C. O. HEDSTROM.

CARBURETER.

APPLICATION FILED JAN. 19, 1907.

910,379.

Patented Jan. 19, 1909.

3 SHEETS—SHEET 1.

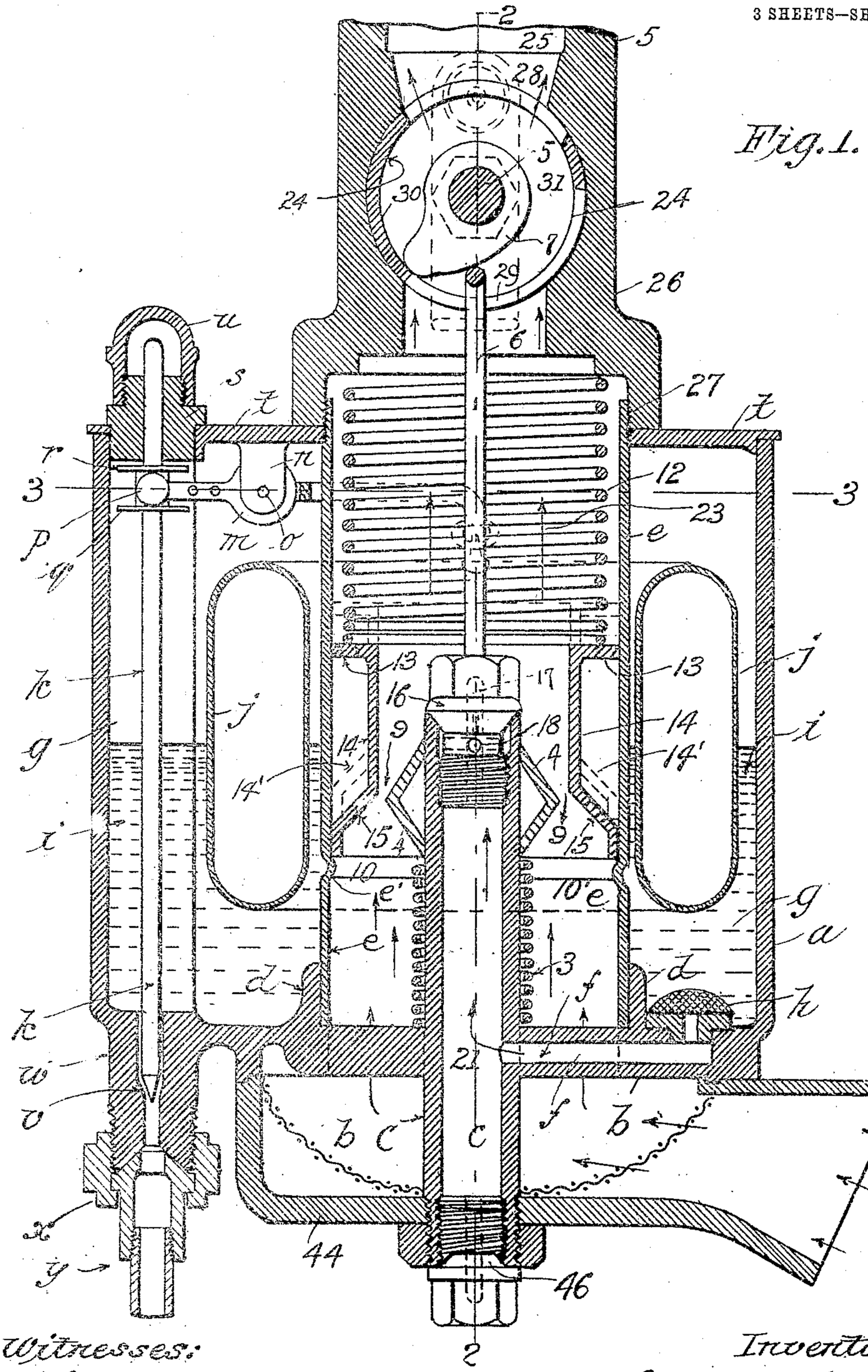

Fig. 1.

