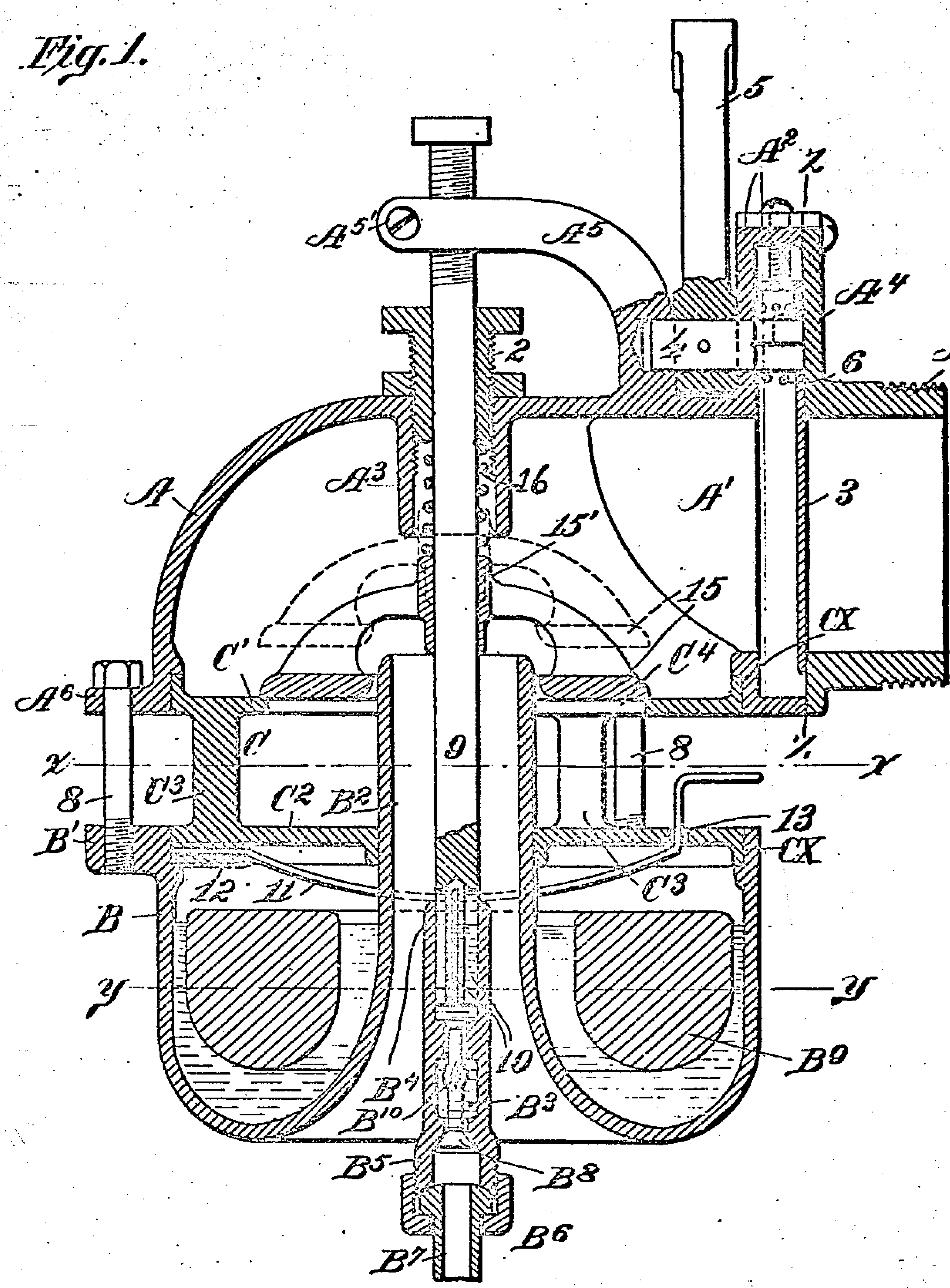
F. H. HEITGER.
CARBURETER.
APPLICATION FILED MAY 16, 1906.

