No. 860,848. PATENTED JULY 23, 1907.

F. E. BOWERS.

CARBURETER.

APPLICATION FILED MAR. 23, 1907.

2 SHEETS—SHEET 1.

Fig 1

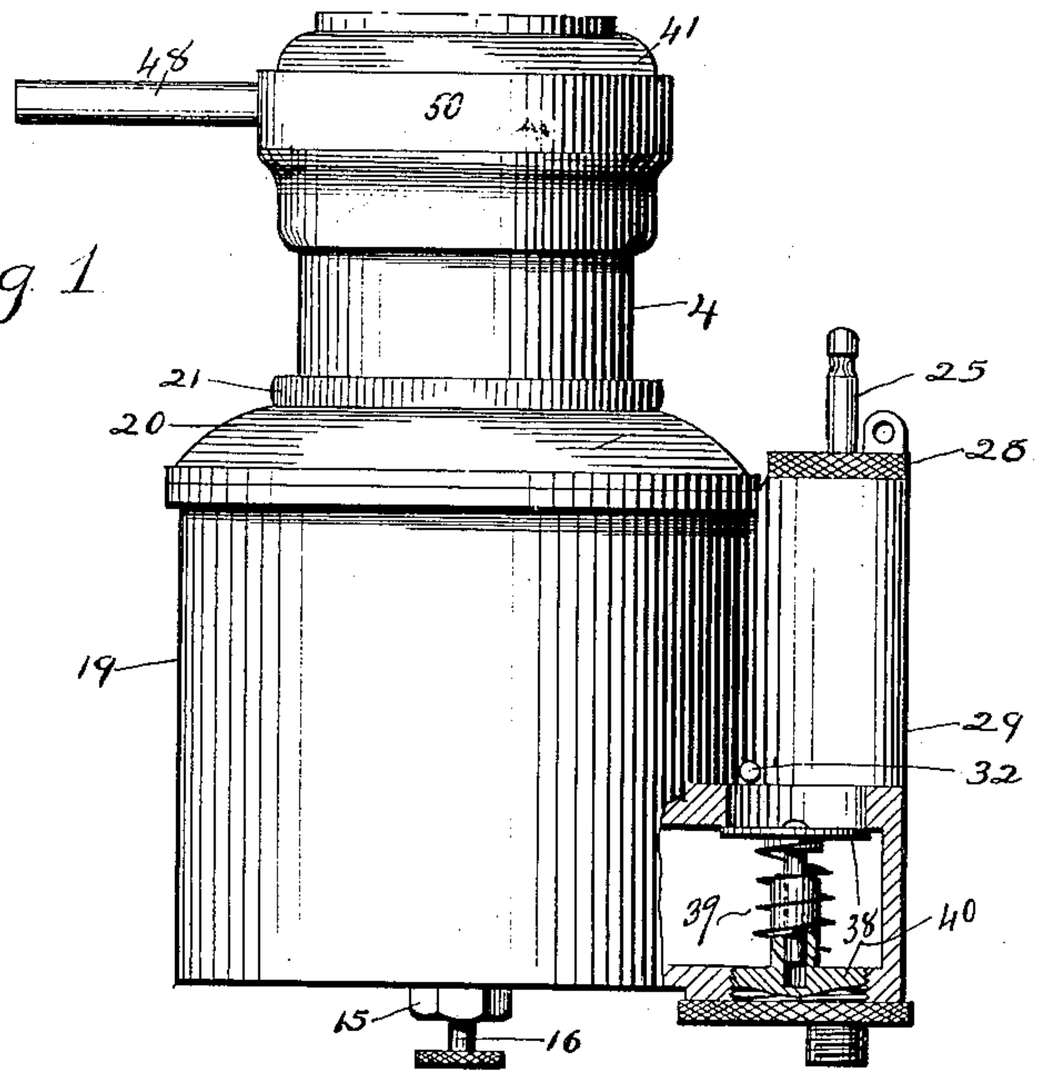
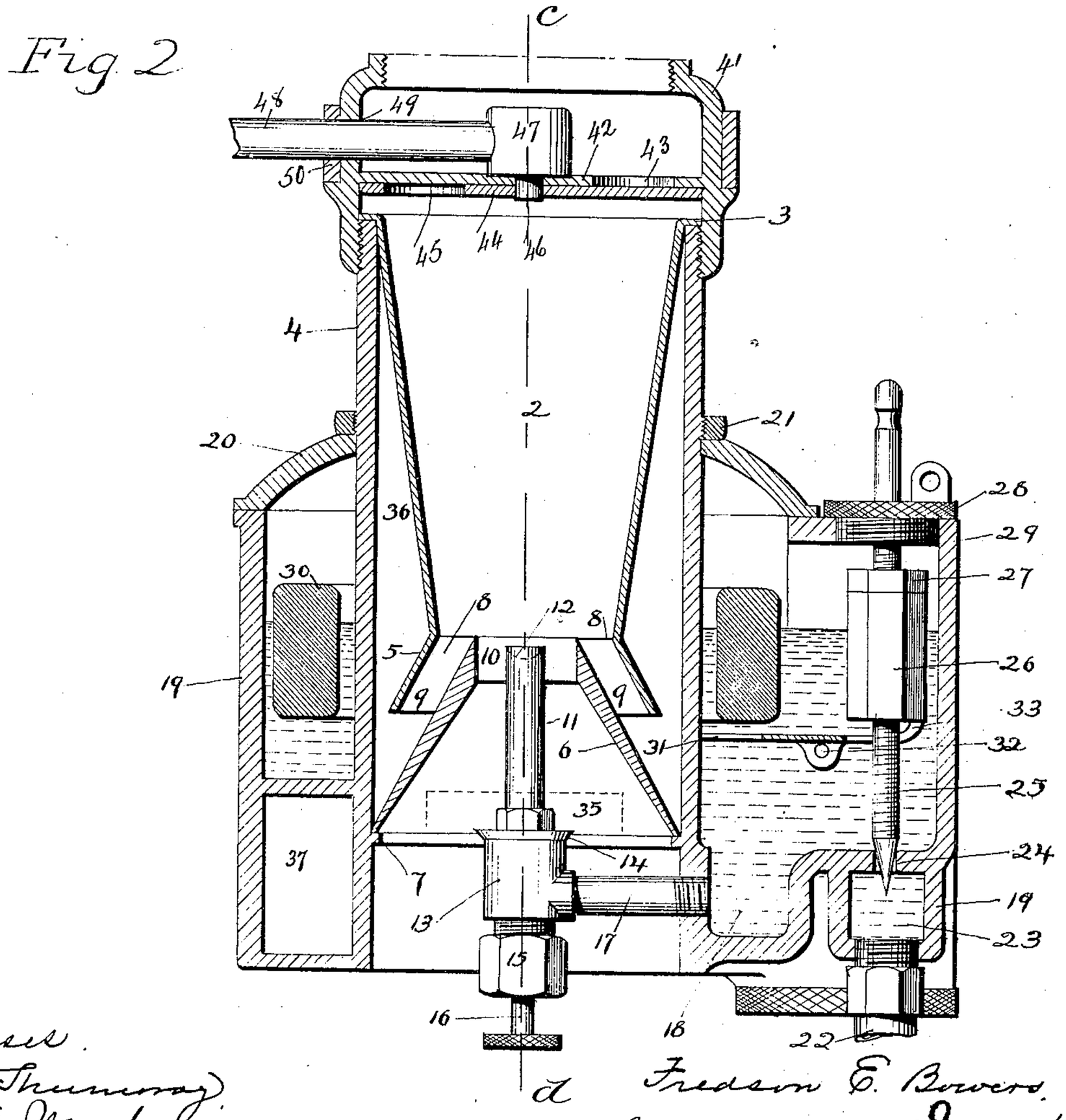


