No. 894,656. PATENTED JULY 28, 1908.

J. JOHNSTON.

CARBURETER FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JUNE 3, 1907.

3 SHEETS—SHEET 1.

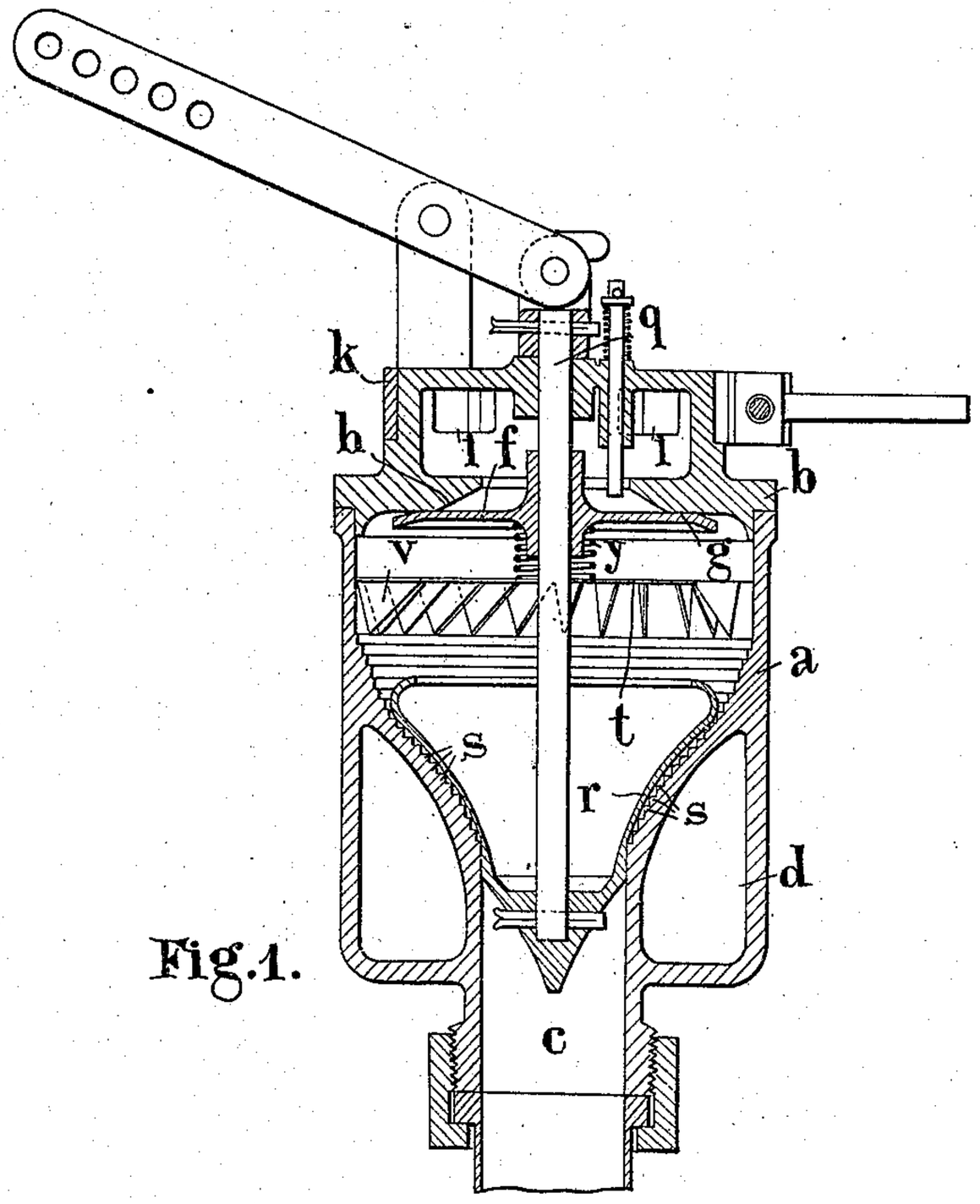

Fig. 1.

