

Dec. 26, 1939.

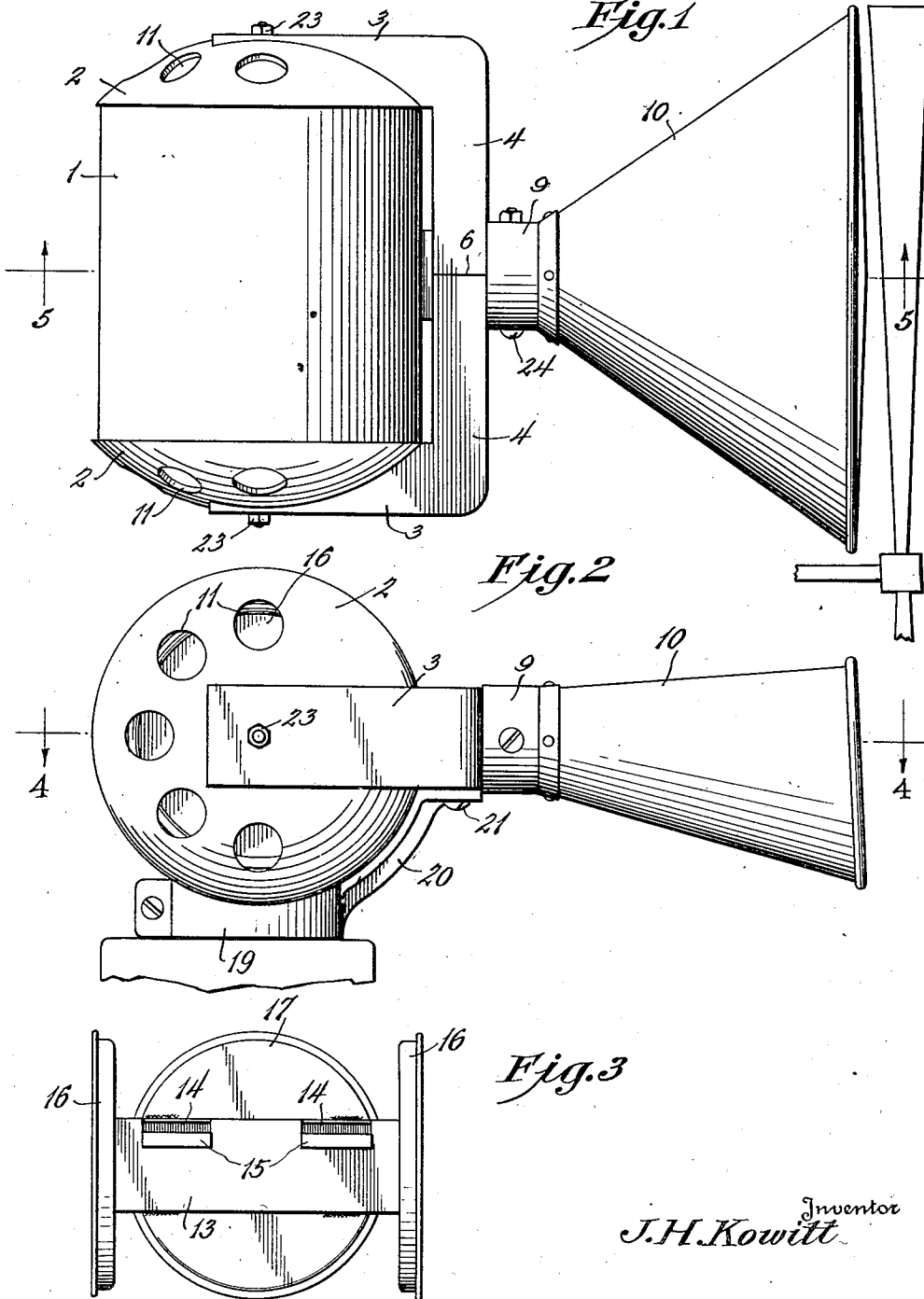
J. H. KOWITT

2,184,918

SUPERCHARGER CONSTRUCTION AND UTILIZATION

Filed May 27, 1936

2 Sheets-Sheet 1



J. H. Kowitt ^{Inventor}

By *Sol Shapiro* ^{Attorney}

Dec. 26, 1939.