Fig 2



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2 SHEETS—SHEET 2.

Fig. 3.

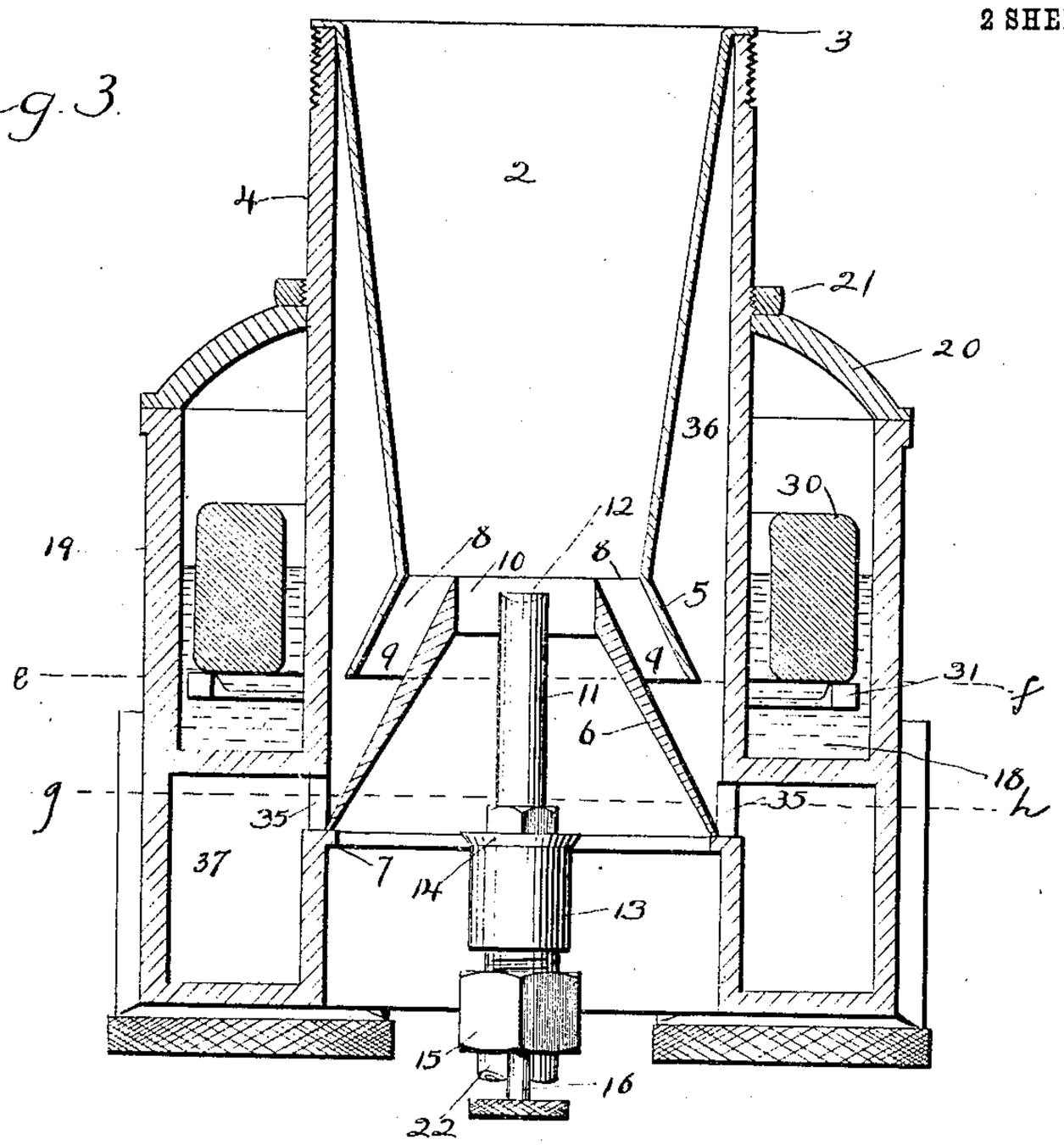


Fig. 4