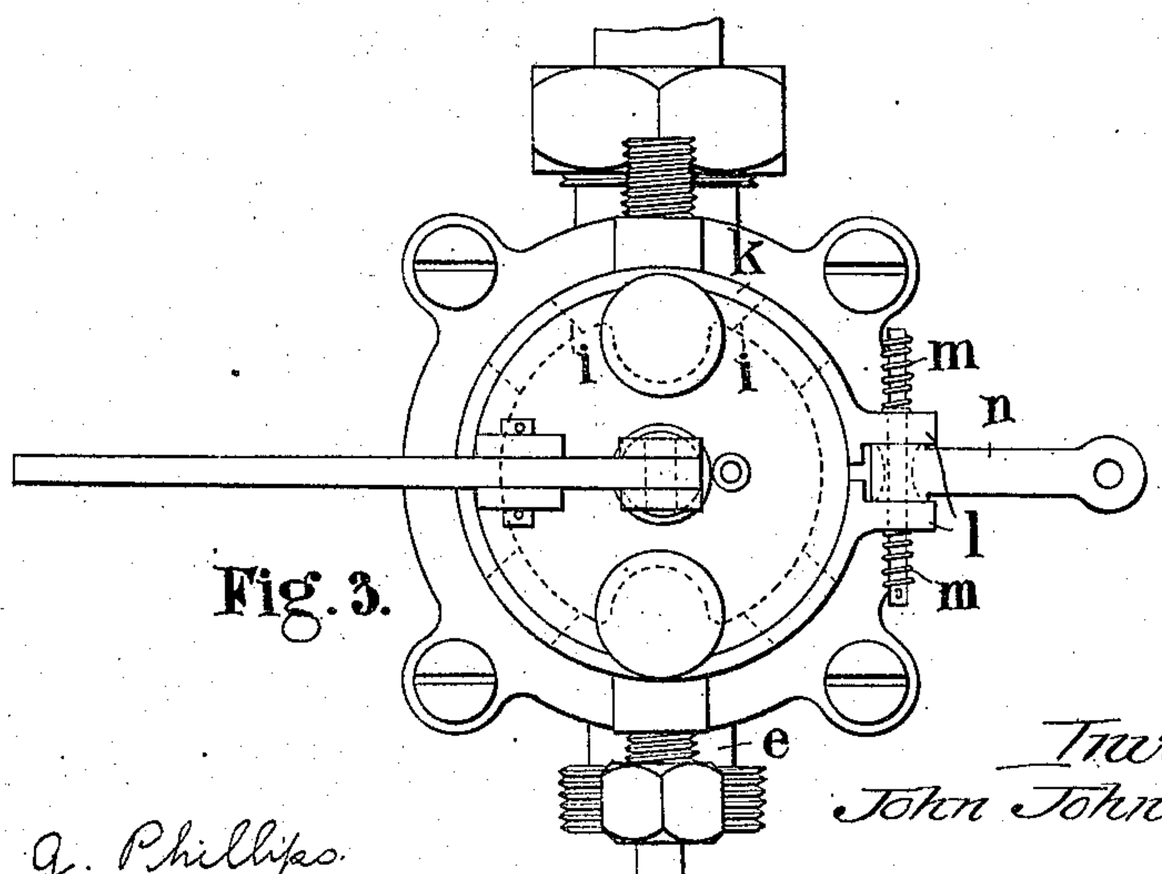

Fig. 3.

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3 SHEETS—SHEET 2.

