

Jan. 5, 1932.

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1,840,253

SUPERCHARGER FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 18, 1929

4 Sheets-Sheet 1

Fig. 1.

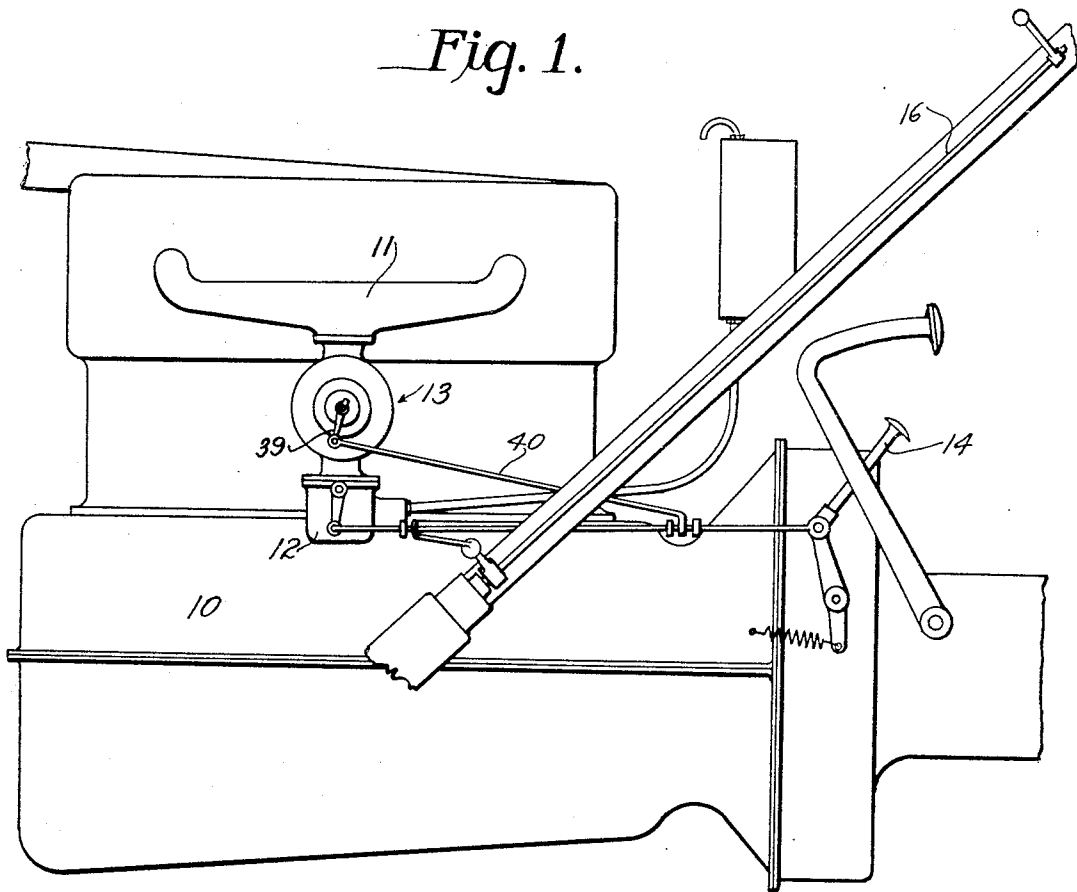
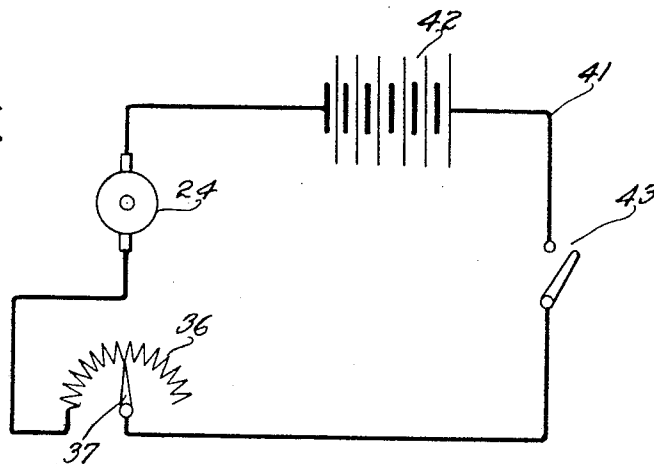


Fig. 5.



