No. 868,265. PATENTED OCT. 15, 1907.

E. V. HARTFORD.

CARBURETER FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED AUG. 25, 1905.

Fig. 1

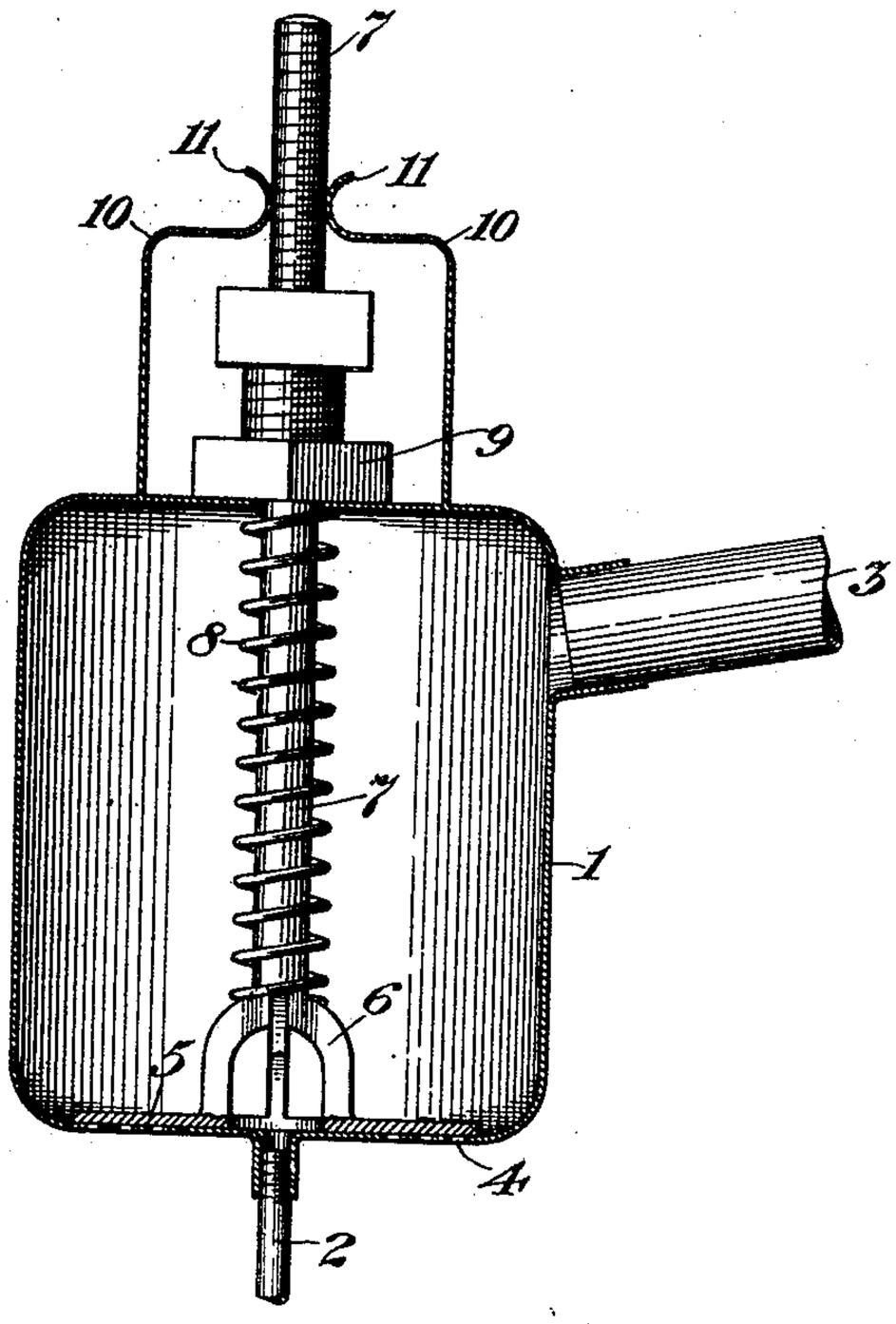
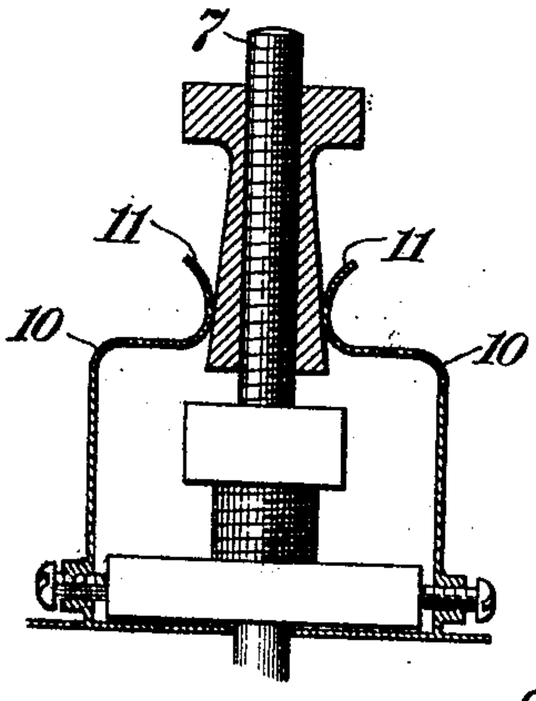


Fig. 2



Witnesses
Chas. F. Clagett
Adolph F. Dinse

Edmund V. Hartford Inventor
By his Attorneys. Munn & Co

UNITED STATES PATENT OFFICE.