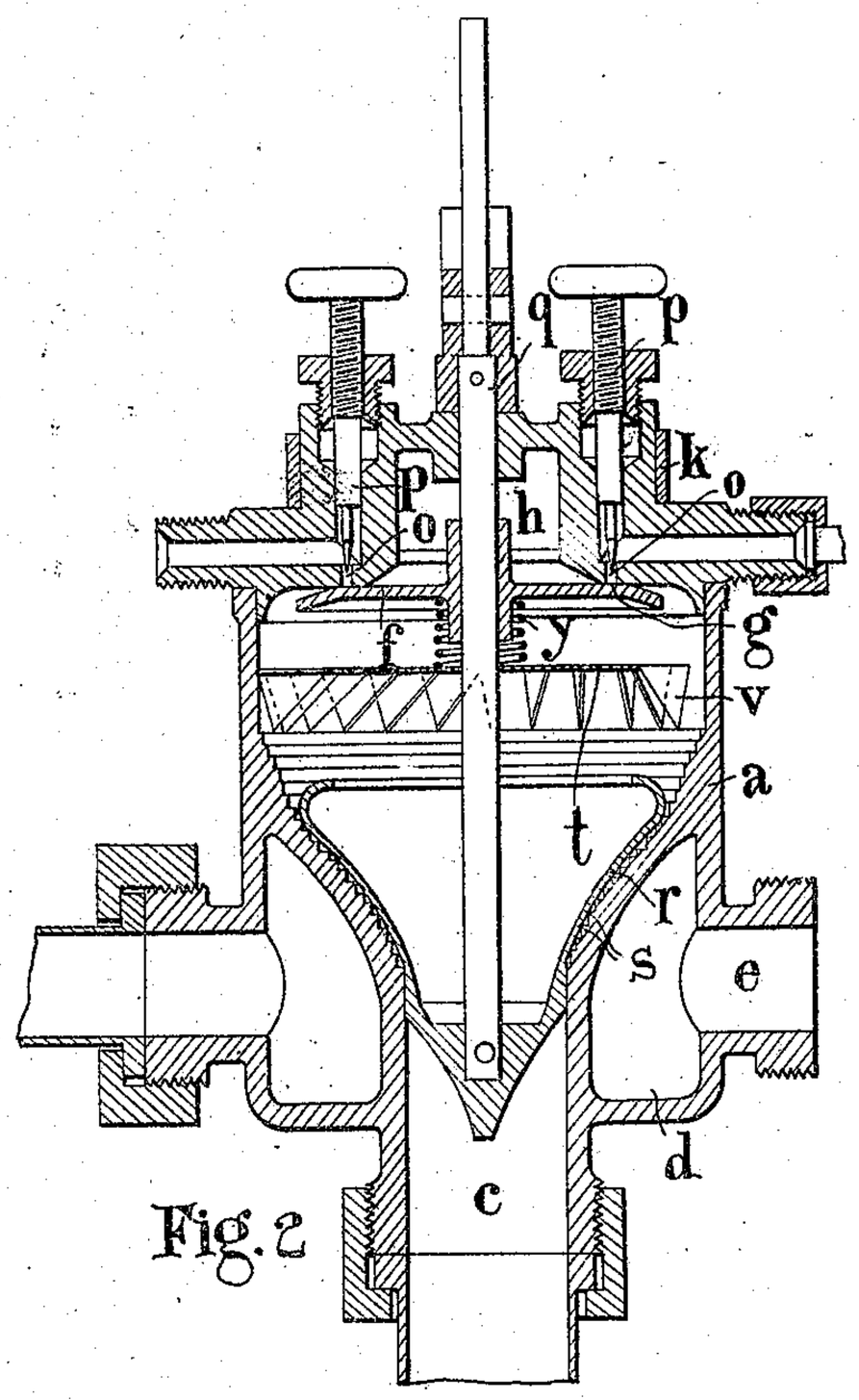

Fig. 2

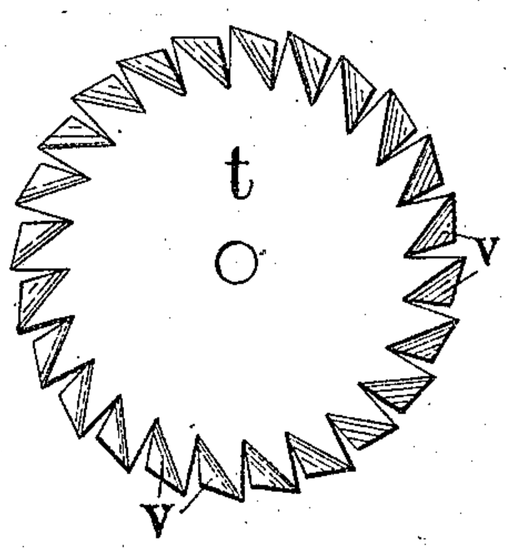

Fig. 4.