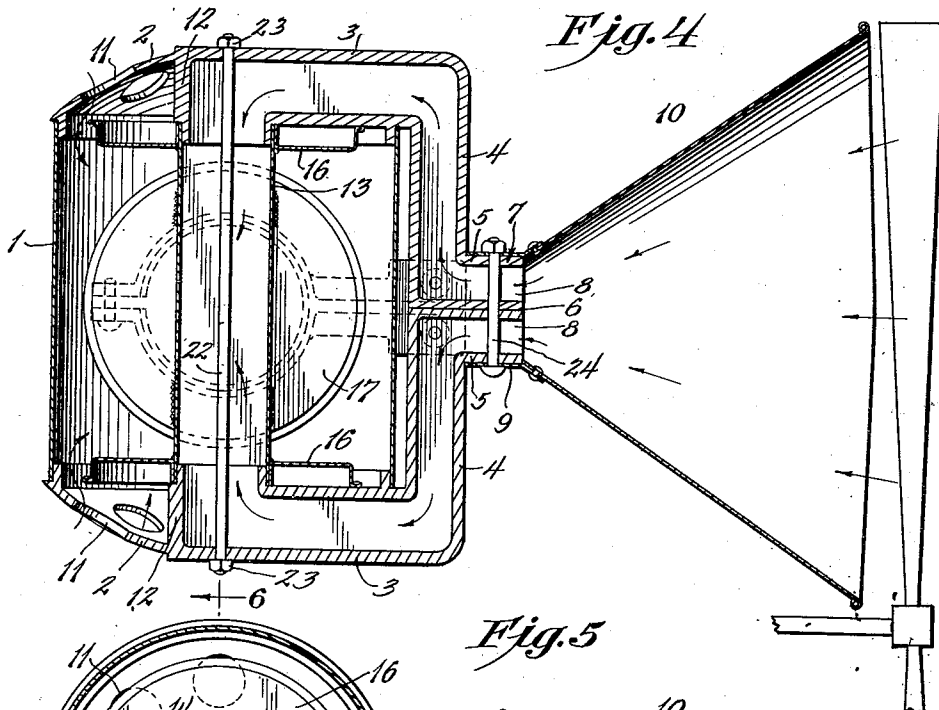
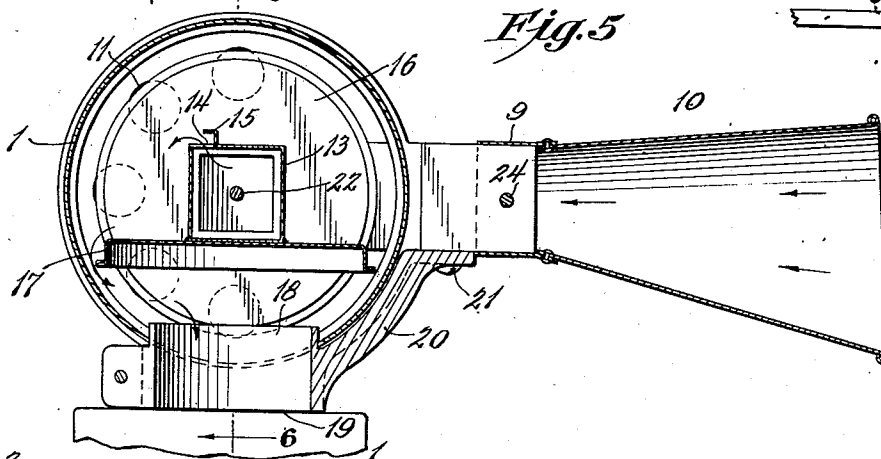
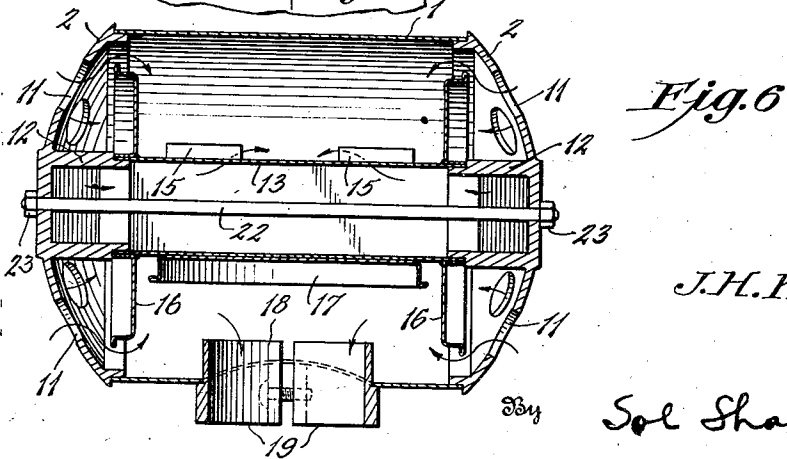
J. H. KOWITT

