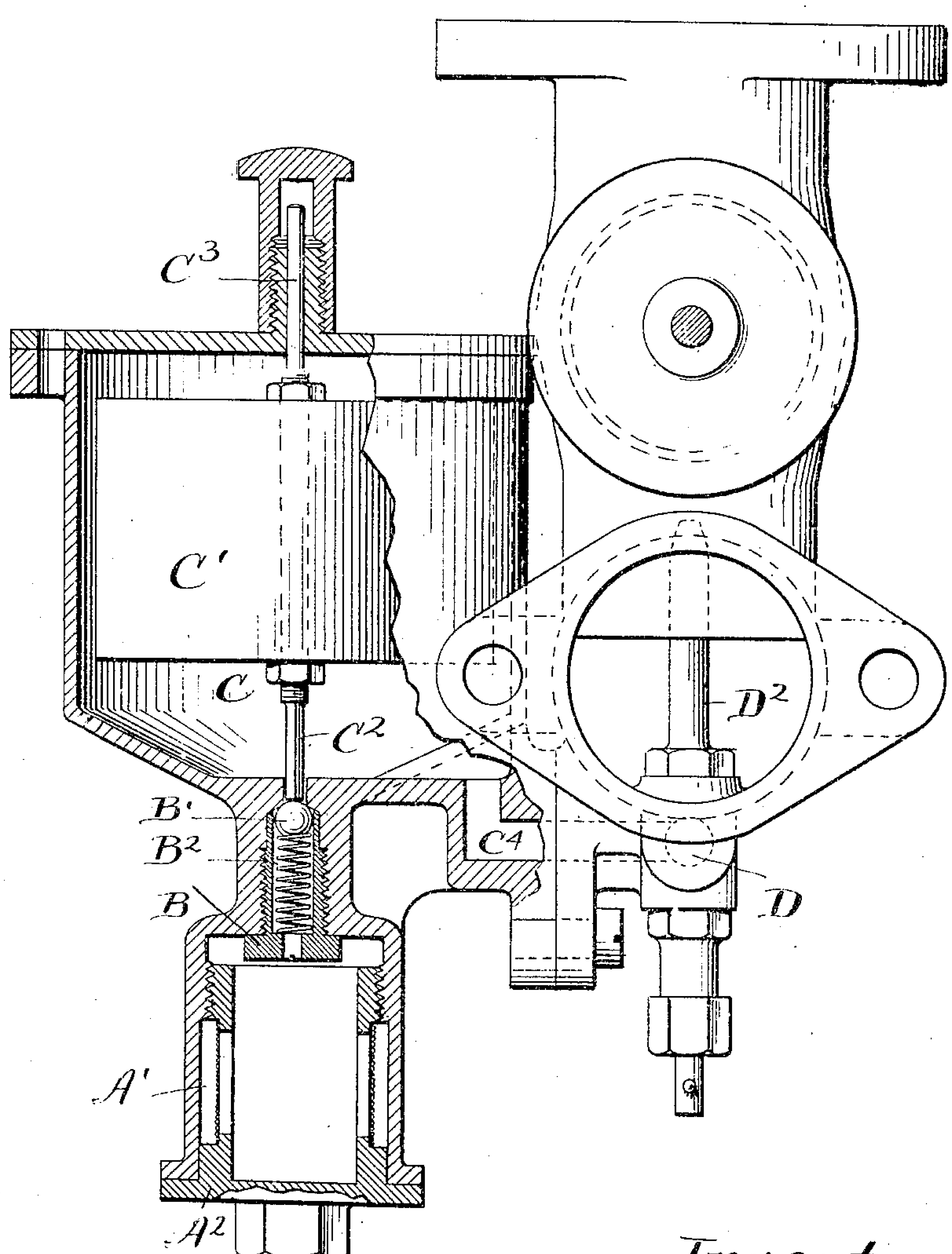
L. P. MOOERS.
CARBURETER.
APPLICATION FILED JUNE 30, 1905.

