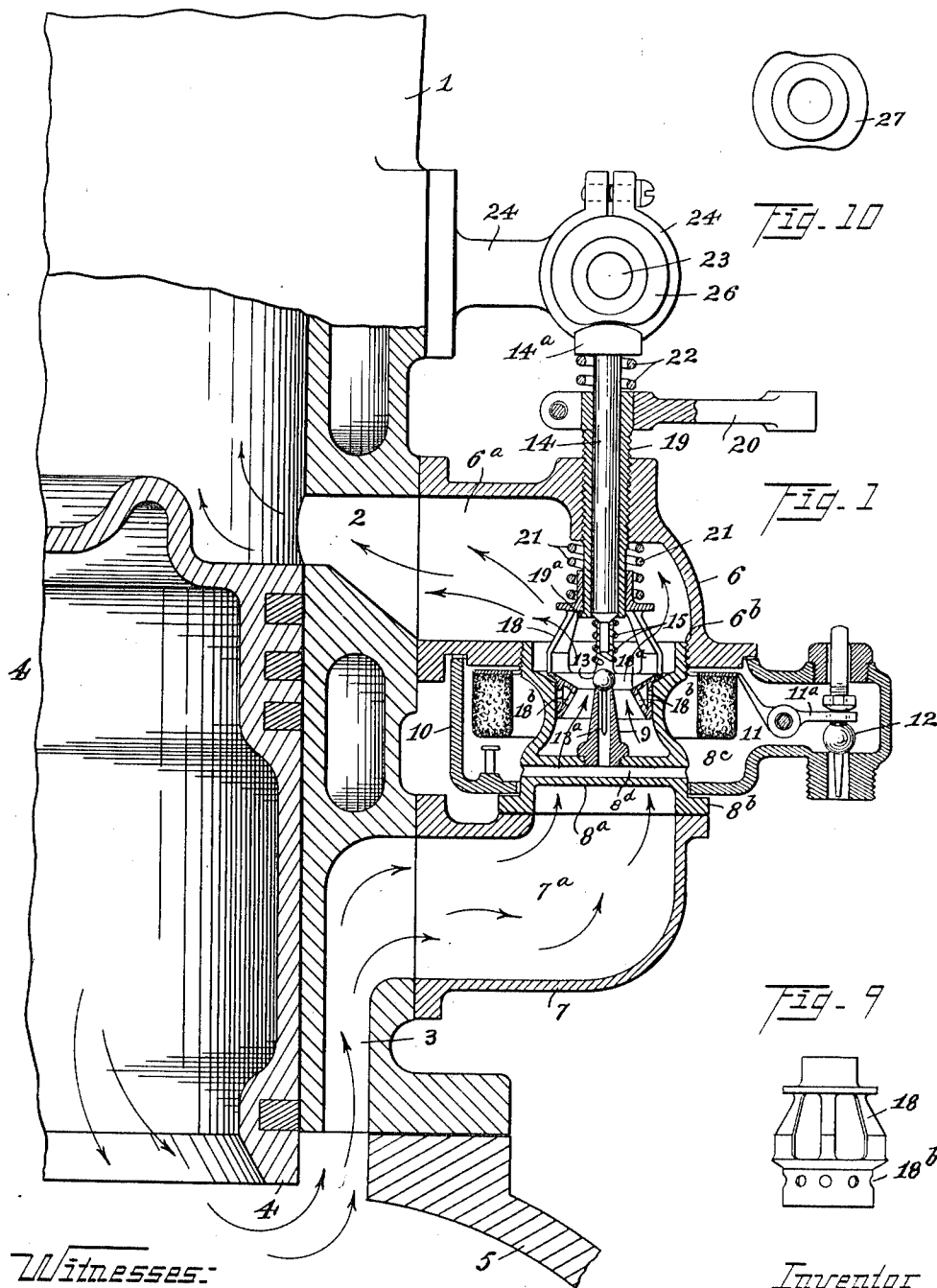


S. D. FILSON.
FUEL FEED REGULATOR FOR EXPLOSIVE ENGINES.
APPLICATION FILED FEB. 16, 1912.

1,063,866.