2,184,918

SUPERCHARGER CONSTRUCTION AND UTILIZATION

Filed May 27, 1936

2 Sheets-Sheet 2



Inventor
J. H. Kowitt

By *Sol Shapirio*
Attorney

UNITED STATES PATENT OFFICE

2,184,918

SUPERCHARGER CONSTRUCTION AND UTILIZATION

Jerome H. Kowitt, Baltimore, Md., assignor, by
mesne assignments, to Standard Supercharger
Corporation, a corporation of New York

Application May 27, 1936, Serial No. 82,148

9 Claims. (Cl. 123—119)

This invention relates to superchargers particularly of the type adapted for installation in standard motors, their construction and utilization.

In the prior art, devices in the nature of superchargers have been suggested for use. In the type adapted for installation on standard motors, they consist of devices adapted to convey air from the front of the car to the carburetor. Such delivery of air is generally taken from just behind the cooling fan and either constitutes the entire air current fed to the carburetor, or acts as a supplementary air feed to that entering the carburetor from the usual air inlet. All such prior art devices have, however, proved defective and have not gone into use for several reasons, among which two may be especially noted. In the first place, the air current delivered from behind the cooling fan depends on two factors: the speed of the car and the speed of the fan. As the speed of the automobile increases, the ratio of air delivered due to the motion of the car compared with that delivered by the fan increases rapidly. On the other hand, as the speed of the car decreases that ratio decreases and the air current through such a supercharger device comes mainly from the cooling fan until when the car is not moving and the engine is idling, the entire air delivery is impelled by the fan. However, due to the rotational movement of the fan, the air delivered therefrom is not at the same pressure throughout the area of delivery, since the air in front of the fan blade is under a pressure greater than that just behind the blade. As a result the air delivered from the fan varies in pressure. Assuming a fan moving in clockwise rotation, the air in the upper right-hand quadrant is at a pressure greater than that in the upper left-hand quadrant. As the air is generally taken from the entire upper half of the fan area, the result is two streams of air under pronouncedly different pressures. No provision has been made in prior art devices to cure this condition with the result that the air delivered by the supercharger is not under uniform pressure, and streams of different air pressures are delivered to the carburetor, giving rise to eddy currents, air locks, uneven carburetion, and faulty engine operation. In fact, stalling of the motor was an invariable defect with prior art superchargers, more particularly at low speeds or idling.

In the second place, the delivery of air by the supercharger requires a change in ratio of air to fuel in the carburetor. No recognition of this

is found in the prior art devices or their utilization, as a result of which the prior art devices have resulted in excessive fuel delivery with, not alone faulty engine operation, but marked inefficiency of operation, which has lost the fuel economies possible by supercharger operation.

Among the objects of the present invention is a supercharger structure wherein all air is delivered therefrom to the carburetor under uniform pressure.

Further objects include regulation of the fuel to air ratios to produce proper carburetion for efficient supercharger operation.

Other objects and advantages will appear from the more detailed description set forth below, it being understood, however, that that more detailed description is given by way of illustration only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In the connection with that more detailed description, there is shown in the accompanying drawings, in

Figure 1, a top plan view of a supercharger constructed in accordance with the principles of the present invention; in

Figure 2, a side elevation of such supercharger; in

Figure 3, a top plan view of the baffle unit used therein; in

Figure 4, a section on line 4—4 of Figure 2; in

Figure 5, a section on line 5—5 of Figure 1; and in

Figure 6, a section on line 6—6 of Figure 5.

In accordance with the illustrative drawings, the supercharger of the present invention is constructed to receive the air from the cooling fan of the engine, in two streams, which air currents are recombined to give an air flow of substantially uniform pressure throughout its body, so that a current of air of substantially uniform pressure is delivered to the carburetor, assuring uniform and effective carburetion. In addition, the supercharger action is preferably correlated with the fuel delivery so that the air to fuel ratio is desirably maintained at greater than 13:1.