Witnesses:
H. L. Sprague
Harry W. Bowen

Inventor:
Carl O. Hedstrom.
by Chapin & Co
Attorneys

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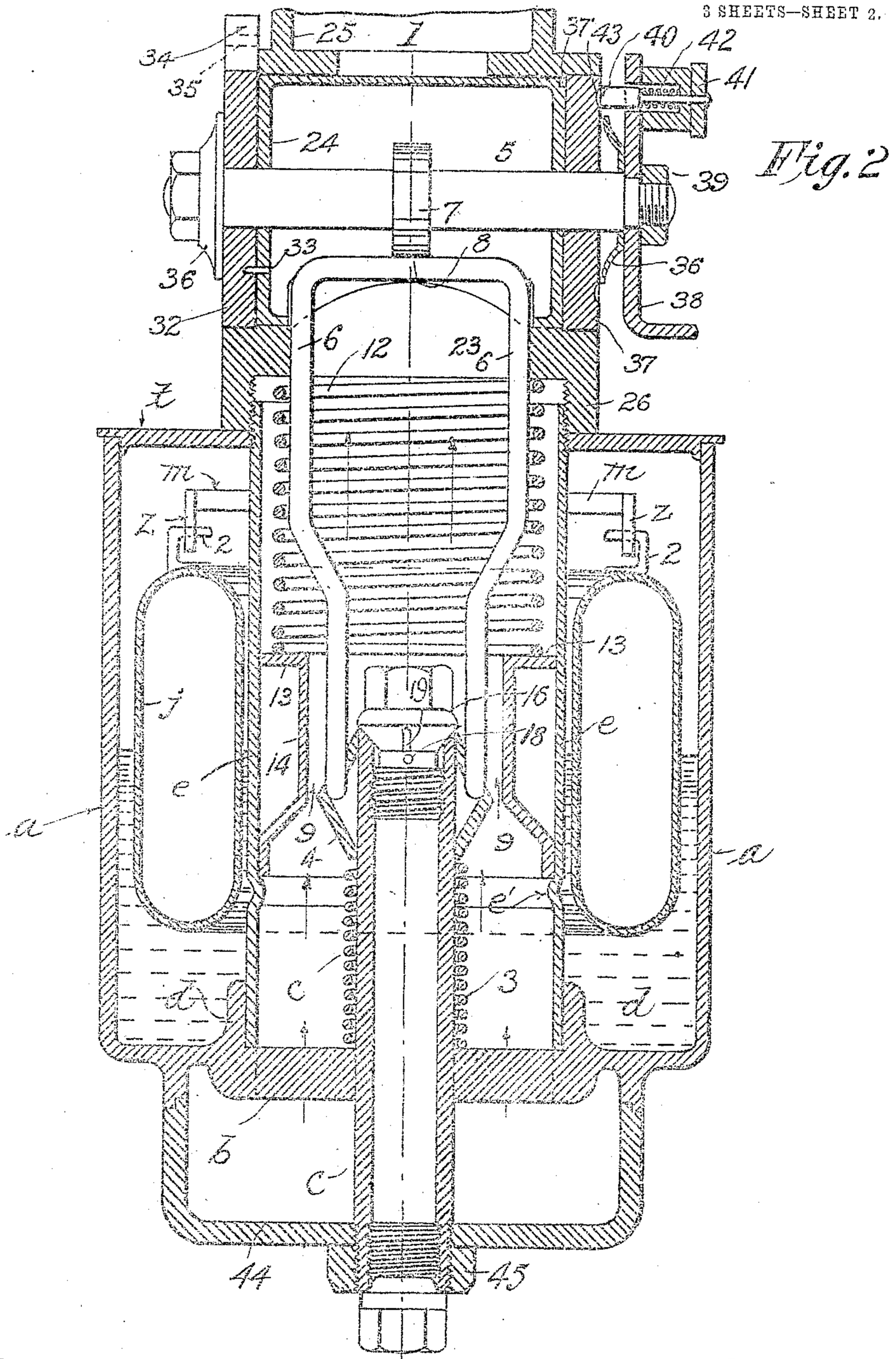

Fig. 2

Witnesses:
H. L. Sprague
Harry W. Bourn.