EDWARD V. HARTFORD, OF NEW YORK, N. Y.

CARBURE'TER FOR INTERNAL-COMBUSTION ENGINES.

No. 868,265. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed August 25, 1905. Serial No. 275,738.

To all whom it may concern:

Be it known that I, EDWARD V. HARTFORD, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Carbureters for Internal-Combustion Engines, of which the following is a full, clear, and exact specification.

My invention relates to certain new and useful improvements in carbureters for internal combustion engines and it consists of the combinations of parts hereinafter more particularly described. As is well known, the efficiency of an engine of this type depends largely upon maintaining a proper mixture of the hydro-carbon vapor and air which forms the combustible charge. Where an engine is operated at different speeds and under different loads, the suction will be found to vary considerably, and to compensate for this it has been usual to vary the secondary air supply and automatic means have been provided for this purpose. I have found, however, that in a device of this type, especially when used in connection with an engine of high speed, the parts reciprocate so rapidly as to interfere with their proper positive action and I have therefore provided my moving parts with a device for controlling the movement and insuring their positive and effective operation.

In the drawings illustrating one form of my invention Figure 1 is an elevation of my carbureter in section, showing the parts in their normal position. Fig. 2 is a detailed section of a modified form of valve controlling device.

In the construction shown in Fig. 1 the numeral 1 indicates the shell or case of the mixing chamber; 2 the supply pipe for the hydro-carbon mixture and 3 the outlet leading to the engine. The casing 1 is preferably cylindrical and entirely closed except at the bottom where it is supplied with a series of perforations 4, as shown. Within the said shell is located an annular valve 5, upon which is fitted a spider 6, secured to the stem 7. The valve 5 is of sufficient area to cover the openings 4 when the valve is in the position shown, and it is retained in this position by a spring 8 on the stem 7, operating against the upper portion of the case and the spider. The upper end of the shaft 7 passes through a stuffing box at 9 at the upper end of the case which forms an air tight joint. Friction retarding devices 10, secured to the upper portion of the case in any desired way, have spring ends 11 which bear against the adjacent portions of the shaft 7 and serve to retard its movement.

In the construction shown in Fig. 2, I have fitted that portion of the shaft 7, adjacent to the spring arms 11 with a cone shaped sleeve. Otherwise the construction is similar to that of Fig. 1.

The operation of the device will be readily understood. Upon the up-stroke of the engine a vacuum is created in the cylinder and, communicating with the mixing chamber of the carbureter, draws a charge into the engine. This vacuum, however, lifts the valve 5 against the operation of the spring and admits the proper amount of air through the apertures 4, the hydro-carbon mixture being fed through the pipe 2 in the usual manner. As the speed of the engine increases the vacuum created by its up-stroke becomes greater and this serves to lift the valve higher and thus admits a correspondingly larger proportion of air into the chamber. At high speed the vibration of the valve and rod will be found to be so rapid as to prevent its complete response to the movements desired, but by means of the frictional retarding means shown, this excessive vibration is completely controlled and the parts caused to respond in strict accordance with the desired operation. The supply of hydro-carbon mixture may be regulated by a suitable plug in the feed pipe, or by an automatic valve of any well known type.

I am aware that prior to my application a dash-pot has been devised for retarding the action of the valve of a carbureter. A dash-pot, however, is not thoroughly effective for the purpose, as it does not act properly under all conditions. For instance, when the engine is running at high speed and the strokes are quick and hard, a dash-pot offers an almost unyielding resistance to the movement of the valve. That is to say, a quick, upward impetus to the carbureter valve would be checked by a dash-pot, whereas a slow, gentle movement would be permitted. The frictional means or devices which I employ are not affected by fluid compression and expansion, such as affects the action of a dash-pot, and my device, therefore, acts with the same resistance under rapid movements as under slow movements. I am aware that an accidental and immaterial amount of friction occurs between the piston and cylinder of a dah-pot or similar device, but this friction is modified and almost entirely overcome by the c mpression and expansion of fluid on opposite sides of the piston in the dash-pot. My device provides pure friction which is not affected by other conditions, such as the compression of air and the like, and by the expressions "frictional means" or "frictional devices" in the claims, I desire to limit myself to means or devices for producing pure, intentional friction, not affected by fluid compression or expansion.

It is obvious that many modifications and changes may be made from the exact constructions shown and described, without departing from the spirit of my invention, and I do not intend to limit myself to the specific form shown, but

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

1. A carbureter having a valve and automatic and frictional means for regulating the action of the valve.

2. A carbureter having an automatically-acting valve and frictional means for retarding the action of the valve.

3. In a carbureter, a mixing chamber, an air inlet, a hydro-carbon vapor inlet, a fuel outlet and automatic and frictional means for regulating the supply of said air, substantially as described.

