

No. 680,115.

Patented Aug. 6, 1901.

C. H. BLOMSTROM.

VAPORIZER FOR INTERNAL COMBUSTION ENGINES.

(Application filed Mar. 23, 1901.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

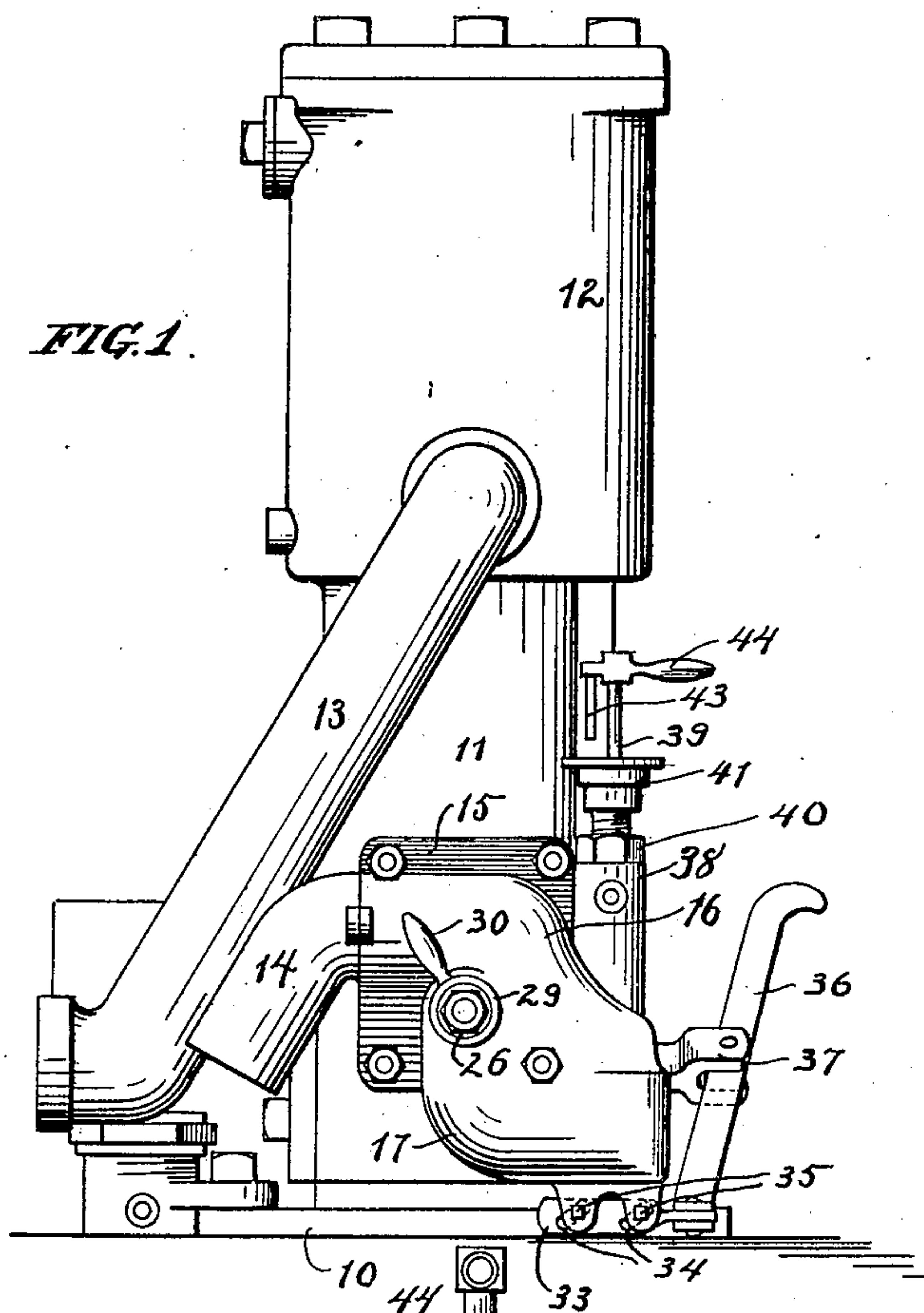
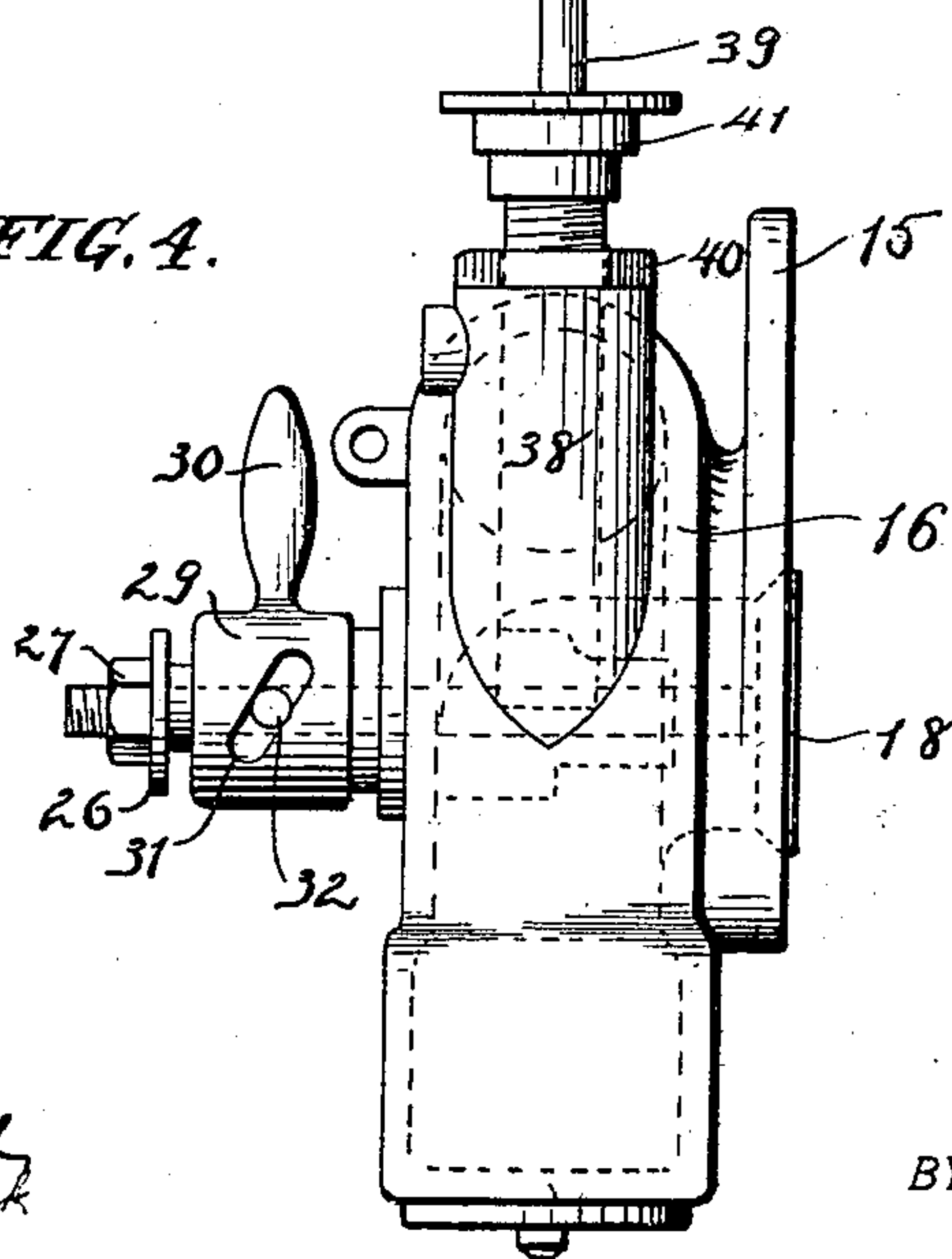