899,109.

Patented Sept. 22, 1908.
3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

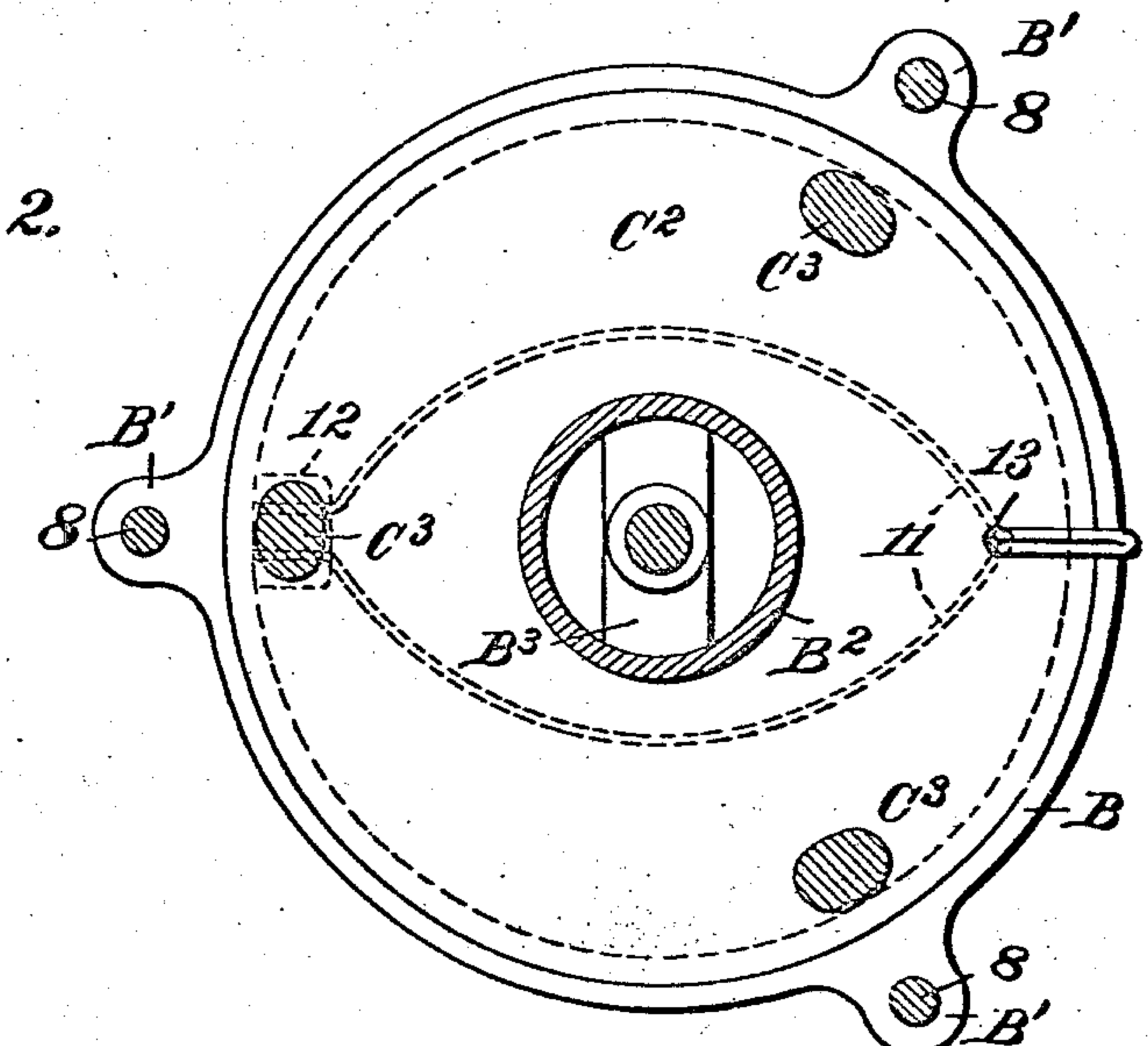
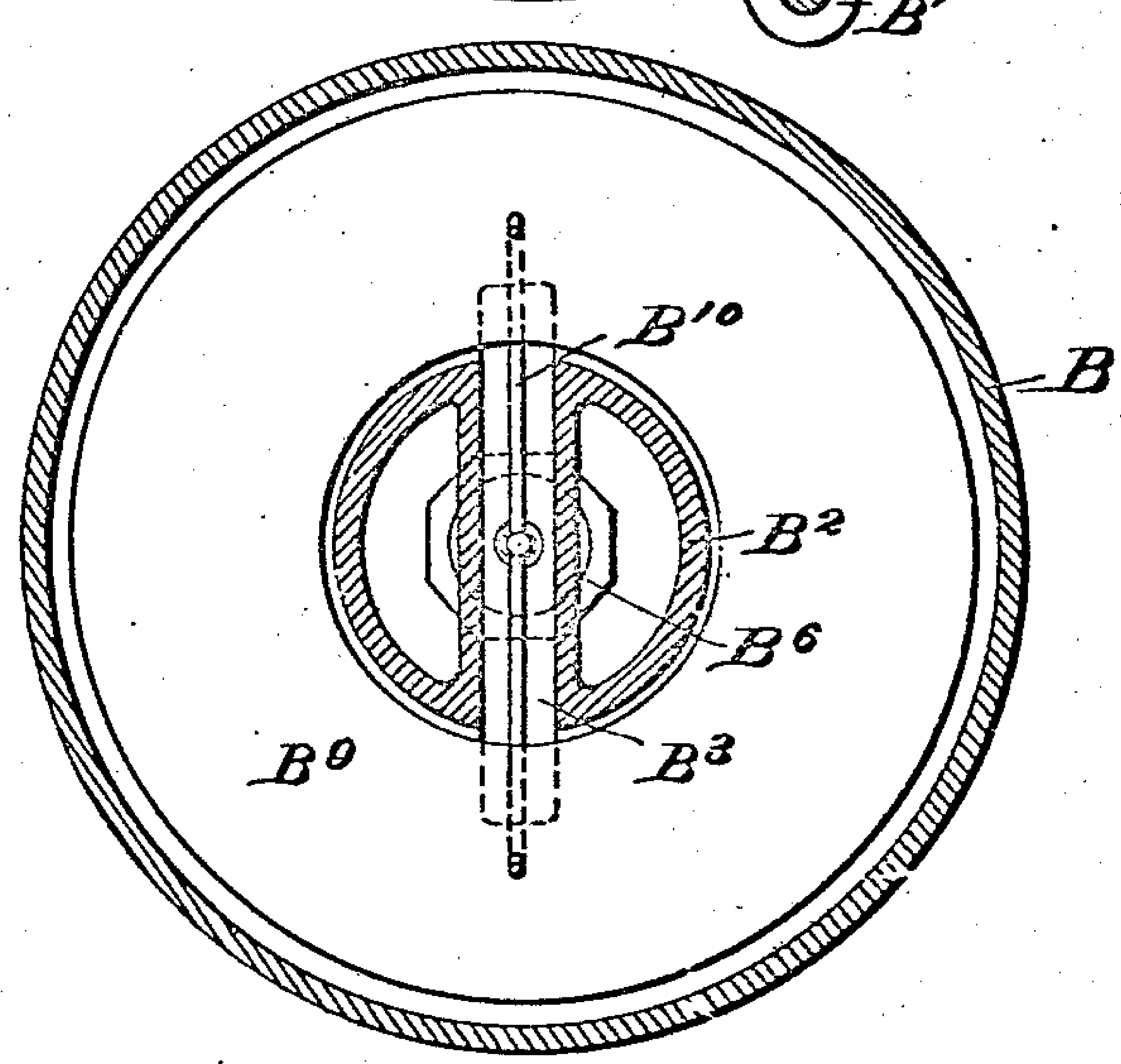


Fig. 3.



