J. L. CLOUDSLEY.

CARBURETER.

APPLICATION FILED JULY 7, 1915.

1,180,976.

Patented Apr. 25, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

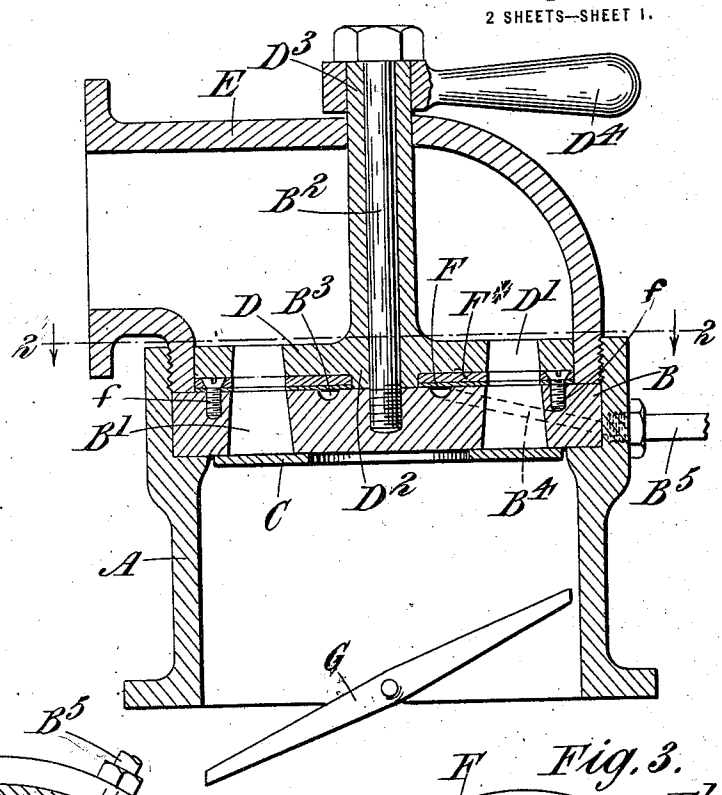


Fig. 2.

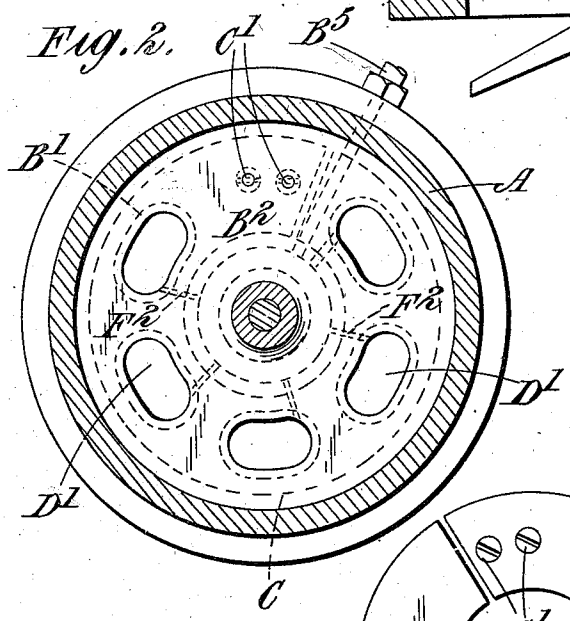


Fig. 3.

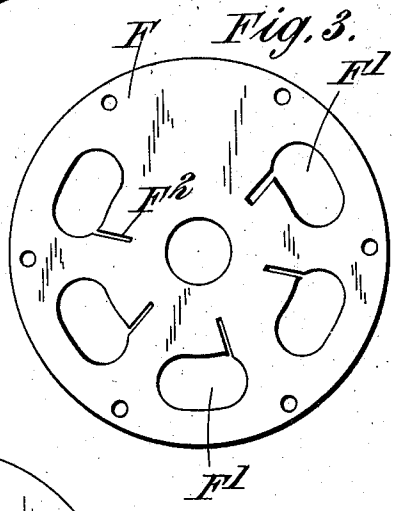
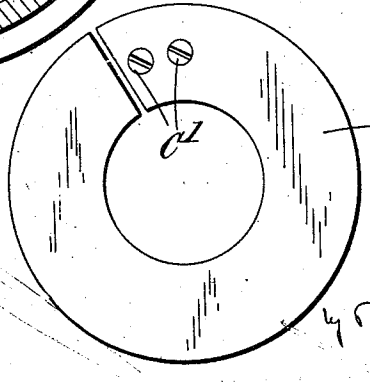