Inventor:
Carl O. Hedstrom.
by Chapin & Co.
Attorneys

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3 SHEETS—SHEET 3.

Fig. 3.

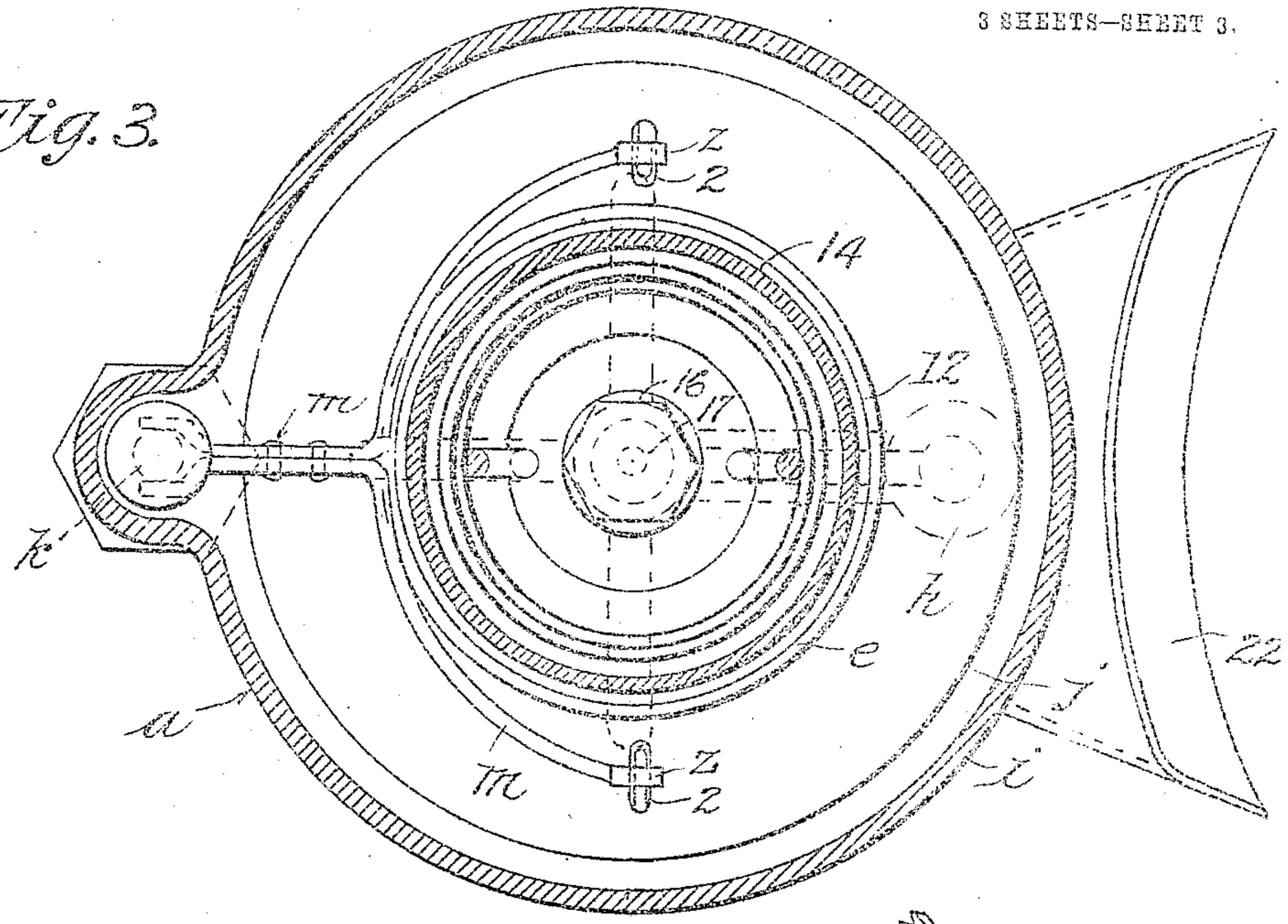
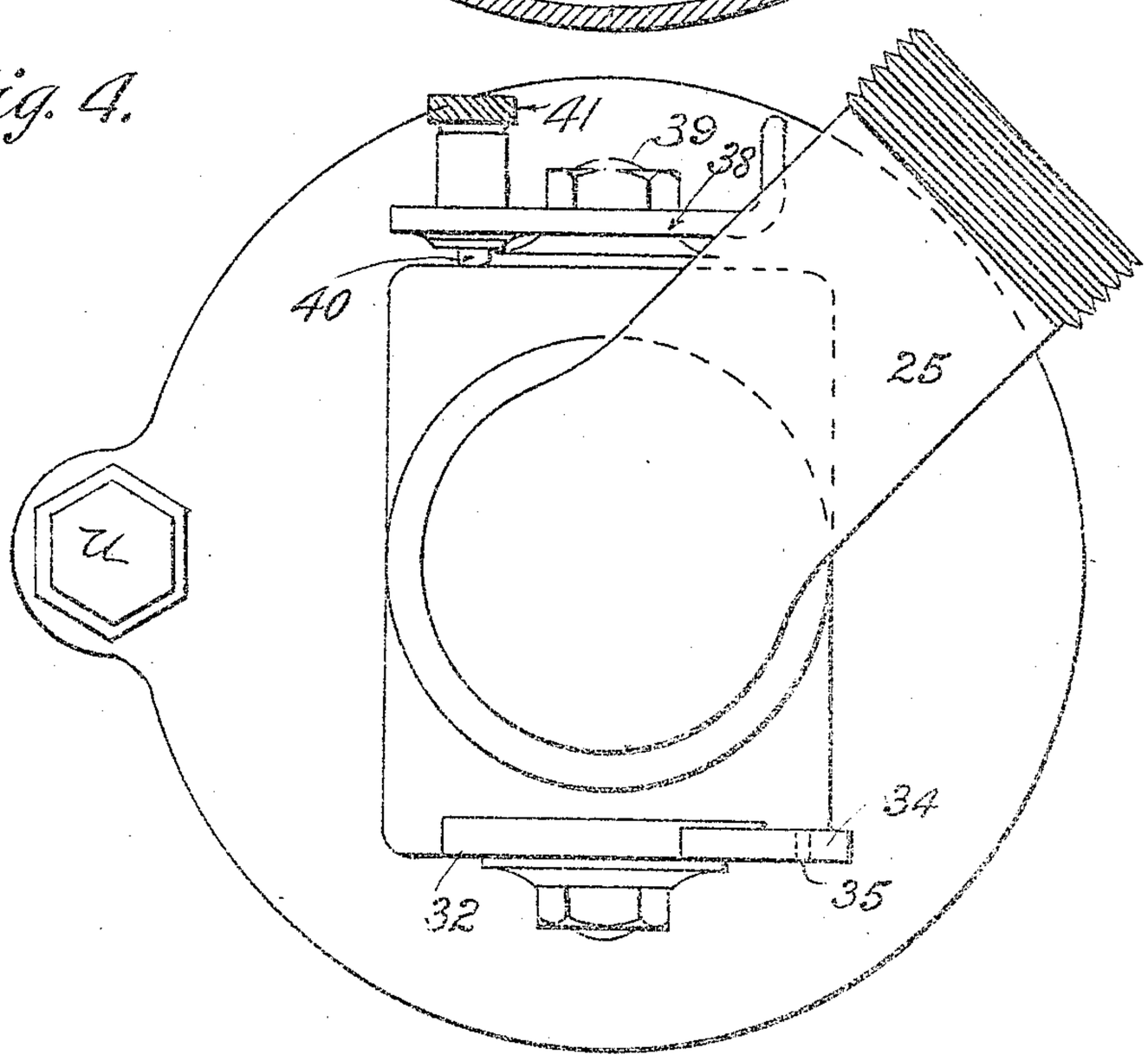