FIG. 4.



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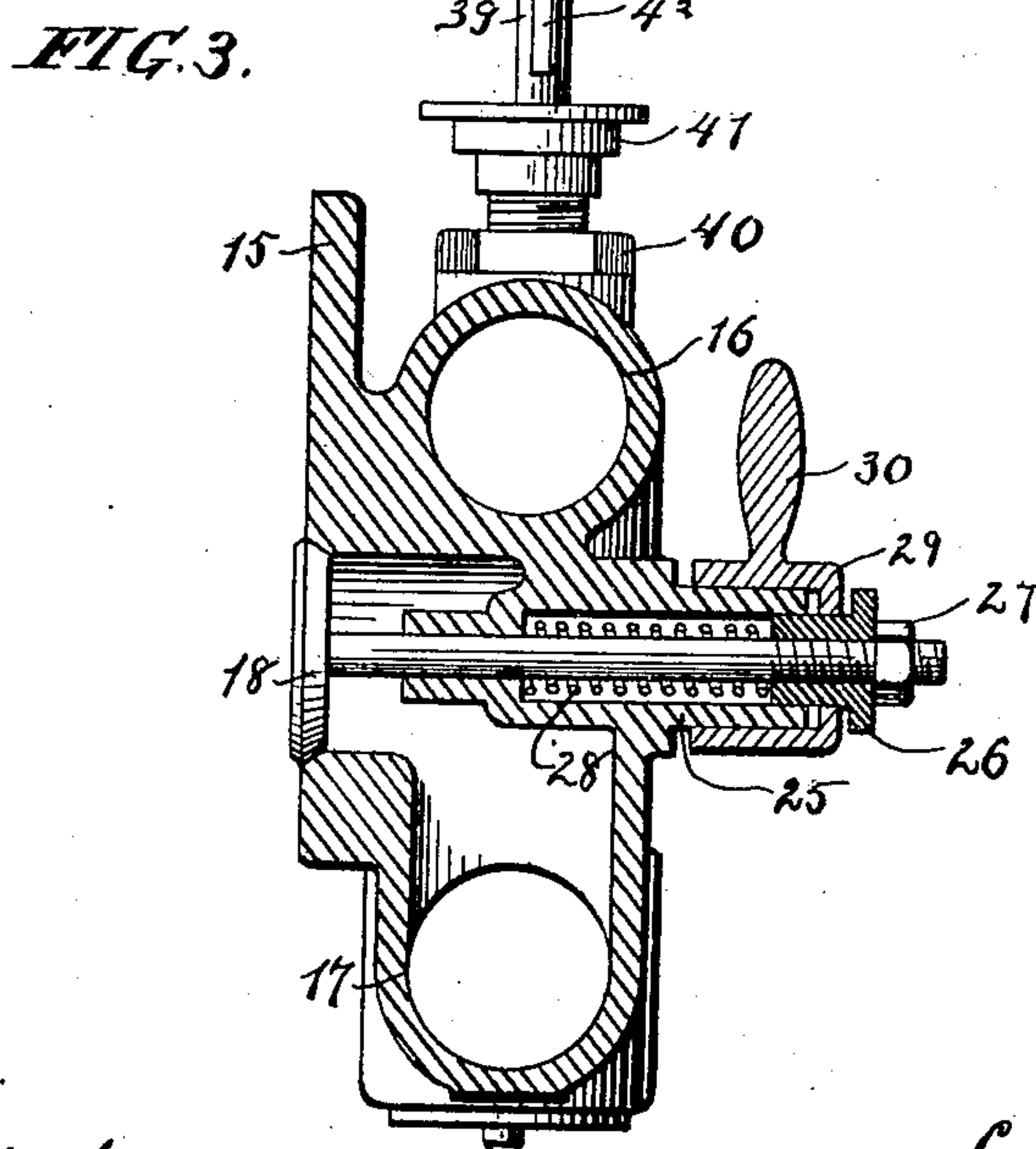