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

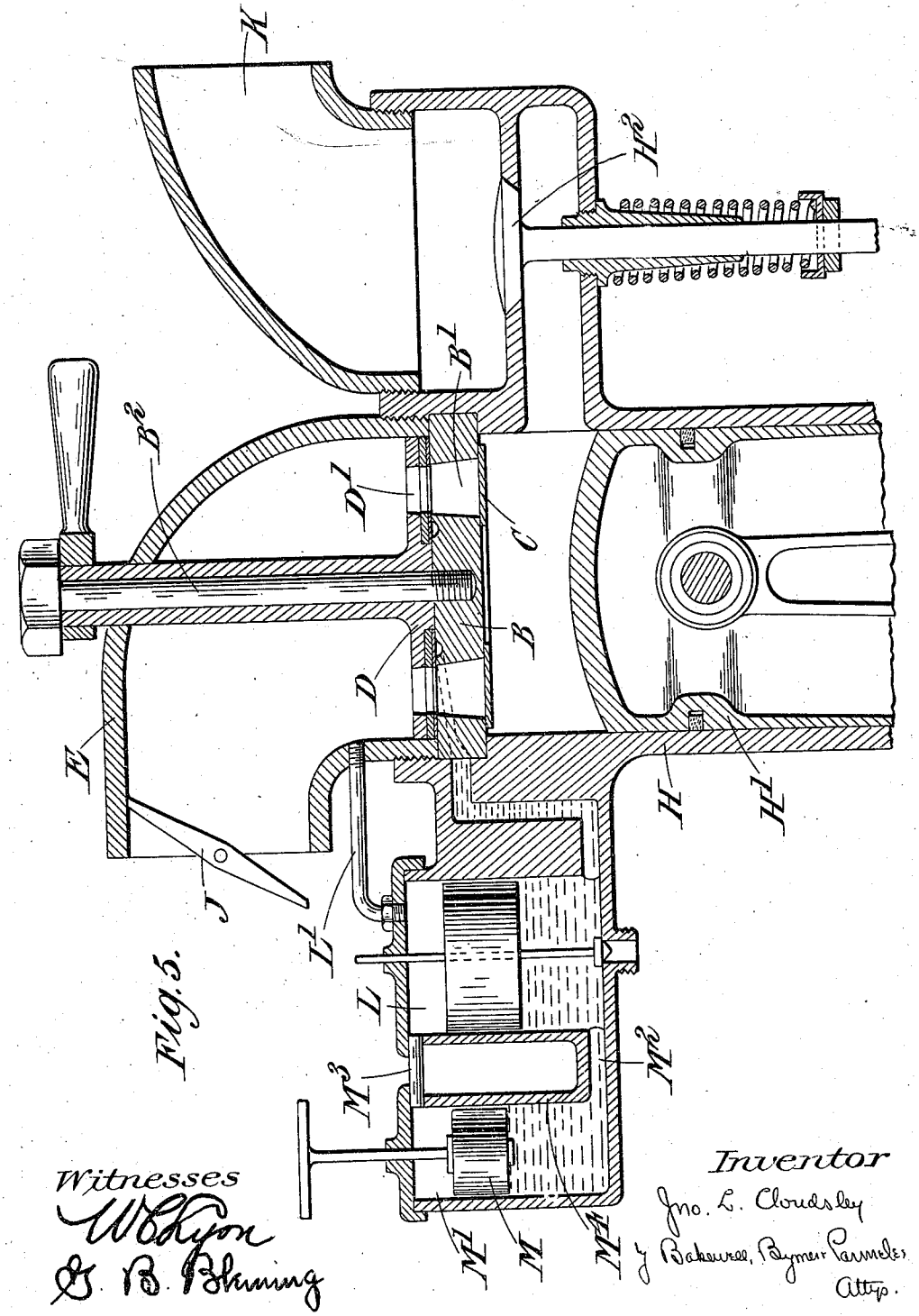


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN LESLIE CLOUDSLEY, OF LONDON, ENGLAND.

