.

In order that all of the air entering the passage may be directed against the layer 39 and into the air inlets 13 I have provided depending vanes 40 pivotally attached to the cover 12 at diametrically opposed sides of the casing 11 and in right angularly disposed relation with the opening 36. As best illustrated in Figure 4, the vanes extend the full width of the passage at these points and, as illustrated in Figure 3, they depend to a position but slightly above the topmost air inlets 13. As the air is caused to circulate within the passage in the manner indicated by the arrows in Figure 5, it will strike the vanes and be deflected downwardly against the layer 39 and into the air inlets 13. Obviously, the above-described action of the vanes to deflect the current of air traversing the passage 28 will cause cross currents to be created within the passage which will efficaciously prevent rotary motion of the air therein. The exhausting of the air from the filter by the carburetor will provide a constant suction within the filter for drawing the air therein and, as pressure within the passage 28 enclosing the air inlets is increased, the quantity of air supplied to the carburetor will be substantially increased to effect a substantial saving in fuel and to materially increase the efficiency and efficacy of the motor.

The device is essentially simple in its construction and there are no moving parts to become worn or in a state of disrepair. The operation is automatic and the device may be readily attached to any filter of the type normally used in automotive vehicle construction.

It is to be understood that while I have here illustrated the filter as constituting the regular direct air intake type, my supercharger may be readily adapted to the heavy duty oil bath type of filter, the casing 11 being mounted on the last-mentioned type of filter in a manner to enclose the annular air inlet. The mode of operation of the supercharger with the oil bath type of filter is so similar to the operation hereinabove described that no further explanation is thought to be necessary.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention, or scope of the appended claims.

Having thus described my invention, I claim:

1. A supercharger adapted to be attached to an air filter having air inlets therearound, said supercharger comprising a casing eccentrically mounted on the filter and including a vertical wall surrounding and circumferentially spaced from the air inlets of the filter, and means projecting radially outwardly from an opening in the vertical wall of the casing for directing air into the casing.

2. A supercharger adapted to be attached to an air filter having air inlets therearound, comprising an eccentrically mounted casing enclosing the air inlets of the filter, said casing being formed with a side wall arranged eccentrically of and in circumferentially spaced relation with the outer wall of the filter to define a continuous an-

nular passage of constantly varying dimension about the inlet openings, a bottom wall closing the bottom of the passage and a top wall closing the top of the passage, radial fins projecting from an opening in the side wall of the casing for directing air into the passage, and baffles for directing the air into the said air inlets.

3. A supercharger adapted to be attached to an air filter having air inlets therearound, comprising a casing enclosing the air inlets of the filter, said casing including a side wall arranged eccentrically of and in circumferentially spaced relation with the outer wall of the filter to define a continuous annular passage of varying dimension about the inlet openings, a bottom wall closing the bottom of the passage and a top wall closing the top of the passage, means for gathering and directing air into an opening in the side wall of the casing and baffles depending from the top wall of the casing but terminating above the air inlets so as not to interrupt the annular passage circumjacent to the said inlets, said baffles receiving air entering through the opening in the side wall and directing the same into the said air inlets.

4. A supercharger adapted to be attached to an air filter having air inlets therearound, comprising a casing enclosing the air inlets of the filter, said casing being eccentrically mounted on the filter so that the wall thereof encompassing the air inlets will be spaced therefrom a greater distance at one side than at the other, said wall having an opening in the portion thereof arranged the greatest distance from the filter in a manner whereby air under pressure passing through the opening may enter the air inlets at substantially equal pressure from all sides of the filter.

5. A supercharger adapted to be attached to an air filter having air inlets therearound, said supercharger comprising a casing surrounding and circumferentially spaced from the air inlets of the filter, fins projecting radially from an opening in the side wall of the casing for directing air into the casing, baffles disposed within the casing for directing air into the air inlets and downwardly against the bottom of the casing, and an adhesive layer at the bottom of the casing for removing solid particles from the air as it is directed thereagainst by the said baffles.

6. A supercharger adapted to be attached to an air filter having air inlets therearound, comprising a casing enclosing the air inlets of the filter, said casing being eccentrically mounted on the filter so that the wall thereof encompassing the air inlets will be spaced therefrom a greater distance at one side than at the other, said wall having an opening in the portion thereof arranged the greatest distance from the filter in a manner whereby air under pressure passing through the opening may enter the air inlets at substantially equal pressure from all sides of the filter, and baffle members depending from the upper wall of the casing but terminating above the air inlets so as not to interrupt the annular passage circumjacent to the said inlets, said baffles receiving air entering through the opening in the side wall and directing the same into the air inlets.

7. A supercharger adapted to be attached to an air filter having air inlets therearound, comprising a casing enclosing the air inlets of the filter, said casing being eccentrically mounted on the filter so that the wall thereof encompassing the air inlets will be spaced therefrom a greater distance at one side than at the other, said wall having an opening in the portion thereof arranged the greatest distance from the filter in a manner whereby air under pressure passing through the opening may enter the air inlets at substantially equal pressure from all sides of the filter, baffle members depending from the upper wall of the casing but terminating above the air inlets so as not to interrupt the annular passage circumjacent to the said inlets, said baffles receiving air entering through the opening in the side wall and directing the same into the air inlets, and radial fins projecting from the opening in the wall for directing a current of air through the said opening and against the said baffles.

LESTER M. ARCHAMBEAU.