

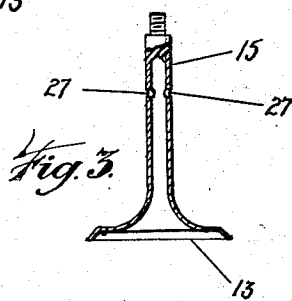
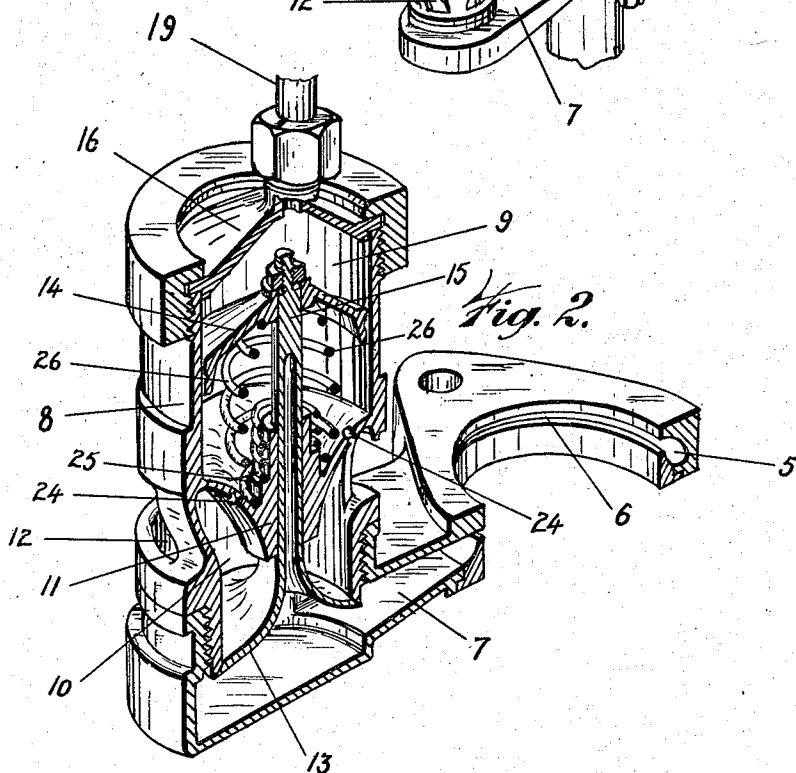
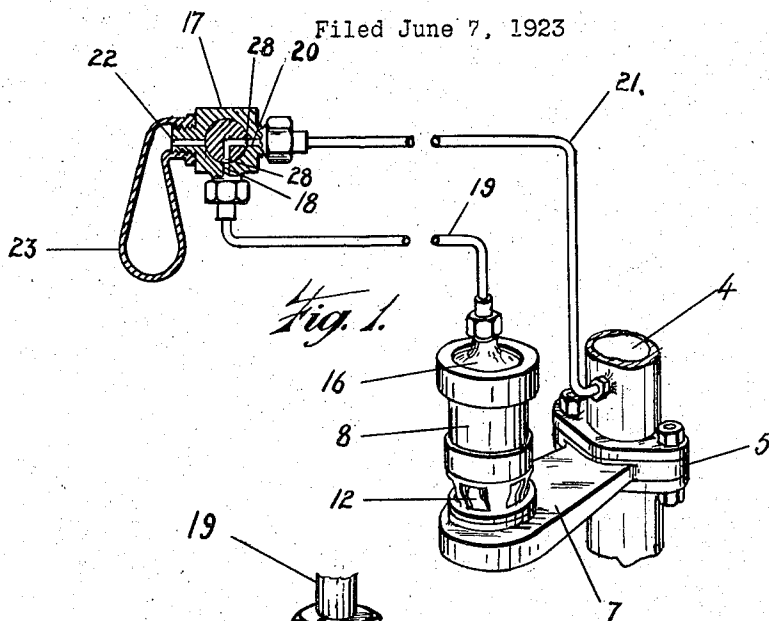
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AUTOMATIC FUEL ECONOMIZING APPARATUS FOR INTERNAL COMBUSTION ENGINES

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AUTOMATIC FUEL-ECONOMIZING APPARATUS FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, ROBERT PLATT-HEPWORTH, a subject of the King of Great Britain, residing at 68 Paddington Street, Paddington, Sydney, New South Wales, Australia, have invented certain new and useful Improvements in Automatic Fuel-Economizing Apparatus for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in economizing apparatus for internal combustion engines and is applicable more particularly to the engines of motor vehicles and aeroplanes and is provided in conjunction with the carburettor in order to provide economy by effecting complete fuel vaporization and giving the driver a means of compensating for climatic and other changes.

