

No. 671,714.

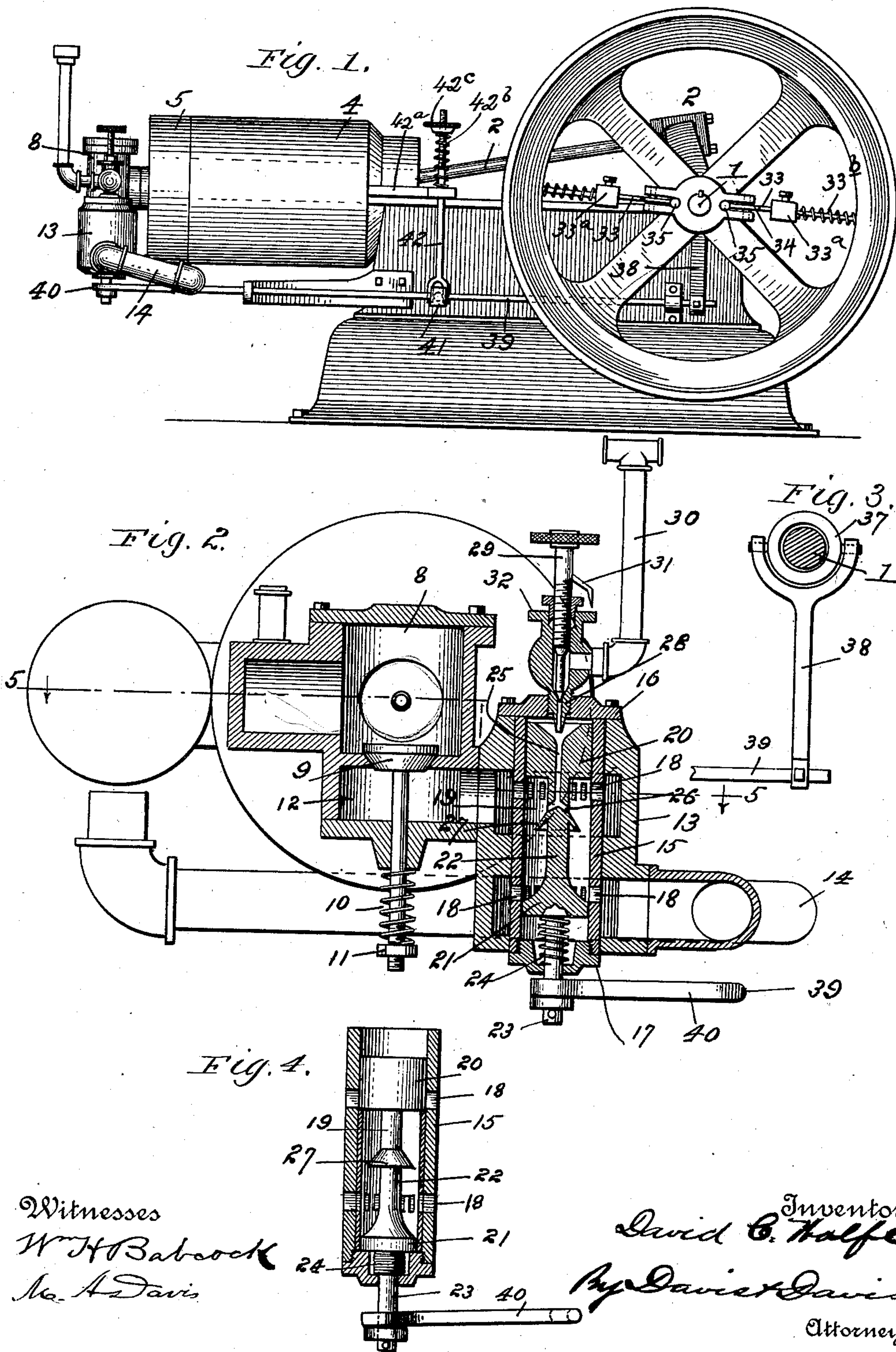
Patented Apr. 9. 1901.

D. C. WOLFE.
GOVERNING DEVICE FOR GASOLENE ENGINES.

(No Model.)

(Application filed May 2, 1900.)