Patented June 3, 1913.

3 SHEETS-SHEET 1.



Witnesses:-

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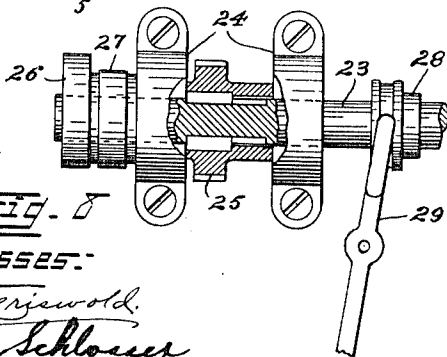
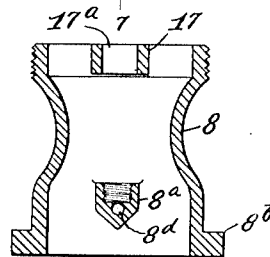
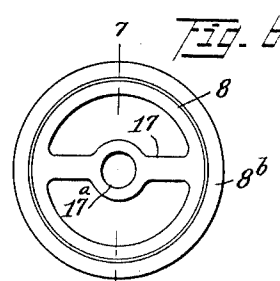
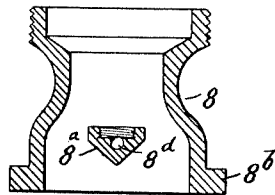
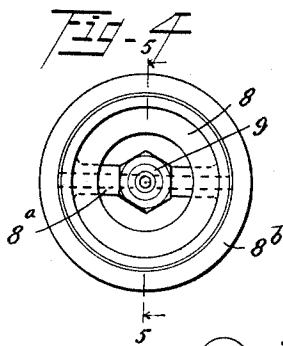
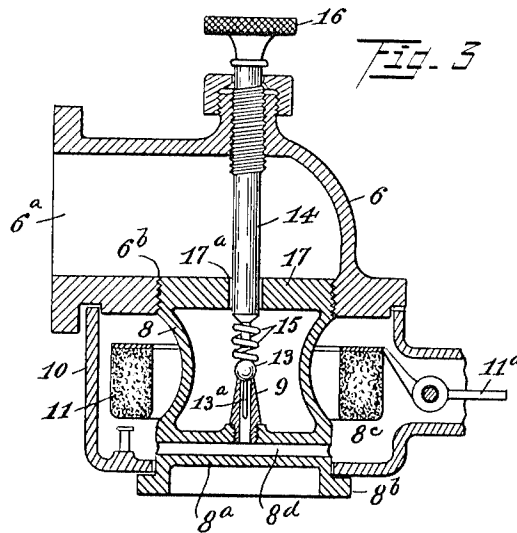
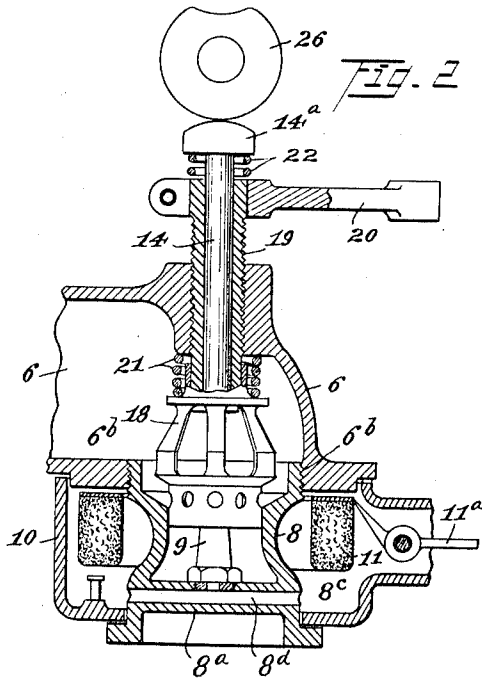
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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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FUEL-FEED REGULATOR FOR EXPLOSIVE-ENGINES.