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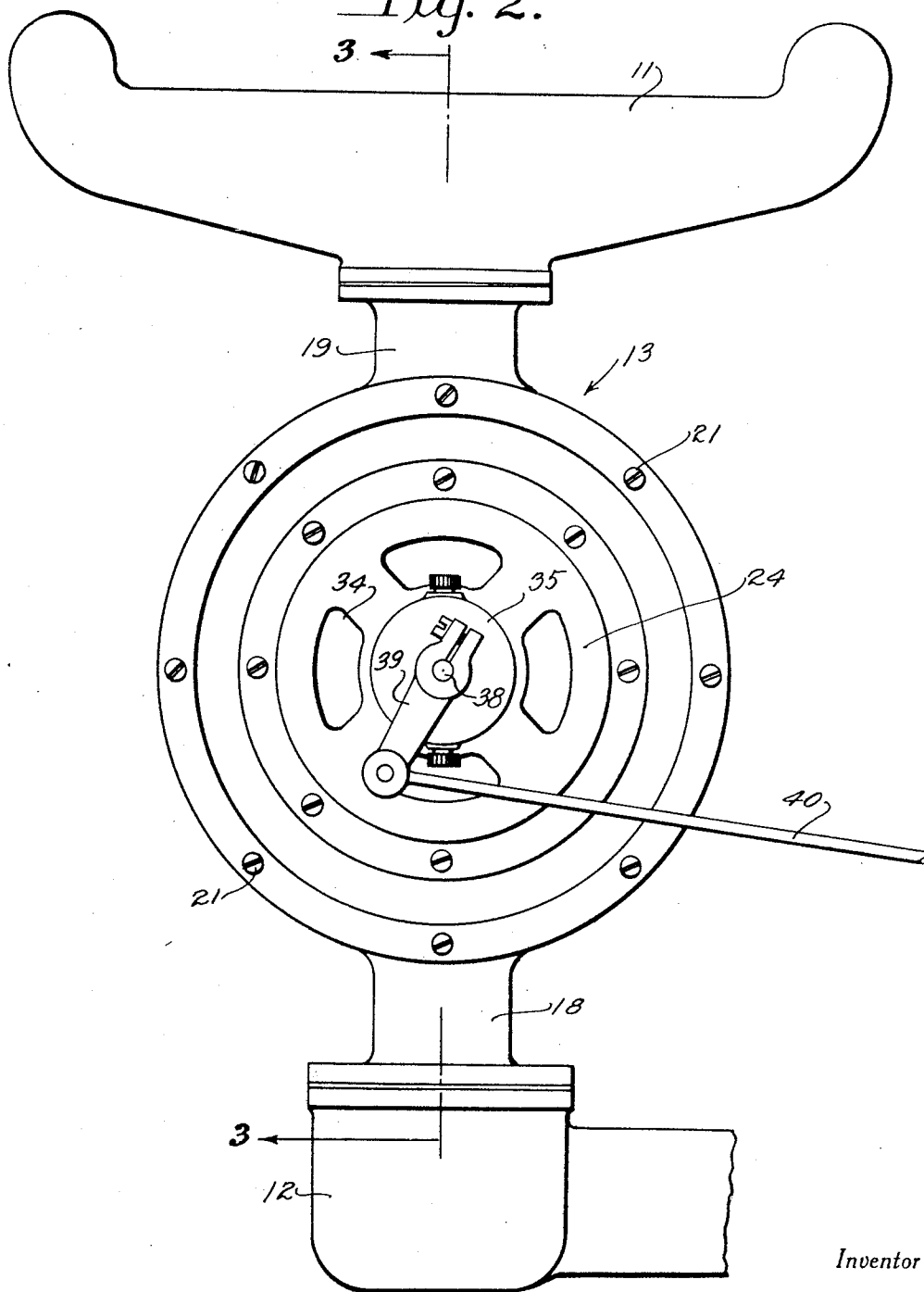
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Fig. 2.



