July 6, 1937. M. L. CHANARD 2,086,292

CARBURETOR

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Fig. 1.

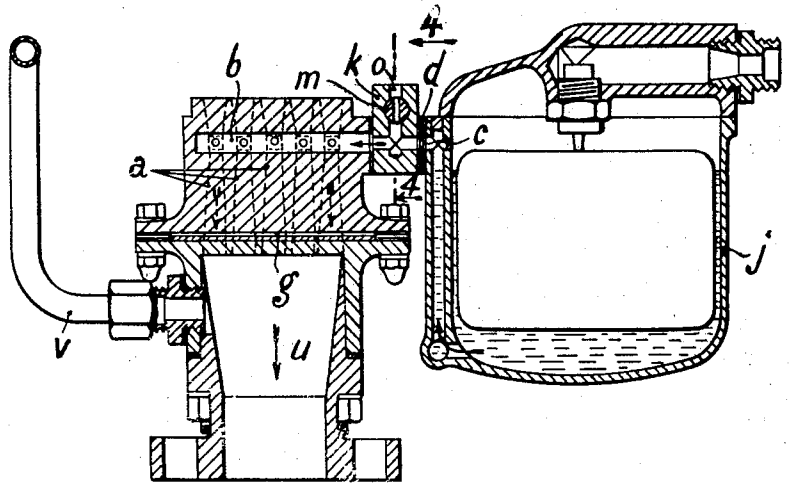
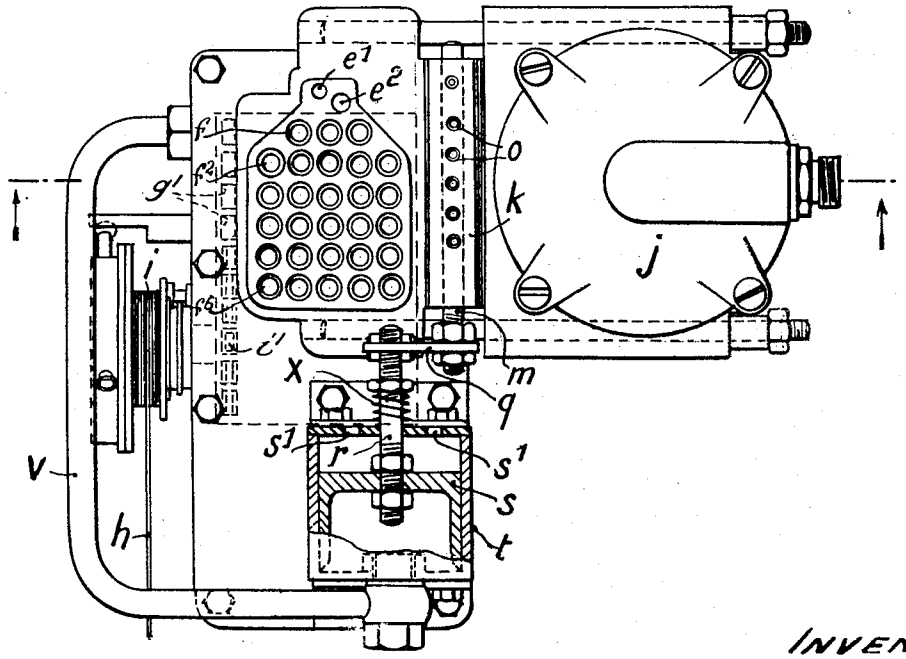


Fig. 3.



INVENTOR
MARTHE LOUISE CHANARD

By: Glascock Downing & Seebold
Attys.

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Fig. 2.

