To all whom it may concern:

Be it known that I, VERNE P. ALEXANDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Connection with Means to Supply Heated Air to Carbureters, of which the following is a specification.

My invention relates to internal combustion engines and has particular reference to the carburing means. The general objects of the invention are to impart to the simpler and less expensive forms of carbureters a higher efficiency, and greater economy of fuel; to provide this in such a simple and comparatively inexpensive form that the improvement is operable by a comparatively unskilled user; to provide my improvement in a part or section of the standardized mechanism which is not only simple, but easily accessible and removable by one not skilled in this particular art, and to avoid any change of parts, reconstruction, or alteration of standardized parts beyond the mere substitution of a part embodying my improvement for one apparently substantially similar that is removed from existing and well known construction.

With the above objects in view my invention consists in the novel carbureter attachment, its construction, arrangement and combination of parts, hereinafter described in detail, illustrated in the accompanying drawing and particularly pointed out in the appended claims.

In the drawing—

Figure 1 is a side elevation of an automobile engine of a universally known construction, its carbureter and the air and explosive mixture pipes leading thereinto and therefrom to the engine cylinders.

Fig. 2 is a vertical section through a well known and, perhaps, most commonly used form of simple carbureter and its inlet, or hot air, pipe constructed and equipped in accordance with my invention, together with a short broken away section of the carbureter outlet or manifold pipe.

Fig. 3 is a section taken substantially on the line X—X of Fig. 2.

Fig. 4 is a section taken on the line Y—Y of Fig. 2.

In the several views 2 represents the inlet hub or branch and 3 the outlet hub or branch of the carbureter, the general details of which herein shown are so well known to those skilled in this art as to be recognized at a glance. A manually operable valve 2 is mounted in the passage 2 and another valve 3 may be mounted in the passage 3. 4 represents the flanged end of the manifold pipe attached to the flange or hub 3 in the usual manner, and leading, as shown in Fig. 1, in the conventional manner to the well known engine therein shown. The body of the inlet, or "hot air" pipe—5—attached to the carbureter branch 2 is, as shown, of the usual and well known form. To this body, which I make, preferably, of aluminum, I cast an auxiliary conduit, by-pass, or passage 6 that is like the conduit 5, open at the top and has an outlet end 7 which is always open to the carbureter's interior. In the usually likewise free and always open conduit 5 I interpose in the elbow bend of its outlet end a wall 8 with openings 9 arranged in a circle as shown in Fig. 3. These openings are controlled by means of a disk or puppet valve 10 that is normally held closed by a spiral compression spring 11 which is arranged to bear against the disk or valve 10 and against a head 12 on a bolt or stem 13 on which the valve 10 is slidable and which is provided with a threaded end 14 that is screw-threaded into a recessed and threaded hub 15 in the center of the wall 8.

As shown the air capacity of the passage 6 is less than that of the usual pipe 5. Said passage 6 is proportioned to take care of the low speed or engine starting air requirements and to be aided by a flow of air through the usual pipe 5 when the suction is sufficiently increased, by speeding up the engine through the admission thereto of more gas, to cause the valve 10 to overcome the resistance of the spring 11. The extent of opening movement of the valve 10 will be automatically proportioned by said resistance spring to the carburing requirements, which provides a uniformity of mixture, or avoids an excess of air through the inlet pipe 5 and the corresponding waste of fuel oil that must be made to correspond with such excess in order to produce a mixture of air and gasoline, or other liquid vapor that may be exploded by the engine spark.

By placing the control valve 10 in the inlet pipe 5, or hot air pipe, which in these types of engines is always a readily removable part, the means here shown are of the greatest simplicity and of the lightest weight and smallest space requirements, and are applicable to all types of engines, and are adapted to the constant needs of these types of engines without the necessity of disturbing the usual carbureter construction of the engine and without the necessity of making any large change of parts, as will be understood from the above description and the accompanying drawings, to which reference is had for a full understanding of the invention and all its advantages.

The specification contains one figure, which is described in the following pages.

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able section, I avoid the complexities in the carbureter itself which enhance very materially the prices of the more expensive carbureters which are designed to effect the higher efficiencies, automatic air regulation, and the fuel economies herein provided for.

My improved inlet pipe may also be simply attached to every form of carbureter needing its air control, regardless of the different internal arrangements of the various forms of carbureters. The pipes or passages 5 and 6 and the dividing wall 8 may be a simple casting, and the control valve 10 is arranged outside of the carbureter itself where it is conveniently accessible. This distancing of the valve 10 from the interior mixing space of the carbureter, together with the admission of the controlled flow of air in the form of a series of spaced apart jets issuing through the holes or perforations 9, also tends to better atomize, divide, or prepare the admitted air for a thorough mixing with the oil vapor admitted into the carbureter.

The length of the hot air pipe 5 will depend upon the relative positions of the carbureter and the exhaust pipe 16, the lip 17 at the inlet end of the hot air pipe being so positioned as to cause all the air entering the carbureter to first pass around this exhaust pipe and be heated thereby.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a carbureter of an internal combustion engine, of an air supply device attached thereto and provided with two passages, one of which is uninterrupted, a valve mounted in the other passage, the intake ends of said passages being adjacent the exhaust pipe of the engine so that the air drawn into the passage may be heated, and a spring mounted in engagement with the valve to hold said second passage closed until the valve is moved from its seat by the force of the suction of the engine.

2. The combination with a carbureter of an internal combustion engine, of an air supply device attached thereto and extending to the exhaust pipe of the engine and provided with two passages, one of which is uninterrupted, a valve mounted in the other passage, and a spring mounted in engagement with the valve to hold said second passage closed until the valve is moved from its seat by the force of the suction of the engine, the inlet end of the air supply device being so positioned relative to the exhaust pipe of the engine that the air passing to the carbureter will be heated by said exhaust pipe.

3. The combination with a carbureter of an internal combustion engine provided with a manually operable intake valve and the exhaust pipe of said engine, of a normally closed passage extending from said exhaust pipe to said carbureter, and a spring held valve in said passage adapted to be moved from its seat by the suction of the engine and of an open passage alongside the normally closed passage and also extending from the exhaust pipe to the carbureter to constantly conduct heated air thereto while the engine is running.

In testimony whereof I have hereunto signed my name.

VERNE P. ALEXANDER.