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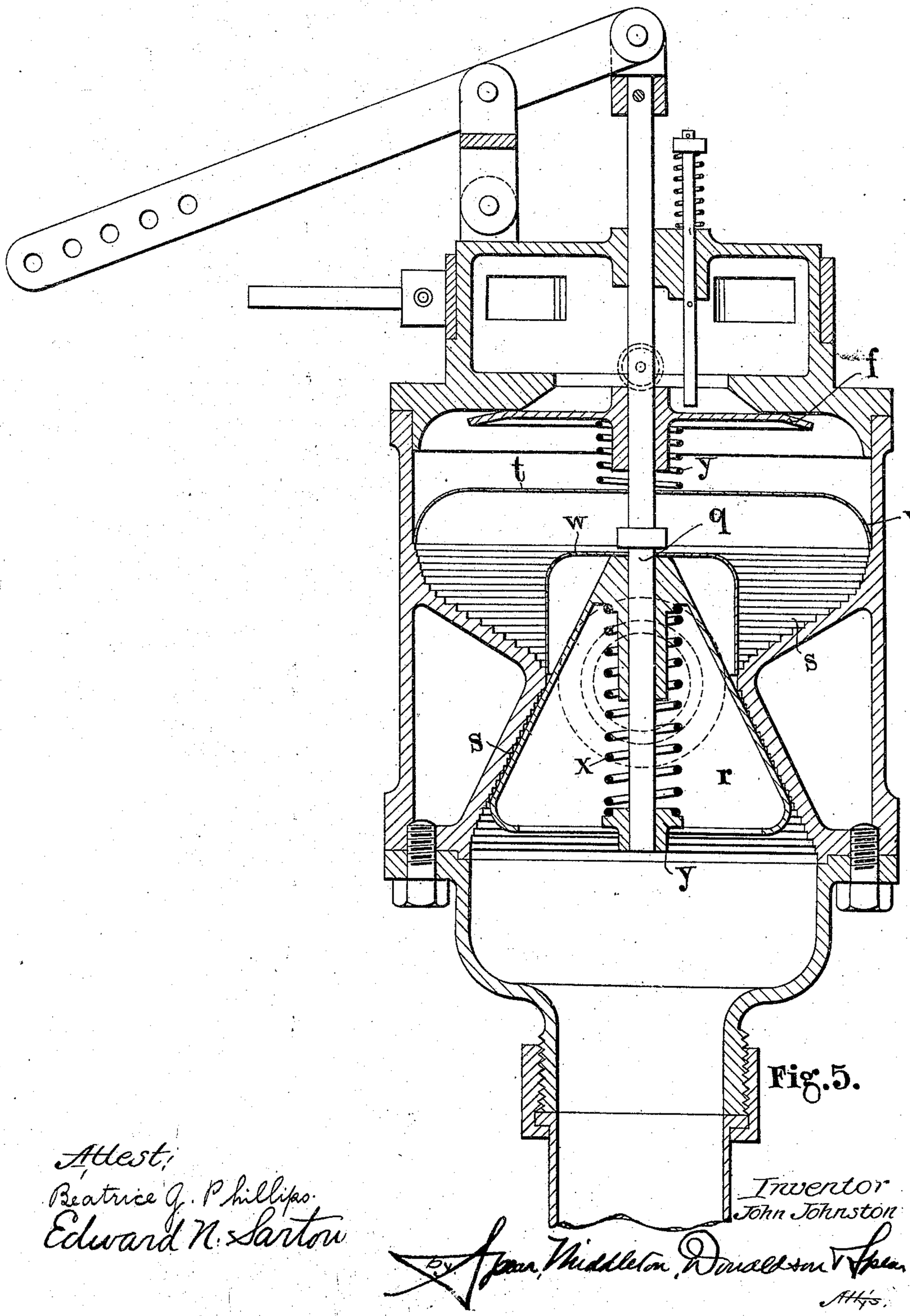

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN JOHNSTON, OF FULHAM, LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO HARRY WILLIAM BUDDICOM, OF PENBEDW, ENGLAND.

CARBURETER FOR INTERNAL-COMBUSTION ENGINES.

No. 894,656. Specification of Letters Patent. Patented July 28, 1908.

Application filed June 3, 1907. Serial No. 376,948.

To all whom it may concern:

Be it known that I, JOHN JOHNSTON, a subject of the King of Great Britain and Ireland, and residing at 19ª Crookham road, Fulham, London, S. W., having invented certain new and useful Improvements in Carbureters for Internal-Combustion Engines, do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to carbureters for internal combustion engines, the object being to construct a device which will give a high vaporizing effect with a low resistance to the incoming air, and which will also keep the supply of oil and air in correct proportion to suit the speed of the engine.

The invention consists in mounting a lift-valve having a broad face of particular construction, the face and its seating being shaped so that when closed the valve makes contact with the seating only over a narrow portion at the center of the same and tapers away towards the edges so that there is considerable clearance between the valve and its seat at the said edges. The air to the carbureter comes in above this valve and the oil on to the center of the valve face at the point it makes contact with the seat; so that when closed both air and oil are shut off, and when open, the passage across the face forms an aperture converging to a narrow throat and then again diverging, which shape tends to keep the oil supply proportional to the air on the well known principle of the "Venturi" tube.

The invention also consists of means for checking the lift of the valve and causing the same to close quickly when the suction of the engine ceases, this being an important point in high speed engines. This is effected by nominally holding the valve to its face by a light spiral spring, and checking the lift at the required point by causing the stem of the valve to come in contact with a flexible steel disk which yields slightly to the impact and to the inrush of air, and when the latter ceases it quickly reacts and gives the valve a sharp impetus towards its seat, thus giving a quick closing movement.