Best results are not given by the existing types of carburettors as they are generally provided with permanent adjustment means, i. e. the adjustment once made remains unaltered, and therefore it is not possible to allow for varying barometric pressures, temperatures, continually varying road conditions and varying qualities of fuel.

Now the object of the present invention is to provide an automatic economizing device in conjunction with the carburettor which although manually adjusted within predetermined limits operates within such limits entirely automatically.

With this object in view this invention consists of a device situated between and connecting the two ends of a break in the induction pipe on the engine side of the carburettor. Said device consists of an annular chamber communicating with the induction pipe through an annular slot, and a branch chamber integral with and communicating with the annular chamber.

Extending from and communicating with the branch chamber is a vertical cylindrical casing formed in two separate chambers disposed one above the other. The upper chamber which has a removable cover plate functions as a dashpot containing therein a piston while the lower chamber is provided with a series of air holes and functions as an air inlet chamber which communicates with the branch chamber through a mushroom valve the stem of which is connected to the dashpot piston. The dashpot chamber is connected to one branch of a threeway

cock which may be mounted on the dashboard and provided with an operating handle and indicating dial. The remaining branches of the threeway cock are connected one to the induction pipe and the other to an air chamber.

The invention may be more completely understood by referring to the accompanying drawings which illustrate one form of the invention and in which:—

Figure 1 is a diagrammatic view of the economizer fitted to an induction pipe.

Figure 2 is a sectional perspective view of the economizer and

Figure 3 is a sectional elevation of a modification of the valve.

Suitably fitted within a break in the induction pipe 4 on the engine side of the carburettor is a chamber 5 which communicates with said induction pipe by means of an annular slot 6, and which also communicates with the branch chamber 7 integral therewith.

Vertically disposed above the chamber 7 is a cylindrical casting 8 which is divided into two circular chambers 9 and 10 by the wall 11. The lower of these chambers 10 has a series of air holes 12 disposed round its periphery and communicates with the chamber 7 through the valve 13 which is of the mushroom type and constructed as lightly as possible.

The chamber 9 acts as a dashpot chamber and contains the piston 14 which is attached to the hollow stem 15 of the valve 13 for which the dividing wall 11 acts as a guide.

This chamber is also provided with an airtight removable cover plate 16.

A threeway cock 17 preferably of the plug type and provided with an operating handle or knob and indicating dial plate (not shown in the drawings) is attached to the dashboard of the vehicle, or in any other suitable position. One branch 18 of the threeway cock is connected by means of the pipe 19 to the dashpot chamber 9. Another branch 20 is connected by a pipe 21 to any convenient point in the induction pipe 4 such as the lead from the vacuum feed petrol supply and the third branch 22 is provided with an air vessel 23.

The threeway cock is so designed that the dashpot 9 may be put in partial or full communication with either the air vessel or the induction pipe and the branches in the plug

of the three way cock may be splayed as shown at 28 to allow of finer adjustment.

In operation and when starting an integral combustion engine fitted with this invention the three way cock is operated so that the dashpot chamber 9 and the induction pipe lead 21 are put in communication with each other. The suction set up in the induction pipe 4 on the intake stroke of any cylinder causes a partial vacuum to be formed in the branch chamber 7 thus tending to open the mushroom valve 13 which however, is prevented from opening for the reason that a partial vacuum is also formed on the upper side of the dashpot piston 14 through the pipe 21 by the intake suction in the induction pipe 4.

This equalizing suction formed on both the valve 13 and the piston 14 keeps the mushroom valve 13 closed and so on air is admitted to the induction pipe and the engine gets the "rich" mixture requisite for starting purposes.

When the engine has increased its speed a greater suction is produced in the spraying chamber of the carburettor and more petrol is drawn out of the jet, thus necessitating an increased supply of air.

The additional air is allowed to enter through the valve 12 by putting the dashpot 9 in communication with the air chamber 23 by manually adjusting the three way cock 17 thus allowing the piston 14 to withdraw air from the chamber 23.

The valve 13 will then "open" and admit air according to the amount of suction in the induction pipe 4. The air from the underside of the piston 14 is allowed to escape slowly through the fine holes 24 as the valve 12 opens thus providing a cushion. The shock of the valve opening fully and suddenly is taken by the small spring 25 and the valve is closed again by the spring 26.

