Feb. 16, 1926. 1,573,065

W. C. HESS

CARBURETOR

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Fig. 1.

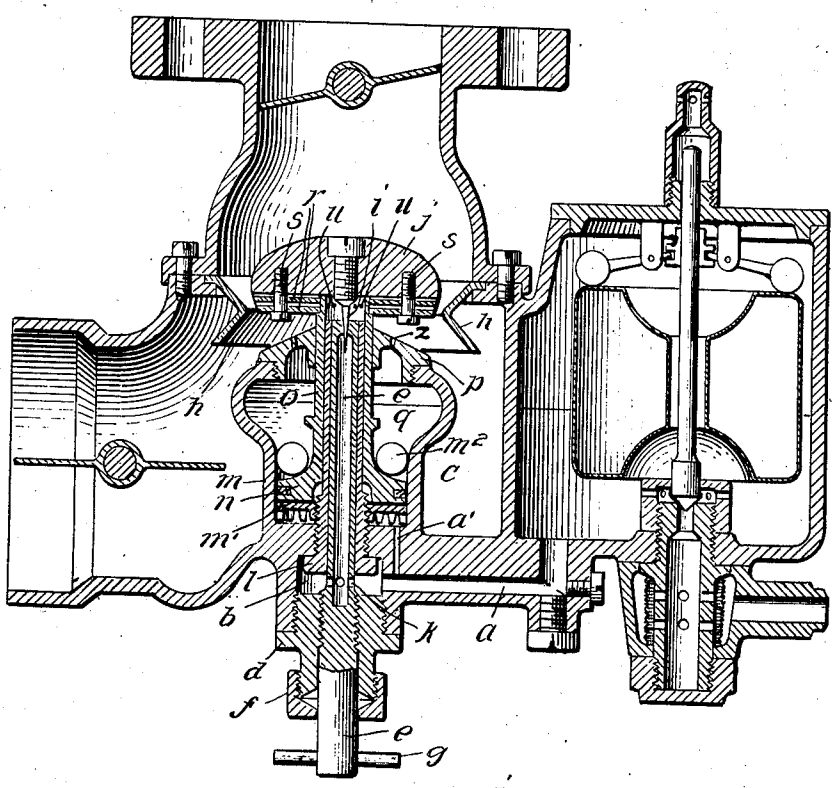
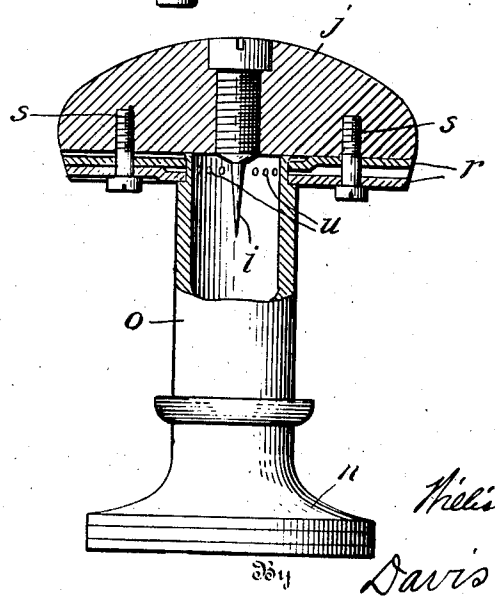


Fig. 2.



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Fig. 3.

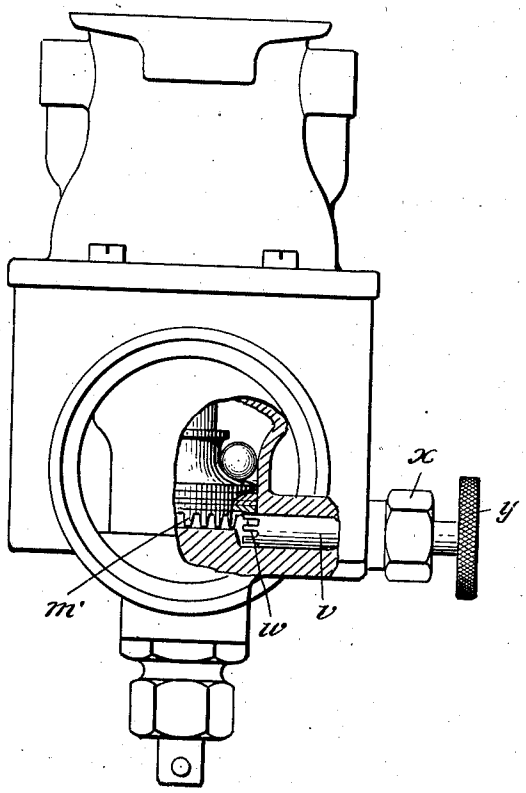


Fig. 4.