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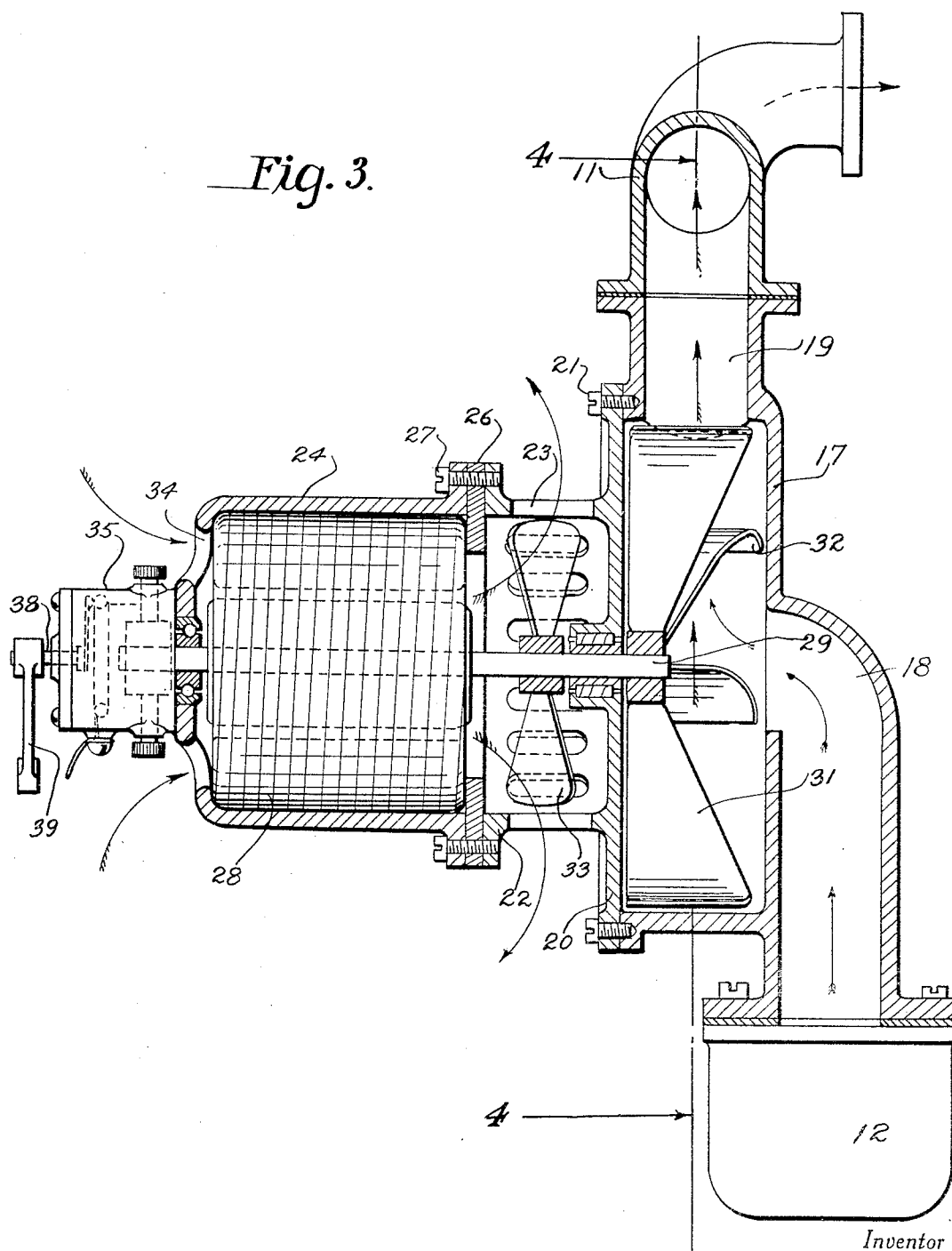
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Fig. 3.