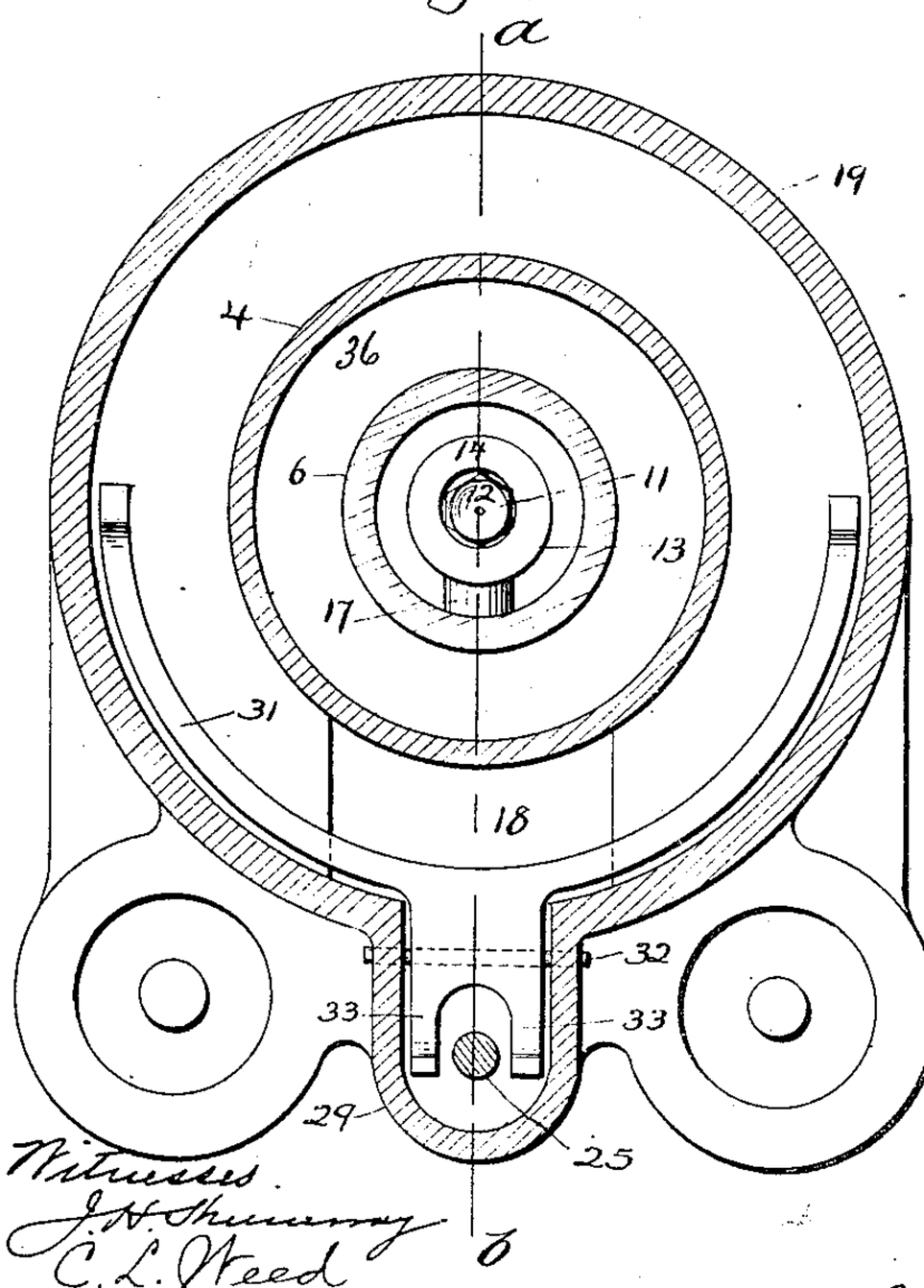
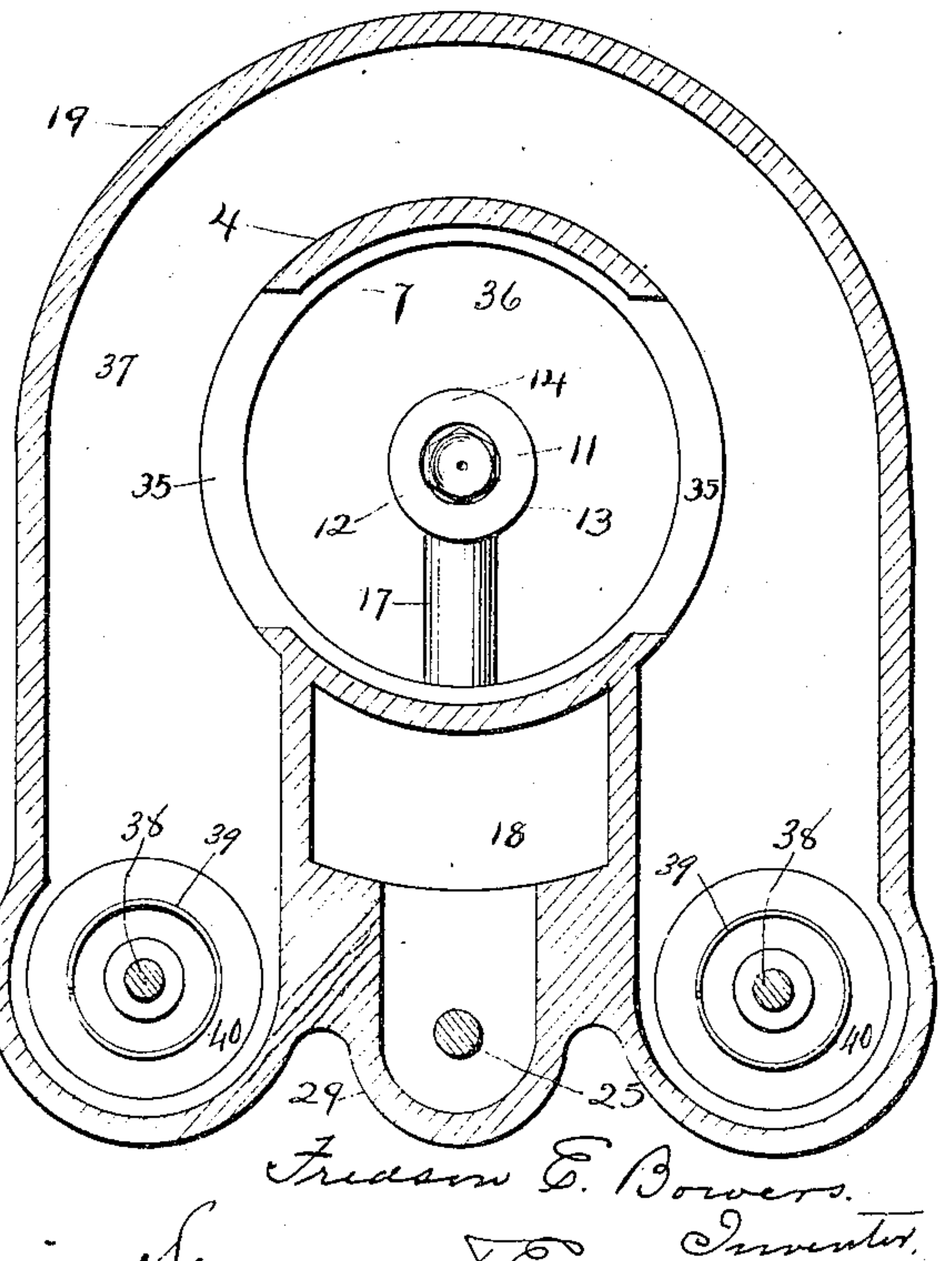