Turning to the form of device shown in the drawings, said device desirably comprises a casing 1, preferably cylindrical and of sheet metal having a semi-spherical head 2 at each end of the casing 1. Hollow side members 3, 3 carried by the heads 2, 2 and desirably integral therewith, extend forwardly from the centers of

the heads 2, 2. The forward ends 4, 4 of the side members 3, 3 extend inwardly adjacent that portion of the casing 1, toward each other, and are provided with forwardly extending complemental portions 5, 5 abutting each other, as shown at 6, to form a double channeled neck 7, desirably cylindrical in contour, each channel 8 thus leading to its corresponding hollow side member 3. Surrounding and securing the complemental neck portions together is a sleeve 9 to which is secured the funnel shaped intake 10 adapted to be placed behind and receive air from the entire upper half of the fan (not shown). A series of openings 11 is desirably placed in each head member 2 for purposes hereinafter set forth.

The inner end of each side member 3 is provided with an inwardly projecting hollow hub portion 12, desirably axially placed with respect to the casing 1. A baffle unit (see Figure 3) is carried on and extends between the hub portions 12, 12. Said baffle unit comprises a closure in the form of a tubular chamber 13, the passage through which connects with the passages through the side members 3, 3, thus forming a continuous air passage. The tubular chamber 13 is provided with air outlet ports 14, 14 through which the air in the chamber member 13 is discharged. Desirably the air outlet ports 14, 14 are positioned in the upper wall of the tubular chamber 13, and consequently the tubular chamber 13 is desirably made rectangular in cross section to enable simple and assured positioning of the ports 14, 14 when the device is assembled. The chamber 13 may be of any contour and cross section, but that shown is desirable for the reasons given. The ports 14, 14 are desirably struck out from the metal sheet from which the tubular chamber 13 is made, and the metal thus removed is preferably bent back, as shown at 15, to control the direction of the air current.

The air ports 14, 14 deliver within the casing 1 in which the movement of the air current is directed by baffles desirably carried on the walls of the tubular chamber 13. Thus a baffle 16 is placed on each end of the tubular chamber 13 adjacent each head member 2, such baffles 16, 16 confining the air entering the ports 14, 14 within a circumscribed portion of the casing 1, the baffles 16, 16 further serving to screen the openings 11 in each head member 2, and to cause any air entering the openings 11 to be deflected before such air can enter the casing 1. A lower baffle 17 desirably cup-shaped and mounted in horizontal position on the tubular chamber 13 is placed above the outlet 18 of the device. Where the tubular chamber 13 is rectangular in cross section, the assembly of the device assures the preferred positioning of the baffle 17, as well as the ports 14, 14, as explained above. The baffles 16, 16 and 17 may be soldered on the tubular chamber 13, or otherwise held in desired position.

The outlet is desirably formed by a split collar 19 carried by a forwardly extending bracket arm 20 exteriorly adjacent the cylindrical casing 1, and secured as shown at 21 to the neck portions of the side members 3, 3 and sleeve 9. The split collar 19 is adapted to be clamped about the intake of either a carburetor or air filter (neither shown).

All parts of the device are desirably made of sheet metal, and the head members and casing are secured together with the baffle unit as by the rod 22, extending axially through the cylinder and heads, and the nuts 23, 23 tightened against the heads 2, 2. By the construction set forth, an

exceedingly simple but durable construction is economically produced capable of ready assembly or disassembly by means of the rod 22 and the bolt 24.

In operation, air entering the funnel shaped intake 10 is split into two segregated streams of different pressures, since the air intake extends across the upper half of the fan area. Such segregated air currents pass through the side members 3, 3 into the tubular chamber 13 where they are mixed to form a single air stream of adjusted and uniform pressure. The latter stream escapes through the ports 14, 14 at high velocity into the casing 1, wherein it is given a tangential direction and follows the inner contour of said casing. It then escapes about baffle 17 into the outlet 19, which directs it to the carburetor or air filter, if the latter is used.

At high speeds of the automobile, an excess of air is delivered into the device. Prior art devices were unable to dissipate such excess. In the present structure, any excess of air escapes through the openings 11, 11. Since further, the air as it is delivered to the casing from the tubular chamber 13, is given a tangential movement, dust or dirt particles are centrifugally expelled through the openings 11, 11.