1,063,866.

Specification of Letters Patent.

Patented June 3, 1913.

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To all whom it may concern:

Be it known that I, SEAMAN D. FILSON, a citizen of the United States, residing at Grove City, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Fuel-Feed Regulators for Explosive-Engines, of which the following is a specification.

My invention relates to improvements in fuel-feed regulators for explosive-engines, the primary object of my invention being to provide a generally improved charge forming and regulating device for hydrocarbon engines of simple, cheap, and efficient construction adapted to automatically provide for the delivery of proper combustible charges to the power cylinder of the engine in accordance with the speed of the latter.

A further object of the invention is to provide an improved carbureter having a valved fuel nozzle adapted to be positively closed and held in closed position at proper intervals whereby to prevent improper fuel feeding or flooding at the fuel nozzle as well as to prevent back firing and crank case ignition.

A still further object is to provide an improved compensating throttle valve adapted to be automatically operated in accordance with the speed of the engine whereby to vary the form of the air passage and suction at the liquid fuel nozzle in accordance with proper motor requirements as well as means whereby said compensating throttle valve may be manually operated as desired.

A still further object of the invention is to provide an improved fuel-feed regulator adapted to provide for either a two cycle or a four cycle operation of the engine as desired under the varying conditions or exigencies of actual service.

With the above mentioned and other ends in view, the invention consists in the novel construction, arrangement, and combination of parts, hereinafter described, illustrated in some of its embodiments in the accompanying drawings, and particularly pointed out in the appended claims.

Referring to the drawings, forming a part of this specification, Figure 1, is a central vertical sectional view of a charge forming and regulating device applied to a power cylinder of an engine, the parts being ad-

justed for four cycle operation, the improved compensating throttle valve being shown in its down or seated position as in slow speed or the starting of the engine. Fig. 2, a similar view of the same, detached, the fuel valve stem being depressed to close the valve of the fuel nozzle, and the improved compensating throttle valve being shown in its elevated position as at high speed. Fig. 3, a similar view of a carbureter or charge forming and regulating device, the compensating throttle valve and cycle regulating mechanism being omitted. Fig. 4, a top plan view of the form of fuel bowl and nozzle shown in Figs. 1 and 2, detached. Fig. 5, a central sectional view taken through line 5—5 of Fig. 4. Fig. 6, a top plan view of the form of fuel bowl shown in Fig. 3. Fig. 7, a central sectional view of the same taken on line 7—7 of Fig. 6. Fig. 8, a front elevation of the cam shaft and shifting mechanism shown in Fig. 1. Fig. 9, a side elevation of the improved compensating throttle valve shown in Figs. 1 and 2, detached. Fig. 10, an end view of the two cycle cam detached.

Similar numerals of reference designate like parts throughout all the figures of the drawings.

The carbureter or charge forming and regulating mechanism of the improved fuel-feed regulator may be attached to each power cylinder 1, as shown in Fig. 1, of the drawings in which instance the power cylinder may be provided with a charge inlet port 2, and an air eduction port or passage 3, said charge inlet port 2, being adapted to be opened and closed by means of the power piston 4, the latter being adapted to intermittently compress the air in the crank casing 5; and to eject the air from the latter through the air eduction port or passage and through the carbureter and into the power cylinder when the charge inlet port 2, is opened as indicated by the arrows in Fig. 1, of the drawings.

The carbureter, proper, or charge forming device, comprises a carbureter casing 6, having a charge outlet port 6^a, adapted to communicate with the charge inlet port 2, of the engine, and said carbureter casing, in the present instance, is secured directly to the power cylinder 1, the air inlet port or

passage 7^a, to the carbureter being formed by means of an elbow casing or pipe 7, secured to the power cylinder 1, as shown.