CARBURETER.

1,180,976. Specification of Letters Patent. Patented Apr. 25, 1916.

Application filed July 7, 1915. Serial No. 38,426.

To all whom it may concern:

Be it known that I, JOHN LESLIE CLOUDSLEY, a subject of the King of England, residing in London, England, have invented certain new and useful Improvements in Carbureters for Internal-Combustion Engines, of which the following is a specification.

This invention is for improvements in or relating to carbureters for internal combustion engines, and has for its object to provide a carbureter of the type in which additional fuel-nozzles are automatically opened as the suction increases. It is well-known that this has been effected by various means such as sliding sleeves or other movable members operated by the governor or by the suction of the engine, but according to the present invention there is employed with a valve-plate having in it a row of air-admission orifices having fuel-jets communicating therewith, a flap-valve of resilient material which covers the orifices on the suction side and is secured by one end only at one end of the row so that the free end of the valve is drawn back first by the suction and uncovers one orifice, the other orifices being uncovered as the valve is drawn farther back by increased suction, the degree to which it is drawn back depending always upon the degree of suction.

A movable regulator-plate may be employed with the valve-plate having orifices which in one position of the plate register with the air-orifices in the valve-plate, and means for securing the regulator-plate in any selected position to partially throttle the air-orifices; the fuel-jets may take the form of channels between the two plates and communicate with the air-orifices and the fuel supply.

The invention refers further to details of construction all hereinafter fully described, the novel features being pointed out in the claims.

In the accompanying drawings—Figure 1 is a central vertical section through the parts of a carbureter which constitute the subject-matter of the present invention; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a plan of a detail of Fig. 1; Fig. 4 is a plan of the flap-valve, and Fig. 5 is a central vertical section through a carbureter according to the present invention as arranged for application to a pump for charging a two-stroke cycle engine.

The same letters indicate the same parts throughout the drawings.

In the induction-conduit A of the engine, a valve-plate B is mounted having in it orifices B^1 which are arranged in a circle and on the suction side of the engine are covered by a flat strip of metal C. The strip C constitutes the valve and is made of resilient material so that it holds itself close against the plate B. One end of the strip is secured by screws C^1 at one end of the ring of orifices and the strip extends around and covers all of the orifices, the extreme free end covering the orifice shown at the right and nearest the top of Fig. 2.

In the center of the valve-plate B a vertical bolt B^2 is screwed and mounted rotatably on this is a regulator-plate D having in it orifices D^1 which in one position of the plate register with the orifices B^1 in the valve-plate. The plate D does not lie flat upon the valve-plate but has a central shoulder D^2 which rests upon the valve-plate.

Screwed into the induction-conduit A above the valve-plate B is an air-admission conduit E. The conduit is employed to hold the plate B rigidly in place and the plate D fits the conduit and can move therein. Extending up from the plate D is a hollow stem D^3 which extends through the top of the air-admission conduit E and carries a handle D^4 whereby the position of the plate can be adjusted.

Around the shoulder D^2 and filling the recess made thereby between the plates B and D is a jet-plate F backed by a packing-plate F^x. The plates F, F^x have in them orifices F^1 that register with the orifices B^1 in the valve-plate B and they are secured by screws *f* to the valve-plate B.

Around the center of the plate B is an annular groove B^3, the open side of which is toward the plate F. The plate F is conveniently of thin metal and has in it a series of slots F^2 which radiate from points above the annular groove B^3 to the orifices F^1, but do not extend into the packing-plate.

The groove B^3 is thus in communication

by means of the slots F^2 with the orifices F^1 and is further in communication by a conduit B^4 in the plate with a conduit B^5 supplied from the float-chamber of the carbureter.

The orifices F^1 and the slots F^2 may be formed in the plate F by stamping and it will be observed that the slot F^2 shown to the right and nearest to the top of Fig. 3 is larger than the other slots. The orifice F^1 supplied by this slot is that which lies under the extreme free end of the valve C.

The induction-conduit may be provided with any suitable throttle, indicated by a butterfly-valve G Fig. 1, on the engine side of the valve C.