Fig. 4.



Witnesses:
H. L. Sprague
Harry W. Bowen

Inventor.
Carl O. Hedstrom
by Chapin & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

CARL O. HEDSTROM, OF SPRINGFIELD, MASSACHUSETTS.

CARBURETER.

No. 910,279. Specification of Letters Patent. Patented Jan. 19, 1909.

Application filed January 19, 1907. Serial No. 352,130.

To all whom it may concern:

Be it known that I, CARL O. HEDSTROM, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to improvements in carbureters for internal combustion engines, and one of the primary objects of the invention is to provide means whereby the amount of vaporized gasolene or other liquid hydrocarbon fuel supplied to the working cylinder of the engine is proportional to the amount of work that is being performed by the engine at any given time.

Another object of the invention is to provide means for varying the amount of opening of the passage-way through the carbureter, said means being operable from any convenient point of the vehicle or other structure on which the engine is mounted.

Another object of the invention is to provide means for automatically varying the size of the passage-way through the carbureter in case the suction effect of the engine is suddenly or gradually increased beyond the capacity of the passage-way that normally allows the supply of air to flow through the carbureter for vaporizing the fuel.

Another object of the invention is to provide means for preventing the wear of the ordinary needle-point valve, and a still further object is to provide means for adjustably positioning the amount of opening through which the vaporized fuel normally passes.

A further object is to provide means for varying the flow of vaporized combustible material from the carbureter, and operable at will.

With the aforesaid objects in view, additional reference will be made in the body of the specification to the details of construction.

In the drawings forming part of this application,—Figure 1 is a vertical sectional elevation of my improved carbureter through the axis of the same on line 1—1, of Fig. 2. Fig. 2 is also a vertical sectional elevation on line 2—2 of Fig. 1. Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 1. Fig. 4 is a top plan view of my improved carbureter.

Referring to these drawings, *a* designates the outer cylindrical part or casing of my improved carbureter, and formed integral therewith is the bottom part *b* that carries integral therewith the hollow vertical atomizer *c*. The part *b* is provided with the vertical flanges *d* to which are secured the internal cylindrical pieces *e* having the shoulder e^1 formed therein. A passage-way *f* is provided in the part *b* that communicates with the annular chamber *g* between the outer casing *a* and the inner cylindrical piece *e* by means of the strainer *h*. This chamber *g* is for the purpose of containing gasolene or other liquid fuel, designated at *i*, and an annular float *j* which is connected to the vertically arranged needle-valve *k* by means of the lever *m* pivoted to the depending bracket *n* at the point *o*. The outer end of this lever *m* is provided with a cylindrical arm *p*, arranged at right angles thereto, which moves between the flanges *q* and *r* on the needle-valve stem.

The needle-valve *k* is guided in its reciprocating movements by means of the plug *s* that is secured in the cap or top piece *t*. A cap *u* is threaded onto the plug *s*, as shown. The lower end of the valve-stem is made conical and adapted to closely fit the inclined shoulders *v* in the depending portion *w* of the base-piece *b*. This depending portion is threaded, as shown, and carries a connecting piece *x* for receiving the pipe *y* through which the liquid fuel supply passes.