At lower engine speeds and during idling, there may be a deficiency of air obtained through the intake 10. In such cases, a supplemental air supply enters through openings 11, 11, the ports 14, 14 creating a Venturi effect. The openings 11, 11 thus exhibit a dual function of normalizing or regulating the air supply or pressure in the casing 1 depending on the engine speed.

In all supercharging devices of the character described wherein the air is preferably taken from behind the fan for delivery to the carburetor, and particularly where the air sent to the carburetor enters only from the supercharger, a reduced fuel ratio to air is necessary to insure engine operation at all speeds and to permit fuel economies. It has been found that in any system utilizing such supercharger devices, the air to fuel ratio is desirably maintained at greater than 13:1, but the preferred ratio must be determined with each particular car. The higher the ratio, the greater is the fuel economy, but this is in part offset by other considerations. To assure proper fuel to air ratios, fuel jets are supplied with each supercharger for use on a given car, whereby the proper fuel to air ratios are secured by a simple substitution of the jets supplied for use in lieu of those normally used in the carburetor without the supercharger installation. Since replacement of the fuel jets is readily accomplished the present invention insures economical and efficient motor operation by means of a simple and relatively inexpensive supercharger system.

It should be noted, however, that the present invention is not dependent on any theory of operation, and regardless of what explanation may be given, the supercharger of the present invention has proved efficacious in actual operation.

Having thus set forth my invention, I claim:

1. A supercharger comprising in combination, an air intake, air channels connected to said air intake to receive air therefrom, a mixing chamber communicating with said channels for receiving and intermingling air streams therefrom, air outlet ports in said mixing chamber permitting air passage therefrom, a casing communicating with said air escape ports to receive air therefrom, said casing having an air outlet adapted to be attached to a carburetor and

openings for regulating the pressure of the air in the said casing.

2. A supercharger comprising a cylindrical casing, a tubular mixing chamber axially mounted within said casing, air channels carried externally on said casing, said channels communicating at one end with said mixing chamber, a funnel shaped air intake carried on said casing communicating with the air channels at the other ends of the latter, air escape ports carried in a wall of the mixing chamber, said ports communicating with the interior of the casing, and an air outlet on said casing.

3. A supercharger comprising a cylindrical casing having semi-spherical ends provided with air inlets, a tubular mixing chamber axially mounted within said casing, air channels carried externally on said casing, said channels communicating at one end with said mixing chamber, an air intake carried on said casing communicating with said air channels at the other ends of the latter, air escape ports carried in a wall of the mixing chamber, said ports opening into the interior of the casing, vanes for directing air from the ports tangentially within said casing, baffles carried on said mixing chamber adjacent said semi-spherical ends, an air outlet on said casing, and a baffle carried on said mixing chamber adjacent said air outlet.

4. A baffle unit for superchargers comprising a tubular mixing chamber, a circular baffle carried vertically at each end thereof, and a circular baffle mounted horizontally on said mixing chamber intermediate the vertical baffles.

5. A baffle unit for superchargers comprising a tubular member forming a mixing chamber, a baffle carried vertically at each end thereof, and

a baffle mounted horizontally on said tubular member intermediate the vertical baffles.

6. A baffle unit for superchargers comprising a member forming a mixing chamber, a baffle carried at each end thereof, and a baffle mounted in said mixing chamber intermediate the end baffles.

7. A supercharger for internal combustion motors provided with a cooling fan, said supercharger comprising in combination, means for receiving a single current of air from said fan, means for splitting said air into separate streams, means for recombining said streams of air into a single stream, means for giving said recombined stream a centrifugal movement, and means for directing said single stream to an outlet adapted to be attached to a carburetor.

8. In a supercharger adapted to receive air from a source of varying pressure, in combination, a casing, a closure within said casing having a plurality of air inlets from said source, and forming a mixing chamber for the air, means for passing the air from the said closure into the said casing and for imparting to the air a tangential motion, and means in the said casing for regulating the air pressure.

9. In a supercharger adapted to receive air from a source of varying pressure, in combination, a casing provided with openings, a closure within said casing having a plurality of air inlets from said source, and forming a mixing chamber for the air and having ports for passing air into the said casing, the said openings and ports being so positioned relative to each other that the said openings will function to regulate the pressure in the casing.

JEROME H. KOWITT.