Fig. 5



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UNITED STATES PATENT OFFICE.

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CARBURETER.

No. 860,848. Specification of Letters Patent. Patented July 23, 1907.

Application filed March 23, 1907. Serial No. 364,111.

To all whom it may concern:

Be it known that I, FREDSON E. BOWERS, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Carbureters; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a view in side elevation of my improved carbureter which is broken away to show one of the air-valves in vertical section. Fig. 2 a view in vertical section on the line *a—b* of Fig. 4. Fig. 3 a view in vertical section on the line *c—d* of Fig. 2. Fig. 4 a view in horizontal section on the line *e—f* of Fig. 3. Fig. 5 a view in horizontal section on the line *g—h* of Fig. 3.

My invention relates to an improvement in carbureters for supplying internal combustion motors with vapor, the object being to produce a simple, compact and reliable device constructed with particular reference to supplying to the motor a perfect mixed vapor of the highest explosive consistency and to automatically regulating the density of the vapor to suit the different motor speeds.

With these ends in view my invention consists in the construction and combination of parts hereinafter described and pointed out in the claims.

In carrying out my invention as herein shown, I employ an upper cone 2 formed at its upper end with a flange 3 by means of which it is suspended from the upper end of an upwardly projecting cylindrical or tube-like inner shell 4 forming a part of the carbureter body. Preferably the said cone is furnished at its lower end with an outwardly projecting flange or skirt 5 which extends down over the upper end of the lower cone 6 which is supported at its lower end upon a rib 7 formed near the lower end of the said inner shell. The lower end of the upper cone 2 and the upper end of the lower cone 6 are sufficiently differentiated in diameter to form between them an annular air-intake space 8 which is located, as it were, at the inner end of a conical air-passage 9 formed between the inner face of the flange 5 and the outer face of the upper end of the lower cone 6, the said flange and cone having the same pitch.

The size of the space 8 and the passage 9 may be varied according to the size of the motor with which the carbureter is to be used, by interchanging the cone 2 with corresponding cones more contracted or less contracted at their lower ends as the case may be. Thus if a cone more contracted at its lower end is employed, the vapor-supplying capacity of the carbureter will be reduced and vice versa. The interchanging of the upper cone 2 with another corresponding cone either larger or smaller than the same at its lower end is very easily accomplished, and in no wise affects the other parts of the device. By preference the lower cone 6 is made of cast rather than of sheet metal as is the upper cone 2. As shown the lower cone is also made removable. By casting the lower cone its upper end may easily be made thicker than its lower end for the production of a cylindrical air-passage 10. This is an advantageous construction as the straight side walls of the said passage center and give right direction to the tubular current or column of air arising through the open bottom of the said lower cone around the spray-nozzle 11 which is arranged centrally within the said passage and therefore in line with the axis of the upper and lower cones 2 and 6.

The spray-nozzle which is formed at its upper end with a shallow "priming" cavity 12, is mounted in a head 13 formed at its upper end with an inclined annular priming flange 14 which will hold enough gasolene to assist in starting the carbureter. The said head 13 is furnished with a nut-like gland 15 carrying a needle-valve 16 which controls the amount of gasolene allowed to pass into the spray-nozzle 11. The head 13 is supported at the inner end of a short supply pipe 17 the outer end of which is screwed into the lower end of the inner shell 4 and opens into an annular or substantially annular gasolene reservoir 18 encircling the inner shell 4 and formed between the same and the outer shell 19 forming a part of the body of the carbureter. The upper end of this gasolene-reservoir is closed by a cap 20 resting upon the upper edge of the said outer shell 19 and secured in place by a collar 21 threaded upon the outer face of the projecting upper end of the inner shell 4 at a point where the same emerges from the cap 20. Gasolene is supplied to the reservoir 18 through a pipe 22 leading into an inlet chamber 23 formed in the outer shell 19. A tapering inlet port 24 leading from the chamber 23 into the reservoir 18 receives an automatically operated gasolene-feeding needle valve 25 carrying an adjustable nut-like counter-weight 26 and a jam nut 27, the stem-like upper end of the needle-valve having bearing in a nut-like gland 28 entered into a lateral extension 29 of the outer shell 19. The needle-valve 25 is operated to automatically control the flow of gasolene into the reservoir by means of an annular float 30 located in the reservoir 18 and coacting with a yoke-shaped feeding-lever 31 hung upon a pivot pin 32 passing through the side walls of the extension 29. The shank of this yoke is centrally cut away to form two fingers 33, 33, upon which the counter-weight 26 rests as clearly shown in Fig. 4. As soon

as the level of the gasolene in the reservoir 18 falls to a predetermined point, the weight of the float 30 will be thrown upon the feeding-lever 31, which will be depressed with the effect of lifting the valve 25 and opening the port 24 so as to permit gasolene to flow from the chamber 23 into the reservoir 18 and replace the gasolene removed therefrom by the action of the spray-nozzle 11. Just as soon as enough gasolene has been admitted into the reservoir 18 to lift the float above the lever 31, the counter-weight 26 will reassert itself and close the valve 25. By properly adjusting the counter-weight 26 upon the valve 25, the automatic feeding of gasolene in to the reservoir may be made to accurately respond to the requirements of the motor.

