

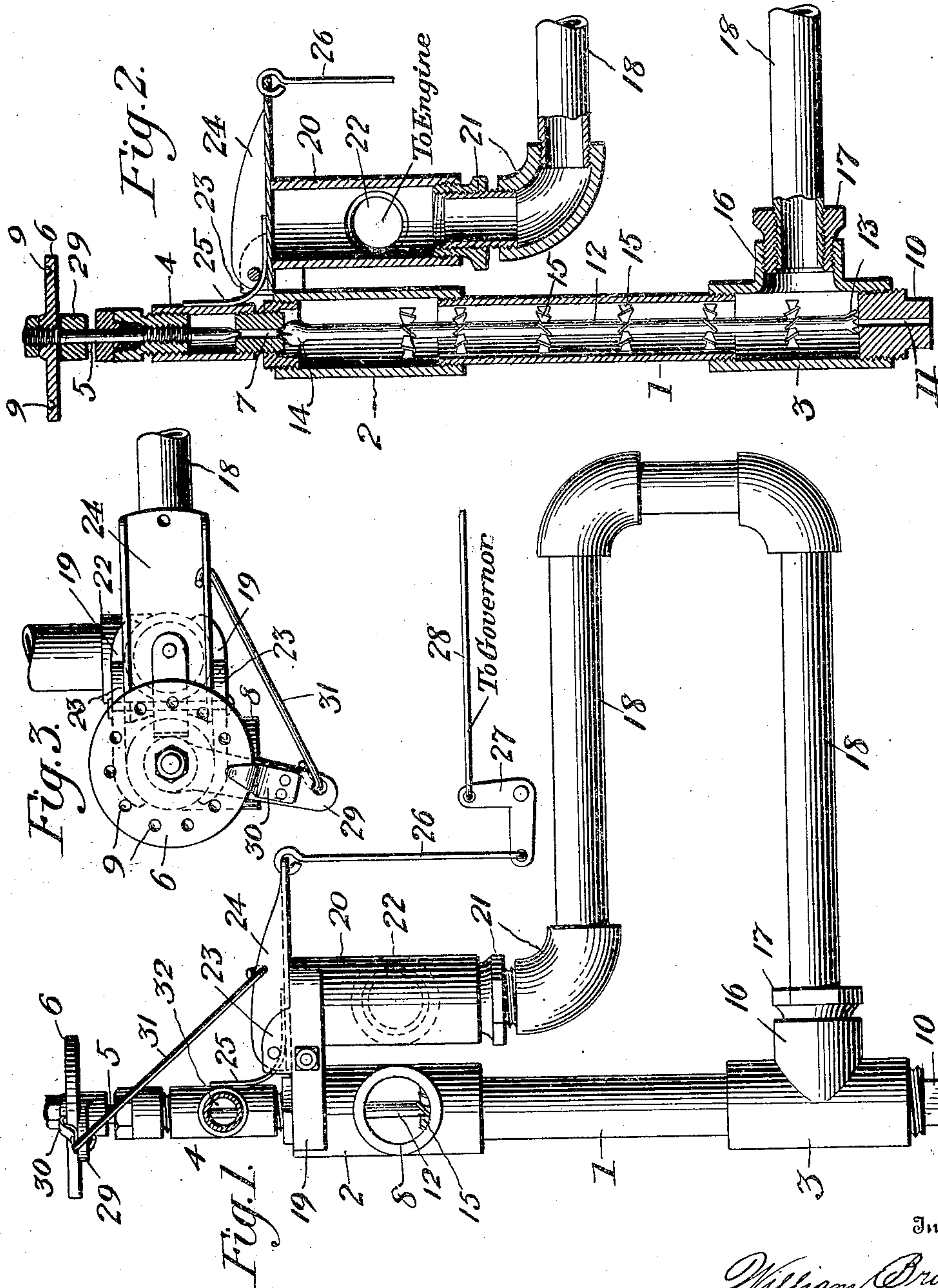
No. 876,519.

PATENTED JAN. 14, 1908.

W. BROTHERS.

CHARGE FORMING DEVICE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED SEPT. 11, 1906.