The invention further consists in fixing below the valve a mixing device comprising a circumferential set of stationary radial blades or baffles similar in shape to the blades of a fan of the screw or axial flow description for giving a centrifugal motion to the air and oil passing them, the disk preventing the air passing otherwise than between the blades. Below the blades and approximately parallel thereto, but separated by a predetermined space, a series of saw tooth shaped projections are formed on the body of the carbureter on to the back of which projections the air and oil is projected due to the direction given to the same by the blades, these teeth extending as far as the induction pipe and the chamber in which they are formed contracts towards a throttle ring by which the sectional area through which the gas passes is reduced so as to increase the velocity of the mixture on its way to the induction pipe as the throttle is closed down thus intensifying the spraying action.

The accompanying drawings illustrate a carbureter according to the invention, Figures 1 and 2 being two sectional elevations on planes at right angles, and Fig. 3 a plan. Fig. 4 is a plan of the spring disk and fan employed. Fig. 5 is a sectional elevation showing a modified form of throttle valve and spraying chamber.

In constructing the invention according to one mode, I form the carbureter in two main portions which I will call the body, *a*, and the cover, *b*, the body being of the before mentioned bottle shape internally with a connection, *c*, to the engine induction pipe at the bottom and with an annular space, *d*, cast round the converging portion of the neck, through which exhaust gases, hot water or any other suitable heating agent is passed to keep the carbureter warm, suitable inlet and outlet connections, *e*, *e*, being provided for the same. The top of the body is turned internally to receive the disk *t*, and blades *v* and has lugs or a flange cast outside for attachment to the cover. The blades *v*, rest on the uppermost of a series of tooth-shaped projections *s*, hereinafter referred to.

The cover is circular in shape and has lugs or a flange corresponding to those on the body for attachment thereto. It primarily forms a seat for the valve, *f*, which may be flat or conical but which is preferably flat as shown, as this shape is better adapted to the before mentioned converging and diverging construction of face, that is to say, the face diverges from the circular contact surface, *g*, outwardly to the circumference and the seating also converges as at *h*. Above the valve

is a cylindrical extension of the cover for the admission of air to the same, the air being admitted by means of ports, *i*, cut in its circumference, each port being separated by a space of the same length. Over these ports and spaces is fitted a movable sleeve, *k*, having corresponding ports and spaces to the cover which sleeve can be moved round so that one set of ports is adjustable to the other in such a manner as to increase or diminish the available area for the passage of air through the ports to the valve.

To hold the sleeve in any set position it is divided at one point and provided with lugs, *l*, on each side of the division with clearance between them, these lugs being forced together by means of springs, *m*, which cause the sleeve, *k*, to tightly clasp the cover, *b*. To move the sleeve, *k*, a lever, *n*, is fitted with fulcrums between the lugs, *l*, in such a way that the first part of its movement is to force the lug, *l*, apart and thus frees the sleeve, *k*, on the cover, *b*, so that it can be easily moved to any desired position.

Leading to the face of the valve are one or more small holes, *o*, for oil or spirit with adjusting needle valves, *p*, of any suitable form fitted into the same.

The top of the carbureter is closed and at its center is formed with a guide for the throttle valve spindle, *q*, which slides vertically in the same, it being operated in any ordinary manner. This spindle passes directly down the center of the carbureter to the conical throttle valve, *r*, working between the tooth shaped projections, *s*, in the body. It also passes through the steel disk, *t*, supported on or formed integral with the stationary blades, *v*, and further forms a guide for the valve, *f*, and for the spring, *y*, which returns the valve to its seat.

In the form shown, the disk *t*, and the blades *v*, are integral and the blades rest on the uppermost of a series of ledges *s*, the disks with its blades being stationary, that is, it does not rotate. It is sustained in position by the spring *y*. The blades *v*, being similar in shape to those of a fan of the screw or axial flow-type, the air rushing between them is deflected and given a centrifugal or whirling motion.

The cone, *u*, of the throttle valve may be corrugated stepped or similarly formed if desired to provide an additional atomizing device on which like on the projections, *s*, any large particles of oil or spirit are broken up by the velocity of the air, this action being intensified as the throttle is closed down due to the reduced area of the passage past the throttle causing an increased vacuum and a higher velocity of air.