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3 SHEETS—SHEET 3.

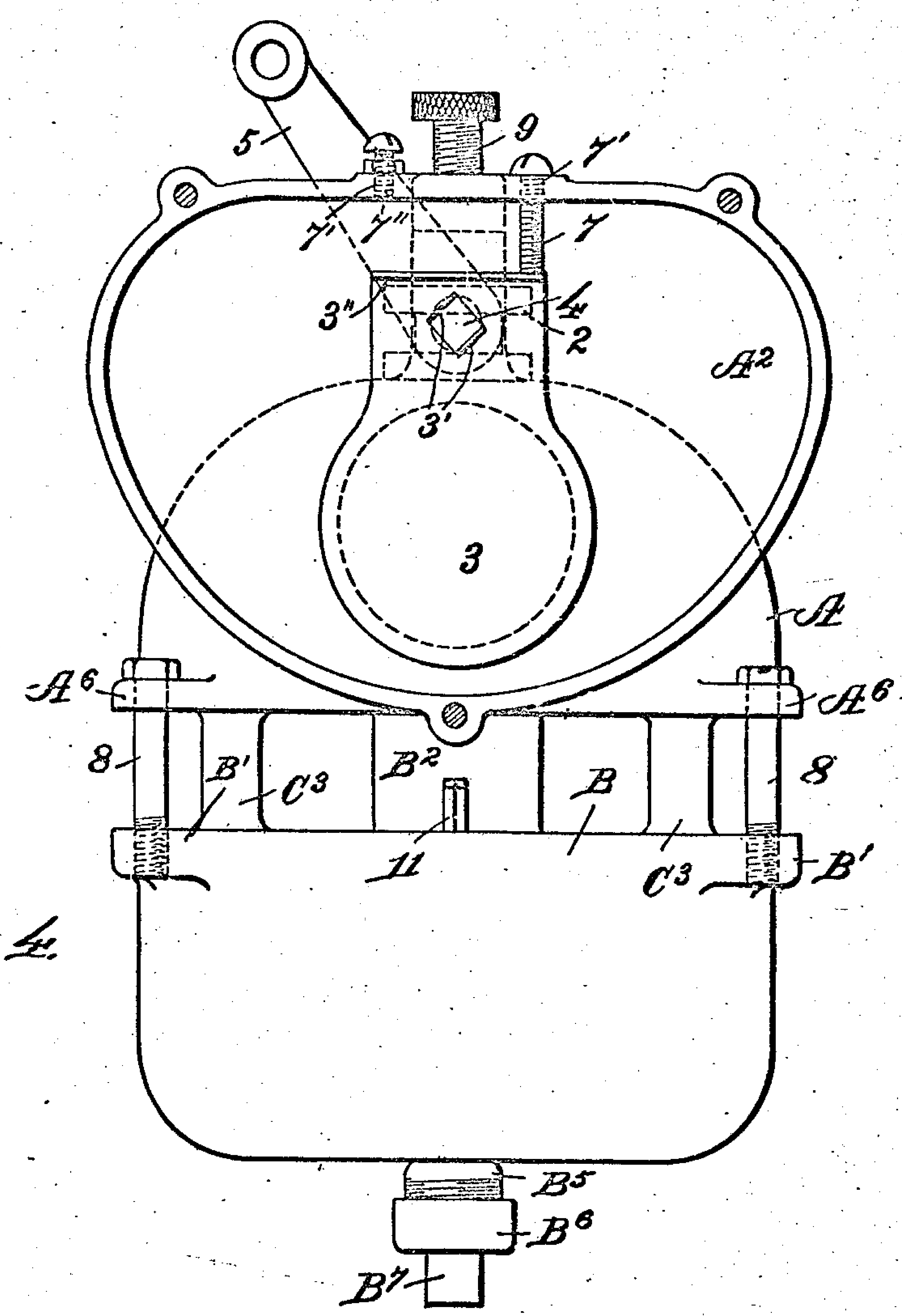

Fig. 4.

