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CARBURETER FOR INTERNAL COMBUSTION ENGINES.

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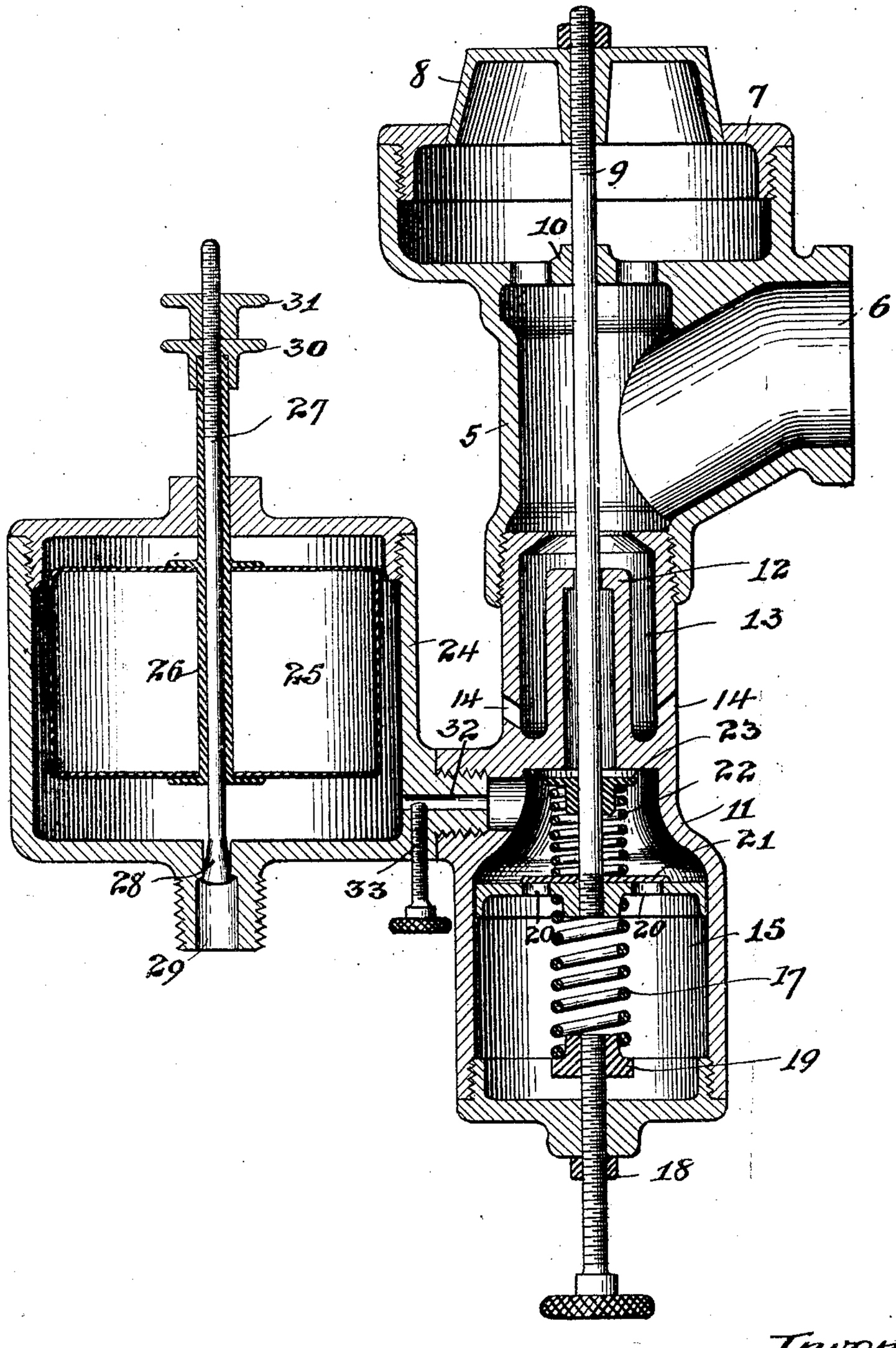

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CARBURETER FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, WALTER A. DALEY, 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 Carbureters for Internal-Combustion Engines, of which the following is a specification.

My invention relates to carbureters for explosive engines, and has for its prime object to improve the action and enhance the efficiency of such engines through a more perfect control of the air-inlet valve than has heretofore been attained.