898,494. Patented Sept. 15, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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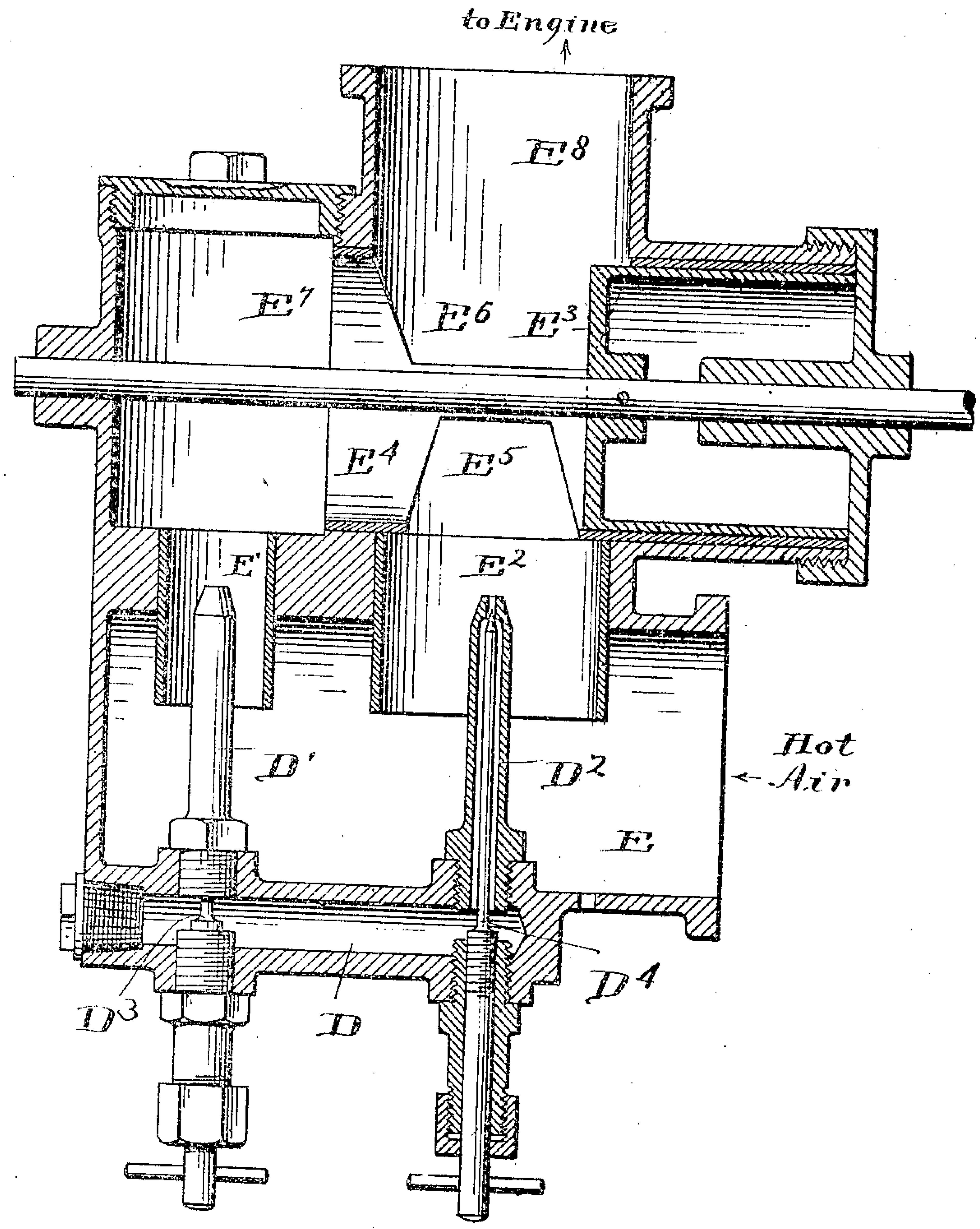
3 SHEETS—SHEET 2.

Fig. 2.