The annular or circular float *j* is pivoted to the lever *m* by means of the hangers *z* and the hook pieces 2 on the upper surface thereof. The float is for the purpose of maintaining the gasolene or other liquid fuel at the proper level at all times by means of the needle-valve *k* which controls the supply through the pipe *y* in the well known manner.

Surrounding the hollow atomizer *c* is a coil spring 3, and movably supported on the upper end of the atomizer and resting on the coil spring is a baffle-plate 4 that is connected to the adjusting shaft 5 by means of the yoke 6 that is secured at its lower end to the baffle-plate. The valve 4 is provided with the double inclined walls, as shown.

Mounted on the adjusting shaft 5 is a cam

7 that engages or rests against the upper end of the yoke 6. Upon the rotation of the shaft 5, the cam 7 will force the baffle-plate 4 downward against the tension of the spring 3 and vary the size of the annular passage-way or opening 9 so that the velocity of the in-coming current of air will be increased in passing through the constricted passage-way.

12 designates a spring mounted in the upper end of the cylinder *e* and bears at its lower end on the horizontal shoulder 13 of a second movable baffle-plate 14 which rests at its lower end on the rib e^1 of the cylindrical element *e*. The baffle-plate 14 is provided with the upwardly inclined surface 15 which ends adjacent the apex of the valve 4 as shown.

16 designates a plug that is threaded so as to be screwed into the upper end of the atomizer *c*. This plug is provided with an internal recess or opening 17 (shown in dotted lines) and communicating with this hole 17 are a series of holes 18.

19 designates a series of channels or passage-ways cut in the inclined surface of the plug 16 for permitting the gasolene vapor to escape through the upper end of the atomizer into the body portion of the carbureter.

The gasolene passes through the strainer *h* into and through the passageway *f* in the radial arm *b* into the interior of the atomizer *c* as indicated by the arrow 21, from which point it passes into the opening 17 and out through the holes 18 and channel-ways 19 into the body of the carbureter, it being understood that the air which enters through the mouth-piece 22 in the lower part of the carbureter is drawn in by the suction of the engine through the annular passage-way 9 and past the upper end of the atomizer *c* where it passes in close proximity to the passage-ways 19 whereby the vapor of the gasolene is thoroughly intermixed with the in-coming air. From this point the mixture of air and gasolene is drawn upward, as indicated by the arrow 23, through the cylindrical throttle 24 and out through the discharge-pipe 25 that is connected with the upper end of the carbureter.

The action which has been described is the normal operation of the carbureter but should a greater suction effect occur on account of an increased speed of the engine, the increased suction will cause the loosely mounted baffle-plate 14 to rise and increase the size of the opening 9 between the baffle-plates 4 and 14 as readily understood. This feature of automatically increasing the supply of fuel in proportion as the suction increases, I consider a most important one, and as far as I am aware it has not been heretofore successfully accomplished, especially for motor cycles. The automatically movable baffle-plate 14 also provides means for maintaining the quality of the mixture constant.

26 designates a bonnet or cap-piece that is threaded onto the upper end of the cylinder *e* at the point 27. This cap-piece supports the throttle-valve 24, (as clearly shown in Figs. 1 and 2,) which is provided at diametrically opposite sides with openings 28 and 29 and with solid portions 30 and 31.

32 designates an operating piece for the throttle 24 that is secured to the throttle-valve 24 by means of the pin 33 (see Fig. 2). The upper end of the operating piece is provided with a projection 34 having an opening 35 therein so that the same can be suitably connected to a convenient part of the vehicle and be operated by the driver as occasion requires to vary the flow of the mixture through the discharge pipe 25.

It will be noticed, on referring to Fig. 1, that the throttle valve 24 is wide open, but should the same be rotated so that the solid portion 30 is moved to close the passage-way through the cap 26, the amount of fuel supplied to the engine would be diminished, as readily understood, since the baffle-plate 4 would be elevated thus partially closing the passage-way 9 and diminishing the flow of air through the carbureter, (see Fig. 2).