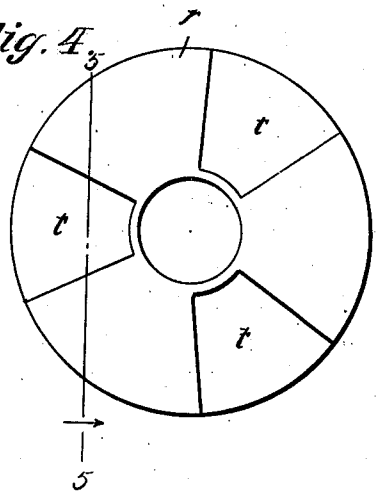
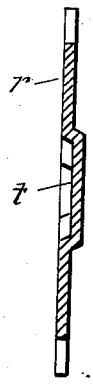


Fig. 5.



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1,573,065

UNITED STATES PATENT OFFICE.

WILLIS C. HESS, OF TOLEDO, OHIO.

CARBURETOR.

Application filed July 28, 1919. Serial No. 313,798.

To all whom it may concern:

Be it known that I, WILLIS C. HESS, a citizen of the United States of America, and a resident of Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Carburetors, of which the following is a full and clear specification.

The object of this invention is to provide a structure which will ensure thorough atomization of the fuel as well as mixture with the air and which will be quickly and efficiently responsive to the varying running conditions of the engine, as more fully hereinafter set forth.

In the drawings—

Fig. 1 is a vertical sectional view of my apparatus;

Fig. 2 is a view partly in side elevation and partly in section of a floating air-valve;

Fig. 3 is an end elevation partly in section; Figs. 4 and 5 are detail views of one of the valve disks.

Referring to the drawings annexed by reference-characters, *a* designates the fuel-inlet to the carbureting device, the inlet-end of this conduit *a* being connected to any suitable device which will automatically maintain the necessary head, the preferred device for this purpose being a float chamber of any of the well-known constructions, such as illustrated in my drawing. The conduit *a* leads into a chamber *b* depending integrally from the usual air-chamber *c* and closed at its lower end by a screw-plug *d*. Extending up through the plug *d* is a nozzle-tube *e*, this tube being threaded through the plug for the purpose of vertical adjustment, a stuffing-box *f* being employed to prevent leakage of fuel, and a suitable handle *g* being provided.

The upper end of the nozzle-tube *e* extends up into the air-chamber to a point about on a horizontal level with the narrowest diameter of the throat-ring *h* and it is provided with a reduced fuel-exit into which depends the needle-point of a needle-valve *i* extending centrally down through the body portion of a floating air-valve *j*. Fuel enters the nozzle through a plurality of openings *k*, and I surround this nozzle-tube *e* with a sleeve *l* which is screwed up through a threaded opening in the top of the inlet-chamber *b*, the upper end of this tube *l* extending to a point above the normal level of liquid in the nozzle-tube.

The nozzle as well as the sleeve *l* extends centrally up through a cylinder *m* which extends up into the air-chamber *c* and contains a vertically-movable head *n* provided with a sleeve *o* which nicely fits the stationary tube *l* and is attached at its upper end to the aforesaid valve *j*. This head rests upon a stop-collar *m'*, and, in order to weight the piston and its attached valve, a plurality of balls m^2 are arranged above the piston. The upper end of the cylinder *m* is closed by a cap *p* which fits around the sleeve *o*. The upper end of the cylinder is enlarged laterally to form a lateral chamber or pocket *q*. Valve *j* is circular in shape and when in its normal—i. e., lowest—position leaves a narrow annular opening between the valve and the narrowest part of the throat-ring *h*.

The bottom face of the air-valve *j* is formed of a pair of disks *r* which are superposed upon each other and fastened to the upper end of the piston-sleeve *o* by brazing or otherwise. The valve body (which serves to weight the valve) is fastened to the upper face of the upper disk by screws *s*. The disks *r* are provided with corresponding segmental depressions *t* which form radial exits for the fuel, these exits being in communication with the interior of the piston-sleeve *o* through the medium of perforations *u*, whereby the fuel will be forced downwardly into the narrow throat of the intake in the form of a plurality of thin films and thus be in condition to be broken up readily by the inrushing air.

The piston *n* fits the cylinder *m* loosely and rests upon the aforesaid stop-collar *m'*, the position of which determines the feed of the fuel past the needle-valve *i*. To permit this stop-collar *m'* to be adjusted up-and-down, I thread it upon the upstanding tube *l*, so that by rotating the collar its vertical position may be varied. To rotate the collar from the exterior of the device, I provide a shaft *v* whose inner end is provided with a small pinion *w* which meshes with the teeth on the collar, said shaft *v* extending through a gland *x* and being provided with a thumb-disk *y*.

It will be observed that the initial flow of air will be determined by the position of the valve and that this position is determined by the position of the stop-collar *m'*. The balls m^2 on top of the piston will pre-

vent the valve from rising until the engine speeds up to a point where a more attenuated fuel-mixture is desired, when the suction will be sufficiently great to float the valve far enough upwardly to discharge the balls m^2 into the lateral pocket q, thus relieving the piston of the weight of the balls and enabling the suction to maintain the valve in its uppermost position, where, as is usual, the greatest proportion of air to the amount of fuel the nozzle-valve is adjusted for is ensured, thereby providing for the greatest economy in running of the engine. The upper face of the head n is inclined outwardly to thus cause the balls m^2 to roll outwardly away from the stem, and it will be observed also that the lower wall of the lateral enlargement on the cylinder is inclined downwardly and inwardly to thus insure the automatic return of the balls back onto the piston when in its descent it reaches the loading point. It will be understood that the valve i carried by the air-valve shall be of such length and shape that the proper amount of fuel will be discharged at the nozzle within the range of movement of the air-valve.