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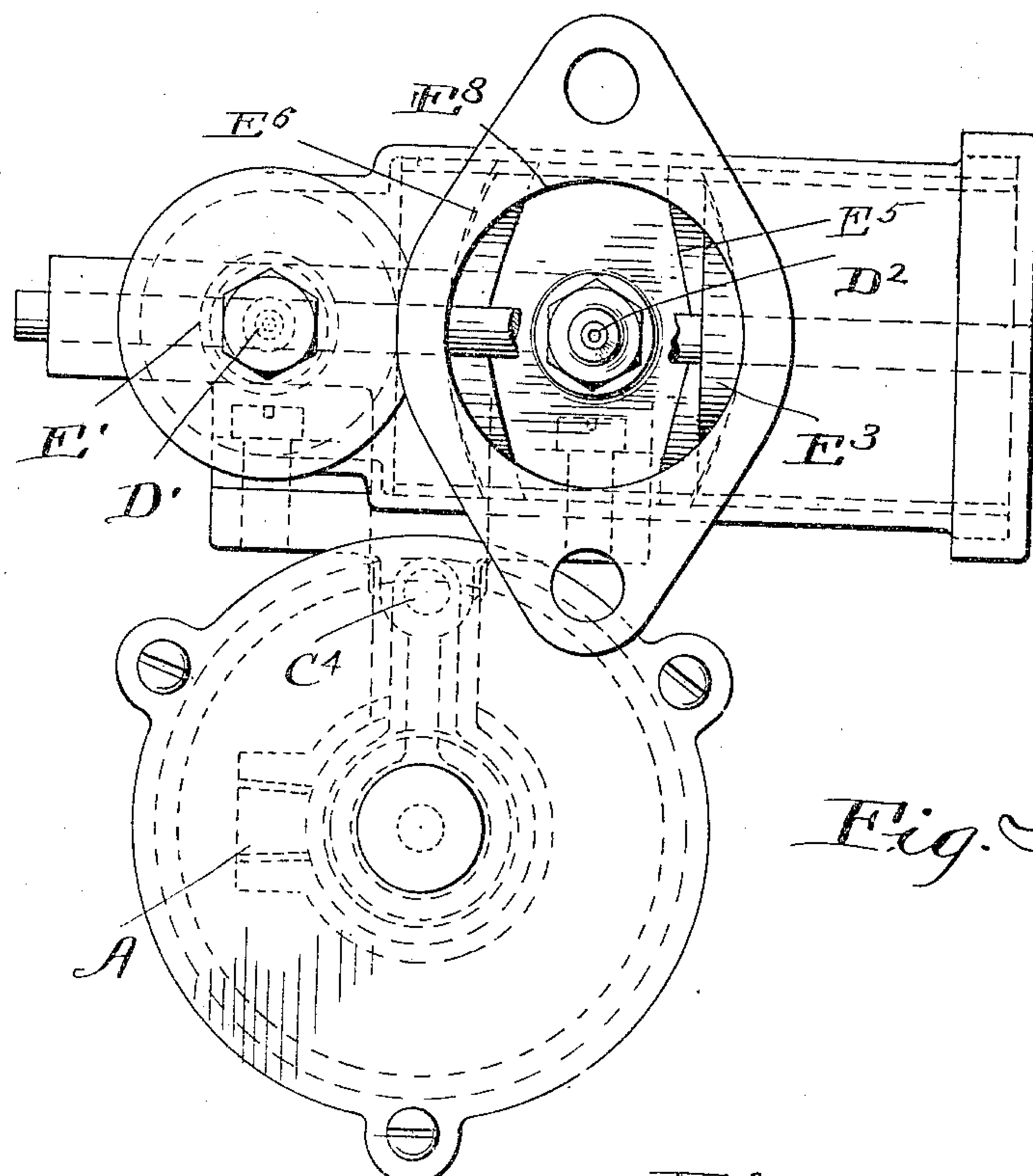
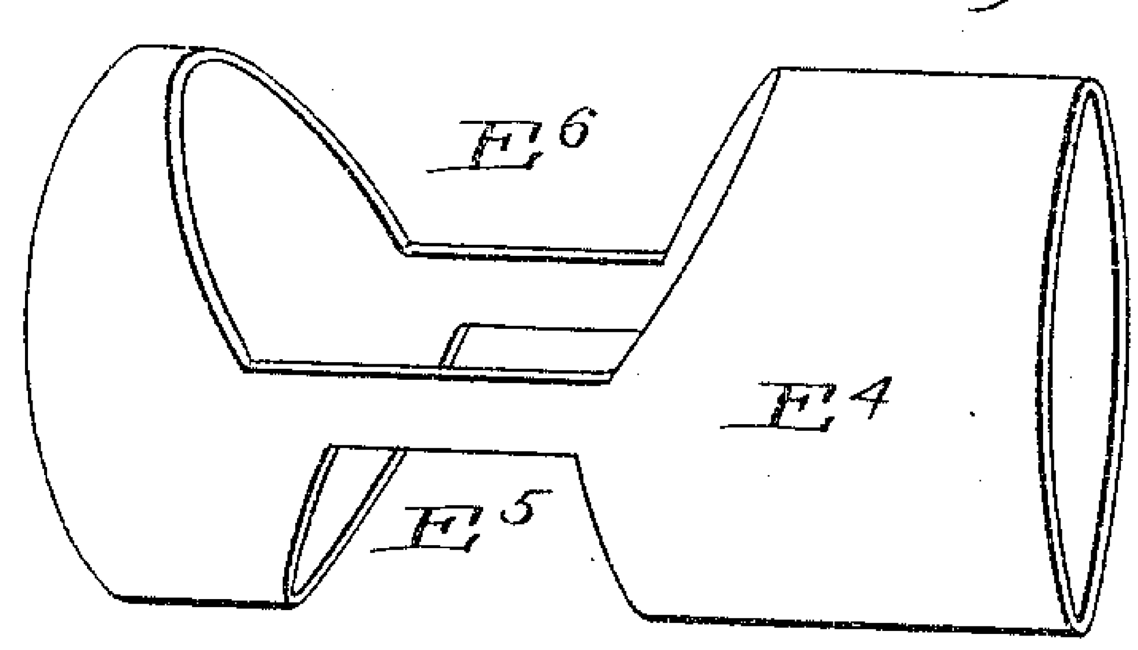


Fig. 3

Fig. 4.