In order to adjustably maintain the shaft 5, and consequently the position of the cam 7 and the yoke-piece 6 (to which the baffle-plate 4 is connected) a spring washer 36 is placed on the shaft 5, and between the closure piece 37 and the handle 38. A nut 39 is threaded onto the shaft 5 to hold the parts in place and to vary the amount of tension on the washer 36. This construction will maintain the parts previously mentioned in any desired position and hold the baffle-plate 4 fixed.

Mounted on the opposite end of the handle 38 is a spring-pressed detent or pawl 40 that is adapted to be withdrawn or actuated by the thumb-nut 41 against the tension of the spring 42, the inner end of this spring-pressed detent being adapted to engage the recesses in the cap or closure piece 37, as shown at 43, for the purpose of indicating the position of the baffle-plate 4, as readily understood. The piece 37 is locked to the valve 24 by means of the lug 37^1.

The air inlet or hood 44 is secured in place on the lower end of the atomizer *c* by means of the nut 45 that is threaded onto the atomizer *c*, as shown.

46 designates a plug threaded into the lower end of the atomizer *c* for closing the same, and also serves the purpose of permitting any sediment that may be contained in the gasolene to be deposited in the lower part of the atomizer *c* and readily removed therefrom.

In the operation of the carbureter, the

gasolene flows through the pipe *y*, past the needle-valve *k* and into the reservoir chamber *g*, the height of the liquid being maintained therein by means of a float *j* to which the needle-valve *k* is attached by means of the lever *m*, as described. Should the height of the liquid rise above the opening 18, the float *j* will also rise and through the medium of the lever *m* close the valve *k* and shut off the flow. After the level of the liquid drops slightly from use, the float *j* will also drop and open the needle-valve *k*. The external air is drawn, by suction, into the hood 44 past the arms *b* and into the interior of the casing or cylinder 15, through the restricted passage-ways 9 formed by the lower inclined wall of the baffle-plate 4 and the inclined wall 15 of the baffle-plate 14 with greatly increased velocity. The in-coming air at this point mingles with the gasolene vapor that is drawn through the passage-ways 9 by the production of the partial vacuum, and is thoroughly intermixed with the same. From this point, the combined mixture of air and gasolene vapor passes upward through the upper end of the casing and practically within the spring 12 and through the openings 28 and 29 in the throttle-valve 24, to the outlet-pipe 25 that is connected with the interior of the engine cylinder. The position of the throttle-valve 24 having been previously set so as to give the requisite amount of opening therethrough by means of the projection 34 the baffle-plate 4 is, in practice, maintained in fixed position by means of the detent 40 engaging the depression 43 in the cap-piece 37.

The shaft 5 is not in any way connected to the parts 32 or 37, but turns loosely therein when the pawl 40 is withdrawn from the depressions 43.

The operation of my described carbureter is as follows: The operator first places the spring-pressed detent 40 in one of the holes or depressions 43 in the piece 37 which operation, it will be observed, rotates simply the shaft 5 and cam 7. The cam 7, according to the direction of rotation, will raise and lower the baffle-plate 4 on the atomizing nozzle *c*. Should the operator then wish to vary the flow of the mixture through the discharge pipe 25, he rotates the projection 34 which turns the piece 32, throttle-valve 24, cap-piece 37, pawl 40, handle 38, shaft 5, cam 7, and consequently the baffle-plate 4 is moved in unison with the throttle-valve 24. The movement of the cam 7 causes the baffle-plate 4 to rise as the throttle-valve closes, and to descend as the throttle-valve opens, whereby the area of the opening 9 is lessened as the throttle-valve closes, and increased as the throttle-valve is opened. Should the suction effect increase, (the throttle 24 and baffle-plate 4 having been previously adjusted,) the baffle-plate 14 will be automatically elevated against the tension of the spring 12 thus increasing the area of the opening 9 between the baffle-plates 4 and 14 in direct proportion to the suction effect of the engine, and maintaining the air and gasolene mixture at a constant quality. The purpose of the movable detent 40 is to vary the position of the baffle-plate 4 to suit the changing atmospheric conditions, while the baffle-plate 14 automatically maintains the quality of the mixture of air and gasolene in accordance with the suction effect.