In order to effectively dilute the mixture produced by the commingling of the gasolene sprayed from the nozzle 11 with the tubular current of air drawn through the bottom of the lower cone 6, I provide for the introduction of supplemental air currents by forming in the inner shell 4 two long horizontal supplemental air-ports 35 at points directly opposite each other and adjacent to the lower end of the lower cone 6. As thus located these ports open upward into a relatively large annular vacuum-chamber 36 formed by the said shell 4 and encircling the upper and lower cones 2 and 6, the said ports being located below the flange 9 of the upper cone 2 so that the air passing through them readily finds its way into the lower end of the conical air-passage 9 leading into the air-intake 8 space which opens into the upper cone 2 where the commingling of the gasolene vapor with the air takes place. These ports 35 lead out of an air-chamber 37 formed in the bottom of the carbureter between the lower ends of the inner shell 4 and the outer shell 19 and located below the gasolene reservoir 18, the said air-chamber 37 and gasolene reservoir 18 practically conforming to each other in shape as seen by reference to Figs. 4 and 5. At its outer ends the air-chamber 37 is furnished with air-valves 38 respectively located on opposite sides of the needle-valve 25. The valves 38, which may be of any approved construction, are provided as herein shown, with springs 39 and are carried by nuts 40 entering the bottom of the device. As there are two of these valves respectively entering the opposite ends of the air-chamber and two corresponding but oppositely located supplemental air ports 35 entering the lower end of the vacuum-chamber 36, the supplemental air current supplied thereto by the said ports will be so equalized in pressure that one will neutralize the effect of the other so far as unduly deflecting the spray of vapor being jetted from the nozzle 11 into the upper cone 2 is concerned, any marked deflection of the jet of gasolene spray tending to interfere with the uniform commingling of the spray and air.

Upon the upper end of the inner tube 4 I mount a throttle valve which may be of any approved construction. It consists, as herein shown, of a tubular head 41 having its lower end internally threaded to adapt it to be screwed upon the externally threaded upper end of the inner shell 4. This had 41 heas a fixed circular bottom plate 42 containing a circular series of openings 43 which are simultaneously opened or closed to the same extent by a disk-shaped valve 44, having corresponding openings 45, placed against the lower face of the bottom plate 42 and secured to the lower end of a pivot 46 projecting downward through the plate 42 from a hub 47 carrying a throttle-valve lever 48 passing into the head 41 through an elongated slot 49 formed therein, this slot being closed by a ring 50 encircling the head 41 and containing an opening through which the lever 48 passes. Such a throttle valve as described is admirably adapted for use in conjunction with my improved carbureter but may be replaced by a throttle valve of some other form.