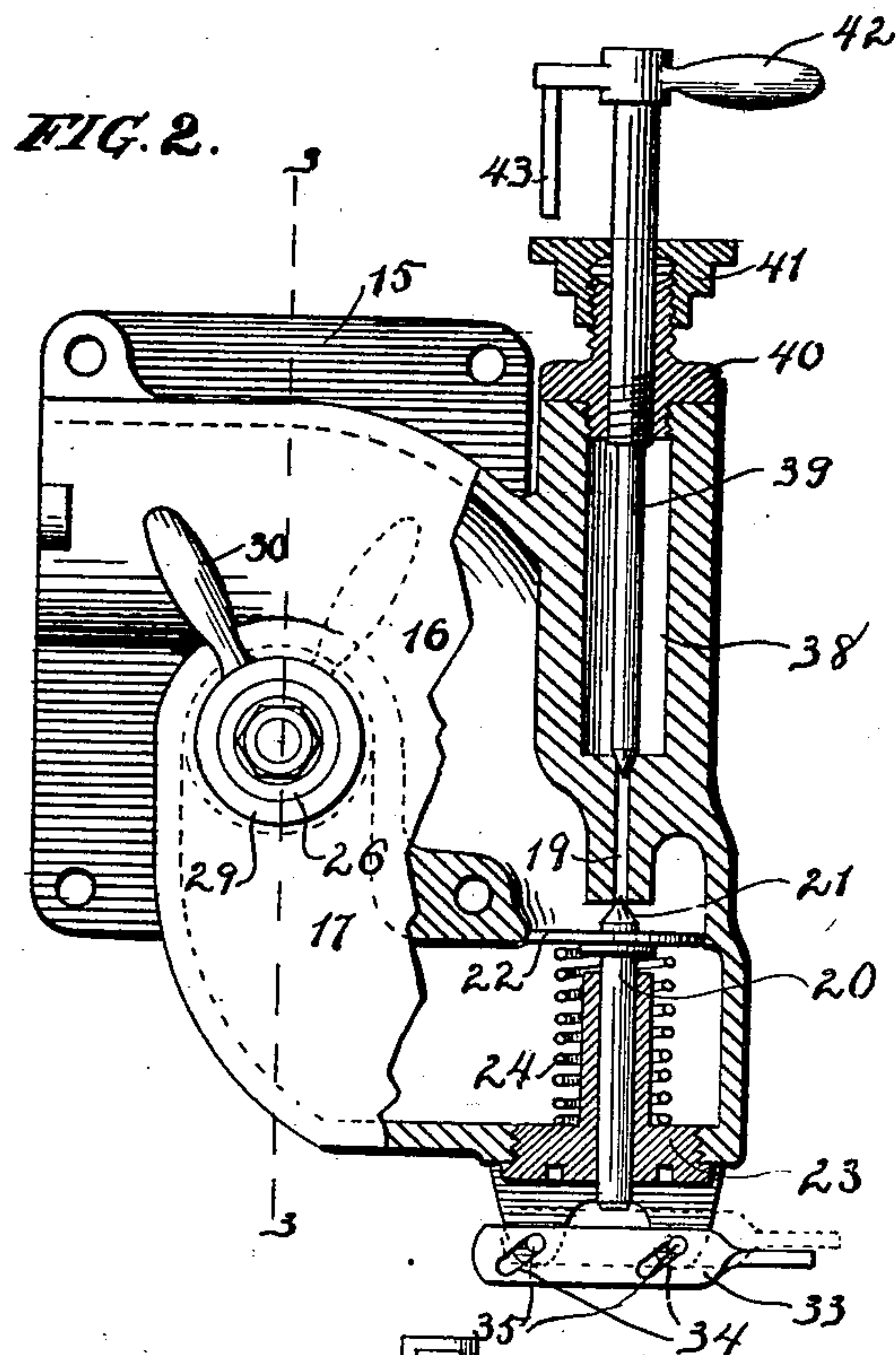
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2 Sheets--Sheet 2.