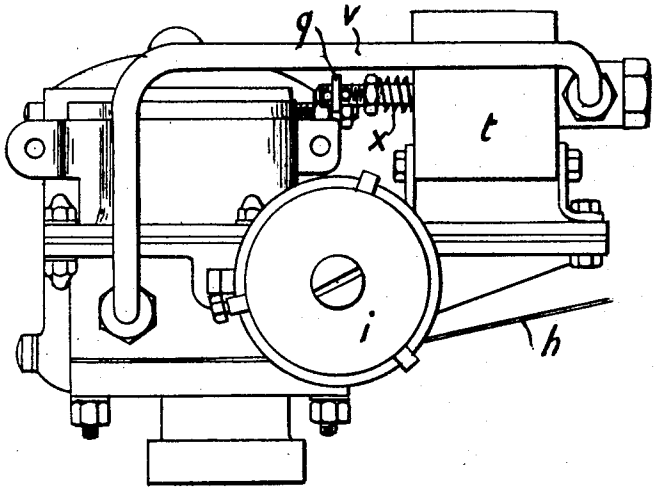


Fig. 4.

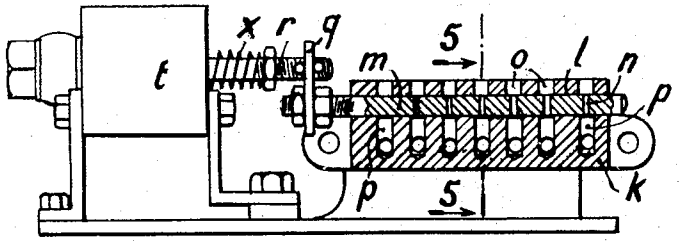


Fig. 5.

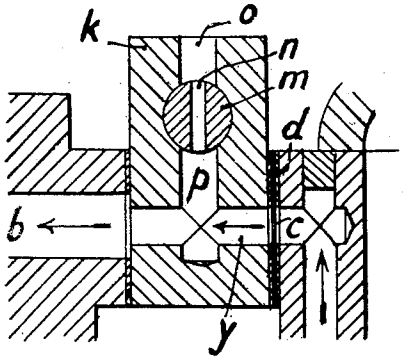
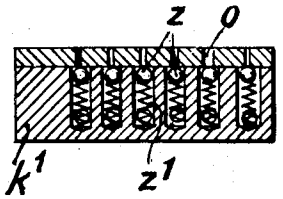


Fig. 6.



INVENTOR:

MARTHE LOUISE CHANARD

By: Glascock Downing & Seebold

Attys.

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Fig. 7.

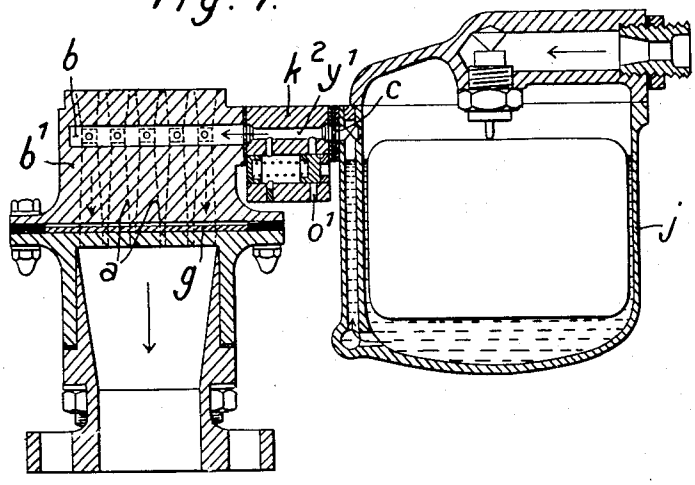


Fig. 8.