4. In a carbureter, a mixing chamber, an air inlet, a hydro-carbon vapor inlet, a fuel outlet and automatic means for regulating the supply of air, and frictional means for retarding said regulating means, substantially as described.

5. In a carbureter, a mixing device regulated by the speed of the engine, whereby, as the speed of the engine increases a greater proportion of air is supplied to the fuel, and a frictional device for retarding the action of the mixing device, substantially as described.

6. In a carbureter, a mixing device regulated by the speed of the engine whereby, as the speed of the engine increases, a greater proportion of air is supplied to the fuel, and frictional means for retarding the same, substantially as described.

7. In a carbureter, an air inlet, a valve for closing the same a frictional device for retarding the action of the valve, and spring means for holding said valve in a normally closed position, substantially as described.

8. In a carbureter, an air inlet, a valve for closing the same and spring means for holding said valve in a normally closed position, and frictional devices for retarding the movements of said valve, substantially as described.

9. In a carbureter, an air inlet, a valve for closing the same, a stem for said valve, a spring surrounding said stem and operating to hold said valve in a normally closed position, and frictional means for retarding the action of the valve, substantially as described.

10. In a carbureter, an air inlet, a valve for closing the same, a stem for said valve, a spring surrounding said stem and operating to hold said valve in a normally closed position and a friction device in contact with said stem for retarding the movements of said valve, substantially as described.

11. In a carbureter, a mixing chamber containing a fuel outlet, an inlet for the liquid fuel, an air inlet, a valve for said air inlet and a stem attached to said valve and passing outside of said mixing chamber, a spring surrounding said stem in said mixing chamber and operating to normally close said air inlet, spring fingers contacting with said stem outside of said mixing chamber and operating to retard the vibrations thereof, substantially as described.

12. In a carbureter, a mixing chamber containing a fuel outlet, an inlet for the liquid fuel, an air inlet, a valve for said air inlet and a stem attached to said valve and passing outside of said mixing chamber, a spring surrounding said stem in said mixing chamber and operating to normally close said air inlet, spring fingers contacting with said stem outside of said mixing chamber and operating to retard the vibrations thereof, means on said stem for preventing the escape of fuel from the mixing chamber, substantially as described.

13. In a carbureter, a mixing chamber containing a fuel outlet, an inlet for the liquid fuel, an air inlet, a valve for said air inlet and a stem attached to said valve and passing outside of said mixing chamber, a spring surrounding said stem in said mixing chamber and operating to normally close said air inlet, spring means outside of said mixing chamber operating to retard the vibrations of said stem and adjustable means to regulate the retarding effect of said spring means, substantially as described.

14. In a carbureter, a mixing chamber containing a fuel outlet, an inlet for the liquid fuel, an air inlet, a valve for said air inlet and a stem attached to said valve and passing outside of said mixing chamber, a spring surrounding said stem in said mixing chamber and operating to normally close said air inlet, a cone-shaped sleeve fixed upon said stem, outside of said mixing chamber, spring fingers attached to said mixing chamber and adapted to bear upon said cone-shaped sleeve, whereby as the upward motion of said stem is increased, the retarding effect of said valve upon said spring fingers will be correspondingly increased, substantially as described.

15. In a carbureter, a mixing chamber, equipped with a fuel outlet and an inlet for the hydro-carbon, an air inlet consisting of a plurality of openings disposed around said hydro-carbon inlet, an annular valve adapted to close said air inlet, a stem attached to said valve, a spring surrounding said stem and normally operating to close said air inlet and a plurality of frictional devices for retarding the action of said valve, substantially as described.

16. In a carbureter, a mixing chamber equipped with a fuel outlet and an inlet for the hydro-carbon, an air inlet consisting of a plurality of openings disposed around said hydro-carbon inlet, an annular valve adapted to close said air inlet, a stem attached to said valve, a spring surrounding said stem and normally operating to close said air inlet and frictional means for retarding the vibrations of said stem, substantially as described.

17. In a carbureter, a mixing chamber equipped with a fuel outlet and an inlet for the hydro-carbon, an air inlet consisting of a plurality of openings disposed around said hydro-carbon inlet, an annular valve adapted to close said air inlet, a stem attached to said valve and projecting outside of said mixing chamber, a spring surrounding said stem and normally operating to close said air inlet, and spring fingers adapted to contact with the projecting portion of said stem and retard the vibrations thereof, substantially as described.

18. In a carbureter, a mixing chamber equipped with a fuel outlet and an inlet for the hydro-carbon, an air inlet consisting of a plurality of openings disposed around said hydro-carbon inlet, an annular valve adapted to close said air inlet, a stem attached to said valve and projecting outside of said mixing chamber, a spring surrounding said stem and normally operating to close said air inlet, spring fingers adapted to contact with the projecting portions of said stem and retard the vibrating thereof and adjustable means for regulating the pressure of said spring fingers upon said stem, substantially as described.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD V. HARTFORD.

Witnesses:
GEO. HISFORD,
ADOLPH F. DINSE.