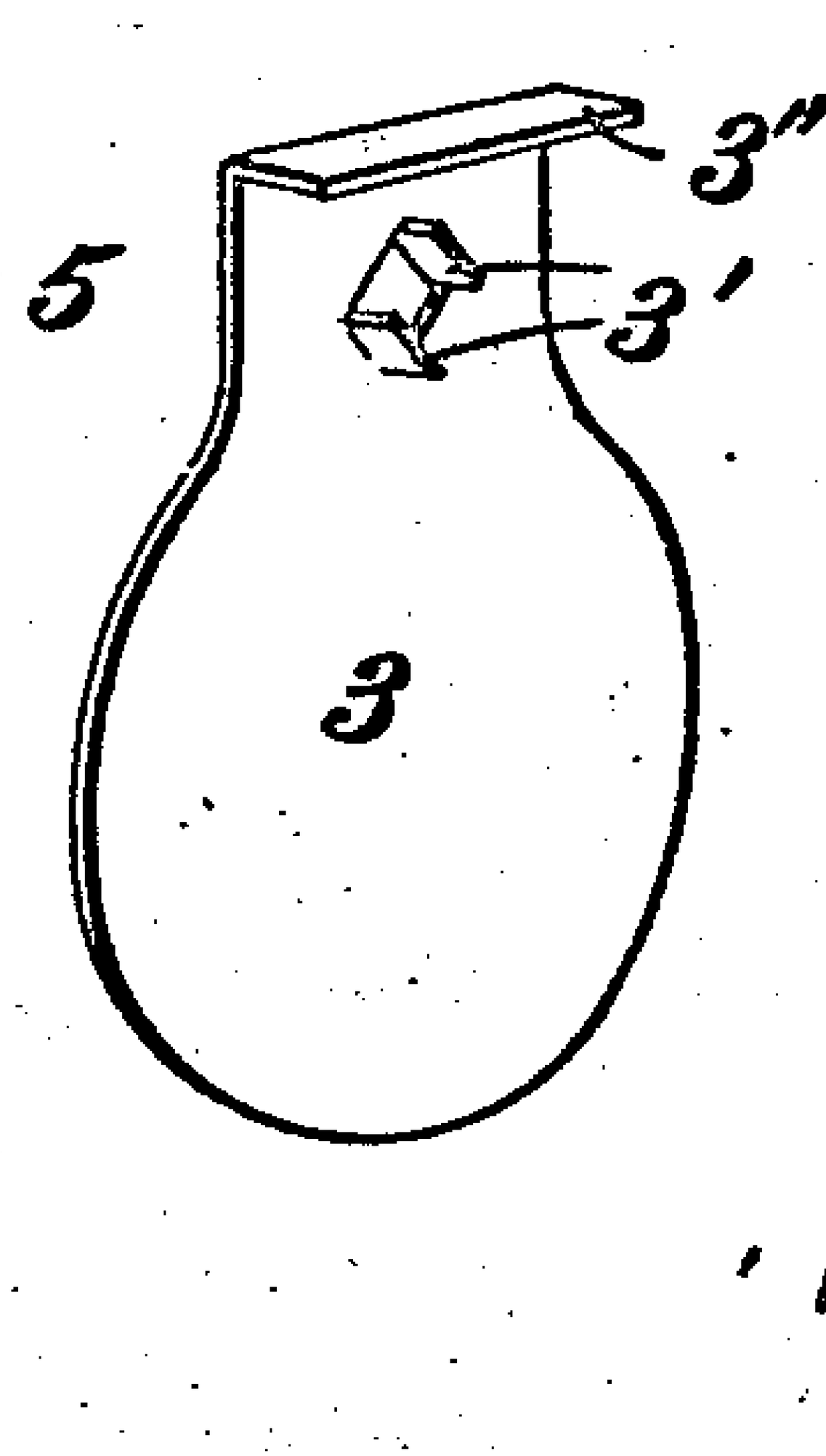

Fig. 5

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UNITED STATES PATENT OFFICE.

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CARBURETER.