2 Sheets—Sheet 1.



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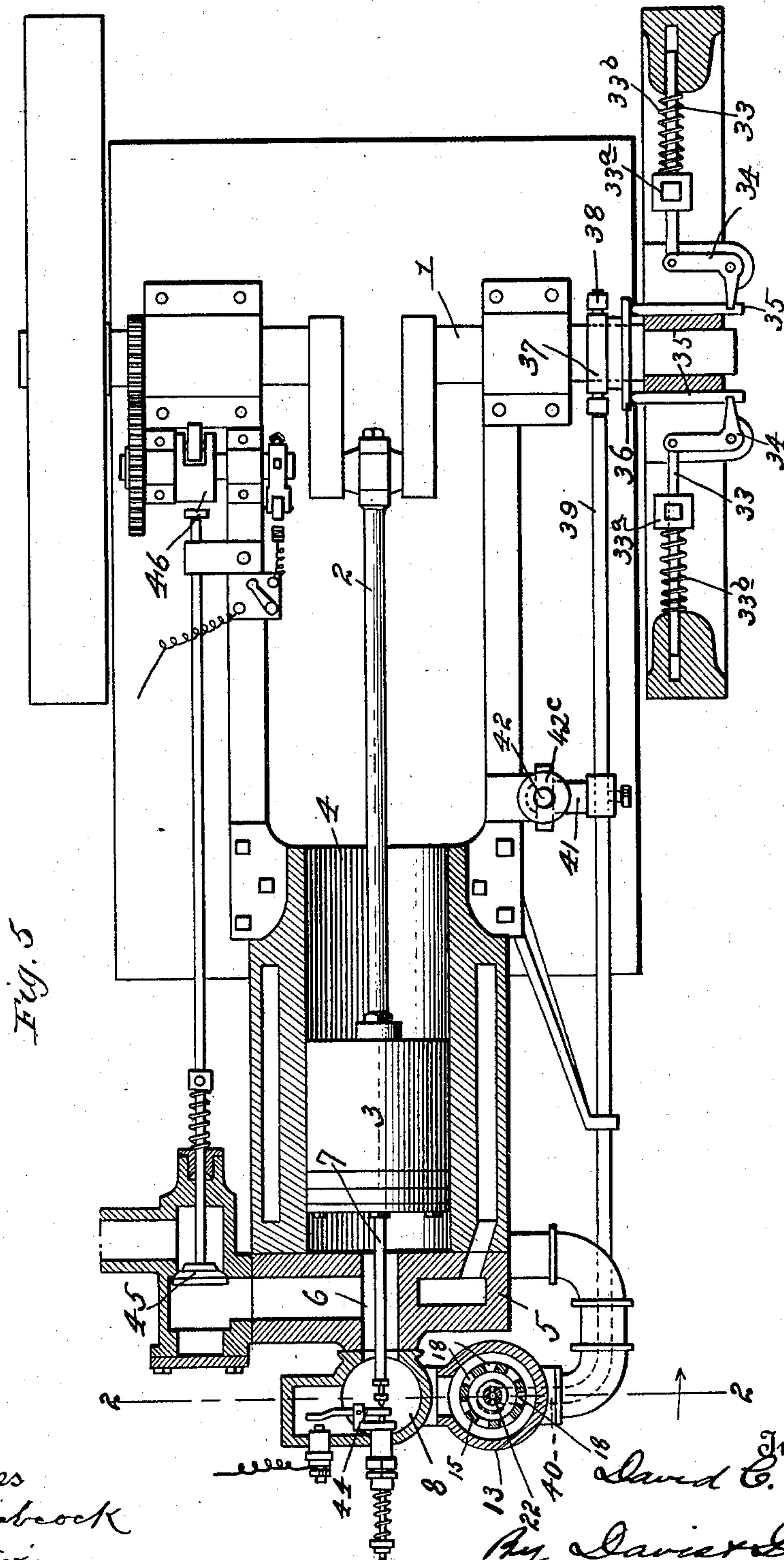
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(Application filed May 2, 1900.)

(No Model.)

2 Sheets—Sheet 2.



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GOVERNING DEVICE FOR GASOLENE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 671,714, dated April 9, 1901.