It will be seen that the walls of the orifices D^1 and B^1 taper outward in the direction of the engine, the taper of the orifices B^1 being a continuation of the taper of the orifices D^1, but the walls of the orifices F^1 of the plate lie a little proud of the walls of the orifices D^1 and B^1 on the side nearest the side nearest the center of the jet-plate so as to increase the injector action on the jets formed by the slots F^2.

The operation of this device is as follows:— The suction of the engine draws back the valve C and the air entering by the air-admission conduit E and rushing through the orifices D^1, F^1 and B^1 sucks fuel from the jets formed by the slots F^2 between the two plates B and D so that the air is thus carbureted. The supply fuel is maintained by any suitable device, such as a float-feed, which keeps the annular channel B^3 in the plate B filled.

It will be seen that the valve C acts as an automatic device for uncovering an increased number of jets as these are required. If the suction is not great, only the extreme free end of the valve may be depressed so that the orifice F^1 shown at the right and toward the top of Figs. 2 and 3 is uncovered, and for this reason this orifice is provided with a bigger jet passage than the others so that sufficient fuel shall be available at slow speeds. As the suction increases, the valve is drawn farther and farther back, so that two, three, four or all five of the orifices may be uncovered.

The plate D is made movable so that it can be adjusted to suit the requirements of the particular engine to which the carbureter is applied. In mounting the carbureter, the plate D is turned around to cover to a greater or less extent the orifices B^1 in the plate B until the proper richness of mixture is obtained for the particular engine. The bolt B^2 is then screwed tight home so that the plate D is secured against further movement.

It will be seen that the construction of this apparatus renders it very easy to remove the plate F and substitute another providing larger or smaller jet slots, or made of thinner or thicker material, as it is only necessary to remove the bolt B^2 and air-admission conduit E to expose the plate F^x and F.

In Fig. 5, the same parts as have been described with reference to Figs. 1 to 4 are shown except that instead of their being mounted on the induction-conduit A, they are mounted in the end of a pump-barrel H and a throttle-valve J is mounted in the air-admission conduit instead of on the suction side of the valve C.

The barrel H in which the pump plunger H^1 travels communicates by a valve H^2 with the induction-conduit K of the engine and the valve C is made to serve the double purpose of automatically regulating the number of fuel-jets uncovered according to the degree of suction and as a check valve for the pump. The operation of the valve C is the same as that already described, except that as the plunger H^1 returns after the suction-stroke, the valve C prevents the charge from passing back through the orifices B^1 and D^1 so that it can be driven into the induction-conduit K.

With the throttle J on the atmosphere side of the valve C and its associated parts, too much petrol would be drawn in with the air when the air-admission conduit E was throttled, and to overcome this difficulty a connection is made between the top of the float-feed chamber L and the air-admission conduit by a conduit L^1, so that the pressure at the top of the fuel in the float-feed chamber is maintained approximately the same as that on the delivery end of the jets. For flooding the carbureter, moreover, a special device is provided. It will be seen that if the float were lifted to flood the carbureter in an arrangement as shown in Fig. 5, the fuel would flow freely from all the jets so that the carbureter might become over-flooded as the operator is unable to tell how much fuel has passed. To obviate this difficulty, a displacement plunger M is mounted in an extension M^1 of the float-feed chamber L. This plunger may be hollow so that normally it floats at the top of the fuel, but by pushing it down, a given amount of fuel is displaced through the interconnection M^2 and float-feed chamber L to the jets. The top of the extension M^1 of the float-feed chamber is conveniently connected by a conduit M^3 to the top of the float-feed chamber L, so that pressures in the float-feed chamber and its extension are equalized.

It will be seen that the extension M^1 is practically part of the float-feed chamber L, and in fact the whole could be made one continuous chamber, but if a dividing partition M^4 is provided between them, this serves as

a guide for the float in the float-feed chamber, and the displacement-plunger in the extension of the float-feed chamber.

It has before been proposed to control the air-inlet of a carbureter by a perforated plate which is rotatable to bring its perforations more or less into register with another set of openings, and no claim is made to such a valve *per se* but only to the valve in combination with the other parts of the apparatus, as set forth in the appended claims.

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

1. In a carbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein, fuel jets communicating with said orifices, a resilient flap-valve extending across the suction side of said orifices, secured by one end on said plate at the end of a series of said orifices, substantially as set forth.