It has been found in practice that in the carbureters at present in use in connection with explosive engines the quality of successive charges of the motive agent varies quite widely even when the engine is running at a substantially uniform speed, owing to irregularities in the operation of the air-intake valve which is apt to "flutter" and thus vary the amount of air admitted on successive suction strokes, thus injuriously varying the quality or richness of the charges. My invention is designed to eliminate this fault through the provision of means for steadying and rendering uniform the action of the air-intake valve, and this means consists essentially of a device preferably in the general nature of a dash-pot connected to said valve and operating to prevent the latter from substantially changing its open position between successive strokes when the engine is maintaining a uniform speed, while permitting it to vary the degree or extent to which the air is admitted responsive to variations in the speed of the engine.

In the accompanying drawing I have illustrated a preferred mechanical embodiment of my invention, the figure showing a central vertical section of the carbureter of a gasolene or other oil engine, including the float chamber and float.

In the drawing 5 designates a hollow casting having a lateral branch 6 adapted for connection to the suction side of the engine, and provided at its upper end with a removable valve seat 7 which coöperates with the air-intake valve 8, which latter is secured on the upper end of a valve-stem 9 that slides through an apertured guide-plate 10. Secured to the lower end of the casting 5 as by the threaded joint shown is a hollow casting 11, the upper portion of which contains an annular vertically-projecting boss 12 through which the valve-stem loosely passes, and surrounding the latter an annular passage 13 for the accommodation of air which is drawn in on the suction stroke of the engine through lateral apertures 14. The lower portion of the casting 11 constitutes a dash-pot chamber 15 which receives a piston 16 attached to the lower end of the valve-stem 9 and loosely fitting the walls of the dash-pot chamber so as to provide a limited clearance on the rise of the piston. The piston 16 is normally forced upwardly so as to seat the valve 8 by means of a coil spring 17 beneath the same, the tension of which is rendered adjustable by a threaded rod 18 passed through the lower end of the dash-pot chamber and carrying an annularly shouldered collar 19 which forms a seat for the spring. The piston 16 is apertured as shown at 20 and is provided on its upper surface with a flat flexible valve-disk 21 which is normally pressed to its seat to cover the apertures 20 by a superposed coil spring 22 abutting against an annularly shouldered collar 23 on the valve-stem.

Tapping the dash-pot chamber laterally at or near its upper end and above the highest point of travel of the piston 16 is the float chamber 24 which contains the float 25. This float is mounted on a sleeve 26 surrounding the valve-rod 27, the lower end of which latter constitutes a valve 28 controlling the fuel-inlet passage 29 leading to the float chamber. The sleeve 26 is clamped at any adjusted position on the valve-rod 27 by means of a nut 30 fast on the upper end of the sleeve and engaged by the threaded upper end of the rod and secured by the locknut 31. By retracting or withdrawing the locknut 31 and turning the nut 30 in either direction, the relative position of the float on the valve-stem may be readily varied, thus determining the height to which the fuel is permitted to rise in the float chamber. The fuel from the valve chamber flows into the upper end of the dash-pot chamber through a passage 32, the capacity of which may be regulated by a threaded pin 33 tapped into the cored boss containing the passage 32 transversely of the latter.

In operation, on the suction stroke of the engine, the gasolene or other fuel is drawn in through the passage 32, upwardly through the hollow boss 12, being more or less sprayed in passing through the constricted annular passage between the latter and the valve-stem, whence it meets and mingles with air

drawn in through the apertures 14, whereupon this mixture joins the current of air flowing in through the opening of the valve seat 7, the suction operating to open the valve 8 at the same time that it tends to raise and draw in the fuel. The dash-pot chamber 15 is filled with some substance which is preferably the motive fluid itself, although it might consist of any other substance suitable for the intended purpose which is to retard and steady the closing movement of the valve 8 under the successive intermittent impulses of the suction. The result of this is that, with the valve 8 open to a certain extent depending upon the strength of the suction, which latter, of course, depends upon the speed of the engine piston, the dash-pot acts to hold the valve 8 continuously open to a uniform extent or degree while the engine is running at a substantially uniform speed; while, when the engine speed drops the valve may gradually move to a less open position, and when the speed increases the valve may readily move to a more open position. In this way the valve is prevented from fluttering and flying back to its seat between successive intake strokes of the engine piston, and this conduces to uniformity and regularity in the quality of the successive charges, and also eliminates the objectionable noise and clatter attendant upon the fluttering and slamming of the valve when employed without a controlling device such as that above described. The valve-disk 21 controlling the openings 20 in the dash-pot piston permits the latter to descend quickly in the opening movement of the valve, but retards the closing movement of the latter since the displaced substance above the piston must, as the latter rises, pass to its under side through the constricted annular passageway between the edge of the piston and the inner wall of the chamber.