WITNESSES:
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UNITED STATES PATENT OFFICE.

CARL H. BLOMSTROM, OF MARQUETTE, MICHIGAN, ASSIGNOR TO LAKE SHORE ENGINE WORKS, OF SAME PLACE.

VAPORIZER FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 680,115, dated August 6, 1901.

Original application filed November 8, 1898, Serial No. 695,912. Divided and this application filed March 23, 1901. Serial No. 52,606. (No model.)

To all whom it may concern:

Be it known that I, CARL H. BLOMSTROM, a citizen of the United States, residing at Marquette, county of Marquette, State of Michigan, have invented certain new and useful Improvements in Vaporizers for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

The subject-matter of this invention was originally disclosed in an application filed by me on November 8, 1898, Serial No. 695,912, and of which the present application is a division.

The object of the invention is to provide an automatically-operating vaporizing device of simple and efficient construction whereby the liquid fuel may be vaporized and thoroughly mixed with the ingoing charge of air by the suction produced by the piston on the engine.

The invention consists in the features set forth in the following description, disclosed in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view in vertical elevation of an engine provided with my improved vaporizer. Fig. 2 is a view in elevation of the vaporizer detached, parts being shown in section. Fig. 3 is a view in vertical section taken on the line 3 3 of Fig. 2. Fig. 4 is an end view in elevation of the vaporizer.

The vaporizer is shown as applied to a form of two-cycle upright explosive-engine, such as is commonly used for marine purposes. In this form of engine the charge is first drawn into the crank-chamber by the suction of the piston and then forced into the cylinder. It will, however, be understood that the vaporizer may be applied to any form of internal-combustion engine in which the charge is drawn in by the suction of the piston.

The engine is mounted upon a suitable base-plate 10, upon which is carried the inclosed crank-casing 11 and the upright cylinder 12. The cylinder 12 is provided with a suitable inclined exhaust-passage 13, to the lower end and at one side of which is mount-

ed an inlet-passage 14, leading to the vaporizer, as indicated in Fig. 1. This passage 14 is preferably cast in piece with the exhaust-pipe 13, so that the charge of air may be readily heated on its way to the vaporizer by conduction. The vaporizer is mounted upon a suitable plate 15, cast in piece therewith, by which it is bolted to the crank-casing. The vaporizer consists of a passage formed by two elbow-sections 16 and 17, cast in piece with the plate 15, arranged in planes at right angles to each other and connected at their lower ends. The elbow-section 16 is downwardly extending and communicates at its outer end with the air-heating pipe 14. The elbow-section 17 is upwardly extending and opens at its upper end into the crank-casing, where it is provided with an automatically-operating suction-valve 18, having a conical seat. Tangentially arranged at the lower end of the elbow-section 16 is a downwardly-extending liquid-fuel inlet or nozzle 19. Beneath the oil-inlet 19 is located a downwardly-movable auxiliary suction-valve 20, provided at its upper end with a conical portion 21, normally seated within the oil-inlet, whereby the latter is controlled. The valve 20 is also provided immediately below the conical portion 21 with a disk 22. This disk is provided with a cylindrical face and fitted within a cylindrical seat formed at the lower end of elbow-section 16, so as to freely slide therein to permit the conical portion 21 to snugly fit within its seat at the oil-inlet, but so, also, as to entirely obstruct the charge-inlet passage. The stem of valve 20 extends through a suitable guide 23, threaded into the body of the vaporizer, and exteriorly projects to a slight extent. A coiled spring 24 serves to hold the auxiliary valve 20 to its seat.

As will be readily understood, when a vacuum is developed within the crank-chamber of the engine (or if the vaporizer is applied to a four-cycle engine within the cylinder) the main valve 18 and the auxiliary valve 20 will be operated, a supply of oil will impinge against and flow over the disk 22, and a charge of air will be drawn through the heating-pipe 14 and the downwardly-extend-

ing elbow-section 16 and will impinge against the disk 22, readily breaking up and vaporizing the oil which has flowed over such disk and carrying it along through the upwardly-extending elbow-section 17 into the crank chamber or cylinder of the engine. I consider the arrangement of the downwardly-extending elbow-passage 16, the tangentially-arranged oil-inlet, and the downwardly-opening valve 20, provided with the conical portion 21 and the disk 22, of especial advantage, not only because by this means the oil-inlet valve is conveniently operated by the ingoing charge of air, but because the disk 22 serves as an abutment against which the oil may strike and also over which the oil may flow and be readily picked up by the downwardly-projected charge of air impinged against and passing over such disk.

In order to conveniently regulate the suction developed within the vaporizer, means are provided for regulating the throw or extent of opening of the main suction-valve 18. The stem of this valve passes through a suitable guiding-sleeve 25, cast in the body of the vaporizer, which is recessed to form an annular chamber about the valve-stem. The outer end of the valve-stem is guided within this chamber by means of a flanged guide and stop-nut 26, which is adjustably threaded upon the valve-stem and held in place by a lock-nut 27. The valve 18 is held to its seat by a coiled spring 28, which is contained within the chamber of guide-sleeve 25 and which bears against the guide-nut 26. Upon the end of the guide-sleeve 25 is mounted a rotatably-adjustable nut 29, provided with an inwardly-turned flange for engaging the flange of stop-nut 26. The nut 29 is also provided with a suitable handle 30 and with a diagonal slot 31, within which projects a pin 32, fastened into the guide-sleeve 25. By adjusting manually or automatically the position of the nut 29 the throw or extent of opening of the valve 18 may be conveniently regulated, and thereby regulating the amount of suction within the vaporizer. The throw of the auxiliary valve 20 is also regulated by means of a sliding piece 33, provided with diagonal slots 34, within which slots project pins 35, secured to the body of the vaporizer. The piece 33 is located directly beneath the stem of valve 20, and as it is shifted moves nearer to or farther away from the end of the valve-stem and so affording a convenient means for regulating the throw or extent of opening of this valve. Means are provided for shifting the piece 33, consisting of a lever 36, pivoted intermediate its ends to a forked lug 37 on the engine-frame. The lever 36 may be manually or automatically shifted, as desired.