The carbureter casing 6, is provided with a threaded opening 6^b, adapted to receive and contain the upper threaded portion of a fuel or carbureter bowl 8, the latter forming the mixing chamber and being provided near its bottom with a bridge or cross member 8^a, carrying the fuel or spray nozzle 9.

The fuel or carbureter bowl 8, communicates with and is surrounded by a fuel or float casing 10, the latter being supported upon the flanged portion 8^b, of the fuel bowl, said fuel bowl forming an annular fuel or float chamber 8^c, the latter being provided with a float 11, carried upon a pivotally mounted float lever 11^a, adapted to operate a float valve 12, whereby the liquid fuel is maintained at a certain predetermined height in the fuel or float chamber 8^c. The liquid fuel in the chamber 8^c communicates with the opening in the fuel or spray nozzle 9, through the medium of the opening or duct 8^a, in the bridge or cross member 8^a, and as a means for intermittently opening and closing the fuel or spray nozzle 9, the latter is provided at its mouth or tip with a ball valve 13, having a guide pin 13^a, extending into the opening of the spray nozzle 9, whereby said ball valve is maintained in proper relative position in its elevated and seated positions. The fuel bowl 8, has its side walls converging toward each other forming a constricted air passage in the mixing chamber about the tip or mouth of the spray nozzle 9.

As a means for positively closing the ball valve 13, as well as providing means whereby the latter may be regulated in its opening and closing movements, a valve stem 14, is provided, the lower end of the latter being provided with a spring 15, said spring being adapted to cushion the ball valve 13, in its upward movements, as well as to be seated on the latter when the valve stem is moved to its closed position as shown in Fig. 3, of the drawings. In the form of carbureter shown in Fig. 3, the valve stem 14, is adapted to be normally adjusted through the medium of a knurled head 16, the valve stem 14, being threaded in the upper portion of the carbureter casing 6, so that the valve stem may be readily adjusted. In this embodiment of the carbureter, the upper end of the fuel or carbureter bowl is provided with a second cross or bridge member 17, having an opening 17^a, to receive the lower end of the valve stem 14.

As a means for positively and automatically opening and closing the valved spray nozzle in accordance with the desired cycle operation of the engine as well as providing an improved compensating throttle valve adapted to be automatically operated in ac-

cordance with the speed of the engine, whereby to vary the form of the air passage as well as the suction at the liquid fuel nozzle in accordance with proper motor requirements, the additional mechanism particularly shown in Figs. 1, 2, and 8, may be provided as hereinafter described.

As shown most clearly in Figs. 1 and 2, of the drawings, the fuel bowl 8, is provided with a vertically movable spring resisted compensating throttle valve 18, said valve being adapted to vary the form of the air passage about the tip or mouth of the fuel nozzle as well as to vary the suction or action of the air upon the ball valve in accordance with proper motor requirements by being provided with an inwardly extending flanged portion 18^a, resting in the same plane with the tip of the fuel nozzle when the throttle valve is in its lower or seated position and forming a constricted air passage adapted to increase the force of the air upon the ball valve 13, and increase the richness of the combustible charge at low speed or in the starting of the engine. It will be observed that the form of the inwardly extending flanged portion 18^a, of the throttle valve 18, and its relation to the adjacent parts is such that as the throttle valve 18, is raised, the size or area of the air passage about the tip of the nozzle will be increased as said compensating throttle valve is raised, and as a further means of decreasing the force of the air, the lower flanged portion of the throttle valve is provided with a series of openings 18^b, which will be opened or uncovered when the throttle valve is raised to its extreme elevated position as shown in Fig. 2, of the drawings when a very lean combustible charge is desired as at high speed or under other conditions requiring a lean or much diluted combustible charge.