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UNITED STATES PATENT OFFICE.

LOUIS P. MOOERS, OF CLEVELAND, OHIO.

CARBURETER.

No. 898,494. Specification of Letters Patent. Patented Sept. 15, 1908.

Application filed June 30, 1905. Serial No. 267,679.

To all whom it may concern:

Be it known that I, LOUIS P. MOOERS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Carbureters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention which forms the subject of this application relates to carbureters for gasolene engines, and has for its object the provision of a structure adapted to efficiently carburet the air and maintain a properly proportioned mixture regardless of the fluctuation in the motor speed and the position of the throttle valve.

Heretofore, in that type of carbureter wherein the injecting action of the air rushing past gasolene spray nozzles is utilized for effecting a proper explosive mixture, difficulty has always been found in securing efficient action when the engine was throttled to a low speed. This difficulty arises from the fact that the injecting action is dependent on the rate of flow immediately past the spray nozzle, which rate is, under the conditions obtaining, the resultant of two factors, viz., the volume of air drawn into the engine per unit of time, and the cross sectional area of the injecting tube. The latter factor being ordinarily unalterable in practical work under operating conditions, a decrease in the volume factor will, at a certain point, so reduce the rate of flow that the injection will cease entirely or no longer be proportionate to the volume of air passing. Thus the carbureting effect is in fact the resultant of certain factors, variation in one of which without compensating change in another will cause deviation from the constant degree of saturation which it is desired to maintain at the point of greatest efficiency. It is to provide a practical solution of this problem that I have devised the structure below described, wherein are embodied principles insuring a proper control of the carbureting action so that the explosive mixture is maintained at the desired point. Further, it has hitherto been found that when the speed was quickly raised the sudden rush of air through the strangle tubes sucked the gasolene out of the spray nozzles to such an extent that the immediately succeeding quantity of air was insufficiently supplied with gasolene and the mixture consequently not effective.

The structure which has been invented by me is so designed that the disturbing effect due to an increase in the volume of air drawn in by the engine is entirely suppressed and no material fluctuation in the carbureting resultant permitted. A specific form of the means which I have found effective for this purpose is hereinafter described and claimed.

Referring to the drawings, Figure 1 is an end elevation partly in section showing the inlet and float chambers and the connection of the latter with the carbureting or mixing chambers. Fig. 2 is a vertical section through the air inlet and mixing chambers. Fig. 3 is a plan view of the float and mixing chambers showing the throttle shaft broken away and certain parts in dotted lines. Fig. 4 is a perspective view of the throttle casing.

In the drawings A is the inlet passage leading from the gasolene reservoir to the inlet chamber A′. Suitably secured in the inlet chamber is a hollow perforated sediment plug A^2 having its perforations covered with gauze. Leading from the inlet chamber is a valve chamber into which is fitted a valve housing B containing a ball valve B′ held normally against its seat by a spring B^2 in such manner as to check the flow from the inlet chamber into the float chamber above. The float chamber C contains any suitable form of float C′ provided at its upper side with a guiding rod C^3 and on its lower side with a rod C^2 of such cross section as to float within the passage leading from the valve chamber to the float chamber without filling the same.

The lower rod C^2 not only guides the float in rising and falling but is adapted to bear the valve B′ away from its seat whenever the gasolene in the float chamber is diminished to such an extent as to allow the float to fall to any definite point. This point may be regulated by adjusting the float rod C^2 in any suitable manner. The rods C^2 and C^3 may be either separate rods or one continuous rod as desired.

Leading from the float chamber is an outlet passage C^4 which conducts the gasolene to the passage D, from whence it rises in the spray nozzles D′, D^2, the orifices of which are controlled respectively by the needle valves D^3 D^4. The height of the gasolene in the spray nozzles is determined by the level in the float chamber, but it usually approaches very close to the mouth of the spray nozzles.