No. 899,103. Specification of Letters Patent. Patented Sept. 22, 1908.

Application filed May 16, 1906. Serial No. 317,162.

To all whom it may concern:

Be it known that I, FRANK H. HEITGER, a citizen of the United States, and a resident of Indianapolis, Marion county, Indiana, have invented a certain new, useful, and Improved Carbureter, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in apparatus for carbureting air for internal combustion engines and has special reference to improvements in carbureters of that class in which the liquid hydro-carbon, to be vaporized, is held in bulk in a small reservoir, which forms part of the carbureter, the liquid being drawn from the reservoir through a nozzle and mixed with air, in another part of the carbureter, called the mixing chamber.

The primary object of my invention is to improve the construction and operation of carbureters of the above mentioned class, with a view of providing means whereby a constant degree of carburetion may be imparted to the varying volume of air demanded or required by the engine with which the carbureter is used.

Other objects of my invention are, to provide a carbureter which shall be composed of few parts, all of simple construction and readily accessible when the principal members of the carbureter are separated;—to provide a carbureter which may be taken apart and re-assembled by even an unskilled person and without altering the adjustments or working relations of the several parts, particularly the air admission valve and nozzle of the carbureter;—further, to provide a carbureter that shall have a simple and efficient throttle valve capable of completely closing the outlet of the carbureter;—further, to provide a carbureter of compact form of large capacity and of good appearance.

My invention will be more readily understood by reference to the accompanying drawings, forming part of this specification, and in which:—

Figure 1 is a vertical section of a carbureter embodying my invention; Fig. 2 is a horizontal section thereof on the line X—X of Fig. 1: Fig. 3 is a horizontal section on the line Y—Y of Fig. 1; Fig. 4 is a front elevation of the carbureter, the outer flange of the throttle valve casing being removed to disclose the throttle valve proper, as upon line Z Z of Fig. 1; and, Fig. 5 is a perspective view of the throttle valve.

As shown in the drawings, the body of my carbureter is made up of three principal parts or members;—"A", "B" and "C"; the part "A" constitutes the mixing-chamber of the carbureter and is provided with an outlet A^1 which terminates in a flange, A^2, hereinafter described in connection with the throttle valve. The part "A" is substantially circular and in its top contains an internal boss A^3 threaded to receive a spring-follower "2". On the top of the part "A" is an integral arm A^5 for holding the adjustable member of the nozzle as hereinafter explained. The flange A^2 is best shown in Figs. 1 and 4. It will be seen to contain a recess that is of sufficient size to accommodate the throttle valve. The casing for the throttle valve is completed by the flange A^4 of the pipe nipple or connection A^7. The flange A^4 may be secured to the member "A" in any suitable manner, as, by the three or more screws shown. In the flange A^2 and the arm A^5, I provide openings which form a bearing for the short valve shaft 4, to which the throttle lever or arm 5 is connected. The end of the shaft 4 is squared to receive the upper end of the throttle valve 3 and said valve is pressed against the smooth inner surface of the flange A^1 and by a spring, 6, surrounding the shaft 4, within the narrow space between the two flanges. I prefer that the throttle valve shall be made of comparatively thin sheet metal in order that it may be sure to seat tightly around the outlet. In forming the opening to fit the square end of shaft 4, I prefer that the sheet metal shall be turned up to provide the lugs 3^1, thereby securing a better connection with the shaft. The upper end of the throttle valve is bent at right angles to provide a ledge or flange, 3″, to coöperate with a stop, 7, arranged in the top of flange A^2. The flange casing is formed to allow the valve to swing in either direction and I prefer that the stop shall be a simple screw that may be arranged in either of two holes 7′, in the top of the valve casing. The hole not occupied by the stop-screw is plugged by the short screw 7″. It is evident that these screws may be interchanged to stop the movement of the valve in one

direction or the other, as required to conveniently connect the carbureter with the controlling or governor rod of an engine.