As a means for guiding and movably supporting the compensating throttle valve in proper position as well as providing means whereby the same may be manually operated, a threaded sleeve 19, is mounted in the upper portion of the carbureter casing 6, said sleeve being provided at its upper end with a suitable handle 20, communicating with suitable operating mechanism, the lower end of said sleeve 19, being provided with a lug 19^a, adapted to engage within the spider portion of the compensating throttle valve 18, so that when the threaded sleeve 19, is raised through the operating mechanism, the throttle valve 18, will likewise be raised against the resistance of the surrounding spring 21, as illustrated in Fig. 2, of the drawings. The sleeve 19, may be provided with coarse thread of considerable pitch, and when the handle 20, is reversed, the compensating throttle valve will be permitted to assume its seated position as shown in Fig. 130

1, of the drawings, said throttle valve being adapted to move upwardly against the resistance of the surrounding spring 21, with each suction impulse of the engine.

5 As a means for varying the cycle of the engine as well as positively and automatically operating the valve stem 14, the latter is slidably mounted in the sleeve 19, and provided with a bearing head 14^a, said head
10 being adapted to be depressed against the resistance of a spring 22, and to be operated by means of a suitable cam on a cam shaft 23. The cam shaft 23, is mounted in suitable brackets 24, mounted on the sides of
15 the engine cylinders, said cam shaft being adapted to be mechanically operated through suitable driving mechanism, as for example,—a suitable driving gear 25, (see Fig. 8,) feathered on the shaft 23, said shaft being
20 adapted to be driven at one half the speed of the crank shaft.

As a means for providing for either a four cycle or two cycle operation of the engine, a single cam 26, is provided for four cycle
25 operation as shown in Figs. 1, and 2, of the drawings, and a double cam 27, (see Figs. 8 and 10) is provided for two cycle operation. As a means for bringing either of said
30 cams 26 or 27 into coöperative relation with the bearing head 14^a, of the valve stem 14, the cam shaft 23 is provided with a shifting collar 28 and a shifting lever 29, the latter being adapted to communicate with any suitable and convenient operating mechanism.
35 By reason of the above arrangement it will be observed that when the single cam 26, is in operation, the valve stem 14 will be held down and only opened during every other or alternate suction impulse through
40 the charge inlet port making the engine a four cycle engine since during one of the suction impulses only pure air will be drawn into the cylinder by reason of the fact that the valve stem 14, through the medium of
45 the spring 15, will hold down the ball valve 13, during such suction impulses.

From the foregoing description, taken in connection with the accompanying drawings, the operation and advantages of my invention will be readily understood.

Having thus described some of the embodiments of my invention, what I claim and desire to secure by Letters Patent is,—

1. A carbureter, comprising a mixing chamber provided with a bridge member and 55 a centrally located liquid fuel nozzle, an annular liquid fuel chamber surrounding said mixing chamber, a float and float valve adapted to maintain the liquid fuel at a predetermined height in said liquid fuel 60 chamber, a vertically movable compensating valve having a constricted air passage surrounding said liquid fuel nozzle, a ball valve seated at the mouth of said nozzle, means for intermittently and positively closing 65 said ball valve, and means for positively raising said vertically movable compensating valve.

2. A carbureter, comprising a mixing chamber provided with a liquid fuel nozzle, 70 a liquid fuel chamber communicating with said nozzle, a ball valve at the mouth of the latter, a compensating valve having a constricted air passage surrounding the mouth of said liquid fuel nozzle, means for regu- 75 lating the movements of said ball valve and for positively closing the same at intervals, means for resiliently maintaining said compensating valve in seated position, and means for positively moving said compensat- 80 ing valve whereby to vary the area of said air passage about said fuel nozzle.

3. In an internal combustion engine, a charge forming and regulating device, comprising a cam shaft and cam, a power cyl- 85 inder provided with a charge inlet port, a carbureter including a fuel nozzle, a ball-valve normally closing the latter, a spring resisted valve stem adapted to be operated by said cam and to intermittently hold said 90 ball-valve in a closed position, and means for shifting said cam for the two or four cycle operation of said engine.

In testimony whereof I have affixed my signature in presence of two witnesses.

SEAMAN D. FILSON.

Witnesses:

M. P. BLACK,

M. H. McCoy.