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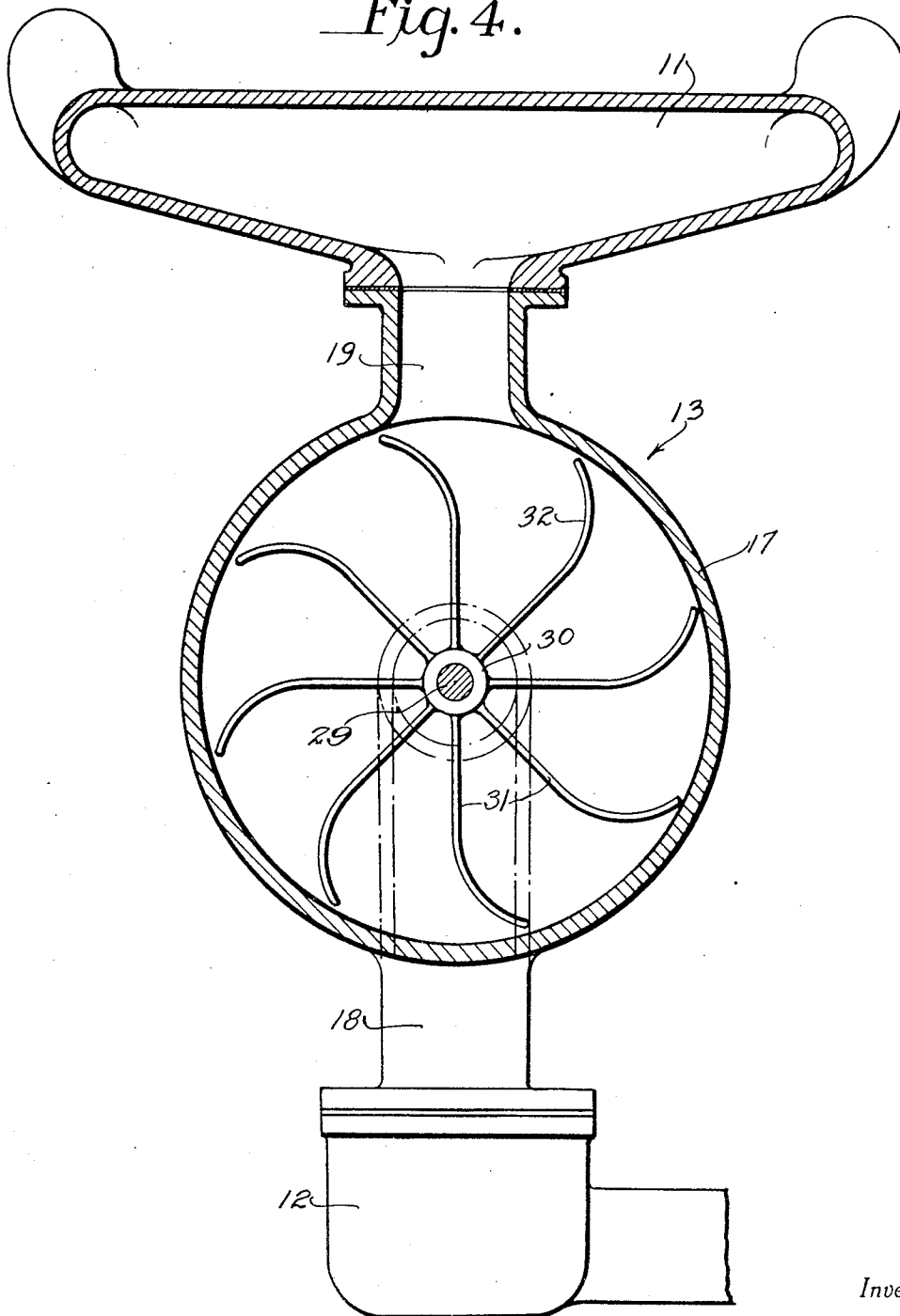
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Fig. 4.



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SUPERCHARGER FOR INTERNAL COMBUSTION ENGINES

Application filed October 18, 1929. Serial No. 400,570.

This invention relates to improvements in superchargers for internal combustion engines.

The primary object of the invention resides in a supercharging device for attachment to the intake manifold of an internal combustion engine for producing an added force for assisting the mixture of air and fuel in its passage to the cylinders of the engine so that the mixture is crowding the intake valves for admission into the cylinders at all times.

Another object of the invention resides in a supercharger which is automatically controlled by the speed of the motor to regulate the operation of the supercharger proportionately.

A further object is the provision of a supercharger driven directly by an electric motor which is considered an improvement over the gear driven types, as it is possible to produce greater speed and power, easier starting of the engine, and a better mixture of the air and fuel.

A still further object is to provide an electric motor driven supercharger in which the electric motor is kept in a cool condition at all times, although it is so close to the engine as to be subjected to the heat therefrom.

With these and other objects in view, the invention resides in the certain novel construction, combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claim and are illustrated in the accompanying drawings, in which:

Figure 1 is a side elevational view of the internal combustion engine of the type used in automobiles, showing my improved supercharger device in use thereon.

Figure 2 is an enlarged elevational view of the supercharger showing the connection between the intake manifold and the carburetor.

Figure 3 is a vertical longitudinal sectional view on the line 3—3 of Figure 2.

Figure 4 is a vertical longitudinal sectional view on the line 4—4 of Figure 3.

Figure 5 is a diagrammatic view of the

electric circuit for controlling the actuation of the electric motor.

Referring to the drawings by reference characters the numeral 10 designates an internal combustion engine of the type commonly used in connection with automobiles and which includes the usual intake manifold 11, and carburetor 12 between which my improved supercharger device 13 is interposed. The flow of vaporized fuel from the carburetor 12 is controlled in the usual manner, that is by a foot accelerator 14 connected to the control valve of the carburetor through a rod 15, and also by the hand control means extending along the steering post and indicated generally by the reference character 16, the means 16 being operatively connected to the actuating rod 15 in the usual manner.