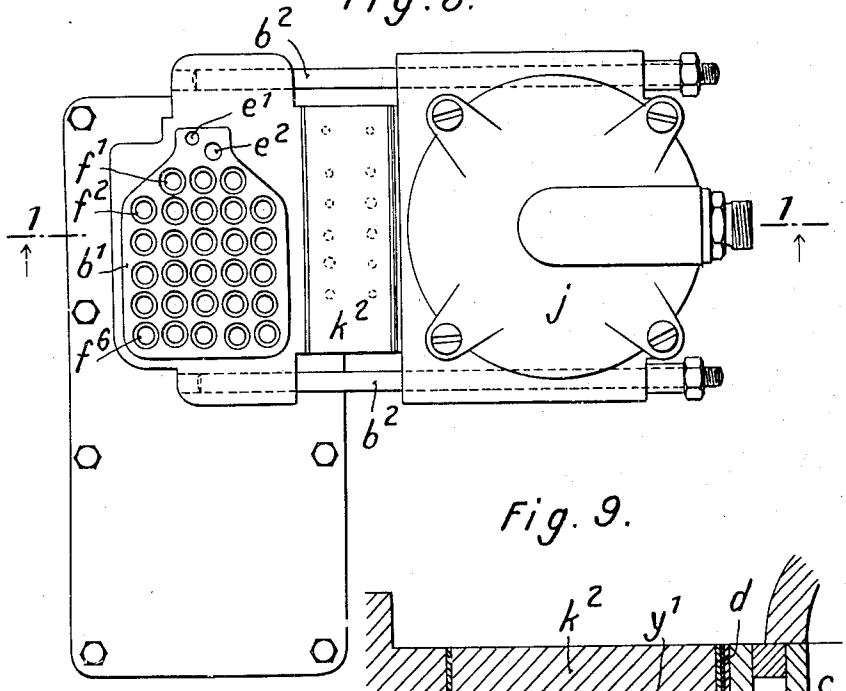
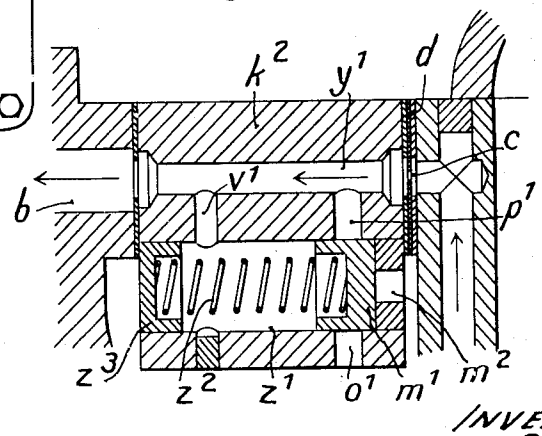


Fig. 9.



INVENTOR
MARTHE LOUISE CHANARD

By: Glascock Downing & Seibold
Attys.

Patented July 6, 1937 2,086,292

UNITED STATES PATENT OFFICE

2,086,292

CARBURETOR

Marthe Louise Chanard, Rueil
Malmaison, France

Application April 2, 1936, Serial No. 72,404
In France April 2, 1935

8 Claims. (Cl. 261—41)

This invention relates to an improvement in carburetors, particularly those which are constituted by several parallel rows of elements constituting as many unitary carburetors which are successively put in action, according to the normal conditions of the carburetion.

Experience has shown that, in this type of carburetors, the known phenomenon of the excess of consumption of gasoline occurs when the power of the engine is reduced, by putting out of action a number of carbureting elements, this creating excessive vacuum.

According to the invention, this inconvenience is remedied by providing the carburetor with air inlet conduits leading opposite to the orifices for the atomization of gasoline, these conduits being automatically opened when the partial vacuum becomes too great and exceeds a definite value.

For carrying this principle into practice, the carburetor is provided with a slide valve controlled by a piston on which acts the partial vacuum existing in the intake manifold and subjected to the action of a returning force. This slide valve is arranged at right angles to the rows of carburetors and it is provided with a series of holes each corresponding to one of these rows and capable of coming opposite to conduits opening in the atmosphere. When the slide valve is moved by the piston so that the holes coincide with said conduits, the partial vacuum which exerts its excessive suction on the spraying holes of gasoline, is reduced to a correct value. The dimensions of the holes of the various rows, their shape and their position can be different so as to control the carburetion for obtaining the maximum economy.

Instead of being controlled by a single slide valve, each row of carbureting elements might be controlled by a special member, either a piston, or a ball pushed by a spring, or any equivalent device. In this case, each spring can be given a different strength, so as to obtain various adjustments.

In the form of construction preferably adopted, each feeding conduit, parallel to the rows of Venturi tubes, is in communication with a chamber wherein moves a small spring piston, capable of uncovering air inlet orifices, this piston being actuated by the partial vacuum which is exerted in said feeding conduit, that is to say at the very place where the excess of partial vacuum must be corrected.