Immediately above an oil inlet or nozzle 19 is provided a vertical oil-well 38, cast in the body of the vaporizer. Through this well extends the downwardly-projecting needle-valve 39, as clearly indicated in Fig. 2, which

serves to regulate the oil-inlet. The upper end of the well 38 is closed by a stuffing-box, consisting of the nut 40, screw-threaded into the top of the well and through which the needle-valve 39 is adjustably threaded. A second nut 41 is threaded upon the upper end of the nut 40, and between the nuts 40 and 41 the packing for the valve-stem is conveniently located. This vertical oil-well 38 serves to retain above the oil-inlet a certain amount of fuel-supply, so that a charge will be supplied under all circumstances to the vaporizer when the valve 20 is operated by the suction of the engine. This has been found particularly desirable in marine engines for small boats, in which the pitch of the craft as it passes over a sea frequently disturbs the flow of oil to the vaporizer from the tank located in the bow.

The needle-valve 39 is provided with a handle 42 and an indicating-pointer 43, which latter coöperates with a suitable scale upon the upper surface of the nut 41.

It is obvious that the details may be varied by the skill of the mechanic without departing from the essentials of the invention.

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

1. In a vaporizer for explosive-engines, the combination with a vaporizing-passage provided with air and liquid fuel inlets, of an automatically-operating, suction-valve at the inner end of said passage, an adjustable flange on the stem of said valve, a coil-spring intermediate said flange and the valve-casing, and a normally fixed rotatably-adjustable nut for engaging said flange, whereby the throw and suction of said valve may be regulated.

2. In vaporizers for explosive-engines, the combination with an inlet-passage comprising downwardly and upwardly extending elbow-sections arranged at right angles and connected to each other at their lower ends; an automatically-operating suction-valve at the inner end of said upwardly-extending elbow-section, a tangentially-arranged oil-inlet at the lower end of said downwardly-extending elbow-section, and an auxiliary downwardly-movable suction-valve at the junction of said elbow-sections, comprising a disk portion for obstructing said passage, and a conical upper end portion above said disk for controlling said oil-inlet.

3. In vaporizers for explosive-engines, the combination with an inlet-passage comprising downwardly and upwardly extending elbow-sections connected to each other at their lower ends, an automatically-operating suction-valve at the inner end of said upwardly-extending elbow-section, a tangentially-arranged oil-inlet at the lower end of said downwardly-extending elbow-section, an auxiliary, downwardly-movable suction-valve at the junction of said elbow-sections comprising a disk portion for obstructing said pas-

sage and a conical upper end portion for controlling said oil-inlet, the stems of said valves being projected through the walls of said vaporizer and adjustable stops for engaging the ends of said valve-stems to regulate the throw of each of said valves.

4. In vaporizers for explosive-engines, the combination with an inlet-passage comprising downwardly and upwardly extending elbow-sections arranged at right angles and connected to each other at their lower ends, said elbow-sections being cast in piece with a face-plate by which it is secured in position to the engine-cylinder, a main suction-valve at the inner end of said upwardly-extending elbow-

section, an oil-inlet at the lower end of said downwardly-extending section, an auxiliary suction-valve at the junction of said elbow-sections provided with means for controlling said oil-inlet, an oil-well cast in piece with the downwardly-extending elbow-section and arranged above said oil-inlet, a stuffing-box closing the upper end of said well and a needle-valve adjustably threaded through said stuffing-box and extending through said well to regulate said oil-inlet.

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Witnesses:

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WILLIAM URICH.