The amount of the opening of the valve 13 will be dependent on the amount of air admitted to the upper portion of the dashpot and therefore when given a maximum valve opening for a particular adjustment of the regulating three way cock, the mushroom valve will operate automatically within the range of this adjustment, allowing more air to enter when the engine suction increases and less when the engine suction decreases.

Any globules of petrol which may condense on the inside of the induction pipe and run down are caught in the chamber 5 and re-vaporized by the incoming air.

In a modification the holes 24 may be dispersed with and holes 27 provided in the stem of the valve 13 thus allowing air to enter and leave the chamber 10 through the hollow stem 15 of the valve. The air is thereby exhausted from the underside of the piston 14 thus assisting the opening of the valve 13.

The invention may be utilized with somewhat more limited advantages by dispensing with the lead from the regulating three way cock to the induction pipe and if desired the air vessel may be omitted and atmospheric air allowed to enter the dashpot.

It is clear that the connections to the three way cock may be altered without affecting the spirit of the invention in any way, for example, the air vessel may be placed between the leads 19 and 21 in which case it would be necessary to have a plug with three branches but care must be taken to see that it is not possible to put the air vessel 23 and induction pipe lead in communication with each other.

Various other modifications in the construction of the apparatus may be made without altering the spirit of the invention.

I claim:

1. An automatic fuel economizing device for use with internal combustion engines comprising an air inlet valve adapted to admit air through a passage to the induction pipe, a piston attached to said valve operating in a separate chamber, movement of said piston being controlled by communication either with the induction pipe or an air supply.

2. An automatic fuel economizing device for use with internal combustion engines comprising an annular chamber surrounding the induction pipe and communicating therewith, a branch chamber extending from said annular chamber, an air inlet chamber communicating with said branch chamber through a spring controlled valve, a dashpot attached to the stem of said valve and means for selectively establishing communication between the dashpot and an air supply or the induction pipe.

3. An automatic fuel economizer for use in internal combustion engines having a valve adapted to admit air through a passage to an annular chamber surrounding and in communication with the induction pipe, said valve being spring controlled and having attached to the stem a piston movable within an overlying chamber adapted to act as a dashpot, movement of said air valve being controlled by the adjustment of a three way cock to selectively establish communication between said dashpot and the induction pipe or an air vessel.

4. An automatic fuel economizing device for use with internal combustion engines comprising an annular chamber within a flange adapted to be secured within a break in the induction pipe, said chamber communicating with said induction pipe, a branch or valve chamber extending from said annular ring, a vertically disposed cylindrical casing overlying said branch or valve chamber, said casing being subdivided into an air inlet chamber and a dashpot

chamber, peripheral air vents in the wall of said air inlet chamber, a hollow stemmed mushroom valve interposed between said air inlet chamber and said branch chamber and adapted to control communication between said chambers, a dashpot piston within said dashpot chamber attached to said hollow stemmed valve, springs surrounding valve stem adapted to control the movement of said valve, air holes in the dividing wall between said dashpot chamber and said air inlet chamber, a pipe or tube leading from said dashpot chamber to one branch of a three way cock, a pipe or tube leading from the induction pipe to another branch of the three way cock, an air vessel attached to the third branch of the three way cock, said three way cock being adapted to selectively establish variable communication between said dashpot and said induction pipe lead or said air vessel.

5. An automatic fuel economizing device for use with internal combustion engines comprising an annular chamber within a flange adapted to be secured within a break in the induction pipe, said chamber communicating with said induction pipe, a branch or valve chamber, extending from said annular chamber, a vertically disposed

cylindrical casing overlying said branch or valve chamber, said casing being subdivided into an air inlet chamber and a dashpot chamber, peripheral air vents in the wall of said air inlet chamber, a mushroom valve having a hollow stem interposed between said air inlet chamber and said branch chamber and adapted to control communication between said chambers, air holes in said hollow valve stem, a dashpot piston within said dashpot chamber attached to said valve stem, springs surrounding valve stem adapted to control the movement of said valve, a pipe or tube leading from said dashpot chamber to one branch of a three way cock, a pipe or tube leading from the induction pipe to another branch of the three way cock, an air vessel attached to the third branch of the three way cock, said three way cock being adapted to selectively establish variable communication between said dashpot and said induction pipe lead or said air vessel.

In testimony whereof he has affixed his signature in presence of two witnesses.

ROBERT PLATT-HEPWORTH.

Witnesses:

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H. C. CAMPBELL.