The invention is illustrated, but by way of example only, in the accompanying drawings, in which:

Fig. 1 is a vertical sectional view of the carburetor;

Fig. 2 is a corresponding side view;

Fig. 3 is a plan view;

Figs. 4 and 5 are two detail sections made according to line 4—4 of Fig. 1 and to line 5—5 of Fig. 4, the second section being made on an enlarged scale;

Fig. 6 illustrates a modification;

Figs. 7, 8 and 9 illustrate another modification, Fig. 7 being a vertical section;

Fig. 8 is a plan view corresponding to Fig. 7;

Fig. 9 is a detail view, on an enlarged scale, showing in vertical section the device for correcting the partial vacuum.

As illustrated in the drawings, Figs. 1 and 2, the carburetor, to which the invention is assumed to be applied, is constituted by a large number of unitary carburetors arranged in rows.

Each unitary carburetor is constituted by a Venturi tube *a* (Fig. 1) laterally arranged relatively to a feed conduit *b* at the end of which is located a spraying nozzle *c* (Fig. 5) formed by small holes perforated in a thin blade *d*. Fig. 3 shows the inlets of the Venturi tubes e^1, e^2 for running at reduced speed; the other Venturi tubes form rows f^1, f^2 . . . f^6. These Venturi tubes are successively uncovered in proportion as the carburetor is further opened by a plane shutter *g* which can be moved by a wire *h* actuating the control drum *i*.

The control drum *i* carries the pinion *i'* which meshes with the slots in the shutter *g* to actuate the same.

The very thin metal blade in which are formed the spraying holes is clamped between a plane surface provided on the upper part of the constant level tank *j* and a metal block *k*.

This block is internally provided with a cylindrical recess *l* in which can slide a rod *m* acting as a slide valve. This slide valve is provided with transverse holes *n* having preferably different cross sections.

Conduits *o* and *p*, formed in the body *k* coincide with the various rows of unitary carburetors.

The conduits *o* open in the atmosphere. The conduits *p* lead into the chambers *y* which are opposite the atomizing holes *c* and are in communication with the feed conduits *b* of the rows of elements.

The slide valve is connected, by an arm *q*, to the rod *r* of a piston *s* arranged in a cylinder *t*. This piston is subjected on its left-hand face (Fig. 4) to the action of the partial vacuum existing in the inner chamber *u* of the carburet-

or, and in the adjacent part of the intake manifold. For that purpose, the cylinder t is connected to this chamber u by a tube v.

Its right-hand face is subjected to the atmospheric pressure owing to holes s^1. A spring x tends to restore the slide valve to its position of rest.

The operation is as follows:

When the shutter g of the carburetor is completely open, that is to say when the engine is under full load, the partial vacuum in the carburetor is relatively small, for instance 1 m. of water. For this value, the carburetion is effected in the optimum conditions. The slide valve m is then closed and does not intervene.

If the power of the engine is reduced, by moving the shutter so as to close a number of elements of carburetion, the partial vacuum increases. For instance, when the shutter uncovers only the first row of orifices, the partial vacuum can reach 6 m. of water. At this moment, gasoline is sucked too violently and is admitted in excess in the carburetor.

But, as soon as the partial vacuum existing in the part u of the carburetor reaches a definite value, the piston s is moved and actuates the slide valve m and the holes n of this slide valve put in communication with the atmosphere, through the medium of the conduits o and p, the chambers y which are located opposite the spraying orifices c. The partial vacuum acting on these orifices is immediately diminished and the consumption of gasoline is reduced accordingly.

By giving to the holes n different cross sections, by displacing them slightly in one direction or the other, according to the axis of the slide valve, or by giving them a more or less elliptic cross section, it is possible to act differently on the various rows of carburetors and to correct in a perfect manner the effects of the excess of partial vacuum at low speeds.

Fig. 6 shows a modification in which, instead of having a single slide valve for correcting the carburetion of all the rows, a distinct correcting member is provided for each row. In the example illustrated, this member is constituted by a ball z pushed by a spring z^1. All these balls are fitted in a member k^1 replacing the member k of Figs. 1 to 5. In this modification, when the shutter g uncovers a row of unitary carburetors, the partial vacuum is exerted in the corresponding feed conduit b and acts on the ball reserved for that row, which ball opens or not according to the partial vacuum and the strength chosen for the spring. By giving to the springs different strengths, and to the openings o uncovered by the balls different cross sections, all desirable adjustments can be obtained.