Inventor.

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Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM BROTHERS, OF CLY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO EDWARD W. SPANGLER, OF YORK, PENNSYLVANIA; MARY F. SPANGLER, THE SECURITY TITLE AND TRUST COMPANY, AND YORK TRUST COMPANY, EXECUTORS OF SAID EDWARD W. SPANGLER, DECEASED.

CHARGE-FORMING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

No. 876,519.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed September 11, 1906. Serial No. 334,115.

To all whom it may concern:

Be it known that I, WILLIAM BROTHERS, a citizen of the United States, residing at Cly, in the county of York and State of Pennsylvania, have invented a certain new and useful Improvement in Charge-Forming Devices for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

10 This invention relates to charge-forming devices for internal-combustion engines, wherein gasoline or other volatile or vaporizable fluids, are used as the vapor-producing element.

15 The object of the invention is to provide a charge-former for internal-combustion engines of simple and economical construction, and effective operation, and which is easily accessible for cleaning and repairing purposes.

20 In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation. Fig. 2 is a vertical section, with the vaporizing coil broken away. Fig. 3 is a top plan view, with the vaporizing coil broken away.

25 The mixing chamber comprises a tube 1, having a coupling 2 at its upper end, and preferably a T-coupling 3 at its lower end. Secured in the upper end of the coupling 2 in any suitable manner, is a valve 4, of any suitable construction, having its valve-stem 5, projecting beyond the valve casing and provided with the hand-wheel 6. As shown in Fig. 2, the outlet port 7 of the valve 4, opens into the mixing chamber, and is arranged substantially in line with the longitudinal axis of said chamber. The opening 40 8 of the coupling 2 constitutes the air inlet for the mixing chamber. The hand-wheel 6 of the valve-stem 5 is provided with a series of notches or indentations 9.

45 10 is a plug screwthreaded into the bottom of the mixing chamber, and provided with a central bore or opening 11.

Longitudinally arranged within the mixing chamber is the mixing core, comprising in its preferred form, a rod or bar 12 of metal 50 or other suitable material, having its lower end provided with a serrated foot 13 supported upon the plug 10 and arranged above the opening 11 thereof so as not to close said

opening. The upper end of the core rod 12 is constructed as a grooved head 14, slightly 55 tapered, and adapted to fit or seat into the outlet port 7 of the valve 4. Between its ends, and commencing just below the air-inlet opening 8, the mixing core or rod 12 is provided with a series of sets of stationary 60 baffles 15, arranged at suitable distances apart, equal or unequal, and preferably constructed as inclined fan-shaped blades, radiating from the core, the blades of each successive set being inclined reversely. 65

The open stem 16 of the T-coupling 3 constitutes the outlet for the mixing chamber, and suitably connected with this outlet, as by a coupling nut 17, is one end of a coil 18, of suitable length and any desired number of 70 sections. The other end of this coil terminates at a point adjacent to the upper end of the mixing chamber, and preferably supported by a clamping member 19 engaging the upper ends of said coil and the mixing 75 chamber, see Figs. 1 and 3.

As herein shown, the upper end of the coil is provided with a fitting 20 constituting a charge modifying or diluting chamber, and having its lower end suitably connected with 80 the terminal of the coil section, as by an elbow and coupling 21. The upper end of said chamber 20 is left open, and said chamber has a lateral charge outlet 22, which outlet is adapted to be connected with the combustion chamber of an engine in any suitable manner. 85

As herein shown, the clamping member 19 is provided with ears 23, in which is pivoted a cover or lid 24, adapted to close the open 90 upper end of the charge modifying or diluting chamber 20. The cover or lid 24 is preferably held to its seat by a spring 25, or said cover or lid may be weighted for this purpose. The outer end of the cover or lid 24 95 is adapted to be connected in any suitable manner with the governor of an engine, whereby said cover or lid may be raised from its seat, and I have herein shown a link 26, connected with the cover and with one arm 100 of a bell-crank 27, the other arm of said bell-crank being connected with the governor rod 28, see Fig. 1.