I have found it desirable to provide for maintaining in the cylinder m the same level of fuel as is maintained in the float-chamber, as shown in Fig. 1, so that when the air-valve is suddenly thrown open a small supplemental charge of fuel is forced out around the piston-stem o (or through specially provided perforations z in the cap p) to assist in acceleration of the motor by enriching the charge during the period of acceleration. I may maintain this level of gasoline in the cylinder m in various ways. I have shown a passage a' connecting the inlet a to the bottom of the cylinder m, whence the fuel rises above the piston n into the cylinder above the piston.

The construction also ensures easy starting at low temperature, even when a fuel of greater density is used. A feature of importance lies in its adjustability to proper initial supply of air without changing or removing any parts, and it will be observed also that my structure will maintain a high vacuum during the accelerating period, to thus ensure rapid acceleration by reason of the initial weight of the air-valve through the period of acceleration, this resistance being released at high motor speed to ensure economical performance of the motor.

It will be understood that the annular bulge on the upper end of the cylinder m not only provides a lateral pocket for the reception of balls m^2, but also provides means for guiding the air in a curved path as it enters the throat-ring, thus tending to equalize the supply of air all around the circular air-inlet.

The nature and scope of the invention having been thus indicated and its preferred embodiment having been specifically described, what is claimed as new is:

1. In a carburetor, a fuel-nozzle, a throat-ring, a floating air-valve supported over the exit-end of said fuel-nozzle and adapted to regulate the supply of air passing through said throat-ring, and means for initially weighting the floating air-valve and relieving it of the weight when the valve is opened to high-speed position.

2. In a carburetor, a fuel-nozzle, a throat-ring, a floating air-valve supported over the exit-end of said fuel-nozzle and adapted to regulate the supply of air passing through said throat-ring, and means for initially weighting the air-valve consisting of a piston carried by the valve, a cylinder for the piston, a mobile body supported by the piston and adapted to be lifted thereby, and a lateral chamber for receiving said mobile body to relieve the weight from the piston when the valve is moved to high-speed position.

3. In a carburetor, a fuel-nozzle, a throat-ring, a floating air-valve supported over the exit-end of said fuel-nozzle and adapted to regulate the supply of air passing through said throat-ring as well as fuel through the nozzle, means for weighting the air-valve in initial position, and means for automatically releasing the weight from the air-valve when said valve is lifted to a predetermined extent.

4. In a carburetor, an air-valve carrying a fuel-valve, means for initially weighting said air valve, said means consisting of a piston carried by the valve, a cylinder in which the piston works, a plurality of balls normally resting on the piston, and a lateral chamber for receiving the balls from over the piston when the valve is moved to high-speed position.

5. In a carburetor, a mixing-chamber and means for supplying fuel thereto, said means comprising a stationary tube extending up into the mixing-chamber, a stop adjustably mounted on this tube, means accessible from the exterior of the mixing-chamber for adjusting this stop up and down on the tube, an air-valve having a depending cylindrical stem fitting and surrounding said tube, auxiliary means for normally holding said air-valve closed with its said stem abutting said stop, and a fuel-valve one member of which depends from the air-valve and the other member of which extends up into said tube.

6. In a carburetor, a mixing-chamber and means for supplying fuel thereto, said means comprising a stationary tube extending up through the bottom of said mixing-chamber and exteriorly screw-threaded, a toothed rotary stop screwed on said externally-threaded portion of the tube, a

shaft journaled in a wall of the mixing-chamber and provided with a pinion on its inner end engaging the teeth of said stop to rotarily adjust the same on the screw-threads, an air-valve provided with a depending hollow stem fitting and surrounding said tube, auxiliary means for normally holding the valve closed with the lower end of said tube in abutting relation to said stop, and a fuel-valve one member of which depends from the air-valve and the other member of which extends up through said tube.

7. In a carburetor, an upstanding cylinder in the mixing chamber, an air-valve having a cylindrical hollow stem depending into said cylinder and provided with a head adapted to rise and fall in said cylinder, a hollow stationary guide-tube extending up into the stem of said valve, a fuel-valve one member of which is carried by the air-valve, means for vertically adjusting the air-valve a plurality of loosely-mounted rolling weights supported on the aforesaid head, the upper face of the head being inclined to cause the balls to normally tend to roll outwardly away from the stem, said cylinder being enlarged at its upper end to provide a lateral cavity to permit said ball weights to automatically roll off the piston at a predetermined point, this cavity having its lower wall inclined downwardly and inwardly to insure the return of the ball weights onto the piston when the piston falls to the predetermined point.

In testimony whereof I hereunto affix my signature.

WILLIS C. HESS.