In the modification illustrated in Figs. 7 to 9, the constant level tank j and the block b^1 in which are formed the various Venturi conduits a, and their feeding conduits b, is inserted a block k^2 and the three elements are clamped together by bolts b^2. Between the block k^2 and the tank j is interposed the thin blade d, in which are formed the holes c for spraying the gasoline, Fig. 9.

Opposite each feed conduit b, which is arranged between two rows of Venturi conduits, is provided a chamber y^1, which is located opposite the spraying holes. Underneath this chamber, is placed the correcting device housed in the block k^2. Parallel to this chamber y^1 is formed a cylindrical recess z^1, Fig. 9, in which can move a piston m^1 pushed by a spring z^2. A forcibly fitted washer z^3 serves as a support or bearing for this spring. A hole m^2 prevents this piston from remaining stuck against the cylinder bottom.

This piston acts as a slide valve and can uncover orifices o^1 and p^1, the first opening in the atmosphere and the second in chamber y^1. Finally, a conduit v^1 puts the cylinder z^1 and chamber y^1 in communication.

The operation of this modification is as follows:

When the engine is under full load, the partial vacuum is moderate and the carburetion normally takes place. At this moment, the piston m^1 is in the position shown in Fig. 9 and closes the orifices o^1 and p^1.

If the shutter is pulled closing therefore a number of carbureting elements, the power of the engine is diminished. The partial vacuum increases and can become excessive. When it reaches a definite value, the partial vacuum existing at b and y^1 acts on the piston m^1 owing to the passage v^1, and this piston is drawn backwards compressing its spring z^2. It uncovers the orifices o^1 and p^1, so that atmospheric air can enter the chamber y^1 and conduit b.

When the partial vacuum ceases to be excessive, the piston m^1 is pushed back by its spring and closes the orifices o^1 and p^1.

It will be noted that, in the arrangement of Figs. 7 to 9, the partial vacuum, which acts on the correcting member, is that existing in the very place where it must be corrected, that is to say in the conduit b feeding the Venturi conduits. The correction is therefore better than in the preceding arrangements.

The arrangements described above are given by way of example only; all the details of construction, the shapes, dimensions and materials employed can vary according to circumstances without thereby departing from the scope of the invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, and means for automatically opening these channels when the partial vacuum reaches an excessive value.

2. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, and pistons actuated by the suction of the engine for automatically opening these channels when the partial vacuum reaches an excessive value.

3. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, and correcting members for automatically opening these channels, each row of carburetors being served by a distinct correcting member.

4. In a carburetor, rows of unitary carburet-

ors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, chambers in which move spring pistons each communicating with the conduit feeding the Venturi tubes, and air inlet holes uncovered by the pistons.

5. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, and an intermediate block inserted between the constant level tank and the block in which are formed the various Venturi conduits, chambers formed in the intermediate block, spring pistons in said chambers, each chamber being opposite each feed conduit, and communicating with it, and air inlet holes uncovered by the pistons.

6. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, said spraying orifices being formed in a thin blade interposed between the tank and an intermediate block, air inlet channels opening in these conduits, chambers formed in said intermediate block in which move spring pistons, each chamber communicating with the conduit feeding the Venturi tubes, and air inlet holes uncovered by the pistons.

7. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, chambers in which move spring pistons, each chamber communicating with the conduit feeding the Venturi tubes, said conduits placed opposite a spraying hole and air inlet holes uncovered by the pistons.

8. In a carburetor, rows of unitary carburetors constituted by Venturi tubes in which the mixture of air and fuel is formed, means for putting out of action a number of these Venturi tubes, feed conduits for the rows of Venturi tubes, spraying orifices opposite these conduits, air inlet channels opening in these conduits, chambers in which move spring pistons, each chamber communicating with the conduit feeding the Venturi tubes, and air inlet holes uncovered by the pistons, said air inlet holes being placed underneath the spraying holes.

MARTHE LOUISE CHANARD.