2. In a arbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein, a movable regulator-plate formed with openings to register with said orifices, means for securing said plate in any desired position, fuel jets constituted by channels between said plates communicating with said orifices and a resilient flap-valve extending across the suction side of said orifices, secured by one end on said plate at the end of a series of said orifices, substantially as set forth.

3. In a carbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein, a movable regulator-plate formed with openings to register with said orifices, means for securing said plate in any desired position, a plate between said valve-plate and said regulator-plate secured on one of them and formed with openings to register with said orifices and with channels constituting fuel-jets communicating with said orifices, and a resilient flap-valve extending across the suction side of said orifices, secured by one end on said plate at the end of a series of said orifices, substantially as set forth.

4. In a carbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein, a resilient flap-valve extending across the suction side of said orifices, secured by one end on said plate at the end of a series of said orifices, a fuel-jet communicating with the orifice most remote from the fixed end of said flap-valve, and smaller fuel jets communicating with the remainder of said orifices, substantially as set forth.

5. In a carbureter the combination of an air-inlet conduit, a circular valve-plate in said conduit formed with a series of air-admission orifices arranged in a circle therein, fuel-jets communicating with said orifices, an annular resilient flap-valve extending across the suction side of said orifices, cut through radially at one point and secured by one end on said plate, substantially as set forth.

6. In a carbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein a movable regulator-plate formed with openings to register with said orifices, means for securing said plate in any desired position, a plate between said valve-plate and said regulator-plate secured on one of them and formed with openings to register with said orifices and with slots opening into said orifices, a groove in said valve-plate communicating with said slots and a fuel conduit communicating with said groove supplying fuel therethrough and a resilient flap-valve extending across the suction side of said orifices, secured by one end on said valve-plate at the end of a series of said orifices, substantially as set forth.

7. In a carbureter the combination of an air-inlet conduit formed with a shoulder thereon, a valve-plate seated on said shoulder and formed with air-admission orifices therein, fuel-jets communicating with said orifices, a member engaging the air-inlet conduit and holding the valve-plate against said shoulder therein, a movable regulator-plate formed with openings to register with said orifices lying against said valve plate, a single bolt detachably securing said regulator-plate in position and a resilient flap-valve extending across the suction side of said orifices, substantially as set forth.

8. In a carbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein, a throttle-valve on the inlet side of said valve-plate, fuel jets communicating with said orifices, a fuel reservoir supplying said jets, a pressure-balance connection between said reservoir and said air inlet conduit between the throttle-valve and the valve-plate and a resilient flap-valve extending across the suction side of said orifices, substantially as set forth.

9. In a carbureter the combination of an air-inlet conduit, a valve-plate in said conduit formed with air-admission orifices therein, fuel jets communicating with said orifices, a reservoir supplying said fuel-jets, a flooding plunger operative in said reservoir and a resilient flap-valve extending across the suction side of said orifices, substantially as set forth.

10. In an internal combustion engine the combination with a pump chamber and piston of a valve-plate in one wall of said

chamber formed with air-admission orifices therein, fuel jets communicating with said orifices, a resilient flap-valve extending across the inner side of said orifices, which acts as a check valve for the pump, and a fuel reservoir for supplying fuel to said jets.

11. In an internal combustion engine the combination of a pump chamber, a piston reciprocating therein, a valve-plate forming one wall of said chamber seated on shoulders on the other walls of said chamber and formed with air-admission orifices therein, a member secured to said chamber and holding said valve-plate against said shoulder, a movable regulator-plate adjacent said valve-plate and formed with openings to register with said orifices, a single bolt retaining said regulator-plate in position, a plate secured on said valve-plate between it and said regulator-plate formed with openings registering with said orifices and with slots communicating with said orifices, said valve-plate being formed with a channel communicating with said slots, a fuel reservoir, a conduit connecting said reservoir and said channel, a flooding plunger operative in said reservoir, a throttle-valve controlling said air-admission orifices, a pressure-balance connection between said reservoir and the throttle side of said air-admission orifices, a resilient flap-valve extending across the pump chamber side of said orifices secured by one end on said plate at the end of a series of said orifices which acts as a check valve and prevents the passage of gases from the pump chamber back through the air admission orifices.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN LESLIE CLOUDSLEY.

Witnesses:
JOHN CAMERON RENNIE,
H. D. JAMESON.