It will be seen by reference to Fig. 2, that I have shown two of these spray nozzles, but in conformance with the spirit of my invention, I may obviously provide more. The air is drawn in through the inlet conduit E and up past the spray nozzles D′ and D^2 through their respective strangle tubes E′ and E^2 when the passages thereabove are freely open. These passages or tubes open into a common mixing chamber or horizontal conduit E^7 from which leads a single outlet E^8 to the engine. As shown, the passage E′ is of less diameter than the passage E^2, thus having the capacity of maintaining a greater injecting action for a small volume of air, than could be maintained by the tube E^2.

The horizontal chamber is controlled by the cylinder E^3 which is constructed to serve as an engine throttle and as a cut off valve for the carbureting means and moves, as shown in Fig. 2, in a hollow cylindrical open ended casing E^4 lining a portion of the mixing chamber, and extending across the ports E^2 and E^8 but suitably cut away so as to provide free communication for these passages. The port E^5 on the lower side is so positioned and proportioned as to properly receive the flow from the tube E^2, the port E^6 on the upper side being proportioned to fit the outlet E^8 which leads to the engine, and is of such size and location as to be left partially open after the tube E^2 has been entirely closed by the throttle.

In the operation of the device at the high speeds when the throttle E^3 is in its retracted position as shown in Fig. 2, each of the strangle tubes is uncovered and in communication with the outlet to the cylinder, thus allowing a free flow of air which can be fully and properly carbureted by the proper setting of the needle valves. When the speed of the engine is diminished and the throttle is moved so as to check the flow to the engine through the outlet passage E^8, the passage E^2 is likewise throttled and the ports are so constructed as to make the throttle of the latter passage proportionate to that of the first named passage until the lower limits are approached. It will be seen that if there were but one strangle tube of unalterable diameter, the result of this throttling action would be to diminish the rate of flow past the single spray nozzle, since the total volume allowed to pass is the product of the two controlling factors, namely the rate of flow and cross sectional area of the passage. The effect of such a condition is to disproportionately diminish the injecting action toward the lower limits and produce an inefficiently carbureted mixture in the conduit beyond. But it will be seen that in my apparatus, as the throttle moves across the port leading from the strangle tube E^2 and throws the latter out of action, the carbureting action is not impaired for the reason that the flow of air to the engine will be supplied through the strangle tube E′, which, being of comparatively small diameter, will maintain the proper rate of flow for the purpose of securing an adequate injection of gasolene. By this action it will be seen that notwithstanding variation in the volume drawn into the engine per unit time I have placed the determining factors under control so that the resultant is not varied. The larger strangle tube is cut off toward the latter part of the throttle valve's movement at a point where the volume drawn in would diminish the rate of flow to a point where the injecting action would become insufficient, and its less efficient product so dominate or influence the character of the explosive mixture as a whole as to cause a substantial deviation from the constant. The rate of flow through the smaller tube will obviously still be sufficient to secure a proper injection and carbureting action, even though a far less volume of air is drawn in by the engine, since its cross sectional area is comparatively small. Supposing now, the throttle valve to have been thrown toward the extreme limit of its movement, short of entirely throttling the engine passage, and only the smallest of the carbureting or strangle tubes remaining in action, it will be seen that a sudden opening of the throttle will allow an immediate inflow of a large volume of air without causing an abnormal rush past the spray nozzles, since each opening movement of the throttle uncovers a larger tube of sufficient capacity to take care of or allow a free flow for the volume of air admitted by the engine, and there is consequently no sudden elevation in the rate of flow such as to create the abnormal injecting action referred to above. Thus it will be seen that, although the volume drawn in by the engine per unit time is a fluctuating factor of the carbureting resultant, I am enabled to so vary the ratio of the several factors that the resultant is a constant.

There are, of course, quite a number of variations possible in the style and form of throttling valves and the disposition of the ports, and I do not desire to be understood as limiting myself to one form. In the event of using more than two strangle tubes, the throttling valve would be adapted to this amplified form in any one of the obvious ways which would secure the result above described.

Having described my invention, I claim:

1. In an explosive engine a plurality of independent sets of carbureting means, one of the carbureting factors being the same in each set, other carbureting factors being different in each set, a mixing chamber, an engine throttle and means operating simultaneously with the closing movement of the throttle to cut off that carbureting set having the least carbureting effect for a given

volumetric rate of flow of the mixture therefrom.

2. In an explosive engine a carbureter having separate spray nozzles in separate strangle passages of different feeding capacities, a mixing chamber communicating with said passages and having an outlet to the explosion chamber, a throttle controlling said outlet and means connected with the throttle arranged to cut off the feed from the feed passage of largest capacity simultaneously with the closing movement of the said throttle.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

L. P. MOOERS.

Witnesses:
E. B. GILCHRIST,
J. B. WOODWARD.