Application filed May 2, 1900. Serial No. 15,291. (No model.)

To all whom it may concern:

Be it known that I, DAVID C. WOLFE, a citizen of the United States, residing at Lyons, county of Rice, State of Kansas, have invented a new and useful Improvement in Gasolene-Engines, of which the following is a full, clear, and exact description, reference being had therein to the accompanying drawings, in which—

Figure 1 is a side elevation of the engine; Fig. 2, a transverse vertical sectional view taken on line 2 2 of Fig. 5; Fig. 3, a detail view which will be hereinafter described; Fig. 4, a vertical sectional view of the carbureting-chamber; Fig. 5, a horizontal sectional view taken on line 5 5 of Fig. 2.

The main object of this invention is to produce a simple and efficient carbureting mechanism for a gasolene-engine, the governor-valve of the engine being placed in the carbureting-chamber and forming a part of the carbureting mechanism as well as regulating the quantity of the air and gas mixture which is permitted to flow into the engine-cylinders.

Referring to the various parts by numerals, 1 designates the crank-shaft, which is journaled in suitable bearings mounted on the engine-frame. Connected to the crank-shaft is the pitman 2, whose rear end is connected to the piston 3, which works in the cylinder 4. The rear end of the cylinder is closed by a head 5, which is formed with the large central opening 6 for the passage of the rod 7, which is secured to the rear end of the piston and extends into the igniter-chamber 8, secured centrally to the rear side of the head 5, said rod operating the igniting devices therein. The opening 6 also permits the explosive mixture to pass freely into the cylinder. The igniter-chamber is provided at its bottom with an inlet-valve 9, which is held to its seat by a spring 10, which surrounds the projecting end of the valve-stem and whose pressure on the valve may be regulated by a nut 11. Below the valve 9 is a chamber 12, which is connected through a lateral passage with the casing 13, which contains the governor-valve and carbureting device.

The governor-valve casing is divided into two horizontal chambers, one above the other, the upper one of which is connected to the chamber 12, the lower one being connected to

the air-intake pipe 14. Mounted centrally in this valve-casing is a vertical cylindrical tube 15, which extends through both horizontal chambers in the casing, its upper end being closed by a cap-plate 16, which is bolted to the top of the valve-casing, its lower end extending through the bottom of the valve-casing and being closed by a cap 17. This cylinder fits very tightly in a central opening formed in the horizontal wall between the two chambers of the valve-casing, there being no communication between these chambers except through the cylinders. To put these chambers in communication with each other and with the cylinder, the cylinder is provided near the top of each of said chambers with an annular series of openings 18.

Sliding vertically in the cylinder 15 is a governor-valve 19, which is formed with an upper head 20 and with a lower head 21, both of which fit snugly in the cylinder, and a small central bar 22, which connects the two heads together. In the normal position of the valve the upper head is above the upper series of holes 18, the lower head remaining below the lower series of holes 18 at all times. The upper surface of the lower head inclines upward and inward to the bar 22, for a purpose which will be hereinafter described. Extending downward from the valve 19 and through the cap 17 is a valve-stem 23, which within the cylinder is surrounded by a spring 24, which normally holds the valve raised, as shown in Fig. 2. The top surface of the upper head is dished, and extending from the center of this dished portion downward is a small central channel 25, which at its lower end connects with a plurality of ports 26, which extend to the outer surface of the connecting-bar 22 far enough below the head 20 so that when the valve is in its extreme open position, as in Fig. 2, these outlet-ports will be below the upper series of holes 18. Just below the ports 26 the bar 22 is formed with an outward-extending downward-inclined annular flange 27, whose under surface is undercut, as shown in Fig. 2, for a purpose which will appear hereinafter.

Secured centrally in the cap 16 is a gasolene-pipe 28, whose lower outlet end is pointed and extended below the under surface of the cap 16 and is directly over the central verti-

cal channel in the valve. A needle-valve 29 regulates the flow of gasolene through this pipe, and a supply-pipe 30 is connected to the pipe 28 above the needle-valve. On the stem of the valve 29 is an indicator 31, which registers with a scale on the disk 32 to indicate the extent of the valve-opening.