It will be observed that the valve 8 is of varying diameter from top to bottom and, when closed, extends through the opening controlled thereby, occupying the latter at the point of its maximum diameter. This construction is of importance in that it effects the automatic regulation of the fuel drawn in on the suction strokes of the engine proportionately to the amount of air admitted by the valve 8. It will be seen that, owing to the shape of the valve, the wider it is opened or withdrawn from its seat, the smaller will be the area thereof subjected to the suction, and consequently the greater will have to be the suction to open it further, since, the wider it is opened the greater will be the amount of air admitted responsive to the suction effect. Now, the increased suction which thus draws in an increased amount of air at the same time, obviously, exerts a greater pull upon the fuel supply and draws in a proportionately increased amount of fuel to be mingled with such increased volume of air. In this way the relative proportions of the ingredients of the charge are maintained substantially constant during the variations in the speed and suction effect of the engine.

While I have shown and described the valve-controlling device as consisting of a dash-pot mechanism directly connected to the stem of the valve, and in practice prefer to employ a controlling means of this character, yet it is obvious that other valve-controlling devices responsive to variations in the suction effect might be substituted for the dash-pot without departing from the spirit of this invention or sacrificing any of the advantages thereof. It is also evident that the particular relative arrangement of the coöperating parts herein shown and described might be varied to suit particular circumstances, especially where the device is used on automobile engines which constitutes its principal intended application. Hence I do not limit the invention to the mechanism shown and described, except to the extent indicated in specific claims.

I claim:

1. In a carbureter, the combination with a casing having a lateral branch designed for connection to the suction side of an engine, of means for admitting and commingling air and fuel located on one side of said branch, an air-intake valve located on the opposite side of said branch and having a stem extending through said casing, and means connected with said valve-stem serving to retard the closing movement of the valve between successive suction impulses, substantially as described.

2. In a carbureter, the combination with a casing having a lateral branch designed for connection to the suction side of an engine, of means for admitting and commingling air and fuel located below said branch, an air-intake valve located above said branch and having a stem extending through said casing, and means connected to the lower end of said valve-stem serving to retard the closing movement of the valve between successive suction impulses, substantially as described.

3. In a carbureter, the combination with a casing having a lateral branch designed for connection to the suction side of an engine, of means for admitting and commingling air and fuel located beneath said branch, an air-intake valve located in the head of said casing above said branch and having a stem extending through said casing, and a dash-pot constituting a depending extension of said carbureter casing, the piston whereof is directly connected to the lower end of said valve-stem and serves to retard the closing movement of the valve, substantially as described.

4. In a carbureter, the combination with a casing having a lateral branch designed for

connection to the suction side of the engine, of means for supplying fuel located on one side of said branch, an air-intake valve located on the opposite side of said branch and having a stem extending through said casing, and means connected with said valve-stem serving to retard the closing movement of the valve between successive suction impulses, substantially as described.

5. In a carbureter, the combination with a casing having a lateral branch designed for connection to the suction side of an engine, of means for supplying fuel located on one side of said branch, an air-intake valve located on the opposite side of said branch and having a stem extending through said casing, and a fluid dash-pot the piston whereof is connected to said valve-stem, substantially as described.

6. In a carbureter, the combination with a casing having a valve-seat forming an air inlet opening, a port leading from a source of fuel supply, and a suction passage communicating with both said air opening and port, of an air valve of varying diameter and greater thickness than said valve-seat operating in and through said air inlet opening, substantially as described.

7. In a carbureter, the combination with a casing having a beveled valve-seat forming an air inlet opening, a port leading from a source of fuel supply, and a suction passage communicating with both said air opening and port, of a conical air valve controlling said air inlet opening and, when closed, occupying said valve-seat at the point of maximum diameter of said valve, said air valve having a stem extending inwardly of said casing, and means connected with the end of said valve stem serving to retard the closing movement of the valve, substantially as described.

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