The elevated position of the baffle-plate 14 is shown in dotted lines at 14^1, Fig. 1, where the baffle-plate 4 is also lowered and then throttle 24 opened.

What I claim is:—

1. In a carbureter of the float feed type, an atomizing nozzle, a double cone-shaped baffle-plate adjustably mounted on said nozzle, means for deflecting the incoming air towards said baffle-plate whereby the velocity of the same is increased as it passes said nozzle.

2. In a carbureter of the float feed type, an atomizing nozzle provided with ports and communicating with the reservoir thereof, a cylindrical element having an inclined wall, an adjustable double cone-shaped element for deflecting the flow of air through the carbureter and located in proximity to the inclined wall of the cylindrical element whereby the direction of incoming air may be deflected towards the ports of the atomizing nozzle and the volume of the incoming air thereby varied.

3. In a carbureter, a casing, a cylindrical element mounted therein, a cap-piece secured to the cylinder, a shaft mounted within the cap-piece and provided with a cam, an atomizer, a baffle-plate movably mounted on the atomizer, a yoke secured thereto and engaging said cam whereby when the shaft is rotated the baffle-plate will be moved in unison therewith.

4. In a carbureter, a casing, a cylindrical element mounted therein, a cap piece secured to the cylinder, a shaft mounted within the cap-piece and provided with a cam, an atomizer, an element movably mounted on the atomizer, a yoke secured thereto and engaging said cam whereby when the shaft is rotated the element will be moved in unison therewith, a spring encircling the atomizer and engaging the lower end of the movable element whereby when the cam is rotated in one direction the element is moved, and whereby when the cam is rotated in the opposite direction the element is moved by said spring, as described.

5. In a carbureter, a centrally disposed atomizing nozzle, a double conically shaped baffle-plate movably mounted thereon, and means for adjusting said baffle-plate, said

means including a spring engaging the lower side of the same.

6. In a carbureter, in combination, an atomizing nozzle, a deflecting element mounted thereon, a throttle-valve, and means for moving the throttle-valve and deflecting element in unison, a second deflecting element spaced from said first mentioned deflecting element, and means for permitting the same to rise under an abnormal suction effect.

7. In a carbureter in combination, an atomizing nozzle, a throttle valve, a deflecting element on said nozzle, a second deflecting element spaced therefrom and affording a passage-way therebetween, the deflecting elements having oppositely disposed inclined walls, and means for permitting the normal position of said walls to change relative to each other, whereby the area of the passage is changed, and means for moving one of the deflecting elements in unison with the throttle valve.

8. In a carbureter, in combination, a throttle, an atomizer, a movable baffle-plate mounted on the atomizer, and means for operating the throttle and baffle-plate in unison, and a second baffle-plate, elastic means for retaining the same in a depressed position, whereby the amount of movement of the second baffle-plate will vary in proportion to the suction effect.

9. In a carbureter of the float-feed type, in combination, an atomizing nozzle, a baffle-plate thereon, a throttle-valve, a yoke connected to the baffle-plate and operatively arranged in relation to the throttle-valve, whereby the baffle-plate is moved in unison with the throttle-valve.

10. A carbureter of the float feed type having in combination, an atomizing nozzle, a baffle-plate thereon, means for adjusting the same, a cylindrical element having a deflecting surface and arranged to deflect the incoming air against the baffle-plate, and means for permitting the cylindrical element to automatically vary the opening between said element and the baffle-plate, as described.

CARL O. HEDSTROM.

Witnesses:
W. H. CHAFIN,
K. S. CLEMONS.