Loosely mounted upon the valve stem 5, between the hand-wheel 6 and the valve 105 casing, is an arm 29 projecting beyond the

outer edge of the hand-wheel, and secured upon said arm 29 and overhanging the hand-wheel 6, is a spring-finger 30, the end of which is adapted to engage one or the other of the notches or indentations 9 of said hand-wheel, whereby said arm 29 and the hand-wheel 6 are frictionally locked together. A link 31 is connected with the arm 29 at its outer end, and extends to and is connected with the lid or cover 24, about centrally between its pivot and outer end, whereby the lid and said arm are simultaneously moved in the operation of the device.

Gasolene or other suitable vaporizable fluid is fed to the valve 4, from a suitable tank or other supply, through an opening 32 in its casing, see Fig. 1.

It is obvious that the parts of the device as thus constructed are easily separable for the purpose of cleaning when foul and also for the purpose of repairing or renewing the parts.

The operation of the device is as follows:—

The device being connected with the engine as stated, at the opening 22, and the valve 4 set for supplying the desired quantity of gasolene or other fluid, the engine is started in the usual manner. Upon opening the valve 4, previous to the starting of the engine, the gasolene or other fluid passes through the outlet 7 of the valve and coming in contact with the end 14 of the mixing core 12, finds its way through the several grooves or passages therein, and being thus initially separated or divided gravitates down said core and spreads thereabout in a fine film, and as it approaches the air inlet 8 of the mixing chamber, the suction stroke of the engine causes a rush of air into said inlet and about said core, and the air thus drawn in absorbs the film of gasolene from the core, thoroughly cleaning the core of the gasolene, and thus preparing the core for the next succeeding charge of gasolene to be received and spread thereon ready for the next suction stroke of the engine. The mixture of air and partly vaporized fluid thus produced, is carried through the mixing chamber and in contact with the series of baffles and is thoroughly commingled. The mixture then passes into the coil 18 and is retained therein during the working stroke of the engine, and in its passage through and retention in said coil becomes thoroughly vaporized and passes thence into the combustion chamber of the engine, through its valve. By this construction and operation the gasolene or other volatile or vaporizable fluid and air are thoroughly mixed in passing through the mixing chamber, and the fluid partly vaporized and during retention in and passage through the coil the partly vaporized fluid becomes thoroughly vaporized and expanded, and produces a charge which is very effective in operation.

The valve 4 is normally open when the engine is running and may be set to deliver the desired quantity of gasolene according to the capacity of the engine, by turning the valve by hand and maintaining the valve in such position by placing the spring-finger 30 in one or the other of the notches or indentations 9 of the hand-wheel 6. When the apparatus is set to suit the working capacity of the engine, and should the engine exceed its predetermined speed, the governor of the engine will be brought into operation, and pulling upon rod 28, will lift or raise the cover or lid 24 and thus admit air into the diluting chamber, and thus the charge will be modified or diluted before entering the engine. Simultaneously with the movement of the cover or lid 24, the link 31 acts to turn the arm 29 and through the spring connection with the hand-wheel 6 of the valve, will turn the valve to modify or shut off the supply of fluid to the mixing chamber. Thus it will be seen that the engine may be automatically controlled and maintained at a regular rate of speed according to the work required of it. By the described control of air and fluid, the engine will not run against atmospheric pressure. Any accumulation or excess of fluid in the mixing chamber will be drained off through the passage 11 in the plug 10 in the bottom of the mixing chamber. The valve 4 may be closed by hand to shut off the supply of oil when the engine is stopped.

As already indicated, the fluid may be gasolene, petroleum oil, alcohol or other highly explosive fluids.

I wish to be understood as not limiting my invention to the exact details of construction herein shown and described, since it is obvious that the construction may be varied in many particulars and still be within the scope and principle of the invention.

What I claim is:—

1. A charge-forming device for internal combustion engines, comprising a mixing chamber, and a normally open fluid supply and a continuously open air supply therefor, combined with a stationary mixing core arranged in said mixing chamber and having its upper end arranged opposite the air inlet and seated against the fluid supply, whereby the fluid is directed onto said core and spread into a film thereon adjacent said air inlet.