The member "C" comprises two rings C^1 and C^2 fitting annular seats C^x, provided therefor in the bottom of the member "A" and the top of the member "B", and connected by two or more integral posts, C^3. In brief, the member C is a spreader or separator arranged between the upper and lower members of the one and providing an air admission space between the reservoir and the mixing-chamber. The upper part C^1 of the member "C" contains a large central opening C^4 through which air is admitted to the mixing-chamber. It will be noted that the member "A" does not, in itself, complete the mixing-chamber, as its bottom is formed by a separate part, to-wit:—member "C". This likewise is true of the lower member whose top is formed by the ring C^2. The members "A" and "B" are each provided with two or more lugs A^6 and B^1 respectively, and are bound or secured upon the intermediate member by screws, 8; and when the screws are removed the members will fall apart, there being no other means of connection between them. The lower member "B" constitutes or contains the liquid reservoir and the vapor tube B^2. The vapor tube B^2 is an integral part of the member B and is open at the top and bottom. The upper end of the tube extends to a point within the mixing-chamber; thus it will be seen that air entering at the lower end of the tube B^2 will flow into the mixing chamber, air being admitted thereto through the tube as well as through the main opening C^4. The lower part of the member "B" contains a cross duct B^3, integral therewith, and provided with an integral nozzle B^4, which rises within the vapor tube B^2. On the lower part of the duct B^3 is a short stem B^5, forming part of the union joint B^6, of the liquid supply pipe B^7. In the central part of the duct, I arrange a valve, B^8, which is operated by a float B^9, within the reservoir. The connection between the valve and the float is made by a cross bar B^{10}, see Fig. 3.

As shown, the liquid supply pipe communicates with the duct B^3 and is thereby placed in communication with the reservoir and the nozzle B^4. It should be observed that the reservoir is circular and that the nozzle is concentric therewith, likewise the float B^9. It follows that the nozzle is substantially at the center of the surface of the liquid within the reservoir and hence the column of liquid within the nozzle will be little, if at all, affected by the swaying of the liquid within the reservoir, occasioned by the tilting of the carbureter, as when it is used upon an automobile. The nozzle rises to a point somewhat above the level of the liquid in the reservoir, a column of liquid always standing therein in readiness to be drawn forth by suction in the vapor tube. The nozzle B^4 is completed by an adjustable member 9, comprising a rod that is concentric with the several parts of the carbureter, having its end telescoped within the nozzle B^4. This end is provided with a plurality of narrow slits or saw-cuts—10, which being exposed above the stop of the member B^4 provide several spraying openings through which the liquid hydrocarbon is discharged into the vapor tube to be taken up by the air moving therein. The upper end of the rod 9 is threaded within the arm A^5 and hence said rod is vertically adjustable. The end of the arm A^5 is split and contains a screw $A^{5'}$ for fastening the rod 9 after it is adjusted.

As the simplest means for depressing the float to open the valve B^8, when necessary, I employ a loop of spring wire 11. The ends of the loop are attached to the member C at 12. At the opposite end the loop is contracted and passing through the hole 13 in the ring C^2 is provided with a bent end; whereby it may be readily forced down to depress the float within the reservoir.

The carbureter is completed by the air admission valve 15 arranged within the mixing chamber. This valve is in the form of a ring adapted to seat on the top of the ring C^1, to close the opening C^4. The valve contains a central opening to accommodate the upper end of the vapor tube. In this connection I desire that it be understood that the valve may have a depending part to slide upon or within the vapor tube; in which case the tube may be shorter. I however, prefer the construction shown, for the reason that when the valve rises from its seat, a certain volume of air may pass through its central opening and accelerate the movement of vapor in the tube, operating after the manner of an injector. The valve has a central sleeve, 15', and is guided by the central rod 9. For holding the valve upon its seat, I employ a coiled spring 16 and the resistance offered by the valve to the entrance of air may be regulated by means of the follower 2, in the top of the member A, previously referred to. By adjusting the follower 2, and the nozzle 9, the proportion of air and vapor admitted to the mixing chamber may be accurately determined and as the valve opens or responds in direct ratio with the vacuum within the mixing-chamber, the degree of carburetion will be maintained constant throughout the period of the use of the carbureter.