In the form shown in Fig. 5, the throttle valve, *r*, is arranged with its vertex uppermost the surface of the body conforming thereto. The upper part of the valve, *r*, in this case is provided with deflecting vanes or baffles, *w*, to aid in buffeting the spray. The throttle valve is also shown mounted on a spring, *x*, which abuts against the valve and a collar, *y*, on the spindle, *q*.

The action of the carbureter is briefly as follows:—A suction stroke of the engine taking place the throttle valve being opened the valve, *f*, is sucked open, uncovering the oil holes, *o*, and simultaneously passing in a charge of oil and air which passes down between the stationary blades or baffles, *v*, and by them is given a centrifugal motion causing it to pass diagonally across the teeth, *s*, from one to the other of which the oil is buffeted and sprayed; the teeth, *s*, at the same time being kept hot by the exhaust jacket the air and oil is formed into a comparatively stable mixture which now passes over the edges of the teeth and past the throttle, *r*, into the induction pipe and thence to the engine cylinder; when the suction ceases the pressure of the incoming air against the valve, *f*, and disk, *t*, is removed and the reaction of the latter together with the spiral spring, *y*, quickly closes the valve *f*, stopping the flow of oil and air till the next suction.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a carbureter, a disk valve, a seating therefor, an air passage leading to the valve and oil holes leading to the face of the seating and adapted to be closed by the valve, said valve and seating having between them when the valve is open, a throat which first converges in the direction of flow and then diverges in said direction, substantially as described.

2. In a carbureter, a disk valve, a seating therefor, an air passage leading to the valve, oil holes leading to the face of the seating and adapted to be closed by the valve, said valve and seating being so shaped that when the valve is open they form in conjunction a converging and diverging throat, a light spring beneath said valve and an elastic disk adapted to yield under the suction but to aid in sharply returning the valve when the suction ceases.

3. In a carbureter, a disk valve, a seating therefor, an air passage leading to the valve, oil holes leading to the face of the seating and adapted to be closed by the valve, said valve and seating being so shaped that when the valve is open they form in conjunction a converging and diverging throat, an elastic disk beneath said valve adapted to yield under the suction, but to aid in sharply returning the valve when the suction ceases, and blades forming a mixing device adjacent to the circumference of said disk adapted to impart a centrifugal motion to the air and oil, substantially as and for the purpose set forth.

4. In a carbureter, a disk valve, a seating therefor, an air passage leading to the valve, oil holes leading to the face of the seating and adapted to be closed by the valve, the valve and seating being so shaped that when the valve is open they form a converging and diverging throat, an elastic disk beneath the valve adapted to yield under the suction but to aid in sharply closing the valve when the suction ceases, blades forming a mixing device adjacent to the circumference of the disk, an inclosing body, and an irregular surface in said body below the blades, substantially as and for the purpose set forth.

5. In a carbureter, a cover, air ports in said cover, a movable perforated sleeve for regulating the opening of said ports, a body having a converging interior and an outlet connection to the engine, a passage connecting the interior of the cover and body a disk valve for controlling said passage, a valve seating on the cover, oil holes leading to the face thereof and adapted to be closed by the valve, the valve and seating being so shaped as to form a converging and diverging throat when the valve is open, a light spring beneath the valve, an elastic disk supporting said spring and adapted to yield under the suction but to close the valve when suction ceases, blades forming a mixing device adjacent to the circumference of the disk and saw-toothed projections on the internal surface of the body, substantially as and for the purpose set forth.

6. In a carbureter, a cover and a body, air ports in the cover, means for regulating the same, a passage between the cover and body, a disk valve controlling said passage, a seating for said valve, the seating and valve being so shaped as to form a converging and diverging throat when the valve opens, oil holes leading to the seating adapted to be closed by the valve, a light spring beneath the valve, an elastic disk beneath said spring adapted to yield under suction but to aid in closing the valve when suction ceases, blades forming a mixing device, on the circumference of said disk, a converging internal surface to the body, irregularities on said surface, an outlet from the interior of the body, and a throttle valve for controlling said outlet, substantially as and for the purpose hereinbefore set forth.

7. In a carbureter, a disk valve, a seating therefor, the seating and valve being so shaped as to form a converging and diverging throat when the valve is open, oil holes in the face of the seating, a spring and an elastic disk beneath said valve for closing the same, a body having a converging interior, irregularities on the internal surface of the body, a throttle valve for controlling the outlet from the interior of the body and a jacket for hot fluid surrounding the body, substantially as and for the purposes hereinbefore set forth.

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

JOHN JOHNSTON.

Witnesses:
ALBERT E. PARKER,
FRANCIS J. BIGNELL.