The operation of my improved carbureter is as follows: Supposing the engine to have been started, the air in the upper cone 2 will be exhausted by the motor with the effect of inducing an upward suction of air through the bottom of the cone 6 and around the spray-nozzle 11. The upward current of air thus induced is tubular in form and produces a suction about the spray-nozzle 11 which starts the spray-nozzle into action. Gasolene in the form of spray and air are thus inspired into the cone 2 in which they are commingled to form a gasolene vapor more or less enriched according to the amount of gasolene supplied, this vapor being drawn through the throttle-valve for combustion in the engine. To facilitate the starting of the carbureter the priming cavity 12 in the top of the spray-nozzle and the flange 14 at the top of the head 13, may be filled with gasolene prior to starting the engine so that the very first intake of air through the bottom of the cone 6 will be enriched with gasolene vapor, the cavity 12 and flange 14 being filled by manually lifting the feeding valve 25, whereupon the pressure of the gasolene in the chamber 23 will cause some gasolene to ooze out into the cavity 12 and run over and fill the flange 14. Now when the speed of the engine passes a predetermined limit the suction in the cone 2 will create a vacuum in the vacuum-chamber 36 and in the air-chamber 37, opening the air-valves 38 and permitting two independent streams of air to rush into the air-chamber 37 from which they will pass through the two ports 35 into the lower end of the vacuum-chamber 36 at opposite points under the flange 5 of the upper cone 2, and hence at opposite points under the conical air passage 9 in which the two currents will unite to form a single cone-shaped current of air. This cone-shaped current of air will rush into the upper cone 2 and intersect the tubular current of air rising through the air-passage 10 of the lower cone 6 as well as the jet of gasolene spray rising from the nozzle 11. These conflicting currents of air all entering the cone 2 with great velocity will so commingle with each other and with the gasolene spray as to produce a gasolene vapor in which the air and gas is so perfectly commingled that it will burn with the highest efficiency.

It will be understood, of course, that the air-valves 38 open and admit the supplemental currents into the carbureter automatically in direct accordance with the demand made by the motor upon the carbureter for vapor. The faster the engine is running the more rapid the exhaustion of the air from the vacuum-chamber 36 and the air-chamber 37, and hence the greater the amount of supplemental air added to the mixture. On the other hand, when the engine runs slower, the air-valves 38 will be less frequently opened or to a lesser extent, and less air will be taken in and the mixture will be less diluted and therefore richer. On account of the considerable size of the vacuum-chamber 36 and

the air-chamber 37, they have a marked steadying effect upon the air-valvess 38 which are thus prevented from opening and closing too rapidly and having anything like a fluttering action. By employing two air-valves and introducing the supplemental air into the vacuum-chamber at opposite points therein, the pressure of the supplemental air is equalized, whereas if it were introduced into the vacuum-chamber at one point it might have the effect of driving the air rising through the air-passage 10 and driving the gasolene spray to one side more than to the other, thus interfering with the perfect commingling of the air and vapor.

It will be seen from the foregoing that my improved instrument automatically regulates the density of the vapor correctly according to the requirements of the different motor speeds.

I claim:—

1. In a carbureter, the combination with an upper cone and a lower cone constructed and arranged to form an air-intake space between their adjacent ends and surrounded by a vacuum-chamber, of an air-chamber, air-ports leading from opposite points in the said air-chamber into the lower end of the said vacuum-chamber, and valves leading into the said air-chamber.

2. In a carbureter, the combination with an upper cone and a lower cone made independently of each other and constructed and arranged to form an air-intake space between their adjacent ends and surrounded by a vacuum chamber, of an air-chamber, air-ports leading from the said air-chamber into the lower end of the said vacuum-chamber at points below the lower end of the upper cone, air-valves for the said air-chamber, and a spray-nozzle entering the lower cone.

3. In a carbureter, the combination with an upper shell and a lower shell made independent of each other and constructed to form an air-intake space between their adjacent ends and surrounded by a vacuum-chamber, of a gasolene reservoir encircling the said vacuum-chamber, a float located in the said reservoir, a gasolene-feeding valve automatically controlled by the said float, an air-chamber located below the gasolene reservoir, air-ports leading from the said air-chamber into the lower portion of the said vacuum-chamber, air-valves leading into the said air-chamber, and a spray-nozzle entering the said lower cone.

4. In a carbureter, the combination with an upper and a lower cone made independent of each other and constructed and arranged to form an air-intake space between their adjacent ends, of a tubular inner shell in which the said cones are located and forming a concentric vacuum-chamber by which they are surrounded, an outer shell concentric with the said inner shell, an oil-reservoir located between the said shells, an air-chamber located between the said shells and below the said gasolene-reservoir and having ports opening into the said vacuum-chamber, a float located in the reservoir, a gasolene feeding valve automatically operated by the said float, and two air-valves located in the air-chamber on opposite sides of the said gasolene feeding valve.

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

FREDSON E. BOWERS.

Witnesses:
FREDERIC C. EARLE,
CLARA L. WEED.