The supercharger device 13 includes a circular casing 17 open at one side, the said casing being provided with inlet and outlet passages 18 and 19 respectively which directly communicate with the carburetor 12 and intake manifold 11 respectively. The open side of the casing 17 is closed by a removable closure plate 20 which is molded or otherwise secured to the casing by fastening elements 21, while extending outwardly from the closure plate is a housing or collar 22 having slots or openings 23 in the side wall thereof. The housing 22 is provided with an attaching flange by which an electric motor 24 is attached thereto and interposed between the motor casing 25 and the housing 22 is an annular ring member 26. Bolts 27 or the like secure the motor casing to the housing 22 with the ring 26 held therebetween. The motor casing houses the usual field coils 28 and mounted axially therein is the motor or armature shaft 29 which has one end journaled in the outer end of the motor casing and its opposite end journaled in the closure plate 20 and extending therebeyond into the casing 17.

A rotary fan 30 is fixedly mounted to the free end of the armature shaft 29 and is disposed within the casing 17 so as to freely turn therein. The rotary fan 30 includes a plurality of radially extending impeller blades 31 having their outer ends curved in the same

direction as at 32. It will be appreciated that as the fan 30 rotates in a counter-clockwise direction when looking at Figure 4 of the drawings, a suction will be produced at the inlet passage 18 to suck the mixture of air and gas from the carburetor and which mixture will be carried up and exhausted through the outlet passage 19 and blow to the intake manifold 11 under pressure so as to crowd the intake valves of the engine and enter the respective cylinders under pressure as the intake valves successively open.

Also mounted on the armature shaft 29 but disposed within the collar or housing 22 is a cooling fan 33 which rotates with the armature shaft of the motor to create a circulation of atmospheric air through the opening 34 in the motor casing 25 and openings 23 in the housing 22 to maintain the motor in a relatively cool condition during operation. It will be appreciated that by reason of the location of the motor with respect to the engine, the heat from the engine will tend to unnecessarily heat up the electric motor, and for efficient operation, the electric motor should be kept in a cool condition at all times.

For the purpose of controlling the speed of the motor proportionately to the amount of fuel mixture released by the carburetor, I provide an electric rheostat 34 which is mounted on the outer end of the motor casing 25, and which rheostat includes the usual resistance wiring 36 over which a rotatable switch arm 37 is movable, the said arm 37 being mounted upon a shaft 38 extending from the outer end of the rheostat casing and to which an arm 39 is fixedly connected. This arm 39 is in turn operatively connected to the actuating rod 15 by a connecting link 40 whereby actuation of the rod 15 to regulate the flow of mixture from the carburetor automatically imparts a turning movement to the switch arm 37 to move the same progressively back and forth over the resistance wiring 36. By this arrangement the speed of the electric motor is proportionately controlled by the actuation of the throttle to in turn control the speed of the internal combustion engine. Thus it will be seen that the speed of rotation of the fan 30 is proportionate to the amount of fuel passing from the carburetor to the intake manifold. In addition to inducing the flow of mixture from the carburetor to the manifold, the fan tends to cause a more thorough mixing of the air and gas prior to its passage to the intake manifold.

In Figure 5 of the drawing I have shown a diagrammatic view of the electric circuit for controlling the actuation of the motor in which the circuit is referred to generally as at 41 in which the resistance coil or windings 36 and switch arm 37 are arranged with the inductance coils of the motor 24. An electric battery or source of electrical energy is indicated at 42 and a manually controlled switch

at 43. It will be seen that by closing the switch 43 upon the starting of the internal combustion engine, the circuit 41 will be closed and the motor 24 will be put in operation, after which the rheostat will function to regulate the speed of the motor as hereinbefore described.

Although I have specifically stated that the rotary fan is driven directly by an electric motor, there may be times when it is desired to obtain a relatively high fan speed and at which time a train of gearing may be interposed between the motor and the fan. In using an alternating current motor, it is possible to obtain a speed by which the device will successfully operate but a D. C. motor might not be practical for a long grind and in which case the gearing might be required.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:—

A supercharger device for internal combustion engines comprising a circular housing having inlet and outlet passages adapted to be respectively connected to the carburetor and intake manifold of an internal combustion engine, an electric motor fixed to said housing with its armature shaft axially disposed with respect to said housing, a fan fixed to said armature shaft for inducing a suction at said inlet passage and a forced pressure at said outlet passage, and an electric rheostat mounted on the outer end of said electric motor and adapted to be arranged in an electric circuit therewith and operatively connected to the throttle control mechanism of a carburetor.

In testimony whereof I affix my signature.
EDWIN P. RICHARDSON.