Slidably mounted at diametrically opposite points in the balance-wheel, which is on the same side of the engine as the governor-valve, are two radial rods 33, the inner end of each rod being pivotally connected to the inner end of one arm of a pivoted angle-lever 34, the lever extending inward toward the shaft and having its end fitting loosely in a recess in the side of a sliding rod 35, which is parallel with the crank-shaft and extends through the hub of the balance-wheel to the inner side thereof. Connected to the inner ends of the rods 35 and surrounding the shaft 1 is a collar 36, which abuts against a similar collar 37, to which are pivoted the upper ends of the arms of a yoke formed on the upper end of an arm 38, (shown clearly in Fig. 3,) which is rigidly secured at its lower end to a horizontal rock-shaft 39, which is mounted in suitable bearings and is formed at its rear end with the inward-turned arm 40, which arm is connected to the depending valve-stem 23 of the governor-valve. Connected to the rock-shaft is an inward-extending arm 41, to the inner end of which is secured the lower end of a vertical tension-bar 42, whose upper end passes through a bracket 42^a and carries a tension-nut 42^c above the bracket. Between the bracket and the tension-nut is confined a spring 42^b, which tends to lift the bar 42, and thereby take the weight of the arm 40 from the valve and to regulate the speed of the engine. On the rods 33 are slidable weights 33^a, which are held in their adjusted positions by set-screws, and between these weights and the rim of the balance-wheel are springs 33^b, which are for an obvious purpose.

The igniter 44 is mounted in the igniter-casing and is operated by the rod 7. The exhaust-valve 45 is operated by the mechanism 46 at the proper time to exhaust the burned gases.

If desired, the interior of the cylinder 15 may be lined, as shown in Fig. 4, the upper head of the valve seating on the upper edge of the lining when the valve is closed.

Operation: Gasolene in the proper quantities drops from the end of the pipe 28 directly into the bore of the valve 19 and passes down out through the ports 28 and down to the edge of the flange 27. At this point the air which is drawn in through the lower series of openings 18 and up through the cylinder 15 meets the finely-divided gasolene as it drops off the lower edge of the flange and instantly vaporizes it. The vapor then passes out through the upper set of openings 18 into the upper chamber, and thence into the igniter-chamber and the rear end of the cylinder. The lower end of the pipe 28 is sharp-

ened or pointed and extended below the under side of the cap 16 to prevent, as far as possible, the gasolene from getting on the top and side of the cylinder. The under side of the flange 27 is cut out, as shown, to prevent the gasolene from getting on the bar 22 below the flange and to cause the gasolene to drop through the air in the cylinder and be thereby quickly vaporized. The upper surface of the lower head is inclined inward and upward, so that should any gasolene be unvaporized as it drops from the flange 27 it will be caught on this inclined surface and be subjected to the current of air as it flows in through the lower openings 18 and be thereby quickly vaporized. It will thus be seen that the cylinder 15 and the valve 19 form a vaporizing-chamber in which the gasolene is vaporized and mixed with the desired quantity of air, the heads of the valve forming, respectively, the top and the bottom of said chamber, and the upper part of the valve forming the conducting means by which the gasolene is brought into the vaporizing-chamber.

It will be observed that the centrifugal force acting on weights 33^a will cause the same to move radially outward and through the medium of levers 34, rods 35, collars 36 and 37, and lever 38 rock the shaft 39 inward, and thereby draw down the valve 19 against the action of its spring 24 and also the action of spring 42^b of the tension device. By increasing or decreasing the tension on spring 42^b it is evident that the speed of the engine may be increased or decreased, it being evident that the less tension there is upon the spring 42^b the less will be the speed required to rock the shaft 39 and close the governing-valve.

It will be observed that the area of the air-inlet openings 18 remains the same throughout the operation of the engine, notwithstanding the area of the mixture-inlet openings above is varied with the speed of the engine. The result of this is that when the mixture-inlets 18 are fully open there is more suction exerted upon the gasolene-feed with each intake than when the mixture-inlets are partly closed, whereby a greater quantity of the gasolene will be drawn into the mixture-chamber when the engine is most in need of it and a lesser quantity will be drawn in as the inlets are shut off, thereby insuring a mixture of the proper richness at all times.