2. A charge-forming device for internal combustion engines, comprising a mixing chamber, and a normally open fluid supply and a continuously open air supply therefor, combined with a stationary mixing core arranged in said mixing chamber and having its upper end arranged opposite the air inlet and seated against the fluid supply, whereby the fluid is directed onto said core and spread into a film thereon adjacent said air inlet, and a series of baffles rigidly secured to said core below said air inlet.

3. A charge-forming device for internal combustion engines, comprising a mixing chamber, and a normally open fluid supply and a continuously open air supply therefor, 5 combined with a stationary mixing core arranged in said mixing chamber and having its upper end arranged opposite the air inlet and seated against the fluid supply, whereby the fluid is directed onto said core and spread 10 into a film thereon adjacent said air inlet, and a series of stationary baffle blades on said core below said air inlet.

4. A charge-forming device for internal combustion engines, comprising a mixing 15 chamber, and a normally open fluid supply and a continuously open air supply therefor, combined with a stationary mixing core arranged in said mixing chamber and having its upper end arranged opposite the air inlet and seated against the fluid supply, whereby the fluid is directed onto said core and spread 20 into a film thereon adjacent said air inlet, and a series of stationary reversely arranged baffle blades on said core below said air inlet.

5. A charge-forming device for internal combustion engines, comprising a mixing 25 chamber, a fluid supply and an air supply therefor at its upper end, a drainage opening in the bottom of said chamber, a mixing core arranged in said chamber and having a serrated foot for supporting said core above said drainage opening and having a slightly tapered and grooved upper end seated against said fluid supply, whereby the fluid is direct- 30 ed onto said core and spread into a film thereon opposite said air supply, and a series of baffles secured to said core below the air supply.

6. A charge-forming device for internal 40 combustion engines, comprising a mixing chamber, a normally open fluid supply and a continuously open air supply therefor at its upper end, and an outlet at the lower end of said mixing chamber, a stationary mixing 45 core arranged in said mixing chamber between the supply and outlet openings, combined with a vaporizing coil connected with said outlet and communicating directly with the engine.

50 7. A charge-forming device for internal combustion engines, comprising a mixing chamber, a normally open fluid supply and a continuously open air supply therefor at its upper end, and an outlet at the lower end 55 of said mixing chamber, a stationary mix-

ing core arranged in said mixing chamber between the supply and outlet openings, combined with a vaporizing coil connected with said outlet and terminating in a charge diluting chamber and communicating directly 60 with the engine, and a lid or cover for said charge diluting chamber for controlling the supply of air thereto.

8. A charge-forming device for internal combustion engines, comprising a mixing 65 chamber, a fluid supply therefor, a valve for regulating the supply of fluid, an air supply for said chamber, a mixing core arranged in said mixing chamber, an outlet for said mixing chamber, a vaporizing coil connected 70 with said outlet and terminating in a charge diluting chamber, means for connecting said coil with an engine, an air inlet for said charge diluting chamber, a lid or cover for said charge diluting chamber air inlet, con- 75 nections between said lid or cover and said fluid supply valve and engine governor, for simultaneously controlling the supply of fluid to the mixing chamber and the supply of air to the charge diluting chamber. 80

9. A charge-forming device for internal combustion engines, comprising a mixing chamber, a fluid supply therefor, a valve for said fluid supply having a notched hand- 85 wheel, an air supply for said mixing chamber, a mixing core arranged in said mixing chamber, an outlet for said mixing chamber, a vaporizing coil connected with said outlet and terminating in a charge diluting chamber, means for connecting said coil with an 90 engine, an air inlet for said charge diluting chamber, a lid or cover for said inlet, an arm loosely mounted on the stem of said fluid supply valve and provided with a spring-finger adapted to engage one or the other of 95 the notches in said hand-wheel, a link connection between said lid or cover and said arm, and a governor connection, whereby said lid or cover and valve may be simulta- 100 neously operated to control the supply of air to said charge diluting chamber and the supply of fluid to the mixing chamber.

In testimony whereof I have hereunto set my hand this 8th day of September A. D. 1906.

WILLIAM BROTHERS.

Witnesses:

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