As various modifications of this invention will readily suggest themselves to one skilled in the art, I do not confine my invention to the specific constructions herein shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a device of the class described, a reservoir containing a central vapor tube opening through its bottom and extending above its top, in combination with a suitable nozzle communicating with the reservoir and located in the lower part of said tube, a suitable cover or top for said reservoir through which said tube extends, a mixing chamber having an opening in its bottom and arranged above the top of the reservoir, said mixing chamber having a suitable outlet, and an automatic air admission valve arranged about the upper end of said vapor tube for closing the inlet opening in said mixing chamber, substantially as described.

2. In a device of the class described, a reservoir containing a central vapor tube which opens through the bottom of the reservoir and extends above the top thereof, a fuel nozzle in said vapor tube, a mixing chamber arranged above the reservoir and having an inlet opening concentric with said vapor tube, said mixing chamber having a suitable outlet, there being an air admission space between the top of the reservoir and the bottom of the mixing chamber, substantially as described.

3. In a device of the class described, a reservoir containing a central vapor tube and equipped with a suitable nozzle for injecting liquid into said tube, a mixing chamber above said reservoir and having an inlet concentric with said tube, means separating said reservoir and chamber to provide an air admission space between them, said mixing chamber having a suitable outlet and an automatic air admission valve arranged in the inlet of said mixing chamber surrounding the upper end of said tube, substantially as described.

4. In a device of the class described, a reservoir containing a central vapor tube open at its upper and lower ends and of greater height than said reservoir, in combination with a suitable nozzle in said tube and communicating with said reservoir, an upper chambered member having a suitable outlet, an intermediate member comprising suitably connected rings closing the top of said reservoir and the bottom of said chambered member, the upper of said rings containing an air admission opening concentric with said tube, and an automatic air valve arranged in said chambered member, to close said opening, substantially as described.

5. In a device of the class described, a reservoir having a central vapor tube and equipped with a suitable nozzle in said tube, in combination with a ring fitting the upper end of said tube and closing the top of said reservoir, a second ring supported above the first mentioned ring and containing an opening that is concentric with said tube, a chambered member provided with a suitable outlet and having its bottom formed by said second ring and a valve closing the opening in the second ring, substantially as described.

6. In a device of the class described, a reservoir in combination with a chambered member above the same, a spreader member provided with an air space between said reservoir and said chambered member, and closing both thereof, said spreader member containing a central opening communicating with the chambered member, an air admission valve closing said opening, a nozzle communicating with said reservoir and a vapor tube communicating with said chambered member through said valve, substantially as described.

7. In a device of the class described, a mixing chamber having an opening in its bottom, in combination with an automatic air admission valve closing said opening, a reservoir arranged beneath said member, a vapor tube rising through said reservoir and through said valve, and a nozzle provided in the lower part of said tube, substantially as described.

8. In a device of the class described, a reservoir containing a central vapor tube and provided with a nozzle opening within said tube, in combination with a valved mixing chamber wherewith said tube communicates, there being an air admission space between said reservoir and said mixing chamber, substantially as described.

9. In a device of the class described, a circular chambered member, A, in combination with a circular reservoir, B, having a central vapor tube, B^2, extending into the member, A, a spreader member comprising suitably connected rings seated in the bottom and top of the members A and B respectively, and means upon the members, A and B, for securing the same upon said spreader member, substantially as described.

10. In a device of the class described, a chambered member having a suitable outlet and open at the bottom, in combination with a reservoir member containing a central vapor tube and open at the top, a nozzle within said tube, a spreader member comprising connected rings forming the bottom of said chambered member and the top of said reservoir member, means for securing the latter on said spreader member, an opening through the top of said spreader member into said chambered member and a spring pressed valve closing said opening in the top of the spreader member, substantially as described.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses, this 7th day of May, 1906.

FRANK H. HEITGER.

Witnesses:
L. D. BUENTING,
LILLIAN KRELER