What I claim is—

1. The combination, of a valve-casing provided with a vertical passage having an air-inlet near its lower end and a vapor-outlet near its upper end, a governor-valve therein formed with two heads connected by a reduced portion, one of said heads being normally above the vapor-outlet and the other below the air-inlet, means for delivering gasolene and air into the space between the heads, and means for depressing the valve and thereby regulating the speed of the engine.

2. In combination, a valve-casing provided with a vertical passage having an air-inlet

near its lower end and a vapor-outlet near its upper end, a valve in said passage formed with an upper head and a lower head connected together by a reduced portion, a gasoline-passage being formed through the upper head and extending from the top of the valve to the space between the heads, said upper head being normally above the vapor-outlet and the lower head being below the air-inlet, means for delivering gasoline to the gasoline-passage in the upper head, and means operated by the speed of the engine to depress the valve.

3. The combination, of a governor-valve casing formed with an upper chamber and a lower chamber, a tube extending through said chambers and closed at its ends and formed with air-inlets communicating with the lower chamber and with vapor-outlets communicating with the upper chamber, a reciprocating valve in said tube and formed with an upper head and a lower head connected together by a reduced portion, the upper head being normally above the vapor-outlets and having formed therein a small channel which opens into the space between the heads and extends to the top of the valve, the lower head being below the air-inlet, and means for permitting a flow of gasoline through the channel in the valve to the vaporizing-space between the valve-heads, and means operated by the speed of the engine to cause the valve to regulate the flow of vapor from the vaporizing-chamber.

4. In combination, a valve-casing provided with a vertical passage having an air-inlet near its lower end and a vapor-outlet near its upper end, a valve in said passage formed with an upper head which is normally above the vapor-outlet and a lower head below the air-inlet, these heads being connected by a central reduced portion, a central passage being formed in the valve and extending from the top of the valve to outlet-ports formed in the reduced portion below the vapor-outlet, a downward and outward inclined annular flange on the reduced portion below the gasoline-outlet ports formed therein, means for feeding gasoline to said passage, and means operated by the speed of the engine to reciprocate the valve.

5. In combination, a valve-casing, a vertical tube therein formed with a vapor-outlet near its upper end and an air-inlet near its lower end, a valve in said tube and formed with an upper head and a lower head connected together by a reduced portion, said

heads fitting the interior of the tube and the upper head being provided with a vertical passage which extends from the top of the valve to a point in the reduced portion below the vapor-outlet in the tube, the upper head being normally above the vapor-outlet and the lower head being below the air-inlet, means for delivering gasoline to the channel in the upper head, a depending stem on the valve, a rock-shaft provided with a lateral arm engaging said stem, an adjustable tension device connected to said shaft, and means operated by the speed of the engine to rock said shaft.

6. In combination, a valve-casing provided with a vertical passage having an air-inlet near its lower end and a vapor-outlet near its upper end, a valve in said passage and formed with an upper head which is normally above the vapor-outlet, and with a lower head below the air-inlet, a reduced portion connecting said heads together, a central passage being formed in the valve and extending from the top of the valve to outlet-ports formed in the reduced portion below the vapor-outlet, means for feeding gasoline to said passage, a rock-shaft formed with a lateral arm at one end engaging the valve and adapted to depress it, and with an upright arm at its other end, a reciprocating device adapted to engage the upper end of this latter arm, means carried by the balance-wheel and operated by the rotation thereof to move the reciprocating device.

7. In combination, a gas-engine cylinder, an igniting-chamber connected thereto, an inlet-valve, a valve-casing connected to the chamber of the inlet-valve and comprised essentially of two chambers, one leading to the inlet-valve chamber and the other being connected to the atmosphere, a tube connecting these two chambers and having an opening leading into each of the chambers, a valve in said tube having a head at one end normally held away from the opening leading into the chamber connected to the inlet-valve chamber, means for introducing gasoline into the tube between its openings, whereby said tube is converted into a mixing-chamber, and means whereby said valve is automatically adjusted by the speed of the engine to close the mixture-opening in the tube.

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